BARGHAUSEN

PRELIMINARY STORMWATER REPORT

Cooper Ridge
19785 137th Street Southeast
Monroe, WA 98272

RECEIVED
06/28/2021
CITY OF MONROE

City File No.

Prepared for:
Prospect Development, LLC
2913 5th Avenue Northeast, Suite 201
Puyallup, WA 98372

6/09/21

June 9, 2021

Our Job No. 21609

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425-251-6222 F) 425-251-8782
BRANCH OFFICES: TUMWATER, WA KLAMATH FALLS, OR LONG BEACH, CA ROSEVILLE, CA SAN DIEGO, CA
barghausen.com

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Tab 1.0

1.0 EXECUTIVE SUMMARY

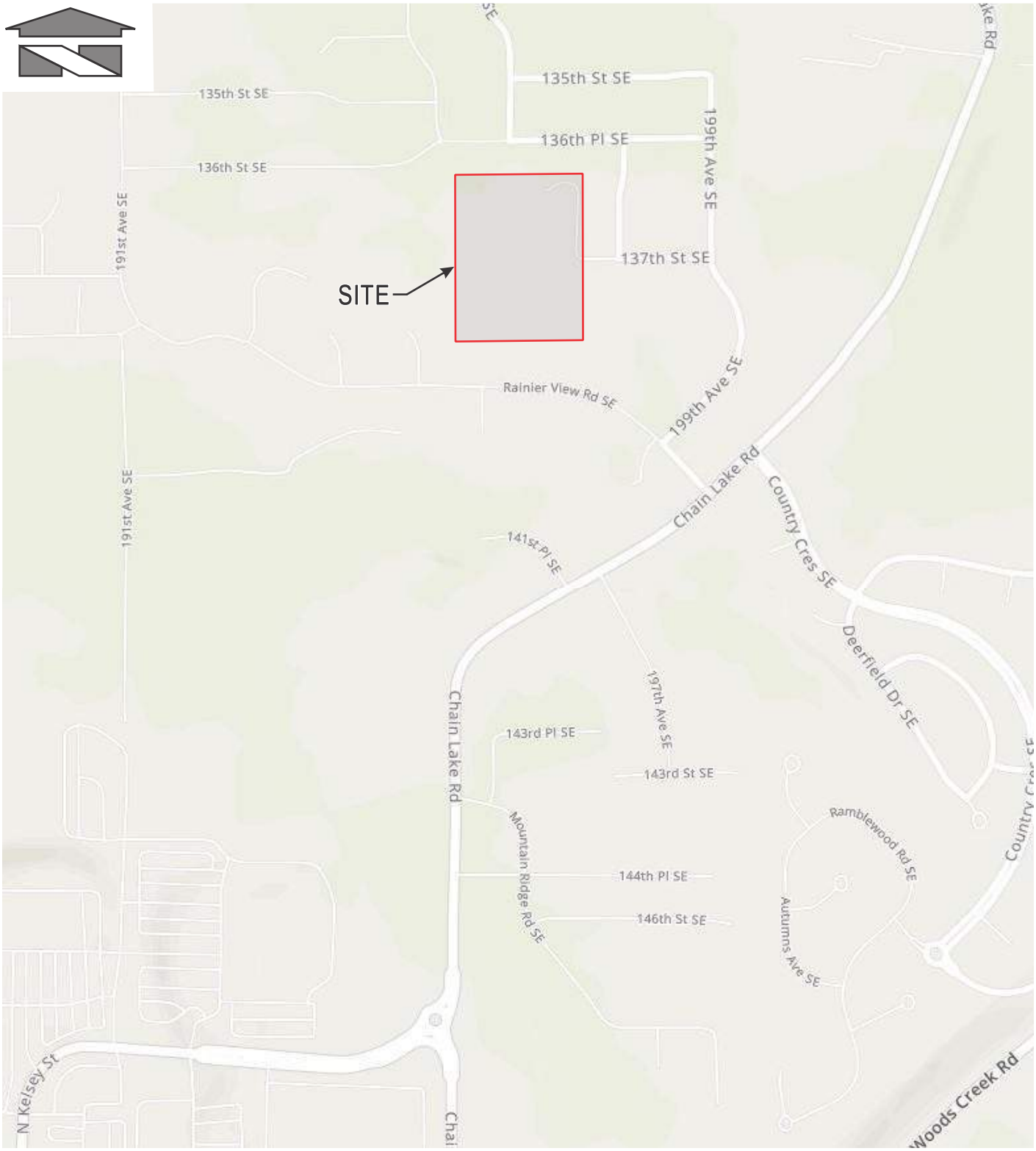
The Cooper Ridge preliminary plat is proposed on one existing tax parcel (#28073100203800) that is located at 19785 137th Street Southeast in the City of Monroe, Washington. The site is also located within a portion of the Northwest Quarter of Section 31, Township 28 North, Range 07 East. Refer to the Vicinity Map within this section for a depiction of the project site.

The existing parcel is rectangular in shape and totals 8.35 acres. The site contains one single-family residence with multiple sheds, a gravel driveway and gravel parking areas. The site is bound by single family parcels on all sides except for a portion of the west site border that is neighbored by an undeveloped parcel.

Site soils primarily consist of Tokul gravelly medial loam with conditions observed at test pit locations generally described as silt sand with gravel and silty gravel with sand. The parcel contains mostly pasture aside from a line of trees at the eastern and southern borders, and vegetation around the existing single-family residence. Elevation ranges from approximately 257 near the southwest corner of site to 340 in the northeast portion of site. The site has one threshold discharge area that drains southwest.

The project will subdivide the parcel into 33 single family lots, a public road, and an open space tract. The single-family lots will be accessed from a public road with a 52-foot Right-of-Way that will be constructed in accordance with City of Monroe design standards. The project will be complete with water and sewer extensions from City of Monroe Public Works, stormwater controls, retaining walls, landscaping, and recreation space.

The stormwater facilities are designed pursuant to the 2014 Department of Ecology Stormwater Management Manual for Western Washington (SMMWW). The stormwater standards require Standard Flow Control and Basic Water Quality. To meet the City of Monroe's stormwater requirements, the project will utilize Perforated Stub-Outs and a combined stormwater detention and water quality wet vault in addition to post construction soil amendments as required by BMP T5.13.



REFERENCE: MapQuest (2021)

Scale:
Horizontal: **N.T.S.** Vertical: **N/A**

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For:
Cooper Ridge
Monroe, Washington

Title:
VICINITY MAP

Job Number
21609

DATE: 5/21/21

P:\21000s\21609\exhibit\graphics\21609 vmap.cdr

REFERENCE: Snohomish County Department of Assessments (Nov. 2020)

Scale: Horizontal: **N.T.S.** Vertical: **N/A**	For: Cooper Ridge, Monroe, Washington	Job Number 21609
Barghausen Consulting Engineers, Inc. 18215 72nd Avenue South, Kent, WA 98032, 425.251.6222, barghausen.com	Title: ASSESSOR MAP	DATE: 5/21/21

P:\21000s\21609\exhibit\graphics\21609 amap.cdr

REFERENCE: Federal Emergency Management Agency (Portion of Map 53061C1377F, June 2020)

Scale:
Horizontal: **N.T.S.** Vertical: **N/A**

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For:
Cooper Ridge
Monroe, Washington

Title:
FEMA MAP

Job Number
21609

DATE: 5/21/21

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REFERENCE: USDA, Natural Resources Conservation Service

LEGEND:	HSG
72 = Tokul gravelly medial loam, 0-8% slopes	A

Scale:
Horizontal: **N.T.S.** Vertical: **N/A**

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Monroe, Washington

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Title:
SOIL SURVEY MAP

DATE: 5/21/21

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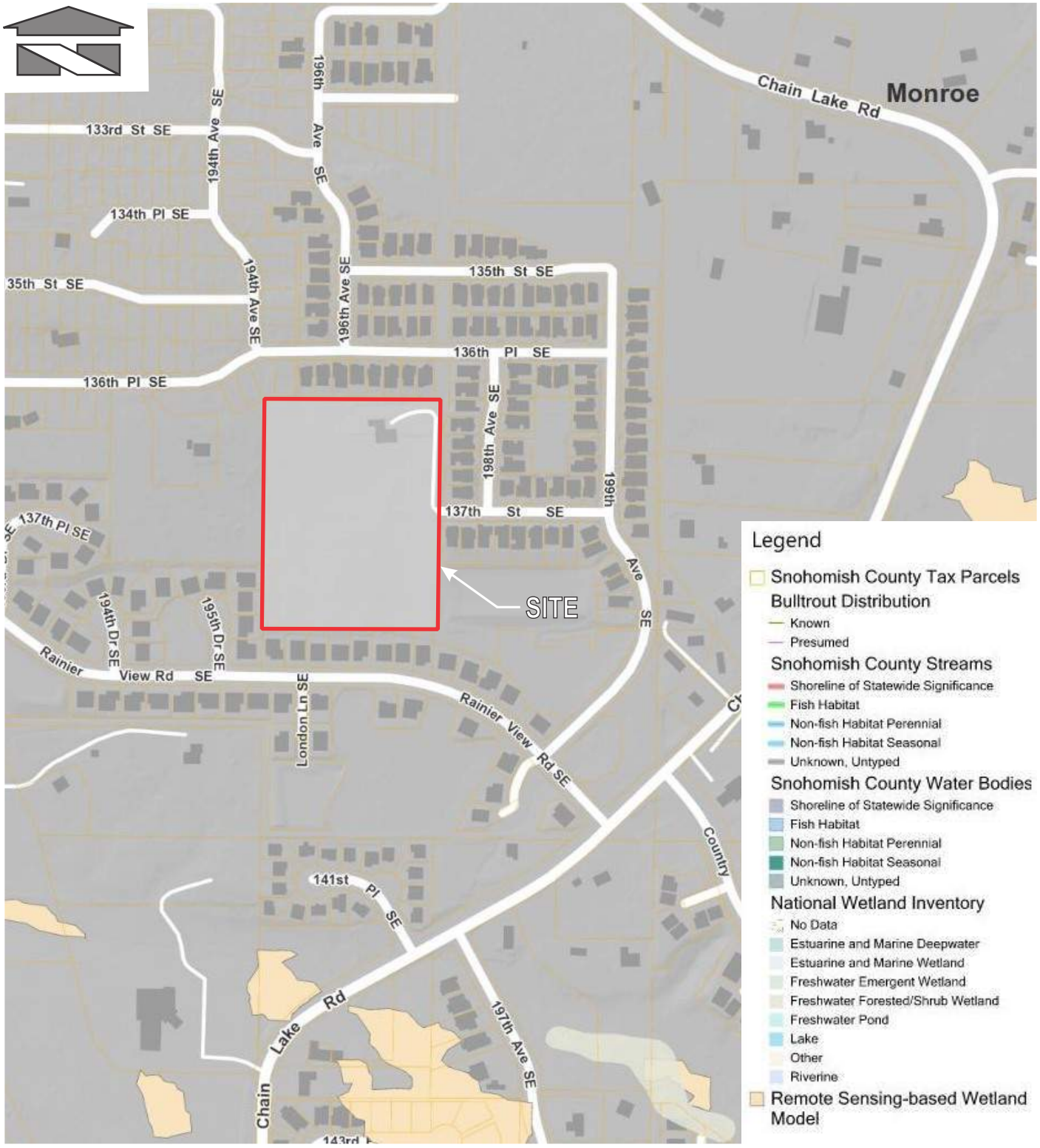

REFERENCE: Snohomish County PDS Map Portal (2021)

Scale:
Horizontal: **N.T.S.** Vertical: **N/A**

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For:
Cooper Ridge
Monroe, Washington

Title:
SENSITIVE AREAS MAP

Job Number
21609

DATE: 5/21/21

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Tab 2.0

2.0 CONDITIONS AND REQUIREMENTS SUMMARY

The project is classified as new development according to the SMMWW where all Minimum Requirements (MRs 1-9) apply to all new and replaced impervious surfaces and converted vegetation areas.

2.1 Analysis of the Minimum Requirements

Minimum Requirement No. 1: Preparation of Stormwater Site Plans

Response: This report presents the hydrologic analysis and calculations that justify the stormwater plan. Please also refer to the preliminary drainage plan.

Minimum Requirement No. 2: Stormwater Pollution Prevention Plans (SWPPPs)

Response: A will be prepared and included with the construction documents. All 13 SWPPP elements will be addressed.

Minimum Requirement No. 3: Source Control of Pollution

Response: Operational and Structural Source Control BMPs will be incorporated to the fullest extent possible. All runoff from the pollution generating impervious surfaces will be routed to stormwater detention and water quality facilities prior to discharging from the site.

Minimum Requirement No. 4: Preservation of Natural Drainage Systems and Outfalls

Response: Runoff will be released from the onsite stormwater vault to the existing stormwater system in. From the existing stormwater system in Rainier View Road Southeast, stormwater will flow to an existing public stormwater pond located to the south of the road. Outflow from this pond is conveyed to the south, maintaining the ultimate natural discharge location of the site's stormwater runoff.

Minimum Requirement No. 5: Onsite Stormwater Management

Response: Stormwater BMPs will be utilized at the site to the maximum extent feasible. All stormwater runoff will be treated and detained onsite without causing erosion or flooding impacts.

Minimum Requirement No. 6: Runoff Treatment

Response: Basic Water Quality Treatment will be accommodated within the proposed stormwater wet vault.

Minimum Requirement No. 7: Flow Control

Response: Since infiltration of stormwater is not feasible, flow control will be achieved by detaining stormwater runoff in a proposed stormwater vault and then controlling discharge through an outlet structure. All stormwater discharges will

match the pre-developed durations from 50 percent of the 2-year peak flow up to the full 50-year peak flow.

Minimum Requirement No. 8: Wetlands Protection

Response: There are no onsite wetlands, or adjacent wetlands that require a buffer to be applied to the site.

Minimum Requirement No. 9: Operations and Maintenance

Response: An inspection, operations, and maintenance manual will be included with the final civil construction plans.

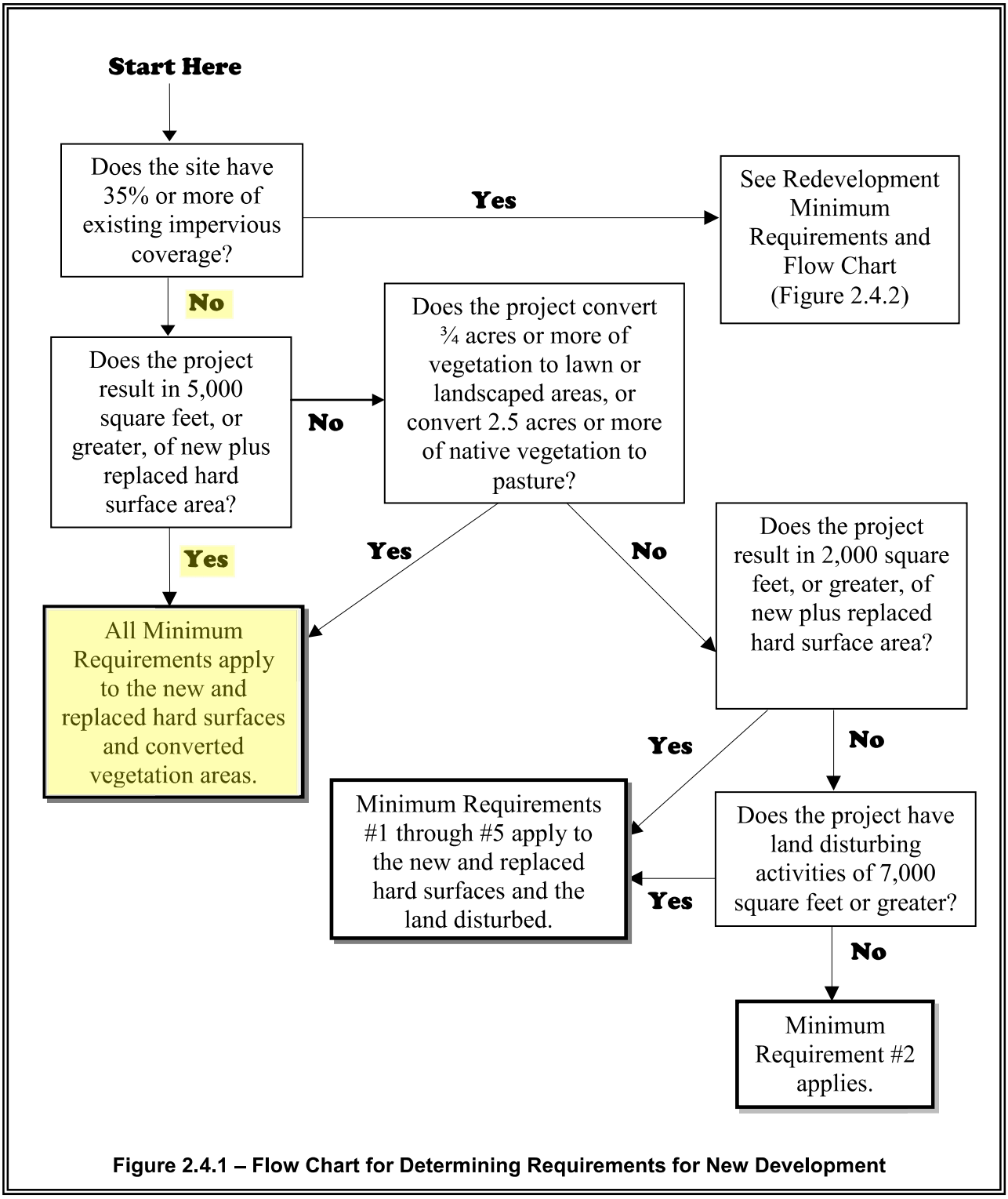
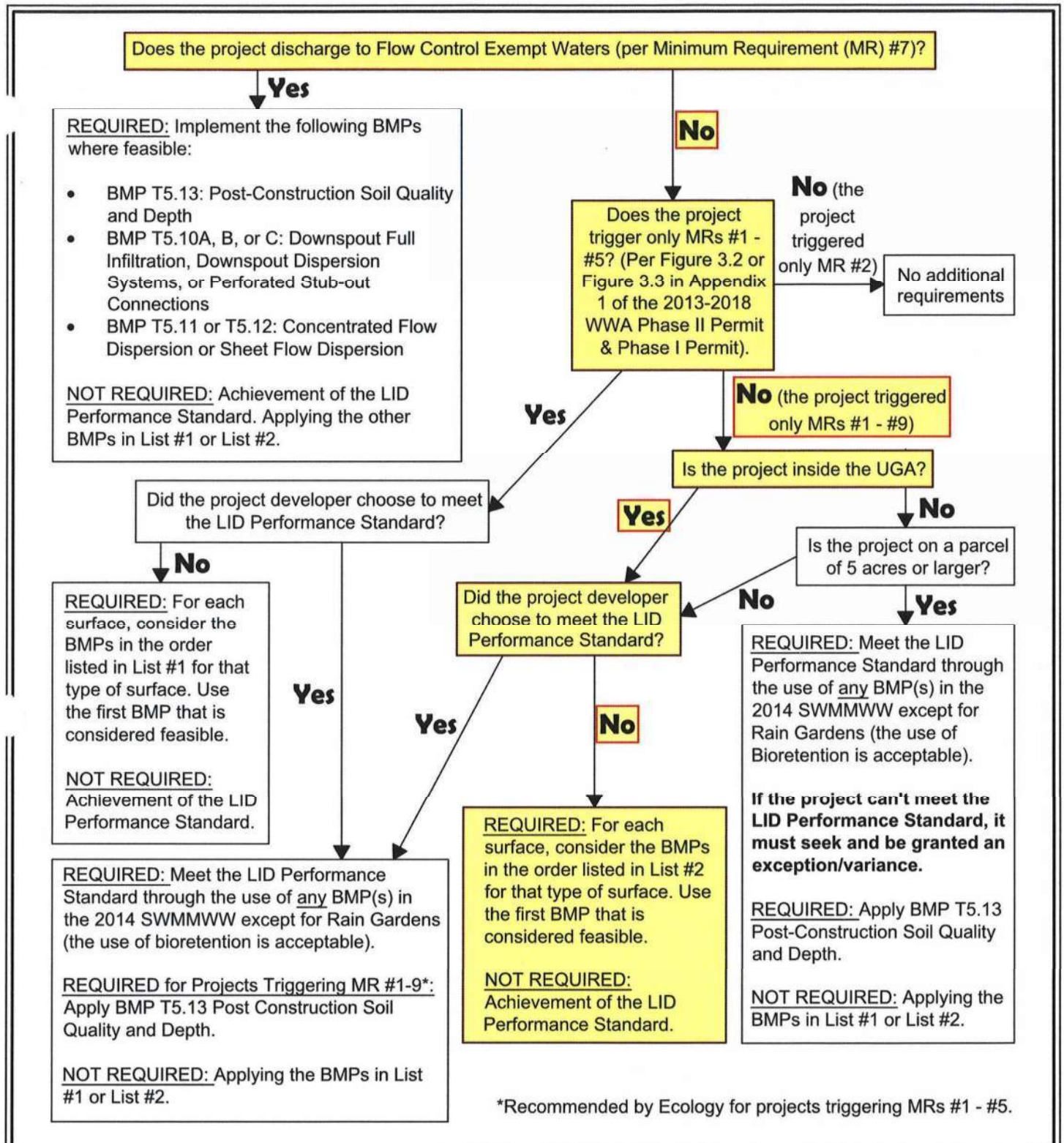


Figure 2.4.1 – Flow Chart for Determining Requirements for New Development



DEPARTMENT OF ECOLOGY
State of Washington

Figure I-2.5.1
Flow Chart for Determining LID MR #5 Requirements

Revised June 2015

Tab 3.0

3.0 OFF-SITE ANALYSIS

3.1 Upstream Drainage

It appears that minimal runoff sheet flows onto the project site from the north given that the majority of upstream properties are developed and assumed to have adequate stormwater controls.

3.2 Downstream Drainage Course

The site contains one drainage basin located within the Lower Woods Creek Basin of the Skykomish Watershed. Stormwater runoff from the site sheet flows to the south across the southern property line and is collected by an existing interceptor trench located on the neighboring properties. From the interceptor drain, stormwater runoff flows south approximately 180-feet within an 8-inch storm pipe flowing beneath Rainier View Road and outlets into an existing wetland on the south side of Rainier View Road. Runoff then sheet flows through the wetland and is collected by an existing 18-inch stormwater main. Runoff then flows through the existing plat of Carriage Place, flows to the south within the 18-inch stormwater main until intersecting Chain Lake Road. The 18-inch stormwater main then flows west within the northern shoulder of Chain Lake Road for approximately 300-feet until discharging into an unnamed ditch. Please refer to the Downstream Map within this section for more information.

3.3 Resource Review

- **Adopted Basin Plans:** The site is part of the Lower Woods Creek Basin.
- **Finalized Drainage Studies:** This is not applicable.
- **Floodplain and Floodway FEMA Maps:** Based on FEMA flood zone mapping, this site is not located in a floodplain.
- **Sensitive Areas Folios:** Based on a review of available GIS mapping, it was found that the subject site does not contain any seismic hazards, coal mines, landslide hazards, or erosion hazards.
- **Road Drainage Problems:** No road drainage problems have been identified.
- **United States Department of Agriculture Soils Survey:** Based on the soils map for this area, the site is primarily comprised of Tokul gravelly medial loam. This soil class is moderately well drained but the capacity of the most limiting layer to transmit water is very low to moderately low.
- **Migrating River Studies:** This is not applicable.

SITE
FLOW DIRECTION (TYP.)
A PORTION OF THE NW. 1/4 OF SEC. 31, T. 28 N., R. 7 E., AND
A PORTION OF THE NE. 1/4 OF SEC. 36, T. 28 N., R. 6 E., W.M.
MONROE, WASHINGTON
EX. INTERCEPTOR DRAIN
77 LF 8" @ 4.6%
102 LF 8" @ 1.9%
OUTLETS TO WETLAND
420 LF SHEET FLOW THROUGH WETLAND
190 LF 18" SD @ 7.8%
104 LF 18" SD @ 2.4%
99 LF 18" SD @ 3.6%
30 LF 18" SD
110 LF 18" SD
60 LF 18" SD
125 LF 18" SD
OUTLET TO DITCH
141st PL SE
CHAIN LAKE ROAD
SEE LEFT
SEE SHEET 7 FOR CONTINUATION
RAINIER VIEW RD SE
TRACT A
TRACT B
TRACT C
TRACT D
TRACT E
TRACT F
TRACT H
TRACT I
TRACT J
TRACT K
TRACT M
TRACT N
WETLAND A
WETLAND B
WETLAND C
WETLAND D
WETLAND E
SENSITIVE AREA FENCING AND SIGN PER CITY OF MONROE STANDARDS (TYP.) (FENCE SHALL BE CONTINUOUS AROUND ENTIRE PERIMETER OF SENSITIVE AREA TRACT) SENSITIVE AREA SIGNAGE SHALL BE FIELD PLACED AS DIRECTED BY THE CITY OF MONROE.
EXISTING DRIVEWAY TO REMAIN UNTIL ABANDONED BY BENEFICIARY
PROPOSED ACCESS FOR THE FARM AT WOODS CREEK (SEE SEPARATE PLANS BY OTHERS)
REMOVABLE BOLLARDS PER CITY OF MONROE STANDARDS
6' CHAIN LINK FENCE ALONG PROPERTY LINE
12' GRAVEL PATH (PER SECTION ON SHT. 25)
SP 130 (5-81)
SCALE: 1" = 50'
CONTOUR INTERVAL = 2'
DOWNSTREAM MAP
AS-BUILTS BY GROUP FOUR, INC., OCTOBER 31, 2003 (AB)= AS CONSTRUCTED
DEC 22 2003
FINAL CORRECTED PLANS
FIELD CHANGE NO. 1
SINCLAIR HEIGHTS
INTERCEPTOR COLLECTOR SYSTEM (SUB-SURFACE FLOWS ONLY)
CITY OF MONROE WASHINGTON
GROUP FOUR, Inc.
16030 JUANITA-WOODINVILLE WAY NE
BOTHELL, WASHINGTON 98011
(425)775-4581 • (206)362-4244 • FAX(206)362-3819
SURVEYING ENGINEERING PLANNING MANAGEMENT
PER CITY COMMENTS
6/20/03
SHT. 2 OF 2
JOB NO: 03-8003

Tab 4.0

4.0 PERMANENT STORMWATER CONTROL PLAN

4.1 Existing Site Hydrology

The site consists of one 8.35-acre parcel with an existing single-family residence. The remainder of the site contains pasture with trees along the eastern, southern, and western boarders. Please refer to the Pre-Developed Basin Map for existing site conditions.

Since the site requires Standard Flow Control per the SMMWW. A Type C forested land cover condition was assumed for the existing condition for hydrologic modeling purposes.

4.2 Developed Site Hydrology

Limits of site disturbance will include installation of sediment and erosion control Best Management Practices (BMPs), demolition of existing buildings, construction of a public road, utilities, stormwater facilities, and grading the single-family residential lots. The total disturbed area will cover approximately 8.35-acres of the existing 8.35-acre site.

Upon completion of the project, impervious surfaces covering the site include approximately 1.378-acre of roadways/driveways, 0.305-acre of concrete sidewalks, and 2.651-acres of new rooftops. The remainder of the developed site area will include residential lawn, landscaping, and open space areas.

To meet the City of Monroe's stormwater requirements aligned with the SMMWW, the project will provide Perforated Stub Out connections and an underground combined detention and water quality wet vault in addition to post construction soil amendments as required by BMP T5.13.

Please refer to the Developed Basin Map for proposed improvements.

4.3 LID Feasibility

Per the Geotechnical Engineering Study, infiltration was deemed infeasible due to variable but low infiltration capacity of the native soils and relatively persistent shallow groundwater seepage. Roof runoff from each individual lot will utilize Perforated Stub Out Connections (BMP T5.10C) with each stub connecting to the proposed storm system within the right-of-way. See the feasibility of individual BMPs below.

<u>Lawn and Landscape Areas</u>

- Soil Preservation and Amendment (Ecology BMP T5.13).

