

Small Project Stormwater Management Control Guidance

Increases in impervious surface (an area that does not infiltrate into the ground, such as roof area, driveways, patios or pools) create additional runoff. The increases in runoff volume are required to be controlled at their source. This handout details a brief explanation of some of the methods available to property owners to control the increased runoff.

Stormwater runoff from residential areas can be handled by simple, cost-effective and aesthetically pleasing methods. Every time it rains, or when snow melts, water flows over impervious surfaces such as roofs, driveways, roads, parking lots and turf grasses, and does not infiltrate the ground. This runoff collects fertilizers, dirt and debris, pesticides, oil, grease, and many other pollutants that are discharged into out lakes, streams and rivers. This untreated discharge is detrimental to our water quality and environment.

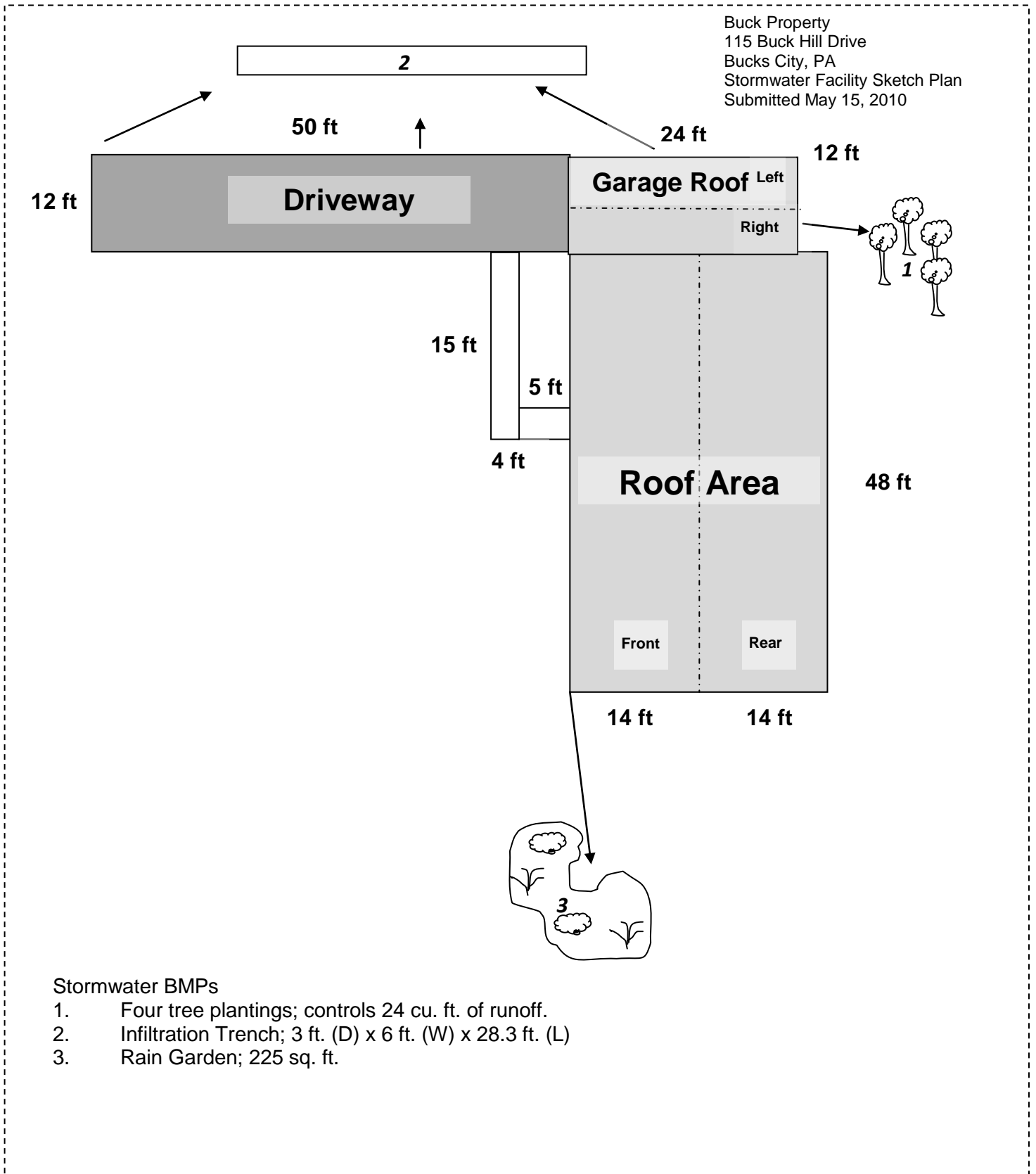
Federal and state regulations require Warwick Township to implement a program of stormwater controls. Warwick Township is required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES). The implementation of stormwater controls and water quality measures is necessary to maintain compliance with the NPDES Permit.

