

TABLE OF CONTENTS | DEWATERING OR DRAINAGE WELLS

1 WHO CAN CONSTRUCT DEWATERING OR DRAINAGE WELLS? . . . 2

2 SURFACE SEALING OF DEWATERING OR DRAINAGE WELLS . . . 3

3 WELL HEADS 6

4 WELL CAPS AND WELL COVERS 7

5 WELL IDENTIFICATION 8

6 TEMPORARY WELLS AND CHANGE OF USE OF A WELL 10
WELL OPERATION

7 PROHIBITION ON INTRODUCING FOREIGN MATERIAL 10
INTO A WELL

8 WELL DEACTIVATION 11

9 WELL CLOSURE 12

REPORTING REQUIREMENTS



DEFINITIONS



SPECIFIC REQUIREMENTS



CHAPTER 1 | WHO CAN CONSTRUCT DEWATERING OR DRAINAGE WELLS?

Well Construction

Any person who constructs or closes a dewatering or drainage well must:

- be a qualified well driller (QWD), or
- work under the direct supervision of a QWD or a qualified professional QP (P.Eng or P.Geo) who has competency in the field of hydrogeology or geotechnical engineering.

This requirement does not apply to a person excavating a well or closing an excavated well not more than 15 m (50 ft) deep. However, the well construction and closing standards still apply.

Note: An owner may deactivate his/her own well.

“direct supervision” means:

- Confirming in advance the supervisory relationship and methods of communication.
- The supervisor has considered the hydrogeological and drilling conditions likely to be encountered.
- The supervisor is aware of all actions taken by the supervised person.
- The supervisor has the ability to provide directions at appropriate stages throughout the activity, and does so.
- The supervisor is able to appraise the work.
- The supervisor is ultimately responsible for the work completed.

In some cases this may require physical presence by the supervising person on the site at all times when work is in progress.

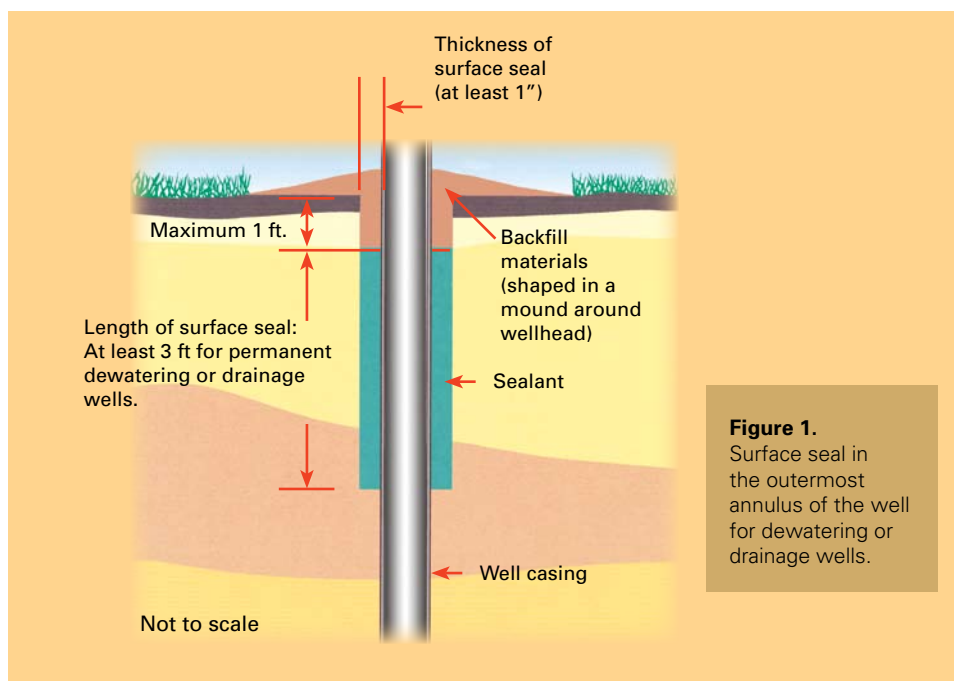


If you are not registered and need information on how to get registered, please refer to Tab 8 Registration.

CHAPTER 2 | SURFACE SEALING OF DEWATERING OR DRAINAGE WELLS

What is a surface seal?

A seal prevents contaminants from being transported to the aquifer along the length of the casing.



