

Installing a Rain Garden: What Homeowners Need to Know

August 13, 2015
North Scituate Library
Scituate, RI



Funded by RIDEM with an EPA grant under Section 319 of
the Clean Water Act

Tonight's Agenda

- ▶ How do rain gardens work?
- ▶ The installation process
- ▶ Considerations before installation
- ▶ Resources to help
- ▶ Neighborhood tour



How Do Rain Gardens Work?

» By Helping Water Absorb Into
The Ground

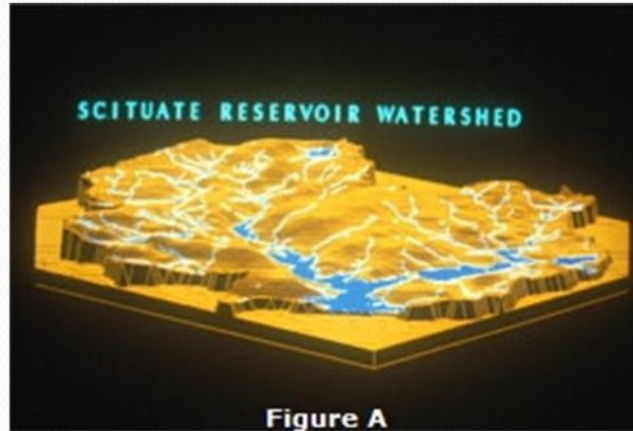
Rain Gardens Control Stormwater



Stormwater picks up pollution as it moves downhill



- ▶ Fertilizer
- ▶ Animal waste
- ▶ Trash
- ▶ Oil and gasoline
- ▶ Sediment
- ▶ Road salt
- ▶ Yard waste

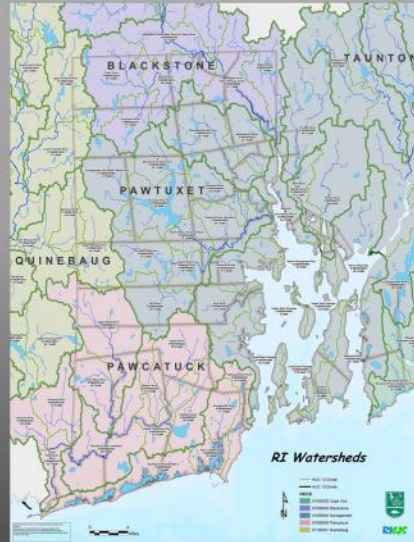


The Scituate Reservoir Watershed

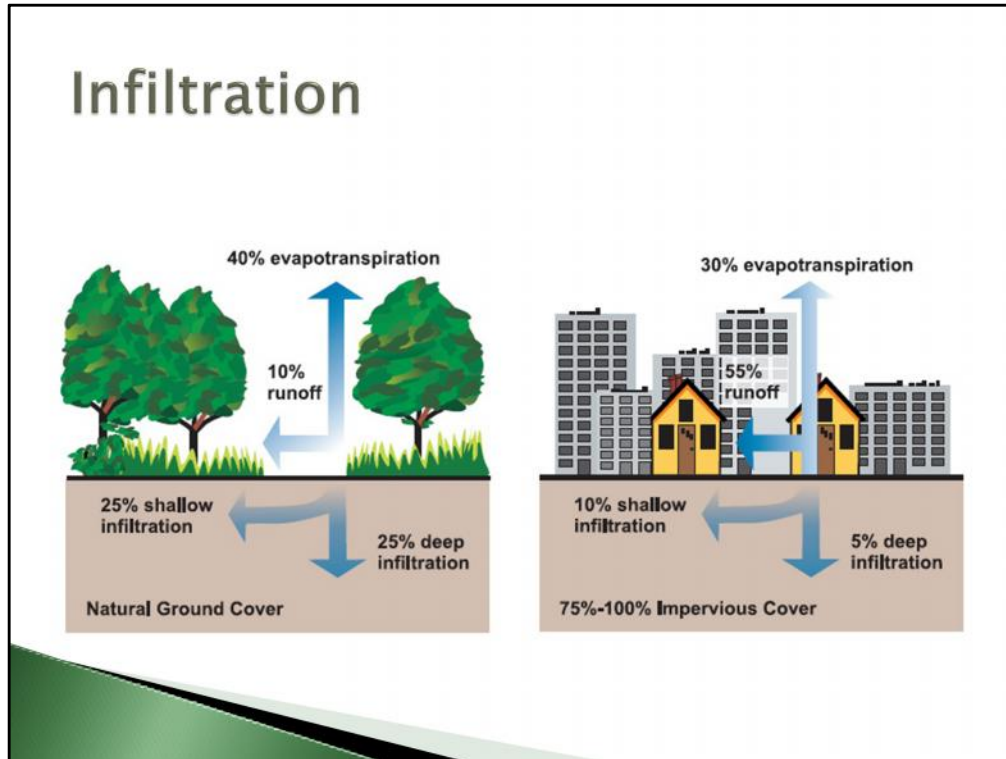
Over 60% of Rhode Islanders drink
water from this watershed

