

# GI Implementation Forms

## Continued Tutorial: New Development Site

This Continued Tutorial is meant to follow the Introductory Tutorial for the Oregon State University Extension Service's **Green Infrastructure (GI)** Implementation Forms.

This tutorial continues the design of the New Development site from the [Introductory Tutorial](#). This Continued Tutorial contains additional examples of BMPs and scenarios to overcome soil or site challenges. Click on the sections in the Table of Contents to be taken to the page discussing the BMP or scenario you are interested in.

### Table of Contents:

- [Site Review](#) (see Introductory Tutorial for more info)
- [Catchment 2: \(Stormwater Planter\)](#)
- [Catchment 3: \(Vegetated Roofs, Downspout Disconnection\)](#)
- [Catchment 4: \(Lined Stormwater Planter, slow-draining soils\)](#)
- [Catchment 5: \(Vegetated Filter Strip, expansive clay soils\)](#)

The additional tutorials found below contain further information:

#### [Introductory Tutorial](#)

Contains general information on using the GI Implementation Forms as well as more background information on this new development site.

- General information on using the GI Implementation Forms
- Catchment 1: [\(Porous Pavement & Rain Garden\)](#)

#### [Continued Tutorial: Redevelopment Site](#)

Manages an example redevelopment of an office site in eastern Oregon. Contains examples of retrofit and pavement removal BMPs.

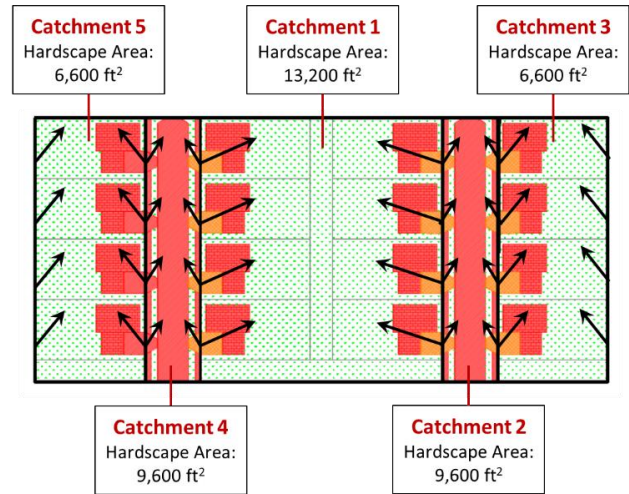
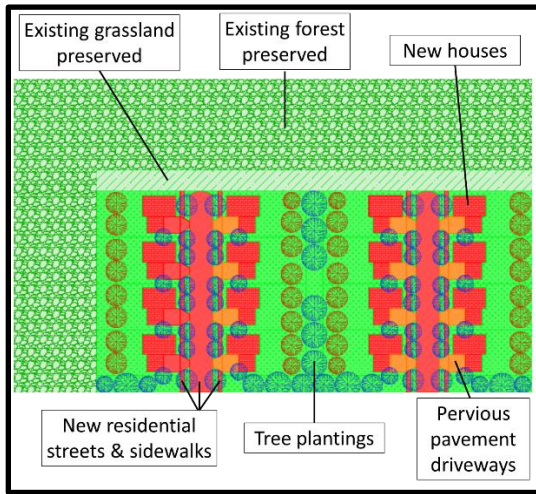
- Redevelopment Site: [\(Soakage Trench, Porous Pavement, Vegetated Roofs, Minimal Excavation\)](#)

# Site Review

(see [Introductory Tutorial](#) for more information)

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As discussed in the Introductory Tutorial, this site is a new housing development in western Oregon. There are 5 catchments in the site. This Continued Tutorial will design Catchments #2-5.



Prior to filling out the GI Implementation Forms, you will need the following information. These topics are covered in greater detail in the Introductory Tutorial.

## 1. Check Rainfall Depth Requirements ([OSU Extension link](#)) ([NOAA Link](#))

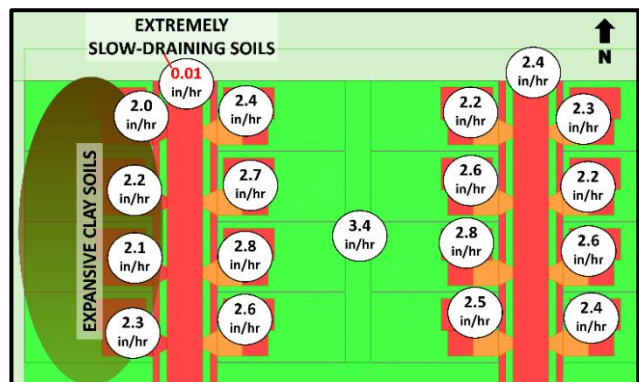
Jurisdictions generally require stormwater designs to manage rainfall depth of a given **design storm** (ie. 10-year 24-hour storm, etc.). This example site will use a 25-year, 24-hour design storm of **4.5"**.

## 2. Check NRCS/SCS Storm Type ([link](#))

The NRCS/SCS **Storm Type** determines the design storm precipitation timing and intensity. Since this site lies in western Oregon, we will use the GI Implementation Form spreadsheet for **Storm Type IA**.

