

Proper Drainage Around Your Home

Wet basements, flooded yards, and poor plant growth are symptoms of a poorly drained lot. In Iowa, many homes have been built in poorly drained soils. Wet lots generally are caused by flooding, springs and seeps, seasonal high water tables, ponding of surface water, or slow soil permeability. This publication explains how to deal with these problems and improve the drainage around your home.

Flooding

Houses that are in the flood plains of a nearby stream or creek may be flooded if the stream overflows during periods of heavy rainfall or rapid snow melt. To avoid areas that might flood, check with local officials to determine the flood plain boundaries before buying or building a home.

For existing houses in flood plains, determine how you can ensure the safety of occupants and minimize damage from a flood. Be certain that you have an escape route that will be open during a flood. Use dikes, block outlets that might back up into the basement, waterproof the walls, and block windows and doors with sandbags.

During extreme flooding, water pressure can collapse foundation walls. In some cases it might be preferable to allow the basement to flood and equalize water pressure. Contact local authorities to determine the possibility of basement collapse.

Do not locate your house in the path of a natural drainageway or in a pothole or site that is lower than the surrounding area. Drainageways or low areas

may appear safe in dry seasons but may carry large amounts of runoff water in wet seasons. Ask neighbors and local officials about drainage patterns.

Housing developments often modify the landscape and block or alter natural drainage ways. Check site plans carefully before choosing an existing house or purchasing a lot. You may want to ask a housing professional to help you evaluate the adequacy of the drainage on a particular site. Problems in drainage usually require the cooperation of several homeowners.

Springs and Seeps

Natural springs and seeps occur because of existing soil, rock, and landscape characteristics. Water may flow throughout the year or only seasonally during periods of heavy rainfall.

Water may flow into or around your house if it is constructed over or near a spring or seep. Most Iowa houses require subsurface perimeter drains, at least 4 inches in diameter and surrounded with 6 to 12 inches of gravel or sand and gravel, along the outside of the foundation wall. The bottom of the drain tile must be below the basement floor, and the tile must slope to an outlet. When possible, drain perimeter drains to a free outlet, storm sewer, or any approved outlet. If none of these options will work, use a sump pump to remove the water.

Springs and seeps also affect lawns and on-site septic fields. Install subsurface drains (tile lines) to remove the water. Tile commonly are made of clay, concrete, perforated plastic, metal,

asbestos-cement, or bituminous wood fiber. Check with local building codes for approved materials and other drainage regulations.

Seasonal High Water Table

The water table is the upper surface of groundwater. Below the water table the soil is saturated with water. The level fluctuates by several feet throughout the year depending on soil, landscape, and weather conditions. In Iowa, the seasonal high water table often is 2 to 5 feet below the ground surface.

In selecting a building site, consider the level of the seasonal high water table. On some sites the seasonal high water table may be at or near the ground surface for long periods. Avoid these areas. Seasonal high water tables 6 feet deep or more may be of little concern, unless you plan to excavate a deep basement.

Subsurface drains such as those used to handle springs and seeps can be used to lower the water table. You'll need a good outlet for the discharge flow and adequate capacity to handle the most severe conditions. Sump pumps should have a back-up power supply in case of power failure.

It is preferable to build the basement floor above the seasonal high water table. Provide drainage under the basement floor with 4 to 6 inches of free-draining material and a subsurface drainage system. Use a moisture barrier and high quality concrete to reduce water migration through the floor.

Seasonal high water tables around existing houses can be lowered by

installing drainage around the outside wall or under the basement floor. Both methods are expensive and disruptive. Lowering the water table under the basement floor should be done with caution. On some soils, especially slow-draining silts and clays, unequal settling may crack the walls.

To remove water from the interior of concrete block walls, install drainage channels at the intersection of the wall and the floor. These channels are commercially available.

Ponding of Surface Water

You can use small diversions or ditches to channel water away from your lot. Various regulations concerning water flow will apply and you must not change the flow in a way that adversely affects your neighbor. Before beginning a project, check with your neighbors and local officials.

Surface inlets can be used to carry water to a subsurface drain. The drain outlet can empty into street gutters or storm sewers if permitted by local building codes.

Grade your yard so that surface water drains away from the house. Often the fill used around a house settles, leaving

a low area. It must be filled so water runs away from the house. In the first 10 feet away from the house, the soil should drop a minimum of 6 inches. A minimum grade of 1 foot in 100 feet is generally adequate after the first 10 feet.

To prevent wood rot, the soil around a house must not be too close to the wood siding. There must be at least 8 inches between the soil and the wood siding. The soil directly around the house should be of slow permeability so water does not penetrate near the house. Do not use rock and gravel on the surface, since they will serve as a conduit for water into the ground.

If your lot is poorly graded, large amounts of earth will need to be moved. Obtain professional advice before starting a major grading project.

Install roof gutters and downspouts to carry the water away from the house. Thousands of gallons of water will fall on the roof during a heavy rain and must be removed quickly from the area around the house. Downspouts can empty into a subsurface drain or be discharged over a grassy area.

Avoid using the same subsurface drain for perimeter tile around the foundation and for the downspout. If the capacity of the drain is not sufficient, excess water will be dumped around the basement footings.

Water from downspouts that empty onto the lawn must be dumped and

spread far enough from the house so the water does not enter the basement. On steeply sloping well-drained lawns with no basement water problems, a simple splash block usually will be sufficient. For houses with basement water problems, the water should be dumped at least 5 to 10 feet from the house.

Slow Soil Permeability

Dense layers of soil will restrict the flow of water, and water may pond on the lawn. If the problem is due to poor drainage through the soil, you can drain small wet areas by digging a small trench through the layer and filling it with sand or gravel to improve permeability. However, this method will not work if the problem is caused by a high water table.

Drain larger wet areas by installing subsurface drains 4 to 6 inches in diameter at a depth of 2 to 5 feet. The drains should be back-filled to within a foot of the ground surface with sand or gravel. Use porous topsoil to fill the last foot.

Other Help

Local building suppliers, county or municipal authorities, your soil and water conservation district office, and local Iowa State University Extension offices may be able to provide more information about planning and installing specific drainage measures. Prepared by Tom Geiner and Stewart Melvin, extension agricultural engineers; and Laura Sternweis, extension communication specialist.

File: Human Housing 6-1 (Basement Planning)

This material is based upon work supported by the Extension Service, U.S. Department of Agriculture, under special project number 93-EFRA-1-0002.

. . . and justice for all

The Iowa Cooperative Extension Service's programs and policies are consistent with pertinent federal and state laws and regulations on nondiscrimination regarding race, color, national origin, religion, sex, age, and disability.

Cooperative Extension Service, Iowa State University of Science and Technology and the United States Department of Agriculture cooperating. Robert M. Anderson, Jr., director, Ames, Iowa. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.