WATER WELLS PRIVATE

TARGET RANGE SEWER &WATER DISTRICT

This section consists of information for our members or potential members with information on private water wells. The Target Range Sewer and Water District area is one of the most desirable areas in Montana if not the United States for ground water used for drinking. You may have read articles that reference potable water which means water that is safe to drink or used in food preparation without risk of health problems, we have one of the best.

It is estimated that more than 13 million households rely on private wells for drinking water in the United States (US Census American Housing Survey). The District and Federal Agencies such as the EPA does not regulate private wells nor does it provide recommended criteria or standards for individual wells other than those provided by State, County or City Regulations thru Montana EPA. These regulations usually provide for the proximity of the well from any septic or other system that may cause a pollutant to the well water. All we can do is offer information regarding the importance of testing your private wells and guidance on new technologies that may be used to treat or remove any contaminants that may be harmful in your well.

The private well owners in the District are responsible for the safety of their water. This portion or our website is intended to educate well owners on wells, groundwater, and information on protecting their health in using well water. This website also provides links to other state and federal non-profit websites that host additional educational materials and resources to help our private well owners.

Basic Private Well Information:

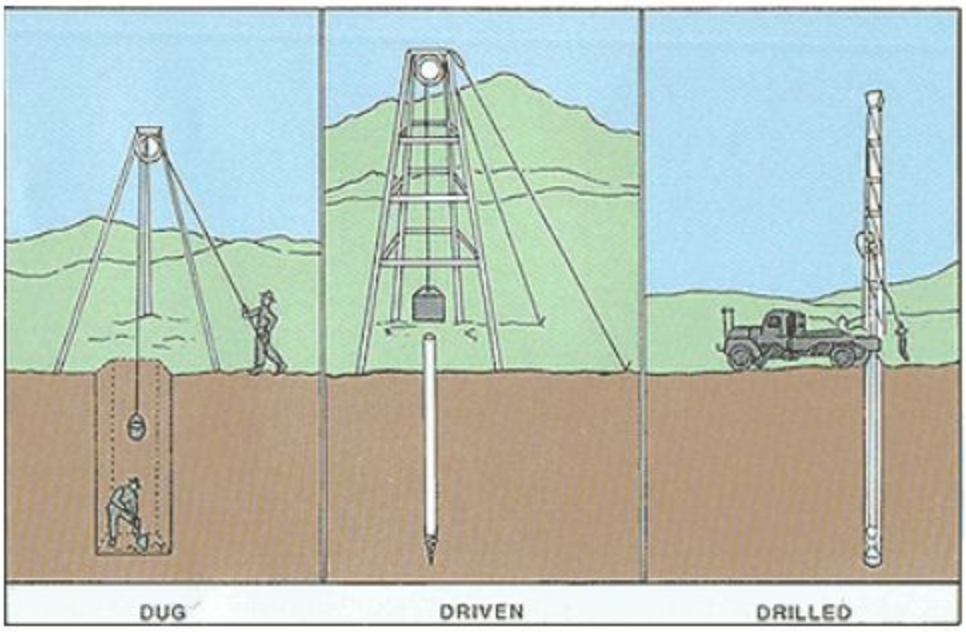
The following provides information on how wells are developed, maintained and provide water to the user.

- Well Types:

  There are three major types of wells that are common in our area:

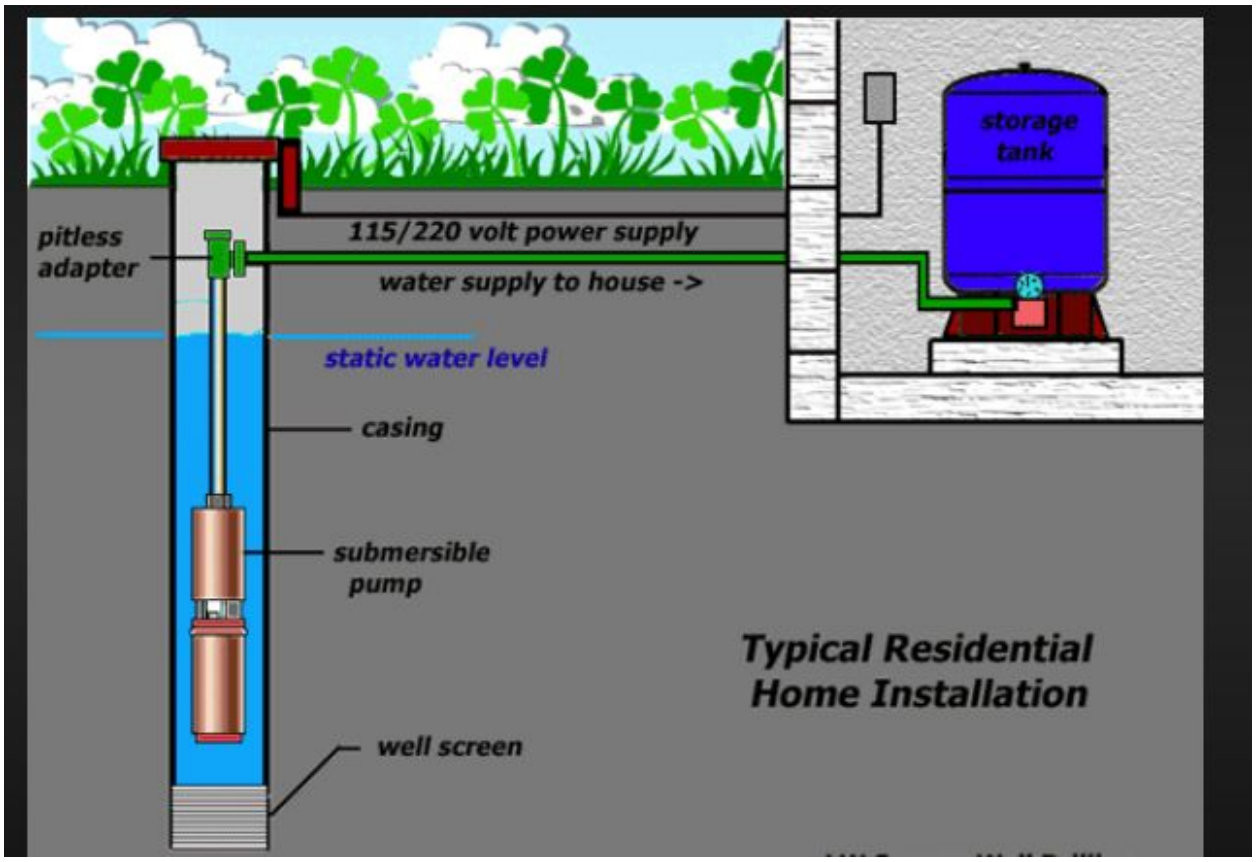
- **Dug/Bored wells** are holes in the ground dug by shovel or backhoe. They are lined (cased) with stones, brick, tile, or other material to prevent collapse. Dug wells have a large diameter, are shallow (approximately 10 to 30 feet deep) and are not cased continuously.
- **Driven wells** are constructed by driving pipe into the ground. Driven wells are cased continuously and shallow (approximately 30 to 50 feet deep). Though driven wells are cased, they can be contaminated easily because they draw water from aquifers near the surface. These wells draw water from aquifers near the surface.
- **Drilled wells** are constructed by percussion or rotary-drilling machines. Drilled wells can be thousands of feet deep and require the installation of casing. Drilled wells have a lower risk of contamination due to their depth and use of continuous casing.

  The following is a diagram of these types of wells:



The most common type of well in the District is the drilled well. There may be some dug wells in areas of the valley very close to the aquifer and some driven well is use today but very few.

The following is a diagram of a drilled well that is the most common within the District. The diagram shows how the water is supplied from the well to the user source. Once the water reaches the storage tank commonly referred to as the pressure tank it is distributed throughout the house/establishment.



