



MAKING A "WAY" OUT OF "NO WAY"

Andrew Sather

2226 172nd St NE, Marysville, WA 98271

PN PA18-_____

December 2018

**Stormwater Site Plan
Report
for
Sather B Property**

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Acronyms

The following acronyms and abbreviations may or may not be called out within the body of this report.

○ ASTM	- American Society for Testing and Materials
○ BMPs	- Best Management Practices
○ CB	- Catch Basin
○ CAO	- Critical Areas Ordinance
○ CESCL	- Certified Erosion and Sediment Control Lead
○ DOE	- Department of Ecology
○ EDDS	- Engineering Design & Development Standards
○ FEMA	- Federal Emergency Management Agency
○ HSPF	- Hydrological Simulation Program—Fortran
○ LiDAR	- Light Detecting And Ranging
○ LDA	- Land disturbing activity
○ LID	- Low Impact Development
○ LID Manual	- DOE 2005 LID Technical Guidance Manual for Puget Sound
○ MRs	- Minimum Requirements (for Stormwater Management)
○ MS4	- Municipal Separate Storm Sewer System
○ MSL	- Mean Sea Level
○ NAVD88	- North American Vertical Datum of 1888
○ NGVD29	- National Geodetic Vertical Datum of 1929
○ NPDES	- National Pollutant Discharge Elimination System
○ NRCS	- Natural Resources Conservation Service
○ NPGIS	- Non-Pollutant Generating Impervious Surface
○ O&M	- Operations and Maintenance
○ PGIS	- Pollutant Generating Impervious Surface
○ PGPS	- Pollutant Generating Pervious Surface
○ PLSS	- Public Land Survey System
○ POC	- Point of Compliance
○ RCW	- Revised Code of Washington
○ ROW	- Right-of-Way
○ SCDM-2010	- Snohomish County 2010 Drainage Manual
○ SMMWW	- DOE 2005 Stormwater Management Manual for Western Washington
○ SWPPP	- Stormwater Pollution Prevention Plan
○ TDA	- Threshold Discharge Area
○ TESC	- Temporary Erosion and Sediment Controls
○ USDA	- United States Department of Agriculture
○ US EPA	- United States Environmental Protection Agency
○ WSDOT	- Washington State Department of Transportation
○ WWHM	- Western Washington Hydrology Model

Section 1 – Report Summary

1.1 Project Description

Andrew Sather is proposing to bring in temporary fill material to his property. The proposed grading permit will be on 17.1-*acres* of land in northwest Marysville, WA off of 172nd St NE. Future development of the parcel is in the planning phase. Fill material will be required for the future development of the parcel. The temporary grading permit will be to “jump start” the development of the parcel with needed import material.

The parcel is currently vacant and vegetated with pasture. In the past few years the parcel was used for the harvesting of corn and other crops. The property has been used for agricultural for several decades. No known critical areas occur onsite or directly offsite.

Fill will be brought into the site from the existing shared driveway at the north-east corner. This shared driveway will have already been used for the Sather-A temporary Fill project to the North. The shared driveway will likely have wheel wash and construction entrance/exits installed. A temporary construction entrance will still be installed at the northern parcel line. The existing construction entrances and wheel wash are required to be maintained and in place until conclusion of all grading activities on all adjacent sites.

Trucks will leave the site along the existing gravel driveway and through the entrance location. Fill will be brought into the parcel along this route. The final site will contain no new impervious area. Temporary site will have a construction entrance of 1,350 sf.

The fill will have a maximum slope of 2:1. A 40 *foot* vegetated buffer will extend from the toe of the slope to the property boundary. An existing vegetated agriculture ditch borders the west property line. The vegetated buffer will extend from this ditch to the toe of the fill material.

The fill slopes will be tracked, seeded, and mulched. No plastic coverings will be required in order to keep flow rates to predeveloped levels.

The 2014 DOE Stormwater Management Manual for Western Washington will be used for stormwater management.

Per NRCS mappings, type “C/D” Custer fine sandy loam soils are found through the bulk of the site in the east. A band of Kitsap Silt loam soils are located in the west portion of the site. An intrusion from the south of Terric Medisaprists also exists. The site is mapped as the Marysville Sand Member- Recessional Outwash.

