Rain Garden Design Workshop
Train-the-Trainer

November 4, 2024

Live at the Rutgers EcoComplex

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AGENDA

1. Review of rain garden educational presentation
2. Instruction on how to deliver an in-person technical design workshop
    a) Select rain garden location
    b) Determine rain garden drainage area
    c) Web soil survey
    d) Rain garden sizing
    e) Plant information
    f) Sample designs
    g) Maintenance guide

Review of Rain Garden Educational Presentation

Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.

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Water Resources Program

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Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.

www.water.rutgers.edu

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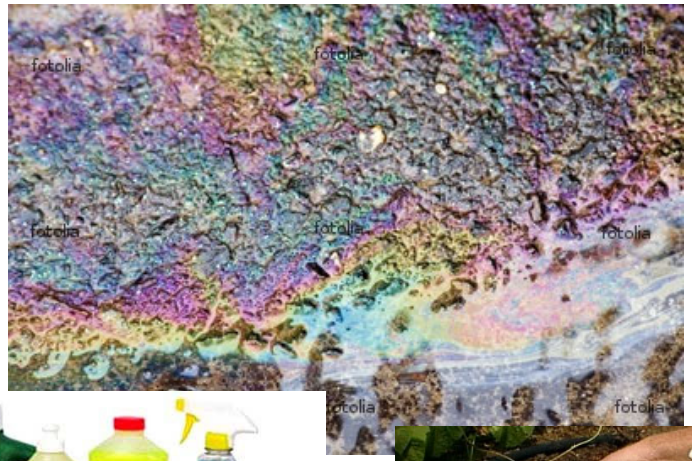
What happens to the rain in our watersheds?

What is stormwater?

Stormwater is the water from rain or melting snows that can become “runoff,” flowing over the ground surface and returning to lakes and streams.

Examples of Nonpoint Source Pollution

- Oil and grease from cars
- Fertilizers
- Animal waste
- Grass clippings
- Septic systems
- Sewage leaks
- Household cleaning products
- Litter
- Agriculture
- Sediment



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The Impact of Development on Stormwater Runoff

more development → *More impervious surfaces* → *more stormwater runoff*

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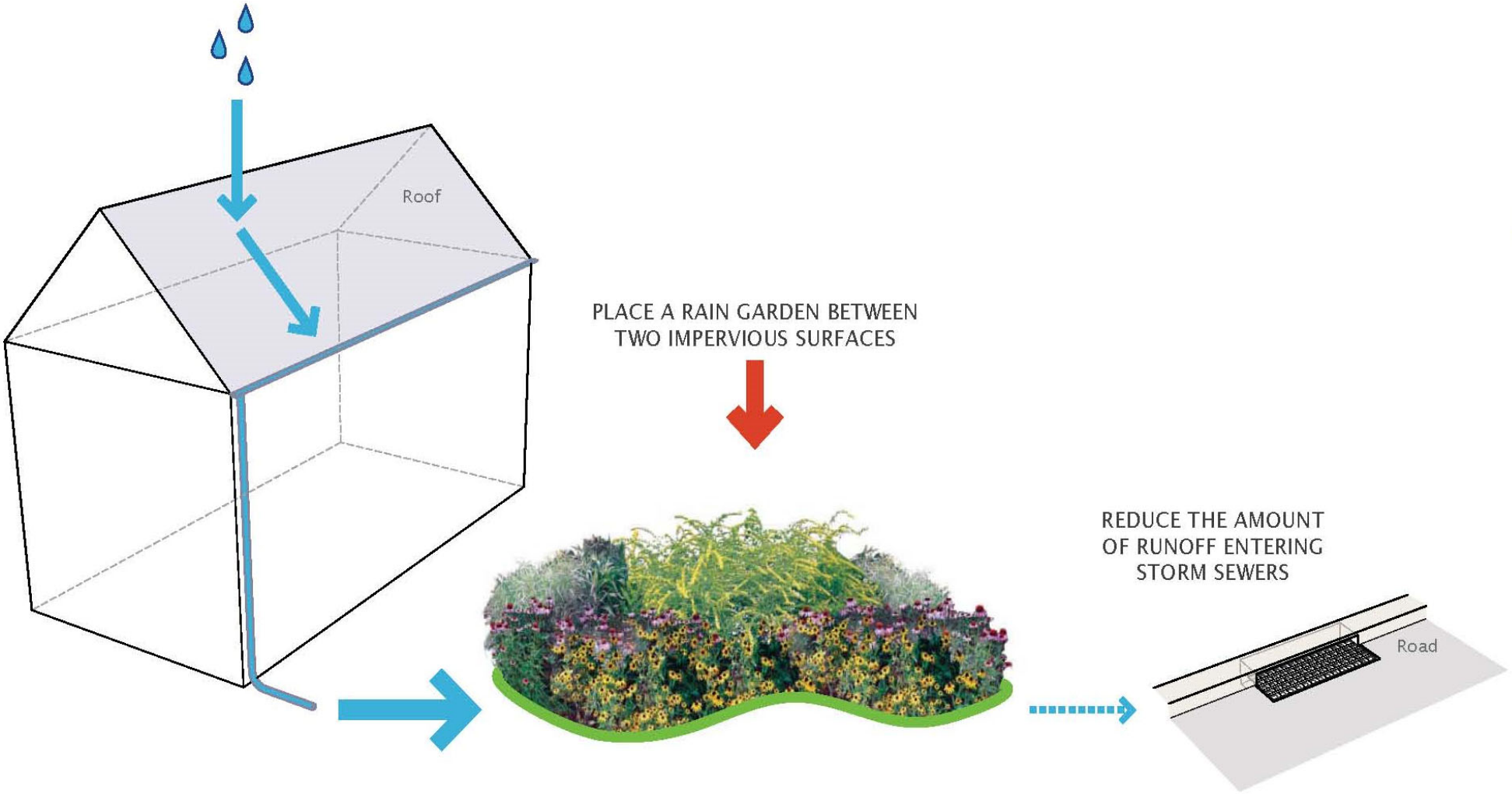
Connected or Disconnected?

The Solution…



Rain Gardens

A rain garden is a landscaped, shallow depression that is designed to intercept, treat, and infiltrate stormwater at the source before it becomes runoff. The plants used in the rain garden are native to the region and help retain pollutants that could otherwise harm nearby waterways.

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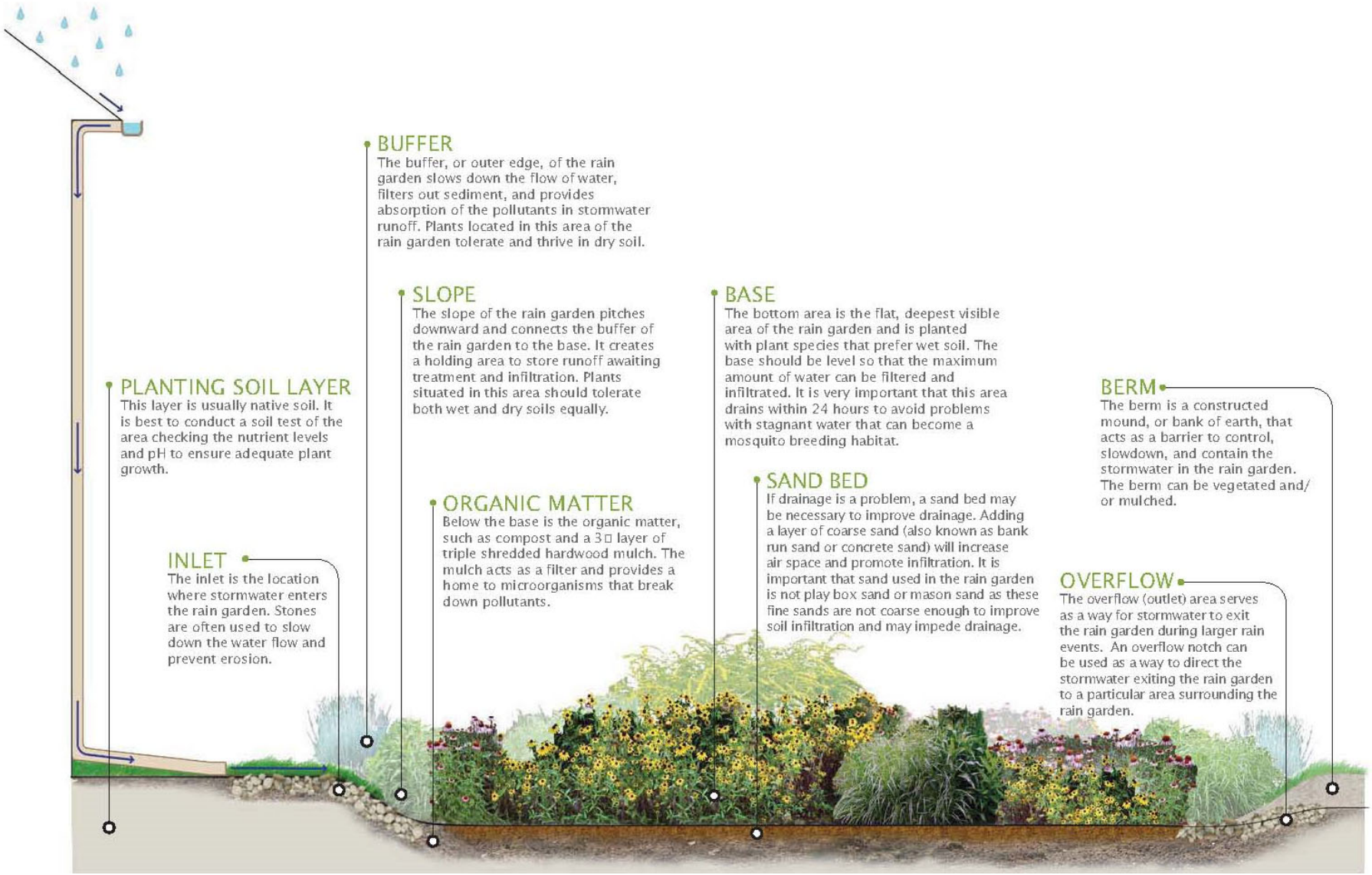
PARTS OF A RAIN GARDEN

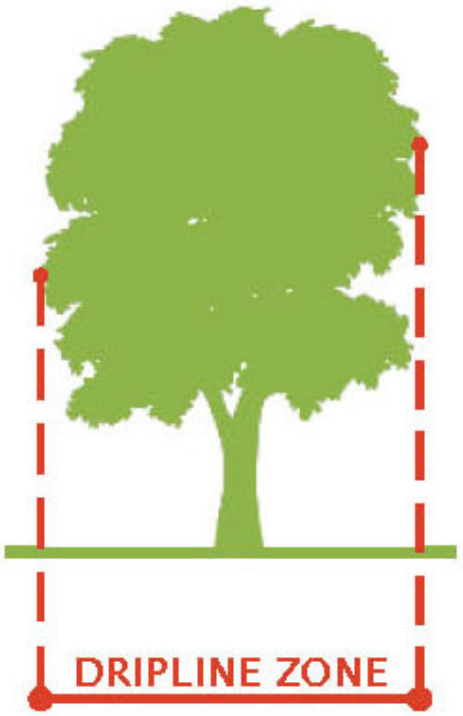


SITE SELECTION & DESIGN

PLANNING YOUR RAIN GARDEN

SITE SELECTION

1. Next to a building with a basement, rain garden should be located min. 10’ from building; no basement: 2’ from building
2. Do not place rain garden within 25’ of a septic system
3. Do not situate rain garden in soggy places where water already ponds
4. Avoid seasonably-high water tables within 2’ of rain garden depth
5. Consider flat areas first – easier digging
6. Avoid placing rain garden within dripline of trees
7. Provide adequate space for rain garden



