

## **16.0 BUILDING 4821: WATSON LAKE WEIGH SCALES**

### **16.1 Description of Existing Water system**

Building 4821, the Watson Lake Weigh Scales, is served by a water system that delivers water from a 28.8 m deep well. The well is equipped with a pitless adapter and is located in the parking lot approximately 30 m west of the weigh scales office building. At the time of inspection it was observed that because of damage to the casing the cap could no longer fit properly to seal the well. The well location, and other site details are provided in Figure 4821-A in Appendix A16. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 9
- Northing: 6657029
- Easting: 519309

A schematic detailing the water system is provided as Figure 4821-B in Appendix A16.

### **16.2 Description of Existing Wastewater Systems**

The septic tank is located north of the weigh scales office approximately 52 m east from the wellhead. The septic tank discharges effluent to a field located north of the tank. A site plan showing the septic system is given by Figure 4821-A in Appendix A16.

## **16.3 Water Quality Results**

### **16.3.1 Water Quality Results from Previous Sampling**

#### *Bacteriological*

Four samples were collected from the water system by YTG representatives between September 2004 and March 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 4821-1. Coliform bacteria and *E. coli* were reported as absent in each of the four samples for which results were provided.

---

### *Potability*

A water sample was collected by YTG representatives from the Watson Lake Weigh Scales water system on November 9, 2004. The sample was submitted to Northwest Labs in Surrey, BC for detailed potability analyses. The results of these analyses are summarized in Table 4821-2 in Appendix A16. Additional baseline results were also provided by YTG for a sample collected on June 21, 2005. 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 potential indicators of contamination.

- At 8.6 and 5.29 NTU, the baseline and routine sampling turbidity results exceeded both the CDWQG health based upper limit of 1.0 NTU and aesthetic objective of 5.0 NTU;
- At 27 and 17.9 CU, the colour exceeded the CDWQG aesthetic objective of 15 CU.
- At 0.0078 and 0.00717 mg/L, the arsenic concentrations, though not in excess of the current MAC of 0.025 mg/L, did exceed the proposed new MAC of 0.005 mg/L;
- At 0.079 and 0.0551 mg/L, the manganese concentrations exceeded the CDWQG aesthetic objective of 0.05 mg/L;
- At 0.601 mg/L during the June 21, 2005 sampling event, the total iron concentration exceeded the CDWQG aesthetic objective of 0.3 mg/L; and
- All other health based and aesthetic objectives were met for the parameters analyzed.
- The hardness (as CaCO<sub>3</sub>) of approximately 140 mg/L is considered moderately hard.

#### 16.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Watson Lake Weigh Scales that was identified to be included during the water system assessments is detailed below:

- UV absorbance, as well as tannins and lignin, to determine potential for UV treatment as a disinfection option for this water system;
- As turbidity had previously been in exceedence of CDWQG MAC, a sample was obtained to analyze for this parameter;
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

### *Additional Analytical Results*

A water sample was obtained by EBA during the field program on June 21, 2005, and was submitted to ALS Environmental in Vancouver, BC for analysis. These results are summarized in Table 4821-2 in Appendix A16 and the laboratory reports are included in Appendix B.

- At 2.1 NTU, turbidity was above the CDWQG health based upper limit; and,
- Field chemistry completed at the time of inspection found the pH to be at 8.56, above the CDWQG aesthetic objective of 8.5, but within the margin of error of the instrument.

#### 16.3.3 Indicators of Potential Contamination

No elevated concentrations of indicator parameters were observed in the sample results reviewed.

