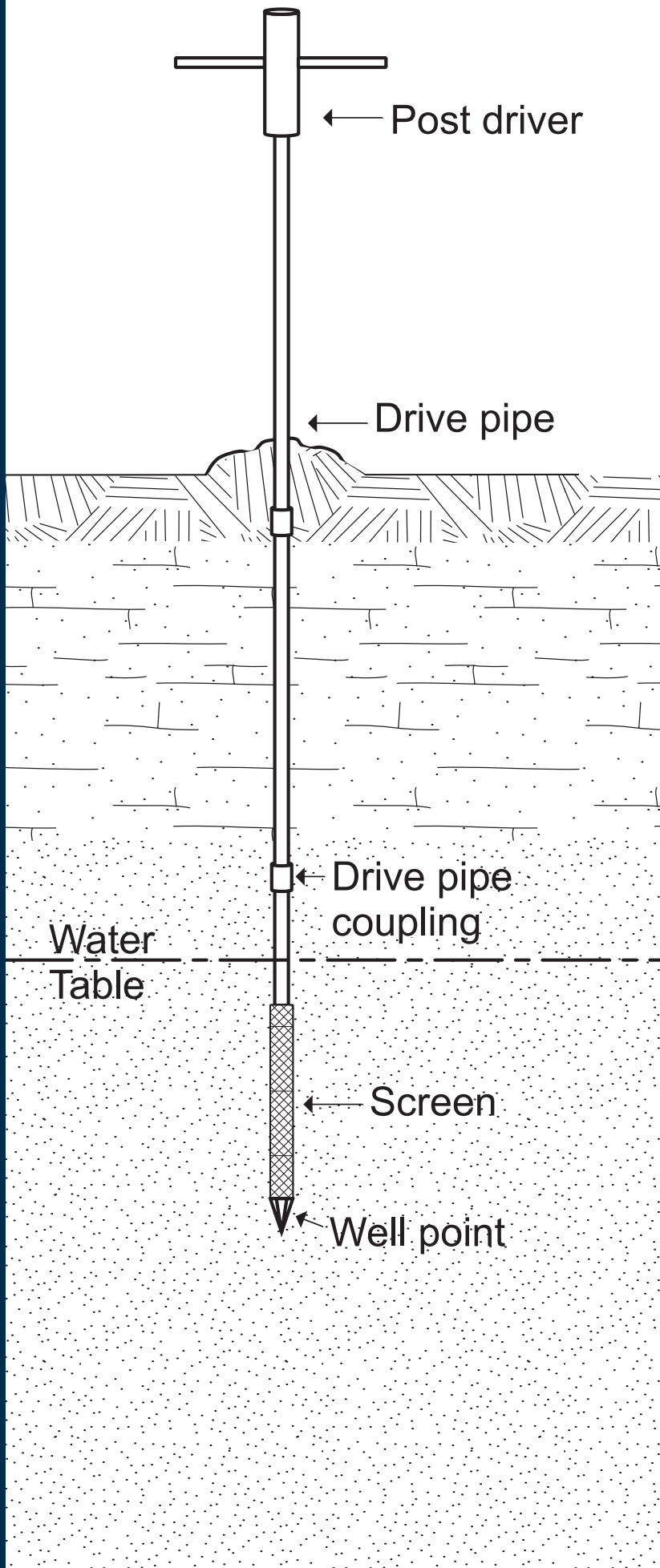
Driven Point (Sand Point) Wells



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What Is A Driven Point Well?

A driven point well — sometimes called a **sand point well** — is a small-diameter well made by connecting lengths of 1-1/4-inch or 2-inch diameter steel pipe together with threaded couplings. Threaded to the bottom of the string of pipe is a drive point well screen. The screen is usually two to three feet long with a hardened steel tip or drive point at the bottom.

The screen allows groundwater to flow into the well but keeps the surrounding sand out. Water can then be pumped up through the pipe to the surface. The hardened steel drive point tip allows the well to be more easily driven into the ground. The pipe and drive point resemble a long spear. Installation of a driven point well begins by driving the point and a single length of pipe into the ground. A special fitting called a drive cap is threaded onto the top of the pipe to protect the pipe threads while driving and to prevent contaminants from entering the pipe. Sometimes a shallow starter hole is dug or augured at the ground surface to accommodate the pipe lengths and facilitate the starting of the driving process.

Driving is often done by hand using a post driver — a short length of weighted steel pipe with handles. Some well-point installers use mechanical, motor-operated equipment with a tripod and pulley set up to raise and lower the heavy driver. Sections of steel pipe are added as the pipe is driven deeper into the ground. This is continued until a sufficient depth below the water table is reached.

In many areas of Wisconsin, a driven point well can be an alternative to a larger diameter drilled well. Installed properly using a high-quality drive point, it can provide an adequate supply of safe drinking water, especially for cottages and many residences. However, because of installation limitations, driven point wells are usually only found in areas having permeable sandy soils and a high water table. These same conditions can make both driven point and drilled wells and shallow groundwater susceptible to contamination from land use activities. Contaminants, especially chemical contaminants, can easily migrate down through permeable sandy soils, enter the groundwater and move into a well. But if properly located and constructed, and taking into consideration the land use in the immediate area, driven point wells can offer protection from most types of contaminants, especially biological contaminants like bacteria.

