



Partnership for
Action Learning
in Sustainability



Bioretention Planting Guide

PLSC452, Spring 2026

AUTHORS

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Nicholas Mobbille, Hess Morgan, Corrine Quaerna

UNDER THE SUPERVISION OF

Dr. Diana Cochran

Acknowledgements:

We gratefully acknowledge the Partnership for Action Learning in Sustainability (PALS) and thank them for bringing us the opportunity to work with the Washington Metropolitan Area Transportation Authority (WMATA).

We also acknowledge WMATA's vested interest in the improvement of their Landover Bus Division bioretention ponds. And we extend our sincere appreciation to WMATA for their valuable partnership and their development of the planting project which provided us with real-world, hands-on experience.

Today's presentation will include:

- 1.Site goals (Nicholas Mobille)
2. Planting plans
 - a.Bioretention Pond #1 (Corinne Quaerna)
 - b.Bioretention Pond #2 (Leyu Kalkidan)
3. Planting guide
 - a.Template and information sheets(Abigail Butina)
 - b.Maintenance calendar (Ian Bartlett)
 - c.Plant health and care (Jason Hipp)

Site Goals

The Sites: Bioretention ponds with dormant grasses

WMATA's Vision

Soil tolerance

Salt tolerant

Heat tolerant

Ease of maintenance

Ease of access

Aesthetic value

Low wildlife attraction

Few woody plants



Site Goals

Our Vision



Year- around color: Diverse plant palette providing seasonal interest all year

Focal points: Include elements that stand out and provide visual interest

Native plants: Utilize mostly plants indigenous to the region and local ecosystem

Maintenance pathways: Incorporate designated pathways for maintenance

Please hold your questions until the end
of the presentation- Thank you !



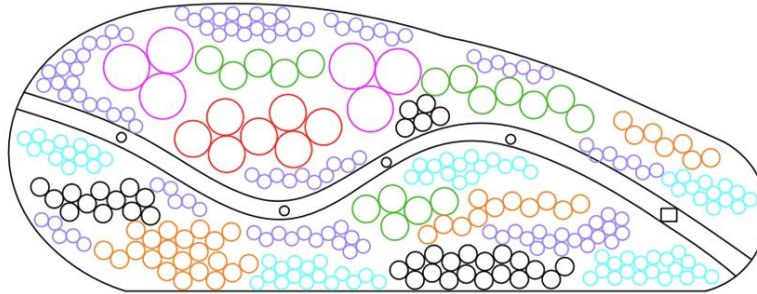
**Partnership for
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Planting Plans: Bioretention Pond #1

- *Panicum virgatum* (17)
OC: 30-26"
- *Itea virginica* (7)
OC: 3-4'
- *Ilex glabra* "Shamrock" (6)
OC: 4-5'
- *Muhlenbergia capillaris* (39)
OC: 24-30"
- *Rudbeckia hirta* (76)
OC: 12-18
- *Asclepias tuberosa* (35)
OC: 12-18
- *Phlox subulata* (109)
OC: 12-18"

Area: 2100 ft²



SCALE: 1"-16'



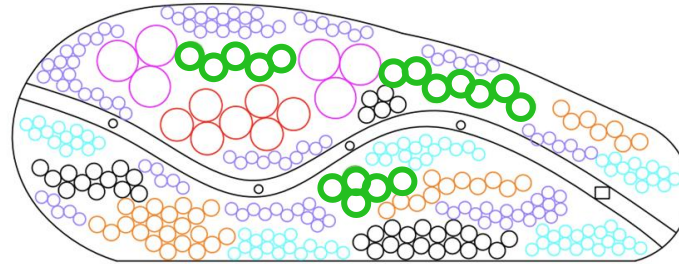
Design Intention:

- Seasonal interest
- Tolerant plants
- Ease of maintenance
 - Mulch path
 - Groundcover
 - Plant selection

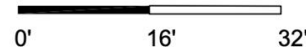
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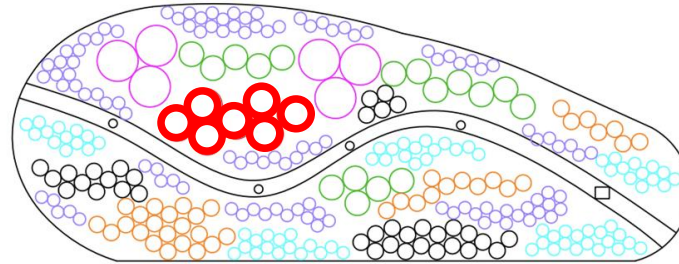
Switchgrass



