



**Your Land. Your Water. Your Solution.**

Rain Garden Sizing, Installation, and Maintenance

**L4WQ March 2023**



# Rain gardens, anyone?

Build/helped build  
one?

Seen one?

Heard of them?

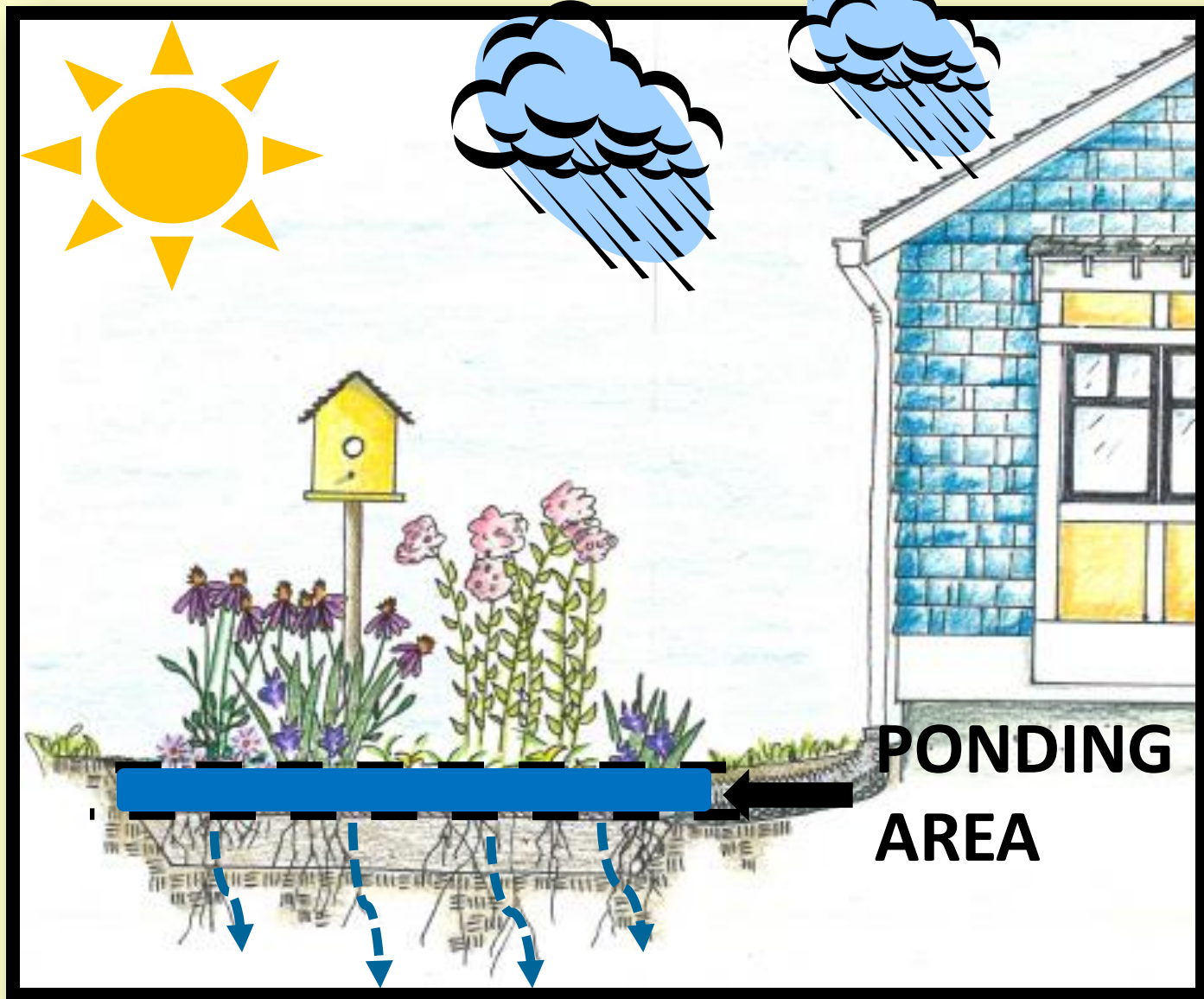
What the heck is a rain  
garden again?