For drilled wells, the best way to install a surface seal is to drill first with an oversized casing to the appropriate depth and to backfill with an adequate sealant when the surface casing is pulled.

Note: if a temporary casing is used to install the surface seal, then the size and length of the temporary casing should be reported in the comments section of the well construction report.

What can be used to seal a well?

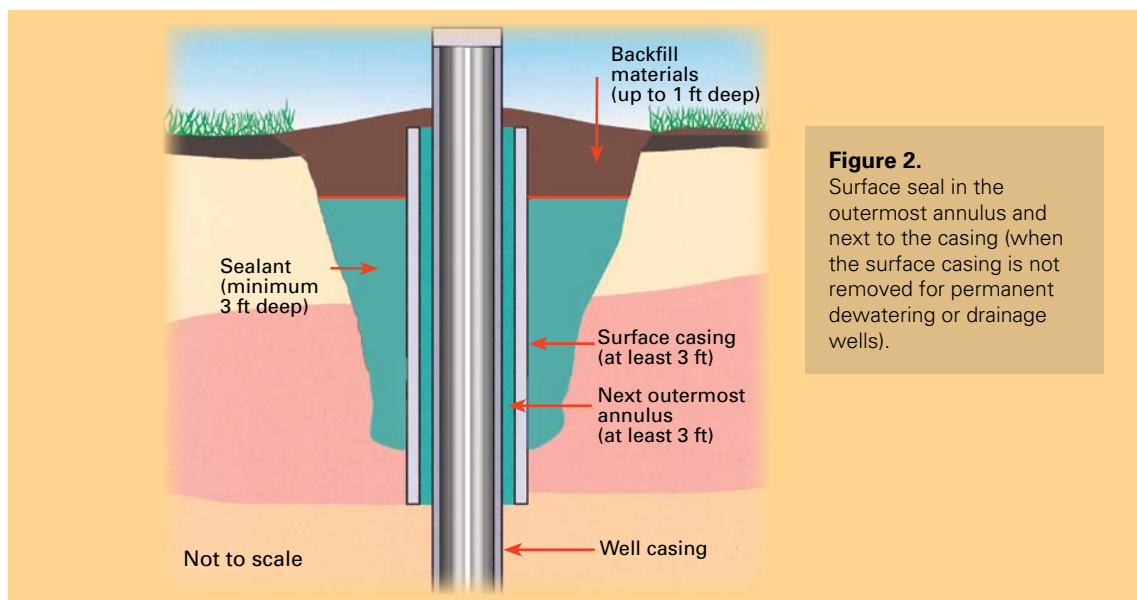
A proper sealant

A sealant is a non-toxic commercially available material or a mixture of materials including:

- bentonite clay
- bentonite clay and water mixture
- bentonite clay and sand and water mixture
- neat cement grout
- sand cement grout
- concrete grout

TECHNICAL SPECIFICATIONS OF SURFACE SEALS

- The surface seal must be completed with an appropriate sealant and must meet the following minimum specifications:
 1. The length of the surface seal of a **permanent** dewatering or drainage well must be at least 3 feet, unless a qualified professional who has competency in the field of hydrogeology or geotechnical engineering or an engineer (MOE) confirms in writing that a lesser length will not significantly increase the risk of a contaminant entering the well or aquifer. For **temporary** wells, surface seals are optional (recommended).
 2. The sealant must be at least 1 inch thick (including wall thickness of the surface casing if the casing is left in place).
 3. If the surface casing is installed with a drive shoe, or an annulus is created during installation, the surface casing must be removed and the seal completed between the production casing and the geologic formation.
 4. If a surface casing can not be removed to allow the seal to be completed between the remaining casing and the geologic formation:
 - the area directly around the surface casing must be excavated and sealed as in Figure 2 with 3 ft of sealant to completely seal the area.
 - the next outermost annulus must also be sealed as in Figure 2 to at least the length specified in (1) - Subject to this last requirement, any open annular space between multiple well casings must be effectively capped or sealed.
 5. If it is not desirable to have the sealant exposed at the ground surface, the sealant may extend to within 1 foot of the ground surface to allow for 1 foot of backfill materials but must still have a total length at least equal to that specified in (1).



MAINTENANCE OF SURFACE SEALS ON NEW WELLS

- Owners of permanent dewatering or drainage wells must ensure the integrity of the seal is maintained and that any annular space that may develop around the well is resealed by a QWD.

