

Jacob's Ladder

Polemonium reptans



PLANT NOTES

A shorter (up to 1 foot tall) perennial providing vibrant shades of blue in April to May. Jacob's Ladder prefers shady areas but can withstand full sun if moisture conditions are sufficient. Cup-shaped blooms provide nectar to a host of pollinators. "Reptans", meaning "creeping", gives this spring ephemeral a sprawling aesthetic.

Photos: Shutterstock



Chapter 6

Constructing a Rain Garden

▼ "Do-It-Yourself" Installation

Be aware that rain gardens require a significant amount of excavation. For rain gardens with a ponding depth of six inches, be prepared to excavate at least 14 inches (six-inch ponding depth, two-inch mulch layer, six inches of amended soils) for the entire footprint. Increasing the ponding depth will add more excavation.

The first construction step is to remove or kill-off existing turfgrass or other vegetation at the site. If turfgrass is not removed properly, it will compete with rain garden plants. Turfgrass removal can be completed in one of three ways after mowing the grass as short as possible.

- Place plastic sheeting or cardboard to cover the rain garden area and weigh it down with rocks or other heavy items. This method should suppress existing vegetation within a few weeks.
- Rent a sod cutter or remove it using a shovel. The sod could be used to fill in bare areas outside of the rain garden or elsewhere on the property.
- An herbicide like Roundup® can be used to kill off existing vegetation. Grass should be killed off within a few weeks of application.

Use a garden hose, rope, or spray paint to layout the rain garden area. Don't forget to include additional space to achieve a minimum of 3:1 side slopes on the rain garden.

See "Ensuring 3:1 Slopes" above for guidance on how much space to include based on the ponding depth. Additional space will be needed if the rain garden side slopes are flatter than 3:1. If the subsoil is not being re purposed for a berm or elsewhere on the property, create a plan for disposal.



Equipment List

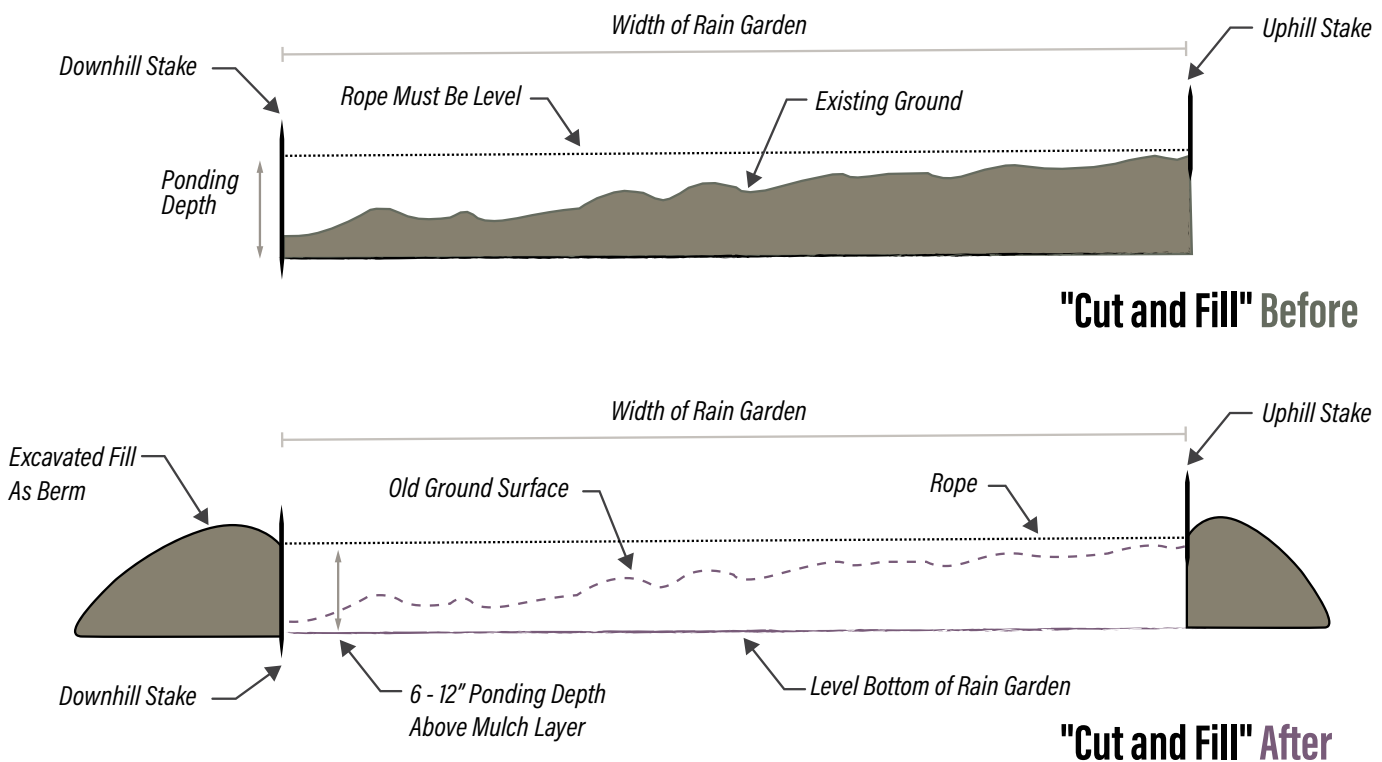
- Carpenter's Level
- 2" x 4" Board, 6' Length
- Rubber Mallet
- Shovel
- Spade
- 2-4 Wooden Stakes
- Rope, Garden Hose, Flags
- Wheelbarrow
- Tape Measure
- Rake
- Rototiller
- Spray Paint (optional)