Washington, NH  
Community  
Center Rain  
Garden

- **Basics – Video:**
- <https://www.youtube.com/watch?v=Q2EoHBnCCII>
- **Linked on SOAK NH home page**
- **Sizing Exercise – please play along!**
- **Maintenance Tips**
- **Lessons Learned**
- **Photos**

# Rain Garden - Key Feature



# Basics- perc test

1. Dig a hole 12" deep.



2. Fill it with water.



3. Check back 24 hours later.



**Ideally: Test hole will drain within 24 hours**

# Basics - infiltration

If so:  
**JUST  
SAY  
NO**

Is it:

- Soggy?
- Squishy?
- Spongy?



Why do I have a puddle in my yard days after the rain has stopped?



# No Rain Garden Here



# Basics – site constraints

Roots, rocks,  
utilities





# Rain Garden Sizing Exercise

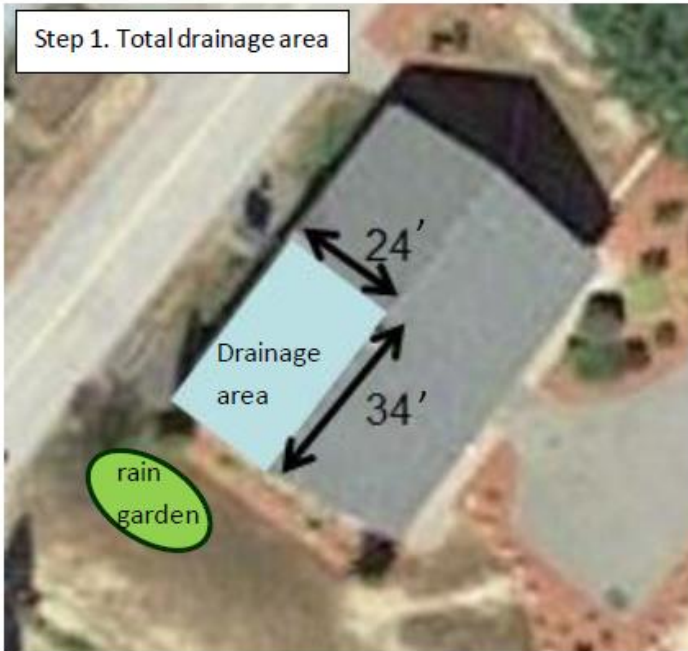


Table 2. Ponding Depth & Size Factor

Slope		≤ 4%	5 - 7%	8 - 12%
Ponding Depth		3-5 inches	6-7 inches	8 inches
Soil Type	Sand	0.19	0.15	0.08
	Silt	0.34	0.25	0.16
	Clay	0.43	0.32	0.20

Table 3. Rain Garden Sizing Information

START. Infiltration test (pass/fail)	
STEP 1. Total drainage area (ft <sup>2</sup> )	
STEP 2. Soil test (type)	
STEP 3. Slope (%)	
STEP 4. Ponding depth (inches)	
STEP 5. Size factor	
STEP 6. Rain garden area (ft <sup>2</sup> )	
STEP 7a. Planting bed depth (inches)	
STEP 7b. Total depth to dig (inches)	



