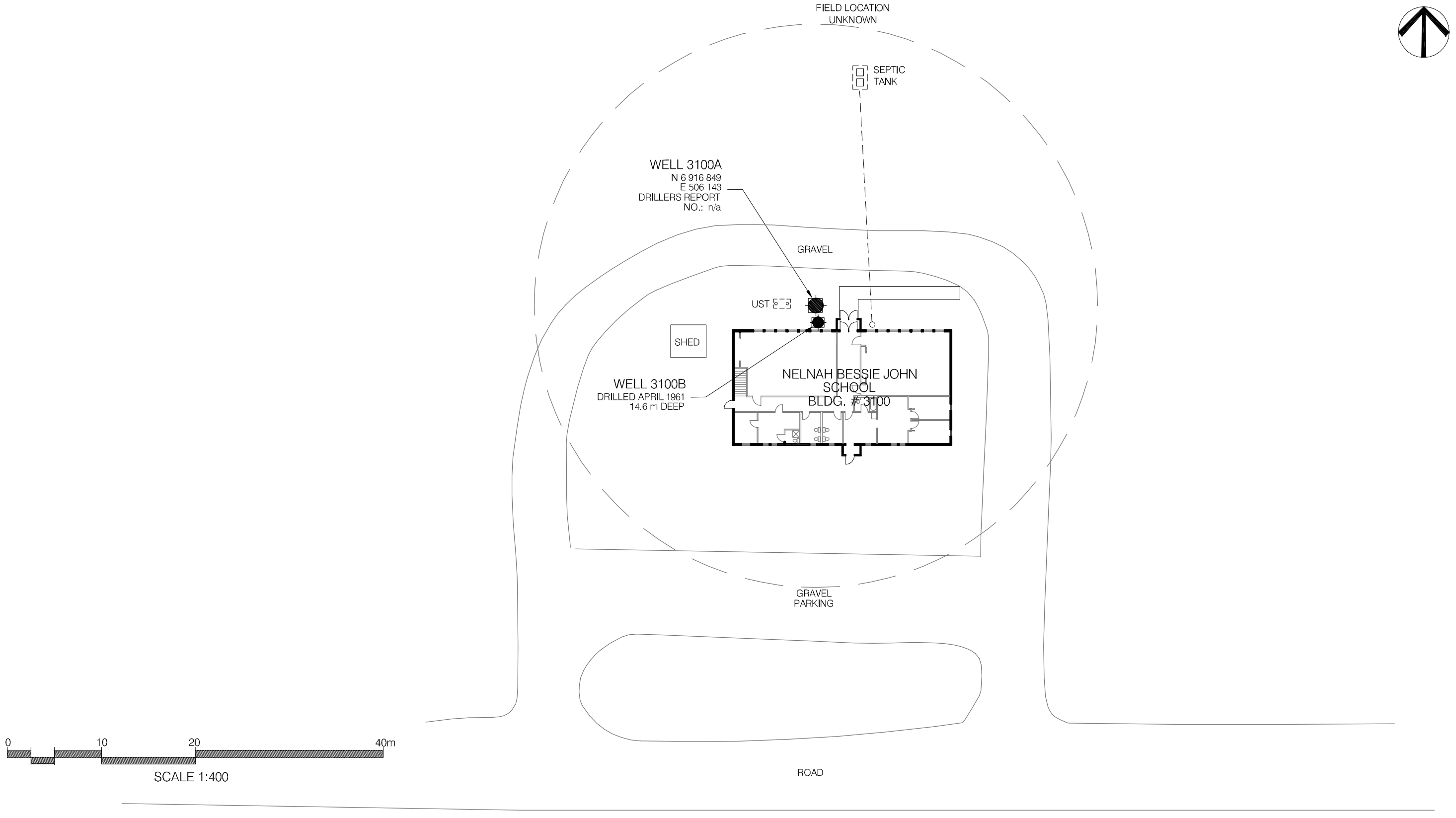


NOTES:

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

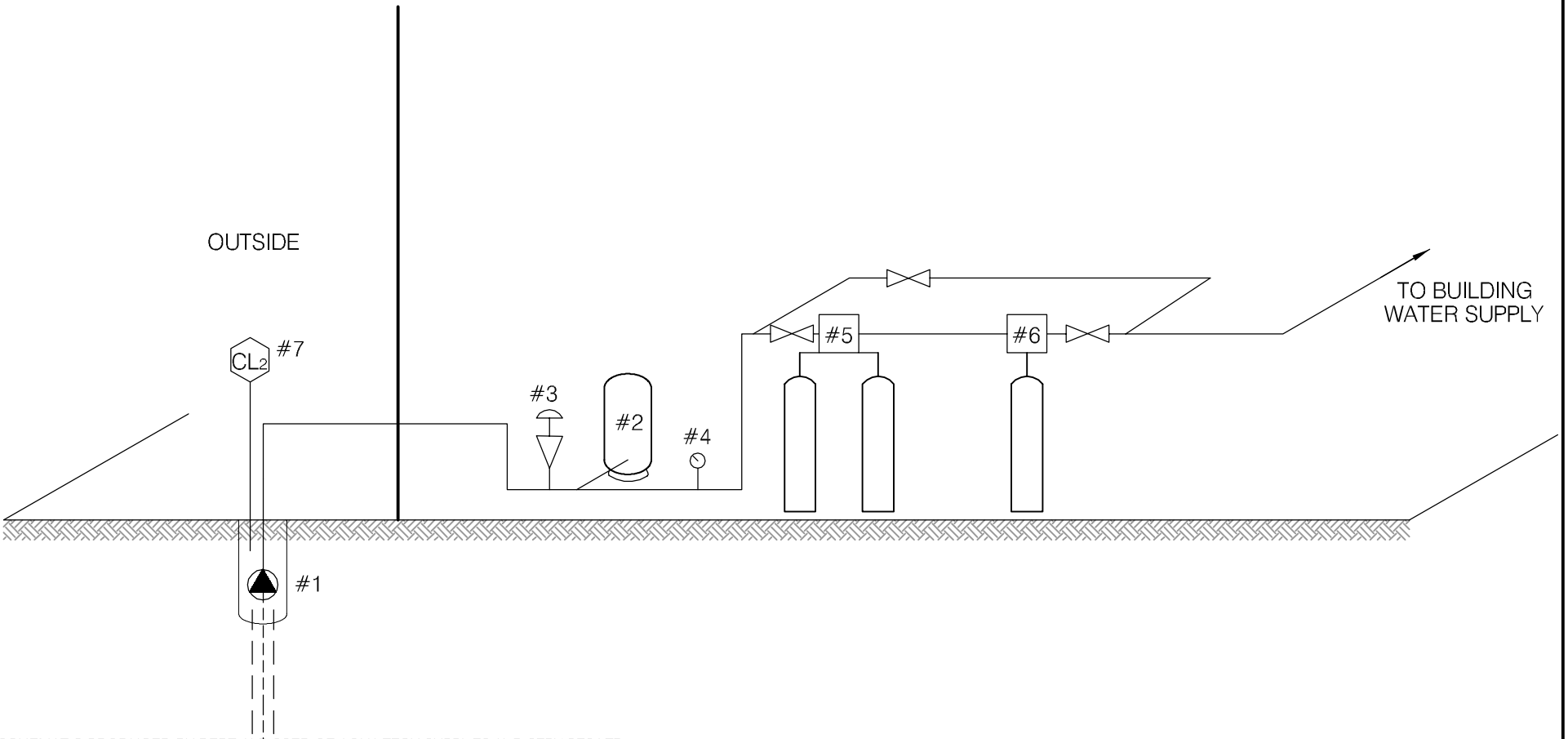
SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WESTERN REGION

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



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

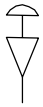
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

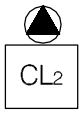

SOLENOID

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

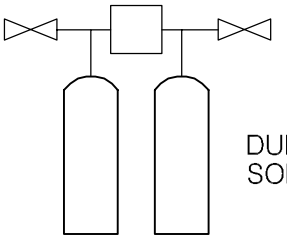
FLOW METER

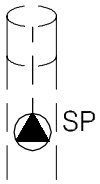
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

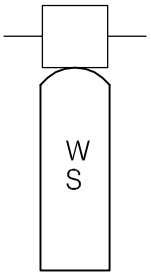


CHLORINE RESERVOIR AND
INJECTION PUMP


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 Aroamtic 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 E506143 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...)

---

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 ½ 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)

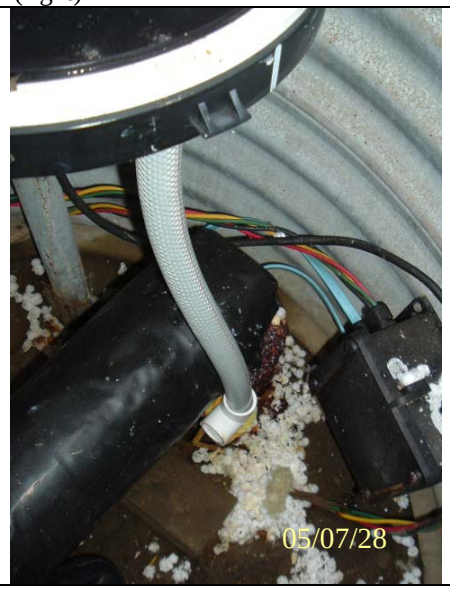


Photo 0572: 3100 Wellhead and pellet chlorinator. Note pellets in bottom of pit.

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)