Rhode Island's Watersheds

- ▶ Wherever you live, you are in a watershed
- ▶ Most RI watersheds lead to Narragansett Bay
- ▶ Some lead to Long Island Sound



Infiltration



The goal of modern stormwater management techniques is to increase infiltration, or the amount of water that soaks into the ground. In natural areas like you see on the left, about half of water absorbs into the ground, recharging groundwater supplies and preventing the problems caused by runoff. A significant additional percentage is used by plants. On the right, in a densely built city, over half of runoff runs over the landscape where it can collection pollution. Our aim when installing rain gardens is to get the percentage of water absorbed into the ground closer to the image on the left than on the right, even in densely built areas like we have here in North Scituate Village.

The Rain Garden Installation Process

»» A Broad Overview

What I will share now is a broad overview of the rain garden installation process. Rain gardens can be installed by a typical homeowner who is in good health and likes a good project! However, it is important to do research ahead of time to make sure that your garden is properly sited and installed. Today I'll give you a basic idea, but other resources I have provided will help point you in the right direction if you decide to move forward with putting a garden on your property. Of course, hiring a landscape architecture firm to install a garden for you is also a very sound option, and I will talk about some considerations to make when hiring one later in this presentation.

Step 1: Chose a Spot For Your Garden



The first step to choosing a good spot for your rain garden is to take a walk around your home during a rain storm and see where your storm water is going. See if you can add a rain garden somewhere where it can stop stormwater from leaving your property. At the site we are looking at here, water from this downspout was running right into the road. Even though some of the water was being absorbed into the grass, the ground was relatively hard packed so the majority was not infiltrating. We sited the garden near the downspout, and then buried the downspout underground to bring water to the garden so it no longer leaves the property.

It may seem counterintuitive, but you should NOT place a rain garden at a site that tends to develop a big puddle after a rainstorm. Drainage at a site like that is probably insufficient to allow water to absorb quickly.

Other Location Considerations

Landscape Feature	Required Setback (ft) for Infiltration Trenches and Dry Wells	Required Setback (ft) for Rain Gardens and Permeable Paving Practices
Public Drinking Water Supply Well – Drilled (rock), Driven, or Dug	200	200
Public Drinking Water Supply Well – Gravel Packed, Gravel Developed	400	400
Private Drinking Water Wells	50	25
Surface Water Drinking Water Supply Impoundment with Supply Intake	100	100
Tributaries that Discharge to the Surface Drinking Water Supply Impoundment	50	50
All Other Surface Waters	50	50
Up-gradient from Natural slopes > %15	25	25
Down-gradient from Building Structures	10	10
Up-gradient from Building Structures	10	10
Onsite Wastewater Treatment Systems (OWTS)	15	15
Coastal features, coastal buffer zones, regulated freshwater wetlands	As applicable	As applicable

When you are deciding where to put the garden, you will also need to consult the single family homeowner guidance document (**PAGE 3**) to make sure that you are far enough away from your well, septic system, and foundation. The garden can be planted on a mild slope, but DEM requirements do not recommend planting on a slope of greater than 10%. You'll also want to think about aesthetics, and the practical aspects of having this garden at your home. Can you mow and weed whack around it? Is it near a hose connection so you can water it when the plants are new? Will you be happy with its location from an aesthetic perspective?

Step 2: Determine Your Drainage Area



Next, we will need to determine the size of the drainage area that will feed into the garden. I'm using an aerial photo of my own house, taken from Google Maps, as an example here. If I was going to put a rain garden in my front yard, and feed it using the downspout by my front door, I would need to take a look at my roof and figure out what portion of the roof is feeding into that particular downspout. I'd then figure out the area of that portion of the roof, erring on the side of larger if there is any question, and use that to determine my drainage area. If my drainage area included a walkway or driveway, I would add that area onto my total drainage area. Be sure to take a close look at where your gutters actually lead—they may bring water to the other side of the house from where they are located. It can be helpful to watch them during a rainstorm to be sure.