## 3. Perform Soil Infiltration Testing ([link](#))

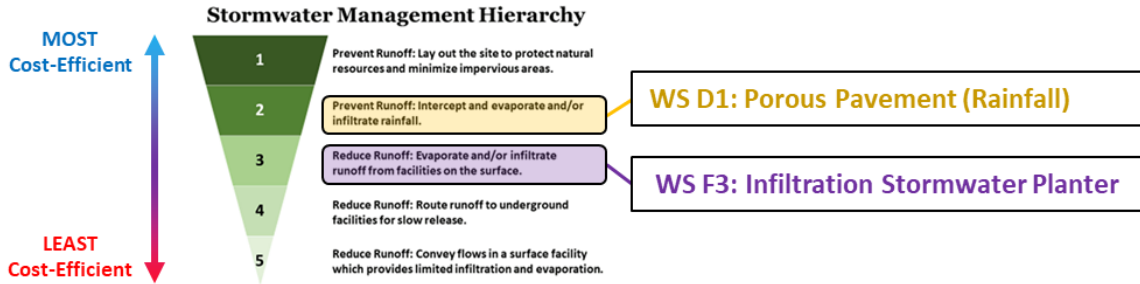
The types of BMPs available and the sizes required depend on the **infiltration rate** of local soils. Infiltration testing should be performed near the proposed location and depth of each BMP. Site infiltration testing found areas of slow-draining soils and expansive clay soils.



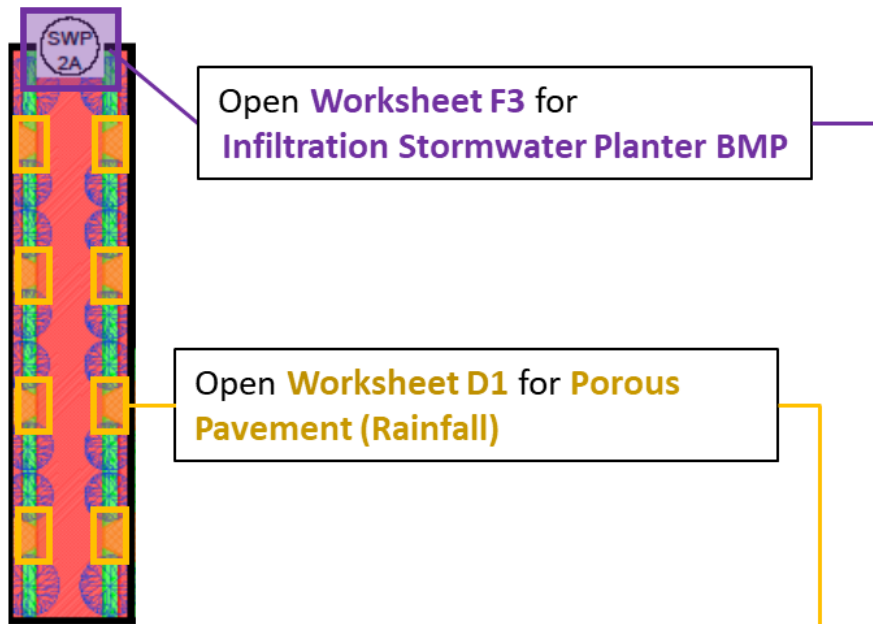
# Catchment #2

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Catchment #2 consists of 8 Porous Pavement (Rainfall) driveways and an Infiltration Stormwater Planter receiving drainage from the street.



The **Worksheet D1** for **Porous Pavement (Rainfall) BMP** in Catchment #2 is the same as in Catchment #1 from the [Introductory Tutorial](#), so we will skip this step here.



**0 ft<sup>2</sup> remaining. Success!**

**CATCHMENT FORM STEPS TO AN LID SITE & SIZING FACILITIES SECTIONS D – I (COMPLETE A SINGLE CATCHMENT FORM FOR EACH CATCHMENT)**

**C. Calculate Total Remaining Hardscape Drainage Area to be Managed (CATCHMENT 2) 0 square feet remaining**

21. Total # of Catchments (found from Site Hardscape Areas)	5	A single Catchment Form needs to be completed for each Catchment.
22. Enter the Catchment address id by this Catchment Form (eg. 1, 2, 3, 4)	2	
23. Total Hardscape Area (found from Site Hardscape Areas)	9,800 sf	Apply BMPs below applicable to hardscape areas until no area is left unmanaged.
25. Porous Pavement (Rainfall) BMP. Enter area of porous pavement that manages ONLY the rainfall it receives to calculate hardscape area managed. Complete Worksheet D1 if entering an area.	100 = 1,200 sf of BMP = 1,300 sf	If entering area here, click to complete Worksheet D1 for Porous Pavement (Rainfall) BMP
34. Infiltration Stormwater Planter BMP. Enter the hardscape area managed with a stormwater planter.	840	If entering area here, click to complete Worksheet F3 for Infiltration Stormwater Planter BMP

Also set automaticity to Cell N15 in (CR) F3 Planter

Next, open **Worksheet F3** to design the **Infiltration Stormwater Planter BMP** (process is similar to Worksheet F2 for Rain Garden BMP in the [Introductory Tutorial](#)). First, enter hardscape area from the street and sidewalks (*ignore porous pavement driveways-- they have already been accounted for*). Then, enter the plantings that are within 10 ft. of the street to reduce the drainage area from 8,400 ft<sup>2</sup> down to 6,720 ft<sup>2</sup> (max. 20% area reduction allowed). Finally, adjust the rock trench and stormwater planter dimensions to determine a final BMP size of 500 ft<sup>2</sup>.

