

How to Reduce the Risk of Well Water Contamination

Approximately 25 per cent of Manitobans rely on groundwater for drinking, household use, industry, farming and irrigation. Since groundwater is an essential resource for many Manitobans, it's important for well owners to understand the basics of well maintenance and operation and to know how to reduce the risk of well water contamination.

The location and depth of your well and the type and thickness of soil around it will help determine the level of risk of contamination to your well. For example, shallow wells covered by sand or gravel are at a higher risk for contamination than deep wells covered by less permeable materials such as clay.

It is recommended that you check your Well Information Report (well drillers report or well log) for information on its location, construction and type and depth of soil around the well. If you do not have a Well Information Report, you can contact your well driller for a copy or contact Manitoba Conservation and Water Stewardship, Groundwater Management Section.

Natural soil conditions and depth to the groundwater source can't be controlled, but there are a number of protective measures that well owners can take to reduce the risk of well contamination. These include proper well construction, regular inspection and maintenance, and having a basic understanding of other groundwater protection measures.

As a well owner, you are responsible for ensuring your well is properly constructed and maintained. Only licensed, experienced contractors should be used to drill and construct your well; hook it up to your plumbing system and electricity; and to do major repairs.

If you are drilling a new well

Manitoba well drillers are licensed and knowledgeable in proper well construction. A licensed professional well driller can advise you on the likely depth of a new well and the quantity and quality of water it will likely produce. Well drillers can also advise you on the best location for a new well to help you avoid possible sources of contamination to your well water. Contact Manitoba Conservation and Water Stewardship, Groundwater Management Section to locate a licensed well driller near you.

Choosing a well site

Important factors in choosing the best site for a well include:

- **Site accessibility.** Ensure there is easy access to the well site, not only for drilling and construction, but also to help make it easier to access the well for future maintenance and repair. Avoid putting your well in low lying areas, areas at risk of overland flooding or inside buildings or basements.
- **Future development.** Think about how other development (ex: buildings, infrastructure, fuel storage tanks) may affect your well. Don't put a well where it may later be covered or built over.
- **Property line.** Place your well a safe distance from your property line to prevent difficulties with neighbouring sewage disposal systems or other potential sources of contamination. It will also avoid problems with inaccurate boundary lines.

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- **Neighbouring wells.** Place your well far enough away from neighbouring wells so that yours won't interfere with or affect the operation of existing wells.
- **Contamination potential.** Make sure your well site is a safe distance from potential sources of contamination. Wells should not be located next to roadways, ditches or near areas where vehicles or farm equipment, including sprayers, may be parked or equipment stored.

Sources of water well contamination

There are several ways contaminants can get into your well and reach groundwater, including:

- run-off or flood water entering through unsealed wells
- sewage from leaky holding tanks or septic fields that are too close to the well, or from livestock areas
- insects or rodents getting in through damaged or unsealed well caps or lids
- seepage from improperly stored or handled fuels, pesticides or other chemicals
- surface water drawn into a well that's close to a water body (ex: river, lake). *Wells located near a water body may be drawing groundwater that is under the direct influence of the surface water and therefore more vulnerable to contamination.*

Standard set back distances help avoid contamination

Septic fields, disposal fields and other potential sources of contamination must be separated (setback) from wells as specified by regulation under Manitoba law. Setback distances from wells include:

- at least eight metres (26 feet) for a septic tank*
- at least 15 metres (50 feet) for a disposal field (septic field) for a well drilled and cased to a minimum of six metres (20 feet) below ground*
- at least 30 metres (100 feet) for a disposal field (septic field) for all other wells*
- at least 60 metres (200 feet) for the discharge point of a sewage ejector*
- at least 100 metres (330 feet) for manure storage and composting sites**
- at least 400 metres (1,315 feet) for a waste disposal ground (landfill)***

* Onsite Wastewater Management Systems Regulation, M.R. 83/2003, under *The Environment Act*.

** Livestock Manure and Mortalities Management Regulation, M.R. 42/98, under *The Environment Act*.

*** Waste Disposal Grounds Regulation, M.R. 150/91, under *The Environment Act*.

To avoid contamination sources not regulated by law, it is good practice to maintain a minimum distance of at least 30 metres (100 feet) between your well and any other potential contamination sources. Add even more distance if the overlying soil is very porous (ex: sand or gravel) or the well is shallow, wide diameter or is completed into bedrock which is not covered by a thick low permeability soil.

Maintenance and inspection of wells

Wells need to be regularly maintained to keep them working properly. Wells can deteriorate over time and need repair or replacement. Regular inspection, repair and replacement of worn parts and equipment will help keep your well in good working condition.

