



Smokey Point Holdings, LLC.
14XXX Smokey Point Blvd, Marysville, WA 98271

PN SPA 23-_____

Site Plan Approval: January 2023

**Stormwater Site Plan
Report
for
Ideal Industrial Park**

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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

Smokey Point Holdings, LLC./Ideal Property Investments LLC. is proposing to develop the subject property into an industrial park. The industrial park will consist of three buildings to maximize space and a centralized truck court to accommodate shipping for the leased tenants. The proposed site plan approval and subsequent grading permit will be on 10.15-acres of land in northern Marysville, WA off of Smokey Point Blvd.

The parcels are predominately vacant and vegetated with pasture. No critical areas are known to occur onsite or immediately offsite. A non-regulated ditch enters the site at the NE corner of the property and follows the eastern property line before reaching a 36" CMP culvert offsite.

The entire parcel will be cleared and an Early Grading Permit has already been obtained. Imported fill material will be needed to raise the site for separation to the groundwater table. Groundwater monitoring piezometers are currently in place for the 2022-23 Wet Season. The stormwater management strategy presented within this report assumes a very shallow groundwater depth to ensure feasibility for the design.

Access to the site will be along the west boundary at Smokey Point Blvd and a single access to 150th Pl. The driveway access points are strategically located along the western boundary. The south and north access are located consistent with access separation from opposing driveways along Smokey Point Blvd.

Parking spaces are located along the perimeter of the site for employees/customers. A fire access route is provided around each building.

Stormwater management design will enforce LID Principles utilizing LID BMPs consistent with the DOE Stormwater Management Manual for Western Washington (SMMWW). LID Principles are to maintain natural hydrology to the maximum extent feasible. The project will employ interspersed stormwater management systems in lieu of a centralized collection system. The stormwater management system will consist of multiple bioretention cell BMPs and Rooftop Infiltration Trenches (BMP T5.10A). These BMPs will return rainfall to the soil column mimicking the natural vegetative systems that were once established on site.

The 2019 DOE Stormwater Management Manual for Western Washington adopted by City of Marysville will govern stormwater management practices and controls.

Per NRCS mappings, type "C/D" Custer fine sandy loam soils are found throughout the site. Sandy, permeable soils are found at depth.

The entire developable project area is in a single natural discharge area with a single discharge location to Hayho Creek. 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 2019 SMMWW Vol-1, Ch-2, Section 2.4 are summarized in the following tables.

Table 1 - Project Parcel Summary

Project Data:	
Applicant	Ideal Property Investments
Site Owner	Smokey Point Holdings, LLC.
Project Name	Ideal Industrial Park
Project T.S.R. Location	TwN 31 N, Rng 5 E, Sec 33, Qtr-NW
Project Address	14XXX Smokey Point Blvd, Marysville, WA 98271
Parcel ID(s)	310533-003-006-00, -002-022-00, -002-023-00; -002-024-00; -002-015-00; -002-025-00;
Watershed	Snohomish
Basin	Snohomish
Sub-Basin	Quilceda Creek
WRIA Number	7
Analysis Standard	2019 DOE SMMWW

Table 2 - Project Area Analysis & Activities Summary

Existing Conditions:		
Total Site Area	442,244	sf (10.15 ac)
Proposed Activity:		
Proposed Activity	Industrial Park	
Total Proposed Disturbance Area	435,271	sf (9.99 ac)
Proposed Grading Area	435,271	sf (9.99 ac)
Proposed New NPGIS	181,450	sf (4.17 ac)
Proposed New PGIS	163,484	sf (3.75 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 (0.00 ac)
Total New Impervious Area	344,934	sf (7.92 ac)
Total Site Impervious Area (new+exist)	344,934	sf (7.92 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 9. A full construction SWPPP is also required.

Minimum Requirements per the SMMWW:

- 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)
- MR-6: Runoff treatment. MMC 14.15.050 (6)
- MR-7: Flow control requirements. MMC 14.15.050 (7)
- MR-8: Detention or treatment in wetlands and wetland buffers. MMC 14.15.050 (8)
- MR-9: Inspection, operation and maintenance requirements. MMC 14.15.050 (9)

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 33 of Township 31 North, Range 5 East. The street address is 14XXX Smokey Point Blvd, Marysville, WA 98271 and the parcel is located on the east side of Smokey Point Blvd. See Figure 1 for a vicinity map.

2.2.2 Site Description, Existing Conditions

The project site is 10.15-acres parcel. The parcels are owned by Smokey Point Holdings, LLC. With one parcel owned by Ideal Property Investments, LLC. The Snohomish County parcel numbers are 310533-003-006-00, -002-022-00, -002-023-00; -002-024-00; -002-015-00; -002-025-00; . They are zoned General Commercial and are located within City of Marysville inside Snohomish County.

The site is predominately vacant, it is unclear if the existing buildings are habitable or still onsite. Regardless, all existing buildings and structures will be removed from the site with the issued early grading permit early on in 2023. The existing drainage system(s) are undetermined but largely surface runoff to the south and east with some infiltration. Surface runoff overall flows east. Surface runoff is due to the silty top layer of Custer soils.

The site is pasture with some large trees scattered throughout. A row of trees are located along the ditch to the east.

