

Case 3: Happy Meadows Campground and Equestrian Training Centre, near Hazelmere, Lower Mainland

- existing water system with 3 shallow (6 m deep) sand point wells that have been in operation since 1993;
- historic water quality sampling has never shown any coliform or E. coli bacteria but elevated levels of nitrate N (3 to 5 mg/L) are reported;
- wells are completed in an unmapped, unconfined fine sand aquifer and situated within the floodplain of the Nicomekl River and 500 m from the main channel of the river;
- no known sources of contamination within Public Health setback distances for all wells;
- the wells do not appear to meet the floodproofing requirements of the Ground Water Protection Regulation, section 11 (2b).

STEP 1. Based on the information you have available run through the checklist and complete each item as you see it (one checklist for all wells will suffice).

STEP 2. Discuss your individual findings as a group and record any major differences.

STEP 3. Identify any areas where you feel additional information or more details are required.

STEP 4. Discuss and record the recommendations of your group.

CASE 3

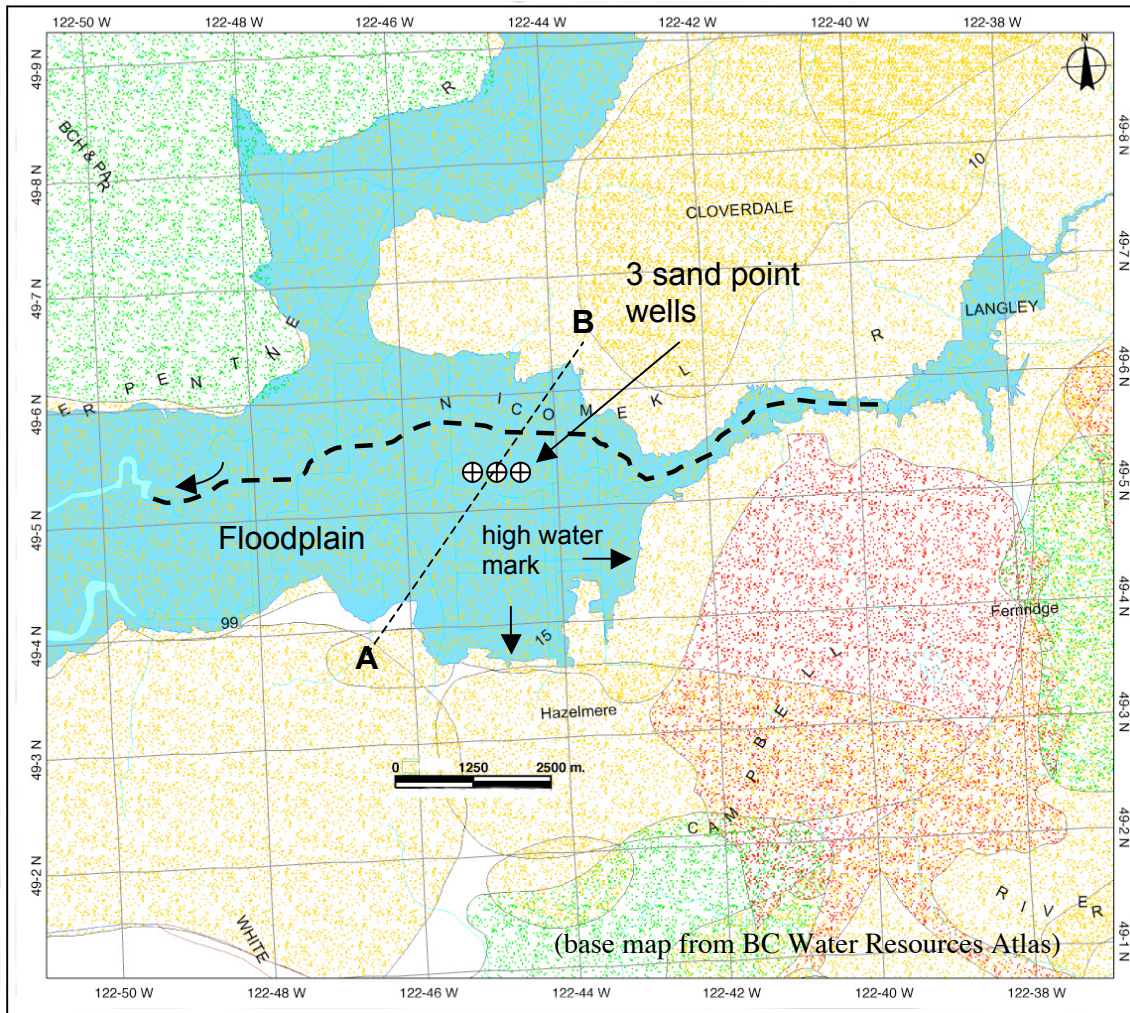


Figure 1. Location of sand point wells, Happy Meadows Campground and Equestrian Training Centre near Hazelmere.