Using **Worksheet F3** to enter **Infiltration Stormwater Planter BMP**

**WORKSHEET F3. INFILTRATION STORMWATER PLANTER BMP IN STEP 34 OF CATCHMENT FORM** [\[View BMP Factsheet\]](#)

a. Infiltration Stormwater Planter Designation (e.g. SP-1, etc.): **SWP-2A**

b. In Catchment #: **2**

Confirm suitability for infiltration of runoff:

c. Under "Physical Setting" in the Stormwater Planter factsheet, are all conditions met to safely infiltrate runoff? If Yes, continue to Step d. If No, then site is unsuitable for this BMP. Skip to Step 37 of the Catchment Form to investigate the possibility of using a conveyance BMP instead or redesign the site layout to accommodate infiltration.

d. Total Hardscape Drainage Area Draining to BMP: (Max 10,000 sf) = **8,400 sf**

e. Hardscape Area Reduction from Tree Plantings. Max 20% (1680 sq ft) = **1,680 sf**

f. Total Remaining Hardscape Area = **6,720 sf**

Determine footprint/size of Infiltration Stormwater Planter BMP:

g. Once you have calculated the hardscape area reduction from tree plantings, use the BMP calculator at the bottom of the worksheet to calculate to determine the area footprint of the BMP (it will be automatically entered here). Indicate this area on plans as well.

h. Confirm vegetation health. Have appropriate plants been chosen for level of moisture they are likely to receive, regardless of excavation depth and ponding depth set by overflow strategy? Plants are critical to the success of these systems. If the answer is no, redesign the planting plan to improve plant establishment and long-term viability, then enter a yes.

Determine hardscape area reduction (max 20% reduction) from tree planting:

i. Limit Disturbance: Tree Protection BMP (Hardscape), Evergreen Tree Planting BMP, Vegetator, Roof, and Contained Planters. Enter areas where these BMPs are placed over or overhang hardscape drainage areas in first box and multiply by value shown to find area generating runoff to manage.

Determine available proposed canopy of evergreen trees to manage hardscape areas:

Evergreen (Hardscape). Calculate the total mature canopy for multiple evergreen trees to manage hardscape area runoff. (If desired, trees may be used to prevent runoff from landscape areas using worksheet B1 instead.)

j. Small Canopy (for trees with small mature canopy area spreads including small trees and many trees with upright canopies with a canopy diameter measuring about 20 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

k. Medium Canopy (for trees with medium mature canopy area spreads with a tree canopy diameter measuring about 25 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

l. Large Canopy (for trees with large mature canopy area spreads with a tree canopy diameter measuring about 30 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

1. Manually enter hardscape drainage area to **Planter** (roofs, roads, sidewalks, etc.). Ignore vegetated areas.

Our **Tree Plantings** have reduced our remaining hardscape drainage area by **1,680 sf** from **8,400** → **6,720!**

2. Entering **Tree Plantings** of **12 small, 4 medium evergreens** to reduce remaining hardscape drainage area. (*Trees must be within 10 ft. of hardscape areas draining to Planter.*)

315 square feet x 12 # of small proposed trees = 3,780 sf

490 square feet x 4 # of med proposed trees = 1,960 sf

700 square feet x # of large proposed trees = 0 sf

**STORMWATER PLANTER SIZING CALCULATOR**  
Suitable for modeling a 24 Hour Storm, SBUH Type 1A Rainfall Distribution

Assumption: Time of concentration is conservatively 0.

User Inputs

Hour Rainfall Depth (i.e. Design Storm) = **4.5** in

Drainage area = **6,720** sf

Drainage Area Runoff Coefficient = **0.9**

Design Infiltration Rate of Soil = **2.4** in/hr

Below Stormwater Planter (optional) = **0** in

Rock Trench Void Porosity = **40%**

Desired Maximum Ponding Depth = **12** in

Stormwater Planter Area = **500** sf

3. Enter design storm. (see: Check Rainfall Depth Requirements)

4. Enter Runoff Coefficient. Generally = 0.9 since the calculator only considers hardscape drainage areas (roofs, roads, sidewalks, etc.).

5. Enter tested local soil infiltration rate (see: Perform Soil Infiltration Testing)

Optional: This is typically 40%. Enter a different void porosity as needed.

Enter the maximum ponding depth desired, not to exceed 12 inches to protect plant health.

Adjust this until the maximum ponding depth in facility is just less than the "Desired Ponding Depth" you just entered. This will ensure the facility is completely empty in 30 hours.