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 site 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 are known to occur onsite or immediately offsite. A non-regulated ditch enters the site at the NE corner of the property and follows the eastern property line before reaching a 36" CMP culvert offsite.

2.2.6 Topography

The site and surrounding topography was analyzed using survey topographic points provided by the Puget Sound Lidar Consortium. A 3D surface model was generated. Site survey was conducted by Pacific Coast Surveys and augments the 3D surface model within the site.

The site has mostly moderate slopes with a low point around 102 *feet* MSL along the east property boundary within the existing ditch. The site slopes up from the SE corner to a high point of 107 *feet* along the NW property corner.

Slopes average in the range of 0 to 2 percent for the majority of the developable area. The site has an average slope of 0.30%.

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.

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

The site has not been visited recently.

2.2.9 Upstream Analysis

There is no recognizable upstream area flowing into the site. Stormwater and topography of the surrounding areas fall away from the site and into the neighboring ditches.

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 south between property lines before reaching an existing ditch along the east boundary of the site. Stormwater flows south before reaching the south property boundary and flowing east through a 36" CMP Metal culvert. Stormwater turns and flows south again and then discharges to Hayho Creek. Hayho Creek travels south before reaching the Quilceda Creek. Quilceda Creek drains to the Puget Sound.

Stormwater generated from the project site is to be infiltrated to the maximum extent feasible by accessing the clean, native sands of the Marysville sand member.

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 2019 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 Ideal Industrial Park**”, dated January 2023.

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 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 this project. There is no recognized pollutant or activity proposed on this site which may trigger this requirement. 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 2019 SMMWW.

Natural drainage patterns as they once existed shall be retained. Existing conditions experience a sheet drainage pattern to the site's east property boundary. Pre-developed conditions experience surface runoff. Stormwater generated onsite reaches the property boundary through infiltration and surface runoff. Surface runoff reaches the offsite ditch and is conveyed offsite.

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 triggers MR's 1-9. This project is within the City's UGA. This project is required to adhere to the LID Performance Standard or List #2 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.

Roofs are required to employ BMP T5.30 Full Dispersion or Downspout Infiltration, Rain Gardens or Bioretention, BMP T5.10A Downspout Dispersion Systems, or perforated stub-out connections. The first feasible BMP in this list must be used.

Other Hard surfaces (Roads, Driveways, Parking Lots, Etc.) must utilize BMP T5.30 Full Dispersion, BMP T5.15 Permeable Pavement, Bioretention, Sheet Flow Dispersion, or Concentrated Flow Dispersion. The first feasible BMP in this list must be used.

Lawn/landscape will utilize BMP T5.13, Post Construction Soil Quality and Depth where applicable.

Roofs and Driveways will not be able to provide BMP T5.30 Full Dispersion. Full Dispersion requires 100 *foot* flow paths within native areas. The project will not be able to maintain 65% open space.

Individual Roof Infiltration is feasible based on the low-permeability of native soils at depth. Roofs will be routed to rooftop infiltration trenches per BMP T5.10A sized in accordance with Medium Sand. Geotechnical investigation revealed the site consistent with USDA 'Gravelly Sand' at depth.

Some infiltration trenches may be located above fill material. The fill material below these infiltration trenches shall be gravelly, sand borrow from this same site. This shall be confirmed by the Geotech to form a continuous conduit to the clean, recessional outwash consistent with the Marysville Sand Member.

Aisle and Driveway/Parking will be routed to bioretention areas. The bioretention cells will treat stormwater through filtering, phytoremediation, and microbial action from within the compost. Bioretention cells receiving less than 5,000sf of PGIS require a 1-ft separation to groundwater. When the contributing area to each cell exceeds 5,000sf of PGIS or 10,000sf of NPGIS, a 3-ft separation is required. The bioretention cells located on site are distributed across the perimeter of the site and have a 3-ft separation to groundwater.

Bioretention cells will treat more than 91% of incoming stormwater generated from the PGIS (per MR #6). See Minimum Requirement #6.

Permeable pavement will not be used as the site will may have frequent heavy loads. Permeable pavement is cost prohibitive and undesirable for this site. Imported fill material across the site will render this BMP infeasible.

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

2.7 MR #6: Runoff Treatment

Minimum Requirement #6 in MMC 14.15.050 (6) specifies the requirements for providing runoff treatment. The threshold for requiring a treatment BMP is 5,000 *square feet* of PGIS (Pollution Generating Impervious Surface) or a total of more than $\frac{3}{4}$ of an acre of PGPS (Pollution Generating Pervious Surface).

This project is expected to generate 163,484 *square feet* (3.75 *acres*) of PGIS based on aisle, driveway, sidewalk, and parking areas, therefore treatment facility BMPs are required for this project.

Runoff treatment facility selection is outlined in Vol. I, Ch. 4.2, Step V of the 2019 SMMWW. Step V outlines the treatment facility selection flow chart based on the intended use of a project. Treatment selection is based on if the site is a high-use site, if the downstream receiving waters are phosphorous sensitive, and/or if the site is required to provide enhanced treatment. The definitions of high-use, phosphorous control, and enhanced treatment can be found in Step V in Section 4.2 of the 2019 SMMWW.

The project is not a high use site and infiltration is practicable for the site. There will be no vehicle maintenance, vehicle storage, and no transfer or petroleum or oil on this site.

