

Build Your Own Rain Garden

Preplanning, Design and Construction

The first item to remember is the purpose of the Rain Garden (RG)—which is to capture some stormwater and allow the soil and garden plants to soak it up. The process returns stormwater back to the water table and to the plants where it is expelled into the atmosphere. Both processes help to cleanse the stormwater and reduce the amount of water going to storm sewers, ponds, rivers and floodplains. This process is directly opposite of the normal urban situation in which we channel water off our lot, temporarily store the water in wet or dry ponds and quickly transfer it to a river or stream. Rain Gardens attempt to mimic the natural hydrologic cycle when wetlands, prairies and woodlands soaked up the water until they were full. The excess water moved slowly to the streams and rivers. Water moved a lot slower than it does today.

Pre-Planning for Your Rain Garden

Remember the purpose of the Rain Garden and that will help you make good decisions.

- **Site the Rain Garden near the point of runoff water:** The Rain Garden needs to be located near the points of water runoff. These can be downspouts from your house or garage, patio surface, driveways or other hard surfaces. If you are uncertain how the water flows, view the situation during a hard rainstorm. Creating a shallow channel in the yard or extending the downspouts with pipe are two common ways to direct the rain water into the Rain Garden if the existing topography is not appropriate.
- **Site the Rain Garden away from foundations and septic systems:** Remember the Rain Garden will collect and disperse the water into the ground. This shallow pond should not be too close to the house (10' away is a good distance) and not over a septic field. If you have a wet basement or crawl space this should be corrected before installing a Rain Garden. If the soils stay wet and soggy for an extended period of time then your location for the RG may not be appropriate.
- **Build the Rain Garden in a sunny site:** Many of the vigorous blooming plants like full to partial sun. These plants will provide more color and diversity to the garden. The sun will also help dry up the soggy soils. You can build a Rain Garden in a shady location but the plants will be less showy, fewer plants are available for selection, and the site will stay damp for a longer period of time. Pick a sunny site if possible.
- **Check for Utilities:** After you have decided on a site you will need to check and make sure no utilities are under the ground. In Indiana, call 811 or 800-382-5544 at least two working days before you plan to dig. The utility company will mark the lines on your property. You should also consider other lines that you own such as:
 - ⇒ Water lines for irrigation
 - ⇒ Electrical lines for outside lighting or other uses
 - ⇒ Invisible fence
 - ⇒ Gas lines for external grills or lamps

Some of these can be easily relocated but you need to be aware and plan for that. When you are done, make a simple utility map of your property to make planning easier for the next project.

Designing Your Rain Garden

Designing your RG involves several steps:

- Determine the size and depth—See the tip sheet called: "Suggested Methods to Size a Rain Garden"
- Selecting Plants—See the tip sheet called: "Plant Selection and Planting Schemes"
- Determining the layout—Once you know the size of the garden you can use a garden hose or rope to form the shape in your lawn. This helps to visualize the size and finalize the shape and location. The RG will have a bowl shape with sloping sides and a flat bottom. The sides should be stable, but still need to be moderately steep to facilitate water storage. A 3 to 1 side slope is recommended. (For each foot of rise the slope would extend 3'. For a 6" deep RG the slope would be 18" long.)



Suggested Methods to Size a Rain Garden (cont.)

Step #3 is to determine the depth of the Rain Garden. It is recommended that the Rain Garden should be free of water after 24 hours. The depth of your pond should not be any deeper than your soil's infiltration rate/day. If the infiltration is 5 inches/day then make the rain garden no more than 5 inches deep. It is generally recommended not to exceed a depth of 8 inches even if your infiltration rate/day exceeds 8 inches/day. A depth of 6" to 8" is generally recommended for most Rain Gardens with soils that have an infiltration rate of 8 inches/day or more.

Step #4 is a simple calculation to determine the area of the Rain Garden.

Drainage Area/Depth of Rain Garden = Area of Rain Garden

Example: Drainage area of the roof = 12 ft. x 15 ft. = 180 sq. ft.
 The infiltration rate was measured at 5 inches/day
 A depth of 4 inches was selected for the rain garden
 180 sq. ft. divided by 4 = 45 sq. ft.

After you have determined the size of the Rain Garden you can decide what shape to build it. A 45 sq. ft. Rain Garden could be a square 7' by 7' or rectangle 5' by 9' or an 8' circle. For odd shapes, graph paper can be handy. Using the graph paper, make each square one foot by one foot. Draw the design on the graph paper and count the squares to determine the area.

Problem Soils

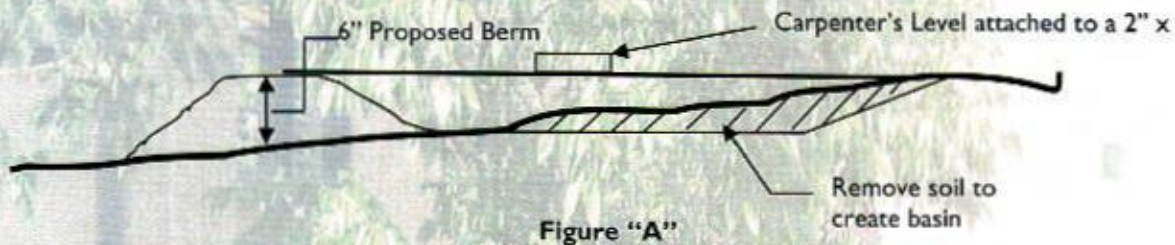
Some soils are so densely compacted or have a persistent high water table that water will not drain out of the test hole. These soils are not suitable for a Rain Garden unless conditions are modified. The homeowner has several choices. He can decide not to build a Rain Garden, try another location or improve the soil drainage. The "What You Need to Know About Your Soil" tip sheet describes the process of amending the soil or adding drain tile for a Rain Garden. Contact the Soil and Water Conservation District in your county to get professional advice on how to improve the soil and add tile drainage.



