UCONN COOPERATIVE EXTENSION SYSTEM
College of Agriculture and Natural Resources

University of Connecticut

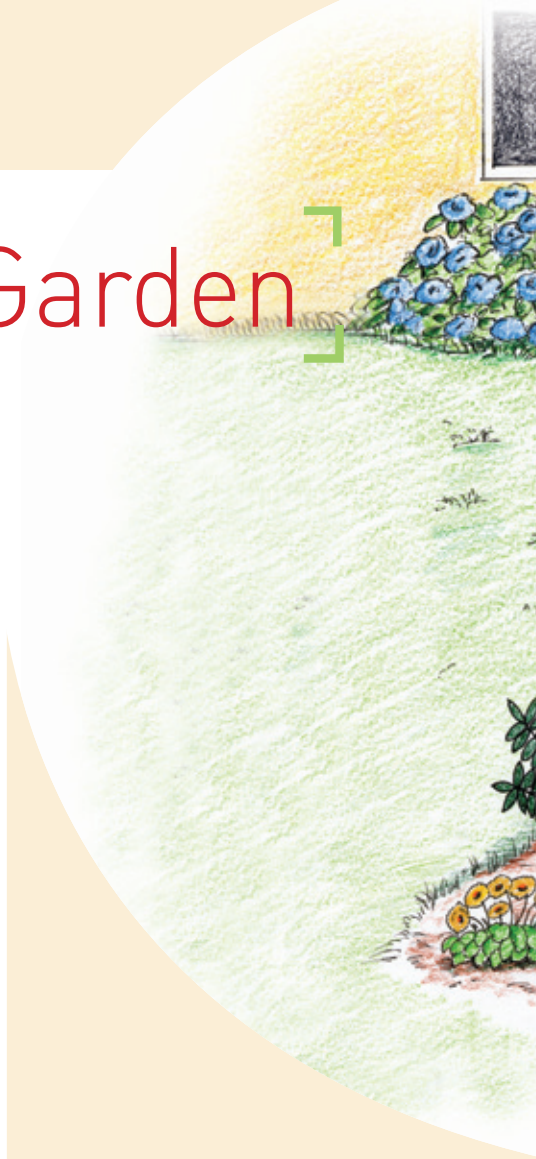
RAIN GARDENS

A DESIGN GUIDE FOR HOMEOWNERS

in Connecticut

Helping to improve water quality in your community.

Consider a Rain Garden



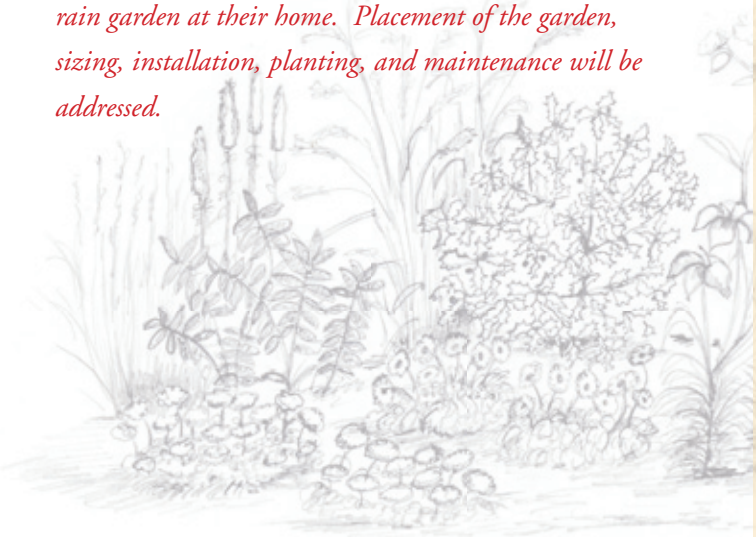
What is a rain garden?

It is a depression (about 6 inches deep) that collects runoff from a roof, driveway or yard and allows it to infiltrate into the ground. Rain gardens are typically planted with shrubs or perennials, and can be colorful, landscaped areas in your yard that will also provide important environmental benefits.

Why build a rain garden at your home?

