



City of **WOODSTOCK**



RAIN GARDEN INSTALLATION GUIDELINES

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SUBMITTED BY:
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CONSULTING ENGINEERS

RAIN GARDEN

Frequently Asked Questions

What is a rain garden?

A Rain Garden is a shallow depression planted with flowers, grasses and other vegetation that is designed to collect stormwater runoff from surrounding impervious surfaces. It provides environmental benefits, such as

- Increases the amount of water that can soak into the ground to replenish groundwater supplies and reduce flooding.
- Protects water quality of streams and lakes by trapping sediment, fertilizers, and other pollutants.
- Native plants provide food and shelter for butterflies, birds and other animals.
- Enhances the beauty of neighborhoods.
- Develops a positive environmental ethic.

Native plants are often used because they have deeper roots than turf grass and are efficient at absorbing water. They are more drought tolerant, do not require fertilization, and attract a variety of butterflies and birds.

Does a rain garden form a pond?

No. The rain water will soak in so the rain garden is dry between rainfalls. Depending on soil conditions, it may take a few days for water to infiltrate.

Are they a breeding ground for mosquitoes?

No. Mosquitoes need 7 to 12 days to lay and hatch eggs, and standing water in the rain garden will last for a few hours after most storms. Mosquitoes are more likely to lay eggs in bird baths or other standing water sources. Also, rain gardens attract dragonflies and birds which eat mosquitoes.

Do they require a lot of maintenance?

Rain gardens can be maintained with little effort after the plants are established. Weeding and watering will be needed for the first two years, and perhaps some thinning in later years as the plants mature. If the stormwater runoff contains sediments, then removal of sediments may be needed every few years.

Rain Garden Location

Home rain gardens are often placed in two general locations: 1) near the house to catch roof runoff from downspouts; and 2) farther out in the lawn to collect water from both roof and lawn runoff. Consider these points:

- The rain garden should be at least 10 feet away from the house so infiltrating water does not seep into the foundation.
- Do not place the rain garden directly over a septic field.
- Avoid placing rain gardens over buried utilities. Call JULIE (800-892-0123) before digging.
- It may be tempting to place the rain garden in a part of the yard where water already ponds, but don't. The goal of a rain garden is to encourage infiltration, and your yard's wet spot shows where infiltration is slow. However, the wet spot could be a good location for a wet meadow garden, where water will pond for long periods of time. The use of native wetland plants is ideal for these wet areas.
- It is better to build a rain garden in sun or partial sun, not directly under a big tree or in shade.
- Putting the rain garden in a flatter spot makes digging easier. The bottom of the rain garden should be as flat as possible to encourage infiltration over the entire rain garden.

Water from heavy rain events will spillover from the rain garden. The spillover point should be directed towards the existing, natural drainage pathway. Spillover water should not be directed towards any buildings or structures.

Rain Garden Size

A typical rain garden ranges from 50 – 300 square feet. Sizing guidelines are provided below, but the rain gardens can be smaller and still control the majority of runoff from the desired source area.

First, dig a coffee-can sized hole about 6 inches deep at your proposed rain garden location. Fill the hole with water. If it takes more than 24 hours to soak in, then it is not a suitable site for a traditional rain garden. Soil amendments, such as sand and gravel, and an underdrain system may be needed if an infiltration-type garden is desired.

Estimate the drainage area, soil type, and preferred depth for your rain garden. Use Table 1 or Table 2 and instructions below to determine the size of the rain garden.

Table 1. Size Factors for Rain Garden less than 30 feet from Downspout.

	3-5 inches deep	6-7 inches deep	8 inches deep
Sandy soil	0.19	0.15	0.08
Silty soil	0.34	0.25	0.16
Clayey soil	0.43	0.32	0.20

Table 2. Size Factors for Rain Garden more than 30 feet from Downspout.

	Size Factor, all depths
Sandy soil	0.03
Silty soil	0.06
Clayey soil	0.10

1. Find the size factor for the soil type and rain garden depth.
2. Multiply the size factor by the drainage area. This is the recommended rain garden size in square feet.
3. If the recommended rain garden area is much more than 300 square feet, divide it into smaller rain gardens.

Example

Alison's house is 30 feet by 40 feet, or 1,200 square feet. The house has four downspouts, each draining $\frac{1}{4}$ of the roof. She wants to install a 6-inch deep rain garden to intercept roof runoff from one downspout in clayey soils within 30 feet of her house. She multiplies the downspout drainage area, 300 square feet, by 0.32 to find the recommended rain garden area, 96 square feet ($300 \text{ sf} \times 0.32 = 96 \text{ sf}$).

A typical cross-section of a rain garden is shown on Figure 1. The rain garden consists of a depressed area, typically 4 – 8 inches deep, that collects stormwater runoff. Any excess stormwater should be routed through the rain garden and discharged to the existing, natural drainage pathway. The rain garden soil should be tilled/mixed with compost or peat.