The entire developable project area is in a single natural discharge area with a single discharge location to an agricultural ditch in the west. The agriculture ditch runs north to south along the Railroad right of way. Stormwater BMPs will be employed to mitigate polluted and unpolluted surface water flows.

1.2 Project Data Summary

Existing and proposed project areas are presented for determination of stormwater management requirements based on prescribed thresholds as outlined in the Marysville Municipal Code (MMC 22C) and the 2014 SMMWW Vol-1, Ch-2, Section 2.4 are summarized in the following tables.

Table 1 - Project Parcel Summary

Project Data:	
Applicant	Andrew Sather
Site Owner	Andrew Sather
Project Name	Sather B Property
Project T.S.R. Location	TwN 31 N, Rng 5 E, Sec 29, Qtr-NW
Project Address	2226 172nd St NE, Marysville, WA 98271
Parcel ID(s)	31052900201300
Watershed	Snohomish
Basin	Snohomish
Sub-Basin	Quilceda Creek
WRIA Number	7
Analysis Standard	2014 DOE SMMWW

Table 2 - Project Area Analysis & Activities Summary

Existing Conditions:		
Total Site Area	744,699	sf (17.1 ac)
Existing Impervious Area	0	sf (0.0 ac) 0%
Proposed Activity:		
Proposed Activity	Temporary	Grading Import
Total Proposed Disturbance Area	744,699	sf (17.1 ac)
Proposed Grading Area	744,699	sf (17.1 ac)
Proposed New NPGIS	0	sf (0 ac)
Proposed New PGIS (Temp. Construction Entrance)	1,350	sf (0.03 ac)
Proposed Replaced Impervious Area	0	sf (0.00 ac)
Native Vegetation convert to Lawn	0	sf (0.00 ac)
Native Vegetation convert to Pasture	0	sf (0.000 ac)
Total New Impervious Area	1,350	sf (0.03 ac)
Total Site Impervious Area (new+exist)	1,350	sf (0.03 ac)
Grading is ≤ 2 feet from P/L	No	
Any excavation 4+' at <1:1 slope to P/L	No	
Fill Slopes 4+' and >33% slope	No	

Section 2 - Minimum Requirements

2.1 Assessment of Minimum Requirements and Thresholds

Minimum requirements and thresholds are established by City of Marysville Municipal Code 14.15.050 – Minimum Requirements. Minimum Requirements for new development and Redevelopment are based on a development’s disturbance area. Existing and proposed project areas for determination of stormwater management requirements are presented in Table 2.

The existing impervious area is less than 35% so this project qualifies as ‘new development’. The proposed condition of the fully developed site will have impervious area less than 2,000 sf. The project does not convert more than 2.5 acres of native vegetation to pasture. The project does cause more than 7,000 *square feet* of land disturbing activity. This requires construction activities and stormwater management to comply with Minimum Requirements 1 through 5. A full construction SWPPP is also required.

Minimum Requirements per the SCMD:

- MR-1: Prepare Stormwater Site Plan. MMC 14.15.050 (1)
- MR-2: Stormwater Pollution Prevention Plan (SWPPP). MMC 14.15.050 (2)
- MR-3: Water pollution source control for new development. MMC 14.15.050 (3)
- MR-4: Preservation of natural drainage systems and outfalls. MMC 14.15.050 (4)
- MR-5: On-site stormwater management. MMC 14.15.050 (5)

Each Minimum Requirements is described in the following sections. There are no additional requirements to be met.

2.2 MR #1: Preparation of Stormwater Site Plans

This document is the Stormwater Site Plan Report that addresses the requirements of MR-1. This section presents the portion of the Stormwater Site Plan that includes recommendations, calculations, and procedures required to adhere to Minimum Requirement #1. The evaluation of the existing site conditions follows.

2.2.1 Site Location

The site is located in the NW quarter of Section 29 of Township 31 North, Range 5 East. The street address is 2226 172nd St NE, Marysville, WA 98271 and the parcel is located to the south of 172nd at the end of a private shared driveway. The parcel is also bordered on the west by the Burlington North R.R. See Figure 1 for a vicinity map.

