



# BOROUGH OF CONSHOHOCKEN

## *Stormwater Management Plan Application*

### MAYOR

Yaniv Aronson

### BOROUGH COUNCIL

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Stephanie Cecco  
Borough Manager

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**Application is hereby made for Stormwater Management Site Plan review in accordance with the Borough of Conshohocken Stormwater Management Ordinance.**

Date of Submission \_\_\_\_\_

Property/Site Location/ Address:  
\_\_\_\_\_  
\_\_\_\_\_

Select applicable category below:

- Commercial Property:
- Residential Property (owner occupied):
- Residential Property (rental):

### **Property Owner Information:**

1. Property Owner Name: \_\_\_\_\_

2. Property Owner Address:  
\_\_\_\_\_  
\_\_\_\_\_

3. Property Owner Phone Number: \_\_\_\_\_

4. Property Owner Email: \_\_\_\_\_

### **Contractor Information:**

1. Contractor Name: \_\_\_\_\_

2. Contractor Address:  
\_\_\_\_\_  
\_\_\_\_\_

3. Contractor Phone Number: \_\_\_\_\_

4. Contractor Email: \_\_\_\_\_



**Complete the Calculation of Impervious Surface Chart**

Calculation of Impervious Surface			
<b>LOT AREA (SQARE FOOTAGE)</b>			
<b>EXISTING IMPERVIOUS SQUARE FOOTAGE</b>	<b>Width</b>	<b>Length</b>	<b>Area – Square Footage</b>
House			
Additions			
Patio & Walkways			
Accessory Structures (i.e. tool shed, detached garage, etc.)			
Swimming Pool <input type="checkbox"/> In-ground <input type="checkbox"/> Above- ground			
Sidewalk (portion on lot)			
Driveway/ Driveway Apron (portion on lot)			
OTHER:			
<b>TOTAL EXISTING IMPERVIOUS SQUARE FOOTAGE/PERCENTAGE OF LOT AREA</b>			
<b>PROPOSED IMPERVIOUS SURFACE</b>	<b>Width</b>	<b>Length</b>	<b>Area – Square Footage</b>
Structures			
Driveway			
Patio & Walkway			
Swimming Pool <input type="checkbox"/> In-ground <input type="checkbox"/> Above- ground			
OTHER:			
<b>TOTAL NEW PROPOSED IMPERVIOUS SURFACE SQUARE FOOTAGE/ PERCENTAGE OF LOT AREA</b>			
<b>COMBINED TOTAL OF IMPERVIOUS SURFACE OF LOT AREA SQUARE FOOTAGE/ PERCENTAGE</b>			

*Note: Above-ground swimming pools are not considered impervious if there is a minimum of two feet between the pool and any property line or other structure on the property.*

**Stormwater Impervious Categories**

**A. For Projects adding 600 square feet or less of impervious cover:**

- Request for Exemption from Stormwater Management? Yes \_\_\_\_\_ No \_\_\_\_\_
- If yes, submit documentation confirming stormwater flows will not be created, increased, decreased, relocated, or otherwise altered onto adjacent properties.
- If no, submit calculations, plans and narrative information as necessary to comply with the Stormwater Management Ordinance based on proposed design.
- Fees:
  - **Application and Filing Fee: \$40.00**
  - **Engineering Services Escrow Deposit: \$165.00**

**B. For Projects adding between 601 and 1,000 square feet of impervious coverage, submit the Site Plan and Simplified Method Worksheet from Appendix B of the Stormwater Management Ordinance (see attached).**

- **Fees:**
  - **Application and Filing Fee: \$125.00**
  - **Engineering Services Escrow Deposit: \$500.00**

**C. For Projects adding over 1,000 square feet of impervious coverage, answer the following questions. All calculations, plans, and narrative information required by the Borough's Stormwater Management Ordinance must be included with the application in support of the responses:**