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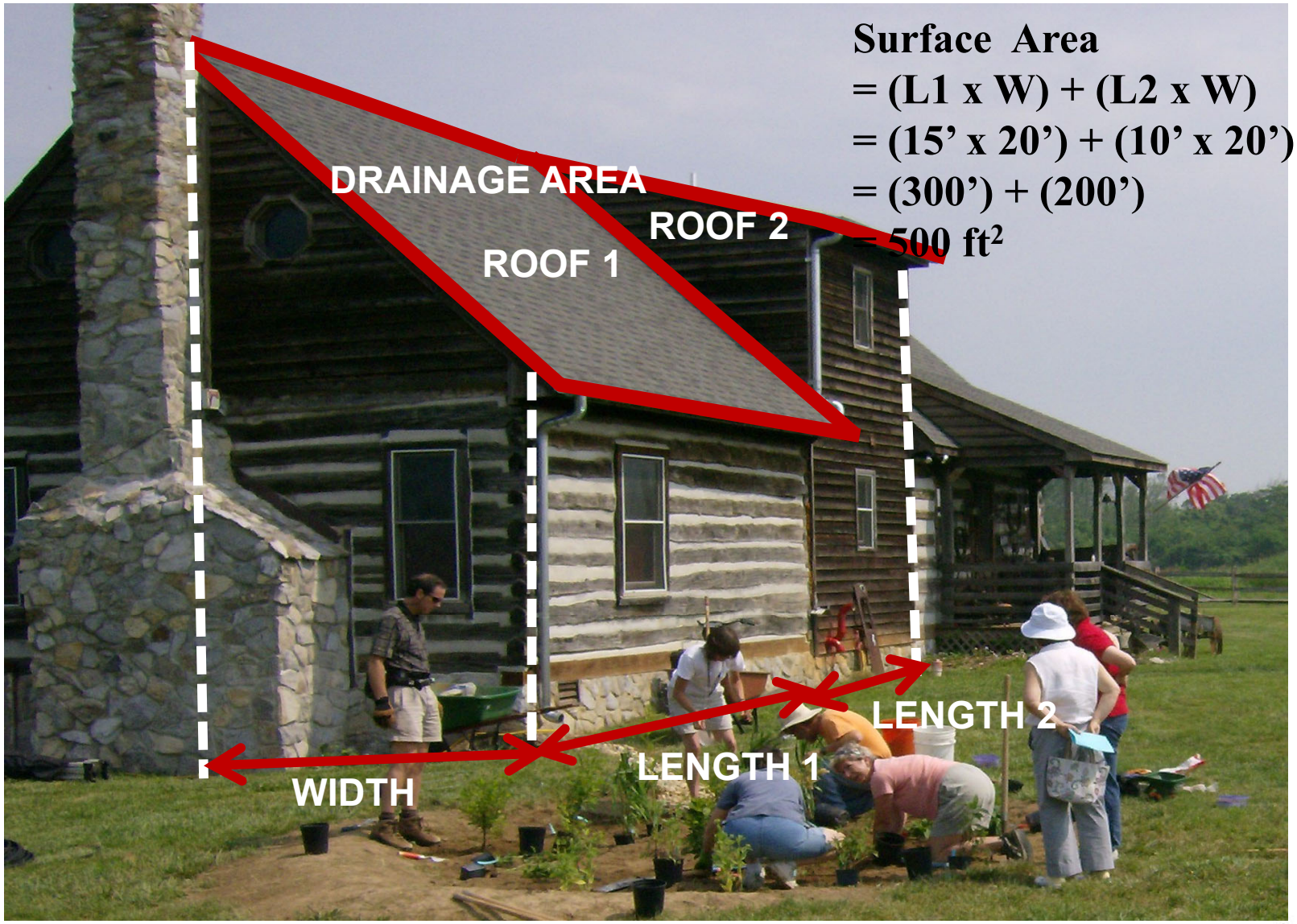
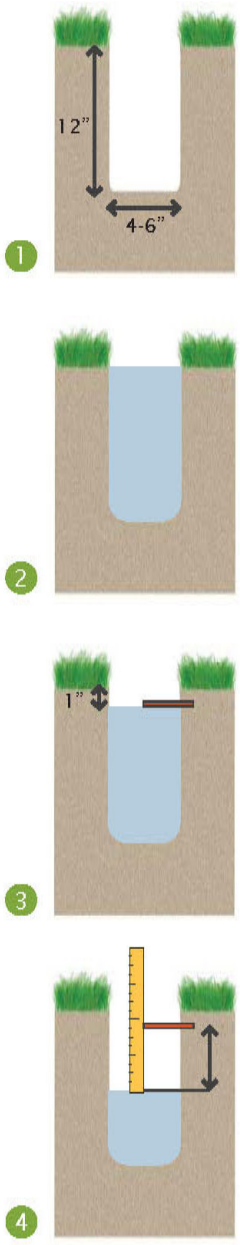
CALL BEFORE YOU DIG

- **NJ One Call: 1-800-272-1000**
- Free markout of underground gas, water, sewer, cable, telephone, and electric utility lines
- Call at least 3 full working days, but not more than 10 days, prior to planned installation date
- Do not place rain garden within 5' horizontally and 1' vertically from any utilities

DRAINAGE AREA CALCULATION

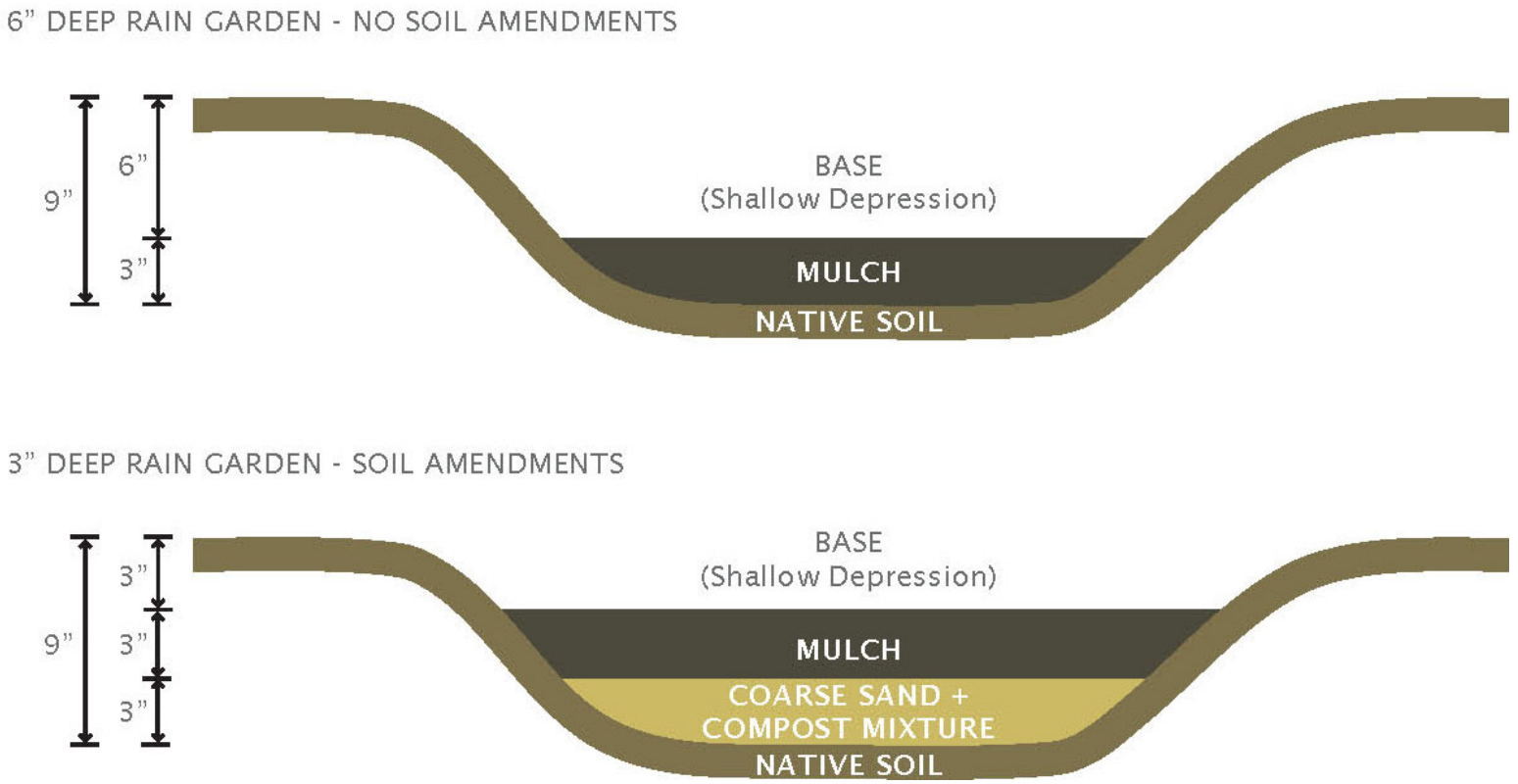


CHECK YOUR SOIL



- Infiltration/Percolation Test
  1. Dig a hole in the proposed rain garden site (12” deep, 4-6” wide)
  2. Fill with water to saturate soil and then let stand until all the water has drained into the soil
  3. Once water has drained, refill the empty hole again with water so that the water level is about 1” from the top of the hole
  4. Check depth of water with a ruler every hour for at least 4 hours
  5. Calculate how many inches of water drained per hour

DETERMINING THE DEPTH OF THE RAIN GARDEN



- Depth of rain garden is dependent upon the soil texture found at the site of the rain garden
- Depth is usually 3-8 inches

DETERMINING THE SIZE OF THE RAIN GARDEN

- The size of the rain garden is dependent upon the amount of runoff entering the rain garden

Rain Garden Sizing Table

Based on New Jersey's Water Quality Design Storm (1.25" of rain over 2 hours)

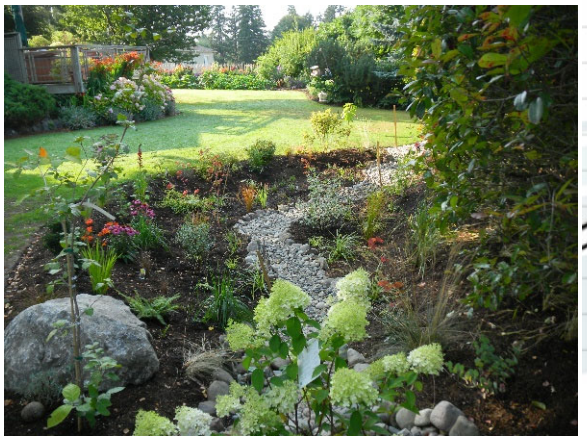
Drainage Area	Size of 3" Deep Rain Garden CLAY SOIL*	Size of 6" Deep Rain Garden SILTY SOIL	Size of 8" Deep Rain Garden SANDY SOIL
500 ft^2	200 ft^2	100 ft^2	75 ft^2
750 ft^2	350 ft^2	150 ft^2	112 ft^2
1,000 ft^2	400 ft^2	200 ft^2	149 ft^2
1,500 ft^2	600 ft^2	300 ft^2	224 ft^2
2,000 ft^2	800 ft^2	400 ft^2	299 ft^2

*SOIL TEXTURE AMENDMENTS NEEDED

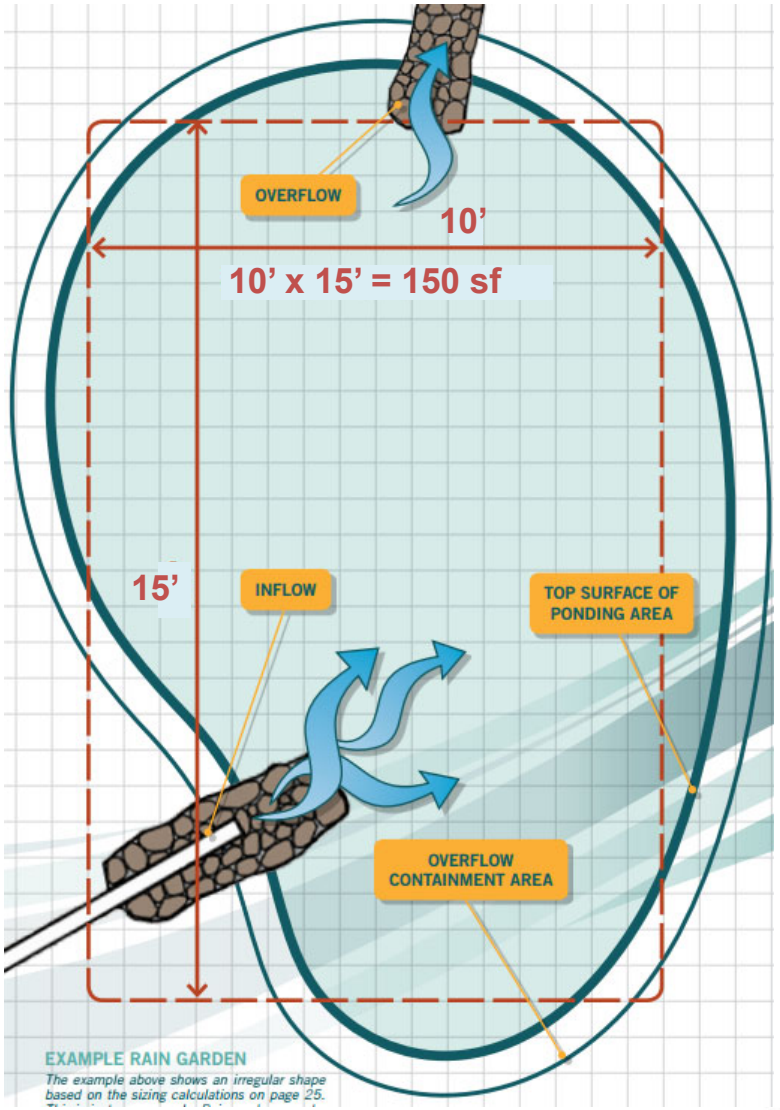
RAIN GARDENS
Typical Size

What is a typical rain garden size?

- Typically100-200 square feet.
- A 100 square feet rain garden will often receive water from an area 5 to 10 times larger than the rain garden..



Modified from Rain Garden Handbook for Western WA



SOIL AMENDMENTS

- Soil amendments improve the rain garden's infiltration rate and help the plants grow

DETERMINING THE INLET AND OVERFLOW

- Stormwater runoff enters the rain garden from an **inlet**
- Stormwater exits through the **overflow**

PREVENTING EROSION

- Slope no greater than 3:1
- Slow down velocity of water flowing through rain garden
  - Add rocks to inlet area (River Stone)

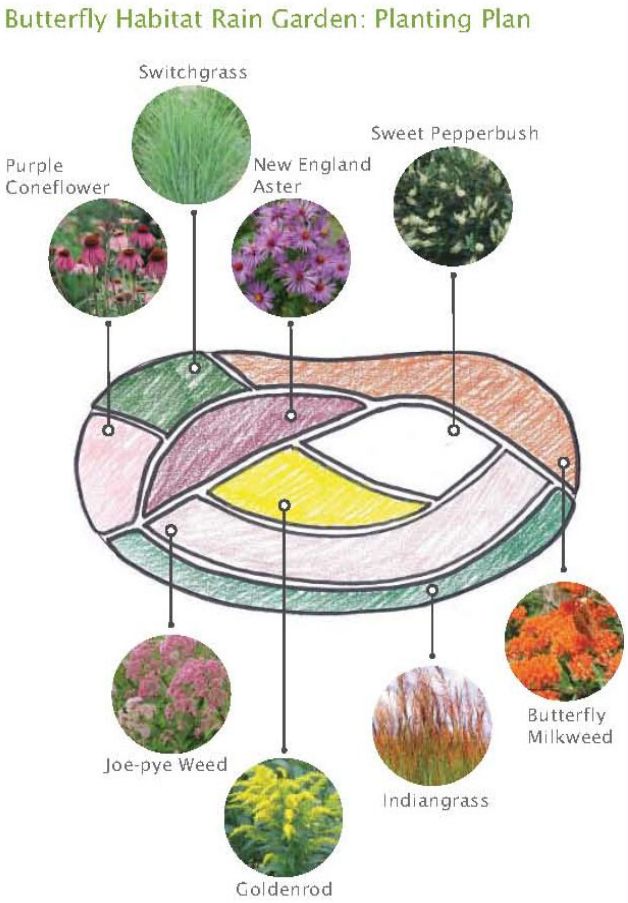
DETERMINING MULCH QUANTITY

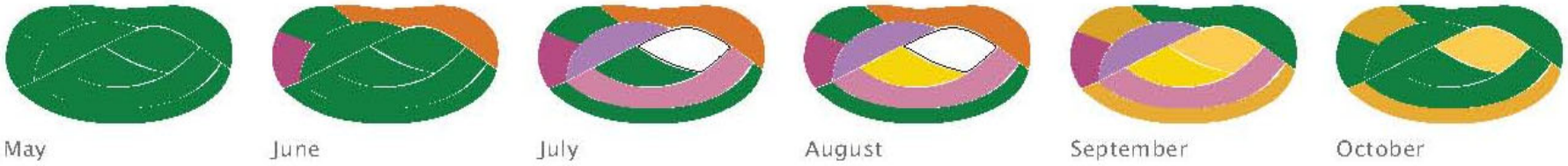
- Allow for a 3” depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden
- Every 100 square feet of rain garden needs 1 cubic yards (3” depth)

RAIN GARDEN DESIGN

SHAPING YOUR RAIN GARDEN

- Use a garden hose or rope to outline the desired shape of your rain garden on the ground
- Many rain gardens are in the shape of a circle or kidney bean, but your rain garden can take on whatever shape you prefer





THE FUN PART!

