

Volunteer

Professional

Volunteer + Professional

# Basement Rain Garden

Image Source: Frank Mayfield. "Carex Stricta Common" 23 May 2008 via Flickr, CC BY-SA 2.0



# HELLO

MY NAME IS

## Basement Rain Garden

**The Basement Rain Garden is an urban rain garden designed for the footprint of a recently demolished house. This lot design can reduce the amount of soil required to fill basement holes after demolition. The limits of the rain garden fit within the footprint of a former house and transforms the basement area into stepped, planted tiers. This design can accommodate stormwater runoff for up to two houses or commercial buildings.**

**It is best located on a lot where two disconnected downspouts can easily be redirected into the rain garden. This lot design is also suitable for flat lots. The excavated soil can be used for other lot designs, such as Mounds of Fun, that require fill.**

**For more information refer to [DFC-lots.com](https://dfc-lots.com)**

### What is the lot design likely to cost?

The estimated cost of the Basement Rain Garden is over \$5,500 and based on utilizing volunteer and professional labor. The Field Guide recommends hiring a professional for earthwork, lot preparation, and installation of the overflow culvert. The overflow culvert requires a permit to connect to the municipal infrastructure. The cost assumes that residents or volunteers have access to basic safety gear and garden tools.

### How much upkeep will this lot design require?

This lot design requires a medium level of maintenance to thrive. Maintenance will include weeding and watering plants the newly planted rain garden, particularly during the first two growing seasons while the plants establish themselves.

### Will the installation of this lot design require a professional?

The installation of this lot design will require professional assistance for the first few steps. The Field Guide identifies volunteer opportunities if you, with the help and support of friends, family, or neighbors, would like to complete the planting portion of this lot design. Please refer to the Step-By-Step section for guidance on professional and volunteer recommended steps. If you do not feel able to tackle the volunteer aspect of this lot design, a professional can construct the entire project.

### How long will it take to install this lot design?

This lot design requires a professional for the completion of several steps. The projected installation time listed below is for volunteer opportunities listed in the Step-By-Step section only. While people tackle projects differently, the Field Guide estimates the installation time of the lot design to be one to two full weekends with a volunteer group organized by a knowledgeable lot leader. The Field Guide recommends the help of at least eight healthy adults or youth to complete this lot design. The Field Guide assumes that the lot is 'construction ready,' and all equipment and materials required for the lot design have been acquired and are ready to use.

Cost	\$50 - 1,000	\$1,000 - 2,500	\$2,500 - 5,500	\$5,500 +
People	Volunteer	Professional	Volunteer + Professional	
Experience	Beginner	Intermediate	Advanced	
Upkeep	Low	Medium	High	
Stormwater	Good	Better	Best	
Location	Residential Lot in Full Sun to Part Sun (Ideal for Lot With Recently Demolished Home)			