2.2.2 Site Description, Existing Conditions

The project site is 17.1-*acre* parcel. The parcel is owned by Andrew Sather. The Snohomish County parcel number is 31052900201300. It is zoned Mixed Use and is located in City of Marysville within Snohomish County.

The parcel is vacant. The existing drainage system(s) are undetermined but largely surface runoff to the west agriculture ditch over the top silt layer and some infiltration. Surface runoff overall flows west.

The site is pasture. It has previously served as a corn field.

All maps and figures are presented in the Support Data section of this document.

A vicinity map that shows the site location is shown as Figure 1.

A site map that shows the property lines is shown in Figure 2.

A topographic map that shows the site boundaries, study area boundaries, and the downstream flow-paths is also presented in Figure 3.

2.2.3 Existing Basin Analysis

The project is defined by the development within the subject parcel. Existing project flow paths are shown in Figure 2.

The study area is located in the Quilceda Creek sub-basin of the Snohomish Basin in the Snohomish watershed (WRIA-7), which drains to the Puget Sound.

All existing flow assessment and site related basin delineations were established by tracing analysis of a LIDAR surface model.

2.2.4 Other Information on the Study Area

The site is not in or adjacent to a USEPA Sole Source Aquifer.

The site is not in a well-head protection area.

The site is not in a floodway or floodplain.

2.2.5 Critical Areas

No critical areas occur onsite or directly offsite.

2.2.6 Topography

The site and surrounding topography was analyzed using survey topographic points provided by the Puget Sound Lidar Consortium as well as survey points from Andes Land Surveying. A 3D surface model was generated.

The site has mostly flat slopes with a low point around 112 *feet* MSL in the southwest corner. The low point is in the location of the agricultural ditch system. The site slopes up from the south to a high point of 118 *feet* along the north property boundary nearest the existing shared driveway connection.

Slopes average in the range of 0 to 2 percent for the majority of the developable area. The site has an average slope of 0.75%.

2.2.7 Soils

The majority of the site is situated on Custer fine sandy loam soils, a hydrologic Type-C/D soil per the NRCS mapping. Custer fine sandy loam soils have a 0-9 *inch* first layer of fine sandy loam with the remaining profile being sand. Much surface runoff is attributed to the fine sandy loam layer. Infiltration increases significantly with depth within this soil type in the eastern portion of the site. A narrow band of Kitsap silt loam exists in the west and Terric Medisaprists in the south portion of the site. Kitsap and Terric soils have limited infiltration capacity due to the fine grained nature of the soils.

A Geotech report was prepared by Earth Solutions NW, Inc. to detail the preliminary fill at the site. The soil explorations confirm the NRCS mappings of the site. (Earth Solutions NW, LLC, 2018)

Detailed physical and chemical properties of these soils are presented in Section 4.1. The NRCS mapping can be seen in Figure 5.

2.2.8 Field Inspection

A downstream reconnaissance was performed by Land Technologies, Inc. on October 20th, 2017. No standing water was found anywhere onsite.

2.2.9 Upstream Analysis

A relative high point at 120 *feet* MSL is located directly north of the site in the location of the roundabout. This local high intercepts all upstream flows from flowing onto the site and adjacent upstream site. Agriculture ditches throughout the area direct stormwater around the edges of the parcel and adjacent parcels.

2.2.10 Downstream Analysis

The downstream area was established by tracing analysis of a LIDAR surface model and evaluation of various GIS data, aerial imagery, and City of Marysville Drainage Inventory. The development area flows to the west before reaching the Burlington Northern RR ROW. Stormwater turns at the ROW and flows south along the east side of tracks. Stormwater flows along the east side of the

tracks for two miles downstream of the project site before flowing through a 36 *inch* culvert underneath the RR tracks. The culvert leads stormwater to a ditch that parallels Interstate 5. Stormwater eventually meets with Quilceda Creek near 140th St NE & 29th Ave NE.

Figure 3 shows a portion of the downstream flow path.

