



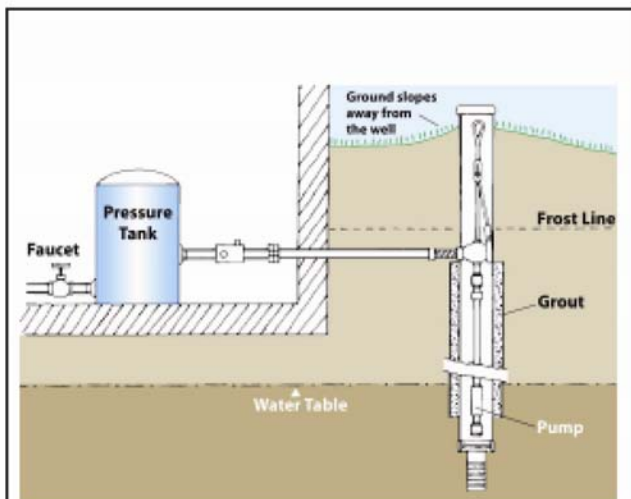
Domestic Well Performance and Information Guide



January 2009

A resource for domestic well owners, people who are considering the purchase of property that is supplied water via a domestic well, and those people who are considering having a well drilled or deepened.

If you thought drawdown was a gunfighter's term or GPM was a designer clothing label, keep reading. This brochure will help you learn how a well functions and how to monitor its performance. A list of useful terms is provided on page three.



Typical Well Construction

Do you know:

- * The history of your well
- * The depth of your well
- * The depth of the pump
- * The static water level
- * The pumping water level
- * The flow rate of your well
- * The water quality of your well

"An annual performance test takes about one hour and provides an assessment of the performance and life expectancy of a domestic well."

**Dan Dragan, Washoe County
Department of Water Resources.**

What to Look For if Your Home, or Potential Home, Has a Domestic Well

If your property has a domestic well or if you are planning to live in a home with a domestic well for a water supply here are a few items to consider:

1. *Driller's log* – This document is filed with the Nevada Division of Water Resources. It tells the age, construction, geology, productivity and water level at the time the well was drilled. They are available on the State's website, see page three for the address.
2. *Pump installation log* – When the pump was installed in the well, this document should have been given to the homeowner by the pump installer. It shows the type and capacity of the pump, the depth the pump is set in the well and its age.
3. *Water Quality Analyses* - Prospective domestic well owners should request results of a recent water quality analysis to compare them with current drinking water standards. There is no legal requirement for domestic wells to meet drinking water standards, but lenders may require an analysis. The Nevada State Health Laboratory can give guidance on sampling requirements, recommended analysis and cost.
4. *Records and data*: Obtain a maintenance history on the well and pump. Ideally, this should include water level data.
5. *Aquifer flow test*: This shows flow rate, static water level, and amount of drawdown after a period of continuous pumping, usually four hours.

Answers About Monitoring the Performance of Your Well

How do I know my well will be a reliable source of water?

There are no guarantees that a well will continue performing over the long term. However, by collecting some simple information, you'll have a better idea how reliable your well will be. Monitor water levels, both static and pumping, at least once a year. Record the values you measure. You'll be able to see if water levels are declining over time. This will allow you to plan for the expenses of pump lowering or well deepening. You can plot changes in water levels over time against pump and well depth to determine about how long you'll have until work will need to be done on your system.

Can I measure the water level in the well myself?

If a well has a sounding tube,

homeowners may use speaker wire, a small voltmeter, and a weight to do their own monitoring. A brief description of the installation of a monitoring tube is provided below. More information on this monitoring method is available from the Washoe County Department of Water Resources.

Can't I just lower a rope into the well to measure its depth?

Commonly a calibrated tape is lowered into the well that transmits a signal when it hits water. This method has some drawbacks: the water level may be too deep; the well casing may be crooked; or the wire or tape may tangle in the electrical cable that runs to the pump motor. You may want to install a monitoring tube instead. The

monitoring tube consists of a $\frac{3}{4}$ inch or 1 inch diameter Schedule 40 PVC pipe installed to the top of the pump intake. The tube is used to lower the monitoring equipment without risking damage to the well or the measuring device. If the tube is installed at the same time as the pump, typical cost is about \$2.00 more per foot of tube.

