Rain Gardens

Holding back and soaking in runoff in small depressed planting beds is like gardening the rain, hence the name. Rain gardens allow you to passively water plants without touching a tap. They are meant to both absorb and cleanse runoff. They deliver a similar range of environmental benefits as ponds and wetlands, while avoiding the challenges of standing water.
Benefits of Rain Gardens

**Low maintenance.** Rain gardens need no more care than regular landscaping.

**Grows quickly.** Extra moisture and loose, deep soil make plants thrive and quickly fill in a space.

**Provides habitat.** Rain gardens can provide abundant food, water, and shelter for wildlife such as birds and butterflies.

**Diversifies plant possibilities.** Extra natural moisture means you can have a water-wise garden while including more moisture-loving plants you might otherwise have had to leave out.

**Improves aesthetics.** Rain gardens add visual interest to your yard and your community.

Rain Gardens are Best for...

**Properties with more space.** Rain gardens are simplest to install when you can stay at least three metres away from building foundations.

**Newer properties with mostly manicured turf.** Typical groomed turf is usually underlain with a shallow soil that is inhospitable to plant survival, doesn’t break down contaminants, and creates a lot of runoff. Adding rain gardens to this type of property (newer than about 1970) will instantly improve its performance.

**Areas where a tree canopy is yet to establish.** If you have mature trees, your property is working hard already, and rain gardens are a type of feature that might be difficult to fit in. Where you don’t have trees, rain gardens are a major performance booster.
Rain Garden Components

**Water Source.** Rain gardens can collect runoff from any source: a downspout off a roof, directly from a hard surface like a driveway or patio, as part of an overflow route from rain barrels, or even from lawn areas.

**Inlet.** Once you get water to your rain garden, protect the location where it flows in. Just add some small stones to slow the water down and make sure soil doesn’t wash away.

**Overflow.** Most of the time, the water that flows into your rain garden will soak in. Occasionally, a big storm will generate enough runoff to fill up your rain garden and more. For these times, an overflow location needs to be provided on the downhill side of the garden. Add some small stones here as well.

**Plants.** Rain gardens can be planted with any combination of trees, shrubs, grasses, or perennials and can look just like a regular planting bed. When selecting plants to include in your rain garden, you should consider using native plants as much as possible. Native plants are usually fully cold-hardy and typically require little maintenance, while being highly adaptable to a variety of soil and light conditions. They are often the first to leaf out in the spring and the last to drop their leaves in the fall. Most native plants are also relatively inexpensive, but can be more difficult to source. They are normally the best choice if you have larger areas to fill, as many will readily spread and self-seed. They are preferred for slopes where erosion control is needed, as they are more likely to have deep, binding roots.

In addition to helping improve water quality, native plants provide important habitat, nectar sources, and act as hosts for a wide variety of pollinators, including butterflies, hummingbirds, and native bees.

**Soil.** The most significant part of a rain garden compared to a regular planting is the depression that holds water and what you can’t see—the loose, deep soil underneath that absorbs and treats stormwater. There is much discussion about what soils to use for rain gardens. Unlike sand, native loam provides excellent nutrient-binding and moisture-buffering capacity. Plain loam is recommended and is the basis of the rain garden sizing calculation presented later in this chapter.

**Ponding Depression.** The surface of the rain garden should be depressed between 15 cm and 30 cm below the surrounding grade and be able to drain away from foundations if it fills up and overflows during major storms. Overflow areas can include other rain gardens, soakaways, bioswales, or natural areas.

**Compost and Organics.** Adding compost and organics to soil is a common gardening practice. If you want to do so, use ONLY vegetable-based amendments, not those containing animal manure. This is very important for the nutrient-removal capacity of rain gardens. Adding compost will add absorptive capacity and help with re-establishing soil structure once soil is placed, but it is not required.

