

Keeping Clean Water Clean and Reducing Mud

Improving Drainage



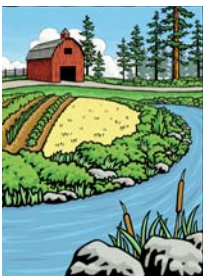
With all of the rain Clark County receives, managing rainwater runoff can be a challenge. Installing and/or properly maintaining gutters on your house and outbuildings provides a simple and effective measure of collecting and diverting rainwater, reducing mud and keeping clean water clean (see the fact sheet [Managing Roof Runoff](#)).

What can be done with all of the water collected in those gutters? And how do you manage rain that lands on your pastures and other areas? Water flowing across pastures, turnouts and dry lots, arenas and other areas can pick up particles of sediment and manure. Nutrients attach to sediment particles and can be transported to nearby waterbodies where they can negatively impact stream health and fish and wildlife. Runoff may also cause erosion and create mud, which can affect the health of your animals and your land. Runoff collecting around foundations of barns and other buildings causes significant damage over time. Several methods are available to collect and divert rainwater before it reaches pastures, turnouts and buildings reduces mud and standing water, and limits erosion and property damage including french drains, berms, grassy swales or dry wells.

French Drains

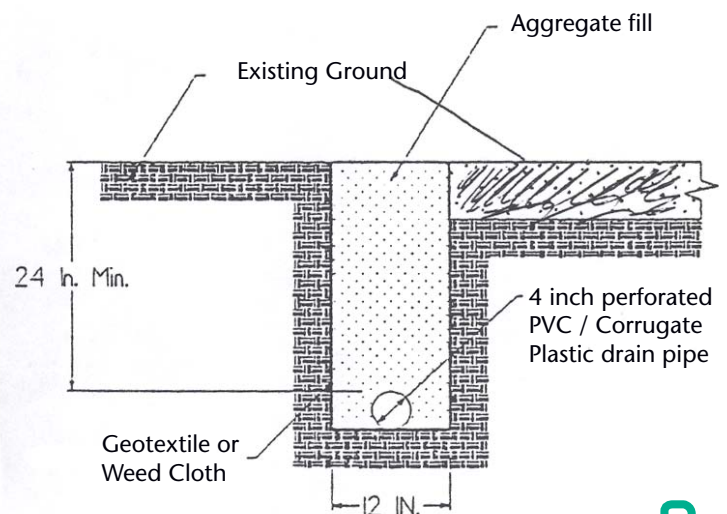
As illustrated in Figure 1, french drains intercept water flowing across a slope. They are shallow trenches lined with weed cloth or geotextile fabric, with a perforated plastic pipe surrounded by gravel. The weed cloth is wrapped over the top of the gravel and then covered with soil. The weed cloth prevents soil from filling in the spaces between gravel, maintaining water flow through the gravel. To facilitate water flow, the trench should be sloped between 0.5% and 1%. For example, for every 100 feet in distance, a one foot drop in elevation would provide a 1% slope.

French drains can be used to collect runoff flowing down a slope or from a gutter system and divert the water around a feature such as a building, turnout, driveway or arena. Rainwater from a single roof can be collected in gutters and the buried downspouts connected to a



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Figure 1: Cross Section of Typical French Drain



(Doug Stienbarger, 1995)



french drain (Figure 2). A T-shaped pipe can be placed at the end of the french drain outlet to slow the speed of the water, and spread it out over a larger area (Figure 3).

