



LAND SURVEYING • LAND USE PLANNING • CIVIL ENGINEERING

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CITY OF MONROE

CONCEPTUAL STORMWATER SITE PLAN  
FOR THE  
PRELIMINARY 11 UNIT  
RESIDENTIAL DEVELOPMENT OF  
PONDEROSA PACIFIC, INC  
MONROE, WASHINGTON

June 23, 2023



6-23-23

EVERETT (ASPI)  
5205 S. 2<sup>nd</sup> Avenue, Ste. A  
Everett, WA 98203  
425-252-1884

MONROE  
125 East Main Street., Ste. 104  
Monroe, WA 98272  
360-794-7811

MOUNT VERNON  
603 South First Street  
Mount Vernon, WA 98273  
360-336-9199

OAK HARBOR  
840 SE 8<sup>th</sup> Avenue, Ste. 102  
Oak Harbor, WA 98277  
360-675-5973

## **PROJECT OVERVIEW**

This Stormwater Site Plan has been prepared for the Preliminary 11 Unit Residential Development in Monroe, Washington. The 0.72-acre site is located at 16096 174<sup>th</sup> Drive SE, see Figure 1: Vicinity Map. The project consists of 2 lots with 11 attached dwelling units divided into one 6-unit building, and one 5-unit building. Each unit has a separate driveway. Currently, there is one non-residential structure with at least two chicken coop shed buildings, and a driveway area that will be removed from the site.

## **METHODOLOGY**

The drainage design for the project has been prepared based on the requirements of the 2019 Department of Ecology Stormwater Management Manual as adopted by the City of Monroe (MMC 15.01.025). WWHM2012 as provided by DOE has been used for determining basin runoff and for sizing of the stormwater facilities. Based on the flow chart in Figure I-2.4.1 of the DOE Manual and the site parameters, the project is subject to Minimum Requirements 1-9.

The project site parameters are:

- The project is a new development with less than 35% existing impervious coverage.
- The project will create more than 2,000 sf of new plus replaced impervious area.
- The project will create over 5,000 sf of new plus replaced impervious area.
- The project will disturb more than 7,000 sf.
- The project does not convert  $\frac{3}{4}$  acre of pasture to lawn.
- The project does not convert 2.5 acres of forest to pasture.

## **MR 1: PREPARATION OF STORMWATER SITE PLANS**

### **DRAINAGE PLAN DESCRIPTION**

Stormwater runoff from roofs and paved areas will be collected and conveyed to an infiltration trench located under the access drive.

### **WATER QUALITY MEASURES**

The following is a list of the proposed construction water quality BMPs. See MR 3: Water Pollution Source Control for more information. The proposed BMPs are as follows:

- BMP C103, High Visibility Fence
- BMP C105, Construction Entrance
- BMP C107, Construction Road/Parking Area Stabilization
- BMP C120, Temporary and Permanent Seeding
- BMP C121, Mulching
- BMP C123, Plastic Covering
- BMP C125, Topsoiling/Composting
- BMP C140, Dust Control
- BMP C220, Storm Inlet Protection
- BMP C233, Silt Fence
- Temporary Infiltration Pond

### **INFILTRATION SIZING**

Flow control will consist of an infiltration into the underlying soils using underground infiltration trenches. Permeable pavement is also proposed for the site, and as a result, there will be minimal surface runoff from the site.

### **CONVEYANCE CALCULATIONS**

It is anticipated that pipe runs will be short, and that conveyance will not be an issue.

### **STORMWATER TREATMENT BMP'S**

The roof runoff is considered clean, and treatment is not required. Both on-site and off-site paved surfaces are proposed to be paved with permeable concrete or asphalt. For permit documents, the soil will be tested for CEC (Cation Exchange) values, and if the soils lack the required treatment ability, a sand layer will be added below the paving to provide the needed treatment.

### **PROTECTION OF WETLANDS**

There are no wetlands on or adjacent to the site.

### **OPERATIONS AND MAINTENANCE**

This will be provided with the permit documents after preliminary approval.