  All disturbed areas which are not converted to impervious areas shall apply post-construction soil quality and depth in accordance with BMP T5.13 in Volume V, Chapter 5 of the Department of Ecology 2012 (2014 Revision) Stormwater Management Manual for Western Washington.

Roofs

- Full Dispersion (BMP T5.30) was deemed infeasible due to limited available flow paths that will be left undisturbed.

- Downspout Infiltration (BMP T5.10A) was deemed infeasible due to variable but low infiltration capacity of the native soils and relatively persistent shallow groundwater seepage as outlined in the Geotechnical Engineering Study.

- Bioretention (BMP T5.14B) and Rain Gardens (BMP T5.14A) were deemed infeasible due to variable but low infiltration capacity of the native soils and relatively persistent shallow groundwater seepage as outlined in the Geotechnical Engineering Study.

- Downspout Dispersion (BMP T5.10B) was deemed infeasible due to the lack of undisturbed areas onsite that could be used as flow paths.

- Perforated Stub-out Connections (BMP T5.10C) are feasible and will be used for all lots. All stubs will connect to the proposed on-site stormwater system that will detain runoff in a vault in the south portion of site and is then outlet to the existing storm system in Rainier View Road Southeast.

Other Hard Surfaces

- Full Dispersion (BMP T5.30) was deemed infeasible due to limited site area.

- Permeable pavement and Bioretention were deemed infeasible due to variable but low infiltration capacity of the native soils and relatively persistent shallow groundwater seepage as outlined in the Geotechnical Engineering Study.

- Sheet flow dispersion was deemed infeasible since the required flowpath was not available onsite after development.

4.4 Flow Control Design

Detention volumes for the site will be accommodated within a stormwater detention vault. The Western Washington Hydrology Model (WWHM) methodology was used to meet the volume outflow design requirements for Standard Flow Control. Approximately 106,000 cubic feet of detention storage is required. The vault will release runoff to match the predeveloped peaks and durations for 50 percent of the 2-year up to the 50-year storm event. The discharge from the vault will be released through an outlet structure and flow to the existing public storm system in Rainier View Road Southeast. Flow is then conveyed to an existing stormwater pond that was constructed as a part of the Sinclair Heights development (Tract 993 of Sinclair Heights). Modifications to the existing control structure in Tract 993 may be necessary to allow the additional flow as “flow-through” and will be finalized with the construction documents.

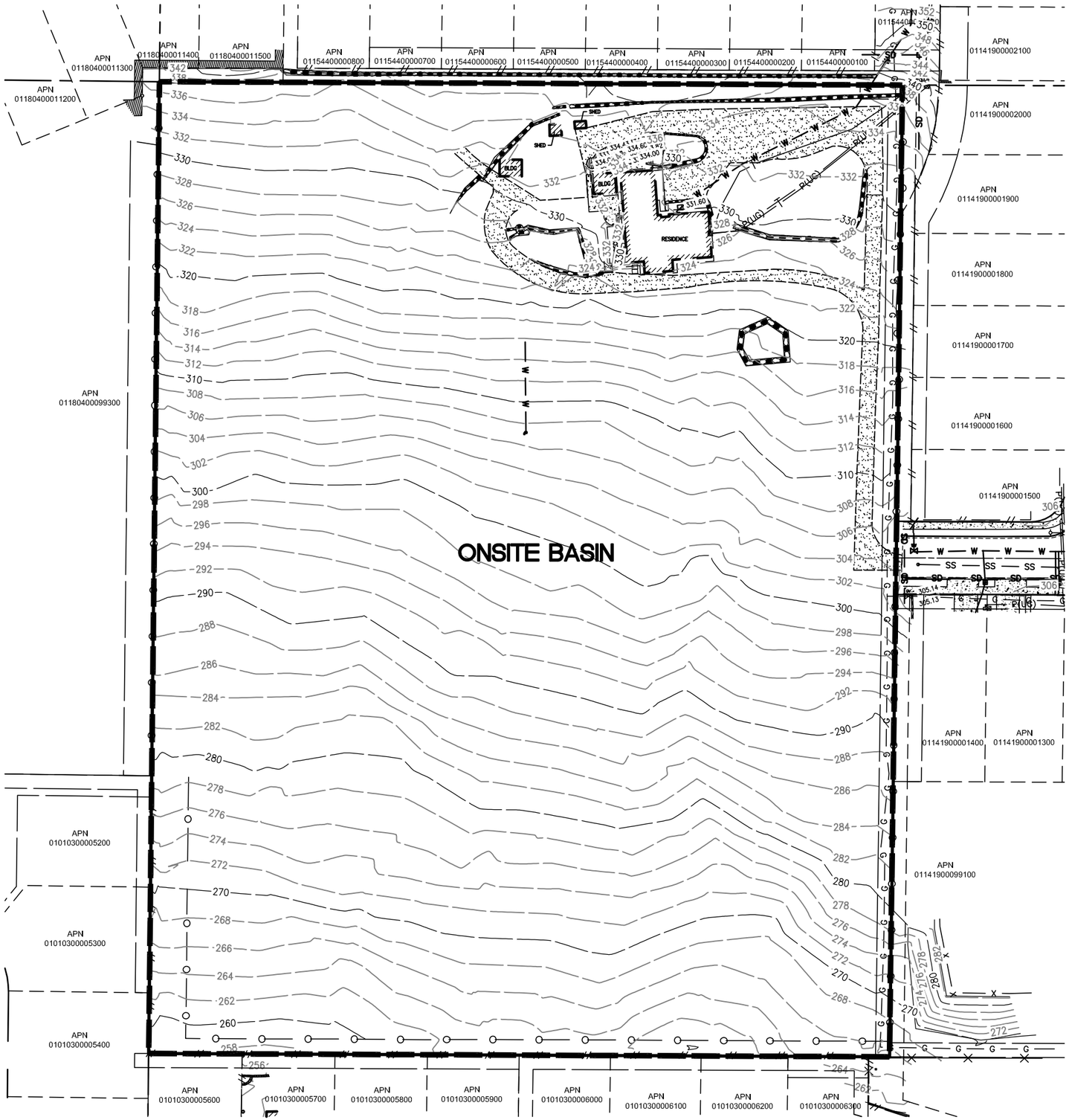
In addition, all post construction soil will be amended per BMP T5.13.

4.5 Water Quality Design

Basic water quality treatment will be provided for all stormwater runoff from across the site and will be provided beneath the live storage elevations in the stormwater vault. Approximately 26,800 cubic feet of water quality volume is required and is provided through 3-feet of dead storage.

4.6 Conveyance Design

Stormwater runoff from the site will be collected in a series of catch basins and stormwater pipes within the proposed public roadway right-of-way that will flow to the stormwater vault in the south portion of site. Runoff from all roofs with utilize Perforated Stub Out Connections, connecting to the same stormwater system within the public right-of-way that flows south to the site's stormwater vault. All conveyance pipes will be sized to convey the 100-year developed storm event. Final sizing calculations will be provided with the construction documents.



N

0 40' 80' 160'

SCALE: 1"=80'

ONSITE BASIN = 8.35 AC
(FOR MODELLING PURPOSES)

TILL FOREST (MODERATE) = 8.35 AC

ONSITE BASIN = 8.35 AC
(EXISTING SURFACES)

PASTURE (MODERATE)	=	7.898 AC
ROOF AREA	=	0.097 AC
DRIVEWAY/PARKING	=	0.355 AC

No.	Date	By	Ckd.	Appr.	Revision

Title: **PRE-DEVELOPED BASIN MAP**

For: *PROSPECT DEVELOPMENT, LLC*

Scale: Horizontal 1"=80' Vertical N/A

Designed BMS Drawn BMS Checked CV Approved CV Date 5/19/21

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18215 72nd Avenue South
Kent, WA 98032
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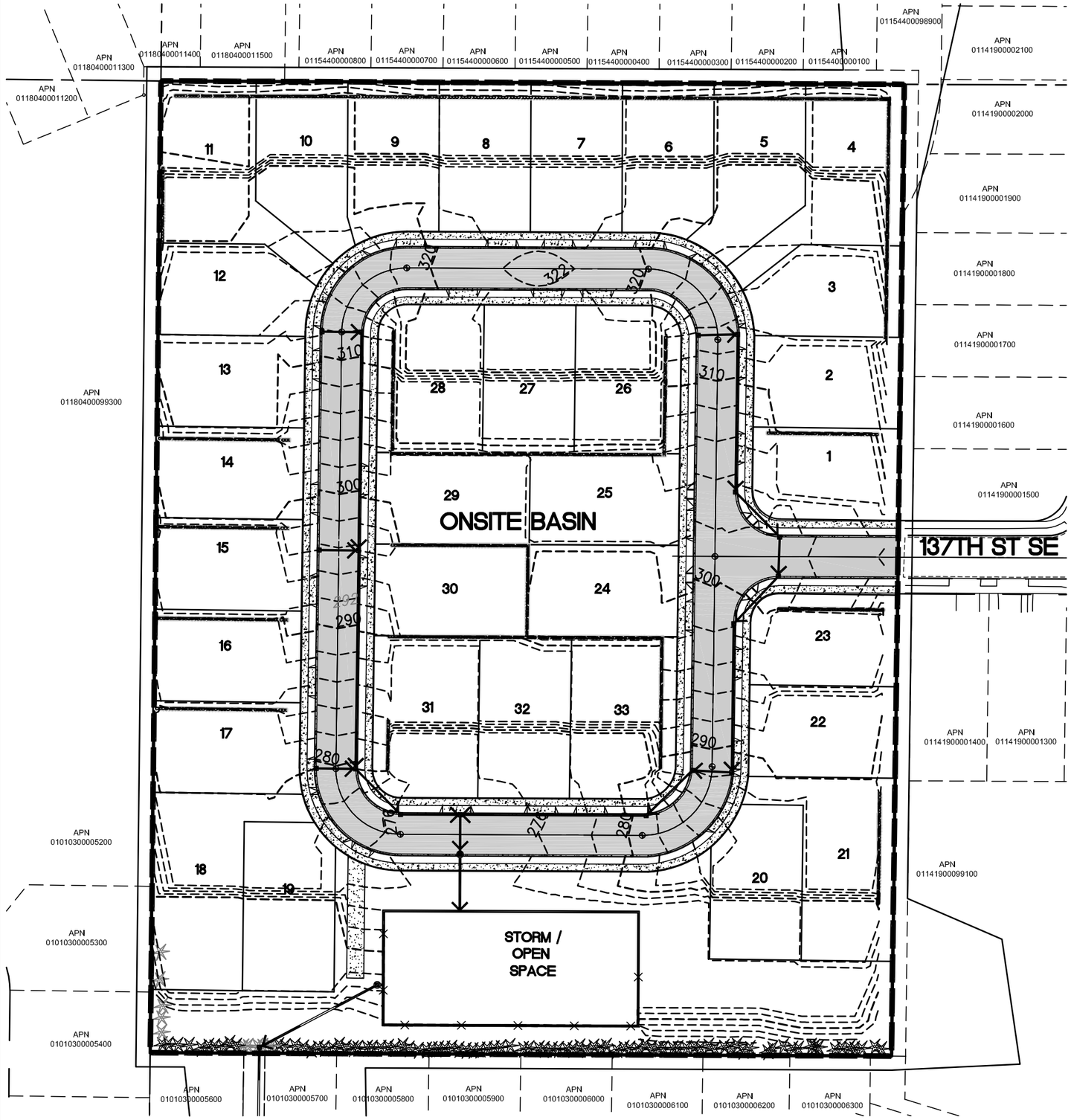
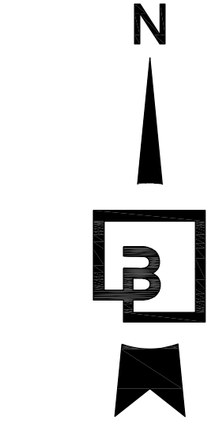
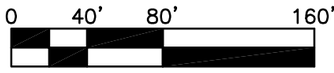
Job Number 21609

Sheet 1 of 1

P:\21000s\21609\exhibit\21609 PRE-DEVELOPED CONDITIONS MAP.dwg 5/19/2021 5:02 PM BSUTEY







TOTAL PERVIOUS SURFACES = 4.016 AC

PASTURE (FLAT)	= 2.008 AC
PASTURE (MODERATE)	= 2.008 AC

TOTAL IMPERVIOUS SURFACES = 4.334 AC

ROOF	= 2.651 AC
DRIVEWAY (FLAT)	= 0.378 AC
SIDEWALK (MODERATE)	= 0.205 AC
SIDEWALK (FLAT)	= 0.100 AC
ROADWAYS (MODERATE)	= 1.000 AC

NOTES:

FOR PRELIMINARY DESIGN THE FOLLOWING IMPERVIOUS AREAS HAVE BEEN ASSUMED FOR EACH SINGLE FAMILY LOT (33 TOTAL).

- ROOF AREA = 3,500 SF/LOT
- DRIVEWAY = 500 SF/LOT

No.	Date	By	Ckd.	Appr.	Revision

Title: **DEVELOPED BASIN MAP**

For: *PROSPECT DEVELOPMENT, LLC*

Scale: Horizontal 1"=80' Vertical N/A

Designed BMS Drawn BMS Checked CV Approved CV Date 5/19/21

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Job Number 21609

Sheet 1 of 1

P:\21000s\21609\exhibit\21609 DEVELOPED CONDITIONS MAP.dwg 5/20/2021 11:02 AM CVISINTAINER

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	21609-Vault
Site Name:	
Site Address:	
City:	
Report Date:	6/8/2021
Gage:	Everett
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.000 (adjusted)
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	8.35
Pervious Total	8.35
Impervious Land Use	acre
Impervious Total	0
Basin Total	8.35

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	2.008
C, Pasture, Mod	2.008
Pervious Total	4.016

Impervious Land Use	acre
ROADS MOD	1
ROOF TOPS FLAT	2.651
DRIVEWAYS MOD	0.378
SIDEWALKS FLAT	0.1
SIDEWALKS MOD	0.205
Impervious Total	4.334
Basin Total	8.35

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

Width: 57.5237184711921 ft.
Length: 230.094873884767 ft.
Depth: 9 ft.
Discharge Structure
Riser Height: 8 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 1.73 in. Elevation:0 ft.
Orifice 2 Diameter: 3.08 in. Elevation:5.226 ft.
Orifice 3 Diameter: 1.81 in. Elevation:6.32208333333337 ft.
Element Flows To:
Outlet 1 Outlet 2

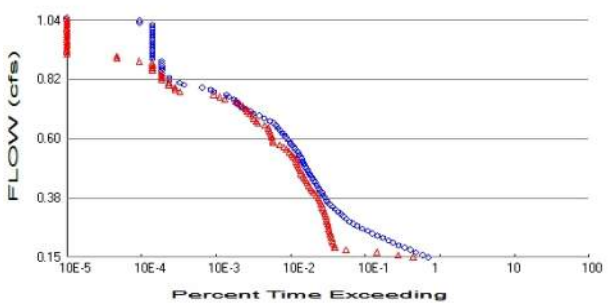
Vault Hydraulic Table

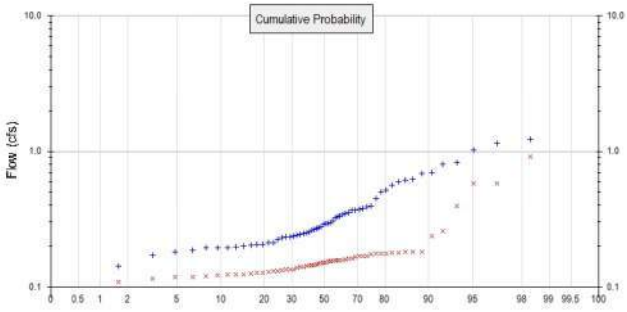
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.303	0.000	0.000	0.000
0.1000	0.303	0.030	0.025	0.000
0.2000	0.303	0.060	0.036	0.000
0.3000	0.303	0.091	0.044	0.000
0.4000	0.303	0.121	0.051	0.000
0.5000	0.303	0.151	0.057	0.000
0.6000	0.303	0.182	0.062	0.000
0.7000	0.303	0.212	0.068	0.000
0.8000	0.303	0.243	0.072	0.000
0.9000	0.303	0.273	0.077	0.000
1.0000	0.303	0.303	0.081	0.000
1.1000	0.303	0.334	0.085	0.000
1.2000	0.303	0.364	0.089	0.000
1.3000	0.303	0.395	0.092	0.000
1.4000	0.303	0.425	0.096	0.000
1.5000	0.303	0.455	0.099	0.000
1.6000	0.303	0.486	0.102	0.000
1.7000	0.303	0.516	0.105	0.000
1.8000	0.303	0.546	0.109	0.000
1.9000	0.303	0.577	0.112	0.000
2.0000	0.303	0.607	0.114	0.000
2.1000	0.303	0.638	0.117	0.000
2.2000	0.303	0.668	0.120	0.000
2.3000	0.303	0.698	0.123	0.000
2.4000	0.303	0.729	0.125	0.000
2.5000	0.303	0.759	0.128	0.000
2.6000	0.303	0.790	0.131	0.000
2.7000	0.303	0.820	0.133	0.000
2.8000	0.303	0.850	0.135	0.000
2.9000	0.303	0.881	0.138	0.000
3.0000	0.303	0.911	0.140	0.000
3.1000	0.303	0.941	0.143	0.000
3.2000	0.303	0.972	0.145	0.000
3.3000	0.303	1.002	0.147	0.000
3.4000	0.303	1.033	0.149	0.000
3.5000	0.303	1.063	0.151	0.000
3.6000	0.303	1.093	0.154	0.000
3.7000	0.303	1.124	0.156	0.000

3.8000	0.303	1.154	0.158	0.000
3.9000	0.303	1.185	0.160	0.000
4.0000	0.303	1.215	0.162	0.000
4.1000	0.303	1.245	0.164	0.000
4.2000	0.303	1.276	0.166	0.000
4.3000	0.303	1.306	0.168	0.000
4.4000	0.303	1.337	0.170	0.000
4.5000	0.303	1.367	0.172	0.000
4.6000	0.303	1.397	0.174	0.000
4.7000	0.303	1.428	0.176	0.000
4.8000	0.303	1.458	0.177	0.000
4.9000	0.303	1.488	0.179	0.000
5.0000	0.303	1.519	0.181	0.000
5.1000	0.303	1.549	0.183	0.000
5.2000	0.303	1.580	0.185	0.000
5.3000	0.303	1.610	0.257	0.000
5.4000	0.303	1.640	0.296	0.000
5.5000	0.303	1.671	0.325	0.000
5.6000	0.303	1.701	0.349	0.000
5.7000	0.303	1.732	0.371	0.000
5.8000	0.303	1.762	0.390	0.000
5.9000	0.303	1.792	0.408	0.000
6.0000	0.303	1.823	0.425	0.000
6.1000	0.303	1.853	0.441	0.000
6.2000	0.303	1.883	0.456	0.000
6.3000	0.303	1.914	0.470	0.000
6.4000	0.303	1.944	0.509	0.000
6.5000	0.303	1.975	0.535	0.000
6.6000	0.303	2.005	0.557	0.000
6.7000	0.303	2.035	0.577	0.000
6.8000	0.303	2.066	0.596	0.000
6.9000	0.303	2.096	0.614	0.000
7.0000	0.303	2.127	0.631	0.000
7.1000	0.303	2.157	0.647	0.000
7.2000	0.303	2.187	0.662	0.000
7.3000	0.303	2.218	0.678	0.000
7.4000	0.303	2.248	0.692	0.000
7.5000	0.303	2.278	0.707	0.000
7.6000	0.303	2.309	0.721	0.000
7.7000	0.303	2.339	0.734	0.000
7.8000	0.303	2.370	0.747	0.000
7.9000	0.303	2.400	0.760	0.000
8.0000	0.303	2.430	0.773	0.000
8.1000	0.303	2.461	1.288	0.000
8.2000	0.303	2.491	2.202	0.000
8.3000	0.303	2.522	3.311	0.000
8.4000	0.303	2.552	4.454	0.000
8.5000	0.303	2.582	5.472	0.000
8.6000	0.303	2.613	6.246	0.000
8.7000	0.303	2.643	6.749	0.000
8.8000	0.303	2.673	7.206	0.000
8.9000	0.303	2.704	7.601	0.000
9.0000	0.303	2.734	7.975	0.000
9.1000	0.303	2.765	8.332	0.000
9.2000	0.000	0.000	8.673	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 8.35
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 4.016
Total Impervious Area: 4.334

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.308666
5 year	0.493605
10 year	0.640766
25 year	0.856537
50 year	1.040077
100 year	1.24414

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.153776
5 year	0.219846
10 year	0.27344
25 year	0.353718
50 year	0.423589
100 year	0.502936

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.343	0.135
1950	0.349	0.154
1951	0.295	0.133
1952	0.240	0.122
1953	0.195	0.119
1954	1.221	0.151
1955	0.370	0.176
1956	0.323	0.237
1957	0.448	0.175
1958	0.390	0.141

1959	0.304	0.154
1960	0.295	0.157
1961	0.612	0.166
1962	0.296	0.134
1963	0.500	0.129
1964	0.394	0.118
1965	0.244	0.157
1966	0.143	0.126
1967	0.290	0.134
1968	0.353	0.168
1969	1.143	0.138
1970	0.202	0.131
1971	0.380	0.181
1972	0.235	0.142
1973	0.231	0.146
1974	0.624	0.148
1975	0.239	0.123
1976	0.251	0.144
1977	0.181	0.123
1978	0.211	0.123
1979	0.699	0.140
1980	0.328	0.120
1981	0.206	0.128
1982	0.267	0.168
1983	0.567	0.131
1984	0.275	0.259
1985	0.368	0.176
1986	0.826	0.582
1987	0.374	0.395
1988	0.193	0.161
1989	0.249	0.109
1990	0.261	0.168
1991	0.269	0.158
1992	0.205	0.161
1993	0.196	0.115
1994	0.187	0.151
1995	0.274	0.181
1996	0.516	0.178
1997	1.024	0.912
1998	0.171	0.126
1999	0.223	0.156
2000	0.194	0.178
2001	0.067	0.102
2002	0.255	0.159
2003	0.199	0.144
2004	0.335	0.181
2005	0.234	0.151
2006	0.806	0.173
2007	0.595	0.157
2008	0.691	0.580
2009	0.210	0.145

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.2211	0.9119
2	1.1426	0.5825
3	1.0242	0.5797

4	0.8259	0.3950
5	0.8057	0.2594
6	0.6993	0.2368
7	0.6909	0.1812
8	0.6245	0.1808
9	0.6124	0.1806
10	0.5951	0.1784
11	0.5670	0.1782
12	0.5162	0.1760
13	0.4997	0.1760
14	0.4481	0.1752
15	0.3939	0.1732
16	0.3898	0.1684
17	0.3800	0.1681
18	0.3735	0.1675
19	0.3699	0.1659
20	0.3677	0.1614
21	0.3531	0.1609
22	0.3487	0.1587
23	0.3434	0.1581
24	0.3354	0.1573
25	0.3275	0.1571
26	0.3233	0.1571
27	0.3044	0.1556
28	0.2963	0.1543
29	0.2952	0.1541
30	0.2950	0.1512
31	0.2895	0.1506
32	0.2755	0.1506
33	0.2738	0.1484
34	0.2692	0.1459
35	0.2672	0.1448
36	0.2614	0.1445
37	0.2546	0.1440
38	0.2509	0.1423
39	0.2486	0.1411
40	0.2435	0.1403
41	0.2401	0.1384
42	0.2388	0.1347
43	0.2346	0.1339
44	0.2336	0.1336
45	0.2311	0.1332
46	0.2233	0.1311
47	0.2110	0.1306
48	0.2104	0.1290
49	0.2060	0.1277
50	0.2052	0.1264
51	0.2016	0.1256
52	0.1995	0.1235
53	0.1964	0.1231
54	0.1948	0.1230
55	0.1942	0.1220
56	0.1934	0.1196
57	0.1868	0.1186
58	0.1809	0.1177
59	0.1710	0.1150
60	0.1429	0.1088
61	0.0673	0.1016

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1543	14859	9364	63	Pass
0.1633	12429	5890	47	Pass
0.1722	10262	3059	29	Pass
0.1812	8577	1177	13	Pass
0.1901	7144	836	11	Pass
0.1991	5963	820	13	Pass
0.2080	5007	796	15	Pass
0.2170	4344	770	17	Pass
0.2259	3664	751	20	Pass
0.2349	3108	735	23	Pass
0.2438	2663	722	27	Pass
0.2527	2280	710	31	Pass
0.2617	1941	694	35	Pass
0.2706	1662	682	41	Pass
0.2796	1475	668	45	Pass
0.2885	1311	657	50	Pass
0.2975	1183	645	54	Pass
0.3064	1079	630	58	Pass
0.3154	1002	616	61	Pass
0.3243	921	600	65	Pass
0.3333	840	585	69	Pass
0.3422	782	570	72	Pass
0.3512	719	552	76	Pass
0.3601	672	535	79	Pass
0.3691	635	519	81	Pass
0.3780	610	502	82	Pass
0.3870	585	475	81	Pass
0.3959	553	433	78	Pass
0.4048	521	409	78	Pass
0.4138	499	392	78	Pass
0.4227	481	372	77	Pass
0.4317	456	355	77	Pass
0.4406	437	342	78	Pass
0.4496	417	326	78	Pass
0.4585	397	311	78	Pass
0.4675	382	296	77	Pass
0.4764	363	287	79	Pass
0.4854	348	279	80	Pass
0.4943	336	268	79	Pass
0.5033	323	264	81	Pass
0.5122	312	255	81	Pass
0.5212	299	247	82	Pass
0.5301	288	233	80	Pass
0.5391	276	219	79	Pass
0.5480	265	205	77	Pass
0.5569	246	187	76	Pass
0.5659	236	171	72	Pass
0.5748	222	152	68	Pass
0.5838	210	124	59	Pass
0.5927	198	122	61	Pass
0.6017	187	119	63	Pass
0.6106	175	117	66	Pass
0.6196	164	113	68	Pass

0.6285	153	111	72	Pass
0.6375	146	107	73	Pass
0.6464	135	95	70	Pass
0.6554	126	78	61	Pass
0.6643	112	73	65	Pass
0.6733	94	69	73	Pass
0.6822	80	66	82	Pass
0.6911	67	60	89	Pass
0.7001	61	56	91	Pass
0.7090	54	53	98	Pass
0.7180	46	49	106	Pass
0.7269	41	44	107	Pass
0.7359	40	39	97	Pass
0.7448	37	28	75	Pass
0.7538	32	24	75	Pass
0.7627	30	20	66	Pass
0.7717	20	7	35	Pass
0.7806	18	6	33	Pass
0.7896	14	6	42	Pass
0.7985	8	5	62	Pass
0.8075	7	5	71	Pass
0.8164	5	4	80	Pass
0.8254	5	4	80	Pass
0.8343	4	4	100	Pass
0.8432	4	4	100	Pass
0.8522	4	3	75	Pass
0.8611	4	3	75	Pass
0.8701	4	3	75	Pass
0.8790	4	3	75	Pass
0.8880	4	2	50	Pass
0.8969	3	1	33	Pass
0.9059	3	1	33	Pass
0.9148	3	0	0	Pass
0.9238	3	0	0	Pass
0.9327	3	0	0	Pass
0.9417	3	0	0	Pass
0.9506	3	0	0	Pass
0.9596	3	0	0	Pass
0.9685	3	0	0	Pass
0.9774	3	0	0	Pass
0.9864	3	0	0	Pass
0.9953	3	0	0	Pass
1.0043	3	0	0	Pass
1.0132	3	0	0	Pass
1.0222	3	0	0	Pass
1.0311	2	0	0	Pass
1.0401	2	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.6147 acre-feet
On-line facility target flow:	0.8193 cfs.
Adjusted for 15 min:	0.8193 cfs.
Off-line facility target flow:	0.4631 cfs.
Adjusted for 15 min:	0.4631 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	1044.05			☐	0.00			
Total Volume Infiltrated		1044.05	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

