



Lorain County Master Rain Gardener Coursepack

A Rain Garden:

1. Soaks rainwater into the ground quickly
2. Protects our lakes, rivers and creeks from pollution
3. Replenishes the groundwater
4. Creates beautiful gardenscapes throughout the growing season
5. Provides food and shelter for birds, butterflies & beneficial insects

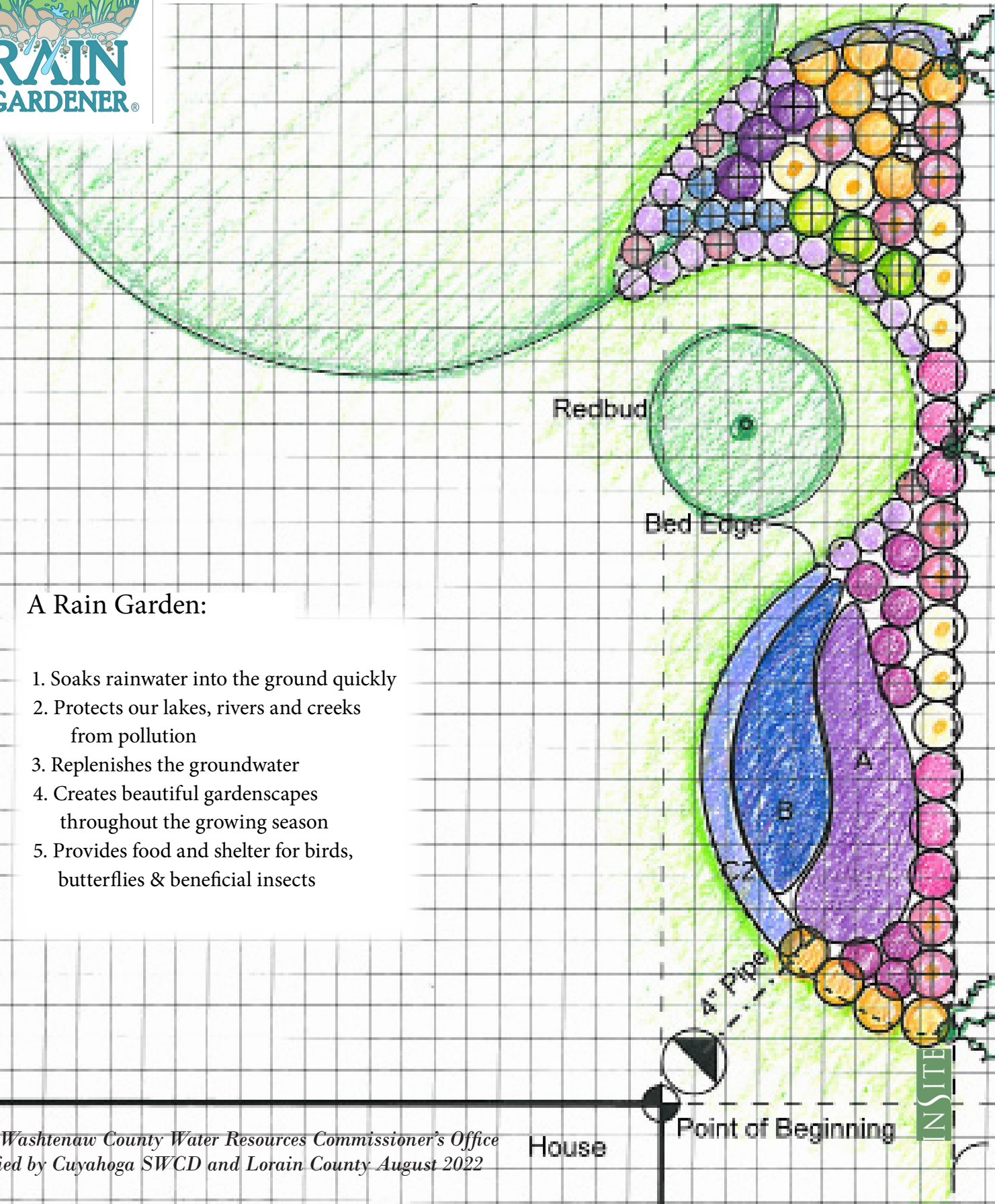


TABLE OF CONTENTS

TOPIC	PAGE NUMBER
Introduction	
Background	3
Program Description.	4
Syllabus	5-8
Northeast Ohio Rain Gardens	9
Watersheds	10-11
Rain Garden Essentials	
Rain Garden Description, Tools & Construction.	12
Locating & Measuring the Rain Garden.	13
Sizing	14
Design	15
Sample Designs	16-20
Transfer Your Drawing to Your Site	21
Drainage	22
Digging on a Slope	23
Soil Preparation & Planting	24
Recommended Native Plants.	25
Common Invasives	26
Resources to Build a Rain Garden	
Local Native Plant Producers	27
Resources	28
Compost Vendors	29
Additional Information	
Rain Barrels	30
How to Build a Rain Barrel	31
Rain Garden Sizing Worksheet	32
Additional Resource Guides	33
Implementation Guide.	34

INTRODUCTION

Background

In most towns and cities, rainfall and snow melt are whisked away into an engineered stormwater system of pipes and basins that funnel water, unfiltered, directly into local streams, rivers and lakes.

After its trip through the pipes, stormwater is no longer just rainwater. It is hot - stormwater is warmed as it flows over hot pavement. It is polluted - phosphorous, e-coli, and trash are washed off the streets and carried to the creek. And it is huge - a small creek can flow like a river after a rainfall, eroding the banks and muddying the river.

In the river, the polluted runoff poisons fish, plants and other species that depend on them, including us.

Most communities get their drinking water from a combination of water drawn from rivers and lakes and from wells. Water polluted with runoff can be more expensive to purify at water treatment plants. Well water is only available if rainwater soaks into the ground and recharges the ground water.

Woods and prairies historically soaked in almost all the rain that fell on them. Concrete soaks in none.

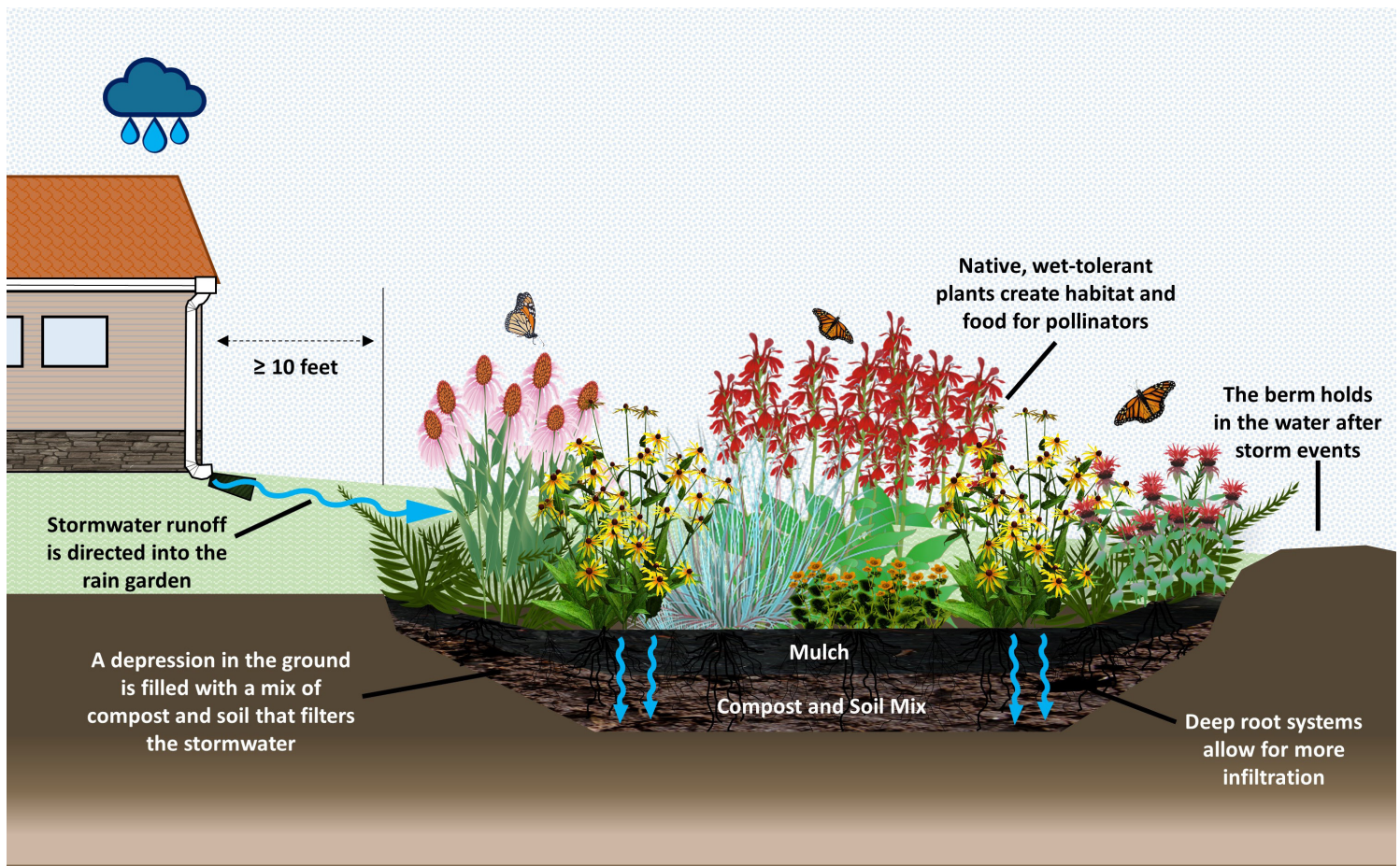
People play, boat and fish in the rivers and lakes. If contamination levels are too high, restrictions can be placed on recreational activities such as swimming and fishing. Stormwater is the #1 source of pollution in rivers today.

There is a simple way to do your part to keep pollution out of the rivers and lakes, reduce flooding, recharge the water table and revitalize your yard:

Rain Gardens

Rain gardens help protect our nearby water bodies by filtering and soaking water back into the ground. For a modest 1,500 square foot home, 5,000 gallons of water from a one inch rain storm run off from roofs, driveways, patios and even lawn.

A simple, low-maintenance rain garden can capture much of that runoff, similar to how the natural environment would function. Learn how you can mimic nature's effects by following this guide to rain gardens.



Program description

Class Details

5 classes - in person

Field Trips: optional but encouraged

Instructors & Resources

- Jennifer Reeves, Oberlin Stormwater Coordinator
440-776-4871; jreeves@cityofoberlin.com

- Susan Bryan, Washtenaw Rain Garden Coordinator

- Northeast Ohio Master Rain Gardeners FB Group
facebook.com/groups/neomasterraingardeners/

- Master Rain Gardeners FB Group
facebook.com/groups/MasterRainGardener

Purpose

We would like all of you to become ambassadors of rain gardens. Plant one yourself. Tell your neighbors. Be the person on your street that everyone asks about rain gardens. Have fun with it. Experiment. Show your neighborhood how beautiful a rain garden is by growing a spectacular one.

History of Program

Since 2011, Washtenaw County Water Resources Commissioner's Office, the City of Ann Arbor, MSU Extension and residents have collaborated to build rain gardens and train Master Rain Gardeners. By completing the Master Rain Gardener course, you will become an invaluable resource to your friends and neighbors. To maintain your Master Rain Gardener Certification: help others build a rain garden, educate the community, or adopt a public rain garden.

In 2022 Lorain SWCD, Lorain County Metroparks, the City of Avon, the City of Elyria, the City of Oberlin, the Village of South Amherst, and Loco Yaks worked with Susan Bryan to bring the Master Rain Gardener course to Lorain County, Ohio.

We believe "Each one, Teach one" is the best way to spread the word about rain gardens. By volunteering to share your knowledge, you will be helping to solve one of the most vexing environmental problems we face today.

Requirements to earn your "Master Rain Gardener" certificate

- 1) Participate in all 5 weeks of course content, and complete all homework and quizzes.
- 2) Design a rain garden for a specific location.
- 3) Present your rain garden design plan.
- 4) Build, dig and plant the rain garden. Or, adopt a rain garden in a public park. Contact your instructor to find one.
- 5) Send your instructor an e-mail so she can send your SWAG.
- 6) Receive your Master Rain Gardener certificate of completion.
- 7) To keep your certification current, each year you must complete one of the following options:
 - a. Help someone else build a rain garden. Send your instructor a photo of the completed garden.
 - b. Share your knowledge about rain gardens. Give a talk about rain gardens to your local library. Host a garden club tour at your rain garden. Or throw a rain garden dinner party at your house. Your choice! Drop your instructor a note about your projects so she knows what great work you do!
 - c. Adopt a Rain Garden. Lead a volunteer weeding day at a public rain garden. Monitor how it grows. Ask your instructor for gardens waiting for adoption in public parks.

Quizzes

We will have a quiz before every class. It is a closed book quiz. The questions are included in this syllabus, so feel free to read ahead. After the quiz we will go over the answers in class. Plant names can be either latin or common names.

