9.0 BUILDING 3100: NELNAH BESSIE JOHN SCHOOL

9.1 Description of Existing Water Supply System

Building 3100, Nelnah Bessie John School in Beaver Creek, is currently served by a water supply system that delivers water from a 21.6 m deep well. The well is located in a pit adjacent to the school, approximately 2 m from the building. The well location and other details about the surrounding area are provided in Figure 3100-A in Appendix A9. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 7
- Northing: 6916849
- Easting: 506143

The water system is equipped with a pellet chlorinator that is installed on the wellhead, however, at the time of the assessment, it was not functioning properly as it was discharging some pellets into the wellhead enclosure (some appeared to be discharging into the well as designed). This water system is also equipped with a water softener and an activated carbon filter for treatment. Field chemistry completed during the water system assessment indicated that the residual chlorine concentration was approximately 0.07 mg/L.

A schematic detailing the well supply system is provided as Figure 3100-B in Appendix A9.

There is an abandoned well located approximately 1 m from the current well. The abandoned well did not have a proper cap.

9.2 Description of Existing Wastewater Systems

The school's septic tank is located approximately 22 m north of the well on the north side of the school as indicated in Figure 3440-A. The location of the septic effluent discharge field is unknown but it is likely located north of the tank. The location of the septic disposal system should be confirmed prior to making final decisions regarding water supply system upgrades.

9.3 Water Quality Results

9.3.1 Water Quality Results from Previous Sampling

Bacteriological

Nine samples were collected from the Nelnah Bessie John School water system between September 2004 and June 2005 and were tested for total coliform and *E. coli* by Yukon Environmental Health Services using the presence/absence test method. Results are tabulated in Table 3100-1 in Appendix A9. Coliform bacteria and *E. coli* were reported as absent in each of the nine samples for which results are provided.

Potability

Water samples were previously collected from the School water system on September 21, 2004 and June 15, 2005. The samples were submitted to Northwest Labs in Surrey, BC and ALS Environmental in Vancouver, BC for potability analyses. The results of these analyses are summarized in Table 3100-2 in Appendix A9. EBA reviewed the analytical results to compare them with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality, identify and recommend additional sampling and analytical, and to identify indicators of potential contamination as follows:

- The water quality results indicated that all health based and aesthetic objectives were met for the parameters analyzed;
- The water quality results indicated low hardness, calcium, and magnesium, and high potassium, indicating that the water softening system is functioning properly; and,
- The hardness (as $CaCO_3$) reported from both sampling events was indicated to be less than 1 mg/L, and the water is considered very soft.

9.3.2 Identification of Additional Analytical Testing Required

Additional analytical for Nelnah Bessie John School that was identified to be included during the water system assessments is detailed below:

- Trihalomethane parameters (THMs) and other disinfection by-products are formed when chlorine disinfectants react with naturally occurring organic matter in the

source water. THMs were analyzed, as there is an existing chlorine disinfection system.
- Similar to THMs, Haloacetic Acid (HAA) can be present in chlorinated drinking water as a disinfectant byproduct. HAA analysis has been included due to the presence of the chlorination system.
- Total organic carbon (TOC);
- Extractable Petroleum Hydrocarbons (EPH) and Polycyclic Aromatic Hydrocarbons (PAH) to determine if there are any indications of hydrocarbon contamination; and,
- Measurements in the field for total dissolved solids, conductivity, pH, temperature and the residual chlorine concentration.

Additional Analytical Results

A water sample was obtained during the water system assessment on July 28, 2005, and was submitted to ALS Environmental in Vancouver, BC for analysis. These results are summarized in Table 3100-2 in Appendix A9 and the laboratory reports are included in Appendix B. Items to note are:

- Laboratory results for THMs and HAAs indicated concentrations below analytical detection limits;
- Screening for EPH and PAH did not indicate any parameter above the laboratory detection limits; and
- The water quality results from additional analytical sampling indicated that all health based and aesthetic objectives were met for the parameters analyzed.

9.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. Chloride concentrations were reported to be low and are considered to be within the normal background ranges for groundwater in the area. Nitrate and nitrite concentrations for this sample were also low and within the normal background range for this area. These water quality results do not suggest that the aquifer from which the groundwater is obtained for Nelnah Bessie John School is under the influence of surfacewater sources or septic wastes.

9.4 Conceptual Hydrogeology

There is no log available for this well, however, it is reportedly 21.6 m deep with a static water level at approximately 11 m below grade. Most of the well logs in the Beaver Creek

area indicate coarse sand and gravel with cobbles and small boulders to depths of at least 30 m. The well logs also indicate that discontinuous lenses of finer-grained sediments persist throughout the area, but in general the sediments are dominated by coarse alluvium. Some discontinuous permafrost is also interpreted to persist throughout the Beaver Creek area. The variability of sediments in the Beaver Creek area indicates limited aquifer protection from surficial sources of contamination. A study previously completed in the Beaver Creek area by EBA determined that the direction of groundwater flow in the vicinity of the site is north to northeasterly.