6. Size the Planter until **True**.

Calculated Design Criteria

Maximum Ponding Depth in Stormwater Planter = **10.7** in

Depth of Water Left in Rock Trench After 30 Hours = **0.00** in

Depth of Water Left in Stormwater Planter After 30 Hours = **0.00** in

Stormwater Planter Area is Adequately Sized? **TRUE**

Other Calculated Values

Peak Rainfall Intensity = **1.46** in/hr

Peak flow overflowing/leaving facility/site = **0.000** cfs

Calculated: This is the depth of water predicted in the facility for the conditions entered in USER INPUTS.

Calculated: This should be 0 to be ready for the next storm.

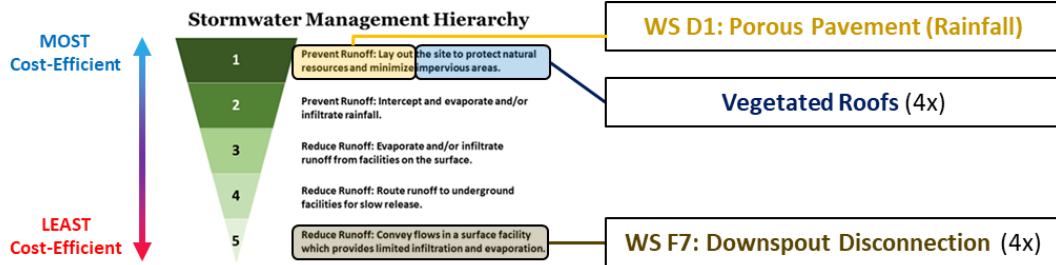
Calculated: This should be 0 to be ready for the next storm.

Peak flow from here can be used to check any site quantity/detention requirements.

# Catchment #3

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Catchment #3 consists of a single row of 4 housing lots. Unfortunately, the lots are built right up to a neighboring property, so there is no common area to place a BMP like in Catchment #1.



These houses are designed with Vegetated Roofs to partially manage the roof hardscape area. However, since there is no above-ground space for a BMP, we must move down the **Stormwater Management Hierarchy** and use Downspout Disconnections to fully manage our hardscape areas.

**Vegetated Roofs (4x)**

Open (4x) **Worksheet F7's** for the (4x) **Downspout Disconnection BMP's**.

Open **Worksheet D1** for **Porous Pavement (Rainfall)**

**0 ft<sup>2</sup> remaining. Success!**

**CATCHMENT FORM: STEPS TO AN LID SITE & SIZING FACILITIES SECTION 5 D --1 (COMPLETE A SINGLE CATCHMENT FORM FOR**

**C. Calculate Total Remaining Hardscape Drainage Area to be Managed (CATCHMENT 3)** 0 square feet remaining

21. Total # of Catchments (found from Site Hardscape Areas)  A single Catchment Form needs to be completed for each Catchment.

22. Enter the Catchment addressed by this Catchment Form (eg. 1, 2, 3, 4)

23. Total Hardscape Area (found from Site Hardscape Area)  of Apply BMPs below applicable to hardscape areas until no area is left unmanaged.

24. Porous Pavement (Rainfall) BMP. Enter area of porous pavement that manages either the rainfall it receives to calculate hardscape area managed. Complete Worksheet D1 if entering an area.  of BMP =  of  of

25. Combined Porous Pavement (Rainfall) BMP and Vegetated Roofs (Green Roofs) BMP. Enter area where these BMPs are placed over hardscape drainage areas in the blue box and multiply by value shown to calculate area managed.  of BMP =  of

26. Slope into Downspout Disconnection BMP. Enter the hardscape area managed with a disconnected downspout.  You must manually change area. There are multiple sheets.

Add up and manually enter the total area managed by the (4x) **Downspout Disconnections** here.



First, fill out Worksheet D1 for Porous Pavement (Rainfall) for each driveway like previous catchments (see Catchment #1 in the [Introductory Tutorial](#) for help).

Next, enter the hardscape area managed by **Vegetated Roof BMPs** directly into the Catchment Form. Note that although the Vegetated Roofs cover 5,000 ft<sup>2</sup>, the Area Managed Equation only gives credit for 50% of this area (2,500 ft<sup>2</sup>). We must add more BMPs to fully manage Catchment #3.

Then, open four separate versions of **Worksheet F7**; one for each **Downspout Disconnection BMP**. To open a duplicate form, click on the blue button in the Catchment Form again (you will be prompted to enter a unique name identifier). All the conditions in Worksheet F7 must be met for Downspout Disconnection to be possible in your location. In this case, although each roof area is 1,250 ft<sup>2</sup>, 50% of this area is already managed by the Vegetated Roof, cutting our effective hardscape area to only 625 ft<sup>2</sup>. Since we used multiple worksheets for this BMP, we must manually enter the total Area Managed of 2,500 ft<sup>2</sup> from all four Downspout Disconnection BMPs to the Catchment Form.

### Using **Worksheet F7** to enter each **Downspout Disconnection BMP**

#### WORKSHEET F7. DOWNSPOUT DISCONNECTION BMP IN STEP 39 OF CATCHMENT FORM [\[View BMP Factsheet\]](#)

Complete this worksheet for each instance of Downspout Disconnection BMP.  
The Hardscape Drainage Area here will count towards the total Area Managed in the Catchment Form. Continue adding BMP's until the remaining area to manage in the Catchment Form is 0.

a. **Downspout Disconnection Designation** (i.e. DD-1, etc.):

b. **In Catchment #:**

You must complete one version of **Worksheet F7** for each **Downspout Disconnection BMP**.