Students must build a garden, or adopt a public rain garden to receive the Master Rain Gardener certificate.



Final Rain Garden Plan Assignment

- 1) Dig the rain garden.
- 2) Direct a water source to the rain garden (like a roof downspout, or a trench drain in the driveway)
- 3) Mix in compost and spread mulch.
- 4) Install plants.
- 5) Add a sign, if you like.
- 6) Give it a personal touch (garden art, stone border, edging . . . your choice)
- 7) Email or call your instructor to be awarded your Master Rain Gardener certification.

Skills Checklist:

- ☐ The Big Picture
 - Why?
 - How? In general terms.
- ☐ Site Evaluation
 - Is there enough space?
 - Is your site 10' away from house foundation?
 - Is your site downhill from the water source?
 - Are there any trees, sidewalks, etc. in the way?
 - Is it too steep?
 - Hazards: stay away from basements, retaining walls, utilities, wells & septic fields. Make sure tall plants don't obscure sight lines from a driveway.
- ☐ Drawing up a Plan on Paper
 - Measuring
 - Drawing to scale
- ☐ Water
 - What size of roof equals what size garden?
 - How to get the water there: pipe vs. overland flow
 - Required depth of water and how to dig the garden so water pools to that depth.
- ☐ Plants
 - Wetness zones
 - Types of plants that do well in rain gardens
 - 5 plants you know do well "in your back pocket"
- ☐ Layout and Construction
 - Laying out the footprint of the plan
 - Setting up a level line, then figuring the appropriate depth

Syllabus

CLASS 1: INTRO & TOUR

Announcements & Introduction

Introduction to Rain Gardens

- What is a rain garden?
- What are the benefits?
- How does it function?
- How big does it have to be?
- Story of a rain garden

Rain Garden Plants of the Week - SUN & SHADE

Blue Flag Iris	<i>Iris virginica</i> & <i>Iris versicolor</i>
Fox Sedge	<i>Carex vulpinoidea</i>
Lobelias	<i>Lobelia siphilitica</i> & <i>cardinalis</i>
Wild Geranium	<i>Geranium maculatum</i>
Wild Strawberry	<i>Fragaria virginiana</i>
Black Chokeberry	<i>Aronia melanocarpa</i>
Summersweet	<i>Clethra alnifolia</i>
Virginia Sweetspire	<i>Itea virginica</i> L.
Red-osier dogwood	<i>Cornus sericea</i>
River Birch	<i>Betula nigra</i>

Quiz Prep

Explain to your neighbor what a rain garden is, and what some of the benefits are. Have them ask you questions. Then switch roles.

Homework Assignment

Step 1 of Build your Own Rain Garden:

Start thinking where you will build your own rain garden. It can be in your own yard, or in a willing friend's, or a park, etc. We can find you a site if you don't have one available. Take a picture of the location where you will be designing this rain garden. Get permission from the owner, if it is not on your property. Working in a group is ok.

- ☐ Take photos of the area (or potential areas), and post to the facebook group or send it to your instructor.
- ☐ Read pages 3, 10-12, 22-24

If you want personal feedback on your selected site, post photos and questions in the Facebook group. Or send your instructor an email!

CLASS 2: WHERE & HOW BIG

Individual Feedback

Send photos to your instructor, or post them and a description on the Facebook Group for feedback.

Quiz on last class

1. What is a rain garden?
2. How does it function?
3. What are the benefits?
4. Name 4 plants that will grow in rain gardens in both sun & shade including a grass-like texture plant and a shrub.

Site Selection

What makes a good site for a rain garden? Or, where *not* to plant a Rain Garden.

Percolation Test & How big to make it

- Sizing 20%-30%
- Depth 3"-6" water depth

Rain Garden Elements

- Basin Flat
- Conveyance pipe or swale
- Berm the side of the 'bathtub'
- Outlet the overflow spot
- Soils clay - loam - sand
- Amendments compost

NEORSD Stormwater Credit

Story of a Rain Garden

Rain Garden Plants of the Week - SHADE

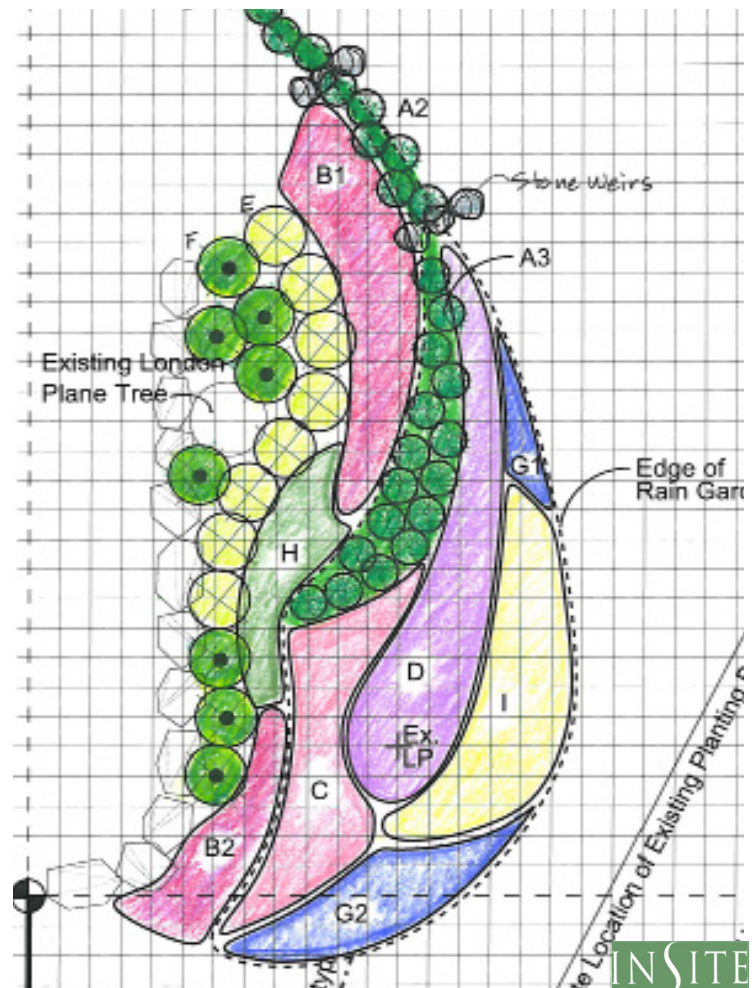
Ostrich Fern	<i>Matteuccia struthiopteris</i>
Sensitive Fern	<i>Onoclea sensibilis</i>
Wild Ginger	<i>Asarum canadense</i>
Marsh Marigold	<i>Caltha palustris</i>
Jacob's Ladder	<i>Polemonium reptans</i>
Wild Hyacinth	<i>Camassia scilloides</i>
Bottle Gentian	<i>Gentiana clausa</i>
Monkeyflower	<i>Mimulus ringens</i>
Early Meadow Rue	<i>Thalictrum dioicum</i>
Sweet Shrub	<i>Calycanthus florida</i>
Sun King	<i>Aralia cordata</i>

Homework Assignment

Step 2 of Build your Own Rain Garden:

Do a site evaluation on your selected property. What spots would not work? What are the spots that meet the criteria? Where would be a good location? Decide where the rain garden will go. Does it fit all of the "Do No Harm" criteria?

- ☐ Take another picture of your site, if necessary, and send it to your instructor, or post it in the Master Rain Gardener Facebook Group for feedback.
- ☐ Read pages 14-20 of this coursepack.
- ☐ Do a percolation test in the spot where you are planning the rain garden: Dig a 18" deep hole and fill it with water. Wait for it to infiltrate and then fill it again. Note time it takes to percolate into the ground the second time.
- ☐ Determine the approximate roof area that will feed the garden. Use the worksheet on page 32. Send that number to your instructor (XX square feet)
- ☐ Figure out how big your rain garden will need to be, using the 20% or 30% rule of Thumb.



CLASS 3:

HOW: DIGGING

Individual Feedback

Send photos to your instructor, or post them and a description on the Facebook Group for feedback.

Quiz

Slide quiz on what might be a good spot for a rain garden, and what might be a bad location.

1. What is the Hippocratic Oath of Master Rain Gardeners?
2. How big will a rain garden be for a 500ft² roof with loam or sand soils? (hint: 20%)
3. What was your site's percolation rate?
4. What are three plants that will do well in a shady rain garden?

Discussion on Percolation Rates

- Who found they have clay? Loam? Sand?
- Clay gardens should hold no deeper than 3" of water while sand can hold 6" of water
- Clay gardens must be bigger than sand gardens to infiltrate the same amount of water
- Clay gardens can use 30% of roof as a multiplier, instead of 20%.

Story of a Rain Garden

Digging, Soils

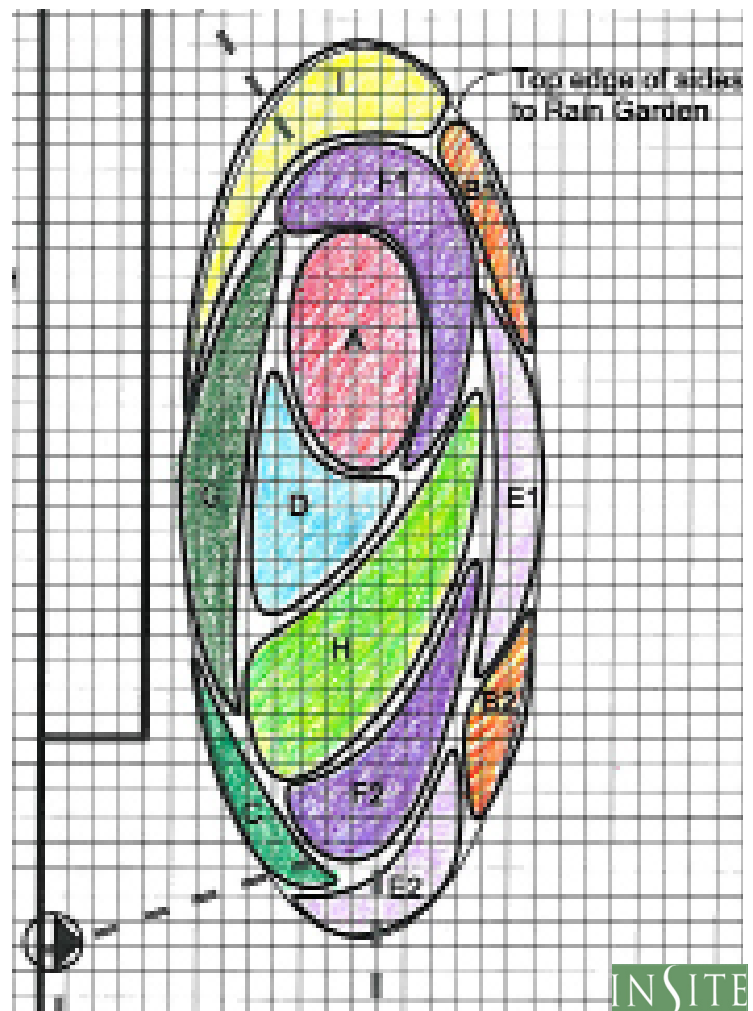
Becoming a Rain Garden Steward

Measuring The Space & Drawing the Plan

How to measure the world, so you can make a base map on which to draw your design.

Rain Garden Plants of the Week - PART SHADE

Canada Anemone	<i>Anemone canadensis</i>
Swamp Milkweed	<i>Asclepias incarnata</i>
Nodding Wild Onion	<i>Allium cernuum</i>
Black Cohosh/Snakeroot	<i>Actaea racemosa</i>
Wild Senna	<i>Senna hebecarpa</i>
Winterberry	<i>Ilex verticillata</i>
Spiderwort	<i>Tradescantia virginiana</i>
Golden Alexander	<i>Zizia aurea</i>
Cutleaf Elderberry	<i>Sambucus racemosa</i>
	'Lemon Lace'



Homework Assignment

Step 3 of Build your Own Rain Garden:
Create a base map for your garden plan.

- ☐ Measure your space using the methods outlined in class and described on page 13.
- ☐ Draw up a base sheet to scale, mapping the house location, and any fences, trees, etc., that are relevant.
- ☐ Start thinking about what size and shape the rain garden will be. Draw a few tentative shapes.
- ☐ Think of some plants that you grow in your own garden, or that you are familiar with and that you would like to try in the rain garden.
- ☐ The best rain garden plants are those that are adaptable to a wide variety of conditions & can grow in extremes. Bring two names of plants to try in your design.

CLASS 4: PLANT DESIGNS

Individual Feedback

Send photos to your instructor, or post them and a description on the Facebook Group for feedback

Quiz

1. What is the approximate roof area that will feed the rain garden?
2. Using your percolation rate, what should the rain garden size be adjusted to, so it is appropriate for the existing soil?
3. What could the dimensions of the rain garden be? (for example, 10'x5')
4. What are two other plants that you would like to try in your rain garden? (not including plants of the day)
5. For part-shade, name a rain garden plant that spreads like crazy, a short plant that is better behaved, two tall plants and a shrub.