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0' 16' 32'

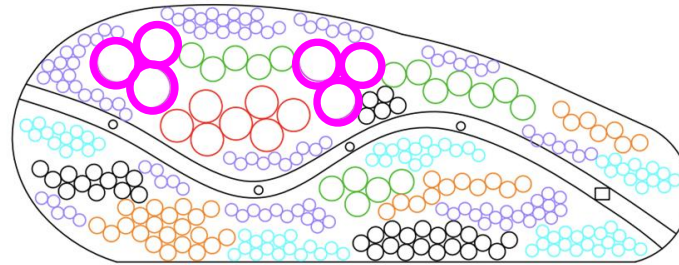
Virginia Sweetspire



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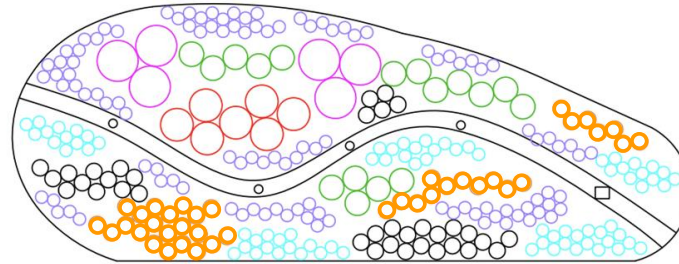
Shamrock inkberry



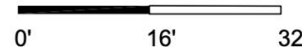
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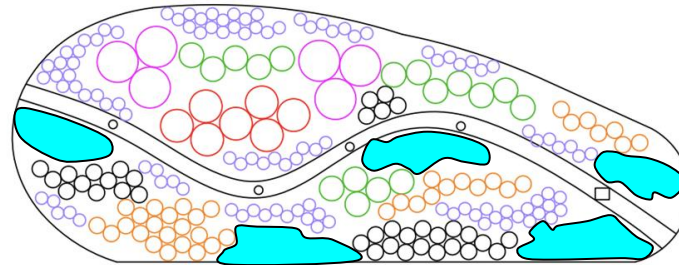
Pink muhly grass



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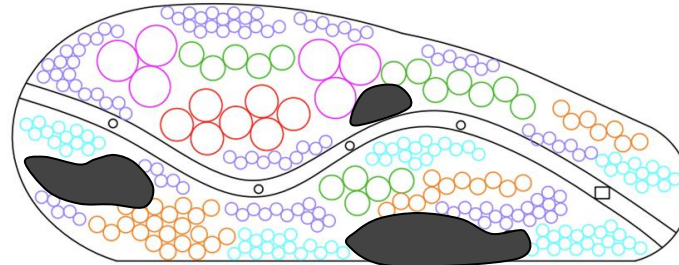
Black-eyed susan



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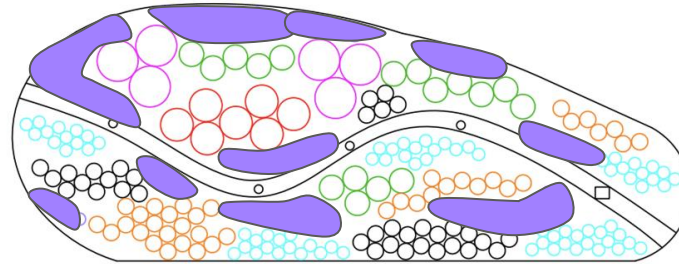
Butterfly milkweed