You can make a difference! Every time it rains, water runs off impervious surfaces such as roofs, driveways, roads and parking lots, collecting pollutants along the way. This runoff has been cited by the United States Environmental Protection Agency as a major source of pollution to our nation's waterways. By building a rain garden at your home, you can reduce the amount of pollutants that leave your yard and enter nearby lakes, streams and ponds. As more rain gardens are installed, the amount of pollutants that reach the Long Island Sound will be lessened. We can all play a role in preserving the health of the Sound!

The intent of this brochure is to provide homeowners with an easy to use quick-reference tool for designing a rain garden at their home. Placement of the garden, sizing, installation, planting, and maintenance will be addressed.



Rain Gardens are beneficial to our environment in several ways. They:

- Reduce the amount of pollutants that wash into lakes, streams, ponds and wetlands.
- Help sustain adequate stream flow during dry spells through infiltration and recharge.
- Enhance the beauty of your yard and the neighborhood.
- Help protect communities from flooding and drainage problems.
- Reduce the need for costly municipal storm water treatment structures.

Adapted from University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.

Concerns regarding rain gardens:

We often hear we should avoid standing water on our property to decrease the amount of mosquitoes. Won't a rain garden create an unwanted pond? No. A rain garden IS NOT a pond. A properly designed rain garden will hold water for only about 6 hours after a storm. Mosquitoes need much more time than this to lay and hatch eggs.

Will it be expensive or difficult to install or maintain at my house? Once the shallow depression (about 6 inches) is dug for the rain garden, it won't be any more expensive than planting other landscaped areas in your yard. Most of the recommended plants can be purchased at local nurseries, and once established, you maintain them just like any other plants in your yard.

Designing your garden

Take some time to consider placement of your rain garden. It is important to locate your garden where it will collect the most amount of runoff possible. Placing your rain garden downhill from paved surfaces where water would naturally flow will maximize its ability to collect runoff.

Some questions to answer at this point may be:

- *Will the garden be close enough to the downspout to install a pipe without having the pipe be in the way or look out-of-place?*
- *Does the overall shape of the garden fit with the rest of my yard? Rain gardens are versatile; they can be any size or shape imaginable.*

STEP 1 Placement of the rain garden

Here are some factors to consider when locating your rain garden:

- To avoid potential water problems, rain gardens should not be placed closer than about 10 feet from the foundation of a house with a basement.
- Do not build/locate the rain garden over a septic system, or very close to a water supply or well.
- Avoid placing the rain garden in a low spot in the yard that always seems wet. Remember, a rain garden is not a water garden. Placing it in poorly drained soils may lead to slow infiltration and unwanted long term ponding.
- It is easier to construct and maintain a rain garden in a flat or slightly sloped area. For highly sloped areas there are alternative designs. [See pages 1-25 in the Prince George's County Bioretention Manual.]

http://www.goprincegeorgescounty.com/government/agencyindex/der/esd/bioretention/bioretention.asp

STEP 2 Soils

One way to determine if the soils are suitable at your rain garden site is to perform a small percolation test. Dig a hole about 6 inches deep and fill it with water. If there is still water in the hole after 24 hours, the site is not suitable for a rain garden. **The sizing method on the following page is suited for loamy or sandy soils where water infiltrates easily.**

STEP 3

Sizing

This sizing method is designed to capture the majority (more than 90%) of runoff from the roof. If a gutter downspout will run directly into the garden, the only information that you will need is the area of the roof that contributes to that gutter. Don't worry, this doesn't require a trip to the roof!

- Just measure the footprint of your house (the area taken up by your house if you were looking down from above).
- Then, estimate how much of this area actually contributes to the gutter downspout. In other words, if it were raining, what portion of the roof area would be contributing water to the garden?
- Next, divide this area by 6. This calculation sizes the garden to hold one inch of roof runoff in a garden 6 inches deep. This is the area you need for your rain garden (see example on the following page).

If you are placing the garden in an area of lawn, and the runoff from your downspouts travels over more than 30 feet before it gets to your garden, the garden may not need to be as large. Some water will sink into the grass before entering the garden. However, if there is a large area of grass that will also contribute runoff to the rain garden, consider using the size calculated above. While it won't hurt to have the garden be a bit larger than necessary, if size or cost is a constraint, the garden can be smaller and still provide some treatment. Every little bit helps!

