



# Wellhead Inspection Report Program

## Abandoned Water Wells and Public Water Supplies

Presented by: Eric Watton, B.Sc.

2012 Clean and Safe Drinking Water Workshop  
March 29, 2012

# Outline

Definitions

Wellhead Inspection Report

Well owner responsibility

The threat associated with abandoned wells

Water well design and construction

GUDI

Sub-surface well interaction

Well Sealing

Why and how

Required report

# Well Inspection Report

A report that examines the condition at and around a wellhead.

Reported to the owner of the Wellhead(s)

Used for non-domestic and domestic wells

Will be updated and modified for future inspection – **Annual Water Well Construction Report**

# Components

- Well annulus not properly sealed
- Area around well not properly sloped
- Well buried or not accessible
- Well located too near a building
- Source of contamination
- Wellhead cap
- Venting
- Not high enough
- Abandoned well nearby

# Components continued

Wellhead area (whether it is protected or not)

## NEW COMPONENTS

Camera Inspection

Total depth

Casing length

Drive Shoe

Coupling with bedrock/other

Possible water flow zones

## Wellhead Inspection Report

Source Well \_\_\_\_\_

Public Water Supply System \_\_\_\_\_

Town / Local Service District of \_\_\_\_\_

A  below indicates a problem with finished construction of the above source well as noted by the undersigned on the date indicated. The consequences of each problem are provided for your information. All problems noted are contrary to the requirements of the *Well Drilling Regulations* under the *Water Resources Act*.

- Well annulus not properly backfilled/sealed.** The annulus between the outside of the well casing and the drill hole should be filled with an impervious clay like material. The terms and conditions of a *Non-Domestic Well Construction Permit* (required for the construction of a public water supply well) state that the well annulus must be grouted from the bottom of the well casing to the ground surface.  
*Consequence:* Surface runoff and shallow groundwater will seep down around the well casing and may enter the well carrying pollutants into the water supply.
- Area surrounding the well not properly sloped.** The area immediately surrounding a well must be adequately graded in all directions (to a distance of 5 metres) to prevent water from ponding around the wellhead and must be graded to an elevation of at least 0.6 metres from the highest known surface water level.  
*Consequence:* Surface water passing over or near the well may seep down around the well casing and into the well carrying pollutants into the water supply. This problem is particularly critical if the well annulus has not been properly backfilled/sealed.
- Well buried or located such that it is not accessible.** The wellhead should be extended a minimum of 0.6 metres above finished grade by welding a section of steel casing of standard pipe size and weight to the existing wellhead. The weld should be continuous to prevent the entry of pollutants in the well. A pitless adaptor should be used to allow access to the well for the supply line and a vermin proof well cap should be used to provide an air vent and access for electrical cables.  
*Consequence:* Surface water and shallow groundwater passing over or near the well opening may pool over or around the well casing or in side the well pit and eventually seep into the well carrying pollutants into the water supply. Also, difficulty may be experienced in locating and/or accessing the well for inspection, testing and maintenance.
- Well located too near a building** A well should not be located inside, under or too close to a building unless provision is made in the construction of the building to allow access to the well for cleaning, treatment, repair, testing and inspection of the well. A well located inside a building must be finished above floor level, sealed, and vented in the same manner as a well finished outside.  
*Consequence:* The well's location may make proper cleaning, treatment, repair, testing, and inspection costly or impossible.
- Well located too close to a source of contamination.** Extra precautionary measures must be taken around wells that are located close to a source of contamination. It is best to remove the contaminant source. If this is not possible, measures must be taken around both the wellhead and the source of contamination to reduce the risk.  
*Consequence:* Soil conditions may not be adequate to filter impurities from percolating water before entering a well. Well contamination may result, and in more serious situations the aquifer may become unfit for use.