Basic treatment is provided through the use of a bioretention facility per Vol. III Section 3.3.12 of the 2019 SMMWW. The bioretention specified will provide enhanced treatment. The bio-cell treats stormwater through the percolation of stormwater through soils and their ability to absorb pollutants. See Vol III. Section 3.3.12 of the 2019 SMMWW for specific soil design criteria.

The bioretention cell mitigates polluted stormwater through physical, chemical and biological treatment processes. The treatment process will break down heavy metals that are not easily separated by physical means. Stormwater percolates through compost amended soils and plantings to obtain treatment. Stormwater flows through this part of the cell at a rate of 12.0 *inches/hour*. Infiltration is allowed to occur below the bio-cells. The total percolated runoff through the bio-cell's amended soils is well over the 91% total runoff volume treatment requirement. The bioretention cells infiltrate 99.99%.

2.8 MR #7: Flow Control

Minimum Requirement #7 in MMC 14.15.050 (7) specifies the requirements for runoff flow control. The threshold for requiring Minimum Requirement #7 is 5,000 *square feet* of impervious surface. Flow control shall be provided if the project creates more than 10,000 *square feet* of effective impervious area in a threshold discharge area, converts $\frac{3}{4}$ of an acre or more of native vegetation to lawn, 2.5 *acres* or more native vegetation is converted to pasture, or a combination of impervious and converted pervious surfaces cause a 0.1 *cfs* increase in the 100-year flow frequency from a continuous simulation runoff model.

The project exceeds this requirement and is required to provide flow control. Flow Control is provided by infiltration. A small portion of the frontage bypasses facilities for infiltration. In order to provide access from Smokey Point Blvd to the property, a ramp is created to get up to the finished grade. This area is less than 2,000 square feet and flows immediately to the Smokey Point Blvd's stormwater system and into the neighboring stormwater infiltration pond constructed by the County. (A portion of this site was counted as contribution to this facility, therefore capacity exists.) The Bioretention cells are located directly at the frontage to capture as much of this runoff as possible.

The project uses bioretention cells to treat and infiltrate all incoming stormwater flow from PGIS. The bioretention cell marginally detains stormwater but provides 100% treatment of stormwater generated by PGIS. The bio-cells are comprised of 1.5 *feet* of amended soils, 0.5 *feet* of clean chip filter. The bio-cell utilizes a 0.5 *foot* ponded area with 0.5 *feet* of freeboard to allow stormwater to infiltrate through the amended soils. In some areas the clean chip filter expands beyond the footprint of the bioretention cell to aid in increased infiltration footprint.

Roofs will be able to provide BMP T5.10A Full Infiltration. Infiltration requires suitable soils with depth. Onsite soils of gravelly sand were found during site investigations by ESNW. Infiltration trench size (length) is based on soil type and amount of contributing rooftop area. Medium sand soils relate to 30lf per 1,000sf of rooftop. A total of 5,505 lf of 2-ft wide trench is required, or 11,010 square feet. Twice this much will be provided within combined infiltration trenches. Downspouts will be spaced at intervals not to exceed 100lf but exact locations are not yet determined from the Architects design drawings. Trenches will be placed around the perimeter of the buildings to readily accept stormwater for the future downspout roof design. Trenches that parallel have a 6ft separation and all trenches are placed 15ft from the buildings foundation.

The combination of full infiltration BMPs for rooftops and Bioretention for aisles preclude the requirement for hydrologic modeling.

See Figure 4 for Basin Mapping.

2.9 MR #8: Wetlands Protection

MMC 14.15.050 (8) specifies requirements for discharge of stormwater in wetlands and wetland buffers as well as discharge of stormwater to a stream.

Since there is no detention or treatment in any critical areas, MR-8 does not apply to this project.

2.10 MR # 9: Operation and Maintenance

Minimum Requirement #9 specified MMC 14.15.050 (9) contains requirements for inspection, operation and maintenance of stormwater facilities and BMPs. Specific maintenance standards and requirements are outlined in Volume V of the 2019 SMMWW. The 2019 SMMWW requires the regular maintenance and inspection of drainage facilities.

For portability and reproduction purposes, the Operations and Maintenance Manual is presented in a separate stand-alone document titled “**Operations and Maintenance Manual for Ideal Industrial Park**”, dated **2 January 2023**.

