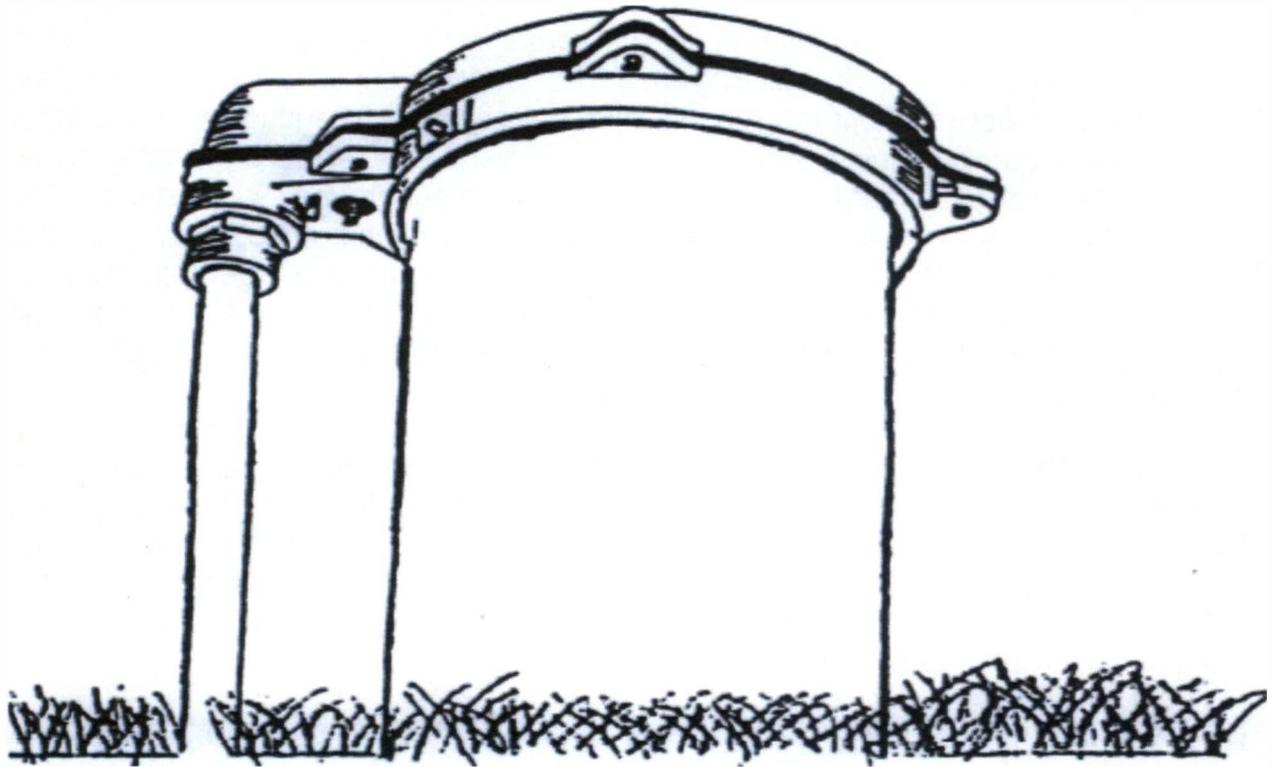


WELL MAINTENANCE HANDBOOK



A Publication of
Frederick County Health Department
Water Quality Office
350 Montevue Lane
Frederick, MD 21702
301-600-1717

