

Understanding Water Wells and How They Work

A well is the most common way to obtain groundwater for household use. A well is basically a hole in the ground, held open by a pipe (or casing) that extends to an aquifer. A pump draws water from the aquifer for distribution through the plumbing system. The depth to which wells are constructed is determined by factors such as 1) depth to groundwater, 2) the groundwater quality, and 3) the geologic conditions at the well site.

Permitting

Each County requires permits to drill. We will assist with this process.

Well Location

A well must be located so that it meets the minimum isolation distances (also known as “setback” or “separation” distances) required by your county. These distances are between the well and utilities and potential sources of contamination on your property or neighboring properties. Before construction begins, the best location on the property should be identified by considering the location of proposed or existing buildings, septic systems, buried gas or power lines, future building and construction and any other potential sources of contamination. We will conduct an on-site meeting before making location with the Rig.

Well Casing

New wells can be lined with PVC or steel casing depending on the geological formation at the well site. The casing provides a connection to the groundwater and a pathway for bringing the water to the surface. The casing also prevents loose soil, sediment, rock, and contaminants from entering the well. The casing may also house and protect the pump and related equipment. In order to prevent contaminants from entering the well, the well casing must be properly vented and have a cap that is weatherproof and insect-proof.

Well Screen

We install well screens on all PVC casing wells. Each joint of screen casing is 20ft long with manufactured slots from top to bottom ranging in size from .020” to .032” thick. Sandy formations will receive the .020” screen while limestone formation will

receive .032” screen. Each well will receive at least 60’ of screen in the water producing zone. Sometimes more depending on the well construction. Sand wells will get gravel packed (filter pack) through the water producing zone. This is designed to hold the bore hole open and filter out the water before entering the casing.

Grout

The rotary drilling method produces a bore hole which is larger in diameter than the casing. The space between the outside of the well casing and the bore hole wall is called the annular space. After the well casing has been placed in the bore hole, it is necessary to fill the annular space to keep surface water and other contaminants from entering the well. The material used to fill this annular space is called grout, a specific mixture of water and cement, or water and “bentonite” clay, and sometimes other permitted additives such as sand. Grout must be pumped in from the bottom of the well upward, to assure a complete seal around the casing. The usual method is to insert a ¾- to 1 ¼ -inch diameter pipe (known as a grout pipe or tremie pipe) down to the bottom of the space between the well casing and the bore hole. The grout is then pumped in until it comes to the ground surface. The grout must not be poured from the surface. All rotary-drilled wells must be grouted from a required minimum depth to the surface which is shown in the illustration.

Pumping Systems

A water system is needed to pump the water out of the well to the surface and deliver it under pressure to the place where you will be using it. A typical home water system consists of a pump, and a pressure storage tank and control devices that allow the system to operate automatically.

Pumps

A pump is used to push or lift water from the well into your household plumbing. The correct size of pump and pump motor depends on the well diameter, the water level in the well, the number of plumbing fixtures, the amount of water use, and the peak water demand. Peak demand usually occurs during the morning and evening hours. Pumps are rated in gallons per minute (gpm) and pump motors are rated in horsepower (hp). A typical pump for domestic use might have a 10-gpm pump with a 1-hp or larger motor. Special water needs – such as for irrigation, heat pumps, or livestock – can increase peak demand and require a larger pump. A submersible

pump, which is the type most often used in drilled wells, consists of a pump and motor unit, typically 4 inches in diameter and 3-4 feet long. The pump is placed directly into a 4.5" or larger well, below the water level.

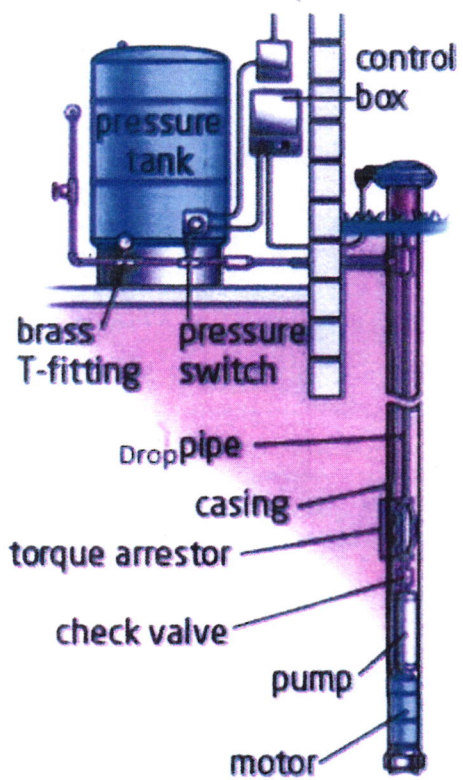
Pressure Tanks

As the name implies, a pressure tank contains water under pressure. As water is pumped into the tank, it compresses the air in the tank until the pressure reaches a preset level – ranging from 30-50 or 40-60 pounds per square inch (psi) – which automatically shuts off the pump. When a faucet is opened, the air pressure in the tank forces water through the pipes until the pressure drops to another preset level – usually from 20 to 40 psi – which starts the pump again. A pressure switch starts and stops the pump at the preset pressure levels and allows the system to work automatically.

Well Maintenance

Modern wells require remarkably little routine maintenance, but there are steps that you can take to protect your well:

- When constructing new additions to your home, adding new buildings, or altering waste systems or chemical storage facilities, be sure to maintain proper isolation distances required by your state.
- Be careful when working around your well. Avoid damaging the well casing, which could jeopardize the sanitary condition of your well.
- When working with hazardous chemicals like paint, fertilizer, pesticides, and motor oil, keep them away from your well.
- Wrapping pipes/winterizing your pipes helps protect your well from damage due to freezing temperatures.
- Coming Soon! - **Well Maintenance Agreements** with American Water Well Services, Inc.



WATER WELL SYSTEM

