

Site Assessment Checklist

This material is adapted from Rutgers Cooperative Extension Rain Garden Resources.

Things to Remember:

- Call 1-800 – DIG – SAFE for a utility mark-out.
- Do not put rain garden in places where the water already ponds or the lawn is always soggy.
- Do not put rain garden in former sites of built-in pools or parking lots.
- Place in full or partial sunlight as a first option.
- Select a flat part of the yard for easier digging as a first option.
- Avoid large tree roots.

Step 1 – Percolation and Compaction Test

When you conduct a site visit, a percolation test can be used to check the drainage in a potential rain garden site. This is helpful in determining what, if any, soil amendments are needed for your rain garden. Follow the steps below.

Percolation Test Steps:

1. Dig a hole 12 inches deep by 6 inches in diameter.
2. Fill hole with water and let stand until all the water has drained into the ground (this will give you saturated soil conditions).
3. Refill the empty hole with water again. Measure the depth of the water with a ruler. Record depth in the table below.
4. Check the depth of water with a ruler every hour for at least 4 hours. Record depths for each hour in the table below.
5. Calculate the percolation rate (how many inches of water drained per hour).

Time	Depth (inches)
0 hour (before walking away)	
1 st hour	
2 nd hour	
3 rd hour	
4 th hour	
Percolation rate (inches/hour)	

JUST IN CASE...

[Depth at 0 hour (inches) - Depth at 4th hour (inches)]/4 hours = Percolation Rate (inches/hour)

EXAMPLE...

[10"-6.5"]/4 hours = 0.875"/hour

Interpreting the Percolation Rate Results:

A rate of one inch per hour to one and a half inches per hour is considered ideal for a rain garden. For rates above one inch per hour, consider decreasing the depth of the rain garden if space permits. If the water does not drain in 24 hours, the site is not appropriate for a rain garden and the soil will need to be amended.

NOTE: Sometimes the percolation test gives you a false reading of the soil conditions of a site. For example, if a percolation test is done during drought conditions, the water in the soil may drain very quickly. A rainy season may later reveal that the soil is very clayey and that the water will not percolate through. These situations can be corrected by auguring holes in the rain garden and filling the holes with coarse sand to help with percolation.

Soil Compaction (Optional)

Conduct wire flag test (poke wire flag in ground)

- Easily penetrates 6"-8" or more – Ground is not compacted and suitable for rain garden
- Difficult to insert - Ground may be compacted. Further testing required or find new location.

Step 2 – Determine Slope

The slope of the land will help to determine the depth of the rain garden. 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.

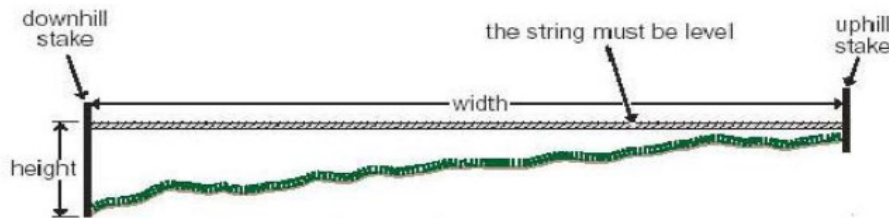


Figure 1: Measuring Slope
(Credit: University of Wisconsin)

To calculate the percent slope, divide the height (distance the string is above ground on the downhill stake) by the width (distance between the two stakes), which should both be in feet. Multiply this number by 100 to obtain the percent slope.

	Measurement (Feet)
Height	
Width	
[height/width] x 100 = Percent Slope	

Step 3 – Determine Rain Garden Depth

The depth of the rain garden depends upon the percent slope (calculated in Step 4). Use the table below to determine the typical depth of the 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

NOTE: Rain gardens with poor percolation rates should be shallower with a larger surface area since they percolate slowly.

Step 4 – Determine Contributing Drainage Area

Determine the surfaces you want to capture stormwater from and measure the area:

Surface	Contributing Drainage Area (Square Feet)
Rooftop*	
Driveway/Parking Lot	
Other	
Total Drainage (Square Feet) =	

*Be sure to find the area of the roof that actually feeds to that downspout. Multiply the roof area by the estimated percentage of the roof that feeds to the rain garden downspout.

