



**Bureau of
Development
Services** FROM CONCEPT
TO CONSTRUCTION

PROGRAM GUIDE



Rain Gardens for Existing Impervious Area Located in Eastside Combined Sewer Basins

Category: Residential and Small Commercial Construction

Revised: April 14, 2014 *[Paul L. Scarlett]* , Director

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PURPOSE:

As a part of a stormwater retrofit program, the Bureau of Environmental Services (BES) partners with private property owners to implement rain gardens and downspout disconnection. This program guide provides information on how the rain gardens and downspout disconnection will be implemented between BES (having local authority for water quality and environmental regulations) and the Bureau of Development Services (BDS) (having local authority over building and plumbing code).

APPLICABILITY:

Under the terms of this program guide, installation of a variety of alternate stormwater drainage systems will be allowed without BDS building, site development, or trade permits including downspout disconnection and rain gardens that meet the program guide specifications. Zoning permits may be required as discussed in this program guide. Other stormwater management systems not covered by the terms of this program guide, such as planters, swales, basins, drywells, or soakage trenches, will require permits to be obtained through BDS.

BACKGROUND:

The management of stormwater from roofs and other impervious surfaces is a key factor in maintaining and improving the environmental quality of Portland. New development and redevelopment must meet the stormwater requirements and design criteria in the City's Stormwater Management Manual. Runoff from impervious surfaces must meet specific standards for discharge to either an on-site stormwater management system or an off-site storm system as approved by BES.

Previously, in some portions of the City, stormwater drainage was routed from buildings and other impervious surfaces directly into the existing combined stormwater and sanitary sewer system. As the City has grown, the combined sewer system has become overtaxed, and is prone to local sewer backups or system overflows into the Willamette River and Columbia Slough. As part of the plan to reduce local and system capacity problems, BES implements a stormwater retrofit program in targeted combined sewer areas. As a part of this stormwater retrofit program, BES partners with private property owners to implement rain gardens and downspout disconnection.

STORMWATER RETROFIT PROGRAM:

Program funding will only be available on a limited basis within targeted areas in eastside combined sewer areas. Inquiries about specific sites should be directed to BES program staff to determine eligibility.

For eligible properties in the targeted areas, BES will either directly manage the implementation of rain gardens and downspout disconnection or will provide financial incentives to property owners to construct their own rain gardens or disconnect downspouts on their properties as long as the rain gardens and disconnected downspouts meet the provisions of this program guide and funding criteria.

Detailed information on the BES Stormwater Retrofit Program can be obtained by calling (503) 823-7740.

General. The characteristics of all types of stormwater management systems should be compatible with the site characteristics. The sections below describe the requirements for residential-scale rain gardens and downspout disconnection under this program guide.

A. Where Allowed.

1. Rain gardens and downspout disconnection can be installed at existing residential, multifamily or commercial structures to manage less than a total of 5,000 square feet of roof and other impervious area.

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2. Vegetated infiltration basins that manage more than 5,000 square feet, other stormwater management systems not covered by this program guide, and any stormwater management system that manages runoff from private parking lots will be designed as per the Stormwater Management Manual and permitted through BDS.
3. The City review and inspection requirements for these facilities are identified in Table 1.

Table 1 – Surface Systems		
Property Description	Surface System	Inspectors
Rain gardens and downspout disconnection managing less than 5,000 square feet of impervious area	Yes	BES ¹
Vegetated infiltration basins managing more than 5,000 square feet of impervious area	Yes	BES ²
1. BES Stormwater Retrofit Program staff, no permit required. 2. BES Development Review staff will inspect as a part of the standard process for permitting stormwater retrofits.		

4. Residential-scale rain gardens are only allowed on properties where the roof runoff remains on the site. Runoff from the building roof shall not be a nuisance, cause harm to any structure on the same or neighboring properties, or cause ponding of water for over 36 hours after rainfall ceases.
5. For multifamily and commercial properties that meet the program guidelines for implementation, a site plan will be submitted to BDS to clarify any zoning requirements for landscaping and screening. If there are any zoning requirements, a zoning permit will be required to ensure that landscaping and screening standards are met.

B. Standards

Where downspouts are disconnected from the combined sewer so that stormwater is managed with downspout disconnection or a rain garden, the following standards must be met:

1. Disconnected downspouts shall be designed to provide adequate area for the water to drain and infiltrate, equal or greater to a 10% ratio of landscape area to

roof area (i.e. 500 square feet of roof would need to drain to at least 50 square feet of landscape area).

2. Rain gardens should be sized to drain within 36 hours after rainfall ceases. A minimum of one simple pit infiltration test will be done per rain garden. Depending on infiltration rate, the rain garden will be sized as per Table 2.

Infiltration Rate	Sizing Factor
4" or greater per hour	6%
2" to 4" per hour	10%
1.5" to 2" per hour	12%
1" to 1.5" per hour	15%
0.5" to 1" per hour	21%

3. Rain gardens that include an overflow to mini-drywells may be used in areas of infiltration over 2" per hour where site restrictions do not allow for full sizing of a rain garden.
 - a. A mini-drywell is a hard plastic chamber manufactured specifically for underground stormwater management. Mini-drywells are sized two feet in diameter and two feet in depth. Mini-drywells are placed one foot below finished grade and have a one foot gravel lens below and on the sides.
 - b. Rain gardens should be sized to a minimum of 50% of the infiltration-rate based sizing factor (see Table 2) and constructed with an atrium grate overflow from within the rain garden to the mini-drywell.
 - c. The atrium grate overflow must be at an elevation below that of the rain garden escape route.
 - d. Rain drains must daylight directly into the rain garden and the rain garden must be constructed without under drains or direct piping between rain drains and mini-drywell.
 - e. The center of the mini-drywell must be located at least five feet from any property line and eight feet to any foundation.
4. Each facility will be designed with a safe escape route, such as driveway, sidewalk, street, or parking lot.