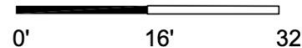
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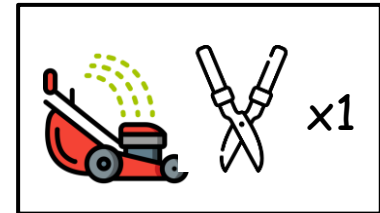
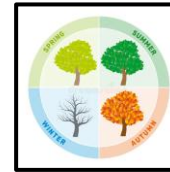
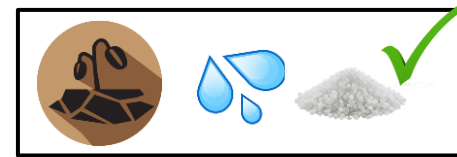
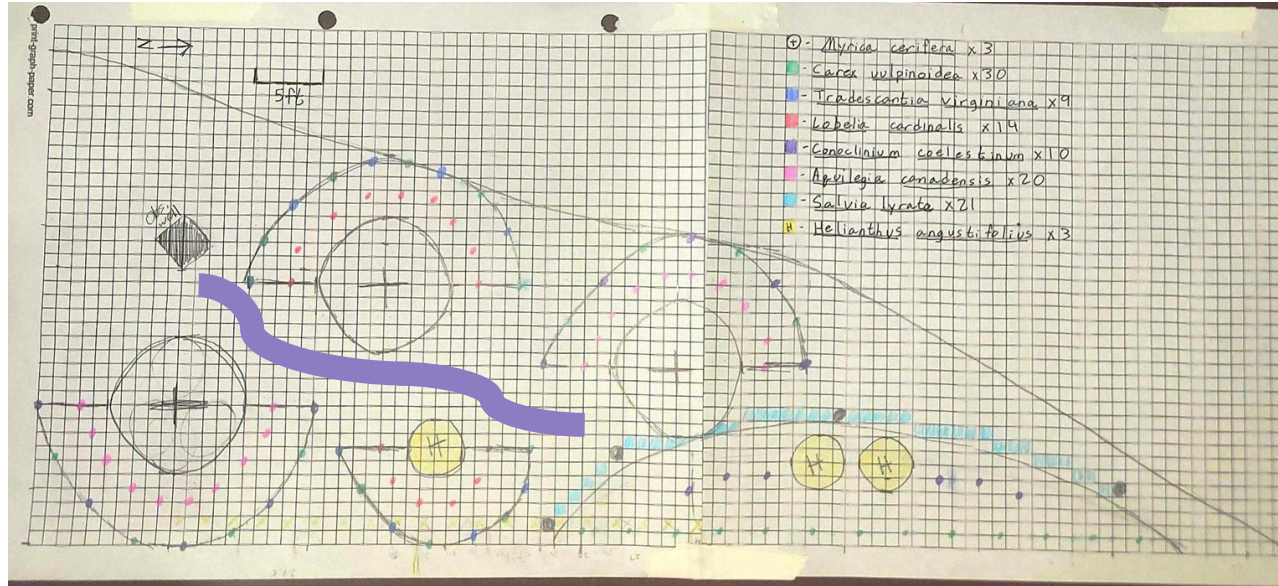