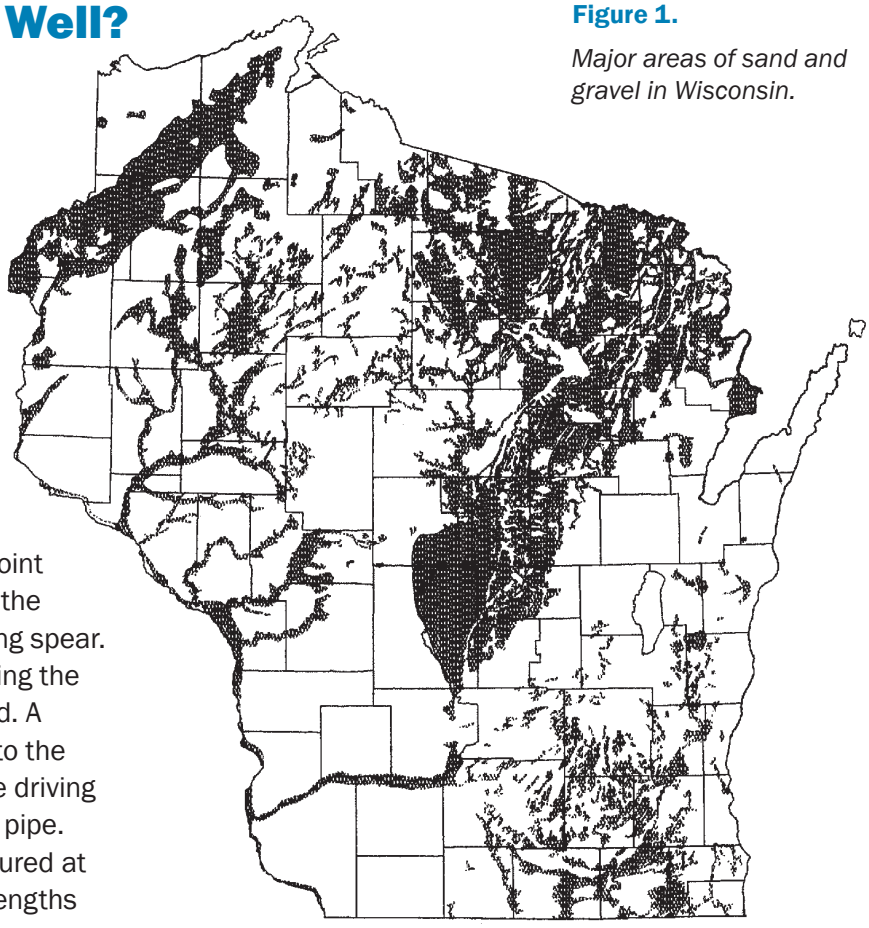


Figure 1.

Major areas of sand and gravel in Wisconsin.

The map (**Figure 1**) will help you determine if you are in a predominantly sandy soil area where driven point well installation is more likely. However, sandy soils alone will not guarantee the successful installation of a driven point well. If the water table is deep, it may not be physically possible to drive the well point deep enough to reach it. Large boulders or layers of tightly compacted soil like clay or hardpan may be encountered that effectively stop the driving process.

Further, though clay can hold a lot of water, the clay particles are too closely packed to allow water to flow through it into a well. Depth to the water table is another very important consideration when installing a driven point well. Although a 1-1/4-inch diameter well pipe can be used when the water table is less than about 20 feet below the ground surface, a 2-inch diameter pipe must be used when the water table is deeper than 20 feet. This is because different pumps and pumping equipment vary in their ability to draw water from various depths. A shallow well pump can only draw water from a maximum depth of about 20 feet, and for these shallow water table depths, a

1-1/4-inch diameter well pipe is sufficient. A deep-well pump installation is necessary if the water table is deeper than about 20 feet. Two-inch diameter pipe is necessary to accommodate a jet and packer assembly to be installed in the well pipe itself. This assembly allows the water to be drawn from depths up to about 100 feet. However, be aware that pumps lose efficiency as the pumping depth increases.

Water use is another factor to consider when deciding what type of well to install. Many homes today have numerous modern conveniences such as automatic clothes washers, dishwashers, garbage disposers and two or three bathrooms. Some people water gardens and lawns. All create increased water demand, often at higher pressures. If higher water use is anticipated, a drilled well with a submersible pump installation is often a better, more energy-efficient alternative to a driven point well.

Who Regulates Driven Point Wells?

The construction of driven point wells and the installation of pumps for them are regulated by the Wisconsin Department of Natural Resources (DNR). Specific rules are in the Wisconsin Well Construction and Pump Installation Code (Chapter NR 812). This code, originally passed in 1936, was one of the first well codes in the country and has been used as a model for rules in other states. Wisconsin is recognized as a national leader in well protection. A major code revision (8th edition) went into effect on July 1, 2020.

The well code is based on the sound premise that if a well is properly located and constructed and pumping equipment is properly installed, the well should provide bacteriologically safe water without the need for disinfection treatment.

Several counties have been delegated authority to regulate portions of the well code. Some of these counties require a Well Location Permit before a well may be installed. **Check with your county before proceeding with well construction: dnr.wisconsin.gov/topic/Wells/delegatedcounties.html**

Email **DNRWELLREPORT@wisconsin.gov** to obtain a driven point well packet, which includes a well construction report and water sample form. You can also call 608-266-1054 to request the packet.

When Is Approval Required Prior To Construction?

A DNR notification number is required prior to construction and prior to any screen replacement that requires pulling the drive pipe. You may obtain a DNR notification number online for new and replacement water wells and heat exchange wells on **GoWild** (gowild.wi.gov). Be sure to print a copy for your records. A second option is to visit one of the 1,500 locations throughout Wisconsin where hunting and fishing licenses are sold. You will receive a receipt for your records, which displays a DNR notification number. Also, some DNR-approved county ordinances require that a well permit be obtained prior to construction. See “Contact Us” on page 12 for more information.

Who May Construct A Driven Point Well?

You do not have to be licensed to install driven point wells. Anyone may install these wells, provided there is no preliminary excavation or starter drill hole constructed deeper than 10 feet before driving of the point begins. Further, the work must be done in one mode of operation. That is, the screen must be attached to the pipe before the assembly is driven into the ground. Any other type of well construction must be done by a licensed Wisconsin well driller, except that a property owner may construct any type of well on their property. Regardless of who installs the well, the installation must meet the specifications of the well code (NR 812) for well location, well construction, pump installation and finishing operations. A pump for a driven point well must be installed by a licensed pump installer.

What Are The Well Installer's Responsibilities?

The well constructor must locate and construct the well in compliance with the well code requirements. Upon completion of the well construction or reconstruction, the installer of the well must test pump the well, disinfect and flush it, collect a water sample for coliform bacteria and nitrate and submit a well construction report. Email **DNRWELLREPORT@wisconsin.gov** to obtain a driven point well packet, which includes a well construction report and water sample form. You can also call 608-266-1054 to request the packet.

What Are The Pump Installer's Responsibilities?

