



## **FOOTER DRAINS and your storm sewer system**

If you like to dig, replacing downspout or footer drains is the hobby for you. These drains form your **storm sewer**, the system of drainpipes buried around the perimeter of your house. They are designed to carry ground water away from your foundation and basement walls, so you can have a relatively dry basement.

Traditionally, a storm sewer system will consist of a series of 4-foot long clay pipes, 4" in diameter, laid end-to-end in a bed of gravel and slanting about 1/4" per foot. **Footer drains** encircle your home at the level of your basement floor or slightly below it. They slope from the high point at the back of your house toward the front, where the pipes running along either side of the house meet and extend out to the street. There, they eventually connect with the main storm sewer under the pavement. Along the way, your **downspout drains** (which also surround the house, but higher up along your basement wall), **driveway drain**, and any **yard drains** usually connect into this system.

It would be easier to list what goes right with this system than what goes wrong. When it is working right, you don't even know it is there; when it is malfunctioning, however, the water that seeps down to the storm sewer can't be carried away from the house. So, it seeks other places to go – most often through the foundation walls and into your basement. If your footer drain is not working properly, water will usually seep into the basement at the foot of the wall. On the other hand, if the problem is in a downspout drain, the seepage will usually appear higher on the wall, but below the outside grade level.

What can keep your storm drains from working properly? Pipes can break when ground heaves in the winter. (The pipes may even have been broken when the dirt was filled in, back at the time of original construction.) Tree roots can block the pipe; since the pipes simply lie end-to-end in the ground, roots can penetrate between them, or through any small cracks in the tile. Pipes can become blocked from leaves or other debris washing down from the gutters or driveway drains. Dirt may have sifted down over the years and packed the pipes.

Maintenance is cheaper than replacement. It usually consists of keeping gutters free of leaves; putting a root killer such as Root-X (a brand of copper sulfate) into your downspouts and/or drive-way drain four times a year to prevent roots from blocking the pipes; and using a sewer snake to open clogged drain lines or keep them clear.

Replacement is a last alternative, but one you'll need to undertake if the drain cannot be cleared with a snake. (This is usually a permit job, so be sure to check with your city's Building Department about their requirements.) Before digging begins, you or your contractor should locate the gas, water, and underground electric lines that come through the foundation; care must be taken to keep from cutting through them. Then, try to locate the portion of the sewer line that needs replacement – usually through the process of elimination. If, for example, a garden hose in the front downspouts can be run at full blast for ten minutes or so without water backing up, then the line is probably clear from that point to the street. But, if water backs up quickly from a hose inserted into a rear downspout, then the problem is probably in the downspout drain between the rear downspout and the front one that was clear.

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Once the problem area has been located, the next step is to dig down and expose that part of the drain. After the pipe has been exposed, you might try running a snake through it again. (Sometimes you can have better luck with the snake operating in a straight line.) Even if the snake doesn't clear the pipe, the snake cable can be used to determine the location of the blockage. Insert the cable until you reach the obstruction and mark that point on the exposed cable with tape. Then, pull the cable out, lay it on top of the ground, and use it to measure where you'll need to dig down to the clogged pipe.

When you have dug down far enough to expose the drainpipe, you can remove any broken or clogged pieces. It's usually easier to replace them with plastic pipe, using "no-hub" rubber adapters to connect the plastic to the clay pipe. It's a good idea to leave the hole open for one or two good rains, just to make sure the drain is working. When you are sure the system is operating properly, the pipe should be buried in gravel (to about two feet above the pipe) and then covered over with dirt on top.

When working below the ground, there's always a safety issue – the possibility that the trench may collapse on someone working in it. To minimize the risk, the dirt removed from the trench should be piled two feet or more away from the edge. If the trench is longer than four feet, there should be a ladder every 4 feet. If the ground is at all unstable, the trench should be shored up with upright 2 x 10's lining the walls and braced in between with 4 x 4 beams to hold back the sides.

Since exposing a footer drain is quite labor-intensive, hiring a professional to do this job can be costly. If you don't mind hard labor and take the proper precautions, you can save thousands by doing this job yourself.