Ensuring 3:1 Slopes

Add the following distances to the perimeter of the calculated rain garden area.

- 1.5' for 6" ponding depth
- 2.25' for 9" ponding depth
- 3' for 12" ponding depth

The most common installation approach for rain gardens is the "cut and fill" technique. This is because most rain garden sites have some degree of slope and rain gardens require a level bottom. With "cut and fill", a small berm is built on the downslope side of the rain garden using material excavated from the upper side of the rain garden. Once the rain garden has been excavated, refer to "Place Soil Amendments" on page 49 to continue basic rain garden installation.



"Cut and Fill" Instructions

1. Layout the shape of the rain garden with a rope, garden hose, flags, or spray paint. Adjust the layout to make sure the rain garden fits into the landscape nicely and provides an aesthetic addition to the yard. If you adjust the layout in this step, make sure the footprint of the area is equal to the footprint area calculated in Chapter 4.
2. Place stakes at the upper edge of the rain garden and stakes at perpendicular angles on the lower edge of the rain garden. Tie a rope at the base of the upper stake. Then tie the rope to the top of the lower stake. Use a carpenter's level and 2"x4" board to ensure the rope is level.

Photo: Polk SWCD



"Cut and Fill" Instructions (Continued)

3. Measure the distance from the ground at the lower stake to the rope. Depending on the ponding depth selected in Chapter 4, raise or lower the rope to meet the desired depth. Adjust the upper stake to ensure the rope is level using a carpenter's level and a 2"x4" board.
4. If it is necessary to raise the rope to get the correct ponding depth, the area around the lower stake will need to be backfilled. Likewise, if you need to lower the rope to meet the correct ponding depth, excavate the area at the upper stake.
5. Once the rope is level and the lower stake is located at the correct ponding depth, excavate 8 inches deeper than the lower stake. If amended soil is used, fill 6 inches up to the bottom of the lower stake. A rototiller can be used to loosen the soil that can then be removed using a shovel. Fill the area with amended soil. Ensure a level bottom is achieved throughout.
6. Level the berm by raising or flattening the soil using the 2"x4" board. Place the carpenter's level on top of the board to verify levelness. For basic and enhanced rain gardens, notch out a designated outlet area on the berm to accommodate overflow from storms that exceed the capacity of the rain garden. Make sure the notch is set at or just above the ponding depth. Decorative rocks or stones can be placed on this area to prevent scour. The area beneath the berm where overflow will be discharged should be protected with vegetation (turf grass) or rock.
7. The upper edge of the rain garden, where rainwater from turf or other areas will flow into the rain garden, should be gently sloped backward (3:1 or flatter). It is recommended that for every 1 foot of height (depth of the cut slope), the slope should step back 3 feet. Place a layer of straw mulch or an erosion control blanket along this slope to protect it until vegetation is established (if seed is used). Sod can provide immediate protection.

Photo: Polk SWCD



Photo: Polk SWCD



Photo: Polk SWCD



Photo: Polk SWCD



Photo: Polk SWCD



Installation for Contractors

Contractors can be hired to construct both basic and enhanced rain gardens. The following instructions are provided to ensure that rain gardens are constructed properly, and soil compaction is avoided throughout the installation process.