A pump installer must install the pitless adapter (if used), the pump, the pressure tank and other associated piping and equipment in compliance with the code; disinfect the pump distribution system after installation, flush it, take a water sample for bacteriological analysis (as described in one of the latter sections of this document) and report the results to the owner. The pump installer may delegate the water sample collection to the owner or another agent.

For What Types Of Uses Are Driven Point Wells Allowed?

Driven point wells are allowed for the same uses as private drilled wells, including:

- Private residential wells serving six or fewer homes and serving fewer than 25 year-round residents.
- Non-community water supplies such as restaurants, taverns and gas stations, etc., but not for schools. (School water supplies require DNR approval and driven point wells are not usually allowed.)
- Non-potable wells: wells not used for drinking or sanitary purposes. (Non-potable wells must be installed according to the same standards as potable wells).

Where Must A Driven Point Well Be Located?

The well code location requirements for driven point wells are the same as the requirements for private drilled wells.

The basic well location requirements are as follows:

Highest Point On Property

- The well must be located on the highest point of the property consistent with the general layout and surroundings if reasonably possible. In any case, the well must be protected against surface water flow and flooding and not be directly down slope from a contamination source on the property or on an adjacent property. The well may be side gradient from a contaminant source if surface water that flows over the contaminant source does not flow within eight feet of the well.

Basement Location Prohibition

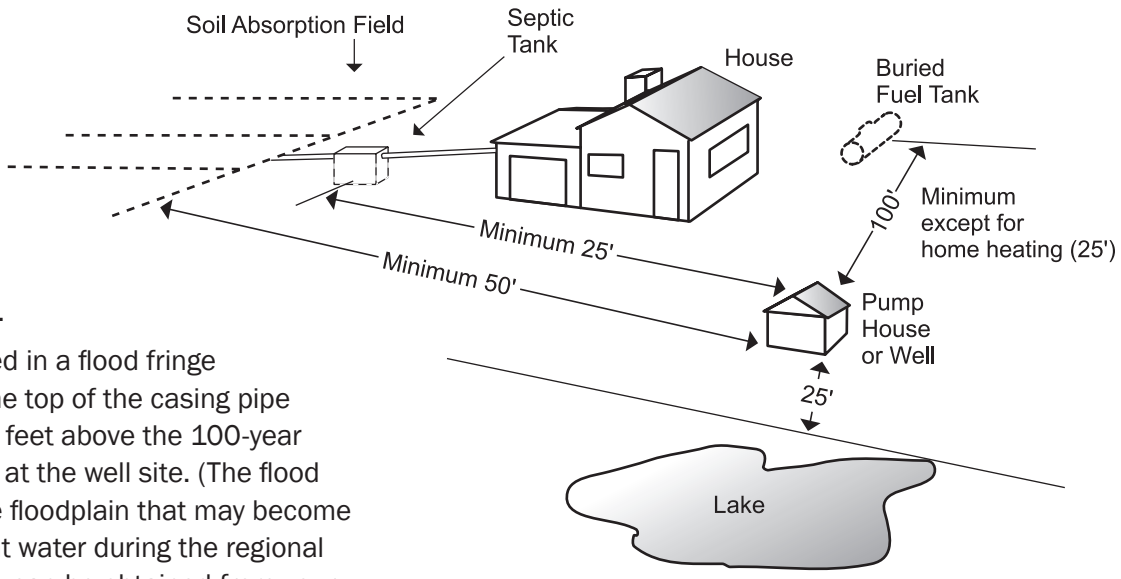
- The well must not be in a basement, unless it is installed in a walkout basement, i.e., a basement that is at ground grade on one side of the house. A well located in a basement is subject to contamination from the backup of sewers and from spills of fuel oil and other products in the basement. Further, terminating a well in a basement effectively reduces the casing depth and, thus, the sanitary protection provided by the casing. Wells have not been allowed in non-walkout basements since April 10, 1953.

Pit Prohibition

- The well must **not** be in an unapproved pit. Pits for new wells have been prohibited without special approval since April 10, 1953. A pit is also not a sanitary location for a well. A pit can easily flood and contaminate a well. Pits became obsolete for providing frost protection for a well with the invention and use of pitless adapters in the 1930s and '40s. (A pitless adapter is a piece of equipment that provides an underground connection to a well for the pump piping that extends below frost depth into the basement.)

Floodplain Locations

- The well must not be installed in a floodway. A floodway is a part of a river valley floodplain that becomes inundated with the actual flowing floodwater during the regional 100-year flood.



- The well may be installed in a flood fringe of a river floodplain if the top of the casing pipe is terminated at least 2 feet above the 100-year regional flood elevation at the well site. (The flood fringe is that part of the floodplain that may become inundated with stagnant water during the regional flood.) (Floodplain maps can be obtained from your County Zoning Department.)

Separation Distance Requirements

The well must be properly separated from sources of well contamination by the minimum setback distances as specified by the well code. For example, the well must be at least:

- Eight feet from a building sewer pipe or storm sewer.
- Not in line with downspout or any clear water discharge.
- 25 feet from a septic or holding tank.
- 25 feet from a lake, pond or ditch.
- 50 feet from the nearest edge of a septic soil absorption system or mound system.
- 25 feet from municipal sanitary sewers and private collector sewers.
- 50 feet from the nearest existing or future gravesite in a cemetery.
- 50 feet from animal yards.
- 100 feet from any buried petroleum tank, including associated piping, except that only 25 feet of separation is required for a buried fuel oil tank if the tank is used only for private residential heating.
- 1,200 feet from any existing, proposed or abandoned landfill site.

Note: This list is not complete. See **NR 812.08 Table A** *for a complete listing (docs.legis.wisconsin.gov/code/admin_code/nr/800/812.pdf).*

Screen Replacement

- The well code defines screen replacement as new well construction. When the screen for an existing driven point well in a basement or a pit becomes plugged, it may not be legally replaced. The well must be properly abandoned and filled, and a new well must be constructed outside in a complying location.

What Are The Well Construction Requirements?