- Wellhead not properly sealed / well cap not secure.** A double vent, screened vermin proof-well cap should be firmly in place at all times to securely seal the wellhead.  
*Consequence:* Contaminants may gain entrance to the well and aquifer(s), which may result in the loss of a potable water supply. Foreign material, such as rocks, sticks, etc., can be dropped into the well making pump removal and well maintenance expensive if not impossible.
- Well not properly air vented.** A double vent, screened vermin proof well cap should be used to seal and vent a well.  
*Consequence:* The vacuum created inside the well during drawdown may cause permanent damage to the bedrock-casing seal permitting contaminants from the surface and shallow groundwater to be drawn into the well.
- Wellhead finished too close to the ground surface or pump house floor.** The wellhead should be extended a minimum of 0.6 metres above finished grade by welding a section of steel casing, of standard pipe size and weight, to the existing wellhead. The weld should be continuous to prevent the entry of pollutants into the well. A pitless adaptor should be used to allow access to the well for the supply line, and a double vent, screened vermin proof well cap should be used to provide an air vent and access for electrical cables.  
*Consequence:* Foreign materials and various contaminants, such as surface water or floor drainage, can enter the well carrying pollutants directly into the water supply.
- Abandoned well near production well.** A drilled well must be properly maintained as per the *Water Resources Act* until such time the owner properly seals the well. All wells when abandoned must be sealed in accordance with the Department of Environment and Conservation *Guidelines for Sealing Groundwater Wells*.  
*Consequences:* Contamination of aquifer or aquifers may result in the loss of potable water to all those utilizing the aquifer(s).
- Poor handpump well construction.** Overflow or waste water from the operation of the handpump may be washing over the base of the handpump and ground surface, returning directly to the well through the wellhead and/or bottom end of the well casing. Surface water and/or shallow groundwater may also be entering the well directly.  
*Consequence:* Pollutants will gain direct entrance to the well and aquifer(s), resulting in contamination of the water supply to all those tapping the aquifer(s).
- FINISHED AS REQUIRED. None of the above problems were noted.**

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

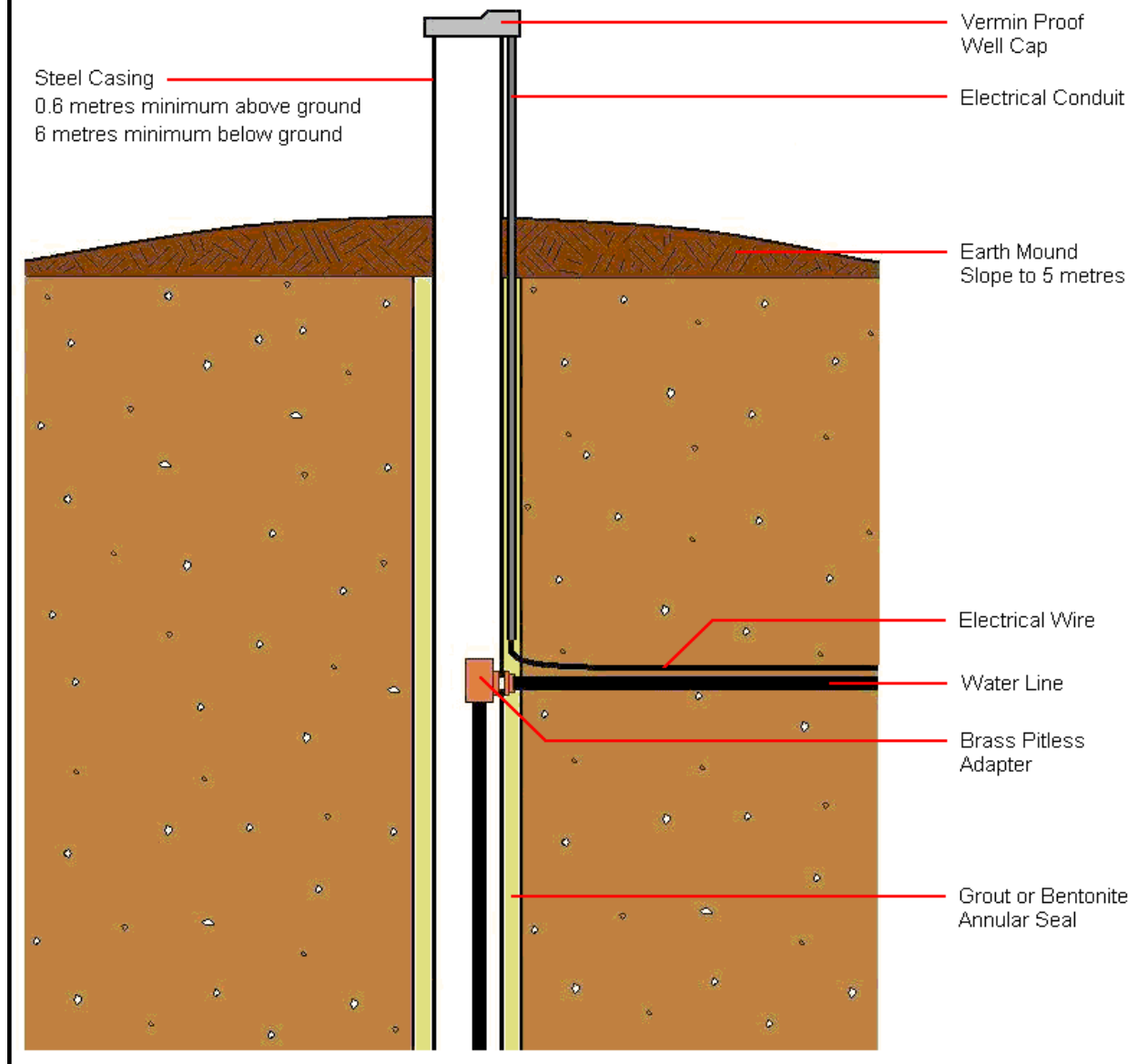
The Department of Environment and Conservation requests that the problems outlined in this Wellhead Inspection Report be corrected at your earliest convenience. The Water Resources Management Division is available to lend advisory assistance at your request.