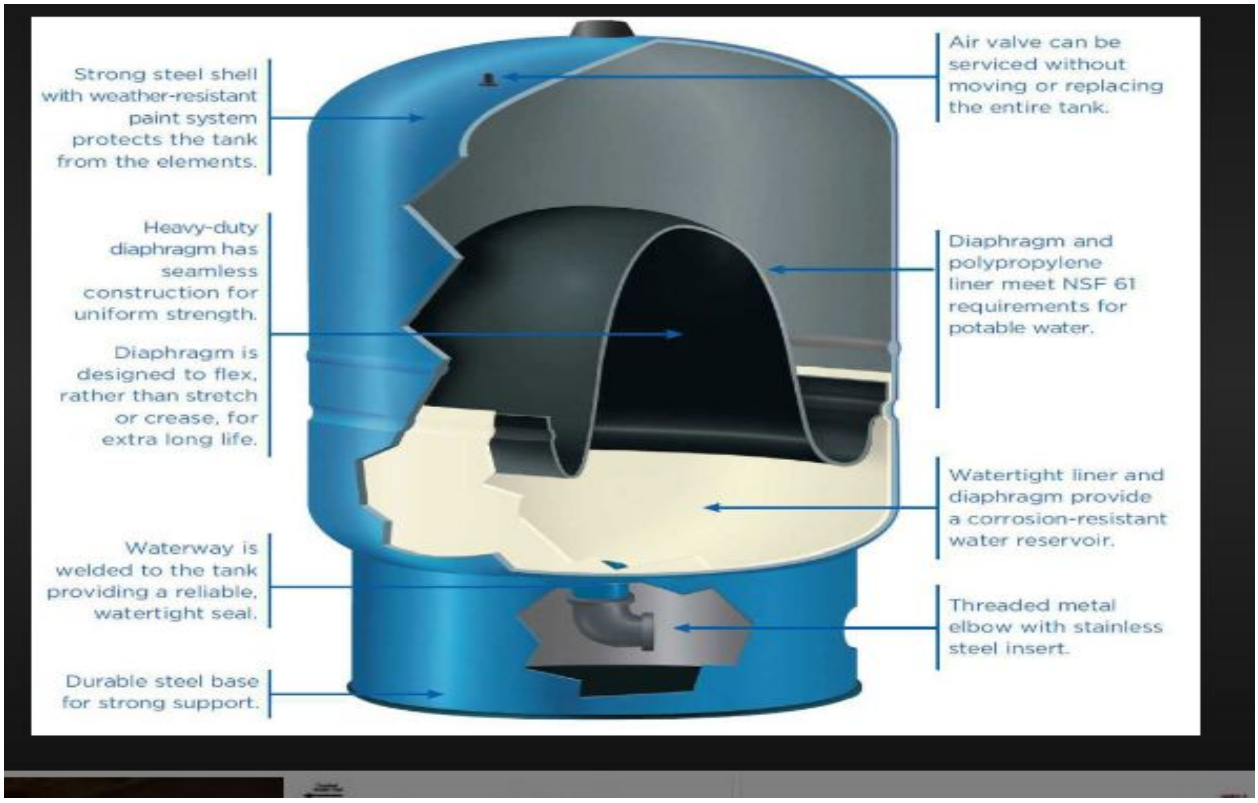
The amount of water a well can produce is dependent on several issues. These issues depend on well depth, size of well casing, aquifer saturation and size of flow from well to termination (storage tank/pressure tank). A Well Log is a detailed record of the geological formation during the drilling of a borehole. A well log is prepared by either taking samples through visual inspections or with the aid of measuring instruments lowered into the borehole. Logs prepared using visual inspections are called geological logs whereas logs prepared with the help of inspection instruments are called geophysical Logs.

Water well logs are maintained in the MBMG's Ground-Water Information Center (GWIC). The collection currently includes approximately 250,000 records (both in hard copy and digital formats) describing water-related resources (wells, boreholes,

springs, etc.) in Montana. The paper collection is stored in the GWIC offices at the Bureau.