- **Minimum depth:** The string of well casing pipe — not including the screen — must extend to at least the 25-foot depth or to at least 10 feet below the static water level, whichever is the greater depth. This is the same minimum casing depth as required for private drilled wells. (The static water level is the normal depth of standing water in the well before the well is pumped.)
- **Casing pipe:** The well casing pipe must be steel or steel-galvanized and must meet the well code specifications for dimensions and weights and the appropriate ASTM or API standards. (ASTM A53, A106, A589 or API 5L, 5LX, 5D or 5CT. One of these standards designation must be either marked on the pipe or available from the supplier.)

- **Screen:** Any standard metal drive point screen may be used for driven point wells. Plastic screens may **not** be used for driving. The screen does not have to be continuous-slot. However, screens having a lead content of greater than 8% by weight cannot be used. Experience has shown a high-quality, continuous-slot stainless steel screened well point will provide efficient, trouble-free service for the longest time.
- **Minimum Diameter:** There is no minimum diameter for driven point wells installed with a shallow well pump. Atmospheric pressure of about 14.7 pounds per square inch allows a shallow-well pump to pull water up from a maximum depth of only about 20 feet (**Figure 2**). However, if you know the pumping water level will be deeper than about 20 feet, then you must use a drive pipe having a minimum diameter of at least 2 inches. This is necessary because the drive pipe must be large enough to accommodate a packer-jet assembly to be installed within the pipe to enable the pump to pull water up from a greater depth (**Figure 3**).

  Remember, you are **not** allowed to construct a pit to bring the pump closer to the water table, enabling you to use a shallow well pump.
- **Termination Height:** The well casing drive pipe must be terminated to extend at least 12 inches above the permanent ground grade.

  If you plan to landscape around the well, be sure to leave some extra pipe so that the final pipe height is at least 12 inches above the ground.
- **Cap:** The top of the drive pipe must be sealed with a vermin-proof cap, such as a threaded cap, to prevent the entry of insects and mice. Many pumps are directly connected to the well pipe, as shown in **Figure 4**. A sanitary well seal with compressible gaskets must be used for such installations.

What Are The Pump Installation Requirements?

- **Discharge types:** Several types of installations are allowed for the discharge piping from a driven point well.
  - **Above-ground discharge:** With this method, the water is discharged through the top of the well pipe above ground level. The well may be in:
    - An above-ground building or pump house (**Figure 4**).
    - A walk-out basement of a house. (A walk-out basement is the first floor of a house built into the side of a hill.) Wells may **not** be in true, non-walkout basements.
    - Outside, unprotected for warm season operation (**Figure 5**).
    - Outside, protected with an insulated structure (**Figure 6**).
    - Outside, protected with an outer protective casing (**Figure 7**).
  - **Below-Ground Discharge Using A Pitless Unit:** The pitless unit must be department-approved and must allow for pressurized concentric piping — the suction pipe within a larger pipe — between the well and the building.
    - The annular space between the concentric piping must be pressurized under water pressure by installing a seal-cross fitting or a flange adapter (**Figure 2**).
    - Installations having non-pressurized concentric piping are **not** allowed.
    - The pitless unit must be installed to a depth necessary to prevent freezing.
- **Sampling faucet:** An accessible faucet must be installed on the water line between the pump and the pressure tank. The faucet must be at least 12 inches above the floor of the building or basement to allow for the filling of sample bottles. The faucet must have a smooth end. This discourages the attachment of hoses to the faucet, preventing the possibility of back-siphoning of contaminants into the water system.

- **Pumps:** Methods of installation. There are several methods for the installation of pumps for driven-point wells:
  - Direct connection of the pump to the top of the well pipe for both shallow and deep well pumps. The well can be in a building or outside for warm seasons.
  - Offset connection using horizontal pressurized concentric piping if the well is installed outside with the pump offset in the basement (**Figures 2 and 3**).
- **Pump Types:** Two pump types are generally used:
  - Shallow-well jet suction pump for water levels less than about 20 feet deep (**Figure 2**).
  - Deep-well type pump with a packer-jet assembly for water levels deeper than about 20 feet. The minimum well diameter for this type of pump is 2 inches to accommodate the installation of the jet assembly in the well (**Figure 3**). This type of pump can be used efficiently for wells having pumping water levels down to about 70 to 100 feet.

What Must Be Done After The Well And Pump Installation Are Completed?

Upon completion of the well and the pump installation, the installer is required to:

1. Test pump the well to determine the capacity in gallons per minute (GPM). For a residence, the well should produce at least about 4 GPM, but 8 to 10 GPM is better especially if many plumbing fixtures are used in the home. If the well is a low producer of water, this problem can often be overcome by installing a larger pressure tank.
2. Disinfect the well using a chlorine solution having a chlorine concentration of at least 100 parts per million.
3. Flush the well to remove all traces of the chlorine disinfectant.
4. Collect a water sample for a coliform bacteria and nitrate test, submit the water sample to either the State Lab of Hygiene or an independent laboratory that provides the DNR with a copy of the test results and provide a report of the sample results to the owner within 30 days following completion of the analysis. (The DNR recommends the water sample also be tested for nitrate.)
5. Submit a report for the well on a well construction report form to the DNR and provide the owner or their agent with a copy of the report within 30 days of completion of the well.

How Should A Driven Point Well Be Filled And Sealed?

When the well is contaminated, is noncomplying, poses a hazard to health, has not been used for 90 days or is in a pit or basement, it must be properly filled and sealed. Only a licensed well driller or pump installer may do this work.

The licensed well driller or pump installer is required to submit a completed **Well Filling and Sealing Form** online within 30 days following the completion of the filling and sealing. (Visit **apps.dnr.wi.gov/warspub/Report** to access the form.)