Tables 7. and 8. Rain Garden Sizing Guidance

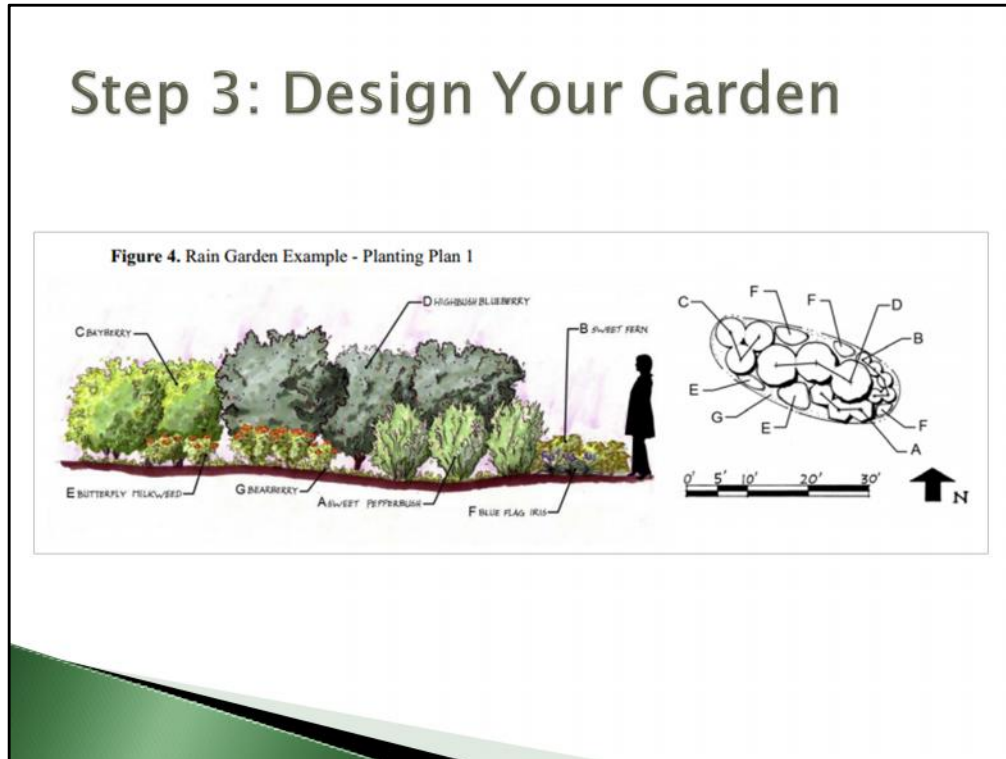
Rain Garden Surface Area in Sandy Soils (Sands, Loamy Sands and Sandy Loams) (square feet)			
Drainage Area (Square feet)	for 4 inch deep garden	for 6 inch deep garden	for 8 inch deep garden
100	19	15	8
200	38	30	16
300	57	45	24
400	76	60	32
500	95	75	40
600	114	90	48
700	133	105	56
800	152	120	64
900	171	135	72
1000	190	150	80

Rain Garden Surface Area in Silty Soils (Loams and Silt Loams) (square feet)			
Drainage Area (Square feet)	for 4 inch deep garden	for 6 inch deep garden	for 8 inch deep garden
100	34	25	16
200	68	50	32
300	102	75	48
400	136	100	64
500	170	125	80
600	204	150	96
700	238	175	112
800	272	200	128
900	306	225	144
1000	340	250	160

*In lieu of a soil texture determination, use the calculated surface areas for silty soils

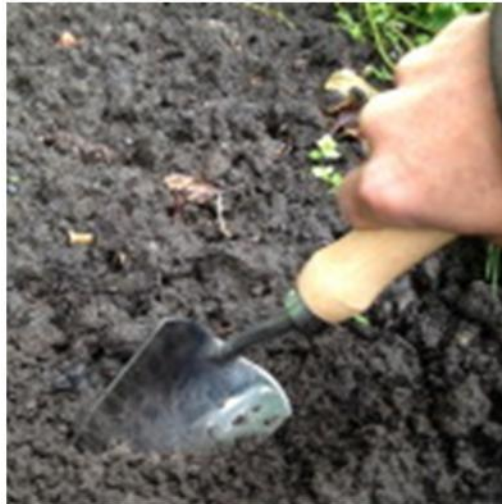
I would then take my total drainage area to this chart from the DEM guidelines. It specifies how large a garden needs to be for various drainage areas and soil types. If you are not sure whether your soil is sandy or silty, you should use the silty chart since it will give a larger margin of error. You can also decide how deep you would like your garden to be. A shallower garden will allow more room for plants, but a deeper 8" garden may be a good choice if your space is limited.