1. Does the design address the Volume Control requirements of 19-303? \_\_\_\_\_
2. Does the design address the Rate Control requirements of 19-304? \_\_\_\_\_
3. Does the design utilize the upper bound of the 90% confidence interval from NOAA Atlas 14 rain data? \_\_\_\_\_
4. Was the NRCS Soil-Cover Complex Method used in the calculations? \_\_\_\_\_
5. Does the plan contain the signature blocks required by 19-401.D? \_\_\_\_\_
6. Does the submission include the information required by 19-401.E, including SALDO 22-410.3?  
\_\_\_\_\_
7. Do any proposed roof drains and sump pumps address the requirements of 19-702? \_\_\_\_\_
8. Have stormwater BMPs and proposed drainage been designed in accordance with SALDO 22-410 and the PA BMP Manual?  
\_\_\_\_\_
9. Has the stormwater management and E&S plan, supporting documentation, and narrative been submitted to the Montgomery County Conservation District? \_\_\_\_\_
10. **Fees:**
  - **Application and Filing Fee: \$500.00**
  - **Engineering Services Escrow Deposit: \$2,000.00**

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**For Office Use Only:**

Date Received: \_\_\_\_\_

Stormwater Escrow Project Number: \_\_\_\_\_

Impervious Category:

Application and Filing Fee Paid: \_\_\_\_\_

- 600 or Less
- 601 - 1000
- 1001 +

Engineering Services Escrow Deposit Paid: \_\_\_\_\_

Borough Engineer Signature authorizing exemption or generation of stormwater permit and agreement:

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**APPENDIX B**  
**SIMPLIFIED METHOD WORKSHEET**

## APPENDIX B

### SIMPLIFIED APPROACH TO STORMWATER MANAGEMENT FOR SMALL PROJECTS

#### Introduction

As required by federal and state law, the Borough of Conshohocken has adopted regulations that impact stormwater runoff and surface and groundwater quantity and quality. The purpose of the regulations is to help reduce stormwater runoff in the community, maintain groundwater recharge, prevent degradation of surface and groundwater quality, and otherwise protect water resources and public safety.

Every project constructing, reconstructing or adding over 600 square feet of impervious surface (see definition below) is required to comply with the regulations of the Borough's Stormwater Management Ordinance. However, projects that involve construction, reconstruction, or addition of up to 1,000 of impervious area may follow the simplified approach as outlined in this document. This approach includes sizing, designing, locating and installing structures, referred to as Best Management Practices, or BMPs, that will capture the first 1 inch of rainfall runoff from those impervious surfaces. BMPs may include infiltration trenches, rain gardens, dry wells, or tree planting.

This document describes requirements and a simplified method for designing a suitable BMP, or multiple BMPs, if desired, and a description of what needs to be included on the Site Plan. Detailed descriptions of each BMP option that may be considered for on-lot stormwater management are included, as are requirements for on-going operation and maintenance of the installed BMPs.

Upon completion, the Simplified Method Worksheet and Simplified Method Site Plan shall be submitted to the Borough, along with the Stormwater Management Plan application and any applicable fees.

#### Definitions

**Best Management Practice (BMP)** - Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from regulated activities, to protect and maintain water quality and groundwater recharge and to otherwise meet the purposes of the Stormwater Management Ordinance, including but not limited to infiltration trenches, rain gardens, dry wells, and tree planting.

**Capture** - Collecting runoff to be stored for reuse or allowed to slowly infiltrate into the ground.

**Geotextile** - A fabric manufactured from synthetic fiber that is used to achieve specific objectives, including infiltration, separation between different types of media (i.e., between soil and stone), or filtration.

**Hotspot** - Areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants that are higher than those that are typically found in stormwater (e.g., vehicle salvage yards and recycling facilities, vehicle fueling stations, fleet storage areas, vehicle equipment and cleaning facilities, and vehicle service and maintenance facilities).

**Impervious Surface (Impervious Area)** - A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) include, but are not limited to all buildings; and all forms of impervious paving materials used for roads, driveways, parking, loading, walks, courts, patio, etc. Non-permanent, aboveground swimming pools are exempt from this definition, provided that there is a minimum of two feet between the pool and any property line or other structure on the property.

