HIP Pre-Design Information
Case Study

*Calculations are estimates and based on proposed project options. These numbers are subject to change based on final project determination.*

Total Parcel Area: 179,423 ft²

Total Treatable Area: 179,423 ft²

Minimum 25% treatment: 44,856 ft²

Soil Information (see attached soil characterization sheets):
- Soil Test #1 — A Soil Drainage Test was completed for this site. No groundwater was found, and the infiltration rate is moderate.
- Soil Test #2 — A Simple Investigation was completed to check for bedrock or groundwater. No bedrock or groundwater was discovered, and infiltration rate is assumed moderate based on information from Soil Test #1.

Proposed BMPs:
1. Rain Garden treating house roof and lawn
2. Infiltration trench treating driveway, outbuildings & lawn/landscape
3. Media Filter Drain treating lawn
4. Dispersion with native landscaping treating lawn and barn roof
5. Native Landscaping treating lawn and rehab of existing landscape area

Estimated Area to be Treated: 176,000 ft²

Estimated Budget: $228,800
Soil Characterization Sheet – Soil Test #1 (Rain Garden)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

<table>
<thead>
<tr>
<th>Test Pit Number</th>
<th>Soil Type/Infiltration Rate</th>
<th>Depth to Groundwater</th>
<th>Depth to Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS_PIT_2</td>
<td>.68</td>
<td>4 ft</td>
<td>Greater than 3'</td>
</tr>
<tr>
<td>E_North EBV5</td>
<td>.68</td>
<td>2 ft</td>
<td>Greater than 3'</td>
</tr>
<tr>
<td>E_North EBV6</td>
<td>.68</td>
<td>5 ft</td>
<td>Greater than 3'</td>
</tr>
</tbody>
</table>

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SOIL DRAINAGE TEST

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

- [X] Soil Drainage Test
  - I used the Rain Garden Manual
  - After one wet season (or three dry season) tests I have determined that my soil drainage rate is 0.68 in/hr.
  - I've characterized my soil as:
    - [ ] Good
    - [X] Moderate
    - [ ] Marginal
    - [ ] Poor

- [ ] Simple Investigation
  - I dug to a depth of 5' below ground surface and found:
    - [ ] Groundwater
    - [ ] Bedrock
    - [ ] Other: ___________________________
    - [ ] None of the above

- [ ] Soil Texture Test
  - I used this test method to determine soil type (circle one):
    - [ ] Clay
    - [ ] Clayey Silt
    - [ ] Silt/Loam
    - [ ] Sandy Loam/Sand
  - I've characterized my soil as:
    - [ ] Good
    - [ ] Moderate
    - [ ] Marginal
    - [ ] Poor
Soil Characterization Sheet – Soil Test #2 (Infiltration)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100' of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

<table>
<thead>
<tr>
<th>Test Pit Number</th>
<th>Soil Type/Infiltration Rate</th>
<th>Depth to Groundwater</th>
<th>Depth to Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS_PIT_2</td>
<td>.68</td>
<td>4 ft</td>
<td>Greater than 3'</td>
</tr>
<tr>
<td>E_North EBV5</td>
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</tr>
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<td>E_North EBV6</td>
<td>.68</td>
<td>5 ft</td>
<td>Greater than 3'</td>
</tr>
</tbody>
</table>

Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

**SIMPLE INVESTIGATION - based on Soil Test #1 Information**

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

- [ ] Soil Drainage Test
  I used the Rain Garden Manual
  After one wet season (or three dry season) tests I have determined that my soil drainage rate is _______ in/hr.
  I've characterized my soil as:
  - [ ] Good
  - [ ] Moderate
  - [ ] Marginal
  - [ ] Poor

- [X] Simple Investigation
  I dug to a depth of 3' below ground surface and found:
  - [ ] Groundwater
  - [ ] Bedrock
  - [ ] Other: __________

<table>
<thead>
<tr>
<th>Other Soil Type</th>
<th>Other Soil Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>Clayey Silt</td>
</tr>
<tr>
<td>Silt/Loam</td>
<td>Sandy Loam/Sand</td>
</tr>
</tbody>
</table>

  I've characterized my soil as:
  - [ ] Good
  - [ ] Moderate
  - [ ] Marginal
  - [ ] Poor
Submittal Requirements Checklist

Use this checklist to determine which submittal documents are required for your project. Please make sure all of the required documents are included in the submittal packet and check the appropriate boxes.