% Roof feeding to downspout	Area of Roof	Contributing Area

Step 5 – Determine Soil Texture

The soil in which you plant your rain garden is an important factor that governs how water will infiltrate. Analyzing the soil texture will help you determine the size of your rain garden. Choose one of the following methods to determine soil texture (Refer to Soil Test Sheet for more information):

A. Ball Test

Roll moistened soil into a ball in hand and see how it forms:

- Hard ball – Clayey soils (clay loam, clay)
- Soft ball - Silty Soils (sandy loam or silt loam)
- No ball – Sandy soils (sand or sandy loam)

B. Ribbon Test

- Ribbons less than 1"
 - Feels gritty = coarse texture (sandy) soil
 - Not gritty feeling = medium texture soil high in silt
- Ribbons 1-2"
 - Feels gritty = medium texture soil
 - Not gritty feeling = fine texture soil
- Ribbons greater than 2" = fine texture (clayey) soil

C. Send Soil Testing Lab

Test more than one area of potential rain garden location. Take soil sample 6" below the proposed rain garden depth. Have a soil test done by UConn Soil Testing Lab (<http://soiltest.uconn.edu/sampling.php>)

D. Soil Scientist Evaluation

A soil scientist would be the best option for analyzing soil characteristics. A soil scientist could determine site suitability by evaluating soil texture, depth to seasonal high groundwater and bedrock.

Step 6 – Determine Rain Garden Size

The size of the rain garden is based upon the drainage area (calculated in Step 1), and predominant soil texture (determined from soil test). The following table provides sizing factors, based on soil type and depth, which can be multiplied by the drainage area to determine size.

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

*Clay found in Block Island. Once you have determined your sizing factor, you can multiply this value by the drainage area.

Example Sizing Calculation:

Drainage Area = 450 ft²
 Rain Garden Depth = 8 in
 Predominant Soil Type = Silty
 Sizing Factor = 0.16

Drainage Area x Sizing Factor = Rain Garden Area $450 \text{ ft}^2 \times 0.16 = 72 \text{ ft}^2$
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Step 7 – General Site Criteria

Check the rain garden site. Does location meet the following criteria?

- Rain garden at least 10' from building
- Rain garden is at least 15' from a septic tank or field and 25' from private drinking well
- Rain garden is uphill or level with a septic tank
- Rain garden is at least 50' from surface water or coastal feature
- Slope is less than 12% and be 25 ft up - gradient from natural slopes >15%
- Seasonably high water table is at least 2 feet from the proposed bottom of rain garden.
- Rain garden is not over utilities (already called DIG - SAFE)
 - ❖ Before calling, mark out the area you plan to dig with white mark-out paint. After the utilities come out, they will place flags where the utilities are located. The marks/flags indicate the following utilities:

✓ Red - Electric	✓ Blue - Water
✓ Yellow - Gas, Oil, Steam	✓ Green - Sewer
✓ Orange - Communications, CATV	

Step 8 – Determine Inlet

How will the water enter the rain garden. Consider the site and determine the materials you will need.

Method	Materials (size, length, width, diameter, quantity)
Extended downspout/gutter	
Buried downspout or drain tile	
Stone or concrete spillway	
Across lawn via gradual slope	
Vegetated or stone-lined swale	
Diversion berm along the bottom of slope	
Paved surface	
Other:	

Assess the potential for erosion and plan accordingly. If inflow velocity is high and erosion is possible, address this issue with one of the following:

- Grading
- Rocks or obstructions to slow flow
- Rocks to stabilize
- Erosion control blanket

Step 9 – Determine Overflow

Does overflow meet the following criteria?

- Overflow is away from buildings
- Berm higher near building
- Overflow sheets over lawn or garden
- Overflow sheets over driveway or walkway
- Overflow flows onto street
- Other:

Step 10 – Installation Methods and Materials

A. Soil Removal Method

How are you going to remove the soil?

- Shovel
- Mini-backhoe
- Other:

AVOID COMPACTING SOIL!!

Plan your work for the least amount of walking in the rain garden.

B. Excess Soil Placement

Where are you going to put the excess soil?

- Use for berm around rain garden
- Use or store elsewhere on site
- Haul off site

C. Scarify

Scarify (mix up) the bottom 6” - 12” of the rain garden with:

- Shovel
- Fork
- Tiller

Why use “shredded hardwood” mulch?

Because shredded mulch binds together and forms a semi-solid mat whereas wood chips simply float away!

D. Add Mulch

Apply approximately 3” thick layer of triple shredded hardwood mulch with no dye. Use table as guide.