Creeping phlox





Planting Plans: Bioretention Pond #2



Planting Plans: Bioretention Pond #2

- *Myrica cerifera*

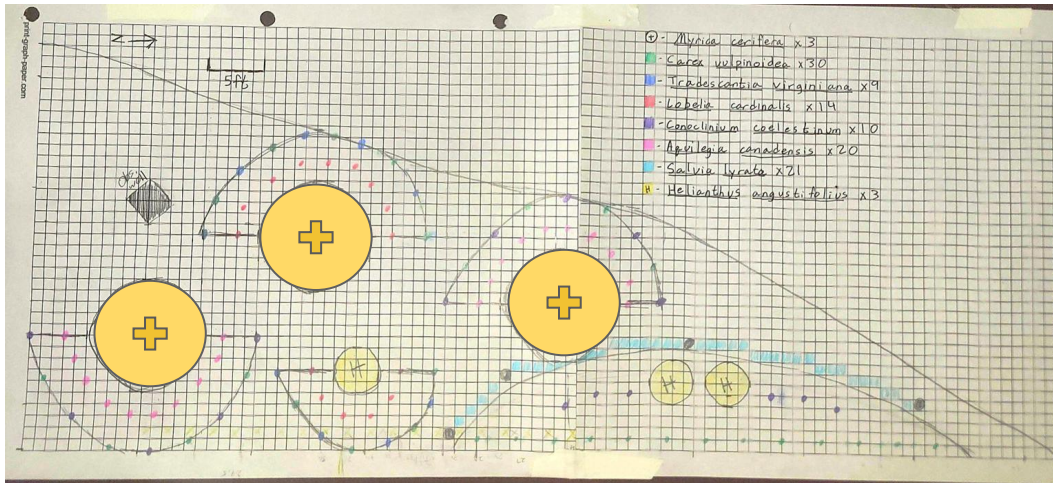


Photo cred: North Carolina Extension
Gardener Plant Toolbox

Planting Plans: Bioretention Pond #2

- *Carex vulpinoidea*

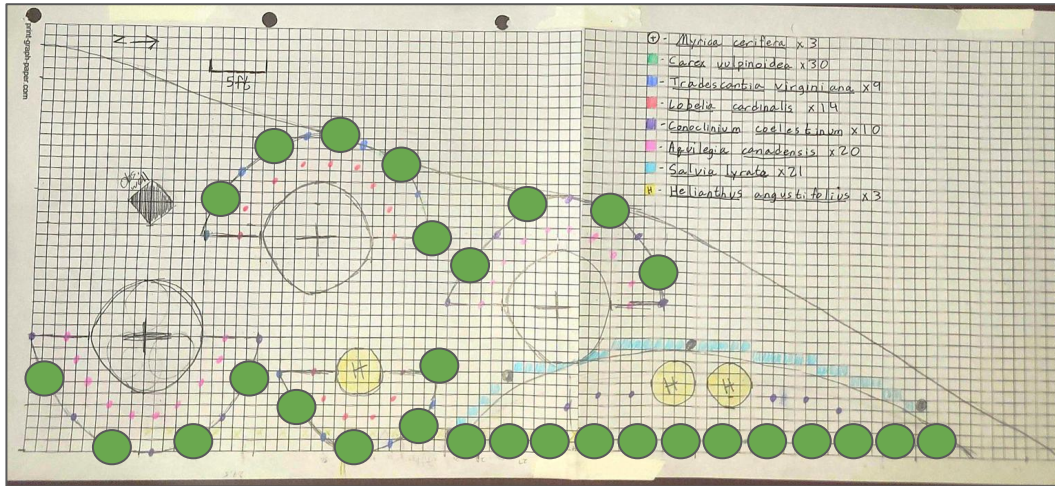
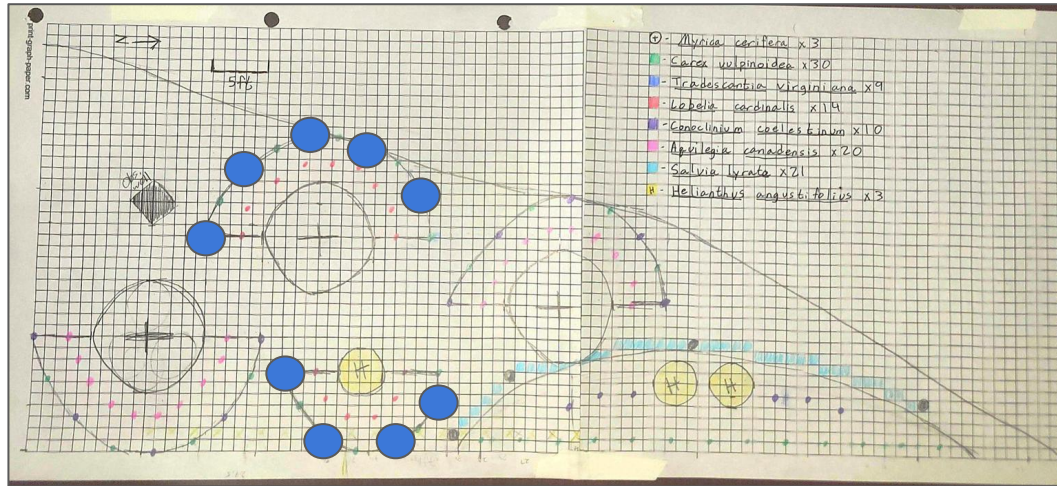