Part I: Submittal requirements for all HIP projects

☐ Project Summary & Project Narrative
☐ Project Site Plan
  ☐ Existing Conditions Sheet with utilities, including approximate location of rights-of-way
  ☐ Proposed Improvements Sheet (BMP footprint, dimensions, and conveyance)
☐ Stormwater Pollution Prevention Plan (SWPPP) - required for all ground-disturbing projects
  ☐ SWPPP Narrative
  ☐ Erosion and Sediment Control Plan Sheet
  ☐ Erosion and Sediment Control Details
☐ Material Specifications

Part II: Submittal requirements for each primary BMP

☐ Native Landscaping
  ☐ Design Submittal (Sections I - II)
  ☐ Plant Density Calculator
  ☐ Plant List

☐ Infiltration Trench
  ☐ Design Submittal (Sections I - II)
  ☐ Sizing Calculator
  ☐ Alternative Sizing Calculator
  ☐ Facility Cross Section

☐ Media Filter Drain
  ☐ Design Submittal (Sections I - II)
  ☐ Sizing Calculator
  ☐ Alternative Sizing Calculator
  ☐ Facility Cross Section
Part II (continued)

☐ Dispersion
  ☐ Design Submittal (Sections I - II)
  ☐ Sizing Calculator
  ☐ Alternative Sizing Calculator
  ☐ Facility Cross Section

☐ Lake Whatcom Rain Garden
  ☐ Design Submittal (Sections I - II)
  ☐ Sizing Calculator
  ☐ Alternative Sizing Calculator
  ☐ Facility Cross Section

Part III: Submittal requirements specific to the City or County

City Only:

☐ Stormwater Permit Application*
☐ Other City forms if applicable

*This project will not trip redevelopment thresholds regarding new or replaced impervious or partially-pervious surfaces. Therefore, this work qualifies for permitting exemptions for phosphorus- or flow-limiting projects as provided by applicable local codes and development standards.

County Only:

☐ Natural Resource Notification of Activity
☐ Other County forms if applicable

Part IV: Signatures

<table>
<thead>
<tr>
<th>Printed Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submittal Completed By:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On Behalf Of:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These requirements were developed in accordance with the minimum requirements found in the Stormwater Management: Manual for Western Washington and local regulations.
# Project Summary

**Address:**

(Street address)  

**Parcel #:**

(zip code)

**Owner:**

Phone:  

Email:

**HIP Staff:**

Phone:  

Email:

**Designer:**

Phone:  

Email:

**Short Description:**

__________________________________________________________________________

__________________________________________________________________________

Check boxes below to characterize the project:

<table>
<thead>
<tr>
<th><strong>Best Management Practices</strong></th>
<th><strong>Additional Practices</strong></th>
<th><strong>Stormwater Calculations</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Native Landscaping</td>
<td>□ Permeable Paving</td>
<td>□ None (Landscaping Only)</td>
</tr>
<tr>
<td>□ Infiltration Trench</td>
<td>□ Rainwater Harvesting</td>
<td>□ HIP Standard Calculations</td>
</tr>
<tr>
<td>□ Media Filter Drain</td>
<td>□ Invasive Species Removal</td>
<td>□ WWHM Modeling</td>
</tr>
<tr>
<td>□ MFD Clean Beach</td>
<td>□ Other:</td>
<td>□ MGS-Flood Modeling</td>
</tr>
<tr>
<td>□ Dispersion</td>
<td></td>
<td>□ Other:</td>
</tr>
<tr>
<td>□ Lake Whatcom Rain Garden</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Measurement</strong></th>
<th><strong>Number</strong></th>
<th><strong>Notes</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Treatable Area</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>Area Landscaped by Project</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>Area Infiltrated by Project</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>Area Dispersed/Treated by Project</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>New or Replaced Lawn</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>New or Replaced Hard Surface</td>
<td>$ft^2$</td>
<td></td>
</tr>
<tr>
<td>Amount of Soil Excavated</td>
<td>$yd^3$</td>
<td></td>
</tr>
</tbody>
</table>
Project Narrative

The following project, located at _______________________________ is proposed as a voluntary stormwater retrofit designed to protect and restore water quality in and around Lake Whatcom. The attached and enclosed information details the proposed phosphorus-reducing best management practices (BMP’s) to be installed at the project site.

A summary of these BMPs is as follows:

❖ **BMP#1:**

This component will be ________________ ft² in size.

This component addresses ________________ ft² of site area.

Location of BMP relative to house: ________________________________

❖ **BMP#2:**

This component will be ________________ ft² in size.

This component addresses ________________ ft² of site area.

Location of BMP relative to house: ________________________________

❖ **BMP#3:**

This component will be ________________ ft² in size.

This component addresses ________________ ft² of site area.

Location of BMP relative to house: ________________________________

*If the project contains more than three BMPs, additional information must be attached to this project narrative.*
Material Specifications

In order to ensure project approval and reimbursement for project expenses, HIP applications must clearly define the materials for each BMP. Designers are strongly encouraged to adhere verbatim to the material definitions found in the most current version of the HIP 2.0 BMP - Material Specifications book included as an appendix to this manual and available online at www.LakeWhatcomHIP.org/resources.

Pre-approved permits for HIP projects are based on the assumption that all materials will match those shown in the HIP Specifications book. Streamlined application review requires that these specs are followed exactly as published. Alternative specifications, if proposed, must be reviewed for compliance with design guidelines and regulations and may be subject to additional or conditional requirements. HIP cannot guarantee approval of alternative materials. Decisions on allowances for alternatives are made on a case-by-case basis.