Size of Rain Garden	Approximate Amount of Mulch
50 ft ²	0.50 yd ³
100 ft ²	1.0 yd ³
200 ft ²	2.0 yd ³

E. Materials Review

Depth of Rain Garden (Step 3)	
Size of Rain Garden (Step 6)	
Amount of mulch needed (Step 10)	
Other materials needed	

Step 11 – Planting Design Elements

A. Rain Garden Style

- Wild
- Naturalistic but not too wild
- Relatively formal
- Formal
- Other:

Your Rain Garden is composed of woody plants (trees and shrubs) and herbaceous species (flowers, grasses, and ground covers) planted in three wetness zones.

B. Native or Non-Native

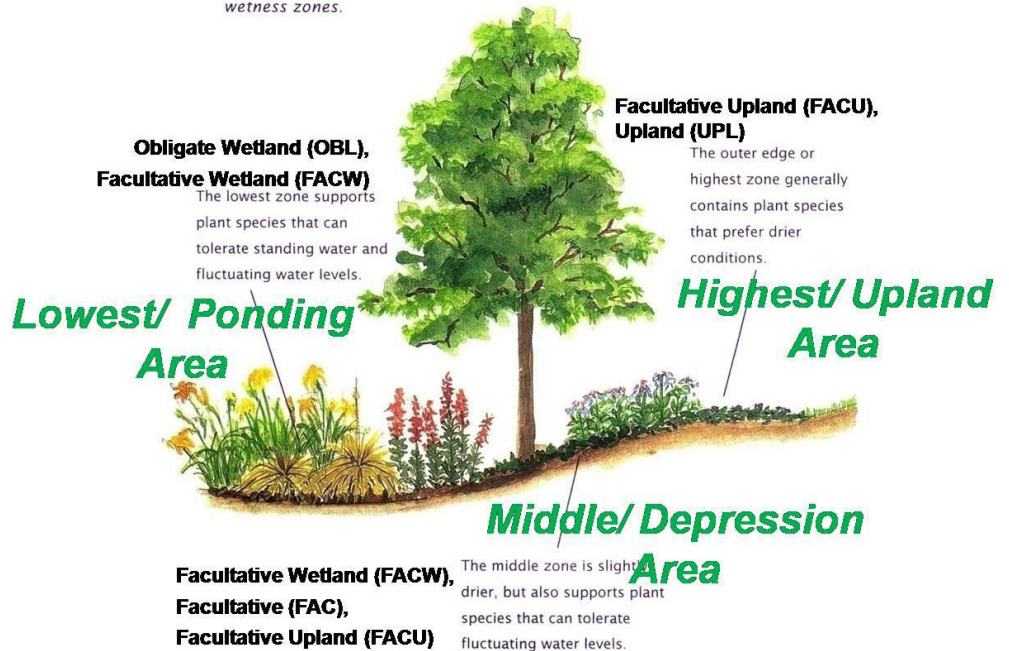
- Native only
- Mix of native and non-Native

C. Plant Type

- Perennials
- Shrubs
- Trees
- Annuals
- Bulbs (upland area)
- Other

D. Maximum Plant Height

- Up to 2 ft
- Up to 3 ft
- Up to 5 ft
- Over 5 ft
- Other



Cross section image credit:
 University of Wisconsin

Step 12 – Planting Methods and Materials

A. Create Design

- List plants to be used in ponding area
- List plants to be used in depression area
- List plants to be used in upland area
- Will plants be mixed or massed?
- Sketch rain garden design below

B. Spacing

Plant Size	Typical Spacing
Plugs	12" – 15"
2" – 4" pots	15" – 18"
≥ 6" pots	Depends on species
Trees and shrubs	Depends on species

C. Number of plants

Determine the number of plants for the rain garden by dividing the size of the rain garden (in square feet) by 100. Then, multiply this number by the number of plants recommended in the table below (determined from the plant size typical spacing).

Number of Plants Needed for 100 Square Foot Rain Garden	
Spacing	Number of Plants
12"	100
16"	56
18"	45
24"	25
48"	6

Just In Case:

$[\text{Size of Rain Garden (measured in square feet)} / 100] \times \text{Number of Plants (from Table)} = \text{Total \# of Plants}$

Example:

200ft² Rain Garden with Plugs (12" Spacing)

$$[200\text{ft}^2 / 100] \times 100 = 200 \text{ Plants}$$

200ft² Rain Garden with 2"-4" Pots (18" Spacing)

$$[200\text{ft}^2 / 100] \times 45 = 90 \text{ Plants}$$