

New York State Stormwater Management Design Manual

Chapter 5: Green Infrastructure Practices

Section 5.3 Green Infrastructure Techniques

Construction Rain gardens should initially be dug out to a 24" depth, then backfilled with a 6-12 inch layer of clean washed gravel (approximately 1.5-2.0 inch diameter rock), and filled back to the rain garden bed depth with the design soil mix. When an underdrain is used, excavate to 30-36" depth, backfill with 12" stone, fill with 18-24" design soil mix. Rain gardens should only be installed when surrounding landscapes are stabilized and not subject to erosion.

Environmental/Landscaping Elements

The rain garden system relies on a successful native plant community to stabilize the ponding area, promote infiltration, and uptake pollutants. To do that, plant species need to be selected that are adaptable to the wet/dry conditions that will be present. The goal of planting the rain garden is to establish an attractive planting bed with a mix of upland and wetland native shrubs, grasses and herbaceous plant material arranged in a natural configuration starting from the more upland species at the outermost zone of the system to more wetland species at the innermost zone. Plants shall be container-grown with a well-established root system, planted on one-foot centers. Table 5.11 provides a representative list of suggested plant selections. Rain gardens shall not be seeded as this takes too long to establish the desired root system, and seed may be floated out with rain events. The same limitation is true for plugs. Shredded hardwood mulch should be applied up to 2" to help keep soil in place.

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Table 5.11 Suggested Rain Garden Plant List	
Shrubs	Herbaceous Plants
Witch Hazel	Cinnamon Fern
Hamamelis virginiana	Osmunda cinnamomea
Winterberry	Cutleaf Coneflower
Ilex verticillata	Rudbeckia laciniata
Arrowwood	Woolgrass
Viburnum dentatum	Scirpus cyperinus
Brook-side Alder	New England Aster
Alnus serrulata	Aster novae-angliae
Red-Osier Dogwood	Fox Sedge
Cornus stolonifera	Carex vulpinoidea
Sweet Pepperbush	Spotted Joe-Pye Weed
Clethra alnifolia	Eupatorium maculatum
	Switch Grass
	Panicum virgatum
	Great Blue Lobelia
	Lobelia siphatica
	Wild Bergamot
	Monarda fistulosa
	Red Milkweed
	Asclepias incarnate
Adapted from NYSDM Bioretention Specifications, Bannerman, Brooklyn Botanic Garden.	

Maintenance

Rain gardens are intended to be relatively low maintenance. However, these practices may be subject to sedimentation and invasive plant species which could create maintenance problems. If the recharge ability is lost by accumulation of fine sediment, mosquito breeding may occur. Adequate arrangements for long-term maintenance of these systems and updated inventories of their location are essential for the long-term performance of these practices. Rain gardens should be treated as a component of the landscaping, with routine maintenance specified through a legally binding maintenance agreement. Routine maintenance may include the occasional replacement of plants, mulching, weeding and thinning to maintain the desired appearance. Weeding and watering are essential the first year, and can be minimized with the use of a weed-

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free mulch layer. Studies have found that rain gardens, especially when native plants are used, are well accepted if they appear orderly and well maintained. Homeowners and landscapers must be educated regarding the purpose and maintenance requirements of the rain garden, so the desirable aspects of ponded water are recognized and maintained.

Select lower growing species that stay upright. Keep plants pruned if they start to get “leggy” and floppy. Cut off old flower heads after a plant is done blooming. Keeping the garden weeded is one of the most important tasks, especially in the first couple of years while the native plants are establishing their root systems. Once the rain garden has matured, the garden area should be free of bare areas except where stepping stones are located.

Inspect for sediment accumulations or heavy organic matter where runoff enters the garden and remove as necessary. The top few inches of planting soil should be removed and replaced when water ponds for more than 48 hours. Blockages may cause diversion of flow around the garden. If the garden overflow device is an earthen berm or lip, check for erosion and repair as soon as possible. If this continues, a harder armoring of stone may be necessary. Make sure all appropriate elevations have been maintained, no settlement has occurred and no low spots have been created.

References/Further Resources

Bannerman, Roger. 2003. Rain Gardens, a How-to Manual for Homeowners. University of Wisconsin. PUB-WT-776.

Brooklyn Botanic Garden. 2004. Using Spectacular Wetland Plantings to Reduce Runoff.

Iowa Rain Garden Design and Installation Manual, 2008 www.iowastormwater.org

Low Impact Development Center, Inc. (LID) <http://www.lid-stormwater.net/intro/sitemap.htm#permpavers>

Pennsylvania Stormwater Best Management Practices Manual. Draft 2005.

Rain Gardens, A hoe-to manual for homeowners, Wisconsin department of Natural Resources DNR Publication PUB-WT-776 2003.