Step 3: Design Your Garden



Your guidelines from RIDEM also give guidance to help with the rain garden plant design process. In general, the garden should be about twice as long as it is wide, and should be angled perpendicular to the flow of water that you are trying to accept. At this point you can also start to think about plants you might like to add, using resources like URI's RI Native Plant Guide.

Step 4: Soil Test



Rain gardens should not hold water for any more than 12 to 48 hours to ensure proper functioning and prevent mosquito breeding. To ensure that your soil drains well enough to allow infiltration in this time period, there is a quick soil test you can do before breaking ground. All you need to do is dig a 6-8" hole, fill it with water, and make sure that all of the water is absorbed within 12 hours. Here in our North Scituate gardens, water was generally absorbed within 20 minutes!

Step 5: Call Dig Safe

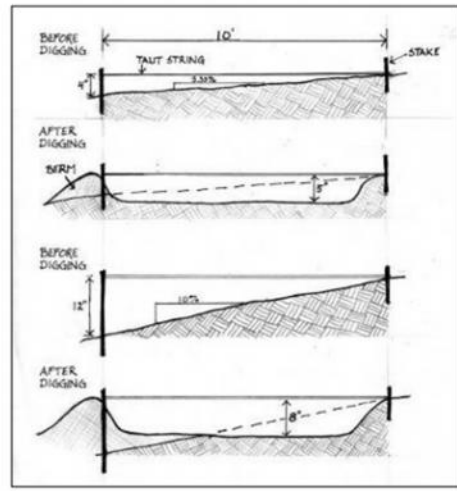


- ▶ Call 811
- ▶ Mark area with white stake or white spray paint
- ▶ Allow 3 business days for utilities to mark the area
- ▶ Begin work within 60 days
- ▶ Digsafe.com

Before breaking ground on your rain garden, it is important to verify that there are no underground utility lines in the area where you would like to dig. Calling digsafe at 811 will allow all utilities operating in your area to be notified about your potential excavation. They will then have three business days to mark any utilities in the area so that you can avoid digging through them. Keep in mind that any underground utilities may be relatively close to the surface-if utilities are marked in your garden area, you should chose a new spot for the garden. This step is important for everyone, but takes on an EXTREMELY high level of importance if you live in a town with natural gas lines. If you hire a contractor to excavate your garden, be sure that they call dig safe as well. Most contractors will be familiar with this process.

Step 6: Prepare to Measure Depth

Figure 3. Digging the Rain Garden and Creating a Berm



As you begin to dig the garden, you will need a system to ensure you dig to the proper depth. If your garden is on a slope, you will need to add a “berm” on the downslope side of the garden to allow water to pool evenly. You can build this berm using sod and soil as you dig, but remember that if you use any sod, the berm will lose height as the sod decays. We used a system, like that seen here, of poles, a string, a level, and a ruler to ensure we dug our gardens to the prescribed depth. It is very difficult to “eyeball” these depths, so frequently checking our measurements was essential.

Step 7: Excavate and Remove Soil



Excavating and removing soil is the most challenging step in rain garden installation. You have a choice—you can excavate by hand, or hire someone with a digger to excavate for you. Most of the rain gardens in our project were excavated by hand, and took two people 2-3 work days of digging. We also had to remove the soil to a location off-site; if you have someplace on site to keep your soil, this step will go more quickly. The Village Drum and Charmed and Dangerous gardens were excavated by machine, and this took only a couple of hours per garden, but cost over \$1000. Local septic system contractors may be able to complete this work for you if you chose to go this route.

The volume of soil that needs to be removed from a typical rain garden is quite large. All of our gardens needed at least three yards removed, which is at least 5 trips in a typical small pickup truck if it needs to be taken offsite. It is hard, tiring work, which is one of the many reasons that rain gardens are best installed in the spring or fall, when temperatures are lower.

One step you can take to make digging easier is to kill any sod by putting a tarp in the shape of your rain garden over the excavation area for three or more days.