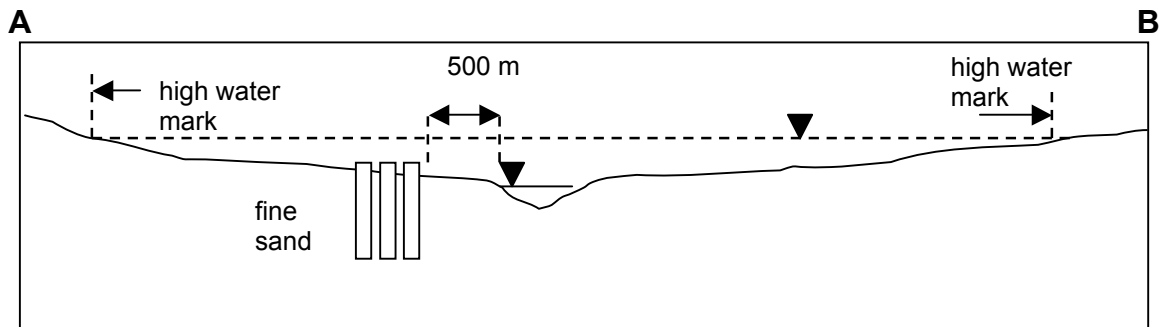


Figure 2. Cross section A-B looking northwesterly.

WATER ACT

GROUND WATER PROTECTION REGULATION

Part 2 — Ground Water Protection

Floodproofing of wells

11 (1) For the purposes of this section, flood debris and flood waters are a prescribed matter or substance under section 79 (1) (f) of the Act.

(2) The owner of a new well that is for the purpose of supplying a water supply system must locate, complete, equip and maintain the well

(a) to prevent the entry from the surface of anything set out in section 79 (1) of the Act, either directly into the top opening of the well or by entering the well through any annular space along the outside of the outermost well casing, and

(b) to protect the well or wellhead from physical damage due to flood debris, ice or erosion.

(3) An engineer may require the owner of a well that is for the purpose of supplying a water supply system to assess whether

(a) the well prevents the entry from the surface of anything set out in section 79 (1) of the Act, either directly into the top opening of the well or by entering the well through any annular space along the outside of the outermost well casing, and

(b) the well has been maintained in such a way that the well or wellhead is protected from physical damage due to flood debris, ice or erosion,

and the engineer may, after having considered the assessment, order the well owner to alter and maintain the well so that it complies with paragraphs (a) and (b) of this subsection.

(4) An engineer may order the owner of a well that is for the purpose of supplying a water supply system to engage a qualified professional who has competency in the field of hydrogeology to make the assessment required by subsection (3).

(5) An engineer may

(a) require the owner of a well that is in proximity to a well that is for the purpose of supplying a water supply system and that may pose a threat of a contaminant entering the well that is for the purpose of supplying the water supply system, or entering the aquifer supplying the water supply system, to engage a qualified professional who has competency in the field of hydrogeology to assess the threat, and

(b) after having considered the assessment, order the owner of the well that is in proximity to, and that may pose a threat to, the well that is for the purpose of supplying the water supply system,

(i) to alter or maintain the well in accordance with subsection (3) (a) and (b), or

(ii) to deactivate or close the well in accordance with section 9.

(6) Any work to alter or close a well under subsection (3) or (5) must be done by

(a) a qualified well driller,

(b) a qualified professional who has competency in the field of hydrogeology, or

(a) a person under the direct supervision of a person referred to in paragraph (a) or (b).

WATER ACT

Part 5 — Wells and Ground Water Protection

Prohibition on introducing foreign matter into a well

79 (1) A person must not introduce, allow to be introduced or cause to be introduced any of the following into a well:

(a) refuse;

(b) carcasses;

(c) human or animal waste;

(d) pesticides or fertilizers;

- (e) material, natural or otherwise, from construction or demolition;
- (f) any other prescribed matter or substance;
- (g) a contaminant, or a prescribed matter or substance, in such amounts or in such a manner as to cause or to be likely to cause a significant adverse impact on
 - (i) the quality of ground water in the well, or
 - (ii) the existing uses made of the ground water from the well.