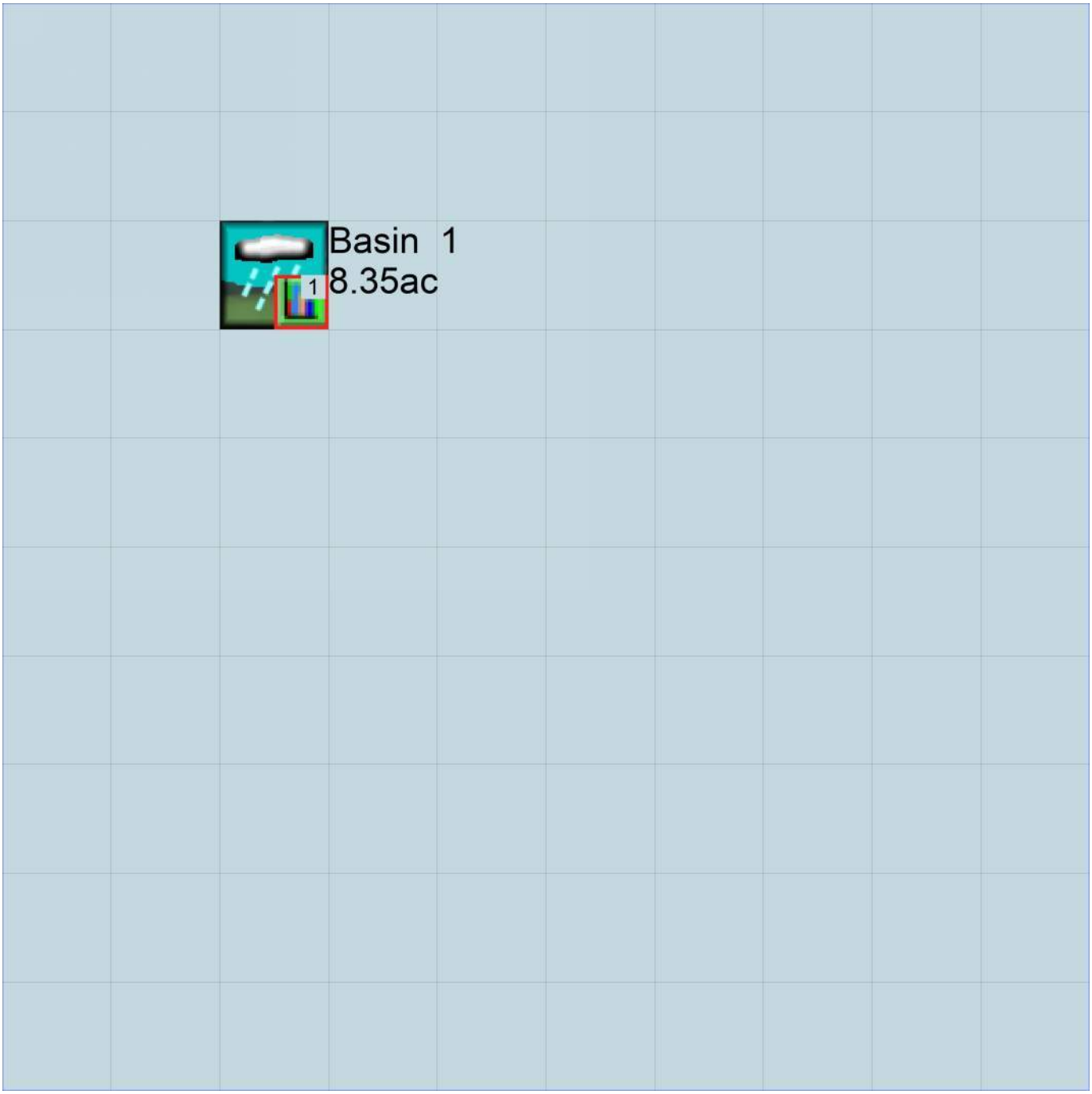
PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   21609-Vault.wdm
MESSU       25   Pre21609-Vault.MES
            27   Pre21609-Vault.L61
            28   Pre21609-Vault.L62
            30   POC21609-Vault1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      11
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                      in  out           ***
   11     C, Forest, Mod          1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   11         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   11         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   11         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   11              0       4.5      0.08       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   11              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   11            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   11              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  11                       8.35     COPY   501     12
PERLND  11                       8.35     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *      *  *  *  *  *        ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01        END    2009 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   21609-Vault.wdm
MESSU       25   Mit21609-Vault.MES
            27   Mit21609-Vault.L61
            28   Mit21609-Vault.L62
            30   POC21609-Vault1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      PERLND      14
      IMPLND       2
      IMPLND       4
      IMPLND       6
      IMPLND       8
      IMPLND       9
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1                    MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
   14     C, Pasture, Mod         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
```

```
   13         0    0    1    0    0    0    0    0    0    0    0    0
   14         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
   14         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   13         0    0    0    0    0    0    0    0    0    0    0
   14         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   13              0       4.5      0.06       400      0.05       0.5     0.996
   14              0       4.5      0.06       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   13              0         0         2         2         0         0         0
   14              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                          ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13           0.15       0.4       0.3         6       0.5       0.4
   14           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
   13              0         0         0         0       2.5          1         0
   14              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    2      ROADS/MOD              1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
    6      DRIVEWAYS/MOD          1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
    9      SIDEWALKS/MOD          1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    2         0    0    1    0    0    0
    4         0    0    1    0    0    0
    6         0    0    1    0    0    0
    8         0    0    1    0    0    0
    9         0    0    1    0    0    0
  END ACTIVITY
```

```
  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    2         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
    6         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
    9         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    2         0    0    0    0    0
    4         0    0    0    0    0
    6         0    0    0    0    0
    8         0    0    0    0    0
    9         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    2            400      0.05       0.1      0.08
    4            400      0.01       0.1       0.1
    6            400      0.05       0.1      0.08
    8            400      0.01       0.1       0.1
    9            400      0.05       0.1      0.08
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    2              0         0
    4              0         0
    6              0         0
    8              0         0
    9              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    2             0         0
    4             0         0
    6             0         0
    8             0         0
    9             0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  13                     2.008     RCHRES   1      2
PERLND  13                     2.008     RCHRES   1      3
PERLND  14                     2.008     RCHRES   1      2
PERLND  14                     2.008     RCHRES   1      3
IMPLND   2                         1     RCHRES   1      5
IMPLND   4                     2.651     RCHRES   1      5
IMPLND   6                     0.378     RCHRES   1      5
IMPLND   8                       0.1     RCHRES   1      5
IMPLND   9                     0.205     RCHRES   1      5

******Routing******
PERLND  13                     2.008     COPY     1     12
PERLND  14                     2.008     COPY     1     12
```

```
IMPLND   2                          1     COPY     1     15
IMPLND   4                      2.651     COPY     1     15
IMPLND   6                      0.378     COPY     1     15
IMPLND   8                        0.1     COPY     1     15
IMPLND   9                      0.205     COPY     1     15
PERLND  13                      2.008     COPY     1     13
PERLND  14                      2.008     COPY     1     13
RCHRES   1                          1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
    1     Vault  1               1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *      *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
    <------><--------><--------><--------><--------><--------><-------->      ***
    1              1      0.04       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
    <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
```

(ft)	(acres)	(acre-ft)	(cfs)	(ft/sec)	(Minutes)***
0.000000	0.303855	0.000000	0.000000		
0.100000	0.303855	0.030385	0.025683		
0.200000	0.303855	0.060771	0.036322		
0.300000	0.303855	0.091156	0.044485		
0.400000	0.303855	0.121542	0.051367		
0.500000	0.303855	0.151927	0.057430		
0.600000	0.303855	0.182313	0.062911		
0.700000	0.303855	0.212698	0.067952		
0.800000	0.303855	0.243084	0.072643		
0.900000	0.303855	0.273469	0.077050		
1.000000	0.303855	0.303855	0.081218		
1.100000	0.303855	0.334240	0.085182		
1.200000	0.303855	0.364626	0.088970		
1.300000	0.303855	0.395011	0.092602		
1.400000	0.303855	0.425397	0.096098		
1.500000	0.303855	0.455782	0.099471		
1.600000	0.303855	0.486168	0.102733		
1.700000	0.303855	0.516553	0.105895		
1.800000	0.303855	0.546939	0.108965		
1.900000	0.303855	0.577324	0.111951		
2.000000	0.303855	0.607709	0.114859		
2.100000	0.303855	0.638095	0.117696		
2.200000	0.303855	0.668480	0.120465		
2.300000	0.303855	0.698866	0.123173		
2.400000	0.303855	0.729251	0.125822		
2.500000	0.303855	0.759637	0.128417		
2.600000	0.303855	0.790022	0.130960		
2.700000	0.303855	0.820408	0.133454		
2.800000	0.303855	0.850793	0.135903		
2.900000	0.303855	0.881179	0.138309		
3.000000	0.303855	0.911564	0.140673		
3.100000	0.303855	0.941950	0.142999		
3.200000	0.303855	0.972335	0.145287		
3.300000	0.303855	1.002721	0.147539		
3.400000	0.303855	1.033106	0.149758		
3.500000	0.303855	1.063492	0.151944		
3.600000	0.303855	1.093877	0.154100		
3.700000	0.303855	1.124263	0.156225		
3.800000	0.303855	1.154648	0.158323		
3.900000	0.303855	1.185034	0.160392		
4.000000	0.303855	1.215419	0.162435		
4.100000	0.303855	1.245804	0.164453		
4.200000	0.303855	1.276190	0.166447		
4.300000	0.303855	1.306575	0.168417		
4.400000	0.303855	1.336961	0.170364		
4.500000	0.303855	1.367346	0.172289		
4.600000	0.303855	1.397732	0.174193		
4.700000	0.303855	1.428117	0.176076		
4.800000	0.303855	1.458503	0.177939		
4.900000	0.303855	1.488888	0.179783		
5.000000	0.303855	1.519274	0.181608		
5.100000	0.303855	1.549659	0.183415		
5.200000	0.303855	1.580045	0.185205		
5.300000	0.303855	1.610430	0.257006		
5.400000	0.303855	1.640816	0.296116		
5.500000	0.303855	1.671201	0.325225		
5.600000	0.303855	1.701587	0.349629		
5.700000	0.303855	1.731972	0.371140		
5.800000	0.303855	1.762358	0.390635		
5.900000	0.303855	1.792743	0.408621		
6.000000	0.303855	1.823128	0.425422		
6.100000	0.303855	1.853514	0.441260		
6.200000	0.303855	1.883899	0.456293		
6.300000	0.303855	1.914285	0.470640		
6.400000	0.303855	1.944670	0.509212		
6.500000	0.303855	1.975056	0.535131		
6.600000	0.303855	2.005441	0.557274		
6.700000	0.303855	2.035827	0.577422		
6.800000	0.303855	2.066212	0.596220		

```
  6.900000  0.303855  2.096598  0.613998
  7.000000  0.303855  2.126983  0.630957
  7.100000  0.303855  2.157369  0.647231
  7.200000  0.303855  2.187754  0.662917
  7.300000  0.303855  2.218140  0.678090
  7.400000  0.303855  2.248525  0.692806
  7.500000  0.303855  2.278911  0.707112
  7.600000  0.303855  2.309296  0.721046
  7.700000  0.303855  2.339682  0.734640
  7.800000  0.303855  2.370067  0.747921
  7.900000  0.303855  2.400452  0.760914
  8.000000  0.303855  2.430838  0.773637
  8.100000  0.303855  2.461223  1.288288
  8.200000  0.303855  2.491609  2.202813
  8.300000  0.303855  2.521994  3.311628
  8.400000  0.303855  2.552380  4.454377
  8.500000  0.303855  2.582765  5.472881
  8.600000  0.303855  2.613151  6.246437
  8.700000  0.303855  2.643536  6.749001
  8.800000  0.303855  2.673922  7.206058
  8.900000  0.303855  2.704307  7.601475
  9.000000  0.303855  2.734693  7.975909
  9.100000  0.303855  2.765078  8.332425
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.2           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.2           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76          PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76          IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
```

```
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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Tab 5.0

5.0 CONSTRUCTION STORMWATER POLLUTION PREVENTION

The minimum requirements for erosion and sediment control are defined in Volume II of the SMMWW. The Temporary Erosion and Sediment Control Plans in addition to the SWPPP provides the design and locations of BMPs to control erosion and sediment.

Requirement No. 1: Mark Clearing Limits – Prior to any clearing or construction on site, the clearing limits for the project stage will be clearly marked as shown on the Temporary Erosion and Sediment Control Plan.

Requirement No. 2: Establish Construction Access – Prior to the start of construction, the construction vehicle entrance to the site shall be stabilized with a stabilized construction entrance.

Requirement No. 3: Control Flow Rates – Temporary sediment traps and/or the proposed stormwater vault will be utilized during construction to control flow rate of construction stormwater.

Requirement No. 4: Install Sediment Controls – Filter fabric fencing (silt fence) shall be installed per the Temporary Erosion and Sediment Control plan. A sediment trap will be sized and implemented onsite.

Requirement No. 5: Stabilize Soils – Provide immediate protection of exposed soils during construction delays or over winter months. All areas left exposed more than 7 days in the summer and 2 days in the winter shall be stabilized with mulching and seeding. Mulch can come from a variety of sources with shredded straw being the most common.

Requirement No. 6: Protect Slopes – Cut and fill slopes within the project will be limited to a maximum of 2 horizontal to 1 vertical. Slopes of 3 horizontal to 1 vertical shall be used whenever there is sufficient space available. Cut and fill slopes will be stabilized following the guidance of Erosion and Sediment Control methods.

Requirement No. 7: Protection Drain Inlets – Storm drain inlets will be protected from sediment entry by the installation of sediment filters subsequent to clearing and grading, installation of the storm drains system, and prior to completion of the project.

Requirement No. 8: Stabilization of Channels and Outlets – Outlet protection shall be used on the site where applicable.

Requirement No. 9: Control Pollutants – All pollutants, including waste materials and demolition debris shall be handled and disposed of in a manner that does not contaminate stormwater.

Requirement No. 10: Control Dewatering – All dewatering from construction activity shall discharge to either a sediment trap specifically constructed for the dewatering operation or shall be conveyed to the temporary sediment pond/vault. In no case shall the dewatering discharge be at a greater rate than the sediment trap or basin is designed for.

Requirement No. 11: Maintain BMPs – Erosion and sediment BMPs shall be inspected at regular intervals for damage and sediment accumulation. At a minimum, the facilities shall be inspected weekly and after any runoff-producing rain event. Weekly inspections

shall take place at the end of the work week and any needed repairs completed before the job is shut down for the weekend. BMP inspections shall continue at these intervals during periods of work stoppages or until permanent cover has been established. As required in the project specifications, all temporary erosion and sediment control BMPs will be removed within 30 days after final site stabilization. Disturbed areas resulting from BMP removal shall be permanently stabilized immediately after removal.

Requirement No. 12: Manage the Project – A construction phase has been detailed on the Temporary Erosion and Sediment Control Plans.

Requirement No. 13: Protect on-site stormwater management BMPs for runoff from roofs and other hard surfaces – Minimize the depth of soil disturbance and compaction in areas where gravel trenches will be placed in accordance with Perforated Stub Out Connections (BMP T5.10C).

Tab 6.0

6.0 SPECIAL REPORTS AND STUDIES

- Geotechnical Engineering Study, prepared by Earth Solutions NW, LLC dated April 23, 2021
- Traffic Impact Analysis, prepared by Gibson Traffic Consultants, Inc., dated May 20, 2021
- Wetland and Fish and Wildlife Habitat Assessment, prepared by Soundview Consultants, dated June 7, 2021

Earth Solutions NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
PROPOSED CHEBUHAR SUBDIVISION
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PROSPECT DEVELOPMENT, LLC

April 23, 2021

Scott S. Riegel, L.G., L.E.G.
Senior Project Manager

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Earth Solutions NW LLC

Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

April 23, 2021
ES-7734

Prospect Development, LLC
2913 – 5th Avenue Northeast, Suite 201
Puyallup, Washington 98372

Attention: Mr. Justin Holland

Dear Mr. Holland:

Earth Solutions NW, LLC (ESNW) is pleased to present this report that supports the current project. Based on the results of our investigation, construction of the proposed residential subdivision is feasible from a geotechnical standpoint. Our study indicates the site is underlain primarily by medium dense to very dense glacial till deposits and shallow persistent perched groundwater is present across much of the site.

In general, the proposed residences may be supported on conventional continuous and spread footing foundations bearing on competent native soil, recompacted native soil, or new structural fill placed directly on competent native soil. Because no design details were available at the time of this report, ESNW should review the project details to confirm the recommendations in this report are applicable. In general, competent native soil, suitable for support of the new foundations, will likely be encountered beginning at depths of about two to four feet below the existing ground surface. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of soils to the specifications of structural fill, or overexcavation and replacement with suitable structural fill, will be necessary.

Infiltration on this site is not feasible from a geotechnical standpoint due, in part, to the variable but low infiltration capacity of the native soil deposits and relatively persistent shallow groundwater seepage.

We appreciate the opportunity to be of service to you on this project. If you have questions regarding the content of this geotechnical engineering study, please contact us.

Sincerely,

EARTH SOLUTIONS NW, LLC

Scott S. Riegel, L.G., L.E.G.
Senior Project Manager

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GEOTECHNICAL ENGINEERING STUDY
PROPOSED CHEBUHAR SUBDIVISION
19785 – 137TH STREET SOUTHEAST
MONROE, WASHINGTON

ES-7734

INTRODUCTION

General

This geotechnical engineering study (study) was prepared for the proposed residential development to be constructed off the western terminus of 137th Street Southeast in Monroe, Washington. The purpose of this study was to develop geotechnical recommendations for the proposed project. The scope of services for completing this study included the following:

- Subsurface exploration consisting of test pit excavations;
- Laboratory testing of soil samples collected at the test pit locations;
- Engineering analyses and recommendations for the proposed development, and;
- Preparation of this report.

The following documents and maps were reviewed as part of preparing this study:

- Conceptual Site Plan undated;
- Geologic map of the Lake Roesiger 7.5-minute quadrangle, Snohomish County, Washington;
- Monroe Municipal Code Title 22 – Unified Development Regulations, and;
- Web Soil Survey (WSS), provided by the United States Department of Agriculture (USDA), Natural Resources Conservation Service.

Project Description

We understand the overall subject site will be developed with 33 detached residential lots, an access roadway, stormwater detention tract and utility improvements. Perimeter footing loads will likely be on the order of 1 to 2 kips per lineal foot. Slab-on-grade loading is anticipated to be approximately 150 pounds per square foot (psf). Based on existing grades, we anticipate mass grading activities will include cuts and fills of up to about five to eight feet. Landscape retaining walls may be used to accommodate grade transitions on some lots.

We understand stormwater will be conveyed to a storm tract delineated in the southeastern corner of the site on the referenced site plan. Typical vault excavations exceed 10 feet; however, plans were not provided to us for review at the time of this report.

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations provided in this report. ESNW should review final designs to confirm that our geotechnical recommendations have been incorporated into the plans.

SITE CONDITIONS

Surface

The subject site is located off the western terminus of 137th Street Southeast, roughly situated between 136th Place Southeast and Rainier View Road Southeast in Monroe, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map). The site consists of a single tax parcel (Snohomish County Parcel Number 28073100203800) about eight acres in size. The property is occupied by a residence and associated improvements. The site topography descends gently to the south and vegetation consists primarily of general landscaping and sparse trees.

Subsurface

A representative of ESNW observed, logged, and sampled six test pits excavated across the overall project area, on February 5, 2021 using a mini-trackhoe and operator provided by the client. The test pits were completed for purposes of assessing soil conditions, classifying site soils, and characterizing near-surface groundwater conditions within the overall development area. The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the test pit logs provided in Appendix A for a more detailed description of subsurface conditions. Representative soil samples collected at the test pit locations were analyzed in general accordance with Unified Soil Classification System (USCS) and USDA methods and procedures.

Topsoil and Fill

Topsoil generally extended to a depth of six inches below the existing ground surface (bgs). The topsoil was characterized by the observed dark brown color, the presence of fine organics, and root intrusions extending into the shallow, weathered soils.

Fill was encountered during our exploration at test pit location TP-1 that consisted of a loose silty sand with gravel (USCS: SM) extending to a depth of about three feet bgs and contained scattered debris. The relic topsoil layer was observed at the base of the fill. Fill is likely present near the existing development areas of the site as well.

Native Soil

Underlying topsoil, native soils encountered on the subject site were consisting primarily of silty sand with gravel (USCS: SM) and silty gravel with sand (USCS: GM) with scattered cobbles. A layer of sandy gravel (USCS: GP-GM) was encountered at test pit location TP-3 that began about five feet bgs and persisted to the termination depth of 11 feet bgs.

Native soils were encountered in a medium dense to dense condition beginning at about two to four feet bgs. Soils were observed to be in a moist to wet condition across the majority of the site to a maximum exploration depth of 11 feet bgs, which was the maximum depth afforded by the excavator.

Geologic Setting

The referenced geologic map resource identifies glacial till (Qtvg) deposits as the primary geologic unit underlying the site and surrounding areas. As reported on the geologic map resource, Vashon subglacial till consists primarily of a non-sorted mixture of silt, sand, and sub-rounded to well-rounded gravels, commonly referred to as “hardpan.” The till was deposited directly from the glacier as it advanced over bedrock and older Quaternary sediment.

The referenced WSS resource identifies Tokul gravelly medial loam (Map Unit Symbol: 72) across the majority of the site. Tokul series soils formed in glacial till.

Based on our field observations, on site soils generally correlate with glacial till deposits.

Groundwater

During our subsurface exploration completed on February 2021, groundwater seepage was encountered at the majority of the test pit locations. The groundwater flows were field characterized as moderate to heavy flows with emergent depths ranging from about two to six feet bgs. In general, groundwater flow rates and elevations are higher during the winter, spring, and early summer months. In our opinion, an interceptor trench drain system may be warranted along the up-slope perimeter of the project area to help mitigate or otherwise control shallow perched groundwater flows.

GEOLOGICALLY HAZARDOUS AREAS

Based on our review of the referenced plan, our site exploration and Monroe Municipal Code Title 22 – Unified Development Regulations, there are no geologic hazard areas (erosion, landslide, seismic, or mine hazards) on or within 300 feet of the subject site. Standard development BMPs may be used for this site development plans.

DISCUSSION AND RECOMMENDATIONS

General

Based on the results of our investigation, construction of the proposed single-family residences is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with the proposed development include site grading, foundation support, slab-on-grade subgrade support, the suitability of using on-site soils as structural fill, and drainage.

The proposed residences can be supported on conventional continuous and spread footing foundations bearing on competent native soil, recompacted native soil, or new structural fill placed directly on competent native soil. In general, competent native soil, suitable for support of the new foundations, will likely be encountered beginning at depths of about two to four feet bgs. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of soils to the specifications of structural fill, or overexcavation and replacement with suitable structural fill, will be necessary. ESNW should review the proposed plans to confirm the recommendations in this report remain applicable.

Due to the low infiltration capacity of site soils, infiltration is not recommended for this project.

This study has been prepared for the exclusive use of Prospect Development, LLC, and their representatives. A warranty is neither expressed nor implied. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Initial site preparation activities will consist of installing temporary erosion control measures, establishing grading limits, removing structural improvements, and clearing and stripping the site. Subsequent earthwork activities will involve site grading and related infrastructure improvements.

Temporary Erosion Control

The following temporary erosion control measures are offered:

- Temporary construction entrances and drive lanes, consisting of at least six inches of quarry spalls, should be considered to both minimize off-site soil tracking and provide a stable access entrance surface. Placing geotextile fabric underneath the quarry spalls will provide greater stability, if needed.
- Silt fencing should be placed around the site perimeter.
- When not actively graded, soil stockpiles should be covered or otherwise protected.
- Temporary measures for controlling surface water runoff, such as interceptor trenches, sumps, or swales, should be installed prior to beginning earthwork activities.
- Dry soils disturbed during construction should be wetted to minimize dust and airborne soil erosion.

Additional Best Management Practices (BMPs), as specified by the project civil engineer and indicated on the plans, should be incorporated into construction activities. Temporary erosion control measures should be actively managed and may be modified during construction as site conditions require, to ensure proper performance.

Stripping

Topsoil was generally encountered within the upper approximately six inches at the test pit locations. The organic-rich topsoil should be stripped and segregated into a stockpile for later use on site or to haul off site. The material remaining immediately below the topsoil may have some root zones and will likely be variable in composition, density, and/or moisture content. The material exposed after initial topsoil stripping will likely not be suitable for direct structural support as is and will likely need to be compacted in place or stripped and stockpiled for reuse as fill; depending on the time of year stripping occurs, the soil exposed below the topsoil may be too wet to compact and may need to be aerated or treated. ESNW should observe initial stripping activities to provide recommendations regarding stripping depths and material suitability.

Excavations and Slopes

Based on the soil conditions observed at the subsurface exploration locations, the maximum allowable temporary slope inclinations provided below may be used. The applicable Federal Occupation Safety and Health Administration and Washington Industrial Safety and Health Act soil classifications are also provided.

- Areas exposing groundwater seepage 1.5H:1V (Type C)
- Loose soil; fill 1.5H:1V (Type C)
- Medium dense to dense native soil 1H:1V (Type B)

Permanent slopes should maintain a gradient of 2H:1V or flatter and should be planted with vegetation to both enhance stability and minimize erosion. The presence of perched groundwater may cause localized sloughing of temporary slopes. An ESNW representative should observe temporary and permanent slopes to confirm the slope inclinations are suitable for the exposed soil conditions and to provide additional excavation and slope recommendations as necessary. If the recommended temporary slope inclinations cannot be achieved, temporary shoring may be necessary to support excavations.

In-situ and Imported Soils

The soils encountered during our subsurface exploration have a high sensitivity to moisture and were generally in a moist to wet condition at the time of the exploration (February 2021). The native soils on this site are not suitable for use as structural fill unless the moisture content is at or slightly above optimum (about 2 percent) at the time of placement and compaction. Exposed soils will degrade rapidly if exposed to wet weather and/or construction traffic. In general, soils encountered during site excavations that are excessively over the optimum moisture content will require aeration or treatment prior to placement and compaction. Conversely, soils that are substantially below the optimum moisture content will require moisture conditioning through the addition of water prior to use as structural fill. An ESNW representative should determine the suitability of in-situ soils for use as structural fill at the time of construction.

Imported soil intended for use as structural fill should consist of a well-graded, granular soil with a moisture content that is at (or slightly above) the optimum level. During wet weather conditions, imported soil intended for use as structural fill should consist of a well-graded, granular soil with a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction).

Wet-Season Grading

Because the site soils are highly sensitive to moisture, grading during the rainy season or when the soils are over the optimum moisture content will be very difficult. If grading takes place during the winter, spring, or early summer months, a contingency in the project budget should be included to allow for export of native soil and import of structural fill.

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, roadway, permanent slope, retaining wall, utility trench, and vault backfill areas. Soils placed in structural areas should consist of a granular material devoid of deleterious debris and organics, placed in loose lifts of 12 inches or less and compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by the Modified Proctor Method (ASTM D-1557).

Foundations

The proposed residential structures may be supported on conventional spread and continuous footings bearing on competent native soil, recompacted native soil, or new structural fill placed directly on competent native soil. In general, competent native soil suitable for the support of foundations will likely be encountered at depths of about two to four feet bgs. ESNW should evaluate the design subgrade conditions to confirm suitable conditions are exposed and to provide additional preparation recommendations, where necessary. Where loose, organic, or otherwise unsuitable soil conditions are observed at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with granular structural fill, will likely be necessary.

Provided the structures will be supported as described above, the following parameters can be used for design of the new foundations:

- Allowable soil bearing capacity 2,500 psf
- Passive earth pressure 300 pcf (equivalent fluid)
- Coefficient of friction 0.40

The passive earth pressure and coefficient of friction values include a safety factor of 1.5. A one-third increase in the allowable soil bearing capacity may be assumed for short-term wind and seismic loading conditions. With structural loading as expected, total settlement in the range of 1 inch is anticipated, with differential settlement of about 0.5 inch. The majority of settlement should occur during construction, as dead loads are applied.

