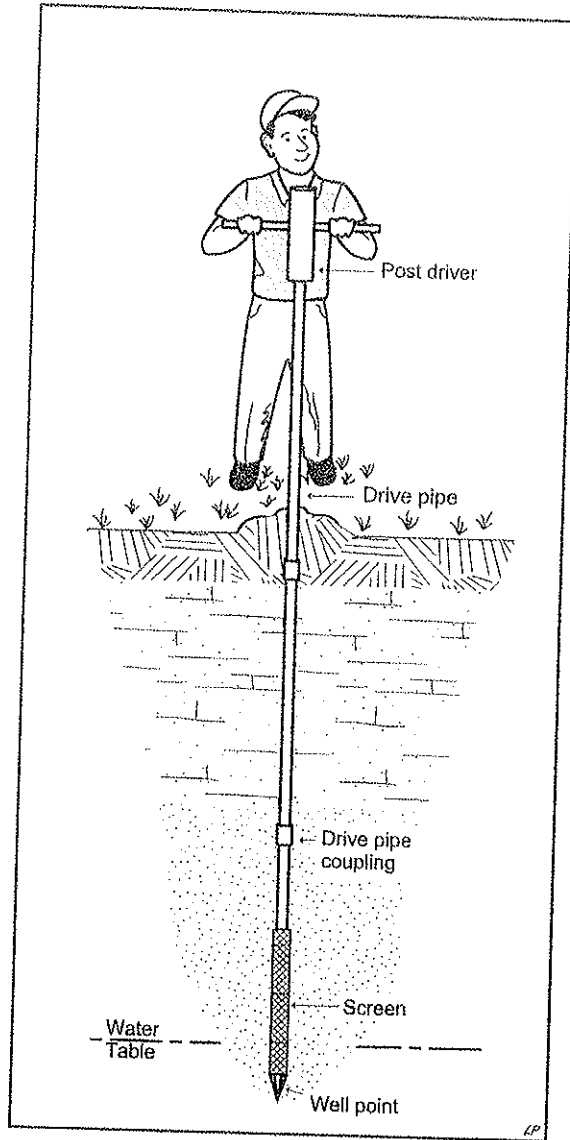


# Driven Point (Sand-Point) Wells



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## What is a driven-point well?

A driven-point well — sometimes called a “sand point” — is a small diameter well made by connecting lengths of 1-1/4" or 2" 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 2 to 3 feet long with a hardened steel tip or “drive-point” at the bottom. The purpose of the screen is to allow groundwater to flow into the well but keep 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