## **16.4 Conceptual Hydrogeology**

The log for 4821 indicates that the well is completed at a depth of 28.8 m within a confined clayey gravel aquifer. The static water depth is 3.3 m below grade. The lithology indicates material ranging from clay to gravel, with some permafrost at approximately 15 m below ground. This is consistent with the lithology of most wells in the area, which are completed at depths of less than 30 m within surficial morainic and colluvial deposits. These deposits are described as gravel, sand and silt, with occurrences of silty till sediments. The presence of fine-grained silt and clay from 10.1 to 23.5 m provides a reasonable confining layer and hence some protection from surficial sources of contamination. This well is located on the north side of a groundwater divide nearby a low-lying area of groundwater discharge. The inferred direction of groundwater flow is northeast towards an unnamed creek and low-lying area.

---

## 16.5 Potential Contaminant Sources

Potential contaminant sources observed during the site investigation are presented in field notes in Appendix A16. Photos of potential contaminant sources are also provided in Appendix A16. A drainage feature runs directly around the well and during rainy periods surface water flows within 1 m of the wellhead. The drillers log indicates that this is an item of concern and that the sanitary surface seal is not sufficient to protect the aquifer from this surface water feature.

### 16.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environment Branch did not identify any recorded spill events or contaminated sites issues for this site or neighbouring properties.

## 16.6 Identified Water System Deficiencies and Associated Risk

### 16.6.1 High and Medium Risk Deficiencies

The following deficiencies were identified as high-risk for the Watson Lake Weigh Scales:

- Poor location of the well in the weigh scales parking lot. There is a drainage feature that runs directly around the wellhead. The wellhead is susceptible to damage from vehicle impact. A truck has reportedly already hit the well casing, and the damage prevents the cap from being properly fastened to the top of the casing;
- Surface seal is not sufficient to protect the aquifer from this surface water feature,
- The drillers log indicates that the surface sanitary seal may not be constructed according to standards set by the Canadian Groundwater Association's Well Construction Guidelines;
- 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; and,
- The turbidity has been in exceedence of CDWQG MAC; and
- There is no treatment or disinfection system present.

### 16.6.2 Low Risk Deficiencies

The following deficiencies were identified as low-risk for the Watson Lake Weigh Scales:

- The arsenic concentration, though is not in exceedence of the CDWQG MAC at the present time, is in exceedence of the proposed MAC; and,

- 
- Colour, iron and manganese concentrations are in exceedence of CDWQG aesthetic objectives.

## 16.7 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). With respect to water treatment system recommendations, these are conceptual recommendations based on the information available. Engineering input will be required for final system design or selection.

### 16.7.1 Priority 1

The following Priority 1 mitigative options should be carried out to address deficiencies associated with this water system.

#### **Option 1:**

This option involves upgrading the existing well for interim use until such time as a new well is constructed, and would involve the following well rehabilitation and treatment:

- The well and water system should be superchlorinated and the well casing should be repaired. The casing should extend at least 500 mm above grade and be equipped with a proper locking and vented cap;
- A surface-seal to at least 3 m below grade should be installed;
- The ground surface around the wellhead should be graded to promote surface drainage away from the well;
- A proper reinforced barricade and chain-link fence should be placed around the wellhead to prevent damage by vehicles; and,
- An NSF-61 certified filtration system (to 1 micron absolute) followed by a UV disinfection system (or equivalent) should be installed. Pretreatment consisting of a softener may be required to ensure that the UV system operates properly.

#### **Option 2:**

In the event that an adequate sanitary surface seal cannot be installed, the second option involves abandoning the existing well and drilling a new well immediately. The new well should be constructed in consideration of the following:

- The well should be equipped with a surface seal to at least 6 m and a pitless unit should be installed with the casing raised above grade (500 mm);
- The well must be located at a distance greater than 30 m and upgradient from any potential source of contamination; and,
- 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 treatment/disinfection system would consist of a NSF-61 certified filtration system (to 1 micron absolute) followed by a UV disinfection system (or equivalent). Pretreatment would likely be required.

#### 16.7.2 Priority 2

- There are no Priority 2 recommendations for this site.

#### 16.7.3 Priority 3

- A point of use reverse osmosis treatment system should be installed to provide drinking water with arsenic concentrations below the proposed MAC.

