

Green Facts

The protection of water quality in drilled wells.

The purpose of this Green Facts sheet is to assist people who rely on drilled wells for their water to achieve acceptable water quality. Improper well construction or the failure to carry out routine preventive maintenance on a well can result in contaminated water. In 2003, Ontario updated its regulatory requirements for water well siting, construction, maintenance and abandonment to better protect well users and groundwater resources.

Ontario's Wells Regulation (Reg. 903, under the Ontario Water Resources Act) requires well contractors and well technicians to be licenced by the Ministry of the Environment. The regulation also sets the minimum construction standards to which all well contractors, including private homeowners, must adhere. Although upgrading work can be done by a private well owner working on their own property, employing a licenced well contractor is strongly advised to ensure that proper minimum well construction standards are met and protection of the water supply is achieved.

The regulation also states that "the well owner shall maintain the well at all times after the completion date in a manner sufficient to prevent the entry into the well of surface water or other foreign materials."

Factors contributing to the deterioration of drilled well water quality

A poorly maintained or constructed well can result in the bacterial and/or chemical contamination of its water. One of the most common causes of contamination is foreign materials and surface waters in the immediate vicinity of a well having direct access into the well.

In Ontario, drilled wells are constructed using a variety of drilling machines that produce holes of varying diameters, and are usually lined with a steel casing. Problems due to surface water contamination occur when the sealing

around the outside or top of the casing is not watertight. Damage such as cracking of old cement grouting or corrosion can also allow surface waters to enter such a well.

Wells in pits are particularly vulnerable because the pits can hold surface contamination directly over or around the casing for long periods of time. For that reason, the construction of well pits for new wells is no longer permitted in Ontario effective August 1, 2003.

Indicators that sealing around the well casing may be inadequate and surface contamination may be gaining access to the well include:

- presence of coliform bacteria in counts exceeding recommended limits set by health authorities;
- changes in the appearance or physical quality of the water, such as turbidity, colour, taste or odour, especially after a rainstorm or snow melt;
- rapid or large changes in the well water level, especially after a rainstorm or snow melt ;
- cascading, seeping or stagnant water and/or staining inside the casing in a well pit;
- the presence of biological material, such as animals, insects or roots, in a well pit;
- unsealed or parted joints or cracks in the casing wall or cover;
- a cracked or damaged well cap;
- settlement of soils around the well casing at ground level or around the old well pit;
- the casing is noticeably heaved or loose in its seal, or water is bubbling up around casing;
- an absence of any sanitary well seal or vermin-proof or watertight well cap over the casing set at an appropriate height above land surface level; or
- changes in the chemical quality of the well water detected through laboratory analysis.

Preventive maintenance measures

Well owners should be aware of the measures that should be taken for the care and maintenance of a well to ensure it provides good quality water.

Protect against contaminants

To safeguard a well supply, do not do anything near the well that might result in contamination. Do not store, use or dispose of refuse, manure, petroleum products, salt, pesticides, paint or any other potential contaminant in the vicinity of the well. When mixing pesticides or paints, the water supply line from the pressure system should be equipped with a backflow device to prevent water from flowing back down the well.

Watch for signs of damage

The well cap must be securely in place and vermin-proof. If the cap is damaged, cracked or missing, replace it immediately so that contaminants will not have direct access to the well. The well cap must be a minimum of 40 centimetres above land surface level. The well air vent must be shielded and screened to prevent the entry of any materials into the well.

Well owners are encouraged to hire a licenced contractor to replace existing well pits with a pitless adapter so that the steel well casing terminates above ground level and not in a well pit. The sanitary seal over the casing must be securely in place, watertight and properly vented. If any unsealed openings are found in the wall or along the joints of cement-tile casing in a well pit, make them watertight with an appropriate durable sealing material. Applying this from the outside of the casing is preferable.

The air vent for a well pit must extend above the covering of the well pit or extend above the ground surface a sufficient height to prevent the entry of flood waters.

Any space outside the casing should be filled with a suitable sealant, such as a bentonite slurry. This will prevent surface water runoff or shallow groundwater seeping directly into the well through the space around the casing. Call a licenced well contractor to repair the damage if settlement or erosion of the sealant has occurred.

If the land surface around the well is depressed or susceptible to flooding, it should be graded to prevent pooling, flooding and direct runoff away from the well. The well casing should be raised an additional 40 centimetres minimum above the regraded soil.

The connection at the well casing for pump and electrical lines must be watertight and properly sealed. For drilled wells where the pump connection is below ground, use a commercially manufactured pitless adaptor for a good

watertight seal through the side of the well casing. To make an opening in the casing for the pitless adaptor, a licenced Well Technician (Class 4 Pump Installer) must use a hole saw to cut a circular hole in the casing to accommodate the pitless adaptor and ensure that it does not leak surface water into the well casing.

All wells that have been repaired must be chlorinated. It is recommended that the well water be tested for potability immediately after the work has been completed. Proper evacuation of the chlorinated water out of the well must be conducted before the well water is consumed or used.

Do not tamper with or remove any well tags.

All abandoned wells must be plugged and sealed in accordance with the Wells Regulation.

Additional information sources

You can obtain a copy of Regulation 903 from the e-Laws Web site at www.e-laws.gov.on.ca or by calling Publications Ontario at 1-800-668-9938. The following information sheets are available from the Ministry of the Environment's Web site or by calling its Public Information Centre (see below):

- The protection of water quality in bored and dug wells
- The protection of water quality in jetted, or driven point wells
- Important facts about water well construction

For further information about wells contact your nearest Ministry of the Environment office listed in the blue pages of your telephone directory. You can also call the ministry's Public Information Centre at 1-800-565-4923 or (416) 325-4000. The ministry's web site is at www.ene.gov.on.ca.