Planting Design

Pollinators

Story of a Rain Garden

Plants of the Day - SUN

Switch Grass	<i>Panicum virgatum</i>
Beardtongue	<i>Penstemon digitalis</i>
Blue False Indigo	<i>Baptisia australis</i>
New England Aster	<i>Symphyotrichum novae-angliae</i>
Swamp Sunflower	<i>Helianthus angustifolia</i>
Arkansas Blue Star	<i>Amsonia hubrichtii</i>
Swamp Rose Mallow	<i>Hibiscus moscheutos</i>
Culver's Root	<i>Veronicastrum virginicum</i>
Prairie Dock	<i>Silphium terebinthinaceum</i>
Shrubby Cinquefoil	<i>Potentilla fruticosa</i>
Rattlesnake Master	<i>Eryngium yuccifolium</i>

Homework Assignment

Step 4 of Build your Own Rain Garden: See pages 15-35 for sample designs, plant ideas and additional info.

- ☐ Draw your rain garden design on your base sheet.
- ☐ Draw the outline of the garden: the bottom, the berm, the cut edge.
- ☐ Draw the water conveyance (pipe, or overland flow).
- ☐ Draw in individual, or areas for specific plants. List the plant palette you will be using.
- ☐ Send the photo to your instructor.

CLASS 5: PRESENT YOUR PLAN

Class Presentations

Everyone send one photo of the location you have selected for your rain garden, (.jpg or .ppt) plus a list of what plant species you will be including, and a plan with where they will go. Describe your garden, and ask for feedback before you get out your shovel.

Happy Digging!

Use the Rain Garden Essentials and Resources sections of this coursepack as you build your rain garden. As you dig, compost, mulch, plant, and watch your garden grow, keep us updated. We'd love to hear how it is going, and give you a hand if you need it. (And by a "hand," we mean advice. Don't make us wield a shovel!)

Going Forward

When you are done

Make sure to drop your instructor an email so she knows to send your Master Rain Gardener SWAG! You will be a certified Master Rain Gardener. You will receive: a Master Rain Gardener Certificate of completion.

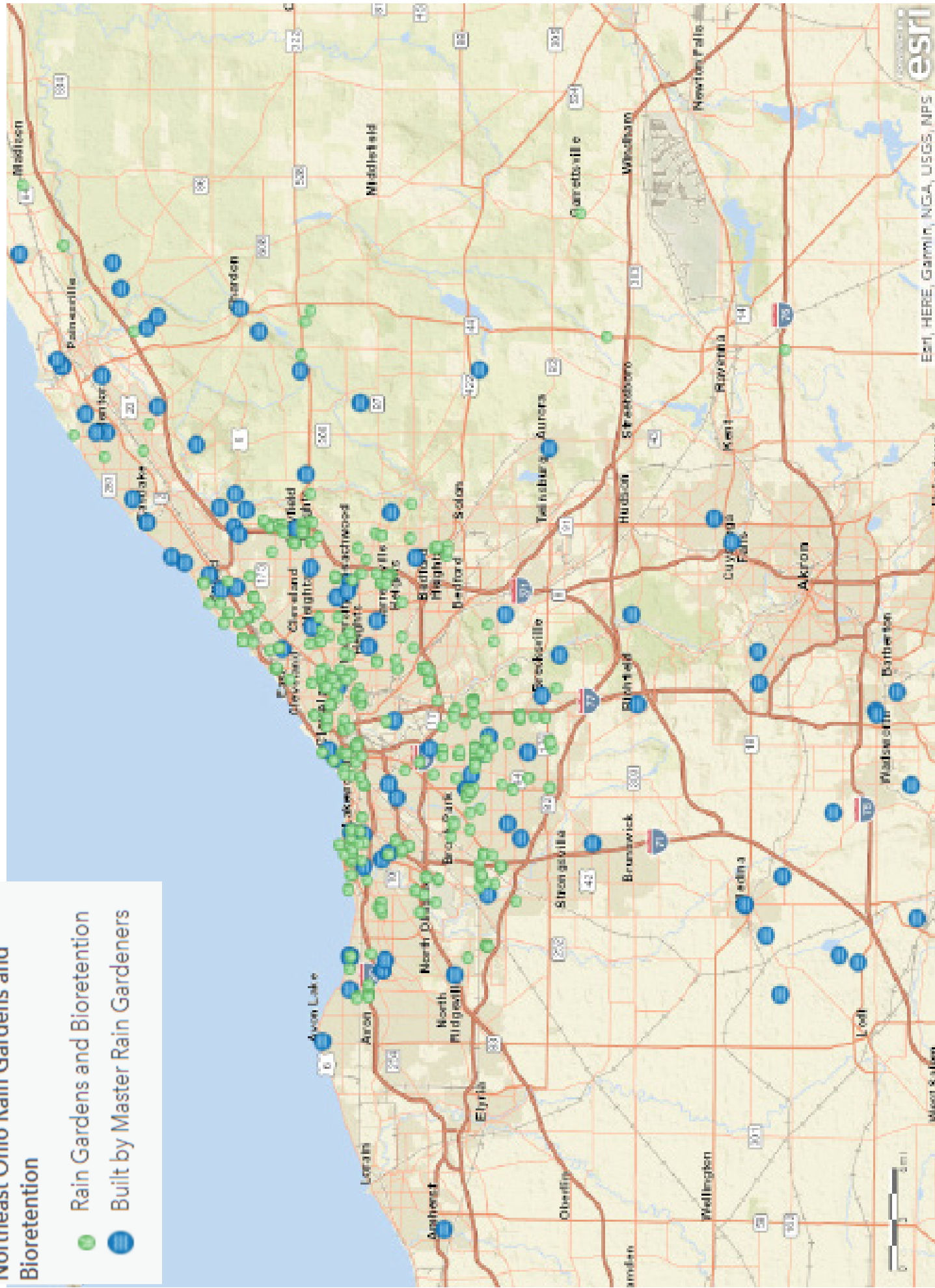
Adopt a Rain Garden!

Our local conservation groups are often in need of help giving presentations on rain gardens, serving on an advisory committee, maintaining a public rain garden, leading a rain garden workday, making a rain garden video, or other various, glamorous rain garden tasks. We might ask you to serve! Contact your instructor to adopt a rain garden.



Northeast Ohio Rain Gardens and Bioretention

- Rain Gardens and Bioretention
- Built by Master Rain Gardeners



Watersheds

Where does the rain water runoff from your property go? In Northeast Ohio, including Lorain County, all watersheds flow into Lake Erie. In Summit, Medina, Portage and Trumbull counties, the southern areas flow to the Ohio River watershed.

Which watershed are you in?

- Look at the map attached to see in what watershed your property lies.
- Get involved! Many of the watersheds have Watershed Groups, which coordinate conservation efforts for that watershed. You can participate in Adopt-A-Beach, River monitoring, a River Clean Up day, run in a 5K fundraiser, or take a class on naturalizing your landscape.



Watershed Groups

Arcola Creek/McKinley Creek

www.lakecountyohio.gov/swcd

Big Creek Connects

www.friendsofbigcreek.org/

Cahoon Creek Frontal Lake Erie

cuyahogaswcd.org

Chagrin River Watershed Partners

crwp.org/

Cuyahoga River Restoration

cuyahogariver.org/

Doan Brook Watershed Partnership

www.doanbrookpartnership.org/

Friends of Euclid Creek

www.cuyahogaswcd.org/euclid-creek

Mentor Marsh

www.cmnh.org/mentor-marsh

Mill Creek

www.millcreekpartnership.org/

Rocky River Watershed Council

www.myrockyriver.org

Bluestone Heights

bluestoneheights.org/bsh/

Tinker's Creek Watershed Partners

tinkerscreek.org

West Creek Conservancy

westcreek.org/

Cleveland Metroparks Watershed Volunteer Program

www.clevelandmetroparks.com

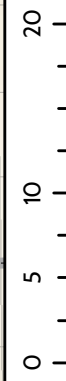
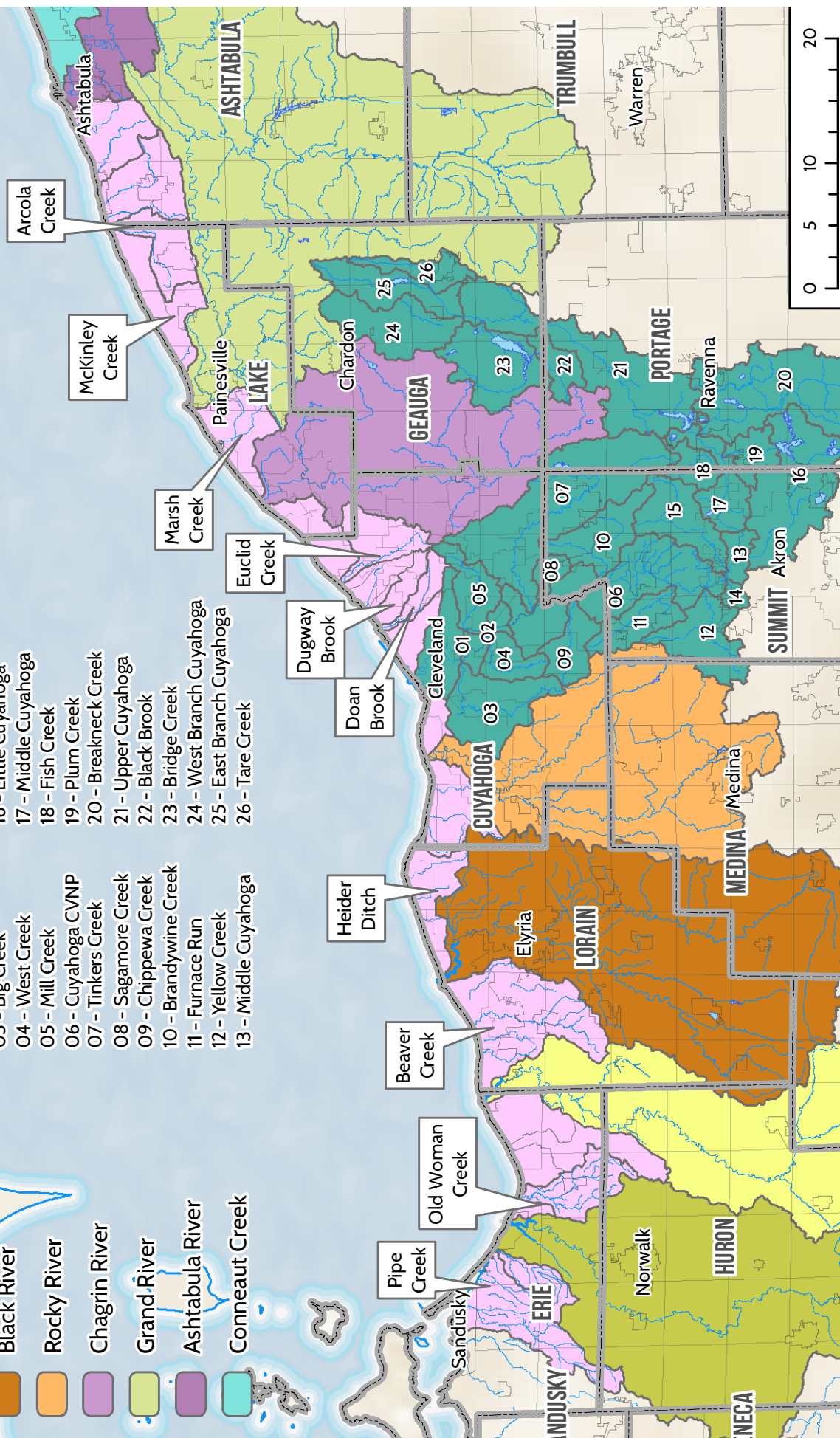


Central Lake Erie Watersheds

- Lake Erie Coastal Tributaries
 - Huron River
 - Vermilion River
 - Black River
 - Rocky River
 - Chagrin River
 - Grand River
 - Ashtabula River
 - Conneaut Creek
 - Cuyahoga River
- Cuyahoga River Subwatersheds**
- 01 - Cuyahoga Channel
 - 02 - Lower Cuyahoga
 - 03 - Big Creek
 - 04 - West Creek
 - 05 - Mill Creek
 - 06 - Cuyahoga CVNP
 - 07 - Tinkers Creek
 - 08 - Sagamore Creek
 - 09 - Chippewa Creek
 - 10 - Brandywine Creek
 - 11 - Furnace Run
 - 12 - Yellow Creek
 - 13 - Middle Cuyahoga
 - 14 - Sand Run
 - 15 - Mud Brook
 - 16 - Little Cuyahoga
 - 17 - Middle Cuyahoga
 - 18 - Fish Creek
 - 19 - Plum Creek
 - 20 - Breakneck Creek
 - 21 - Upper Cuyahoga
 - 22 - Black Brook
 - 23 - Bridge Creek
 - 24 - West Branch Cuyahoga
 - 25 - East Branch Cuyahoga
 - 26 - Tare Creek

We all live in a watershed!