Instructions:

Based on the project site plan and facility cross-section details, check the box next to ALL materials selected for this project that will follow the HIP 2.0 BMP - Material Specifications book. Note and clearly identify proposed alternative specifications, if any, in the space provided or attach additional pages with details and justifications. Materials submitted that do not meet HIP Specifications are not guaranteed for approval and may be subject to additional requirements or regulations.
## Material Specifications List

<table>
<thead>
<tr>
<th>Check Here</th>
<th>Material Name in HIP 2.0 BMP Material Spec Book</th>
<th>Check Here</th>
<th>Material Name in HIP 2.0 BMP Material Spec Book</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Native Plants (Page 15)</td>
<td></td>
<td>Pipe and Drains (Pages 9-10)</td>
</tr>
<tr>
<td><strong>Rock Materials (Pages 4-7)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cascade Stone</td>
<td></td>
<td>Atrium Grate</td>
</tr>
<tr>
<td></td>
<td>Media Filter Drain Mix</td>
<td></td>
<td>Catch Basin</td>
</tr>
<tr>
<td></td>
<td>Pea Gravel</td>
<td></td>
<td>Fine Mesh Screen</td>
</tr>
<tr>
<td></td>
<td>Permeable Ballast</td>
<td></td>
<td>Perforated Pipe</td>
</tr>
<tr>
<td></td>
<td>Quarry Spalls</td>
<td></td>
<td>Pipe Couplings and Fittings</td>
</tr>
<tr>
<td></td>
<td>River Rock</td>
<td></td>
<td>Rigid Solid Pipe</td>
</tr>
<tr>
<td></td>
<td>Sand</td>
<td></td>
<td>Solid Lids and Grates</td>
</tr>
<tr>
<td></td>
<td>Shoreline Gravel</td>
<td></td>
<td>Trench Drain</td>
</tr>
<tr>
<td></td>
<td>Washed Drain Rock</td>
<td></td>
<td>Trench Drain Grate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type 1 Catch Basin</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Permeable Pavement Materials (Pages 11-12)</td>
</tr>
<tr>
<td><strong>Mulch and Compost Materials (Pages 7-8)</strong></td>
<td></td>
<td></td>
<td>Permeable Interlocking Paver System</td>
</tr>
<tr>
<td></td>
<td>Compost</td>
<td></td>
<td>Permeable Pavers</td>
</tr>
<tr>
<td></td>
<td>Hog Fuel</td>
<td></td>
<td>Permeable Paver Joint Filler</td>
</tr>
<tr>
<td></td>
<td>Low-Phosphorus Mulch</td>
<td></td>
<td>Poured Permeable Surfacing</td>
</tr>
<tr>
<td><strong>Soil-Based Materials (Pages 8-9)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low-P Rain Garden Soil Mix</td>
<td></td>
<td>Edge Restraints</td>
</tr>
<tr>
<td></td>
<td>Low-P Topsoil</td>
<td></td>
<td>Grid Paver System</td>
</tr>
<tr>
<td>Check Here</td>
<td>Material Name in HIP 2.0 BMP Material Spec Book</td>
<td>Check Here</td>
<td>Material Name in HIP 2.0 BMP Material Spec Book</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------</td>
<td>------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Erosion Controls (Pages 12-14)</td>
<td>Other (Pages 14-15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catch Basin Inserts</td>
<td>Dispersion Trench Edging</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass Seed</td>
<td>Dispersion Trench Support Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sandbags</td>
<td>Geotextile for Drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silt Fencing</td>
<td>Rigid, Waterproof Barrier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sod</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Coverage Tarp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wattles</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Stormwater Pollution Prevention Plan (SWPPP)

Describe all elements below that apply to your project. Refer to the current edition of the Stormwater Management Manual for Western Washington for drainage project instructions. If you are only completing a landscaping project, describe elements below that you will implement during the winter work season.

Elements of the SWPPP

Element 1 – Mark Clearing Limits:

Element 2 – Establish Stabilized Construction Access:

Element 3 – Control Flow Rates:

HIP Projects are not intended to increase flow rates or stormwater discharge volumes by any amount. Therefore, no flow controls are necessary during construction. If point-discharges are created during construction, they will be mitigated by proper installation of sediment controls and will be disconnected at the completion of the project.

Element 4 – Install Sediment Controls:

Element 5 – Stabilize Soils:

All disturbed, exposed, stockpiled, or uncovered soil materials will be covered using an approved material (durable tarp, mulch, straw, etc.) during all rain events occurring during construction. Unworked soils that will be left exposed for more than 48 hours will be covered at the end of the last working day prior to that 48-hour duration. All disturbed soils will be covered completely between October 1 and May 30.