## **EXISTING CONDITIONS SUMMARY**

### **DESCRIPTION**

The site is located at 16096 174th Drive SE in Monroe, WA. There is one non-residential structure that exists on the 2-parcel, 0.72-acre site which is to be demolished. Apart from the structure, the site is mostly lawn with a gravel driveway, concrete slabs from the previously demolished building foundations, and two small chicken coops. The east side of the lot is the frontage to 174<sup>th</sup> Drive SE. To the south there is a duplex and manufactured home site. The west side of the lot is neighbor to two single-family residences, and to the north lies another manufactured home site. Highway 522 is in close proximity to the northwest of the site. The topography of the site lies between 49 feet and 52 feet with the lowest corner in the northwest. See Figure 2: Existing Site Map for more information.

### **SOILS DESCRIPTION**

A geotechnical engineering study was performed by Pacific Geo Engineering for the site and is available under a separate cover. In summary, the report finds the underlying soils to be comprised of alluvium to a depth of approximately 3 to 5 feet, generally in very moist to wet conditions. Below the alluvium layers they encountered dense sand with gravels, also in moist conditions. The study found that "limited infiltration" systems comprised of downspout infiltration systems and porous pavement seem reasonable in the upper alluvium deposit."

### **EXISTING BASIN**

The existing basin is full site. As 100 percent infiltration is proposed, no existing basin calculations were performed.

### **OFFSITE ANALYSIS & MITIGATION**

No runoff is proposed to leave the site.

### **UPSTREAM ANALYSIS**

Due to the relative flatness of the area and considering all the surrounding lots are developed with their own storm systems, no significant upstream flow is anticipated to be a factor in the site design.

### **DOWNSTREAM ANALYSIS**

No runoff is proposed to leave the site.

### **PROPOSED CONDITIONS SUMMARY**

The 2-parcel site will be sub-divided into 11 attached single-family lots, consisting of two attached residential buildings, one with 5 units, and one with 6 units. A shared access road which will connect to each building's driveway. A tract for a playground will be created, and the created shared access road will be part of a separate tract. Access will be from the existing site access location on the east side of the lots coming from 174<sup>th</sup> Drive SE. Frontage improvements to 174<sup>th</sup> Drive SE from the site boundary on the south to Main Street are also proposed. See Figure 3: Developed Conditions.

## **MR 2: CONSTRUCTION STORMWATER POLLUTION PREVENTION (SWPP)**

This SWPPP Narrative has been prepared as part of the preliminary plat and is conceptual in nature. The project proposes less than 1 acre of land disturbing activities and will not require a Department of Ecology Construction Stormwater General Permit.

The construction site has the following characteristics:

Disturbed Area:	Approximately 0.93 ac. (0.72 ac. on property, 0.21 ac. frontage)
Soil Type:	Alluvium to 3-5' depth, sand with gravels below alluvium.
Average slope:	0.5-2%
Critical Areas:	None.

### **1. CONSTRUCTION STORMWATER POLLUTION PREVENTION ELEMENTS**

A Construction Stormwater Management Plan will be prepared that addresses the 13 Required Elements summarized below:

#### **Element #1: Mark Clearing Limits**

The construction plans delineate the limits of the clearing for the site. These will be located in the field prior to clearing taking place.

#### **Element #2: Establish Construction Access**

Construction access will be taken from the existing access to 174<sup>th</sup> Drive SE. A stabilized construction entrance will be installed at that location.

#### **Element #3: Control Flow Rates**

Temporary infiltration ponds will be constructed by the contractor to allow construction runoff to infiltrate.

#### **Element #4: Install Sediment Controls**

Sediment controls and their installation will be delineated on the construction documents in the future.

#### **Element #5: Stabilize Soils**

In planting areas, the exposed soils will be stabilized BMP T5.13. In paved areas the soil will be stabilized by the placement of the rock base course. Temporary stockpiles will be mulched, seeded or covered with plastic.

#### **Element #6: Protect Slopes**

The site is flat and will not require slope protection.

#### **Element #7: Protect Drain Inlets**

There are no catch basin inlets along 174<sup>th</sup> Drive SE, but inlets will be protected along 162<sup>nd</sup> Street SE in vicinity to the project.

#### **Element #8: Stabilize Channels and Outlets**

No channels or outfalls are proposed.

**Element #9: Control of Pollutants**

All pollutants, including waste materials and demolition debris, which occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris.