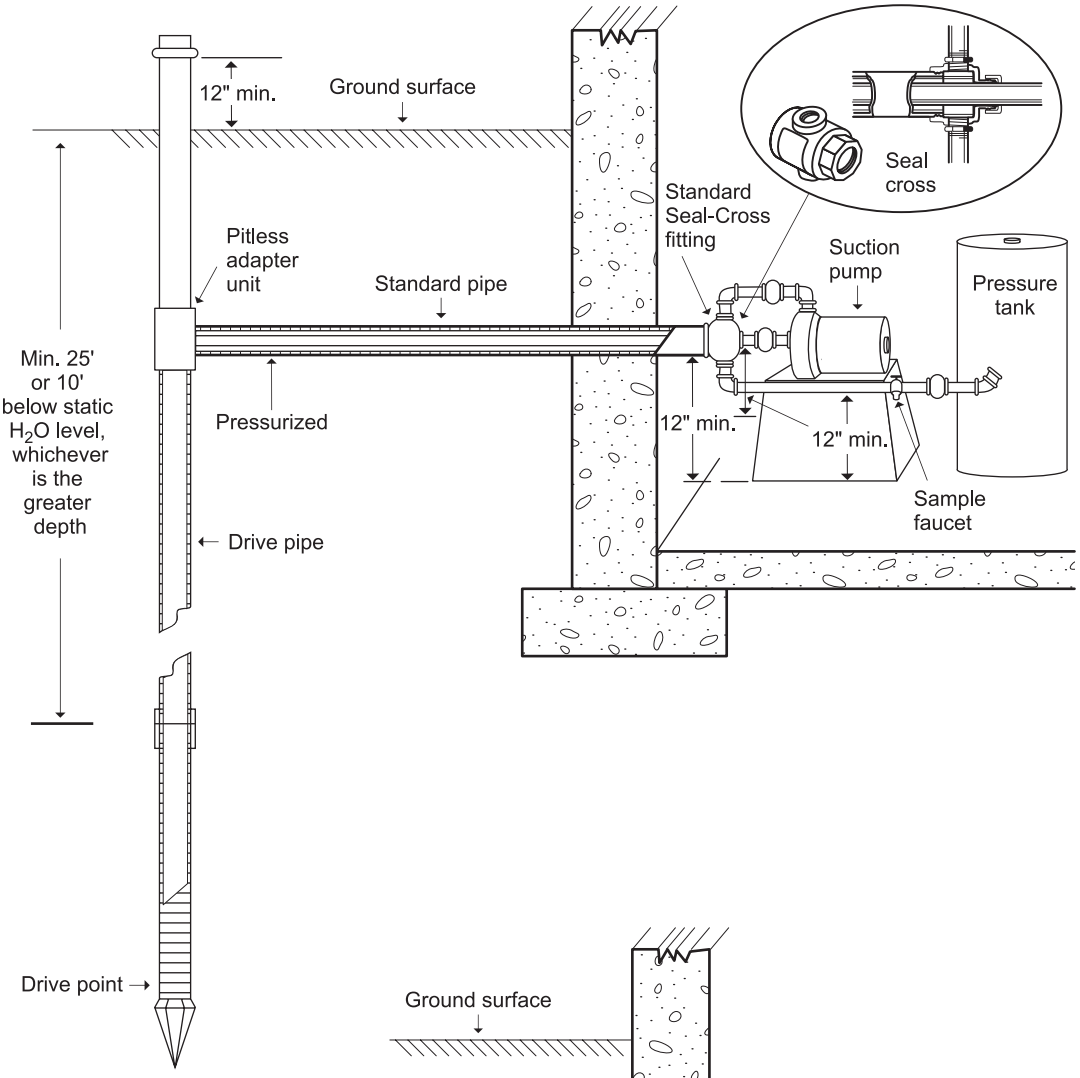


Figure 2.

Shallow-well pump installation.

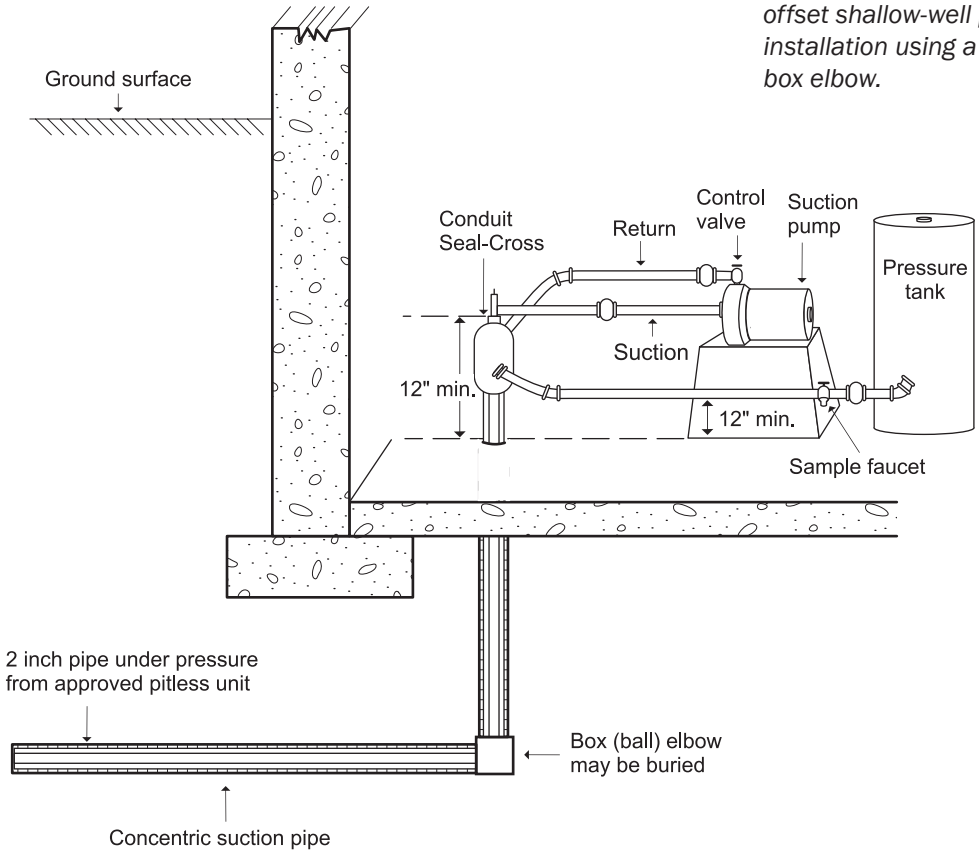


Figure 2a.

Alternative installation for offset shallow-well pump installation using a buried box elbow.