INSTALLING YOUR RAIN GARDEN

STEP ONE

- Delineate rain garden area

- Remove existing grass with a shovel or machinery

STEP TWO

- Excavate to design depth based on necessary storage and soil amendment requirements

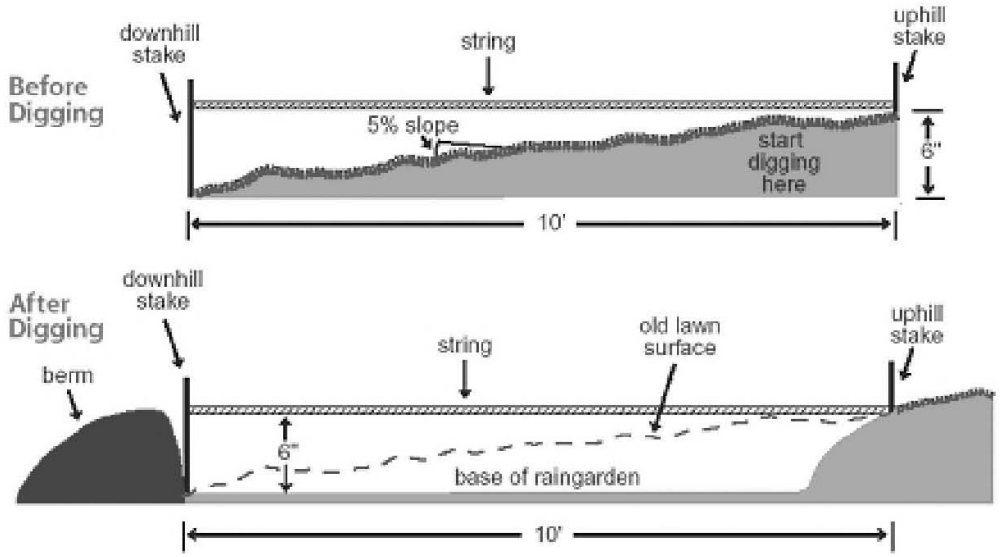
STEP THREE

- Add soil amendments, if necessary

- Combine amendments with existing soil using shovels or rototiller
- Loosen and prepare soil for grading and planting

STEP FOUR

- Prepare the berm, if necessary



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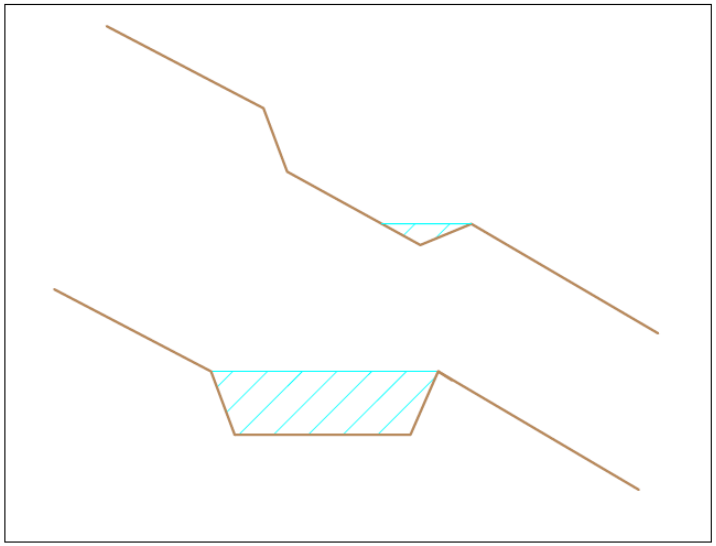
STEP FIVE

- Prepare the overflow

STEP SIX

- Level the rain garden base



STEP SEVEN

- Plant native species







STEP EIGHT

- Apply mulch

- Allow for a 3” depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden

- For every 100 square feet of rain garden, you will need about 1 cubic yard of mulch (3” depth)

STEP NINE

- Water Plants

STEP TEN

- Appreciate a job well done

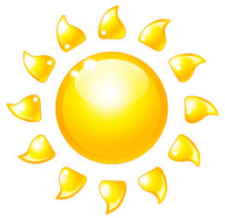
RAIN GARDEN PLANTING DESIGN

DESIGN AESTHETICS

- Formal or traditional design
  - Shrub bed
  - Perennial garden
  - Hedges
- Naturalized planting & design
  - Butterfly garden
  - Meadow (warm season grasses & wildflowers)
  - Buffer plantings

SITE CONSTRAINTS

- Sun vs. shade
- Exposure/wind
- Soil characteristics
- Hydrologic conditions
- Road salts
- Vehicle/pedestrian traffic

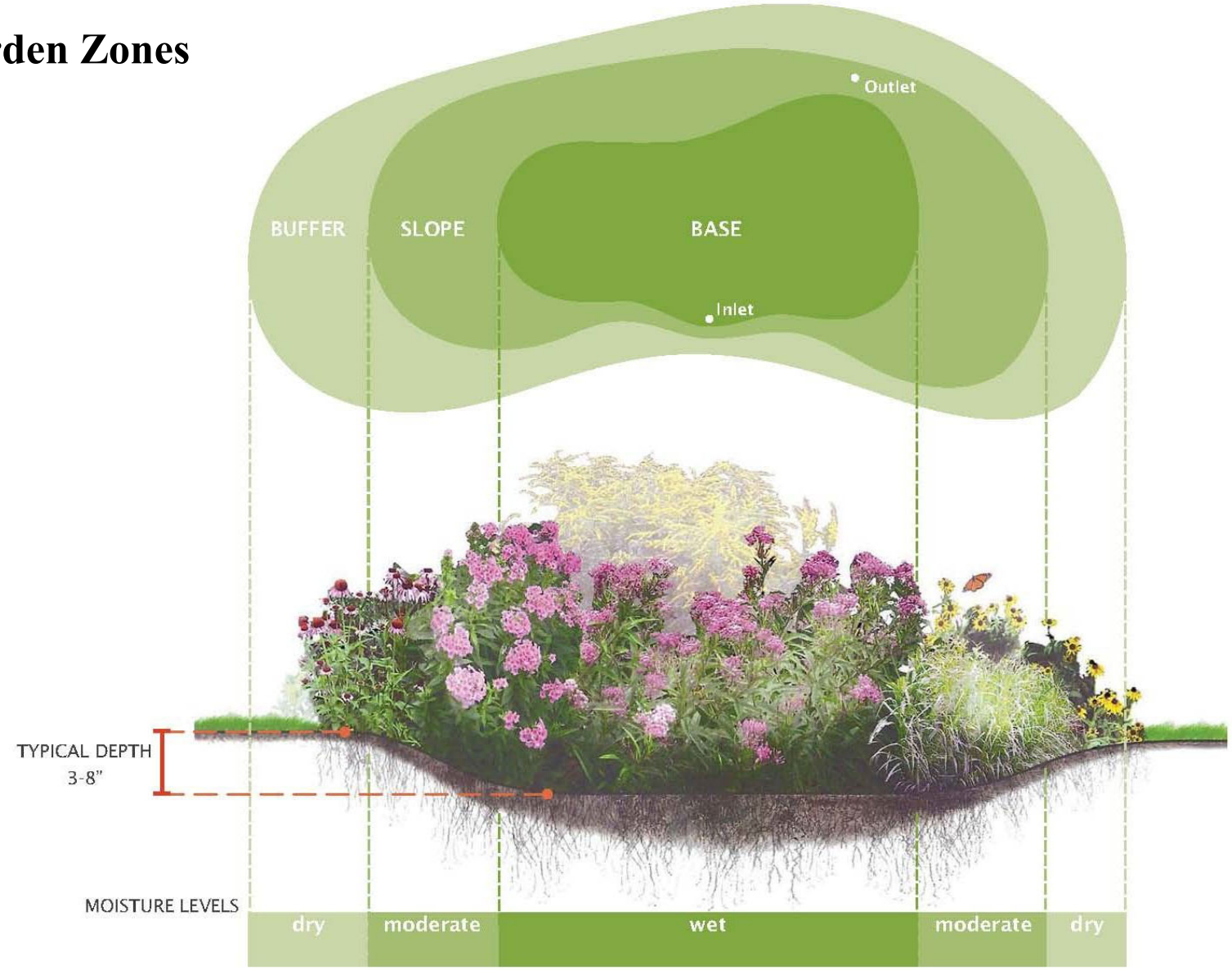


PLANTS IN THE RIGHT PLACE…

Courtesy of Pinelands Nursery & Supply

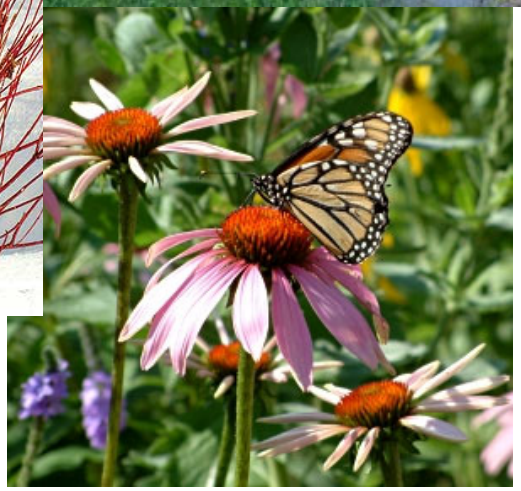
PLANTING DESIGN: Wet + Dry Conditions

Rain Garden Zones



SELECTING PLANT SPECIES

- Mature plant size
  - Proximity to buildings and utility lines
  - Pruning and shaping
- Seasonal interest
  - Flowers
  - Fall color
  - Winter character
- Beneficial wildlife
  - Flowers for butterflies
  - Fruits for song birds



GRASSES & GROUND COVERS

BUFFER

- Broomsedge
- Bearberry
- Panic grass
- Switchgrass
- Little bluestem
- Indiangrass

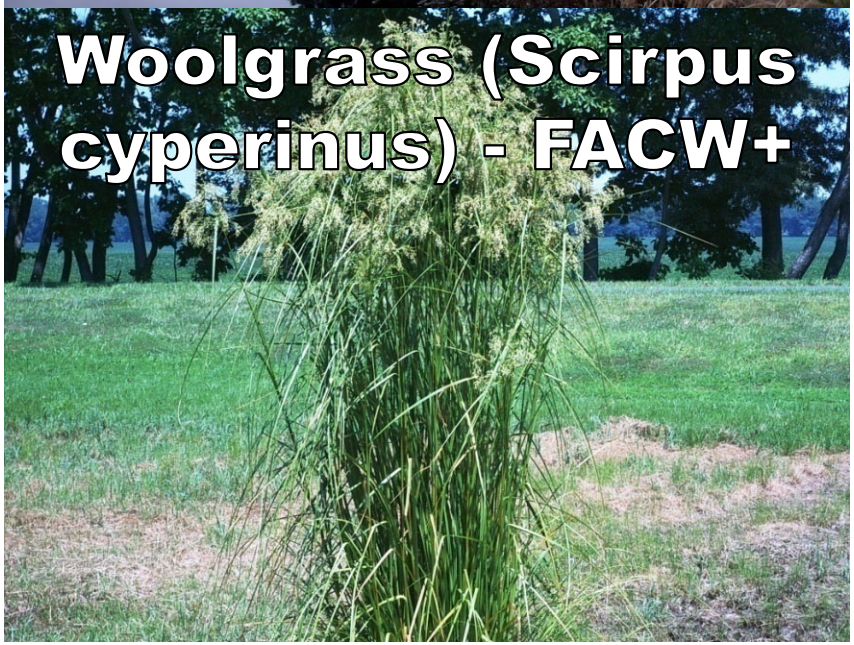
BASE

- Big bluestem
- Virginia wild-rye
- Switchgrass
- Wool grass

SLOPE

- Bluejoint grass
- Sedges
- Fowl mannagrass
- Softrush

GRASSES & GROUND COVERS



WILDFLOWERS & FERNS

BUFFER

- Butterfly milkweed
- Wild indigo
- Purple coneflower
- Beebalm
- Black-eyed susan

BASE

- New England aster
- New York aster
- Columbine
- Coreopsis
- Joe-pye weed
- Blazing star
- Sensitive fern
- Cinnamon fern
- Ironweed

