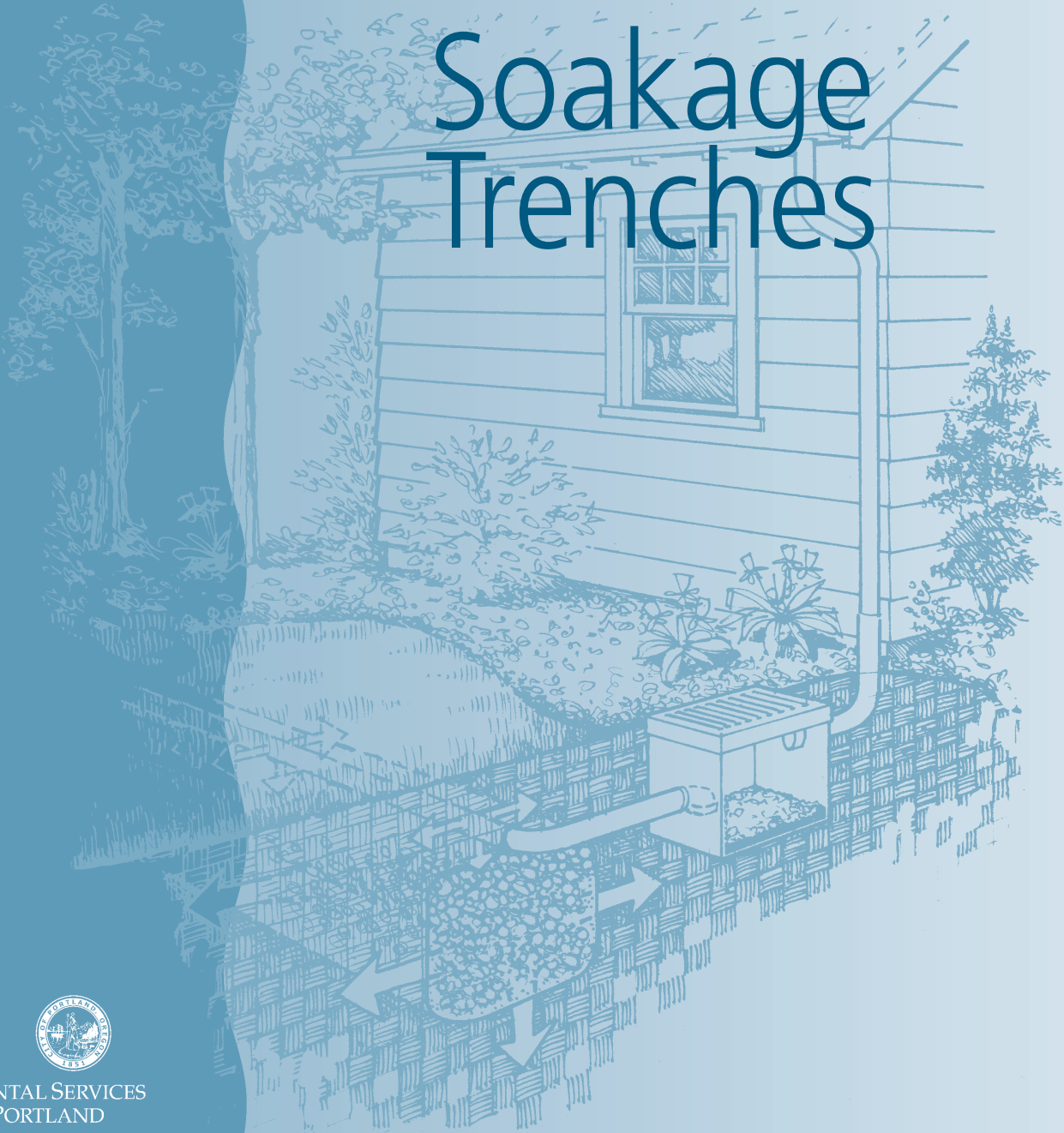


stormwater management for clean rivers

How to manage stormwater

Soakage Trenches



ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

how to build a residential soakage trench

Portland gets an average of 37 inches of rain a year. Rain that runs off your roof or patio can flow into a sewer pipe or stream. Why not put it to better use? You can create a soakage trench in your yard that captures runoff and lets it to soak into the ground. Containing rainwater from hard surfaces on your property also reduces wear and tear on the sewer system and protects water quality in local streams and groundwater.

What is a soakage trench?

A soakage trench, or infiltration trench, is a below ground shallow, linear trench filled with gravel under an underground perforated pipe.

