

**STORMWATER SITE PLAN
FOR
SUNRISE GROVE APARTMENTS
MARYSVILLE, WASHINGTON**

December 1, 2022



LAND SURVEYING • LAND USE PLANNING • CIVIL ENGINEERING

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MR 1: PREPARATION OF STORMWATER SITE PLANS

DRAINAGE PLAN DESCRIPTION

This Stormwater Site Plan has been prepared for the proposed development of a three-story mixed-use building with supporting parking on a 0.43-acre site at 4726 72nd ST NE. (30052800108700). Figure 1: Vicinity Map depicts the location of the project. The property is bordered by Grove Street to the north, commercial parking to the south, and similar residential properties to the west and east.

The project site currently contains a single-family residence along with a garage on the southeastern portion of the property. The topographic map of the site displays a relatively level lot. The ground generally descends from the northeast to the southwest with an elevation of 47 feet in the northeast and 45 feet in the southwest. The ground cover is primarily lawn with gravel covering approximately 1/5 of the site. There are no critical areas on site. See Figure 2: Existing Conditions for a graphic depiction of the current site conditions.

The proposed development is to construct a multifamily building with at grade base level parking. Access for the proposed development will be available from Grove Street to the north. See Figure 3: Developed Site Conditions for the layout.

METHODOLOGY

The 2019 Department of Ecology Stormwater Manual as adopted by the City of Marysville was used as the basis of design. The site has the following characteristics:

- Approximately 0.54 ac / 0.25 ac / 10,750 sf disturbed area.
- Less than 35% existing impervious. The site is NEW development.
- The project will result in greater than 5,000 sf of new impervious.

This requires the drainage system to meet Minimum Requirements 1-9.

SOILS DESCRIPTION

According to the geotechnical report prepared by Cobalt Geosciences, LLC titled *Geotechnical Evaluation* and dated May 17, 2022, the soils underlying the site are Marysville Sand and Weathered Marysville Sand. The first of two test pits on site encountered approximately 6 inches of topsoil underlain by approximately 5.5 feet of loose to medium dense, silty-fine to medium grained sand trace gravel (Marysville Sand), which continued to the termination depth. The second test pit encountered approximately 6 inches of grass and topsoil underlain by about 4.5 feet of loose to medium dense, silty-fine to medium grained sand trace gravel (Weathered Marysville Sand). This layer was underlain by medium dense, fine to medium grained sand trace gravel and silt (Marysville Sand), which continued to the termination depths of the test pit. The Marysville Sand is described as well-drained, stratified to massive outwash sand with fine gravel, silt and clay. No ground water was encountered.

CRITICAL AREAS

There are no critical areas on or near the site.

The Ebey Slough is located approximately 6,000 ft downstream of site which contains 1 category 5 listing for bacteria-fecal coliform and 1 category 2 listing for temperature as displayed below in Figure 4. Allen creek feeds into the Ebey Slough, is closer proximity to site but is at higher elevation preventing site runoff from entering it until the downstream confluence with Ebey Slough.

MR 2: SWPPP NARRATIVE

With less than 1 acre of disturbance, a Department of Ecology Construction Stormwater Permit is not required.

A full SWPPP narrative will be provided with the permit documents.

MR 3: WATER POLLUTION SOURCE CONTROL

Source control will consist of both construction BMP's and long term source controls. The temporary measures are included in the SWPPP. Permanent Source Control will be done as follows:

- Container storage of wastes;
- Vegetation management;
- Cleaning of paved surfaces;
- Storm drainage maintenance.

MR 4: PRESERVATION OF NATURAL DRAINAGE

The City of Marysville will not allow any site runoff to enter the local storm systems. This will be accommodated through a series of roof drains connected to gravel trenches infiltrating 100% of roof runoff into the soil. The proposed 100 sf driveway will be permeable pavement.

MR 5: ON-SITE STORMWATER MANAGEMENT

As the site is located in the City of Marysville and will be required to meet MR #1-9, it can achieve MR 5 requirement either through the use of List #2 or by meeting the Low Impact Development Performance Standard. The performance standard will be used.

LAWN AND LANDSCAPED AREAS:

BMP T5.13 Post Construction Soil Quality and Depth will be implemented on disturbed and landscaped areas. It is expected that most disturbed soil will be covered with new impervious. Select site topsoil will be used for those small areas where pervious surfaces need restoration.