9.5 Potential Contaminant Sources

Potential contaminant sources identified during the water system assessment are compiled in field notes in Appendix A9. Photos of potential contaminant sources are also provided in Appendix A9. Potential sources of contamination within 30 m of the wellhead are:

- An underground fuel storage tank (UST) at approximately 1 m; and
- A septic field potentially within 30 m (exact location unknown).

An additional source of contamination is an abandoned and uncapped well that is located approximately 1 m from the existing well.

9.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any recorded spill events or contaminated sites issues for this site or neighbouring sites.

9.6 Identified Water System Deficiencies and Associated Risk

9.6.1 High and Medium Risk Deficiencies

- Poor surface completion of the wellhead (located in a pit below grade);
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Guidelines for Water Well Construction;
- By definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because it does not meet the requirements of the Guidelines for Water Well Construction;
- The well is located within 30 m of potential sources of contamination including an underground fuel storage tank located 1 m from the well;

- There is an open, abandoned well located approximately 1 m from the current well;
- The septic tank is located approximately 22 m from the well, and although the exact location of the septic field is unknown, it may be within 30 m;
- There is no well log available to review well construction and/or lithology;
- The pellet chlorination system on the wellhead has not been properly installed. It was observed that a large number of the chlorine pellets do not drop into the well but fall into well pit instead;
- Field chemistry reported that the residual chlorine concentration was 0.07 mg/L, below the required minimum of 0.2 mg/L; and,
- The configuration of the treatment system does not meet current standards.

9.6.2 Low Risk Deficiencies

- The heat-trace installation does not meet code.

9.7 Mitigative Options for Deficiencies

Mitigative options were developed to address the deficiencies identified in the previous section. Deficiencies are categorized by recommended level of priority (with Priority 1 being most critical).

9.7.1 Priority 1

The following recommendations are provided in order to mitigate deficiencies that are of immediate concern for the Nelnah Bessie John School water supply system. Priority 1 remedial recommendations include:

- Properly decommissioning the abandoned well adjacent to the well that currently serves the building;
- Priority 1 upgrades to eliminate immediate risk would also involve upgrading the existing disinfection system to ensure that adequate disinfection is provided. Two options are presented below:
  - The first option would involve the installation of retention tanks and a proportional feed chlorine injection system with a flow meter, a chemical feeding pump, day tank, injection piping, spill containment deck and appurtenances.
  - The second option presented for Priority 1 upgrades would involve the installation of a UV disinfection system with NSF/ANSI 55 certification.

There are conceptual options based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications.

Some additional assessment is required prior to determining final Priority 2 options. These include obtaining a well log to determine well construction, and determining the exact location of the septic field and the distance to the well.

9.7.2 Priority 2

Priority 2 recommended upgrades include the removal of the UST located adjacent to the well. The UST should be replaced with a double walled above ground storage tank (AST) located at a safe distance from the well. Observations should be made and confirmatory sampling completed to confirm whether the existence of the UST has impacted soils in the vicinity of the tank, which could ultimately impact on the groundwater and water quality.

Pending the results of the UST removal, the confirmed location of the septic tank, and the well construction, the following options are presented:

Option 1: Upgrade Existing Well

- Option 1 is presented in consideration that the UST removal confirms that there is no potential impact of hydrocarbons on water quality, that the septic field is greater than 30 m from the well, and that the well construction (screen construction etc.) are adequate to warrant further capital investment in upgrades to this well. For this option, Priority 2 upgrades would include "standard wellhead upgrades" including extending the well to at least 500 mm above grade and installing a commercial pitless unit. A surface sanitary seal (grout or bentonite) to at least 3 m below grade should be retrofitted around the well and then the ground should be graded to promote surface drainage away from the wellhead. For this option, it is also recommended that a NSF 61 NSF 61 filtration system (to 1 micron absolute) be installed in advance of the disinfection system installed as Priority 1.

Option 2a: New Water Well Construction

- Options 2a and 2b are presented for the scenario that further assessment supports the fact that the existing well should not be used for a long-term option. Option 2a considers the installation of a new well to serve only the School. For this option, it is recommended that a new well should be drilled and the current well be decommissioned. It is recommended that a new well be installed to meet the following conditions:
  - The well should be equipped with a surface seal to at least 6 m and the casing should be extended above grade (500 mm) within a lockable enclosure that is inaccessible to animals and unauthorized personnel;

- The well must be located at a distance greater than 30 m from any potential source of contamination, including the above ground storage tank and all parts of the septic system;
- The water from the new well must meet all CDWQG health based guidelines. If there are any exceedences in the CDWQG health-based guidelines then a treatment system must be designed and installed as necessary. A disinfection system may be recommended.

Option 2a: New Cluster Well Construction

- Option 2b presents the option of a cluster well installation to provide water supply to the Pool building, Recreational Centre, and the School. The advantages would include combined savings on capital costs, and reduced life cycle costs.

9.7.3 Priority 3

- Upgrade of heat trace to meet code would be completed with Priority 2 option 1, and would not be necessary for the scenario presented option 2 or 3.

9.8 Cost Estimates for Mitigative Options

Engineering costs for mitigative options are estimated to be 20% of construction costs, and would include inspection and completion reporting. The costs for materials and labour (not including engineering) are provided in the sections below. An additional contingency allowance of 20% is suggested for budgetary purposes.