ALTERATION OF EXISTING WELLS

If altering a well impairs the integrity of the existing surface seal or creates a visible annular space, the QWD must restore the seal and make sure the annular space is sealed.

REPORTING REQUIREMENTS

Information on the installation of surface seals must be entered in the Well Construction Report for drilled permanent dewatering wells.

Table 1. Roles and Responsibilities

Driller	Owner	Qualified Professional (P.Eng or P.Ge)
<p>Complete a new well with an effective and permanent surface seal according to minimum specifications</p> <p>If any alteration impairs seal integrity, ensure seal integrity is restored</p>	<p>Ensure that the integrity of the surface seal is maintained and that any annular space that develops is resealed</p>	<p>Can provide alternate specifications for length of surface seal and recommending a surface seal in cases where a surface seal is not normally required.</p>

CHAPTER 3 | WELLHEADS

WELLHEADS

SPECIFIC REQUIREMENTS FOR PROTECTING WELLHEADS

- For new permanent dewatering wells, the casing must extend at least 12 inches above ground or above the floor of the well sump or well pit.
- The immediate ground area around a new dewatering or drainage well, or an existing well altered after October 31, 2005, must be graded so water does not pond around the wellhead.
- New well sumps and well pits must be designed, constructed and maintained so as to convey water away from the wellhead.
- Thermoplastic casing must be completely protected from damage and material breakdown at the ground surface.
- A 12 inch stick-up is not required for temporary dewatering wells or temporary or permanent drainage wells.

CHAPTER 4 | WELL CAPS AND WELL COVERS

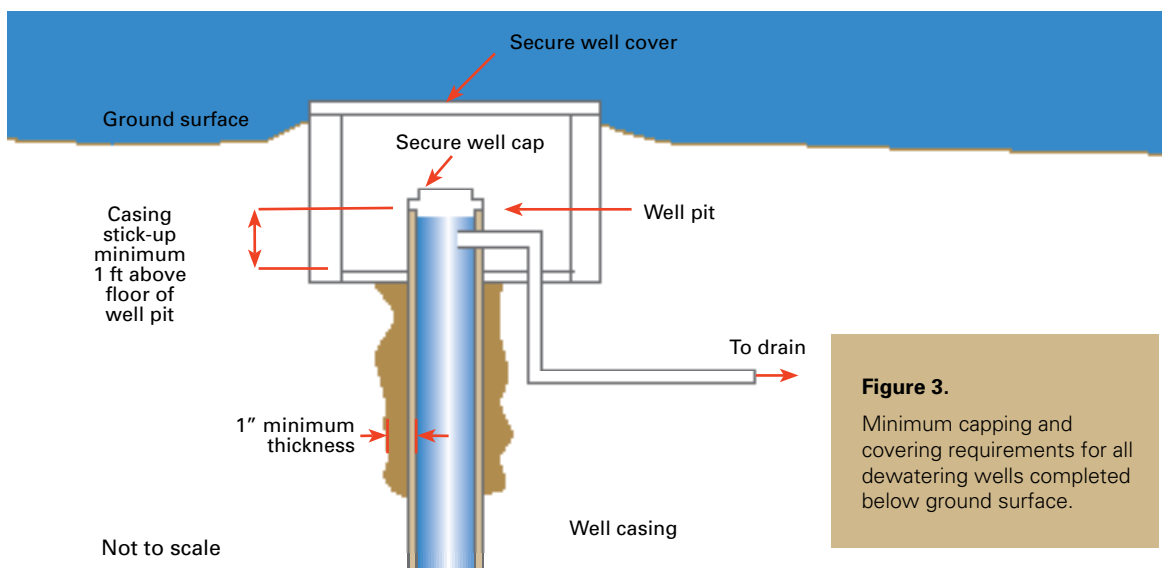
A well cap, or a well cap and cover, must be installed only for dewatering wells.

Definition

- Well cap – secure, vermin-proof cap or lid that prevents direct and unintended or unauthorized access to the interior of the production casing
- Well cover – secure, vermin-proof cover, lid or structure that prevents direct and unintended or unauthorized access to the well

SPECIFIC REQUIREMENTS FOR WELL CAPS OR COVERS

Well covers must be used for all dewatering wells that are completed below the ground surface as shown in Figure 3.