# Rain Garden Sizing



# Sizing

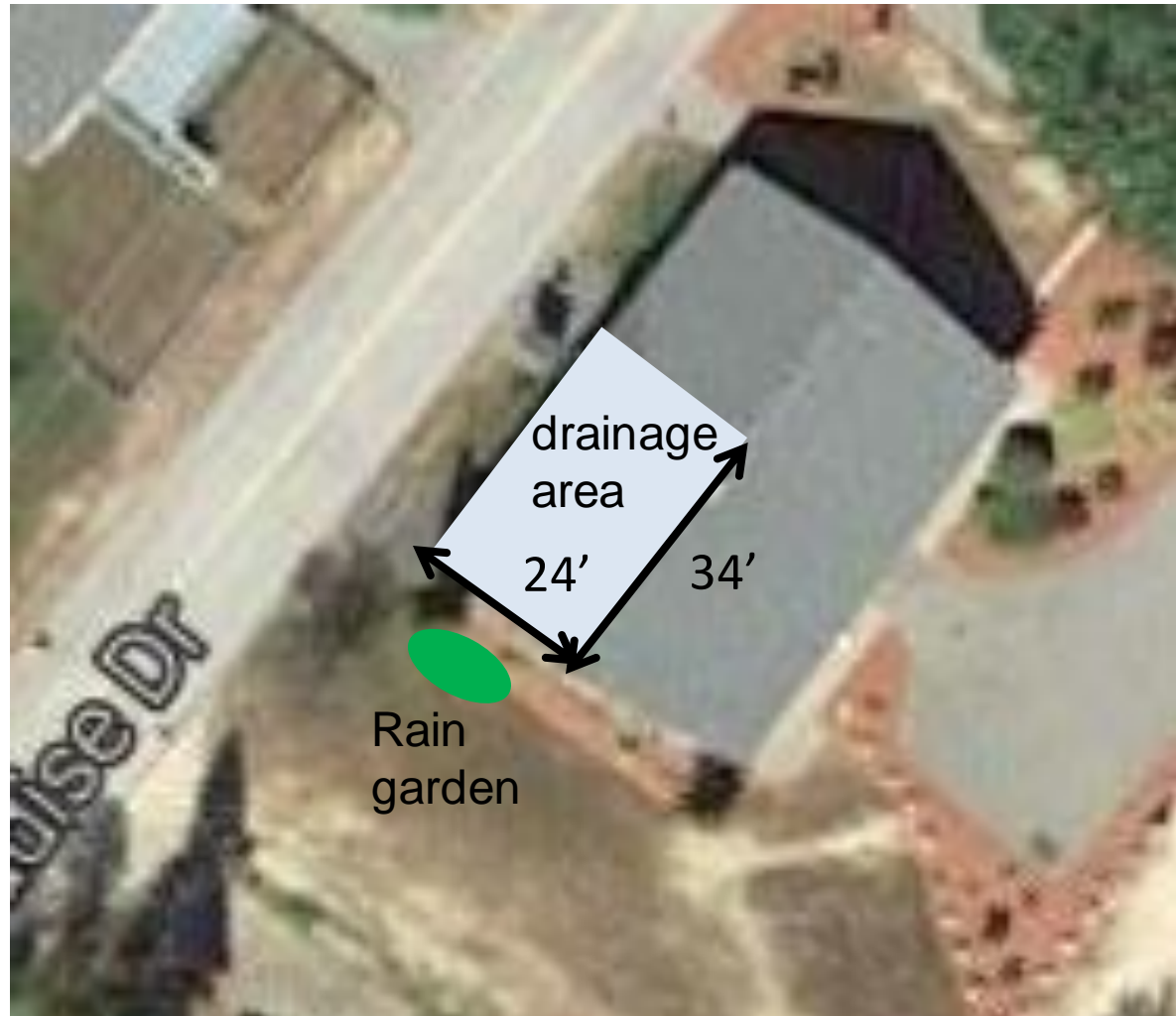
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# Sizing: Drainage Area



# Sizing

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STEP 5. Size factor	
STEP 6. Rain garden area (ft <sup>2</sup> )	
STEP 7a. Planting bed depth (inches)	
STEP 7b. Total depth to dig (inches)	

$$\begin{aligned}
 \text{Total drainage area (ft}^2\text{)} &= \text{length (ft) X width (ft)} \\
 &= 24 \text{ ft X } 34 \text{ ft} \\
 &= 816 \text{ ft}^2
 \end{aligned}$$

# Sizing: Soil Ribbon Test



Soil Type	Ribbon Length (inches)
sand	soil does not form a ribbon at all
silt	a weak ribbon <1.5" is formed before breaking
clay	a ribbon >1.5" is formed