# Basement Rain Garden

## Examples of Rain Gardens

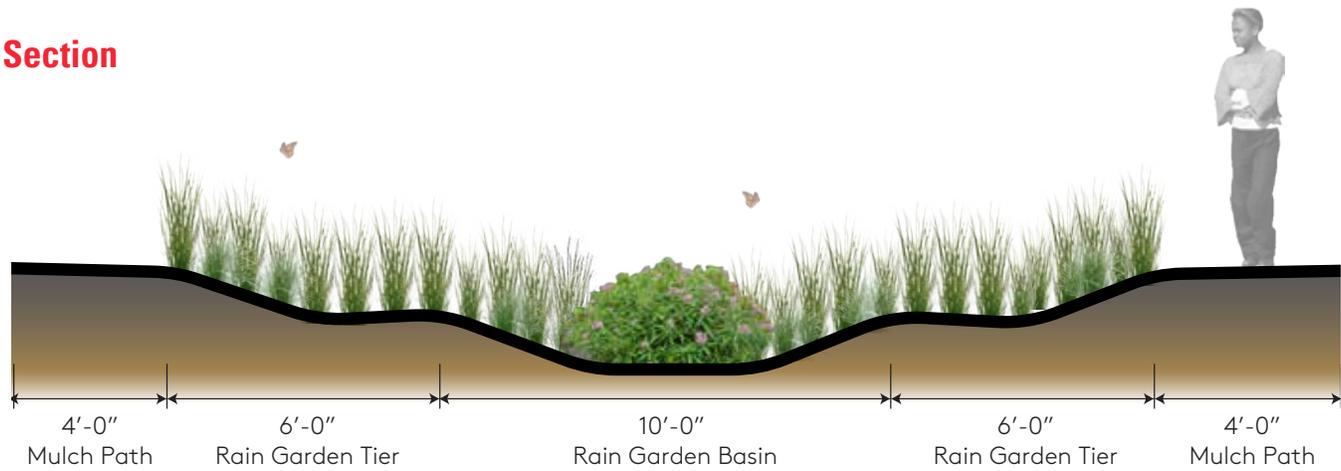


1 - Rain Garden

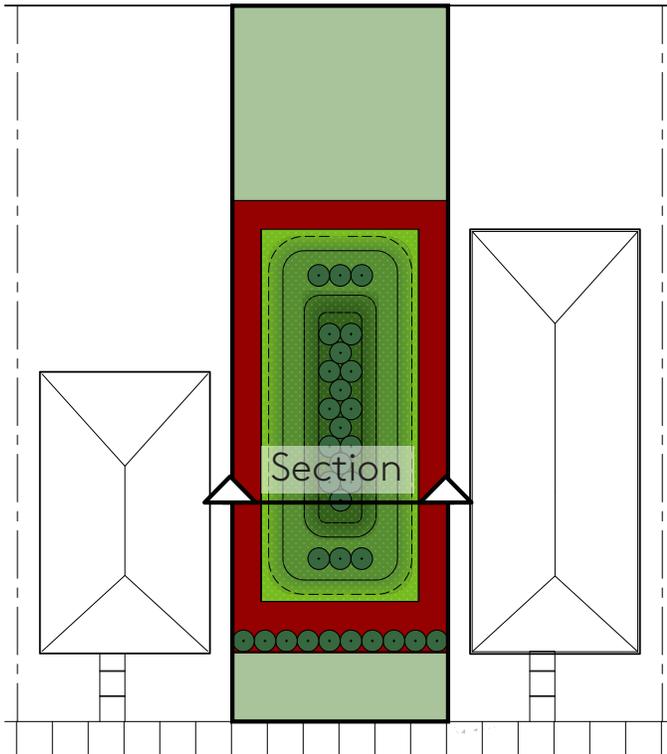


2 - Residential Rain Garden

## Section



## Where Do I Grow?



The Basement Rain Garden can be implemented on a single lot and is best suited for lots where a house has been recently demolished.

- Perennials
- Rain Garden Seed Mix
- Grass or Optional Groundcover
- Mulch

Image Source: 1) James Steakley, "Rain\_garden\_(2014).JPG" 15 July 2014 via Wikimedia, CC BY-SA 4.0; 2) Moreau1., "Bioretention\_cell\_rain\_garden\_US\_winter.jpg" 24 December 2007 via Wikimedia, public Domain

## Before You Start

### 'Construction Ready'

This lot design assumes that you have prepared the lot to a 'construction ready' state.

'Construction Ready' refers to a lot that is clean and clear of trash, hazardous objects, unwanted trees, brush and vegetation, fences, and other unwanted structures.

It may be necessary to remove grass in preparation for your lot design. Refer to the Remove Your Grass box located on the right hand side of this page for more information.

Is there an available water source near your lot? Consider how and where you will access water during and after construction to ensure that your plants can establish.

If your lot is not ready for construction, refer to the [Clean + Green](#) lot design.

You can find the lot design at [DFC-lots.com](http://DFC-lots.com).

### Call Before You Dig

Locate underground utilities before beginning your lot design. MISS DIG provides a free service to Michigan residents by locating and marking utilities on requested properties. Call (800) 482-7171 or 811 at least three days before you plan to start digging on your lot.

### Test Your Soil

Harmful pollutants have made their way into many urban soils. To proceed with awareness, consider having your soil tested before construction. Two great options are available:

- Soil testing is free to members of Keep Growing Detroit's Garden Resource Program. Call (313) 757-2635 for more information or visit [detroitagriculture.net](http://detroitagriculture.net).
- If you are not yet a member, you can work directly with Michigan State University's (MSU) Extension Program. They have a Home Lawn and Garden Soil Test Mailer for \$25. For more information call (888) 678-3464 or visit [msusoiltest.com](http://msusoiltest.com).
- If you are concerned about the presence of lead or other contaminants in your soil, call the Michigan Department of Health and Human Services at (866) 691-5323 or (800) 424-LEAD.

### Remove Your Grass

Need to remove grass in areas where you are constructing your lot design?

There are many ways to remove unwanted grass. The first is to remove the grass and its root system by digging up the grass. Another option is to cover your lot with cardboard or a plastic tarp to smother your grass in darkness. It will take several weeks, but after being covered, the dead grass will be easier to remove.

### Till Safely

Before you till, inspect your lot for signs of buried concrete or rubble that was not removed during the cleanup stage. Large debris can ruin tiller blades.

When tilling, wear appropriate safety gear, such as covered boots with socks, long pants, safety glasses, dust mask, and ear protection. Make sure you understand the safe operating procedures of your tiller. Refer to the user's manual.

## What You Need: Shopping List

### Shopping List

The shopping list provides a breakdown of potential materials, tools, and resources required to undertake this lot design.

**This shopping list is designed for a single lot (30 by 100 feet).**

### Tools + Resources

#### Suggested Tools

- **Safety Gear:** Gloves, heavy work boots, tall socks, pants, long sleeve shirts, dust masks, protective eye wear, ear plugs, and hard hats (if using heavy machinery)
- **Garden Tools:** Spades, shovels, rakes, trash bags, and wheelbarrows
- Hacksaw and Screwdriver

#### Potential Water Sources

- Garden Hose with potential extension hose
- Sprinkler
- Downspout Disconnect (shown in lot design)

#### Field Guide Resources

Resources are available on the Field Guide's web site.