LOW IMPACT DEVELOPMENT PERFORMANCE STANDARD:

The site will achieve 100% infiltration of runoff based on the WWHM calculations using BMP T5.10A: Downspout Full Infiltration and BMP T5.15 Permeable Pavements. With 100% infiltration, the site meets the performance standard.

MR 6: RUNOFF TREATMENT REQUIREMENTS

With less than 5,000 sf of pollution generating impervious surface the site does not require runoff treatment.

MR 7: FLOW CONTROL

Flow control is required for the site development. The on-site system will receive flow from the building, walks and parking of the development. The new frontage walks as well as the existing tributary public road areas are also included in the basin.

Given the site infiltration rate, an infiltration trench will be used for flow control. The conceptual trench has the following characteristics:

Total Bottom Area	900 sf
Depth	2.5 ft
Side Slopes	Vertical
Rock Porosity	0.35
Detention Volume	2,250 cf
Percentage Infiltrated	99.99%

The bottom of the trench will be at elevation 43.0 to be approximately five feet above the high groundwater. This will require a mounding analysis with the construction design.

With those parameters, the site meets the Stream Protection Duration standard as well as the Low Impact Development Performance Standard. See Appendix for WWHM2012 output.

MR 8: WETLANDS PROTECTION

There are no wetlands on or near the site.

MR 9: OPERATION AND MAINTENANCE MANUAL

An Operations and Maintenance Manual will be provided under separate cover.