Element 6 – Protect Slopes:

Element 7 – Protect Drain Inlets:
Element 8 – Stabilize Channels and Outlets:

Element 9 – Control Pollutants:

No pollution-generating activities in excess of the approved HIP project are allowed. Spills and leaks of fuels, fluids, or chemicals will not be allowed to enter storm systems. Any fuel, fluid, or chemical pollutants entering storm systems, including ditches, must be reported to the City of Bellingham or Whatcom County immediately upon discovery.

Element 10 – Control Dewatering:

Dewatering is not an expected activity related to a HIP project. Trenches, drywells, and other stormwater systems will not be used as sediment traps at any time. If sedimentation occurs, restoration (including dewatering) will not cause the discharge of sediment-laden water from the site by either surface or piped flow.

Element 11 – Maintain BMPs:

All erosion control BMPs will be maintained per manufacturer’s recommendations and as directed by HIP, City of Bellingham, or Whatcom County Staff.

Element 12 – Manage the Project:

Work will occur as defined in an approved HIP project plan and per HIP rules and requirements. Contractor will exercise adaptive management to correct any unexpected deficiencies in erosion control efforts, as necessary. Adaptive management strategies may be reviewed by HIP, City of Bellingham, or Whatcom County staff to ensure compliance with applicable rules and regulations.

Element 13 - Protect LID Features:
Design Submittal
Lake Whatcom Rain Garden

Section I: System and Sizing Summary

☐ I have provided a site plan and facility cross-section. I have defined the area that will drain into the rain garden, by piping or sheet flow.

The drainage area is _______ ft² of impervious surface and/or _______ ft² of lawn/landscape

☐ I have sized the system using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.

The ponding area of the rain garden will be at least _______ ft² in size.

☐ I have calculated the number of plants needed for the total rain garden area (square feet of ponding area divided by 16) and completed a plant list.

I will need to install at least _______ native plants in my rain garden.

☐ I have calculated the amount of lake-friendly mulch (area divided by 80) I will need. I have chosen mulch from the HIP-approved mulch list.

My rain garden plan requires _______ cubic yards of approved mulch.

Section II: Site-Specific Planning

☐ I have determined that the ponding area is at least 5’ from known utilities.

☐ I have determined that the ponding area is at least 10’ from structures or property lines.

☐ I have determined that the rain garden is not on a slope >10% or within 10’ upgradient of a slope >15% or within 50’ upgradient of a slope >35%.

☐ I have developed an erosion control plan for the excavation of the rain garden and completed a site-specific SWPP that is included with this application.
Sizing Calculator
Lake Whatcom Rain Garden

How to Use Sizing Calculator:
Input project-specific data into the table below to calculate the size of the ponding area of the rain garden facility. Choose soil type based on test results in Step 1. Insert amount of hard surface (roof, pavement, gravel) in square feet and amount of lawn and/or landscape area in square feet. Determine multipliers by using the table below and calculate required ponding area.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Impervious Surface (square feet)</th>
<th>Hard Surface Multiplier (Varies)*</th>
<th>Lawn/Landscape (square feet)</th>
<th>Lawn/LS Multiplier (Varies)*</th>
<th>Ponding Area Minimum (square feet)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
</tr>
<tr>
<td>Moderate</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
</tr>
<tr>
<td>Marginal</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
<td>X</td>
<td>[ ]</td>
</tr>
<tr>
<td>Poor</td>
<td>[ ]</td>
<td>Infiltration Not Recommended. Use Treatment, Dispersion, or Native Landscaping BMPs</td>
<td>[ ]</td>
<td></td>
<td>[ ]</td>
</tr>
</tbody>
</table>

*Use multiplier reference table below.

** The ponding area is defined as the area that will be flooded before the system overflows. All rain gardens will have side slopes extending at least 18" from the top of this ponding area in all directions. See Design Guidance for more details and examples.

MULTIPLIER REFERENCE TABLE
RAIN GARDEN SIZING

<table>
<thead>
<tr>
<th></th>
<th>Multiplier by Soil Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
</tr>
<tr>
<td><strong>Hard Surface Area</strong></td>
<td></td>
</tr>
<tr>
<td>Less than 5,000 sf</td>
<td>0.09</td>
</tr>
<tr>
<td>More than 5,000 sf</td>
<td>0.07</td>
</tr>
<tr>
<td><strong>Lawn/Landscape Area</strong></td>
<td></td>
</tr>
<tr>
<td>Less than 2,000 sf</td>
<td>0.05</td>
</tr>
<tr>
<td>Between 2,000-10,000 sf</td>
<td>0.04</td>
</tr>
<tr>
<td>Between 10,000 - 40,000 sf</td>
<td>0.03</td>
</tr>
<tr>
<td>More than 40,000 sf</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Soil Characterization Sheet – Soil Test #1 (Rain Garden)

Step 1. Review available soil data and recommend on-site soil testing
To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100’ of any property line, list only that data. Otherwise, please list three representative test pits, preferably within 1/4 mile of the site.