#### Confirm suitability for infiltration of runoff:

c. Have you confirmed that no structures will be damaged when and if runoff infiltrates or flows downhill from the point where the downspout has been placed on the ground's surface? If Yes, continue to Step d. If No, then site is unsuitable for a downspout disconnection.

d. Enter tested design infiltration rate, ideally performed within the footprint of the downspout disconnection flow path. If the infiltration rate less than 2.0 inches/hour, this form cannot be used to determine suitability. If the infiltration rate greater than or equal to 2.0 inches/hour, continue to Step e.

Enter tested local soil infiltration rate (see: *Perform Soil Infiltration Testing*)

#### Check to see that Downspout Disconnection BMP DD-3A meets the following design criteria:

e. Enter the roof area to be managed (Max. 700 sf)

f. Is the hardscape roof area less than or equal to 700 square feet? This worksheet may only be used to design Downspout Disconnections with a roof area no greater than 700 square feet. If "No", consider designing multiple Downspout Disconnection BMP's each with a smaller drainage area.

g. Has a downspout extension 6-foot long (for minimal excavation foundations such as slab-on-grade and pier, post, or block foundations) or 10-foot long (full basements) been incorporated?

h. Has a splash block been incorporated?

i. Is the flow path greater than or equal to 50 feet with a slope between 2% and 5%?

Used to determine the "Area Managed" in Catchment

We have already managed 50% of each roof area using **Vegetated Roofs**. Therefore, we only have to enter the remaining 50% of each roof area (**625 ft<sup>2</sup>**) for our **Downspout Disconnection**.

#### Confirm Downspout Disconnection BMP DD-3A is allowed:

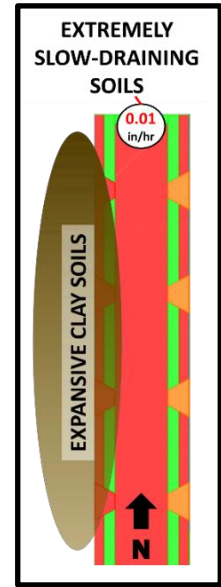
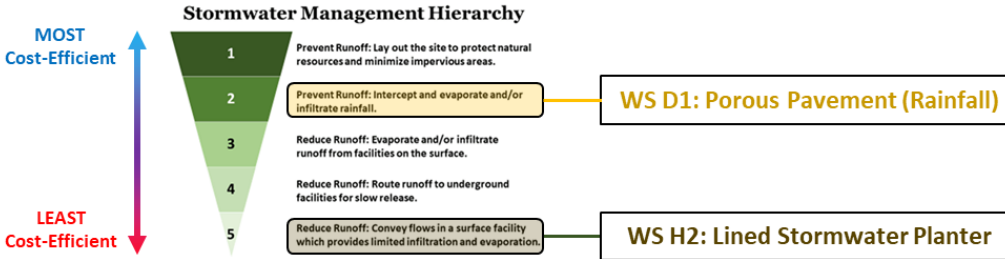
j. Is a Downspout Disconnection BMP implementable? If Yes was entered for ALL the above Yes/No questions, then a downspout disconnection BMP may be implemented. Enter the total area of roof managed with downspout disconnection on the LID Implementation Form, Step 39. If No was entered for any of the above Yes/No questions, then modify the site plan layout and/or design to enter a Yes, otherwise, enter No and use a different BMP.

You must satisfy all conditions and produce a **YES** in **Step j.** to be able to use **Downspout Disconnection**.

# Catchment 4

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Catchment #4 contains street drainage area similar to Catchment #2. However, we have some challenging soil conditions here.



Infiltration testing revealed areas of Expansive Clay Soils and slow-draining soils. After consulting the **BMP Suitability Matrix**, the developers determined that they cannot use Porous Pavement for the driveways on the west side of the street due to the Expansive Clay Soils. Additionally, the developers were concerned because they already drew up plans to install a Green Infrastructure BMP in the area of slow-draining soils. Although towards the bottom of the **Stormwater Management Hierarchy**, the developers were able to design a Lined Stormwater Planter, using imported soils to overcome the native soil infiltration rate.

Extremely slow-draining soils here. See **BMP Suitability Matrix** for available BMP options.

Expansive clay soils present on this edge. **BMP Suitability Matrix** does not allow for Porous Pavement here!

Open **Worksheet H2** for **Lined Stormwater Planter BMP**

Open **Worksheet D1** for **Porous Pavement (Rainfall)**

0 ft<sup>2</sup> remaining. Success!