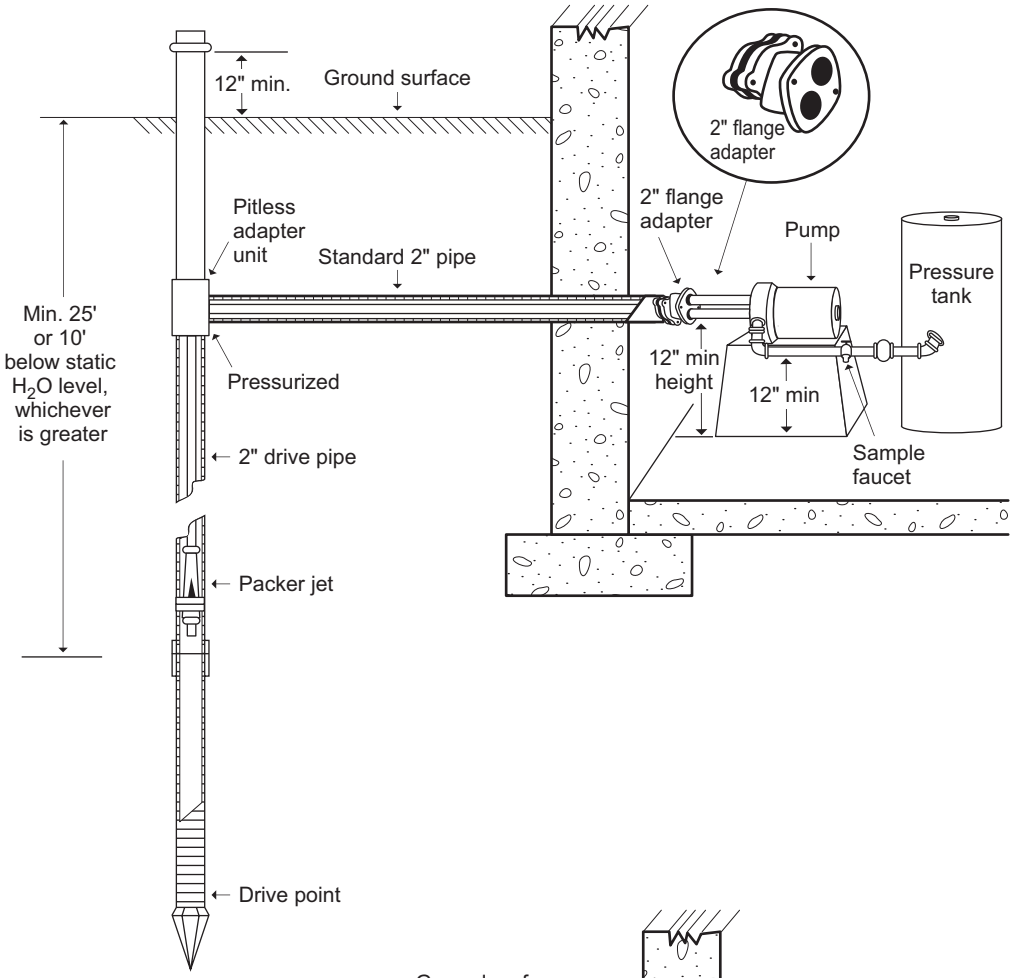


Figure 3.

Deep-well offset pump installation using a packer-jet assembly in a 2-inch diameter well.

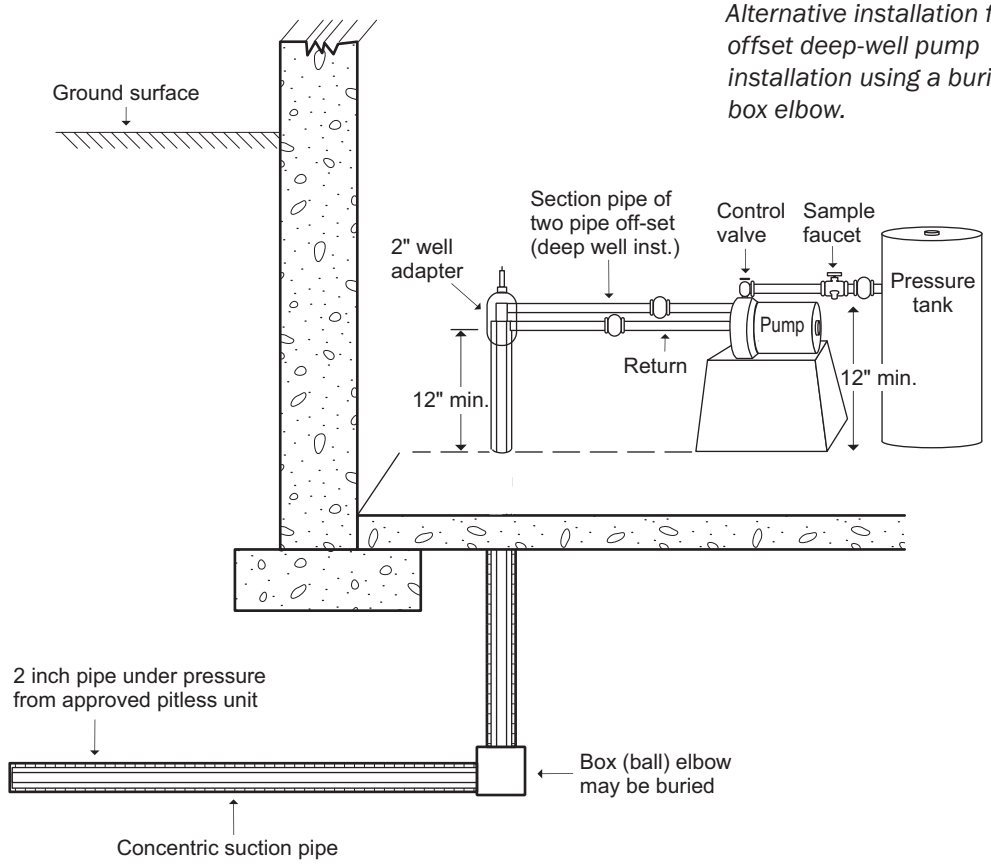


Figure 3a.

Alternative installation for offset deep-well pump installation using a buried box elbow.