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Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):

SOIL DRAINAGE TEST

Step 2. On-site testing procedure to determine soil type
To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

I completed an on-site soil investigation using (check boxes of all completed tests):

- [X] Soil Drainage Test
  I used the Rain Garden Manual

  After one wet season (or three dry season) tests I have determined that my soil drainage rate is **0.68 in/hr**.

  I've characterized my soil as:

  - [ ] Good
  - [X] Moderate
  - [ ] Marginal
  - [ ] Poor

- [ ] Simple Investigation
  I dug to a depth of 3’ below ground surface and found:

  - [ ] Groundwater
  - [ ] Bedrock
  - [ ] Other: __________________________

- [ ] Soil Texture Test
  I used this test method to determine soil type (circle one):

  - [ ] Clay
  - [ ] Clayey Silt
  - [ ] Silt/Loam
  - [ ] Sandy Loam/Sand

  I've characterized my soil as:

  - [ ] Good
  - [ ] Moderate
  - [ ] Marginal
  - [ ] Poor
Construction Criteria for Infiltration Facilities

Initial basin excavation should be conducted to within 1-foot of the final elevation of the basin floor. Excavate infiltration trenches and basins to final grade only after all disturbed areas in the upgradient project drainage area have been permanently stabilized. The final phase of excavation should remove all accumulation of silt in the infiltration facility before putting it in service. After construction is completed, prevent sediment from entering the infiltration facility by first conveying the runoff water through an appropriate pretreatment system such as a pre-settling basin, wet pond, or sand filter.

Infiltration facilities should generally not be used as temporary sediment traps during construction. If an infiltration facility is to be used as a sediment trap, it must not be excavated to final grade until after the upgradient drainage area has been stabilized. Any accumulation of silt in the basin must be removed before putting it in service.

Traffic Control: Relatively light–tracked equipment is recommended for this operation to avoid compaction of the basin floor. The use of draglines and trackhoes should be considered for constructing infiltration basins. The infiltration area should be flagged or marked to keep heavy equipment away.
Design Submittal
Infiltration Trench

Section I: System and Sizing Summary

☐ I have defined the area that will drain into the infiltration trench, by piping or sheet flow and have provided a site plan and facility cross-section.

The drainage area is _______ ft² of impervious surface and/or _______ ft² of lawn/landscape

☐ I have sized the trench using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.

The trench will be at least _______ ft² in size and at least 1.5' (18 inches) deep.

☐ I have calculated the amount of rock needed to fill the trench (cubic feet of trench volume ÷ 27).

I will need to install at least _______ yd³ of drain rock.

Section II: Site-Specific Planning

☐ I have determined that the trench is at least 5' from known public and private utilities.

☐ I have determined that the trench is at least 5' from structures with slab-on-grade foundations and 10' from structures with a basement or crawl space.

☐ If any portion of my trench is within 10' of a neighboring property, I have received written approval to proceed from that neighboring property owner.

☒ I have determined that the trench is not on a slope steeper than 10% and not within 10' upgradient of a slope steeper than 15% and not within 50' upgradient of a slope steeper than 35%.

☐ I have developed an erosion control plan for the excavation of the trench and completed a site-specific SWPPP that is included with this application.
Sizing Calculator
Infiltration Trench

Sizing Calculator: input soil characterization data into the table below to calculate the size of the facility.

Instructions: using the soil type identified on the Soil Characterization Sheet measure the amount of hard surface (roof, pavement, gravel) in square feet and amount of lawn and/or landscape area in square feet and insert values into table below. Use multipliers below to calculate required trench area.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Hard Surface (square feet)</th>
<th>Hard Surface Multiplier</th>
<th>Lawn/Landscape (square feet)</th>
<th>Lawn/LS Multiplier</th>
<th>Trench Minimum (square feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>[</td>
<td>✗ 0.06</td>
<td>[</td>
<td>✗ 0.02</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>[</td>
<td>✗ 0.09</td>
<td>[</td>
<td>✗ 0.04</td>
<td></td>
</tr>
<tr>
<td>Marginal</td>
<td>[</td>
<td>✗ 0.12</td>
<td>[</td>
<td>✗ 0.06</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>Infiltration Not Recommended. Use Media Filter Drain or Dispersion BMPs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Soil Characterization Sheet – Soil Test #2 (Infiltration)**

**Step 1. Review available soil data and recommend on-site soil testing**

To be completed by HIP Coordinator.

Off-site test pit data. Review map provided by HIP. If one test pit is within 100’ of any property line, list only that data. Otherwise, please list three representative test pits, preferably within ¼ mile of the site.