**CATCHMENT FORM: STEPS TO AN LID SITE & SIZING FACILITIES**  
**SECTIONS D -- I (COMPLETE A SINGLE CATCHMENT FORM FOR EACH CATCHMENT)**

c. Calculate Total Remaining Hardscape Drainage Area to be Managed (CATCHMENT 4) **0 square feet remaining**

21. Total # of Catchments (found from Site Hardscape Areas)	5	A single Catchment Form needs to be completed for each Catchment.
22. Enter the Catchment addressed by this Catchment Form (eg. 1, 2, 3, 4)	4	
23. Total Hardscape Area (found from Site Hardscape Areas)	9,600 sf	Apply BMPs below applicable to hardscape areas until no area is left unmanaged.
26. Porous Pavement (Rainfall) BMP. Enter area of porous pavement that manages ONLY the rainfall it receives to calculate hardscape area managed. Complete Worksheet D1 if entering an area.	600	600
43. Lined Stormwater Planter BMP. Enter the hardscape area managed with a lined stormwater planter.	9,000	9,000

Like previous catchments, complete out Worksheet D1 for Porous Pavement (Rainfall) for the 4 driveways NOT within the Expansive Clay Soils BMP (see [Introductory Tutorial](#) for help).

The rest of the hardscape area is managed by the **Lined Stormwater Planter BMP** in **Worksheet H2**. In Worksheet H2, we enter the imported soil grain size, which equates to an estimated infiltration rate of 2.00 inches/hour. We calculate a Lined Stormwater Planter Footprint of 500 ft<sup>2</sup>.

### Using **Worksheet H2** to enter **Lined Stormwater Planter BMP**

**WORKSHEET H2. LINED STORMWATER PLANTER IN STEP 43 OF CATCHMENT FORM** [View BMP Worksheet](#) [View BMP Suitability Matrix](#)

Use this form for a single Lined Stormwater Planter BMP to:

1. Confirm site suitability for a Lined Stormwater Planter BMP
2. Determine the hardscape area managed by a Lined Stormwater Planter BMP

Complete this worksheet for each instance of Lined Stormwater Planter BMP. The Hardscape Drainage Area here will count towards the total Area Managed in the Catchment Form. Continue adding BMP's until the remaining area is 0.

a. Lined Stormwater Planter Designation (eg. LSP-1, etc.):

b. In Catchment#:

c. Total Hardscape Drainage Area Draining to BMP: (Max 10,000 sf) =  sf

d. Hardscape Area Reduction from Tree Plantings: Max 30% (3000 sq ft) =  sf

e. Total Remaining Hardscape Area =  sf

**Determine footprint/size of Lined Stormwater Planter BMP:**

f. Once you have calculated the hardscape area reduction from tree plantings, use the BMP calculator at the bottom of the worksheet to calculate to determine the area footprint of the BMP (it will be automatically entered here). Indicate this area on plans as well.

g. Confirm vegetation health. Have appropriate plants been chosen for level of moisture they are likely to receive, regardless of excavation depth and ponding depth set by overflow strategy? Lined facilities will be more moist at the base. Plants are critical to the success of these systems. If the answer is no, redesign the planting plan to improve plant establishment and long-term viability, then enter a yes.

**Determine the design infiltration rate of imported soil via:**

h. Enter the D10 from ASTM D422 Soil Gradation Test, either by testing or as provided by imported soil supplier. If infiltration testing per ASTM D2434 at 85% compaction per ASTM D2668 is known, enter value in step i, without using Table H2.1.

i. Calculated infiltration rate. Using Table H2.1, the design infiltration rate of the imported soil has been calculated. Use this as the design infiltration rate in the Lined Stormwater Planter Excel Calculator to help size the facility footprint.

**Table H2.1 D10 Size versus Estimated Design Infiltration Rate**

D10 Size (mm)	Estimated Design Infiltration Rate
0.4	9
0.3	6.5
0.2	4
0.15	2.8
0.1	2
0.075	1.4
0.05	0.8
0.025	0.4
0.01	0.2
0.002	0.1

**1. Manually enter hardscape drainage area to Lined Planter (roofs, roads, sidewalks, etc.). Ignore vegetated areas.**

**Our Tree Plantings have reduced our remaining hardscape drainage area by 1,880 sf from 9,000 → 7,200!**

**2. Enter the grain size of the imported soil to calculate the estimated infiltration rate.**

**Grain size equated to estimated infiltration rate here. Using imported soils can overcome slow-draining native soils.**

**3. Entering Tree Plantings of 12 small, 4 medium evergreens.**

**Determine hardscape area reduction (max 30% reduction) from tree planting:**

j. Limit Disturbance: Tree Protection BMP (Hardscape), Evergreen Tree Planting BMP, Vegetated Roof, and Contained Planters. Enter areas where these BMPs are placed over or hanging hardscape drainage areas in first box and multiply by value shown to find area generating runoff to manage.

**Determine available proposed canopy of evergreen trees to manage hardscape area via:**

**Evergreen (Hardscape).** Calculate the total mature canopy for multiple evergreen trees to manage hardscape area runoff. (If desired, trees may be used to prevent runoff from landscape areas using Worksheet B3 instead.)

k. Small Canopy (for trees with small mature canopy area spreads including small trees and many trees with upright canopies with a canopy diameter measuring about 20 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

l. Medium Canopy (for trees with medium mature canopy area spreads with a tree canopy diameter measuring about 25 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

m. Large Canopy (for trees with large mature canopy area spreads with a tree canopy diameter measuring about 30 feet). Enter number of trees in the blue box and multiply by assumed canopy area.

