

Best Management Practices for Well Closure

Why do wells have to be closed?

Abandoned wells pose a threat to groundwater by serving as a pathway for surface pollutants to infiltrate into the subsurface and present an opportunity for various qualities of water to mix. These wells also represent a potential hazard to human safety and are a liability for property owners. According to BC's **Water Act** and **Groundwater Protection Regulation (GWPR)**, wells that are no longer in use must be closed. Wells that are intended for future use may be kept, provided they are properly maintained while out of service.

When does a well have to be closed?

The *Water Act* states that if a well has not been used for a period of 5 years it must be deactivated. A **deactivated** well has a secure cap or cap and cover, is maintained in a safe and sanitary condition, and is accessible to inspection. If a well has been deactivated for 5 years, or not in use for 10 years, and if there is no intent to use the well in future, the well must be closed.

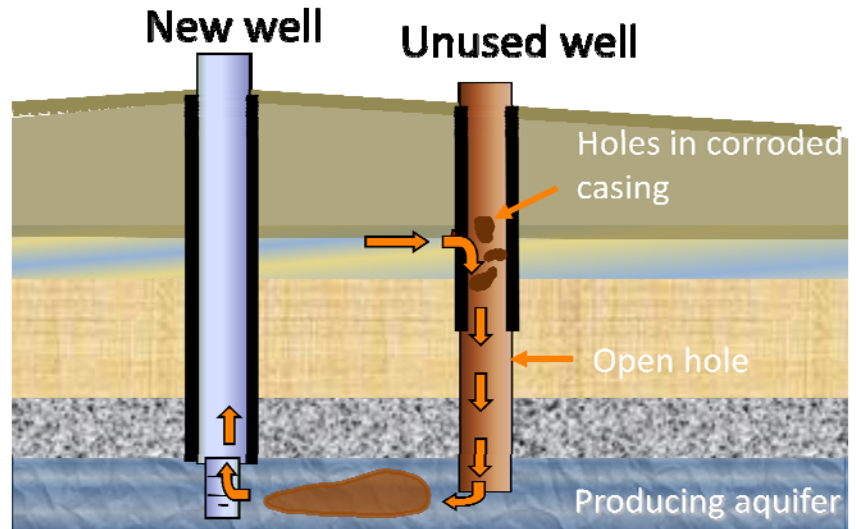
What is well closure? The basics

Well closure involves completely filling in the well. Only Qualified Well Drillers (QWD), or a person working under the direct supervision of a QWD or a qualified professional (Professional Engineer or Professional Geoscientist with expertise in hydrogeology) can close a well. **A well owner can do this work themselves ONLY if it is a drilled well that is less than 15 feet deep or if it is an excavated/dug well less than 50 feet deep.**

Well closure specifics

The person responsible for closing a well is required to follow the standards of the GWPR. The summary below is for the benefit of home owners who are curious about the requirements. However this is not intended as a technical guide for contractors. The full text of the GWPR is available at:

www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/index.html



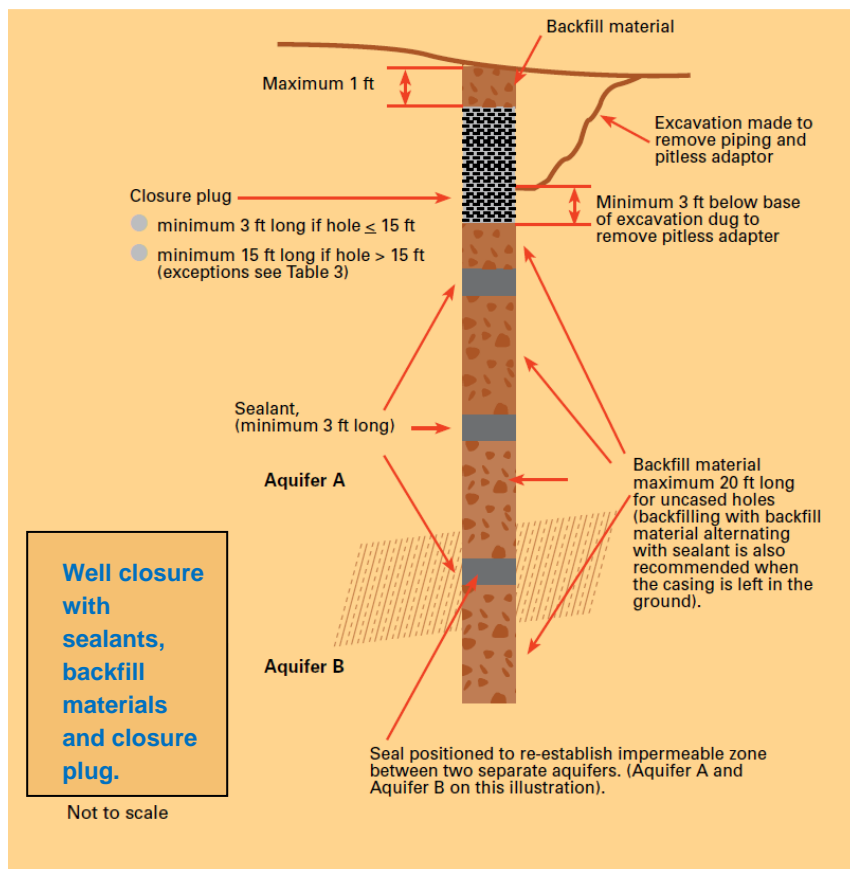
Examples of unused wells: drilled well with corroded casing (above); open dug well (below).



The GWPR requires the following for well closure:

- The well must be filled completely with sealant and clean backfill, with a closure plug in the upper section (see figure at right).
- The sealant is a non-toxic material that has a lower permeability than the surrounding geologic formation. Mixtures of bentonite clay, cement and/or concrete are most commonly used. The closure plug is also made from sealant.
- The backfill material can be any clean fill that is available.
- The maximum interval between sealant layers must not exceed 20 feet; each sealant layer must be a minimum of 3 feet long; the closure plug must be at least 15 feet long. These requirements are the minimum. The entire well can also be filled completely with sealant.
- All equipment (e.g. pumps, pipes, etc) should be removed before closing the well.
- Every attempt should be made to seal off water-bearing zones to prevent ground water mixing (e.g. a layer of backfill should not create a pathway by which two aquifers mix).
- The well casing may be left in place however it can be cut down to below ground level.

- The performance of bentonite, a swelling-clay often used in well closure, is hindered in salty water. If you have issues with high salt content in your well, advise the person closing the well.
- The person who does the work must complete a well closure report and submit it to the Ministry of Environment. The contractor should also provide a copy to the well owner.



One common method used to install sealant is to use a large hose called a tremie-line to pour pre-mixed sealant down to the bottom of the well under pressure and fill the well from the bottom up. Another method is to use chips or pellets made of bentonite, a natural clay that expands when wet to form a sealant layer. The bentonite is poured across a coarse mesh screen and into the well, taking care to add the chips or pellets very slowly to avoid bridging or sticking of the material on the sides of the well before they reach the bottom.

Well Drillers Registry

To find a Registered Qualified Well Driller in your area, consult the Ministry of Environment, Water Stewardship site: www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/wells.html#reg

Questions? Contact the Ministry of Forests, Lands and Natural Resource Operations, Nanaimo:
Ground Water Protection Officer (250) 751-3265 Sylvia.Barroso@gov.bc.ca
Regional Hydrogeologist (250) 751-3149 Pat.Lapcevic@gov.bc.ca

Disclaimer: This document is intended for the owner of a private water well to understand the well closure requirements. It is meant as a guide to the Groundwater Protection Regulation (GWPR) in plain language. In the event of any inconsistency between this text and the GWPR, the Regulation prevails.