9.8.1 Priority 1

- The cost to decommission the abandoned well is estimated to be approximately **$1,000** for materials and labour, and should be completed regardless of which disinfection treatment system is chosen.
- The estimated cost for a proportional feed chlorine injection system with appurtenances, and included disinfection of the well and water system is in the order of **$7,000**.
- The estimated cost for an NSF/ANSI 55 certified UV disinfection system including disinfection of the well and water system by superchlorination would cost approximately **$2,500.**

Therefore, with the options presented, Priority 1 upgrades would range from **$3,500** to **$8,000** including materials and labour.

9.8.2 Priority 2

Priority 2 upgrade options to mitigate long-term risk and meet the proposed regulation are presented below:

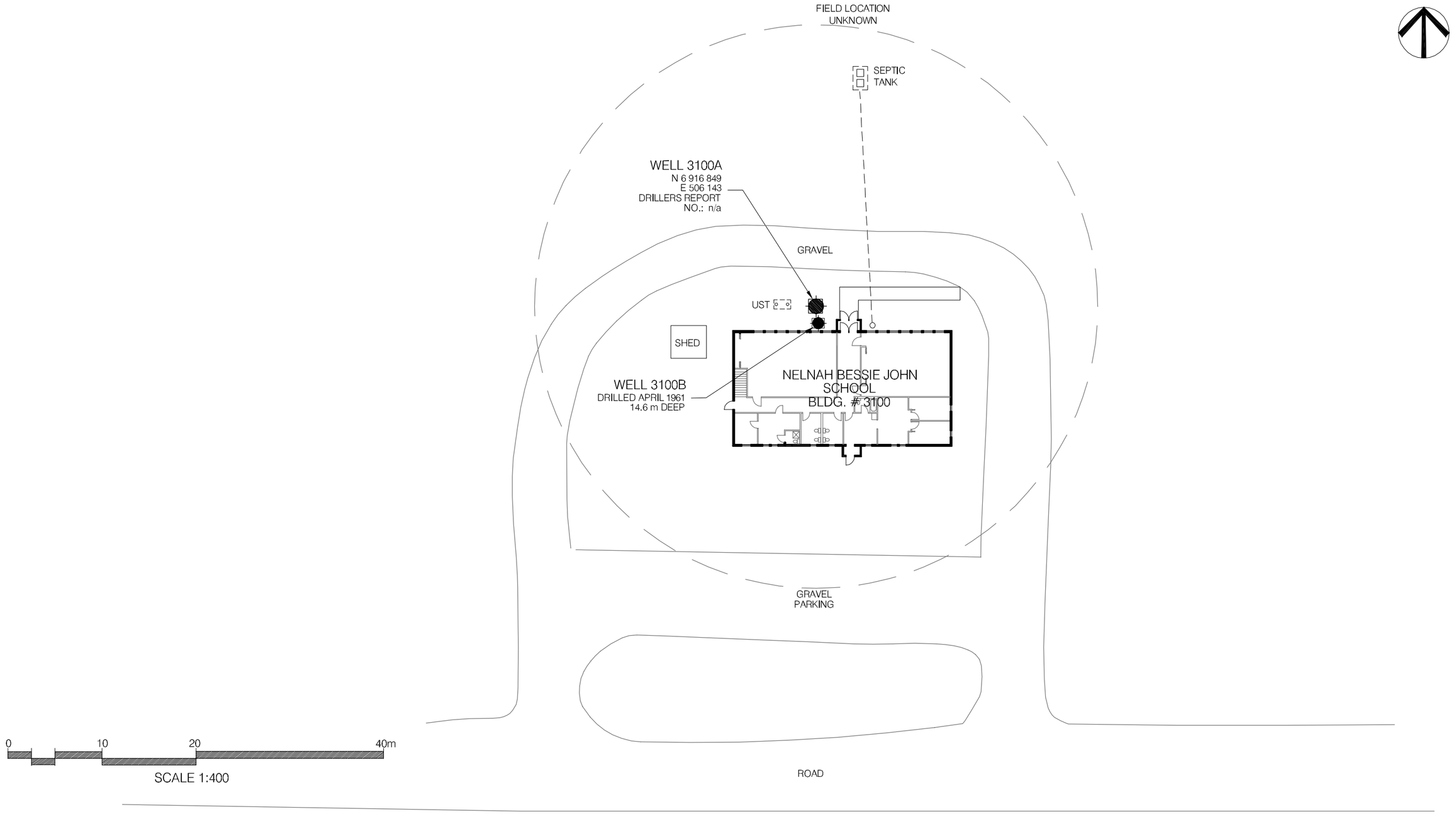
Option 1: The cost associated with upgrading the existing well (pending the results of additional assessment) is estimated to cost approximately **$5,000**. The estimated cost for removal of the UST adjacent to this well is approximately **$6,000**. Installation of an adequately sized NSF 61 NSF 61 filtration system to 1 micron absolute would cost approximately **$500**. Therefore, the total cost for Option 1 Priority 2 upgrades is **$11, 500** for materials and labour.