Seismic Design

The 2015 International Building Code recognizes the American Society of Civil Engineers (ASCE) for seismic site class definitions. In accordance with Table 20.3-1 of the ASCE Minimum Design Loads for Buildings and Other Structures manual, Site Class D should be used for design. While the explorations were limited to the upper approximately eight feet across the site, dense glacial till deposits were identified. This geologic deposit is dense and is underlain by a sequence of similar deposits. On this basis, the exploration completed on this site adequately characterizes the depositional environment to support this seismic site class.

Please note that if this project will adhere to 2018 IBC design guidelines, due to updated site class characterization requirements, additional coordination with the structural engineer and potential additional work may be required to fully comply with the code requirements. On this basis, the Seismic Site Class D may be considered a preliminary classification.

Liquefaction is a phenomenon where saturated or loose soils suddenly lose internal strength and behave as a fluid. This behavior is in response to soil grain contraction and increased pore water pressures resulting from an earthquake or other intense ground shaking. In our opinion, the site soils would exhibit a low risk of susceptibility to liquefaction. The relative density of native soils and lack of a shallow groundwater table is the primary basis for this opinion.

Slab-on-Grade Floors

Slab-on-grade floors should be supported on a firm and unyielding subgrade consisting of competent native soil or new structural fill. Unstable or yielding areas of the subgrade should be recompacted or overexcavated and replaced with suitable structural fill prior to construction of the slab. A capillary break, consisting of a minimum of four inches of free-draining crushed rock or gravel, should be placed below the slab. The free-draining material should have a fines content of 5 percent or less defined as the percent passing the number 200 sieve based on the minus three-quarters inch fraction. In areas where slab moisture is undesirable, installation of a vapor barrier below the slab should be considered. If used, the vapor barrier should consist of a material specifically designed to function as a vapor barrier and should be installed in accordance with the manufacturer's specifications.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. The following parameters may be used for design:

- Active earth pressure (unrestrained condition) — 35 pcf (equivalent fluid)
- At-rest earth pressure (restrained condition) — 55 pcf
- Traffic surcharge (passenger vehicles) — 70 psf (rectangular distribution) *
- Passive earth pressure — 300 pcf (equivalent fluid)
- Coefficient of friction — 0.40
- Seismic surcharge — 8H psf**

* *Where applicable*
** *Where H equals the retained height (in feet)*

The above design parameters are based on a level backfill condition and level grade at the wall toe. Revised design values will be necessary if sloping grades are to be used above or below retaining walls. Additional surcharge loading from adjacent foundations, sloped backfill, or other relevant loads should be included in the retaining wall design, where applicable. A safety factor of 1.5 is included in the passive earth pressure and coefficient of friction values.

Retaining walls should be backfilled with free-draining material or suitable sheet drainage that extends along the height of the wall and a distance of at least 18 inches behind the wall. The upper 12 inches of the wall backfill can consist of a less permeable soil, if desired. A perforated drainpipe should be placed along the base of the wall and connected to an approved discharge location. A typical retaining wall drainage detail is provided on Plate 3. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Landscape Retaining Walls

Based on the existing site grades, retaining walls may be used along the western portions of the lots to raise grades for new building pads. Final wall heights, alignments and facing materials have not been determined at the time of this report. Walls over four feet in total height, including toe embedment will require building permits supported by an engineered design. ESNW can prepare and engineered retaining wall design, upon request. ESNW should review the final grading plans to confirm the recommendations are incorporated and to provide additional recommendations where appropriate.

Drainage

Groundwater seepage was encountered at the majority of the test pit locations during our exploration; as such, groundwater seepage will likely be encountered within site excavations, particularly utility trenches and deeper excavations such as detention vault/pond areas. Temporary measures to control surface water runoff and groundwater during construction would likely involve passive elements, such as interceptor trenches and sumps. ESNW should be consulted during preliminary grading to identify areas of groundwater and to provide recommendations to reduce the potential for instability related to groundwater effects. Depending on the flow volumes encountered during grading, an interceptor trench drain system may be warranted along the up-slope perimeter of the work area to help mitigate or otherwise control shallow perched groundwater flows. We recommend conducting additional test pits under the observation of ESNW during the stripping process to further characterize the groundwater conditions on this site.

Finish grades must be designed to direct surface water away from the new structures and/or slopes for a distance of at least 10 feet or as setbacks allow. Water must not be allowed to pond adjacent to the new structures and/or slopes. A typical foundation drain detail is provided on Plate 4.

Preliminary Stormwater Vault Design Recommendations

Detention vault foundations should be supported on competent native soil or crushed rock placed directly on a competent native subgrade. Final stormwater vault designs must incorporate adequate space from property boundaries such that temporary excavations to construct the vault structure can be successfully completed or shoring will be required. Perimeter drains should be installed around the vault and conveyed to an approved discharge point. The presence of perched groundwater seepage should be anticipated during excavation activities for the vault.

The following parameters can be used for preliminary stormwater vault design:

- Allowable soil bearing capacity (dense native soil) 5,000 psf
- Active earth pressure 35 pcf
- Active earth pressure (hydrostatic) 80 pcf
- At-rest earth pressure (restrained) 55 pcf
- At-rest earth pressure (restrained, hydrostatic) 100 pcf
- Coefficient of friction 0.40
- Passive earth pressure 300 pcf
- Seismic surcharge 8H*

** Where H equals the retained height.*

Vault walls must be backfilled with at least 18 inches of free-draining material or suitable sheet drainage that extends along the height of the walls. The upper one foot of the wall backfill can consist of a less permeable soil, if desired. A perforated drain pipe should be placed along the base of the vault wall and connected to an approved discharge location. If the elevation of the vault bottom is such that gravity flow to an outlet is not possible, the portion of the vault below the drain should be designed to include hydrostatic pressure. Design values accounting for hydrostatic pressure are included above.

ESNW should observe grading operations for the vault and the subgrade conditions prior to concrete forming and pouring to confirm conditions are as anticipated, and to provide supplemental recommendations as necessary. Additionally, ESNW should be contacted to review final vault designs to confirm that appropriate geotechnical parameters have been incorporated.

Utility Support and Trench Backfill

The native soils observed at the test pit locations are generally suitable for support of utilities; however, the native soils may not be suitable for use as structural backfill in the utility trench excavations unless the soil is at or near the optimum moisture content at the time of placement and compaction. Moisture conditioning or cement treatment of the soils may be necessary at some locations prior to use as structural fill. If utility backfill occurs during wet weather, cement treatment of native soils or import of a suitable material will be necessary. Utility trench backfill should be placed and compacted to the specifications of structural fill provided in this report, or to the applicable requirements of presiding jurisdiction.

Preliminary Pavement Sections

The performance of site pavements is largely related to the condition of the underlying subgrade. To ensure adequate pavement performance, the subgrade should be in a firm and unyielding condition when subjected to proofrolling with a loaded dump truck. Structural fill in pavement areas should be compacted to the specifications detailed in the *Site Preparation and Earthwork* section of this report. It is possible that soft, wet, or otherwise unsuitable subgrade areas may still exist after base grading activities. Areas of unsuitable or yielding subgrade conditions may require remedial measures such as overexcavation and replacement with structural fill or thicker crushed rock sections prior to pavement. Cement treatment of the subgrade soil can also be considered for stabilizing pavement subgrade areas.

For lightly loaded pavement areas subjected primarily to passenger vehicles, the following preliminary pavement sections may be considered:

- A minimum of two inches of hot mix asphalt (HMA) placed over four inches of crushed rock base (CRB), or;

- A minimum of two inches of HMA placed over three inches of asphalt treated base (ATB).

Heavier traffic areas generally require thicker pavement sections depending on site usage, pavement life expectancy, and site traffic. For preliminary design purposes, the following pavement sections for occasional truck traffic areas may be considered:

- Three inches of HMA placed over six inches of crushed rock base (CRB), or;

- Three inches of HMA placed over four-and-one-half inches of ATB.

The HMA, CRB and ATB materials should conform to WSDOT specifications. While the pavement sections above will provide an adequate level of service for the traffic types and loading estimates, the city of Monroe minimum pavement requirements supersede our recommendations and may require thicker pavement sections.

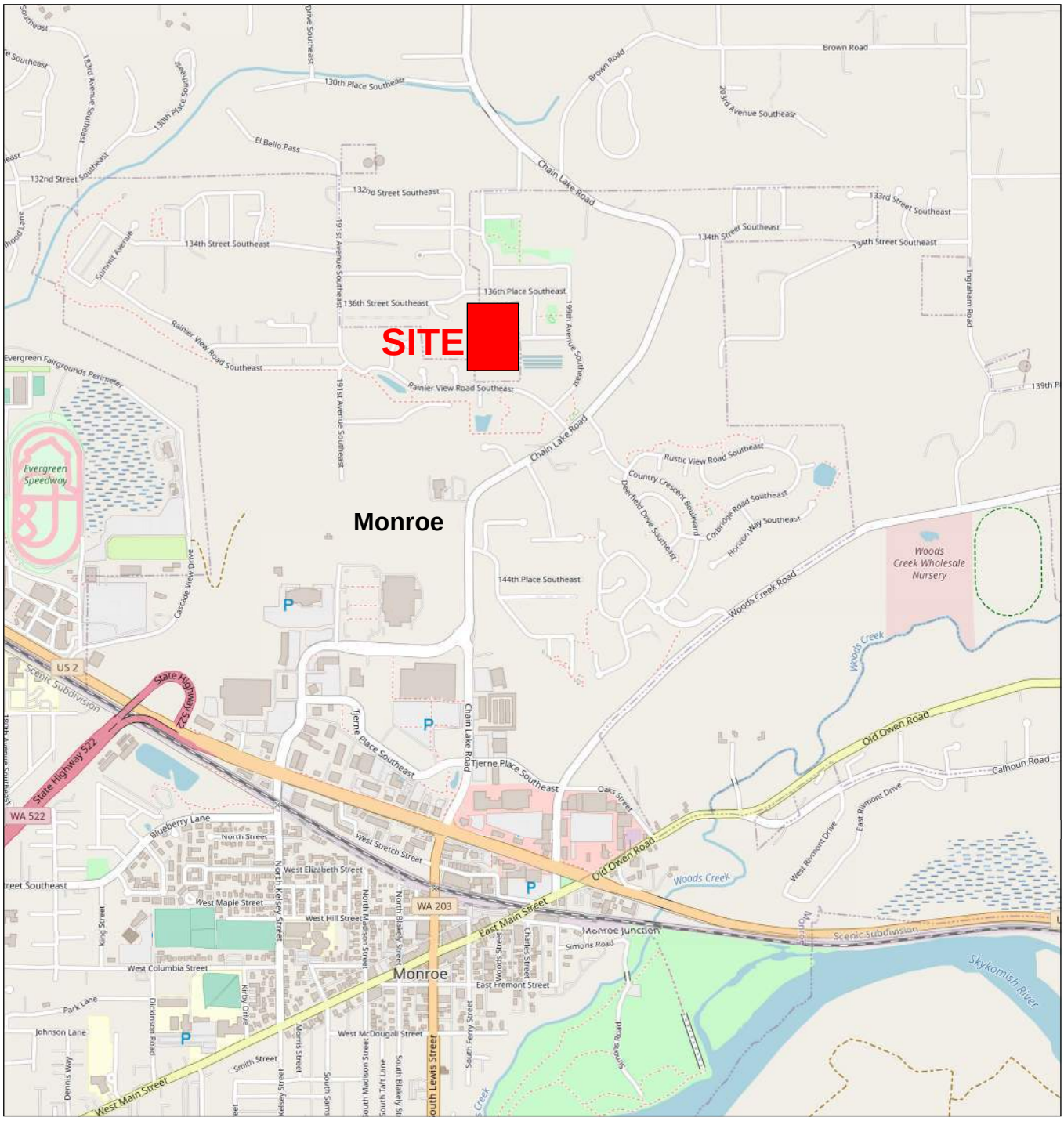
If pavement areas will include a reverse crown or if groundwater seepage is exposed at subgrade elevations, additional drainage should be used to effectively convey water that may enter the subgrade toward the storm drainage system. ESNW can provide recommendations for subgrade drainage upon request.

LIMITATIONS

The recommendations and conclusions provided in this study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is neither expressed nor implied. Variations in the soil and groundwater conditions observed at the test locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions provided in this study if variations are encountered.

Additional Services

ESNW should have an opportunity to review final project plans with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.



Reference:
Snohomish County, Washington
OpenStreetMap.org

NORTH

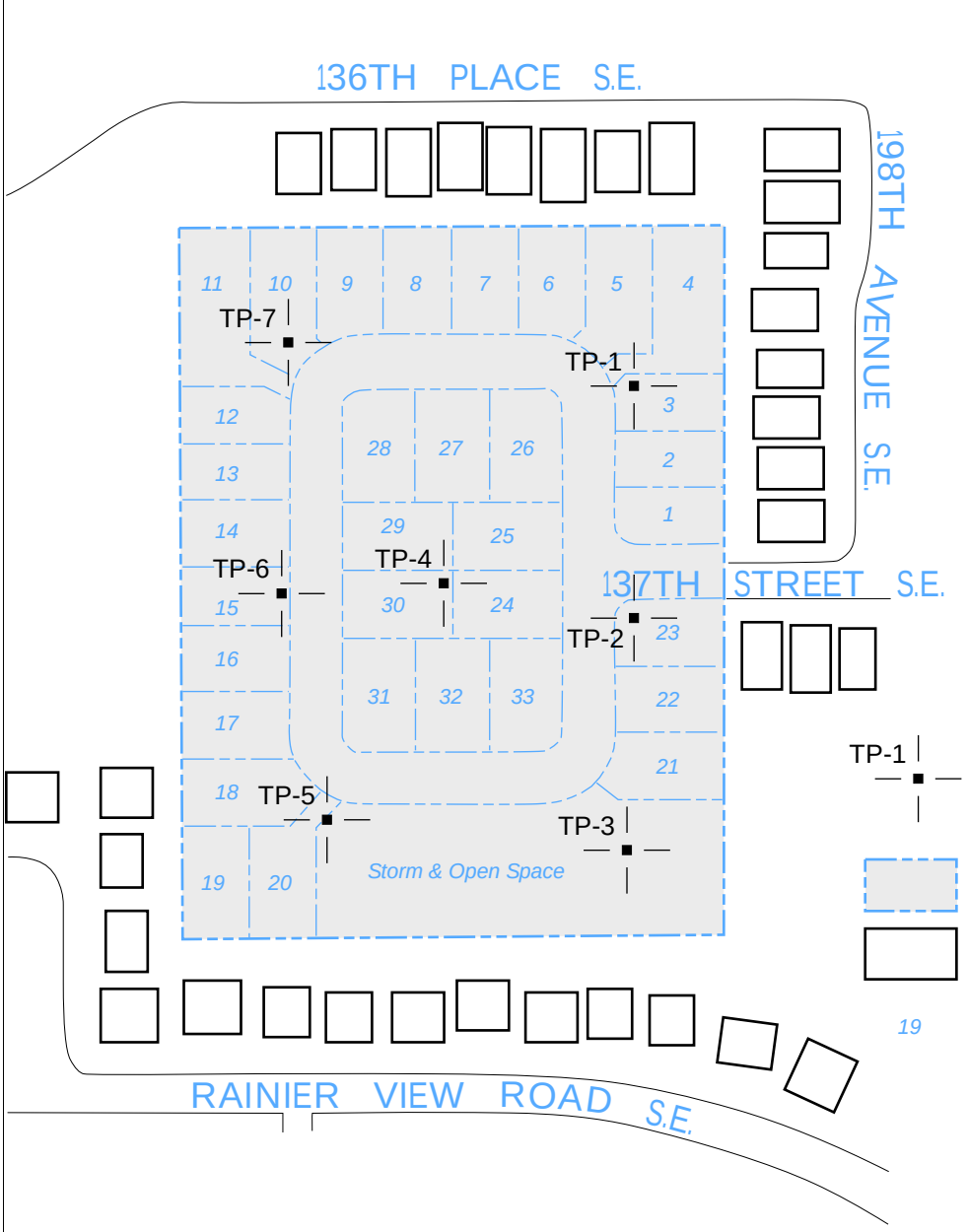
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Chebuhar Short Plat
Monroe, Washington

Drwn. CAM	Date 04/14/2021	Proj. No. 7734
Checked SSR	Date Apr. 2021	Plate 1



NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

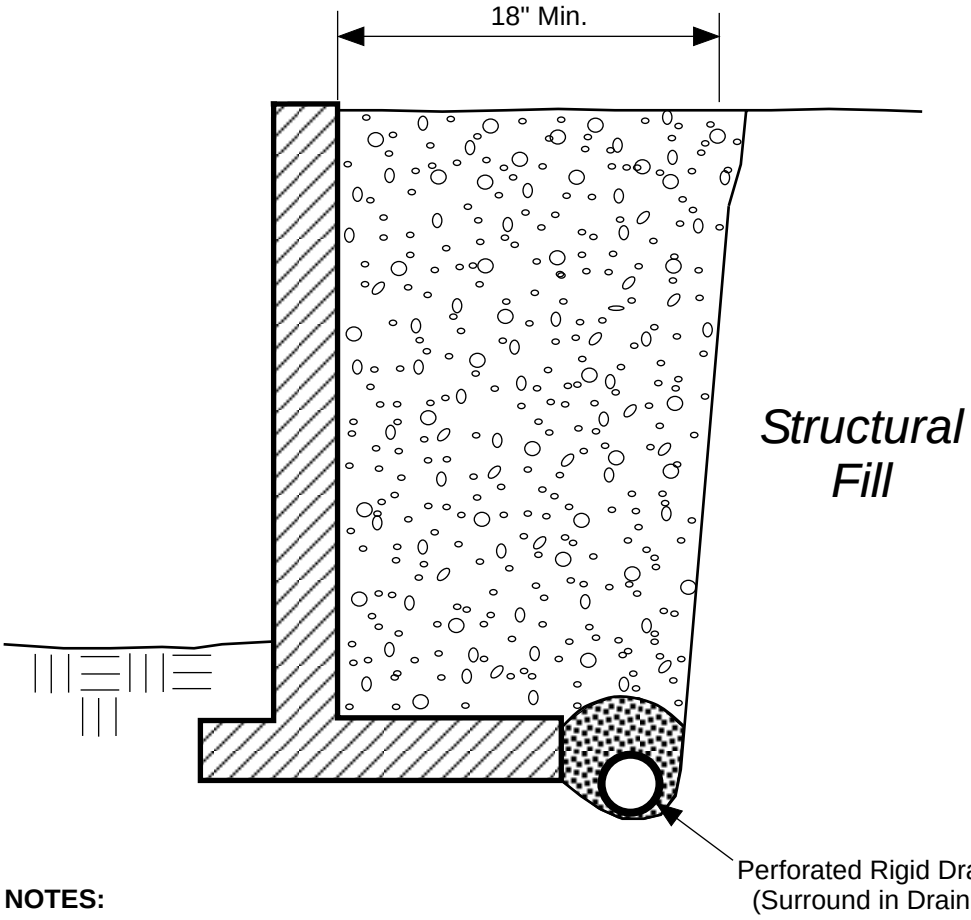
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Chebuhar Short Plat
Monroe, Washington

Drwn. CAM	Date 04/14/2021	Proj. No. 7734
Checked SSR	Date Apr. 2021	Plate 2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

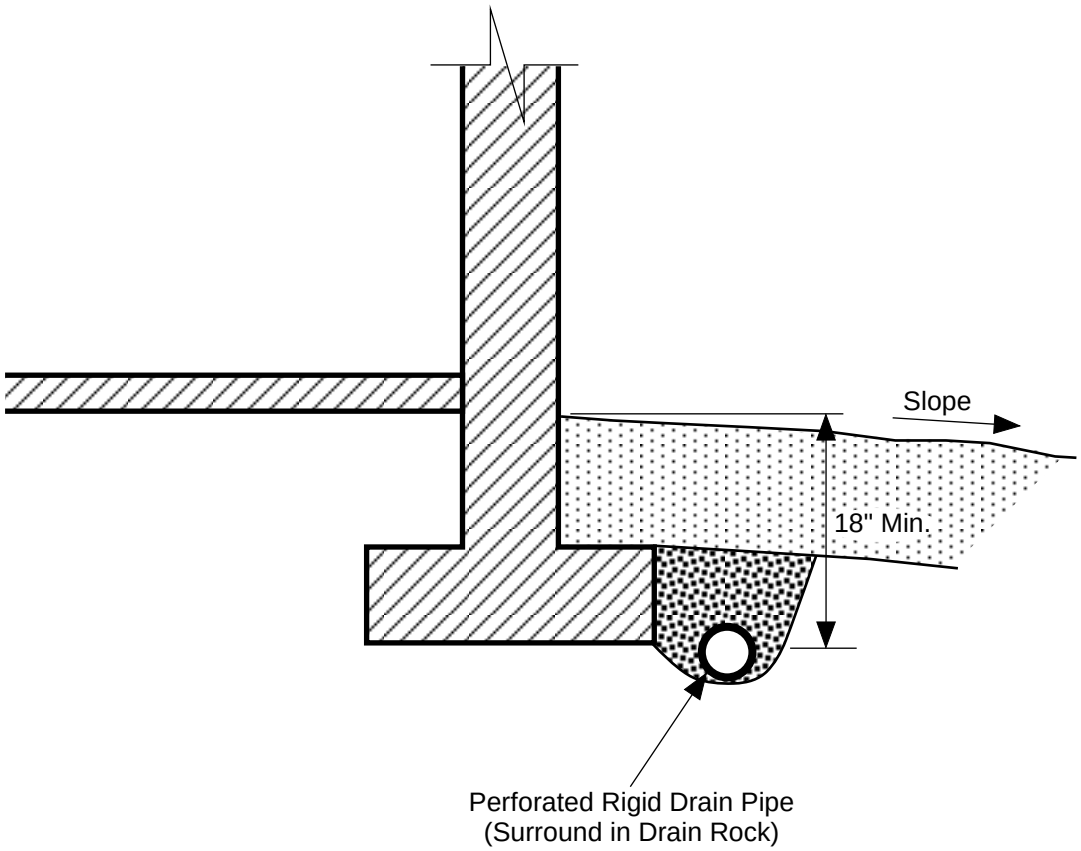
Free-draining Structural Backfill

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
Chebuhar Short Plat
Monroe, Washington

Drwn. CAM	Date 04/14/2021	Proj. No. 7734
Checked SSR	Date Apr. 2021	Plate 3



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
Chebuhar Short Plat
Monroe, Washington

Drwn. CAM	Date 04/14/2021	Proj. No. 7734
Checked SSR	Date Apr. 2021	Plate 4

Appendix A

Subsurface Exploration
Test Pit Logs

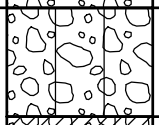
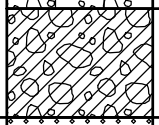
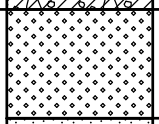
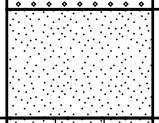
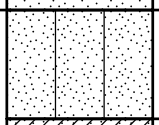
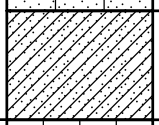
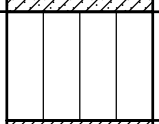
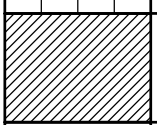
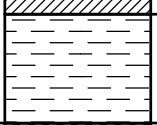
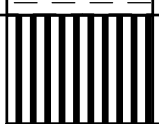
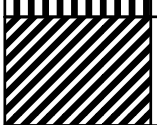
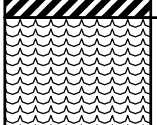
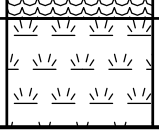
ES-7734

Subsurface conditions at the subject site were explored on February 5, 2021 by excavating seven test pits using a mini-trackhoe and operator provided by the client. The approximate locations test pits are illustrated on Plate 2 of this study. The test pit logs are provided in this Appendix. The maximum exploration depth was approximately 11 feet bgs and were terminated in firm native soils.

The final logs represent the interpretations of the field logs and the results of laboratory analyses. The stratification lines on the logs represent the approximate boundaries between soil types. In actuality, the transitions may be more gradual.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Surface Conditions: grass on fill **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			SM		Brown silty SAND with gravel, medium dense, moist (Fill)
					-asphalt chunks in upper 1'
					-topsoil horizon at 3'
				3.0	
		MC = 10.5% Fines = 20.1%			Brown silty SAND with gravel, medium dense, wet
					-moderate groundwater seepage
					-becomes gray, dense to very dense [USDA Classification: very gravelly coarse sandy LOAM]
5			SM		-becomes very dense
		MC = 7.5%		8.5	

Test pit terminated at 8.5 feet below existing grade. Groundwater seepage encountered at 3.5 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL, minimal root intrusions
				0.5	Brown silty SAND with gravel, medium dense, damp
			SM		-moderate groundwater seepage -becomes gray, very dense, moist
5				5.0	Gray silty GRAVEL with sand, very dense, damp
		MC = 7.3% Fines = 12.9%	GM	9.0	[USDA Classification: extremely gravelly coarse sandy LOAM]
					Test pit terminated at 9.0 feet below existing grade. Groundwater seepage encountered at 2.0 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL
				0.5	Brown silty SAND with gravel, medium dense, wet
		MC = 54.7%	SM		-minor groundwater seepage
					-becomes gray, very dense, moist
5				5.0	
			GP-GM		Gray poorly graded GRAVEL with silt and sand, very dense, damp
		MC = 9.2%			-minor caving to BOH
10					
		MC = 5.8%		11.0	[USDA Classification: extremely gravelly sandy LOAM]
		Fines = 7.7%			Test pit terminated at 11.0 feet below existing grade. Groundwater seepage encountered at 2.5 feet during excavation. Caving observed from 5.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-4

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL, minimal root intrusions
				0.5	Brown silty SAND with gravel, medium dense, damp
					-minor groundwater seepage
					-becomes gray, very dense, moist
5			SM		
		MC = 9.6%		8.5	

Test pit terminated at 8.5 feet below existing grade. Groundwater seepage encountered at 2.0 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-5

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL	0.5	Dark brown TOPSOIL, minimal root intrusions
			SM		Brown silty SAND with gravel, medium dense, wet
					-heavy groundwater seepage
					-becomes gray, dense
5		MC = 17.3%		5.0	

Test pit terminated at 5.0 feet below existing grade due to seepage. Groundwater seepage encountered at 3.0 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-6

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL, minimal root intrusions
0.5					Brown silty SAND with gravel, medium dense, wet
			SM		-heavy groundwater seepage
		MC = 41.4% Fines = 35.5%			[USDA Classification: gravelly LOAM]
3.5					Test pit terminated at 3.5 feet below existing grade due to heavy seepage. Groundwater seepage encountered at 2.0 feet during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-7

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat

DATE STARTED 2/5/21 **COMPLETED** 2/5/21 **GROUND ELEVATION** _____ **TEST PIT SIZE** _____

EXCAVATION CONTRACTOR Client Provided **GROUND WATER LEVELS:**

EXCAVATION METHOD _____ **AT TIME OF EXCAVATION** ---

LOGGED BY SES **CHECKED BY** SSR **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL, minimal root intrusions
				0.5	Brown silty SAND with gravel, medium dense, damp
		MC = 22.1%			-minor groundwater seepage
					-becomes gray, very dense
5			SM		
		MC = 9.4% Fines = 17.7%		9.0	[USDA Classification: very gravelly coarse sandy LOAM]
					Test pit terminated at 9.0 feet below existing grade. Groundwater seepage encountered at 1.5 feet during excavation. No caving observed.