### 16.8 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.

#### 16.8.1 Priority 1

##### Option 1:

- Superchlorination of the well and casing repair would cost in the order of **\$1,000** for materials and labour;
- Standard wellhead upgrades and regrading around the wellhead to promote surface drainage and rerouting the drainage system to a distance of 10 m north of the wellhead would cost in the order of **\$3,000**;
- Installing a chain-link fence around the wellhead, assuming a 1.8 m high, 2.5 m by 2.5 m square fence, would cost **\$2,500** for all materials and labour. Installing a concrete barricade would cost in the order of **\$500**;
- A suitable treatment/disinfection system would cost in the order of **\$5,200**, assuming **\$1,500** for the duplex filtration system, **\$2,200** for the UV disinfection, and **\$1,500** for a residential size water softener.

##### Option 2:

- A new well, assuming approximately 30 m of overburden, would cost in the order of **\$32,700** to drill, test, and connect; and,

- A suitable treatment/disinfection system would cost in the order of **\$5,200**, assuming **\$1,500** for the duplex filtration system, **\$2,200** for the UV disinfection, and **\$1,500** for a residential size water softener.

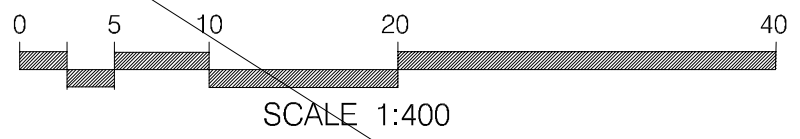
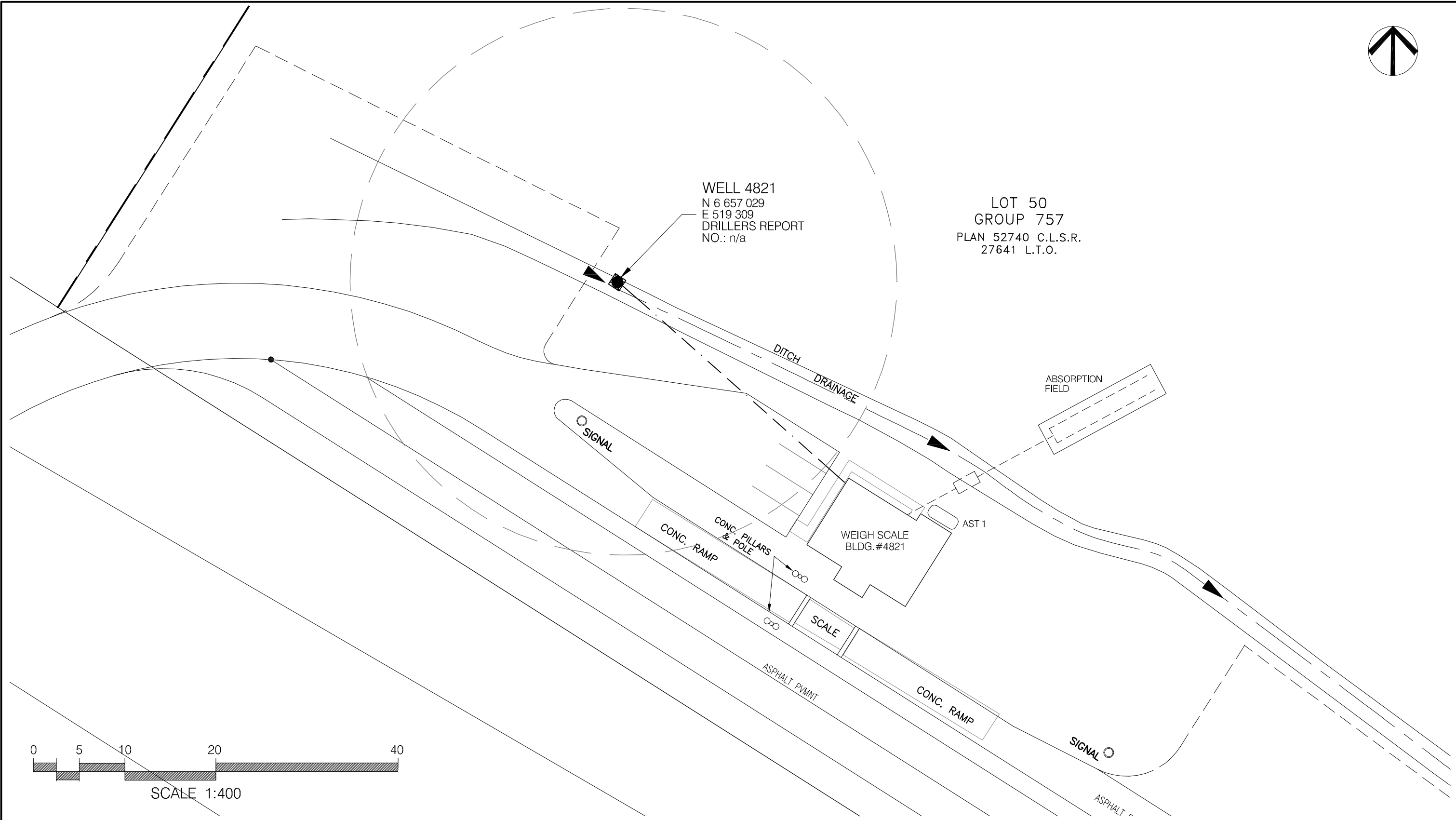
#### 16.8.2 Priority 3