Can my well water become contaminated from the monitoring tube or probe?

It's always a good idea to disinfect the equipment with a small amount of chlorine bleach prior to each use.

What's the expected lifetime of a well? What influences the lifetime?

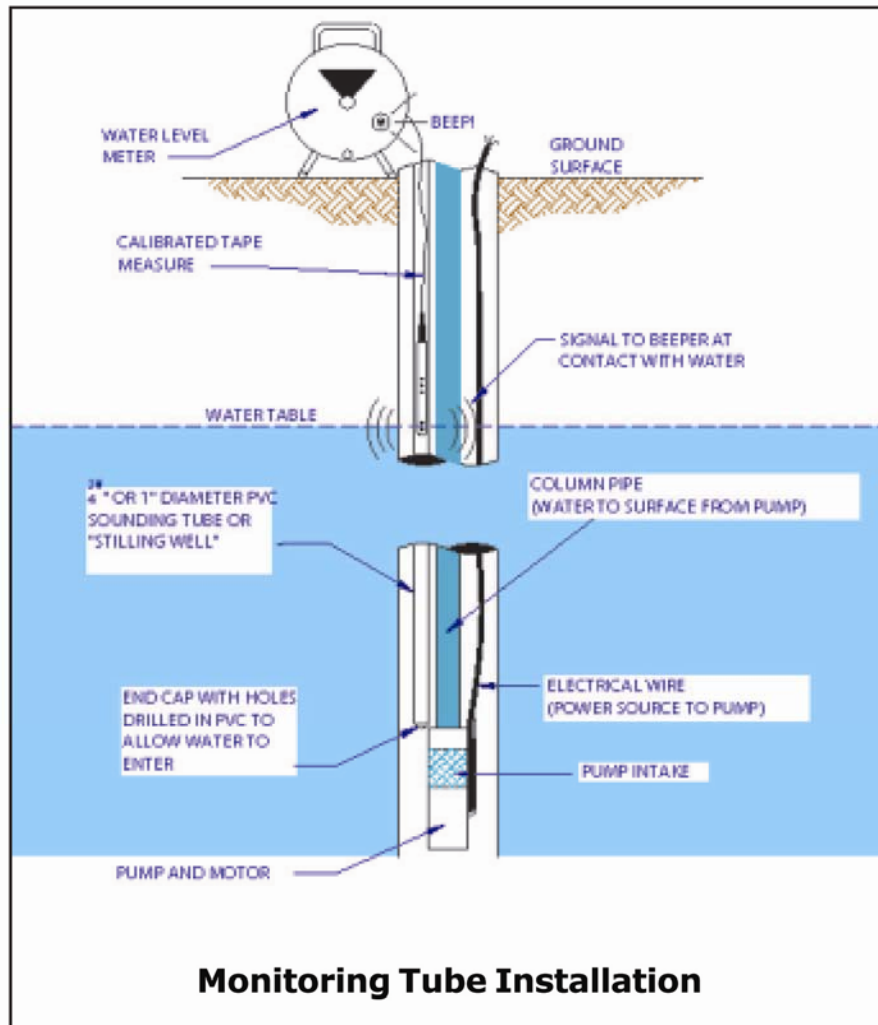
A variety of factors affect the lifespan of a well. Depending on construction techniques and materials, hydrogeology of the site, and water quality, a well may last from a few years to more than 40 years.

Where can I learn details about the aquifer from which my well produces water?

The Groundwater Data Center (GWDC) was created by Washoe County with support from the Regional Water Commission. The GWDC may be able to provide information about aquifer trends in your area including depths to the water, history of well failures, water quality and aquifer productivity.

How do I get a driller's log?

Driller's logs are available on the web at <http://water.nv.gov/information/services/welllogdatabase>. You will need to know your Section, Township and Range to access the wells in your area. You may be able to locate your well log through a name, address or parcel number on the log.



Have you tested your private well lately?

More and more families are going "GREEN," opting for a self-sufficient means of obtaining their domestic water and power sources, and in many cases relying less on public utilities for their basic water and power needs. Some households have installed solar panels to help defray energy costs and reduce their reliance on the energy grid. Others have made a choice to purchase a home with a private domestic well, utilizing the groundwater in the aquifers beneath their property.