Section 3 - Maps & Figures

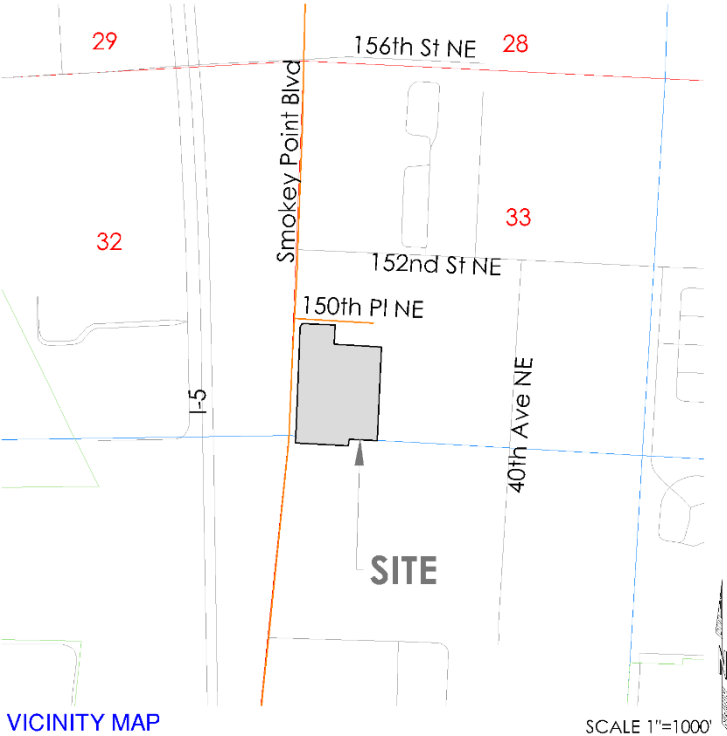


Figure 1 - Vicinity Map



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 irrigated and drained

Map Unit Composition

Custer, undrained, and similar soils: 85 percent

Minor components: 15 percent

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

Description of Custer, Undrained

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 0 to 12 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): 5w

Hydrologic Soil Group: C/D

Forage suitability group: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Minor Components

Custer, drained

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Indianola

Percent of map unit: 5 percent

Hydric soil rating: No

Norma, undrained

Percent of map unit: 5 percent

Landform: Depressions

Hydric soil rating: Yes

Section 5 Works Cited

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.

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

Section 6 Continuous Simulation Modeling

6.1 Continuous Simulation Background

HSPF based continuous simulation modeling was used to evaluate the hydrologic performances of the pre-developed and developed sub-basins in order to accurately assess flow rates.

The currently adopted continuous simulation models use the HSPF (Hydraulic Simulation Program in FORTRAN) software engine. The HSPF model uses a robust and detail accounting of the 'water budget', including evaporation, evapotranspiration, interception, interflow, and groundwater. The modeling accounts for and assesses land segment areas that include vegetation or impervious cover, soil types, and slopes. The modeling also utilizes over 50 years of continuous rainfall data (precipitation) and evaporation data for the area. The HSPF continuous modeling is considered the best available science for hydrologic analysis.

6.2 Modeling Methodology

HSPF modeling was managed via the Western Washington Hydrology Model (WWHM) interface program. The current professional version of WWHM by Clearcreek Solutions, Inc., WWHM-2012 was used. The current data precipitation and evaporation set provided by DOE with the WWHM-2012 software interface that includes quantized data in 15-minute time steps from October 1948 to October 2009. The WSDOT Data used for this model extends the precipitation record from 1901 to 2048.

The WWHM program comes packaged with generic, well considered HSPF modeling parameters. These settings allow for the modeling of the majority of the topological conditions found in the Puget Sound area. Where conditions fall reasonably outside the range of the default HSPF parameters, adjustments should be made to more accurately reflect those conditions. These are generally limited to the pervious land segments (IMPLNDS) and are mostly limited to slopes (SLSUR), infiltration rates (INFILT), and length of flow path (LSUR). For this project, HSPF parameters were not adjusted to reflect site conditions.

6.3 Existing Conditions

The surface vegetative cover is assumed forested with a flat slope. The NRCS soil maps indicate Custer soils throughout the project area. For hydrologic modeling, Custer soils are C-type soils due to proximity of groundwater.

6.4 Developed Conditions

The site is flat and grading will consist of stripping existing soils and importing new soils. Buildings, Driveway/Parking area will be added to the developed site. These areas are accounted for and used in the WHMM program. The remaining area of the site will be used for stormwater management. The stormwater bio-retention cells will be excavated down below the filled surface layer to allow stormwater to readily infiltrate into the native soils. The bio-swale areas are not accounted for in the WWHM bio-retention element. Rooftops are managed with BMP T5.10A. Consistent with the modeling parameters detailed in the SMMWW, rooftops are discounted from the model. The preceding section contains input and output of parameters relevant to the existing and developed site to achieve 100% infiltration meeting current DOE standards.

6.5 Software Output

**WWHM2012
PROJECT REPORT**

Project Name: Ideal Industrial Jan 2023
Site Name: Ideal Industrial
Site Address:
City : Marysville
Report Date: 1/2/2023
MGS Regoin : Puget East
Data Start : 1901/10/1
Data End : 2058/09/30
DOT Data Number: 05
Version Date: 2021/08/18
Version : 4.2.18

Low Flow Threshold for POC 1 : 50 Percent of the 2 Year

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No
GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
C, Forest, Flat	8.82
Pervious Total	8.82

<u>Impervious Land Use</u>	<u>acre</u>
Impervious Total	0

Basin Total **8.82**

Element Flows To:		
Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : Pavement
Bypass: No
GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0

<u>Impervious Land Use</u>	<u>acre</u>
ROADS FLAT	3.41
DRIVEWAYS FLAT	0.02
SIDEWALKS FLAT	0.324
Impervious Total	3.754

Basin Total

3.754

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

Name : Bioretention 1
Bottom Length: 2550.00 ft.
Bottom Width: 2.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: SMMWW
Material thickness of second layer: 0
Material type for second layer: Sand
Material thickness of third layer: 0
Material type for third layer: Sand
Infiltration On
Infiltration rate: 3
Infiltration safety factor: 1
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 1639.308
Total Volume Through Riser (ac-ft.): 0.358
Total Volume Through Facility (ac-ft.): 1639.666
Percent Infiltrated: 99.98
Total Precip Applied to Facility: 40.996
Total Evap From Facility: 20.671
Underdrain not used
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 12 in.

