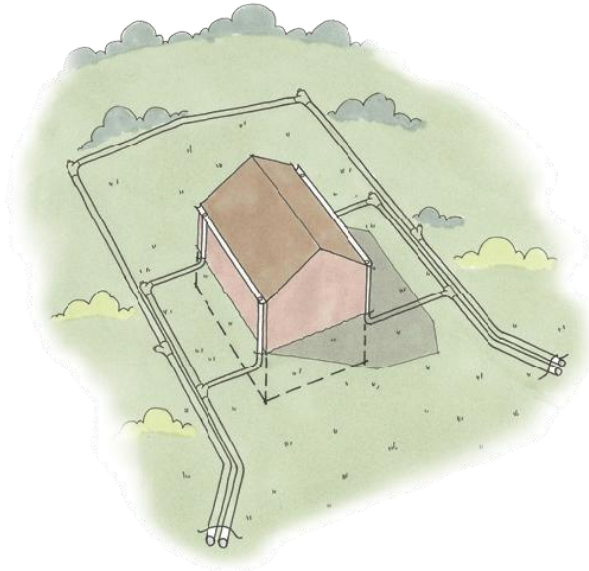


# Stormwater Management

## The Right Drainage Can Keep the House Dry and the Landscape Green

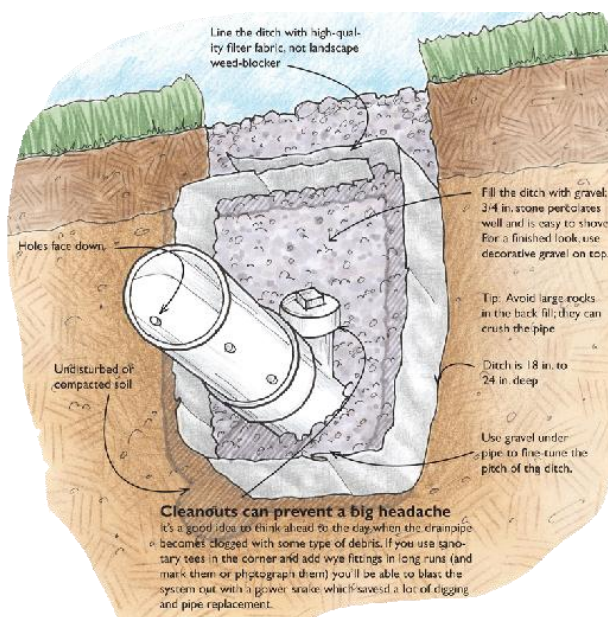


Site drainage should be kept separate from gutter runoff or the drain pipes can become overloaded and flood.

### Roof gutters, curtain drains, and slope are key

There are two things to think about in keeping a site dry: water coming off the roof; and rain soaking into everything else that's at site level or higher. Consequently there are two drainage systems —

one for gutters, and one to keep the immediate area clear. In small yards or those that are not configured for a rain garden or drywell, getting gutter runoff "to daylight" is an absolute minimum. This means that gutter drainpipes are terminated above-ground to let them empty above ground. Many local codes specify at least five feet away from the house without also specifying "and downhill." Avoid runoff in the streets, recharge the ground water. As land gets developed, rainfall is increasingly diverted from ground storage and directed to storm drains. This further depletes ground water supplies, overtaxes city sewer systems, and dumps lawn fertilizers, pesticides, and pollution from streets into rivers, lakes, and oceans.



Silt Clogs Drains. Every heavy rainstorm will carry silt into a curtain drain trench, clogging the spaces between pieces of crushed stone. Filter fabric around the stone will extend the curtain drain's useful life by holding back most of the silt.

Keep the foundation dry. Build to keep water away from the house but retained on-site. Different types of drains incorporated in to the landscape and house can carry bulk water away from a house

to keep it dry. A curtain drain is like a gravel-filled moat that protects a house from ground water. These are a good solution for houses with hills behind them that constantly keep the basement damp. Inside the moat is a perforated pipe. When water comes down the hill just below the surface, it runs into the gravel, fills up the pipe and is carried away to daylight, drywell, or rain garden.



**Pipe Types.** Rigid PVC drainpipe (top) is crush-resistant but a little harder to work with than flexible pipe (bottom). PVC comes in 10-foot lengths, is crush-resistant to 3,000 pounds, and costs about \$0.65 per foot. Flexible plastic comes in long rolls, but big rocks can crush it during backfill. Cost: \$0.40 per ft.

Choose materials well, you won't see them for a while

**Gravel:** 3/4-in. gravel percolates well and is easy to shovel. For a finished look, top with decorative gravel.

**Drain pipe:** Solid PVC is best; black flexible pipe is easiest and least expensive.

**Filter fabric:** Avoid generic landscape-type weed-blocking fabrics; they won't last. Instead, choose high-quality landscape filter fabric such as Typar.

A curtain drain or other stormwater diversion doesn't have to be an eyesore. Make them focal points, or even integrate them into other garden features.

Paving and drainage choices need equal consideration. It's an integrated issue because the paving material has to work with the building and landscape design, and may need to be coordinated with the interior design as well. Paving has green building implications in two areas: First, production effects (whether it an environmentally preferable material, e.g., recycled content, salvaged, etc.); and second, performance effects such as heat island (the reflectivity/emissivity of the material) and stormwater absorption/retention (the permeability of the material).