Option 2: The cost associated with the construction of a new well to meet the proposed regulations, and drilled to approximately 30 m in depth would cost in the order of **$31,200** including hook-up. Proper decommissioning of the existing well would cost approximately **$1000.** Therefore, the total cost for Option 2 Priority 2 upgrades is **$32, 200** for materials and labour.

Option 3: The shared cost for construction of a cluster well that would serve the recreational hall and pool, assuming that the well would be constructed to meet the proposed regulations, and would be 30 m deep, and including 80 m of distribution piping would cost approximately **$26,800** including half of the drilling costs and the full costs for distribution.

9.8.3 Priority 3

- The cost for heat trace upgrade is included in Priority 2 Option 1, and not necessary in the event that Option 2 or 3 are chosen.



NOTES:

1. UTM COORDINATES OBTAINED WITH A HAND HELD GPS USING NAD83 SYSTEM AND ARE CONSIDERED TO BE ACCURATE TO 10.0 m, APPROXIMATELY.

30 m RADIUS FROM WATER WELL FOR CONSIDERATION OF PROXIMITY TO POTENTIAL CONTAMINANT SOURCES.

No.	DESCRIPTION	DATE	APPROVED
0	ISSUED FOR CLIENT REVIEW	DD/MM/YY	XXX

REVISION

EBA Engineering Consultants Ltd.

DESIGNED BY:	R. MARTIN
DRAWN BY:	J. BUYCK
DATE:	AUG. 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.003
ACAD FILENAME:	003-WESTERN REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WESTERN REGION

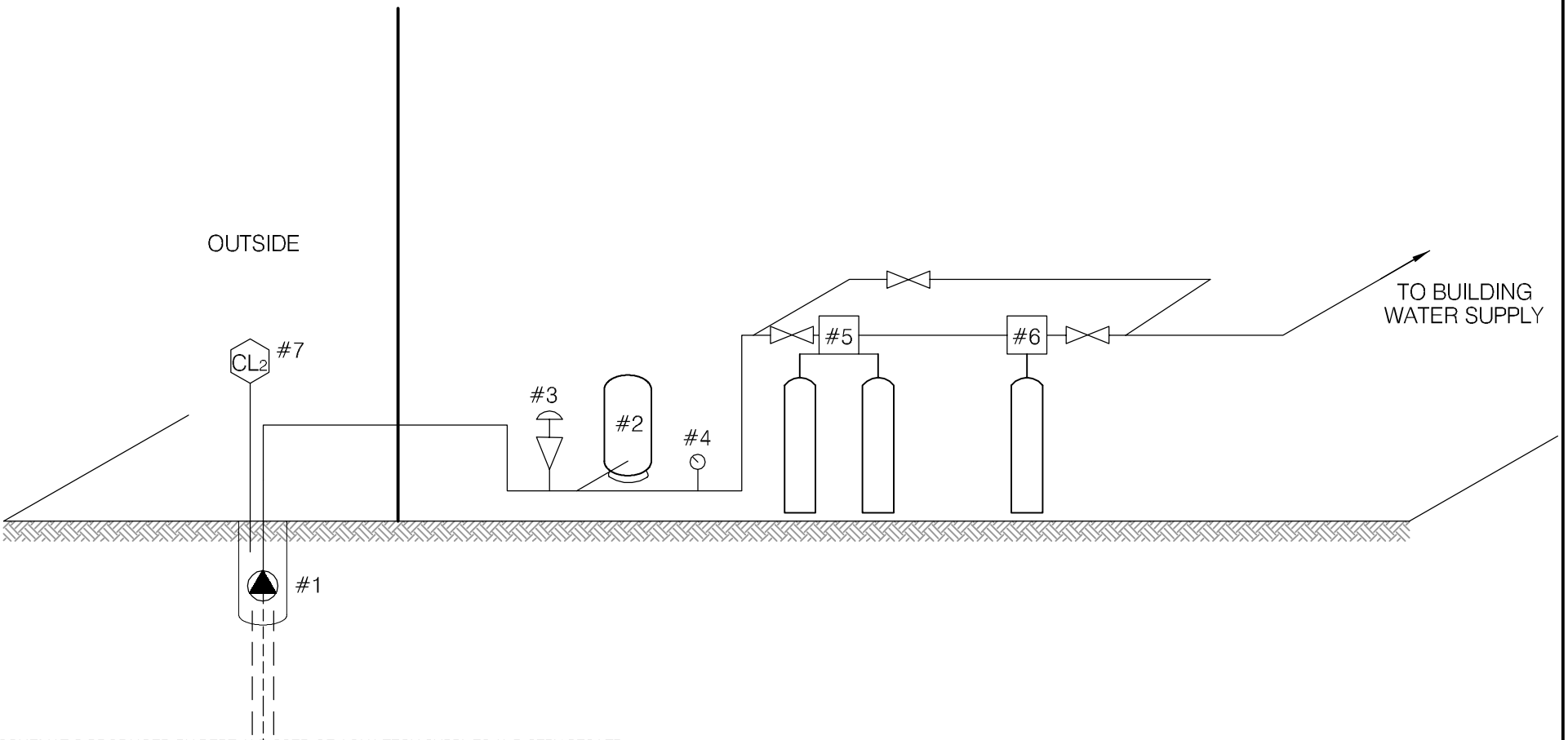
GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

NELNAH BESSIE JOHN SCHOOL BUILDING # 3100 SITE LOCATION DIAGRAM WELL ID: 3100A

REVISION ISSUE: 0

FIGURE No.: FIGURE 3100-A

Z:\0201Drawings\1260002 Water Assessment YTG\003 -Western Region\beaver\1260002 B Crk School_3100A Site Plan.dwg, 9/20/2005 9:25:57 PM, Adobe PDF



SCHEMATIC PRODUCED BY BERT ALBISSER OF AQUA TECH SUPPLIES AND SERVICES LTD.