**Element #10: Control De-Watering**

No dewatering is expected as no excavation of the water table is anticipated.

**Element #11: Maintain BMPs**

Notes for the maintenance of erosion control facilities will be included on the construction plans.

**Element #12: Manage the Project**

The project will be subject to seasonal work limitations, site inspection and monitoring as required by the City of Monroe. Erosion control monitoring and supervision will be managed by the contractor.

**Element #13: Protect Low Impact Development**

This will be addressed on the final construction documents after preliminary short plat.

**MR 3: WATER POLLUTION SOURCE CONTROL**

**PERMANENT SOURCE CONTROL BMPs**

Being a residential development source control will consist of maintained garbage facilities, maintenance of the storm drain system, and pavement sweeping.

**MR 4: PRESERVATION OF NATURAL DRAINAGE**

Infiltration of the storm water runoff from the developed site is proposed. This matches the existing conditions where there is negligible surface discharge from the site. As such there is no downstream drainage that will be impacted by the discharge of surface water from the proposed development. By allowing the runoff to continue to infiltrate, the natural drainage will be preserved.

**MR 5: ON-SITE STORMWATER MANAGEMENT**

The project proposes 100 percent infiltration of runoff, meeting the requirements of MRs #1-9. WWHM 2012 modeling parameters and results are shown in Appendix A. The project includes the construction of eleven attached residences (10,713 sf total), a combined driveway and access road (17,189 sf), and concrete sidewalk and walkways (3,123 sf). The total new plus replaced impervious surface is 31,025 sf. The following is a conceptual evaluation of the proposed onsite stormwater management BMPs for the site:

The project is not flow control exempt and triggers MRs #1-9. By following Figure I-2.5.1, the developer will need to choose between meeting the LID Performance Standard or following List #2 for each surface. Should the developer follow the List #2 option, the likely BMPs that will be used for each surface are as follows:

**Lawn and Landscaped Areas**

BMP T5.13 Post Construction Soil Quality and Depth will be implemented on disturbed and landscaped areas.

**Roof Areas**

**BMP T5.10A Downspout Full Infiltration Systems**

As the site is a previously developed, there is no option to use full dispersion, so downspout full infiltration systems are the preferred method of stormwater management for roof areas. Conceptual sizing is shown below.

Per Table 3.3 of the Drainage Manual, medium sand requires 30 lf of 2' wide infiltration trench per 1,000 sf of roof area. With three roof areas of varying size, the following calculations have been used in preliminary sizing:

Lots	Building Size (sf)	Required Trench Length (lf)	Proposed Trench Dimensions
1-5	5,131	154	77' x 4'
6-11	5,582	168	84' x 4'

Each trench location was chosen to be in the backside of the lots where there is the most open area. With full infiltration, the roof area has not been included in the developed basin WWHM2012 calculations.

### **Other Hard Surfaces**

#### **BMP T5.15 Permeable Pavement**

As previously mentioned, full dispersion is not feasible due to the existing developed conditions of the site and surroundings. The remaining hard surface comprises of the shared driveway and repave of the existing access road to the updated road standards. Overall, this accounts for 20,312 sf of hard surface, with the existing driveway and remaining concrete slabs covering 7,148 sf; a difference of 13,164 sf. The main access road to the site in its current condition is paved asphalt. Permeable pavement in accordance with BMP T5.15 will be the preferred method of stormwater management for the access road, parking areas and sidewalks for the site. The investigation of the site soils by Pacific Geo Engineering measured infiltration rates of the underlying soils which is a critical component of permeable pavement and downspout infiltration systems. Their report determined that "limited infiltration" systems such as downspout infiltrations systems and permeable pavement are viable options for stormwater management in the upper alluvium layers of the soils. The WWHM2012 model does not include permeable paving since it is being used in the List Approach.

### **MR 6: RUNOFF TREATMENT**

With more than 5,000 sf (20,312 sf) of pollution generating hard surface the site requires runoff treatment. Basic treatment is required for the site and will be achieved with permeable paving. Both on-site and off-site paved surfaces are proposed to be paved with permeable concrete or asphalt. This will allow for stormwater to infiltrate through the surface layer to the underlying soils. Assuming the native underlying soils can remove pollutants through CEC (Cation Exchange), the water will be treated as it infiltrates, and no further treatment will be required. If the soils report determines the underlying soils are incapable of CEC, a sand layer with CEC properties will be added to treat the infiltrating water.



