Perfecting drainage problems

Identify and correct potential issues

There are a number of indicators which may help you identify current or potential drainage and water problems around your yard or home.

- First, check your survey or plat for the location of nearby flood plains. If you own land in a flood plain, it is reasonable to expect the area will be inundated with water at some point. It is important that no structures, especially homes, are built within a designated flood plain. This is further regulated by the EPD (Environmental Protection Division). Any work to be considered must be approved by the local county or state authority, or fines could be incurred, and removal of all materials would be mandated.
- Flood plain designations also indicate that hydric soils may be present on your property. Characteristically, hydric soils will hold water more readily than other soils. These areas may be muddy, or collect water, and may be incapable of supporting certain types of landscape plants.
- Also check the map for drainage easements. They should be labeled "d.e." on the plat and are usually located along property lines. A drainage easement indicates that water will be flowing across that stretch of land during a rain storm; erosion is common along such easements. Structures and fences should not be constructed in these areas.
- Next, check for nearby rivers, creeks, and bodies of water which would increase the probability of flooding. For example, a creek may appear to be an attractive feature until you realize the flood threat, the unstable soils, and potential stream bank erosion. Also remember that the water flow in your creek will increase as upstream development and construction increases. If you do acquire property near a waterway, do not remove the vegetation adjacent to and along the stream bank. This vegetation is an essential buffer zone that will help maintain the water quality and curb erosion problems.
- Run off water that is improperly channeled also will cause damage to and devaluation of your property. Note the elevation of your property in relation to adjacent properties. Does the land slope? Where will rain water come from and what is in its path? During a rain storm watch to see where run off water flows and exits. Ideally your home will have sufficient outlets to handle rooftop, driveway, and overland run off.

Run off erosion

Erosion due to run off coming from higher elevations is the most common water problem faced by home owners. The problem is most obvious and most damaging when you live downhill from a number of properties. The first step toward a solution is watching it rain and noting where the run off originates and where it concentrates or puddles.

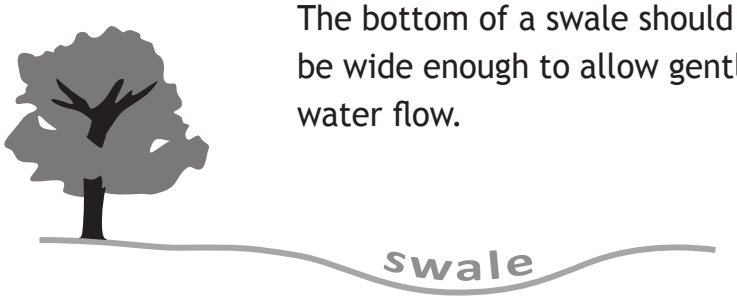
Roof water can be piped to a low-impact location such as a drainage easement, a creek, or the street. Down spout fittings can be purchased at a home supply store and used to

pipe the water to the low-impact area. Avoid sags in the pipe to ensure downhill flow. This may mean burying the pipe to give it enough "fall." The minimum slope should be 2% (2 feet of fall in 100 linear feet of run) Always ensure that the outlet is open and clear of debris. A "pop-up" drain opening is preferable, as it will allow the water to bubble up to the surface, and be diffused to diminish erosion.

Water flowing over the driveway, as well as other concentrated flows, may be more difficult to handle. If the concentrated flow moves over a relatively flat surface, a thickly grassed area may prevent erosion. Shrubbery, ground covers, or other deep-rooted plants can also be used. It is important to consider the shade and sun factors and the soil type when selecting plants for a particular purpose.

Swales

If vegetation alone is not the answer to control erosion, a swale or diversion may be a solution. A swale is a broad depression that can be constructed in your yard to transport water more directly where you want. A swale should be constructed to carry the majority of the water flow. By design, it should be at least three feet wide across the top and at least six inches deep. Be sure the swale has enough downhill slope to prevent ponding. The surface should be sodded for protection. Occasionally flat rocks are necessary to protect large swale surfaces from erosion. Rock may also be placed at the outlet to disperse the force of the water. Swales should drain into a creek, drainage easement, street, or wooded area. The bottom of a swale should be wide enough to allow gentle water flow. A steeply pitched bottom will cause water to flow in a concentrated area, at a high rate

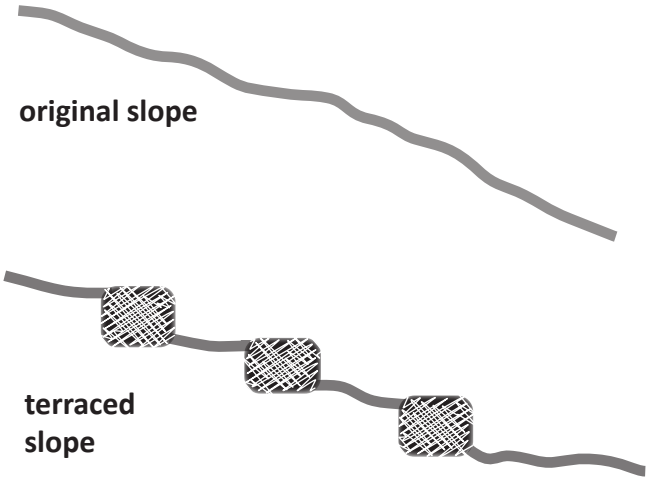


The bottom of a swale should be wide enough to allow gentle water flow.

of flow, and cause more erosion. If this is desired, or required, a thick layer of granite "rip-rap" (football sized chunks) should cover this area.