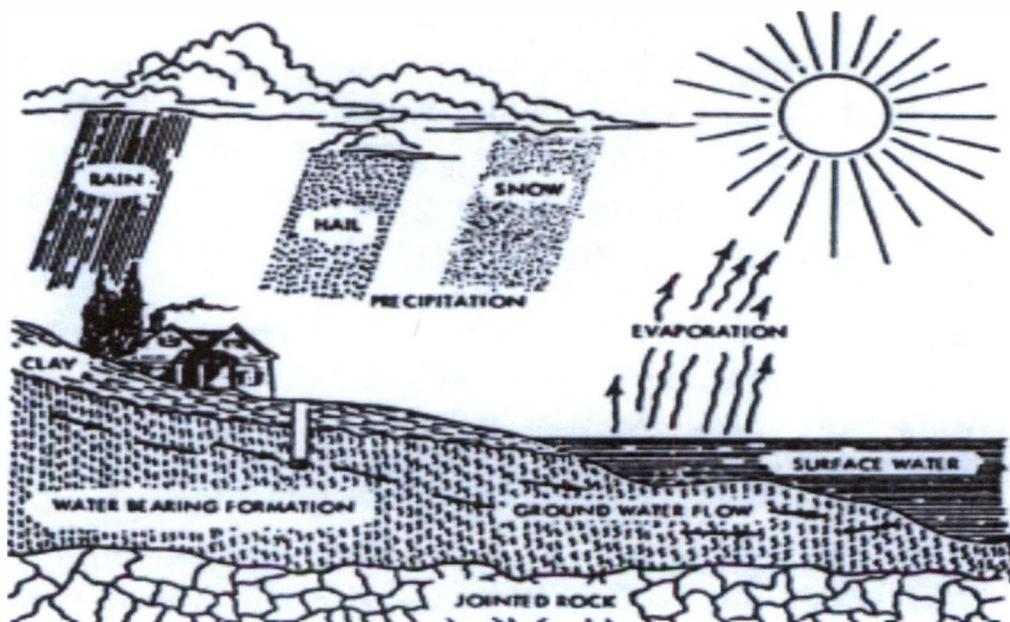


Groundwater – What is it and where does it come from?

Groundwater is the resource that provides 95% of rural Americans and 35% of Urban Americans with the water they use on a daily basis. The ultimate source of groundwater comes as precipitation in the forms of snow, hail and rain. When precipitation occurs too rapidly there is runoff that flows into our streams and rivers. The water that does not contribute to runoff penetrates the soil. The plants use this water first and the water remaining seeps deep into the soil until it reaches the water table. The water table is a saturated zone that provides us with our groundwater resource. The groundwater gradually moves through crevices in the rocks and untapped groundwater eventually feeds into the streams and rivers. Through the process of evaporation, the surface water returns to the atmosphere where it condenses and forms rain, snow and hail. This whole process, which is called the hydrologic cycle, begins again with precipitation and our groundwater is restored.

It was believed in the 1970's that the groundwater we drink is safe because the soils absorb any contaminants that seep into the ground from the Earth's surface. Unfortunately, this is not always true. Some contaminants still make their way into our water supply. The contaminants can be naturally occurring metals, but more often the problem stems from human activities such as improper use of pesticides or improper siting or construction of a well or a septic field.

Hydrologic Cycle

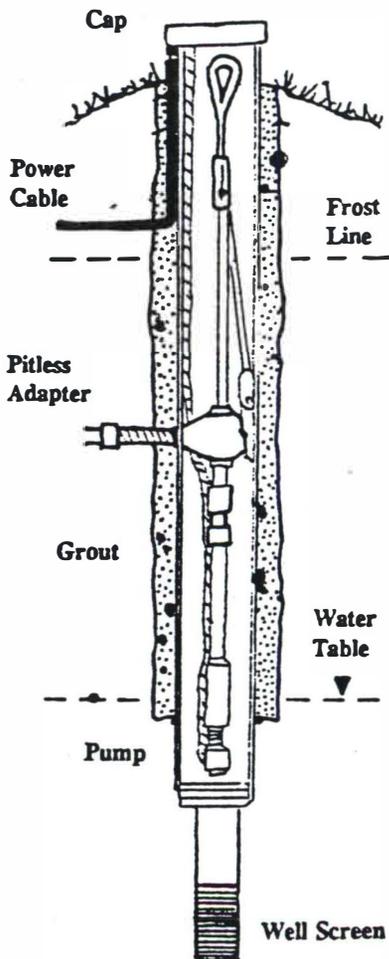


Basic facts about your well

The State of Maryland requires your well to be constructed by a licensed well driller registered with the state. To meet average water demands, the well must produce one (1) gallon of water per minute. This water yield plus the water in storage in your well must be able to produce or exceed 500 gallons in two (2) hours.