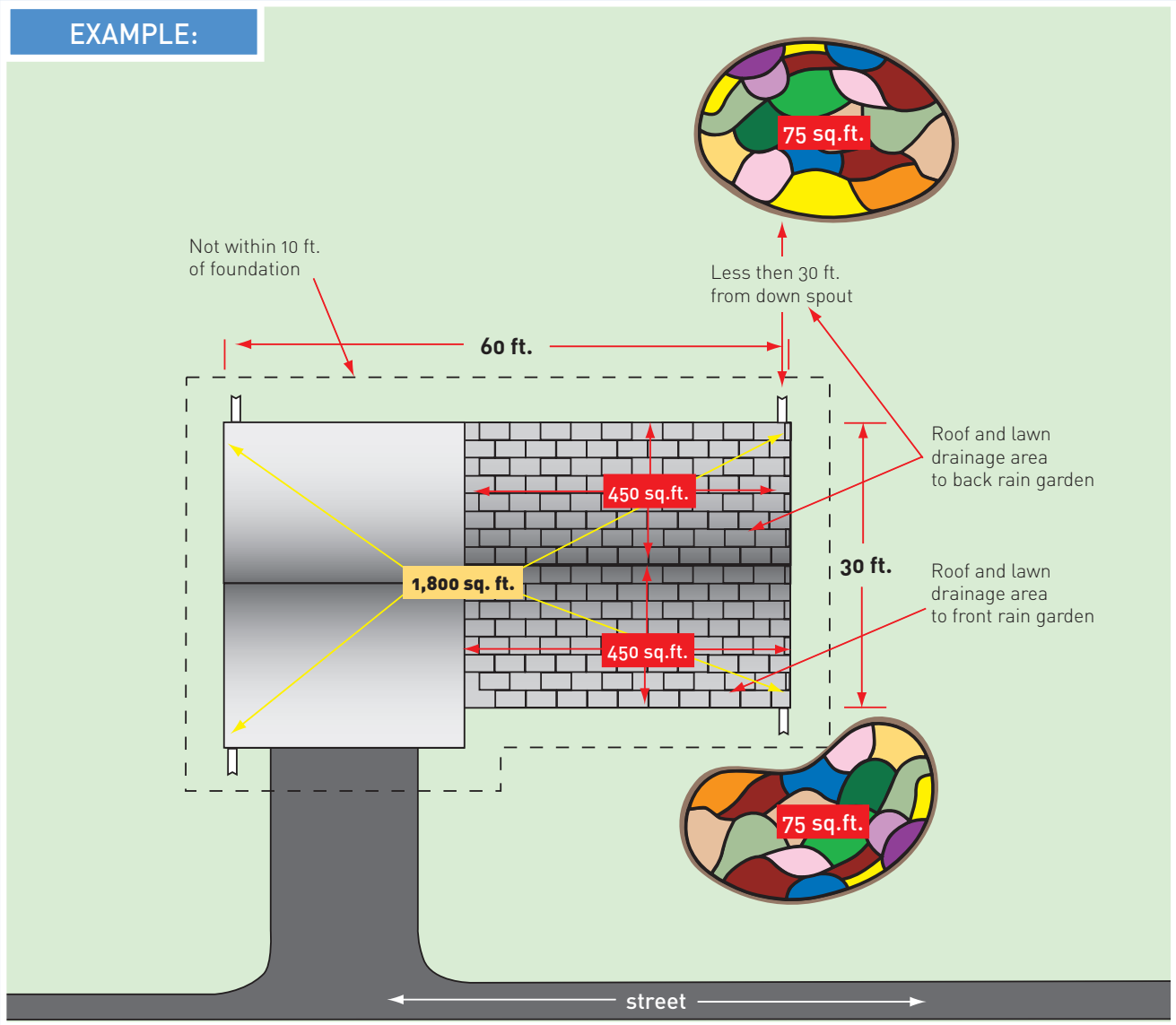
If the percolation test shows that your soils are suitable, or if you know that the soils are loamy/sandy, then you can move on to the installation section. Even with soils that are silty or clayey, you can still have a rain garden. Remember, if the soils are poorly drained, or your test hole still had water after 24 hours, the site is not suitable for a rain garden. If there was some infiltration but it was slow, increasing the size of your garden can make up for the tight soils. With silty soils, the size can be increased about 50%. If the soils are clayey, the size can be increased up to 100%. This increase will provide the same amount of treatment as if your soils were sandy. However, if an increased size is not feasible due to cost or space constraints, don't worry. You will still be providing some treatment of the runoff, and therefore a benefit to the local waterways.

