
ENVIRONMENTAL Fact Sheet



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Point Well Design

This document assumes the installation of a new point well is being evaluated for a domestic water supply source. Point wells are also called “washed wells.” In many cases there is relatively little choice in well type since this decision is primarily controlled by the type of soil and the height of the water table on your property. Suggestions concerning inspection of existing point wells can be found on the last page.

State Regulations: A person or firm in the well construction business must be licensed by the New Hampshire Water Well Board of DES. A homeowner can install their own well without a license. The Board requires the submission of a “well completion report” describing the well’s design and construction, the soil and rock conditions encountered, and the well’s yield within 90 days of the completion of the well installation.

State rules govern well construction and placement. These rules (We 100-1000) were originally adopted by the board in 1983 and subsequently revised. There are no state requirements concerning minimum well water quality or quantity for private domestic wells. However, when selling a home with an on-site water system, RSA 477:4-c requires disclosure of the water system’s location, malfunctions, date of installation, date of the most recent water test, and whether or not the seller has experienced a problem such as an unsatisfactory water test.

Local Regulations: Some municipalities have requirements relative to the placement, construction, water quantity, testing, or quality for private wells. Please contact your local health officer or code enforcement office for more information.

Evaluating a New Water Source: Determining How Much Water You Use

To determine needed well yield, you must first estimate your water demand. A typical household uses up to 5 gallons per minute (gpm) to meet modest domestic water needs. Factors to be considered when determining your household’s water demand include: the number of water uses that you have, their flow rates, how many of these uses could occur simultaneously and for what duration.

Determining How Much Well Yield is Needed

The minimum well yield that will satisfy your family’s water needs is more difficult to identify. As little as 2-3 gpm could be tolerated if there is adequate water system storage. A low yield well (for example 1 gpm) may be acceptable if there is meaningful storage; however, this is clearly a marginal situation with little factor of safety. There is no meaningful water “stored” within the point well casing. Meaningful storage could be achieved by the use of a large storage tank(s) in your basement or other location.

Large non-pressurized storage tanks can accumulate water during periods of non-use. An additional pump

will be necessary to pressurize this water. This option has additional expense, uses valuable floor space and is merely a response to a well that lacks normal capacity.

Seasonal Changes In Well Yield

The yield of a point well can be affected by drought and can also change with time due to clogging of the well screen and development in the upstream watershed. To reduce the risk of low water table effects the well point should be installed significantly below the anticipated seasonal low water table. It is not uncommon to have a 5-10 foot variation in elevation between the spring and fall groundwater levels. In order to maintain suction, the entire well screen must always be below the water table. If the water table drops below the well screen, the water pump will lose its prime and will no longer be able to raise the water out of the well. The seasonal high water table can be determined by soil experts based on the color profile of the soil. It is generally not possible to determine the seasonal low water table. However, licensed water well contractors who install wash and point wells may have this knowledge based on other wells they have constructed in the area.

Water Quality Considerations

Point wells experience iron, manganese and taste and odor conditions as often as bedrock wells. Point wells generally do not experience the arsenic, fluoride and radiological problems that are often seen in bedrock wells. Point wells are normally resistant to bacterial problems due to the high quality of their construction materials.

Well Placement and Protection

Since point wells usually receive their recharge water from the highest water table, they are typically sensitive to contaminants from those land use activities that take place in the immediate vicinity of the well. Examples of pollution hazards include the application or inadvertent spillage of fertilizer, pesticides, herbicides and inappropriate disposal of used motor oil, anti-freeze or solvents, or waste salt brine from water softeners. The use of chemicals in your backyard or that of your uphill neighbors may negatively affect the quality of the groundwater recharging point wells.

Tests for many of these chemicals involve complex and costly laboratory procedures. The best and least costly approach to protect the drinking water quality of a point well is pollution prevention rather than treatment. Be careful with the use and disposal of chemicals near and upstream of your well or the wells of others.

