

University of Rhode Island Cooperative Extension  
**RAIN GARDENS: A DESIGN GUIDE FOR HOMEOWNERS *in Rhode Island***  
*Helping to improve water quality in your community*  
*Adapted from University of Connecticut Cooperative Extension System*

**Consider a Rain Garden**

What is a rain garden? It is a depression (about 6 inches deep) that collects runoff from a roof, driveway or yard and allows it to infiltrate into the ground. Rain gardens are typically planted with shrubs or perennials, and can be colorful, landscaped areas in your yard that will also provide important environmental benefits.

Why build a rain garden at your home? You can make a difference! Every time it rains, water runs off impervious surfaces such as roofs, driveways, roads and parking lots, collecting pollutants along the way. This runoff has been cited by the United States Environmental Protection Agency as a major source of pollution to our nation's waterways. By building a rain garden at your home, you can reduce the amount of pollutants that leave your yard and enter nearby lakes, streams and ponds. As more rain gardens are installed, the amount of pollutants that reach Narragansett Bay will be lessened. We can all play a role in preserving the health of the Bay! *The intent of this brochure is to provide homeowners with an easy to use quick-reference tool for designing a rain garden at their home. Placement of the garden, sizing, installation, planting, and maintenance will be addressed.*

**Rain Gardens are beneficial to our environment in several ways. They:**

- Reduce the amount of pollutants that wash into lakes, streams, ponds and wetlands.
- Help sustain adequate stream flow during dry spells through infiltration and recharge.
- Enhance the beauty of your yard and the neighborhood.
- Help protect communities from flooding and drainage problems.
- Reduce the need for costly municipal storm water treatment structures.

*Adapted from University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.*

**Concerns Regarding Rain Gardens**

We often hear we should avoid standing water on our property to decrease the amount of mosquitoes. Won't a rain garden create an unwanted pond?  
No. A rain garden IS NOT a pond. A properly designed rain garden will hold water for only about 6 hours after a storm. Mosquitoes need much more time than this to lay and hatch eggs

Will it be expensive or difficult to install or maintain at my house?

Once the shallow depression (about 6 inches) is dug for the rain garden, it won't be any more expensive than planting other landscaped areas in your yard. Most of the recommended plants can be purchased at local nurseries, and once established, you maintain them just like any other plants in your yard.

## **Designing your garden**

Take some time to consider placement of your rain garden. It is important to locate your garden where it will collect the most amount of runoff possible. Placing your rain garden downhill from paved surfaces where water would naturally flow will maximize its ability to collect runoff. Some questions to answer at this point may be:

- Will the garden be close enough to the downspout to install a pipe without having the pipe be in the way or look out-of-place?
- Does the overall shape of the garden fit with the rest of my yard? Rain gardens are versatile; they can be any size or shape imaginable.

### **Step 1: Placement of the rain garden**

Here are some factors to consider when locating your rain garden:

- To avoid potential water problems, rain gardens should not be placed closer than about 10 feet from the foundation of a house with a basement.
- Do not build/locate the rain garden within 15 ft of a septic system, or 25 ft to a water supply or well.
- Avoid placing the rain garden in a low spot in the yard that always seems wet. Remember, a rain garden is not a water garden. Placing it in poorly drained soils may lead to slow infiltration and unwanted long term ponding.
- It is easier to construct and maintain a rain garden in a flat or slightly sloped area.

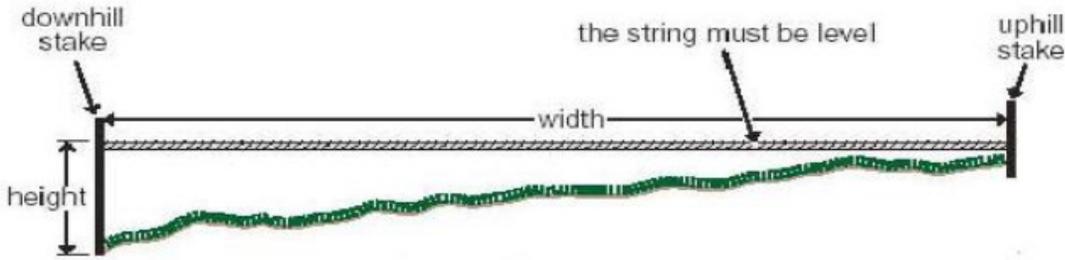
### **Step 2: Soils**

Percolation Test - One way to determine if the soils are suitable at your rain garden site is to perform a small percolation test. Dig a hole about 12 inches deep by 6 inches in diameter and fill it with water. Let the water drain to give you saturated conditions. Refill the empty hole with water and measure the depth every hour for four hours. Determine how many inches drained per hour to find the percolation rate. A rate of one to one and a half inches per hour is ideal. If the water does not drain in 24 hours, the site is not appropriate for a rain garden.