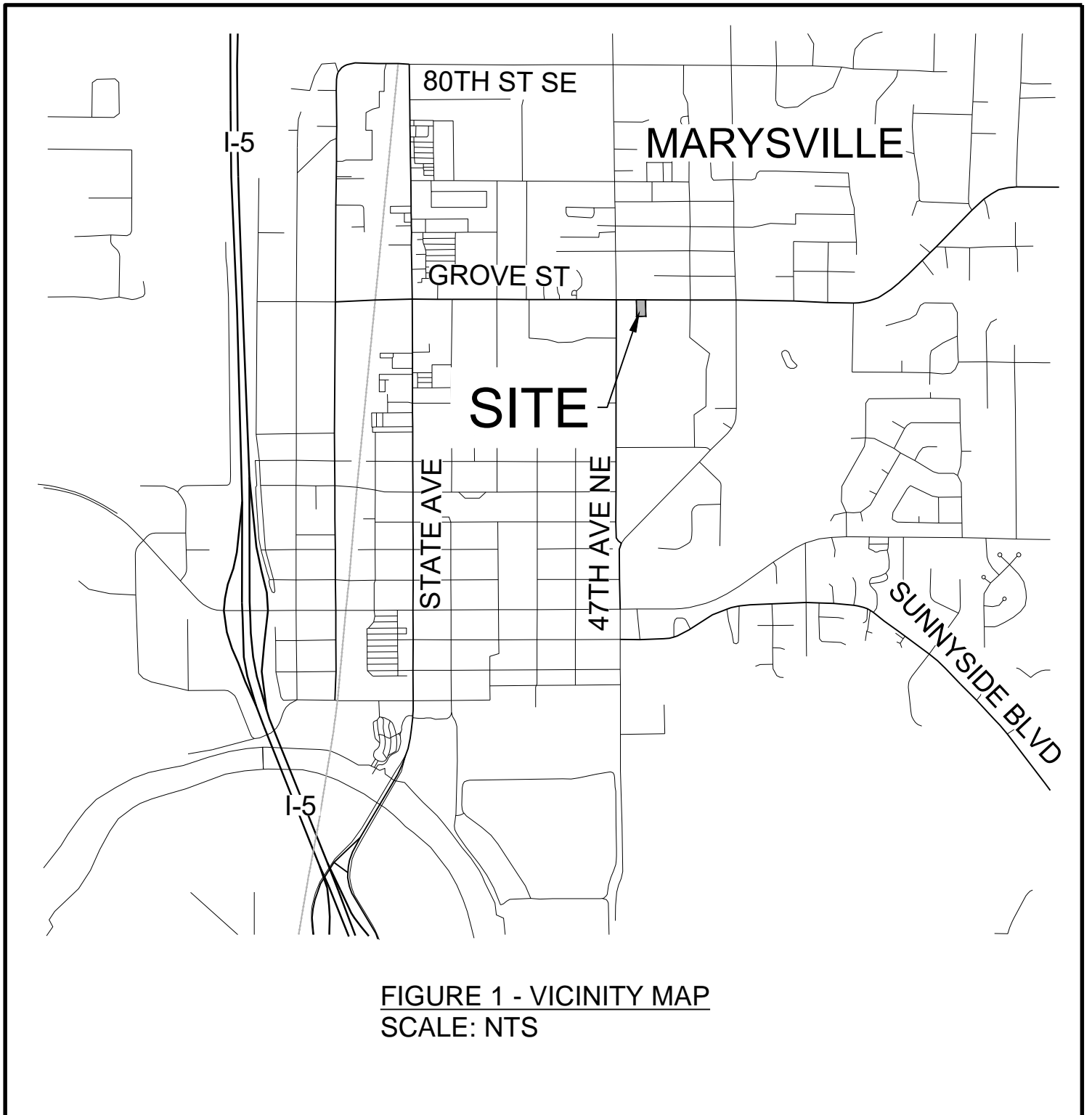


FIGURE 1 - VICINITY MAP
SCALE: NTS