Owning a private domestic well has its benefits and its drawbacks. While state law allows domestic well users up to 1,800 gallons per day without those monthly water bills, well owners still pay for the initial capital investment of drilling the well, installing a filtering system and pump, and the ongoing costs to run the filter and pump.

And what are you really getting from your well? Is it clean, pure water? Or could it be under the influence of a neighboring septic tank, agricultural or industrial run-off, or possibly affected by naturally occurring chemicals that could be harmful to your health?

According to The University of Nevada Cooperative Extension (UNCE), untreated or "raw" groundwater is not always safe to drink straight out of a domestic well. While much of our groundwater is quite good, there is a chance it may be contaminated by natural or human causes. Some of our local deep aquifers contain water that has naturally high concentrations of salts and other dissolved solids, including arsenic and uranium. Consuming water with high levels of arsenic has been connected with various types of cancer and other health effects. And, you can't tell if the water is contaminated simply by its appearance.

Local water purveyors must adhere to very strict rules under the EPA's Safe Drinking Water Act that regulate the quality of the water they provide. This includes the aesthetics of the water – smell, appearance and taste, as well as the health and safety of the product. However, private domestic water wells are not subject to these same rules. As such, your well water may not have been tested for harmful chemicals or received treatment to remove any harmful constituents that might be present.

According to Sue Donaldson, Water Quality Education Specialist at UNCE, well owners should test well water at least once a year for bacteria including tests for:

- **coliform**
- **E. coli**
- **fecal streptococcus**

At least every five years well owners should test their well's water chemistry and run a "**routine domestic water analysis**" that includes testing for arsenic, nitrite and nitrate.

A partial list of labs certified to perform these tests is outlined below:

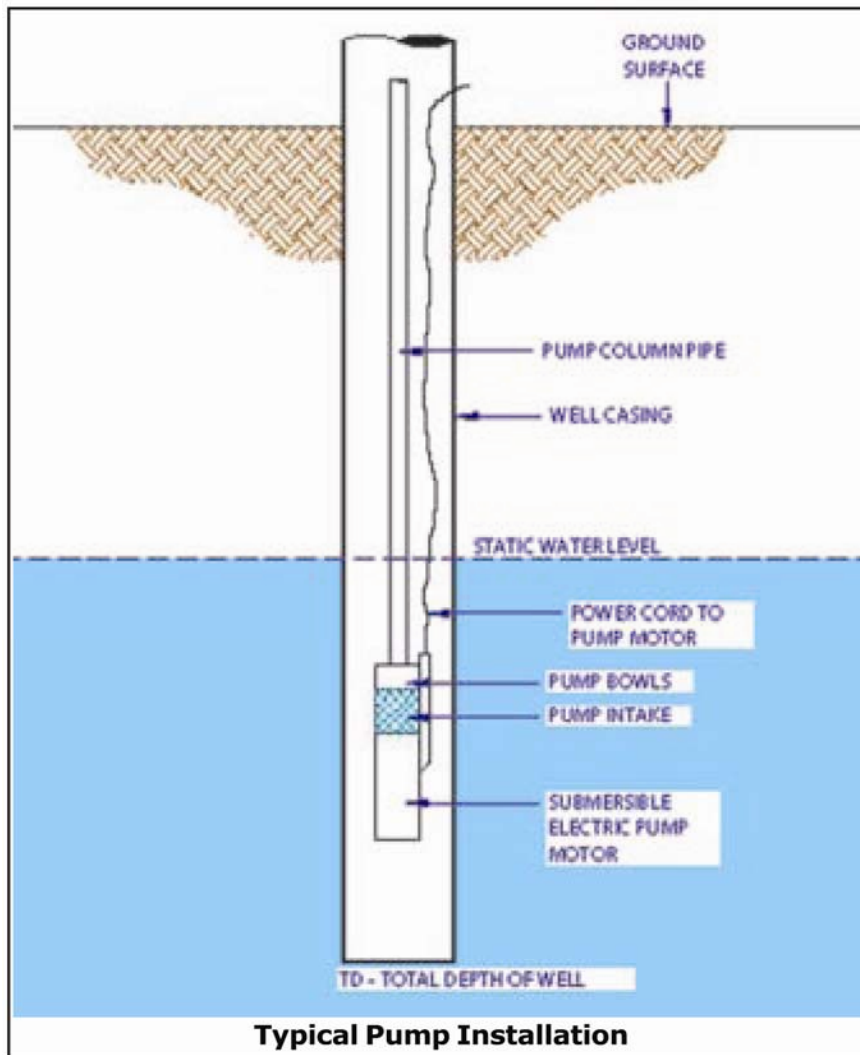
(Department of Water Resources does not endorse, certify, nor recommend any specific laboratory)