**Infiltration** - Movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

**Pervious Surface** - Any area not defined as impervious.

**Runoff** – Any part of precipitation that flows over the land.

**Stormwater** – Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

**Void Ratio** - The ratio of the volume of void space to the volume of solid substance in any material.

#### Description of BMPs

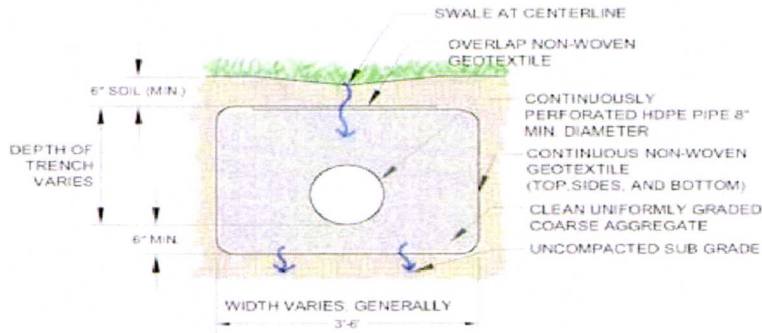
The following is a description of several types of BMPs that may be implemented in the simplified approach to stormwater management for small projects. The requirements of each BMP as described below are taken from the PA BMP Manual, which can be found on the PA Department of Environmental Protection's website.

#### **Infiltration Trench**

An infiltration trench is a long, narrow, rock-filled trench with or without a perforated pipe that receives stormwater runoff. Runoff is stored in the void space between the stones and in the pipe and infiltrates through the bottom and into the underlying soil. Infiltration trenches perform well for removal of fine sediment and associated pollutants. A typical infiltration trench configuration is shown below. Infiltration trenches shall incorporate or make provisions for the following elements:

- When incorporated, set the perforated pipe level.
- Provide a width between 3 and 8 feet with a depth range from 2 to 5 feet.
- Wrap the trench in non-woven geotextile (see definition above) on the top, sides, and bottom.
- Provide a positive overflow to allow excess flow from large storms to travel to other substantial infiltration areas or pervious areas and would not cause harm to property.
- Locate the infiltration trench at least 50 feet from individual water supply wells, 100 feet from community or municipal water supply wells, and 50 feet from any septic system component. It shall not be located near hotspots (see definition above).
- Locate the infiltration trench a minimum of ten (10) feet from any building foundation to avoid foundation seepage problems. Infiltration trenches are not recommended if their installation would create a risk for basement flooding.
- Protect infiltration areas from compaction during and after construction.
- The ratio of the collected area to the footprint of the infiltration trench should be as small as possible with a ratio of less than 5:1 preferred.
- Roof downspouts may be connected to infiltration trenches but shall contain a cleanout to collect sediment and debris before entering the infiltration area.
- Infiltration testing is recommended to ensure that the soil is capable of infiltrating stormwater. A description of how an infiltration test is performed is found in Appendix C of the PA BMP Manual.
- It is recommended that there be a 2 foot clearance between the bottom of the aggregate and the regularly occurring seasonal high water table and bedrock.

### Typical Infiltration Trench



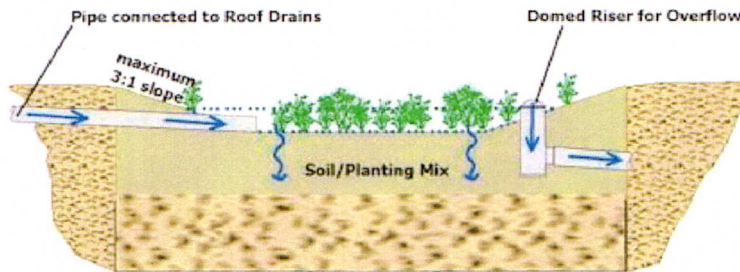
Source: Pennsylvania Stormwater BMP Manual (2006)

### Rain Garden

A rain garden is an excavated depression area on the surface of the land in which native vegetation is planted to filter and use stormwater runoff. Runoff ponds on top of the surface of the rain garden and then infiltrates into an enhanced soil below the surface where plants can use the water to grow. Rain gardens also improve water quality, vegetation filters the water, and the root systems encourage or promote infiltration. A typical rain garden is shown below. Key elements of a rain garden shall include:

- Ponding depths of 1 foot or less recommended but no greater than 2.5 feet.
- Plant with native vegetation that can tolerate dry and wet weather.
- Provide a positive overflow that allows stormwater that cannot be stored or infiltrated to be discharged into a nearby vegetated area and would not cause harm to property; or
- Provide an overflow such as a domed riser to allow excess flow from large storms to travel to other substantial infiltration areas or pervious areas and would not cause harm to property.
- Provide maximum 3:1 side slopes.
- Provide a soil/planting mix depth between 2 feet and 6 feet deep.