- A person who installs a well cap or well cover for a well must:
 - (a) use a commercially available or manufactured well cap or well cover, or
 - (b) fabricate a suitable and adequate well cap or well cover.
- A welded steel plate may be used as a well cap on a well with a steel casing that has yet to be put into use.
- If there is an annular space between well casings, the annulus must be capped or covered with a permanently installed water-tight well cap or well cover.

CHAPTER 5 | WELL IDENTIFICATION

Purpose:

To relate a well on the ground to the well record.

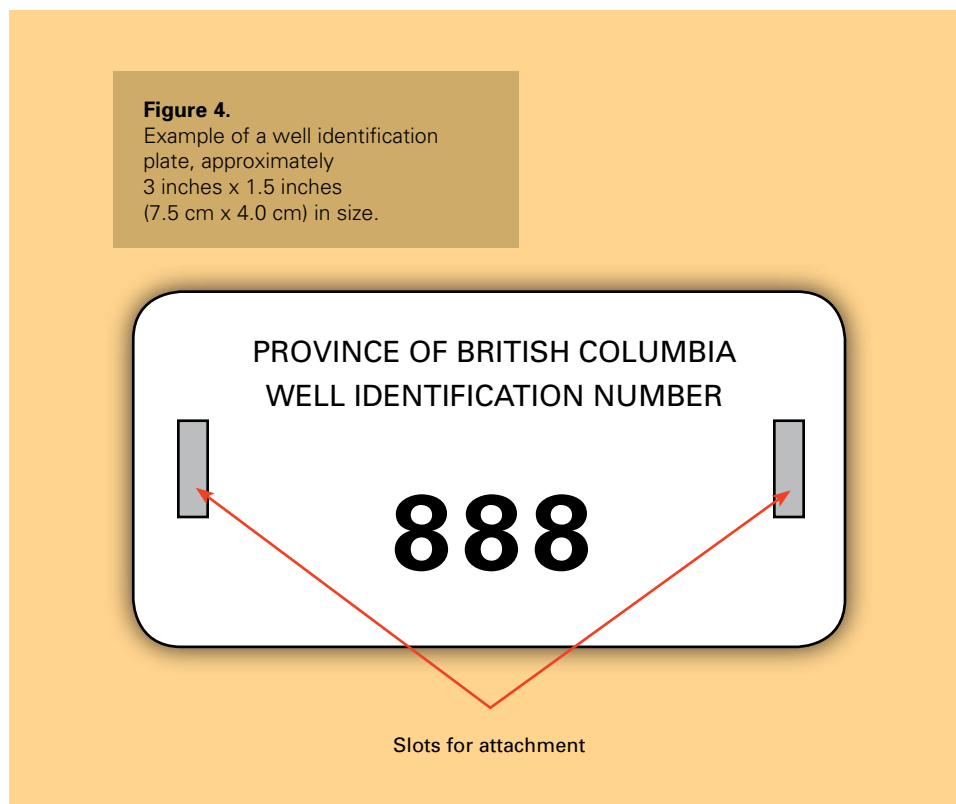
REQUIREMENTS FOR IDENTIFICATION PLATE FOR PERMANENT VERTICAL DRILLED DEWATERING WELLS (NEW OR ALTERED WELLS)

An identification plate must be attached to a **permanent vertically drilled dewatering well or wellhead**. All other dewatering wells do not require identification plates.

WHERE TO GET WELL IDENTIFICATION PLATES?

Well identification plates are available without charge from the Ground Water Data Technician, Water Stewardship Division at 250 387-0014 or Ground.Web@gov.bc.ca.

An example of a plate is shown on Figure 4.



HOW TO ATTACH WELL ID PLATES?

The well identification plate can be attached to the well casing stick-up with a hose clamp.

Note: Identification plates should not be welded to the casing, in case the well is closed and the plate has to be returned to MOE.

MULTIPLE WELLS IN SINGLE PROTECTIVE CASING

If two or more wells that require a well identification plate are contained in a single protective casing, each well must have its own well identification plate.

PROTECTION AND MAINTENANCE OF WELL IDENTIFICATION PLATE

Well owners must maintain and safeguard the well identification plate from physical damage and ensure that the number remains plainly visible.

MISSING OR DAMAGED WELL PLATES

Well owners must report to the comptroller any missing or damaged well plates, and request a replacement within 30 days of discovering loss or damage.

CLOSING

Persons closing a permanent vertically drilled dewatering well must remove the well identification plate and return it to the comptroller within 90 days.

They must also complete the Well Closure Report form and submit it to the comptroller within 90 days.