- **Nevada State Health Laboratory** - Stephanie Van Hooser 775-682-6205
- **Sierra Environmental Monitoring, Inc** - Joe Nava 775-857-2400
- **Western Environmental Testing** - Ginger Peppard 775-355-0202

A complete list of certified labs serving Washoe County and adjacent areas can be found by logging on to the Nevada Division of Environmental Protection's Web site at <http://ndep.nv.gov/bsdw/wells.htm>.

Should laboratory testing identify any problems with the quality of your well water, many treatment options are available to protect you and your family. For example, ultraviolet light and chlorination can be used to kill bacteria. Reverse osmosis filters can remove harmful metals. Activated carbon and other filters can address other types of harmful chemicals. Web sites like www.nsf.org (National Sanitary Foundation) and www.epa.gov/safewater (Environmental Protection Agency) can answer many of the questions you may have about well water safety and treatment options.

For more information on protecting the quality of your private domestic well water, please log on to University of Nevada's Cooperative Extension Web site at www.unce.unr.edu or feel free to call the Department of Water Resources at 775-954-4600.



Contact Information

Washoe County Ground Water Data Center:
775-954-4650

Washoe County Department of Water Resources: 775-954-4600

Nevada Division of Water Resources, State Engineer:
775-684-2800

Water Analysis guidance: The Nevada State Health Laboratory, 775-688-1335

Driller's Logs: available at <http://water.nv.gov>, look for the link on their home page.



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Water Resources



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Useful Terms

- ❖ **Domestic Well:** As defined in the Nevada Revised Statutes, a domestic well is for culinary and household purposes directly related to a single-family dwelling, including watering of a family garden and lawn and the watering of livestock and any other domestic animals or household pets if the draught does not exceed a daily maximum of 1800 gallons.
- ❖ **Groundwater:** Water below the surface of the land that is in the saturation zone.
- ❖ **Aquifer:** A geologic formation that yields enough water for beneficial use.
- ❖ **Well Bore:** The hole drilled into the earth that allows installation of the well.
- ❖ **Well Casing:** The pipe inserted into the well bore, usually 6- or 8-inch diameter steel.
- ❖ **Gravel Pack:** An gravel-filled space between the borehole wall and the well casing that filters water and stabilizes the hole.
- ❖ **Well Screen:** A perforated section of casing that allows water to enter from the aquifer
- ❖ **Static Water Level:** The groundwater level when the pump is off.
- ❖ **Pumping Level:** The water level in the well when the pump is on.
- ❖ **Drawdown:** The difference between the static water level and the pumping level.
- ❖ **Pump Setting:** The depth of the pump in the well.
- ❖ **GPM (gallons per minute):** Used to measure the rate at which a pump will move water out of the well (the flow rate).
- ❖ **Recovery Rate:** The amount of time it takes for the water level to return to the static level after pumping stops.
- ❖ **Stilling Well (also called a sounding tube or monitoring tube):** A pipe that runs alongside the pump that is used to lower a measuring device into the groundwater at the well site to measure water levels.

Domestic Well Monitoring and Maintenance Activity Sheet

Water Level Data

Date Measured	How Measured	Depth of Water	Well On or Off?

Well Repairs

Date Repaired	Type of Repair Done	Receipts?

Water Quality

Date Tested	Test Completed	Problems Noted

Well

Name of Driller, Phone Number	
Date Drilled	
Type of Well (dug, drilled, etc.)	
Location	
Capacity	

Pump

Name of Pump Installer, Phone Number	
Type of Pump	
Pump Capacity (gallons per minute)	
Brand Name, Serial Number and Model	
Depth to pump or intake line	
Date Purchased	