2.3 MR #2: Stormwater Pollution Prevention Plans (SWPPPs)

MMC 14.15.050 (2) specifies the requirements for development and redevelopment projects are responsible for preventing erosion and discharge of sediment and other pollutants into receiving waters. Volume I, Chapter 2.5.2 of the 2014 SMMWW specifies that all new development and redevelopment implement a Stormwater Pollution Prevention Plans (SWPPP), which is a list of 13 elements that present measures and methods for all permanent and temporary erosion and sediment control (TESC), pollution prevention, inspection/monitoring activities, and recordkeeping required during the proposed construction project.

Based on the MR#2 thresholds, this project generates more than 2,000 *square feet* of impervious area, so a full SWPPP is required. Required elements for the SWPPP:

- SWPPP element 1: Preserve vegetation/mark clearing limits
- SWPPP element 2: Establish construction access
- SWPPP element 3: Control flow rates
- SWPPP element 4: Install sediment controls
- SWPPP element 5: Stabilize soils
- SWPPP Element 6: Protect slopes
- SWPPP element 7: Protect permanent drain inlets
- SWPPP element 8: Stabilize channels and outlets
- SWPPP element 9: Control pollutants
- SWWP element 10: Control dewatering
- SWPPP element 11: Maintain best management practices
- SWPPP element 12: Manage the project
- SWPPP element 13: Protect On-Site Stormwater Management BMPs for Runoff from Roofs and Other Hard Surfaces

The SWPPP is assembled as a separate document for portability and reproduction purposes. The document is titled “**Stormwater Pollution Prevention Plan for Andrew Sather**”, dated 4 December 2018. This document will be provided with Construction Plan Submittal.

2.4 MR #3: Source Control of Pollution

MMC 14.15.050 (3) specifies the requirements for water pollution source control for new development or redevelopment activities in accordance with Volume IV of the SMMWW. These activities are primarily commercial industrial developments that represent significant pollutant generation potential and the associated source control BMPs are designed to suit those activities.

Per Chapter 2.5.3, MR#3 does not apply to residential development, hence such source controls are not specified for this project.

2.5 MR #4: Preservation of Natural Drainage Systems and Outfalls

MMC 14.15.050 (4) specifies the requirements for preservation of natural drainage systems or outfalls for all new development and redevelopment activities under Minimum Requirement 4 in the 2014 SMMWW.

Natural drainage patterns as they once existed shall be retained. The existing farm field has a very slight slope to the west-southwest. Any rains heavy enough to create runoff and not infiltrate will sheet flow to the farm ditch/MS4 along the west perimeter of the Sather Farm.

The Proposal is to bring in fill material on to the site for future development potential without changing the natural flow characteristic of the parcel and surrounding area.

Natural drainage systems and outfalls will be preserved.

2.6 MR #5: On-Site Stormwater Management

MMC 14.15.050 (5) specifies requirements for on-site stormwater BMPs. This requirement mandates that on-site stormwater runoff be infiltrated, dispersed, and/or retained to the maximum extent feasible without causing flooding or erosion impacts. Projects triggering Minimum Requirements 1 through 5 must use On-site stormwater management BMPs from List #1 for all surfaces or demonstrate compliance with the LID Performance Standard. Projects triggering Minimum Requirements 1 through 9 must meet the requirements of Table 2.5.1 in Vol. 1 of the 2014 SMMWW. Table 2.5.1 specifies the requirements for new or redevelopment depending on UGA and parcel size to meet the requirements of the LID Performance Standard and/or List #2. List #1 and List #2 specify stormwater BMPs in order of preference. The first BMP determined feasible is required.

This project trigger MR's 1-5. This project is within the City's UGA. This project is required to adhere to List #1 per Table 2.5.1.

List #1 and #2 contain appropriate BMPs to mitigate a particular developed surface. The surfaces included in the list are Lawn and Landscaped Areas, Roofs, and other hard surfaces (road/driveway/parking).

Lawn/Landscape is required to utilize BMP T5.13, Post-Construction Soil Quality and Depth.

No roofs are proposed.

No driveways are proposed. (Temporary construction entrance is to be removed and rehabilitated at project's end.)

