Rain Gardens in Austin

John Gleason, Landscape Architect
City of Austin Watershed Protection Department
What is a Rain Garden?

A shallow, vegetated depression designed to absorb and filter runoff from hard (impervious) surfaces like roofs, sidewalks, and driveways.

Why Build a Rain Garden

- Protect Watershed
- Conserve Water
- Conserve Energy
- Wildlife Friendly
- Aesthetics

Create A Rain Garden in Six Steps

1. Find the Right Location:
   - Choose a location where surface water accumulates, or other major points of water flow, which is overland flow.

2. Prepare the Soil:
   - Incorporate soil amendments into the soil to improve its structure and water retention.

3. Plant Diversity:
   - Select native plants that are adapted to the local climate and soil conditions.

4. Maintain the Garden:
   - Regularly water and prune to promote healthy growth and prevent pests.

5. Enjoy!
   - Observe the results and enjoy the benefits of a rain garden!
Watersheds & Impervious Cover

Impervious cover disrupts watershed hydrology and leads to flooding, erosion and water pollution.
Deluge, more floods sock region

1 teen dies, 2 are rescued in swollen South Austin waterways

By Ben Bavon
Austin American-Statesman Staff

The boy's van was carrying a crucial morning work crew. He was driving through the streets, avoiding flooded areas. The workers encountered severe flooding in Central Texas on Tuesday. Two cars were submerged near a canal, and a family was rescued from their flooded home. The news was alarming, with local residents wondering about their safety.

A 17-year-old woman was walking with friends along South First Street when she stepped into a manhole and was trapped. The water rose quickly, and she called for help. Firefighters responded and rescued her just in time. The incident highlighted the dangers of flooding and the importance of being cautious around water.

The situation showed the impact of such events, with residents facing challenges and authorities responding. The community was urged to remain vigilant and prepared for similar situations.

That tragedy wasn't the only one.
Creek Baseflow & Degraded Habitat

Baseflow: Stream flow due to groundwater seepage, not runoff
Rain Gardens Benefit the Environment

Watershed Benefits
• Reduce Stormwater Runoff
• Increase Baseflow
• Minimize Erosion
• Cleanse Stormwater
• Reduce Water Pollution
Rain Gardens Keep Water on the Land

**KEEP WATER ON THE LAND**

With increased population growth and smaller lots, much of our land is being covered with roadways, rooftops, parking lots and sidewalks that do not let water soak into the soil. This decreases baseflow (the constant flow in a creek) while increasing the chances of flooding and streambank erosion. The result is that many creeks have excessive flow during heavy rains and dry up shortly afterwards.

You can help both our waterways and your drainage problems by incorporating some "greenscape" techniques into your landscape plans.

**Rainwater Harvesting**

By directing rooftop water to a rain barrel, you can then use the collected rainwater on areas of the land that most need water.

**Swale or "Dry Creekbed"**

Install a more or less permanent detour that diverts rainwater to an area of the yard where it can be better absorbed.

**Soils**

As least 6 inches (and ideally 6-8 inches) of organic topsoil should be added to help keep nutrients and water on the land.

**Beem**

This could be a mound of earth or a low stone wall. It is typically at the bottom of a slope to help retain water and prevent erosion.

**Reminder:** When you change your landscape design, remember to change your sprinkler system as well!

**Cross Section: Rain Garden**

- **Checklist Plan:**
  - Big Mulch
  - Georgia Blanketflower
- **Soil:**
  - Mound of excavated soil
  - Silt barrier at garden
- **Soil Solution:**
  - Broad-leafed soil with sand or mulch

**Trees**

Plant diverse native species to promote water retention, improve air quality, provide shade and habitat.

**Porous Pavement**

An alternative to asphalt, porous materials allow water to penetrate the ground and maintain the land. Some options include bark mulch, gravel, pervious concrete paving stones, and sliced glass.

**Your Lawn As a Filter**

Grass slows down water flow and stores infiltration. Lawn does best in an area that is nearly level and should not be treated with chemicals as it may reduce the potential for water pollution.

**Rain Gardens**

These gardens are designed to catch and more rainfall for short periods of time and then dry out. They can be filled with attractive plants and often help solve drainage issues in the yard. For details on rain garden design and plant choices, see the following page and visit www.growgreen.org/plants.htm.
Find the Right Location for Your Yard

Capture Runoff From:
- Roof Valleys & Downspouts
- Within Existing Flowpaths

Avoid:
- Utility Easements
- Rights of Way (ROW)
- Steep Slopes & Bedrock
- Existing Tree Roots
- Foundation Problem Areas
- Impacting Your Neighbor
Rain Garden in a Small Front Yard
Sotiva Townhomes on Harmon Ave.
Test the Soil to Determine Infiltration

Dig A Hole and Fill w/Water:
- 6” Wide x 12” Deep
- Fill w/Water Twice
- 2nd Time Fill to 6”

Determine Infiltration Rate:
- Insert Ruler to 6” level
- Measure Soaking Time
- Should Absorb in 24 hrs. min.
Determine the Size of Your Garden

A Design to Hold 1” of Runoff in a 6” Deep Rain Garden

- Determine Drainage Area (DA) Size in Square Feet
- Divide DA by 6 to Determine Garden Area Size
Example Garden Sizes

- Gardens Can Be Any Size
- All Numbers are in Square Feet
- Example Calculation $200 \div 6 \approx 33$