Preplanning, Design and Construction (cont.)

Designing Your Rain Garden (cont.)

For a typical lot with a level yard the bowl will be dug out to create the water storage. If your lot has sloping topography you can build a berm or dam on the downhill side and trap the water into a bowl shaped pool. (See figure "A") This requires less digging but more careful layout. You will need to measure the amount of drop to determine the height of the dam and how much soil to remove to attain the necessary depth. A carpenter's level attached to a 10-14' long 2" x 4" will help determine the amount of drop in the yard. After you have decided on your layout you can consider other components that will make your RG look better and be easier to maintain. Stones or sculpture can be added to give a finished look. Edging around the garden prevents grass from creeping into the garden and gives it a professional appearance.



Constructing Your Rain Garden

With the planning completed you can prepare for construction. Spring construction and planting is best for buying plants, preparing the soil and keeping the new plants moist. You can also watch for plant sales from garden and plant organizations like Master Gardeners and Indiana Native Plant and Wildflower Society.

Construction of the rain garden can take 8-10 hours. Baking flour, rope or string can be used to mark the outline of the garden. A glyphosate herbicide can be used to kill the grass or a sod cutter can be rented to remove the sod. Most of the soil from digging the basin can be made into a berm on the downhill sides of the RG—away from the house. Making short landscape berms keeps the excess soil close to the digging and eliminates having to haul it away. Make sure you do not block the flow of incoming water into the basin. Shallow ditches or swales can be cut into the yard to direct the water from a downspout or patio into the RG. Plastic tile buried below the ground is another good way to direct the water from a downspout to the RG. Rock or stone may be needed where the water enters the garden to prevent erosion.

As the water builds up in the basin we want it to flow out of the basin and away from the house. Make sure that a 5' wide strip of ground at the low end remains unchanged to permit water to flow out of the basin. Rain Gardens using a small dam to hold water will need to be built to prevent water from backing up towards the house.

A rotor tiller is a great tool to condition the soil for final raking, shaping and planting. If the soil needs to be amended to improve growing conditions or infiltration (see "What You Need to Know about Your Soil") you will need to remove another 4-6" of soil from the RG basin. Compost and/or sand can be added in 1" layers. After a 1" layer of compost or sand is added thoroughly mix the soil with a rotor tiller and go through the process until the basin is built up to the designed level. Once the soil is prepared you can do a final test before planting. Saturate the site with a sprinkler and fill the basin with your garden hose. Monitor the water and make sure it soaks into the soil in 24 hours. If the basin is still holding water after 24 hours then you may want to consider making the basin shallower, amending the soils, adding drain tile or reducing the amount of water if that is possible.

After the water test the RG is ready to plant. Plugs or potted plants are recommended for the garden. A 2 ¼" planting auger powered by an electric drill can speed up the planting process. Most of the native plants can be placed 12" apart as they are the primary mechanism to return water to the ecosystem. Mulch between the plants with course shredded hardwood mulch to hold moisture and reduce weed pressures. Edging, rocks, and other landscaping items can be used to make your RG have a finished look.

This fact sheet is part of a series of helpful publications made possible by a grant from the Lilly Endowment Inc. For more information contact your county's Soil and Water Conservation District or go to our website. The Hoosier Heartland RC&D Council and our partnering organizations are equal opportunity providers and employers. We are a 501c3 not-for-profit organization that works to teach people how to care for, improve, and protect their natural resources in a way that improves the economy, environment, and quality of life in Central Indiana.

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Suggested Methods to Size a Rain Garden

This guide recommends building a Rain Garden that will hold 1" of rain water collected from the impervious area and allowing it to soak into the ground within 24 hours. This method will utilize the drainage area, infiltration rate and Rain Garden depth to determine the appropriate size of your Rain Garden.

Step #1 is to determine the drainage area. Water collects and runs off areas of your roof, driveway, patio or other hard surface. You will need to evaluate what part of the roof or other surface drains to the proposed Rain Garden. Make sure you are measuring the horizontal area from the ground and not the surface area of the roof. If you are measuring a roof do it from the ground. Measure the number of feet from gutter to the peak of the roof and measure the width of roof that drains to the downspout.



Example: This house has a simple roof.

There is a gutter that collects the roof water from the peak and ridge on the front of the house. You would need to measure from gutter to peak which is "W" and from the end of the house to the ridge line which is "L". The drainage area is $W \times L$. Take your measurements in feet to get an answer in square feet.

Step #2 is to measure the infiltration rate of your soil. Dig an 8" circle 8"-10" deep in the location of the proposed Rain Garden. Saturate the soil by running a garden hose several times during a day to fill the hole and saturate the surrounding soil. This is best done in the spring when the rains have naturally moistened the soil. The next day fill the hole nearly to the top. Mark the top of the water with a stick in the side of the hole. After six hours measure the drop of the water by measuring between the stick and the top of water. Take this measurement in inches and multiply by 4. This will be your infiltration rate for 24 hours. (Inches of drop in 6

hours $\times 4 =$ inches of drop in 24 hours) If the level has changed less than one inch after 6 hours, wait a full 24 hours from the time you initially filled the hole and measure the total drop. This measurement will be the amount of water that can soak into the ground in 24 hours (one day). No multiplication is need.