Soakage trenches can help create borders or edges to your existing landscaping, or be completely underground and invisible. You can also use them to capture the overflow from rain gardens or rainwater harvesting systems.

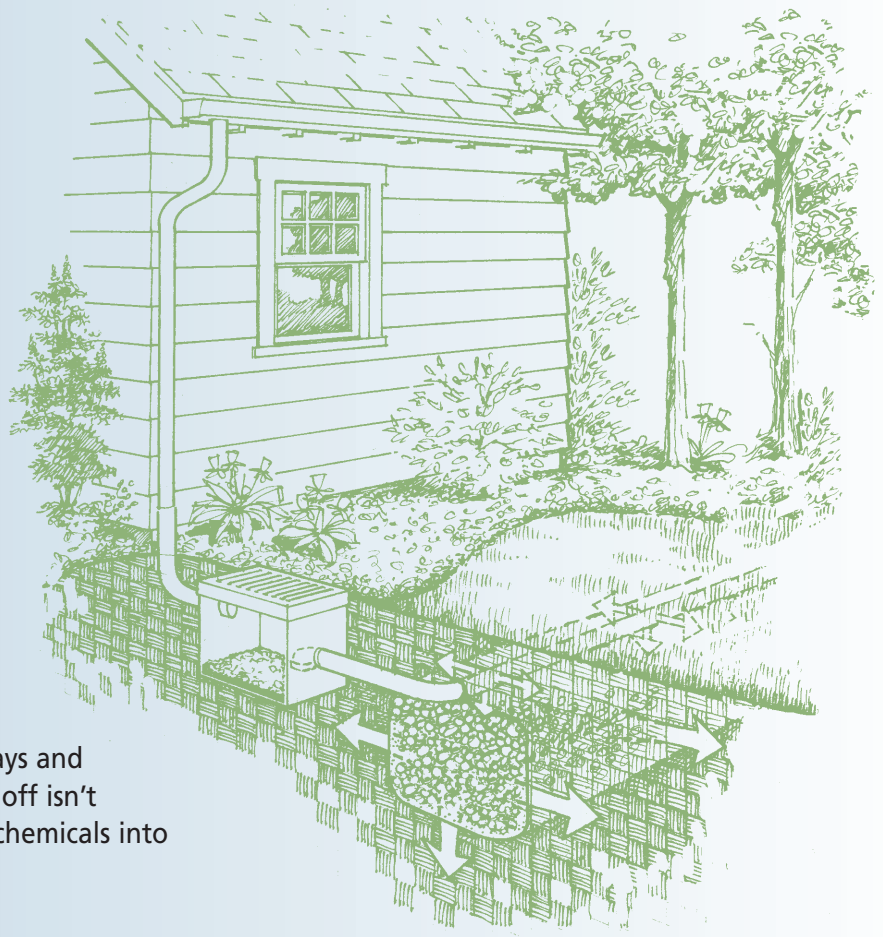
Other brochures in this series show you *How to* disconnect downspouts, build a rain garden, or rain barrel to manage the stormwater runoff. Refer to the resources section on page 7 to learn how to get copies.

Are there incentives to build a soakage trench?

When rain fall, it washes over roofs, driveways and other impervious surfaces. If stormwater runoff isn't managed properly, it can wash dirt, oil and chemicals into rivers, streams and groundwater.

Where do I begin?

Prepare a good plan to ensure that the stormwater soaks into the ground without damaging your building or neighboring buildings. This brochure describes an easy, four-step process to help you create your soakage trench.



1 observe your site

Watch where runoff from your roof downspouts, patios, and driveways goes. Are your downspouts disconnected to your lawn or are they still connected to the sewer system? Does your driveway runoff go into your yard or the street? Locate your soakage trench where it will safely intercept and collect the most runoff from downspouts and drains.

Draw What You See

- Sketch a site plan. You can print an aerial view of your property from www.portlandmaps.com as a starting point.
- Mark the locations of downspouts and paved areas. You can always move a downspout and re-grade gutters so that the rain drains to a suitable location for your soakage trench.
- Estimate the square footage of your roof area that drains to each downspout.
- Map out areas in your yard down-slope of buildings where you might construct a soakage trench.
- The trench needs to be installed level and parallel to the contour of the finished grade.

