

**DRAINAGE  
TIPS FOR  
HILLSIDE  
HOME  
OWNERS**

Hillside lots that have been damaged by fire or are located in a fire-damaged watershed can be susceptible to erosion, drainage and other runoff related problems. Torrential or prolonged rains cause the most damage. To treat surface drainage problems, you will first need to identify the sources of surface water (runoff) flowing onto or over your property. Walk outside and around your home. As you walk, observe the "lay" of your lot and the surrounding properties. Also, observe your roof and driveway. Is your home on top of a hill where all surface waters drain away from your home? If so, you will be concerned with holding topsoil on your property. Few homeowners live on top of a hill. So, it is more likely that water will flow onto your property from an adjacent hillside. Where will the water concentrate and how can you control the sediment that is carried with the water?

**Gutters and  
Downspouts  
Direct Roof Runoff**

Be sure that your roof is properly fitted with gutters and downspouts, that will release water onto a non-erodible surface such as a paved driveway. Or you can connect downspouts firmly to solid plastic pipe that will carry water downslope away from your home to a place where it will be released safely such as a paved roadside or storm drain ditch. Because twigs, pine needles and leaves can clog gutters and downspouts, the use of gutter guards of 1/4 to 1/2-inch hardware cloth screen is highly recommended. Clear your gutters regularly and inspect them to insure your roof runoff system is working properly.

**Curbs and Berms  
Protect Sensitive  
Slopes**

An concrete curb, a compacted earth berm, or other similar structures on the outside edge of a driveway or building pad can direct runoff away from sensitive slopes to an area where it can be released safely. The recommended height of the berm is a minimum of 12-18 inches. (see other fact sheets for information on temporary flood barriers). A pipe drop may be used to carry runoff downslope to a place where it can be released safely, such as a lined roadside ditch or storm drain.

**Lined Ditches  
Handle Road and  
Driveway Runoff**

Roads and driveways can be graded toward a lined ditch or street side gutter designed to handle sheet flow water from paved surfaces and uphill slopes. At specific intervals along the main road, water may be transported under the road through a culvert and released safely onto a non-erodible surface. An energy dissipater, such as a rock lined outlet, can serve this purpose where slope is minimal. In steeper areas or where large volumes of water may accumulate, other precautions may be needed to prevent washouts or localized flooding.

**Proper Grading  
Promotes Good  
Drainage**

Proper grading of your land helps prevent water from pooling around foundations, flooding basements or below grade structural components, and concentrating water into destructive volumes. In general, grade surfaces around a home so runoff flows away from foundations at a minimum slope of 1-2 feet for every 100 feet. Grade and compact surfaces evenly since water can collect in depressions or channelize into destructive flows.

### ***Drainage for Retaining Walls***

Good drainage must be provided for solid construction retaining walls. Properly placed weep holes and perforated pipe with a gravel backfill behind the wall work well. The small openings between wood boards or non-grouted brick, stone or concrete block retaining walls serve this purpose. Many walls are not designed for saturated soils or ponded water behind them and can break, tip over or slide if this is not prevented with good drainage behind them.

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### ***Runoff Diversions***

A diversion may be needed to handle surface runoff flowing onto your property from upslope. For slopes steeper than 2%, or where large amounts of water are expected, the diversion channel will require an erosion resistant lining. Direct water to a safe, non-erodible outlet -- never directly onto the downstream slope itself. Never direct water onto adjoining property without consulting the owners. Always consult a qualified engineer to design water diversion measures.

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### ***Maintenance***

Regular maintenance of drainage systems will keep your drainage problems to a minimum.

- Check gutters, downspouts and pipes during and after storms and remove debris that might cause clogging.
  - Regularly inspect, clean, and repair berms and ditches as necessary.
  - Check for and repair any damage caused by burrowing animals.
  - Seed and mulch or otherwise vegetate all bare areas, especially on slopes.
  - Regular maintenance saves time and money in the long run.
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### ***Safety Measures***

- Do not start any work until you are assured that both above-ground and underground utility lines will not be affected by your work. Information on the location of underground utility lines can be obtained by calling the Utility Notification Center of Colorado, (UNCC), **1-800-922-1987**
- Do not release runoff onto septic leach fields or at the base of structural foundations.

***Also see fact sheets describing several types of temporary flood control measures***

**NOTE:** After a fire many trees are weakened from burning around the base of the trunk. The **trees can fall over or blow down without warning**. Shallow rooted trees can also fall. Therefore **be extremely alert when around burned trees**.