

# RAIN GARDEN FACT SHEET

## TOWN OF BURLINGTON

### INTRODUCTION

A rain garden is a planted depression that allows rainwater runoff from impervious urban areas, like roofs, driveways, walkways, parking lots, and compacted lawn areas, the opportunity to be absorbed. Rain gardens reduces rain runoff by allowing storm water to soak into the ground (as opposed to flowing into storm drains and surface waters, which causes erosion, water pollution, flooding, and diminished groundwater).

Native and adapted plants are recommended for rain gardens. The plants (a selection of wetland edge vegetation such as wildflowers, sedges, rushes, ferns, shrubs, small trees) take up excess water flowing into the rain garden. Water filters through soil layers before entering the groundwater system. Root systems enhance infiltration, maintain or even augment soil permeability, provide moisture redistribution, and sustain diverse microbial populations involved in biofiltration.



#### Does a rain garden form a pond?

No. The rain water will soak in so the rain garden is dry between rainfalls. Rain gardens are designed to be drained within four hours after a 1" rain event. Rain gardens that include an additional underdrain system typically are designed to drain within 2 hours of the design storm event. This is achieved through the use of highly porous planting media and underdrains which carry the cleaned rainwater away from the garden.

#### Are they breeding grounds for mosquitoes?

No. Mosquitoes need 7 to 12 days to mature to the adult stage, and standing water in the rain garden will last for a few hours after most storms. Mosquitoes are more likely to lay eggs in bird baths, standing water in drainage ditches, and clogged roof gutters. Also rain gardens attract dragonflies, which eat mosquitoes!

#### Do they require a lot of maintenance?

Rain gardens can be maintained with little effort after the plants are established. Proper mulching will lower weeding chores, and weeding time will decrease as the plants mature.

#### Is a rain garden expensive?

The main cost will be purchasing the plants, and even this cost can be minimized by using some native plants that might already exist in the yard or in a neighbor's yard.

### PLANNING A RAIN GARDEN

#### **Where should a rain garden go?**

- Home rain gardens can be in one of two places – near the house to catch only roof runoff or farther out on the lawn to collect water from the lawn and roof.
- The rain garden should be at least 10 feet from the house so infiltrating water doesn't seep into the foundation.
- It may be tempting to put the rain garden in a part of the yard where water already ponds. Don't! The goal of a rain garden is to encourage infiltration, and your yard's wet patches show where infiltration is slow.
- Avoid building a rain garden directly under a big tree. Roots might make it difficult to dig the garden and the additional water could damage the tree.
- Putting the rain garden in a flatter part of the yard will make digging much easier. For example, a rain garden 10 feet wide on a 10% slope must be 12 inches deep to be level, unless you import topsoil or use cut and fill.
- Avoid putting the rain garden in high foot-traffic areas. Areas where children frequently play or people walk could have more compacted soils.
- If one of your roof downspouts is draining much more roof area than the other downspouts, you will control more runoff by putting your rain garden below that downspout.

## How big should a rain garden be?

A typical residential rain garden ranges from 100 to 300 square feet. Rain gardens can be smaller than 100 square feet, but very small gardens tend to have little plant variety. If a rain garden is larger than 300 square feet it takes a lot more time to dig, is more difficult to make level, and could be hard on your budget.

The size of the rain garden will depend on:

- o how deep the garden will be,
- o what type of soils the garden will be planted in, and
- o how much roof and/or lawn will drain to the garden.



### a. How deep should a rain garden be?

A typical rain garden is between four and eight inches deep. A rain garden more than eight inches deep might pond water too long, look like a hole in the ground, and present a tripping hazard for somebody stepping into it. A rain garden much less than four inches deep will need an excessive amount of surface area to provide enough water storage to infiltrate the larger storms. No matter what the depth of the rain garden, the goal is to keep the garden level.

### b. What type of soils are on a rain garden site?

After choosing a rain garden depth, identify the lawn's soil type as sandy, silty, or clayey. Sandy soils have the fastest infiltration; clayey soils have the slowest. Since clayey soils take longer to absorb water, rain gardens in clayey soil must be bigger than rain gardens in sandy or silty soil. If the soil feels very gritty and coarse, you probably have sandy soil. If your soil is smooth but not sticky when wet, you have silty soil. If it is very sticky and clumpy when wet, you probably have clayey soil.

When an area's soils are not permeable enough to allow water to drain and filter properly, the soil should be replaced and an underdrain installed. This mixture should typically contain 60% sand, 20% compost, and 20% topsoil. Existing soil must be removed and replaced. Do not combine the sandy soil mixture with a surrounding soil that does not have high sand content. Otherwise, the clay particles will settle in between the sand particles and form a concrete-like substance.

### c. How big is the area draining to the rain garden?

Account for the roof drainage area and lawn drainage area.

### d. How can you calculate the size of a rain garden?

Having estimated the drainage area, soil type, and depth for your rain garden, use Table 1 or Table 2 to determine the rain garden's surface area. Use Table 1 if the rain garden is less than 30 feet from the downspout, and use Table 2 if it is more than 30 feet from the downspout.