- Clean + Green
- Perennials + Grasses Planting Detail

### Materials List

#### Materials

- Imported Drainage Soil, 11.5 cubic yards
- Mulch or Wood Chips, 6 cubic yards
- Downspout Disconnect: Standpipe cap, downspout elbow, downspout connection pipe, rubber cap, and hose clamp

#### Planting

- Swamp Milkweed, 5 pots
- Purple Cornflower, 3 pots
- Blue Flag Iris, 5 pots or bulbs
- Bee Balm, 3 pots
- Black-Eyed Susan, 5 pots
- Green Gem Boxwood, 10 pots

#### Rain Garden

- Rain Garden Mix, 1 pounds of seed
- Annual Cover Crop, 1 pounds of seed
- Germination Blanket, 2 rolls (8 by 112.5 feet)

### Remaining Lot (Optional)

#### Groundcover

- Low-Maintenance Fescue Mix, 10 pounds of seed
- Germination Blanket, 3 rolls (8 by 112.5 feet)

## Basement Rain Garden Step-By-Step

### Let's Start

**Want to create the Basement Rain Garden? The Field Guide recommends hiring a professional for some tasks. Here are a few guiding principles to help you understand the tasks involved in the lot design and the steps appropriate for volunteers.**

- Check off tasks as you go along.

### Lot Design Steps

#### Professional Recommended:

- Prepare Your Lot
- Excavate + Sculpt Soil

#### Volunteer Opportunities:

- Plant Rain Garden
- Sow Rain Garden
- Disconnect Your Downspout
- Sow Remaining Lot
- Maintain Your Lot Design

### Prepare Your Lot

The Basement Rain Garden is one of the more complex lot designs in the Field Guide. It is recommended that you hire a professional for these steps: Prepare Your Lot and Excavate + Sculpt Soil.

If you decide to complete this lot design without the recommended assistance of a professional, the following steps can assist you with the installation of the lot design.

- The Field Guide recommends coordinating installation of the Basement Rain Garden with the demolition process in order to reduce the amount of required imported soil.
- The Basement Rain Garden should be (minimum) 4.5 feet any from adjacent property lines and at least five foot from the sidewalk.
- You do not need to kill grass in basement as earth sculpting and imported planting soil suppress existing weeds.
- Align the front edge of the Basement Rain Garden design with the front setback line of adjacent houses. This will help strengthen your block's identity.
- The Basement Rain Garden is designed to accommodate or collect stormwater runoff from two standard single family houses up to 2,100 square feet of roof area. (The average Detroit house is 920 to 1,350 square feet.)

**! Annual Cover Crop is used to establish Rain Garden Mix and does not require annual re-seeding.**

## Basement Rain Garden Step-By-Step

### ○ **Excavate + Sculpt Soil**

Below are a few guiding principles regarding importing and sculpting the soil. These guidelines assume the lot design is being installed directly after demolition of a home; therefore, there is no required excavation of soil. The Field Guide recommends hiring a professional to complete this portion of this lot design.

**The Basement Rain Garden earthwork is divided in two parts: the rain garden tiers and the rain garden basin. The rain garden basin is the lowest point of the lot design, and the tiers are located one foot above the bottom of the basin.**

- **Rain Garden Basin:** The rain garden basin is two feet below the top of the lot design and is 6 by 35 feet.
- **Check that the bottom of the rain garden is level.** An easy way to check this is with a string level or a spirit level attached to a two-by-four board. A level bottom is important to maximize infiltration and minimize the chance of standing water in the rain garden.
- After leveling the bottom, the soil should be prepared by scarifying, raking, or tilling the soil four to six inches deep to loosen any compaction.
- **Fill the rain garden with 18 inches (11.5 cubic yards) of organic planting soil.** The rain garden edges should slope at 33% (1 unit of rise for 3 units of run).
- **Rain Garden Tiers:** Tiers are located one foot higher than the rain garden basin. These tiers can collect stormwater in pockets, irrigating plants along the tier.
- Use imported soil to shape basin tiers, and slope away from the rain garden basin at 5% (1 unit of rise for 20 units of run).

- All remaining slopes in the lot design should slope toward the rain garden basin at 33% (1 unit of rise to 3 units of run).
- Place three inches depth of mulch around perimeter of rain garden.

### ○ **Plant Rain Garden**

Sunny to partly sunny plantings are recommended for the Basement Rain Garden. If your lot is in shade, seek alternative planting options.

The Basement Rain Garden includes potted plants and Rain Garden Seed Mix. Place plants in desired location, then remove plastic pots, loosen roots, and plant.

Spread seed mix over the rain garden area after potted plants have been installed. Do not add mulch.

**For more guidance on planting perennials refer to the [Perennials + Grasses Planting Detail](#).**

### ○ **Sow Rain Garden**

Seeding should take place in either spring (mid-May to mid-June) or fall (mid October to end of November). Ernst Conservation Seeds' Rain Garden Mix (ERNMX-180) and Annual Cover Crop seed mix are good options for the Basement Rain Garden. Similar mixes are available from other suppliers.