In Frederick County, the majority of newly constructed wells are drilled. Drilled wells provide safer sources of water than older hand dug wells as they are deeper and not as susceptible to surface contamination. Driller wells are constructed in one of two ways – with a percussion-type cable tool that beats and punches through the Earth or with a rotary bit that grinds and crushed its way through rock. The bore hole that is formed through drilling is then lined with metal or heavy plastic casing. The casing must extend at least eight inches out of the ground to avoid surface contamination. The annular space, which is the space between the bore hole and the casing, is filled with a cement grout which protects the well from surface or shallow groundwater contamination. A metal well cap seals off the well, and the pitless adaptor provides a connection for the water to flow from the well to the house. A pump is installed to pull the water from the well and a screen may be added to prevent sediment from clogging the pump.

Well Anatomy



What should I know about water quality?

A. Bacterial Contamination

The most common contaminant of drinking water is bacteria. *E.coli* and total coliform are the two types of bacteria most commonly tested for because they are easily isolated in the laboratory and because they serve as an indicator of the potential presence of other harmful bacteria. Total coliform is often associated with surface contamination. If the bacteria *E.coli* is present in your drinking water, there is a possibility that you may have fecal contamination in your water. While *E.coli* itself may not be harmful, other harmful fecal bacteria is generally associated with *E.coli*. The harmful bacteria associated with *E.coli* and coliform bacteria can cause a variety of serious gastrointestinal illnesses. Bacteria problems can usually be eliminated by chlorinating your well. Your local Health Department can provide you with chlorinating instructions.

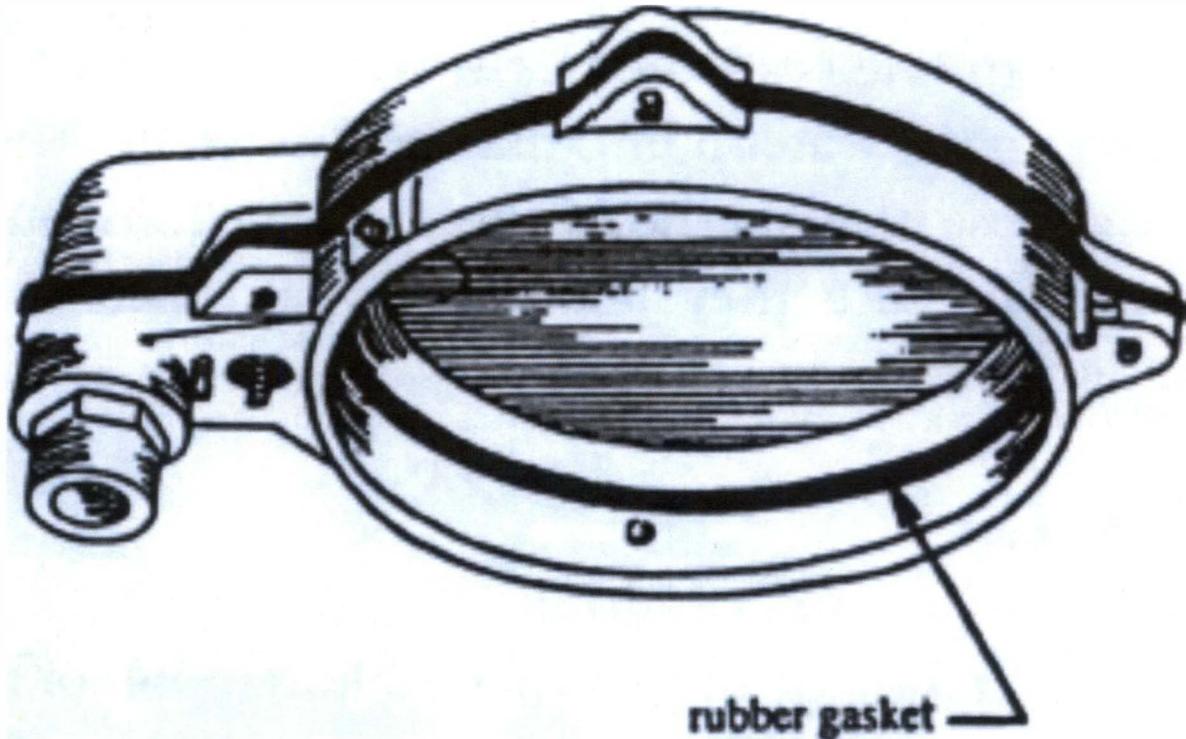
A common source of bacteria in wells is insects, particularly earwigs. Earwigs get into the well through the small hole in your well head that allows air to circulate. These insects thrive in cool damp environments. Once they are in the casing of the well, they often fall in the well where they die, generating coliform bacteria. Chlorination will kill the bacteria at the present time, but to prevent future contamination you must prevent the entry of earwigs. That is why it is still advisable to check for insects in addition to chlorination.