Element Flows To:

Outlet 1	Outlet 2
-----------------	-----------------

Bioretention 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1171	0.0000	0.0000	0.0000
0.0275	0.1171	0.0013	0.0000	0.0000
0.0549	0.1171	0.0026	0.0000	0.0000
0.0824	0.1171	0.0039	0.0000	0.0000
0.1099	0.1171	0.0052	0.0000	0.0000
0.1374	0.1171	0.0065	0.0000	0.0004
0.1648	0.1171	0.0077	0.0000	0.0031
0.1923	0.1171	0.0090	0.0000	0.0045
0.2198	0.1171	0.0103	0.0000	0.0063
0.2473	0.1171	0.0116	0.0000	0.0084
0.2747	0.1171	0.0129	0.0000	0.0108
0.3022	0.1171	0.0142	0.0000	0.0136
0.3297	0.1171	0.0155	0.0000	0.0168
0.3571	0.1171	0.0168	0.0000	0.0204
0.3846	0.1171	0.0181	0.0000	0.0245
0.4121	0.1171	0.0194	0.0000	0.0290
0.4396	0.1171	0.0207	0.0000	0.0340
0.4670	0.1171	0.0220	0.0000	0.0394
0.4945	0.1171	0.0232	0.0000	0.0453
0.5220	0.1171	0.0245	0.0000	0.0518
0.5495	0.1171	0.0258	0.0000	0.0587
0.5769	0.1171	0.0271	0.0000	0.0662

0.6044	0.1171	0.0284	0.0000	0.0743
0.6319	0.1171	0.0297	0.0000	0.0829
0.6593	0.1171	0.0310	0.0000	0.0920
0.6868	0.1171	0.0323	0.0000	0.1018
0.7143	0.1171	0.0336	0.0000	0.1121
0.7418	0.1171	0.0349	0.0000	0.1231
0.7692	0.1171	0.0362	0.0000	0.1346
0.7967	0.1171	0.0375	0.0000	0.1468
0.8242	0.1171	0.0387	0.0000	0.1597
0.8516	0.1171	0.0400	0.0000	0.1732
0.8791	0.1171	0.0413	0.0000	0.1873
0.9066	0.1171	0.0426	0.0000	0.2021
0.9341	0.1171	0.0439	0.0000	0.2176
0.9615	0.1171	0.0452	0.0000	0.2338
0.9890	0.1171	0.0465	0.0000	0.2507
1.0165	0.1171	0.0478	0.0000	0.2683
1.0440	0.1171	0.0491	0.0000	0.2866
1.0714	0.1171	0.0504	0.0000	0.3056
1.0989	0.1171	0.0517	0.0000	0.3254
1.1264	0.1171	0.0529	0.0000	0.3459
1.1538	0.1171	0.0542	0.0000	0.3542
1.1813	0.1171	0.0555	0.0000	0.3542
1.2088	0.1171	0.0568	0.0000	0.3542
1.2363	0.1171	0.0581	0.0000	0.3542
1.2637	0.1171	0.0594	0.0000	0.3542
1.2912	0.1171	0.0607	0.0000	0.3542
1.3187	0.1171	0.0620	0.0000	0.3542
1.3462	0.1171	0.0633	0.0000	0.3542
1.3736	0.1171	0.0646	0.0000	0.3542
1.4011	0.1171	0.0659	0.0000	0.3542
1.4286	0.1171	0.0672	0.0000	0.3542
1.4560	0.1171	0.0684	0.0000	0.3542
1.4835	0.1171	0.0697	0.0000	0.3542
1.5000	0.1171	0.0705	0.0000	0.3542

Surface retention 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
1.5000	0.1171	0.0705	0.0000	0.7083	0.0292
1.5275	0.1267	0.0739	0.0000	0.7083	0.0584
1.5549	0.1364	0.0775	0.0000	0.7343	0.0877
1.5824	0.1461	0.0814	0.0000	0.7473	0.1169
1.6099	0.1557	0.0855	0.0000	0.7602	0.1461
1.6374	0.1654	0.0899	0.0000	0.7732	0.1753
1.6648	0.1750	0.0946	0.0000	0.7862	0.2046
1.6923	0.1847	0.0995	0.0000	0.7991	0.2338
1.7198	0.1944	0.1047	0.0000	0.8121	0.2631
1.7473	0.2040	0.1102	0.0000	0.8251	0.2923
1.7747	0.2137	0.1159	0.0000	0.8381	0.3216
1.8022	0.2234	0.1220	0.0000	0.8510	0.3508
1.8297	0.2331	0.1282	0.0000	0.8640	0.3801
1.8571	0.2427	0.1348	0.0000	0.8770	0.4093
1.8846	0.2524	0.1416	0.0000	0.8900	0.4386
1.9121	0.2621	0.1486	0.0000	0.9029	0.4679
1.9396	0.2718	0.1560	0.0000	0.9159	0.4972
1.9670	0.2814	0.1636	0.0000	0.9289	0.5264
1.9945	0.2911	0.1714	0.0000	0.9419	0.5557
2.0220	0.3008	0.1796	0.0346	0.9444	0.5850
2.0495	0.3105	0.1879	0.1165	0.9444	0.6143