REPORTING REQUIREMENTS FOR NEW OR ALTERED PERMANENT VERTICALLY DRILLED DEWATERING WELLS
The well identification number must be recorded in the Well Construction Report form and the completed report submitted to the comptroller within 90 days.



Figure 5. Well head with ID plate.

CHAPTER 6 | TEMPORARY WELLS AND CHANGE OF USE OF A WELL

Purpose:

To specify when dewatering or drainage wells must be closed.

REQUIREMENTS

Temporary dewatering or drainage wells must be closed within 90 days and in accordance with the Regulation.

If a temporary dewatering or drainage well remains open for more than **90 days**, then the person responsible for the well or the well owner must ensure:

- A professional hydrogeologist or geotechnical engineer provides written confirmation that the well may remain open for a further

90 days, without impairing the quality of ground water in the aquifer or posing a threat to human health or public safety, or

- The well is made permanent by meeting the minimum standards set out in the Regulation for that class of well, or
- The well is closed in accordance with the Regulation, after the 90-day extension.

The Regulation does not permit further extensions of 90 days.

Change of use:

When the use of a well or purpose of a well is changed, the well owner must ensure that the well meets the minimum standards for that new use or purpose.

CHAPTER 7 | WELL OPERATION

Purpose:

To set out the rules regarding well operation, so as to prevent contamination of the well or significant adverse impacts to the aquifer.

REQUIREMENTS

A person must not operate a well in a manner that causes or is likely to cause a significant adverse impact on the quality of the ground water in that aquifer, or on existing uses of the ground water by any well drawing water from that aquifer.

CHAPTER 8 | PROHIBITION ON INTRODUCING FOREIGN MATTER INTO A WELL

Purpose:

To set out rules to prohibit the introduction of foreign materials into wells.

REQUIREMENTS

A person must not introduce or allow to be introduced into a dewatering or drainage well any of the following

- Refuse,
- Carcasses,
- Human or animal waste,
- Pesticides or fertilizers,
- Material, natural or otherwise, from construction or demolition,
- Flood debris and flood waters,
- Contaminants in an amount or manner that might cause a significant adverse impact on the quality of the ground water or on the existing uses made of the ground water from the well.

ENGINEER'S ORDER TO REMEDiate OR MITIGATE

An engineer (MOE) may order a person to stop introducing deleterious substances that impact the well and the groundwater.

If the engineer cannot ascertain who introduced the substances, the engineer may make the order against the owner of the well or the owner of the land.

GOVERNMENT ACTION AT THE EXPENSE OF THE PERSON TO WHOM AN ORDER IS ISSUED

If a person to whom an order is issued fails to comply, and the comptroller or regional water manager considers that the failure may result in harm or damage to ground water, the comptroller or regional water manager can authorize the government or another person to take actions to comply with the order, at the expense of the person to whom the order is made.

CHAPTER 9 | WELL DEACTIVATION

Objective of deactivating a well: To ensure that the well does not compromise the sanitary integrity of the aquifer or pose a safety risk.

Difference between deactivation and closure:

- Deactivation: take the well temporarily out of service
- Closure: take the well permanently out of service by filling in the well with backfill and sealant

BASIC REQUIREMENTS TO DEACTIVATE A WELL

If a dewatering or drainage well is not used for five years the owner must ensure it is deactivated or closed. This does not, however, apply to existing wells that are actively maintained with the intent of future service.

DEACTIVATING A WELL MEANS

- making the well available for inspection; and
- maintaining the well in a safe and sanitary condition.

Where the owner of the land on which a well is located does not know who owns the well, the owner of the land must ensure the applicable deactivation requirements are met.

WHO MAY PERFORM A WELL DEACTIVATION?

A QWD, a QWPI or a QP, or any person under the direct supervision of a QWD, a QWPI, a QP or the owner of the well may deactivate a well.

CHAPTER 10 | WELL CLOSURE

BASIC REQUIREMENTS TO CLOSE A WELL

If a well has been deactivated or has not been used for 10 years, the owner must ensure that it is closed.

These rules do not however apply to existing wells that are actively maintained with the intent of future service.

Where the owner of the land on which a well is located does not know who owns the well, the owner of the land must ensure the applicable closing requirements are met.

WHO MAY PERFORM A WELL CLOSURE?

- a QWD, or
- a person working under the direction of a QWD or a qualified professional with competency in hydrogeology or geotechnical engineering.