Ernst Conservation Seeds suggests one pound of Rain Garden Mix with one pound of Annual Cover Crop per 1,000 square feet. **For the Basement Rain Garden (1,144 square feet), the Field Guide recommends one pound of Rain Garden Mix with one pound Annual Cover Crop.**

Before spreading the seed, rake the soil if it is compacted, allowing for easier seed germination and better water infiltration.

## Basement Rain Garden Step-By-Step

Once seeds have been mixed, spread seed across the entire meadow area. You can do this by hand or with a hand-cranked whirlwind seeder. You may need to do this several times to get even coverage. Gently water seedlings daily until they are four to six inches in height.

Placing a thin layer of straw or a germination blanket over seeded areas will help ensure that your seed establishes by keeping seeds from blowing away and protecting them from birds.

**Two roll of 8 by 112.5 foot single net germination blankets will cover the meadow areas.** Germination blankets or straw can be purchased at most nurseries and garden stores, including Detroit Farm and Garden.

### ○ Sow Remaining Lot

If a house has recently been demolished on your lot, you will likely need groundcover for the remaining lot. If you are seeking a lower maintenance alternative to a traditional lawn, the Field Guide recommends a fescue seed mix. This family of floppy grasses is very drought resistant and requires only one cutting (in August or September) per year. The soil should already be loosened and prepared for seeding through the tilling of the lot.

Fescue can be established in full sun to shade and should be seeded in spring (mid-March to mid-May) or fall (August to September). Seed mix should be applied to a damp lot.

Sow seed across remaining lot by using a seed spreader or by hand. Spread seed mix evenly over the entire lot. You may need to do this several times over the bed. A seed rate of five pounds per 1,000 square feet is recommended. **If you follow the Basement Rain Garden lot design you will need approximately 10 pounds of seed mix for the remaining 1,500 square foot lot.**

Gently water seedlings daily until they are four to six inches in height. Placing a thin layer of straw or a germination blanket over seeded areas will help ensure that your seed establishes by keeping seeds from blowing away and protecting them from birds.

**Three 8 by 112.5 foot rolls of single net germination blankets required for a 30 by 100 lot.** Germination blankets or straw can be purchased at most nurseries and garden stores such as Detroit Farm and Garden.

Eco-Turf Low Maintenance Fescue Mix is one recommended seed mix and can be purchased through the Michigan Wildflower Farm.

**Other Field Guide lot designs can be used as groundcovers. Check out the web site for additional options and ideas.**

Plant bulbs (daffodils, crocuses, and snowdrops) in clusters of three to five randomly throughout grass area. (This might be a fun activity to do with children.) Bulbs should be planted in the fall.

**For more guidance on bulb planting, refer to the [Bulb Planting Detail](#).**

### ○ Disconnect Your Downspout

**One of the easiest ways to collect stormwater is by disconnecting your downspout and directing it into your rain garden.**

Before you start, remember that disconnected downspouts should extend at least six feet from any house foundation and five feet from adjacent property or public sidewalk. Avoid disconnecting downspouts where they might discharge water across walkways, patios, or driveways or where they might be a tripping hazard. Do not disconnect directly over a septic system.

**Follow these steps to help you redirect your roof water into your rain garden.**

- Measure the existing downspout, and mark it approximately nine inches above sewer connection or standpipe.

## Basement Rain Garden Step-By-Step

- Cut with a hacksaw and remove cut piece.
- Plug or cap the sewer standpipe with a rubber cap secured by a hose clamp. Use screwdriver to tighten and secure cap.
- Attach elbow joint over the downspout.
- Add downspout extension to elbow joint. Extension should be length needed to carry water away from house and towards rain garden.
- Secure pieces with sheet metal screws at each joint.
- Use plastic or concrete splashblocks, rocks, flagstone, or boulders at the end of the downspout to control erosion of soil and plants in the rain garden from stormwater.

For more information, refer to [DWSD's How to Disconnect a Downspout](#) document.



**Visit the Resources page on the Field Guide's web site (DFC-lots.com) to discover other vendors and places to purchase plants.**

### Average Height of Plants



Grasses, Shrubs, and Perennials

### ○ Maintain Your Lot Design

Gardens require care and maintenance to thrive and look their best! The Basement Rain Garden is a large rain garden and will require regular watering and weeding, especially during the first few years. **Do not let your rain garden dry out in the first warm season.**

**In the first year, carefully weed or use a weed whacker to cut your rain garden meadow back to four to six inches whenever it reaches above ten inches in height.** Be careful not to cut back the potted perennials.