# Sizing

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# Sizing: Slope



$$\text{rise} / \text{run} \times 100 = \% \text{ slope}$$

$$0.5' / 6.5' \times 100 = 8\%$$

**Note: Slope should be <12%**



# Sizing

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# Next Steps

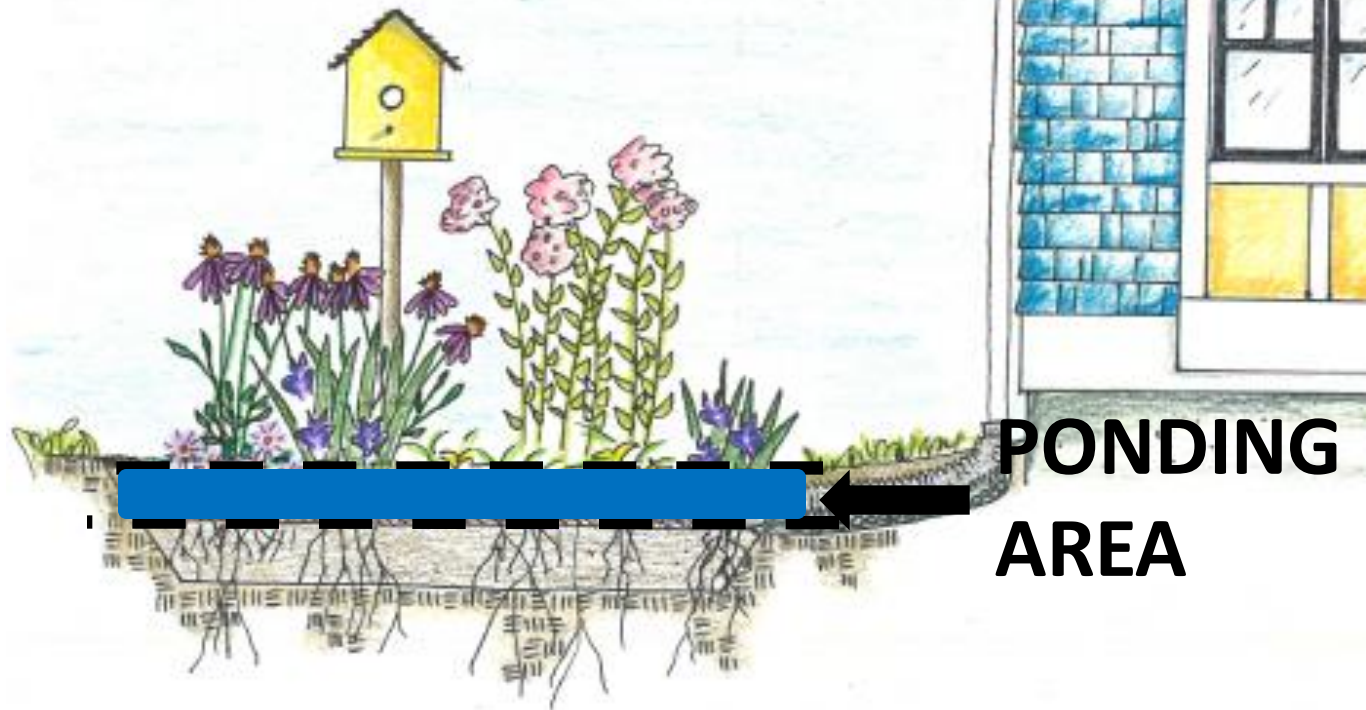
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# Rain Garden - Key Feature



**PONDING  
AREA**

# Sizing: Ponding Depth

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STEP 6. Rain garden area (ft <sup>2</sup> )	
STEP 7a. Planting bed depth (inches)	
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# Sizing: Rain Garden Area

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STEP 3. Slope (%)	8
STEP 4. Ponding depth (inches)	8
STEP 5. Size factor	0.16
STEP 6. Rain garden area (ft <sup>2</sup> )	130
STEP 7a. Planting bed depth (inches)	
STEP 7b. Total depth to dig (inches)	

To capture  
1" rain

$$\begin{aligned}
 \text{Rain garden area} &= \text{total drainage area} \times \text{size factor} \\
 &= 816 \text{ ft}^2 \times 0.16 \\
 &= 130 \text{ ft}^2
 \end{aligned}$$

# Sizing: Last Steps

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STEP 6. Rain garden area (ft <sup>2</sup> )	130
STEP 7a. Planting bed depth (inches)	12
STEP 7b. Total depth to dig (inches)	

\*send a sample  
of the native  
soil to UNHE  
for testing

Planting bed:  
-“native” soil  
- compost  
- other amendments



# Sizing: Total Depth to Dig

Total Depth to dig = ponding depth+ mulch layer depth + planting bed depth



$$\text{Total Depth to dig} = 8'' + 2'' + 12'' = 22''$$

**NOTE:** This is ideal! May not be able to dig that deep!



# Sizing: Done!

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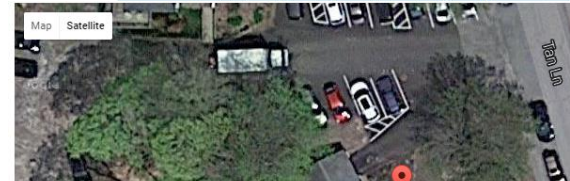
# Sizing, etc.