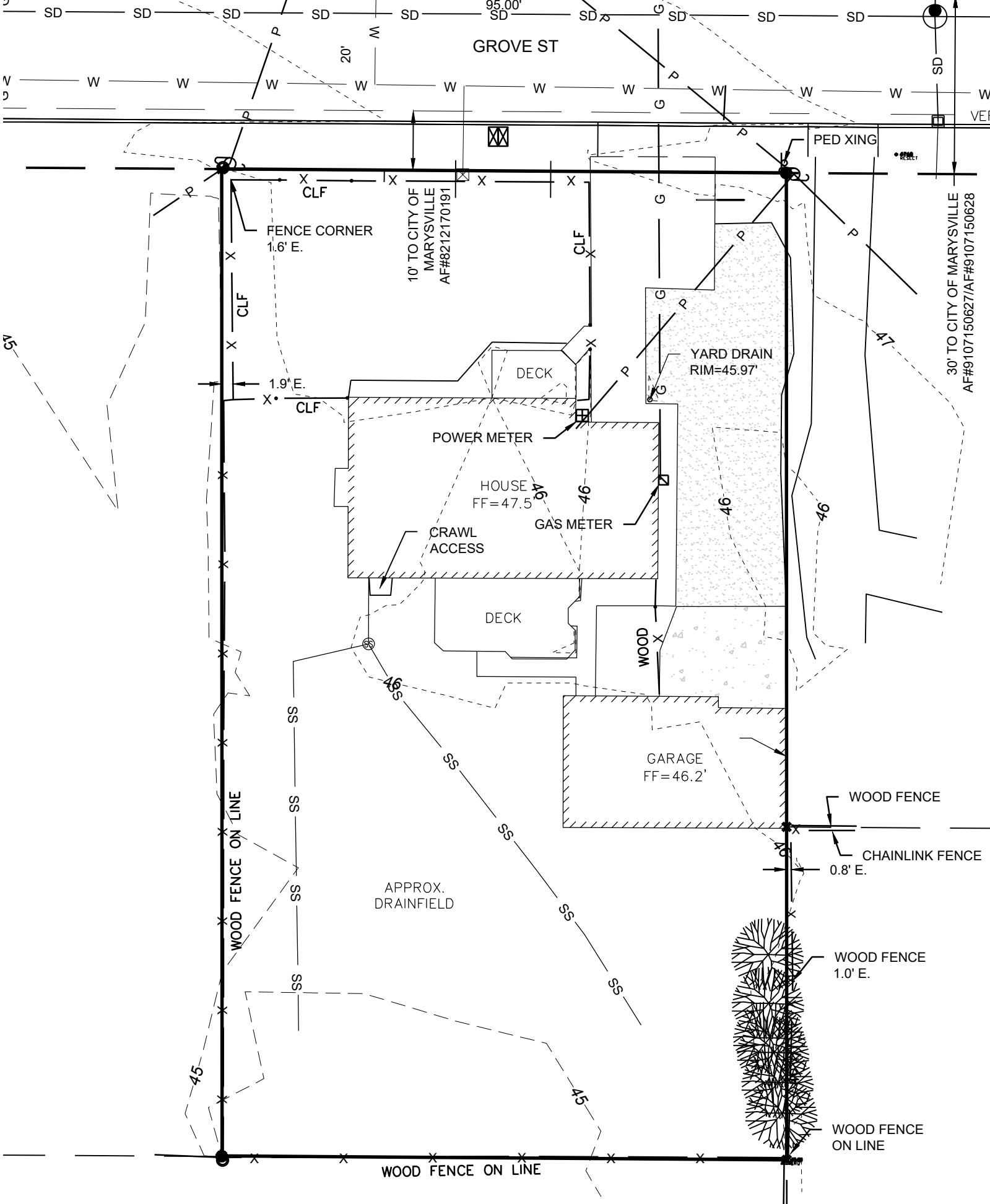


FIGURE 2 - EXISTING CONDITIONS
SCALE: 1" = 20'