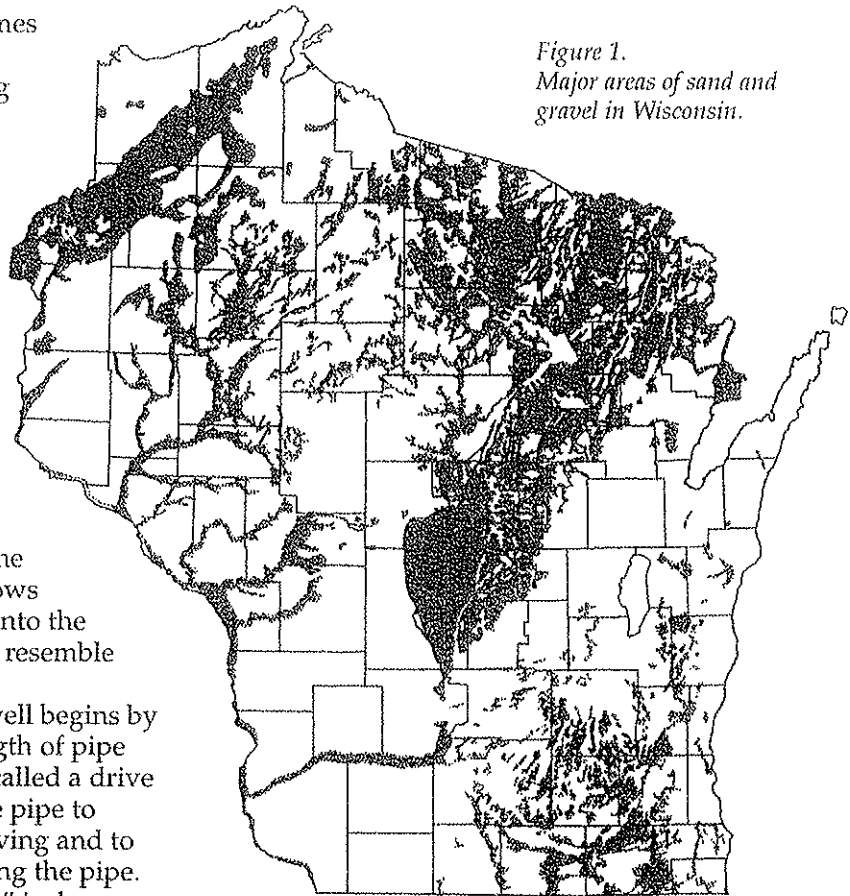


Figure 1.  
Major areas of sand and gravel in Wisconsin.

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.

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 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. Local governmental agency offices, such as the Natural Resources Conservation Service or County Zoning, are other sources of information about local conditions, as are neighboring property owners who already have wells, and, of course, your local water well contractor.

Depth to the water table is another very important consideration when installing a driven-point well. Although 1-1/4" diameter well pipe can be used when the water table is less than about 20' below the ground surface, 2" diameter pipe must be used when the water table is deeper than 20'. 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', and for these shallow water table depths, 1-1/4" diameter well pipe is sufficient. A deep-well pump installation is necessary if the water table is deeper than about 20'. 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'. 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.

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## Who regulates driven-point wells?

The construction of driven-point wells and the installation of pumps for them are regulated by the Department of Natural Resources. 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 (5th Edition) went into effect on February 1, 1991.

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 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.

For additional well code information you may contact Drinking Water and Groundwater staff at the DNR Regional Offices throughout the State or your local licensed well driller or pump installer. The locations and phone numbers of these offices are listed at the end of this brochure. If you are in a delegated county, you may contact the County Health or Zoning Department for more information.

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## 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 drillhole 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 his/her 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, except when the pump is installed by the owner for his/her residence. The pump must also be installed according to the code requirements no matter who installs it.

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## 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 bacteriological analysis and submit a well construction report. (For more detail on these requirements refer to one of the latter sections of this brochure).

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## What are the pump installer's responsibilities?

A pump installer must install the pitless adapter unit (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 brochure); and report the results to the owner. The pump installer may delegate the water sample collection to the owner or another agent.

The owner of the water supply may do his/her own pump installation work for their well on their own property provided the work is done in a code-complying manner.

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## For what types of uses are driven-point wells allowed?

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

- ▼ Private residential wells serving 6 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 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).

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## 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.

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### 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, but 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 contaminate source provided that surface water that flows over the contaminate source does not flow within 8 feet of the well.

#### Basement Location Prohibition

- ▼ The well must **not** be located 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 back-up 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 located 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 that 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 DNR regional offices or from your County Zoning Department.)

### Separation Distance Requirements

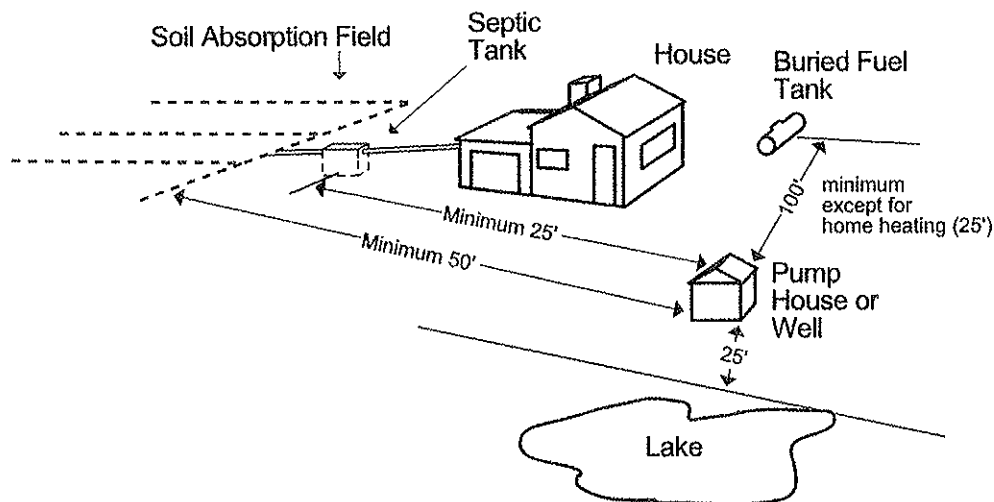
- ▼ The well must be properly separated from sources of well contamination by the minimum "setback" distances as specified by the well code. For example the well must located be at least:
  - ▼ 8 feet from a cast iron or acceptable plastic building sewer pipe or 25 feet from building sewers made of other materials.
  - ▼ 8 feet from a "clear water drain" (for example: a rain water downspout outlet or foundation drain discharging to the ground).
  - ▼ 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.