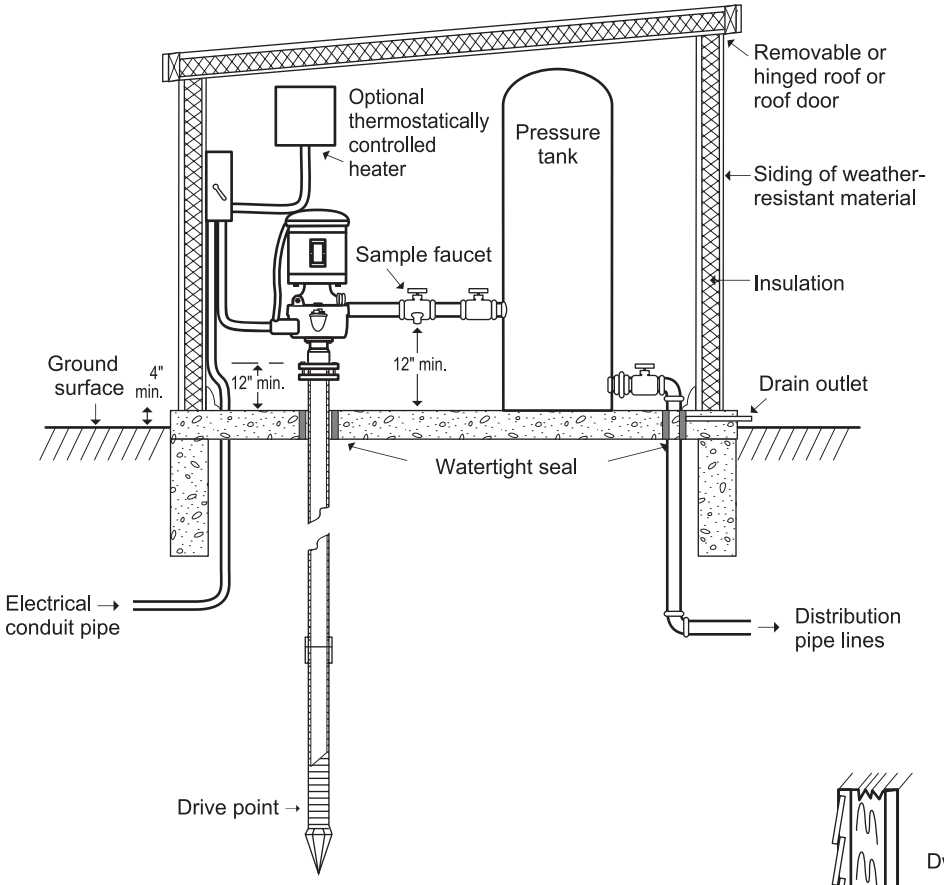


Figure 4.

Above-ground discharge using a pumphouse.

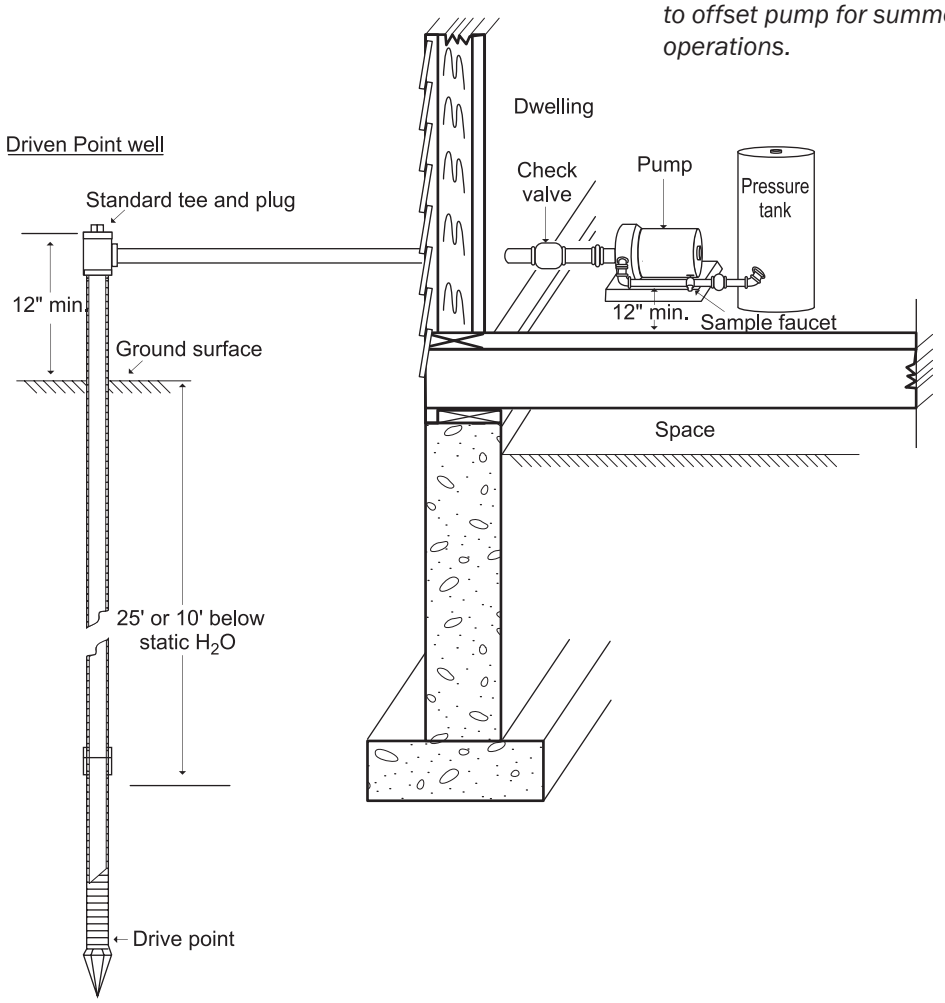


Figure 5.

Above-ground discharge to offset pump for summer operations.