<b>Table 1.</b>	<b>Rain gardens less than 30 feet from downspout.</b>			<b>Table 2.</b>	<b>Rain gardens more than 30 feet from downspout.</b>	
	3-5 in. deep	6-7 in. deep	8 in. deep		Size Factor, for all depths	
Sandy soil	0.19	0.15	0.08	Sandy soil	0.03	
Silty soil	0.34	0.25	0.16	Silty soil	0.06	
Clayey soil	0.43	0.32	0.20	Clayey soil	0.10	

1. Find the size factor for the soil type and rain garden depth.
2. Multiply the size factor by the drainage area. This number is the recommended rain garden area.
3. If the recommended rain garden area is much more than 300 sq. ft., divide it into smaller rain gardens.

e. What small soil test can I do to ensure that my soils are adequate?

- Dig a hole about 6 to 12 inches deep and at least 4 inches in diameter where the rain garden is to go. Fill the hole with water. Let the water stand for one hour to pre-soak the soils for your test. Then fill the hole back up with water and measure the depth of the water with a ruler. Measure the depth of the water again after one hour.
- A measurement larger than one-half inch means the site should be suitable for a rain garden. If the difference in the depths is one-half inch or less, consider another site or make a temporary hole in the berm for the first year or two. Try plugging the hole until the garden drains in less than a day.
- Pre-installation infiltration rates should be at least 0.25 in/hour, however some soils will require an underdrain paired with the sandy soil mix in order to drain properly.



## **INSTALLING A RAIN GARDEN**

### Facts about digging the rain garden

- Water flowing into the rain garden will naturally try to run off the downhill edge. A berm is needed to keep the water in the garden. The berm is a “wall” across the bottom and up the sides of the rain garden.
- While digging the rain garden to the correct depth, heap the soil around the edge where the berm will be. If the lawn is almost flat, you will be digging at the same depth throughout the rain garden and using the soil for the berm. If the lawn is steeper, the high end of the rain garden will need to be dug out noticeably more than the low end, and some of the soil from the upper end can be used in the lower end to make the garden level.
- In any garden, compost will help the plants become established and now is the time to mix in compost if needed. To add two inches of compost, dig the rain garden one to two inches deeper than planned.

### How to make the berm for a rain garden

- The berm will need to be highest at the downhill side. After shaping the berm into a smooth ridge about a foot across, stomp on it. It is very important to have a well-compacted berm, so stomp hard.
- The berm should have very gently sloping sides; this helps smoothly integrate the rain garden with the surrounding lawn and also makes the berm less susceptible to erosion.
- To prevent erosion, cover the berm with mulch or plant grass. Use straw or erosion-control mat to protect the berm from erosion while the grass is taking root.

### How to make the rain garden attractive

- When choosing native plants for the garden, it is important to consider the height of each plant, bloom time and color, and its overall texture. Use plants that bloom at different times to create a long flowering season. Mix heights, shapes, and textures to give the garden depth and dimension.
- When laying plants out, randomly clump individual species in groups of 3 to 7 plants to provide a bolder statement of color.

- Try incorporating a diverse mixture of sedges, rushes, and grasses with your flowering species (forbs). This creates necessary root competition that will allow plants to follow their normal growth patterns and not outgrow or out-compete other species. Once the rain garden has matured and your sedges, rushes and grasses have established a deep, thick root system, there will be less change in species location from year to year, and weeds will naturally decline.
- Finally, consider enhancing the rain garden by using local or existing stone, ornamental fences, trails, garden benches, or additional wildflower plantings. This will help give the new garden an intentional and cohesive look and provide a feeling of neatness.

### Planting the rain garden

- Make sure to have at least a rough plan for which plants will be planted where. Lay out the plants as planned one foot apart in a grid pattern, keeping them in containers if possible until they are actually planted to prevent drying out before they get in the ground.
- Dig each hole twice as wide as the plant plug and deep enough to keep the crown of the young plant level with the existing grade.
- Make sure the crown is level and then fill the hole and firmly tamp around the roots to avoid air pockets.
- Apply double-shredded mulch evenly over the bed approximately three inches thick, but avoid burying the crown of the plants. The mulch will help minimize the loss of moisture.
- Renewing the mulch every year until the plants have filled out is recommended so the soil does not dry out too rapidly. Mulching is usually not necessary after the fourth growing season.
- You should not have to water your rain garden once the plants are established.

## **MAINTAINING A RAIN GARDEN**

### Maintaining the rain garden

- Some weeding will always be needed for your garden, but the most time-consuming weeding will occur in the first two years.
- Remove by hand only those plants you are certain are weeds. Try to get out all the roots of the weedy plants.
- In the third year and beyond, the native grasses, sedges, rushes, and wildflowers will begin to mature and will out-compete the weeds.
- Once spring arrives and new growth is 4 to 6 inches tall, cut all tattered plants back.
- Another important maintenance consideration is whether water is standing in the garden for too long. Usually you do not want standing water for more than a day. The standing water problem should diminish if plants improve the infiltration rates as they mature. The simplest solution is to dig a small opening in the berm to let some of the water out. Replacing the soil with gravel can help stabilize the opening. This defeats some of the purpose of a rain garden but allows the plants to survive. After the first or second year, plug the opening and see if the drainage problem is resolved.

*With thoughtful planning and minimal long term maintenance, you can have an attractive, environmentally beneficial rain garden for years to come!*