Texture - The texture of the soil is an important factor that governs how water will infiltrate, and helps to determine the size of the rain garden. Send a sample of the soils in your rain garden site to the UConn Soil Testing Lab (<http://soiltest.uconn.edu/sampling.php>) to determine if your soils are sandy, silty or clayey.

### **Step 3: Rain Garden Depth**

The slope of the land will help to determine how deep the rain garden should be. To find the slope of the rain garden location, a string should be tied to the base of an uphill stake then tied to a downhill stake using a string level to be sure the string is perfectly level. Divide the height (distance the string is above the ground from the lower stake) by the width (distance between the two stakes), which should both be in feet, and multiply the number by 100 to obtain the percent slope.



Use the following chart and the slope to determine the depth of your rain garden.

Percent Slope	Typical Depth
Less than 4%	3 – 5 inches
Between 5% - 7%	6 – 7 inches
Between 8% - 12%	8 inches
Greater than 12%	Consider another location

#### Step 4: Sizing Calculations

This sizing method is designed to capture the majority (more than 90%) of runoff from the roof. If a gutter downspout will run directly into the garden, you will need to find area of the roof that contributes to that gutter. Don't worry, this doesn't require a trip to the roof!

- Just measure the footprint of your house (the area taken up by your house if you were looking down from above).
- Then, estimate how much of this area actually contributes to the gutter downspout. In other words, if it were raining, what portion of the roof area would be contributing water to the garden? This is your drainage area.
- Next, use the soil texture and depth of rain garden to find the proper sizing coefficient.

Rain Garden Sizing Factors			
	3-5" deep	6-7" deep	8" deep
Sandy soil	0.19	0.15	0.08
Silty soil	0.34	0.25	0.16
Clayey soil*	0.43	0.32	0.20

- Multiply your drainage area by your sizing coefficient. This is the size of your rain garden.

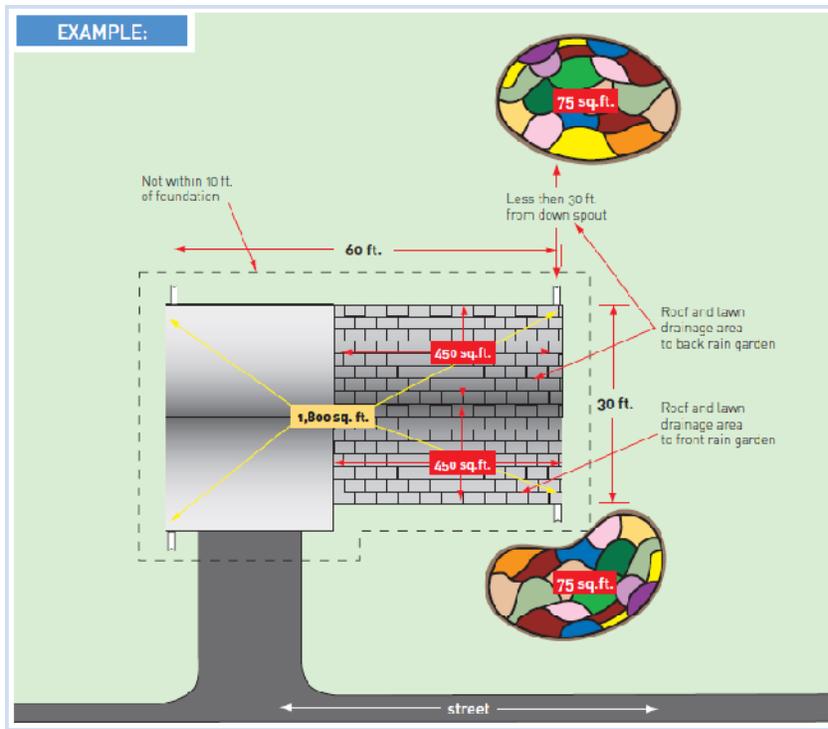
Remember, if the soils are poorly drained, or your test hole still had water after 24 hours, the site is not suitable for a rain garden. A more detailed design manual with accommodations for silty or clayey soils can be found at the following website: <http://www.dnr.state.wi.us/runoff/rg/>