### Typical Rain Garden/Bioretention Area



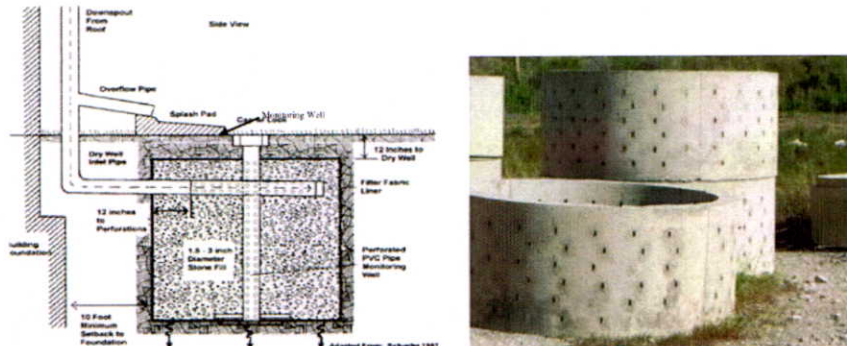
Source: Pennsylvania Stormwater BMP Manual (2006)

### Dry Wells

A dry well, also referred to as a seepage pit, is a subsurface storage facility that temporarily stores and infiltrates runoff from the roofs of buildings or other impervious surfaces. A dry well can be either an excavated pit filled with stone fill (Dry Well #1) or a structural prefabricated chamber with no stone bed (Dry Well #2). Dry wells discharge the stored runoff via infiltration into the surrounding or underlying soils. A typical dry well configuration with stone fill and a typical prefabricated dry well are shown below. The following elements shall be incorporated into all dry well designs:

- Locate the dry well a minimum of ten (10) feet from any building foundation to avoid foundation seepage problems. Dry wells are not recommended if their installation would create a risk for basement flooding.
- Construct a dry well after surface soils in all other areas of the site are stabilized to avoid clogging.
- Protect infiltration areas from compaction during and after construction.
- Provide a depth range of 1.5 to 4 feet.
- Provide AASHTO #3 gradation stone fill wrapped in a non-woven geotextile (see definition above) on the top, sides, and bottom.
- Place at least 1 foot of soil over the top of a dry well.
- Provide an overflow pipe to allow excess flow from large storms to travel to other substantial infiltration areas or pervious areas and would not cause harm to property.
- Provide at least one monitoring well for each dry well.
- Infiltration testing is recommended to ensure that the soil is capable of infiltrating stormwater. A description of how an infiltration test is performed is found in Appendix C of the PA BMP Manual.
- It is recommended that there be a 2 foot clearance between the bottom of the aggregate and the regularly occurring seasonal high water table and bedrock.

**Typical Dry Well Configuration filled with Stone Fill (DRY WELL #1) (Left) and Structural Prefabricated Chamber with no Stone Fill (DRY WELL #2) (Right)**



Source (for picture on left): <http://www.seagrant.sunysb.edu/pages/BMPsForMarinas.htm>  
 Source (for picture on right): <http://www.copelandconcreteinc.net/1800652.html>

**Tree Planting**

Trees reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. Tree roots and leaf litter also create soil conditions that promote the infiltration of rainwater into the soil. In addition, trees reduce pollutants by taking up nutrients and other pollutants from soils and water through their root systems. A site can reduce runoff volume by planting new trees.

To receive credit for planting trees to address stormwater management for a small project, the following criteria must be met:

- Plant 2 deciduous trees or 1 evergreen tree to address between 0 and 500 square feet.
- Plant 4 deciduous trees, 2 evergreen trees, or 2 deciduous trees and 1 evergreen tree to address between 501 and 1,000 square feet on impervious surface.
- Trees must be native species; non-native species will not count towards addressing the stormwater management requirement. See [https://elibrary.dcnr.pa.gov/GetDocument?docId=1742582&DocName=sf-Native\\_Plants\\_Landscaping-brochure.pdf](https://elibrary.dcnr.pa.gov/GetDocument?docId=1742582&DocName=sf-Native_Plants_Landscaping-brochure.pdf) for some examples of native plants.
- Tree shall be a minimum 2 inches caliper for deciduous trees and minimum 6 feet high for evergreen trees at the time of planting.