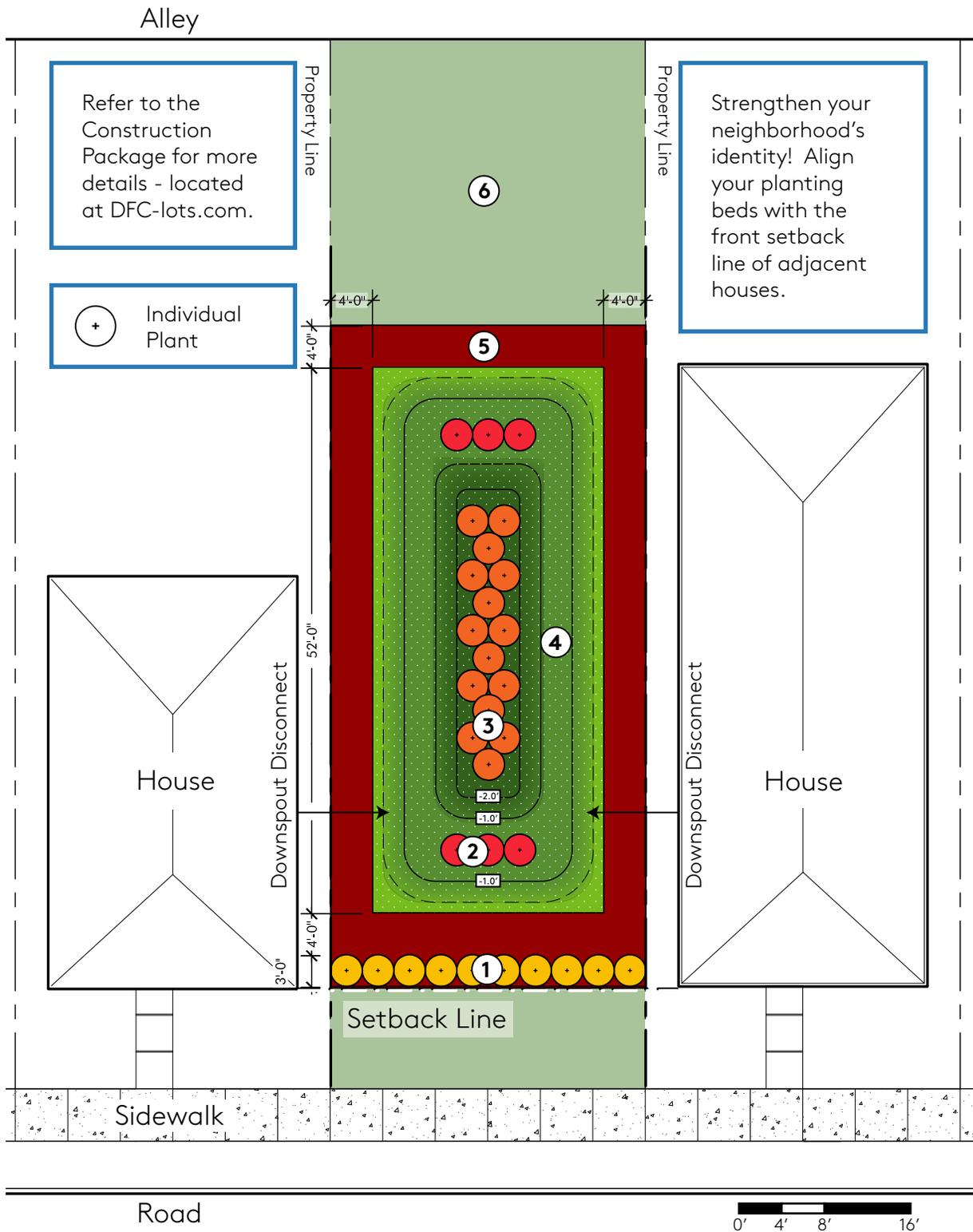
After the first year, continue weeding and weed whacking your rain garden in late fall or early spring of each year. This will keep the rain garden at its best. It will take about three years for rain garden to establish.

Low-maintenance fescue mix should be watered daily until seedlings are four to six inches in height. Once established, grass will not require supplemental watering except during unusually dry periods. Plan to water your establishing grass for three weeks following installation or until your grass is four to six inches in height.

This family of floppy grasses is very drought-resistant and requires one cutting (in August or September) per year. Fescue grasses do not get tall.

Gardens are a work in progress. Bulbs and perennials may need to be replaced to keep gardens dynamic and playful. Be creative and make it your own!

# Basement Rain Garden Lot Design



Refer to the Construction Package for more details - located at DFC-lots.com.

⊕ Individual Plant

Strengthen your neighborhood's identity! Align your planting beds with the front setback line of adjacent houses.

**1** Hedge (Boxwood)

**3** Rain Garden Basin Shrubs and Perennials

**5** Mulch

**2** Rain Garden Tier Perennials

**4** Rain Garden Seed Mix

**6** Grass or Optional Groundcover

# Planting: Full Sun to Part Sun



**Swamp Milkweed<sup>1</sup>**  
*Asclepias incarnata*  
 48" Height x 24" Width.  
 Blooms July - August.  
Quantity: 5 pots



**Purple Coneflower<sup>2</sup>**  
*Echinacea purpurea*  
 24" Height x 12" Width.  
 Blooms July - August.  
Quantity: 3 pots



**Blue Flag Iris<sup>3</sup>**  
*Iris Virginica\**  
 24" Height x 12" Width.  
 Blooms May - June.  
Quantity: 5 pots or bulbs



