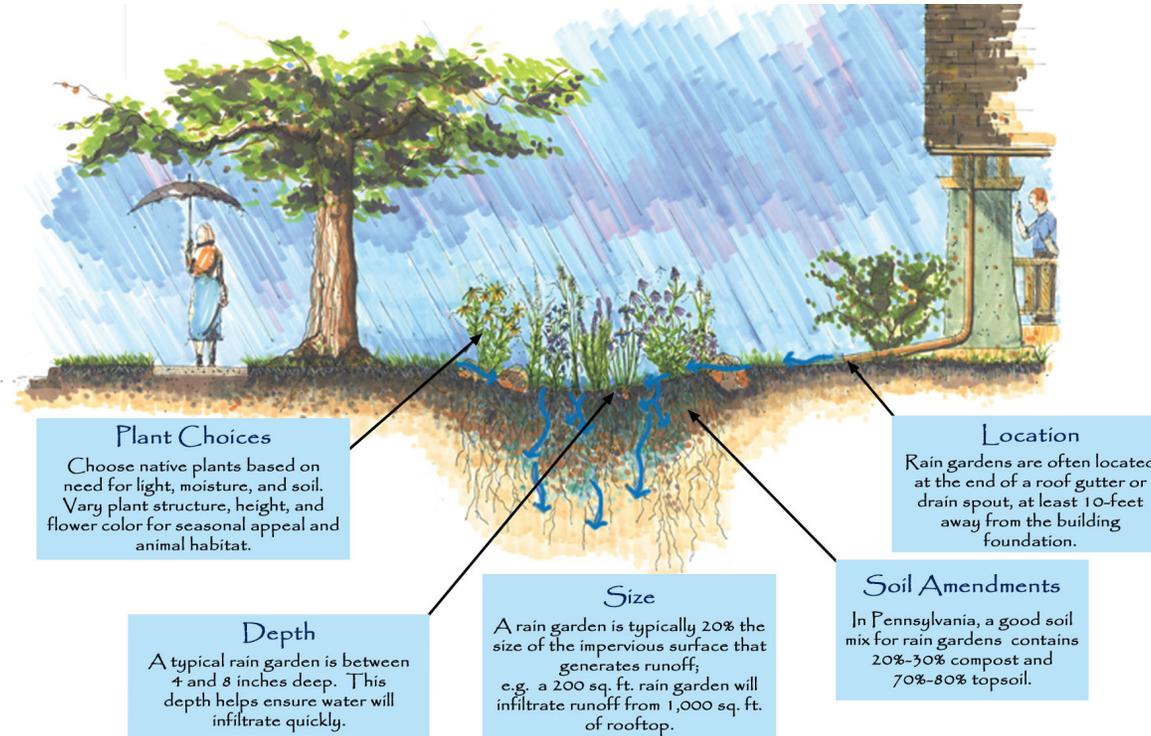


Rain Garden



Original illustration Doug Adamson; modified by Cahill Associates

Rain Garden

A Rain Garden is a native planting bed that contains a shallow depression used to soak up stormwater during a storm. It is used to treat and capture stormwater runoff that would otherwise flow off your property into the stormwater sewer system and ultimately Trout Creek.

Another term used to describe rain gardens is "bioretention garden," since both vegetation and water retention are important components of the garden. Stormwater is cleaned through a natural process before the water soaks into the ground and recharges the groundwater aquifer.

Rain Gardens can be integrated into a residential property with a high degree of flexibility and can balance nicely with other stormwater management BMPs discussed here, as well as with your overall landscaping design.



*This residential rain garden captures stormwater from the rooftop;
Image: Cahill Associates, Inc.*

In order to function as a stormwater BMP, your rain garden needs a few important elements. The necessary components include:

- Stormwater enters the garden through **roof downspouts**
- The water needs a **ponding area** which provides temporary surface area for water to store and evaporate.
- The garden should be planted with **native species** that are adapted to periods of seasonal weather patterns.
- The **plant soil** provides nutrients to the vegetation and can be supplemented with organic rich compost material
- The **mulch** or organic layer protects the underlying soil from erosion.
- The **optional sand bed/gravel base** (also called an Infiltration Bed) should be wrapped in filter fabric (If you decide to go this route, you should contact the township for assistance).
- A **positive overflow** is a design feature that allows stormwater to overflow during large storm event. The structure is design dependant (the more technical your design, the more technical your outlet) and can range in sophistication from a "domed riser" to something as simple as a graded river rock channel or even a small soil berm.