- Trees shall be located on the project site and adequately protected during construction.
- Trees to be credited for stormwater management shall be clearly labeled on the Site Plan.
- Trees shall be maintained and protected for a minimum of 50 years or until redevelopment occurs. Dead trees shall be replaced within 6 months.
- Previously installed trees, shrubs, perennials, grasses, etc. will not count towards addressing the stormwater management requirement.

**Determining Volume Requirements for BMPs**

All proposed new and reconstructed impervious areas must be included when calculating the volume requirements for proposed BMPs needed to control stormwater. Proposed impervious areas must be constructed so that runoff is conveyed to a BMP; no runoff can be directed to storm sewers, inlets, or other impervious areas (e.g. street).

Listed below are the steps to be used in order to meet the Borough’s Stormwater Management Ordinance requirements for projects following the simplified approach. Begin with Step 1, and then follow the other steps for each BMP to be used in the stormwater plan. The results obtained for each step should be included in the Simplified Method Worksheet (included) and shown on the Site Plan (example included). Tree planting will be credited as a subtraction of the impervious surface area as noted above, based on the number and type of planted trees; no partial crediting for planting fewer than the indicated number of trees will be considered.

**STEP 1** – Establish the total area of all proposed impervious surfaces that need to drain to one or more BMPs. Determine locations where BMPs should be placed so that runoff from all of the proposed impervious surfaces can be captured. Any arrangement of BMPs is allowed, as long as all impervious surfaces are infiltrated. It is permissible to install a BMP that collects water draining from an adjacent site, other than the site where the new or reconstructed impervious cover is located, so long as the same amount of area is infiltrated and would not cause harm to property.

*Example: Joe Homeowner wants to build a 600 square foot addition to his home and increase his driveway by 350 square feet to reach the new addition. Because the total amount of impervious cover is less than 1,000 square feet, he is able to use the simplified method. He decides to infiltrate the front of the addition to a dry well, the rear to a rain garden, and the driveway to an infiltration trench.*

Addition (Front) (10 ft. x 20 ft.)	200 square ft.	BMP 1	Dry Well #2
Addition (Rear) (20 ft. x 20 ft.)	400 square ft.	BMP 2	Rain Garden
Driveway (35 ft. x 10 ft.)	350 square ft.	BMP 3	Infiltration Trench
<b>Total Proposed Impervious Surface</b>	<b>950 square ft.</b>		

Next, calculate the required storage volume and surface area needed for each of the proposed BMPs from the appropriate heading below. Results shall be included on the Simplified Method Worksheet.

**For Rain Garden or Dry Well #2 (prefabricated, no stone fill)**

**STEP 2 – Determine Amount of Water to be Infiltrated (Infiltration Volume)**

*Example: Joe Homeowner is infiltrating 400 square feet from the rear of his addition to a rain garden.*

1.0 inches x 400 square feet = 33 cubic feet = infiltration volume

### **STEP 3 – Size the Rain Garden or Dry Well #2**

Infiltration volume = Depth (D) x Width (W) x Length (L)

*Example: Joe would like the rain garden to occupy an area 4 feet wide and 6 feet long. To determine how deep the base (soil/planting mix) of the rain garden needs to be, Joe does the following calculation:*

$$33 \text{ cubic feet} = D \times 4 \text{ feet (W)} \times 6 \text{ feet (L)}$$
$$D = 1.375 \text{ feet}$$

*Example: Joe Homeowner decided to round up the depth to 2 feet.*

**STEP 4** - Fill in the "Rain Garden or Dry Well #2" section of the Simplified Method Worksheet and include it on the Simplified Site Plan.

### **For Infiltration Trench or Dry Well # 1 (excavated pit filled with stone)**

#### **STEP 2 – Determine Amount of Water to be Infiltrated (Infiltration Volume)**

*Example: Joe Homeowner is infiltrating 350 square feet from his driveway addition.*

$$\frac{1.0 \text{ inches} \times 350 \text{ square feet}}{12} = 29 \text{ cubic feet}$$

$$\frac{29 \text{ cubic feet}}{0.4^*} = 73 \text{ cubic feet} = \text{infiltration volume}$$

(\* 0.4 is to account for 40% void ratio in stone fill used in the trench or dry well)

#### **STEP 3 – Size the Infiltration Trench**

Infiltration volume = Depth (D) x Width (W) x Length (L)

*Example: Joe would like to place the infiltration trench along the edge of his driveway but doesn't know how long it has to be. He figures he'll dig down about 2 feet, and he knows the minimum width required for the trench is 3 feet. To determine the length of the trench, Joe does the following calculation:*

$$73 \text{ cubic feet} = 2 \text{ feet (D)} \times 3 \text{ feet (W)} \times (\text{L})$$
$$\text{Length} = 12 \text{ feet}$$

Final trench dimensions = 2 feet (D) x 3 feet (W) x 12 feet (L)

**STEP 4** - Fill in the "Infiltration Trench or Dry Well #1" section of the Simplified Method Worksheet and include it on the Simplified Site Plan.

