

MASTER WELL OWNER NETWORK

A program of the Penn State College of Agricultural Sciences and Cooperative Extension

5 PARTS OF SANITARY WATER WELL CONSTRUCTION

In Pennsylvania, the construction and maintenance of private water wells aren't regulated by any state agency. While some local mandates exist, it is primarily up to the private well owner to maintain their well to ensure a safe drinking water supply.

Anything that ends up on the ground's surface – animal waste, sediment, fertilizer, chemicals – has the potential to be washed into wells with surface runoff after rain events. To help lessen the possibility that drinking water isn't contaminated by surface water runoff, there are several well features to consider.

1. Well casing extending 12 inches above the ground surface. Making sure the casing is extended, helps keep surface water from entering the well. If your well is lower than the ground or buried in a pit, a well driller may be able to help with extending the casing above the surface.

2. Ground sloping away from the wellhead. If the ground around your wellhead is sloped gently away from your wellhead and casing, this will also help surface water to runoff away from your well and reduce the possibility of contamination.

3. Well casing to bedrock. This is a well construction feature that needs to be in place when the well is drilled. Having the well casing extend to bedrock also helps to create a barrier between surface water runoff. Casing can also be professionally inspected with down-well cameras to check for leaks or damage.

4. Grout seal. When a well is drilled, a grout seal – usually made of bentonite clay material – can be put in place around the casing. The grout material expands and creates a tight seal against the casing to further reduce the influence of surface water runoff. Grout is usually not used on private wells in Pennsylvania unless it is required by local ordinances or requested by the homeowner.

5. Sanitary well cap. Newly constructed wells are not automatically installed with sanitary caps and must be

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A sanitary well cap provides another layer of protection against surface influences reaching your well water supply. Photo credit: Bryan Swistock

requested by the well owner. This is a feature that can be installed on an existing well. Most wells have a standard well cap that leaves an air gap between the well casing and the cap. This air gap allows for insects, vermin, and surface water to potentially enter a well. A sanitary well cap has a rubber gasket to allow for a tight seal with the well casing and also a screen that allows for necessary airflow. A well owner can purchase a sanitary cap from a well driller or from hardware stores or online sources. It can be installed by a well driller or by a well owner with some electrical skills.

Less than 20% of wells in Pennsylvania have all five of these features, but even having a few in place can help reduce surface water impacts on private water supplies. For more detailed information on this topic visit: <https://extension.psu.edu/sanitary-water-well-construction>.

Susan Boser, Water Resources Educator, Penn State Extension

Resource Highlight: National Primary Drinking Water Regulations

This Environmental Protection Agency (EPA) website provides information on public water systems' primary drinking water standards, including treatment techniques for various standards.

<https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>

A PDF table shows the contaminants, source, potential health effects, and standards.

https://www.epa.gov/sites/default/files/2016-06/documents/npwdr_complete_table.pdf

Contaminant	MCL or TT* (mg/L)	Potential health effects from long-term exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)
Acetamide	TT*	Nervous system or blood problems, increased risk of cancer	Added to water during sewage/wastewater treatment	zero
Alachlor	0.002	Eye, liver, kidney, or spleen problems, anemia, increased risk of cancer	Runoff from herbicide used on row crops	zero
Alpha (photon emitters)	15 picocuries per liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
Antimony	0.006	Increase in blood cholesterol, decrease in blood sugar	Discharge from petroleum refineries, fire retardants, ceramics, electronics, solder	0.006
Arsenic	0.010	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits, runoff from orchards, runoff from glass & electronics production wastes	0
Asbestos (fibers >10 micrometers)	7 million fibers per liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains, erosion of natural deposits	7 MFL
Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
Barium	2	Increase in blood pressure	Discharge of drilling wastes, discharge from metal refineries, erosion of natural deposits	2
Benzene	0.005	Anemia, decrease in blood platelets, increased risk of cancer	Discharge from factories, leaching from gas storage tanks and landfills	zero
Benzo(a)pyrene (BaP)	0.0002	Reproductive difficulties, increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero

Upcoming Event:

Wednesday Water Webinar - On-Lot Septic Systems and Groundwater Quality

During this free webinar, learn how the maintenance and care of on-lot septic systems can impact groundwater resources.

When: October 4, 2023 (1:00 PM - 2:00 PM ET)

Septic systems are integral components for managing domestic wastewater in communities not connected to public sewer lines. This webinar will discuss the care and maintenance of on-lot septic systems as part of a larger strategy to protect your private water supply systems, such as wells and springs.



What will you learn?

- Recommended septic system care and maintenance practices
- How septic systems care and maintenance relate to water quality
- Be able to ask questions

Future Wednesday Water Webinars

Webinar begins at 1:00pm on scheduled dates

October 11 - Homebrewer's Guide to Private Well or Spring Water

<https://extension.psu.edu/homebrewer-s-guide-to-private-well-or-spring-water>

October 18 - Woodlands and Watersheds: How Forest Stewardship Protects and Improves Pennsylvania's Streams and Groundwater

<https://extension.psu.edu/woodlands-and-watersheds-how-forest-stewardship-protects-and-improves-pennsylvanias-streams-and-groundwater>

November 1 - Sources of Information for Well and Spring Owners

Registration link to come soon. Please check the Extension.psu.edu website.

November 8 - Nitrogen in Groundwater – Where it comes from and what's the health risk?

<https://extension.psu.edu/nitrogen-in-groundwater-where-it-comes-from-and-health-risks>

SAVE THE DATE: PA Farm Show

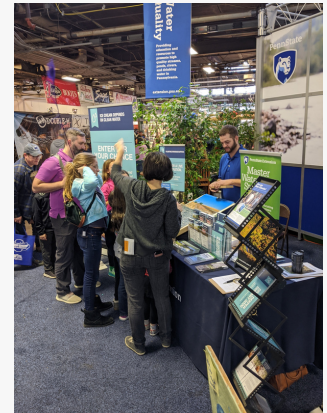
Dates

Saturday, January 6 - Saturday, January 13, 2024

Location

Pennsylvania Farm Show Complex & Expo Center
2300 N. Cameron St, Harrisburg, PA 17110

<https://www.farmshow.pa.gov/>



What is the Master Well Owner Network?

The Penn State Master Well Owner Network (MWON) is a program dedicated to educating PA residents about the proper construction and management of private water systems. This program aims to educate private water system owners and promote better management of private wells, springs, and cisterns throughout the state.

MWON Sponsors

This project is made possible in part by Penn State Extension, the Pennsylvania Department of Environmental Protection and the Pennsylvania Ground Water Association.

Important Websites

Master Well Owner Network

<http://extension.psu.edu/water/mwon>

Penn State Extension Drinking Water

<http://extension.psu.edu/water/drinking-and-residential-water>

PA Ground Water Association

<http://www.pgwa.org/>

National Ground Water Association

<http://www.wellowner.org/>

Penn State Drinking Water Interpretation Tool

<http://dwit.psiee.psu.edu/>

Penn State Resources for Well and Spring Owners

<https://extension.psu.edu/resources-for-water-well-spring-and-cistern-owners>

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