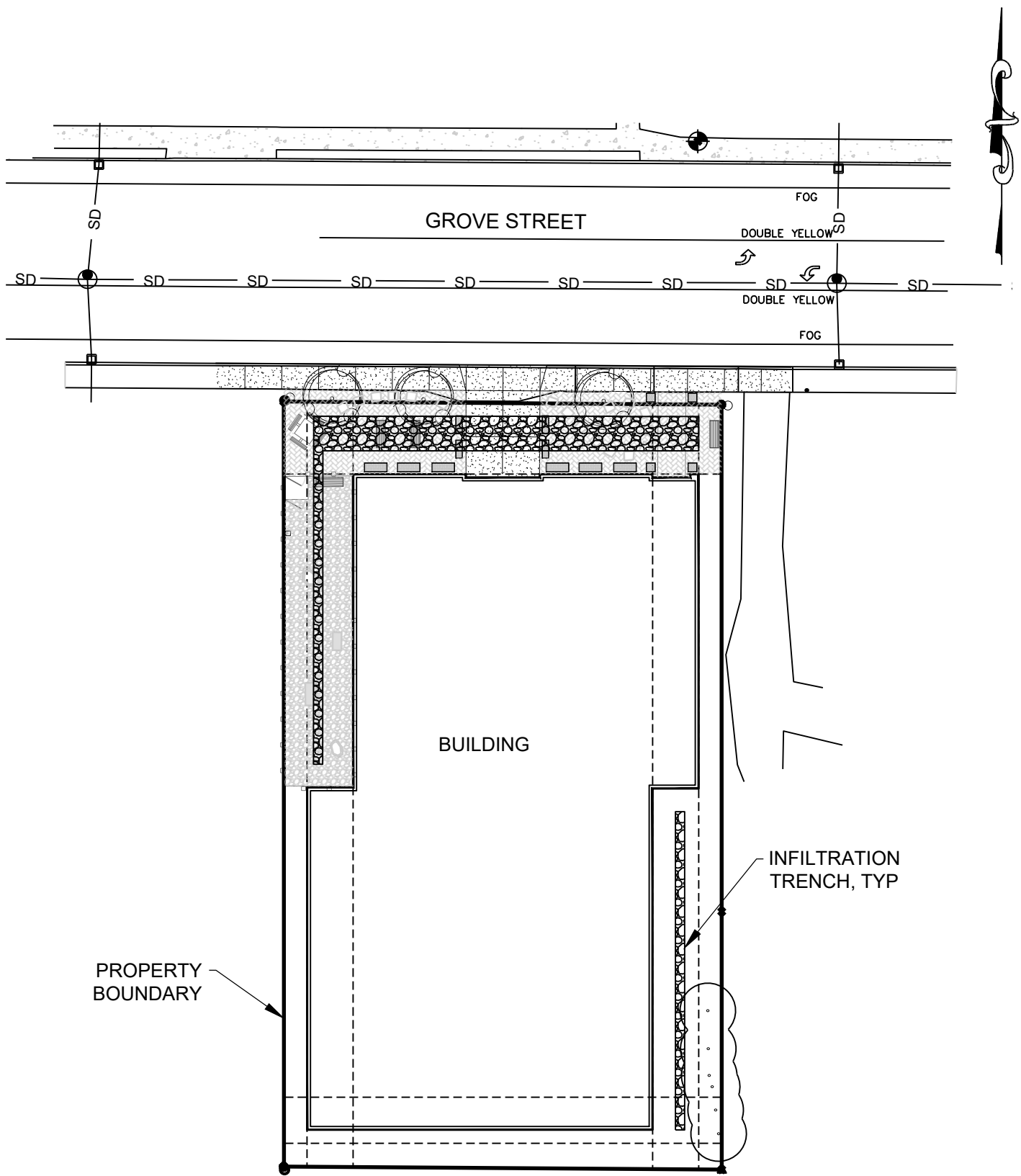
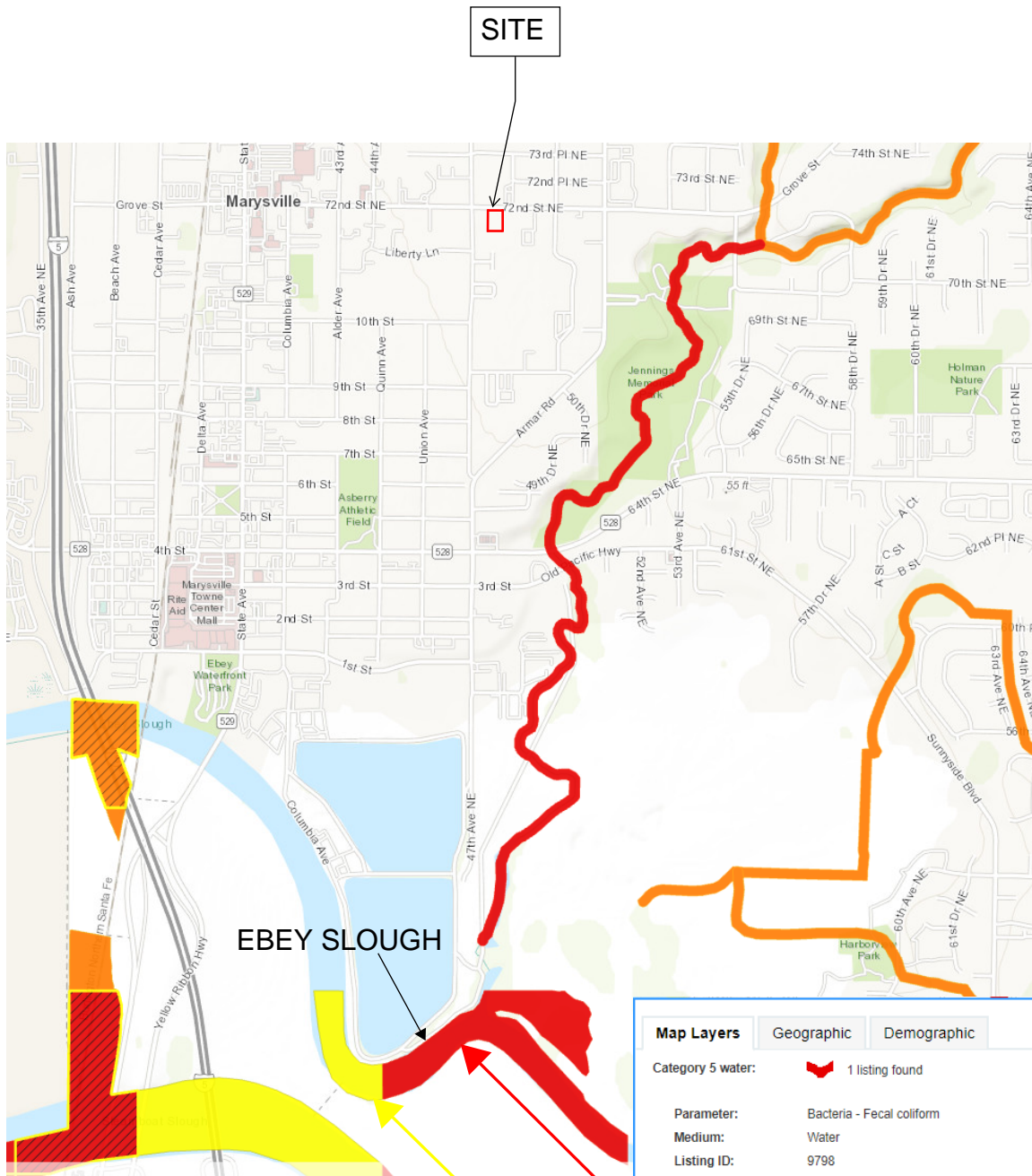