- ▼ 50 feet from municipal sanitary sewers, private collector sewers, or storm sewers.
- ▼ 50 feet from the nearest existing or future grave site 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.
- ▼ 250 feet from an absorption, storage, retention or treatment pond, sludge disposal area, ridge and furrow system, or spray irrigation waste disposal site.
- ▼ 1,200 feet from any existing, proposed, or abandoned landfill site.

*Note: This list is not complete. See appendix for complete listing.*

### Screen replacement

- ▼ The well code defines screen replacement as well reconstruction. When the screen for an existing driven-point well in a basement or a pit becomes plugged, the screen 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.



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## 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 also must not 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 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. (See Figure 3). Remember, you are **not** allowed to construct a pit to get the pump closer to the water table to enable 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 do landscaping around the well,

be sure to leave some extra pipe so 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 that will prevent the entry of insects and mice. Many pumps are directly connected to the well pipe as, for example, in Figure 4. A sanitary well seal with compressible gaskets must be used for such installations.

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## 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 located in:
    - ▼ An above-ground building or pump house (Figure 4).
    - ▼ In 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 located 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 filling of sample bottles. The faucet should have a smooth end or, if threaded, the threads must be filed off. 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 located 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 in order 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.

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## 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. For a residence, the well should produce at least about 4 gallons per minute, but 8 to 10 gpm is better especially if many water using 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 bacteriological test; submit the water sample to either the State Lab of Hygiene or an independent laboratory certified for bacteriological testing 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 Department of Natural Resources and provide the owner or his or her agent with a copy of the report within 30 days of completion of the well.

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## How should a driven-point well be abandoned?

When the well is contaminated; is noncomplying; poses a hazard to health; has not been used for three or more years, or is in a pit or in a basement, the well must be abandoned by being properly filled and sealed. A license is not required for an individual or a firm to do this work.

Driven-point wells must be filled with neat cement grout—a fluid mixture of Portland cement and water mixed in the ratio of one 94-pound bag of cement to 6 gallons of water. The material may be poured into the top of the well pipe until the well is filled. Any settling within the pipe must be made up afterwards. Bentonite clay chips may not be used to fill driven-point wells because they can bridge too easily within the pipe. The drive pipe may be left in place, but it can be pulled prior to filling of the well if the well is 25 feet deep or less.

A well abandonment form (form 3300-5B or 5W) must be completed and submitted to the DNR regional office within 30 days following completion of the abandonment.