Figure 3. T-shaped Buried Outlet

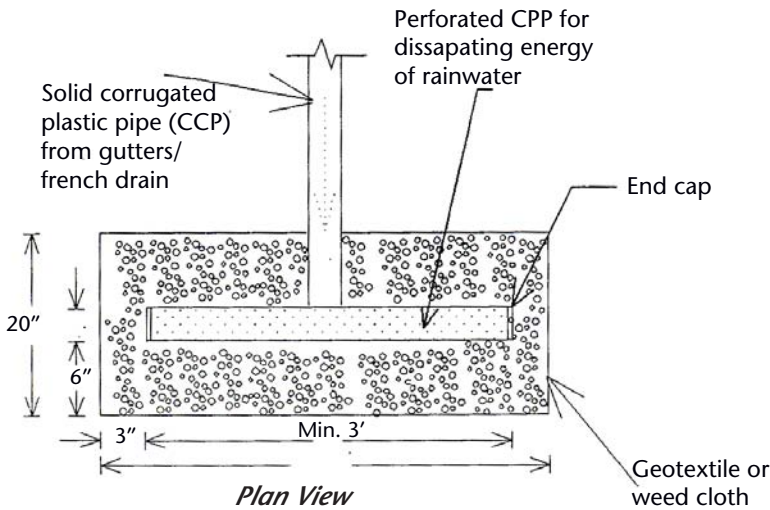
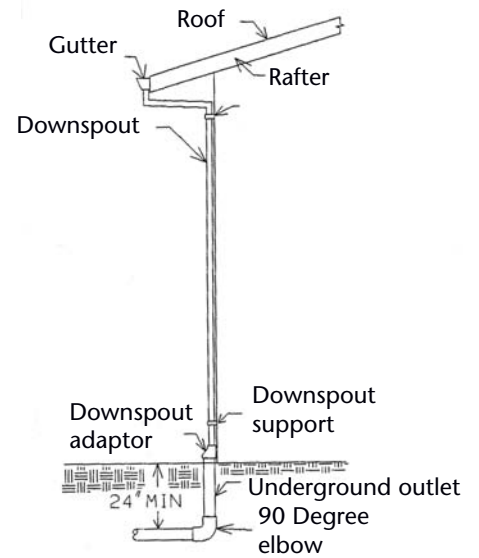
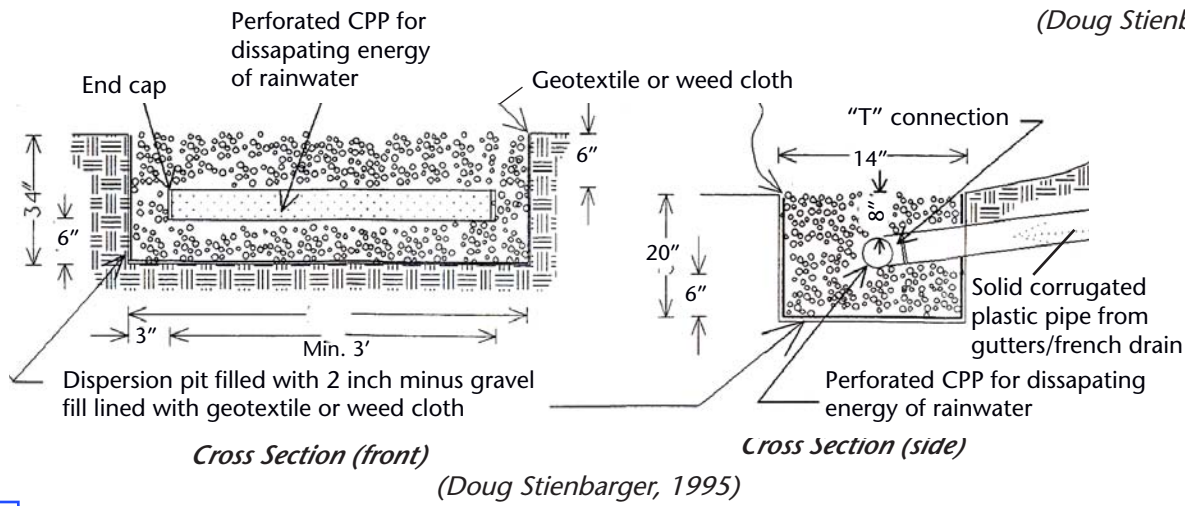


Figure 2: Underground Gutter Outlet



(Doug Stienbarger, 1996)



(Doug Stienbarger, 1995)

French drains can also be used to collect water draining from adjacent properties and direct it on your property where it will not do any damage. French drains work best if they are not within the groundwater table. Heavy machinery and livestock should be kept off the french drain. They can compact the soil, crush the drainage pipe and damage the drain, thereby blocking water flow and requiring repairs and possibly replacement.