Safety Considerations

Because soakage trenches are underground, it's important to make sure they don't affect your or your neighbors' property. Soakage trenches should be:

- At least 10 feet away from buildings;
- At least 5 feet away from all property lines;
- At least 5 feet away from all utility lines.
- Not within 20 feet of a septic system or drain field, or above an underground oil tank that hasn't been decommissioned.
- **Call before you dig.** Make sure you don't damage underground utilities by digging a trench. Call 1-800-332-2344 to locate all underground utilities. The service is free.

You need a city plumbing permit to construct a residential soakage trench. Information about permits is available at www.portlandonline.com/bds. See the brochure resources section for more information.

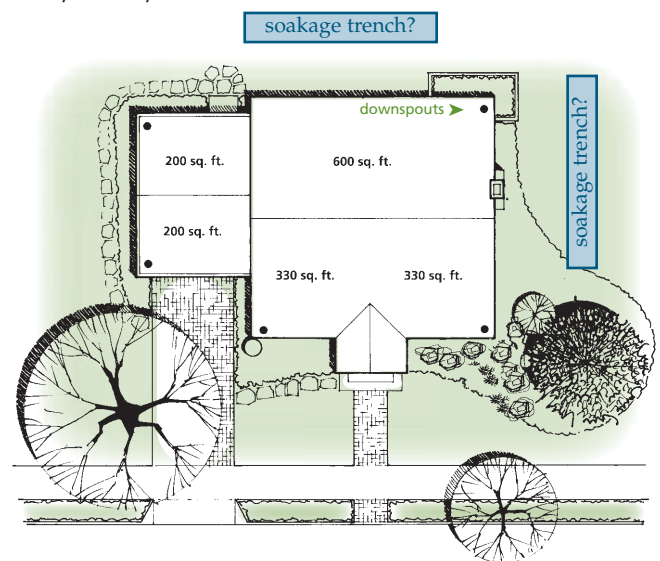


Soakage trenches may not be appropriate for all sites. If your site has the following conditions, a soakage trench may not be suitable:

- Your property has slopes greater than 20%;
- Your property is within 50 feet of a wetland or waterbody; or
- Your property is in a floodplain.
- Your property has high groundwater, seeps or springs.

If any of these conditions apply to your property, you may need to include additional options to safely manage stormwater. See this brochure resources section for more information.

example site plan:



2 design your soakage trench

Mark the location of your soakage trench on your site plan.

Calculate how large your soakage trench needs to be.

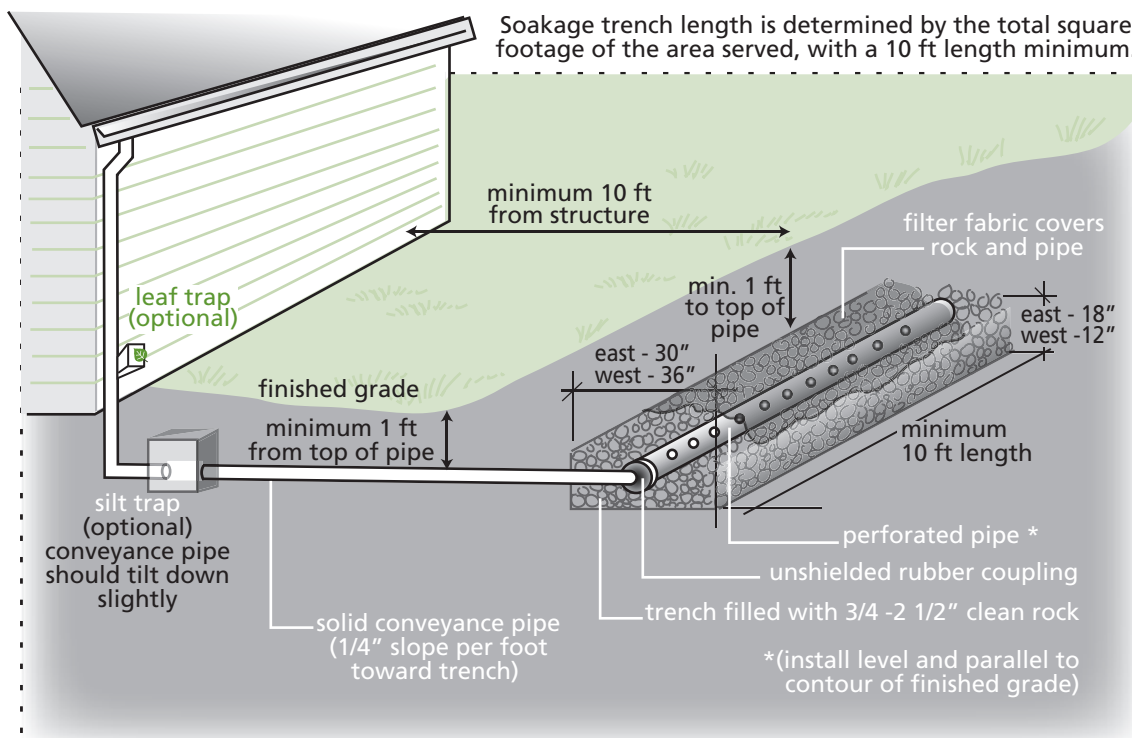
- On the **east side** of the Willamette River where soils generally drain well, the soakage trench needs to be 20 linear feet for every 1,000 square feet of impervious area draining to it (sizing factor of 0.020).
- On the **west side** of the Willamette River where soils generally don't drain as well, the soakage trench needs to be 30 linear feet for every 1,000 square feet of impervious area (sizing factor of 0.030). Regardless of where you live, if your soils don't drain well, use the west side sizing factor.