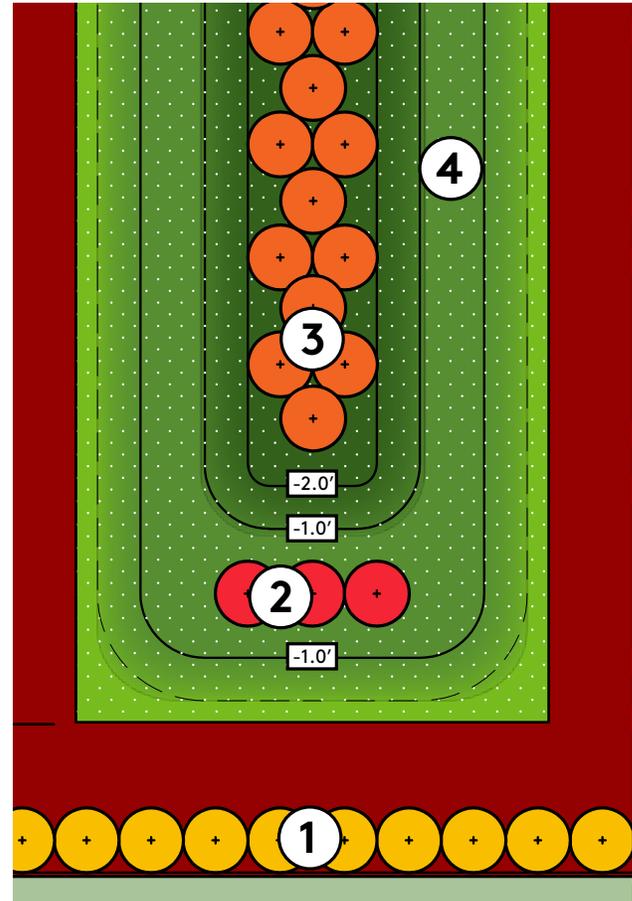
**Bee Balm<sup>4</sup>**  
*Monarda fistulosa*  
 24" Height x 28" Width.  
 Blooms July - September.  
Quantity: 3 pots



**Black-Eyed Susan<sup>5</sup>**  
*Rudbeckia hirta\**  
 24" Height x 24" Width.  
 Blooms June - October.  
Quantity: 5 pots



**Green Gem Boxwood<sup>6</sup>**  
*Buxus 'Green Gem'*  
 24" Height x 24" Width.  
Quantity: 10 pots



### Key

- 1** **Boxwood Hedge**  
 (Space approximately two feet apart.)
- 2** **Bee Balm & Purple Coneflower**  
 (Space approximately 1.5 feet apart.)
- 3** **Swamp Milkweed, Black-Eyed Susan & Blue Flag Iris**  
 (Space approximately 1.5 feet apart.)
- 4** **Rain Garden Mix**

### Plant Sizes

 **Pots:** Plants can be purchased in one to five gallon pots. Size of pots can change based on availability.

Image Source: 1) PDH, "Asclepias incarnata.jpg." 03 February 2006 Public Domain; 2) Jordan Meeter, "Purple Coneflower (Echinacea purpurea)." 07 August 2008 via Flickr, CC BY 2.0; 3) Jenny Evans, "Blue Flag Iris." 28 December 2010 via Flickr, CC BY-NC 2.0; 4) Corey Seeman, "Bee Balm Flowers." 16 July 2013 via Flickr, CC BY-NC-SA 2.0; 5) Parshotam Lal Tandon, "Rudbeckia hirta." 27 July 2013 via Flickr, CC BY-NC-SA 2.0; 6) Martin Kenny, "Box Hedge - shallow DOF edition." 10 December 2011 via Flickr, CC BY-NC-SA 2.0

## Planting: Full Sun to Part Sun

### Rain Garden Mix

Mixing one pound of Rain Garden Mix with one pound of Annual Cover Crop seed mix is recommended for this lot design.

You can buy these seeds premixed at Ernst Conservation Seeds.