A more detailed design manual with accommodations for silty or clayey soils can be found at the following website:
http://www.dnr.state.wi.us/org/water/wm/nps/rg/#plant_lists

Calculating the size of your rain garden

Based on the amount of roof runoff from your home.

The house has a footprint of **60 feet x 30 feet, or 1800 ft²**. One quarter of the roof area contributes to the gutter near where the rain garden is to be built. So the contributing area would be **1800 ft² x 0.25 = 450 ft²**. This area is then divided by 6, so that the square footage of the rain garden would be: **450 ft² / 6 = 75 ft²**. A nicely shaped rain garden might be **10 ft x 7.5 ft**. However, you have the flexibility to make it any shape you want, as long as you approximate the size.



Diagrams above dapted from the University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.

STEP 4

Installation

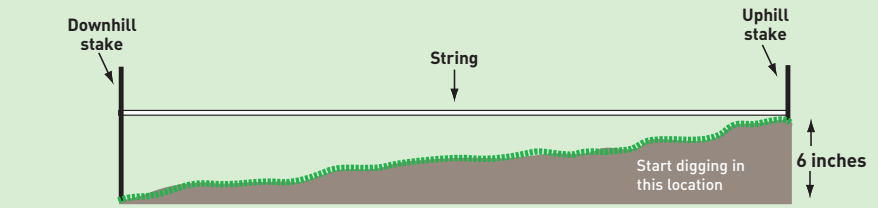
Now it's time to start digging! Smaller gardens can be dug by hand with a shovel, or equipment can be rented for larger gardens. Most gardens for average sized homes can be dug by hand if you are in good health, or have some extra help.

Before digging, be sure to call the "Call Before You Dig" hotline to locate any underground utilities:

1-800-922-4455

WHERE TO DIG

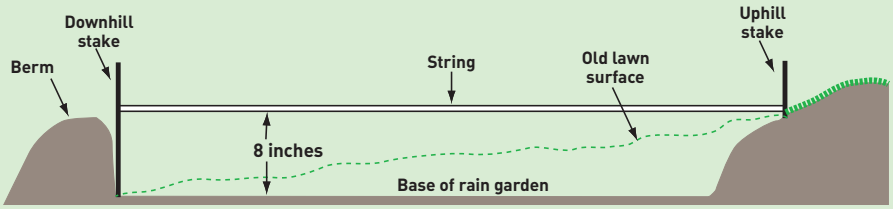
Diagram illustrates before digging has occurred.



Adapted from University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.

WHERE TO PUT THE SOIL YOU'VE DUG

Diagram illustrates after digging has occurred.



Adapted from University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.

CROSS SECTION OF RAIN GARDEN

Once you feel confident in the placement of the garden, **lay out the shape to define where to dig**. A string can be helpful for this. If the yard is fairly level, you can just dig out the bowl to the proper depth, which is 6 inches deep, or a couple of inches deeper if mulch will be used. If the yard is sloped, you may need to construct a small berm (mound) at the downslope side of the garden to prevent the soil from washing away after a storm. Use the soil that was removed from upslope side of the garden and add it to the downslope side.

The bottom of the garden should be fairly level to maintain the storage area inside the garden. A string or board can be helpful for this: just lay either across the garden (make sure the string is tight) at the level of the lawn, and measure down with a tape measure. **Slope the edges of the garden**, but don't make them too steep. Steep slopes tend to erode easily. Mulch or a ground cover will help to stabilize the soils.

A word on newer houses...

