

### Section 3.3 Rain Garden (RG)



A Rain Garden is a shallow landscaped depression that temporarily ponds stormwater runoff and encourages it to infiltrate into the underlying soil. Rain Gardens are vegetative infiltration practices providing runoff reduction and pollutant removal.

#### A. Purpose

- This practice is intended to treat runoff from small areas such as individual rooftops, driveways and small parking areas.
- Inflow is typically from a downspout or can be sheet flow from a driveway/patio or lawn. This practice is intended to absorb runoff from impervious surfaces before it flows into storm sewers, swales, or channels within 48 hours.

#### B. Site Criteria

- Impervious drainage area shall be  $\leq 5,000 \text{ ft}^2$  and total drainage area (impervious + pervious areas) shall be  $\leq 0.5$  acres. Drainage area must include impervious surfaces and should be located within 40 feet of the impervious drainage.
- If contributing drainage area is greater than 0.5 acres, consider using Bioretention (practice 3.8).
- Cannot be placed on wetland soils.
- Cannot be placed within the areas designated as the FEMA 100-year flood plain, 1% annual chance flood plain, or by the locality as within the 100-year flood plain, whichever is most stringent.
- Depth to water table and bedrock shall be greater than 2 feet below the bottom of the practice. If the seasonal high water table is identified as a potential concern based on field or desktop analysis, it should be verified by a professional soil scientist (Contact Extension, NRCS, or Society of Professional Soil Scientists for local providers).
- The site must have subsoils capable of infiltrating stormwater runoff. An infiltration test must be performed.
- Steep slopes may utilize low-profile (less than 3 feet) block retaining walls. Low permeability geotextile fabric and a footer drain shall be used behind the wall. A Form 5-Release Agreement may be required.
- Urban areas with limited space may utilize low-profile raised planter beds of suitably durable material.
- Shall be located at least 10 feet from building foundations (includes basement and crawl space walls, slabs on grade), greater if upgradient. May not be appropriate near buildings where there is significant risk for basement seepage. An impermeable liner separating the building from the practice may be required.

- Impact on septic drain fields should be evaluated prior to application submission. Consult local setback requirements.

**C. Design Criteria**

- Rain gardens shall be sized to capture the 1-inch volume of runoff. This shall be based on the contributing drainage area, corresponding runoff value and ponding depth. (See Appendix A.1 for Calculations).
- Ponding depth can range from 3 to 12 inches, with 6 inches being typical. The depth should be based on site conditions and plant tolerances.
- Soil amendments may be necessary to allow appropriate infiltration. Amendment and underdrain requirements are determined by the native soil infiltration rate:

Infiltration Rate	Soil Amendment Required
Rate > 0.5 inches/hour	Compost Amendment
Rate < 0.5 inches/hour	Engineered Soil Media
Rate < 0.25 inches/hour	Underdrain Required; Consider a bioretention practice;

- Further details on soil amendments are as follows:
  - When necessary, as defined above, the subsoil of the ponding area will be amended with compost to achieve 5% organic matter content. Typically, compost is applied at a 4:1 ratio (soil to compost) usually 1 inch of compost incorporated into 4 inches of soil. See Technical Resources below for additional guidance.
- Must have engineered soil media of 80-90% sand by volume; 10-20 % soil fines by volume; and 3-5% leaf compost by weight. For simplification, the soil media could be made (DIY) from a Sand-Soil-Leaf Compost ratio of 4:1:3 by volume. The engineered soil media must be clean (free from debris and weed seeds) and homogenous or well-mixed. Test datasheet should be provided by vendor.
  - When necessary, as defined above, under drain shall be placed in 6 inches of clean gravel.
- A stable overflow route must be designed.
- Splash blocks, gravel or other means to slow and spread flow should be used at each point where concentrated runoff enters the rain garden. For more information about pretreatment, see Appendix B.
- Planting, mulching and all other site stabilization measures shall occur immediately after construction. Temporary stabilization measures may be necessary.
- Minimum planting density of 75% shall be achieved within two years of installation. Required density and minimum ground covers for all plantings will be based on mature size of approved species.
- Plant species must be considered native or nativity uncertain by the *Flora of Virginia*. Annual plants and harvestable vegetables are not allowed in the landscape plan and are not eligible for cost share. See Helpful Technical References for *Flora of Virginia*.