**Mulch.** Mulch can be shredded or chipped wood or bark, or composted plant material. Mulch is not absolutely essential, however it controls weeds, retains moisture, adds organic material and improves drainage. Place it over bare ground and between plants to a depth of between 5 and 10 cm.
Plants for Rain Gardens. You can plant anything drought-tolerant. Try these beauties that both handle dryness and thrive on a little more moisture.

Siberian Iris
Daylily
Tufted Hairgrass (native)
Feather Reed Grass (native)

Spotted Joe Pye
Creeping Jenny
Ligularia
Showy Milkweed (native)

Dogwood (native)
Spirea
Dwarf Birch (native)
Raspberry

Willow (some native)
Currant (native)
Potentilla (native)
Snowberry† (native)

† Photo compliments of TreeTime.ca — all rights reserved

The guidance in this document is for general informational purposes only, and is not intended to substitute for professional advice.
Siting. Rain gardens can be constructed in low-lying areas, or wherever it makes sense in relation to downspouts or hard surfaces.

**Distance from basements and crawl spaces.** Rain gardens should be positioned away from foundations (at least three metres).

**Distance from steep slopes.** Rain gardens should not be installed within 15 m of steep slopes (over 15%), as there is a potential to cause slumping and landslides.

**Distance from septic systems.** Rain gardens should never be placed within four metres of a septic field and, if uphill from a septic system, should be at least 15 m away.

**Sizing.** Using the sizing chart on page 69, you can quickly determine how big your rain garden needs to be to capture most of the stormwater that flows from hard surfaces like your roof or driveway.

**Drainage capability of the subsoil.** The layer below the soil may be sandy and drain easily, especially if you live in a river valley or near a shoreline. In this case your rain garden will not have as much potential for standing water, so deeper depressions are okay. On the other hand, if your subsoil is more like clay (which is typical in much of Alberta), then shallower depression depths and deeper soil depths are more desirable to ensure water doesn’t linger for more than a few days.

---

**Milkweed for Monarchs**

Monarch caterpillars will only eat Milkweeds. Talk about fussy! Fortunately, rain gardens provide perfect conditions for growing Showy Milkweed (*Asclepias speciosa*, pictured at right). It is hardy in Alberta and available through native growers. In Zone 4, *Asclepias tuberosa* is another possibility, sometimes available at garden centres. Want to save the Monarchs? Include milkweed in your planting plan.
Our example lot has two rain gardens in its front yard.

One is shallower, but has a larger surface area, and accepts two-thirds of the roof’s runoff. The second is deeper, but is much smaller in area and accepts the runoff from one-third of the roof at the front of the home.

**Example Options to Retain Runoff with a Rain Garden**

1. **Retain 2500 L:**
   - 15-cm ponding depth / 60-cm-deep soil / 10.4 m² surface area
   - Complexity: **Intermediate**
   - Cost to Install: $$$$$
   - Equal to 625 milk jugs

2. **Retain 1000L:**
   - 15-cm ponding depth / 30-cm-deep soil / 6 m² surface area
   - Complexity: **Easy**
   - Cost to Install: $$$$$
   - Equal to 250 milk jugs

3. **Retain 500L:**
   - 30-cm ponding depth / 60-cm-deep soil / 1.5 m² surface area
   - Complexity: **Easy**
   - Cost to Install: $$$$$
   - Equal to 125 milk jugs

**Runoff Generated**

1. A single 2.5-cm rain event on a 40 m² roof area generates 1000 L of runoff.
   - Equal to 250 milk jugs

2. A single 2.5-cm rain event on a 20 m² roof area generates 500 L of runoff.
   - Equal to 125 milk jugs
**RAIN GARDEN SIZING CHART**

