



Using Rock-filled Trenches

to convey and infiltrate storm water



Note: These factsheets are for voluntary improvements by homeowners that are unlikely to need a city permit. You can check permit requirements at DPD Applicant Services: 684-5362, email SideSewerInfo@Seattle.gov

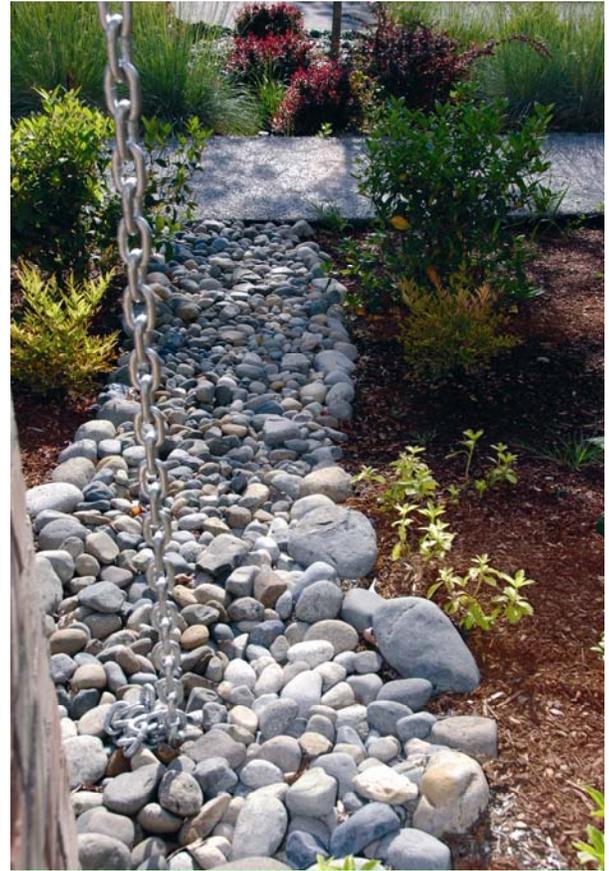
Why use a rock-filled infiltration trench?

Rock-filled trenches can hold and slowly infiltrate roof or driveway runoff in locations that are too narrow for a rain garden, such as in-between houses or next to driveways. Rain gardens are better where there's room, because the plants and compost-amended soil in them clean runoff while enhancing your property's landscape.

- Shallow **conveyance trenches** (up to 12 inches deep) can slowly convey runoff along a shallow slope, away from buildings to a better discharge location such as a rain garden or a large landscape area with deep, compost-amended soil.
- Deeper **infiltration trenches** (18 inches deep) can hold a lot of water from big storms in the spaces between the rocks until it filters into the soil.

Where to use a rock-filled trench

- ☑ **Safety first!** Read the *Disconnecting Downspouts* factsheet on the RainWise website, and follow those precautions.
- ☑ **Don't install any infiltration measure within 500 feet of steep slopes or landslide-prone areas.** Check your address with the steep slope and known landslide-prone map areas at <http://web1.seattle.gov/dpd/dpdgisiv2/mapviewer.aspx>
- ☑ **Don't locate over underground utilities or major tree roots.** For a free utility location service, call 1-800-424-5555 or see www.callbeforeyoudig.com). Don't locate trenches in soggy areas (where water won't soak in, or puddles stay in winter).
- ☑ **Shallow conveyance trenches** should collect water from roofs, driveways, or patios and carry that water away from buildings and your neighbors' property, at no more than a 15% slope (1 foot drop in 7 feet). (Slopes greater than 4% require check dams.)
- ☑ **Locate deeper infiltration trenches** at least 5 feet away from your side and back property lines, and **at least 10 feet away from any building**. If you or a neighbor have a basement deeper than 5 feet underground, add 2 feet more setback (to that 10 ft. minimum) for each foot the basement extends deeper than 5 feet.
- ☑ For infiltration trenches deeper than 18 inches, consult an engineer and see the technical and sizing guidance in Seattle's *Stormwater Flow Control Manual* (link available on the RainWise website). As that manual describes, trenches or dry wells that are deeper than they are wide may also require an Underground Injection Control Well permit from the Department of Ecology.



This shallow **conveyance trench** is letting water soak into the soil, while it carries excess from big storms to a pipe running under the sidewalk, to a street drain.

Deeper, larger **infiltration trenches** are used on fairly level sites to hold roof or driveway runoff until it can all soak into the soil. A "rain garden" may be a better solution for many sites – see the Rain Garden fact sheet on the RainWise website below to compare, and consider what works best for your yard.