<table>
<thead>
<tr>
<th>Test Pit Number</th>
<th>Soil Type/Infiltration Rate</th>
<th>Depth to Groundwater</th>
<th>Depth to Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS_PIT_2</td>
<td>.68</td>
<td>4 ft</td>
<td>Greater than 3’</td>
</tr>
<tr>
<td>E_North EBV5</td>
<td>.68</td>
<td>2 ft</td>
<td>Greater than 3’</td>
</tr>
<tr>
<td>E_North EBV6</td>
<td>.68</td>
<td>5 ft</td>
<td>Greater than 3’</td>
</tr>
</tbody>
</table>

**Based on this information, the recommended soil investigation procedure to follow in Step 2 is (determined by HIP Coordinator):**

**SIMPLE INVESTIGATION - based on Soil Test #1 Information**

**Step 2. On-site testing procedure to determine soil type**

To be completed by HIP Coordinator or the project designer

Follow the soil testing methods and instructions for infiltration BMPs, found in the HIP Design Handbook (Infiltration Trench and Lake Whatcom Rain Garden).

Note: If designing for infiltration facilities in multiple locations, it is suggested that each location be checked for factors that might affect design considerations. Consult with the HIP Coordinator to determine the number of additional investigations recommended for each unique site.

—I completed an on-site soil investigation using (check boxes of all completed tests):

- [ ] Soil Drainage Test
  - I used the Rain Garden Manual
  - After one wet season (or three dry season) tests I have determined that my soil drainage rate is _____ in/hr.
  - I've characterized my soil as:
    - [ ] Good
    - [ ] Moderate
    - [ ] Marginal
    - [ ] Poor

- [X] Simple Investigation
  - I dug to a depth of 3’ below ground surface and found:
    - [ ] Groundwater
    - [ ] Bedrock
    - [ ] Other: ____________
    - [X] None of the above

- [ ] Soil Texture Test
  - I used this test method to determine soil type (circle one):
    - [ ] Clay
    - [ ] Clayey Silt
    - [ ] Silt/Loam
    - [X] Sandy Loam/Sand
  - I've characterized my soil as:
    - [ ] Good
    - [ ] Moderate
    - [ ] Marginal
    - [ ] Poor
ROCK-FILLED INFIlTRATION TRENCH
HG BMP "D" TYPICAL
NTG

Construction Criteria for Infiltration Facilities

Initial basic excavation should be conducted to within 1-foot of the final elevation of the basin floor. Excavate infiltration trenches and basins to final grade only after all disturbed areas in the upgradient project drainage area have been permanently stabilized. The final phase of excavation should remove all accumulation of silt in the infiltration facility before putting it in service. After construction is completed, prevent sediment from entering the infiltration facility by first conveying the runoff water through an appropriate pre-treatment system such as a pre-settling basin, wet pond, or sand filter.

Infiltration facilities should generally not be used as temporary sediment traps during construction. If an infiltration facility is to be used as a sediment trap, it must not be excavated to final grade until after the upgradient drainage area has been stabilized. Any accumulation of silt in the basin must be removed before putting it in service.

Traffic Control Relatively light-weighed equipment is recommended for this operation to avoid compaction of the basin floor. The use of shovels and trackhoes should be considered for constructing infiltration basins. The infiltration area should be flagged or marked to keep heavy equipment away.
### Design Submittal

**Media Filter Drain System**

**Section I: System and Sizing Summary**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>I have provided a site plan and facility cross-section.</td>
</tr>
<tr>
<td>□</td>
<td>I have defined the area that will drain into the MFD by piping.</td>
</tr>
<tr>
<td></td>
<td>That area is ______ ft² of impervious surface and/or</td>
</tr>
<tr>
<td></td>
<td>______ ft² of lawn/landscape</td>
</tr>
<tr>
<td>□</td>
<td>I have defined the area that will drain into the MFD by sheet flow.</td>
</tr>
<tr>
<td></td>
<td>That area is ______ ft² of impervious surface and/or</td>
</tr>
<tr>
<td></td>
<td>______ ft² of lawn/landscape</td>
</tr>
<tr>
<td>□</td>
<td>I have sized the MFD using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.</td>
</tr>
<tr>
<td></td>
<td>My trench will need to be at least ______ feet wide and ______ ft² in filter area</td>
</tr>
</tbody>
</table>

**Section II: Site-Specific Planning**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>I have determined that the MFD is at least 5' from known public and private utilities.</td>
</tr>
<tr>
<td>□</td>
<td>I have determined that the MFD is at least 5' from structures with slab-on-grade foundations and 10' from structures with a basement or crawl space.</td>
</tr>
<tr>
<td>□</td>
<td>I have determined that the MFD is not on or next to a slope steeper than 15% and not within 50' upgradient of a slope steeper than 35%.</td>
</tr>
<tr>
<td>□</td>
<td>I have developed an erosion control plan for the excavation of the trench and completed a site-specific SWPPP that is included with this application.</td>
</tr>
</tbody>
</table>
**Sizing Calculator**
**Media Filter Drain System**

*Instructions:* Measure hard surface area and lawn/landscaping surface area draining to trench. Characterize flow as sheet flow or piped flow. Insert values in the table below and use the following formula to calculate the size of MFD trench that is needed to adequately manage the runoff directed to the system. Sheet flow trenches must be at least 2' wide while piped flow trenches must be at least 3' wide in order for this calculation to be applicable. Runoff from a pipe that crosses at least 25' of lawn or landscape before reaching the trench can be considered sheet flow.