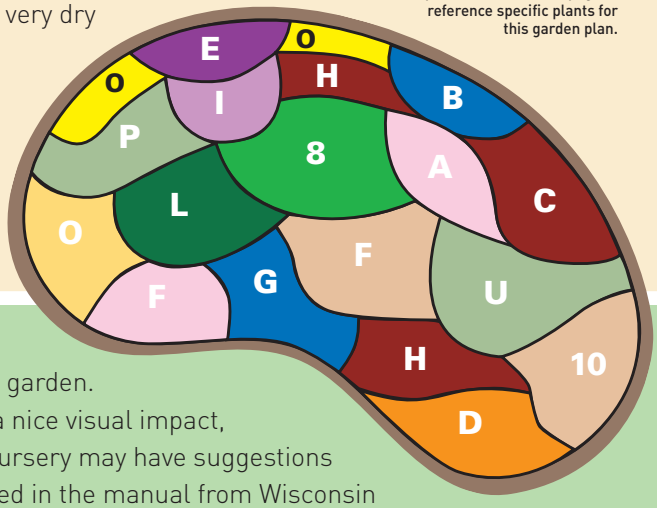
If you have a newer house or if heavy equipment has been used in the area of the rain garden, you may want to loosen up the soil with a rototiller, or by hand, to allow water to soak in more easily. In this situation or any other rain garden, compost or other soil conditioner can be added to enhance plant growth. Just dig the garden a bit deeper to account for the added material.

STEP 5

Planting

Now it's time to plant! The plants that tend to do well in rain gardens are the ones that can tolerate wet conditions, but also very dry conditions. Many plants that are native to Connecticut fit this description. Refer to page 9 for a list of perennials and shrubs (that will do well in most locations in full sun to partial shade), for Connecticut rain gardens. The list is from John Alexopoulos, Landscape Architecture Program at the University of Connecticut.

Sample layout
See plant list on the next page to reference specific plants for this garden plan.

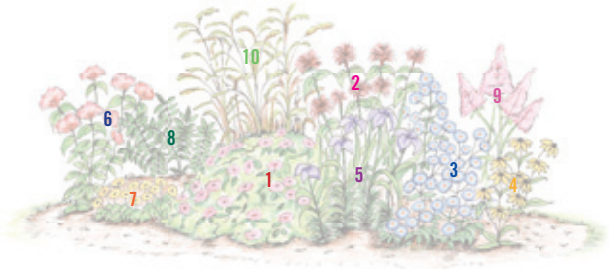


There are many ways to combine plants in a rain garden. Groupings of the same species tend to produce a nice visual impact, but it's really up to you. Be creative! Your local nursery may have suggestions for design layouts, and several examples are listed in the manual from Wisconsin mentioned on page 5. **See illustration below for an example of plant selections you could use for your rain garden.**

After planting, a vegetative ground cover or hardwood mulch can be applied to reduce weeds and conserve moisture. If using mulch, make sure that it is shredded hardwood, since pine bark chips tend to float. **See cross section diagram on page 7.**

Plants selection:

1. Swamp Azalea
2. Cardinal Flower
3. New York Aster
4. Black-Eyed Susan
5. Iris
6. Joe Pyeweed
7. Lanceleaf Coreopsis
8. Royal Fern
9. Astilbe
10. Switch Grass



Sample layout
See plant list on the next page to reference specific plants for this garden plan.

Suggested plant list for Connecticut rain gardens

PERENNIALS

A. Swamp milkweed *(Asclepias incarnata)*
B. New York aster *(Aster novae-belgii)*
C. Astilbe *(Astilbe spp.)*
D. Tickseed sunflower *(Bidens aristosa)*
E. Joe Pye weed *(Eupatorium fistulosum)*
F. Rose mallow *(Hibiscus moscheutos)*
G. Iris *(Iris versicolor)*
H. Cardinal flower *(Lobelia cardinalis)*
I. Spiked gay feather *(Liatris spicata)*
J. Sensitive fern *(Onoclea sensibilis)*
K. Cinnamon fern *(Osmunda cinnamomea)*
L. Royal fern *(Osmunda regalis)*
M. Marsh fern ***(Thelypteris palustris)***
N. Spiderwort *(Tradescantia virginiana)*
O. Black-Eyed Susan *(Rudbeckia birta)*

GRASSES

P. Creeping bentgrass *(Agrostis stolonifera)*
Q. Meadow foxtail *(Alopecurus pratensis)*
R. Blue joint *(Calamogrostis Canadensis)*
S.Tussock sedge *(Carex stricta)*
T. Tufted hair grass *(Deschampsia caespitosa)*
U. Switch grass *(Panicum virgatum)*
V. Ribbon grass *(Phalaris arundinacea)*