If there are any questions or if further information is required please call (709) 729-1671, email [ericwatton@gov.nl.ca](mailto:ericwatton@gov.nl.ca), or write this department at PO Box 8700, St. John's, NL, A1B 4J6.

\_\_\_\_\_  
Date

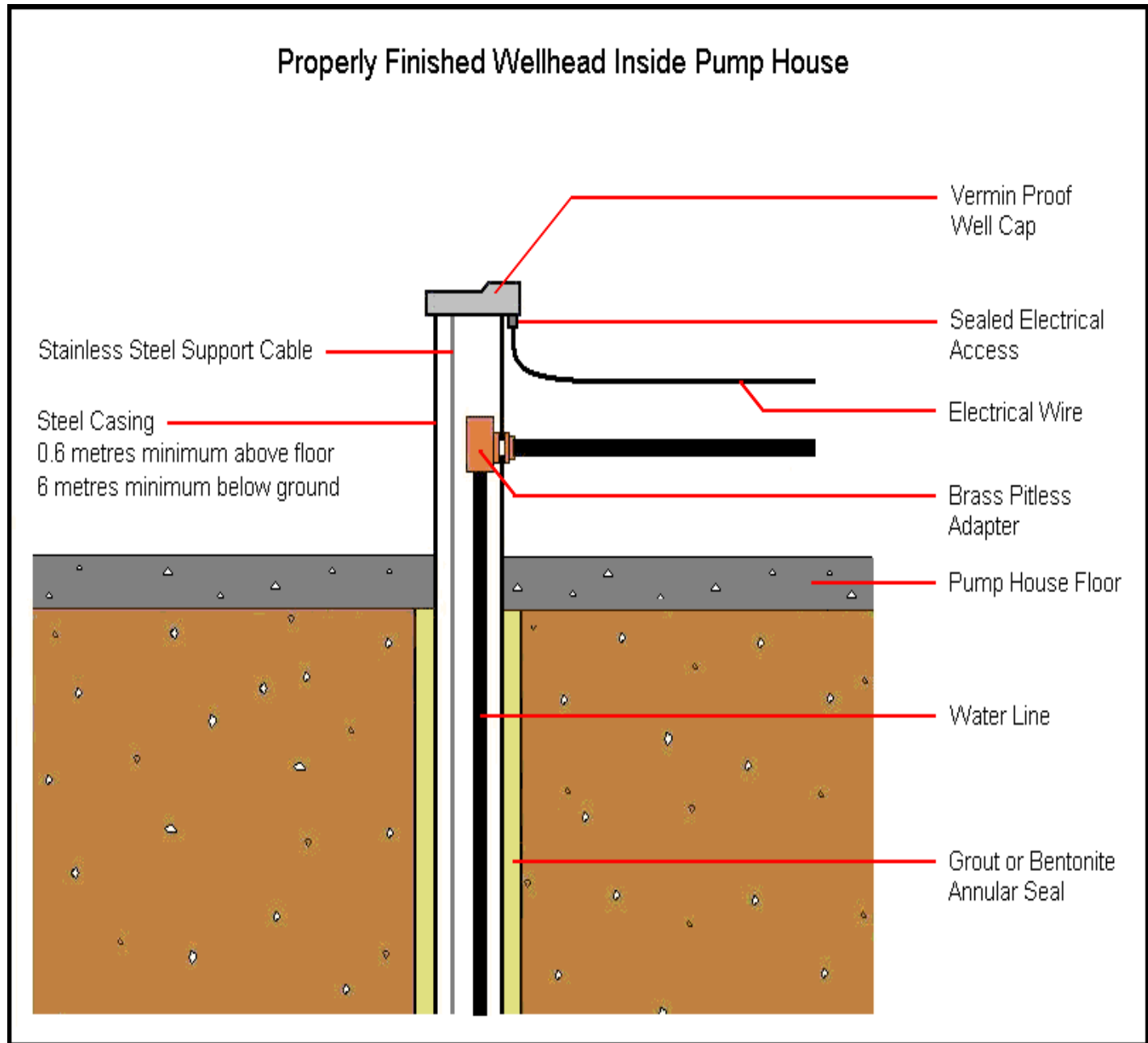
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Signature