roof area	sizing factor	soakage trench length
750 sq. feet	x 0.020	= 15 feet long

For example, for a house in Southeast Portland with well-draining soils and 750 square feet of rooftop to be managed, the soakage trench should be 15 feet long.

Test Your Soils

Dig a hole two feet wide and two feet deep where you want to locate your soakage trench. Fill the hole with water and let it drain completely. Fill it again and monitor how fast the water drains. If it drains within 24 hours (approximately 1" per hour), this may be a good spot to locate a soakage trench. It's a good idea to dig a couple of holes to see if drainage in your yard is uniform.



Direct Water Away From Your House

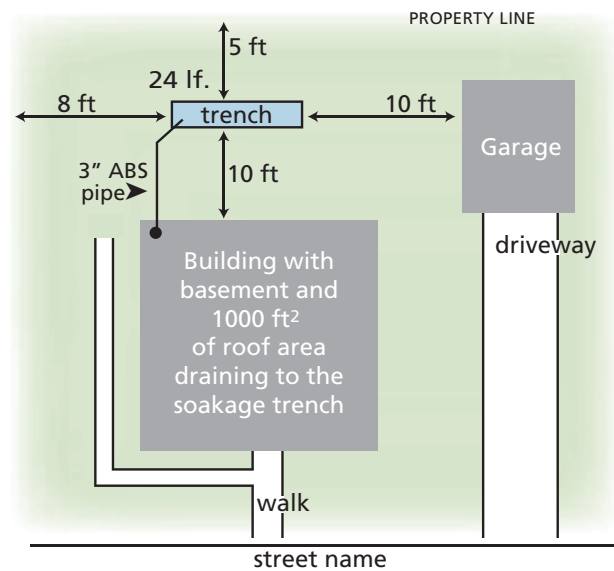
Locate your soakage trench where water from your downspouts or rainwater harvesting system will drain into it, at a low point in your yard and downslope from building foundations. Make sure that materials you use are sturdy and made to handle outdoor conditions. Suggested pipe materials include cast iron, or Schedule 40 ABS or PVC pipe. Ask your local hardware store for these kinds of supplies. If you are draining less than 1,500 square feet of roof to your soakage trench, you should use 3" pipe. If you are draining more roof area, use 4" pipe.



Your Permit

Once you've located your soakage trench, you will need to apply for a city plumbing permit before you start digging. Bring a clear copy of your site plan to the city's Development Services Center. The plan should show where you want to locate your soakage trench, including distances to buildings, property lines, and other structures. The plan should show your pipe size, length and material.

example site plan



3 building it

Step by Step

- A** Use string and stakes to outline the area you're going to dig.
- B** Dig up existing grass and plants. Set aside any shallow-rooted plants you might be able to replant above your soakage trench.
- C** **East side** of the Willamette River: dig a trench at least 34" deep and 30" wide.
West side of the Willamette: dig a trench at least 28" deep and 36" wide.
- D** Line the bottom and sides of the trench with filter fabric. Use filter fabric 8' wide and the length of your trench.
- E** **East side** soakage trenches: fill the trench with 18" of clean, 3/4" to 2.5" drain rock.
West side trenches: fill the trench with 12" of clean, 3/4" to 2.5" drain rock.
- F** Fold one side of the filter fabric over the sand or small rock.
- G** Place the perforated pipe as level as possible on top of the drain rock. Cap the down slope end of the perforated pipe.
- H** Fold the other side of the filter fabric over the perforated pipe.