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WESTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 3100 BESSIE JOHN SCHOOL - BEAVER CREEK	
DATE SEPT. 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.003		DWG.: FIGURE 3100-B

Z:\0201Drawings\1260002 Water Assessment YTG\003 -Western Region\beaver\1260002 B Crk School_3100B Schematic.dwg, 4/4/2006 12:39:41 PM, Adobe PDF, jbuyck

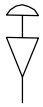
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

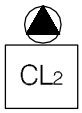

SOLENOID

#2 COMPONENT ID. No.
(SEE TABLE ON FOLLOWING PAGE)

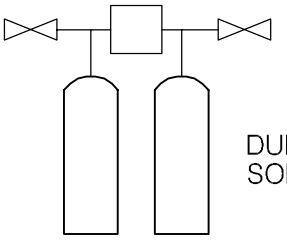
FLOW METER

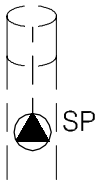
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

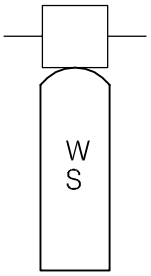


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER



WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WESTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	SCHEMATIC SYSTEM LEGEND	
DATE APRIL 2006	DWN. JSB	CHKD. RMM	FILE NO. 1260002		DRWG. LEGEND

Western Region – Nelnah Bessie John School
Building # 3100

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	Sub Pump.	Monarch	SK10B5E		5091	4" - ½ HP.
2	Pressure Tank.	Well X Trol	WX-203			
3	Pressure Switch	Square D	FSG-2			2 HP - ¼" NPT
4	Pressure Gauge	Marsh	2" (0-100)			2" - 0-100 PST
5	Water Softner	Aqua-Tech	Duplex 9000-45MI			45K - Duplex
6	Charcoal Filter	Aqua-Tech	L5600-AC15			1.5 Cu Ft.
7	Pellet Chlorinator	Better Water	Sentry 1.			
8						
9						
10						

TABLE 3100- 1: SUMMARY OF BACTERIOLOGICAL RESULTS

Building #	Building Name	Number of Sampling Events	Time Period over which Sampling was Done	Any Positive Total Coliform Results? (yes or no)	Fraction of Positive Total Coliform Results vs. Total Sampling Events	Any positive E.Coli results? (yes or no)	Most Recent Sampling Event Available for EBA Review	Is Most Recent Result Positive?
3100	Nelnah Bessie John School	9	Sept-04 to Jun-05	no	0/9	no	16-Jun-05	no