A site plan showing the stormwater management and development can be seen in Figure 4.

Section 3 - Maps & Figures

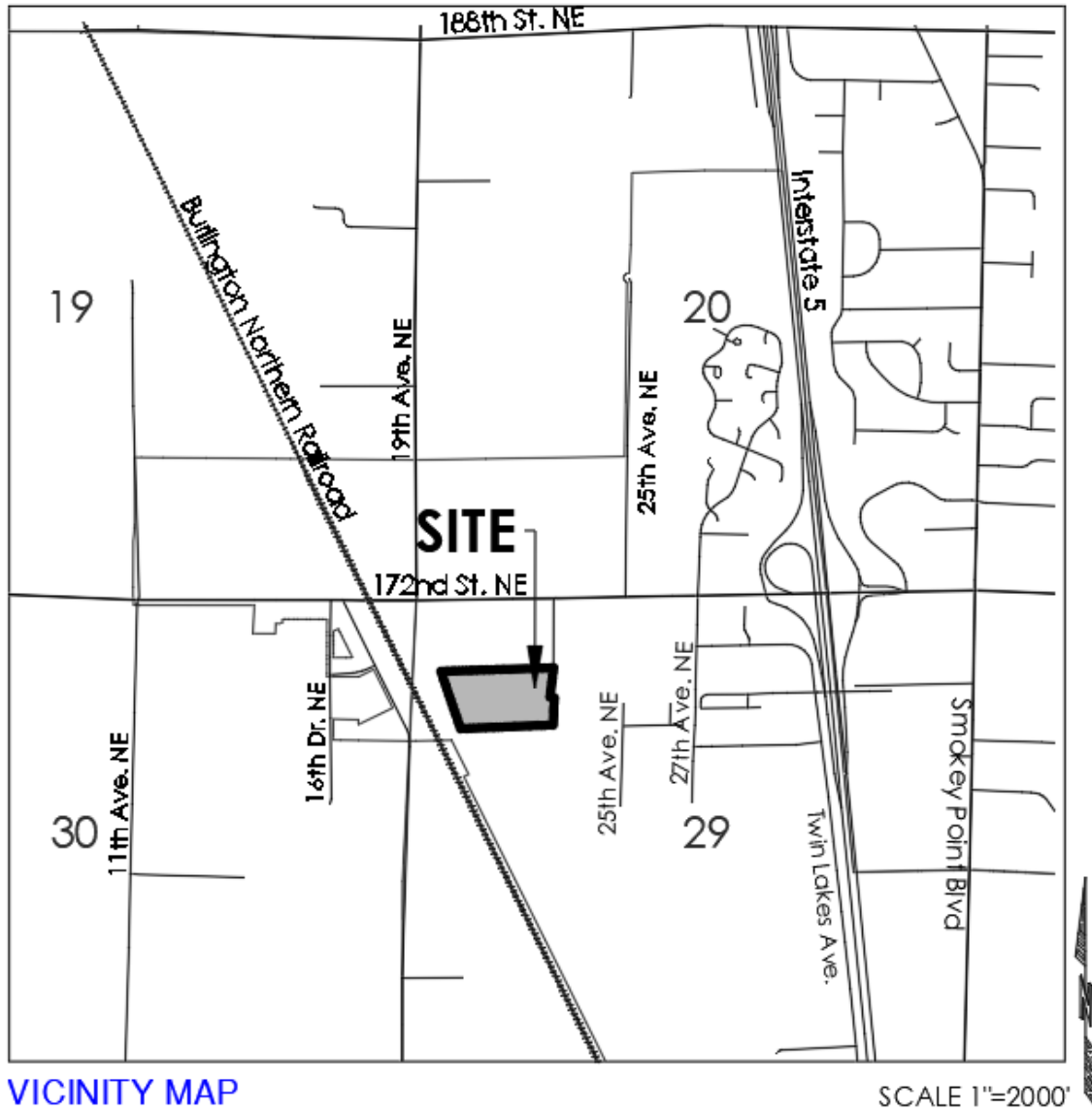


Figure 1 - Vicinity Map



Figure 2 - Existing Conditions (not to scale)