Contact any of our participating watershed organizations to learn ways you can get involved!



RAIN GARDEN ESSENTIALS

A rain garden is a shallow saucer-shaped garden that soaks rainwater into the ground. It fills up with the rain that falls on it – plus rainwater that runs off a hard surface like a roof or a driveway. It is a simple solution but it has a big effect.

The runoff water has picked up pollutants that the rain garden can filter out: phosphorus and nitrogen from fertilizers; bacteria from animal waste; oil, grease and heavy metals from cars, and just plain old “dirt” called sediment.

Studies have shown rain gardens are effective at removing pollutants harmful to human health. [How?](#) Sunlight destroys bacteria and viruses harmful to humans. Petroleum is eliminated by bacteria in the soil. [Heavy metals](#) are adsorbed by soil and mulch particles. This is in addition to those substances which are bad for the environment like nitrogen-containing compounds and phosphorous, at rates of over 90%.

Plants in rain gardens require less watering during hot summer months. Because they capture water from the roof, a rain garden gets enough water that it doesn't need water from the tap. Your water bill can be reduced by using free water from the sky.

Construction Steps

Each site is different but in general, follow these five steps.

- 1) Pick a location at least 10 feet from the house and downhill from the downspout. Call OUPS (811) to check for underground utilities three days before you dig. Dig a garden bed that will hold water 3-6" deep. The area of the depression should be 20-30% the size of the contributing roof or driveway. More information on sizing can be found on page 14.
- 2) Rototill in compost, spread mulch and plant the native plants recommended in this guide, on page 25.
- 3) Direct the water from your downspout or sump pump to your depression, either overland or through a buried, non-perforated black plastic drain pipe, available at most home centers, see page 22.
- 4) Water your garden if it doesn't rain, until it is well established.
- 5) Once your plants are established, they'll thrive without additional watering. Fertilizers aren't necessary but weeding is, especially at the beginning.



Photo of Roger Moon's Rain Garden. Designed & Installed by Roger Moon. Photo credit: Susan Bryan.

TOOLS

- ☐ Tape Measure
- ☐ Shovels
- ☐ Rakes
- ☐ Trowels
- ☐ Line Level
- ☐ String
- ☐ Wood stakes
 - at least 2' tall*
- ☐ Small backhoe
 - or rototiller
 - optional*



Locating

- 1) The garden must be at least 10 feet away from any building to prevent potential water seepage into the basement.
- 2) Select a naturally low spot that is flat or gently sloping and is downhill of the downspout. Avoid tree roots. Make sure overflow from the rain garden will go to a safe location, away from a building.
- 3) Do not place a rain garden over a septic tank, leach field or drinking water well.
- 4) Call OUPS at 811 at least three days before digging to avoid public pipes & utilities.
- 5) Avoid any private wiring or utilities such as driveway lights, sheds with electricity or lawn irrigation pipes.

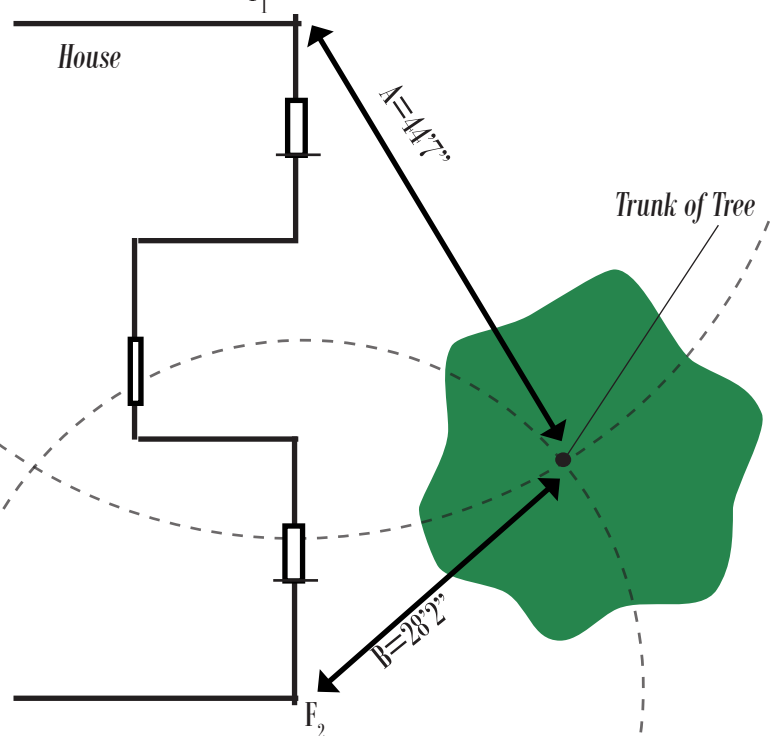
Measuring

Now that you have chosen a general location for the future rain garden, create a base plan that has all the elements that are currently on the site. This is so you can draw up a rain garden plan. Include the house, trees, fences, sheds and bed lines that are near the future rain garden in the base plan. Being able to draw the rain garden plan “to scale” on an accurate base plan will help accurately estimate quantities of plants, mulch & compost. It is handy!

- 1) First start with a piece of graph paper. Each square on the paper might equal one square foot in the real world, depending on the size of your site. Make sure your graph paper is big enough to include your rain garden’s location. To do that, go outside and measure the space. Count the number of squares across your paper and make sure the plan will fit on the paper.
- 2) Measure the distance between two fixed spots. (Often, this is two corners of the house.) Draw them on the graph paper to scale.
- 3) Start locating other objects in the yard (trees, fences, etc.) To do this, measure between both of the fixed spots, and the object. Sketch them on the plan in an approximate location, and write down the distances to each of the fixed spots. For example, $A=44'7''$; $B=28'2''$.
- 4) Go back inside and using a string or compass that is measured to length, triangulate the exact location of the

objects on the plan. Use the graph paper squares to make the string the first length that you measured (A). Holding one end of the string on the first fixed spot (F_1), draw a semi-circle with the other end with the string the length you measured. Then use the graph paper to make the string the second length you measured (B). Holding one end of the string at the other fixed spot (F_2), draw a semi-circle that crosses the first. Where the two circles cross is the location of the object. Erase the approximate location, and re-draw it in the exact location.

5. Repeat this process for fence ends, trees or other objects that will affect the location of the rain garden. Sketch in the approximate location of the future rain garden too. Now you have a base plan on which to draw the shape of the rain garden.



Notes:

Activity courtesy of J. Hiss & N. Booth, (2002) “Residential Landscape Architecture” Design Process for the Private Residence. Prentice Hall.



Sizing

1) Measure the length and width of the impervious surfaces (roof or driveway) that will flow to your rain garden. Multiply length time width to find the area in square feet.

2) Design the garden to be 3-6" deep and 20-30% the size of the impervious surfaces.

3) To figure out the exact size of your rain garden, first test your soil permeability by digging a hole that is the width of your shovel and 18" deep. Fill with water, wait until dry. Fill the hole again with water and time the rate of infiltration.

4) If your hole drains within 24 hours, then you will want your rain garden to be 20% the size of your hard surfaces and the depth to be between 4 and 6 inches. If the hole takes longer than 24 hours to drain, size it at 30% your impermeable surface area and a depth of 3".

Time to Drain	Impermeable Multiplier	Lawn Multiplier	Depth in inches
within 24 hours	0.2	0.05	4-6
longer than 24 hours	0.3	0.1	3

Example

If the impermeable surface draining into my rain garden is 750ft² and my test hole takes longer than 24 hours to drain
 $750 \times .3 = 225\text{ft}^2$

Then my rain garden must be at least:
 225ft² in size & 3" deep*.

The dimensions could be 22.5'x10' or 15'x15'.

5) On your base plan, since one grid box equals one foot, you can count the boxes in the outlined garden to see how many square feet your rain garden is. Count up the boxes in your sketched garden to see if you are making it big enough.

If there isn't enough space on your property for the needed area, or if long term maintenance isn't possible in such a large garden, it is acceptable to make the rain garden smaller. Every little bit helps!

*** If your garden will be capturing overland (lawn) flow, then use the Lawn Multipliers (5 and 10%) to calculate your rain garden size.**

*** You will have to dig your garden deeper than the final elevation to allow for added compost.**

***Use the Rain Garden Sizing Worksheet to help with your calculations on page 32.**

***Can't get outside to test the soil? Web Soil Survey has mapped soil types:**

<https://websoilsurvey.sc.egov.usda.gov/>



Design

1) Draw a rain garden outline on the base plan you just made. Make it any shape you like. Draw in the berm, if you are digging on a slope, on the downslope sides (see page 23 for more information). The berm can take up a surprising amount of room, especially on steeper sites. Make sure you will only be changing the grade of your property, not the grade of your neighbor's property. The rain garden should be at least 2 feet away from the property line.

2) Make sure there is at least ten feet between any structure with a basement (for instance your house, or your neighbor's house) to the rain garden.

3) Make the garden a pleasing shape that goes with the rest of the landscape.

4) Count up the grid boxes in the designed rain garden (not including the berm) to see how many square feet the rain garden is. Are you in the ballpark of the number of square feet you calculated? If not, revise a bit.

5) Decide how water will get to the rain garden: overland swale or underground pipe. More information is on page 22. Draw the path and type of conveyance on the drawing.

6) Select a rainwater overflow outlet location for when the garden fills up and spills over. Make sure it flows away from any buildings and to a safe place.

7) Select plants. Plants for the sides and bottom of the rain garden should include those adapted to the extremes of wet and dry conditions. Plants for the berm should be adapted to dry conditions. See the suggested plant list on page 25.

8) Consider the height, bloom time, sun requirements and color to create a garden you will like.

9) Include some personalized details. A defined border can make the garden look polished. Including stepping stones or stumps can be fun for kids to play on. These are useful for perching on to weed from too. Buy some labels for the new plants so you can identify them when you are weeding.



Miller Ave Rain Gardens in Ann Arbor. Design by Susan Bryan & Chris Carson.

Installed by Hoffman Brothers and Chapman's Nursery in 2013. These gardens capture runoff from the street & are maintained by volunteers. Rose Mallow, pictured.

Sample design: part shade

Black-eyed Susan
Rudbeckia hirta
part sun-part shade
height 2-3'
spread 1-1.5'
Blooms July-Sept



Coral Bells
Virginia Waterleaf
Early Meadow Rue
Blazing Star
Obedient Plant
Starry Solomon's Seal
Black-eyed Susan

Blue-eyed Grass
Canada Anemone
Blue Flag Iris
Blue Lobelia
Blue Lobelia
Gray's Sedge

Spiderwort
Wild Geranium
Slender Mountain Mint
Wild Geranium
Celandine Poppy
Nodding Wild Onion

Sample design: full shade

Wild Geranium
Geranium maculatum
full sun-part shade
height 1.5-2'
spread 1-1.5'
Blooms April-July



