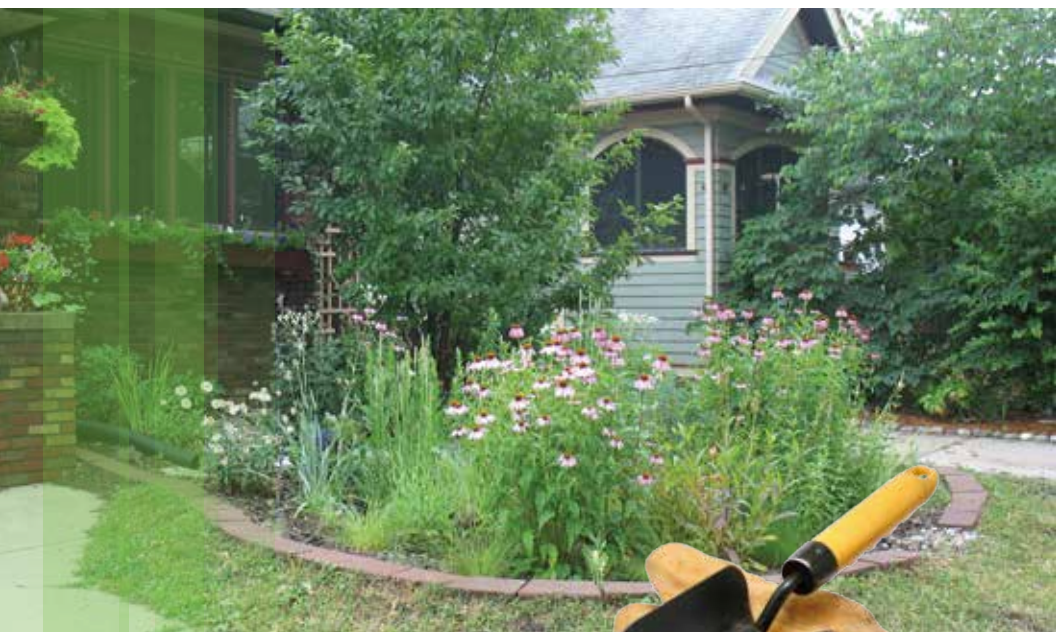




RAIN GARDEN HANDBOOK



HOW A RAIN GARDEN WORKS

Rain gardens are designed to collect rainwater from rooftops and other hard surfaces, such as driveways or patios. The redirected flow is absorbed by plants and infiltrates into the ground.

The deep, dense roots of native plants help break up heavy soils and increase infiltration. Common grass seed mixtures used in lawns have very shallow roots that cannot absorb excess water.

Choose plants that are native, drought-tolerant and non-invasive.



RAIN GARDENS:

- Capture stormwater runoff
- Alleviate flooding and drainage problems
- Help keep waterways clean by filtering runoff before it reaches our local streams
- Attract birds and butterflies
- Help replenish the ground water supply
- Reduce the need to mow
- Provide an alternative to traditional landscaping
- Enhance the beauty of your yard and neighborhood

6 SIMPLE STEPS FOR A SUCCESSFUL RAIN GARDEN:

1. FINDING THE BEST LOCATION

Locate your rain garden to capture runoff as it drains from the roof through the downspout. Many houses have four or more downspouts, each taking a part of the entire roof surface area. Choose an area for your rain garden that is almost flat or gently sloping. Be mindful of where the water could possibly overflow in the event of heavy rain to avoid sending water in an unwanted direction.

Full or partial sun works best, although rain gardens can also work in shady areas with careful plant selection. It's not a good idea to place a rain garden under a large, mature tree where garden construction may damage tree roots. Small trees and shrubs can be successfully incorporated into the rain garden design.

Place your rain garden 10 feet or more downhill from the house foundation to avoid water seepage into the basement. The garden should be located close enough to the source of water runoff—your disconnected downspout or driveway—so that water can easily be directed into the garden bed. The distance from the end of the downspout can be extended by adding a length of 4-inch PVC or black plastic drain pipe to the edge or center of the rain garden. If you have a septic system, be sure to avoid your septic tank and drain field.