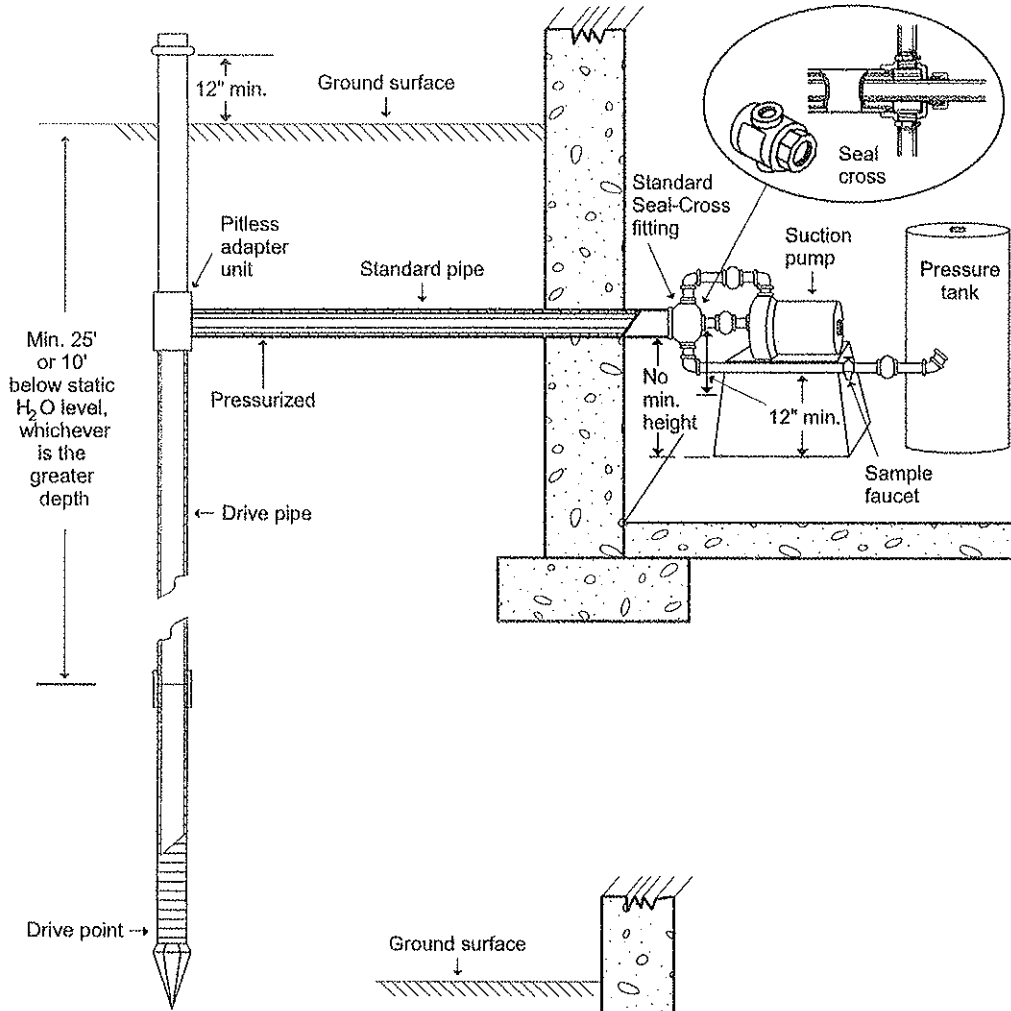


Figure 2.  
Shallow-well  
pump installation.