Plants

Native plants are recommended for rain gardens because they have deeper roots and encourage more infiltration than common horticultural plants. Seeds or plant stocks can be obtained from native plant nurseries. Installing transplants have several advantages over seeding:

- Transplants will often flower the year they are planted while seeds typically require three years to bloom.
- Plants can be placed according to a design to create a desired effect.
- Weeds can be readily distinguished from garden transplants whereas slow-growing native seedlings can be difficult to differentiate from weeds.

Native plants commonly used in rain gardens are shown below. These herbaceous plants are arranged by soil type and sun/shade habitat.

Plant plugs (2-in x 2-in potted plants) are typically spaced 1 foot apart. For a 100 sq ft rain garden, 100 plant plugs are recommended.

Maintenance

Rain garden maintenance requirements are similar to any garden. During the first year, watering is necessary. The plants are young and the roots are shallow, so watering is needed to keep them from drying out.

Weeding will be needed the first couple of years. By the third season, native grasses, sedges, rushes and wildflowers will mature and begin to out-compete weeds, but weeding isolated patches may be needed on occasion.

After each growing season, the stems and seedheads can be left for winter interest, wildlife cover, and bird food. Once spring arrives, mow or cut back last season's stems to approximately 4-6 inches above the ground surface.

Do not fertilize the rain garden. This will stimulate weed growth.

If the stormwater runoff contains sediments, check the rain garden for accumulation of sediments. Remove any accumulated sediment and grit as necessary.

References

Rain Gardens, A How-To Manual for Homeowners, published by University of Wisconsin-Extension, 2003. Internet: clean-water.uwex.edu/pubs/raingarden

Table 3. Plants for Clay Soils and Full Sun

Scientific Name	Common Name	Bloom Period	Bloom Color	Height
<i>Acorus calamus</i>	Sweet Flag	Late Spring	Gr-Brown	2 – 3 ft
<i>Asclepias incarnata</i>	Marsh Milkweed	Summer	Red	2 – 5 ft
<i>Aster novae-angliae</i>	New England Aster	Aug - Oct	Purple	3 – 6 ft
<i>Baptisia lactea</i>	White False Indigo	May – June	White	3 – 5 ft
<i>Boltonia asteroides</i>	False Aster	Aug – Sept	White	2 – 4 ft
<i>Carex hystericina</i>	Porcupine Sedge	May	Green	1 – 3 ft
<i>Carex vulpinoidea</i>	Fox Sedge	May – July	Yellow	1 – 3 ft
<i>Echinacea purpurea</i>	Purple Coneflower	June – July	Purple	1 – 4 ft
<i>Eupatorium maculatum</i>	Joe Pye Weed	Summer	Pink	3 – 10 ft
<i>Eupatorium perfoliatum</i>	Boneset	Summer	White	2 – 5 ft
<i>Gentiana andrewsii</i>	Bottle Gentian	Fall	Purple	1 – 2 ft
<i>Iris versicolor</i>	Wild Iris	May – July	Blue	2 – 3 ft
<i>Juncus torreyi</i>	Torrey’s Rush	Summer	Brown	1 – 2 ft
<i>Liatris pycnostachya</i>	Prairie Blazingstar	Summer	Pink	3 – 5 ft
<i>Lobelia cardinalis</i>	Cardinal Flower	Summer	Red	2 – 5 ft
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Summer	Blue	1 – 4 ft
<i>Mimulus ringens</i>	Monkeyflower	Summer	Purple	1 – 3 ft
<i>Parthenium integrifolium</i>	Wild Quinine	Summer	White	3 – 5 ft
<i>Penstemon digitais</i>	Foxglove Beard Tongue	Early Summer	White	2 – 3 ft
<i>Physostegia virginicum</i>	Obedient Plant	Late Summer	Purple	2 – 4 ft
<i>Ratibida pinnata</i>	Yellow Coneflower	Summer	Yellow	3 – 6 ft
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan	Late Summer	Yellow	3 – 4 ft
<i>Scirpus atrovirens</i>	Green Bulrush	Summer	Brown	3 – 5 ft
<i>Solidago rigida</i>	Stiff Goldenrod	Fall	Yellow	2 – 5 ft
<i>Vernonia fasciculata</i>	Ironweed	Late Summer	Purple	3 – 6 ft
<i>Veronicastrum virginicum</i>	Culver’s Root	Summer	White	2 – 6 ft