### Properly Finished Wellhead Outside





### Properly Finished Wellhead Inside Pump House



# GUDI

**Groundwater Under Direct Influence of  
Surface Water**

Examples:

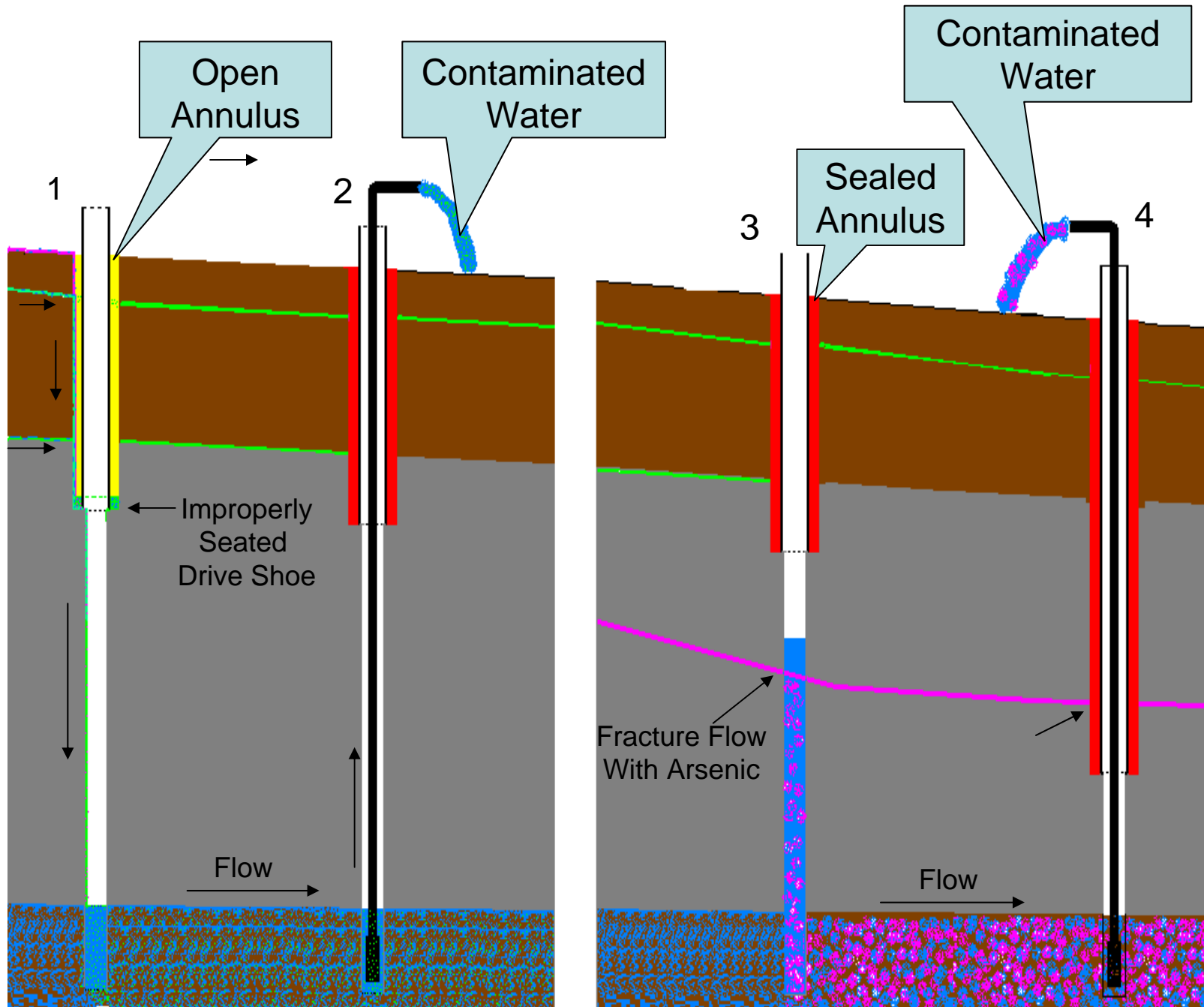
- Surface water running into the casing
- Shallow groundwater flowing into the borehole/well under the casing and/or drive shoe
- Surface water and/or shallow groundwater flowing into a well via a fracture or other transport means