Photo cred: Hoffman Nursery

Planting Plans: Bioretention Pond #2



- *Sisyrinchium angustifolium*



Photo cred: North Carolina Extension
Gardener Plant Toolbox

Planting Plans: Bioretention Pond #2

- *Lobelia cardinalis*

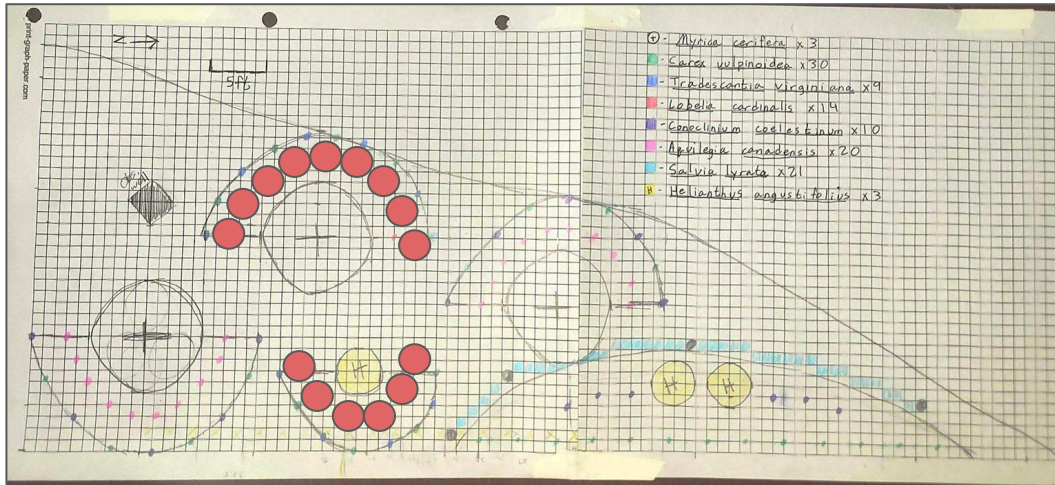


Photo cred: Missouri Botanical Garden

Planting Plans: Bioretention Pond #2

- *Conoclinium coelestinum*

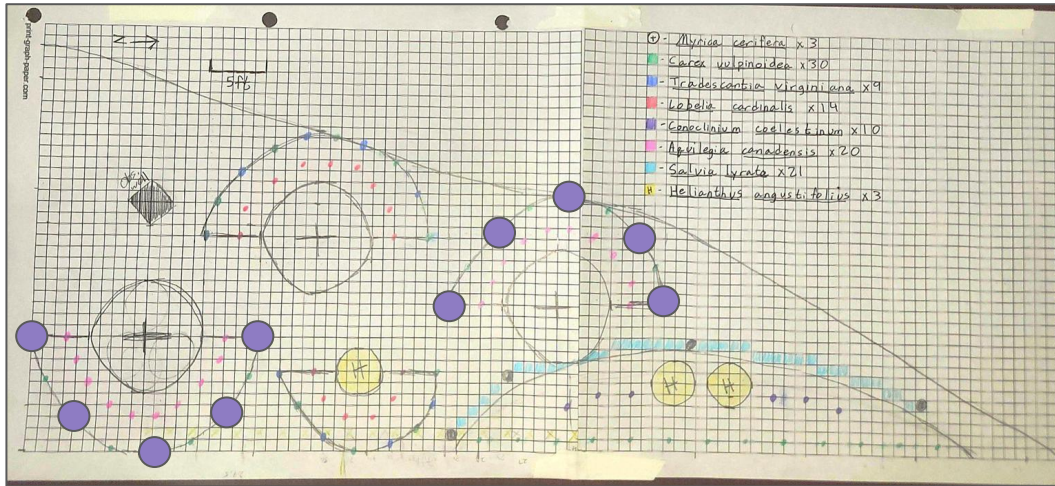


Photo cred: Missouri Botanical Garden