Pennsylvania sedge
Wild Geranium



Common Lilac
Swamp Milkweed

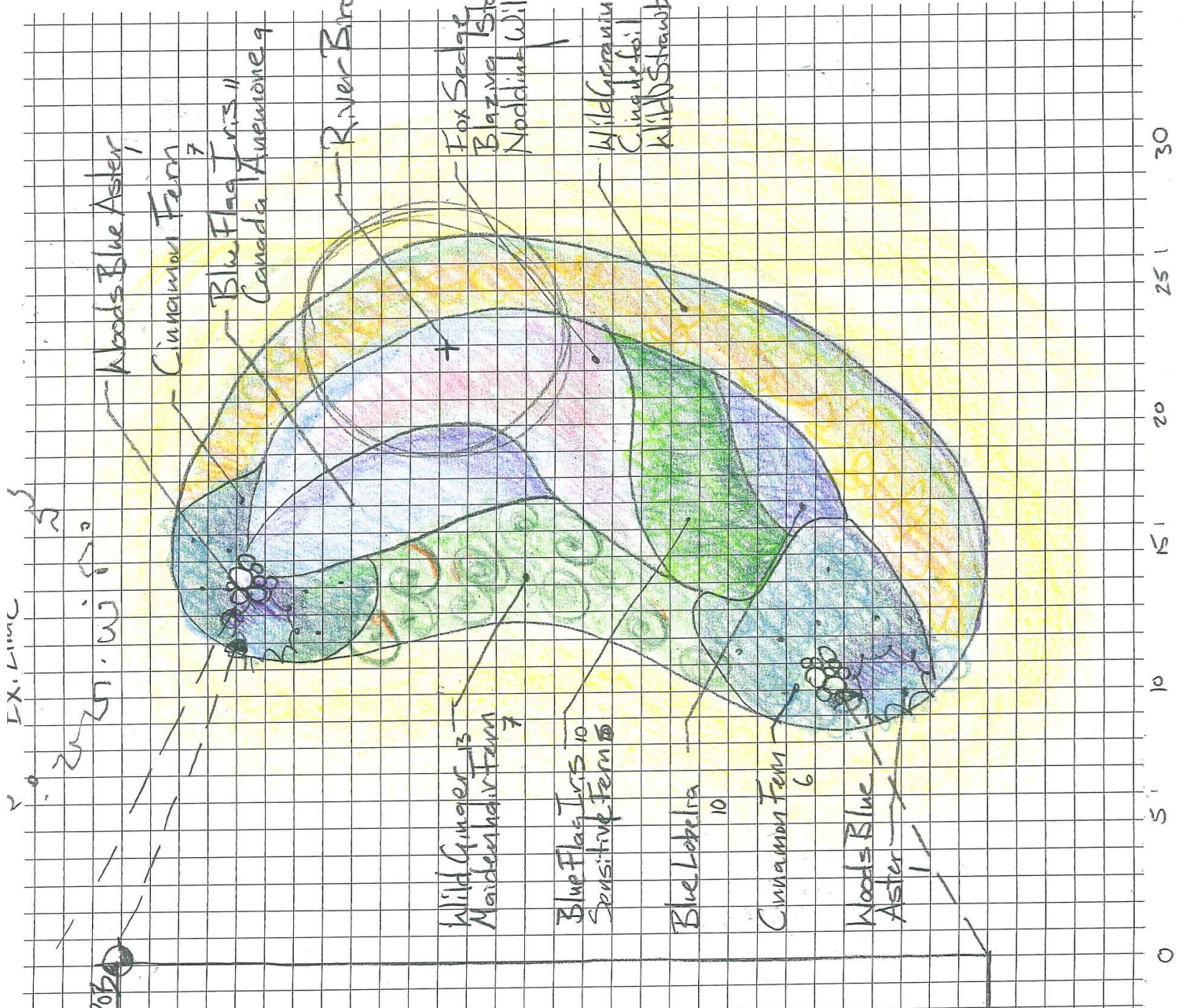
Blue Flag Iris
Prairie Dock

Photo credit: Jonathan Kittel

Sample design: part shade

LEGEND

-  Point of Beginning
-  Stormwater Conveyance from Roof



NOTES

1. Drawing is completed to the accuracy of the base information. Slight modifications may be necessary during installation.
2. Plants are subject to nursery availability. Substitutions may be made.



BEFORE YOU DIG
CALL MISS DIG
800-482-7171
Miss. Reg.

OWNER is responsible to field verify location of all underground utilities prior to any work

Scale 1"=4'-0"

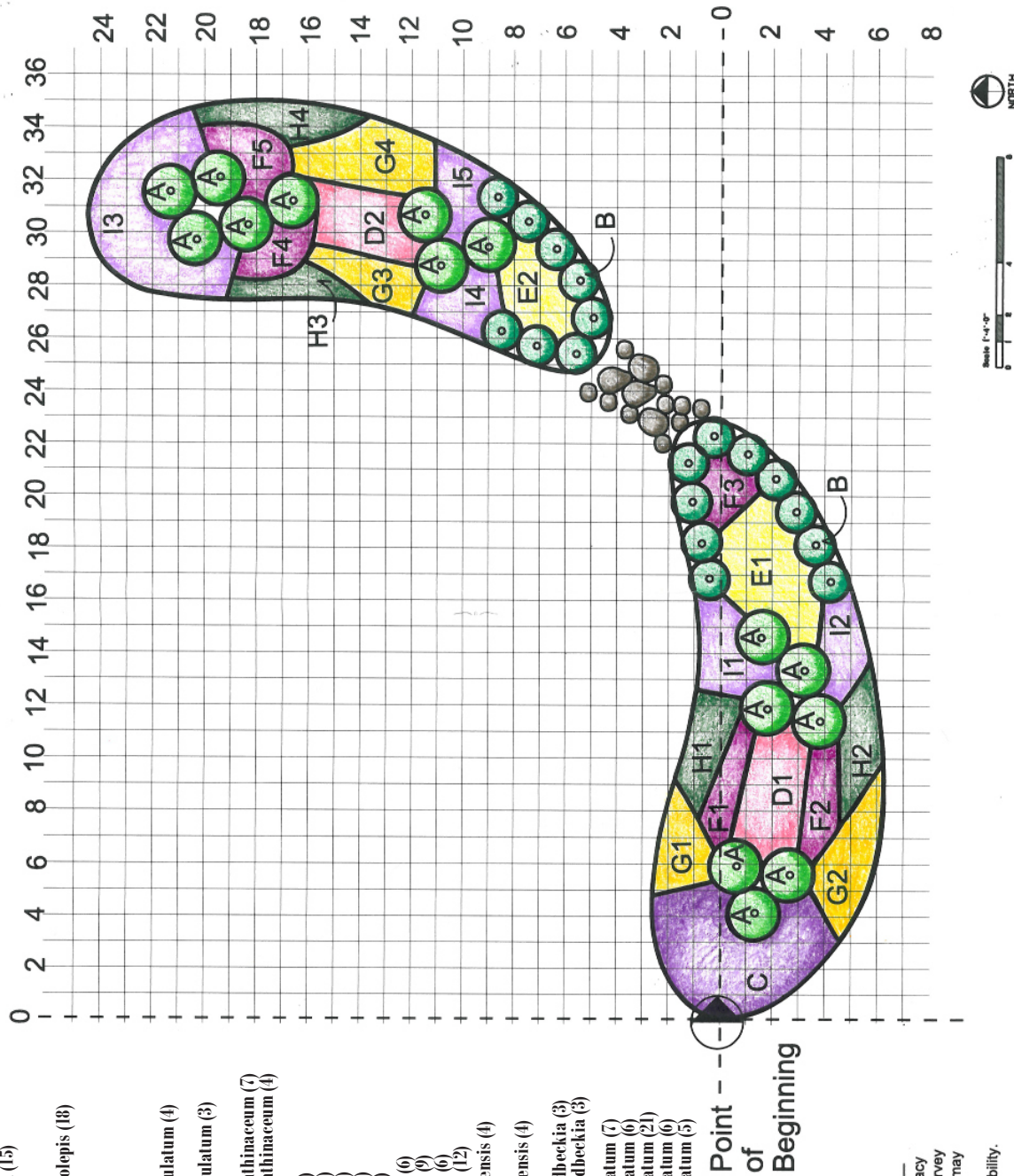
Design by Susan Bryan for Kim Wheeler

Sample design: full sun

IN SITE

LEGEND

- A: *Panicum virgatum* (15)
- B: *Sporobolus heterolepis* (18)
- C: *Iris virginica* (24)
- D1: *Eupatorium maculatum* (4)
- D2: *Ratibida pinnata* (4)
- D3: *Eupatorium maculatum* (3)
- D4: *Ratibida pinnata* (4)
- E1: *Silphium terebinthinaceum* (7)
- E2: *Silphium terebinthinaceum* (4)
- F1: *Liatris spicata* (8)
- F2: *Liatris spicata* (8)
- F3: *Liatris spicata* (6)
- F4: *Liatris spicata* (8)
- F5: *Liatris spicata* (9)
- G1: *Rudbeckia hirta* (6)
- G2: *Rudbeckia hirta* (9)
- G3: *Rudbeckia hirta* (6)
- G4: *Rudbeckia hirta* (12)
- H1: *Anemone canadensis* (4)
- H2: *Rudbeckia hirta* (4)
- H3: *Anemone canadensis* (4)
- H4: *Rudbeckia hirta* (4)
- I1: *Anemone* (3)
- I2: *Rudbeckia* (3)
- I3: *Anemone* (3)
- I4: *Rudbeckia* (3)
- I5: *Anemone* (4)
- I6: *Rudbeckia* (3)
- J1: *Geranium maculatum* (7)
- J2: *Geranium maculatum* (6)
- J3: *Geranium maculatum* (21)
- J4: *Geranium maculatum* (6)
- J5: *Geranium maculatum* (5)



NOTES

1. Drawing is completed to the accuracy of the aerial photo and mortgage survey (if available). Slight modifications may be necessary during installation.
2. Plants are subject to nursery availability. Substitutions may be made.

Project:
Washenaw County
Rain Gardens
Geddes Lake
3000 Lakehaven Dr.
Ann Arbor, MI

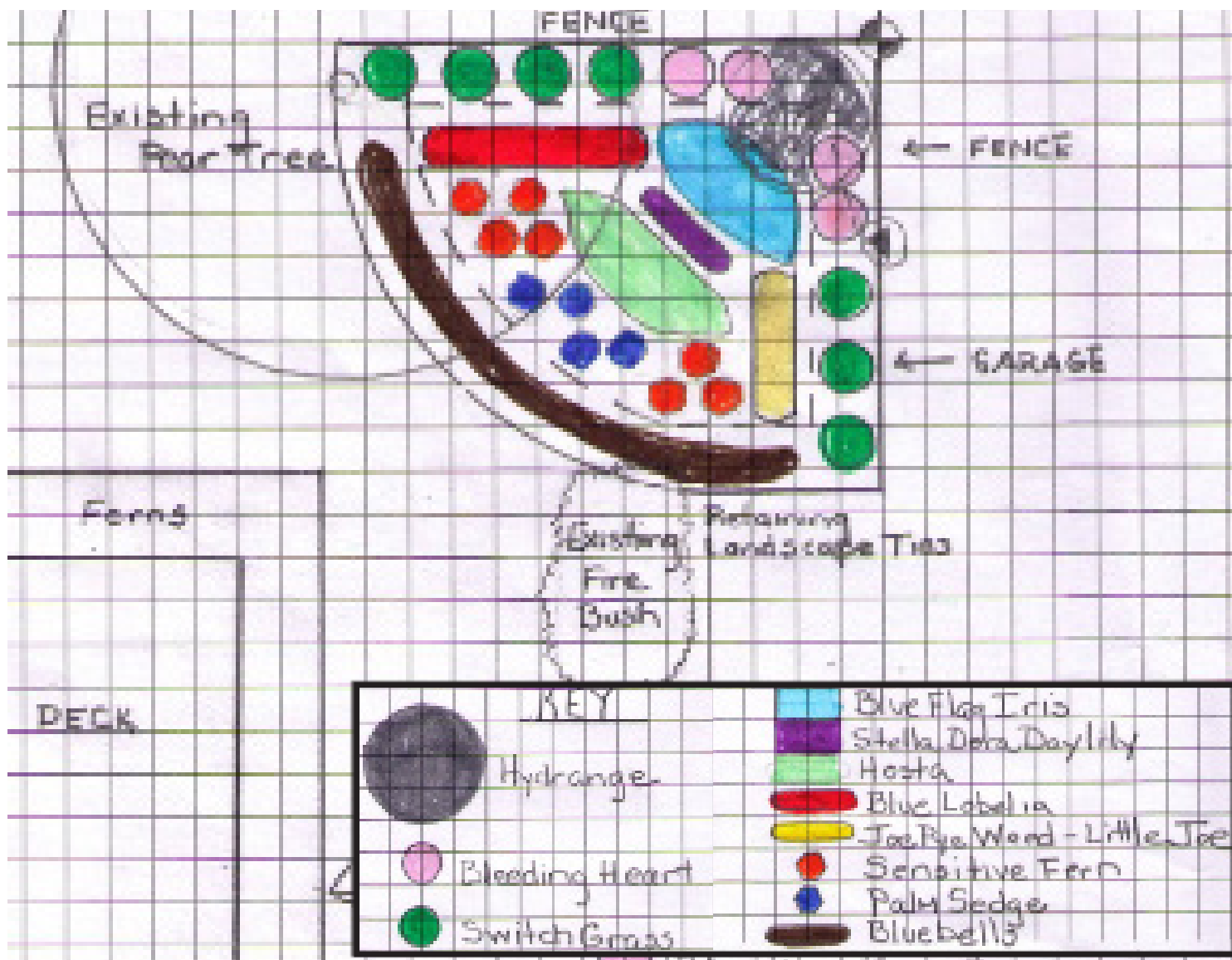


Photo credit: Sallie Richie



Photo credit: Susan Bryan

Sample design: part shade

Top: Master Rain Gardener, Sallie Richie's design

Left: Yard before rain garden construction

Right: Completed rain garden with Master Rain Gardener, Sallie Richie



Sample design: full sun

Top: Master Rain Gardener, Helen Prussian's design and plant list

Bottom Left: Yard before rain garden construction. Footprints in snow outline rain garden border.

Bottom Right: Completed rain garden with Master Rain Gardener, Helen Prussian



Photo credit: Helen Prussian



Photo credit: Susan Bryan

1



Transfer your drawing to your site

1) Translate the dimensions of your rain garden onto the ground by first laying out tape measures that act like the grid paper.

2) Draw the edge of the garden on the ground by placing flags in the measured locations from your 'point of beginning'.

3) Paint the garden border on the grass with spray paint, or use lime or string.

4) Rototill sod, use a sod-cutter, or kill the grass by laying down cardboard and mulch.

5) Dig a shallow depression with a level bottom.

6) With the soil dug out to create the depression, build a berm on the downhill side to hold the water within the garden like a bowl.

7) **Add a notch to the downslope berm for overflow water to go to a safe location.** The notch will determine the water depth within the rain garden.