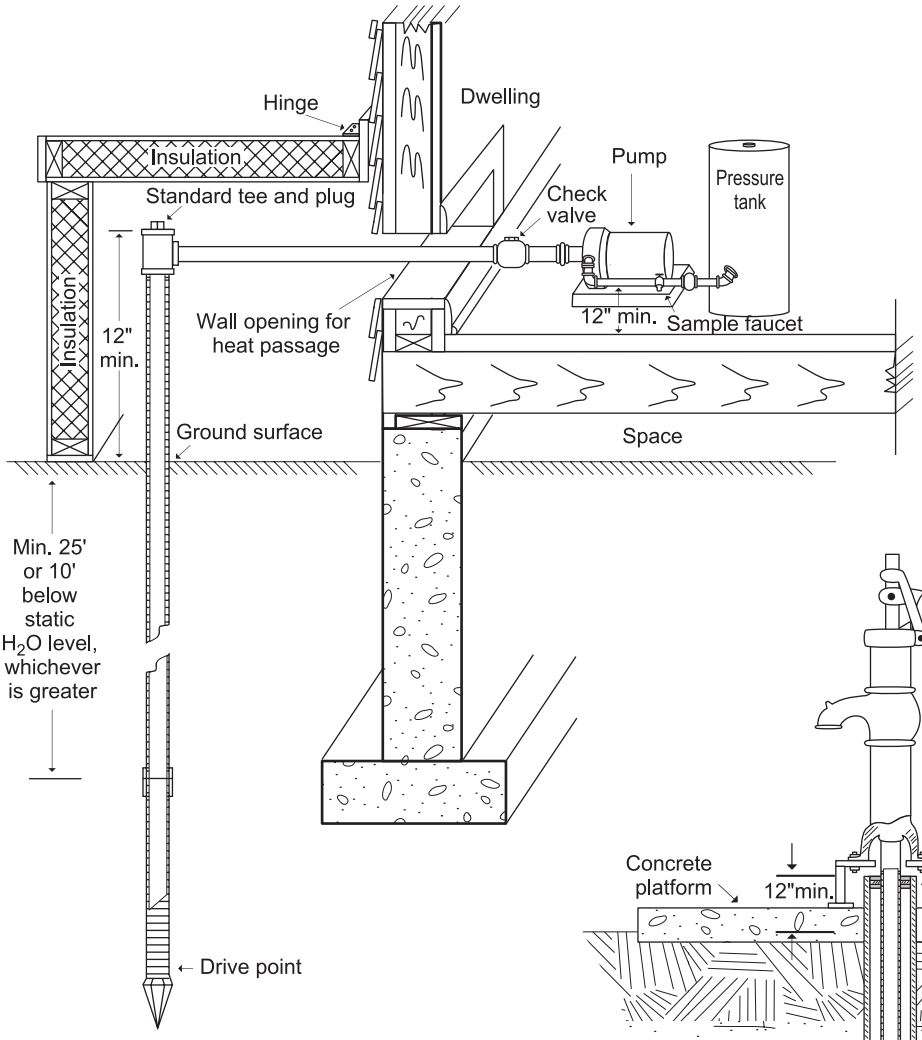


Figure 6.

Above-ground discharge is protected with an insulated enclosure for all-season operation.

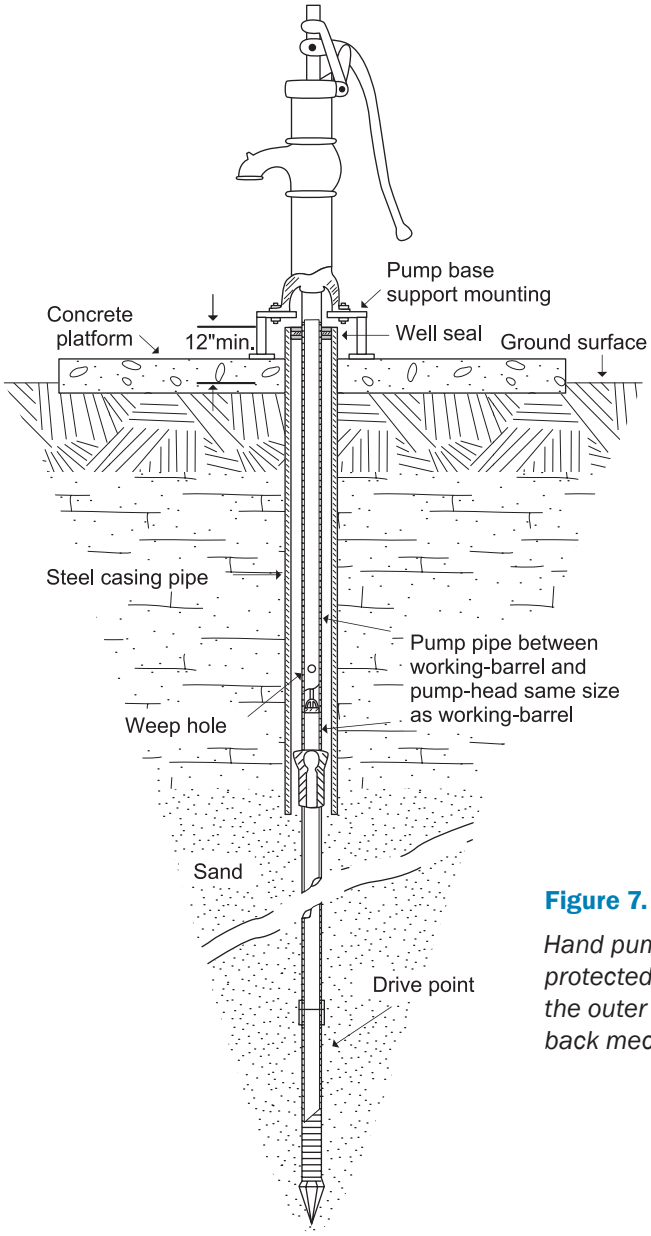


Figure 7.

Hand pump installation protected from frost with the outer casing and drain-back mechanism.

Contact Us

Customer service staff are here to assist you.

Toll-free: 888-WDNRINFO (888-936-7463)

Violation Hotline: Call or text 800-847-9367 to confidentially report suspected wildlife, recreational and environmental violations.

Emergency spill hotline: 800-943-0003 (phone bilingual services are available).

Contact us: dnr.wisconsin.gov/contact

County Well Delegation Program:

Information For Delegated Counties

dnr.wisconsin.gov/topic/Wells/delegatedcounties.html

Directory Of Participating Counties

dnr.wisconsin.gov/sites/default/files/topic/Wells/CountyWellDelegationContacts.pdf

Drinking Water & Groundwater Program
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Find more information on our webpage about **drinking water**.

dnr.wisconsin.gov/topic/DrinkingWater

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