Appendix B

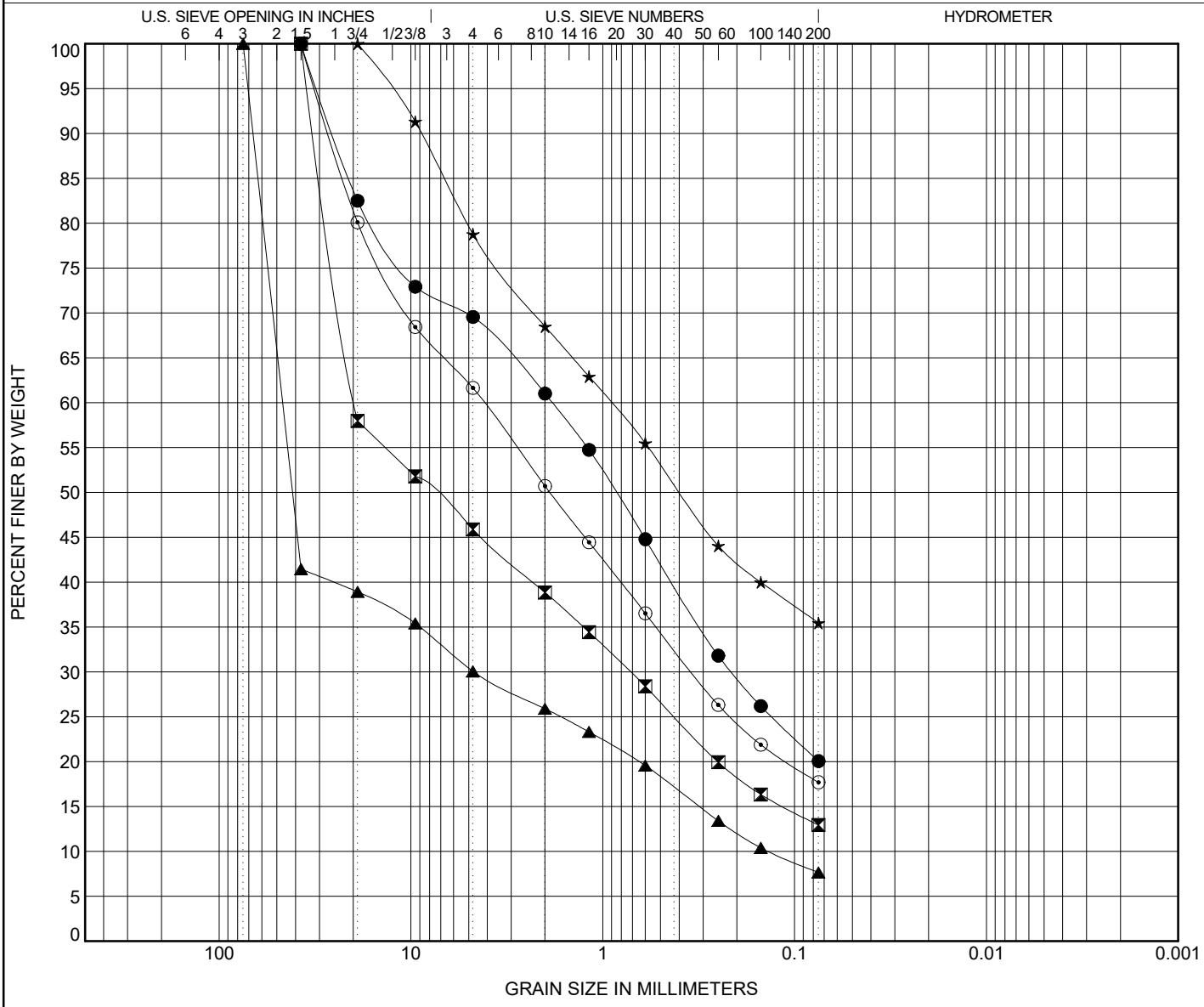
Laboratory Test Results

ES-7734

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-7734 **PROJECT NAME** Chebuhar Short Plat



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-01	4.00ft.	USDA: Brown Very Gravelly Coarse Sandy Loam. USCS: SM with Gravel.		
⊠	TP-02	9.00ft.	USDA: Gray Extremely Gravelly Coarse Sandy Loam. USCS: GM with Sand.		
▲	TP-03	11.00ft.	USDA: Gray Extremely Gravelly Sandy Loam. USCS: GP-GM with Sand.	3.48	343.88
★	TP-06	3.50ft.	USDA: Brown Gravelly Loam. USCS: SM with Gravel.		
⊙	TP-07	9.00ft.	USDA: Brown Very Gravelly Coarse Sandy Loam. USCS: SM with Gravel.		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	4.0ft.	37.5	1.836	0.212					20.1	
⊠	TP-02	9.0ft.	37.5	19.63	0.719					12.9	
▲	TP-03	11.0ft.	75	46.707	4.696	0.136				7.7	
★	TP-06	3.5ft.	19	0.905						35.5	
⊙	TP-07	9.0ft.	37.5	4.172	0.343					17.7	

GRAIN SIZE USDA ES-7734 CHEBUHAR SHORT PLAT.GPJ GINT US LAB.GDT 2/19/21

Report Distribution

ES-7734

EMAIL ONLY

Prospect Development, LLC
2913 – 5th Avenue Northeast, Suite 201
Puyallup, Washington 98372

Attention: Mr. Justin Holland

EMAIL ONLY

Mr. Clay Loomis

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

COOPER RIDGE

JUNE 2021

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

COOPER RIDGE

JUNE 2021

PROJECT LOCATION
19785 137TH STREET SOUTHEAST
MONROE, WASHINGTON 98272

PREPARED FOR
JUSTIN HOLLAND
PROSPECT DEVELOPMENT
2913 5TH AVENUE NORTHEAST, SUITE 201
PUYALLUP, WASHINGTON 98732

PREPARED BY
SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Prospect Development (Applicant) with a Wetland and Fish and Wildlife Habitat Assessment for the proposed residential development of an 8.35-acre site located at 19785 137th Street Southeast in the City of Monroe, Washington. The subject property consists of one parcel situated in the Northwest ¼ of Section 31, Township 28 North, Range 7 East, W.M. (Snohomish County Tax Parcel 2807310020380).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in January and April of 2021. Using current wetland delineation methodology, no potentially regulated wetlands were identified on the subject property. In addition, no waterbodies or priority habitats or species were identified on the subject property. However, four previously delineated and assessed wetlands (offsite Wetlands A-D) were identified offsite to the south associated with the Sinclair Heights residential plat project (PL 199003). Offsite Wetlands A-D were previously approved in 2004 as Category IV wetlands with associated 35-foot buffers; these wetland buffers are separated from the subject property by residential development and as such do not project on the subject property. No other potentially-regulated wetlands, waterbodies, fish and wildlife habitat, or priority species were identified within 225 feet of the subject property.

Site Map


Data Point
35' Standard Wetland Buffer
Wetland
Site Boundary
SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR
N
DP-1U
DP-2U
DP-3U
Offsite Wetland A Category IV
Offsite Wetland B Category IV
Offsite Wetland C Category IV
Offsite Wetland D Category IV
0
75
150
300 Feet

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Chapter 1. Introduction

Soundview Consultants LLC (SVC) has been assisting Prospect Development (Applicant) with a Wetland and Fish and Wildlife Habitat Assessment for the proposed residential development of an 8.35-acre site located at 19785 137th Street Southeast in the City of Monroe, Washington. The subject property consists of one parcel situated in the Northwest ¼ of Section 31, Township 28 North, Range 7 East, W.M. (Snohomish County Tax Parcel 2807310020380).

The purpose of this wetland and fish and wildlife habitat assessment is to identify the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species on or near the subject site.

This report provides conclusions and recommendations regarding:

- Site description and area of assessment;
- Background research and identification of potentially-regulated critical areas within the vicinity of the proposed project;
- Identification and assessment of potentially-regulated wetlands and other aquatic features;
- Identification and assessment of potentially-regulated fish and wildlife habitat;
- Existing site map detailing identified critical areas and standard buffers; and
- Supplemental information necessary for regulatory review.

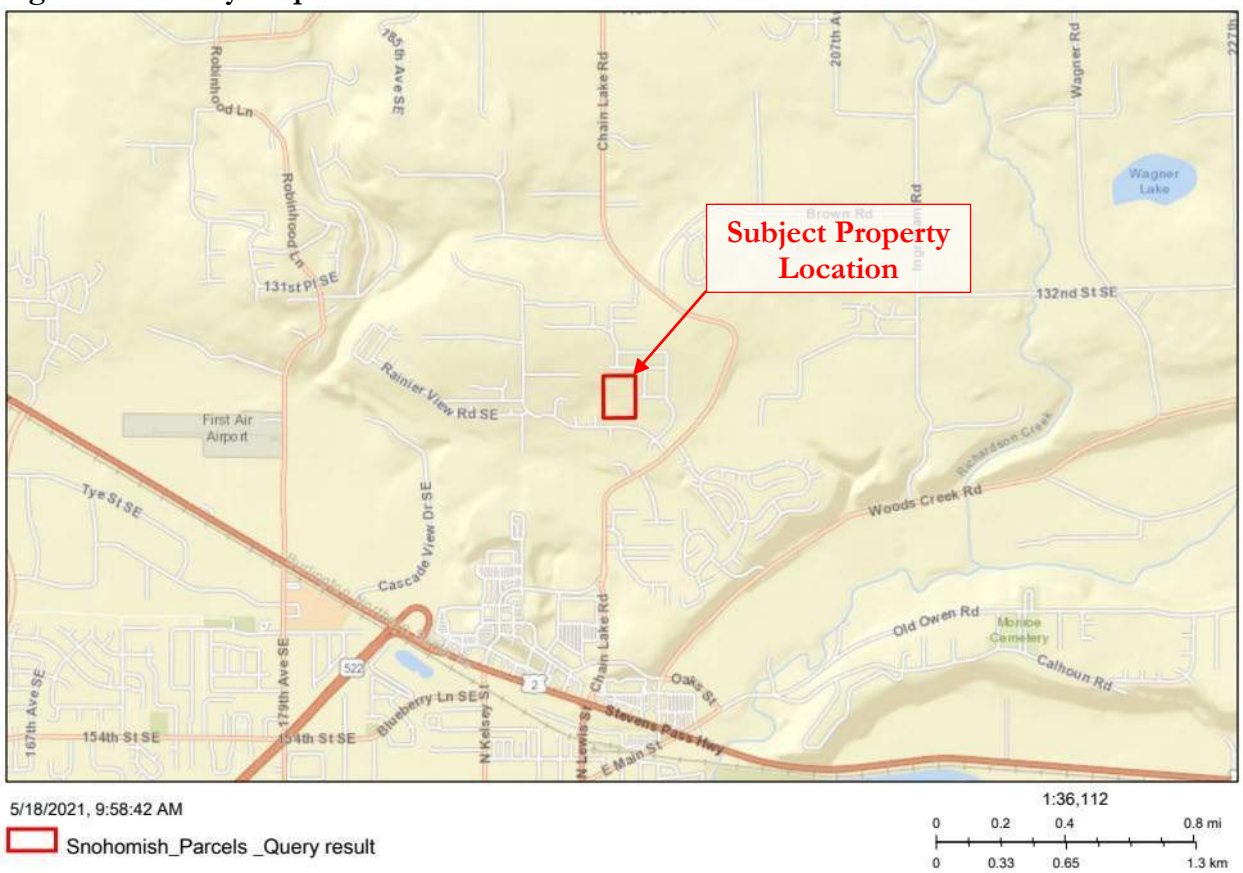
Chapter 2. Proposed Project Location

2.1 Project Location

The subject property consists of an 8.35-acre site located at 19785 137th Street Southeast in the City of Monroe, Washington. The subject property consists of one parcel situated in the Northwest ¼ of Section 31, Township 28 North, Range 7 East, W.M. (Snohomish County Tax Parcel 2807310020380).

To access the subject site from I-5 North, take Washington- 522 East from the Bothell area and take the US-2 East exit after 5.6 miles. After 0.4 mile, turn left onto 195th Avenue Southeast/Chain Lake Road. Continue for 0.9 mile–straight through the traffic circle–and turn left onto Rainier View Road Southeast. Proceed for 280 feet and turn right onto 199th Avenue Southeast. After 0.2 mile, turn left onto 137th Street Southeast, where the subject property will be located at the end of the public roadway.

Figure 1. Vicinity Map.



Chapter 3. Methods

SVC investigated and assessed any potentially-regulated wetlands, drainages, and other fish and wildlife habitat on and within 225 feet of the subject property in January and April of 2021. All determinations were made using observable vegetation, hydrology, and soils in conjunction with data from the U.S. Geological Survey (USGS) topographic maps, National Resource Conservation Service (NRCS) soil survey, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), Washington State Department of Natural Resources (DNR) water typing system, Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) and Salmonscape mapping tools, Snohomish County Geographic Information Systems (GIS) data, and various orthophotographic resources (Appendix B). Appendix A contains further details for the methods and tools used to prepare this report.

Wetlands, streams, and select fish and wildlife habitats and species are regulated features per Monroe Municipal Code (MMC) Chapter 22.80 and subject to restricted uses/activities under the same title. In accordance with MMC 22.80.090, wetland presence/absence was determined using the routine approach described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and modified according to the guidelines established in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE, 2010) and *Field Indicators of Hydric Soils in the United States* (NRCS, 2018). Pink surveyor's flagging was labeled alpha-numerically and tied to 3-foot lath or vegetation at formal sampling locations to mark the points where detailed data was collected (DP-1 to DP-3). Additional tests pits were excavated at regular intervals throughout the site to further confirm wetland absence.

The fish and wildlife habitat assessment were conducted during the same site visit by qualified fish and wildlife biologists. The experienced biologists made visual observations using stationary and walking survey methods for both aquatic and upland habitats noting any special habitat features or signs of fish and wildlife activity.

Chapter 4. Existing Conditions

4.1 Landscape Setting

The 8.35-acre subject property is located in a residential setting in the City of Monroe (Figure 2). The subject property is surrounded by residential plats or single-family residences. Topography onsite slopes moderately to the south with elevations ranging from approximately 330 feet above mean sea level (amsl) on the northeast portion of the subject property to approximately 260 feet amsl on the southeast portion of the subject property. A Snohomish County contours map is provided in Appendix B1. The subject property is located within Water Resource Inventory Area (WRIA) 7 – Snohomish.

Figure 2. Aerial Image of the Subject Property.

4.2 Soils

The NRCS Soil Survey of Snohomish County, Washington identifies one soil series on the subject property: Tokul gravelly medial loam, 0 to 8 percent slopes (72). A soil map is provided in Appendix B2. Below is a detailed description of the soil profile.

Tokul gravelly medial loam, 0 to 8 percent slopes (72)
According to the NRCS survey, Tokul gravelly medial loam, 0 to 8 percent slopes is a moderately well drained soil formed in glacial till and volcanic ash. In a typical profile, the surface layer is

approximately 4 inches thick and is a dark brown gravelly loam. From 4 to 22 inches the subsoil is a brown, strong brown and dark yellowish-brown gravelly loam. From 22 to 31 inches the soil is light olive brown gravelly fine sandy loam. A hard pan is present at a depth of approximately 31 inches. Tokul gravelly medial loam, 0 to 8 percent slopes is listed as a non-hydric soil, but as much as 5 percent of the areas may contain hydric inclusions of McKenna and Norma loams (NRCS, N.d.).

4.3 Vegetation

The subject property consists primarily of maintained lawn/field dominated by colonial bentgrass (*Agrostis capillaris*), orchard grass (*Dactylis glomerata*), hairy cat's ear (*Hypochaeris radicata*), narrowleaf plantain (*Plantago lanceolata*), and common dandelion (*Taraxacum officinale*). A small patch of western red cedar (*Thuja plicata*) and other ornamental plantings are present around the single-family residence on the northern portion of the site.

4.4 Critical Area Inventories

No potential wetlands, waterbodies, or fish and wildlife habitat are mapped within 275 feet of the subject property by the Snohomish County critical areas inventory (Appendix B3), WDFW PHS map (Appendix B4), USFWS NWI map (Appendix B5), DNR water typing map (Appendix B6), or the WDFW SalmonScape map (Appendix B7).

4.5 Precipitation

Precipitation data was acquired from the National Oceanic and Atmospheric Administration (NOAA) station at Seattle-Tacoma International Airport (Sea-Tac) in order to obtain percent of normal precipitation for the general Puget Sound region during and preceding the investigations. A summary of data collected is provided in Table 1.

Table 1. Precipitation Summary[1]

Date	Day Of	Day Before	1 Week Prior	2 Weeks Prior	30 Days Prior (Observed/Normal)	Year to Date (Observed/Normal)[2]	Percent of Normal[3]
1/28/2021	0.27	0.12	0.61	0.81	9.82/5.80	23.15/21.20	169/109
4/13/2021	0.00	0.00	0.00	0.00	2.39/3.89	31.12/31.18	61/100

Notes:
1. Precipitation levels provided in inches. Data obtained from NOAA (http://w2.weather.gov/climate/xmacis.php?wfo=sew) for Sea-Tac International Airport.
2. Year-to-date precipitation is for the 2020/2021 water year from October 1 to the onsite dates.
3. Percent of normal is shown for the last 30 days and 2020/2021 water year to date.

Precipitation levels during the site investigation in January 2021 were above the statistical normal for the prior 30 days (169 percent of normal) and within the normal range for the 2020/2021 water year (109 percent of normal). Precipitation levels during the site investigation in April 2021 were below the statistical normal range for the prior 30 days (61 percent of normal) and within the normal range for the 2020/2021 water year (100 percent of normal). This precipitation data suggest that hydrologic conditions encountered at the time of site investigations may have been slightly wetter (January 2021) and slightly drier (April 2021) than normal. Such conditions were considered in making professional wetland determinations.

Chapter 5. Results

The site investigations in January and April of 2021 did not identify any potentially regulated wetlands, waterbodies, or priority habitats or species on or within 275 feet of the subject property. However, four previously delineated and assessed wetlands (offsite Wetlands A-D) were identified offsite to the south associated with the Sinclair Heights residential plat project (PL 199003).

5.1 Onsite Non-Wetland Findings

During the site investigation conducted in January and April of 2021, it was determined that there were no potentially-regulated wetlands onsite as no areas met all three wetland delineation criteria (a predominance of hydrophytic vegetation, hydric soils, and wetland hydrology) according to current wetland delineation methodology. Three representative data plots (DP-1 to DP-3) were collected to document the non-wetland conditions in the subject property (Appendix D). Data plot DP-1 documents representative upland conditions onsite and data plots DP-2 and DP-3 document non-wetland conditions in a topographic swale/bench on the southeast corner of the site.

Data plot DP-1 is representative of the general upland site conditions and did not meet any three of the required wetland criteria. Data plot DP-1 exhibited no hydrophytic vegetation due to a dominance of facultative upland (FACU) species, including bluegrass species and non-native invasive hairy cats' ear, both of which are commonly found in disturbed upland areas. No facultative-wetland (FACW) or obligate (OBL) plant species were observed, indicating the area does not exhibit consistent wetland hydrology. The non-hydric soils at DP-1 consisted of a very dark grey (7.5YR 3/1) gravelly silt loam in the upper 9 inches and a brown (7.5YR 4/4) gravelly loam in the matrix from 9 to 16 inches below ground surface (bgs), with no redoximorphic concentrations observed. In addition, no indicators of wetland hydrology (including a water table or saturation within 12 inches of the ground surface) were observed.

Data plots DP-2 and DP-3 were excavated in a low topographic swale/bench on the southeast corner of the site. This area exhibited hydrophytic vegetation due to a dominance of tall fescue and Kentucky bluegrass, both facultative plant species that is typical to disturbed and managed upland fields. Data plot DP-3 contained only small amounts of soft rush (*Juncus effusus*), a FACW species, which indicates that the area does not exhibit sufficient hydrology in the early growing season for this species or other FACW or OBL species to persist. The soils at both of these data plots met for hydric soil indicator F6 (Redox Dark Surface) due to the presence of a very dark brown (10YR 2/2) gravelly silt loam surface layer with 5 percent redoximorphic concentrations beginning within 8 inches of the soil surface and extending for at least 4 inches. During the January 2021 site investigation in the middle of the wet season and during elevated precipitation levels (refer to Section 4.5 above), soil saturation and a groundwater table were observed within this area (11 inches below ground surface, respectively); however, no primary indicators of wetland hydrology (including a water table or saturation within 12 inches of the ground surface) were observed during the April 2021 site investigation early in the growing season. Due to the lack of wetland hydrology early in the growing season, this area was determined to not meet wetland criteria. As none of the three data plots met all three wetland criteria, the subject property was determined to be unencumbered by potentially regulated wetlands.

5.2 Offsite Wetland Findings

Four previously delineated and assessed wetlands (offsite Wetlands A-D) were identified offsite to the south associated with the Sinclair Heights residential plat project (PL 199003). Offsite Wetlands A-D were previously approved in 2004 as Category IV wetlands with associated 35-foot buffers; these wetland buffers are separated from the subject property by residential development and as such do not project on the subject property. Please refer to the Existing Conditions Exhibit in Appendix C and the Sinclair Heights Plat Drainage Exhibit in Appendix E for the locations of these offsite wetlands. Please note that SVC utilizes a different wetland naming convention.

Chapter 6. Regulatory Considerations

The site investigations in January and April of 2021 did not identify any potentially regulated wetlands, waterbodies, or priority habitats or species on or within 275 feet of the subject property. However, four previously delineated and assessed wetlands (offsite Wetlands A-D) were identified offsite to the south associated with the Sinclair Heights residential plat project (PL 199003).

6.1 Local Considerations

6.1.1 Wetland Buffer Standards

Four previously delineated and assessed wetlands (offsite Wetlands A-D) were identified offsite to the south associated with the Sinclair Heights residential plat project (PL 199003). Offsite Wetlands A-D were previously approved in 2004 as Category IV wetlands with associated 35-foot buffers under prior City of Monroe critical areas code; these wetland buffers are separated from the subject property by residential development and as such do not project on the subject property.

Chapter 7. Closure

The findings and conclusions documented in this report have been prepared for specific application to the Cooper Ridge project. They have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this project may need to be revised wholly or in part.

All critical areas determinations by SVC are based on conditions present at the time of the site inspection and considered preliminary until the site conditions are validated by the jurisdictional agencies. As critical areas, including wetlands and waterbodies, are dynamic communities affected by both natural and human activities, changes in critical area determinations may be expected; therefore, critical area assessments cannot remain valid for an indefinite period of time. Local agencies typically recognize the validity of critical area assessments for a period of five years after completion of a critical areas report. Development activities on a site five years after the completion of this report may require revision of the critical areas determination. In addition, changes in government codes, regulations, or laws may occur. Due of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Chapter 8. References

Debose, Alfonso and M. W. Klungland. 1983. *Soil Survey of Snohomish County Area, Washington*. Soil Conservation Service United States Department of Agriculture, Soil Conservation Service, in cooperation with the Washington Agricultural Experiment Station. Natural Resource Conservation Service.

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Appendix A — Methods and Tools

Table A1. Methods and tools used to prepare the report.

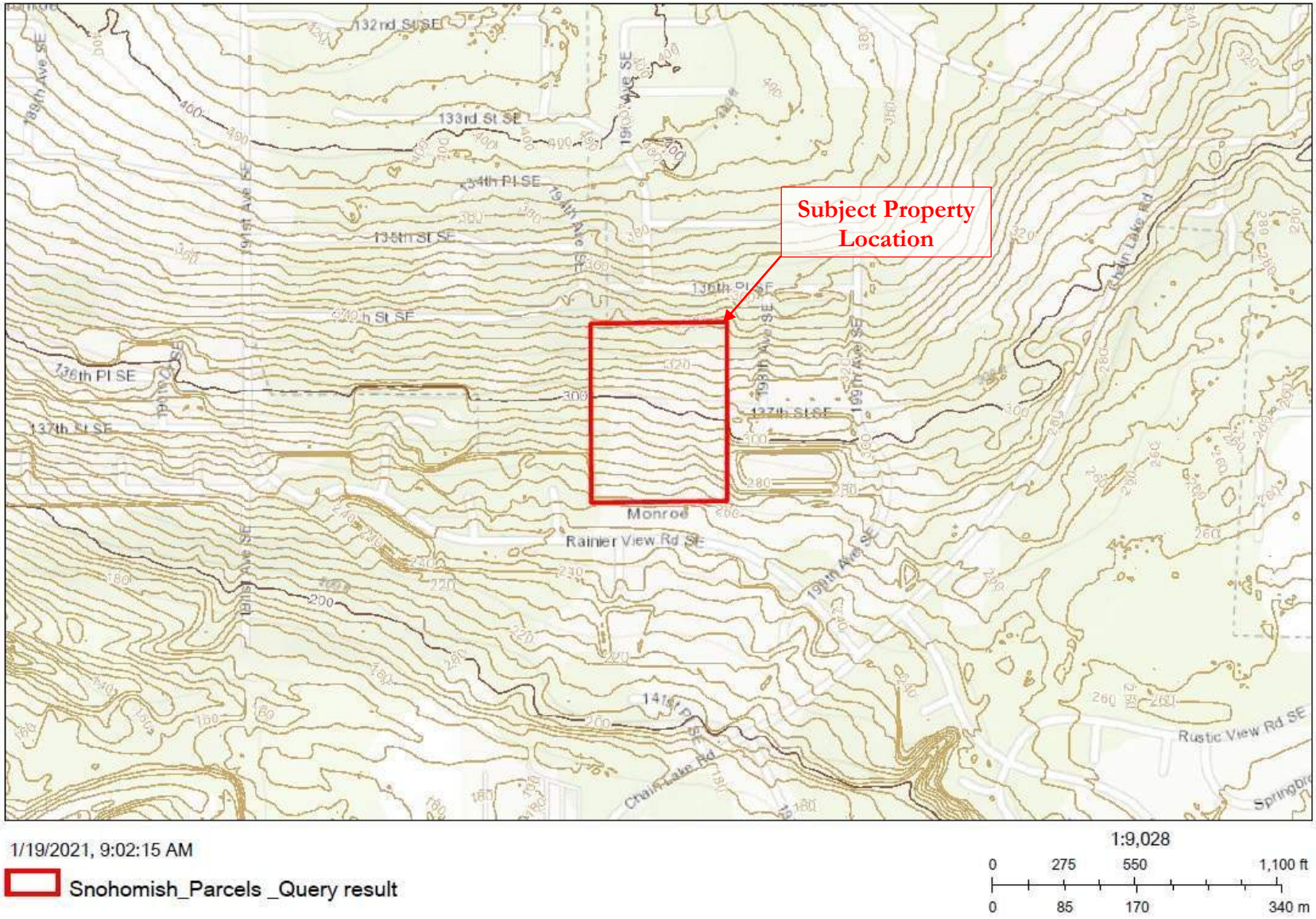
Parameter	Method or Tool	Website	Reference
Wetland Presence/ Absece	USACE 1987 Wetland Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**Environmental Laboratory.** 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Western Mountains, Valleys, and Coast Region Regional Supplement	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf	**U.S. Army Corps of Engineers.** 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Indicator Status	2018 National Wetland Plant List	http://wetland-plants.usace.army.mil/	**USACE.** 2018. *National Wetland Plant List, version 3.4.* Website.
Plant Names and Identification	USDA Plant Database	http://plants.usda.gov/	Website.
	Flora of the Pacific Northwest	http://www.pnwherbaria.org/florapnw.php	**Hitchcock**, C.L. & A. Cronquist, Ed. by D. Giblin, B. Ledger, P. Zika, and R. Olmstead. 2018. Flora of the Pacific Northwest, 2nd Edition. U.W. Press and Burke Museum. Seattle, Washington.
Soils Data	NRCS Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/	Website GIS data based upon: **Debose**, Alfonso and M. W. Klungland. 1983. *Soil Survey of Snohomish County Area, Washington.* Soil Conservation Service United States Department of Agriculture, Soil Conservation Service, in cooperation with the Washington Agricultural Experiment Station. Natural Resource Conservation Service.
	Soil Color Charts		**Munsell®** Color. 2000. Munsell® Soil Color Charts. New Windsor, New York.
	Soil Data Access Hydric Soils List	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316620.html	**Natural Resources Conservation Service.** N.d. Soil Data Access Hydric Soils List (Soil Data Access Live).
	Field Indicators of Hydric Soils	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf	**NRCS.** 2018. *Field Indictors of Hydric Soils in the United States, Version 8.2. L.M. Vasialas, G.W. Hurt, and C.V. Noble (eds.).* USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.
Threatened and Endangered Species	Washington Natural Heritage Program	http://data-wadnr.opendata.arcgis.com/datasets/wnhp-current-element-occurrences	**Washington Natural Heritage Program**. Endangered, threatened, and sensitive plants of Washington. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA

Parameter	Method or Tool	Website	Reference
	Washington Priority Habitats and Species	http://wdfw.wa.gov/hab/phspage.htm	**Priority Habitats and Species (PHS) Program** Map of priority habitats and species in project vicinity. Washington Department of Fish and Wildlife.
Species of Local Importance	WDFW GIS Data	http://wdfw.wa.gov/mapping/salmonscape/	Website
Report Preparation	Monroe Municipal Code	https://monroe.municipal.codes/MMC/22.80	MMC Chapter 22.80 –Critical Areas

Appendix B — Background Information

This appendix includes a Snohomish County Contours Map (B1); NRCS Soil Survey Map (B2); Snohomish County Critical Areas Inventory (B3); WDFW PHS Map (B4); USFWS NWI Map (B5); DNR Stream Typing Map (B6); and WDFW SalmonScape Map (B7).