Equipment List

- Spray Paint and/or Flags
- Laser Survey Equipment
- Excavator
- Rototiller
- Shovel
- Rake
- 2" x 4" Board, 6' Length
- Rubber Mallet
- 2-4 Wooden Stakes, Rope
- Wheelbarrow
- Rake
- Tape Measure

Step 1 - Layout. Use spray paint or place flags to layout the rain garden area. Extend the layout to accommodate for 3:1 side slopes (see page 45). If vertical sides are being used for the perimeter, there is no need to extend the layout. Ensure that the area surrounding the rain garden is stabilized prior to excavation of the garden area. Install erosion and sediment control practices upslope to protect the rain garden from eroded sediment.

Step 2 - Survey. Use survey equipment throughout the construction process to ensure that the base of the rain garden is level from front to back and side to side and to ensure downslope berms are high enough. Refer to “cut and fill” instructions (pages 46-47) for sloped areas.

Step 3 - Excavation. Excavate the rain garden area to the length, width, and depth specified in the contract design documents. Keep all equipment out of the garden

by working from the sides of the garden. This will prevent compaction of the soils. Use tooth buckets on small excavators that will not smear soils. Final grading may require using hand shovels to avoid compaction.

Step 4 - Construct Berm(s). Place excavated subsoil on the downslope side of the rain garden site. Use this to create a berm on the lower edge of the rain garden. Soil compaction is needed on the berm to prevent it from collapsing when water is ponded. Use a tamper to compact soil after each two-inch lift. This is the only soil material that should be compacted during construction. If installing an enhanced

rain garden, drainage infrastructure will need to be installed before backfilling with amended soils. This step is not required for basic rain gardens.

Step 5 - Place the Subdrain (Enhanced Rain Gardens Only).

Excavate the trench for the subdrain according to depths recommended for enhanced rain gardens (see page 25). Place first lift of aggregate then the perforated pipe at the elevation specified. The subdrain should extend the entire width of the longest side of the enhanced rain garden. Confirm local requirements if the subdrain

Photo: Polk SWCD



Rain garden berms under construction.

will be connected to the storm sewer system. If the subdrain is daylighted downslope of the rain garden, ensure the area is protected from scouring using rock, sod, or other erosion control products.

Step 6 - Add Overflow Pipe (Enhanced Rain Gardens Only).

Install the vertical overflow pipe at this time. Use a carpenter's level to make sure the pipe is standing at a 90-degree angle. Ensure all joints and connections are sealed tight. Backfill the trench with enough of the one-inch rock to cover the subdrain completely and to a depth of at least two inches above the subdrain. Next, place a two-inch layer of 3/8-inch aggregate rock into the trench. This creates a "choker" layer to prevent sediment from moving into the aggregate layer and subdrain.

Photo: Fairfield Elementary School



Placement of perforated subdrain.

Step 7 - Place Soil Amendments. Soil amendments are required for enhanced rain gardens. Depending on the native soils at the project site, soil amendments may also be used in basic rain gardens.

Add amended soil in two to three-inch lifts to the elevation specified in the contract documents. Overfill area with amended soil by five percent of the specified depth to allow for natural settlement. Avoid compaction by allowing time for natural settlement. If the project schedule does not allow for natural settlement of soil, enhance the settlement of the amended soil by soaking. Apply water to uniformly saturate the entire rain garden surface by spraying or sprinkling. Add amended soil as required to restore settled surface to finished elevation. Uniformly grade and rake the top of the amended soil layer to a flat and smooth surface.

Do not use landscaping fabric in a basic or enhanced rain garden for controlling weeds. Landscaping fabric will significantly limit rainwater infiltration. This will not allow the rain garden to function properly. Mulch is used to help control weeds.

Step 8 - Add Mulch. Place a two to three-inch layer of long-strand, hardwood mulch over the base and side slopes. If using plugs for vegetation, place the mulch then plant. Larger plants can be installed prior to placing mulch. Mulch should be level so that water infiltrates uniformly across the base of the rain garden.

Step 9 - Install Edging. The final step for both basic and enhanced rain gardens is to install edging if it is being used. Edging provides a barrier that prevents the roots of surrounding sod from creeping into the rain garden. It also makes mowing around the rain garden easier. Make sure that water can still flow into the rain garden over the edging. Mulch located in the rain garden along the perimeter should be lower than the installed edging. Common edging products include plastic, wood, or composite landscape edging, retaining wall blocks, and edging pavers.