- Rain Garden Alliance
  - Online tool
  - Same method = same result
  - Can adjust rain depth captured
- UCONN
  - Online tool
  - Sandy loamy soil
  - 6" deep
- VT Rain garden manual
  - For designs



## What size garden do I need?

Before using our garden calculator below, read these guidelines to get you started. The size of your garden is determined by a number of variables. Some of these are established by the conditions of your yard (such as soil type and yard slope), while others are determined by you (such as amount of roof top to be addressed or rainfall to prepare for). Enter information for the four items across the top (surface area, downspouts, soil type, and slope) then slide the rain





















den Size:  
sq. ft.



# Size It, but don't worry about it too much!

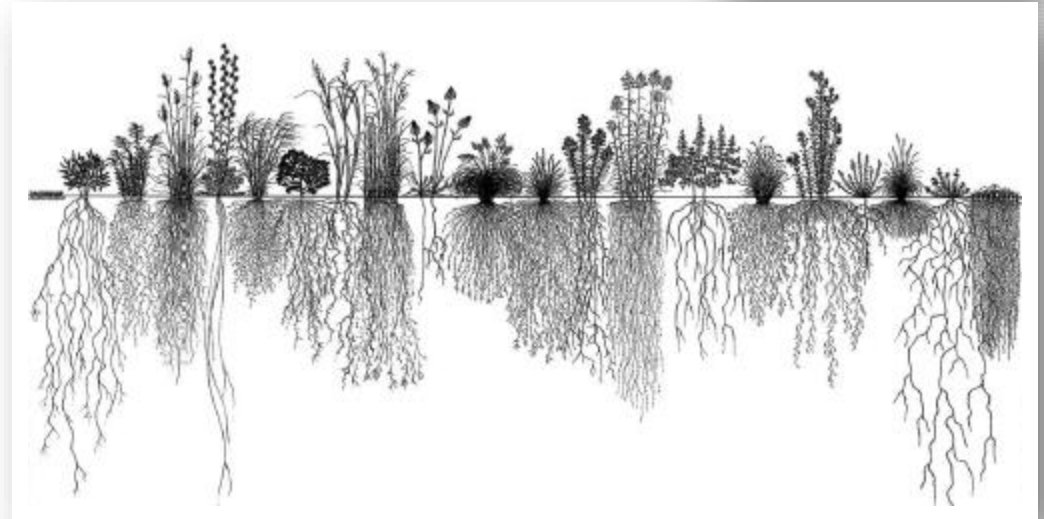


# Native Plants for NE Rain Gardens List

PERENNIALS	FERNS	SHRUBS	Scientific Name Common Name	Rain Garden Zone			Soil Moisture	Light Exposure	Bloom Period, Color, Season of Interest											Mature Size		USDA Hardiness Zone	Attractive to:	Plant Notes
				Base	Slope	Berm			Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Height (feet)	Spread (feet)					
			<b>Morella</b> (formerly <i>Myrica</i> ) <b>carolinensis</b> Small bayberry		•	•	•	☀️ ☀️	●	●	●				●	●	●	5-10'	5-10'	2-9	🐦	Small, fragrant, waxy berries.		
			<b>Physocarpus</b> <b>opulifolius</b>	•	•	•	•	☀️		●	●							5-8'	4-6'	2-8	🐝	Purple-leaved cultivars are popular.		
<b>RUSHES &amp; SEDGES</b>																								
			<b>Carex</b> <b>pensylvanica</b> Pennsylvania sedge		•	•	•	☀️ ☁️	🌿	🌿	🌿							0.5-1'	0.5'	4-8	🐦			
			<b>Carex stricta</b> Tussock or Upright sedge	•			•	☀️ ☁️	🌿	🌿								2-3'	1'	5-8	🦋 🐦	Eyed Brown larval host.		
			<b>Carex vulpinoidea</b> Common fox or Fox sedge	•			•	☀️ ☁️	🌿	🌿								1-3'	1.5'	3-7	🐦	Red, brown fruit.		
			<b>Juncus effusus</b> Common or Soft rush	•	•		•	☀️ ☀️	🌿	🌿	🌿							6.5'	1'	2-9	🐦	Tolerant of diverse conditions. Thrives in full sun, finely textured soils.		

# Rain Garden Plants

- Native (at least non-invasive)
- Tolerant of fluctuating wet and dry conditions
- Have extensive root systems
- Grow without added fertilizers, pesticides, or other inputs
- Fit the site characteristics



# Maintenance

- ✓ Inspect periodically and after heavy rain.
- ✓ Typical: weed, mulch, refresh materials.