Step 8: Soil Amendments



Before adding plants to the new garden basin, you may need to make some changes to the soil to ensure either proper drainage or proper plant growth. All we had to do in NSV was to put aside the good top soil, take out a bit more of the rocky under soil, then mix the top soil back in with 50% finished compost, which we purchased from Resource Recovery or Macera's.

Step 9: Planting!



At this point we planted the gardens. When possible, we purchased plants in 1-gallon containers since smaller plants have an easier time becoming established. You could purchase plants in 3-gallon containers if you prefer that your garden have a very “full” look right off the bat. Take care to leave enough space between plants to allow for future growth.

Step 10: Mulching



Next, add 4 inches of shredded bark mulch, avoiding heavily died mulches when possible. At this point, your garden's depth should be the initially planned depth, which means you need to dig as far as 8 additional inches down in the excavation stage to account for mulch and compost additions.

Step 11: Downspout Connections, Etc.



Finally, it is important to make sure that water has a simple method of accessing your garden. This may mean burying a connection from the nearest downspout, creating a channel of stones to guide water from the downspout, or even simply steering a downspout extender towards the garden if it will not create a mowing hazard for you. For this project we had all of our downspouts done by a gutter professional to ensure seamless connections. The cost of this was relatively low (\$200ish per garden) for the piece of mind it brought.

Smooth river stone near the point of downspout entry to the garden, especially if it is a steep slope, will prevent erosion and stabilize the garden basin.

Step 12: Monitor, Water and Enjoy!



Your garden will need to be watered daily for the first couple of weeks, and then periodically throughout the rest of the first growing season, until plants are established. You should also check your garden after the first few major storms to make sure that it is functioning as designed and is not ponding water for too long.

Hiring a Contractor?

Advantages

- ▶ Quicker installation
- ▶ Ease of plant selection
- ▶ Ease of soil removal
- ▶ Professional opinion on soil quality
- ▶ Professional design skills

Disadvantages

- ▶ May not share ecological goals
- ▶ May not be familiar with using native plant species

If you do not have 2-4 days to devote to rain garden installation, you may choose to hire a contractor to help with all or part of your project. Landscape designers and architects can do your design work and recommend plantings, and may be able to subcontract the actual installation to landscape crews. There are pros and cons to working with a contractor, and it is important to find a designer or architect who shares your goals for the project, as we did with our project.

Another option, as previously mentioned, is to simply contract out excavation. With excavation done by machine, installation can be done in as little as a day. Renting or borrowing a small excavator may also be an option if someone in your family is qualified to operate one.

Questions to Ask

- ▶ Have you created rain gardens before?
- ▶ Are you familiar with “Single Family Guidance...”
- ▶ Are you familiar with native plants?
- ▶ Will you provide post-installation support?



Where to find a landscaper?



If you are looking for a landscaper, a good place to start is by checking out the RI Nursery and Landscape Association's member directory. You can filter your search by county and specialty. Look for a landscape designer or architect, and then check out their website for examples of their work.

Resources for Self-Installation

A promotional graphic for the Rain Garden App. At the top, the title "Resources for Self-Installation" is displayed. Below it, the app's logo features a green leaf with blue water droplets and the text "Rain Garden App" and "UConn". A subtitle reads "A Mobile App for designing, installing, and maintaining a Rain Garden". The main text describes the app as a free tool for planning and installing rain gardens, including features like soil type determination and plant selection. It provides download links for the App Store and Android. Two smartphone screens are shown: one displaying a list of plants like Serviceberry and Shadbush, and another showing the app's main menu with sections for Basics, Design, Choose Plants, Install, and My Rain Gardens.

Rain Garden App
A Mobile App for designing, installing, and maintaining a Rain Garden

Download the Rain Garden App first. "Rain Garden" is a **FREE app** designed to help you properly install a rain garden at your home, office, or job site. Through video tutorials, diagrams, text, and tools, the App guides you through determining the size and placement of your garden, selecting plants, digging and planting your garden, and maintaining your garden. It also includes tools for determining your soil type, measuring the size of the area that will drain to your garden, and managing multiple rain garden projects.

Download on the **App Store** | Download for **Android**

Help Promote the App! [Click here](#) to request App promo cards to display in your town hall or business.

To learn more about Rain Gardens visit the [NEMO Rain Garden Website](#).