The following protective distances are required or recommended when locating a point well for a single family home:

- 1) Surface water and drainage culverts should not pass within 25 feet of a point well; 50+ feet is recommended.
- 2) Animals should not be penned or tied within 20 feet of a point well; 75+ feet is recommended.
- 3) Leach fields and septic tanks must not be located within 75 feet of a point well.
- 4) Point wells should not be located within 50 feet of the right-of-way line of roads, preferably more.
- 5) Point wells must not be placed within 75 feet of adjacent property which you do not control. (See RSA 485-A:30-b). If placement is made necessary within 75 feet, a standard release form is required to be signed by the well owner and given to DES, the town health officer and the registry of deeds. Since most zoning codes require a 10 foot setback from adjoining property, this distance is effectively 65 feet. For more information, see [WD-DWGB-21-4, "Best Management Practices for Well Drilling Operations."](#)
- 6) A point well should not be placed in a location subject to any flooding unless the immediate (25 foot radius) vicinity of the well is built up above the highest flood level.

Choosing the Type of Well to Construct

Based on the considerations above, such as soil depth, water quantity needs and existing pollution, a well type can now be chosen. In many cases, there is little choice since the choice of well types is largely influenced by the type of soil and the water availability on the property.

CONSTRUCTION OF A NEW POINT WELL

Point wells are typically driven with a percussion hammer or by hand, or “jetted” into the ground. Point wells are used exclusively in sand and gravel formations, also known as aquifers, where the water table is high and relatively stable year round. The presence of larger stones, cobbles or boulders will typically prevent the installation of a point well casing into the earth.

Contracting With a Point Well Contractor

Prior to actual installation, you will need to provide the contractor with guidance to govern the amount of work to be done. Normally, point wells are installed in accordance with a lump sum agreement. However, this method does not insure the deepest well unless that issue is specified as part of the agreement. The nature of all well installation contracts is strictly between the homeowner and the well contractor.

Excavation and Backfill

In general there is no excavation, per se, for point wells. The well screen is either hammered into the ground or a very small diameter hole is jetted into the soil by a high velocity jet of water. The point well should be installed as deep as reasonably possible to prevent drought impact. However, the suction capability of the pump must also be considered. Back fill around the top of the well point with very fine soils. Mound this material up around the location of the well point.

Apron

To insure adequate filtration of the water entering the point well, an impervious apron of clay or fine silt should be placed around the immediate well area. This apron should be approximately 3-5 feet wide. Finally, the apron should be loamed and seeded to assure a stable condition.

Configuration of The Upper Portion of the Well Point

The top of the point well has a “T” configuration. This configuration provides the ability to add chlorine to the well if needed and gives a clear visual indication of the well’s location. The entire assembly must be airtight in order for the water pump to maintain a vacuum within the well. Air entering a point well will cause a loss of vacuum and the inability to pump. A locking cap or other vandal proofing is recommended.

It is important to note that most existing well points, including some new wells, are installed in a well pit below ground surface. This is done to prevent freezing of the water service line exiting the well head and in some cases the well pump is installed at the well head inside the pit.

Water Supply Line

Provide a minimum of 5 feet of cover over the water line to the home for frost protection. Before backfill, take field measurements of the precise location of the well and the entire discharge line and then draw an accurate sketch. Place the sketch in a water proof envelope such as a sealed plastic freezer bag and attach it to your pressure tank or your water system control box. Seal the electrical conduit and waterline as they enter the home to reduce radon entry into the home and to keep groundwater out of the basement..

PUMPING FROM A POINT WELL

The typical pump for a point well is a centrifugal pump located in the basement of your home or in a

protective enclosure at the top of the well. The pump creates a vacuum within the well point. This vacuum pulls the water into the well and up and into the pump impellers. This configuration is subject to at least two operational limitations discussed below.

First, no matter how good the pump's vacuum, water can not be raised by suction more than approximately 32 feet at sea level. As a practical reality, conventional centrifugal pumps can only raise water by suction 20-25 feet. Where the water table is deeper than 25 feet below the centerline of the pump, conventional pumping equipment will not work. A "deep well" packer jet pump mechanism can be installed, although this requires a larger vertical casing/well screen, which creates more expense.