To minimize the adverse effects of the increase in impervious surface, the first 2 inches of rain must be controlled as part of statewide requirements. This can be done through Best Management Practices (BMPs). BMPs can be structural or nonstructural and a combination of the two can be used on the site to achieve the required storage volume.

The attached sheet will assist you in choosing an appropriate Best Management Practice (BMP) for your project. The suggested BMPs are recommended, but not the only available options. If you desire information about other options available to control the runoff on your site, an informational packet is available at the Township.

The tabulation identifies various impervious surface amounts, along with the respective runoff volumes that must be controlled. Also indicated are three options available to provide compliance, with sizing provided accordingly. Please note that it is acceptable to “mix and match” various options in order to achieve the required volume.

Figure 1: Sample Site Sketch Plan (Note: Figure 1 is an example of how various BMPs can be utilized in conjunction to control the total required volume on one site.)



The examples given are commonly used, but other BMP measures may be acceptable.

Structural BMPs

1. Infiltration Trench

An Infiltration Trench is a linear stormwater BMP consisting of a continuously perforated pipe at a minimum slope in a stone-filled trench. During small storm events, infiltration trenches can significantly reduce volume and serve in the removal of fine sediments and pollutants. Runoff is stored between the stones and infiltrates through the bottom of the facility and into the soil matrix. Runoff should be pretreated using vegetative buffer strips or swales to limit the amount of coarse sediment entering the trench which can clog and render the trench ineffective. In all cases, an infiltration trench should be designed with a positive overflow.

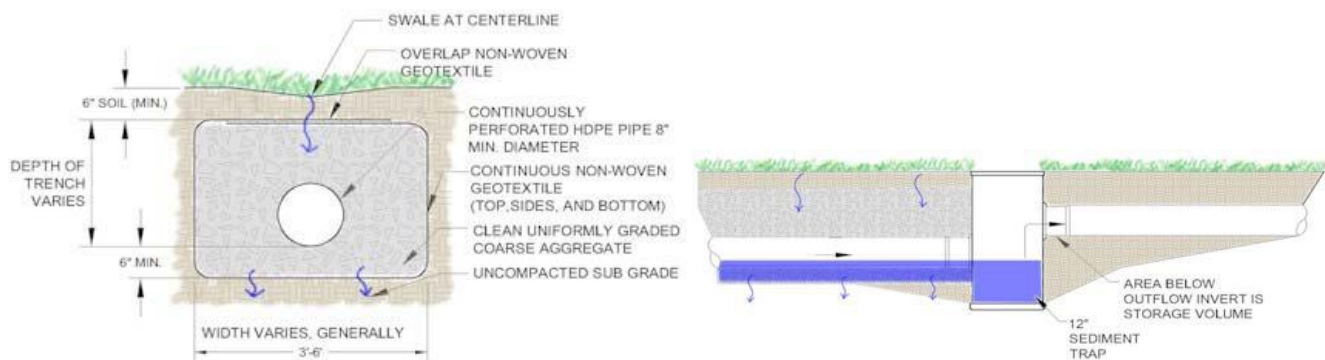
Design Considerations:

- Although the width and depth can vary, it is recommended that Infiltration Trenches be limited in depth to not more than six (6) feet of stone.
- Trench is wrapped in nonwoven geotextile (top, sides, and bottom).
- Trench needs to be placed on uncompacted soils.
- Slope of the Trench bottom should be level or with a slope no greater than 1%.
- A minimum of 6" of topsoil is placed over trench and vegetated.
- The discharge or overflow from the Infiltration Trench should be properly designed for anticipated flows.
- Cleanouts or inlets should be installed at both ends of the Infiltration Trench and at appropriate intervals to allow access to the perforated pipe.
- Volume of facility = Depth x Width x Length x Void Space of the gravel bed (assume 40%).

Maintenance:

- Catch basins and inlets should be inspected and cleaned at least two times a year.
- The vegetation along the surface of the infiltration trench should be maintained in good condition and any bare spots should be re-vegetated as soon as possible.
- Vehicles should not be parked or driven on the trench and care should be taken to avoid soil compaction by lawn mowers.

