

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 July 2007, Ontario amended Wells Regulation 903 to improve clarity and functionality and to ensure wells are properly constructed to better safeguard public health and our groundwater resources. These amendments became effective on December 31, 2007.

Ontario's Wells Regulation (Reg. 903, under the *Ontario Water Resources Act*) requires well contractors and well technicians who construct wells to be licensed by the Ministry of the Environment, and sets minimum construction standards to which all well contractors and well technicians, including private homeowners, must adhere. Although well construction and upgrading work can be done by a private well owner working on their own property, employing a licensed 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 of the well’s structural stage in a manner sufficient to prevent the entry into the well of surface water and other foreign materials.”

Factors contributing to the deterioration of drilled well water quality

A poorly maintained or constructed well can result in bacterial and/or chemical contamination of well water. One of the most common causes of contamination is foreign materials and surface water 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 not permitted in Ontario.

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

- the 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 the casing;

- an absence of any sanitary well seal or commercially manufactured vermin-proof 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

It is important that well owners be aware of the measures that should be taken for the care and maintenance of a well to ensure it provides good quality water. The following measures are key:

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.

Do not try to conceal the well with flower boxes, a garden or trees or place bird feeders nearby.

Watch for signs of damage

The top of a casing in a drilled well must be sealed with a commercially manufactured vermin-proof well cap. If the well cap is damaged, cracked or missing, replace it immediately so

that contaminants will not have direct access to the well. The well casing must be watertight and be a minimum of 40 centimetres above the highest point on the ground surface. 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 licensed well contractor to replace existing well pits with a pitless adaptor so that the steel well casing would terminate above ground level and not in a well pit. Where a well pit has not yet been replaced, 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 concrete-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 if no well pit exists, the air vent must extend above the ground surface at least 40 cm to prevent the entry of flood waters. The open end of the air vent must be shielded and screened to prevent the entry of any materials into the well.

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 licensed 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 licensed Well Technician with Class 4 – Pump Installation 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 chlorinated water has been evacuated out of the well and confirmed safe to drink before the well water is consumed.

Do not tamper with or remove any well tags.

A well record must be completed and submitted to the Ministry of the Environment for well construction, alteration including a well tag replacement. All abandoned wells must be plugged and sealed in accordance with the Wells Regulation and reported on a well record.

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:

- 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
- Managing your water well in times of water shortage

For further information about wells contact the Water Well Help Desk at **1-888-396-9355** (Toll Free in Ontario) or 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** or visit the ministry's Web site at www.ontario.ca/environment.