- The installed cost for a reverse osmosis treatment system would be in the order of **\$600**.




WELL 4821  
 N 6 657 029  
 E 519 309  
 DRILLERS REPORT  
 NO.: n/a

LOT 50  
 GROUP 757  
 PLAN 52740 C.L.S.R.  
 27641 L.T.O.



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: JULY 2005  
 SCALE: AS SHOWN  
 PROJECT No.: 1260002.002  
 ACAD FILENAME: 002-EASTERN REGION

CLIENT:

**Yukon**  
 Highways and Public Works  
 Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT  
 EASTERN REGION

GOVERNMENT OF YUKON  
 HIGHWAYS & PUBLIC WORKS

WATSON LAKE WEIGH SCALE  
 BUILDING # 4821  
 SITE LOCATION DIAGRAM  
 WELL ID: 4821-A

REVISION ISSUE  
 0

FIGURE No.  
 4821-A



# LEGEND



PUMP



PRESSURE GAUGE



GATE VALVE



CHECK VALVE



SOLENOID

#2

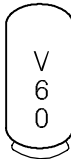
COMPONENT ID. No.  
(SEE TABLE ON FOLLOWING PAGE)



FLOW METER



WATER FILTER  
(CARTRIDGE TYPE)

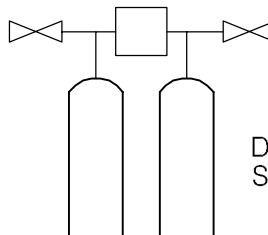


PRESSURE TANK



CL<sub>2</sub>

CHLORINE RESERVOIR AND  
INJECTION PUMP

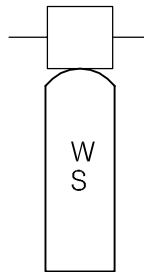


DUPLEX WATER  
SOFTENER



SP

WELL WITH  
SUBMERSIBLE PUMP



ACTIVATED  
CARBON

Z:\0201\Drawings\1260002 - Water Assessment YTG\002 - Eastern Region\1260002\003 Eastern Schematic\_LEGEND.dwg, 4/11/2006 10:31:08 AM, Adobe PDF, jbuyck