**STORMWATER PLANTER SIZING CALCULATOR**  
Suitable for modeling a 24 Hour Storm, SBUH Type 1A Rainfall Distribution

Assumption: Time of concentration is conservatively 0.

**User Inputs**

24 Hour Rainfall Depth (i.e. Design Storm) =  in

Drainage area =  sf

Drainage Area Runoff Coefficient =

Design Infiltration Rate of Soil =  in/hr

Depth of Rock Trench Below Stormwater Planter (optional) =  in

Rock Trench Void Porosity =

Desired Maximum Ponding Depth =  in

Stormwater Planter Area =  sf

**4. Enter design storm. (see: Check Rainfall Depth Requirements)**

**5. Enter Runoff Coefficient. Generally = 0.9 since the calculators only considers hardscape drainage areas (roofs, roads, sidewalks, etc.).**

**Estimated Infiltration Rate of imported soils used here.**

**6. Size the Lined Planter until True.**

**Peak flow from here can be used to check any site quantity/detention requirements.**

**INSTRUCTIONS:**  
Enter your jurisdiction's 24-hour design storm.

**Calculations:**  
Calculated. This is the depth of water predicted in the facility for the conditions entered in USER.  
Calculated. This should be 0 to be ready for the next storm.  
Calculated. This should be 0 to be ready for the next storm.

**Other Calculated Values**

Maximum Ponding Depth in Stormwater Planter =  in

Depth of Water Left in Rock Trench After 30 Hours =  in

Depth of Water Left in Stormwater Planter After 30 Hours =  in

Stormwater Planter Area is Adequately Sized?  TRUE

Peak Rainfall Intensity =  in/hr

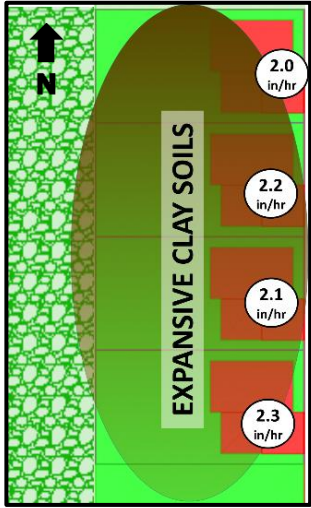
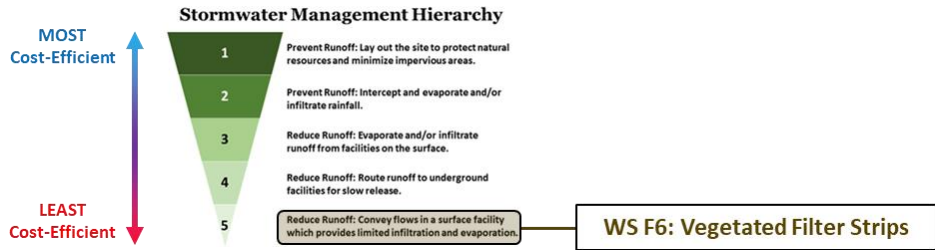
Peak Flow overflowing/leaving facility/site =  cfs



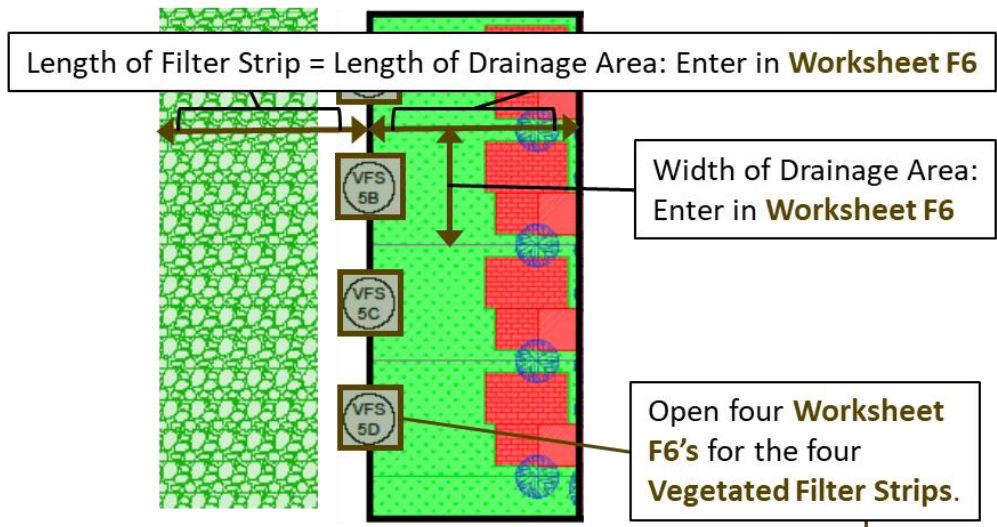
# Catchment 5

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Catchment #5 contains the final row of houses. The site is challenging, with Expansive Clay Soils and little room for a BMP; the house lots back right up to a forest the developers are preserving.