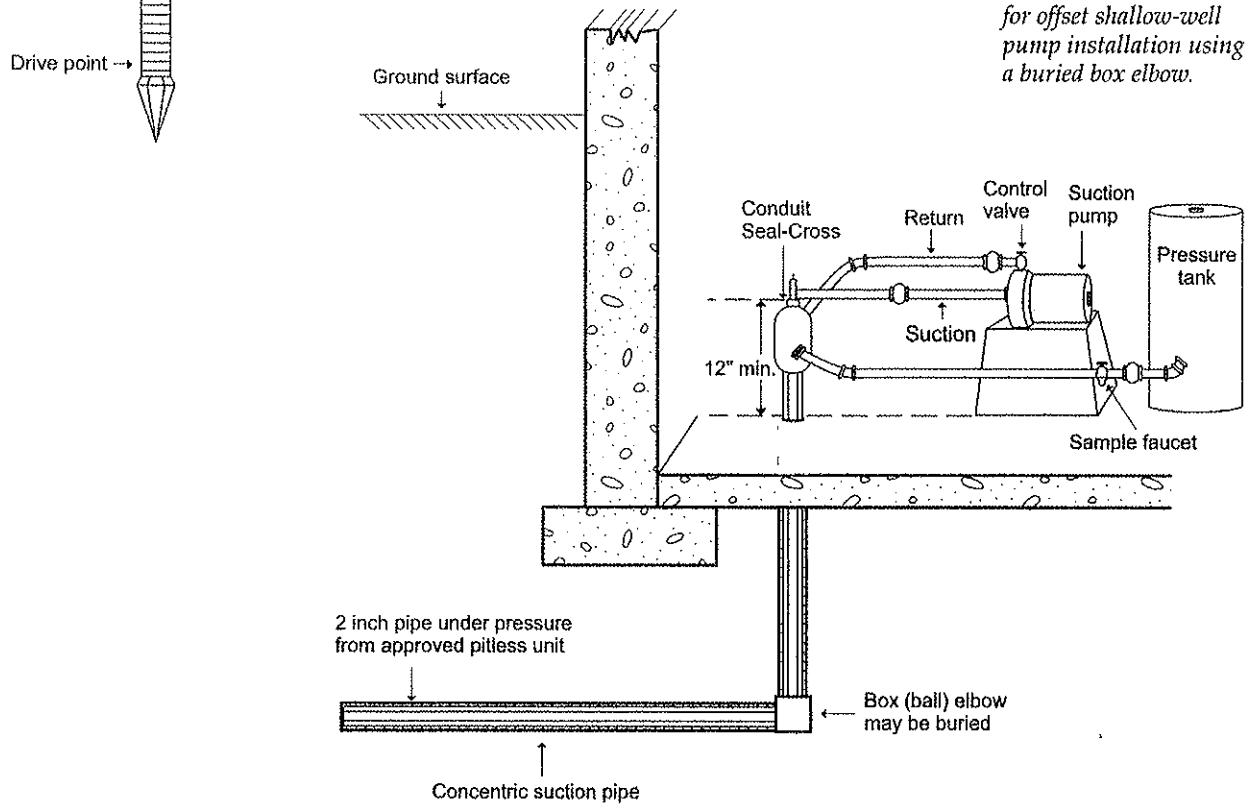


Figure 2a.  
Alternative installation  
for offset shallow-well  
pump installation using  
a buried box elbow.

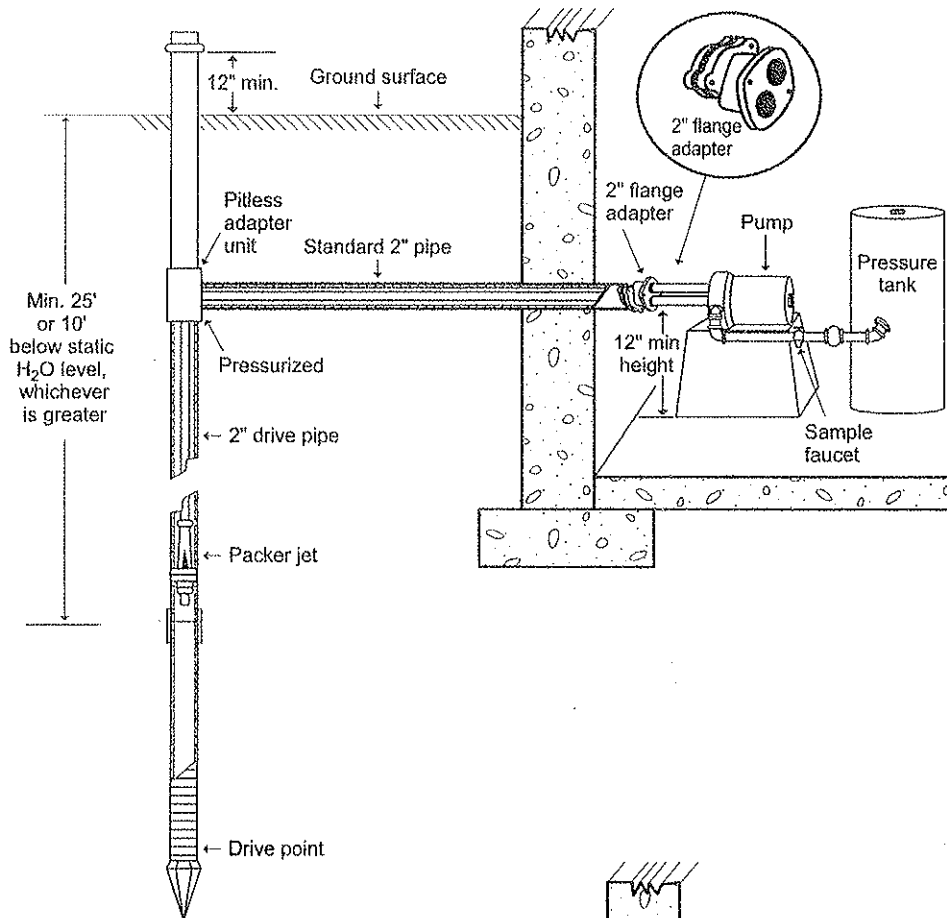


Figure 3.  
Deep-well offset pump  
installation using a  
packer-jet assembly in  
a 2" diameter well.