### **MR 7: FLOW CONTROL**

The site has currently been sized as a single basin but may be broken up into parts depending on project the extents at the final construction documents. Paved areas will either be permeable and infiltrate all runoff or will be graded to drain to a conveyance system which will flow to a flow control BMP.

The basin is modeled as 0.92 acres of forest and flat lawn in the predeveloped condition and consists of 0.06 acres of impervious sidewalk, 0.22 acres of pervious landscaping, and 0.39 acres of permeable paving in the developed condition. Roof area (0.25 acres) is fully infiltrated and is zeroed out in the developed condition.

See attached WWHM2012 Report under Appendix A.

### **MR 8: WETLANDS PROTECTION**

There are no wetlands or other critical areas on or near the site.

### **MR 9: OPERATION AND MAINTENANCE**

A full operations and Maintenance Manual will accompany the final drainage report.



FIGURE 1: VICINITY MAP



FIGURE 2: EXISTING CONDITIONS

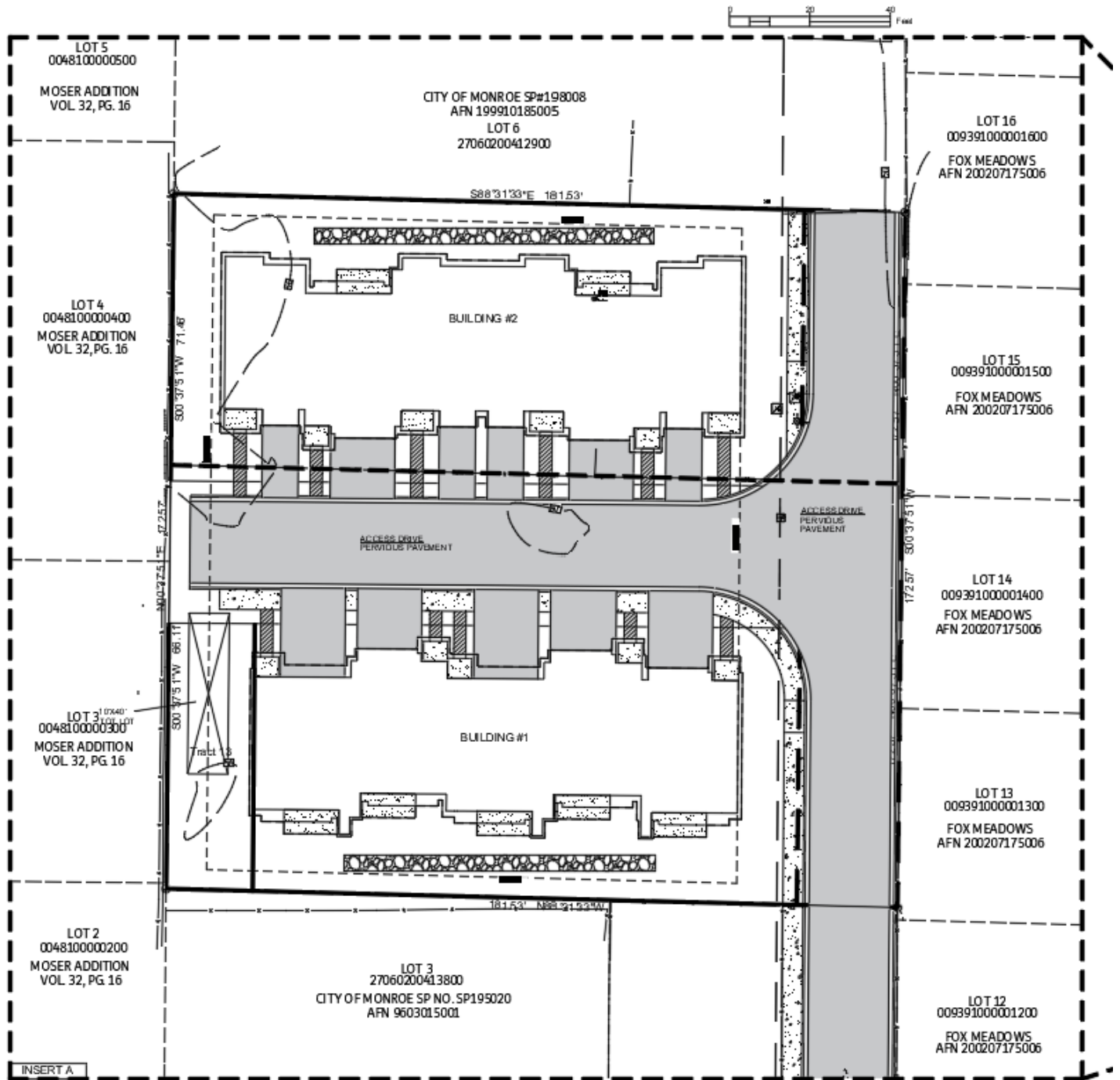


FIGURE 3: DEVELOPED SITE

## **APPENDIX A: WWHM2012 REPORT**

**WWHM2012  
PROJECT REPORT**

**Project Name:** 23-152 Ponderosa Pacific  
**Site Name:**  
**Site Address:**  
**City :**  
**Report Date:** 6/23/2023  
**Gage :** Everett  
**Data Start :** 1948/10/01  
**Data End :** 2009/09/30  
**Precip Scale:** 1.20  
**Version Date:** 2019/09/13  
**Version :** 4.2.17

**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	.1
C, Lawn, Flat	.82
<b>Pervious Total</b>	<b>0.92</b>
<u>Impervious Land Use</u>	<u>acre</u>