2.0769	0.3202	0.1966	0.2257	0.9444	0.6436
2.1044	0.3298	0.2055	0.3555	0.9444	0.6729
2.1319	0.3395	0.2147	0.5015	0.9444	0.7022
2.1593	0.3492	0.2242	0.6597	0.9444	0.7315
2.1868	0.3589	0.2339	0.8261	0.9444	0.7608
2.2143	0.3686	0.2439	0.9966	0.9444	0.7901
2.2418	0.3783	0.2542	1.1671	0.9444	0.8194
2.2692	0.3880	0.2647	1.3333	0.9444	0.8487
2.2967	0.3977	0.2755	1.4914	0.9444	0.8781
2.3242	0.4074	0.2865	1.6378	0.9444	0.9074
2.3516	0.4170	0.2979	1.7695	0.9444	0.9367
2.3791	0.4267	0.3095	1.8845	0.9444	0.9661
2.4066	0.4364	0.3213	1.9818	0.9444	0.9954
2.4341	0.4461	0.3334	2.0620	0.9444	1.0247
2.4615	0.4558	0.3458	2.1274	0.9444	1.0541
2.4890	0.4655	0.3585	2.1826	0.9444	1.0658
2.5000	0.4694	0.3636	2.2635	0.9444	0.4167

Name : Surface retention 1

Element Flows To:

Outlet 1 **Outlet 2**
Bioretention 1

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1

Total Pervious Area:8.82

Total Impervious Area:0

Mitigated Landuse Totals for POC #1

Total Pervious Area:0

Total Impervious Area:3.754

Flow Frequency Return Periods for Predeveloped. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.190725
5 year	0.289706
10 year	0.342632
25 year	0.396025
50 year	0.427562
100 year	0.453396

Flow Frequency Return Periods for Mitigated. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0
5 year	0
10 year	0
25 year	0
50 year	0
100 year	0

Stream Protection Duration

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.235	0.000
1903	0.091	0.000
1904	0.199	0.000
1905	0.095	0.000
1906	0.071	0.000
1907	0.287	0.000
1908	0.182	0.000
1909	0.186	0.000
1910	0.299	0.000
1911	0.161	0.000
1912	0.622	0.212
1913	0.265	0.000
1914	0.070	0.000
1915	0.099	0.000
1916	0.161	0.000
1917	0.074	0.000
1918	0.168	0.000
1919	0.143	0.000
1920	0.174	0.000
1921	0.182	0.000
1922	0.192	0.000
1923	0.156	0.000
1924	0.091	0.000
1925	0.101	0.000
1926	0.155	0.000
1927	0.197	0.000
1928	0.124	0.000
1929	0.297	0.000
1930	0.162	0.000
1931	0.171	0.000
1932	0.128	0.000
1933	0.146	0.000
1934	0.387	0.000
1935	0.149	0.000
1936	0.221	0.000
1937	0.245	0.000
1938	0.187	0.000
1939	0.024	0.000
1940	0.157	0.000
1941	0.149	0.000
1942	0.251	0.000
1943	0.099	0.000
1944	0.286	0.099
1945	0.178	0.000
1946	0.152	0.000
1947	0.113	0.000
1948	0.376	0.000
1949	0.323	0.000
1950	0.165	0.000
1951	0.182	0.000
1952	0.569	0.415
1953	0.462	0.324
1954	0.152	0.000
1955	0.131	0.000
1956	0.100	0.000
1957	0.210	0.000
1958	0.483	0.000

1959	0.292	0.000
1960	0.105	0.000
1961	0.300	0.057
1962	0.166	0.000
1963	0.127	0.000
1964	0.355	0.000
1965	0.351	0.000
1966	0.085	0.000
1967	0.141	0.000
1968	0.190	0.000
1969	0.141	0.000
1970	0.209	0.000
1971	0.363	0.003
1972	0.240	0.254
1973	0.302	0.000
1974	0.178	0.000
1975	0.416	0.169
1976	0.185	0.000
1977	0.117	0.000
1978	0.333	0.000
1979	0.097	0.000
1980	0.180	0.000
1981	0.178	0.000
1982	0.117	0.000
1983	0.290	0.000
1984	0.085	0.000
1985	0.206	0.000
1986	0.162	0.000
1987	0.332	0.000
1988	0.215	0.000
1989	0.187	0.000
1990	0.232	0.000
1991	0.179	0.000
1992	0.241	0.000
1993	0.225	0.000
1994	0.358	0.000
1995	0.101	0.000
1996	0.394	0.000
1997	0.196	0.000
1998	0.188	0.000
1999	0.007	0.000
2000	0.137	0.000
2001	0.099	0.000
2002	0.317	0.000
2003	0.210	0.000
2004	0.207	0.000
2005	0.285	0.000
2006	0.128	0.000
2007	0.149	0.000
2008	0.191	0.000
2009	0.120	0.000
2010	0.105	0.000
2011	0.120	0.000
2012	0.195	0.078
2013	0.157	0.000
2014	0.094	0.000
2015	0.286	0.000
2016	0.067	0.000