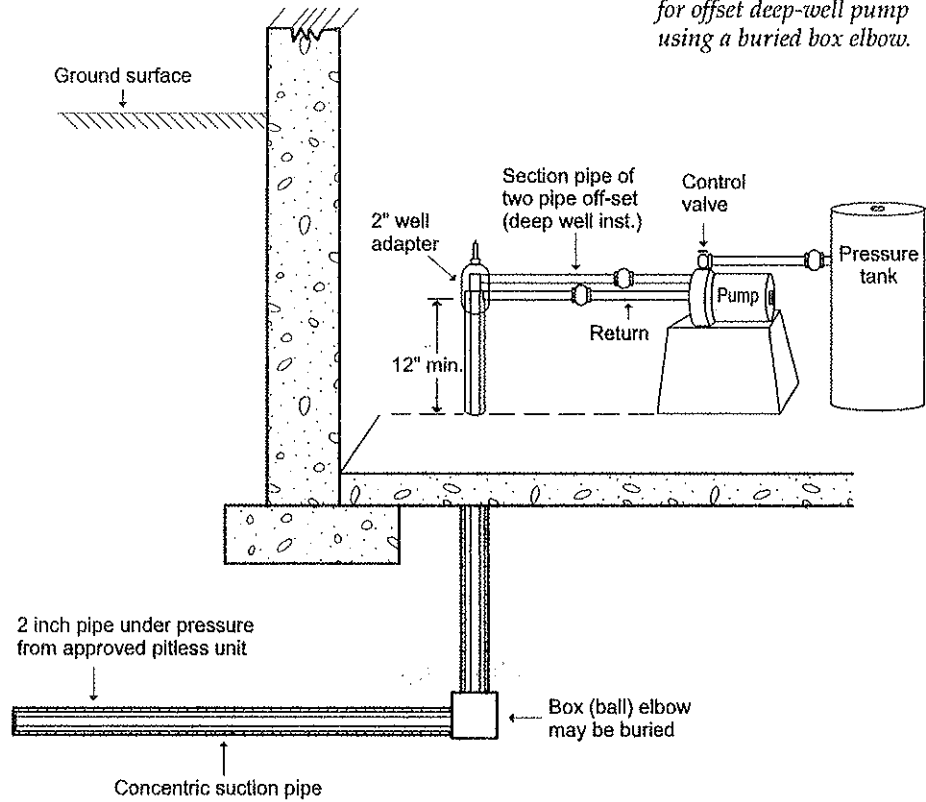


Figure 3a.  
Alternative installation  
for offset deep-well pump  
using a buried box elbow.

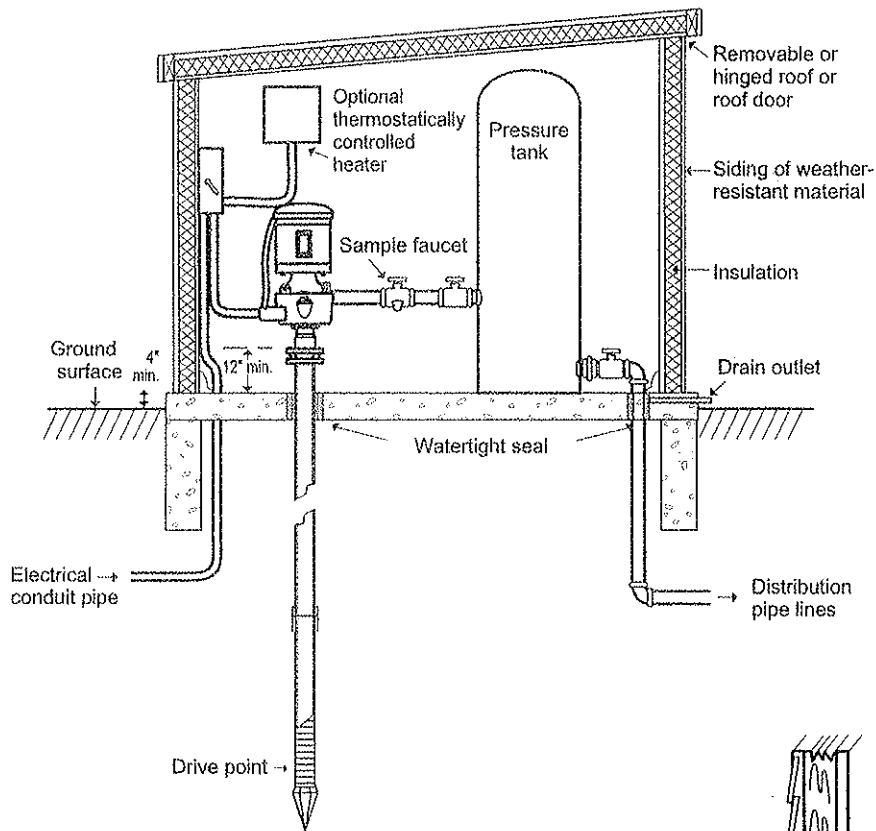


Figure 4.  
Above-ground discharge  
using a pumphouse.

