

Storm Water Management Program

In May of 2001 the governmental agencies that make up ALOA joined together to address EPA's upcoming Phase II requirements.

This brochure is one of a series of publications regarding storm water issues in Lee County.

The series is produced by the ALOA Storm Water Advisory Panel and is intended to protect, maintain, and restore the chemical, physical, and biological integrity of local waters in order to enhance the quality of life for our citizens.



Cleaner streams provide a benefit to all.

Rain Gardens



www.raingardens.org



ACES



NCSU BAE

CONTACT INFORMATION

For more information regarding your community's storm water program please contact the following agencies:

City of Auburn – Department of
Water Resource Management
334-501-3077

<http://www.auburnalabama.org/water/phase2stormwater.html>

Lee County – County Engineer
334-745-9792
www.leeco.us

City of Opelika – Department of Public Works
334-705-5400
www.opelika.org

Auburn University – Risk Management and Safety
334-844-4870
www.auburn.edu/administration/rms/



STORM WATER MANAGEMENT PROGRAM

Rain Gardens



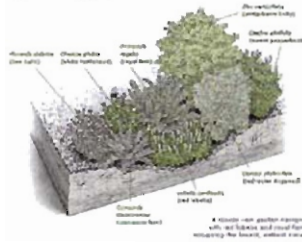
“Local Citizen Groups and Government Working Together for Clean Water”

WHERE DID RAIN GARDENS ORIGINATE?

Rain gardens naturally occur in our environment as wetlands, vegetated fields, and forest. As these natural environments are reduced through development, there becomes a need to alternatively manage untreated stormwater runoff. It was Larry Coffman of the Department of Environmental Resources at Prince George's County, Maryland who first designed and constructed a stormwater treatment system utilizing plants. In an effort to distribute this new technology and assure its effective use, Larry and his team developed the first bioretention design guidelines in 1993. This brochure will briefly discuss the design concepts, techniques, and vegetation used to construct rain gardens.

WHAT ARE THE DESIGN GUIDELINES AND CONSIDERATIONS OF RAIN GARDENS?

Rain garden design must take into account the purpose, site drainage size, surface cover, hydrology, soils, and location of the project site. Once these items are addressed, the volume of runoff that is to be treated can be calculated. Typically a 1 inch storm event is suitable to design for. Once the runoff volume to be treated is determined, the size of the rain garden can then be calculated. This size is directly related to the volume of runoff that will be treated.



RAIN GARDEN DESIGN EQUATIONS AND CALCULATIONS

The following equations can be used for calculating the area and depth a particular rain garden should be:

1. Determine Runoff Depth

$$R/O = (P - 0.2S)^2 / (P + 0.8S)$$

where P=Precipitation, S=1000/CN-10 and CN is the Runoff Coefficient

2. Determine Volume of Runoff

$$V = R/O * \text{Runoff Area}$$

Runoff Area could be roof, yard, etc.

3. Determine Size of Bioretention Pond

*Assume 9" depth in this situation

$$\text{Surface Area} = \text{Volume} / \text{Depth}$$

Each of these calculations is performed separately for each cover type located within the project drainage area.

WHAT ARE SUITABLE LOCATIONS AND APPLICATIONS OF RAIN GARDENS?

As with all stormwater management BMP's there are preferred locations and applications for use.

- Should not be placed in locations where the seasonal high water table is within 24" of the surface
- Are not suitable in cold climates where frozen soils may be an issue
- Should not be placed within 10' of building foundations or septic systems
- May not be suitable in areas with extremely steep slopes
- USDA sandy soils are most suitable for infiltration, as water should not be allowed to pond greater than 24 hours after a single rain event. This hinders the mosquito breeding cycle.

HOW DO I CONSTRUCT MY RAIN GARDEN?

Once you have determined that you are in a suitable location for a rain garden and have calculated the size and shape, you are ready to begin construction.

1. Use stakes and rope to layout the boundary/shape of your rain garden.
2. Remove soil to a depth of no more than 9" at the deepest location.
3. Excavated soil should be used to create a small berm immediately downhill of the rain garden. This will aid in retaining water in the garden.
4. If soil is a heavy clay, a more porous soil mixture that is 50-60% coarse sand may be needed to add to the base of the rain garden.
5. Mix compost/organic into the remaining excavated soil and layer to a depth of 4".
6. Establish a perennial ground cover around the rain garden and berm in order to slow entering stormwater. This will also allow for an "overflow" condition.
7. Plant hardy wet and dry tolerant perennial vegetation within the rain garden. Native plants are preferred.
8. Cover the remaining depth of the garden with pine straw, finely shredded wood, or dense mulch.

HOW DO I MAINTAIN MY RAIN GARDEN?

Regular maintenance will be necessary in order to establish a long lasting rain garden. All weeds and invasive plants should be removed on a routine basis. The mulch layer should be replenished as necessary to maintain a suitable layer for infiltration.

WHAT SHOULD I PLANT IN MY RAIN GARDEN?

Below is a list of several recommended native plants that will thrive in most rain gardens of the piedmont.

TREES

BALD CYPRESS
RED MAPLE
RIVER BIRCH
SWEETBAY
GREEN ASH
WILLOW OAK

SHRUBS

BUTTON BUSH
AMERICAN BEUTYBERRY
INKBERRY
WAX MYRTLE
RED BUCKEYE
TAG ALDER

HERBACEOUS

BUTTON EYENO
HARVESTBELLS
SWAMP SUNFLOWER
LODGESTRIFE
CINNAMON FERN
COMMON PLAINAIN

WHAT ARE SOME LOCAL BENEFITS OF RAIN GARDENS?

Rain gardens are a great way for an individual or small entity to "pitch in" with the growing need for stormwater management and treatment. With the average cost of building a rain garden usually falling between \$3 and \$5 per square foot, they can be financially appealing to both individual homeowners and developers. They can also be used as one of the more aesthetically pleasing BMP measures used in low impact development. With the many benefits of rain gardens and low impact development in mind, the City of Auburn is working to draft and adopt a conservation subdivision ordinance. Below is a brief recap of the benefits that rain gardens can provide.



Yarborough School Rain Garden

- Helps recharge groundwater aquifers
- Aids in nutrient and sediment removal from stormwater
- Allow stormwater to acclimate to an appropriate temperature before entering our streams
- Aesthetically pleasing garden that may increase property value
- Potential for reduced breeding of mosquitoes
- Create habitat for various wildlife
- Excellent education tool

Want More Information on Rain Gardens?

- 1) <http://www.aces.edu/waterquality/mg.htm>
- 2) <http://www.cleanwatercampaign.com/resources/raingardenbrochure.pdf>
- 3) <http://www.bae.ncsu.edu/topic/raingarden/Building.htm>