Table 3100-2: Water Quality Results

SOURCE:	Building 3100 - Nelnah Bessie John School			GCDWQ Criteria		
Location/ Resident	Beaver Creek					
Address						
Treatment	Water softener, activated carbon filter					
Disinfection	Chlorination					
Source of Water	On-site well					
Purpose of Sampling	Base Line	Base Line	Additional Analytical			
Sample Location			Arts room sink			
Date Sampled	21-Sep-04	15-Jun-05	28-Jul-05	Lower	Upper Limit	
Physical Tests *(ALS)*				AO	MAC	AO
Colour (CU)	<5	<5.0	-			15
Conductivity (uS/cm)		456	-			
Total Disolved Solids	265	296	-			500
Hardness CaCO3	<0.9	<0.66	-	AO >200 = poor, > 500 unacceptable[A]		
pH	8.08	7.87	-	6.5		8.5
Turbidity (NTU)	0.2	0.41	-		1	5
UV Absorbance	-	-	-			
%UV Transmittance	-	-	-			
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	164	174	-			
Chloride Cl	2.4	2.24	-			250
Fluoride F	0.05	0.076	-		1.5	
Silicate SiO4			-			
Sulphate SO4	24.6	26.0	-			500
Nitrate Nitrogen N	0.5	0.8	-		10	
Nitrite Nitrogen N	<0.05	<0.10	-		3.2	
Ammonia Nitrogen N	-		-			
Total Phosphate PO4	-		-			
Total Metals *(ALS)*						
Aluminum T-Al	<0.005	<0.010	-			
Antimony T-Sb	<0.0002	<0.00050	-		0.006	
Arsenic T-As	0.0004	0.00028	-		0.025	
Barium T-Ba	0.001	<0.020	-		1	
Boron T-B	0.005	<0.10	-		5	
Cadmium T-Cd	<0.00001	<0.00020	-		0.005	
Calcium T-Ca	-	<0.10	-			
Chromium T-Cr	<0.0005	<0.0020	-		0.05	
Copper T-Cu	0.016	0.0265	-		1	
Iron T-Fe	<0.01	<0.030	-			0.3
Lead T-Pb	<0.0001	<0.0010	-		0.01	
Magnesium T-Mg	-	<0.10	-			
Manganese T-Mn	<0.005	<0.0020	-			0.05
Mercury T-Hg	-	<0.00020	-		0.001	
Potassium T-K	-	154	-			
Selenium T-Se	-	<0.0010	-		0.01	
Sodium T-Na	-	<2.0	-			200
Uranium T-U	<0.0005	<0.00010	-		0.02	
Vanadium T-V	-	-	-			
Zinc T-Zn	0.003	<0.050	-			5
Trihalomethanes						
Bromodichloromethane	-	-	<0.0010			
Bromoform	-	-	<0.0010			
Chloroform	-	-	<0.0010			
Dibromochloromethane	-	-	<0.0010			
Total Trihalomethanes	-	-	<0.0040		0.1	
Organic Parameters						
Tannin and Lignin	-	-	-			
Total Organic Carbon C	-	-	0.84			
Haloacetic Acids						
Bromoacetic Acid	-	-	<0.0020			
Bromochloroacetic Acid	-	-	<0.0020			
Chloroacetic Acid	-	-	<0.020			
Dibromoacetic Acid	-	-	<0.0020			
Dichloroacetic Acid	-	-	<0.0020			
Trichloroacetic Acid (TCA)	-	-	<0.0020			
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	-	-	<0.000050			
Acenaphthylene	-	-	<0.000050			
Acridine	-	-	<0.000050			
Anthracene	-	-	<0.000050			
Benz(a)anthracene	-	-	<0.000050			
Benzo(a)pyrene	-	-	<0.000010		0.00001	
Benzo(b)fluoranthene	-	-	<0.000050			
Benzo(g,h,i)perylene	-	-	<0.000050			
Benzo(k)fluoranthene	-	-	<0.000050			
Chrysene	-	-	<0.000050			
Dibenz(a,h)anthracene	-	-	<0.000050			
Fluoranthene	-	-	<0.000050			
Fluorene	-	-	<0.000050			
Indeno(1,2,3-c,d)pyrene	-	-	<0.000050			
Naphthalene	-	-	<0.000050			
Phenanthrene	-	-	<0.000050			
Pyrene	-	-	<0.000050			
Quinoline	-	-	<0.000050			
Extractable Hydrocarbons						
EPH10-19	-	-	<0.30			
EPH19-32	-	-	<1.0			
LEPH	-	-	<0.30			
HEPH	-	-	<1.0			
Field Chemistry (EBA)						
pH	-	-	8.12	6.5		8.5
TDS (ppm)	-	-	230			500
EC (uS/cm)	-	-	460			
Temperature (°C)	-	-	6.0			
Free Available Chlorine	-	-	0.07			

Notes:

A. Guidelines indicated for hardness are not CDWQG, rather they are general aesthetic guidelines - exceedences are indicated in yellow highlighting.

Italics and underline indicates exceedence of proposed MAC (ie. arsenic)

Bold with Yellow highlighting indicates exceedence of CDWQG Aesthetic Objective (AO)

Bold Underline with Yellow highlighting indicates exceedence of CDWQG MAC

Results are expressed as milligrams per litre except for pH and Colour (CU) Conductivity (umhos/cm), Temperature (°C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

eba

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date July 29, 2005

WELL ID #	Owner	Location Description
3100	YTG	Nelnah Bessie John School

1. Well Location and Potential Contaminant Sources

a. General location of well: (Community, Subdivision, etc.)
Beaver Creek

b. Specific location: (Road or street, Building number, name of owner and/, legal description,

c. GPS location: N 6916849 E 506143 elv 687m ± 12m

d Is there electric power? ☒ Yes ☐ No

e Is there outside water access? ☒ Yes ☐ No

f. Does the well system have:

☐ 15 or more service connections to a piped distribution system ? If so how many_____
School

☐ 5 or more delivery sites on a trucked distribution system? If so how many_____

g. Nearest building, specify School

h. Distance from well to building ~2m

i. If there is an effluent disposal field, is its location known? ☒ Yes ☐ No

j. Distance from well to nearest point of known field: Septic tank + field @ 22m

k. Well location relative to field: ☐ upslope ☐ downslope ☒ lateral

l. Is there any part of a sewage disposal system(s)or other potential sources of pollution that may pose a health and safety risk within 30 m? ☒ Yes ☐ No

---

m. Is the well located within 300 m from a sewage lagoon or pit? ☐ Yes ☒ No unlikely

n. Is the well located within 120 m from a solid waste site or dump, cemetery? ☐ Yes ☒ No unlikely

o. Is the infrastructure protecting the wellhead, pumphouse, storage tank and/or water treatment plant designed and secured to prevent:

Unauthorized access by humans? ☐ Yes ☒ No Unlocked enclosure

Entrance by animals? ☐ Yes ☒ No Access possible

p. Is well site subject to flooding? ☒ Yes ☐ No

q. Is the well site well drained? ☐ Yes ☒ No flat ground around well

r. Is there a buried fuel tank on the property? ☒ Yes ☐ No

If yes, is it ☒ in use ☐ abandoned

Is the location known? ☒ Yes ☐ No

Distance from the well to known buried tank 1m

s. Are there any other known contaminant sources on the property?