**EBA Engineering Consultants Ltd.**

PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT  
EASTERN REGION

CLIENT



TITLE SCHEMATIC SYSTEM  
LEGEND

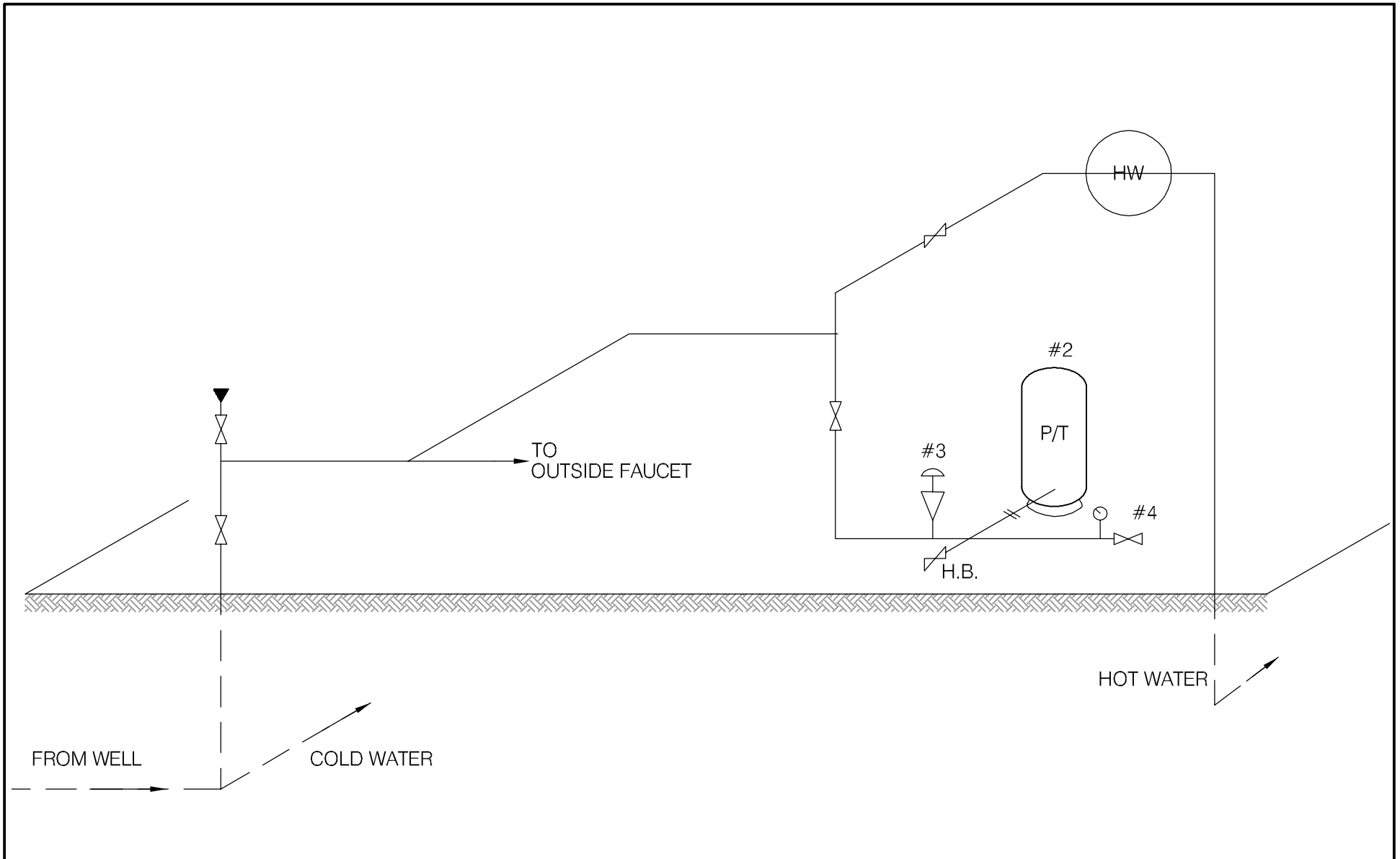
DATE APRIL 2006

DWN. JSB



CHKD. RMM

FILE NO. 1260002

DRWG. LEGEND



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

 <b>EBA Engineering Consultants Ltd.</b>		PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT EASTERN REGION	
CLIENT 		TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 4821 WATSON LAKE WEIGH SCALE	
DATE	JULY 2005	DWN.	JSB
CHKD.	FMM	FILE NO.	1260002.002
		DWG.:	FIGURE 4821-B