2



3

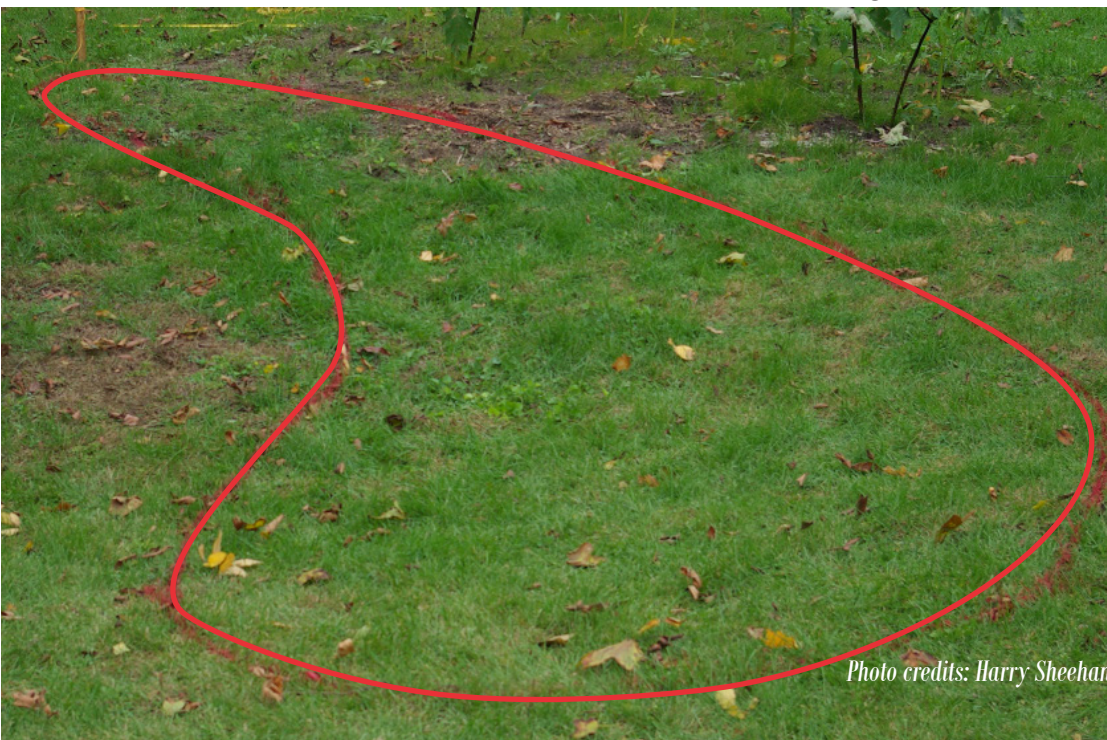


Photo credits: Harry Sheehan

Drainage

With an Underground Pipe

- 1) Sometimes it is necessary to direct water to the rain garden underground with a pipe. The pipe will need to run downhill to the rain garden.
- 2) The pipe should outlet above where the water will pool. The emergency overflow notch will be below the elevation of the bottom of the pipe. This way water won't sit in the pipe. Pipes need to be pitched correctly to avoid freezing in winter. Remember water flows downhill.
- 3) Use a non-perforated pipe with a 4" diameter. Either corrugated black plastic or PVC works. Don't use perforated pipe near the house. PVC is better for long runs (>20'), but is more expensive.
- 4) The end of the pipe can end with a grate (shown) or with a pop-up.
- 5) Place a few stones where the pipe outlets in the garden to reduce erosion.



Rain garden in Dexter, Michigan. Photo credit: Susan Bryan

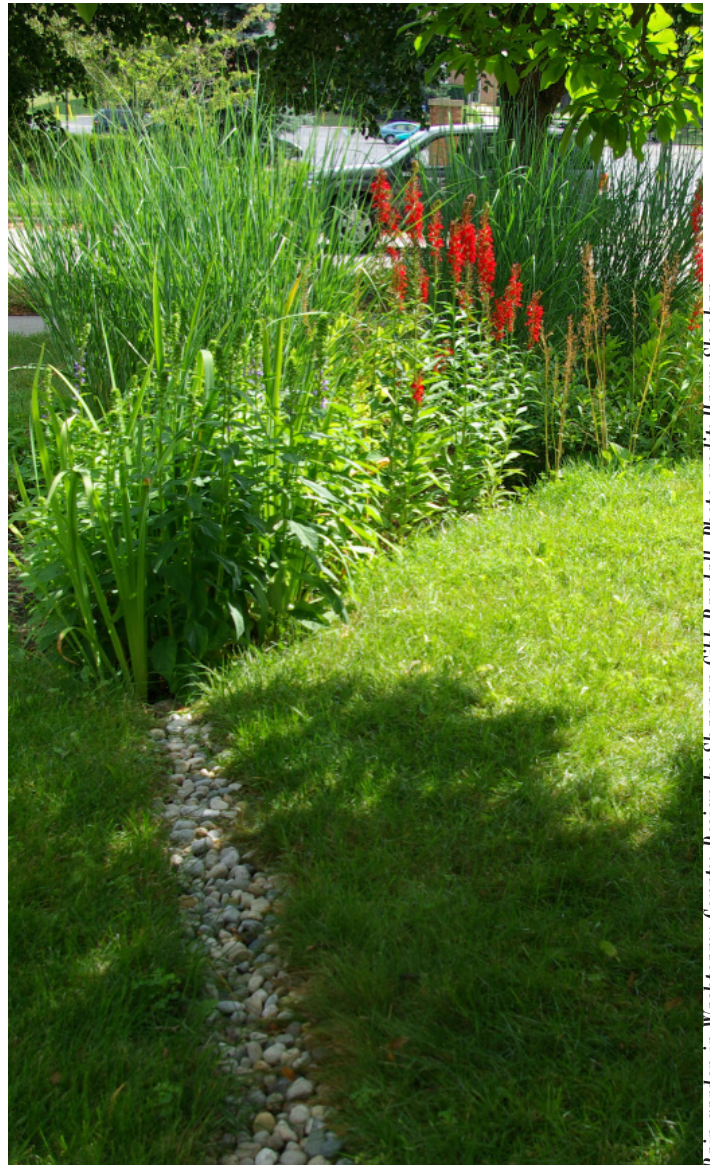
Drainage

Over Land

- 1) Water will run overland to your rain garden if it is downhill from your downspout to your rain garden. Check with a hose to make sure water will flow there.
- 2) Often water will infiltrate into the ground while moving along the channel.
- 3) Your drainage channel can be made of stones, native plants or simply be a lowered grassy pathway.

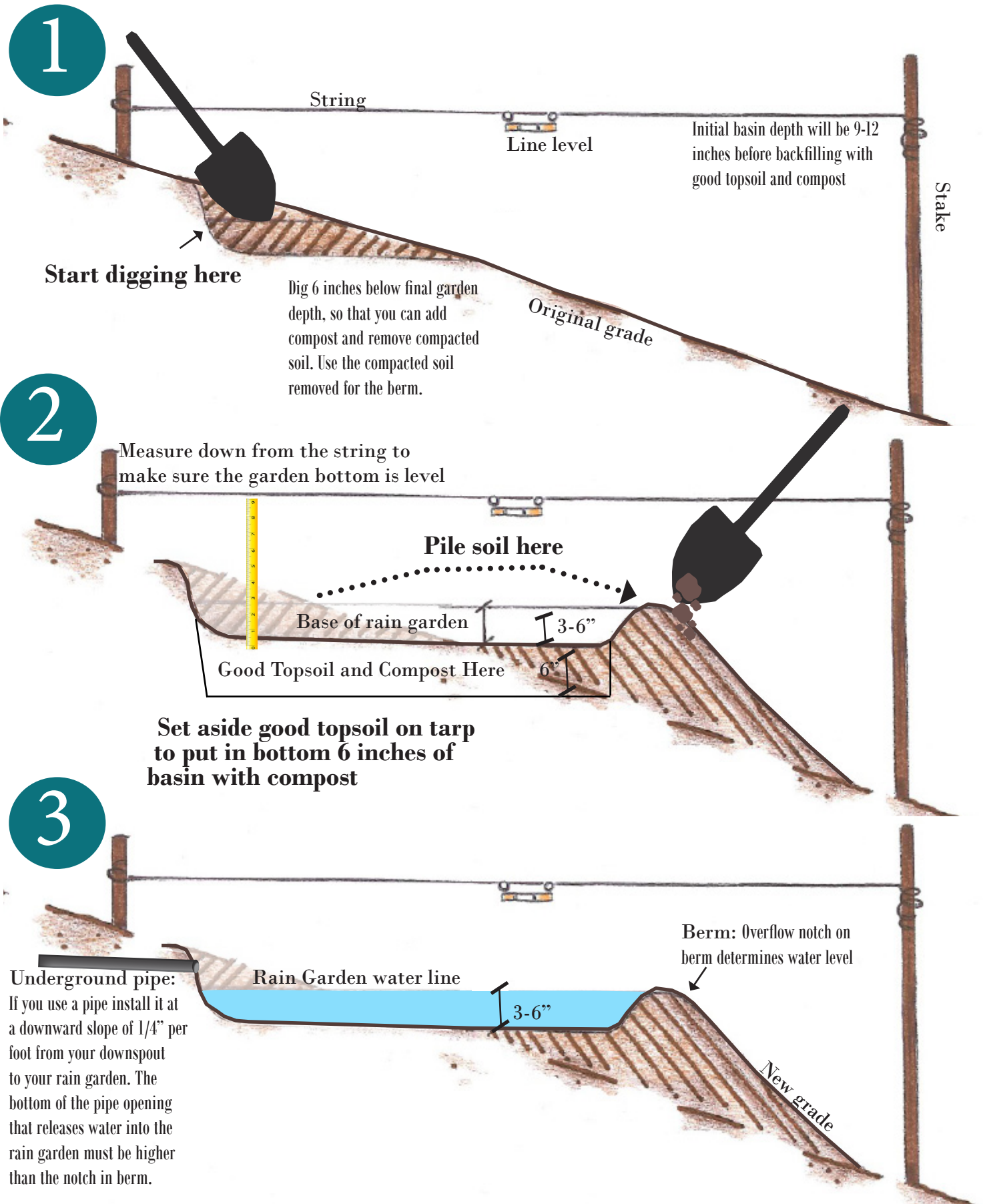


Washtenaw County Water Resources Commissioner



Rain garden in Washtenaw County. Design by Shannan Gibb Randall. Photo credit: Harry Sheehan

Digging the Rain Garden



Soil Amendments

1) Measuring from the bottom of your inlet, dig your rain garden 6 inches deeper than its final intended depth, reserving any topsoil on a tarp. For example, if your rain garden's ponding depth will be 3 inches, dig a 9-inch deep hole. If your rain garden depth will be 6 inches, dig a 12-inch deep hole.

2) Lay 4 inches of topsoil down in the rain garden bottom & sides. Add 2 inches of compost. Till compost into the topsoil and make the basin level. You should now be at your desired ponding depth. At this point, you can either cover the rain garden with 2-3 inches of hardwood shredded mulch or add the mulch after you finish planting.

3) How many cubic yards of mulch and compost do you need? Determine how much compost and mulch is required to cover the garden with the following calculation:

$$(A * 0.00617) = \text{material in cubic yards}$$

where A = area in square feet of garden. This can be calculated by counting the squares on your base plan drawing

Calculation can be used for either compost or mulch material and is for depths of 2".

Planting

If you have plants in your garden that are adapted to both wet & dry conditions, you can transplant them into the rain garden. If you are buying plants, it is recommended to buy plants in pots because seeds are often washed away. Live plants have root systems that can resist the movement of water.

To Plant: dig a hole deep enough that the roots can hang vertically. If the roots are root-bound, break them up. Place the plant deep enough so that the entire root ball is covered but the base of the stem is above the soil. Fill the hole and pat firmly to remove any air space.

Too wet to plant? Place the mulch first. Mulch can soak up some water, and make it less muddy. Don't worry - the plants like it wet.

Watering: Keep soil around plants moist for a few weeks and in times of drought. When to water? Test the soil by sticking your finger into the soil. If your fingertip touches moist, but not soaked soil, you are watering the correct amount.





















When to Plant? Spring and Fall are the best time to plant. For Clayey soils, rain gardens should be planted before mid-October to prevent starting plants in cold soggy soil for their first season.



Rain garden at Eastern Michigan University housing. Design by SGR. Photo credit: Shannan Gibb-Randall.

RAIN GARDEN PLANTS

These are the top twenty plants used successfully in Washtenaw County rain gardens. The first two rows (in blue) should be planted on the sides of your rain garden, where it is moist. The bottom three rows (in green) should be planted on the bottom of your rain garden, where it is the most wet.