After consulting the **BMP Suitability Matrix**, the developers determined that a **Vegetated Filter Strip BMP** for each lot would be a good solution. Each Vegetated Filter Strip would sit along the western edge of the yard and use the adjacent forest as the filter strip area. Since we have Expansive Clay Soils, we cannot use Porous Pavement in Catchment #5.



**CATCHMENT FORM: STEPS TO AN LID SITE & SIZING FACILITIES SECTIONS D -- I (COMPLETE A SINGLE CATCHMENT FORM FOR EACH CATCHMENT)**

**c. Calculate Total Remaining Hardscape Drainage Area to be Managed (CATCHMENT 5): 0 square feet remaining**

21. Total # of Catchments (found from Site Hardscape Areas)  A single Catchment Form needs to be completed for each Catchment.

22. Enter the Catchment addressed by this Catchment Form (eg. 1, 2, 3, 4)

23. Total Hardscape Area (found from Site Hardscape Areas)  sf Apply BMPs below applicable to hardscape areas until no area is left unmanaged.

38. Dispersion: Vegetated Filter Strip (VFS) BMP. Enter the hardscape area managed with a vegetated filter strip.  You must manually change area. There are multiple sheets.

Manually enter the total area managed by the four VFS's here.

We must fill out 4 iterations of **Worksheet F6**, one for each **Vegetated Filter Strip BMP**. The width (55') and length (110') of each filter strip drainage area match the dimensions of the lot. Our Filter Strips meet the conditions required in F6, so they are indeed feasible for this location.

### Using **Worksheet F6** to enter each **Vegetated Filter Strip BMP**

**WORKSHEET F6. VEGETATED FILTER STRIP BMP IN STEP 38 OF CATCHMENT FORM** [\[View BMP Factsheet\]](#) [\[View BMP Suitability Matrix\]](#)

Use this form for a single Vegetated Filter Strip BMP to:

1. Confirm site suitability for a Vegetated Filter Strip BMP
2. Determine the hardscape area managed by a Vegetated Filter Strip BMP

Complete this worksheet for each instance of Vegetated Filter Strip BMP.  
The Hardscape Drainage Area here will count towards the total Area Managed in the Catchment Form. Continue adding BMP's until the remaining area to manage in the Catchment Form is 0.

a. Vegetated Filter Strip Designation (eg. VFS-1, etc.):

b. Enter total hardscape surface area draining to the VFS:

c. In Catchment #:

**Confirm suitability for infiltration of runoff:**

d. Under 'Physical Setting' in the Vegetated Filter Strip fact sheet, are all conditions met to safely infiltrate runoff from other surfaces? If Yes, continue to Step e. If No, then site is unsuitable for a vegetated filter strip. Skip to Step 39 of the Catchment Form to investigate the possibility of using a downspout disconnect.  Enter Yes or No

e. Enter tested design infiltration rate, ideally performed within the footprint of the vegetated filter strip. If the infiltration rate is less than 2.0 inches/hour, use another method to size this facility. If the infiltration rate greater than or equal to 2.0 inches/hour, continue to Step f.  in/hr

**Determine the width of the Vegetated Filter Strip VFS-5A:**

f. Enter the width of the drainage area directed to the vegetated filter strip, which must be less than or equal to 75 feet.  ft

g. Enter the maximum slope (in any direction) across the vegetated filter strip, which must be less than 15%.  %

h. Enter width sizing factor. Using Table F6 enter the sizing factor that corresponds to the VFS slope in Step g.

**Table F6: Vegetated Filter Strip Sizing Factors**

VFS Slope [%]	Sizing Factor
0 - 1.9	0.26
2 - 4.9	0.34
5 - 9.9	0.5
10 - 15	0.67
>15	N/A

i. Calculate the width of the VFS installed perpendicular to the runoff it receives = Step f. x Step h. Indicate this width on construction plans and details.  ft

**Determine the area managed by the VFS BMP VFS-5A:**

j. Enter the length of the drainage area (which, by design, also equals the length of the vegetated filter strip).  ft

k. Calculate the hardscape area managed the Vegetated Filter Strip. This will be the lesser of the total hardscape surface area draining to the VFS in Step b or the width of the VFS in Step h multiplied by the length in Step j. This number will be used to determine the "Area Managed" in the Catchment Form.  sf of hardscape area

*Used to determine the "Area Managed" in Catchment Form (step 38)*

**Total Area Managed given here.**

**1. Manually enter hardscape drainage area to **Vegetated Filter Strip** (roofs, roads, sidewalks, etc.). Ignore vegetated areas.**

**2. Enter tested local soil infiltration rate (see: *Perform Soils Infiltration Testing*)**

**3. Enter **Maximum Slope** and **Width** of drainage area. Used to calculate the Filter Strip **Width**.**

**4. Enter Drainage Area **Length** (this will become the new Filter Strip **Length**.)**

We now have **0 square feet remaining** on our Catchment Form. We have completely managed Catchment #5, and now, the entire site! Well done! You are now ready to tackle your own site!

See the [Continued Tutorial: Redevelopment Site](#) for an example of the GI Implementation Forms for an office redevelopment site using the Type II spreadsheet package in eastern Oregon.