

## PLUGGING ABANDONED WELLS

### Unplugged abandoned wells are a safety, health, and environmental threat

- They are a safety hazard. Each year the Department of Environmental Quality (DEQ) receives reports of people, mostly children, falling into old wells. Injury or death can result.
- They pose a health concern by acting as conduits for contaminants to move from the surface, through the earth's protective formations, into deeper aquifers. Drinking water contamination has been caused by abandoned wells.
- They threaten the environment. Deteriorated well casings or open, uncased boreholes allow movement of water between previously separated aquifers. This can degrade water quality. Abandoned wells have also been used for illegal waste dumping.

The DEQ recommends that property owners hire registered well drilling contractors to plug abandoned wells. Registered well drillers have the specialized training and equipment necessary to properly plug abandoned wells.

### What is an abandoned water well?

The Groundwater Quality Control Act, Part 127, 1978 PA 368 (state well code) defines an abandoned water well as a well that:

- has its use permanently discontinued.
- is in such disrepair that its continued use for obtaining groundwater is impractical.
- has been left uncompleted.
- is a threat to groundwater resources.
- is or may be a health or safety hazard.

Examples of abandoned wells that must be plugged are wells that are not operational or wells that are taken out of service when connection is made to a community water supply.

### If I connect to a community water system what can I do with my well?

Properly plugging the old well is the preferred option. Plugging the well protects the drinking water aquifer and limits the property owner's liability for ground water contamination. The state well code requires "A well that is abandoned when municipal water is installed shall be plugged." In addition, some county, local, and municipal jurisdictions have ordinances that prohibit the retention of private wells when structures are connected to municipal water service.

To retain the existing well for irrigation, car washing, or other uses, it must be restored to operational condition. Plumbing changes are required to physically separate the structure's domestic water piping served by the community water system, from the piping connected to the well. A cross connection inspection and approval from the public water utility, the plumbing inspector, or the local health department is required when water service is initiated. Where existing wells will be retained for non-potable purposes, well construction upgrades are recommended, but are not mandatory.

### Who is responsible for plugging abandoned water wells?

The property owner is ultimately responsible for plugging an abandoned water well. An unsuccessful water well (commonly known as a "dry hole") is normally plugged by the well drilling contractor.

### Who can plug a well?

A property owner may plug a well only at his/her residence. A well drilling contractor or his/her employee may plug a well at any residence, farm, industry, business, or other public water supply.

Farms often have associated, but not necessarily, contiguous properties that have structures served by water wells. These outlying farm wells are considered the same as the farmer's residential well and may be plugged by the owner.

## How to locate abandoned wells on your property

Begin by searching for water well drilling records or old billing statements that show well depth and well location. Information of this type on your well may be available from the contractor who drilled or serviced the well, or the local health department.

If there are no records available for your well, you can look for signs on your property such as: pipes sticking above ground, pipes sticking through wall or floor in the basement, electrical switch boxes out in the yard, cement pits in or under sheds, windmills, old crock, brick, or stone structures, old hand pumps. For additional information on locating abandoned wells, refer to the How to Locate Abandoned Wells factsheet.

## For locating buried wells

Metal detectors may be used to find buried steel well casings. First, locate where the old water line exited the home or building. From this point, survey the ground with the metal detector moving away from the structure. Use a marker to designate the location of any "readings" you get. Usually, well casings will be 4 to 5 feet below grade and will be located between 3 and 25 feet from the home.

Neighbors and senior citizens who have lived in the area for a long time are an excellent source of information. They often know where old wells are located. If you take advantage of their input you may save yourself a lot of work.

## Preparing the well to be plugged

Pumps, drop pipe, pump rods, packers, wire, check valves, and all other debris or obstructions must be removed from the well before plugging. Due to the equipment necessary, this often requires the services of a registered well drilling contractor. Failure to remove obstructions from the well can result in void spaces in the column of plugging material. Following removal of the obstructions, the depth and diameter of the well must be measured before plugging to allow the drilling contractor or well owner to calculate the amount of plugging material necessary to fill the entire depth of the well.

## Plugging methods

Well type and site geology affect the requirements for plugging abandoned water wells. Each well type has specific plugging requirements.

- Drilled Wells in Sand or Gravel Formations: Bentonite grout slurry, neat cement slurry\*, or dry bentonite chips or pellets may be used to plug wells with screens in sand and gravel formations. All slurry grouts must be placed using a "tremie" pipe that runs to the bottom of the well. The slurry may be pumped or poured using a funnel into the tremie pipe. The tremie pipe should be removed after or during the plugging process.
- Wells in Bedrock Formations: Neat cement must be used to plug bedrock wells. A pump and tremie pipe, which runs to the bottom of the well, is necessary. The tremie pipe should be removed as the neat cement is pumped into the well or after cement appears at the surface. Bedrock wells should be plugged by registered well drilling contractors.
- Hand-driven Point Wells: These small diameter wells (normally 1¼ inch diameter) may be plugged by carefully dropping bentonite chips or pellets into the top of the well casing or by pouring a slurry of neat cement through a funnel and tremie pipe extending to the bottom of the well.
- Dug wells: These large (12 to 48 inch diameter) wells are made of cement crock, brick, stone, or tile. A 6 inch layer of bentonite chips or pellets shall be placed at the bottom of the well. The remainder of the well shall be plugged by placing clean soil backfill\* layers that are not more than 10 feet thick, with a 6 inch layer of bentonite chips between backfill layers. The upper 3 to 4 feet of stone, brick, cement crock, or curbing must be broken up and removed. A final 6 inch layer of bentonite must be placed 3 feet below finish grade, then the remainder of the hole backfilled and crowned in a manner that will prevent settling or ponding of water over the old well site.
- Flowing Wells: Because of their unique characteristics, flowing wells should be plugged by registered well drilling contractors. Neat cement must be used to plug flowing wells. Its heavy slurry weight is needed to overcome the artesian pressure of flowing wells and to provide a permanent seal.

For additional information regarding plugging abandoned wells, refer to the Michigan Abandoned Water Well Plugging Manual on the DEQ water well construction website at [www.michigan.gov/deqwaterwellconstruction](http://www.michigan.gov/deqwaterwellconstruction).

*For information or assistance on this publication, please contact the Office of Drinking Water and Municipal Assistance, through the DEQ's Environmental Assistance Center at 800-662-9278. This publication is available in alternative formats upon request.*

*This publication is intended for guidance only and may be impacted by changes in legislation, rules, policies, and procedures adopted after the date of publication. Although this publication makes every effort to teach users how to meet applicable compliance obligations, use of this publication does not constitute the rendering of legal advice.*