<b>Impervious Total</b>	<b>0</b>
<b>Basin Total</b>	<b>0.92</b>

<b>Element Flows To:</b>		
Surface	Interflow	Groundwater

**MITIGATED LAND USE**

**Name :** Basin 1  
**Bypass:** No

**GroundWater:** No

<u>Pervious Land Use</u>	<u>acre</u>
C, Lawn, Flat	.22
<b>Pervious Total</b>	<b>0.22</b>
<u>Impervious Land Use</u>	<u>acre</u>
SIDEWALKS FLAT	0.06
<b>Impervious Total</b>	<b>0.06</b>
<b>Basin Total</b>	<b>0.28</b>

Element Flows To:

Surface	Interflow	Groundwater
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Name : Permeable Pavement 1  
 Pavement Area: 0.3949 ft.  
 Pavement Length: 860.00 ft.  
 Pavement Width: 20.00 ft.  
 Pavement slope 1: 0 To 1  
 Pavement thickness: 0.33  
 Pour Space of Pavement: 0.3  
 Material thickness of second layer: 0.33  
 Pour Space of material for second layer: 0.3  
 Material thickness of third layer: 0  
 Pour Space of material for third layer: 0  
 Infiltration On  
 Infiltration rate: 0.16  
 Infiltration safety factor: 1  
 Total Volume Infiltrated (ac-ft.): 71.495  
 Total Volume Through Riser (ac-ft.): 0  
 Total Volume Through Facility (ac-ft.): 71.495  
 Percent Infiltrated: 100  
 Total Precip Applied to Facility: 0  
 Total Evap From Facility: 5.006

Element Flows To:

Outlet 1	Outlet 2
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**Permeable Pavement Hydraulic Table**

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.394	0.000	0.000	0.000
0.0056	0.394	0.000	0.000	0.063
0.0111	0.394	0.001	0.000	0.063
0.0167	0.394	0.002	0.000	0.063
0.0222	0.394	0.002	0.000	0.063