Water



Weed



Refresh  
Mulch



Replace  
Plants

# Maintenance

- ✓ Check Inlet after storms

What we expected (tested with hose)



What we got

# Maintenance

- ✓ Clean out material washed in



Soak Up the Rain  
Great Bay;  
Great Bay  
Stewards



# Maintenance

✓ Re-stabilize Outlet



# Rain Garden Installation



## Plant List – all natives!

Northern Spicebush

Witch Hazel

Marsh marigold

Blue flag iris

Cardinal flower

Geranium maculatum

Columbine

Royal fern

Pennsylvania sedge

# Following Year



# Rain Garden – day after build



# One year later



## Plant List, mostly native

Sweet pepper bush  
(*Clethra alnifolia*)

Marsh marigold

Red Osier Dogwood

Cardinal Flower

Columbine

Sensitive fern

Little blue stem

Blue flag iris

Siberian iris

# Woodman Museum, Dover



# One Year Later



# Rain Garden - training





# One Year Later



# Lessons Learned: Digging

**Explore site:  
can you dig  
by hand?**

**Not always!**



## Photo albums

NEW HAMPSHIRE HOMEOWNER'S GUIDE TO STORMWATER MANAGEMENT — DO-IT-YOURSELF STORMWATER SOLUTIONS

### RAIN GARDEN

A sunken, flat-bottomed garden that uses soil and plants to capture, absorb and treat stormwater. It helps to reduce stormwater runoff and recharge groundwater.



NHDES SOAK UP THE RAIN PROGRAM | DES.NH.GOV | SOAKNH.ORG



## Rain Garden Plan

### Resources for Planning

- [Rain Garden Do-It-Yourself Fact Sheet](#) and equipment, step-by-step instru garden.
- [Native Plants for New England Rain](#). UNH Cooperative Extension, contain grasses, ferns, rushes, and sedges a stormwater practices.
- [The Benefits of Native Plants in Your](#) reasons to use native plants in your
- [How to Do a Simple Infiltration Test:](#) rain garden (or other infiltration pra
- [Interactive Rain Garden Sizing Calcu](#)

#### DESIGN CONSIDERATIONS

**STEP 1 – Site constraints.** Identify site constraints in the area where the rain garden will be located, such as:

- High water table – rain gardens should not be placed in persistently wet areas or areas where puddles regularly form.
- Underground obstructions such as gas or electrical lines, other utilities, structures or bedrock. Contact DigSafe 72 hours in advance of your project.
- Place rain gardens on slopes less than 12% (less than one foot of elevation change over 8.3 feet of length).

**STEP 2 – Setbacks.** Be sure to locate the rain garden:

- At least 10 feet away from buildings with basements to prevent seepage into the basement.
- At least 15 feet away from a septic tank or leach field.
- Away from tree roots and drinking water wells.

**STEP 3 – Perform an infiltration test.** Test the ability of the soil to infiltrate water (allow it to soak in and drain through the soil). Rain gardens should only be built in areas where soils drain within 24 hours. Follow the steps below.

- Using a shovel or a post hole digger, dig a 12-inch deep hole.
- Fill the hole with water and allow it to drain completely (NOTE: if the hole fills with water on its own or if water is still in the hole after 24 hours, choose a new location).
- Fill the hole with water a second time and do one of the following:

#### EQUIPMENT & MATERIALS

- ✂ Calculator
- ✂ Measuring tape
- ✂ Spray paint
- ✂ Yard stick
- ✂ 6-12 Stakes
- ✂ 2-4 Long stakes (4')
- ✂ String
- ✂ Shovels
- ✂ Carpenter's level
- ✂ String level
- ✂ Rakes
- ✂ Compost/Woodchips
- ✂ Mulch
- ✂ Washed stone
- ✂ Flat stones or pavers
- ✂ Tarp(s)
- ✂ Wheel Barrow(s)
- ✂ Plants
- ✂ Inlet piping, if needed

# Rain Garden Benefits

- Reduce runoff
- Replenish groundwater
- Filter pollutants to reduce pollution
- Provide habitat
- Beautiful!



# Questions?



Rain Garden, Massabesic Audubon Center, Auburn  
Built in 2014; rehabbed by Master Gardeners 2022