However, this does not apply to wells less than 5 m (15 feet) deep nor to excavated wells less than 15 m (50 feet) deep.

REQUIREMENTS

- The well must be filled throughout its depth with sealants and backfill materials and a closure plug as set out in Figure 6 and Table 2.
- All equipment and instrumentation in the well must be removed if practicable.
- Well casings may be left in place.
- Ensure that the well is completely filled so as to prevent lengthwise movement of liquids within the well or annular space surrounding the casing or between casings.
- Every attempt should be made to seal off water bearing zones, if known, to prevent mixing of ground water.
- Closure reports must be completed for permanent dewatering or drainage wells. For permanent vertical dewatering wells made by drilling, the closure report must contain the minimum information in Schedule 3 and be submitted to the comptroller (in MOE). For all other dewatering wells, the closure report must contain the minimum information in Schedule 4 and be retained by the company of the person responsible for a least 5 years.

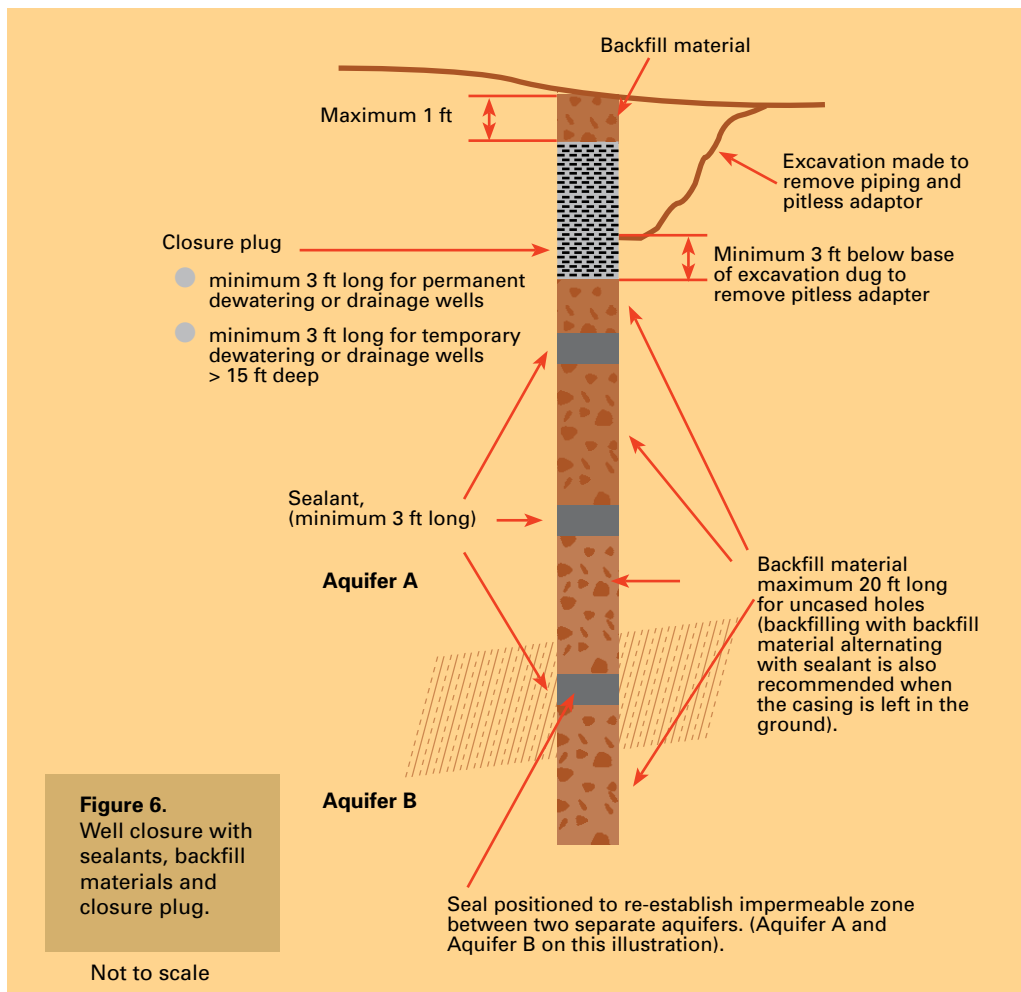


Table 2. Well Closure for Dewatering and Drainage Wells

Class of well	Sub-class of well	Method of drilling	Orientation of well	Closure plug required?		Minimum length of closure plug required (in feet)		Does a well closure report need to be completed?	Does a well closure report need to be submitted or retained?
				Hole depth ≤ 15 ft	Hole depth > 15 ft	Hole depth ≤ 15 ft	Hole depth > 15 ft		
Dewatering or Drainage	Temporary (≤ 90 days)	Drilling	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Drilling	Horizontal	Optional	Required	Not specified	3 V	No	Not applicable
		Driving	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Jetting	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
		Excavating	Vertical	Optional	Required	Not specified	3 V	No	Not applicable
	Permanent (> 90 days)	Drilling	Vertical	Required	Required	3 V	3 V	Yes - dewatering wells only see Schedule 3	Submit
		Drilling	Horizontal	Required	Required	3 V	3 V	Yes - dewatering wells only see Schedule 4	Retain
		Driving	Vertical	Required	Required	3 V	3 V	Yes - dewatering wells only see Schedule 4	Retain
		Jetting	Vertical	Required	Required	3 V	3 V	Yes - dewatering wells only see Schedule 4	Retain
		Excavating	Vertical	Required	Required	3 V	3 V	Yes - dewatering wells only see Schedule 4	Retain

Explanation

Optional : A closure plug is not required, but is recommended in cases where there is a significant potential for contaminants to enter the well either at the time of construction or at a later date.

3 V : The length of the closure plug must be at least 3 feet, unless a qualified professional who has competency in the field of hydrogeology or geotechnical engineering or an engineer under the Water Act confirms in writing that a lesser length will not significantly increase the risk of a contaminant entering the well or aquifer. In wells to be closed, the closure plug should extend a minimum 3 feet below the base of any excavation dug to remove any piping.