New england aster <i>Aster novae-angliae</i>	Canada anemone <i>Anemone canadensis</i>	Wild geranium <i>Geranium maculatum</i>	Black-eyed susan <i>Rudbeckia fulgida</i>
 LBJ wildflower center	 Bransford, W.D. and Dolphia	 LBJ wildflower center	 LBJ wildflower center
Blooms: September - October ☀️	Blooms: May - June 🌞	Blooms: May - June 🌞	Blooms: July - September 🌞 🌧️
Ninebark <i>Physocarpus opulifolius</i>	Redbud <i>Cercis canadensis</i>	Wild strawberry <i>Fragaria virginiana</i>	Blazing star <i>Liatris spicata</i>
 Bloodworth, Stefan	 LBJ wildflower center	 LBJ wildflower center	 Julie Makin
Blooms: May - July 🌞	Blooms: May 🌞	Blooms: May - June 🌞	Blooms: July 🌞
Purple coneflower <i>Echinacea purpurea</i>	Switch grass <i>Panicum virgatum</i>	Nodding wild onion <i>Allium cernuum</i>	Ostrich fern <i>Metteuccia struthiopteris</i>
 LBJ wildflower center	 LBJ wildflower center	 LBJ wildflower center	 LBJ wildflower center
Blooms: July - August 🌞		Blooms: September - October 🌞	
Goldfinger potentilla <i>Potentilla fruticosa</i>	Fox sedge <i>Carex vulpinoidea</i>	Red-osier dogwood <i>Cornus sericea</i>	Rose Mallow <i>Hibiscus moscheutos</i>
 LBJ wildflower center	 LBJ wildflower center	 Garden Photos	 LBJ wildflower center
Blooms: June - July 🌞		Blooms: May - June 🌞	Blooms: August - September 🌞
Pink turtlehead <i>Chelone lyonii</i>	Sensitive fern <i>Onoclea sensibilis</i>	Blue lobelia <i>Lobelia siphilitica</i>	Blue flag iris <i>Iris virginica</i>
 LBJ wildflower center	 LBJ wildflower center	 LBJ wildflower center	 Mahoneys Garden
Blooms: August - September 🌞		Blooms: July - September 🌞	Blooms: May - June 🌞

Legend ☀️ full sun 🌞 part sun 🌧️ aggressive spreader

Common invasives

Refrain from buying, planting or allowing these common invasives to grow. Weed them out!



Yellow Iris
Iris pseudacorus



Purple Loosestrife
Lythrum salicaria



Garlic Mustard
Alliaria petiolata



Autumn-Olive
Eleagnus umbellata



Dames Rocket
Hesperis matronalis



Phragmites
Phragmites australis

Native Plant Producers

Arcola Creek Nursery

2452 Dock Road
Madison, OH 44057
Phone: 440/428-7497
Website: www.arcolacreeknursery.com

Avonlea Gardens and Inn

12511 Fowlers Mill Road
Chardon, OH 44024
Phone: 440/622-7225
Website:
www.avonleagardensandinn.com

Boyert's Greenhouse and Farm

7171 Wooster Pike
Medina, OH 44256
Phone: 330/725-3509
Website: www.boyerts.com

Bremec Garden Centers

Multiple locations
Phone and Website:
Chesterland 440/729-2122
Cleveland Heights 216/932-0039
Concord 440/357-0906
Website: www.bremec.com

Chagrin Valley Nursery

1370 River Road
Gates Mills, OH 44040
Phone: 440/423-3363
Website: www.cvnursery.com

Gale's Garden Center

Multiple locations
Phone and Website:
Westlake 440/871-0808
www.donzells-gales.com
Willoughby Hills 440/944-6066
www.galeswilloughby.com
Maple Heights 216/662-4080
www.galesmaple.com

Plant it Native

Willoughby Ohio
Website: plantitnativeohio.com

Genius Loci, Inc.

by appointment only
Elyria, OH 44035
Phone: 440/324-3465
Website: www.indigation.com

Grace Brothers Nursery and Supply

12905 Ridge Road
North Royalton, OH 44133
Phone: 440/237-2577
Website: www.gracebrosnursery.com

Klyn Nurseries

3322 S Ridge Road
Perry, OH 44081
Phone: 440/259-3811
Website: www.klynnurseries.com

Native Roots, Inc.

by appointment only
3576 Five Oaks Drive
Richfield, OH 44286
Phone: 330/704-5735
Website: www.nativerootsinc.com

Natives in Harmony

4652 Township Road 179
Marengo, OH 43334
Phone: 419/688-9800
Website: www.nativesinharmony.com

Nodding Onion Gardens Native Plant Nursery

not open to the public
sells at Frostville Farmers Market
Columbia Station, OH
Email: noddingoniongardens@gmail.com
Website: www.noddingoniongardens.com

OPN Seed

mail order native seeds
Hiram, OH 44234
Phone: 866/569-3380
Website: www.opnseed.com

Pam's Perennial Plant Farm

3804 Hemphill Road
Norton, OH 44203
Phone: 330/706-9660
Website: www.pamsperennials.com

Perennials Preferred

7572 Mayfield Road
Chesterland, OH 44026
Phone: 440/729-7885
Website: www.perennialspreferred.com

Richardson Farms

6984 Lafayette Road
Medina, OH 44256
Phone: 330/722-4029
Website: www.richardson-farms.com

Riverside Native Trees & Nursery, LLC

2295 River Road
Delaware, OH
Phone: 740/815-3230
Website: www.riversidenativetrees.com

Royal Victorian Garden Center

10911 State Road
North Royalton, OH 44133
Phone: 440/582-2229
Website: www.rvrgardens.com

The Shady Nook

by appointment only
5581 South Ridge Road
Madison OH
Phone: 440/983-9407
Website:
www.theshadynook@windstream.net

This is not a comprehensive list of native plant nurseries, nor do all of these sell strictly native plants. Be sure to take your native plant list with you when you go plant shopping. Larger stores often stock native plants as well.

Resources

There are myriad resources for native plants but often you have to do a bit of driving to find them. In the Spring, many places have sales. These are a few around the region:

Native seed resources

Cuyahoga Soil & Water Conservation District
Website: www.cuyahogawcd.org

Summit Soil & Water Conservation District
Website: www.sswcd.summitoh.net

Annual native plant and tree sales

Cleveland Metroparks
Website: www.clevelandmetroparks.com

Cuyahoga Soil & Water Conservation District
Website: www.cuyahogawcd.org

Geauga Soil and Water Conservation District
Website: www.geaugawcd.com

Holden Arboretum
Website: www.holdenarb.org

Lake Soil & Water Conservation District
Website: www.lakecountyohio.gov/swcd

Nature Center at Shaker Lakes
Website: www.shakerlakes.org

Portage Soil & Water Conservation District
Website: www.portageswcd.org

Rockefeller Greenhouse
Website: www.rockefellerparkgreenhouse.org

Western Cuyahoga Audubon Society
Website: www.wcaudubon.org

Every community has plant exchanges, usually hosted by garden clubs.

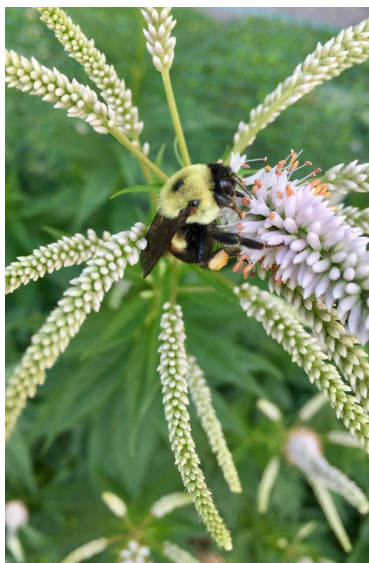
Mature gardeners want to give their perennial splits to you instead of composting them! Find your local exchange and share your own plants!



Washtenaw County Water Resources Commissioner



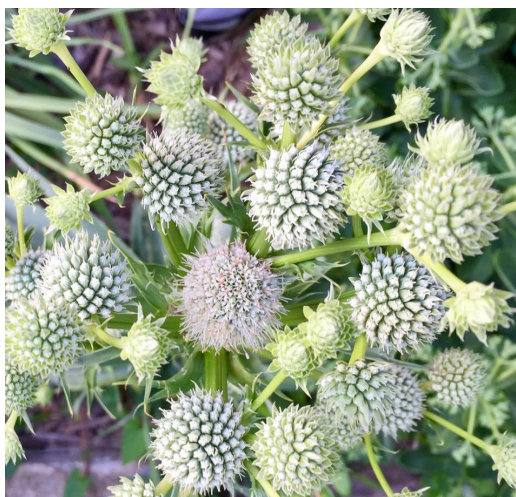
Left: Rain garden with beebalm, coreopsis, swamp milkweed and pale coneflower. Photo credit: Natalie Gertz-Young



Culvers Root with a bumblebee. Photo credit: Amy Roskilly

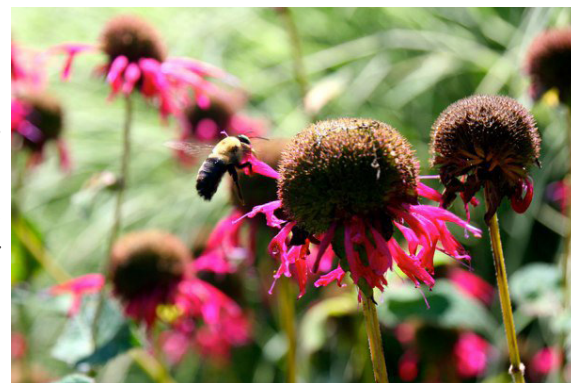


Above: Rain garden berm with butterflyweed with monarch caterpillars. Photo credit: Natalie Gertz-Young



Left: Rattlesnake Master. Photo credit: Amy Roskilly

Right: Bee Balm with a bumblebee. Photo credit: Amy Roskilly



Compost & Mulch

1 cubic yard of farm compost or topsoil weighs approximately 1 ton

Pickup truck capacities: most 1/2 ton pickup trucks and short bed pickup trucks have a volume capacity to hold 1.5 cubic yards but most don't have the weight capacity to safely haul more than 1 cubic yard.

3/4 and 1 ton pickup trucks have the capacity to hold up to 2 cubic yards.

Coverage for spreading compost, topsoil or mulch:

1 cubic yard @ 1" depth covers 324 square feet
2" depth covers 162 square feet
3" depth covers 108 square feet
4" depth covers 81 square feet

Or use the calculator on the link below to estimate how many cubic yards you need:

<https://www.scotts.com/en-us/tools/mulch-calculator>

3 Z's

Screened Leaf humus is \$24.75/cubic yard. Mulch is also available. Delivery and pickup is available. Delivery cost varies by zip code. They have two locations. Call 216-524-4544 or online at <http://three-z.com/>

8700 Heinton Road
Valley View, Ohio 44125-4130
34020 Royalton Road
Eaton Township, OH 44028

Boyas

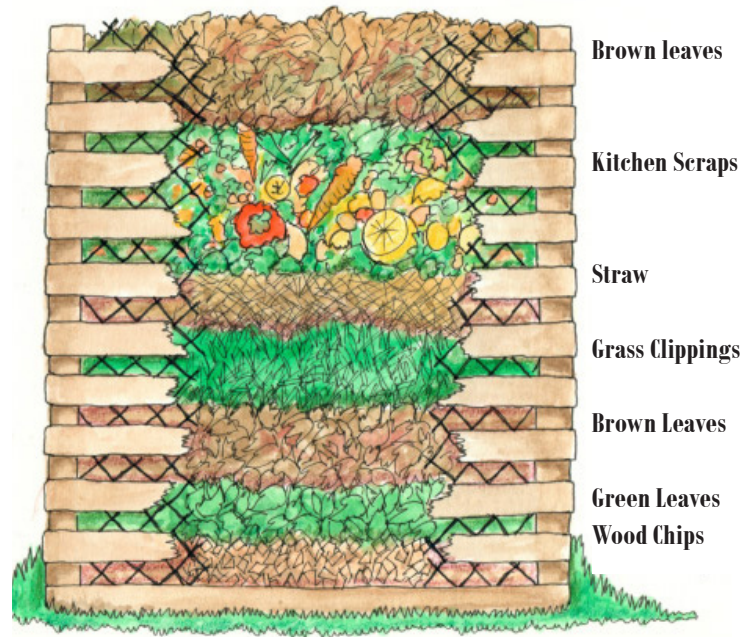
Double shredded hardwood mulch is \$32/cubic yard. 216-524-3620
11311 Rockside Road Cleveland, OH 44125

Earth to You

Screened leaf compost is \$25.95/cubic yard. Delivery cost varies by city. Mulch is also available. 26690 Detroit Rd. Westlake Ohio. 440-892-8080. <http://www.earthtoyoulandscape.com/earthtoyoulandscape.com/Home.html>

Kurtz Brothers

Earthblend Leaf Compost is available at \$25.50/cubic yard. Mulch is also available. Pickup or delivery is available. Price of delivery varies by zip code. Call 216-986-7000. Kurtz has several locations and hours. Check their website. <https://www.kurtz-bros.com/locations-hours/>



Build your own compost with kitchen food scraps and yard waste. Graphic courtesy of landscapeforlife.org

Rust Belt Riders

Rust Belt Riders sell a fungally dominant compost at \$60/cubic yard. Call or email to 216-800-4651 or info@rustbeltriders.com for more information. Pickup only. 5401 Hamilton Avenue Cleveland, OH, 44114

City of Independence

They city of Independence offers free compost and delivery to its citizens. Call 216-524-9191. Or <http://www.independenciohio.org/Departments/Service/CompostDelivery.aspx>

City of Mayfield Village

Mayfield Village offers up to four yards of compost or woodchips and delivery to its citizens. Call 440-442-5506. Or <https://www.mayfieldvillage.com/services/service-department/service-programs/leaf-and-mulch>

City of Westlake

Leaf humus and wood chips are available at \$10/cubic yard and \$7/cubic yard respectively. Materials MUST be purchased at Westlake City Hall, 27700 Hilliard Blvd., Monday - Friday, 8 a.m.- 5 p.m. They CAN NOT be purchased at the Westlake Service Center. Once you have purchased your materials, you can pick up from the Westlake Service Center, 741 Bassett Rd.