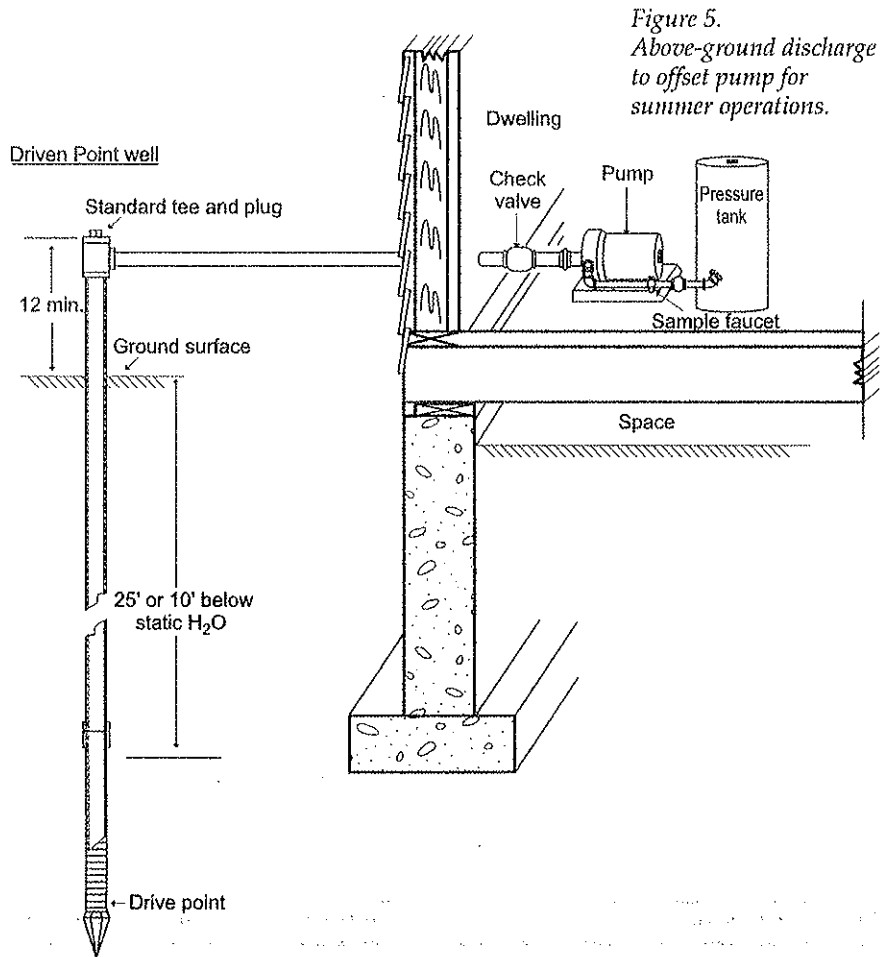


Figure 5.  
Above-ground discharge  
to offset pump for  
summer operations.