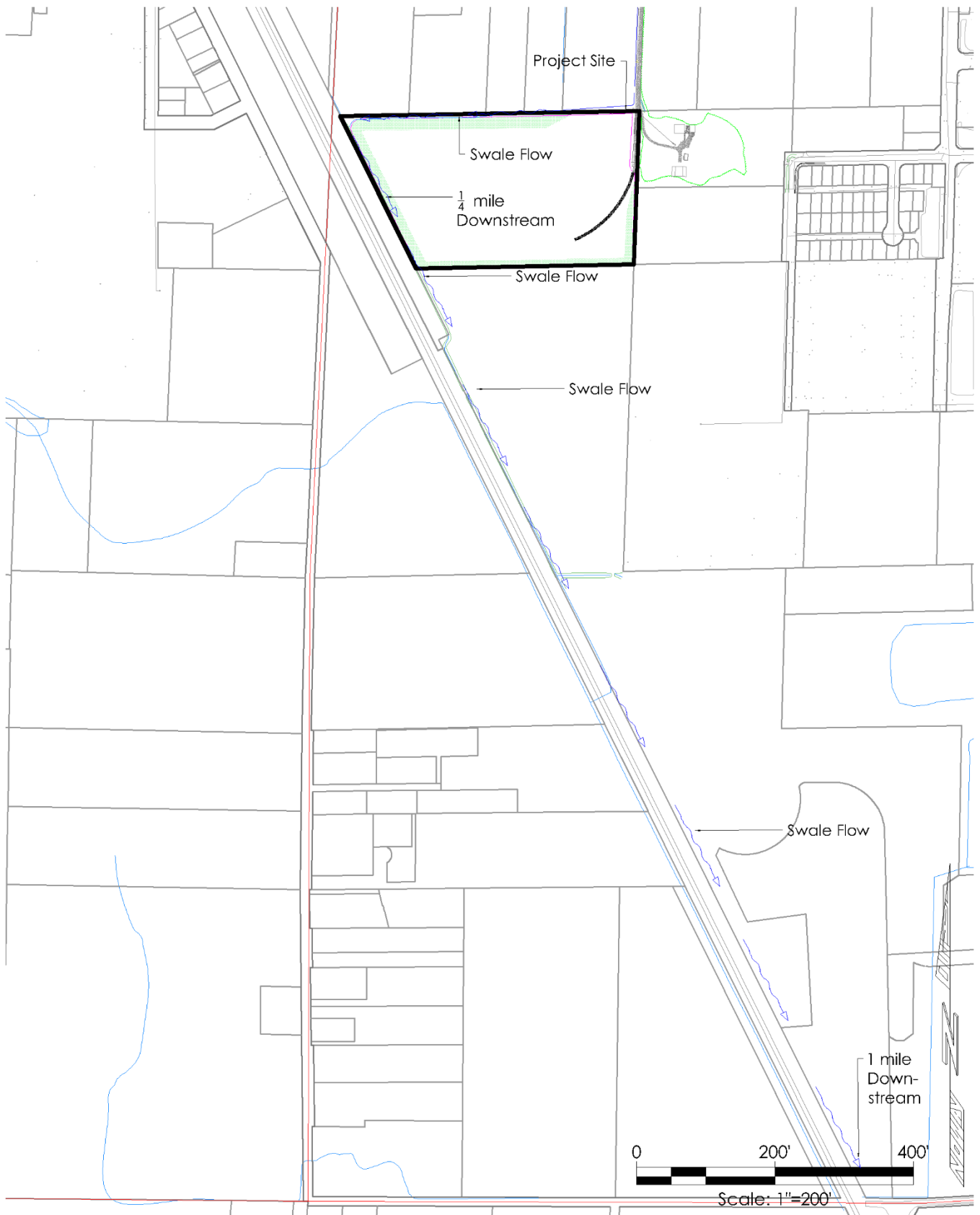


Figure 3 – Downstream Flow Path



Figure 4 - Site Plan



Figure 5 – Soil Map (Not to Scale)