☐ Yes ☐ No Describe _____

If yes, specify the source: ☐ dump ☐ sewage lagoon ☐ cemetery ☐ other

Potential Source 1:_____; Distance from well to Potential Source 1:_____

Potential Source 2:_____; Distance from well to Potential Source 2:_____

Potential Source 3:_____; Distance from well to Potential Source 3:_____

Potential Source 4:_____; Distance from well to Potential Source 4:_____

t. Are there other wells on this property? ☒ Yes ☐ No

How many? 1 ☐ in use ☒ abandoned ☐ require proper sealing
not sealed

2. Well and Wellhead information:

a. When was well installed? Year 1990 Month September

b. Type: ☒ drilled ☐ dug ☐ sand point ☐ other _____

c. Is there a drillers log for the well: ☐ Yes ☒ No

d. Is there a surface seal to 6 m ☐ Yes ☒ No ☐ unknown ☐ unlikely

e. Surface casing: ☐ Yes Diameter _____ ☒ No

f. Well casing: Diameter 15cm Material: ☐ steel ☐ plastic ☐ concrete

g. Depth of well: 71 ft ☐ measured (if possible) ☒ reported ☐ from log

h. Static water level below ground: 36 ft bc

☐ measured (if possible) ☒ reported ☐ from log ☐ flowing

i. (If granular) Is the well completed: ☐ open end casing ☐ with a well screen

☐ with slotted pipe ☒ unknown other _____

j. (If bedrock) Does the well have a liner? ☐ yes ☐ No ☐ steel ☐ plastic

k. If there is a well screen: length unknown slot size(s) _____
Location of screen: from _____ to _____ from log reported

l. Is there a sump below the screen? ☐ Yes ☐ No unlikely - unknown

m. Is the well head: ☐ in pumphouse ☒ in pit ☐ pitless adaptor ☐ in a building

☐ in a wooden enclosure other, describe _____

n. If the well head is located in a wooden enclosure,

i. Is the well head below grade? describe in detail ~1.15m below grade

ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? ☒ Yes ☐ No

iii. Is the wellhead enclosed by fiberglass insulations? ☒ Yes ☐ No

iv. Any evidence of rodents? Specify Access possible

v. Does the well casing have a proper seal cap? ☒ Yes ☐ No

If no, describe condition but heavy rust/corrosion

3. Water Supplying This Well:

a. By definition is the water from a surface water source or under the direct influence of surface water?

☐ Yes ☐ No ☐ farther investigation required.

If yes is there treatment or disinfection ☐ Yes ☐ No

Explain (filtration, disinfection etc...)

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4. Aquifer Supplying This Well:

a. The aquifer is: ☐ bedrock ☒ granular sediment likely ☐ unknown

b. Does water level and/or well capacity show seasonal fluctuation? ☐ Yes ☒ No unlikely

5. Pump Installation:

a. Is the well equipped with a pump? ☒ yes ☐ No

b. Type of pump: ☐ hand ☒ electric submersible ☐ jet

☐ shallow well centrifugal ☐ other,

c. Description: Manufacturer Monarch Model

horsepower 1/2 capacity voltage

d. Date installed: September 1990 By: _____

e. For submersible pump, depth of setting below surface _____

f. Drop pipe for submersible pump: ☐ steel ☒ plastic likely

g. Pump delivers water to: ☒ pressure tank ☐ elevated tank ☐ other

h. Are there automatic pump controls: ☒ Yes ☐ No

i. Is there provision for taking water samples before water reaches storage? ☐ Yes ☐ No

j. Is there a water meter on the system? ☒ Yes ☐ No
But against floor of building

k. Is the pump and piping protected from freezing? ☒ Yes ☐ No

If yes, describe: heat trace & insulation

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

There is also an abandoned well in an enclosure off from the basement of the school. Drilled: April 1961, depth: 48 ft. Abandoned well is open w/ no cap. Static water level (measured) 13.72 m below grade.

b. Recommendations: _____

PART B: EBA Site Inspection

Inspector: _____ Date _____

WELL ID #	Owner	Location Description
3100	YTG	NELNAH BESSIE JOHN SCHOOL BEAVER CREEK

6. **Water Treatment**

a. Is well water treated? ☑ Yes ☐ No; Type of treatment:

☑ chlorination ☐ iron and or manganese removal ☐ other _____

b. Is water entering plumbing or piped distribution system treated with chlorine or another treatment that is as effective as chlorine used to achieve disinfection throughout the system?

☐ Yes ☑ No If so how _____

c. If treated with chlorine, is the free residual chlorine concentration less than 0.2 mg/L

☐ Yes ☑ No _____ reading.