Table 4. Plants for Sandy/Silty Soils and Full Sun

Scientific Name	Common Name	Bloom Period	Bloom Color	Height
<i>Allium cernuum</i>	Nodding Wild Onion	Summer	Pink	1 – 2 ft
<i>Asclepias incarnata</i>	Marsh Milkweed	Summer	Red	2 – 5 ft
<i>Aster novae-angliae</i>	New England Aster	Aug - Oct	Purple	3 – 6 ft
<i>Baptisia lactea</i>	White False Indigo	May – June	White	3 – 5 ft
<i>Boltonia asteroides</i>	False Aster	Aug – Sept	White	2 – 4 ft
<i>Carex vulpinoidea</i>	Fox Sedge	May – July	Yellow	1 – 3 ft
<i>Echinacea purpurea</i>	Purple Coneflower	June – July	Purple	1 – 4 ft
<i>Eupatorium maculatum</i>	Joe Pye Weed	Summer	Pink	3 – 10 ft
<i>Iris versicolor</i>	Wild Iris	May – July	Blue	2 – 3 ft
<i>Juncus torreyi</i>	Torrey’s Rush	Summer	Brown	1 – 2 ft
<i>Liatris pycnostachya</i>	Prairie Blazingstar	Summer	Pink	3 – 5 ft
<i>Lobelia cardinalis</i>	Cardinal Flower	Summer	Red	2 – 5 ft
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Summer	Blue	1 – 4 ft
<i>Monarda fistulosa</i>	Bergamot	July – Sept	Purple	2 – 3 ft
<i>Parthenium integrifolium</i>	Wild Quinine	Summer	White	3 – 5 ft
<i>Penstemon digitais</i>	Foxglove Beard Tongue	Early Summer	White	2 – 3 ft
<i>Physostegia virginicum</i>	Obedient Plant	Late Summer	Purple	2 – 4 ft
<i>Pycnanthemum virginianum</i>	Mountain Mint	Summer	White	1 – 3 ft
<i>Ratibida pinnata</i>	Yellow Coneflower	Summer	Yellow	3 – 6 ft
<i>Rudbeckia subtomentosa</i>	Sweet Black-Eyed Susan	Late Summer	Yellow	3 – 4 ft
<i>Scirpus atrovirens</i>	Green Bulrush	Summer	Brown	3 – 5 ft
<i>Solidago ohioensis</i>	Ohio Goldenrod	Fall	Yellow	2 – 4 ft
<i>Solidago riddelli</i>	Riddell’s Goldenrod	Fall	Yellow	2 – 4 ft
<i>Tradescantia ohiensis</i>	Spiderwort	May – June	Blue	1 – 3 ft
<i>Vernonia fasciculata</i>	Ironweed	Late Summer	Purple	3 – 6 ft
<i>Veronicastrum virginicum</i>	Culver’s Root	Summer	White	2 – 6 ft
<i>Zizia aurea</i>	Golden Alexander	Spring	Yellow	1 – 3 ft

Table 5. Plants for Clay Soils and Partial Sun/Shade

Scientific Name	Common Name	Bloom Period	Bloom Color	Height
<i>Acorus calamus</i>	Sweet Flag	Late Spring	Gr-Brown	2 – 3 ft
<i>Campanula americana</i>	Tall Bellflower	Summer	Blue	2 – 5 ft
<i>Caltha palustris</i>	Marsh Marigold	March – April	Yellow	1 – 2 ft
<i>Carex grayii</i>	Bur Sedge	May	Green	1 – 3 ft
<i>Carex lupina</i>	Hop Sedge	May	Green	1 – 3 ft
<i>Chelone glabra</i>	White Turtlehead	Aug-Sept	White	2 – 4 ft
<i>Gentiana andrewsii</i>	Bottle Gentian	Fall	Purple	1 – 2 ft
<i>Helenium autumnale</i>	Sneezeweed	Summer	Yellow	2 – 5ft
<i>Iris versicolor</i>	Wild Iris	May – July	Blue	2 – 3 ft
<i>Lobelia cardinalis</i>	Cardinal Flower	Summer	Red	2 – 5 ft
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Summer	Blue	1 – 4 ft
<i>Mertensia virginica</i>	Virginia Bluebell	April - May	Blue	1 – 2 ft
<i>Physostegia virginicum</i>	Obedient Plant	Late Summer	Purple	2 – 4 ft
<i>Veronicastrum virginicum</i>	Culver's Root	Summer	White	2 – 6 ft