Appendix B1 — Snohomish County Contours Map



Appendix B2 — NRCS Soil Survey Map

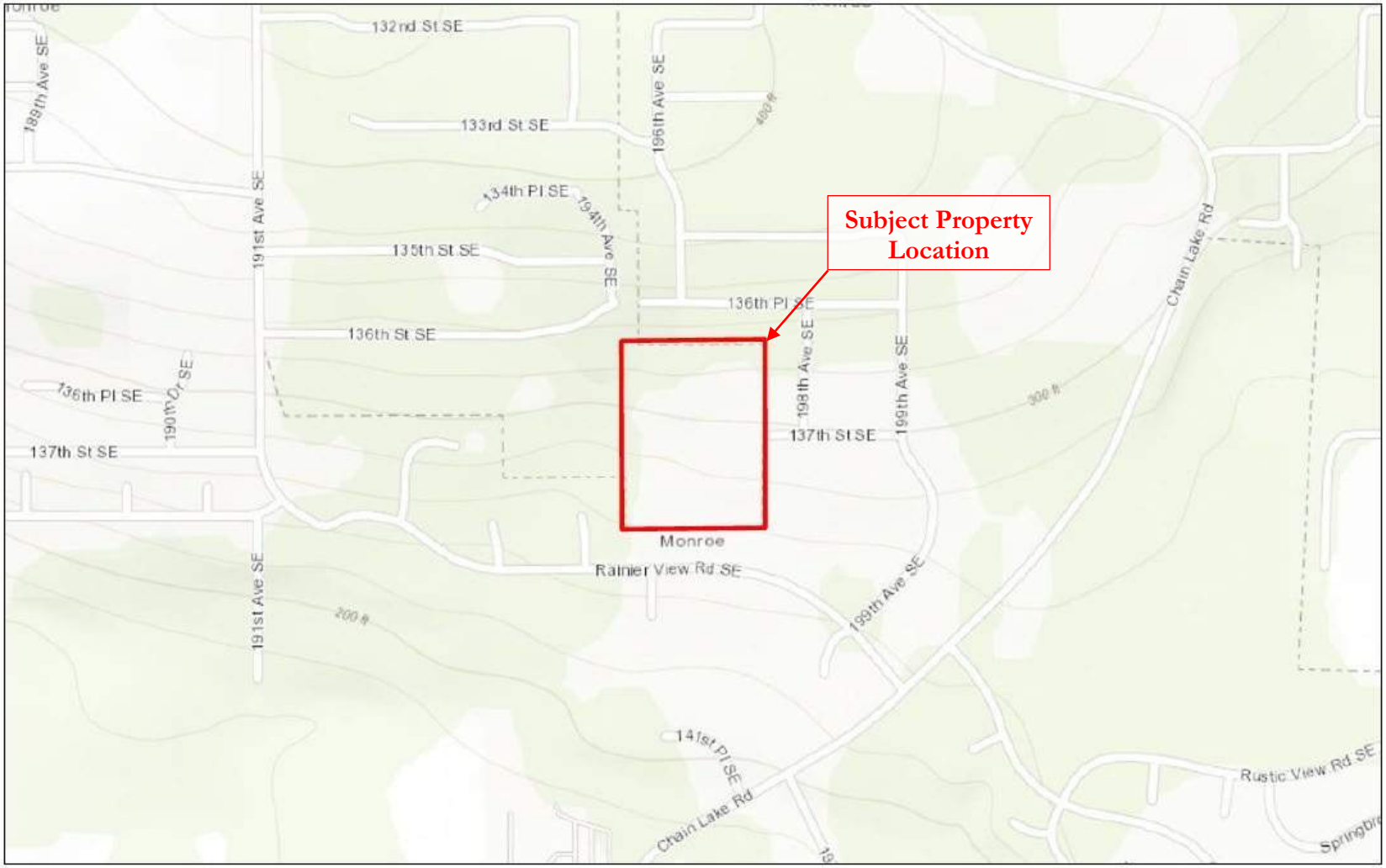
Appendix B3 — Snohomish County Critical Areas Inventory

Appendix B4 — WDFW PHS Map

Appendix B5 — USFWS NWI Map

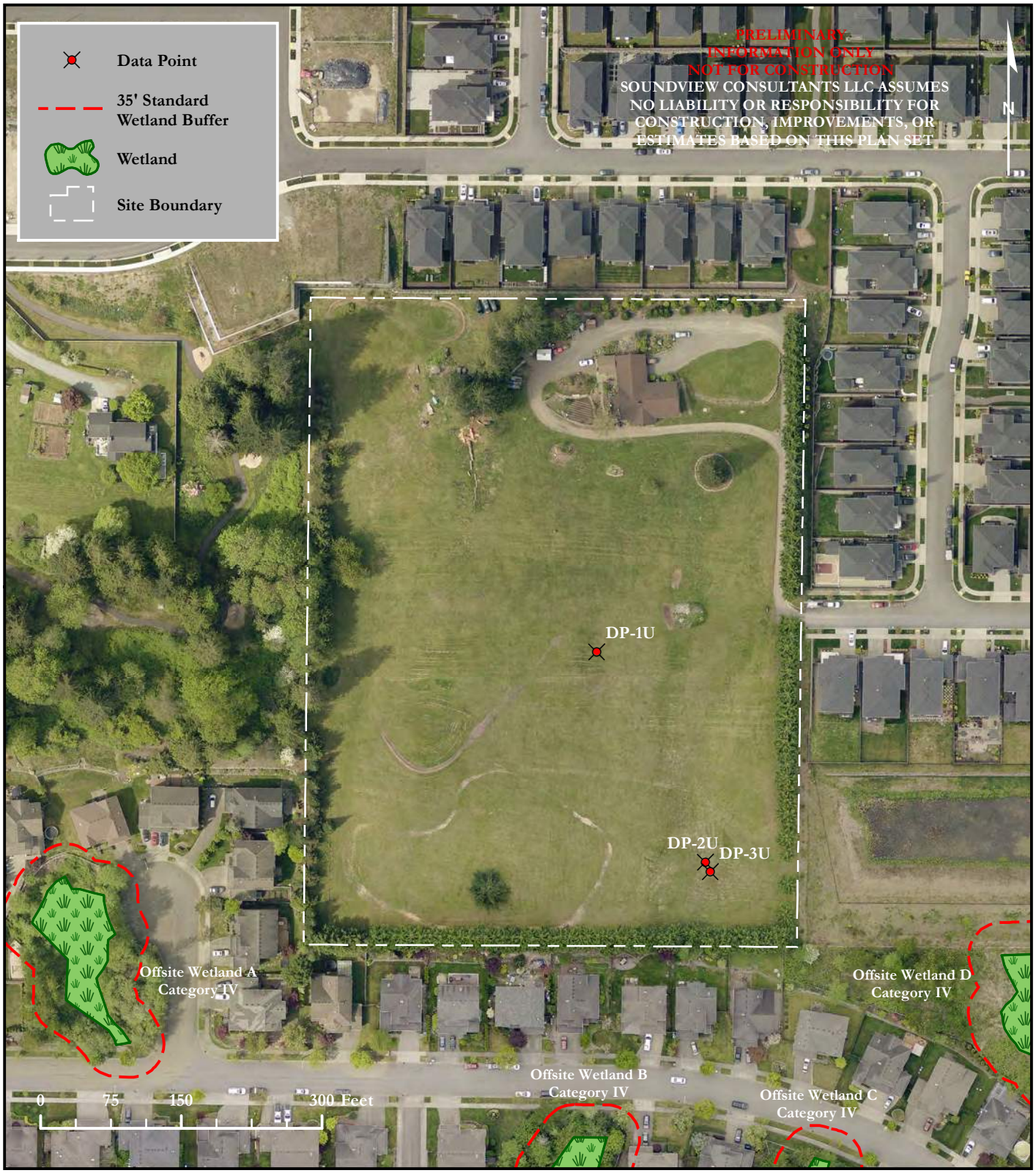
Appendix B6 — DNR Stream Typing Map

Appendix B7 – WDFW SalmonScape Map



Appendix C — Existing Conditions Exhibit

MONROE - EXISTING CONDITIONS MAP



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MONROE

19785 137TH STREET SOUTHEAST
MONROE, WA 98272

SNOHOMISH COUNTY PARCEL NUMBER:
28073100203800

DATE:	4/22/2021
JOB:	1310.0030
BY:	JML
SCALE:	1 " = 150 '
FIGURE NO.	1

Appendix D — Non-Wetland Data Forms

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

Project/Site: 1310.0030 Cooper Ridge City/County: Monroe/Snohomish Sampling Date: 4/13/21

Applicant/Owner: Prospect Development State: WA Sampling Point: DP-1

Investigator(s): Harry Richardson Section, Township, Range: 31, 28N, 7E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR): A2 Lat: 47.872959 Long: -121.96804851 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks: Not all three wetland criteria met; only hydrophytic vegetation present. Data collected in the central portion of the subject property.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. Poa pratensis	50	Yes	FAC
2. Schedonorus arundinaceus	25	Yes	FAC
3. Taraxacum officinale	15	No	FAC
4. Holcus lanatus	10	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (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:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Hydrophytic vegetation criteria met through the dominance test due to the dominance of FAC species typical of disturbed upland fields.

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	7.5YR 3/1	100	-	-	-	-	GrSiLo	Gravelly silt loam
9 - 16	7.5YR 4/4	100	-	-	-	-	GrLo	Gravelly loam

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

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

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

Restrictive Layer (if present):

Type: N/A

Depth (inches): -

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil indicators met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No wetland hydrology indicators met.

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

Project/Site: 1310.0030 Cooper Ridge City/County: Monroe/Snohomish Sampling Date: 1/28/21 & 4/13/21

Applicant/Owner: Prospect Development State: WA Sampling Point: DP-2

Investigator(s): Harry Richardson, Kyla Caddey Section, Township, Range: 31, 28N, 7E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): A2 Lat: 47.872348 Long: -121.96756274 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes (72) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks: Not all three wetland criteria met; lack of wetland hydrology in early growing season. Data collected in low topographic swale/bench on southeastern portion of the subject property. Precipitation levels during 1/28/21 site visit above statistical normal for the prior 30 days (169 percent of normal).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Schedonorus arundinaceus	90	Yes	FAC
2. Veronica serpyllifolia	5	No	FAC
3. Poa pratensis	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (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:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Hyrophytic vegetation criteria met through the dominance test due to the dominance of a FAC species typical of disturbed upland fields.

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 Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/2	100	-	-	-	-	GrSiLo	Gravelly silt loam
8 - 15	10YR 2/2	95	5YR 4/6	5	C	M	GrSiLo	Gravelly silt loam

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

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

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

Restrictive Layer (if present):

Type: N/A

Depth (inches): -

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicator F6.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 11/None*

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 10/None*

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

*During site visit on 1/28/21 in wet season during elevated precipitation levels, soil saturation and high groundwater table observed; however,no indicators of wetland hydrology criteria observed during site visit on 4/13/21 in early growing season.

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

Project/Site: 1310.0030 Cooper Ridge City/County: Monroe/Snohomish Sampling Date: 1/28/21 & 4/13/21

Applicant/Owner: Prospect Development State: WA Sampling Point: DP-3

Investigator(s): Harry Richardson, Kyla Caddey Section, Township, Range: 31, 28N, 7E

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): A2 Lat: 47.872320 Long: -121.96754116 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes (72) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks: Not all three wetland criteria met; lack of wetland hydrology early in growing season. Data collected in low topographic swale/bench on southeastern portion of the subject property. Precipitation levels during 1/28/21 site visit above statistical normal for the prior 30 days (169 percent of normal).

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. Poa pratensis	45	Yes	FAC
2. Schedonorus arundinaceus	35	Yes	FAC
3. Veronica serpyllifolia	10	No	FAC
4. Juncus effusus	10	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (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:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Hyrophytic vegetation criteria met through the dominance test due to the dominance of a FAC species typical of disturbed upland fields.

SOIL

Sampling Point: DP-3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/2	100	-	-	-	-	SiLo	Silt loam
3 - 8	10YR 2/2	95	7.5YR 4/4	5	C	M	GrSiLo	Gravelly silt loam
8 - 14	10YR 2/2	93	7.5YR 4/4	7	C	M	GrClLo	Gravelly clay loam

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

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

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

Restrictive Layer (if present):

Type: N/A

Depth (inches): -

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicator F6.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 11/None*

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 10/None*

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

*During site visit on 1/28/21 in wet season during elevated precipitation levels, soil saturation and high groundwater table observed; however,no indicators of wetland hydrology criteria observed during site visit on 4/13/21 in early growing season.

Appendix E — Sinclair Heights Plat Drainage Exhibit

SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004

DEDICATION

KNOW ALL MEN BY THESE PRESENTS THAT WE, THE UNDERSIGNED OWNERS OF INTEREST IN THE LAND HEREBY SUBDIVIDED, HEREBY DECLARE THIS PLAT AND DEDICATE TO THE PUBLIC FOREVER ALL ROADS AND WAYS AND OTHER PUBLIC PROPERTY SHOWN HEREON, AND THE USE THEREOF FOR ANY AND ALL PUBLIC PURPOSES, WITH THE RIGHT TO MAKE ALL NECESSARY SLOPES FOR CUTS AND FILLS, AND THE RIGHT TO CONTINUE TO DRAIN THE ROADS AND DRIVEWAYS OVER AND ACROSS ANY LOT OR LOTS, WHERE WATER MIGHT TAKE A NATURAL COURSE, IN THE ORIGINAL REASONABLE GRADING OF THE ROADS AND WAYS SHOWN HEREON.

FOLLOWING ORIGINAL REASONABLE GRADING OF ROADS AND WAYS HEREON, NO DRAINAGE WATERS ON ANY LOT OR LOTS SHALL BE DIVERTED OR BLOCKED FROM THEIR NATURAL COURSE SO AS TO DISCHARGE UPON ANY PUBLIC ROAD RIGHT-OF-WAY, OR TO HAMPER PROPER ROAD DRAINAGE. ANY ENCLOSING OF DRAINAGE WATERS IN CULVERTS OR DRAINS OR REROUTING THEREOF ACROSS ANY LOT AS MAY BE UNDERTAKEN BY OR FOR THE OWNER OF SUCH LOT SHALL BE DONE BY AND AT THE EXPENSE OF SUCH OWNER, BUT ONLY AFTER APPROVAL BY THE CITY ENGINEER.

TRACTS 987 AND 988, OPEN SPACE/ENTRY SIGN, TRACTS 994, 995, 996, 997, AND 998, NATIVE GROWTH PROTECTION EASEMENT (N.G.P.E.), ARE HEREBY GRANTED AND CONVEYED, TOGETHER WITH ALL MAINTENANCE OBLIGATIONS, TO THE SINCLAIR HEIGHTS HOMEOWNER'S ASSOCIATION UPON THE RECORDING OF THIS PLAT. MAINTENANCE OF ALL PAVED WALKWAYS AND SIDEWALKS WITHIN THESE TRACTS SHALL BE BY THE CITY OF MONROE. ALL OTHER MAINTENANCE, INCLUDING THE MAINTENANCE OF SOFT SURFACE TRAILS SHALL BE PERFORMED BY THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION.

TRACT 990, PRIVATE ROAD, IS HEREBY GRANTED AND CONVEYED, TOGETHER WITH ALL MAINTENANCE OBLIGATIONS TO LOTS 8, 9, 10 AND 11 WITH AN EQUAL AND UNDIVIDED INTEREST UPON THE RECORDING OF THIS PLAT. THIS TRACT SHALL REMAIN AN APPURTENANCE TO AND INSEPARABLE FROM EACH LOT.

TRACT 986, PRIVATE ROAD, IS HEREBY GRANTED AND CONVEYED, TOGETHER WITH ALL MAINTENANCE OBLIGATIONS TO LOTS 20, 21 AND 22 WITH AN EQUAL AND UNDIVIDED INTEREST UPON THE RECORDING OF THIS PLAT. THIS TRACT SHALL REMAIN AN APPURTENANCE TO AND INSEPARABLE FROM EACH LOT.

TRACT 991, PRIVATE ROAD, IS HEREBY GRANTED AND CONVEYED, TOGETHER WITH ALL MAINTENANCE OBLIGATIONS TO LOTS 2, 3 AND 4 WITH AN EQUAL AND UNDIVIDED INTEREST UPON THE RECORDING OF THIS PLAT. THIS TRACT SHALL REMAIN AN APPURTENANCE TO AND INSEPARABLE FROM EACH LOT.

TRACTS 999, PARK AND TRACTS 992 AND 993, STORMWATER DETENTION FACILITIES, ARE HEREBY GRANTED AND CONVEYED, TOGETHER WITH ALL MAINTENANCE OBLIGATIONS TO THE CITY OF MONROE.

TRACT 989 IS HEREBY GRANTED AND CONVEYED TO THE SINCLAIR HEIGHTS HOMEOWNER'S ASSOCIATION UPON RECORDING OF THIS PLAT, MAINTENANCE OF ALL PAVED WALKWAYS WITHIN THE TRACT, IF ANY, SHALL BE BY THE CITY OF MONROE, ALL OTHER MAINTENANCE OBLIGATIONS SHALL BE BY THE SINCLAIR HEIGHTS HOMEOWNER'S ASSOCIATION.

TRACTS 501 AND 502 ARE HEREBY RESERVED FOR FUTURE DEVELOPMENT, AND SHALL BE RETAINED BY 1218 LLC.

IN WITNESS WHEREOF WE SET OUR HANDS AND SEALS THIS 9th DAY OF April, 2004.

1218, LLC

BARCLAYS NORTH, INC., SOLE MEMBER OF 1218, LLC

BY: _____

TONY R. KASTENS, PRESIDENT OF BARCLAYS NORTH, INC.

HORIZON BANK

BY: Ronald A. Buckner TITLE: Senior Vice Pres.

PRINTED NAME: Ronald A. Buckner

ACKNOWLEDGMENTS

STATE OF Washington)
)SS
COUNTY OF Snohomish)

I CERTIFY THAT I KNOW OR HAVE SATISFACTORY EVIDENCE THAT TONY R. KASTENS, PRESIDENT OF BARCLAYS NORTH, INC., IS THE PERSON WHO APPEARED BEFORE ME, AND SAID PERSON ACKNOWLEDGED THAT HE SIGNED THIS INSTRUMENT, ON OATH STATED THAT HE WAS AUTHORIZED TO EXECUTE THE INSTRUMENT AND ACKNOWLEDGED IT AS A MEMBER OF 1218, LLC, A WASHINGTON LIMITED LIABILITY COMPANY TO BE THE FREE AND VOLUNTARY ACT OF SUCH PARTY FOR THE USES AND PURPOSES MENTIONED IN THE INSTRUMENT.

DATED: 4/29/04

SIGNATURE: Brenda J. Fodge

(PRINT NAME) Brenda J. Fodge

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON

RESIDING AT Lake Stevens

MY APPOINTMENT EXPIRES 03-21-05

BRENDA J. FODGE NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES MAR. 21, 2005

STATE OF Washington)
)SS
COUNTY OF Snohomish)

I CERTIFY THAT I KNOW OR HAVE SATISFACTORY EVIDENCE THAT Ronald A. Buckner IS THE PERSON WHO APPEARED BEFORE ME, AND SAID PERSON ACKNOWLEDGED THAT (HE/SHE/THEY) SIGNED THIS INSTRUMENT, ON OATH STATED THAT (HE/SHE/THEY) WAS/WERE AUTHORIZED TO EXECUTE THE INSTRUMENT AND ACKNOWLEDGED IT AS THE Senior Vice President OF HORIZON BANK, TO BE THE FREE AND VOLUNTARY ACT OF SUCH PARTY FOR THE USES AND PURPOSES MENTIONED IN THE INSTRUMENT.

DATED: 4/30/04

SIGNATURE: Brenda J. Fodge

(PRINT NAME) Brenda J. Fodge

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON

RESIDING AT Lake Stevens

MY APPOINTMENT EXPIRES 03-21-05

BRENDA J. FODGE NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES MAR. 21, 2005

APPROVALS

EXAMINED AND APPROVED THIS 6th DAY OF MAY, 2004.

Brad Feilberg

CITY ENGINEER

EXAMINED AND APPROVED THIS 6th DAY OF May, 2004.

SUBDIVISION ADMINISTRATOR

EXAMINED AND APPROVED THIS 6th DAY OF May, 2004.

CITY OF MONROE

MAYOR ATTEST Betty King CITY CLERK

TREASURER'S CERTIFICATE

I HEREBY CERTIFY THAT ALL STATE AND COUNTY TAXES HERETOFORE LEVIED AGAINST THE PROPERTY DESCRIBED HEREIN, ACCORDING TO THE BOOKS AND RECORDS OF MY OFFICE, HAVE BEEN FULLY PAID AND DISCHARGED, INCLUDING 2004 TAXES.

Bob Dantinne

TREASURER, SNOHOMISH COUNTY

BY: Kimberly Hunt 5-7-04

DEPUTY COUNTY TREASURER

LEGAL DESCRIPTION

PARCEL A:
SOUTH 825 FEET OF SOUTHEAST QUARTER OF NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST, W.M.,
EXCEPT SOUTH 330 FEET THEREOF, AND
EXCEPT WEST 20 FEET THEREOF CONVEYED TO SNOHOMISH COUNTY FOR ROADS BY DEED UNDER AUDITOR'S FILE NOS. 221705 AND 978593;

AND EXCEPT ALL THAT PORTION LYING SOUTHWESTERLY OF A LINE DESCRIBED AS FOLLOWS:
BEGINNING AT THE SOUTHEAST CORNER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST, W.M.;
THENCE NORTH 0°12'29" EAST ALONG THE EAST LINE OF SAID SECTION 1533.19 FEET;
THENCE NORTH 68°33'20" WEST 56.12 FEET;
THENCE NORTH 55°11'29" WEST 127.88 FEET;
THENCE NORTH 40°44'28" WEST 510 FEET;
THENCE NORTH 0°33'05" WEST 238 FEET;
THENCE NORTH 24°03'36" WEST 796.83 FEET;
THENCE NORTH 40°27'37" WEST 661.10 FEET TO THE END OF THIS LINE DESCRIPTION;
THENCE WEST TO THE WEST LINE OF THE SOUTHEAST QUARTER OF NORTHWEST QUARTER OF SAID SECTION.

PARCEL B:
THAT PORTION OF THE SOUTHEAST QUARTER OF THE NORTHEAST QUARTER OF SECTION 36, TOWNSHIP 28 NORTH, RANGE 6 EAST, W.M., RECORDS OF SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SUBDIVISION;
THENCE SOUTH 495 FEET;
THENCE WEST 1140 FEET TO A POINT 180 FEET EAST OF THE WEST LINE OF SAID SUBDIVISION SAID POINT BEING THE TRUE POINT OF BEGINNING;
THENCE NORTH 265 FEET;
THENCE EAST 675 FEET;
THENCE SOUTH 265 FEET;
THENCE WEST 675 FEET TO THE POINT OF BEGINNING;
EXCEPT THE WEST 219.86 FEET THEREOF; AND
EXCEPT ANY PORTION THEREOF LYING WITHIN THE SOUTH 825 FEET OF SAID SOUTHEAST QUARTER OF THE NORTHEAST QUARTER.

PARCEL C:
PARCEL A OF SURVEY RECORDED IN VOLUME 5 OF SURVEYS AT PAGE 165, UNDER AUDITOR'S FILE NUMBER 7705190292, BEING DESCRIBED AS FOLLOWS:

ALL OF GOVERNMENT LOT 2, SECTION 31, TOWNSHIP 28 NORTH, RANGE 7 EAST, W.M., RECORDS OF SNOHOMISH COUNTY WASHINGTON;
EXCEPT THE NORTH 690 FEET THEREOF; AND
EXCEPT THAT PORTION LYING SOUTHEASTERLY OF THE NORTHWESTERLY MARGIN OF COUNTY ROAD KNOWN I.I. TROMBLY CHAIN LAKE ROAD.

ALL SITUATE IN THE COUNTY OF SNOHOMISH, STATE OF WASHINGTON.

AUDITOR'S CERTIFICATE

Filed for record at the request of Group Four Inc. this 7th day of May, 2004, at 34 minutes past 10 A M. and recorded in Volume _____ of Plats, pages _____, AFN 200405075141 records of Snohomish County, Washington.

Bob Terwilliger Snohomish County Auditor

By: Beverly Wohl Deputy County Auditor

DANIEL K. ROUPE 30450 STATE OF WASHINGTON REGISTERED PROFESSIONAL LAND SURVEYOR 1-22-2004 EXPIRES: JAN. 12, 2006

LAND SURVEYOR'S CERTIFICATE

I hereby certify that this plat of SINCLAIR HEIGHTS is based upon an actual survey and subdivision of Section 36 & 31 Township 28 N., Range 6 & 7 East, W.M., as required by state statutes; that the distances, courses and angles are shown thereon correctly; that the monuments have been set and lot and block corners have been staked correctly on the ground, that I fully complied with the provisions of the state and local statutes and regulations governing platting.

Daniel K. Roupe, Professional Land Surveyor 30450 Certificate No. 4/29/2004 Date

INDEXING DATA: SE1/4, NE1/4, SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4, SEC. 31, T. 28 N. R. 7. E., W.M.