The second constraint occurs if the vacuum is lost by air entering the well point through leakage at the piping joints or because the water level is below the screen of the well point. Piping joints must be tight and the well point must be below the lowest seasonal water table.

ACTIONS AFTER CONSTRUCTION

Determining the Well's Safe Yield

The well's safe yield should be known. Once the point well has been installed, a pump test can be performed. The safe yield of a newly completed point well can be determined (and the well can be flushed) by pumping water continuously over a sustained period of 24 or more hours. The pumping rate should be measured by noting the number of minutes required to fill a container of known volume, such as a 20- or 32-gallon trash can. The water level within the point well casing can not be measured. However, if there is no air in the pumped water after sustained pumping, one can conclude that the point well screen is still fully below the water table and thus the pumping rate is sustainable.

The intent of the pump test is to develop an equilibrium between the amount of water being pumped out of the point well and the amount which is replenished naturally from the ground. The discharge should be piped at least 200 feet from the well and downhill, to prevent recycling or "double counting" of the available water. At the beginning of a pumping test on a new well, do not run the dirty water through plumbing or through a septic tank or leach field if it can be prevented.

If the drawdown in the well caused by the pumping has stabilized, the measured yield can be considered as the maximum safe yield of the well. This test should be run in the late summer or early fall when the groundwater table is at its lowest.

Disinfection - Chlorination

For a new point well or well pumps that have been recently repaired or replaced, it is most important to flush the well clean of silt (mud) before chlorinating or testing for bacteria. The well may have to be continuously pumped for days before this cleaning process is complete. Chlorine, regardless of its concentration, is not able to reach bacteria trapped inside accumulations of mud. We strongly advise that a bacterial test not be taken until the well has been thoroughly flushed.

To disinfect a point well, set aside 10 to 30 gallons of clean water in a clean trash can. Take off the point well cap and add 1 to 2 quarts of sodium hypochlorite. Then pour the clean water into the well casing so as to disperse the chlorine down to the well screen. One gallon of 5.25 percent sodium hypochlorite (common household bleach) in 1,000 gallons of water will provide a good disinfecting solution of 50 parts per million. Secure the well cap and re-establish the pump prime. Run each faucet in your home until a chlorine smell is detectable. Close the faucets and allow the chlorine to stay in the well and the plumbing for 12-24 hours. For more information, please read fact sheet: [WD-DWGB-4-11, "Disinfecting a Private Well."](#)

Testing New Wells for Water Quality

After all the chlorine is flushed from the well and plumbing system, a sample can be taken for bacterial and chemical testing. Remember all chlorine must be flushed from the well. The presence of chlorine in water sample containers means that the sample can not be tested for bacteria or nitrate/nitrite. The presence of chlorine can be checked by using a chlorine test kit. These kits are available from swimming pool supply stores.

For a discussion of which water quality factors to test for in private wells, visit http://des.nh.gov/organization/divisions/water/dwgb/well_testing/documents/well_testing.pdf. DES recommends that a bacterial sample be taken annually for point wells due to their shallow construction. A standard analysis is recommended once every five years for chemistry.

INSPECTING EXISTING POINT WELLS

When inspecting an existing point well, look for any defects or openings in the well casing that will allow foreign substances or small animals to enter the well casing. Look for uneven settling around the well point. Point wells typically have very reliable bacterial quality. Any opening in the casing will break the vacuum, preventing pumping and thus giving notice of the problem.

FOR MORE INFORMATION

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or dwgbinfo@des.nh.gov or visit our website at <http://des.nh.gov/organization/divisions/water/dwgb/index.htm>. All of the bureau's fact sheets are on-line at <http://des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>.

Note: This fact sheet is accurate as of August 2010. Statutory or regulatory changes or the availability of additional information after this date may render this information inaccurate or incomplete.