Your well should be inspected and tested for bacteriological contamination (See Well Water Fact Sheets #2 "How to Test Well Water for Bacteria") at least once a year, preferably in spring just after the snow has melted. It should also be inspected if you suspect there has been some kind of contamination or before you disinfect your well. While most of the well cannot be visually inspected, a change in water quality, including sediment in a previously sediment free water, may indicate well failure. The following table provides simple corrective actions for some common problems that can be associated with existing wells:

How to correct common well problems

PROBLEM	CORRECTION
Top of well casing above ground is not high enough to stop surface water from draining into the well.	Extend the well casing to a safe height, typically greater than 0.3 metres (12 inches) above the surrounding finished grade.
The ground around the outside of the well and covering the underground piping has settled or eroded.	Settling is common – build up the ground with clean earth (clay is best) to increase drainage away from the well. If possible, put in a permanent grassed area around the well.
Surface water is collecting near the well.	Build up the ground with clean earth (clay is best) to move drainage (ex: from drain pipes) away from the well and plant grass. Reroute surface drainage further from well.
A depression in the ground around the outside of the well casing. This may allow surface water or contaminants to travel down the outside of the well casing and contaminate the well water.	The sealant (grout) used to fill the space between the drilled hole and the outside of the well casing may have shrunk, collapsed or cracked. Fill shallow depressions with clean earth (clay is best). If the depression is significant, the repair should be done by a licensed professional well driller
The well cap or sanitary seal is loose.	Tighten or replace the cap. Fit properly, it will be tight and secure and should be vented to outside air.
The well cap or sanitary seal is damaged.	Repair or replace the cap or seal. Do not use planks or wood to cover a dug or bored well.
The well casing is damaged, cracked or dislocated.	Repair or replace the casing. If necessary replace the well and properly seal existing well.
There are signs (ex: stains on inside of casing) of surface water seeping into the well through cracks or openings in the casing.	Repair or replace the casing. If necessary replace the well and properly seal existing well.
There are debris floating in the dug or bored well.	Remove debris and take steps (ex: repair or replace cover) to stop debris getting into the well.
The well's air vent screen is damaged or clogged with debris.	Clean or replace the screen.
Electrical wires are loose. Electrical conduit is damaged or not securely attached to the well cap (applies to submersible pumps).	Repairs and replacements should be done by a knowledgeable person such as a plumber, electrician or licensed professional well driller. Secure the wires and repair or replace the electrical conduit.
The well is located within a flood prone area.	Ensure appropriate flood protection measures such as: making sure the elevation of the well is adequately above the flood level; the well is protected by a dike; or the well is covered with a water-tight cap or cover, and all openings into the cap or cover are plugged to prevent floodwater from entering the well; or replace well cap with a properly fitted self sealing snorkel type cap specifically designed for flood areas
Flow from an artesian well or flowing well is uncontrolled.	Install a flow control device capable of handling the water flow.

During maintenance/repairs

To ensure water safety:

During well maintenance - Follow boil water advisory instructions until well water testing shows the water is safe to drink. Refer to Boil Water Advisory Fact Sheet #2 “For Private Wells”.

After repairs or changes to well - Test for bacteria before you start using the water again to ensure the water is safe. Refer to Well Water Fact Sheet #2 “How to Test Well Water For Bacteria” for instructions.

After repair or replacement of a well pump, or after constructing a new well - Disinfect the well and test for bacteria before using the water. Refer to Well Water Fact Sheet #3 “How to Disinfect a Well - Partial Chlorination Method” for instructions.

After a well has been over-topped or submerged with flood water - Disinfect the well and test for bacteria before using the water. Refer to Well Water Fact Sheet #4 “How to Disinfect a Well - Full Chlorination Method” for instructions.

Ongoing safety and protection of well water

Eliminate well pits. Well casings should be extended above ground level and a pitless adapter should be installed. If work needs to be done inside your well pit, or other confined space, it's recommended that you hire a licensed professional well driller or plumber.

Do not enter a well pit or breathe the gases which may fill the pit. Take extra care to ensure children do not gain access to the well pit.

Seal unused wells. You can get information about sealing unused wells in the Guide for Sealing Abandoned Water Wells in Manitoba. A copy is available online at: www.manitoba.ca/conservation/waterstewardship/water_info/misc/abandoned_wells.pdf. It is recommended you contact your local Conservation District (www.mcda.ca) or contact a licensed professional well driller regarding the sealing of an unused well.

Storing chemicals and fuel safely. Store chemicals and fuel in appropriate tanks or containers, and regularly inspect them for wear or damage. Store chemical waste and used chemical products in a secure location, away from the well and dispose any product in an environmentally friendly manner.

Inspect wastewater disposal systems regularly. Inspect nearby wastewater disposal systems (ex: holding tanks, disposal fields, sewage ejectors) regularly. Pump tanks out regularly and make repairs as soon as issues are detected.

Keep well landscaping clear. The area around your well should not be concealed with scrubs, flower beds or bird feeders because they increase the risk of well water contamination. Avoid the use of fertilizers around the well.

Keep animals from area. Livestock and pets are a serious potential threat to your well water. Ensure that they are kept away from the area around your well and that you clean up after them appropriately.

For more information

For more information on drinking water safety, water treatment devices or to receive a copy of other drinking water fact sheets, please visit the Office of Drinking Water website at www.manitoba.ca/drinkingwater or contact the Private Well, Education and Outreach Co-ordinator at 204-948-1351. To locate a local office near you, please refer to the website at www.manitoba.ca/waterstewardship/odw/reg-contacts/index.html.

For information on certification for water treatment devices, visit www.nsf.org.

For information on well driller reports, well construction, well sealing, or for a listing of licensed well drillers, contact Manitoba Conservation and Water Stewardship, Groundwater Management Section at 204-945-6959.

For health information, contact Health Links at 204-788-8200 in Winnipeg; toll free at 1-888-315-9257 or contact your local public health office. To find your nearest office, go to: www.manitoba.ca/health/publichealth/offices.html.