**Eastern Region – Watson Lake New Weigh Scale  
Building # 4821**

**DISTRIBUTION & TREATMENT SYSTEM DATA**

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB. PUMP.	?				4" - 1/2 HP.
2	PRESSURE TANK	WELLY TROL	WX-203		12306104	
3	PRESSURE SWITCH	SQ. D	FSG-2			2HP 1/4" FIPT.
4	PRESSURE GAUGE	MARSH	0-100			2" - 1/4" FIPT.
5						
6						
7						
8						
9						
10						

**TABLE 4821- 1: SUMMARY OF BACTERIOLOGICAL RESULTS**

		<b>Number of Sampling Events</b>	<b>Time Period over which Sampling was Done</b>	<b>Any Positive Total Coliform Results? (yes or no)</b>	<b>Fraction of Positive Total Coliform Results vs. Total Sampling Events</b>	<b>Any positive E.Coli results? (yes or no)</b>	<b>Most Recent Sampling Event Available for EBA Review</b>	<b>Is Most Recent Result Positive?</b>
<b>Building #</b>	<b>Building Name</b>							
4821	New Weigh Scale	4	Sept-04 to Mar-05	no	0/4	no	9-Mar-05	no



Table 4821-2: Water Quality Results

		Building 4821 - SOURCE: Watson Lake Scales		GCDWQ Criteria		
Location/ Resident		Watson Lake				
Address						
Treatment		No				
Disinfection		No				
Source of Water		On-Site Well				
Purpose of Sampling		Baseline	Additional Sampling			
Sample Location						
Date Sampled		9-Nov-04	21-Jun-05	Lower	Upper Limit	
Physical Tests (ALS)				AO	MAC	AO
Colour (CU)		27				15
Total Dissolved Solids		187				500
Hardness CaCO3		155		AO >200 = poor, > 500 unacceptable <sup>A</sup>		
pH		8.20		6.5		8.5
Turbidity (NTU)		<b>8.6</b>	<b>2.10</b>		1	5
UV Absorbance			0.149			
Dissolved Anions (ALS)						
Alkalinity-Total CaCO3		179				
Chloride Cl		0.7				250
Fluoride F		0.21			1.5	
Sulphate SO4		7.28				500
Nitrate Nitrogen N		<0.01			10	
Nitrite Nitrogen N		<0.005			1	
Total Metals (ALS)						
Aluminum T-Al		0.054				
Antimony T-Sb		<0.0002			0.006	
Arsenic T-As		<b>0.0078</b>			0.025	
Barium T-Ba		0.094			1	
Boron T-B		0.011			5	
Cadmium T-Cd		<0.00001			0.005	
Chromium T-Cr		0.0012			0.05	
Copper T-Cu		0.08			1	
Iron T-Fe		0.15				0.3
Lead T-Pb		0.0072			0.01	
Manganese T-Mn		<b>0.079</b>				0.05
Sodium T-Na		17.5				200
Uranium T-U		<0.0005			0.02	
Zinc T-Zn		0.05				5
Organic Parameters						
Tannin and Lignin			0.71			
Field Chemistry (EBA)						
pH			<b>8.56</b>	6.5		8.5
TDS (ppm)			156			500
EC (uS/cm)			312			
Temperature (°C)			9.70			

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)



**Table 4821-3: Summary of Well Assessment Results  
SMALL PUBLIC DRINKING WATER SYSTEMS**

Well Identification			GPS Coordinates		
Building #	Building Name	Location	Northing (+/- 10 m)	Easting (+/- 10 m)	Grade Elevation (+/- 10 m)
4821	Watson Lake Scales	Watson Lake	6557029	519309	690