Figure 3: Infiltration Trench Diagram



Source: PA BMP Guidance Manual, Chapter 6, page 42.

Figure 4: Example of Infiltration Trench Installation



Source: PA BMP Guidance Manual, Chapter 6, Page 46.

2. Rain Garden

A Rain Garden is a planted shallow depression designed to catch and filter rainfall runoff. The garden captures rain from a downspout or a paved surface. The water sinks into the ground, aided by deep rooted plants that like both wet and dry conditions. The ideal location for a rain garden is between the source of runoff (roofs and driveways) and the runoff destination (drains, stream, low spots, etc).

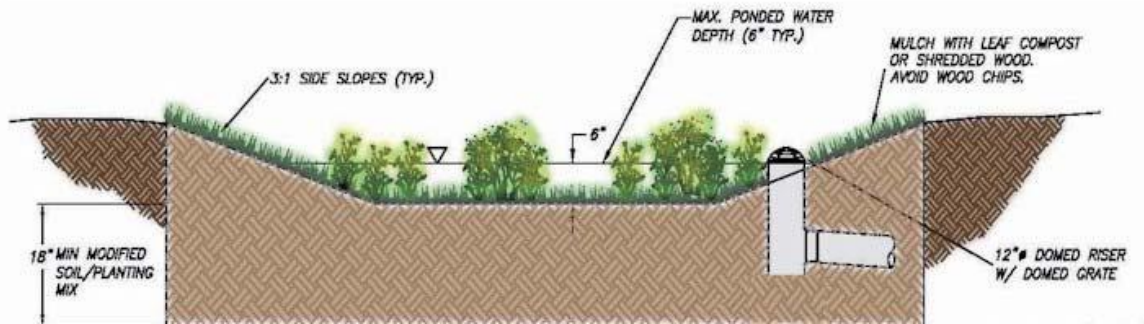
Design Considerations:

- A maximum of 3:1 side slope is recommended.
- The depth of a rain garden can range from 6 - 8 inches. Ponded water should not exceed 6 inches.
- The rain garden should drain within 72 hours.
- The garden should be at least 10-20 feet from a building's foundation and 25 feet from septic system drainfields and wellheads.
- If the site has clay soils, soil should be amended with compost or organic material.
- Choose native plants. See http://pa.audubon.org/habitat/PDFs/RGBrochure_complete.pdf for a native plant list. To find native plant sources go to www.pawildflower.org.
- At the rain garden location, the water table should be at least 2' below the soil level. If water stands in an area for more than one day after a heavy rain you can assume it has a higher water table and is not a good choice for a rain garden.
- Pick a site for the rain garden between the source of runoff and between a low lying area, a.k.a., a drainage area.

Maintenance:

- Water plants regularly until they become established.
- Inspect twice a year for sediment buildup, erosion and vegetative conditions.
- Mulch with hardwood when erosion is evident and replenish annually.
- Prune and remove dead vegetation in the spring season.
- Weed as you would any garden.
- Move plants around if some plants would grow better in the drier or wetter parts of the garden.

Figure 5: Rain Garden Diagram



Source: PA BMP Guidance Manual, Chapter 6 Page 50

3. Tree Planting

Trees and forests 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 and forests reduce pollutants by taking up nutrients and other pollutants from soils and water through their root systems. A development site can reduce runoff volume by planting new trees or by preserving trees which existed on the site prior to development. The volume reduction calculations determine volume reduction credit.

Tree Considerations:

- New tree plantings must be at least 6 ft. in height and have a 2" trunk caliper.
- All newly planted trees must be native to Pennsylvania. See <http://www.dcnr.state.pa.us/forestry/commontr/commontrees.pdf> for a guide book titled *Common Trees of Pennsylvania* for a native tree list.
- When using trees as volume control BMPs, runoff from impervious areas should be directed to drain under the tree canopy.

MAINTENANCE RESPONSIBILITIES

- The owner of stormwater management facilities shall be responsible for their proper maintenance during and after development.
- No person shall modify, remove, fill, landscape, or alter any Stormwater Management (SWM) Best Management Practices (BMPs), facilities, areas, or structures unless it is part of an approved maintenance program without the written approval of the Township.
- No person shall place any structure, fill, landscaping, or vegetation into a stormwater facility or BMP or within a drainage easement which would limit or alter the functioning of the stormwater facility or BMP without the written approval of the municipality.