SLOPE

- Swamp milkweed
- Marsh marigold
- Turtlehead
- Boneset
- Rose-mallow/hibiscus
- Blueflag iris
- Cardinal flower
- Blue lobelia
- Monkey flower

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WILDFLOWERS

TREES & SHRUBS

BUFFER

- Hackberry
- Red Bud
- Pepperbush
- American Holly
- Bayberry
- Witchhazel
- White Oak
- Red Oak
- Arrowwood Viburnum

BASE

- Red Maple
- Service Berry
- River Birch
- Silky Dogwood
- Red-twig Dogwood
- Inkberry Holly
- Winterberry
- Sweetbay Magnolia

SLOPE

- River Birch
- Buttonbush
- Silky Dogwood
- Green Ash
- Swamp White Oak
- Pin Oak
- Cranberrybush Viburnum

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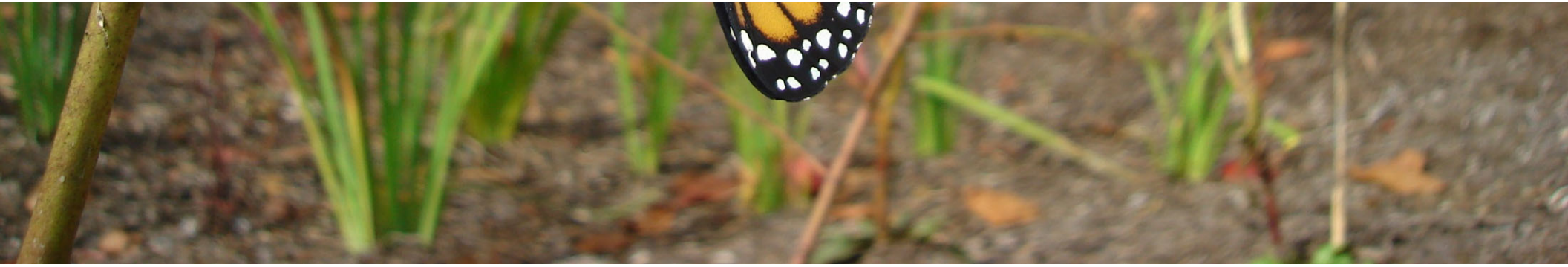
TREES & SHRUBS

INSPECTION AND MAINTENANCE

MAINTAINING YOUR RAIN GARDEN



MAINTENANCE MEASURES

WEEKLY TASKS:

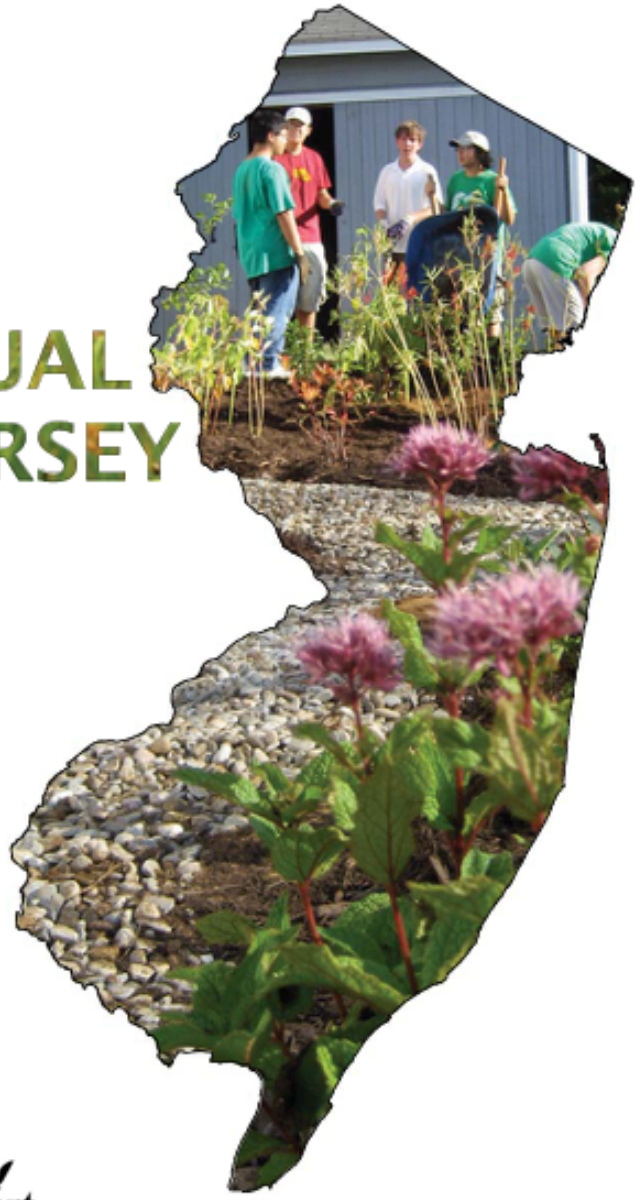
1. Watering
2. Weeding
3. Inspecting

ANNUAL TASKS:

1. Mulching
2. Pruning
3. Re-planting
4. Removing sediment
5. Soil Testing
6. Harvesting Plants
7. Cleaning of Gutters
8. Replacing materials (stone, landscape fabric)

http://water.rutgers.edu/Rain_Gardens/RGWebsite/rginfo.html

RAIN GARDEN MANUAL OF NEW JERSEY



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Water Resources Program

Northeast States & Caribbean Islands Regional Water Center

Sea Grant NJ Sea Grant Consortium

Rain Garden 4+

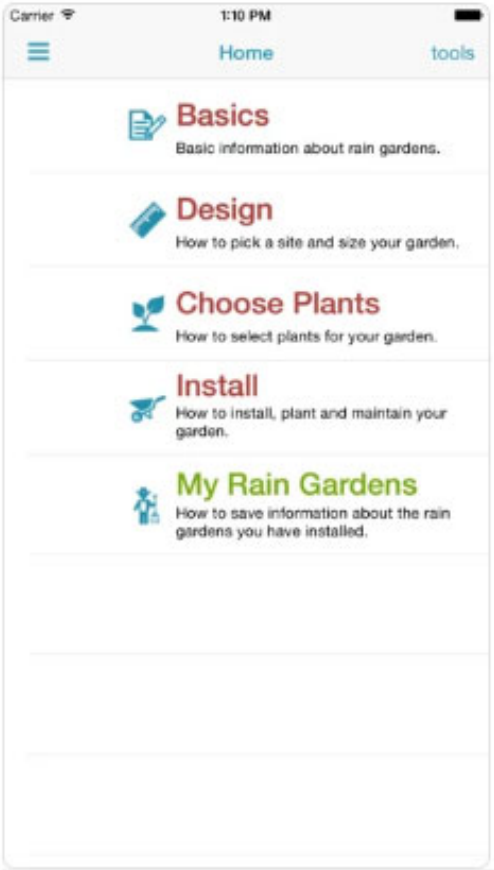
University of Connecticut

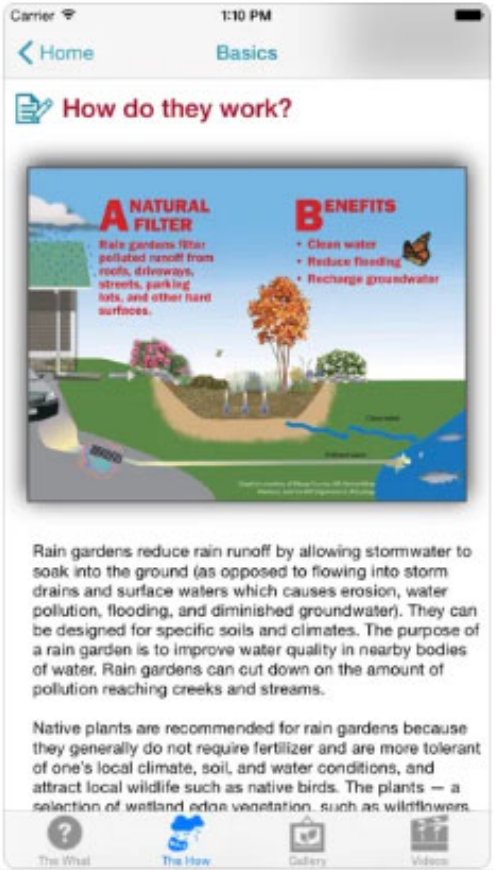
Designed for iPhone

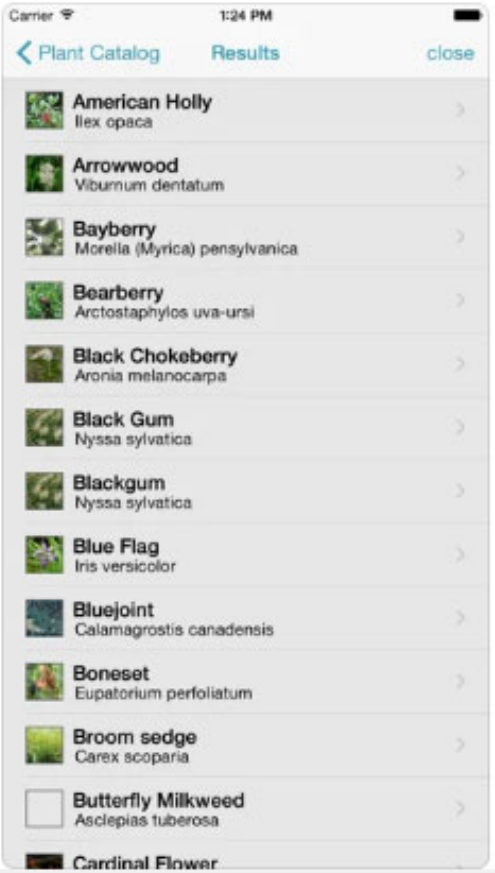
★★½☆☆ 2.6 • 11 Ratings

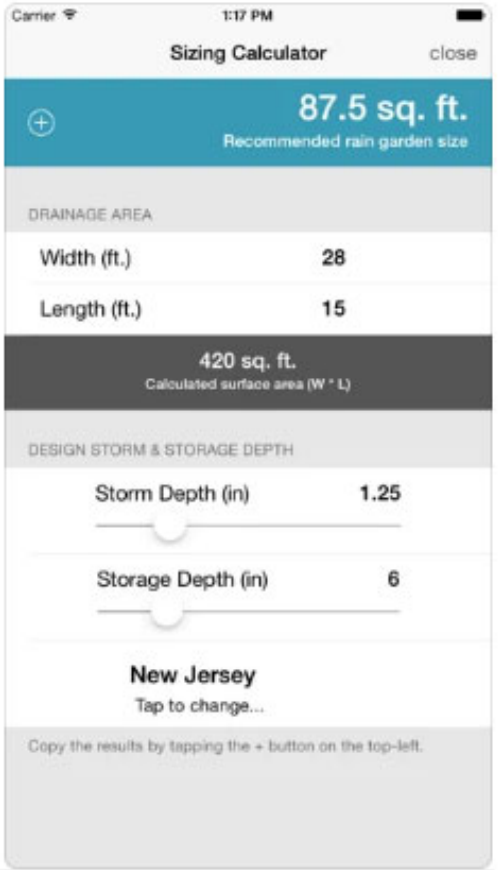
Free

iPhone Screenshots









3. Instructions on how to deliver an in-person design workshop

Materials available sample designs

1. Posterboard of sample designs are available for workshops (10 posters)
2. Rain garden manual will be provided
3. Homeowner rain garden throughout the years Powerpoint presentation and booklet will be provided
4. Plant fact sheet books will be provided
5. Green infrastructure guidance manual will be provided

Steps to developing a design

1. Ask homeowner where they want the garden (google maps can be used to view the home to determine if this is an appropriate location)
2. Determine the area that would drain to the garden (google maps' measure tool can be used to calculate the drainage area)
3. Use Web soil survey to identify soil type and infiltration test data to determine if the soils drain

USDA online Web soil survey

https://websoilsurvey.nrcs.usda.gov/app/

You are here: Web Soil Survey Home

Search

Enter Keyword Go

All NRCS Sites

Browse by Subject

- Soils Home
- National Cooperative Soil Survey (NCSS)
- Archived Soil Surveys
- Status Maps

The simple yet powerful way to access and use soil data.