Minimum Area for Various Ponding and Soil Depths

<table>
<thead>
<tr>
<th>Contributing Area</th>
<th>Runoff generated from 2.5-cm rain event</th>
<th>MINIMUM RECOMMENDED RAIN GARDEN AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10-cm ponding depth / 30-cm soil depth</td>
<td>15-cm ponding depth / 30-cm soil depth</td>
</tr>
<tr>
<td>10 m²</td>
<td>250 L</td>
<td>2.5 m²</td>
</tr>
<tr>
<td>20 m²</td>
<td>500 L</td>
<td>5.0 m²</td>
</tr>
<tr>
<td>50 m²</td>
<td>1250 L</td>
<td>12.5 m²</td>
</tr>
<tr>
<td>100 m²</td>
<td>2500 L</td>
<td>25 m²</td>
</tr>
<tr>
<td>150 m²</td>
<td>3750 L</td>
<td>37.5 m²</td>
</tr>
<tr>
<td>200 m²</td>
<td>5000 L</td>
<td>50 m²</td>
</tr>
</tbody>
</table>

Assumes that the soil has 25% open void space to absorb the rainwater.

**Sizing.** Using the chart above, you can quickly determine how big your rain garden needs to be to capture most of the stormwater that flows from hard surfaces like your roof or driveway.

Four variations of ponding depth (depression depth) and soil thickness are shown in the table above. To determine your rain garden solution:

1. Calculate the area which will send flow to the rain garden (the contributing area).
2. Choose your location to ensure you have proper setbacks, a way to get water to the rain garden, and a way for water to escape in really heavy rains.
3. Use the chart above to fill in the blanks. For example, if the roof area that drains into a downspout is 30 m² (the contributing area) and you want to construct a rain garden that has a 15-cm ponding depth with 30-cm-deep soil underneath, then the area of the rain garden needs to be at least 4.5 m² to capture all of the runoff from a 2.5-cm (one-inch) rain event and to ensure that water drains within 48 hours after a rain event. The minimum dimensions of the rain garden would be 2.5-m by 2.0-m, or 1-m by 4.5 m, and so on. Shape doesn’t matter.

**Is the surface area you have available limited?**
You will need more soil and/or ponding depth, and water will linger longer than in a rain garden with more surface area.

**Lots of space, not much appetite for digging?**
You can limit the soil and ponding depths and still achieve a perfectly functional rain garden by increasing the surface area.
## Maintenance

**Watering.** Water plants regularly for the first one to three years in order to establish them properly. Watering may be necessary during prolonged dry periods even if plants are established. During these periods watch for signs of stress, such as wilting leaves or fading evergreen needles.

**Plant care.** Maintaining healthy plants in your rain garden minimizes weed seed germination, improves drainage, and reduces erosion. If plants continue to do poorly or fail, they may be the wrong plants for that location. Consider the sun exposure, soil moisture, adjacent plants, and other growing factors and replace the poorly performing plants with varieties better suited for that location in the rain garden. You may need to thin out some plants — plants often grow rapidly to full size in lush rain gardens.

**Fertilizer.** Rain gardens are meant to help use up nutrients in runoff. Adding fertilizer defeats this purpose and increases the hazard of leaching nutrients into water sources. Native plants don’t need added fertilizer. If you suspect fertilizer is needed in your case, do a soil test to confirm. If a test reveals this is necessary, compost will probably do the job.

### Call before you dig

Before you start digging your garden — or do any sort of ground-disturbing landscape work — you need to “know what’s below.” Damage to buried utility lines can cause loss of essential services for you and your neighbours, or even serious injury or death. Contact Alberta One-Call at least two full days (more during the busy spring and fall seasons) to locate and mark your property. You can reach them at 1-800-242-3447 or albertaonecall.com

### Check with your municipality

Some municipalities have developed their own rain garden advice and requirements. Check early in your planning to see if there are any permits or other requirements, for example to disconnect a downspout.

---

### More Information

For additional details on planning and building your rain garden, as well as design inspiration, check out these resources.

**Alberta Low Impact Development Partnership**

alidp.org

The Canadian Mortgage and Housing Corporation website has a rain garden page with lots of useful details.

bit.ly/cmhc_raingarden

The David Suzuki Foundation’s Monarch and Milkweed FAQ

bit.ly/monarch_milkweed

---

The guidance in this document is for general informational purposes only, and is not intended to substitute for professional advice.