Planting Plans: Bioretention Pond #2

- *Aquilegia canadensis*

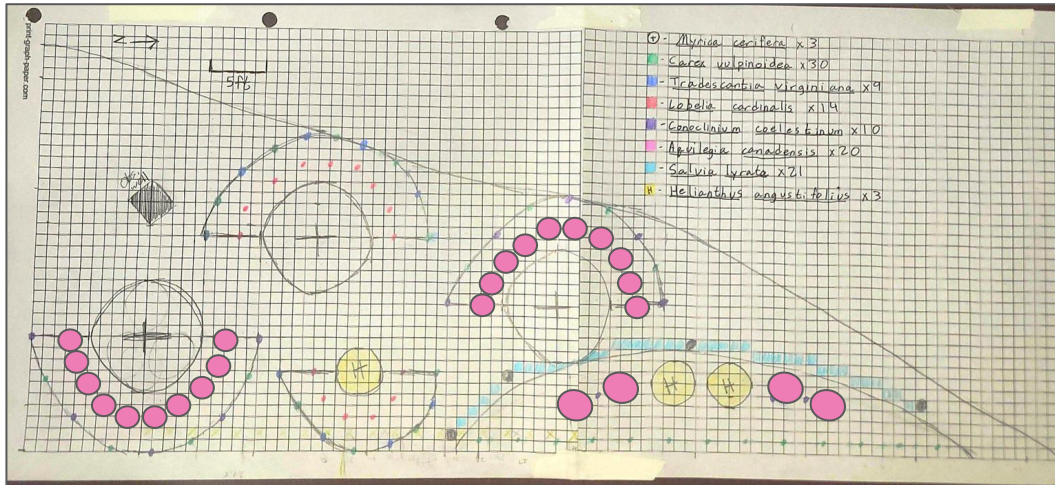


Photo cred: Missouri Botanical Garden

Planting Plans: Bioretention Pond #2

- *Sedum ternatum*

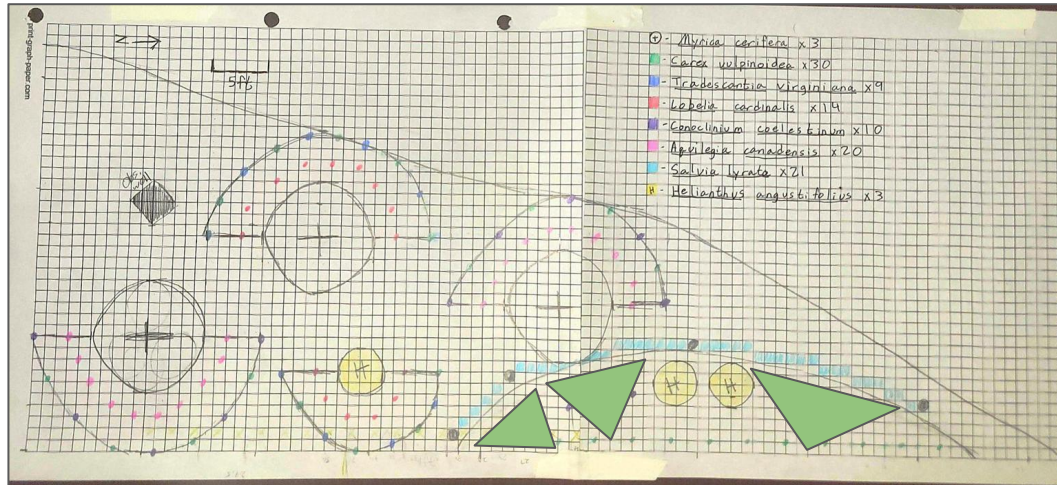


Photo cred: Missouri Botanical Garden

Planting Plans: Bioretention Pond #2

- *Helianthus angustifolius*

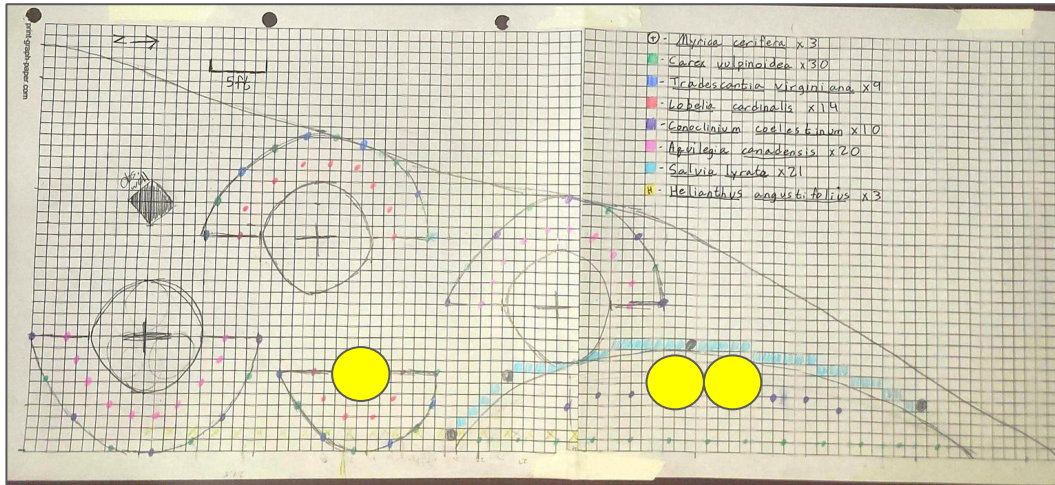
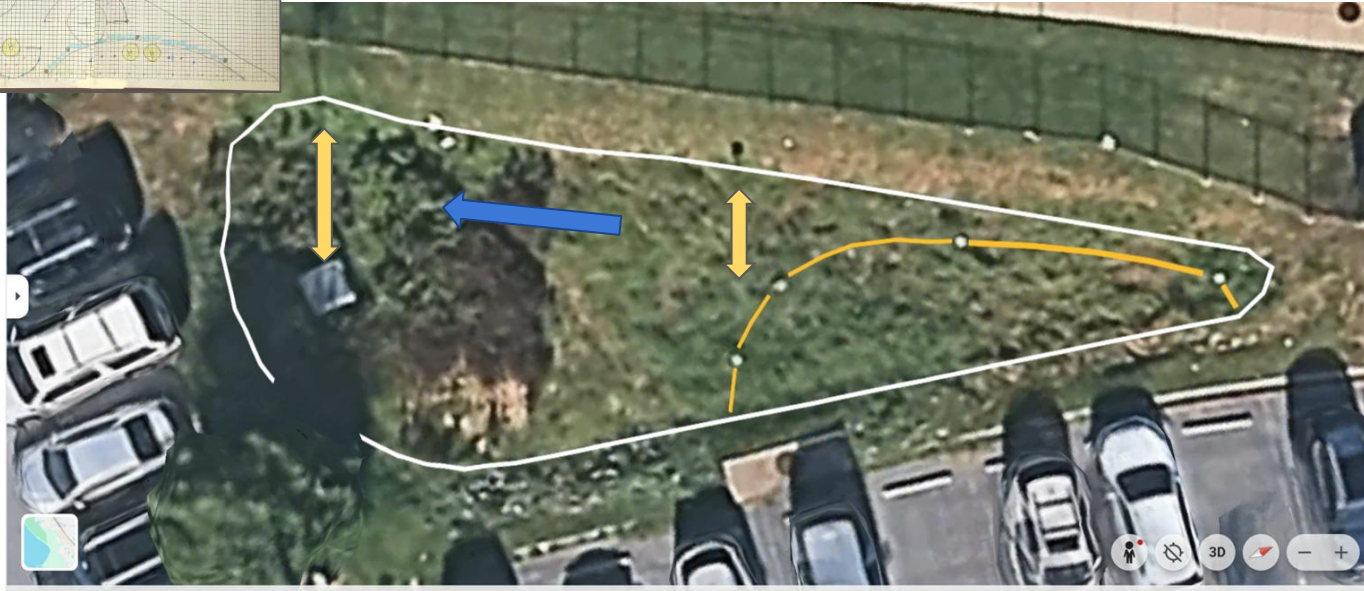
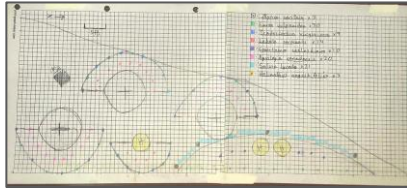