# Water Flowing into a Well



# Abandoned or Inactive Well

Abandoned wells are wells that are not in use. These wells may have been deactivated for a number of reasons including insufficient yield, faulty construction, contaminant issues, because the well has past its life cycle, or other reason. These wells need to be sealed to protect the surrounding groundwater resource.



# Abandoned Well !!



# Open Well Annulus



# Sealed Well?





# Sealed Well?



# Active OR Abandoned ?







# Where is the well ?



# There it is !



# Outdoor Public Water Supply



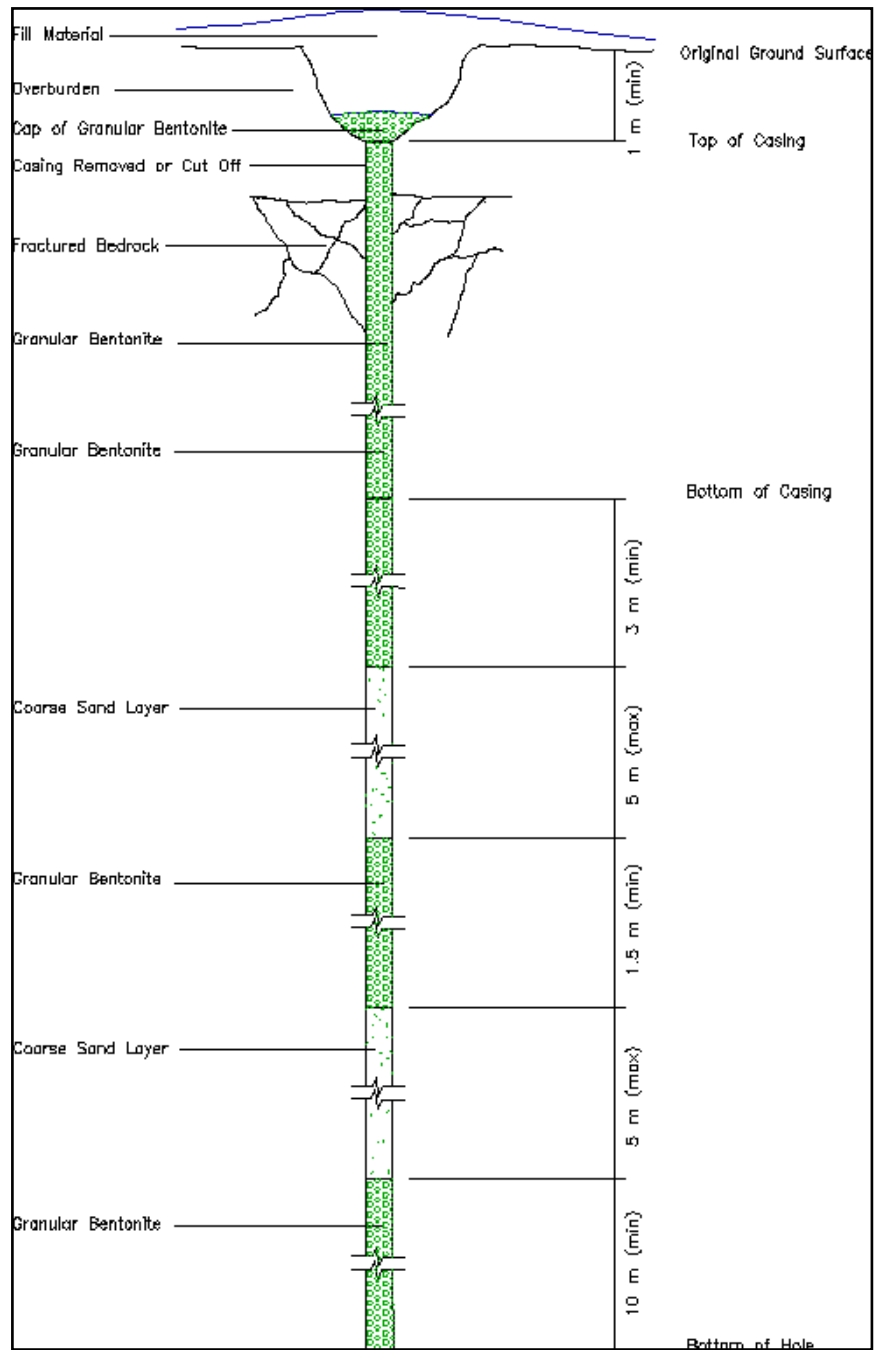
# Inside a Pump house





# Reasons to Seal a Well

- Isolate a water-bearing zone/formation.
- Prevent downward movement of surface water and other foreign materials into the well and aquifers.
- Prevent up and down movement of groundwater between water bearing formations and subsurface formations.
- Prevent migration of groundwater between water bearing formations and the ground surface (artesian condition and flowing wells).
- Prevent aquifer depressurization by stopping the upward movement of water between the casing and the borehole.
- In certain areas of the province, prevent hydrocarbon movement in areas stated above.





### Report for Sealing Drilled Groundwater Wells

Subject to Section 18(3) of the *Well Drilling Regulations* under the *Water Resources Act* SNL 2002 cW-4.01, the undersigned makes the following report pertaining to the sealing of an unsuccessful or abandoned drilled well.

Original Well Owner -----

Present Well Owner -----

Property Location

Community -----

Street/Road -----

Street/Road/Lot # -----