It is important to place your rain garden in an area that does not tend to hold water. Wet areas of shallow water indicate heavy soils with no infiltration. A rain garden shouldn't have standing water for more than 24 hours.

2. EVALUATING YOUR SOIL

Soil texture determines how well water soaks through the soil. Soil is composed of three mineral particles—sand, silt and clay (often referred to as “the texture”). When soil is made up of a high percentage of clay, stormwater will not soak in. Clay soil sticks together and is light in color.

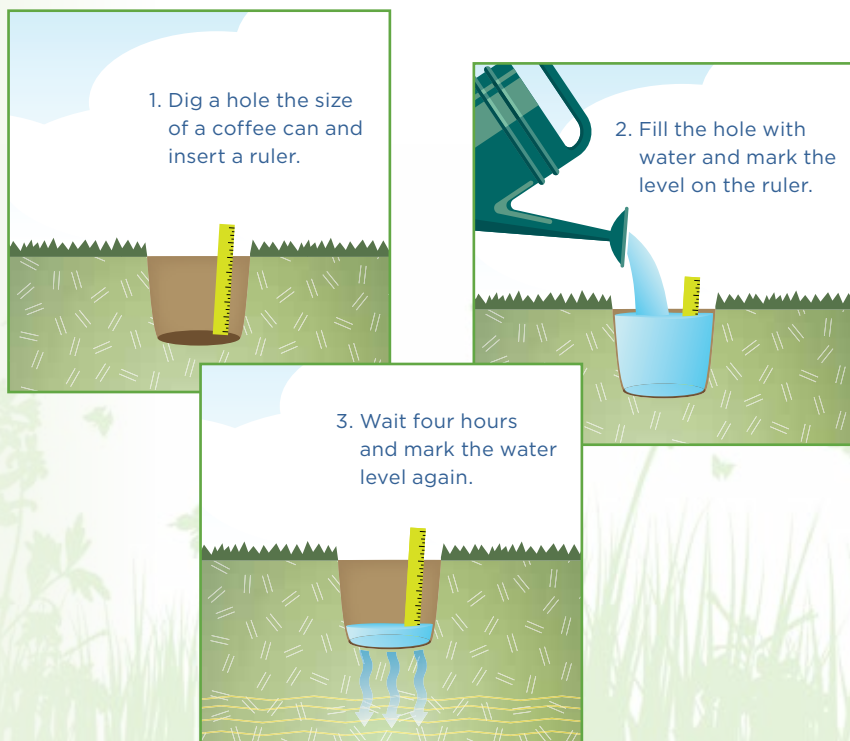
Ribbon Test

For a quick way to determine your soil’s texture, grab a small handful of moist soil. Begin pressing the soil between your thumb and index finger to make a ribbon. Soil with a high clay content will form a ribbon longer than 2 inches.



Percolation Test

Determine if your location will provide adequate infiltration, or water absorption, by performing a percolation test. It is best to perform the test when soil is relatively dry to get an accurate percolation rate.



To determine the daily (24-hour) percolation, multiply the number of inches drained in four hours by six.

For example, if the water drains 2 inches in 4 hours, it will drain 12 inches in 24 hours ($2 \times 6 = 12$). In that case, you would dig your garden 12 inches deeper than the surrounding soil, so it can drain completely in 24 hours.

Dense, compacted soils — or soils with high clay content — will need to be amended to ensure proper drainage. To improve water infiltration, mix in some sand and a lot of organic material, such as compost or peat moss, to increase the total volume by 50 percent. If needed, you can have your soil tested by the Jefferson County Extension Service (<http://ces.ca.uky.edu/jefferson>).

USEFUL TOOLS TO HAVE (OR BORROW)

- Garden hose with spray nozzle
- Rake
- Tape measure or yard stick
- Trowel
- Shovel

Makes the job easier:

- Garden tiller
- Wheelbarrow

If needed to redirect downspout water:

- PVC or black plastic pipe (4-inch diameter)



3. PLANNING YOUR RAIN GARDEN

Surface Size

Choose the size and shape that is best for your yard, budget and ability to manage. A small rain garden can handle a variety of rain events, even though it may not capture 100 percent of the runoff from your roof.