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5. Water runoff from the roof may be conveyed to the point of discharge in one of the following manners:
 - a. A gutter-grade¹ downspout extension above ground, with or without splashblocks; or
 - b. A below-grade downspout extension positioned below ground, daylights into surface vegetation or other above grade facility, and:
 - 1) Where located within the 2-ft or 6-ft distance required prior to discharge as defined in #6 below, the pipe must be watertight; and
 - 2) Where located completely below ground, a patio, or a walkway, it must be composed of cast iron or Schedule 40 ABS, which complies with Sections 701 and 1101 of the Oregon Plumbing Specialty Code and can be positioned at any depth.
 - c. A rock-filled drainage channel lined with moisture-impervious sheeting, such as 30-mm PVC ASTM D1593, where located within the 2-ft or 6-ft distance required prior to discharge as defined in #6 below.
6. Each point of discharge must be at least:
 - a. 2 ft from any onsite building foundations without a basement; and
 - b. 6 ft from any onsite building foundations with a basement; and
 - c. 10 ft from a neighbor's building; and
 - d. 5 ft from a property line.
7. The deepest point of a rain garden should be at least 10 ft from all structures.
8. The point of discharge shall be at a location where the property slopes away from the building.
9. Water shall not discharge onto neighboring property or off the site.
10. Rain gardens will not be installed at locations on the site where slope is greater than 10%.
11. Rain gardens will be constructed to a finished depth of between 12" and 18" with maximum side slopes of 3 horizontal to 1 vertical and a minimum bottom width of 2 ft. Side slopes of 2 horizontal to 1 vertical may be allowed if erosion control

¹ Gutter-grade materials include aluminum, steel, copper, vinyl and select plastics. Materials such as corrugated black plastic (ADS), roll-out-hose, PVC, dryer hose, swivel or open-trough materials are not considered durable enough to be gutter-grade.

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protections are installed to cover 80% of the sloped area, such as vegetative cover or larger boulders. Percentage of vegetative cover is determined by size of plants at full size or within two planting seasons of establishment, not at time of planting.

12. Native soils may be amended with compost, soil, or sand to improve growing conditions for vegetation. Rain gardens may be topped with mulch to enhance soil moisture, prevent weeds and control erosion; mulch should only be applied above the high water line and should not be over applied.
13. Each site will have a sign that is visible from the public sidewalk throughout the duration of construction that provides city staff contact information for ground disturbance activities as per the intent of City Code 10.30.020 B8.
14. For rain gardens with a ground disturbance area of over 500 square feet, erosion control measures will be installed specific to site and project conditions, such as:
 - a. Temporary sediment control and prevention of sediment off the site;
 - b. Gravel or wood ramp construction access entrances;
 - c. Pollution prevention activities during construction;
 - d. Soil stabilization, including exposed stockpiles and soil disposal; and
 - e. Preventing sediment from reaching storm drain and sewer systems.
15. Rain gardens will be planted with vegetation that meet the vegetation standards for stormwater management facilities required by the Stormwater Management Manual and to provide long-term erosion control.
16. Rain barrels may be used as part of the drainage conveyance route but must meet certain material and site specifications. At a minimum, barrels must:
 - a. be made from sturdy, food-grade material; and
 - b. be secured on a firm, level surface; and
 - c. have a solid lid or very fine mesh (such as window screening) covering all openings that is difficult to remove; and
 - d. have an overflow mechanism at least two inches in diameter to direct water to the surface that must meet the discharge requirements described in item 5, above.
17. To complete the stormwater management system, the previous rain drain from the downspout to the sewer shall be permanently capped or plugged above the ground with a rubber cap secured by a hose clamp or a wing nut test plug.

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18. Once complete, property owners will own the rain garden and disconnected downspout(s) and be responsible for ensuring the new system is properly operated and maintained. An operations and maintenance agreement will be recorded against the property's title and deed to describe the required operations and maintenance for the rain garden.
19. Bureau of Environmental Services publications describe standards for rain gardens and other stormwater management facilities. More detailed requirements are contained in BES stormwater retrofit publications. Contact BES at 503-823-7740 or visit www.portlandoregon.gov/bes for information.

C. Permits and Inspections

1. For rain gardens constructed in accordance with this program guide, BES will review and inspect facilities for compliance with the above standards. In these instances, BDS will not require BDS permits or inspections.
2. For stormwater facilities outside of the scope of this program guide, BES staff will review and inspect facilities as a part of the standard process for permitting stormwater retrofits.

Additional Stormwater Management Systems

Additional information about residential-scale stormwater systems (downspout disconnection, rain gardens, rain barrels, soakage trenches) and stormwater management facilities found in the City's Stormwater Management Manual is available on the BES website www.portlandoregon.gov/bes.

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