Hire professional assistance if needed, to advise you or to do the work.

Disclaimer: This sheet contains general principles only, which may not be appropriate or safe for every property or project. Use good common sense. You assume the risk and are responsible for all consequences of your modifications to drainage flow or your property, for legal compliance, and for necessary permits and authorizations. The City of Seattle is not responsible for your modifications and disclaims liability for your actions.

Getting started on rock-filled conveyance or infiltration trenches

➤ **Determine where the water will flow.** Use a level or a running hose to determine which way the ground slopes from the driveway or roof downspout you want to infiltrate into the trench.

➤ **Determine the size needed.**

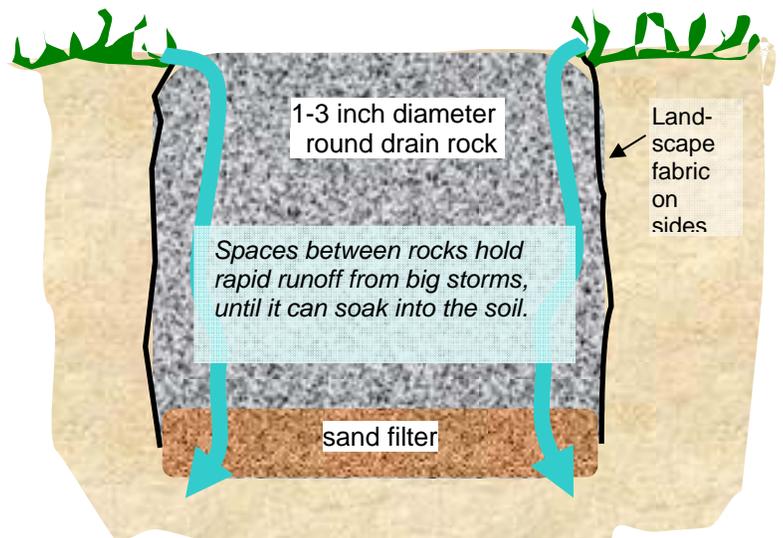
To handle 98% of the annual runoff in Seattle, on soils with low infiltration rates (0.25 inches per hour), infiltration trenches (18 inches deep) need to have a top area that is 27% of the contributing roof or driveway area.

For instance, if a downspout collects water from a 20 x 25 roof area, that equals 500 square feet.

$500 \text{ sq. ft.} \times 0.27 \text{ (27\%)} = 135 \text{ square feet.}$

See Seattle's *Stormwater Flow Control Manual* (linked off RainWise website below) and a geotechnical engineer for more sizing information, or if uncertain about the suitability of your site.

Shallower conveyance trenches can be whatever width and length is needed to slowly carry runoff to a safe overflow area: to a street drain, to a large lawn or landscape area, or to a rain garden.



Installing the trench

➤ **Dig the trench, and line sides with non-woven filter fabric** to keep dirt outside from moving in and clogging the rock spaces.

➤ **Fill the bottom of trench with coarse clean sand** a few inches deep.

➤ **Fill the trench to top with 1 to 3 inch diameter “drain rock”.** See *Materials and Suppliers* on the website below for local sources.

➤ **Direct driveway or downspout runoff to trench.**

A perforated pipe running from the downspout pipe through the upper layer of rock is one way to spread flow along the length of the trench.

➤ **Be sure to provide for a safe overflow route** from the lowest point on the trench to a street drain, a large lawn or landscape area, or a rain garden, without flooding sidewalks or your neighbor's property.

Infiltration trenches should be about 18 inches deep, and wider than they are deep (see sizing at left). Place them away from buildings (see location on previous page). Direct runoff from roof downspouts, driveways, or patios into the trench. Provide a safe overflow route from their lowest point to a street drain, or onto a large lawn or landscape area, or into a rain garden.

Learn more:

For more design ideas see Seattle's *Stormwater Flow Control Manual*, which is linked from the RainWise website, or see the RainWise Design Detail sheets on the website.

To read the precautions in the *Downspout Disconnection* fact sheet, to see the *Materials and Suppliers* list, or for fact sheets on Rain Gardens, Cisterns, Permeable Paving, Planting Trees, Compost-Amended Soil, and other RainWise ideas, see www.seattle.gov/util/rainwise

For printed copies contact the **Garden Hotline** at (206) 633-0224 or email help@gardenhotline.org

See links on the RainWise website if designing with intent to apply for a Stormwater Facility Credit, or for code requirements and additional design guidance in the Stormwater Flow Control Manual.

Learn more at www.seattle.gov/util/rainwise



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