Well Details							
Well Casing Diameter (mm)	Year Well Installed	Well Log?	Well Depth (m bg)	Reported Low Permeability Protective Layer?	Pump Setting (m bg)	Well Capacity - Tested, or Reported by User	Static Water Level Below Ground (m-btwc)
150	2004	Yes	28.8	Clay and silt from 10.1 m to 28.8 m with some permafrost at approximately 15m	13.2	17 gpm from log	2.765

Potential Contaminant Sources					
Distance from well to nearest point of septic field (m)	Distance from well to nearest building (m)	Distance to surface water body (m)	AST present on property?	Distance from well to AST (m)	Other potential sources of contamination observed on property, and distance to well
52	30	Greater than 60 m	AST	38 m	Water drainage from surrounding area runs directly around well

Well Construction Details					
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading	Comments
0.55	Pitless unit, cap not on due to damage	20 slot screen from 19.2 to 21.6 m	Yes, but not properly constructed	No. Well is located in a low point between the parking lot and the forested area behind the weigh scales and water streams directly past the wellhead	The well casing had previously been hit by a truck and was samed. Due to the damage, the cap can no longer be sealed on to the casing and the well is open.



# EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

## SMALL PUBLIC WATER SYSTEM ASSESSMENT

### PART A: EBA Site Inspection

Inspector: Ryan Martin  
Luke Lebel

Date June 21, 2005

WELL ID #	Owner	Location Description
4821	YIG	Watson Lake Weigh Scales

### 1. Well Location and Potential Contaminant Sources

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

Watson Lake

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

Watson Lake, Alaska Hwy - East of town

c. GPS location: N 6657029 E 519309 elev. 690 m ± 7m

d. Is there electric power?  Yes  No

e. Is there outside water access?  Yes  No  
but locked

f. Does the well system have:

15 or more service connections to a piped distribution system? If so how many \_\_\_\_\_  
weigh scales building

5 or more delivery sites on a trucked distribution system? If so how many \_\_\_\_\_

g. Nearest building, specify weigh scales building

h. Distance from well to building 30 m

i. If there is an effluent disposal field, is its location known?  Yes  No N 6657007

j. Distance from well to nearest point of known field: 52m E 519363

k. Well location relative to field:  upslope  downslope  lateral  
slightly

# EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

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

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

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

Cap on top of casing is unfastened due to damage to well casing

Entrance by animals?  Yes  No

Cap on top of casing is unfastened Access is possible

p. Is well site subject to flooding?  Yes  No

The well is apparently built in a natural drainage flow ditch in parking lot. There is a small stream - with evidence of hydrocarbons in it - that runs around well

q. Is the well site well drained?  Yes  No

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

If yes, is it  in use  abandoned

Is the location known?  Yes  No

Distance from the well to known buried tank \_\_\_\_\_

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: AST; Distance from well to Potential Source 1: 30m

Potential Source 2: parking; Distance from well to Potential Source 2: 0m → well was apparently hit and damaged by a truck

Potential Source 3: drainage; Distance from well to Potential Source 3: 0m

Potential Source 4: \_\_\_\_\_; Distance from well to Potential Source 4: \_\_\_\_\_

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

How many? \_\_\_\_\_  in use  abandoned  require proper sealing



# EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

## 2. Well and Wellhead information:

a. When was well installed? Year 2004 Month \_\_\_\_\_

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 → Appears to be a pvc casing with grout in it, but it is warped, and if it does go to 6m, it is not a proper seal

e. Surface casing:  Yes Diameter \_\_\_\_\_  No

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

g. Depth of well: 92ft  measured (if possible)  reported  from log

h. Static water level below ground: 2.765m 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 unknown