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0.0278	0.394	0.003	0.000	0.063
0.0333	0.394	0.003	0.000	0.063
0.0389	0.394	0.004	0.000	0.063
0.0444	0.394	0.005	0.000	0.063
0.0500	0.394	0.005	0.000	0.063
0.0556	0.394	0.006	0.000	0.063
0.0611	0.394	0.007	0.000	0.063
0.0667	0.394	0.007	0.000	0.063
0.0722	0.394	0.008	0.000	0.063
0.0778	0.394	0.009	0.000	0.063
0.0833	0.394	0.009	0.000	0.063
0.0889	0.394	0.010	0.000	0.063
0.0944	0.394	0.011	0.000	0.063
0.1000	0.394	0.011	0.000	0.063
0.1056	0.394	0.012	0.000	0.063
0.1111	0.394	0.013	0.000	0.063
0.1167	0.394	0.013	0.000	0.063
0.1222	0.394	0.014	0.000	0.063
0.1278	0.394	0.015	0.000	0.063
0.1333	0.394	0.015	0.000	0.063
0.1389	0.394	0.016	0.000	0.063
0.1444	0.394	0.017	0.000	0.063
0.1500	0.394	0.017	0.000	0.063
0.1556	0.394	0.018	0.000	0.063
0.1611	0.394	0.019	0.000	0.063
0.1667	0.394	0.019	0.000	0.063
0.1722	0.394	0.020	0.000	0.063
0.1778	0.394	0.021	0.000	0.063
0.1833	0.394	0.021	0.000	0.063
0.1889	0.394	0.022	0.000	0.063
0.1944	0.394	0.023	0.000	0.063
0.2000	0.394	0.023	0.000	0.063
0.2056	0.394	0.024	0.000	0.063
0.2111	0.394	0.025	0.000	0.063
0.2167	0.394	0.025	0.000	0.063
0.2222	0.394	0.026	0.000	0.063
0.2278	0.394	0.027	0.000	0.063
0.2333	0.394	0.027	0.000	0.063
0.2389	0.394	0.028	0.000	0.063
0.2444	0.394	0.029	0.000	0.063
0.2500	0.394	0.029	0.000	0.063
0.2556	0.394	0.030	0.000	0.063
0.2611	0.394	0.030	0.000	0.063
0.2667	0.394	0.031	0.000	0.063
0.2722	0.394	0.032	0.000	0.063
0.2778	0.394	0.032	0.000	0.063
0.2833	0.394	0.033	0.000	0.063
0.2889	0.394	0.034	0.000	0.063
0.2944	0.394	0.034	0.000	0.063
0.3000	0.394	0.035	0.000	0.063
0.3056	0.394	0.036	0.000	0.063
0.3111	0.394	0.036	0.000	0.063
0.3167	0.394	0.037	0.000	0.063
0.3222	0.394	0.038	0.000	0.063
0.3278	0.394	0.038	0.000	0.063
0.3333	0.394	0.039	0.000	0.063
0.3389	0.394	0.040	0.000	0.063



0.3444	0.394	0.040	0.000	0.063
0.3500	0.394	0.041	0.000	0.063
0.3556	0.394	0.042	0.000	0.063
0.3611	0.394	0.042	0.000	0.063
0.3667	0.394	0.043	0.000	0.063
0.3722	0.394	0.044	0.000	0.063
0.3778	0.394	0.044	0.000	0.063
0.3833	0.394	0.045	0.000	0.063
0.3889	0.394	0.046	0.000	0.063
0.3944	0.394	0.046	0.000	0.063
0.4000	0.394	0.047	0.000	0.063
0.4056	0.394	0.048	0.000	0.063
0.4111	0.394	0.048	0.000	0.063
0.4167	0.394	0.049	0.000	0.063
0.4222	0.394	0.050	0.000	0.063
0.4278	0.394	0.050	0.000	0.063
0.4333	0.394	0.051	0.000	0.063
0.4389	0.394	0.052	0.000	0.063
0.4444	0.394	0.052	0.000	0.063
0.4500	0.394	0.053	0.000	0.063
0.4556	0.394	0.054	0.000	0.063
0.4611	0.394	0.054	0.000	0.063
0.4667	0.394	0.055	0.000	0.063
0.4722	0.394	0.055	0.000	0.063
0.4778	0.394	0.056	0.000	0.063
0.4833	0.394	0.057	0.000	0.063
0.4889	0.394	0.057	0.000	0.063
0.4944	0.394	0.058	0.000	0.063
0.5000	0.394	0.059	0.000	0.063

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**ANALYSIS RESULTS**

**Stream Protection Duration**

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**Predeveloped Landuse Totals for POC #1**

**Total Pervious Area:0.92**

**Total Impervious Area:0**

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**Mitigated Landuse Totals for POC #1**

**Total Pervious Area:0.22**

**Total Impervious Area:0.06**

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**Flow Frequency Return Periods for Predeveloped. POC #1**

