Rain Gardens
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A rain garden is a depression that functions as a miniature wetland. These landscaped areas, typically planted with wildflowers and other native vegetation, replace sections of lawn and provide a place for stormwater to infiltrate. Compared to a patch of conventional lawn, a rain garden allows approximately 30% more water to soak into the ground.

Why is infiltration so important?

Non-point source pollution is one of the leading factors contributing to a decline in water quality nationwide. Impervious surfaces such as roads, driveways, and rooftops create stormwater runoff that erodes streambanks and pollutes water systems. Turfgrass lawns also contribute to this problem, since their shallow, dense root systems don’t allow water to seep through easily. As stormwater rushes over these surfaces, it picks up pollutants such as lawn chemicals, oil, grease, and road salts, depositing these contaminants into streams and rivers.
Benefits

Rain gardens:

* Reduce runoff into streams
* Filter out pollutants
* Improve water quality
* Recharge groundwater supplies
* Help sustain stream baseflows
* Are much more attractive than detention ponds
* Help control flooding and erosion
* Provide wildlife habitat

An established rain garden in Wisconsin

Athens rain garden after a rain event
Design guidelines

**Drainage Area**
* limited to less than 2 to 3 acres
* preferably less than 1 acre

**Ponding Depth**
* maximum 6" recommended for soils with an infiltration rate of at least 2"/hr
* maximum 3 to 4" recommended for soils with low infiltration rates or high hydraulic loadings (combine with a smaller drainage area)
* ponding depth may be increased if using sandy soils and underdrains to increase filtration
* any pooled water should be drawn down within 4-6 hours after a storm event

**Plants**
* must be able to tolerate expected pollutant loadings, highly variable soil moisture conditions and ponding water fluctuations
* use of native species is recommended
* minimum recommended caliper size for trees is 1"
* a minimum of 3 species of trees and 3 species of shrubs is recommended to insure diversity
* avoid species that require regular maintenance

**Soil**
* homogeneous mix of 50% construction sand and 20-30% topsoil with less than 5% maximum clay content and 20-30% organic leaf compost

**Mulch**
* maximum 2 to 3 inches deep
* should be fresh, not aged
* apply uniformly, do not pile around the base of trees
* do NOT use grass clippings

**Groundwater**
* depth below rain garden invert should be at least 2' to avoid groundwater contamination

**Slope**
* not recommended for slopes greater than 15%

**Underdrain**
* build with a cleanout well that is accessible by the homeowner
* do not locate within the groundwater zone of saturation
* must have a hydraulic capacity greater than the planting soil infiltration rate
* may outfall to a suitable location such as a common space area, stream valley, drainage swale, roadside open-section, or existing enclosed drainage system

**Surface Overflow**
* typically not a design problem in residential settings due to small drainage areas
* surrounding grass provides a naturally safe, non-erose surface for overflow

**House Considerations**
* if using on a lot with a basement, make sure that there is a minimum 25 foot setback from the home's foundation
* the rain garden's invert is lower than the proposed basement floor elevation
* the rain garden is located downgrade from the home

**Lot Considerations**
* ensure that the rain garden is constructed entirely within lot boundaries
* maintain a minimum of 2 feet between rain garden and property lines

Common questions

Won’t a rain garden attract mosquitoes?

No. Mosquitoes require at least four days to hatch and a well-designed rain garden should have standing water for only 4-6 hours after a storm event.

How can I keep it from looking messy?

Neatly trimmed shrubs, a crisp edge of lawn, stone retaining walls, and other devices can be used to keep garden edges neat and visually appealing.

What happens to water-tolerant plants when there is a dry spell?

Native plants can withstand a range of weather conditions. Species that do well in poorly drained soil will be fine during dry weather.

Newly planted rain garden

Garden after two years
Hardy native wildflowers, grasses and shrubs that thrive without fertilizers and pesticides work best in rain gardens. The following lists show a few examples of suitable plants:

<table>
<thead>
<tr>
<th>Sunny Sites</th>
<th>Shady Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butterfly Weed (<em>Aesclepias tuberosa</em>)</td>
<td>Cardinal Flower (<em>Lobelia cardinalis</em>)</td>
</tr>
<tr>
<td>Black-eyed Susan (<em>Rudbeckia hirta</em>)</td>
<td>Caterpillar Sedge (<em>Carex crinita</em>)</td>
</tr>
<tr>
<td>Joe Pye Weed (<em>Eupatorium fistulosum</em>)</td>
<td>Virginia Bluebells (<em>Mertensia virginica</em>)</td>
</tr>
<tr>
<td>Soft Rush (<em>Juncus effusus</em>)</td>
<td>Sensitive Fern (<em>Onoclea sensibilis</em>)</td>
</tr>
<tr>
<td>Great Blue Lobelia (<em>Lobelia siphilitica</em>)</td>
<td>Wild Geranium (<em>Geranium maculatum</em>)</td>
</tr>
<tr>
<td>Switchgrass (<em>Panicum virginiannum</em>)</td>
<td>Alumroot (<em>Heuchera richardsonii</em>)</td>
</tr>
<tr>
<td>Big bluestem (<em>Andropogon gerardii</em>)</td>
<td>Wild Columbine (<em>Aquilegia canadensis</em>)</td>
</tr>
<tr>
<td>Marsh marigold (<em>Caltha palustris</em>)</td>
<td></td>
</tr>
<tr>
<td>Turtlehead (<em>Chelone glabra</em>)</td>
<td></td>
</tr>
<tr>
<td>Buttonbush (<em>Cephalanthus occidentalis</em>)</td>
<td></td>
</tr>
<tr>
<td>Dogwood (<em>Cornus florida</em>)</td>
<td></td>
</tr>
</tbody>
</table>

Red Twig Dogwood  Joe Pye Weed  Buttonbush  Cardinal Flower
A local example

An excellent example of a successful rain garden in Athens, GA can be seen in the new housing development at the corner of Carlton Terrace and South Lumpkin Street in Five Points.

Collects rainwater from paved areas

Dry stone walls and a crisp edge

Rain garden is relatively large and very attractive
1. *The Bioretention Manual*, Prince George’s County Dept. of Environmental Resources Programs and Planning Division, MD, 2001

2. The City of Lenexa, KS
   http://www.ci.lenexa.ks.us/watershed


4. Virginia Department of Forestry
   http://www.dof.state.va.us/rfb/riparianrain_gardens.htm