



## ARE YOU AT RISK?

If you aren't sure whether your business is at risk from flooding, check with your local floodplain manager, building official, city engineer, or planning and zoning administrator. They can tell you whether you are in a flood hazard area, and they also can tell you how to protect your business from flooding.

## WHAT YOU CAN DO

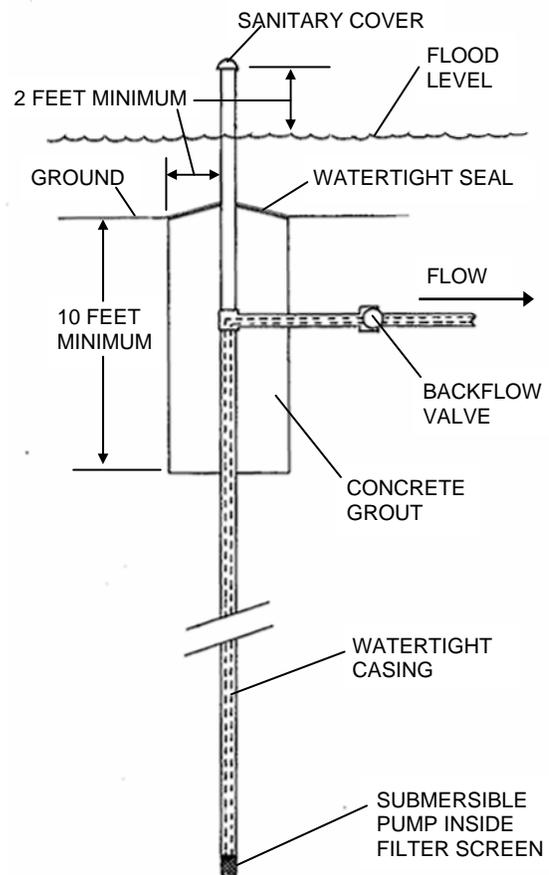
Protecting your business from flooding can involve a variety of actions, from inspecting and maintaining your buildings to installing protective devices. Most of these actions, especially those that affect the structure of your buildings or their utility systems, should be carried out by qualified maintenance staff or professional contractors licensed to work in your state, county, or city. For a business that obtains its water from a private well, one example of flood protection is making improvements to the well to prevent contamination by flood water.

## PROTECT WELLS FROM CONTAMINATION BY FLOODING

Flood waters often carry hazardous and toxic materials, including raw sewage, animal wastes, oil, gasoline, solvents, and chemicals such as pesticides and fertilizer. Flood water that enters a well can contaminate the groundwater and make the well water unsafe to drink or to use in your business. The effects may last long after the flood waters have receded.

Proper well construction will help protect your well against contamination. A licensed well-drilling contractor can inspect your well and suggest improvements, such as the following (see figure):

- extending the well casing at least 2 feet above the highest known flood elevation
- installing a sanitary seal or cover on the casing
- curbing the casing at ground level by surrounding it with a watertight seal that is at least 4 inches thick and that extends at least 2 feet in all directions
- placing grout between the casing and the sides of the bore hole to a depth of at least 10 feet
- installing a backflow valve in the water line
- protecting electrical controls from flood water
- drilling a new well on higher ground, above expected flood levels and known sources of pollution



# Protecting Your Business From Flooding

---

## Protect Wells from Contamination by Flooding

### TIPS

Keep these points in mind when you improve your well to protect it from flooding:

- ✓ Many state and local agencies regulate the construction and modification of wells. Check with your local health department or building officials for more information.
- ✓ Power outages often occur during floods, so you should consider providing a backup power supply to ensure the continued operation of your well. (For more information, see the separate fact sheet *Install a Generator for Emergency Power.*)
- ✓ The vulnerability of a well to contamination by flood waters depends partly on the well's age and depth. Wells over 50 years old and less than 50 feet deep are more likely to be contaminated by flood waters.
- ✓ Do not store potential contaminants within 100 feet of the well. Potential contaminants include fuels, solvents, and dry and liquid chemicals.
- ✓ Have your water tested annually for the most common contaminants, including coliform bacteria.

### ESTIMATED COST

The cost of most improvements to an existing well will vary, depending on the condition of the well. Having a plumber or contractor install a backflow valve in the water line will cost about \$500. This figure includes the cost of excavation and backfilling. Because geological conditions and groundwater yields vary from site to site, you should contact a local licensed well driller regarding the costs of other well improvements and new wells.

### OTHER SOURCES OF INFORMATION

*American Water Works Association Standards*, AWWA A100-90, 1995

*Wellhead Protection for Private Domestic Wells*, A. Tyson, University of Georgia College of Agricultural & Environmental Sciences, 1993

*Assessing the Condition of Your Water Well and Its Location*, D. Weston, North Dakota State University, 1994

*Ground Water Contamination from Drinking Water Well Condition*, Dr. D. Hoffman, Texas A&M University, 1997

To obtain copies of FEMA documents, call FEMA Publications at 1-800-480-2520. Information is also available on the World Wide Web at <http://www.fema.gov>.