#### Example Sizing Calculation:

Drainage Area = 450 ft<sup>2</sup>  
 Rain Garden Depth = 8 in  
 Predominant Soil Type = Silty  
 Sizing Factor = 0.16

Drainage Area x Sizing Factor = Rain Garden Area

$$450 \text{ ft}^2 \times 0.16 = 72 \text{ ft}^2$$



#### **Step 4 Installation**

Now it's time to start digging! Smaller gardens can be dug by hand with a shovel, or equipment can be rented for larger gardens. Most gardens for average sized homes can be dug by hand if you are in good health, or have some extra help.

**Before digging, be sure to call the "DIG-SAFE" hotline to locate any underground utilities:**

Once you feel confident in the placement of the garden, **lay out the shape to define where to dig.** A string can be helpful for this.

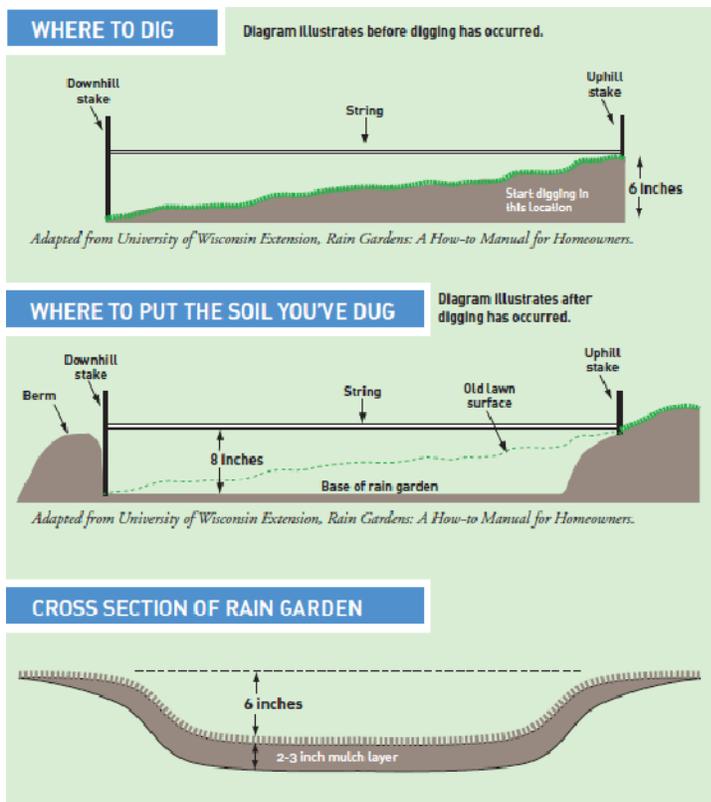
If the yard is fairly level, you can just dig out the bowl to the proper depth or a couple of inches deeper if mulch will be used. If the yard is sloped, you may need to construct a small berm (mound) at the downslope side of the garden to prevent the soil from washing away after a storm. Use the soil that was removed from upslope side of the garden and add it to the downslope side.

**The bottom of the garden should be fairly level** to maintain the storage area inside the garden. A string or board can be helpful for this: just lay either across the garden (make sure the string is tight) at the level of the lawn, and measure down with a tape measure.



**Slope the edges of the garden**, but don't make them too steep. Steep slopes tend to erode easily. Mulch or a ground cover will help to stabilize the soils.

A word on newer houses... If you have a newer house or if heavy equipment has been used in the area of the rain garden, you may want to loosen up the soil with a rototiller, or by hand, to allow water to soak in more easily. In this situation or any other rain garden, compost or other soil conditioner can be added to enhance plant growth. Just dig the garden a bit deeper to account for the added material.