Tested at _____ (location)

d. Is testing for chlorine residual concentration done at the tap (eg. Kitchen faucet) or from representative points in a piped distribution system, including a point from tap at the end line

☐ Yes ☑ No If yes how often? _____

e. If the drinking water is being transported by water delivery truck does it have a minimum chlorine free residual of 0.4 mg/L at the time of fill. ☐ Yes ☑ No

7. **Water Quality (observations):**

a. Does the water stain plumbing? ☐ yes ☑ No ☐ slight ☐ severe

Type of stain: ☐ brown ☐ red ☐ black

b. Does the water contain sediment? ☐ Yes ☑ No ☐ occasional ☐ constant

c. Is there an unpleasant odour? ☐ Yes ☑ No ☐ H_2S ☐ Other _____

d. Is there an unpleasant taste? ☐ Yes ☑ No ☐ brackish ☐ Other _____

e. Is there a history of bad bacterial analyses? ☐ Yes ☑ No

f. Is there a chemical analysis? ☐ Yes ☑ No ☐ adequate ☐ incomplete

g. Is there analysis of trihalomethanes (THMs) where the water source is a surface water supply or a well under the direct influence of surface water? ☐ Yes ☑ No

h. Is the drinking water tested daily with an accurate reading chlorine test kit capable of reading in the range 0 to 3.5 mg/L of free chlorine residual in increments of 0.1mg/L? ☐ Yes ☑ No ☐ unknown

i. If yes is the test performed in accordance with manufactures directions? ☐ Yes ☑ No ☐ unknown

j. Is a record of the date, time,name of person performing the test and results of the drinking water sample kept? ☐ Yes ☑ No

TANK AND PIPING DETAILS

Tank Room

Is there a water tank? Yes No Details: PRESSURE TANK.

Where is it located?
Comments: MECHANICAL ROOM.

Is the room in which the water tank is located heated to maintain an optimum temperature of 4°C for stored water?
YES NO
Comments: _____

Are there windows in the add-on that may allow direct sunlight onto the water holding tank? YES NO

Comments: _____

Are there other heat sources near the tank? YES NO
Comments: _____

Is there waterproof flooring with a sealed base to contain spills? YES NO
Comments: _____

Overall Tank

What are the tank size and dimensions?

_____

What material is the tank constructed of? _____

Is tank and associated piping constructed of safe materials (i.e. CSA approved and material that does not affect the taste of the water)? YES NO

Comments: _____

Tank Inlet, Outlet and Lid

Is there adequate access on the tank for cleaning (i.e. min 15" access lid)? YES NO

Does the lid have a tight seal and is it watertight when closed? YES NO

Does the tank have an overflow or high level whistle? YES NO

Is the water tank drain accessible? YES NO

WATER TANK AND WATER QUALITY CONDITION

Are there signs of staining or biofouling? YES NO
Comments: _____

Is there any sediment or scum in bottom of tank? YES NO
Comments: _____

Is there any odour associated with the water or tank? YES NO

Have there been any bacteriological analyses conducted previously? YES NO

Does the tank appear that it has been cleaned recently? YES NO

Are the tanks easily assessed for the purpose of cleaning and disinfection? YES NO

8. Conclusions

a. Comments on overall installation:

THIS IS A REASONABLY GOOD INSTALLATION. HOWEVER THE CONFIGURATION DOES NOT MEET THE NEW REGULATION AND THE PELLET CHLORINATORS HAVE PROVEN TROUBLESOME FOR MAINTENANCE AND RUSTING OUT THE CASING.
HEAT TAPE INSTALLATION IS NOT TO CODE.

b. Recommendations:

REPLACE THE PELLET CHLORINATOR WITH PROPORTIONAL FEED CHLORINATION AND CHANGE CHARCOAL FILTER TO MULTI-MEDIA CONFIGURATION.
CONVERSELY PREFILTRATION AND UV AFTER THE EXISTING TREATMENT IS AN OPTION.
INSTALL NEW HEAT TRACE TO CODE.

Photo 0567: 3100 Wellhead in pit (back centre), underground fuel storage tank (front centre), school (right)

Photo 0570: 3100 Wellhead in pit (right), access enclosure (left)

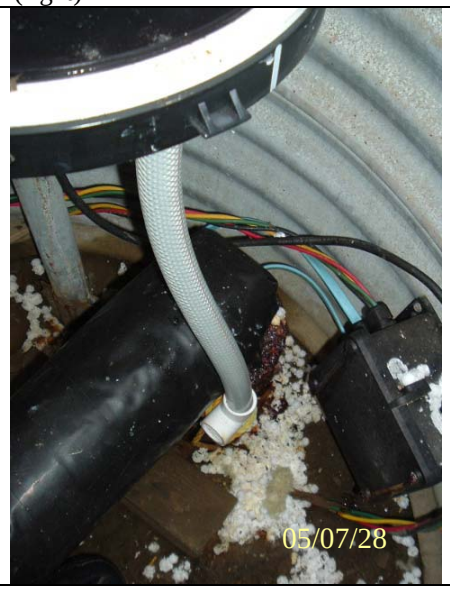

Photo 0572: 3100 Wellhead and pellet chlorinator. Note pellets in bottom of pit.

Photo 0569: 3100 Septic tank (front), school (rear)

	
Photo 0101: 3100 Point of entry from well (top), abandoned well under box (bottom)	**Photo 0103:** 3100 Wellhead in pit (right), access enclosure (left)