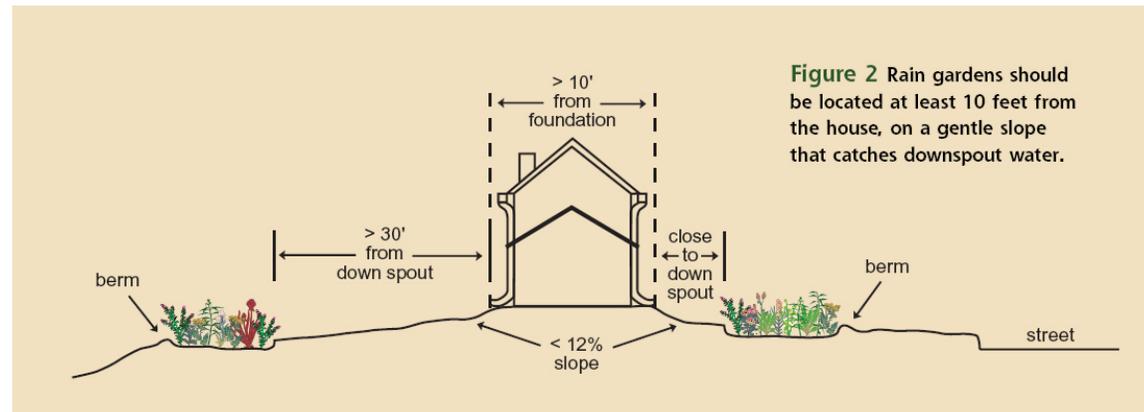


Figure 2 Rain gardens should be located at least 10 feet from the house, on a gentle slope that catches downspout water.

Image: Wisconsin Department of Natural Resources

Benefits



Benefits of a Rain Garden

The rain garden has important functions:

- The root systems enhance infiltration which recharges groundwater
- The plant material (stems, leaves, and twigs) take up pollutants
- The soil particles trap pollutants and microbes break them down further
- The planting bed stores the water and allows it to soak into the ground which prevents water from traveling to the nearest sewer (and ultimately into the creek)
- If planted and designed properly, a rain garden increases biodiversity and provides important habitat for the local ecosystem.
- The rain garden enhances the aesthetics of your landscape design
- Native plants require less fertilizer than lawns and minimize the need for fertilizer applications

Cost Considerations

A Rain Garden is a relatively simple BMP for a homeowner to construct, and is easiest (i.e., cheapest!) if the homeowner has some gardening experience. A landscape design professional can be hired to help design and plant the garden, but expect your costs to rise considerably in every phase of the process. The information provided here assumes that the homeowner will plan, design, excavate and plant the rain garden.

You must keep your overall budget in mind when you set out to build a rain garden. Costs fall into four general categories (or phases), of construction, including:

1. Planning and Design
2. Excavation
3. Installation and Planting
4. Maintenance

Both planning and designing a rain garden will cost the homeowner very little, if any. Time is the only requirement because it is critical to understand the stormwater flow on your property, the potential location of the garden, and the relative size of the garden.

Designing a rain garden is simple, but important when considering your budget and site aesthetics. The garden size and location should be sketched out and the planting plan (i.e., what plant species go where) should be estimated at this Phase. As with any landscaping feature on your property, higher costs are incurred with large quantities of plantings. Consult your local native nursery when estimating the number and type of plantings that will be included in the design.

Costs



Excavation is based on the size of the garden and the amount of soil that will be removed, as well as the amount of compost or soil amendment (if you choose to amend) added to the garden bed. Sand and organic material, such as compost or humus, can be added as needed to create a rich organic soil.

Installation of the garden can be done quickly, usually in one day, by one or two individuals. The biggest cost for this BMP occurs in purchasing the plants; consult your local native nursery for accurate pricing information.