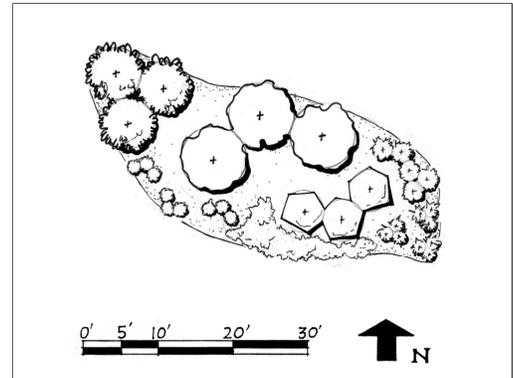
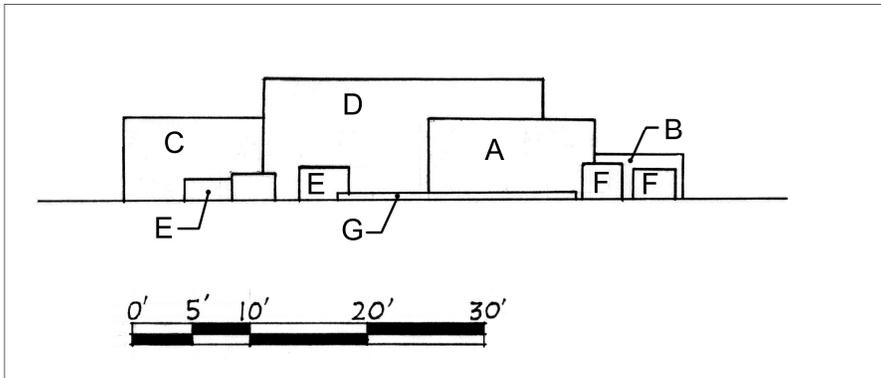
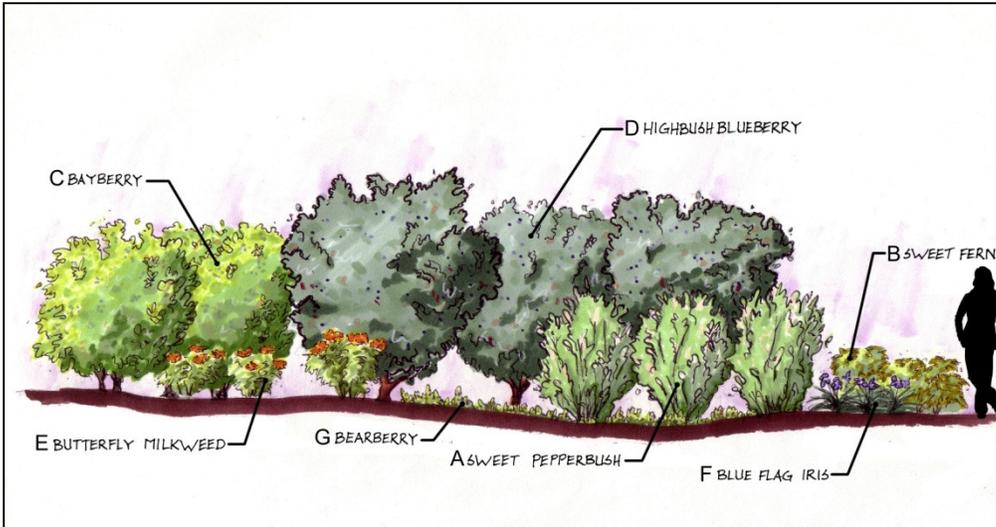
### Step 5: Planting

Now it's time to plant! The plants that tend to do well in rain gardens are the ones that can tolerate wet conditions, but also very dry conditions. Many plants that are native to Rhode Island fit this description. Refer to:

<http://www.uri.edu/cels/ceoc/coastalPlants/CoastalPlantGuide.htm> for a list of perennials and shrubs (that will do well in most locations in full sun to partial shade), for Rhode Island rain gardens.

There are many ways to combine plants in a rain garden. Groupings of the same species tend to produce a nice visual impact, but it's really up to you. Be creative! Your local nursery may have suggestions for design layouts, and several examples are listed in the manual from Wisconsin

mentioned earlier. See illustration below for an example of plant selections you could use for your rain garden. After planting, a vegetative ground cover or hardwood mulch can be applied to reduce weeds and conserve moisture. If using mulch, make sure that it is shredded hardwood, since pine bark chips tend to float.



### Step 6: Maintenance

Maintaining your rain garden is not really much different from maintaining any other newly planted landscaped area. Plants will need to be watered until established, and weeding should be performed as necessary. In the years following installation, removal of dead plant material, and replacement of mulch can be performed. Shrubs can be pruned, if desired, but it is not necessary. Now you can sit back and enjoy the beauty of your rain garden, and also know that it is performing an important function in the protection of our water resources!