Terracing

If the water flows over a steeper grade and vegetation alone will not control the problem, it may be necessary to terrace the area in order to slow down the water. Ideally, short slope lengths and flattened slopes should be used to prevent erosion. To do this, you can "stair step" the area by installing rip-rap, fieldstone, brick or similar products, and filling in behind them to create a flatter, shorter slope length. Each wall should be less than two feet high. These small walls should be embedded into the earth a minimum of a 8 inches. Other types of constructed walls can be made of landscape timbers, or crossties, but these materials will eventually rot and decay.



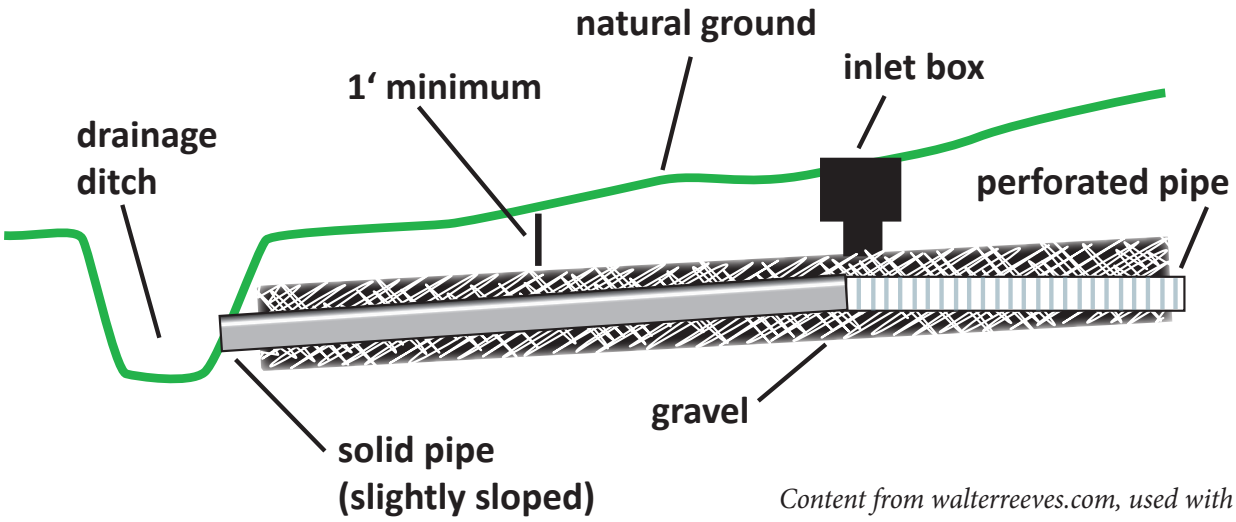
Ponding water

On many sites, water may collect in flat areas or the soil may simply stay saturated for long periods. This could be the result of surface depressions that allow the water to collect.

If surface water stands in depressions on your lawn or flows toward your house, consider constructing a swale or grading portions of the yard to drain away surface water. The minimum slope away from the house should be 5% (5' fall in 100 feet of run) for planting beds or grass, or 2% for concrete paving. If the situation does not allow for regrading or installing diversions, an underground drainage pipe may be necessary. Pipe is usually the last resort, as there has to be a point where the water is allowed to surface. In flat sites, this is not possible, when you consider the slope of the pipe, and the depth of the ditch required to cover the pipe with soil to a minimum depth of 12 inches.

Water enters these underground drainage pipes through drop inlets, with grates, which are connected to the pipe. The inlet box "T"s into a horizontal underground pipe. Place these inlets in low areas or depressions where water will collect. The horizontal pipe should be solid, not perforated, and the pipe slope should be constant to ensure water flow.

Perforated drain pipes can be used against foundation walls and basements to collect water or to drain saturated areas. Perforated drain pipe should be at lease four inches in diameter and surrounded with 12 inches of gravel. Any pipe with holes should be wrapped with a sediment sock to prohibit soil from filling the pipe. The use of gravel around the pipe will allow water to seep into the pipe, without the use of a catch basin. This is generally called a French Drain and is used in areas where the soil properties or slope cause water to not percolate into the ground. Pipe grades should be gentle enough to allow water to enter but provide enough fall so the water can drain readily. Water should be emptied into an existing drainage ditch or curb inlet where possible. Ideally, perforated pipes should be placed 12-18 inches below the surface of the ground.



Content from walterreeves.com, used with permission. Edited by Bruce T. Holliday, Registered Landscape Architect. Illustrations by Kathy Gatten Johnson.