<table>
<thead>
<tr>
<th>Drainage Type</th>
<th>Hard Surface (square feet)</th>
<th>Hard Surface Multiplier</th>
<th>Lawn/Landscape (square feet)</th>
<th>Lawn/LS Multiplier</th>
<th>Minimum Trench Area (square feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet Flow</td>
<td>[</td>
<td>✗ 0.03</td>
<td>[</td>
<td>✗ 0.01</td>
<td></td>
</tr>
<tr>
<td>Piped Flow</td>
<td>[</td>
<td>✗ 0.04</td>
<td>[</td>
<td>✗ 0.01</td>
<td></td>
</tr>
</tbody>
</table>

**Total area of trench needed (add trench areas above):**
MEDIA FILTER DRAIN: SHEET FLOW CONFIGURATION
HIP BMP "C.1", TYPICAL, NTS
### Section I: System and Sizing Summary

- I have provided a site plan and facility cross-section.

- I have defined the area that will drain into the trench by piping.

  The drainage area is ______ ft² of impervious surface and/or ______ ft² of lawn/landscape

- I have defined the area that will drain into the trench by sheet flow

  That area is ______ ft² of impervious surface and/or ______ ft² of lawn/landscape

- I have sized the trench using approved methodology (HIP Sizing Calculator or stormwater hydrological modeling software) and attached that data.

  The trench will be at least ______ feet long and the downstream vegetated flow path must be at least ______ feet in length.

### Section II: Site-Specific Planning

- I have determined that the trench is at least 5' from known private or public utilities.

- I have determined that the trench is at least 5' from structures with slab-on-grade foundations and 10' from structures with a basement or crawl space.

- I have determined that the trench is not on or next to a slope steeper than 15% and not within 50' upgradient of a slope steeper than 35%.

- I have developed an erosion control plan for the excavation of the trench and completed a site-specific SWPPP that is included with this application.
Sizing Calculator
Dispersion

Step 1: Determine Trench Length. Measure the hard surface area draining to the trench. Measure the lawn/landscaping surface area draining to the trench. Use the following formula to calculate the length of dispersion trench that is needed to adequately manage the runoff directed to the system. All dispersion trenches are 2' wide at minimum. Runoff from a pipe that crosses at least 25' of lawn or landscape before reaching the trench can be considered sheet flow.

<table>
<thead>
<tr>
<th>Drainage Type</th>
<th>Impervious Surface (square feet)</th>
<th>Hard Surface Multiplier</th>
<th>Lawn/Landscape (square feet)</th>
<th>Lawn/LS Multiplier</th>
<th>Minimum Trench Length (linear feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet Flow</td>
<td>[ ]</td>
<td>0.009</td>
<td>[ ]</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Piped Flow</td>
<td>[ ]</td>
<td>0.014</td>
<td>[ ]</td>
<td>0.005</td>
<td></td>
</tr>
</tbody>
</table>

Total length of trench needed (add trench lengths above):

Step 2: Determine Vegetated Flow Path Length. Use the following formula to calculate how far the dispersed water must travel, through vegetation, before it leaves your property or enters a water body. Runoff from a pipe that crosses at least 25' of lawn or landscape before reaching the trench can be considered sheet flow.

<table>
<thead>
<tr>
<th>Drainage Type</th>
<th>Hard Surface &quot;A&quot;</th>
<th>Lawn/Landscape &quot;B&quot;</th>
<th>Lawn Length &quot;C&quot;</th>
<th>Formula</th>
<th>Minimum Flow Path Length* (linear feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheet Flow</td>
<td>Not part of formula</td>
<td>Not part of formula</td>
<td>((C-25)/3)+25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piped Flow</td>
<td></td>
<td>Not part of formula</td>
<td>((A/(B+1))*100)+25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total length of vegetated flow path needed* (add flow path lengths above):

* Note that the total vegetated flow path length will never be less than 25' or more than 100'. If your calculation comes out below or above those numbers, adjust up to 25 or down to 100.

Step 3: If there is no existing established vegetated flow path on-site to disperse to and a vegetated flow path needs to be created, please use the Native Landscaping BMP and accompanying calculator and submittal page in addition to this Dispersion BMP.
Flow to Second Dispersion Trench if Necessary

Flow to Other Branching Catch Basins as Necessary

Junction Box

Ground

Fine Mesh Screen

From Roof/Yard

To Trench

Notched Grade Board

18" on Center

2"
Design Submittal
Native Landscaping

Section I: System and Sizing Summary

| ☐ | I have defined the area that will be converted into native landscaping and have provided a site map showing the planting area. |
| ☐ | Native landscaping will replace _______ ft² of lawn/existing landscape and/or _______ ft² of impervious surface |
| ☐ | If any of my planting is in the public right-of-way, I have received written approval from the jurisdiction that manages the public area (City or County). |
| ☐ | The size of the area of the Right-of-Way I plan to landscape is _______ ft² |
| ☐ | I have selected a vegetation layer combination for each unique planting area (e.g., right-of-way area, front yard, back yard, etc...) and used the HIP plant density calculator to calculate the number of plants and yards of mulch required for each planting area. |
| ☐ | The total combined quantities for all of my planting areas are: ______ cubic yards of approved mulch, ______ trees, ______ shrubs, and ______ groundcovers. |