For more information about the App, if you are interested in expanding the App's tools to your area, to make suggestions or to simply heap praise upon the heads of your humble App designers, please [contact us](#).

The University of Connecticut's rain garden app for iPhone or Android is honestly one of the best resources out there to help you self-install a rain garden. The app will walk you through the planning steps that I described here, show you a map of average soil types in your area, and help you to select plants based on your preferences and site conditions. Please note, however, that a few of the plants recommended by the app are non-native, so if using only natives is a priority to you you'll want to research each plant thoroughly.

Resources for Self-Installation

State of Rhode Island Stormwater Management Guidance for Individual Single-Family Residential Lot Development

Section 300.6 of the RI Coastal Resources Management Program (CRMP) and Rule 7.12 of the DEM Rules and Regulations Governing the Administration of the RI Freshwater Wetlands Act require stormwater management for projects on individual single-family residential lots that create 600 square feet or more of new impervious roof surface area, and all new driveway and parking areas. This document provides guidance for meeting those requirements, and may also be used by applicants under the jurisdiction of CRMC Freshwater Wetlands in the Vicinity of the Coast.

The guidance provided in this document may not be used to meet stormwater requirements for residential subdivisions or any project types other than individual single-family residential lot development.

CRMC Supplemental Stormwater Application Requirements:

- Completed CRMC application (4 copies) including all forms, fees and required enclosures.
- 8.5 x 11 inch site plan that depicts the information detailed in the checklist under Step 5 on page 17 of this document.

DEM Application Requirements:

- Completed DEM Application package including all forms, fees and required enclosures (see DEM Rules 7.00 and either 9.00 or 10.00 as applicable).
- Ensure site plans (DEM Rule 7.03) include all elements detailed in the checklist under Step 5 on page 17 of this document.

Residential Stormwater Management Overview

A single residential lot might not be the most obvious source of pollution problems, but behind a suburban landscape, there may be activities that can threaten water quality. Pollutants commonly present on residential lots include pesticides/fertilizers used in landscaping. Other pollutants may include sediment from erosion-prone areas, yard waste such as leaves and grass clippings, pet waste and oil and gas from driveway surfaces. Even runoff from rooftops can contain pollutants known to occur in runoff. These have the potential to be transported in stormwater to surface water bodies, posing risks to the environment and human health. While the contribution from an individual yard may seem small, the cumulative effects of stormwater runoff coming from hundreds or thousands of homes within a watershed can be significant. Reducing the amount of stormwater that leaves your property as runoff helps to prevent pollutants from reaching our streams, lakes, ponds and coastal waters.

Rule Applicability

Under CRMP Section 300.6 and DEM Rule 7.12, applicants for individual single-family residential projects are required to treat the water quality volume, or one inch of stormwater runoff from any new rooftop impervious surfaces of 600 square feet or greater in size, and all new driveways and parking areas. This guidance document describes stormwater management practices for reducing runoff volumes and pollutant levels. It also provides guidance for designing, installing and maintaining stormwater management practices that meet the requirements for new or enlarged single-family dwellings, driveways and parking areas. The practices discussed in this document are part of a stormwater management approach known as low impact development or LID. This document is meant to be used as a generalized guide to help applicants meet storm water management requirements on individual single-family residential lots. For more complex projects, and for more detailed information on the design of storm water management practices, see the most recent version of the Rhode Island Stormwater Design and Installation Standards Manual for additional information at www.crmc.org.

RHODE ISLAND STORMWATER DESIGN AND INSTALLATION STANDARDS MANUAL

DECEMBER 2010



RHODE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND

C R M C

COASTAL RESOURCES MANAGEMENT COUNCIL



You should also familiarize yourself with the RI state standards for stormwater project installation. I did not include a copy of the Single Family Residential Lot Development guidance in tonight's folder since most of you have already received it, but I do suggest that you pick up a copy from our back table if you have not. This document will be extremely helpful as you plan out your rain garden. The full stormwater manual is less relevant to small rain garden projects, but the list of plants in the back may come in handy. Both documents are also available for free online.

Permitting?



In most cases, RIDEM does not require a permit for the private installation of a residential rain garden. We want to encourage homeowners to adopt these practices and make it as simple as possible for you. If you are concerned that your garden may be in a wetland, or may be diverting water from a wetland, however, you can always consult with an environmental professional to be sure. In Scituate, no town permits are required either. However, you should familiarize yourself with any zoning or HOA requirements that may be specific to your town.

Questions?

» Neighborhood Tour