FIGURE 3 - DEVELOPED CONDITIONS
SCALE: 1" = 20'



Map Layers Geographic Demographic

Category 5 water: 1 listing found less ▲

Parameter: Bacteria - Fecal coliform
 Medium: Water
 Listing ID: 9798
 View Details: [View](#)
 Highlight Listing: [Show](#)
 Assessment Unit ID: 48122A1D6_01_01
 Waterbody Name: Ebey Slough

Map Layers Geographic Demographic

Category 2 water: 1 listing found less ▲

Parameter: Temperature
 Medium: Water
 Listing ID: 9267
 View Details: [View](#)
 Highlight Listing: [Show](#)
 Assessment Unit ID: 48122A1D6_01_01
 Waterbody Name: Ebey Slough

FIGURE 4 - WATER QUALITY 303d LISTINGS
SCALE: NTS

**WWHM2012
PROJECT REPORT**

Project Name: 21-371 Nate Grove Infiltration Trench 12-1-22
Site Name:
Site Address:
City :
Report Date: 12/1/2022
Gage : Everett
Data Start : 1948/10/01
Data End : 2009/09/30
Precip Scale: 1.00
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>
A B, Forest, Flat	.3

Pervious Total	0.3
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<u>Impervious Land Use</u>	<u>acre</u>
Impervious Total	0

Basin Total	0.3
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Element Flows To:

Surface	Interflow	Groundwater
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MITIGATED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

<u>Pervious Land Use</u>	<u>acre</u>
Pervious Total	0
<u>Impervious Land Use</u>	<u>acre</u>
ROOF TOPS FLAT	0.24
SIDEWALKS FLAT	0.06
Impervious Total	0.3
Basin Total	0.3

Element Flows To:

Surface	Interflow	Groundwater
Gravel Trench Bed 1	Gravel Trench Bed 1	

Name : Gravel Trench Bed 1
Bottom Length: 100.00 ft.
Bottom Width: 9.00 ft.
Trench bottom slope 1: 0 To 1
Trench Left side slope 0: 0 To 1
Trench right side slope 2: 0 To 1
Material thickness of first layer: 3
Pour Space of material for first layer: 0.35
Material thickness of second layer: 0
Pour Space of material for second layer: 0
Material thickness of third layer: 0
Pour Space of material for third layer: 0
Infiltration On
Infiltration rate: 2.5
Infiltration safety factor: 1
Total Volume Infiltrated (ac-ft.): 46.556
Total Volume Through Riser (ac-ft.): 0.004
Total Volume Through Facility (ac-ft.): 46.56
Percent Infiltrated: 99.99
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Discharge Structure
Riser Height: 2.5 ft.
Riser Diameter: 8 in.

Element Flows To:

Outlet 1	Outlet 2
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Gravel Trench Bed Hydraulic Table

<u>Stage(feet)</u>	<u>Area(ac.)</u>	<u>Volume(ac-ft.)</u>	<u>Discharge(cfs)</u>	<u>Infilt(cfs)</u>
0.0000	0.020	0.000	0.000	0.000
0.0333	0.020	0.000	0.000	0.052