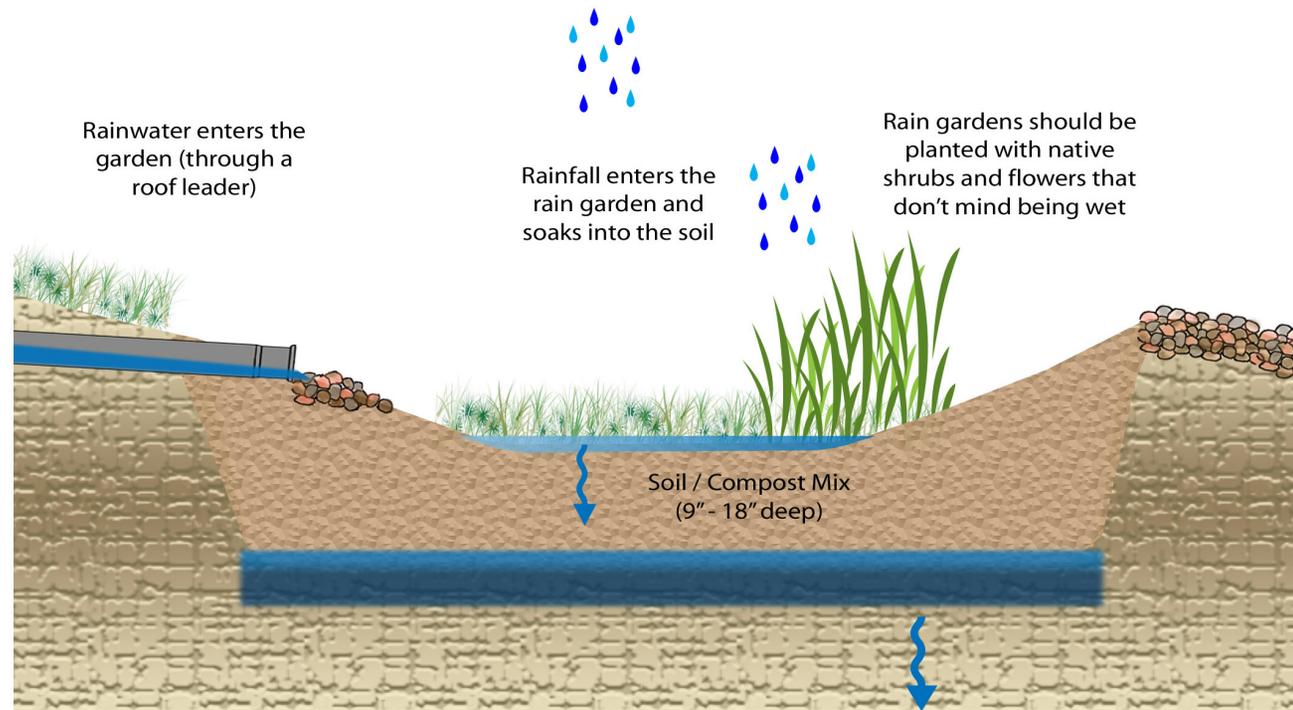


Image: Cahill Associates, Inc.



Construct a Rain Garden

Step 1. Planning the Rain Garden - Size and Location

- Measure the rooftop area (length x width) that drains to the downspout.
- Locate the garden at least 10-feet away from the house, in an area that naturally drains away (or downstream) from your house.
- The surface area of the rain garden should be about 25% of the roof area that drains into the garden. For example, a roof-print area of 10 x 10 (or 100 SF) will drain into a garden that is about 25 SF, or 5' x 5' in size.



Step 2. Excavation and Grading

- Dig the Rain Garden so that the garden is 3 to 4 inches deep across the surface. Do not compact in-situ soils. If you need to improve soil conditions, add compost or other organic amendment by first digging out another 2 inches of native soil and then adding 2 inches of organic material.
- Gently slope the sides of the garden while keeping the bottom level.
- Presoak the planting soil (run your hose to saturate the soil) prior to planting vegetation to aid in settlement. Make any adjustments to the amended soil, the sloping edges, or the outlet/overflow, based on the results of the presoak.



Step 3. Installation and Planting

- Plant the native species according to your plan, taking sun conditions and season into consideration.
- After planting, add a maximum of 2 to 3 inches of shredded mulch or leaf compost to the garden to prevent erosion, enhance metal removals, and simulate leaf litter in a natural forest system. Wood chips should be avoided as they tend to float during inundation periods. Mulch / compost layer should not exceed 3" in depth so as not to restrict oxygen flow to roots.

Images: Wisconsin Department of Natural Resources

Aesthetics



Aesthetics

In a residential setting, rain gardens are very beautiful and can be as "showy" as you like. Native plants that are tolerant of infrequent inundation should be chosen. Take into account how much sun your garden receives as this will affect plant selection.