GROUP FOUR, Inc.
16030 JUANITA-WOODINVILLE WAY NE
BOTHELL, WASHINGTON 98011
(425)775-4581 • (206)362-4244 • FAX(206)362-3819
SURVEYING ENGINEERING PLANNING MANAGEMENT

JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 1 OF 7

AUDITOR'S FILE NO.: 200405075141

SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003 (CONTINUED)

MAY 2004

RESTRICTIONS & CONDITIONS

1. FUTURE DEVELOPMENT TRACTS AND ALL LAND INCLUDED WITHIN SINCLAIR HEIGHTS PRELIMINARY PLAT SHALL BE DEVELOPED IN COMPLIANCE WITH THE PRELIMINARY PLAT APPROVAL. RELIEF SHALL ONLY BE AVAILABLE THROUGH ACTION OF THE MONROE CITY COUNCIL.
2. SUBJECT TO THE SINCLAIR HEIGHTS HOMEOWNER'S ASSOCIATION COVENANTS, CONDITIONS, AND RESTRICTIONS RECORDED UNDER RECORDING NUMBER 200405070306.
3. CERTAIN PRIVATE STORM DRAINAGE EASEMENTS SHOWN ON THE FINAL PLAT MAP ARE FOR STORM DRAINAGE FACILITIES WHICH COLLECT RUNOFF FROM INDIVIDUAL LOTS AND DISCHARGE SAID RUNOFF INTO THE N.G.P.E. LOT OWNERS SHALL COMPLY WITH THE COVENANTS, CONDITIONS AND RESTRICTIONS TO ENSURE PROPER WATER QUALITY TO THE WETLAND TRACTS. IN THE EVENT THE PRIVATE STORM DRAINAGE SYSTEM LOCATED WITHIN ANY SUCH EASEMENT IS DAMAGED AND IMPAIRS THE ABILITY OF THE SYSTEMS TO FUNCTION, IT SHALL BE REPAIRED BY THE OWNER OF THE LOT UPON WHICH THE DAMAGED STORM DRAINAGE FACILITY IS LOCATED, HOWEVER, IF THE LOT OWNER FAILS, FOR WHATEVER REASON, IN A TIMELY MANNER, TO REPAIR SUCH DAMAGE, THE HOA, AT ANY TIME SHALL ENTER UPON SAID EASEMENT TO MAKE REPAIRS TO THE SYSTEM.
4. BUILDING SETBACKS FOR SINGLE FAMILY RESIDENCES ARE AS FOLLOWS:
   FRONT YARD TO HOUSE 10 FEET
   FRONT YARD TO FRONT OF GARAGE 20 FEET
   SIDE YARD BETWEEN HOUSES (1 STORY) 5 FEET
   SIDE YARD BETWEEN HOUSES (2 STORY) 7 FEET
   SIDE YARD ALONG STREET SIDE 10 FEET
   REAR YARD TO HOUSE SAME AS SIDE YARD
   EDGE OF ANY SENSITIVE AREA TRACT 10 FEET, UNLESS A GREATER SETBACK IS SHOWN ON THE PLAT MAP.
5. A NATIVE GROWTH PROTECTION EASEMENT IS TO BE LEFT PERMANENTLY UNDISTURBED IN A SUBSTANTIALLY NATURAL STATE. NO CLEARING, GRADING, FILLING, BUILDING CONSTRUCTION OR PLACEMENT, OR ROAD CONSTRUCTION OF ANY KIND SHALL OCCUR, EXCEPT REMOVAL OF HAZARDOUS TREES AS DETERMINED BY THE CITY. ACTIVITIES SET FORTH IN THE CITY OF MONROE SENSITIVE AREA GUIDELINES, AS AMENDED, ARE ALLOWED WHEN APPROVED BY THE CITY.
6. THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION IS RESPONSIBLE FOR THE MAINTENANCE AND PROTECTION OF THE SEPARATE TRACTS IDENTIFIED AS NATIVE GROWTH PROTECTION EASEMENT (N.G.P.E.). MAINTENANCE INCLUDES INSURING THAT NO ALTERATION OCCURS WITHIN THE SEPARATE TRACTS AND THAT ALL VEGETATION REMAINS UNDISTURBED UNLESS THE EXPRESS WRITTEN PERMISSION OF THE CITY OF MONROE HAS BEEN RECEIVED.
7. PRIVATE STORM DRAINAGE EASEMENTS SHOWN ON THE FINAL PLAT MAP ARE FOR STORM DRAINAGE FACILITIES WHICH COLLECT ROOF, YARD AND FOOTING DRAIN RUNOFF FROM INDIVIDUAL LOTS AND DISCHARGE SAID RUNOFF INTO THE PUBLIC STORM DRAINAGE SYSTEM. IN THE EVENT THE PRIVATE STORM DRAINAGE SYSTEM LOCATED WITHIN ANY SUCH EASEMENT IS DAMAGED AND IMPAIRS THE ABILITY OF THE SYSTEM TO FUNCTION, IT SHALL BE REPAIRED BY THE OWNER OF THE LOT UPON WHICH THE DAMAGED STORM DRAINAGE FACILITY IS LOCATED. HOWEVER, IF THE LOT OWNER FAILS, FOR WHATEVER REASON, IN A TIMELY MANNER, TO REPAIR SUCH DAMAGE, OTHER LOT OWNERS THAT USE THE SYSTEM IN COMMON MAY, AT ANY TIME, ENTER UPON SAID EASEMENT TO MAKE REPAIRS TO THE SYSTEM.
8. THERE SHALL BE NO SEPTIC SYSTEMS OR WELLS WITHIN THIS PLAT. PROVISIONS OF SANITARY SEWER AND WATER SERVICE SHALL BE IN ACCORDANCE WITH CITY STANDARDS OR AS APPROVED BY THE CITY ENGINEER.
9. PROPERTY OWNERS ARE REQUIRED TO MAINTAIN THE RIGHT-OF-WAY AREA BETWEEN THEIR PROPERTY AND THE BACK OF STREET CURBS IN A UNIFORM MANNER. THE HOMEOWNERS ASSOCIATION SHALL BE RESPONSIBLE FOR LANDSCAPING/ IRRIGATION MAINTENANCE OF THE RIGHT-OF-WAY. THE HOMEOWNERS ASSOCIATION SHALL BE RESPONSIBLE FOR PAYMENT OF SAID COSTS.
10. SUBJECT TO WAIVER OF ALL CLAIMS OF DAMAGE CAUSED OR ARISING BY REASON OF THE LAYING OUT AND ESTABLISHING A PUBLIC ROAD (191ST AVENUE S.E.) AS GRANTED IN DEEDS RECORDED UNDER AUDITOR'S FILE NUMBERS 221705 AND 978593.
11. THE LOTS WITHIN THIS SUBDIVISION SHALL BE SUBJECT TO SCHOOL IMPACT MITIGATION FEES FOR THE MONROE SCHOOL DISTRICT TO BE BASED ON THE FEE SCHEDULE IN EFFECT AT THE TIME OF BUILDING PERMIT ISSUANCE, IN ACCORDANCE WITH THE PROVISIONS OF MMC 20.07.120. THE FINAL DETERMINATION OF A DEVELOPMENT ACTIVITY'S FEE OBLIGATION UNDER THIS SECTION SHALL BE MADE PRIOR TO ISSUANCE OF BUILDING PERMITS. THE FINAL DETERMINATION SHALL INCLUDE CREDITS FOR IN-KIND CONTRIBUTIONS. ANY CREDITS MAY BE PRORATED AND DISTRIBUTED TO LOTS DESIGNATED BY THE APPLICANT.
12. SUBJECT TO EXCEPTION AND RESERVATIONS CONTAINED IN DEED RECORDED UNDER AUDITOR'S FILE NUMBER 521979.
13. SUBJECT TO RELINQUISHMENT OF ACCESS TO STATE HIGHWAY NUMBER SR2 AND SR 202 AND OF LIGHT, VIEW AND AIR BY DEED TO THE STATE OF WASHINGTON RECORDED UNDER AUDITOR'S FILE NUMBER 2109063.
14. SUBJECT TO EASEMENT FOR INGRESS, EGRESS AND UTILITIES RECORDED UNDER AUDITOR'S FILE NUMBER 7608100078.
15. SUBJECT TO EASEMENT FOR ROAD AND UTILITIES RECORDED UNDER AUDITOR'S FILE NUMBER 7808080272.
16. SUBJECT TO PRIVATE ROAD MAINTENANCE AGREEMENT AND COVENANTS RECORDED UNDER AUDITOR'S FILE NUMBER 8909010368.
17. SINGLE FAMILY LOTS = 68 LOTS

EASEMENT PROVISIONS

AN EASEMENT FOR UTILITY PURPOSES IS HEREBY GRANTED TO THE CITY OF MONROE, A MUNICIPAL CORPORATION, AND ITS SUCCESSORS AND ASSIGNS, FOR CONSTRUCTING, RECONSTRUCTING, INSTALLING, REPAIRING, REPLACING, OPERATING, AND MAINTAINING UTILITIES, AND UTILITY PIPELINES, INCLUDING, BUT NOT LIMITED TO, WATER, SEWER, ELECTRICAL, CABLE, TELEPHONE AND STORM DRAINAGE LINES, UNDER AND UPON TRACTS 986, 990, AND 991, FOR THE PURPOSE OF SERVING THIS SUBDIVISION, AND OTHER PROPERTY WITH UTILITY SERVICE TOGETHER WITH THE RIGHT TO ENTER UPON THE TRACTS AT ALL TIMES FOR THE PURPOSES HEREIN STATED. SAID TRACTS SHALL BE RESTORED BY THE CITY OF MONROE, AS NEARLY AS REASONABLY POSSIBLE, TO THEIR CONDITION PRIOR TO ANY MATERIAL DISTURBANCE BY THE CITY OF MONROE IN EXERCISING THE RIGHTS OF THIS EASEMENT. THIS EASEMENT SHALL ALSO APPLY UNDER AND UPON THE EXTERIOR TEN FEET PARALLEL WITH AND ADJOINING THE STREET FRONTAGE OF ALL LOTS AND TRACTS WHEN SAID LOTS AND TRACTS ABUT PUBLIC ROAD RIGHT-OF-WAY.

AN EASEMENT IS HEREBY GRANTED TO THE CITY OF MONROE UNDER AND UPON THE EASEMENTS SHOWN ON THE PLAT AND DESCRIBED HEREIN AS PUBLIC WATERLINE EASEMENT, PUBLIC SANITARY SEWER EASEMENT, AND PUBLIC STORM DRAINAGE EASEMENT, TO INSTALL, MAINTAIN, REPLACE, REPAIR, AND OPERATE WATER, SEWER, AND STORM DRAINAGE SYSTEMS, MAINS, AND APPURTENANCES FOR THIS SUBDIVISION AND OTHER PROPERTY, TOGETHER WITH THE RIGHT TO ENTER UPON SAID EASEMENTS AT ALL TIMES. STRUCTURES, EXCEPT FENCES, SHALL NOT BE CONSTRUCTED UPON ANY AREA RESERVED FOR THESE EASEMENTS.

AN EASEMENT FOR UTILITY PURPOSES IS HEREBY GRANTED TO PUBLIC UTILITY DISTRICT NO. 1 OF SNOHOMISH COUNTY, A MUNICIPAL CORPORATION; VERIZON INC.; PUGET SOUND ENERGY; COMCAST; AND THEIR SUCCESSORS AND ASSIGNS OF AFOREMENTIONED UTILITIES, FOR CONSTRUCTING, RECONSTRUCTING, INSTALLING, REPAIRING, REPLACING, OPERATING, AND MAINTAINING UTILITIES, AND UTILITY PIPELINES, FOR THE SERVICES PROVIDED BY THE UTILITIES, UNDER AND UPON TRACTS 986, 990, AND 991, FOR THE PURPOSE OF SERVING THIS SUBDIVISION, AND OTHER PROPERTY WITH UTILITY SERVICE TOGETHER WITH THE RIGHT TO ENTER UPON THE TRACTS AT ALL TIMES FOR THE PURPOSES HEREIN STATED. SAID TRACTS SHALL BE RESTORED BY THE UTILITIES, AS NEARLY AS REASONABLY POSSIBLE, TO THEIR CONDITION PRIOR TO ANY MATERIAL DISTURBANCE BY THE UTILITY IN EXERCISING THE RIGHTS OF THIS EASEMENT. THIS EASEMENT SHALL ALSO APPLY UNDER AND UPON THE EXTERIOR TEN FEET PARALLEL WITH AND ADJOINING THE STREET FRONTAGE OF ALL LOTS AND TRACTS WHEN SAID LOTS AND TRACTS ABUT PUBLIC ROAD RIGHT-OF-WAY.

A PUBLIC PEDESTRIAN ACCESS EASEMENT IS HEREBY ESTABLISHED OVER THE PAVED PEDESTRIAN WALKWAYS AND OVER ALL DESIGNATED PEDESTRIAN TRAILS WITHIN TRACT 989 FOR INGRESS AND EGRESS.

AN EASEMENT IS HEREBY GRANTED TO THE SINCLAIR HEIGHTS HOMEOWNER'S ASSOCIATION FOR THE MAINTENANCE OF LANDSCAPING OVER AND UPON THE STORMWATER DETENTION TRACTS 992 AND 993. NO LANDSCAPING SHALL BE PERMITTED THAT WOULD ADVERSELY EFFECT THE INSTALLATION, MAINTENANCE, REPLACEMENT, REPAIR, AND OPERATION OF THE PUBLIC STORMWATER FACILITIES.

AN EASEMENT FOR ACCESS IS HEREBY GRANTED TO THE CITY OF MONROE, A MUNICIPAL CORPORATION, AND THEIR RESPECTIVE SUCCESSORS AND ASSIGNS, OVER TRACT 990 FOR ACCESS TO AND MAINTENANCE OF A STORMWATER DETENTION POND ON TRACT 993.

THE OWNERS OF LOTS 2, 3 AND 4 SHALL BE JOINTLY RESPONSIBLE FOR THAT PORTION OF THE ACCESS DRIVEWAY AND UTILITIES WITHIN TRACT 991 THAT ARE USED IN COMMON.

THE OWNERS OF LOTS 8, 9, 10 AND 11 SHALL BE JOINTLY RESPONSIBLE FOR THAT PORTION OF THE ACCESS DRIVEWAY AND UTILITIES WITHIN TRACT 990 THAT ARE USED IN COMMON.

EASEMENT PROVISIONS (CONTINUED)

THE OWNERS OF LOTS 20, 21 AND 22 SHALL BE JOINTLY RESPONSIBLE FOR THAT PORTION OF THE ACCESS DRIVEWAY AND UTILITIES WITHIN TRACT 986 THAT ARE USED IN COMMON.

DEDICATION OF A NATIVE GROWTH PROTECTION EASEMENT (NGPE) CONVEYS TO THE PUBLIC A BENEFICIAL INTEREST IN THE LAND WITHIN THE EASEMENT. THIS INTEREST INCLUDES THE PRESERVATION OF EXISTING VEGETATION FOR ALL PURPOSES THAT BENEFIT THE PUBLIC HEALTH, SAFETY AND WELFARE, INCLUDING CONTROL OF SURFACE WATER AND EROSION, MAINTENANCE OF SLOPE STABILITY, VISUAL AND AURAL BUFFERING, AND PROTECTION OF PLANT AND ANIMAL HABITAT. THE NGPE IMPOSES UPON ALL PRESENT AND FUTURE OWNERS AND OCCUPIERS OF LAND SUBJECT TO THE EASEMENT THE OBLIGATION, ENFORCEABLE ON BEHALF OF THE PUBLIC OF THE CITY OF MONROE, TO LEAVE UNDISTURBED ALL TREES AND OTHER VEGETATION WITHIN THE EASEMENT. THE VEGETATION IN THE EASEMENT MAY NOT BE CUT, PRUNED, COVERED BY FILL, REMOVED OR DAMAGED WITHOUT EXPRESS PERMISSION FROM THE CITY OF MONROE, WHICH PERMISSION MUST BE OBTAINED IN WRITING, BEFORE, BEGINNING AND DURING THE COURSE OF ANY GRADING, BUILDING CONSTRUCTION OR OTHER DEVELOPMENT ACTIVITY ON A LOT OR DEVELOPMENT SITE SUBJECT TO THE NGPE. THE COMMON BOUNDARY BETWEEN THE EASEMENT AND THE AREA OF DEVELOPMENT ACTIVITY MUST BE FENCED OR OTHERWISE MARKED TO THE SATISFACTION OF THE CITY OF MONROE.

PRIVATE DRAINAGE EASEMENT PROVISIONS

THE PRIVATE DRAINAGE EASEMENT WITHIN LOTS 10, 11, 12, 13, 14, 15, 16, 17, 18, & 19, AS SHOWN HEREON, IS HEREBY GRANTED AND CONVEYED TO LOTS 10, 11, 12, 13, 14, 15, 16, 17, 18, & 19. THE OWNERS OF LOTS 10, 11, 12, 13, 14, 15, 16, 17, 18, & 19 SHALL BE EQUALLY RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THAT PORTION OF THE DRAINAGE FACILITIES THEY HAVE BENEFIT OF USE, EXCEPT NO OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THAT PORTION OF THE COMMONLY USED STORM SEWER LOCATED UPSTREAM FROM THE POINT OF CONNECTION OF THAT RESPECTIVE LOT OWNER.

THE PRIVATE DRAINAGE EASEMENT WITHIN LOTS 2 AND 3, AS SHOWN HEREON, IS HEREBY GRANTED AND CONVEYED TO LOTS 2, 3, AND 4. THE OWNERS OF LOTS 2, 3, AND 4 SHALL BE EQUALLY RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THAT PORTION OF THE DRAINAGE FACILITIES THEY HAVE BENEFIT OF USE, EXCEPT NO OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THAT PORTION OF THE COMMONLY USED STORM SEWER LOCATED UPSTREAM FROM THE POINT OF CONNECTION OF THAT RESPECTIVE LOT OWNER.

THE PRIVATE DRAINAGE EASEMENT WITHIN LOTS 63, 64, 65, 66, AND TRACT 995, AS SHOWN HEREON, IS HEREBY GRANTED AND CONVEYED TO THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION. THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THE DRAINAGE FACILITIES WITHIN SAID EASEMENT. THESE DRAINAGE FACILITIES DISCHARGE TO SENSITIVE WETLAND AREAS. EXTREME CARE SHALL BE TAKEN TO INSURE THAT NO POLLUTANTS ENTER THE DRAINAGE FACILITIES.

THE PRIVATE DRAINAGE EASEMENT WITHIN LOTS 30, 31, 32, 33, 34, 35, 36, 44, 45, 46, 49, 50, 51, 52 & 53 AS SHOWN HEREON, IS HEREBY GRANTED AND CONVEYED TO LOTS 30, 31, 32, 33, 34, 35, 36, 44, 45, 46, 49, 50, 51, 52 & 53. THE OWNERS OF LOTS 30, 31, 32, 33, 34, 35, 36, 44, 45, 46, 49, 50, 51, 52 & 53 SHALL BE EQUALLY RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND/OR RECONSTRUCTION OF THE DRAINAGE FACILITIES WITHIN SAID EASEMENT. THESE DRAINAGE FACILITIES DISCHARGE TO SENSITIVE WETLAND AREAS. EXTREME CARE SHALL BE TAKEN TO INSURE THAT NO POLLUTANTS ENTER THE DRAINAGE FACILITIES.

THE PRIVATE DRAINAGE EASEMENT WITHIN LOTS 54, 56, 57, 58, 59, 60, 61, 62, 63, AND TRACT 995, AS SHOWN HEREON, IS HEREBY GRANTED AND CONVEYED TO THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION. THE SINCLAIR HEIGHTS HOMEOWNERS ASSOCIATION SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND / OR RECONSTRUCTION OF THE DRAINAGE FACILITIES WITHIN SAID EASEMENT. THESE DRAINAGE FACILITIES DISCHARGE TO SENSITIVE WETLAND AREAS. EXTREME CARE SHALL BE TAKEN TO INSURE THAT NO POLLUTANTS ENTER THE DRAINAGE FACILITIES.

4-29-2004
DANIEL K. ROUTH
STATE OF WASHINGTON
30450
REGISTERED PROFESSIONAL LAND SURVEYOR
EXPIRES: JAN. 12, 2006

GROUP FOUR, Inc.
16030 JUANITA-WOODINVILLE WAY NE
BOTHELL, WASHINGTON 98011
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SURVEYING ENGINEERING PLANNING MANAGEMENT

JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 2 OF 7

AUDITOR'S FILE NO.: 200405075141

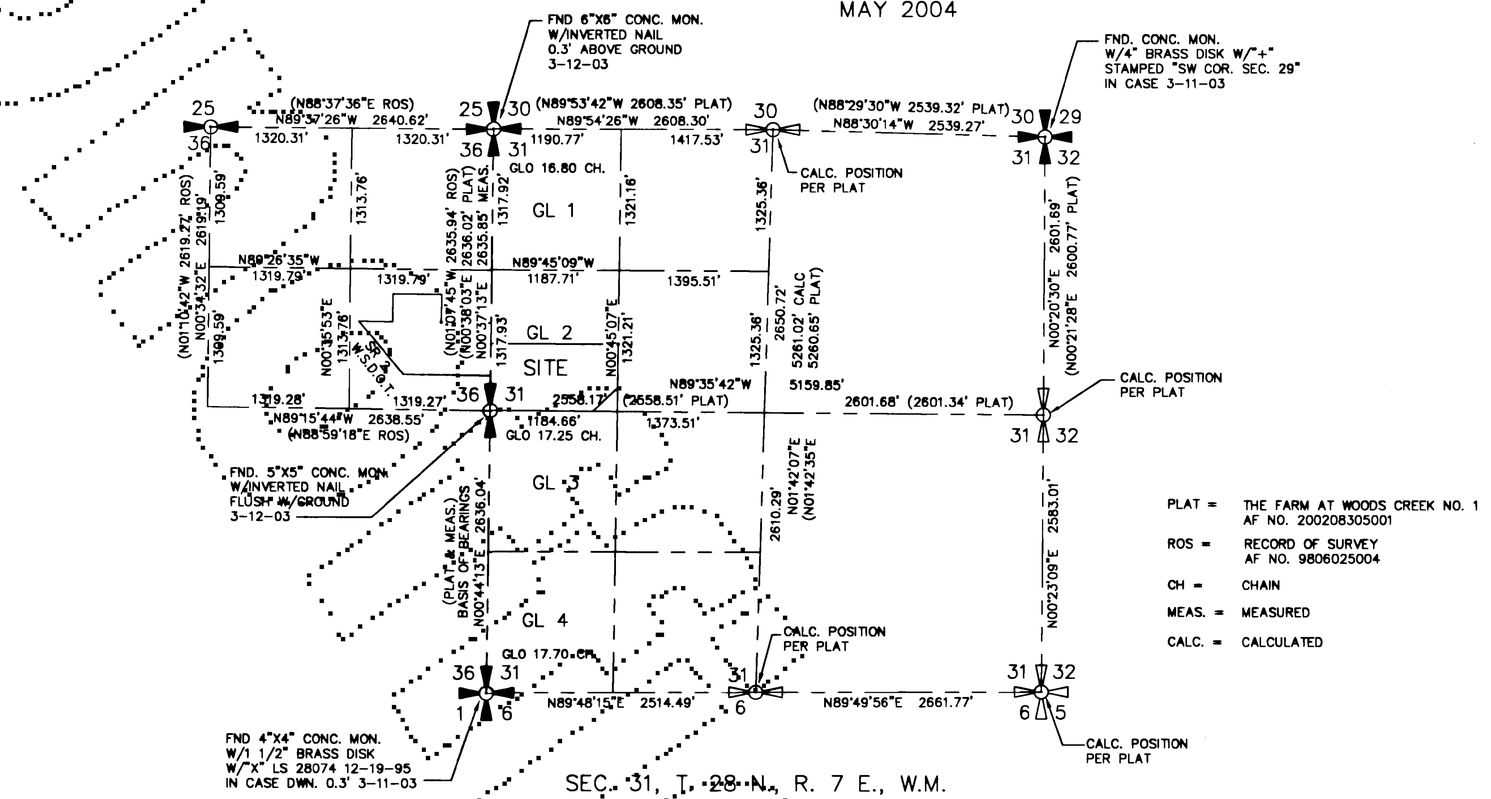
SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004



PLAT = THE FARM AT WOODS CREEK NO. 1 AF NO. 200208305001

ROS = RECORD OF SURVEY AF NO. 9806025004

CH = CHAIN

MEAS. = MEASURED

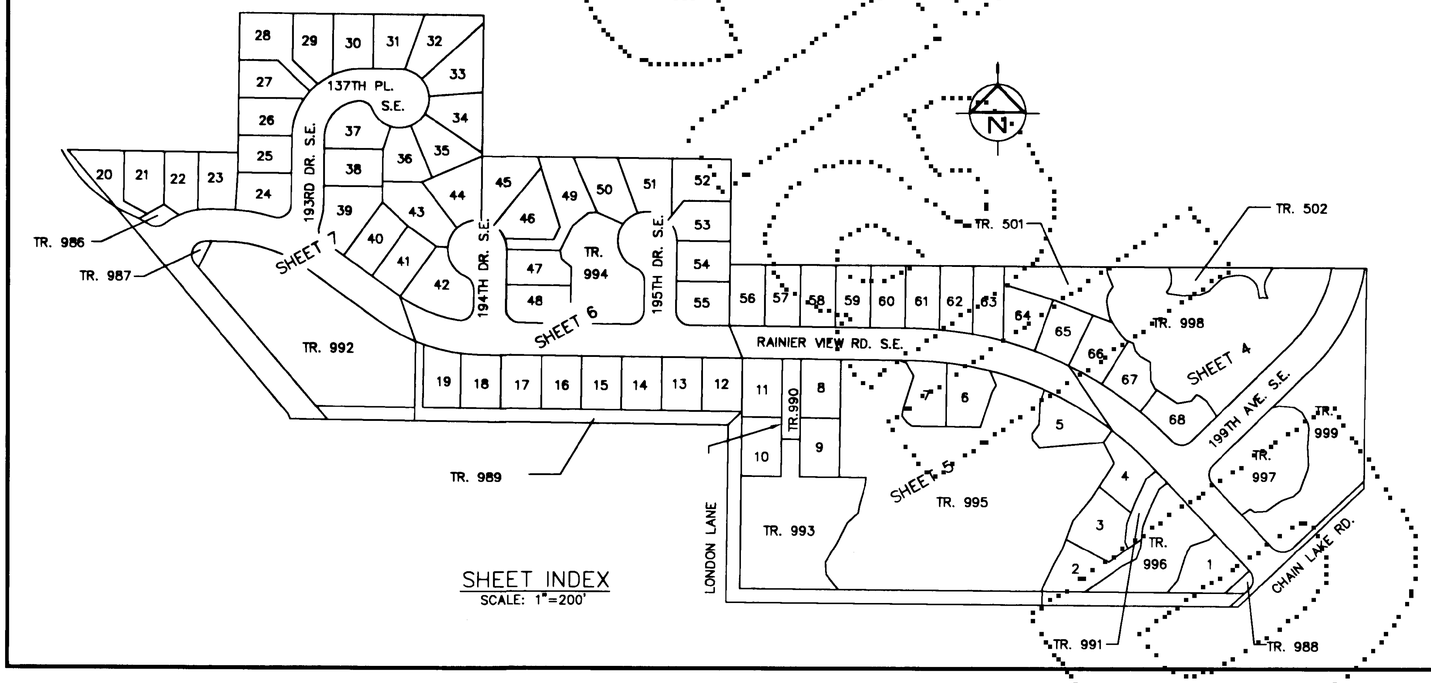
CALC. = CALCULATED

SEC. 31, T. 28 N., R. 7 E., W.M.
SUBDIVISION AND BASIS OF BEARINGS:
PLAT OF THE FARM AT WOODS CREEK NO. 1
A.F. NO. 200208305001

NE1/4, SEC. 36, T. 28 N., R. 6 E., W.M.
SUBDIVISION AND BASIS OF BEARINGS:
RECORD OF SURVEY
A.F. NO. 9806025004

INSTRUMENT DATA: LIETZ 4B (5" DIRECT READING THEODOLITE WITH E.D.M)

PRECISION OF CONTROL TRAVERSE IS AT HIGHER LEVEL THAN MINIMUM STANDARDS REQUIRED BY WAC, 332-130-090.



SHEET INDEX
SCALE: 1"=200'

TEMPORARY EASEMENT PROVISIONS

THERE ARE TEMPORARY DRAINAGE EASEMENTS ON LOTS 30 THROUGH 36, 44 THROUGH 46, 49 THROUGH 54, 56 THROUGH 66, AND TRACTS 994 AND 995, WHICH ENCUMBER THE TEMPORARY DRAINAGE FEATURES CONSTRUCTED ON SAID LOTS. THESE TEMPORARY DRAINAGE EASEMENTS ARE DEFINED AS BEING 5 FEET ON EITHER SIDE OF THE TEMPORARY DRAINAGE SYSTEM, "AS-BUILT" THESE EASEMENTS SHALL BE FOR THE MUTUAL PRIVATE BENEFIT OF ALL LOTS WHICH DIRECT DRAINAGE TO THE CURRENTLY INSTALLED TEMPORARY DRAINAGE SYSTEM. SAID EASEMENTS SHALL AUTOMATICALLY BE EXTINGUISHED UPON THE INSTALLATION OF THE FINAL DRAINAGE SYSTEM WITHIN THE 10 FOOT DRAINAGE EASEMENT PROVIDED WITHIN LOTS 30 THROUGH 36, 44 THROUGH 46, 49 THROUGH 54, 56 THROUGH 66, AND TRACTS 994 AND 995, AS DEPICTED ON THIS FINAL PLAT, OR UPON COMPLETION OF THE CONSTRUCTION AND RECORDING OF A PERMANENT EASEMENT WHERE NECESSARY OUTSIDE OF THE 10 FOOT EASEMENT AS NOTED ON THIS PLAT. AT A MINIMUM, THE TEN FOOT DRAINAGE EASEMENT DEPICTED ON LOTS 30 THROUGH 36, 44, 45, 49 THROUGH 54, 56 THROUGH 66, AND TRACTS 994 AND 995, OF THE FINAL PLAT SHALL REMAIN IN PERPETUITY TO INSURE THAT THE PERMANENT DRAINAGE SYSTEM CAN BE INSTALLED."