Photo cred: North Carolina Extension
Gardener Plant Toolbox

Planting Plans: Bioretention Pond #2



Planting Plans: Bioretention Pond #2



Planting Guide and Additional Plant Information Sheet

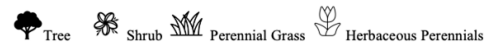
The planting guide will provide information on 75 plants total, including what was planted on 04/29. We wanted to provide additional information for plants that could be used at other bioretention sites for stormwater management.

- Plants are arranged by type: tree, shrub, perennial grass, herbaceous perennials
- A key is included

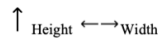
Planting Guide Template and Key

<i>Scientific name</i>		Common name		
Zones:	↑ H'	← W' →	N	
  			R	
   	📅 Bloom Time		 B	
	Level (low, medium)	Type of Maintenance	Maintenance Time	
Additional Comments:				

KEY



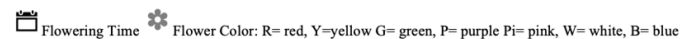
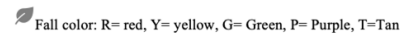
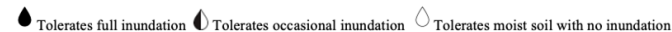
Zones: USDA Hardiness Zone



N- Native NN- Nonnative



NR- Not recommended to be planted on slope



Maintenance Information: Low, Medium, High. Type of Maintenance, and time of year.

Low: Maintenance once a year

Medium: Twice a year

High: Three or more times a year

Additional comments: salt, deer, issues, diseases, special pH requirements, etc.

Examples

<i>Asclepias tuberosa</i>		Butterflyweed		
Zones: 3a-9b	↑ 1-2'	← 1-1.5' →	N	
 			 Y	
   	 May-August		 O	
	Level Low	Mow/Prune stems	January-March	
Additional Comments: Salt, deer, and rabbit tolerant; susceptible to rust and leaf spot; toxic if ingested				



<i>Cercis canadensis</i>		Eastern redbud		
Zones: 4-8	 20-30'	 25-35' →		N
 				 Y
  		 April		 P
	Low	Branch pruning	Winter-Early Spring	
Additional Comments: Canker can be a serious disease. Deer tolerant.				