*A rain garden can capture
stormwater runoff from
the adjacent roadway
AND
look good too!*



Image: Low Impact Development Center

Township Review

In most cases, there should be no need for special Township review or permits when Rain Gardens are developed. The need for Township review or interaction is only based on a large disturbance, renovation, or addition, which would thereby qualify as an action which triggers related permits, reviews, approvals.

Site Constraints

Take advantage of the existing drainage patterns on your property when planning your rain garden. Carefully note the direction of runoff, especially low spots where runoff collects since these areas could be potential locations for your rain garden.

Homes within the Trout Creek watershed are situated on or around steeply sloping areas, so care must be taken to construct rain gardens where the grade is moderate or level. Rain Gardens are impractical on steeply sloping hillsides, but can be incorporated as a linear garden, along contour, in a manner described under the Vegetated Swale BMP.

Variations

Rain gardens are specifically designed to soak up rainwater from impervious surfaces. While a rooftop downspout is an easy location to capture stormwater, a homeowner can also build a rain garden to soak up stormwater from driveways, sidewalks, patios, and other impervious surfaces.

Generally, a rain garden provides for the infiltration of relatively small volumes of runoff, often managing stormwater from one roof leader. If greater volumes of runoff need to be managed, the system can be designed with an Infiltration Bed (see discussion) or, alternatively, the Rain Garden can be increased in size. In addition, depending on the site topography and existing conditions, a homeowner could incorporate more than one rain garden into their property.

*This rain garden in Tredyffrin Township ties in the roof gutters for a new addition on residential property.
Image: Cahill Associates, Inc.*



Maintenance



Maintenance of the Rain Garden

As with any landscape feature on your property, a properly designed and installed rain gardens requires regular maintenance.

- Vegetation must be regularly watered to establish properly
- Pruning and weeding may be required; remove weeds by hand as necessary.
- Detritus may also need to be removed approximately twice per year.
- Perennial plantings may be cut down at the end of the growing season, following the advice of your landscaper or local nursery.
- Mulch should be re-spread when erosion is evident and be replenished annually. Once every 2 to 3 years the entire area may require mulch replacement.
- Inspect the rain garden two times per year at minimum, looking for sediment buildup, erosion, vegetative conditions, and anything out of the ordinary.
- During periods of extended drought, the rain gardens may require watering.
- Rain gardens should not be mowed on a regular basis.
- If the rain garden is planted with trees and shrubs, inspect these species twice per year to evaluate health.

Native Plants Recommended by Fairmount Park for Rain Gardens

Perennials

Bee-balm—*Monarda didyma*
Black-eyed Susan—*Rudbeckia hirta*
Blazing star—*Liatris spicata*
Blue flag iris—*Iris versicolor*
Boneset—*Eupatorium perfoliatum*
Butterfly weed—*Asclepias tuberosa*
Cardinal flower—*Lobelia cardinalis*
Early goldenrod—*Solidago bicolor*
Golden alexander—*Zizia aurea*
Joe-pye weed—*Eupatorium purpureum*
New England aster—*Aster novae-angliae*
New York ironweed—*Veronia novaborensis*
Obedient plant—*Physostegia virginiana*
Ox-eye—*Heliopsis helianthoides*
Solomon's seal—*Polygonatum biflorum*
White snakeroot—*Eupatorium rugosum*

Grasses and Grass-like plants

Big bluestem—*Andropogon gerardii*
Bottle brush grass—*Elymus hystrix*
Canada wild rye—*Elymus canadensis*
Path rush—*Juncus tenuis*
Purple-top—*Tridens flavus*
Soft rush—*Juncus effusus*
Switch-grass—*Panicum virgatum*
Virginia wild rye—*Elymus virginicus*

Ferns

Christmas fern—*Polystichum acrostichoides*
Hay-scented fern—*Dennstaedtia punctilobula*
Rattlesnake fern—*Botrychium virginianum*
Sensitive fern—*Onoclea sensibilis*

Shrubs

Gray dogwood—*Cornus racemosa*
Highbush blueberry—*Vaccinium corymbosm*
Mountain laurel—*Kalmia latifolia**
Ninebark—*Physocarpus opulifolius*
Pasture rose—*Rosa carolina*
Red osier dogwood—*Cornus sericea*
Spicebush—*Lindera benzoin*
Sweet pepperbush—*Clethra alnifolia*

*Pennsylvania's state flower

When purchasing plants, pay close attention to the scientific names to ensure the correct species are selected.

Image: Philadelphia Water Department