Retain : Keep a copy of the well closure report at least 5 years and make it available on request.

Submit : Submit the final well closure report to the Comptroller of Water Rights.

Note : If it is not desirable to have the closure plug exposed at the ground surface, the closure plug may extend to within 1 foot of the ground surface to allow for 1 foot of backfill materials but must still have a total length at least equal to that specified in the Table.

SCHEDULE 3

A well closure report must be submitted for **permanent vertically drilled dewatering wells**. It must include:

- (a) well owner name and mailing address;
- (b) site address, legal description or PID (parcel identifier) of the property;
- (c) geographic coordinates (UTM or latitude and longitude) for the well recorded to accuracy of within 10m but as accurate as possible;
- (d) location map sketch or location description;
- (e) reason for closure;
- (f) well identification plate number if known;
- (g) if applicable, an attached copy of the well construction report (well record);
- (h) depth and diameter of the well;
- (i) method of drilling well;
- (j) diameter of well casing or liner and composition of material;
- (k) method of closure;
- (l) if applicable, an attached copy of the written confirmation of any alternative specifications;
- (m) details of the closure describing the depths, types and amounts of sealant and backfill material;
- (n) name, address and telephone number of the person completing the work;
- (o) name, address and telephone number of the person supervising completion of the work;
- (p) date of commencement and date of completion of the work.

REPORTING REQUIREMENTS
The person responsible for closing a permanent vertically drilled dewatering well must complete a well closure report in accordance with Schedule 3 and submit that to the comptroller, with a copy to the well owner, within 90 days.

SCHEDULE 4

REQUIREMENTS FOR WELL CLOSURE REPORTS FOR PERMANENT DEWATERING AND DRAINAGE WELLS (EXCEPT VERTICALLY DRILLED)

1. The well closure report must provide:
 - (a) name and mailing address of the well owner;
 - (b) site address, legal description or PID (parcel identifier) of the property on which the well is located;
 - (c) geographic coordinates (UTM or latitude and longitude) for the well recorded to accuracy of within 10m but as accurate as possible;
 - (d) location map sketch or location description;
 - (e) method of closure;
 - (f) if applicable, an attached a copy of the written confirmation of any alternative specifications, and the alternative specifications, of the engineer or qualified professional;
 - (g) details of the closure showing the depths, types and amounts of sealant and backfill material;
 - (h) name and address of person completing the work;
 - (i) name and address of the person supervising completion of the work;
 - (j) date of commencement and date of completion of the work.

REPORTING REQUIREMENTS

The person responsible for closing a permanent dewatering or drainage well (except vertically drilled) must complete a well closure report in accordance with Schedule 4 and retain it for a period of 5 years.