Please Note: other communities may offer free compost, mulch, or woodchips to its citizens. Contact your community service department to find out.

ADDITIONAL INFORMATION

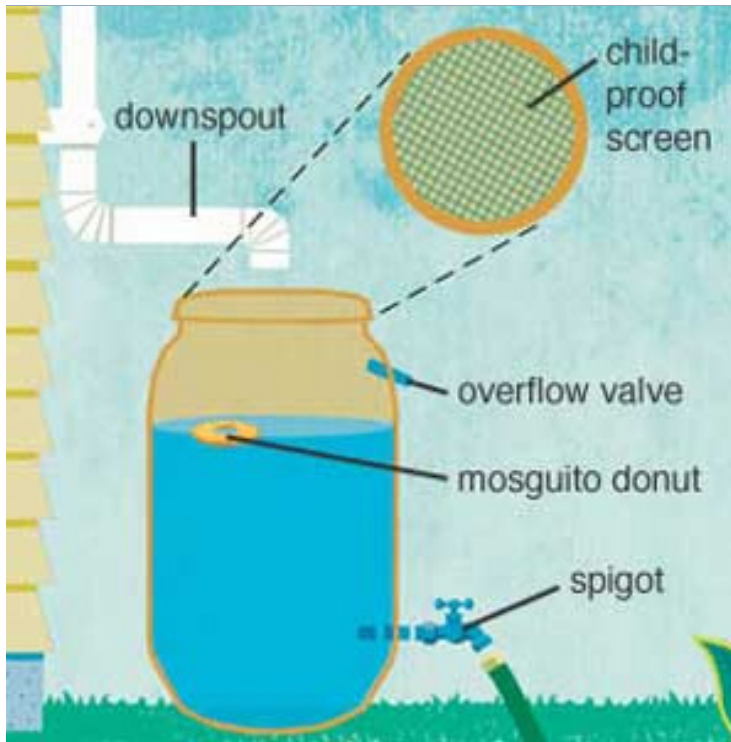
Rain Barrels

What is a Rain Barrel?

A rain barrel collects and stores rainwater from your rooftop to use later for things like lawn and garden watering. Water collected in a rain barrel would normally flow through your downspout, onto a paved surface and eventually into a storm drain.

Why use a Rain Barrel?

Rain barrels help lower water costs by storing approximately 1,300 gallons of water during peak summer months. Using stored rainwater on your garden or lawn instead of directing rooftop runoff to the storm drain network helps recharge groundwater naturally. Rain barrels reduce water pollution by limiting stormwater runoff, which can contain pollutants like sediment, oil, grease, bacteria and nutrients. Rain barrels are inexpensive and easy to install.



Graphic courtesy of mtwatercourse.com



Automatic diverter. Courtesy of rainbarrelsandmore.com

Available through Local Soil & Water Conservation Districts

Barrels are a closed water system with cover to keep out leaves, debris and mosquitoes.

- They have a spigot that can connect to a hose or to fill a watering can
- Recommended placement is 12" high using an optional pedestal, cement blocks or other materials.

Automatic Diverters are also available for connecting rain barrels to downspouts. When it rains, some water will flow from the diverter, through the hose to the barrel and some water will also continue to flow down the lower section of the downspout. When the rain barrel is full, then all the water will flow down the downspout. A 55 gal. rain barrel will take about 1 hour to fill with a Diverter installed (15-20 minutes without). Using the Diverter eliminates the need for an overflow hose to be connected to the barrel and routed to an overflow location. Sizes are available to fit 2"x 3" or 3"x 4" downspouts and hose is included.

To make a Rain Barrel:

Materials Needed

- Drill, with 1 inch forstner bit
- 4 inch hole saw
- Adjustable wrench
- Caulk
- empty, food grade, 55 gallon barrel
- 3/4 inch spigot, or hose bibb
- 3/4 inch MH x 3/4 inch MIP (1/2 inch FIP) garden hose adapter
- 2x3 inch to 4 inch round downspout adapter
- Safety gear (ear and eye protection, gloves)
- Recommended placement is 12" high using an optional pedestal, cement blocks or other materials

Step by Step Instructions

1. Make sure the barrel is thoroughly washed and rinsed, both inside and out. If there are any stickers remaining on the barrel, they can be scraped off.

2. (OPTIONAL) If you have a clear plastic barrel, or if you would like to, you may paint the exterior of the barrel. This is recommended if the barrel is not opaque/blue. Otherwise, light may get through and cause algae to grow.

3. On the top of the barrel, near the edge, drill a 4 inch round hole. Insert the downspout adapter in this hole and seal it with a bead of caulk. This is where the downspout and stormwater will feed into the barrel.

4. Center the 4 inch downspout at the back of the barrel from you. Look at the front bottom area of the barrel that is facing you. Drill a 1 inch hole with the forstner bit down here.

5. Use the adjustable wrench to screw the spigot into this drilled hole. When the spigot is close to being fully inset, put a bead of caulk between the neck of the spigot (where the wrench is gripping) and the barrel for added waterproofing. Finish installing the spigot when the opening is facing down and the handle to open/close the spigot may still turn freely.

6. Look at the barrel from the front again; that is, have the spigot facing you and the downspout adapter at the back. Turn the barrel a quarter to either the left OR the right. Near the top (where the downspout adapter is installed) but *on the side body of the barrel* drill another 1 inch hole with the forstner bit.

7. Use the adjustable wrench to screw the garden hose adapter into this drilled hole. It does NOT need to be sealed with caulk. This is the overflow hole. A garden hose or other tube may be connected to the hose adapter to direct the overflow towards, say, a rain garden or other area when the rain barrel fills up.

8. Set up concrete blocks or some other kind of pedestal under the downspout the barrel will be connected to. Move the empty barrel onto the pedestal and directly feed the downspout into the downspout adapter.

9. Make sure to empty the barrel for winter storage. Other care information may be found online.



*Homemade Rain Barrel. Design modified by Jennifer Reeves.
Photo credit: Jennifer Reeves*

RAIN GARDEN SIZING WORKSHEET

Utilize the equations below to calculate area and depth of the rain garden.

1) Percolation Hole Drain Time & Corresponding Rain Garden Depth:

Use values from this table to calculate rain garden area and depth based on percolation test results

Slower draining percolation tests will build larger but more shallow rain gardens.

Percolation Time	Impervious Size Factor	Pervious Size Factor	Depth (Inches)
Over 24 Hours	0.3	0.1	3
Under 24 Hours	0.2	0.05	6

2) Impervious Drainage Area (Roofs, Driveway, Sidewalk, Street)

Length * Width of roof, driveway, sidewalk directed to rain garden

		Rain Garden Size (sq. ft.)		
		Area (Sq. Ft.)	Over 24 Hours	Under 24 Hours
Width (ft)	Length (ft)	Length * Width	Area * 0.3	Area * 0.2

3) Pervious Drainage Area (Yard)

Length * width of yard area directed to the rain garden

		Rain Garden Size (sq. ft.)		
		Area (Sq. Ft.)	Over 24 Hours	Under 24 Hours
Width (ft)	Length (ft)	Length * Width	Area * 0.1	Area * 0.05

4) Rain Garden Size if Draining both Yard and Hard Surfaces

Sum Rain Garden Size from Lines 2 and 3

		Rain Garden Size (sq. ft.)	
		Over 24 Hours	Under 24 Hours
Size (sq ft)			
Depth (Inches)		3	6

This calculation is designed to catch runoff from a 0.5 inch rain event. If you do not wish to build a rain garden of this size, a smaller rain garden will still help control runoff and filter pollutants.

Additonal Resource Guides

- 1 Washtenaw County Rain Garden website
www.MasterRainGardener.org
- 2 Rain Garden iPhone App
by UCONN, CT Sea Grant, Connecticut Cooperative Extension & CLEAR.
- 3 Rain Garden Manual – Ohio Rain Garden Manual
<https://cuyahogascwd.org/programs/rain-gardens>
- 4 The Blue Thumb Guide to Rain Gardens
bluethumb.org/raingardens
- 5 Wisconsin Extension Pamphlet - Rain Gardens, a How To Manual for Homeowners
https://www.chicagobotanic.org/downloads/wed/WI_DNR_homeowners.pdf
- 6 Rain Garden Calculator
Raingardenalliance.org/right/calculator
Get a quick estimate of the size and costs of your rain garden. But watch out! If you pick clay as your soil, they estimate a much bigger rain garden than we recommend.
- 7 “Lakescaping for Wildlife & Water Quality”
Book by Carol L Henderson and the Minnesota Department of Natural Resources.
Available via Amazon, or directly from the Minnesota State Bookstore
- 8 Videos from Kevin’s Rain Gardens, a landscaper in Illinois.
YouTube: [KevinsRainGardens](https://www.youtube.com/channel/UCv3v3v3v3v3v3v3v3v3v3v3)
Rain Garden Installation from Start to Finish
- 9 Rain Garden Online Discussion Forums:
Facebook Group: www.facebook.com/groups/neomasterraingardeners
Great Lakes Gardening Forum: www.houzz.com/discussions/great-lakes-gardening

RAIN GARDEN IMPLEMENTATION GUIDE

1. Complete your rain garden design and plant list
2. Decide where you will buy/ borrow supplies
3. Draw your rain garden outline on the ground (paint, hose, or flags)
4. Assemble tools and supplies for construction: page 35
5. Dig connection from water source to rain garden location
 - Dig a trench for the pipe - from the downspout to rain garden location. Pipe must be pitched to avoid freezing. (shovel or trench digger)
 - Or, if it is overland flow, test it (hose or rainfall), so you know the water will arrive at the rain garden.
 - Temporarily disconnect water source from the rain garden, while you dig.
6. Site Preparation
 - Cut Grass to lowest level possible
 - Remove Grass (Sod Cutter or flat shovel); stage sod for use in Berm (Tarps) or repair grass in other locations.
7. Dig & Build Basin
 - Dig the basin. Keep the good topsoil (tarp).
 - Pile the subsoil to form the berm. Or, put the soil in other locations in your yard (shovel/backhoe, wheel barrow)
 - Remove additional 2 inches of material for replacement with compost
 - Create Berm at desired height, considering overflow plan (spread and mix compost in berm as well)
 - Measure basin bottom to ensure it is generally level (line level, or level on a board)
 - Cultivate / Mix 2 inches compost with good topsoil from tarp in bottom of basin (rototiller or shovel)
 - Finish shaping basin for final depth (rake)
 - Shape gentle berm slopes - not cliffs.
 - Create Basin edging for grass mowing interface
8. Plant staging and planting
 - Locate assorted plants at desired locations, considering wettest for Basin bottom, and Light patterns for Sun / Shade areas
 - Plant items - (use upside down plant pots to protect plants while mulching)
 - Mulch Basin & Berm
9. Connect Water Source & Create Overflow
 - Re-connect downspout to trenched-in pipe.
 - Create a notch in the berm for the overflow/Connect overflow device to overflow area
 - This notch defines how deep the water will pool
 - Check height levels for proper inlet / overflow level - the notch elevation should be equal to, or lower than, the elevation of the bottom of the inflow pipe
 - Place rocks to control erosion where the water flows into the garden



RAIN GARDEN IMPLEMENTATION GUIDE

- **Tools / Measuring Devices**

- Sod Cutter
- Rototiller
- Tarp
- Spade
- Flat Shovel
- Pick / Hoe / Maddox
- Rake
- Marking Paint / String / Stakes
- Line Level / Level
- Tape Measure
- Planting Trowel



- **Materials**

- Compost, Cubic Yards
- Hardwood Mulch, Cubic Yards
- Pipe: 4" pvc or 4" corrugated black
- Connectors for pipe to downspout
- Inlet erosion control material, i.e. large size Rock / Gravel
- Edging - brick/rock/plastic
- Deer Barrier / Deterrent Device

- **Plants from design listing**

- **Create cost estimate for final item procurement**

Thanks to 2019 Master Rain Gardener Mark Brody for this Implementation Guide. Check out his Rain Gardens at work!





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Join the Northeast Ohio Master Rain Gardener group on Facebook.
[/neomasterraingardeners](https://www.facebook.com/neomasterraingardeners)

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