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Rain Garden Size</th>
<th>Example Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 s.f.</td>
<td>33 s.f.</td>
<td>3’ x 11’</td>
</tr>
<tr>
<td>400 s.f.</td>
<td>67 s.f.</td>
<td>7’ x 10’</td>
</tr>
<tr>
<td>600 s.f.</td>
<td>100 s.f.</td>
<td>5’ x 20’</td>
</tr>
<tr>
<td>800 s.f.</td>
<td>133 s.f.</td>
<td>6’ x 22’</td>
</tr>
<tr>
<td>1000 s.f.</td>
<td>167 s.f.</td>
<td>10’ x 17’</td>
</tr>
</tbody>
</table>
Determine Shape and Remove Existing Plants

- Envision the Garden Size and Shape on the Ground
- Transplant any Existing Desirable Plants
- Thoroughly Eradicate All Weeds

4 Rain Garden Construction

- Once you feel confident your garden is well-placed, lay out the shape using string or tape to define where to dig
  - Now you are ready to dig!!!
    - If the yard is fairly level, dig out the garden to a depth of 6"
    - If the yard is on a gentle slope.
Dig a Hole - Create a Basin

- Excavate 6” - 8” of Soil
- Avoid Tree Roots
- Create a Berm to Hold Water
- Figure Out Overflow

4 Rain Garden Construction

- Once you feel confident your garden is well-placed, lay out the shape using string or tape to define where to dig.
- Now you are ready to dig!!
  - If the yard is fairly level, dig out the garden to a depth of 6”
  - If the yard is on a gentle slope, you may need to dig cut soil from the upslope area to construct a small berm (mound of compacted soil) at the downslope side of the garden (see example below)
- Maintain a depth of 6” throughout the bottom of the rain garden. A string level can help you maintain a consistent depth
- Slope the sides of the rain garden using a shovel
- Level the top border of the basin. You can use the top of the existing lawn, an earthen berm or landscaping material (like stone or timber). This will distribute overflow evenly across the perimeter of the rain garden.
- Loosen the soil in the bottom of the rain garden to a depth of 3”. Cover the loosened soil with compost so the soil is ready for planting.
- If water flows quickly into the rain garden, you will need to construct a “splash pad” to guide the water to the rain garden. Splash pads are typically constructed with rock and extend 2 to 3’ from the point of entry. 1 to 2” gravel or river rock is often sufficient size for splash pads.
Enhance Garden Soil & Verify Depth

- Enhance Garden Soil with Compost, etc.
- Use a Level to Verify Depth
Plant Selection and Installation

- Use Drought-Tolerant Plants
- Avoid Plants That Require Well-Drained Soils
- Plant Roots Will Maintain and Increase Soil Porosity
- Add Mulch (Gravel or Wood)

**Suggested Plants for Central Texas Rain Gardens**

<table>
<thead>
<tr>
<th>Tall Plants</th>
<th>Low Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherry Laurel</td>
<td>Black-eyed Susan</td>
</tr>
<tr>
<td>Eastern Gamagrass</td>
<td>Blue Mistflower</td>
</tr>
<tr>
<td>Maximilian Sunflower</td>
<td>Cherry Sage</td>
</tr>
<tr>
<td>Possumhaw Holly</td>
<td>Coreopsis</td>
</tr>
<tr>
<td>Red Buckeye</td>
<td>Deer Muhly</td>
</tr>
<tr>
<td>Switchgrass</td>
<td>Gulf Coast Muhly</td>
</tr>
<tr>
<td></td>
<td>Gulf Coast Pustemon</td>
</tr>
<tr>
<td></td>
<td>Horseherb</td>
</tr>
<tr>
<td></td>
<td>Inland Sea Oats</td>
</tr>
<tr>
<td></td>
<td>Liriope</td>
</tr>
<tr>
<td></td>
<td>Meadow Sedge</td>
</tr>
<tr>
<td></td>
<td>Missouri Violet</td>
</tr>
<tr>
<td></td>
<td>Monkey Grass</td>
</tr>
<tr>
<td></td>
<td>Pigeonberry</td>
</tr>
<tr>
<td></td>
<td>River Fern</td>
</tr>
<tr>
<td></td>
<td>Spiderwort</td>
</tr>
<tr>
<td></td>
<td>Tropical Sage</td>
</tr>
<tr>
<td></td>
<td>Water Clover</td>
</tr>
<tr>
<td></td>
<td>Zexmenia</td>
</tr>
</tbody>
</table>

For more suggestions, see the Central Texas Rain Gardens book.
Rain Garden Plants - Grasses

Root Systems of Prairie Plants
Some Plants for Shady Areas

- Inland Sea Oats
- Frostweed
- Southwestern Bristlegrass
- Native Sedges
Bellamy Residence Rain Garden
Rain Gardens Require Maintenance
Maintenance of Rain Gardens

http://www.growgreen.org

- Water Plants to Establish Root System
- Infiltration Prevents Mosquitoes
- Remove Weeds
- Add Mulch to Minimize Weeds, Moderate Soil Temperatures, and Provide a Finished Appearance
- Fertilizing is Unnecessary
Public Rain Gardens
Big Stacy Park: Travis Heights neighborhood
Stacy Park Rain Gardens – Plan View
Stacy Park Rain Garden – inlet
Stacy Park Rain Garden
Rainwater Harvesting and Rain Gardens

• Are an Ideal Combination
• Direct Overflow From Container to Rain Garden
Rainwater Harvesting and Rain Gardens

LCRA Redbud Center
Sand Beach Biofiltration: Downtown Austin
One Texas Ctr. Rain Garden

CITY OF AUSTIN
ONE TEXAS CENTER
505 BARTON SPRINGS ROAD

THREADGILL’S
Glen Ellyn, Illinois – Ennis Residence
Glen Ellyn, Illinois – Ennis Residence
Porous Pavement

- Water Infiltrates Through Pore Space
- Regular Sweeping Prevents Clogging

Pervious Concrete
Permeable Pavers
Soil Restoration

Blend compost into soil for better infiltration and vegetative growth