Earwigs



To prevent earwigs from entering your well, keep the well casing clean and make sure that you use clean fill dirt around the casing when replacing dirt that has settled around the well head. There are new vermin-proof caps designed with a screen which prevents insects from entering the well while still providing air circulation.

Example of a vermin-proof cap



If you do not wish to replace the well cap to keep insects out, there is another less expensive alternative that uses nylon stockings as a screen to prevent insects from entering the well while still allowing air circulation. To insect-proof the well using nylon stockings, first turn off the breaker to the water pump. (At this time it is also important not to use any water; running the water may cause damage to the plumbing.) Remove the well cap. Take a pair of nylon stockings and cut a double-layered circle from the upper portion of the stocking. Stretch the nylon stocking over the opening of the well and secure it in place with duct tape, and then you may reattach the well cap. Once the well cap is secure, the breaker to the water pump may be turned on. Should you choose this method, check the nylons once a year to be sure they are securely attached to the casing.

B. Nitrates

The presence of nitrates (a form of Nitrogen) at a concentration of 10 parts per million (ppm) or more is considered unsafe for infant consumption. High levels of nitrates cause the baby's blood to convert from hemoglobin to methemoglobin (methemoglobin does not carry oxygen as efficiently as hemoglobin). The resulting condition, which is called methemoglobinemia, gives the baby's skin a bluish color most often located around the eye and mouth. This condition may result in infant death if the problem is not corrected soon enough. Nitrate levels can be reduced by using reverse-osmosis systems.

C. Lead

Concentrations of lead at 15 parts per billion (ppb) or greater in your water means that you may be in danger of lead poisoning which can result in brain damage or even death. Lead solder is the major source of lead in drinking water. This problem is more common in older homes. Homeowners today often install lead-free fixtures and plumbing. Lead exposure can be minimized by flushing the water out of the pipes before drinking. Always use cold flushed water. Hot water causes even more corrosion of the lead solder.

D. Other

Parts per hydrogen (pH) is the measure of the hydrogen ion concentration in your water. Water with a pH less than 6.5 and greater than 7.5 can lead to corrosion of metals in your pipes causing stains in sinks and possible health threats. The pH can be adjusted with neutralizers.

Hardness is the measurement of calcium carbonate in the water. Hard water causes corrosion of pipes and water heaters. It gives you grayish clothing and it can lead to excessive use of detergent. Water softeners help remedy this problem.

High concentrations of iron in water may result in rust stains on fixtures and laundry. It often lends a metallic taste to the water, and it is often associated with a low pH causing corrosion of pipes. Water softeners also help control the amount of iron in your system.

There are more treatments than the ones mentioned above. The above treatments are most often recommended for each individual water quality problem. If you have any questions about what treatment is best for your situation or how to go about installing your treatment system, make sure you speak with a water quality specialist. In the most extreme case, the water quality specialist will recommend having a new well drilled or having your casing extended.