Well Information (NAD 83 & decimal degrees)

Lat N -----

Long W -----

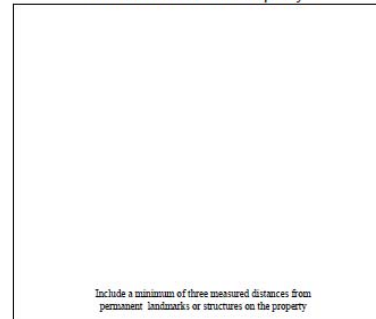
Depth -----

Diameter -----

Casing Length -----

ID No. (if available) -----

Well Location on Property



Include a minimum of three measured distances from permanent landmarks or structures on the property

Description of Well Sealing Procedure (if necessary, add more pages)

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-----  
-----  
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**Note:** Proof of purchase (receipts) of sealing materials are attached -----

Company Completing the Well Sealing Work -----

Date Well was Sealed -----

I certify that the information in this report is true, complete, and accurate.

Date \_\_\_\_\_

Name (Print) \_\_\_\_\_

Signature \_\_\_\_\_

Title \_\_\_\_\_

RS020W 06-10-01 Rev. 3

# Well Owner Responsibility

*Well Drilling Regulations, 2003*

## Maintenance of well and abandoned well

18.

- (1) The owner of a well shall maintain the well at all times after its completion date in a manner sufficient to prevent the entry of surface water and other foreign materials into the well.
- (2) The owner of a well not in use shall cap the well with a device commercially manufactured and of a type approved by the minister sufficient to prevent the entry of a substance that might impair the quality of water in the well.
- (3) Where a well is dry or abandoned and its continued existence might result in the impairment of groundwater, the owner shall fill and seal the well in a manner sufficient to prevent the vertical movement of water in it by a method approved by the minister.

# Thank You

?? Questions ??