<u>Return Period</u>	<u>Flow(cfs)</u>
<b>2 year</b>	0.128404
<b>5 year</b>	0.232332
<b>10 year</b>	0.316757
<b>25 year</b>	0.440839
<b>50 year</b>	0.545776
<b>100 year</b>	0.661346

**Flow Frequency Return Periods for Mitigated. POC #1**

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.063009
5 year	0.101064
10 year	0.131413
25 year	0.175991
50 year	0.213967
100 year	0.25624

**Stream Protection Duration**

**Annual Peaks for Predeveloped and Mitigated. POC #1**

<u>Year</u>	<u>Predeveloped</u>	<u>Mitigated</u>
1949	0.200	0.088
1950	0.231	0.099
1951	0.084	0.041
1952	0.129	0.062
1953	0.164	0.083
1954	0.316	0.133
1955	0.215	0.091
1956	0.073	0.033
1957	0.196	0.080
1958	0.530	0.214
1959	0.099	0.053
1960	0.166	0.073
1961	0.783	0.302
1962	0.144	0.064
1963	0.290	0.117
1964	0.113	0.046
1965	0.032	0.028
1966	0.053	0.040
1967	0.112	0.072
1968	0.130	0.064
1969	0.533	0.207
1970	0.088	0.045
1971	0.180	0.083
1972	0.263	0.114
1973	0.155	0.078
1974	0.221	0.104
1975	0.181	0.084
1976	0.085	0.044
1977	0.043	0.035
1978	0.060	0.030
1979	0.290	0.116
1980	0.100	0.048
1981	0.088	0.043
1982	0.080	0.039
1983	0.181	0.082
1984	0.123	0.062
1985	0.167	0.073
1986	0.253	0.109
1987	0.155	0.079
1988	0.089	0.054
1989	0.161	0.073
1990	0.068	0.042
1991	0.062	0.038

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1992	0.140	0.065
1993	0.069	0.042
1994	0.069	0.038
1995	0.070	0.039
1996	0.160	0.069
1997	0.322	0.121
1998	0.227	0.100
1999	0.044	0.030
2000	0.202	0.120
2001	0.025	0.025
2002	0.037	0.023
2003	0.037	0.030
2004	0.223	0.116
2005	0.080	0.047
2006	0.216	0.089
2007	0.177	0.079
2008	0.128	0.058
2009	0.085	0.049

**Stream Protection Duration**

**Ranked Annual Peaks for Predeveloped and Mitigated. POC #1**

<b>Rank</b>	<b>Predeveloped</b>	<b>Mitigated</b>
1	0.7831	0.3018
2	0.5327	0.2141
3	0.5300	0.2067
4	0.3224	0.1331
5	0.3159	0.1210
6	0.2896	0.1205
7	0.2895	0.1172
8	0.2627	0.1161
9	0.2528	0.1158
10	0.2305	0.1138
11	0.2271	0.1088
12	0.2227	0.1040
13	0.2209	0.1003
14	0.2158	0.0985
15	0.2154	0.0913
16	0.2022	0.0886
17	0.2001	0.0878
18	0.1963	0.0838
19	0.1814	0.0829
20	0.1812	0.0826
21	0.1797	0.0823
22	0.1768	0.0805
23	0.1666	0.0790
24	0.1655	0.0786
25	0.1638	0.0783
26	0.1607	0.0734
27	0.1602	0.0732
28	0.1554	0.0727
29	0.1553	0.0724
30	0.1443	0.0694
31	0.1396	0.0646
32	0.1300	0.0643
33	0.1294	0.0637
34	0.1278	0.0616

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35	0.1232	0.0616
36	0.1127	0.0575
37	0.1115	0.0540
38	0.1004	0.0535
39	0.0986	0.0487
40	0.0889	0.0483
41	0.0876	0.0472
42	0.0876	0.0461
43	0.0848	0.0446
44	0.0848	0.0437
45	0.0844	0.0427
46	0.0804	0.0422
47	0.0795	0.0417
48	0.0726	0.0411
49	0.0699	0.0397
50	0.0692	0.0393
51	0.0689	0.0390
52	0.0677	0.0376
53	0.0617	0.0375
54	0.0597	0.0347
55	0.0532	0.0328
56	0.0442	0.0301
57	0.0427	0.0300
58	0.0374	0.0299
59	0.0372	0.0282
60	0.0325	0.0253
61	0.0251	0.0231