Pressure Tank:

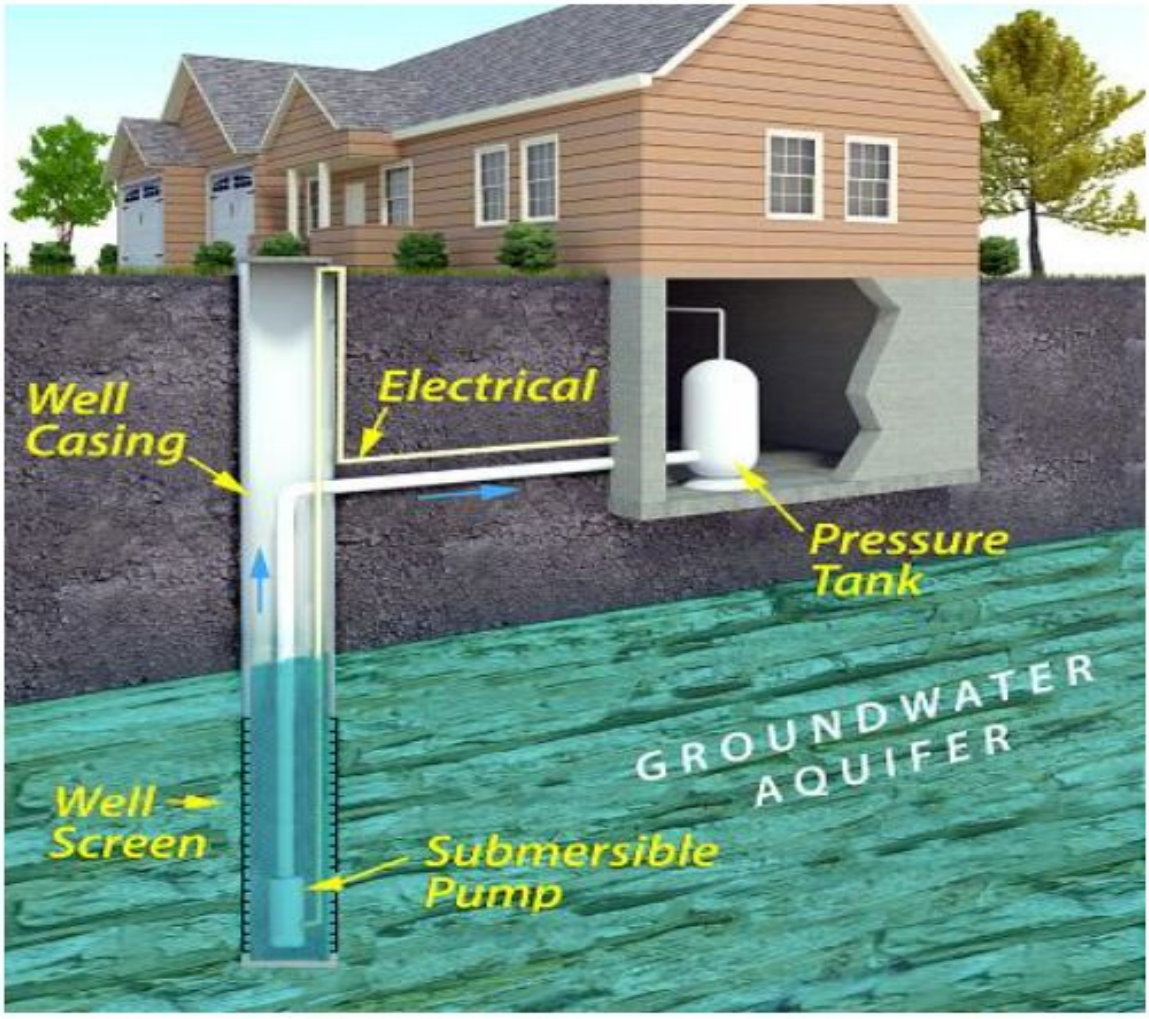
The purpose of a pressure tank is to maintain constant pressure. As water is pumped from the well into the pressure tank, it compresses the air in the tank until it reaches a preset level, typically the 40 to 60 pounds per square inch (psi). When someone turns on a faucet, air pressure in the tank forces water throughout the plumbing until the pressure drops to the preset trigger pressure, usually the 20 to 40 psi. That tells the water pump to turn on, and water is then drawn into the house and tank. When the faucet is shut off, pressure builds until it is restored to its default shut-off level. The amount of water delivered by the pressure tank between the time the pump shuts down and the time it starts again is called the drawdown. Pressure tank size and the drawdown will depend on the amount of water the pump can draw into the home in 1 to 2 minutes. Some tanks hold as little as 10 gallons, others more than 200 gallons. The most common size of pressure tanks in residential homes hold about 44 gallons and have a drawdown of about 16 gallons. If your home uses more than the average amount of water or has a well with a low yield, a larger pressure tank may be needed.