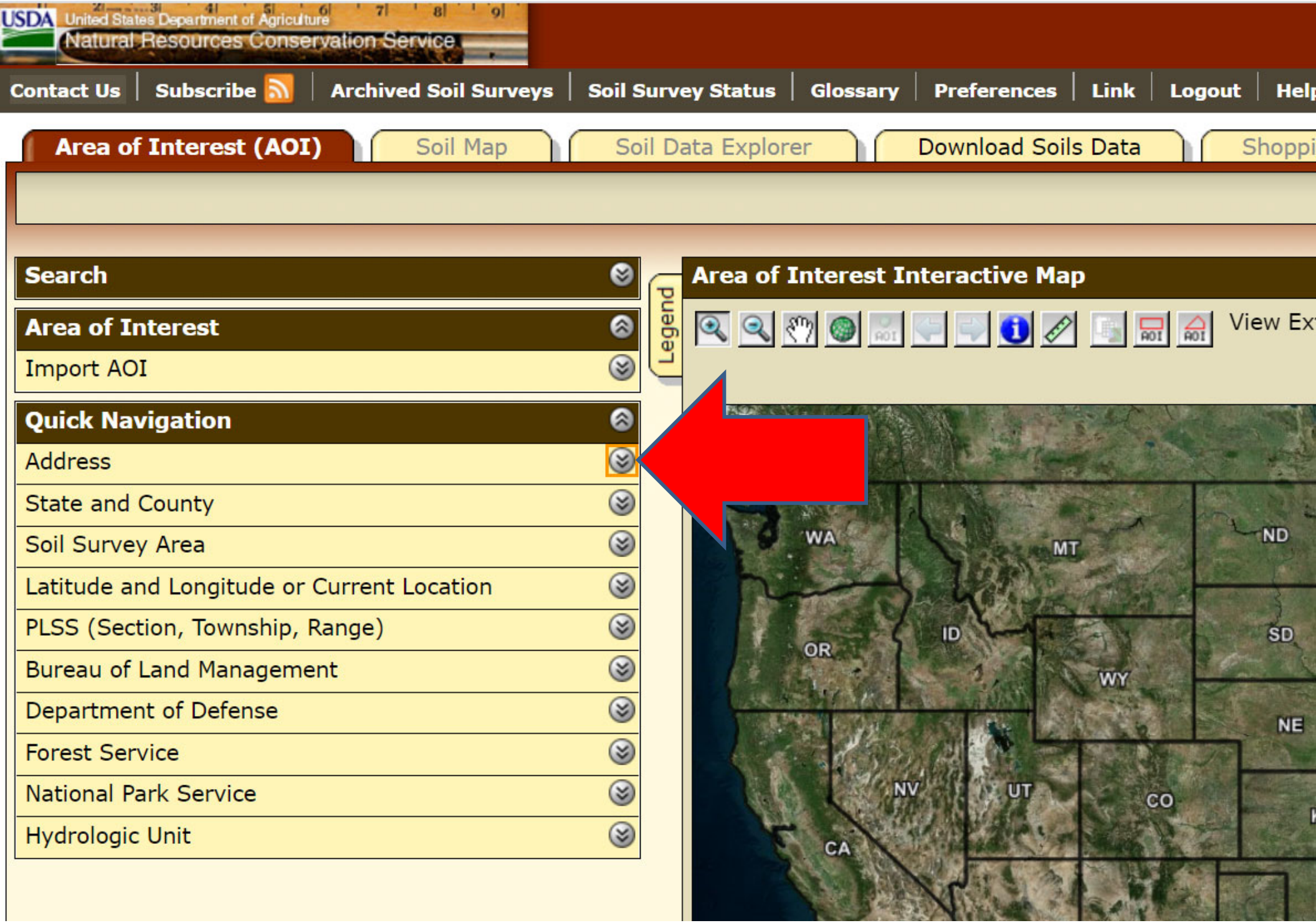
START WSS

I Want To...

- Start Web Soil Survey (WSS)
- Know Web Soil Survey Requirements
- Know Web Soil Survey operation hours
- Find what areas of the U.S. have soil data
- Find information by topic

Welcome to Web Soil Survey (WSS)

Web Soil Survey (WSS) provides soil data and information produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to the largest natural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State and County
Soil Survey Area
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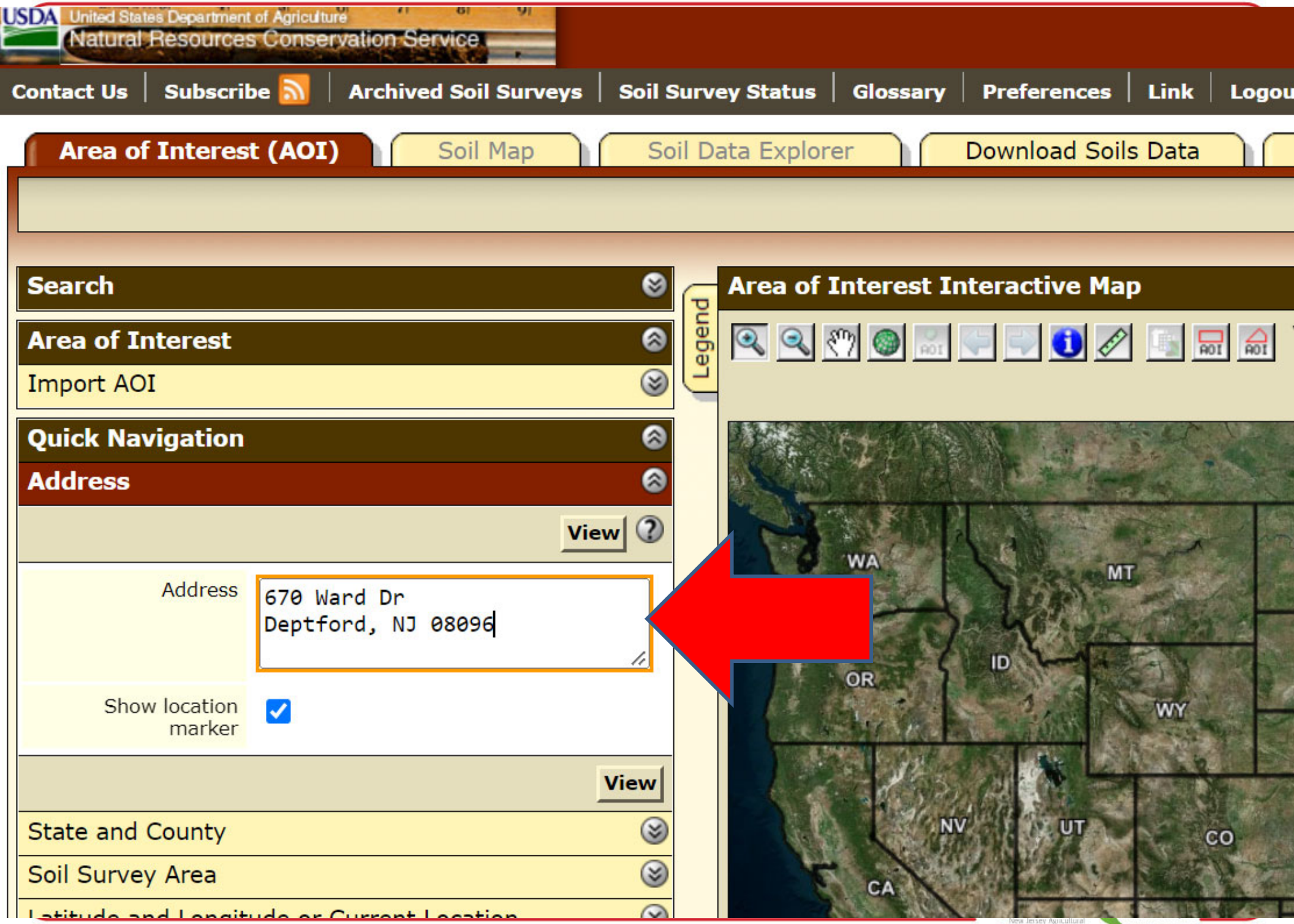
USDA United States Department of Agriculture
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Area of Interest (AOI)
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Area of Interest Interactive Map

View Extent Contiguous U.S. Scal

Area of Interest Interactive Map

View Extent: Contiguous U.S.

Search

Map Unit Legend

Gloucester County, New Jersey (NJ015)

Gloucester County, New Jersey (NJ015)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CokB	Collington sandy loam, 2 to 5 percent slopes	0.0	1.5%
CopB	Collington-Urban land complex, 0 to 5 percent slopes	0.9	49.6%
FrrB	Freehold-Urban land complex, 0 to 5 percent slopes	0.9	48.9%

Legend

Soil Map

Scale (not to scale)

United States Department of Agriculture
Natural Resources Conservation Service

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Area of Interest (AOI) | Soil Map | Soil Data Exp

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Soil M

Legend

Map Unit Description

Report — Map Unit Description

Gloucester County, New Jersey

FrrB—Freehold-Urban land complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 15knz
Elevation: 40 to 110 feet
Mean annual precipitation: 28 to 59 inches
Mean annual air temperature: 46 to 79 degrees F
Frost-free period: 161 to 231 days
Farmland classification: Not prime farmland

Map Unit Composition

Freehold and similar soils: 60 percent
Urban land: 30 percent
Minor components: 10 percent

Estimates are based on observations, descriptions, and tr
mapunit.

Description of Freehold

Setting

Landform: Low hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glauconite bearing loamy eolian depos
glauconite bearing loamy fluviomarine deposits

Typical profile

Ap - 0 to 10 inches: sandy loam
Bt1 - 10 to 14 inches: sandy loam
Bt2 - 14 to 21 inches: sandy clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Hydric soil rating: No

Steps to developing a design

4. Select a rainfall total for the design
5. Use residential rain garden design form to determine rain garden size or
6. Use the spreadsheet to determine size of rain garden
7. If soil amendments are needed, use the spreadsheet to calculate quantities
8. Add dimensions to the rain garden cross-section of the rain garden design form

Steps to developing a design

2. Complete rain garden design program form

Date:

Time:

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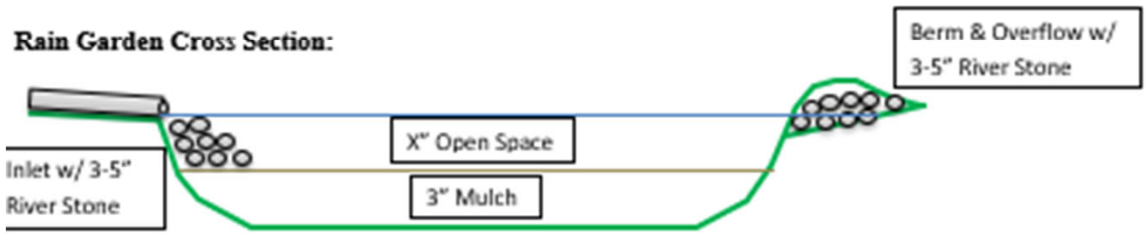
Residential Rain Garden Design Program

Name:	**Address:**
Impervious Cover Calculation:	**Property Soil Type:**
Rain Garden Size:	**Amendments (if necessary):**
Notes:	

Rain Garden Cross Section:



For Reference:

Depth (Soils)	Rainfall	Drainage Area (SF)						
		100	200	300	400	500	750	1000
3" (Clay)	1.25"	40 SF	85 SF	125 SF	165 SF	210 SF	315 SF	415 SF
	1.5"	50 SF	100 SF	150 SF	200 SF	250 SF	375 SF	500 SF
6" (Silt/Loam)	1.25"	20 SF	40 SF	65 SF	85 SF	105 SF	155 SF	210 SF
	1.5"	25 SF	50 SF	75 SF	100 SF	125 SF	190 SF	250 SF
8" (Sand)	1.25"	15 SF	30 SF	45 SF	65 SF	80 SF	115 SF	155 SF
	1.5"	20 SF	40 SF	55 SF	75 SF	95 SF	140 SF	190 SF

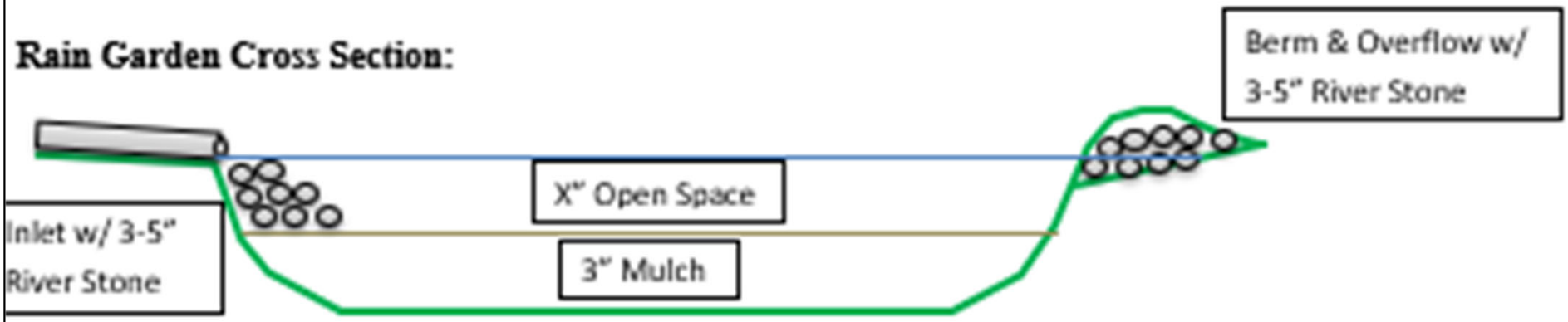
Date:
Time:

RUTGERS UNIVERSITY
Water Resources Program
New Jersey Agricultural Experiment Station

Residential Rain Garden Design Program

Name:	Address:
Impervious Cover Calculation:	Property Soil Type:
Rain Garden Size:	Amendments (if necessary):
Notes:	

Rain Garden Cross Section:



For Reference:

Depth (Soils)	Rainfall	Drainage Area (SF)						
		100	200	300	400	500	750	1000
3" (Clay)	1.25"	40 SF	85 SF	125 SF	165 SF	210 SF	315 SF	415 SF
	1.5"	50 SF	100 SF	150 SF	200 SF	250 SF	375 SF	500 SF
6" (Silt/Loam)	1.25"	20 SF	40 SF	65 SF	85 SF	105 SF	155 SF	210 SF
	1.5"	25 SF	50 SF	75 SF	100 SF	125 SF	190 SF	250 SF
8" (Sand)	1.25"	15 SF	30 SF	45 SF	65 SF	80 SF	115 SF	155 SF
	1.5"	20 SF	40 SF	55 SF	75 SF	95 SF	140 SF	190 SF

Input Cells		
Calculated Cells		
Name		
Address		
Drainage Area Size	0	
Rain Garden Sizing	WQ (Min) 1.25" storm	Suggested 1.5" storm
RG (3" Ponding)	0 SF	0 SF
RG (6" Ponding)	0 SF	0 SF
RG (8" Ponding)	0 SF	0 SF
Proposed RG Size	0	SF
Rough Dimensions		
Length	0	FT
Width	#DIV/0!	FT
Mulch	0.00	CY
	0.0	Bags
Soil Amendments (clay soils)		
Depth of amendments	0.25	FT
bioretention media	0.0	CY
sand	0.0	CY
	0.0	Bags*
compost	0.0	CY
	0.0	Bags*
*Bags @ 2 CF/Bag		