Section 4 - Support Data

4.1 Soils Data

13—Custer fine sandy loam

Map Unit Setting

National map unit symbol: 2hy0

Elevation: 0 to 150 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 48 to 50 degrees F

Frost-free period: 150 to 200 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Custer and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Custer

Setting

Landform: Outwash plains

Parent material: Glacial outwash

Typical profile

H1 - 0 to 9 inches: fine sandy loam

H2 - 9 to 35 inches: sand

H3 - 35 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification

Natural drainage class: Poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 12 to 18 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w

Hydrologic Soil Group: C/D

Other vegetative classification: Seasonally Wet Soils (G002XN202WA)

Hydric soil rating: Yes

Minor Components

Custer

Percent of map unit: 5 percent

Landform: Depressions

Indianola

Percent of map unit: 5 percent

Hydric soil rating: No

Norma

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

27—Kitsap silt loam, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2hyh

Elevation: 0 to 490 feet

Mean annual precipitation: 37 inches

Mean annual air temperature: 50 degrees F

Frost-free period: 160 to 200 days

Farmland classification: All areas are prime farmland

Map Unit Composition

Kitsap and similar soils: 85 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces

Parent material: Lacustrine deposits

Typical profile

H1 - 0 to 6 inches: ashy silt loam

H2 - 6 to 33 inches: silt loam

H3 - 33 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 0 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: About 18 to 30 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C

Forage suitability group: Soils with Few Limitations (G002XF503WA)

Hydric soil rating: No

Minor Components

Bellingham, undrained

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

69—Terric Medisaprists, nearly level

Map Unit Setting

National map unit symbol: 2hzz

Elevation: 0 to 1,150 feet

Mean annual precipitation: 35 to 70 inches

Mean annual air temperature: 50 degrees F

Frost-free period: 170 days

Farmland classification: Prime farmland if drained

Map Unit Composition

Terric medisaprists, drained, and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Terric Medisaprists, Drained

Setting

Landform: Till plains, flood plains, depressions

Parent material: Organic material over alluvium

Typical profile

H1 - 0 to 28 inches: muck

H2 - 28 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Very poorly drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)

Depth to water table: About 12 to 35 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very high (about 16.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3w

Hydrologic Soil Group: C

Forage suitability group: Soils with Few Limitations (G002XN502WA)

Hydric soil rating: Yes

Minor Components**Terric medisaprists, undrained**

Percent of map unit: 5 percent

Hydric soil rating: Yes

Snohomish, undrained

Percent of map unit: 4 percent

Landform: Flood plains

Hydric soil rating: Yes

Mukilteo, undrained

Percent of map unit: 3 percent

Landform: Depressions

Hydric soil rating: Yes

Orcas

Percent of map unit: 3 percent

Landform: Depressions

Hydric soil rating: Yes

Section 5 Works Cited

- Earth Solutions NW, LLC>. (2018). *Preliminary Geotechnical Engineering Study Proposed Development Sather B and C Properties*. Bellevue: ESNW.
- Puget Sound Action Team. (2005, January). Low Impact Development Technical Guidance Manual for Puget Sound. *Publication No. PSAT 05-03*. Washington: Washington State University - Pierce County Extension.
- Puget Sound LIDAR Consortium. (2003, April). LIDAR Bare Earth DEM File. q47121h24be.e00. Snohomish County, Washington. Retrieved May 2013, from <http://pugetsoundlidar.ess.washington.edu/index.htm>
- Snohomish County Planning and Development Services. (2007, October 1). Aquifer Recharge/Wellhead Protection. Everett, WA.
- Snohomish County Surface Water Management Division. (2002, December). Snohomish UGA Drainage Needs Report. Everett, Washington.
- Wetland Solutions. Inc. (2015). *Critical Areas Study*. Everett.

5.1 Topographic Data

- The various on and off site topography, utilities, and drainage elements were professionally surveyed by Pacific Coast Surveying in 2015.
- Snohomish County 2003 LiDAR survey was used to augment the existing site topography and the downstream and surrounding areas.

The modeled coordinate system:

Lateral - Washington State Plan Plane - North, FIPS 4601;

Vertical – NAVD 88