How do I prevent any contamination from leaching into my well?

Contamination of our water supplies can be avoided by remembering that what you dispose of on the lawn or down the drain can make its way into your drinking water system. While bacteria may not be able to survive at the depths where the casing enters the groundwater, chemicals may find their way into your well. Utilize the following guidelines to best prevent contamination from entering your water:

1. Check for all rusted, leaking or abandoned above and below ground storage tanks. These tanks should be removed for proper disposal.
2. Old cisterns should be broken up, removed or filled.
3. Old septic tanks no longer in use or those which have been replaced should be pumped out and removed or filled with soil. Water tight privies should be pumped out. Earth contact pit privies should be limed and filled.
4. Do not dispose of solvents, herbicides, pesticides, fuels or other chemicals by allowing them to go into your septic system. Avoid dumping unused portions on the ground. Follow manufacturer instructions in exercising caution in the use of pesticides and herbicides and use a back-flow prevention device on a well outlet or hose bib being used for mixing chemicals and lawn spraying.
5. Check to insure that water drains away from your well.
6. Any abandoned or unused wells should be disconnected from water lines and filled in accordance with the Maryland Department of the Environment Regulations COMAR 26.04.04.11. This particularly applies to dug wells as they are susceptible to both surface and subsurface pollutants. They are frequently contaminated by bacteria and nitrate and they pose a safety hazard as they are large enough for humans and animals to fall in and drown.
7. Encourage people who change their own automobile oil, antifreeze and other automobile liquids to take the used products to a reclamation center.
8. Do not tie your dog to your wellhead because the dog's fecal matter could lead to contamination of your well. Also a larger dog could break or crack your casing.
9. Never cut off the well casing or remove the cap. Never leave the well uncovered.
10. Have your septic tank cleaned at least once every three to five years.

How do I conserve my water?

At all times it is important to conserve water not only because it is a precious resource, but conservation also helps prolong the life of your septic system and it helps save energy. In times of drought, water conservation is most important to prevent your well from going dry.

Water conservation can best be accomplished by a combination of mechanical methods along with a few changes to your daily routine. Mechanical methods include installation of low-flush toilets (the average toilet uses 7 gallons of water per flush), low-flow shower heads and faucet aerators. The following changes can be added to your daily or weekly routine:

1. Turn water off when brushing teeth, shaving and washing hands and face.
2. Limit showers to four minutes and avoid taking baths.
3. Close the drain to wash vegetables and dishes.
4. Remove foods from freezer in time to thaw them.
5. Establish compost bin and recycle all vegetables in your garden rather than using your garbage disposal.
6. Wash only full loads of laundry.
7. Apply water on the lawn and garden only at times needed (i.e. during drought only if your well can handle the extra burden).
8. Use trickle hoses for watering the garden.
9. Sweep sidewalks and driveways instead of using a hose.
10. Wash your car only when necessary. Use a bucket of soapy water for washing and use the hose for rinsing only.
11. Always fix a leak no matter how small.

Each effort to conserve water may seem insignificant, but when you add up all the water conserved by practicing these conservation techniques you currently do not practice, you can see how easy it is for us to waste water without even realizing it.

Where can I get help?

The Frederick County Health Department, Division of Environmental Health, has the responsibility of approving new well construction and will sample domestic wells upon request. If you suspect that you have a problem, you can call or come in to the Health Department. The address, telephone number and business hours are:

Frederick County Health Department
350 Montevue Lane, Frederick, MD 21702
301-600-1717

Office Hours: Monday thru Friday 8:00 a.m. – 5:00 p.m.

Well Construction Records

Type of Well –

Date of Construction –

Health Department File No. –

Well Permit No. (located on metal tag attached to well casing) –

Depth of Well –

Depth of Casing –

Well Yield –

Remarks –

Water Sample Record

Date sampled –

Reason for sampling –

Parameters Analyzed –

Results –

Well Maintenance Record

Pump Repair or Replacement –

Well Inspection –

Plumbing Replacement or Inspection –