Berms

Berms are low mounds of vegetated soil two to six inches in height. Berms direct and slow the speed of runoff, allowing it a greater chance to infiltrate and filter out sediments, nutrients and other materials in the water. Berms can also be used to divert water around a building, or at the base of a slope to direct runoff around an area such as a livestock turnout. Diverting this “run-on” water around livestock turnouts can greatly reduce mud in these areas.

Grassy swales

Swales are shallow, gently sloped vegetated ditches that capture runoff and transport it away from heavy use areas. Swales are commonly planted with grass, which slows down runoff and facilitates infiltration and removal of sediment and other particles. Swales can be easily incorporated into the landscape on your property, particularly if there is already a low lying area on your property. Swales are often less expensive to install than some underground drainage systems. Swales should be designed to hold water for no more than 48 to 72 hours to reduce habitat for mosquitoes. If standing water is expected for longer periods of time, wetland plants such as rushes (*Juncus* spp.), cattails (*Typha* spp.) or sedges (*Carex* spp.) can be planted.

Maintenance should occur when the soil is not saturated to prevent compaction, which can limit infiltration of runoff. Cuttings should be removed to prevent smothering of the vegetation. Grazing of these areas may be possible, but should be controlled to maintain healthy vegetation. Do not graze during initial vegetation establishment, when the soil is wet or during reseeding of bare areas. Grass height should be maintained at no less than 3 to 4 inches tall. Shorter grass does not provide adequate erosion protection. Bare or eroded spots should be repaired and reseeded. The swale should not be used as a track or roadway. Frequent traffic may damage the swale and create ruts, which can concentrate water flow and eventually result in erosion and the formation of gulleys.

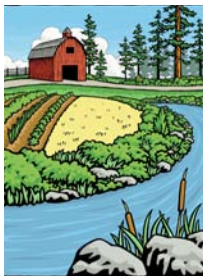
Dry wells

Directing downspouts into drywells can help facilitate infiltration of water into the surrounding soil and prevent it from picking up sediment from the surface. A dry well is a small pit lined with geotextile fabric or weed cloth and filled with 1½" to 3" gravel. Dry wells are best used to collect runoff from a small area with little or no sediment or pollutants, such as stormwater from a roof. Soils surrounding the dry well should be sufficiently permeable to allow adequate infiltration of the runoff. The dry well should be designed to completely drain the water volume into the soil within 48 hours of the rain event. An overflow may be needed to handle large amounts of runoff. Dry wells are relatively small and because they are underground, do not take up much space. They can be installed out of the way, provided the dry well can be easily accessed for maintenance.

Locate dry wells at least 10 feet from building foundations and at least 75 feet from wells, septic systems and surface water bodies.

Permits

Moving soil around on your property to build a french drain, drywell, berm or swale may require a grading permit if more than 50 cubic yards or more of material is moved. More information is available in the fact sheet [Frequently Asked Questions: What Can You Do On Your Land?](#) Before beginning any work, contact Clark County Community Development at 360-397-2375 x 4347.



All of these drainage structures can help you manage runoff on your property, reduce mud and erosion, allow runoff water to infiltrate and recharge groundwater and maintain healthy water quality in Clark County surface waters.

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Sources:

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Pfost, D.L. and L. Caldwell. *Maintaining Grassed Waterways*. University of Missouri Extension, G1504. October 1999, 3 pp. <http://muextension.missouri.edu/explore/agguides/agengin/g01504.htm>

For additional information on managing roof runoff and drainage, contact:

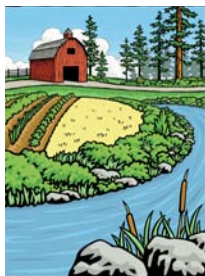
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The Small Acreage Program is sponsored in partnership by [WSU Extension Clark County](#), the [Clark County Clean Water Program](#), and the [Clark Conservation District](#).



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