### **Completing the Simplified Site Plan**

Sketch a Simplified Site Plan such as the sample shown in Figure 1. The Simplified Site Plan should include:

- Name and address of the owner of the property, and or name and address of the individual preparing the plan, along with the date of submission.
- Location of proposed structures, driveways, or other impervious areas with approximate size in square feet.

- Location, orientation, and dimensions of all existing and proposed BMPs, roof drains, and sump pumps. For all constructed BMPs, the length, width, and depth must be included on the plan. For tree planting, the type and size of tree at the time of planting must be included on the plan.
- Location of any existing waterbodies, such as streams, lakes, ponds, wetlands, or other waters of the Commonwealth, within fifty (50) feet of the project site and the distance to the project site and/or BMPs. The BMPs must be located at least than fifty (50) feet away from a waterbody. If an existing buffer is legally prescribed (e.g. deed, covenant, easement, etc.) and it exceeds the requirements of this Ordinance, the existing buffer shall be maintained.
- Location of existing and proposed utilities, including service laterals.
- Arrows indicating the existing and proposed general drainage patterns on the site.

### **Post-Installation Operation and Maintenance Requirements**

It is the property owner's responsibility to properly maintain BMPs in accordance with the following maintenance requirements. It is also the property owner's responsibility to inform any future buyers of the function, operation, and maintenance needed for any BMPs on the property prior to the purchase of the property.

#### **Infiltration Trench**

- Maintain vegetation along the surface of an infiltration trench in good condition and revegetate any bare spots as soon as possible.
- Do not park or drive vehicles on an infiltration trench. Take care to avoid excessive compaction by mowers.
- Routinely remove any debris, such as leaves, blocking flow from reaching an infiltration trench.

#### **Rain Garden**

- Perform routine pruning and weeding of a rain garden.
- Re-spread mulch in a rain garden when erosion is evident. Once every two to three years or after major storms, the entire area may require mulch replacement.
- Routinely water the rain garden as necessary to support plant growth. Additional watering may be required during periods of extended drought.
- Routinely remove any debris, such as leaves, blocking flow from reaching a rain garden.
- At least twice a year and after major storms, inspect the rain garden for sediment build-up and vegetative conditions.
- Inspect trees and shrubs in a rain garden at least twice per year to evaluate their health. Replace any plantings that are in poor health within 6 months.