CURB PLUG TABLE

DISTANCE FROM FRONT LOT CORNER TO CURB PLUG (NAIL & SHINER, LS 30450), ON LOT LINE EXTENDED.

1 = 11.67'	26 = 11.64'	51 = 9.54'
2 = 11.70'	27 = 11.55'	52 = 11.70'
3 = 11.79'	28 = 11.78'	53 = 11.75'
4 = 11.79'	29 = 11.81'	54 = 10.04'
5 = 11.83'	30 = 12.04'	55 = 9.83'
6 = 11.75'	31 = 11.79'	56 = 10.18'
7 = 14.41'	32 = 11.44'	57 = 9.88'
8 = 11.71'	33 = 12.75'	58 = 10.10'
9 = 13.46'	34 = 11.56'	59 = 11.56'
10 = 11.76'	35 = 9.49'	60 = 11.60'
11 = 11.75'	36 = 9.53'	61 = 11.65'
12 = 11.70'	37 = 9.57	62 = 11.62'
13 = 11.80'	38 = 10.22'	63 = 11.66'
14 = 11.77'	39 = 9.77'	64 = 11.65'
15 = 11.80'	40 = 9.58'	65 = 11.69'
16 = 11.84'	41 = 11.50'	66 = 11.77'
17 = 11.85'	42 = 11.45'	67 = 11.78'
18 = 11.75'	43 = 11.45'	68 = 12.13'
19 = 11.80'	44 = 11.55'	69 = 11.60'
20 = 11.78'	45 = 11.49'	70 = 11.75'
21 = 12.42'	46 = 9.63'	71 = 11.86'
22 = 12.81'	47 = 9.35'	72 = 11.73'
23 = 13.24'	48 = 9.65'	73 = 13.76'
24 = 23.69'	49 = 9.53'	74 = 24.31'
25 = 12.51'	50 = 10.59'	75 = 11.85'

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JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 3 OF 7

AUDITOR'S FILE NO.: 200405075141

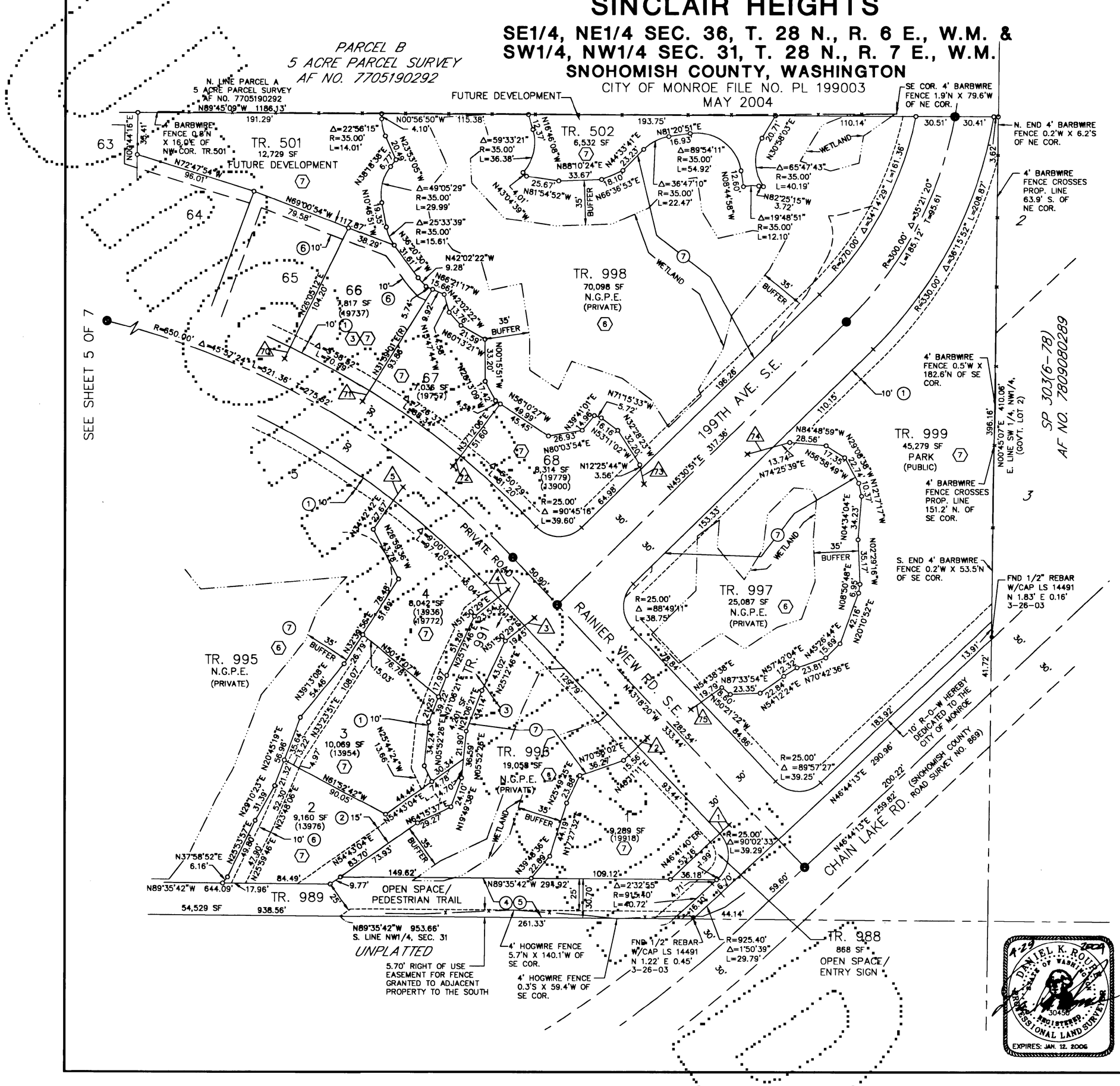
SINCLAIR HEIGHTS

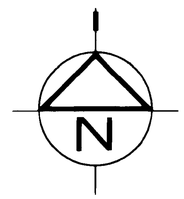
SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004





SCALE: 1"=50'

50' 0 50' 100'

BASIS OF BEARINGS AND SUBDIVISION: RECORD OF SURVEY AF NO. 9806025004

INSTRUMENT DATA: LIETZ 4B (5" DIRECT READING THEODOLITE WITH E.D.M)

PRECISION OF CONTROL TRAVERSE IS AT HIGHER LEVEL THAN MINIMUM STANDARDS REQUIRED BY WAC, 332-130-090.

LEGEND

AF NO.	AUDITOR'S FILE NUMBER
(XXXXX)	LOT ADRESS
N.G.P.A.	NATIVE GROWTH PROTECTION AREA
N.G.P.A./E.	NATIVE GROWTH PROTECTION AREA EASEMENT
(R)	RADIAL
R.	RANGE
R-O-W	RIGHT-OF-WAY
SEC.	SECTION
SE,NE,NW,SW	SOUTHEAST, NORTHEAST, NORTHWEST, SOUTHWEST
S.,N.,E.,W.,	SOUTH, NORTH, EAST, WEST
SF	SQUARE FEET
T.	TOWNSHIP
TR.	TRACT
W.M.	WILLAMETTE MERIDIAN
⊕	EXISTING MONUMENT AS NOTED
●	EXISTING REBAR OR IRON PIPE AS NOTED
◉	SET STANDARD SNOHOMISH COUNTY MONUMENT/ CASE & BRASS CAP WITH PUNCH MARK LS NO. 30450
×	SET TACK & SHINER, LS NO. 30450 (SEE CURB PLUG LEGEND)
△X	DISTANCE FROM FRONT CORNER TO CURB PLUG
o	SET 1/2" X 24" REBAR WITH PLASTIC CAP, LS NO. 30450
⬡X	REFERENCE RESTRICTIONS & CONDITIONS ON SHEET 2 OF 7

EASEMENTS

1. PUBLIC UTILITY EASEMENT
2. PUBLIC SANITARY SEWER EASEMENT
3. PUBLIC DRAINAGE, SANITARY SEWER, WATER AND UTILITY EASEMENT
4. PUBLIC DRAINAGE, SANITARY SEWER AND WATER EASEMENT
5. PUBLIC PEDESTRIAN ACCESS EASEMENT
6. PRIVATE DRAINAGE EASEMENT
7. NATIVE GROWTH PROTECTION EASEMENT

SEE EASEMENT PROVISIONS ON SHEET 2 OF 7

NOTE:

1. NO FENCES OR ENCROACHMENTS FOUND EXCEPT AS NOTED HEREON.

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JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 4 OF 7

AUDITOR'S FILE NO.: 200405075141

SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004

FND 1/2" REBAR W/CAP LS 14491 N 0.15' E 0.07' 3-26-03

PARCEL D
5 ACRE PARCEL SURVEY
AF NO. 7705190292

N. LINE PARCEL A, 5 ACRE PARCEL SURVEY AF NO. 7705190292

TR. 501
FUTURE DEVELOPMENT

RAINIER VIEW RD. S.E.

LONDON LANE PRIVATE ROAD (PRIVATE)

TR. 990
5,250 SF

TR. 993
43,153 SF
STORMWATER DETENTION FACILITIES
(PUBLIC)

TR. 995
155,359 SF
N.G.P.E.
(PRIVATE)

TR. 989
54,529 SF
OPEN SPACE/PEDESTRIAN TRAIL

5' PUBLIC PEDESTRIAN ACCESS EASEMENT

12' PUBLIC PEDESTRIAN ACCESS EASEMENT

WETLAND

35' BUFFER

SEE SHEET 6 OF 7

SEE SHEET 4 OF 7

LOT 1
ZA 8795238 SP
AF NO. 8708170071

W. LINE NW1/4, SEC. 31
N00°37'13"E 330.00'

S. LINE NW1/4, SEC. 31
N89°35'42"W 953.66'

FOUND 5" X 5" CONCRETE MONUMENT WITH 1 1/2" BRASS DISK WITH "X", LS NO. 28074 12-19-95 IN CASE DOWN 0.3' 3-11-03

UNPLATTED

INSTRUMENT DATA: LIETZ 4B (5" DIRECT READING THEODOLITE WITH E.D.M)

PRECISION OF CONTROL TRAVERSE IS AT HIGHER LEVEL THAN MINIMUM STANDARDS REQUIRED BY WAC, 332-130-090.

SCALE: 1"=50'

50' 0 50' 100'

BASIS OF BEARINGS AND SUBDIVISION: RECORD OF SURVEY AF NO. 9806025004

LEGEND

AF NO.	AUDITOR'S FILE NUMBER
(XXXXX)	LOT ADDRESS
N.G.P.A.	NATIVE GROWTH PROTECTION AREA
N.G.P.A./E.	NATIVE GROWTH PROTECTION AREA EASEMENT
(R)	RADIAL
R.	RANGE
R-O-W	RIGHT-OF-WAY
SEC.	SECTION
SE,NE,NW,SW	SOUTHEAST, NORTHEAST, NORTHWEST, SOUTHWEST
S.,N.,E.,W.,	SOUTH, NORTH, EAST, WEST
SF	SQUARE FEET
T.	TOWNSHIP
TR.	TRACT
W.M.	WILLAMETTE MERIDIAN
●	EXISTING MONUMENT AS NOTED
●●	EXISTING REBAR OR IRON PIPE AS NOTED
●	SET STANDARD SNOHOMISH COUNTY MONUMENT/ CASE & BRASS CAP WITH PUNCH MARK LS NO. 30450
×	SET TACK & SHINER, LS NO. 30450 (SEE CURB PLUG LEGEND)
X	DISTANCE FROM CORNER TO CURB PLUG SEE CURB PLUG TABLE SHEET 3 OF 7
o	SET 1/2" X 24" REBAR WITH PLASTIC CAP, LS NO. 30450
(X)	REFERENCE RESTRICTION & CONDITIONS ON SHEET 2 OF 7

EASEMENTS

1. PUBLIC UTILITY EASEMENT
2. PUBLIC SANITARY SEWER EASEMENT
3. PUBLIC DRAINAGE, SANITARY SEWER, WATER AND UTILITY EASEMENT
4. PUBLIC DRAINAGE, SANITARY SEWER AND WATER EASEMENT
5. PUBLIC PEDESTRIAN ACCESS EASEMENT
6. PRIVATE DRAINAGE EASEMENT
7. NATIVE GROWTH PROTECTION EASEMENT

SEE EASEMENT PROVISIONS ON SHEET 2 OF 7

NOTE:

1. NO FENCES OR ENCROACHMENTS FOUND EXCEPT AS NOTED HEREON.

DANIEL K. ROUTH — STATE OF WASHINGTON — 19045 — REGISTERED PROFESSIONAL LAND SURVEYOR — EXPIRES: JAN. 12, 2006

GROUP FOUR, Inc.
16030 JUANITA-WOODINVILLE WAY NE
BOTHELL, WASHINGTON 98011
(425)775-4581 • (206)362-4244 • FAX(206)362-3819
SURVEYING ENGINEERING PLANNING MANAGEMENT

JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 5 OF 7

AUDITOR'S FILE NO.: 200405075141

SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

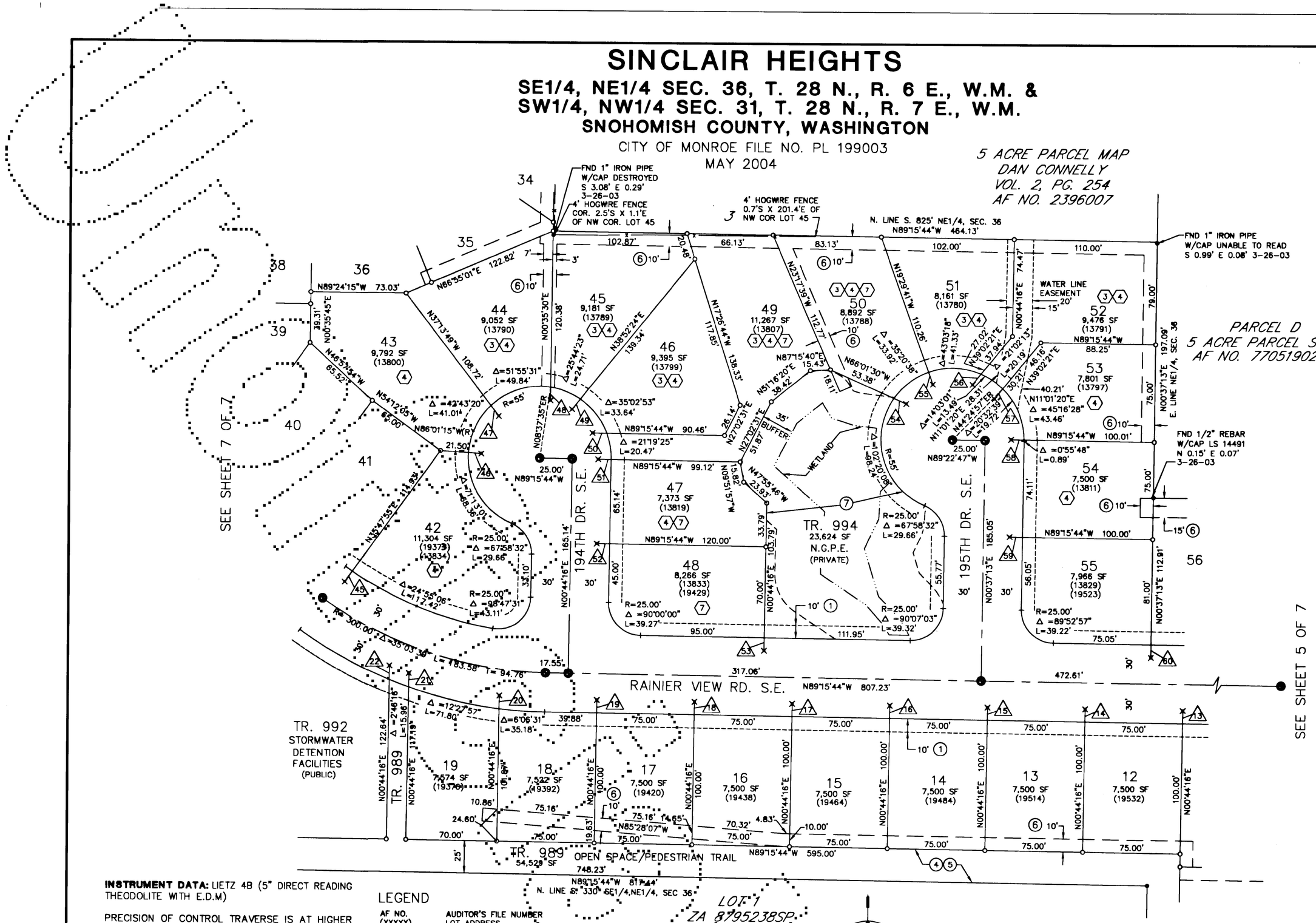
SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004

5 ACRE PARCEL MAP
DAN CONNELLY
VOL. 2, PG. 254
AF NO. 2396007

PARCEL D
5 ACRE PARCEL SURVEY
AF NO. 7705190292



INSTRUMENT DATA: LIETZ 4B (5" DIRECT READING THEODOLITE WITH E.D.M)

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LEGEND

AF NO.	AUDITOR'S FILE NUMBER
(XXXXX)	LOT ADDRESS
N.G.P.A.	NATIVE GROWTH PROTECTION AREA
N.G.P.A./E.	NATIVE GROWTH PROTECTION AREA EASEMENT
(R)	RADIAL
R.	RANGE
R-O-W	RIGHT-OF-WAY
SEC.	SECTION
SE,NE,NW,SW	SOUTHEAST, NORTHEAST, NORTHWEST, SOUTHWEST
S.,N.,E.,W.,	SOUTH, NORTH, EAST, WEST
SF	SQUARE FEET
T.	TOWNSHIP
TR.	TRACT
W.M.	WILLAMETTE MERIDIAN
●	EXISTING MONUMENT AS NOTED
●	EXISTING REBAR OR IRON PIPE AS NOTED
●	SET STANDARD SNOHOMISH COUNTY MONUMENT/ CASE & BRASS CAP WITH PUNCH MARK LS NO. 30450
X	SET TACK & SHINER, LS NO. 30450
X	DISTANCE FROM FRONT LOT CORNER TO CURB PLUG (SEE CURB PLUG TABLE SHEET 3 OF 7)
o	SET 1/2" X 24" REBAR WITH PLASTIC CAP, LS NO. 30450
(X)	REFERENCE RESTRICTIONS & CONDITIONS ON SHEET 2 OF 7

LOT 1
ZA 8795238SP
AF NO. 8708170071

N

SCALE: 1" = 50'

50' 0 50' 100'

BASIS OF BEARINGS AND SUBDIVISION: RECORD OF SURVEY AF NO. 9806025004

DANIEL K. ROUPE — STATE OF WASHINGTON — 20404 — REGISTERED PROFESSIONAL LAND SURVEYOR — EXPIRES: JAN. 12, 2006

NOTE:

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JOB NO.: 03-8003 DATE: 04/22/04 SHEET: 6 OF 7

AUDITOR'S FILE NO.: 200405075141

SINCLAIR HEIGHTS

SE1/4, NE1/4 SEC. 36, T. 28 N., R. 6 E., W.M. & SW1/4, NW1/4 SEC. 31, T. 28 N., R. 7 E., W.M.

SNOHOMISH COUNTY, WASHINGTON

CITY OF MONROE FILE NO. PL 199003

MAY 2004

SCALE: 1"=50'

50' 0 50' 100'

BASIS OF BEARINGS AND SUBDIVISION: RECORD OF SURVEY AF NO. 9806025004

5 ACRE PARCEL MAP
DAN CONNELLY
VOL. 2, PG. 254
AF NO. 2396007

FND 1" IRON PIPE W/CAP DESTROYED S 0.65' E 0.70' 3-26-03

N. LINE PER DEED N89°26'40"W 455.58'

FND 1" IRON PIPE W/CAP LS 9569 S 0.11' E 0.11' 3-26-03

4' HOGWIRE FENCE 0.8'E OF NE COR. LOT 32

FND 1" IRON PIPE W/CAP DESTROYED S 3.08' E 0.29' 3-26-03

4' HOGWIRE FENCE COR. 2.5'S X 1.1'E OF NW COR. LOT 45

N. LINE S. 825' NE1/4, SEC. 36 N89°15'44"W 316.05'

W. LINE PER DEED N00°35'53"E 260.27'

W. LINE SE1/4,NE1/4, SEC. 36 N00°35'53"E 1313.76

SW. CORNER SE1/4,NE1/4, SEC. 36

191ST AVE. S.E.

193RD DR. S.E.

137TH PL. S.E.

RAINIER VIEW RD. S.E.

SR 2 WESTWICK ROAD TO NORTH MONROE INTERCHANGE

W. LINE PER W.S.D.O.T. DEED AF NO. 2100903

W.S.D.O.T. RIGHT-OF-WAY

20' WATERLINE EASEMENT

20	8,597 SF (19147)	
21	7,112 SF (19163)	
22	7,221 SF (19181)	
23	7,068 SF (19199)	
24	7,852 SF (19225) (13776)	
25	7,005 SF (13754)	
26	7,512 SF (13732)	
27	7,494 SF (13720)	
28	10,217 SF (13714)	
29	8,475 SF (19311)	
30	7,734 SF (19327)	
31	7,777 SF (19345)	
32	9,112 SF (19359)	
33	8,993 SF (19367)	
34	7,620 SF (19375)	
35	7,895 SF ((19364)	
36	7,214 SF (19352)	
37	8,435 SF (19340) (13743)	
38	7,701 SF (13759)	
39	10,549 SF (13781) (19315)	
40	7,743 SF (19327)	
41	7,475 SF (19341)	
42		
43		
44		
45		

TR. 986 1,645 SF PRIVATE ROAD

TR. 987 987 SF OPEN SPACE/ENTRY SIGN (PRIVATE)

TR. 989 54,529 SF OPEN SPACE/PEDESTRIAN TRAIL

TR. 992 67,866 SF STORMWATER DETENTION FACILITIES (PUBLIC)

C1 R=342.00' Δ=7°07'05" L=42.49'

C2 R=342.00' Δ=3°22'42" L=20.17'

C3 R=342.00' Δ=3°44'23" L=22.32'

EASEMENTS

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4. PUBLIC DRAINAGE, SANITARY SEWER AND WATER EASEMENT
5. PUBLIC PEDESTRIAN ACCESS EASEMENT
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7. NATIVE GROWTH PROTECTION EASEMENT

SEE EASEMENT PROVISIONS ON SHEET 2 OF 7

SEE SHEET 6 OF 7

INSTRUMENT DATA: LIETZ 4B (5" DIRECT READING THEODOLITE WITH E.D.M)

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LEGEND

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(XXXXX)	LOT ADDRESS
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N.G.P.A./E.	NATIVE GROWTH PROTECTION AREA EASEMENT
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R.	RANGE
R-O-W	RIGHT-OF-WAY
SEC.	SECTION
SE,NE,NW,SW	SOUTHEAST, NORTHEAST, NORTHWEST, SOUTHWEST
S.,N.,E.,W.,	SOUTH, NORTH, EAST, WEST
SF	SQUARE FEET
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NOTE:

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DANIEL K. ROUPE — STATE OF WASHINGTON — 30450 — REGISTERED PROFESSIONAL LAND SURVEYOR — EXPIRES: JAN. 12, 2006

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JOB NO.: 03-8003 DATE: 02/22/04 SHEET: 7 OF 7

AUDITOR'S FILE NO.: 200405075141

Appendix F — Qualifications

All field inspections, wetland determinations, habitat assessments, and supporting documentation, including this ***Wetland and Fish and Wildlife Habitat Assessment Report*** prepared for ***Cooper Ridge*** project site were prepared by, or under the direction of, Jon Pickett of SVC. In addition, the site investigations were performed by Harry Richardson and Kyla Caddey, and report preparation was completed by Mae Ancheta.

Jon Pickett

Associate Principal
Professional Experience: 10+ years

Jon Pickett is an Associate Principal and Senior Scientist with diverse professional experience in habitat development as a Regional Biologist and Environmental Project Manager, with an emphasis in wetland restoration and enhancement. Jon has extensive experience successfully planning, developing, securing funding, managing and implementing numerous large-scale wetland habitat projects aimed at restoring the biological and physical functions of wetlands throughout California's Central Valley and Southern California. During this time, he managed a 2,200-acre private wetland and upland habitat complex as a public trust resource for conservation and consumptive use. He worked to ensure projects were designed and implemented to achieve habitat restoration goals, including reclamation of wetland and floodplain habitats, reintroduction of aquatic complexity and habitat, and reestablishment of riparian corridor.

Jon has worked with Federal and State agencies and private entities on land acquisitions for conservational habitat and public use, including prioritizing acquisitions relative to value and opportunity and funding. In addition, Jon has experience in regulatory coordination to ensure projects operated in compliance with Federal, State and local environmental regulations, preparing permit documentation, coordinating with all pertinent agencies and stakeholders, and developing and maintaining appropriate permitting timelines to ensure timely approvals. He also oversaw earthwork construction components and revegetation efforts, as well as post-project monitoring, with an emphasis in native vegetation establishment and natural channel morphology.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement) and has been formally trained in the use of the Washington State Wetland Rating System, How to Determine the Ordinary High Water Mark, Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Kyla Caddey

Environmental Scientist & Certified Ecologist
Professional Experience: 6 years

Kyla Caddey is an Environmental Scientist with a diverse background in riparian habitat restoration, stream and wetland ecology, wildlife ecology and conservation, and wildlife and natural resource assessments and monitoring. Kyla has advanced expertise in report preparation, grant writing, environmental education, data compilation and statistical analysis. Kyla has field experience

performing in-depth studies in both the Pacific Northwest and Central American ecosystems. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects.

Kyla earned a Bachelor of Science degree in Environmental Science and Resource Management from the University of Washington, Seattle with a focus in Wildlife Conservation and a minor in Quantitative Science. Ms. Caddey is a Certified Ecologist through the Ecological Society of America. She has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement), is a Pierce County Qualified Wetland Specialist and Wildlife Biologist, and is a USFWS-approved Mazama pocket gopher survey biologist. Kyla has been formally trained through the Washington State Department of Ecology, Coastal Training Program, and the Washington Native Plant Society in winter twig and grass, sedge, and rush identification for Western WA; Using the Credit-Debit Method in Estimating Wetland Mitigation Needs; How to Determine the Ordinary High Water Mark; Using Field Indicators for Hydric Soils; How to Administer Development Permits in Washington Shorelines; Puget Sound Coastal Processes; and Forage Fish Survey Techniques. Additionally, she has received formal training in preparing WSDOT Biological Assessments.

Megan Mae Ancheta

Staff Scientist
Professional Experience: 2 years

Megan (Mae) Ancheta is a Staff Scientist with a background in wildlife and conservation biology in Washington state. Mae earned her Bachelor of Science degree in Environmental Science with a focus in Conservation Biology and Ecology and a certificate in Restoration Ecology from University of Washington, Tacoma. There she gained extensive, hands-on experience working in lab and field settings, and studying socio-ecological restoration and wildlife conservation in old growth forests, historic Puget lowland prairies, and wetland and riparian areas. Mae has applied her studies working in the local government at the city and county level as well as within federal entities conducting wetland mitigation planning, stream habitat monitoring, habitat restoration for federally listed species, and thorough site analyses for natural resource management utilizing ArcGIS and model analyses.

Mae currently assists in wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects.

Kyla Caddey
Environmental Scientist & Certified Ecologist
Professional Experience: 6 years

Kyla Caddey is an Environmental Scientist with a diverse background in riparian habitat restoration, stream and wetland ecology, wildlife ecology and conservation, and wildlife and natural resource assessments and monitoring. Kyla has advanced expertise in report preparation, grant writing, environmental education, data compilation and statistical analysis. Kyla has field experience performing in-depth studies in both the Pacific Northwest and Central American ecosystems. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects.

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Tab 7.0

7.0 OTHER PERMITS

The following permits and/or approvals are thought to be required as part of this project.

- Construction Stormwater General Permit (Department of Ecology)
- Land Disturbing Activity / Site Development Permit
- Postmaster Approval
- Building Permits
- Right of Way Permit

Tab 8.0

8.0 OPERATIONS AND MAINTENANCE

An Operations and Maintenance Manual will be provided in this section during Final Engineering Review.