Steps to developing a design

9. Use the spreadsheet to determine amount of mulch needed
10. Review piping needed to get water from impervious surface to rain garden
11. Discuss stone inlet/outlet/border

Steps to developing a design

12. Discuss with homeowner planting style
    a) Manicured or Natural
        i. All shrubs
        ii. Perennial and shrubs
        iii. Deer tolerant
        iv. Shade
        v. All perennial

Let's Review Design Samples

Manicured or Natural

i. All shrubs
ii. Perennial and shrubs
iii. Deer tolerant
iv. Shade
v. All perennial

NATURAL ALL PERENNIAL GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Swamp Milkweed - *Asclepias incarnata*

Height: 3-4 feet
Spread: 1-2 feet
Flowering Period: July-August
Flowering Color: Magenta
Light Requirement: Full Sun

Pennsylvania Sedge - *Carex pensylvanica*

Height: 6-12 inches
Spread: 2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Shade to Part Shade

Purple Coneflower - *Echinacea purpurea*

Height: 2-4 feet
Spread: 1-3 feet
Flowering Period: July-September
Flowering Color: Pink, Purple
Light Requirement: Full Sun to Part Shade

Soft Rush - *Juncus effusus*

Height: 2-3 feet
Spread: 2-3 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Sun

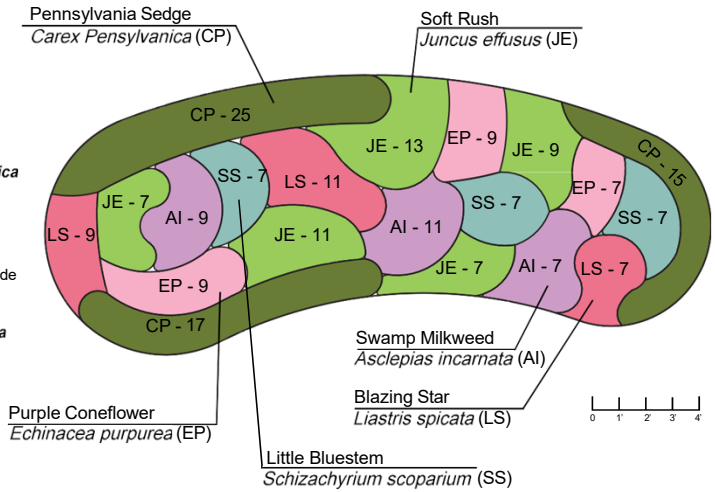
Blazing Star - *Liastris spicata*

Height: 3-4 feet
Spread: 1-2 feet
Flowering Period: July-August
Flowering Color: Magenta
Light Requirement: Full Sun

Little Bluestem - *Schizachyrium scoparium*

Height: 2-4 feet
Spread: 1-2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Sun

RAIN GARDEN PLAN:

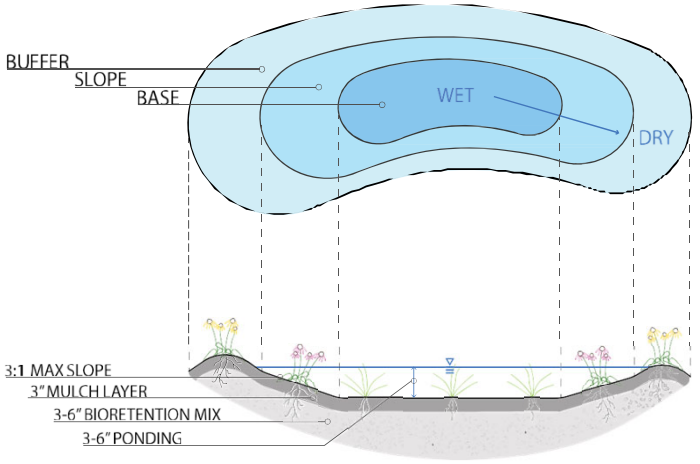


RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AI	*Asclepias incarnata*	SWAMP MILKWEED	29	1 GAL	18-24"
CP	*Carex pensylvanica*	PENNSYLVANIA SEDGE	57	1 QT	6-12"
EP	*Echinacea purpurea*	PURPLE CONEFLOWER	25	1 GAL	18-24"
JE	*Juncus effusus*	SOFT RUSH	47	1 GAL	9-12"
LS	*Liastris spicata*	BLAZING STAR	25	1 GAL	12"-18"
SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	21	1 GAL	18-24"

PROFILE OF RAIN GARDEN:



MANICURED ALL PERENNIAL GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Purple Coneflower - *Echinacea purpurea*

Height: 2-4 feet
Spread: 1-3 feet
Flowering Period: July-September
Flowering Color: Pink, Purple
Light Requirement: Full Sun to Part Shade

Blue Flag Iris - *Iris versicolor*

Height: 2-2.5 feet
Spread: 2-2.5 feet
Flowering Period: May-June
Flowering Color: Blue, Purple
Light Requirement: Full Sun to Part Shade

Blue Lobelia - *Lobelia siphilitica*

Height: 2-3 feet
Spread: 1-1.5 feet
Flowering Period: July-September
Flowering Color: Blue, Purple
Light Requirement: Full Sun to Full Shade

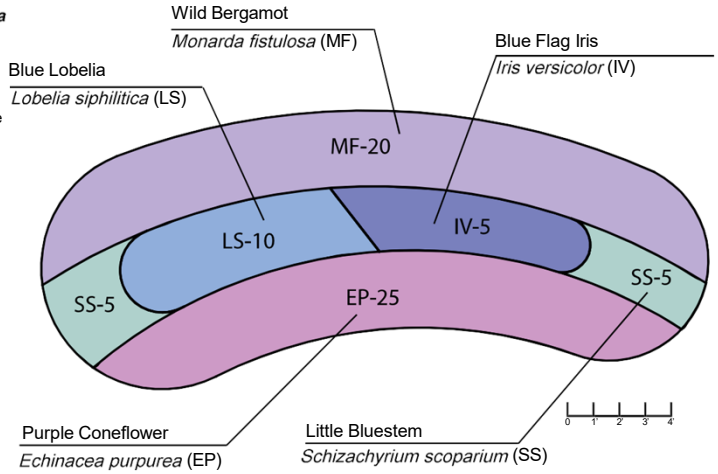
Wild Bergamot - *Monarda fistulosa*

Height: 2-4 feet
Spread: 2-3 feet
Flowering Period: July-September
Flowering Color: Purple, Pink, White
Light Requirement: Full Sun to Part Shade

Little Bluestem - *Schizachyrium scoparium*

Height: 2-4 feet
Spread: 1-2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Sun

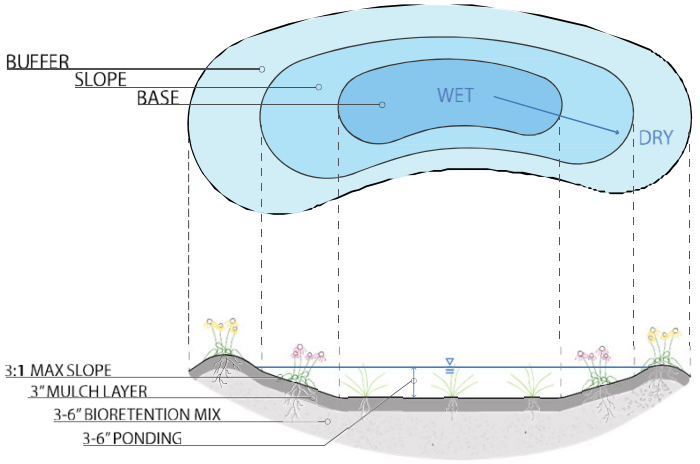
RAIN GARDEN PLAN:



RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN					
SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
EP	*Echinacea purpurea*	PURPLE CONEFLOWER	25	1 GAL	18-24"
IV	*Iris versicolor*	BLUE FLAG IRIS	5	1 GAL	18-24"
LS	*Lobelia siphilitica*	BLUE LOBELIA	10	1 GAL	12-18"
MF	*Monarda fitulosa*	WILD BERGAMOT	20	1 GAL	12-24"
SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	10	1 GAL	18-24"

PROFILE OF RAIN GARDEN:



MANICURED ALL SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Bearberry - *Arctostaphylos uva-ursi*

Height: 6-12 inch
Spread: 1-2 feet
Flowering Period: April-May
Flowering Color: Pink, White
Light Requirement: Full Sun to Part Shade

Summersweet - *Clethra alnifolia*

Height: 4-8 feet
Spread: 4-6 feet
Flowering Period: July-August
Flowering Color: White
Light Requirement: Full Sun to Full Shade

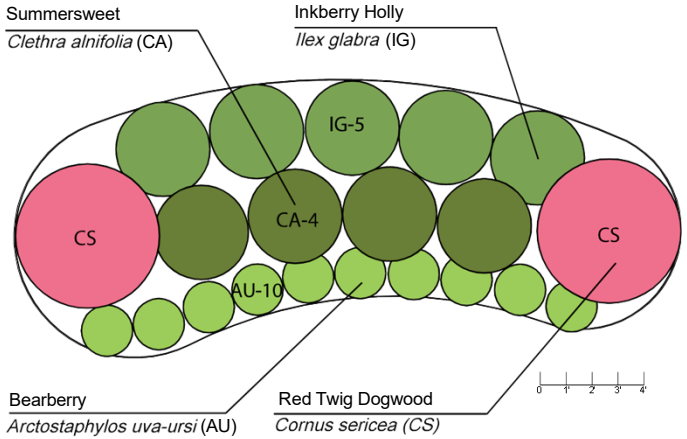
Red Twig Dogwood - *Cornus sericea*

Height: 7-9 feet
Spread: 5-10 feet
Flowering Period: May-June
Flowering Color: White
Light Requirement: Full Sun to Part Shade

Inkberry Holly - *Ilex glabra*

Height: 6-8 feet
Spread: 8-10 feet
Flowering Period: May-June
Flowering Color: Green, White
Light Requirement: Full Sun to Part Shade

RAIN GARDEN PLAN:

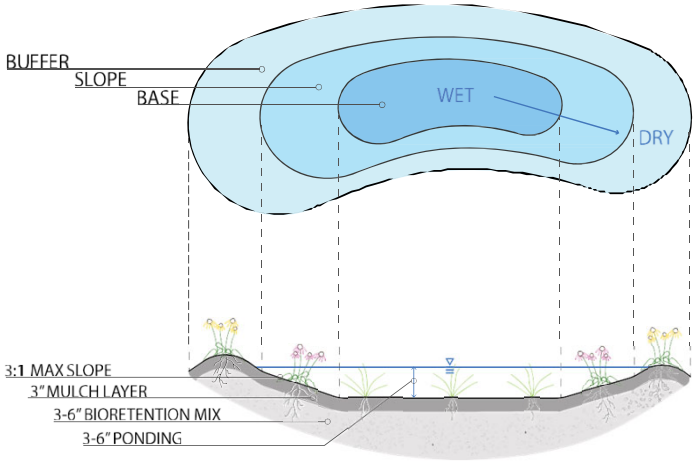


RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AU	*Arctostaphylos uva-ursi*	BEARBERRY	10	1 GAL	12-24"
CA	*Clethra alnifolia*	SUMMERSWEET	4	3 GAL	24-36"
CS	*Cornus sericea*	RED TWIG DOGWOOD	2	3 GAL	24-36"
IG	*Ilex glabra*	INKBERRY HOLLY	5	3 GAL	24-36"

PROFILE OF RAIN GARDEN:



MANICURED PERENNIAL & SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Butterfly Milkweed - *Asclepias tuberosa*

Height: 1.5-3 feet
Spread: 1-2 feet
Flowering Period: June-August
Flowering Color: Orange
Light Requirement: Full Sun

Rose Mallow - *Hibiscus moscheutos*

Height: 3-8 feet
Spread: 1-2 feet
Flowering Period: June-September
Flowering Color: Pink, Red, White
Light Requirement: Full Sun to Part Shade

Inkberry Holly - *Ilex glabra*

Height: 6-8 feet
Spread: 8-10 feet
Flowering Period: May-June
Flowering Color: Green, White
Light Requirement: Full Sun to Part Shade

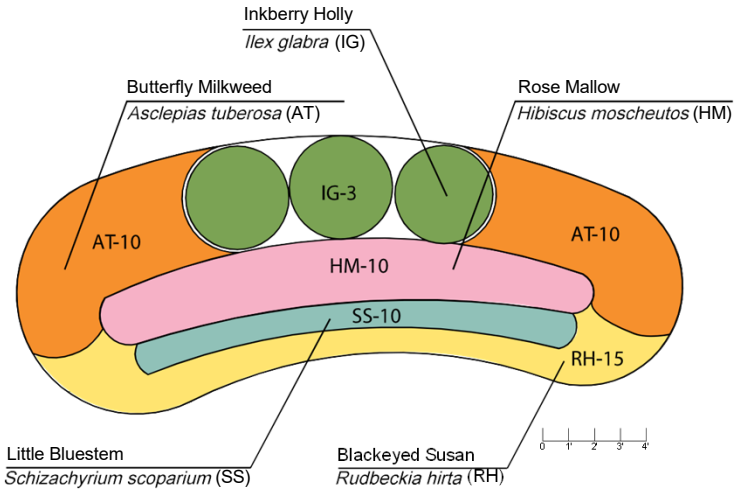
Blackeyed Susan - *Rudbeckia hirta*

Height: 2-3 feet
Spread: 1-2 feet
Flowering Period: June-September
Flowering Color: Yellow, Orange
Light Requirement: Full Sun to Part Shade

Little Bluestem - *Schizachyrium scoparium*

Height: 2-4 feet
Spread: 1-2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Sun

RAIN GARDEN PLAN:

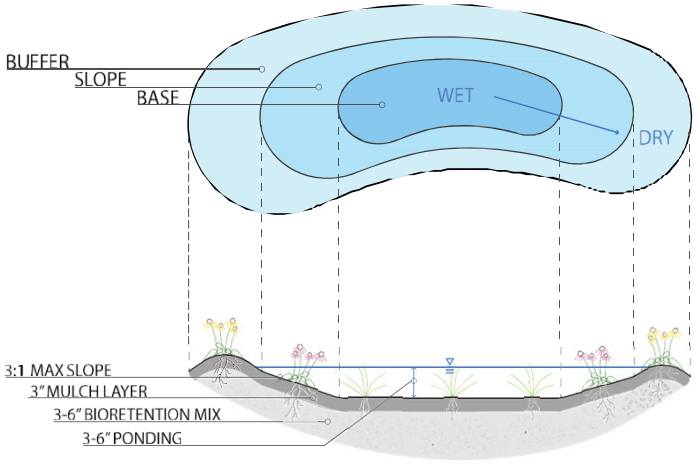


RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AT	*Asclepias tuberosa*	BUTTERFLY MILKWEED	20	1 GAL	12-18"
HM	*Hibiscus moscheutos*	ROSE MALLOW	10	1 GAL	24-36"
IG	*Ilex glabra*	INKBERRY HOLLY	3	3 GAL	24-36"
RH	*Rudbeckia hirta*	BLACKEYED SUSAN	15	1 GAL	12-18"
SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	10	1 GAL	18-24"

PROFILE OF RAIN GARDEN:



MANICURED DEER TOLERANT GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Blue Flag Iris - *Iris versicolor*

Height: 2-2.5 feet
Spread: 2-2.5 feet
Flowering Period: May-June
Flowering Color: Purple, Blue
Light Requirement: Full Sun to Part Shade

Wild Bergamot - *Monarda fistulosa*

Height: 2-4 feet
Spread: 2-3 feet
Flowering Period: July-September
Flowering Color: Purple, Pink
Light Requirement: Full Sun to Full Shade

Mountainmint - *Pycnanthemum muticum*

Height: 1-3 feet
Spread: 1-3 feet
Flowering Period: July-September
Flowering Color: White
Light Requirement: Full Sun to Part Shade

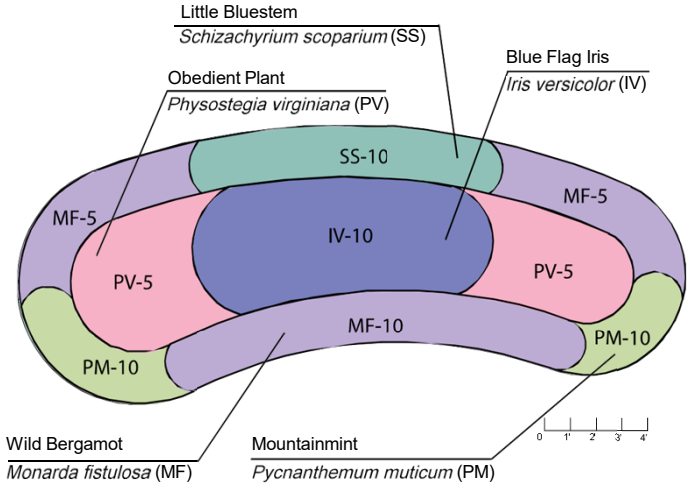
Obedient Plant - *Physostegia virginiana*

Height: 3-4 feet
Spread: 2-3 feet
Flowering Period: August-October
Flowering Color: Pink
Light Requirement: Full Sun to Part Shade

Little Bluestem - *Schizachyrium scoparium*

Height: 2-4 feet
Spread: 1-2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Sun

RAIN GARDEN PLAN:

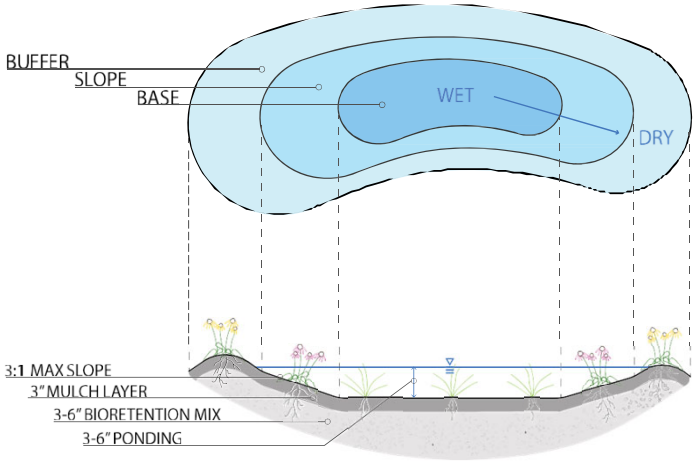


RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
IV	*Iris versicolor*	BLUE FLAG IRIS	10	1 GAL	18-24"
MF	*Monarda fitulosa*	WILD BERGAMOT	20	1 GAL	12-24"
PM	*Pycnanthemum muticum*	MOUNTAINMINT	20	1 GAL	12-24"
PV	*Physostegia virginiana*	OBEDIENT PLANT	10	1 GAL	12-24"
SS	*Schizachyrium scoparium*	LITTLE BLUESTEM	10	1 GAL	18-24"

PROFILE OF RAIN GARDEN:



NATURAL SHADE RAIN GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Creek Sedge - *Carex amphobola*

Height: 1-1.5 feet
Spread: 1-1.5 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Shade to Part Shade

Turtlehead - *Chelone glabra*

Height: 2-3 feet
Spread: 1.5-2.5 feet
Flowering Period: August-October
Flowering Color: Pink, White
Light Requirement: Full Sun to Full Shade

Spotted Geranium - *Geranium maculatum*

Height: 1.5-2 feet
Spread: 1-1.5 feet
Flowering Period: April-May
Flowering Color: Pink, Purple
Light Requirement: Full Sun to Part Shade

Virginia Bluebells - *Mertensia virginica*

Height: 1-2 feet
Spread: 1-2 feet
Flowering Period: March-April
Flowering Color: Blue, Purple
Light Requirement: Full Shade to Part Shade

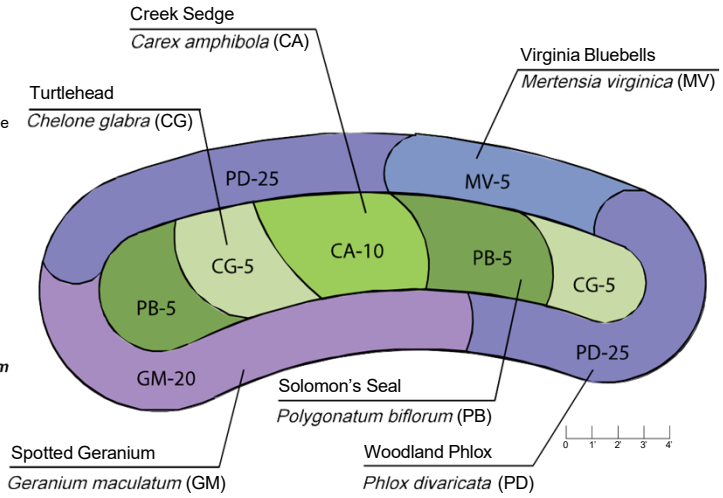
Solomon's Seal - *Polygonatum biflorum*

Height: 2-3 feet
Spread: 1-2 feet
Flowering Period: April-May
Flowering Color: Green, White
Light Requirement: Full Shade to Part Shade

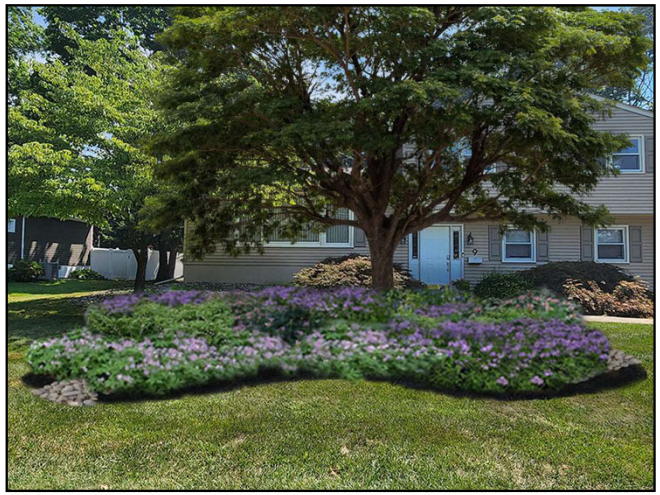
Woodland Phlox - *Phlox divaricata*

Height: 12-15 inches
Spread: 9-12 inches
Flowering Period: April-May
Flowering Color: Blue, Purple
Light Requirement: Full Shade to Part Shade

RAIN GARDEN PLAN:



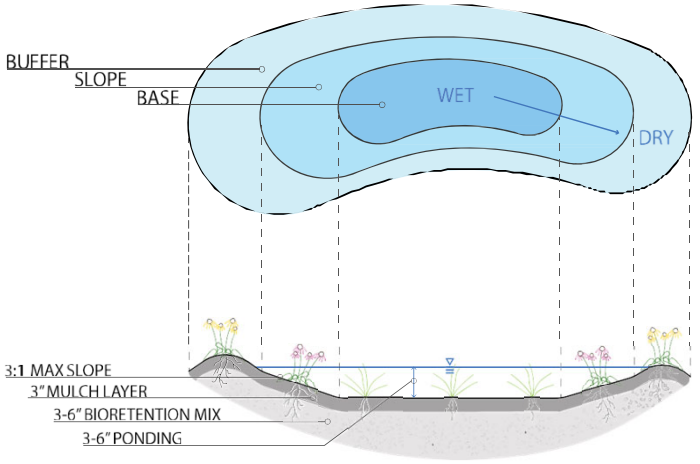
RENDERING OF RAIN GARDEN:



PLANTING SCHEDULE FOR 200-SQ.FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
CA	*Carex amphibola*	CREEK SEDGE	10	1 QT	12-24"
CG	*Chelone glabra*	TURTLEHEAD	10	1 GAL	12-36"
GM	*Geranium maculatum*	SPOTTED GERANIUM	20	1 QT	12-18"
MV	*Mertensia virginica*	VIRGINIA BLUEBELLS	5	1 GAL	12-24"
PB	*Polygonatum biflorum*	SOLOMON'S SEAL	10	1 GAL	12-24"
PD	*Phlox divaricata*	WOODLAND PHLOX	50	1 QT	12-18"

PROFILE OF RAIN GARDEN:



NATURAL DEER TOLERANT GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Swamp Milkweed - *Asclepias incarnata*
Height: 3-4 feet
Spread: 1-2 feet
Flowering Period: July-August
Flowering Color: Magenta
Light Requirement: Full Sun

False Indigo - *Baptasia australis*
Height: 3-4 feet
Spread: 3-4 feet
Flowering Period: May-June
Flowering Color: Purple
Light Requirement: Full Sun

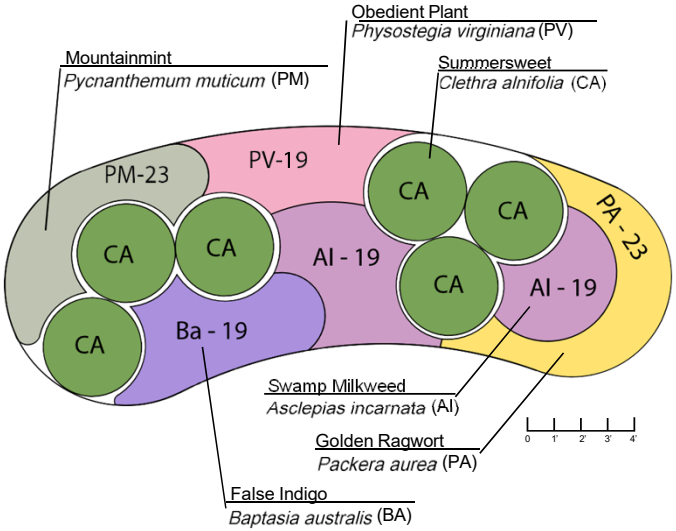
Summersweet - *Clethra alnifolia*
Height: 4-8 feet
Spread: 4-6 feet
Flowering Period: July-August
Flowering Color: White
Light Requirement: Full Sun to Full Shade

Golden Ragwort - *Packera aurea*
Height: 1-2 feet
Spread: 6-12 inches
Flowering Period: March-April
Flowering Color: Yellow
Light Requirement: Full Sun to Full Shade

Mountainmint - *Pycnanthemum muticum*
Height: 1-3 feet
Spread: 1-3 feet
Flowering Period: July-September
Flowering Color: White
Light Requirement: Full Sun to Part Shade

Obedient Plant - *Physostegia virginiana*
Height: 3-4 feet
Spread: 2-3 feet
Flowering Period: August-October
Flowering Color: Pink
Light Requirement: Full Sun to Part Shade

RAIN GARDEN PLAN:

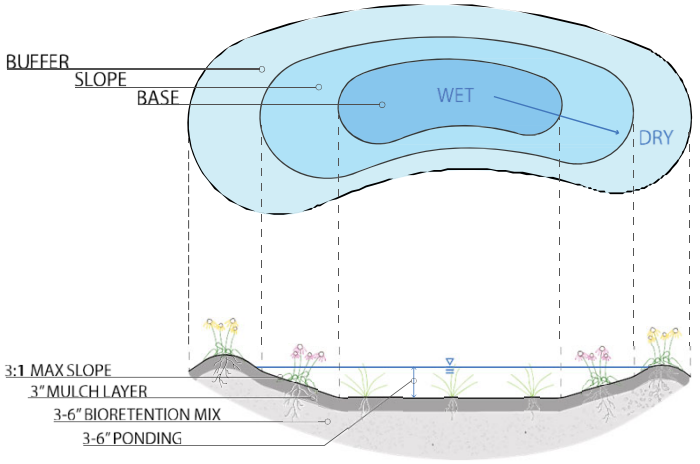


RENDERING OF RAIN GARDEN:

PLANTING SCHEDULE FOR 200-SQ. FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AI	*Asclepias incarnata*	SWAMP MILKWEED	38	1 GAL	18-24"
BA	*Baptasia australis*	FALSE INDIGO	19	1 GAL	24-36"
CA	*Clethra alnifolia*	SUMMERSWEET	6	3 GAL	24-36"
PA	*Packera aurea*	GOLDEN RAGWORT	23	1 GAL	12-24"
PM	*Pycnanthemum muticum*	MOUNTAINMINT	23	1 GAL	12-24"
PV	*Physostegia virginiana*	OBEDIENT PLANT	19	1 GAL	12-24"

PROFILE OF RAIN GARDEN:



NATURAL ALL SHRUBS GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Black Chokeberry - *Aronia melancarpa*

Height: 3-6 feet
Spread: 2-6 feet
Flowering Period: May-June
Flowering Color: White
Light Requirement: Full Sun to Part Shade

Bearberry - *Arctostaphylos uva-ursi*

Height: 6-12 inch
Spread: 1-2 feet
Flowering Period: April-May
Flowering Color: Pink, White
Light Requirement: Full Sun to Part Shade

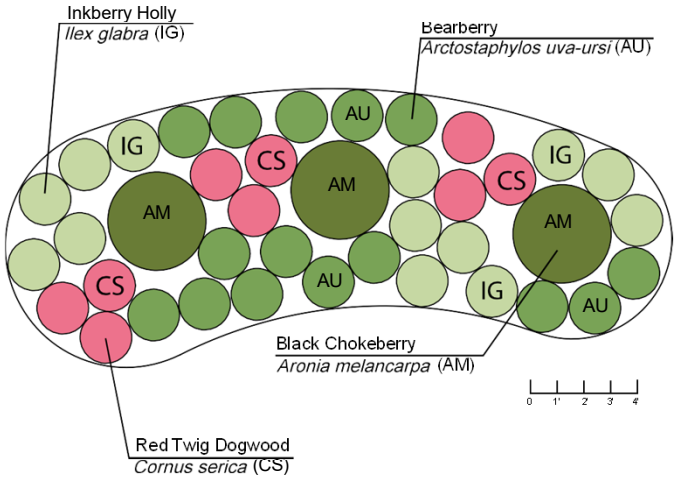
Red Twig Dogwood - *Cornus serica*

Height: 7-9 feet
Spread: 5-10 feet
Flowering Period: May-June
Flowering Color: White
Light Requirement: Full Sun to Part Shade

Inkberry Holly - *Ilex glabra*

Height: 6-8 feet
Spread: 8-10 feet
Flowering Period: May-June
Flowering Color: Green, White
Light Requirement: Full Sun to Part Shade

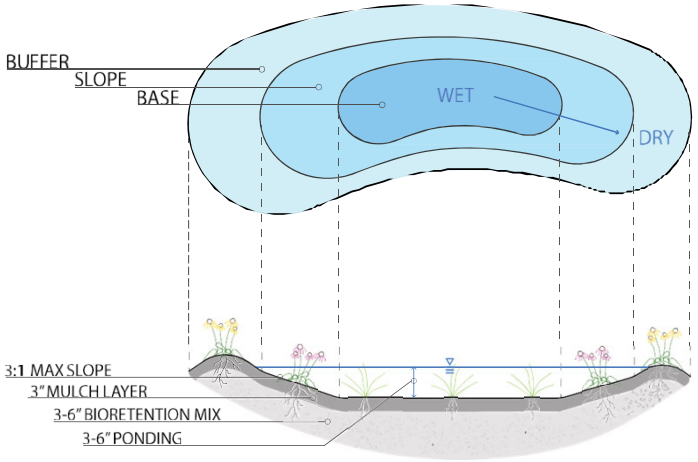
RAIN GARDEN PLAN:



PLANTING SCHEDULE FOR 200-SQ. FT. RAIN GARDEN					
SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AM	*Aronia melancarpa*	BLACK CHOKEBERRY	3	3 GAL	24-36"
AU	*Arctostaphylos uva-ursi*	BEARBERRY	15	1 GAL	12-24"
CS	*Cornus serica*	RED TWIG DOGWOOD	9	3 GAL	24-36"
IG	*Ilex glabra*	INKBERRY HOLLY	13	3 GAL	24-36"

RENDERING OF RAIN GARDEN:

PROFILE OF RAIN GARDEN:



NATURAL PERENNIAL & SHRUB GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

Swamp Milkweed - *Asclepias incarnata*

Height: 3-4 feet
Spread: 1-2 feet
Flowering Period: July-August
Flowering Color: Magenta
Light Requirement: Full Sun

Summersweet - *Clethra alnifolia*

Height: 4-8 feet
Spread: 4-6 feet
Flowering Period: July-August
Flowering Color: White
Light Requirement: Full Sun to Full Shade

Pennsylvania Sedge - *Carex pensylvanica*

Height: 6-12 inch
Spread: 2 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Shade to Part Shade

Inkberry Holly - *Ilex glabra*

Height: 6-8 feet
Spread: 8-10 feet
Flowering Period: May-June
Flowering Color: Green, White
Light Requirement: Full Sun to Part Shade

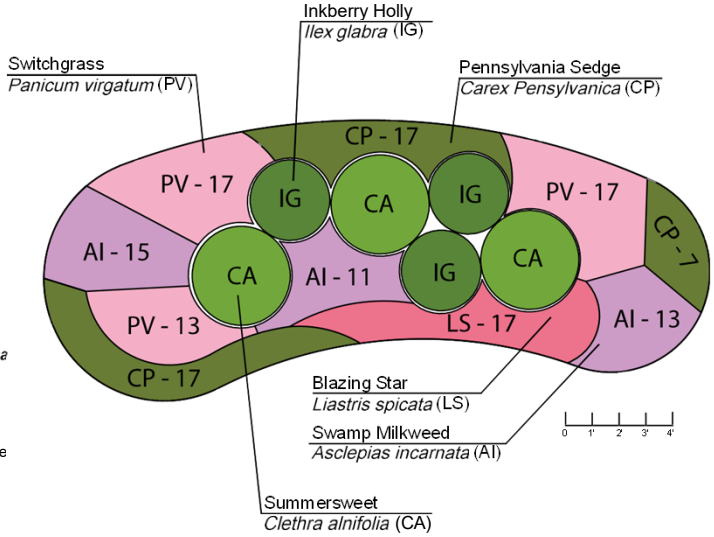
Blazing Star - *Liastris spicata*

Height: 3-4 feet
Spread: 1-2 feet
Flowering Period: July-August
Flowering Color: Magenta
Light Requirement: Full Sun

Switchgrass - *Panicum virgatum*

Height: 3-6 feet
Spread: 3 feet
Flowering Period: August-October
Flowering Color: Pink
Light Requirement: Full Sun to Part Shade

RAIN GARDEN PLAN:

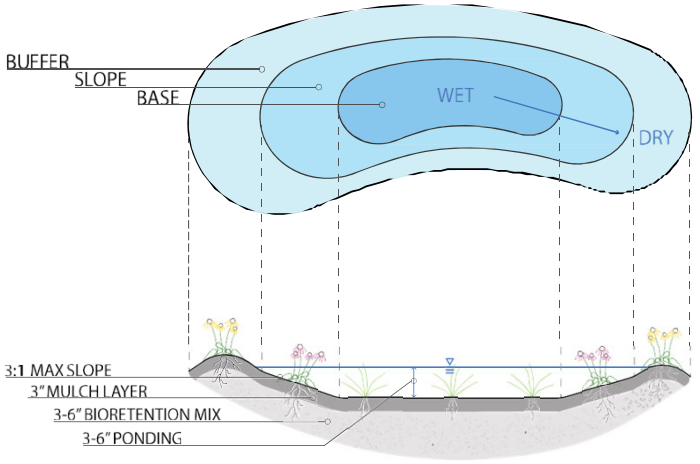


PLANTING SCHEDULE FOR 200-SQ. FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AI	*Asclepias incarnata*	SWAMP MILKWEED	47	1 GAL	18-24"
CA	*Clethra alnifolia*	SUMMERSWEET	3	3 GAL	24-36"
CP	*Carex pensylvanica*	PENNSYLVANIA SEDGE	41	1 GAL	6-12"
IG	*Ilex glabra*	INKBERRY HOLLY	3	3 GAL	24-36"
LS	*Liastris spicata*	BLAZING STAR	25	1 GAL	12-18"
PV	*Panicum virgatum*	SWITCHGRASS	47	1 GAL	24-36"

RENDERING OF RAIN GARDEN:

PROFILE OF RAIN GARDEN:



MANICURED SHADE GARDEN

Concept for a 200-sq.ft. rain garden

PLANT PALETTE:

American Columbine - *Aquilegia canadensis*

Height: 1-2 feet
Spread: 1-2 feet
Flowering Period: March-June
Flowering Color: Red
Light Requirement: Full Shade to Part Shade

Wild Bergamot - *Monarda fistulosa*

Height: 2-4 feet
Spread: 2-3 feet
Flowering Period: July-September
Flowering Color: Purple, Pink, White
Light Requirement: Full Sun to Part Shade

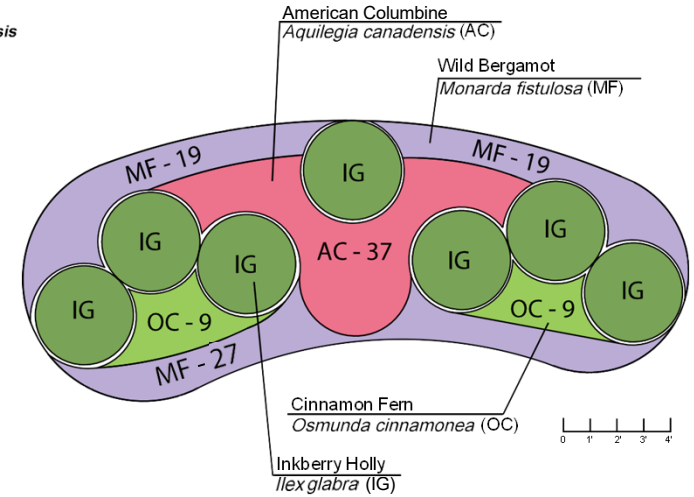
Inkberry Holly - *Ilex glabra*

Height: 6-10 feet
Spread: 5-8 feet
Flowering Period: June-July
Flowering Color: Green, White
Light Requirement: Full Sun to Part Shade

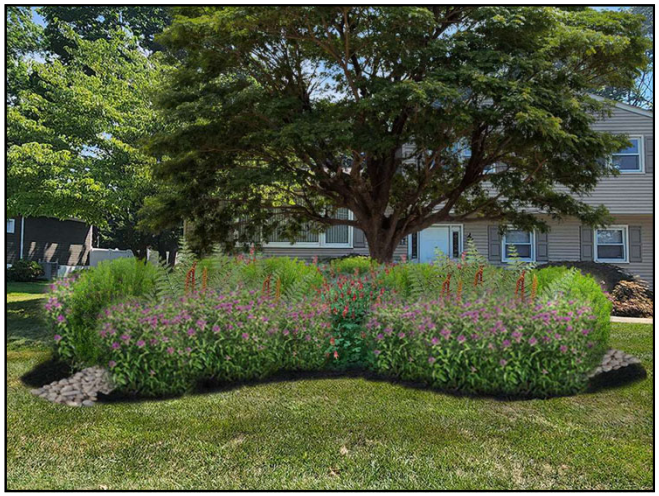
Cinnamon Fern - *Osmunda cinnamomea*

Height: 1-6 feet
Spread: 2-4 feet
Flowering Period: N/A
Flowering Color: N/A
Light Requirement: Full Shade to Part Shade

RAIN GARDEN PLAN:



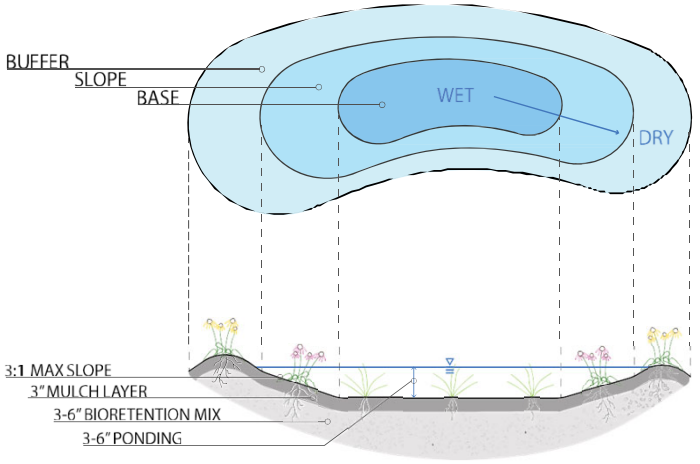
RENDERING OF RAIN GARDEN:



PLANTING SCHEDULE FOR 200-SQ. FT. RAIN GARDEN

SYMBOL	LATIN NAME	COMMON NAME	QUANTITY	CONTAINER	SPACING
AC	*Aquilegia canadensis*	AMERICAN COLUMBINE	37	1 GAL	12-18"
MF	*Monarda Fistulosa*	WILD BERGAMOT	65	1 GAL	12-24"
IG	*Ilex glabra*	INKBERRY HOLLY	7	3 GAL	24-36"
OC	*Osmunda cinnamonea*	CINNAMON FERN	18	1 GAL	18-36"

PROFILE OF RAIN GARDEN:



Maintenance

Weekly:

1. Watering
2. Weeding
3. Inspecting

Annual:

1. Mulching
2. Pruning
3. Re-planting
4. Removing sediment
5. Soil Testing
6. Harvesting Plants
7. Cleaning of Gutters
8. Replacing materials (stone, landscape fabric)

Maintenance Guide

(all available on the RCE Website)

1. General guide
2. One-pager

Discussion and Questions