Depth

Most residential rain gardens will be about 6 to 12 inches deep. If the water in your test hole **from Step 2** has not drained within the 24-hour period, it is probably best to select another location, or amend the soil to a depth of 18 inches. If space is limited, the depth may be increased and area decreased to provide the same amount of capture volume.

This plan shows a rain garden designed to have plants in bloom throughout the season. Taller plants are located in the center of the garden, with shorter plants around the perimeter.



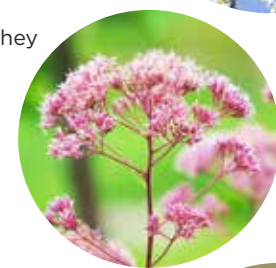
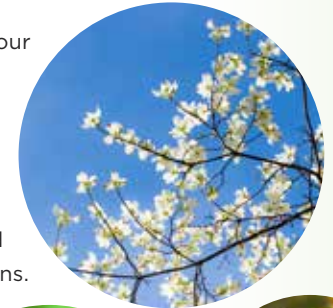
4. CHOOSING YOUR PLANTS

Native plants attract pollinators that support our local biodiversity. Many butterflies depend on native plants to sustain them on their migration journey.

Once established, native plants require little maintenance and have the ability to withstand droughts and other extreme weather conditions.

Non-native plants are acceptable if they are not invasive. There are plenty of non-native, non-invasive perennial species that do well in rain gardens. Hostas and Oakleaf Hydrangeas are good examples.

For a detailed list and photos of Kentucky native plants, grasses, shrubs and trees suitable for your rain garden, consult the **Rain Garden Plant List** at LouisvilleMSD.org/GreenMSD. There, you will also find additional resources, schedules of workshops and other events. Page 8, of this guide, has a list of plants that are ideal for the beginning gardener.



PLANTING IDEAS

BLOOMING PERIOD	BLOOM COLOR	COMMON NAME	SPECIES NAME	HEIGHT	SUN/SHADE
GRASSES/SEDGES/RUSHES					
Summer		Fox Sedge	Carex vulpinoidea	2 - 3'	full/part sun
		Soft Rush	Juncus effusus	3'	full sun
		Prairie Dropseed	Sporobolus heterolepis	2 - 4'	full sun
SMALL TREES/SHRUBS					
Spring		Serviceberry	Amelanchier laevis	25'	full/part sun
		Pawpaw	Asimina triloba	12 - 20'	shade/part sun
		Winterberry	Ilex verticillata	10 - 12'	full/part sun
		Blackhaw Viburnum	Viburnum prunifolium	10 - 15'	shade/full sun
FERNS					
Late Summer/Fall		Christmas Fern	Plystichum acrostichoides	2'	shade
WILDFLOWERS (FORBS)					
Spring		Wild Ginger	Asarum canadense	4 - 8"	shade
Spring/Summer		Blue False Indigo	Baptisia australis	3 - 4'	full/part sun
		Celandine Poppy	Stylophorum diphyllum	2'	shade
		Ohio Spiderwort	Tradescantia ohiensis	2 - 4'	full/part sun
Early Summer		Phlox	Phlox paniculata	2 - 3'	full/part sun
		Soloman's Seal	Polygonatum biflorum	1 - 3'	shade
Summer		Swamp Milkweed	Asclepias incarnata	3 - 6'	full sun
		Pale Purple Coneflower	Echinacea pallida	3 - 4'	full/part sun
		Foxglove Beardtongue	Penstemon digitalis	2 - 4'	full/part sun
Late Summer/Fall		New England Aster	Aster novae-angliae	3 - 5'	full/part sun
		Blue Lobelia	Lobelia siphilitica	1 - 4'	full/part sun
		Black-eyed Susan	Rudbeckia hirta	1 - 3'	full/part sun

5. PREPARING & PLANTING THE GARDEN BED

Preparing the Garden

Prior to digging, use a garden hose to outline the edges of the garden. If building the rain garden in an existing lawn, digging is made easier by killing the grass first or removing grass with a sod cutter, which can be rented.