**River Oats**, *Chasmanthium latifolium*  
(38% of mix)

**Virginia Wildrye**, *Elymus virginicus* (20% of mix)

**Fox Sedge**, *Carex vulpinoidea* (10% of mix)

**Purple Coneflower**, *Echinacea purpurea*  
(4% of mix)

**Tall White Beardtongue**, *Penstemon digitalis* (3% of mix)

**Blackeyed Susan**, *Rudbeckia hirta* (3% of mix)

**Lanceleaf Coreopsis**, *Coreopsis lanceolata* (3% of mix)

**Ohio Spiderwort**, *Tradescantia ohiensis*  
(2% of mix)

**Oxeye Sunflower**, *Heliopsis helianthoides*  
(2% of mix)

**Autumn Bentgrass**, *Agrostis perennans*  
(2% of mix)

**Partridge Pea**, *Chamaecrista fasciculata*  
(2% of mix)

**Marsh Blazing Star**, *Liatis spicata* (2% of mix)

**Smooth Blue Aster**, *Aster laevis* (1.5% of mix)

**Wild Senna**, *Senna hebecarpa* (1% of mix)

**New England Aster**, *Aster novae-angliae*  
(1% of mix)

**Swamp Milkweed**, *Asclepias incarnata*  
(1% of mix)

**Path Rush**, *Juncus tenuis* (1% of mix)

**Soft Rush**, *Juncus effusus* (1% of mix)

**Wild Bergamot**, *Monarda fistulosa* (0.8% of mix)

**Mistflower**, *Eupatorium coelestinum*  
(0.5% of mix)

**Blue False Indigo**, *Baptisia australis* (0.5% of mix)

**Early Goldenrod**, *Solidago juncea* (0.5% of mix)

**Slender Mountainmint**, *Pycnanthemum tenuifolium* (0.2% of mix)

### Plant Sizes



**Seeds:** All plants can be purchased in seed form.

## Did You Know?

### Professionals Can Help!

The Field Guide to Working With Lots provides a Construction Package for each lot design. The Construction Package includes information and details required for a professional to construct this design. On the Field Guide web site, use the [Construction Package](#) link located near the top of this lot design page to download and print. Your selected professional will then be able to provide a cost estimate and schedule based on the condition of your lot and the design you select.

### Want to Hire Locally?

DFC-lots.com has a growing list of Detroit-based professionals and suppliers of landscape materials and services.

Still unsure of where to start?

Call (313) 294-LOTS or email [fieldguide@detroitfuturecity.com](mailto:fieldguide@detroitfuturecity.com) for assistance.

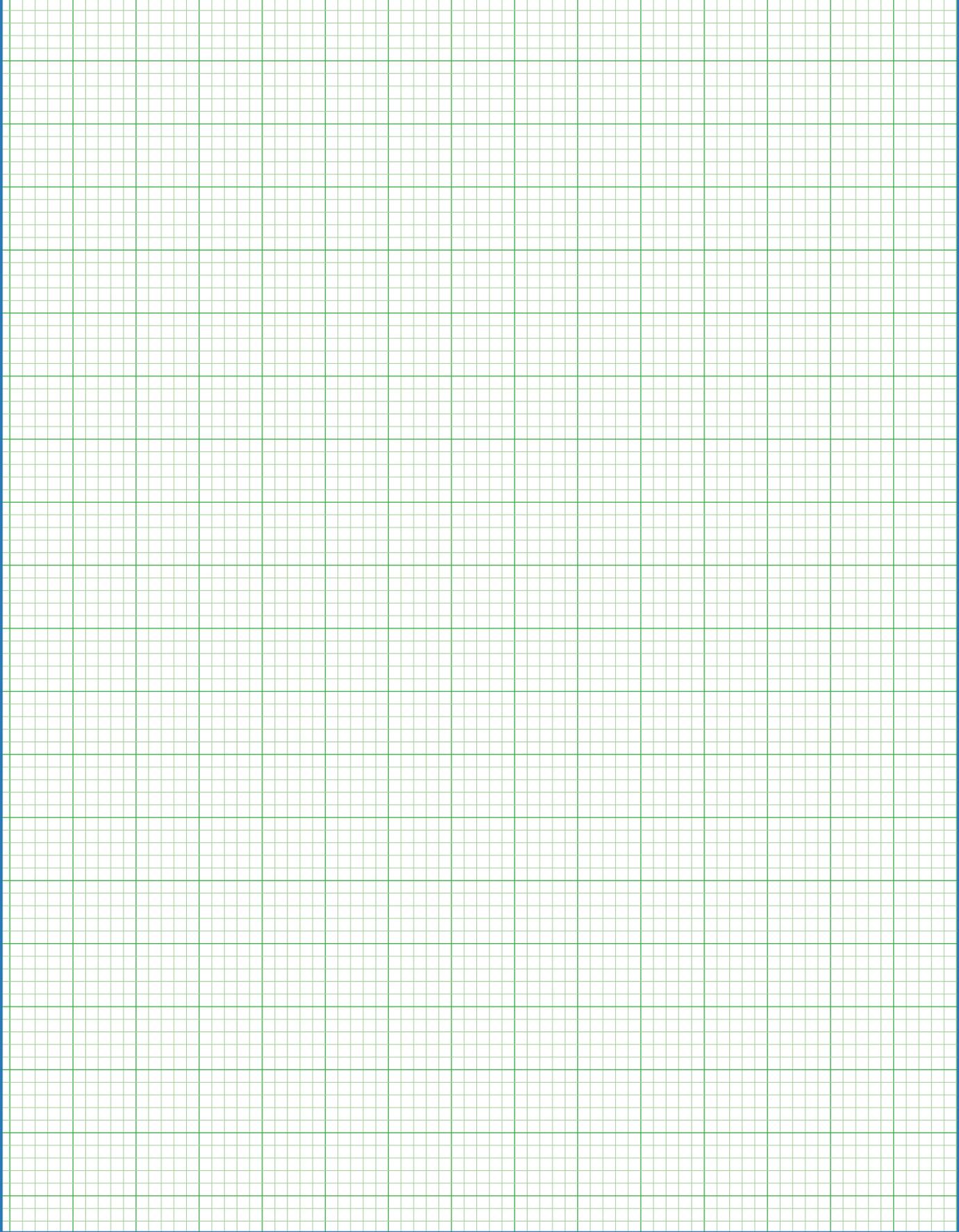
### Helpful Facts

- Rain gardens are designed to decrease the amount of rainwater flowing off your roof and property into the city's storm system.
- Rain gardens capture, hold, and release stormwater back into the soil.
- This rain garden is designed to provide habitat and food for a variety of birds and pollinators.
- The recommended plants for this lot design are selected for their beauty, habitat creation, and local availability.
- Looking for more information on rain gardens? The Sierra Club of Detroit has been running a rain garden program since 2012 and is happy to help.