2017	0.295	0.087
2018	0.540	0.000
2019	0.573	0.054
2020	0.179	0.000
2021	0.243	0.000
2022	0.091	0.000
2023	0.199	0.000
2024	0.695	0.259
2025	0.159	0.000
2026	0.285	0.000
2027	0.136	0.000
2028	0.075	0.000
2029	0.193	0.000
2030	0.381	0.000
2031	0.106	0.000
2032	0.089	0.000
2033	0.098	0.000
2034	0.105	0.000
2035	0.439	0.000
2036	0.224	0.000
2037	0.051	0.000
2038	0.237	0.000
2039	0.028	0.000
2040	0.098	0.000
2041	0.132	0.000
2042	0.472	0.076
2043	0.214	0.000
2044	0.271	0.000
2045	0.166	0.000
2046	0.200	0.000
2047	0.139	0.000
2048	0.196	0.000
2049	0.177	0.000
2050	0.121	0.000
2051	0.205	0.088
2052	0.101	0.000
2053	0.186	0.000
2054	0.252	0.104
2055	0.089	0.000
2056	0.075	0.000
2057	0.119	0.000
2058	0.151	0.000

Stream Protection Duration

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.6948	0.4150
2	0.6217	0.3239
3	0.5731	0.2595
4	0.5692	0.2541
5	0.5401	0.2121
6	0.4831	0.1689
7	0.4719	0.1039
8	0.4616	0.0986
9	0.4387	0.0880
10	0.4157	0.0867
11	0.3939	0.0785
12	0.3866	0.0763

13	0.3810	0.0573
14	0.3755	0.0540
15	0.3635	0.0033
16	0.3579	0.0000
17	0.3552	0.0000
18	0.3511	0.0000
19	0.3333	0.0000
20	0.3322	0.0000
21	0.3230	0.0000
22	0.3170	0.0000
23	0.3017	0.0000
24	0.2998	0.0000
25	0.2989	0.0000
26	0.2971	0.0000
27	0.2955	0.0000
28	0.2916	0.0000
29	0.2900	0.0000
30	0.2866	0.0000
31	0.2864	0.0000
32	0.2856	0.0000
33	0.2851	0.0000
34	0.2848	0.0000
35	0.2707	0.0000
36	0.2654	0.0000
37	0.2517	0.0000
38	0.2508	0.0000
39	0.2454	0.0000
40	0.2428	0.0000
41	0.2410	0.0000
42	0.2399	0.0000
43	0.2368	0.0000
44	0.2345	0.0000
45	0.2322	0.0000
46	0.2249	0.0000
47	0.2242	0.0000
48	0.2212	0.0000
49	0.2150	0.0000
50	0.2143	0.0000
51	0.2103	0.0000
52	0.2099	0.0000
53	0.2090	0.0000
54	0.2067	0.0000
55	0.2062	0.0000
56	0.2045	0.0000
57	0.1999	0.0000
58	0.1992	0.0000
59	0.1986	0.0000
60	0.1971	0.0000
61	0.1960	0.0000
62	0.1959	0.0000
63	0.1952	0.0000
64	0.1926	0.0000
65	0.1922	0.0000
66	0.1911	0.0000
67	0.1901	0.0000
68	0.1882	0.0000
69	0.1874	0.0000
70	0.1868	0.0000

71	0.1864	0.0000
72	0.1863	0.0000
73	0.1854	0.0000
74	0.1824	0.0000
75	0.1823	0.0000
76	0.1819	0.0000
77	0.1802	0.0000
78	0.1791	0.0000
79	0.1791	0.0000
80	0.1784	0.0000
81	0.1784	0.0000
82	0.1782	0.0000
83	0.1773	0.0000
84	0.1738	0.0000
85	0.1709	0.0000
86	0.1683	0.0000
87	0.1663	0.0000
88	0.1662	0.0000
89	0.1647	0.0000
90	0.1617	0.0000
91	0.1617	0.0000
92	0.1609	0.0000
93	0.1606	0.0000
94	0.1589	0.0000
95	0.1570	0.0000
96	0.1566	0.0000
97	0.1561	0.0000
98	0.1545	0.0000
99	0.1522	0.0000
100	0.1519	0.0000
101	0.1505	0.0000
102	0.1490	0.0000
103	0.1489	0.0000
104	0.1486	0.0000
105	0.1460	0.0000
106	0.1430	0.0000
107	0.1410	0.0000
108	0.1409	0.0000
109	0.1390	0.0000
110	0.1374	0.0000
111	0.1359	0.0000
112	0.1323	0.0000
113	0.1306	0.0000
114	0.1283	0.0000
115	0.1281	0.0000
116	0.1274	0.0000
117	0.1240	0.0000
118	0.1208	0.0000
119	0.1198	0.0000
120	0.1197	0.0000
121	0.1192	0.0000
122	0.1168	0.0000
123	0.1166	0.0000
124	0.1133	0.0000
125	0.1059	0.0000
126	0.1055	0.0000
127	0.1054	0.0000
128	0.1048	0.0000