Suggested Spacing	
Perennials	1-2 feet
Grasses	2-3 feet
Small Shrubs (<6 feet)	3-5 feet
Large Shrubs (> 6 feet)	6-8 feet
Small Trees (< 25 feet)	25 feet
Medium Trees (<40 feet)	30 feet
Large Trees (> 40 feet)	35 feet

**D. Design Plan Components**

- A design plan for the site must be submitted by the applicant and approved by the Steering Committee before construction is initiated. The district must be notified of any proposed changes to the approved design. Changes to the approved design may jeopardize cost share reimbursement. The Steering Committee has discretion to approve or deny cost share reimbursement in the event of design changes. Information required in the design plan includes (see VCAP Submission Checklist for a comprehensive list):

- Soil map and/or a soil assessment indicating water table and bedrock depths and other limiting factors.
- Infiltration test results.
- Sizing calculations for the practice.
- Design plan identifying inlet and outlet structures and a cross section with ponding depth and (if required) soil remediation depth.
- Landscape plan including: species, rate of seeding or planting, sufficient quantity and sizing of planting stock, and method of establishment. Only viable, high-quality seed or planting stock should be used. Plant list can include the common plant name but must include the scientific name.
  - a. Planting list must include the complete scientific name (genus and species) and common name of the plant species. For example, *Cornus florida*, flowering dogwood or *Itea virginica* “Little Henry”, Virginia Sweetspire.
- A statement regarding compliance with any permitting requirements.
- Other information as required by the local District.
- It is the VCAP participant’s responsibility to ensure any contractors meet all applicable local codes and requirements.

### E. Operation and Maintenance

- First-year maintenance will include:
  - Weekly watering during the growing season, as necessary to ensure survival.
  - Stabilizing bare or eroding areas.
  - Replace dead, dying or diseased plants.
  - Removal of unwanted and invasive plant species.
- Annual routine maintenance will include:
  - Spot weeding, erosion repair, and removal of trash, debris, and invasive species as needed.
  - Replace dead, dying or diseased plants as necessary.
  - Replace mulch as needed to keep ground covered.
  - Optionally: Cut back perennials as needed in early spring. Prune shrubs and trees as needed in late winter. Spring flowering shrubs may be pruned lightly in mid-summer.
  - Confirm the practice drains within 48 hours of rainfall.
- Maintain all structural components of the practice--such as inlets, pretreatments and outlets—in good working order.
- Assure all drainage areas are maintained to prevent negative impact on practice.
- Applying fertilizer after vegetation has been established is prohibited in keeping with the VCAP goal of reducing nutrient pollution.

### F. Cost-Share Rates/Incentives

- See District Guide to VCAP for practice cost-share rates and caps.
- Eligible costs may include: soil testing, excavation, grading/amending soil, invasive species removal within the footprint of the rain garden, plants, seed, installation costs of plants/seed, compost, mulch, pre-treatment costs, engineered soil, reasonable retaining wall materials if required per most effective design, and underdrain components (pipe, stone) when necessary.

### G. Technical Resources

- Virginia Stormwater Management Handbook, Version 1.0. 2024. Virginia Department of Environmental Quality.
- [Rain Garden Design and Construction: A Northern Virginia Homeowner Guide. Fairfax County, Va. 4/2009.](#)

- [RainScapes Planting Designs for Rain Gardens, 2020 edition, RainScapes Program of the Department of Environmental Protection, Montgomery County, Maryland.](#)
- [Virginia Cooperative Extension. Urban Water-Quality Management: Rain Garden Plants. 2015. 426-043.](#)
- [Cogger, Craig. Compost Amendment Rate Calculator. Washington State University.](#)
- [Building Soil: Guidelines and Resources for Implementing Soil Quality and Depth BMP T5.13 in WDOE Stormwater Management Manual for Western Washington, 5th edition, 2018.](#)
- Virginia Botanical Associates. Digital Atlas of the Virginia Flora (<http://www.vaplantatlas.org>). c/o Virginia Botanical Associates, Blacksburg.
- [Virginia Department of Conservation and Recreation. Virginia Flood Risk Information System.](#)