The deeper the rain garden, the more stormwater it will capture and infiltrate. The average for most residential gardens is 6 to 12 inches. Dig a level depression, and if the soil is compacted, mix in compost while tilling the bed to about a foot deep to loosen the soil. Grade the garden so that water will spread out over a large area.

In the first year, you may want to cut a notch at the bottom, or downside, of the garden to let rain water flow out so that the bed will not fill to the top and drown young plants before they have been able to establish root systems for infiltration.

Planting the Garden

Once you've decided on the plan, lay out the plants per your design approximately one foot apart. Keep the plants in containers until you are ready to put them in the ground to prevent the roots from drying out.

For a shrub or tree, dig the hole twice as wide as the root ball or container and deep enough to keep the crown of the plant level with the existing grade, just as it was in the container. Fill the hole and tamp around the roots to avoid air pockets.

Apply mulch or stone to the garden surface after planting.

ALWAYS CALL BEFORE YOU DIG!

Call 800.752.6007 to identify buried utility lines that may be in the way of the shovel or tiller.



GETTING RID OF GRASS

There are a few ways to remove vegetation such as grass and weeds:

1. Herbicide

Grass is efficiently eradicated by use of an herbicide containing glyphosate. Be sure to follow instructions on the packaging. Do not allow kids or pets on the area for a day following an application. Also check the weather and only apply when rain is not predicted for 2 to 3 days.

2. Black Plastic

Black plastic heats up the ground underneath and keeps light out, allowing the grass to die slowly over several months. The downside of using black plastic is that accomplishing a “good” kill takes time.

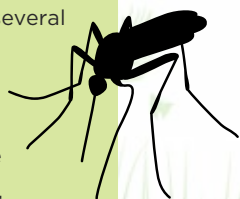
3. Sod Cutter

Renting a sod cutter from a local equipment company provides instant results, and there isn't a need for herbicide application.



WHAT ABOUT MOSQUITOES?

A properly constructed rain garden is not a breeding ground for mosquitoes. Rain gardens are meant to drain quickly—usually within several hours after a “normal” rainfall. Even with a heavy rainfall, runoff will infiltrate the ground within a day. Mosquitoes need at least a week of standing water to complete their life cycle. If mosquitoes are a concern, pellets that eliminate the larvae can be utilized without harm to the environment.



6. MAINTAINING YOUR RAIN GARDEN

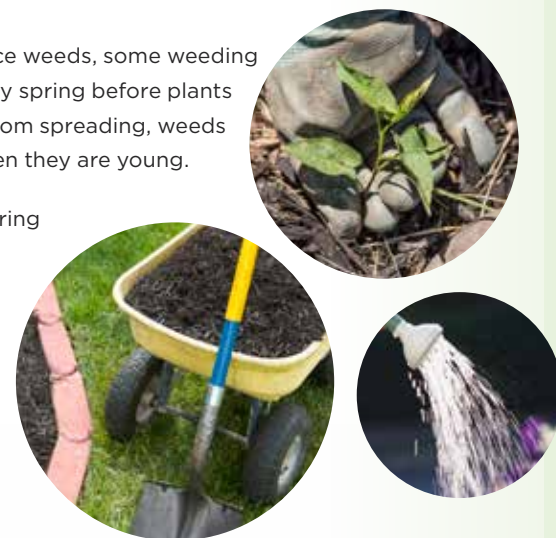
Just like any garden, your rain garden will need some basic maintenance to keep it healthy and functioning.

Mulching is an important part of garden maintenance. Mulch keeps the soil moist, prevents the soil surface from developing a hard crust and adds nutrients to the soil as it breaks down. Be sure to keep the mulch from touching the plant stems to avoid mold or rot.

Although mulching will help reduce weeds, some weeding will be required—especially in early spring before plants have filled out. To prevent them from spreading, weeds should be pulled by hand and when they are young.

Your rain garden will require watering during the first year while young plants are developing roots. Once plants are established, watering will only be required during periods of extreme drought.

Never spread or spray fertilizers too close to your rain garden as it may increase weed production.



SHARE YOUR STORY!

Tweet us a picture of your rain garden @louisvillemsd, or post it to our Facebook page.





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