Maintenance Appendix

- Maintenance levels
 - Low
 - Once/year
 - Medium
 - Twice/year
 - High
 - 3+/year
- Key
 - Required annual
 - Optional

Maintenance Table

Plant type	Plant Name	Botanical Name	Maintenance Required	How Often to Maintain	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Herbaceous perennial	Eastern columbine	<i>Aquilegia canadensis</i>	Mow/prune stems	1/yr												
			Aesthetics - prune stems	1/yr after flowering												
Herbaceous perennial	Swamp milkweed	<i>Asclepias incarnata</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Butterflyweed	<i>Asclepias tuberosa</i>	Mow/prune stems	1/yr												
Herbaceous perennial	White turtlehead	<i>Chelone glabra</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Blue mistflower	<i>Conoclinium coelestinum</i>	Mow/prune stems	1/yr												
			Prevent spreading - remove young plants growing outside of desired areas	1/yr when plants sprout, as desired												
Herbaceous perennial	Joe Pye weed	<i>Eutrochium purpureum</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Swamp sunflower	<i>Helianthus angustifolius</i>	Mow/prune stems	1/yr												
			Prevent spreading - remove young plants growing outside of desired areas	1/yr when plants sprout, as desired												
Herbaceous perennial	Blazing star	<i>Liatris spicata</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Cardinal flower	<i>Lobelia cardinalis</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Great blue lobelia	<i>Lobelia siphilitica</i>	Mow/prune stems	1/yr												
Herbaceous perennial	Virginia bluebells	<i>Mertensia virginica</i>	Aesthetics - remove dead foliage	1/yr after plant goes dormant												

Plant Health Care Appendix

- **Principles of Integrated Pest Management (IPM)**

- Monitoring
- Cultural
- Mechanical
- Biological
- Chemical

- **Plant Guide**

- Common Name, Scientific Name, Type of Plant, Common Pest and Disease

- **Pest/Disease Problems and Solutions**

- Description, Damage, Management

Plant Guide

Common Name	Scientific Name	Type	Common Pests	Common Diseases
Fox Sedge	Carex vulpinoidea	Grass-like	Aphids, Plant bugs, Leafhoppers	Crown rot, Rust, Leaf spot
Swamp Sunflower	Helianthus angustifolius	Perennial	Aphids, Spider mites, Whiteflies, Scale, Sunflower moth	Rust, Powdery Mildew, Leaf spot
Wax Myrtle	Myrica cerifera	Shrub	Spider mites, Whiteflies, Scale, Thrips	Leaf spot, Leaf Mosaic Virus, Stem canker
Woodland Stonecrop	Sedum ternatum	Groundcover	Aphids, slugs/ snails, Spider mites, Mealybugs	Root rot, Botrytis Blight
Blue Mistflower	Conoclinium coelestinum	Perennial	Leafminers, Aphids	Powdery Mildew

Pest/Disease Problems and Solutions

Aphids

Description: Adults are 1/16" – 1/8", pear-shaped soft bodied. Their color ranges from green to brown, red and black. There are multiple generations in a year.

Damage: Adults feed on the plant sugars and excrete a sugary liquid called honeydew. The honeydew drips onto plant foliage and provides a suitable habitat for a black fungus called Sooty Mold to grow.

Management:

- a. Monitoring: Look for aphids on the underside of the leaves. Look for symptoms of sooty mold on the foliage. Ants tend to care for the aphids as they feed on the honeydew, so monitor for an increase in ant activity.
- b. Cultural: Use a jet of water to dislodge and remove aphids from plants.
- c. Biological: Beneficial insects such as lady beetles, green lacewings, and parasitic wasps can naturally control aphid populations.
- d. Chemical: Use of horticultural oils and insecticidal soaps provide good control. Use of synthetic pesticides will also provide good control.



Pest/Disease Problems and Solution

Powdery Mildew

Description: Spores overwinter on leaves, buds and along bark crevices. Infection begin as small fuzzy pale spots on the foliage. Prefers warm days and cool nights.

Damage: White powdery fungus grows on foliage, entire leaf may be covered. Infected foliage may be twisted and stunted.

Management:

- a. Monitoring: Look for small pale fuzzy spots on the leaves. Powdery mildew can be removed by rubbing your across the spot.
- b. Cultural: Plants can be thinned to increase air circulation and reduce moisture on the leaves.
- c. Biological: Use of resistant plant varieties
- d. Chemical: Fungicide applications should begin when early signs of damage appears on the foliage. Fungicide application can provide effective control



Thank you!

To WMATA and PALS for giving us the this marvelous opportunity to design and plant the 2 bioretention ponds.

And to Dr. Diana Cochran for her guidance and enthusiastic support in helping to develop this project.

Questions?



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