0.0667	0.020	0.000	0.000	0.052
0.1000	0.020	0.000	0.000	0.052
0.1333	0.020	0.001	0.000	0.052
0.1667	0.020	0.001	0.000	0.052
0.2000	0.020	0.001	0.000	0.052
0.2333	0.020	0.001	0.000	0.052
0.2667	0.020	0.001	0.000	0.052
0.3000	0.020	0.002	0.000	0.052
0.3333	0.020	0.002	0.000	0.052
0.3667	0.020	0.002	0.000	0.052
0.4000	0.020	0.002	0.000	0.052
0.4333	0.020	0.003	0.000	0.052
0.4667	0.020	0.003	0.000	0.052
0.5000	0.020	0.003	0.000	0.052
0.5333	0.020	0.003	0.000	0.052
0.5667	0.020	0.004	0.000	0.052
0.6000	0.020	0.004	0.000	0.052
0.6333	0.020	0.004	0.000	0.052
0.6667	0.020	0.004	0.000	0.052
0.7000	0.020	0.005	0.000	0.052
0.7333	0.020	0.005	0.000	0.052
0.7667	0.020	0.005	0.000	0.052
0.8000	0.020	0.005	0.000	0.052
0.8333	0.020	0.006	0.000	0.052
0.8667	0.020	0.006	0.000	0.052
0.9000	0.020	0.006	0.000	0.052
0.9333	0.020	0.006	0.000	0.052
0.9667	0.020	0.007	0.000	0.052
1.0000	0.020	0.007	0.000	0.052
1.0333	0.020	0.007	0.000	0.052
1.0667	0.020	0.007	0.000	0.052
1.1000	0.020	0.008	0.000	0.052
1.1333	0.020	0.008	0.000	0.052
1.1667	0.020	0.008	0.000	0.052
1.2000	0.020	0.008	0.000	0.052
1.2333	0.020	0.008	0.000	0.052
1.2667	0.020	0.009	0.000	0.052
1.3000	0.020	0.009	0.000	0.052
1.3333	0.020	0.009	0.000	0.052
1.3667	0.020	0.009	0.000	0.052
1.4000	0.020	0.010	0.000	0.052
1.4333	0.020	0.010	0.000	0.052
1.4667	0.020	0.010	0.000	0.052
1.5000	0.020	0.010	0.000	0.052
1.5333	0.020	0.011	0.000	0.052
1.5667	0.020	0.011	0.000	0.052
1.6000	0.020	0.011	0.000	0.052
1.6333	0.020	0.011	0.000	0.052
1.6667	0.020	0.012	0.000	0.052
1.7000	0.020	0.012	0.000	0.052
1.7333	0.020	0.012	0.000	0.052
1.7667	0.020	0.012	0.000	0.052
1.8000	0.020	0.013	0.000	0.052
1.8333	0.020	0.013	0.000	0.052
1.8667	0.020	0.013	0.000	0.052
1.9000	0.020	0.013	0.000	0.052
1.9333	0.020	0.014	0.000	0.052

1.9667	0.020	0.014	0.000	0.052
2.0000	0.020	0.014	0.000	0.052
2.0333	0.020	0.014	0.000	0.052
2.0667	0.020	0.014	0.000	0.052
2.1000	0.020	0.015	0.000	0.052
2.1333	0.020	0.015	0.000	0.052
2.1667	0.020	0.015	0.000	0.052
2.2000	0.020	0.015	0.000	0.052
2.2333	0.020	0.016	0.000	0.052
2.2667	0.020	0.016	0.000	0.052
2.3000	0.020	0.016	0.000	0.052
2.3333	0.020	0.016	0.000	0.052
2.3667	0.020	0.017	0.000	0.052
2.4000	0.020	0.017	0.000	0.052
2.4333	0.020	0.017	0.000	0.052
2.4667	0.020	0.017	0.000	0.052
2.5000	0.020	0.018	0.000	0.052
2.5333	0.020	0.018	0.043	0.052
2.5667	0.020	0.018	0.121	0.052
2.6000	0.020	0.018	0.219	0.052
2.6333	0.020	0.019	0.329	0.052
2.6667	0.020	0.019	0.441	0.052
2.7000	0.020	0.019	0.547	0.052
2.7333	0.020	0.019	0.639	0.052
2.7667	0.020	0.020	0.711	0.052
2.8000	0.020	0.020	0.762	0.052
2.8333	0.020	0.020	0.799	0.052
2.8667	0.020	0.020	0.847	0.052
2.9000	0.020	0.021	0.885	0.052
2.9333	0.020	0.021	0.921	0.052
2.9667	0.020	0.021	0.956	0.052
3.0000	0.020	0.021	0.989	0.052

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1

Total Pervious Area:0.3

Total Impervious Area:0

Mitigated Landuse Totals for POC #1

Total Pervious Area:0

Total Impervious Area:0.3

Flow Frequency Return Periods for Predeveloped. POC #1

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.000237
5 year	0.000289
10 year	0.000322