Section II: Site-Specific Planning

| ☐ | I have determined that I will not be planting trees or shrubs within 5' of a known utility, including septic systems (on private property) or 10' from a utility (in public ROW). |
| ☐ | I have determined that I will not need additional approvals for planting trees in the public right-of-way (if proposed, tree planting in ROW is not required). |
| ☐ | I have determined that the planting area is not on or next to a slope steeper than 35%. |
| ☐ | I have developed a plan to prevent erosion or runoff during my planting activities, including work during the wet season that complies with winter work provisions. |
Plant Density Calculator

Native Landscaping

Instructions: Select one of the options listed below for each unique planting area and calculate the minimum required planting density and mulch. Note that existing plants may be counted to meet required plant density numbers.

<table>
<thead>
<tr>
<th>Option</th>
<th>Vegetation Layer Combination</th>
<th>Plant Layer</th>
<th>Project area (sq ft)</th>
<th>Density Divider</th>
<th>Number of Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Tree, Shrub, and Groundcover</td>
<td>Trees</td>
<td>225 (15' o.c.*)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shrubs</td>
<td>64 (8' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Groundcovers</td>
<td>25 (5' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Tree and Shrub Only</td>
<td>Trees</td>
<td>144 (12' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No Groundcovers)</td>
<td>Shrubs</td>
<td>36 (6' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Tree and Groundcover Only</td>
<td>Trees</td>
<td>144 (12' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No Shrub)</td>
<td>Groundcovers</td>
<td>16 (4' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Shrub and Groundcover Only</td>
<td>Shrubs</td>
<td>49 (7' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No Tree)</td>
<td>Groundcovers</td>
<td>25 (5' o.c.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cubic Yards of Mulch</td>
<td></td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The abbreviation "o.c." stands for "on center", a convention used to describe the average distance between plants. For example, a tree that is planted 15' o.c. would be, on average, 15' from its nearest neighbor.

Plant List

Instructions: submit a list of native plants proposed for the project categorized by tree, shrub, and groundcover. List plant name (scientific preferred) and quantity. Include number of existing plants used to meet plant density requirements. Identify non-natives and cultivars and limit to no more than 10% of total plants.
Design Guidance

Erosion and Sediment Control

General Construction Stormwater Pollution Prevention Plan

Purpose
To prevent the discharge of sediment and other pollutants to the maximum extent practicable from small construction projects.

Design and Installation
Plan and implement proper clearing and grading of the site. It is most important only to clear the areas needed keeping exposed areas to a minimum. Phrase clearing so that only those areas that are actively being worked are uncovered.

Note: Clearing limits shall be flagged on the lot or project area prior to beginning clearing.

- From December 1 through March 31, no soils shall remain exposed.
- From April 1 to September 30, no soils shall remain exposed and uncovered anywhere, than slab units.
- Soil shall be managed in a manner that does not permanently compact or compact the final soil and landscape system. If disturbance and/or compaction occur the impact must be corrected at the end of the construction activity. This shall include restoration of soil depth, soil quality, permeability, and percent organic matter. Construction practices must not cause damage to or compacts the depth of permanent landscape or infiltration areas.
- Locate any soil piles away from drainage systems. Soil piles should be stripped or mulched until the soil is either used or removed. Piles should be situated so that runoff does not run into the street or adjoining yards.
- Backfill walls as soon as possible after backfilling. This will eliminate any sediment loss from surplus fill.
- The construction entrance shall be stabilized where traffic will be leaving the construction site and traveling on paved roads or other paved surfaces.
- Provide for periodic street cleaning to remove any sediment that may have been tracked out. Sediment should be managed by settling or draining and carefully removed from a temporary disposal area where it will not be re-utilized. Street washing is prohibited.

Silt Fence Sediment Barrier

- 2"x6" by 14 ga. wire or equivalent, if standard strength fencing is used.
- 2" min.
- Newly graded on disturbed slope.
- Bury bottom of filter fabric material, backfill trench with native soil or washed clean rock.

Typical Cross Section

Silt Fence Sediment Barrier

- Live stake
- 1x1" stake
- Ada/for short trim to return 2"-6" of grate

Catch Basin Insert (Outlet Protection) Detail

Notes:
1. Insert shall be installed prior to clearing and grading activity, or upon placement of a new catch basin.
2. Sediment shall be removed from the unit when it becomes half full.
3. Sediment removal shall be accomplished by removing the insert, emptying, and reinserting it into the catch basin.