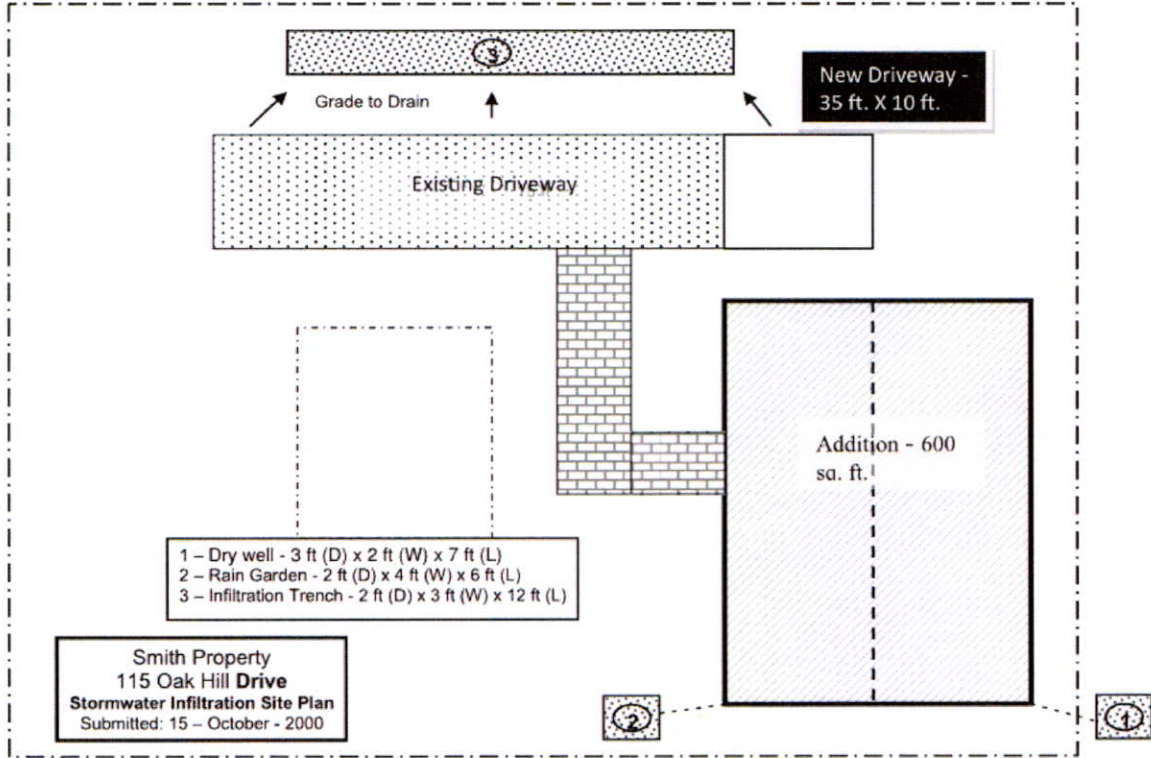
#### **Dry Wells**

- At least four times a year and after major storms, inspect the dry well for debris/trash, sediment, and any other waste material that needs to be removed. Dispose of any removed materials at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.
- Routinely clean out gutters, maintain proper connections, and replace any filter screen that intercepts roof runoff before reaching the dry well to facilitate the effectiveness of the dry well.

#### **Tree Planting**

- Maintain and protect trees for a minimum of 50 years or until redevelopment occurs. Replace any dead trees within 6 months.
- Water, mulch, fertilize, and prune planted trees as appropriate for the planted species.

# SAMPLE SITE PLAN



## Simplified Method Worksheet

### STEP 1

Proposed Impervious Surface for BMP #1	Proposed Impervious Surface for BMP #2	Proposed Impervious Surface for BMP #3

### STEP 2

#### Rain Garden or Dry Well #2

Proposed Impervious Surface	Volume of BMP	Area of BMP	Depth of BMP	Types of Material to Be Used

#### Infiltration Trench or Dry Well #1

Proposed Impervious Surface	Volume of BMP	Area of BMP	Depth of BMP	Types of Material to Be Used

#### Tree Planting

Proposed Impervious Surface	Number of Deciduous Trees to be Planted	Deciduous Tree Species	Number of Evergreen Trees to be Planted	Evergreen Tree Species

\* For additional BMPs, please use additional sheets

Simplified Method Worksheet (filled in from example)

STEP 1

Proposed Impervious Surface for BMP #1	Proposed Impervious Surface for BMP #2	Proposed Impervious Surface for BMP #3
200 sq. ft	400 sq. ft.	350 sq. ft.

STEP 2

Rain Garden or Dry Well #2

Proposed Impervious Surface	Volume of BMP	Area of BMP	Depth of BMP	Types of Material to Be Used
200 square feet	17 cubic feet	2 ft. x 7 ft.	3 ft.	AASHTO #3 stone, perforated HDPE 8" pipe, non-woven geotextile, grass on top
400 square feet	33 cubic feet	4 ft. x 6 ft.	2 ft.	Soil/planting mix full depth, native vegetation

Infiltration Trench or Dry Well #1

Proposed Impervious Surface	Volume of BMP	Area of BMP	Depth of BMP	Types of Material to Be Used
350 square feet	73 cubic feet	3 ft. x 12 ft.	2 ft.	AASHTO #3 stone, perforated HDPE 8" pipe, non-woven geotextile, grass on top

Tree Planting

Proposed Impervious Surface	Number of Deciduous Trees to be Planted	Deciduous Tree Species	Number of Evergreen Trees to be Planted	Evergreen Tree Species

\* For additional BMPs, please use additional sheets