SHRUBS

1. Red chokeberry *(Aronia arbutifolia)*
2. Buttonbush *(Cephalanthus occidentalis)*
3. Summersweet clethra *(Clethra alnifolia)*
4. Silky dogwood *(Cornus amomum)*
5. Gray dogwood *(Cornus racemosum)*
6. Red osier dogwood *(Cornus sericea)*
7. Inkberry *(Ilex glabra)*
8. Winterberry *(Ilex verticillata)*
9. Spicebush *(Lindera aestivale benzoin)*
10. Pinxterbloom azalea *(Rhododendron periclymenoides)*
11. Swamp azalea *(Rhododendron viscosum)*
12. Elderberry *(Sambucus Canadensis)*
13. Lowbush blueberry *(Vaccinium angustifolium)*
14. Highbush blueberry *(Vaccinium corymbosum)*
15. Witherod *(Viburnum cassinoides)*
16. Arrowwood *(Viburnum dentatum)*
17. Nannyberry *(Viburnum lentago)*
18. Black haw *(Viburnum prunifolium)*
19. American cranberry *(Viburnum trilobum)*

One or more trees can be added to a rain garden, depending upon its size. Caution should be used though, as a tree can quickly take over the garden and create a different look. Remember, most trees will grow very large unless they are purposely kept small. If a tree is desired, the following types are recommended:

TREES

20. River birch *(Betula negra)*
21. Red maple *(Acer rubrum)*
22. Sweetgum *(Liquidambar styraciflua)*
23. Swamp white oak *(Quercus bicolor)*
24. Pin oak *(Quercus palustris)*
25. Larch *(Larix laricina)*
26. Cottonwood *(Populus deltoides)*
27. Shadblow *(Amelanchier spp.)*
28. Green ash *(Fraxinus pennsylvanica)*

Helping to improve water quality in your community.

STEP 6

Maintenance

Maintaining your rain garden is not really much different from maintaining any other newly planted landscaped area. Plants will need to be watered until established, and weeding should be performed as necessary. In the years following installation, removal of dead plant material, and replacement of mulch can be performed. Shrubs can be pruned, if desired, but it is not necessary.

Now you can sit back and enjoy the beauty of your rain garden, and also know that it is performing an important function in the protection of our water resources!

RAIN GARDENS

BENEFICIAL | ATTRACTIVE | EASY

University of Connecticut
College of Agriculture and Natural Resources
Cooperative Extension System

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Rain Gardens in Connecticut: A guide for homeowners is available from county Cooperative Extension offices, and online at

www.sustainability.uconn.edu
or
www.nemo.uconn.edu

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Rain Gardens

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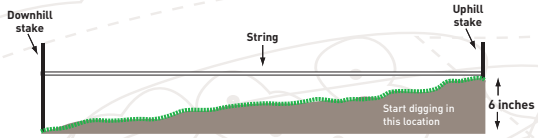
WHERE TO DIG



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WHERE TO PUT THE SOIL YOU'VE DUG

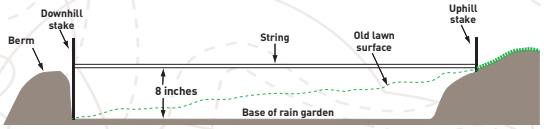


Diagram illustrates after digging has occurred.

Illustrations adapted from University of Wisconsin Extension, Rain Gardens: A How-to Manual for Homeowners.

Rain Gardens *in* Connecticut

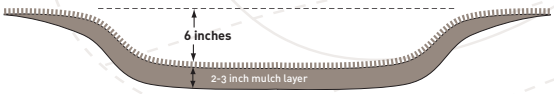
A QUICK REFERENCE GUIDE FOR INSTALLATION AND PLANT SELECTION FOR A HOME RAIN GARDEN

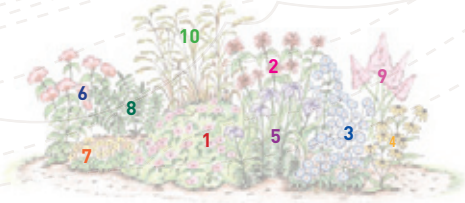
Helping to improve water quality in your community.

Sample Loyout

See plant list on the back of the card to reference specific plants for this garden plan.

CROSS SECTION OF A RAIN GARDEN





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