**Stream Protection Duration**

**POC #1**

**The Facility PASSED**

**The Facility PASSED.**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0642	597	97	16	Pass
0.0691	485	82	16	Pass
0.0739	411	72	17	Pass
0.0788	341	62	18	Pass
0.0837	275	44	16	Pass
0.0885	237	38	16	Pass
0.0934	212	33	15	Pass
0.0983	190	30	15	Pass
0.1031	174	23	13	Pass
0.1080	163	19	11	Pass
0.1128	147	16	10	Pass
0.1177	130	8	6	Pass
0.1226	119	5	4	Pass
0.1274	110	5	4	Pass
0.1323	102	5	4	Pass
0.1372	98	4	4	Pass
0.1420	92	4	4	Pass
0.1469	85	4	4	Pass
0.1518	79	4	5	Pass
0.1566	74	4	5	Pass
0.1615	67	4	5	Pass

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0.1664	60	4	6	Pass
0.1712	56	4	7	Pass
0.1761	53	4	7	Pass
0.1809	49	4	8	Pass
0.1858	46	4	8	Pass
0.1907	45	4	8	Pass
0.1955	42	4	9	Pass
0.2004	38	4	10	Pass
0.2053	34	4	11	Pass
0.2101	34	3	8	Pass
0.2150	32	3	9	Pass
0.2199	30	2	6	Pass
0.2247	27	2	7	Pass
0.2296	26	2	7	Pass
0.2345	24	2	8	Pass
0.2393	23	2	8	Pass
0.2442	22	1	4	Pass
0.2490	21	1	4	Pass
0.2539	19	1	5	Pass
0.2588	16	1	6	Pass
0.2636	13	1	7	Pass
0.2685	12	1	8	Pass
0.2734	10	1	10	Pass
0.2782	10	1	10	Pass
0.2831	8	1	12	Pass
0.2880	8	1	12	Pass
0.2928	6	1	16	Pass
0.2977	6	1	16	Pass
0.3026	6	0	0	Pass
0.3074	6	0	0	Pass
0.3123	6	0	0	Pass
0.3171	5	0	0	Pass
0.3220	5	0	0	Pass
0.3269	4	0	0	Pass
0.3317	4	0	0	Pass
0.3366	4	0	0	Pass
0.3415	4	0	0	Pass
0.3463	4	0	0	Pass
0.3512	4	0	0	Pass
0.3561	4	0	0	Pass
0.3609	4	0	0	Pass
0.3658	4	0	0	Pass
0.3707	4	0	0	Pass
0.3755	4	0	0	Pass
0.3804	4	0	0	Pass
0.3853	4	0	0	Pass
0.3901	4	0	0	Pass
0.3950	4	0	0	Pass
0.3998	4	0	0	Pass
0.4047	4	0	0	Pass
0.4096	4	0	0	Pass
0.4144	4	0	0	Pass
0.4193	4	0	0	Pass
0.4242	4	0	0	Pass
0.4290	4	0	0	Pass
0.4339	4	0	0	Pass
0.4388	4	0	0	Pass

PONDEROSA PACIFIC 11 UNIT RESIDENTIAL DEVELOPMENT

0.4436	4	0	0	Pass
0.4485	4	0	0	Pass
0.4534	4	0	0	Pass
0.4582	4	0	0	Pass
0.4631	4	0	0	Pass
0.4679	4	0	0	Pass
0.4728	4	0	0	Pass
0.4777	4	0	0	Pass
0.4825	4	0	0	Pass
0.4874	4	0	0	Pass
0.4923	4	0	0	Pass
0.4971	4	0	0	Pass
0.5020	4	0	0	Pass
0.5069	4	0	0	Pass
0.5117	4	0	0	Pass
0.5166	4	0	0	Pass
0.5215	4	0	0	Pass
0.5263	4	0	0	Pass
0.5312	3	0	0	Pass
0.5360	2	0	0	Pass
0.5409	2	0	0	Pass
0.5458	2	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		
Total Volume Infiltrated		0.00	0.00	0.00		0.00	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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## **APPENDIX B: GEOTECHNICAL REPORT**