The material used today may also be constructed of fiberglass and other materials. There are other issues that may require additional equipment to be installed after the installation of the pressure tank. These may include the addition of filters to remove sediment such as sand and other materials. The installation of a water softener may also be needed to be installed to remove those materials that the pressure tank and filter did not remove that cause issues with hot water. See water softener units in this and online publications.

PRIVATE WELL SYSTEM VIEW:

The following diagram is an overall view of a private water well system. It does not include a water softener that maybe required as mentioned above. It is very important to you remember that you are responsible for your water system.



WATER WELL MAINTENANCE:

Routine inspection of a water well system can help ensure it is operating properly, prolong its useful life, and protect your investment. Most importantly, inspections can protect your health by discovering issues that could result in water quality problems presenting a health risk.

Visual inspection: Wellhead
Well owners should regularly examine the area above the ground surface over the well. If any of the following issues are discovered, a professional should be contacted to investigate:

- **Casing** (pipe protruding from the ground)—check the general condition and check if the casing extends at least 12 inches above ground.

- **Well cap** (cap on top of casing)—check the condition of the cap and any seals, make sure that it is securely attached.
- **Electrical conduit** (if present)—visually verify that all connections are secure.
- **In a survey of the area around the well:**

√	Check for potential sources of contamination and physical dangers, and: • Remove chemicals such as paint, fertilizer, pesticides, or motor oil • Maintain at least 50 feet between the well and any kennels, pastures, feeding areas, or livestock operations • Ensure a proper distance is maintained from buildings, waste systems, or chemical storage areas (including fuel tanks)—a water well systems professional should know local codes and requirements
√	Be sure the ground surrounding the wellhead is sloping away from the well to divert surface runoff
√	If there is no concrete pad surrounding the well casing, contact your local health department to determine if one should be installed by a water well systems professional
√	If the well is equipped with a vented well cap, make sure the vent is free of debris and able to keep insects and animals out
√	Any growth vegetation with root systems within 10 feet of the well should be physically removed
√	If your well is located in a low-lying area prone to flooding, consider having a water well systems professional raise the casing to at least 12 inches above the historic record flood level—or construct a new well outside the flood-prone area.

Well system components and other equipment.

Well owners also can visually inspect well system components away from the wellhead, again contacting a water well systems professional if any issues are discovered. Note the condition of:

- Any above-ground pumping equipment. Ensure motors are properly cooled and vented (do not close them in and block air flow), check for shaft seal leaks, and rust or other signs of weakened fittings
- Above-ground well system wiring and parts such as pipes, connections, joint seals, gauges, pressure relief valves, and the water meter (if present)

√ Signs of corrosion or breakages

√ Any odor of burned connections or wiring

- Above- and below-ground storage tanks
- The electrical control box and connections
- Water softeners and conditioners, and maintain them according to the manufacturer's instructions
- Filtration equipment. Be sure filters have been maintained and replaced or recharged as required by the manufacturer and the quality of the incoming water.

Other reasons to get a well inspection:

The following are other indicators of when a water well systems professional should be called to evaluate the condition of your well:

- Anytime the well has to be opened up (cap or well seal removed)
- If you experience taste or odor problems
- If you experience turbidity—cloudiness of water caused by presence of suspended matter
- If there is a loss of capacity or pressure—the well is not producing as much water as before, the pressure drops and surges, or the pump cycles on and off frequently
- If a test is positive for total coliforms, anaerobic bacteria, or any positive test results indicating a potential health concern. Contact a professional or your local or state regulatory agency if you experience any positive test results or believe your well has been contaminated. A water well systems professional should be hired to thoroughly clean and disinfect any well that has had a positive "anaerobic" bacterial test result, which should include removal of pumping equipment and evacuation of the well to its bottom to be sure of maximum removal of anaerobic growth.

Sources (NGWA – US EPA)