129	0.1014	0.0000
130	0.1013	0.0000
131	0.1009	0.0000
132	0.1001	0.0000
133	0.0992	0.0000
134	0.0991	0.0000
135	0.0989	0.0000
136	0.0984	0.0000
137	0.0982	0.0000
138	0.0967	0.0000
139	0.0952	0.0000
140	0.0937	0.0000
141	0.0913	0.0000
142	0.0912	0.0000
143	0.0910	0.0000
144	0.0889	0.0000
145	0.0888	0.0000
146	0.0853	0.0000
147	0.0853	0.0000
148	0.0753	0.0000
149	0.0751	0.0000
150	0.0743	0.0000
151	0.0712	0.0000
152	0.0698	0.0000
153	0.0666	0.0000
154	0.0509	0.0000
155	0.0285	0.0000
156	0.0242	0.0000
157	0.0069	0.0000

Stream Protection Duration

POC #1

The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0954	13538	14	0	Pass
0.0987	12558	13	0	Pass
0.1021	11332	12	0	Pass
0.1054	10513	11	0	Pass
0.1088	9782	11	0	Pass
0.1121	8953	11	0	Pass
0.1155	8348	11	0	Pass
0.1189	7787	11	0	Pass
0.1222	7124	11	0	Pass
0.1256	6673	11	0	Pass
0.1289	6278	10	0	Pass
0.1323	5765	10	0	Pass
0.1356	5410	10	0	Pass
0.1390	5078	10	0	Pass
0.1423	4664	10	0	Pass
0.1457	4370	10	0	Pass
0.1491	4034	10	0	Pass
0.1524	3801	10	0	Pass
0.1558	3567	10	0	Pass
0.1591	3280	10	0	Pass
0.1625	3099	10	0	Pass
0.1658	2934	10	0	Pass

0.1692	2732	9	0	Pass
0.1725	2585	9	0	Pass
0.1759	2451	9	0	Pass
0.1793	2258	9	0	Pass
0.1826	2130	9	0	Pass
0.1860	2020	9	0	Pass
0.1893	1881	9	0	Pass
0.1927	1799	9	0	Pass
0.1960	1686	9	0	Pass
0.1994	1613	9	0	Pass
0.2027	1550	8	0	Pass
0.2061	1453	8	0	Pass
0.2095	1393	8	0	Pass
0.2128	1331	8	0	Pass
0.2162	1265	7	0	Pass
0.2195	1213	7	0	Pass
0.2229	1160	7	0	Pass
0.2262	1081	7	0	Pass
0.2296	1032	7	0	Pass
0.2329	986	7	0	Pass
0.2363	935	7	0	Pass
0.2397	901	7	0	Pass
0.2430	848	7	0	Pass
0.2464	827	7	0	Pass
0.2497	798	7	0	Pass
0.2531	764	7	0	Pass
0.2564	744	6	0	Pass
0.2598	720	6	0	Pass
0.2631	697	5	0	Pass
0.2665	670	5	0	Pass
0.2699	647	5	0	Pass
0.2732	607	5	0	Pass
0.2766	594	4	0	Pass
0.2799	565	4	0	Pass
0.2833	537	4	0	Pass
0.2866	509	4	0	Pass
0.2900	485	4	0	Pass
0.2933	468	4	0	Pass
0.2967	451	4	0	Pass
0.3001	425	4	0	Pass
0.3034	405	4	0	Pass
0.3068	387	4	1	Pass
0.3101	373	4	1	Pass
0.3135	353	4	1	Pass
0.3168	341	4	1	Pass
0.3202	326	4	1	Pass
0.3235	309	4	1	Pass
0.3269	295	3	1	Pass
0.3303	282	3	1	Pass
0.3336	273	3	1	Pass
0.3370	265	3	1	Pass
0.3403	249	3	1	Pass
0.3437	242	3	1	Pass
0.3470	228	3	1	Pass
0.3504	211	3	1	Pass
0.3537	200	2	1	Pass
0.3571	190	2	1	Pass
0.3605	177	2	1	Pass

0.3638	170	2	1	Pass
0.3672	157	2	1	Pass
0.3705	148	2	1	Pass
0.3739	139	2	1	Pass
0.3772	130	2	1	Pass
0.3806	122	2	1	Pass
0.3839	114	2	1	Pass
0.3873	103	2	1	Pass
0.3907	99	2	2	Pass
0.3940	92	1	1	Pass
0.3974	88	1	1	Pass
0.4007	84	1	1	Pass
0.4041	81	1	1	Pass
0.4074	75	1	1	Pass
0.4108	70	1	1	Pass
0.4141	63	1	1	Pass
0.4175	57	0	0	Pass
0.4209	54	0	0	Pass
0.4242	49	0	0	Pass
0.4276	46	0	0	Pass

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet
On-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.
Off-line facility target flow: 0 cfs.
Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for	Total Volume	Volume	Infiltration	Cumulative	Percent
Water Quality Percent	Comment	Needs	Through	Volume	Volume	Volume
Water Quality	Treatment?	Treatment	Facility	(ac-ft.)	Infiltration	
Infiltrated	Treated	(ac-ft)	(ac-ft)		Credit	
retention 1 POC	N	1492.10			N	99.98
Total Volume Infiltrated		1492.10	0.00	0.00		99.98
0.00	0%	No Treat.	Credit			

Compliance with LID Standard 8
Duration Analysis Result = Passed

PerlnD and Implnd Changes

No changes have been made.

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