Direct Runoff to the Trench

Disconnect your downspouts or connect your rainwater harvesting system to your soakage trench with a solid conveyance pipe. Install the pipe at a slope of at least 1/4" per foot to allow the rainwater to drain to the soakage trench. Locate the pipe 12" underneath the surface of your yard.

Consider installing a y-junction standpipe cleanout to filter out debris. Another option is to install a silt basin or washer between the rainwater source and the soakage trench to trap debris and allow for cleanout.

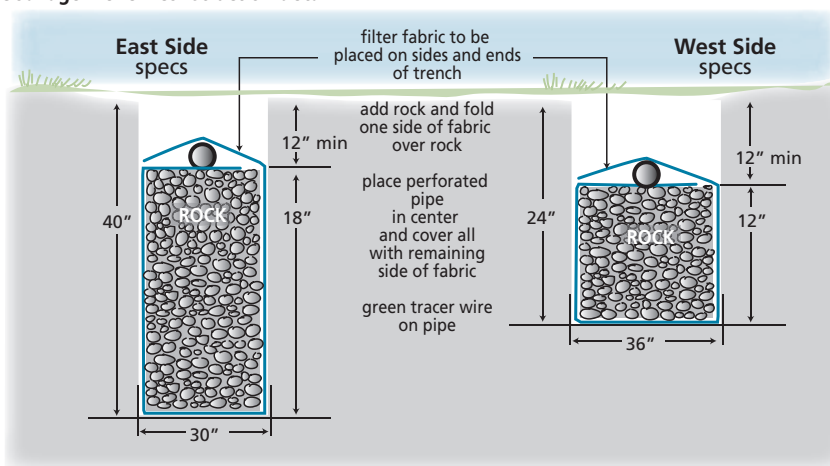
Get It Inspected

Call the City of Portland to inspect your work prior to covering your pipe. The instructions that you got with your plumbing permit walks you through the inspection request process. If there are any concerns about your construction, the inspector will tell you what to do in order to pass the next time you request inspection.

Cover It

Following a successful inspection, cover the soakage trench with the original soil from the trench or with gravel. There should be about 12" of soil or gravel covering the perforated pipe and the surface of your yard. You can cover the soakage trench with grass, small shrubs, rock or gravel.

Soakage Trench: construction detail



4 maintenance

Cleaning and maintaining your downspouts and gutters keeps leaves and debris from clogging your soakage trench.

- Tree roots can damage subsurface systems and pipes, so avoid planting trees over or near the soakage trench.
- Some moss cleaners contain pesticides, which can harm soil microbes that filter and break down pollutants. Use earth-friendly moss cleaners or scrub moss off roofs.
- Clean out the leaf trap or silt basin on a regular basis. Organic material (dirt, leaves) can be composted or used in your yard.



resources

Clean River Rewards

Clean River Rewards is Portland's stormwater discount program. When you contain the rain safely on your property, you qualify for an on-site stormwater management charge discount on your city utility bill. Go to www.CleanRiverRewards.com or call 503-823-1371 for more information.

At the Clean River Rewards website, you can also download publications to help you plan, build and maintain your soakage trench including a referral list of design professionals and contractors, technical information, and links to other programs, such as Naturescaping. Download all the *How to* brochures at www.CleanRiverRewards.com.

More Resources

City of Portland Development Services

www.portlandonline.com/bds

Visit the Development Services Center (DSC) at 1900 SW 4th Avenue, or call 503-823-7300.

The DSC is open Monday through Friday, 7:30 am - 3:00 pm, and there is an evening permit night on Thursdays, from 5:00 pm to 7:30 pm.

City of Portland Residential Plumbing Permits:

www.portlandonline.com/bds/index.cfm?c=41036

City of Portland Stormwater Management Manual:

www.portlandonline.com/bes/2008SWMM

City of Portland Stormwater Solutions Handbook:

www.portlandonline.com/bes/stormwatersolutions



Environmental Services
Dan Saltman, Commissioner
Dean Marriott, Director

1120 SW Fifth Avenue
Portland Oregon, 97204

503-823-7740
www.cleanriverspdx.org

Other publications in this brochure series:
How to manage stormwater - Rain Gardens
How to manage stormwater - Downspout Disconnection
How to manage stormwater - Rain Barrels

To help ensure equal access to city programs, services, and activities, the city will reasonably accommodate persons with disabilities.

Call 503-823-7740 or 1-800-735-2900 with such requests. TDD 503-823-6868.