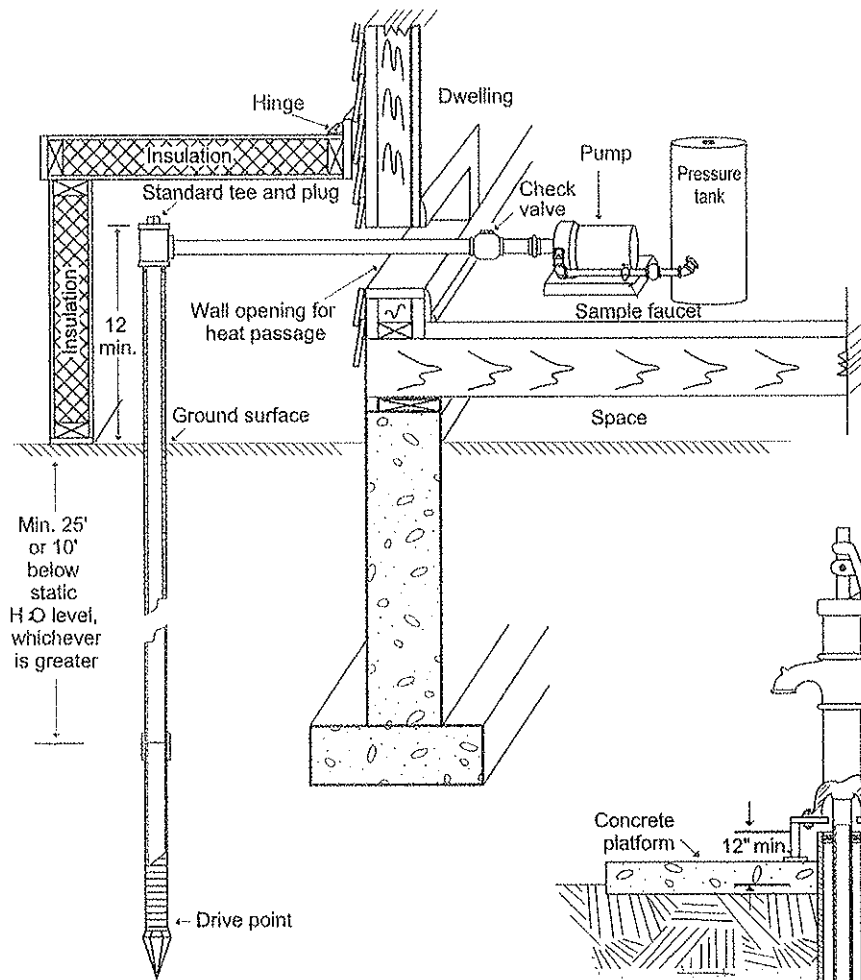


Figure 6.  
Above-ground discharge  
protected with insulated  
enclosure for all  
season operation.

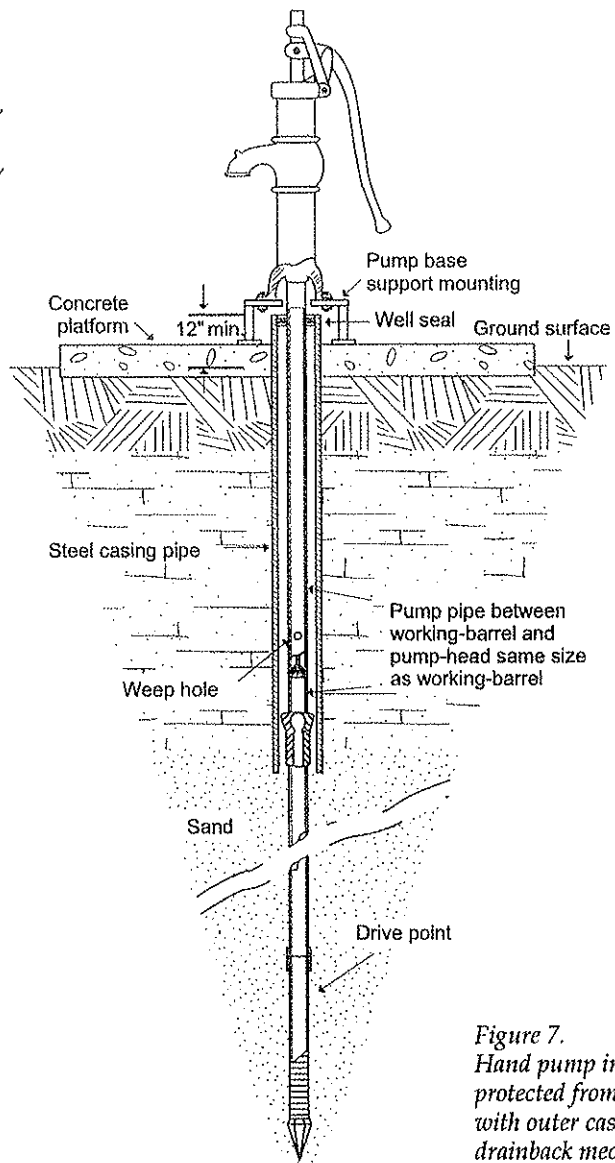


Figure 7.  
Hand pump installation  
protected from frost  
with outer casing and  
drainback mechanism.