Table 6. Plants for Sandy/Silty Soils and Partial Sun/Shade

Scientific Name	Common Name	Bloom Period	Bloom Color	Height
<i>Aquilegia canadensis</i>	Columbine	May – June	Red	1 – 3 ft
<i>Aster lateriflorous</i>	Side-Flowering Aster	Fall	White	2 – 3 ft
<i>Campanula americana</i>	Tall Bellflower	Summer	Blue	2 – 5 ft
<i>Carex grayii</i>	Bur Sedge	May	Green	1 – 3 ft
<i>Dodecatheon meadia</i>	Shootingstar	May – June	Pink	1 – 2 ft
<i>Elymus virginicus</i>	Virginia Wild Rye	June – Oct	Brown	2 – 4 ft
<i>Eupatorium purpureum</i>	Sweet Joe Pye Weed	July – Sept	Purple	4 – 6 ft
<i>Gentiana andrewsii</i>	Bottle Gentian	Fall	Purple	1 – 2 ft
<i>Helenium autumnale</i>	Sneezeweed	Summer	Yellow	2 – 5 ft
<i>Hypericum pyramidatum</i>	Great St. Johnwort	Summer	Yellow	2 – 6 ft
<i>Iris versicolor</i>	Wild Iris	May – July	Blue	2 – 3 ft
<i>Lobelia cardinalis</i>	Cardinal Flower	Summer	Red	2 – 5 ft
<i>Lobelia siphilitica</i>	Great Blue Lobelia	Summer	Blue	1 – 4 ft
<i>Mertensia virginica</i>	Virginia Bluebell	April - May	Blue	1 – 2 ft
<i>Phlox divaricata</i>	Wild Blue Phlox	May – Jun	Blue	1 – 2 ft
<i>Physostegia virginicum</i>	Obedient Plant	Late Summer	Purple	2 – 4 ft
<i>Solidago flexicalus</i>	Zig Zag Goldenrod	Fall	Yellow	2 – 4 ft
<i>Tradescantia ohioensis</i>	Spiderwort	May – June	Blue	1 – 3 ft
<i>Veronicastrum virginicum</i>	Culver's Root	Summer	White	2 – 6 ft
<i>Zizia aurea</i>	Golden Alexander	Spring	Yellow	1 – 3 ft

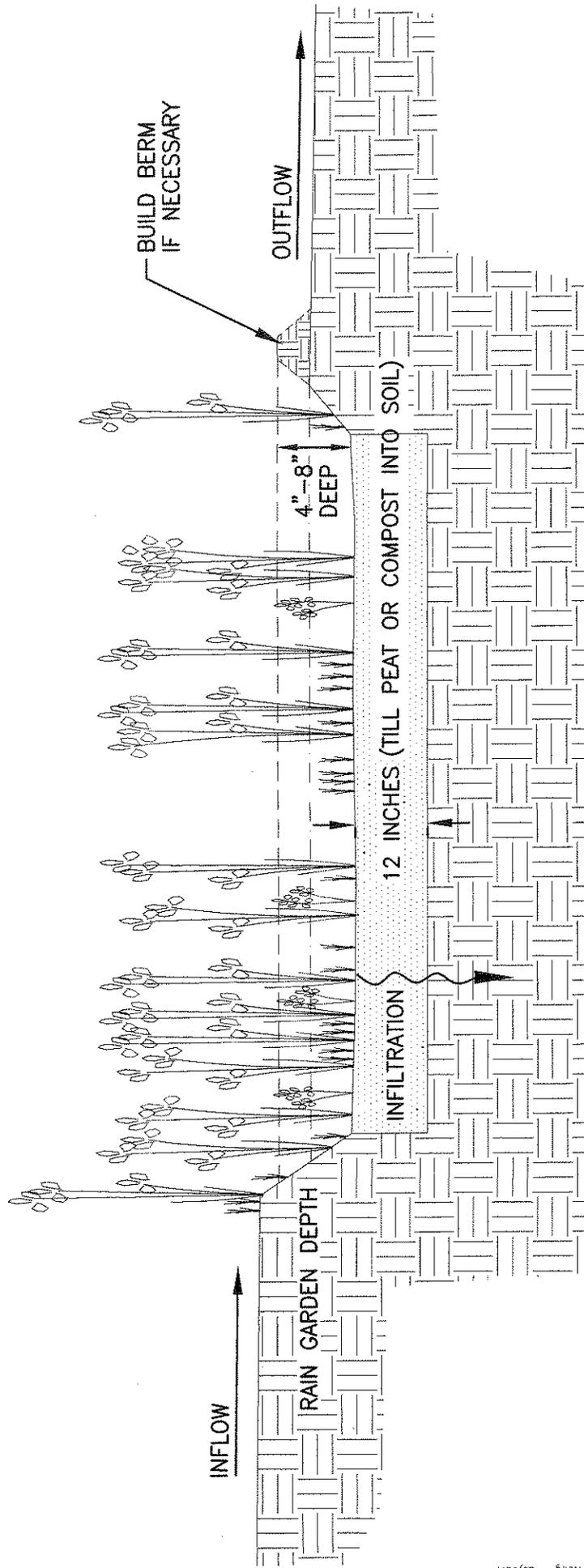


Figure 1. Typical Cross-Section of Rain Garden
 City of Woodstock, Illinois

No Scale

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