(2) Subsection (1) does not apply with respect to

- (a) a well owner in the proper operation, disinfection, maintenance, repair, deactivating or closing of a well in accordance with the regulations,
- (b) a well made for the purpose of ground water remediation,
- (c) activities authorized or required under an enactment,
- (d) a prescribed activity undertaken in accordance with any conditions prescribed by regulation, or
- (e) a prescribed contaminant, matter or substance.

(3) For the purposes of prosecuting a contravention of subsection (1) (g), it is not necessary to prove that the contaminant, matter or substance, if diluted subsequent to the introduction into the well, continued to cause or to be likely to cause a significant adverse impact on the quality of the ground water in the well or the uses made of the ground water from the well.

(4) An engineer may order a person

- (a) to stop the introduction of,
- (b) to remove, or
- (c) to undertake measures, as directed by the engineer, to remediate or mitigate the effects of the introduction of

any thing, contaminant, matter or substance introduced into a well contrary to subsection (1).

(5) If the engineer cannot ascertain who contravened subsection (1), the engineer may make an order under subsection (4) against the well owner.

(6) If the engineer cannot ascertain who contravened subsection (1) or who owns the well, the engineer may make an order under subsection (4) against the owner of the land on which the well is located.

(7) If a person who is subject to an order under subsection (4), (5) or (6) fails to comply with that order and the comptroller or regional water manager considers that that failure may result in harm or damage to ground water in the aquifer, the comptroller or regional water manager may authorize the government or another person, at the expense of the person who is subject to the order, to take the actions necessary to comply with that order.

(8) If work is carried out under subsection (7), the costs to the government are a debt due to the government by the person who is subject to the order under subsection (4), (5) or (6).

(9) This section does not limit the authority under section 86 [*power of comptroller if disobeyed*] or 88 [*powers of engineers and officers*].

Screening Tool Checklist for GROUND WATER AT RISK OF CONTAINING PATHOGENS

WATER SYSTEM NAME: _____

BCMOE Well Identification Plate Number (number on plate on well): _____

Well Log Examined: Yes / No Site Survey Conducted: Yes / No

FACTORS and CRITERIA	YES: At Risk	NO: Low Risk	Unable to determine risk status	Comments
WATER QUALITY RESULTS				
Water system or well sampling shows presence of total or fecal coliform or <i>E.coli</i> .				
Water system has a reported or a history of turbidity problems associated with the source water.				
Water system has a history of known or suspected disease outbreaks that could be associated with surface water or other source(s) or pathogens.				
SOURCE TYPE and LOCATION				
Well situated inside setback distances of the Public Health Act Transitional Regulation, from a possible source of contamination.				
Well with intake depth < 15 m below ground and located in floodplain or with intake depth < 15 m below ground and < 100 m outside from high water mark or natural boundary of surface water feature.				
Well located < 100 m outside from high water mark of surface water feature and with intake depth that is <15 m below the elevation of the high water mark.				
WELL CONSTRUCTION				
Well fails to meet section 7 of Ground Water Protection Regulation (GWPR) for surface sealing.				
Well fails to meet section 10 of GWPR for well caps and covers.				
Well fails to meet section 11 of GWPR for floodproofing.				
Well fails to meet section 12 of GWPR for wellhead protection.				
AQUIFER TYPE and SETTING				
Well with intake depth < 15 m below ground and situated in; a highly vulnerable, unconfined, unconsolidated aquifer or in any bedrock aquifer.				
Well completed in a karst bedrock aquifer.				

Risk Assessment:

Did any factor suggest that the system is "At Risk" (as opposed to "Low Risk")?

Yes/No/Unable to Determine

- If **"Yes"** and the water supplier does not wish to undertake remediation (see below for remediation options), move to Stage 2 Preliminary Hydrogeological Investigation.
- If **"No"**, move to Stage 4 Long-term Water Quality Monitoring.
- If **"Unable to determine risk status"** because information is unavailable for any factor(s) or criteria of the assessment, then move to Stage 2 Preliminary Hydrogeological Investigation.

Remediation Options:

- Treatment to meet Health Authority drinking water requirements
- Provide alternate source of water
- Well Alteration / correct significant deficiencies in well construction¹
- Relocate the well
- Eliminate source(s) of contamination
- Stage 2 Preliminary Hydrogeological Investigation
- Stage 4 Long-term Water Quality Monitoring
- Other

Completed by: _____

DATE: _____

¹ Deficiencies in well construction related to the Ground Water Protection Regulation must be addressed.