25 year	0.000364
50 year	0.000395
100 year	0.000426

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

<u>Year</u>	<u>Predeveloped</u>	<u>Mitigated</u>
1949	0.000	0.000
1950	0.000	0.000
1951	0.000	0.000
1952	0.000	0.000
1953	0.000	0.000
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000
1958	0.000	0.000
1959	0.000	0.000
1960	0.000	0.000
1961	0.000	0.060
1962	0.000	0.000
1963	0.000	0.000
1964	0.000	0.000
1965	0.000	0.000
1966	0.000	0.000
1967	0.000	0.000
1968	0.000	0.000
1969	0.000	0.000
1970	0.000	0.000
1971	0.000	0.000
1972	0.000	0.000
1973	0.000	0.000
1974	0.000	0.000
1975	0.000	0.000
1976	0.000	0.000
1977	0.000	0.000
1978	0.000	0.000
1979	0.000	0.000
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000

1989	0.000	0.000
1990	0.000	0.000
1991	0.000	0.000
1992	0.000	0.000
1993	0.000	0.000
1994	0.000	0.000
1995	0.000	0.000
1996	0.000	0.000
1997	0.001	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000

Stream Protection Duration

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0011	0.0599
2	0.0004	0.0000
3	0.0002	0.0000
4	0.0002	0.0000
5	0.0002	0.0000
6	0.0002	0.0000
7	0.0002	0.0000
8	0.0002	0.0000
9	0.0002	0.0000
10	0.0002	0.0000
11	0.0002	0.0000
12	0.0002	0.0000
13	0.0002	0.0000
14	0.0002	0.0000
15	0.0002	0.0000
16	0.0002	0.0000
17	0.0002	0.0000
18	0.0002	0.0000
19	0.0002	0.0000
20	0.0002	0.0000
21	0.0002	0.0000
22	0.0002	0.0000
23	0.0002	0.0000
24	0.0002	0.0000
25	0.0002	0.0000
26	0.0002	0.0000
27	0.0002	0.0000
28	0.0002	0.0000
29	0.0002	0.0000
30	0.0002	0.0000
31	0.0002	0.0000

32	0.0002	0.0000
33	0.0002	0.0000
34	0.0002	0.0000
35	0.0002	0.0000
36	0.0002	0.0000
37	0.0002	0.0000
38	0.0002	0.0000
39	0.0002	0.0000
40	0.0002	0.0000
41	0.0002	0.0000
42	0.0002	0.0000
43	0.0002	0.0000
44	0.0002	0.0000
45	0.0002	0.0000
46	0.0002	0.0000
47	0.0002	0.0000
48	0.0002	0.0000
49	0.0002	0.0000
50	0.0002	0.0000
51	0.0002	0.0000
52	0.0002	0.0000
53	0.0002	0.0000
54	0.0002	0.0000
55	0.0002	0.0000
56	0.0002	0.0000
57	0.0002	0.0000
58	0.0002	0.0000
59	0.0002	0.0000
60	0.0002	0.0000
61	0.0002	0.0000

Stream Protection Duration

POC #1

The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0001	2513	5	0	Pass
0.0001	2387	5	0	Pass
0.0001	2286	5	0	Pass
0.0001	2224	5	0	Pass
0.0001	2132	5	0	Pass
0.0001	2048	5	0	Pass
0.0001	1946	5	0	Pass
0.0001	1853	5	0	Pass
0.0001	1785	5	0	Pass
0.0001	1716	5	0	Pass
0.0001	1652	5	0	Pass
0.0001	1595	5	0	Pass
0.0002	1512	5	0	Pass
0.0002	1470	5	0	Pass
0.0002	1396	5	0	Pass
0.0002	1334	5	0	Pass
0.0002	1258	5	0	Pass
0.0002	1207	5	0	Pass

0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0003	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	Pass
0.0004	8	5	62	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	Through	Volume	Volume
Volume	Water Quality	Treatment?	Facility	(ac-ft.)	Infiltration
Infiltrated	Treated	Needs	(ac-ft)	(ac-ft)	Credit
Gravel Trench Bed 1 POC	N	42.37			N 99.99
Total Volume Infiltrated		42.37	0.00	0.00	
99.99	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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