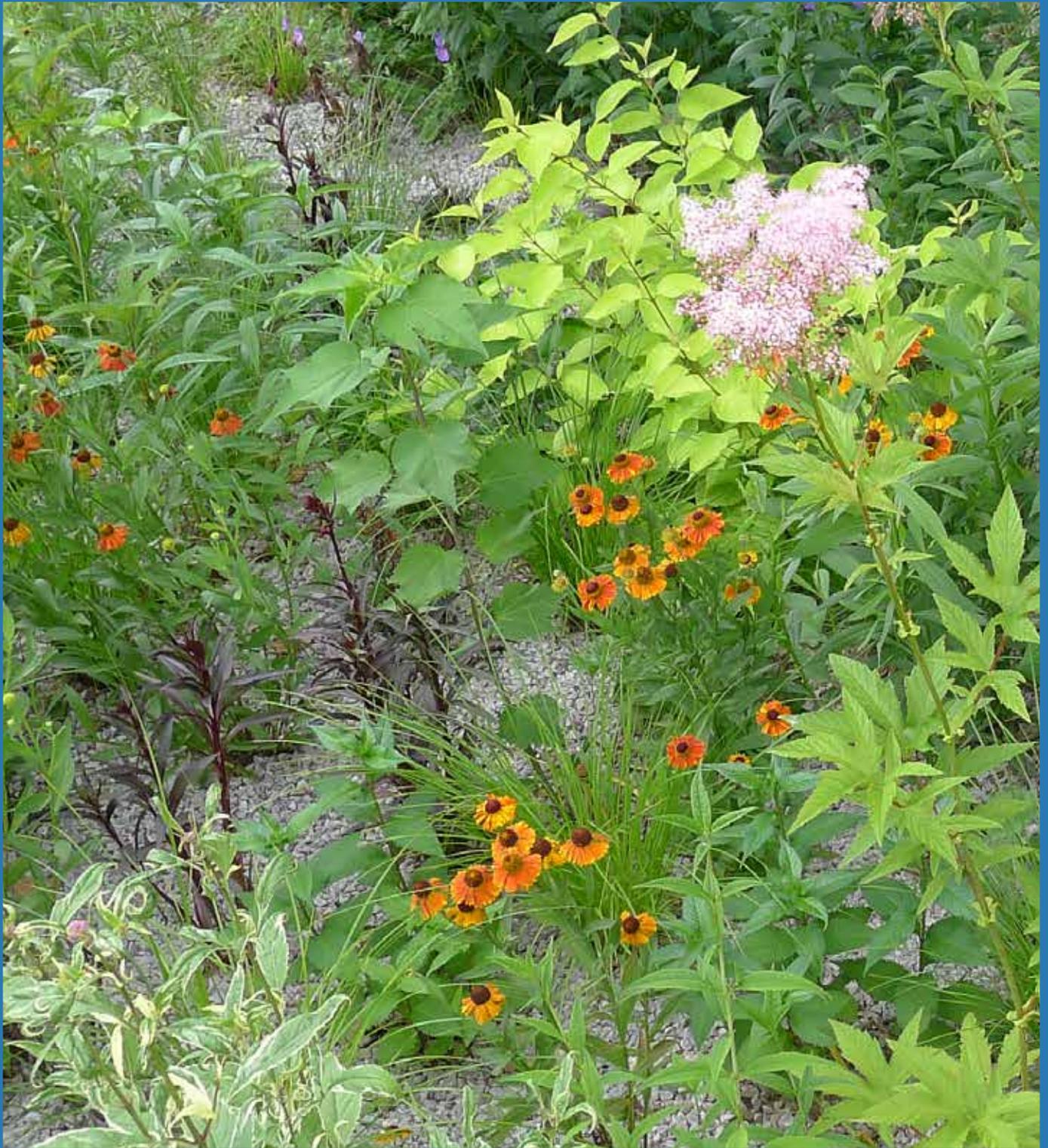
### Planting Tips

- Call ahead to make sure the nursery or garden store has the plants you need for the lot design.
- The best time to plant is in spring or fall.
- Do not plant in extreme heat.
- Water after planting and as needed. Do not allow soil to dry out.
- Weed weekly or as needed.
- To save money, ask a friend or family member if they have any plants or cuttings they are willing to donate to your rain garden.

## Draw Your Lot



## Basement Rain Garden Field Notes



**DETROIT  
FUTURE  
CITY**

**working  
with lots**  
A FIELD GUIDE

**Visit [DFC-lots.com](http://DFC-lots.com)  
#DFClots**

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