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 unknown

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

in a wooden enclosure other, describe \_\_\_\_\_

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

# EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- i. Is the well head below grade? describe in detail 0.55m above grade
- ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)?  Yes  No  
There is a stream (after rain) running around wellhead
- iii. Is the wellhead enclosed by fiberglass insulations?  Yes  No
- iv. Any evidence of rodents? Specify No
- v. Does the well casing have a proper seal cap?  Yes  No  
If no, describe condition damage prevents proper seal

### 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.  
*likely*

If yes is there treatment  Yes  No

Explain (filtration, disinfection etc...) \_\_\_\_\_

### 4. Aquifer Supplying This Well:

- a. The aquifer is:  bedrock  granular sediment  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 \_\_\_\_\_ Model \_\_\_\_\_  
horsepower \_\_\_\_\_ capacity \_\_\_\_\_ voltage \_\_\_\_\_

# **EBA Engineering Consultants Ltd.**

Creating and Delivering Better Solutions

- d. Date installed: 2004 - likely By: \_\_\_\_\_
- e. For submersible pump, depth of setting below surface 13.785 m bc
- 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
- k. Is the pump and piping protected from freezing?  Yes  No  
*but should be below frost line*  
If yes, describe: \_\_\_\_\_
- l. Comments on pump installation: \_\_\_\_\_  
\_\_\_\_\_

## **6. Conclusions**

- a. Comments on overall installation:  
The wellhead was damaged - is currently open as the cap cannot properly seal the top of the casing  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- b. Recommendations: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

## PART B: EBA Site Inspection

Inspector: BERT ALBISSEN

Date JUNE 21 / 05

WELL ID #	Owner	Location Description
4821	YTA	WATSON LAKE WEIGH SCALE

### 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<sub>2</sub>S  Other \_\_\_\_\_

# **EBA Engineering Consultants Ltd.**

Creating and Delivering Better Solutions

- 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:

Where is it located?

Comments: \_\_\_\_\_

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: \_\_\_\_\_

# **EBA Engineering Consultants Ltd.**

Creating and Delivering Better Solutions

---

## ***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:

THE INSIDE INSTALLATION IS WELL DONE, BOTH  
IN WORKMANSHIP & MATERIAL.

b. Recommendations:

INSTALL TREATMENT SYSTEM AS PER WATER  
QUALITY ANALYSIS. INSTALL UV BEYOND  
TREATMENT SYSTEM. INSTITUTE A BI-ANNUAL  
WELL & PIPING SYSTEM STOCK CHLORINATION  
MAINTENANCE PROGRAM. MONITOR  
WATER QUALITY IN THE BUILDING ON A  
REGULAR BASIS.

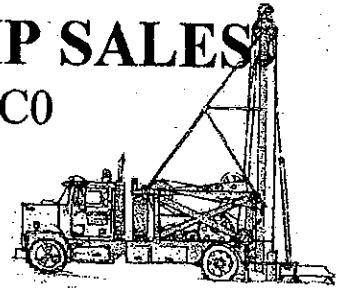
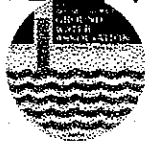
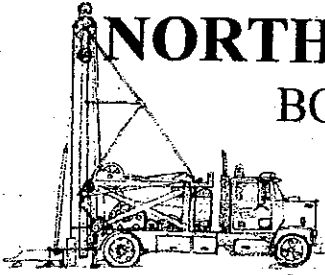
# NORTHWIND DRILLING AND PUMP SALES

BOX 284, WATSON LAKE, YUKON Y0A 1C0

PHONE/FAX: 867-536-2009

E-MAIL: [yknstone@yknet.yk.ca](mailto:yknstone@yknet.yk.ca)

Member of BCGWA & CGWA  
Owner/operator: Shawn Stone



~ Commercial ~ Residential ~ Industrial ~ Well Recovery ~ Soil Sampling ~ Consultations ~

Pump Test Log Sheet;

Saturday, August 21, 2004

Location; Watson lake weigh scale

Clients Name; Bergeron General Contracting

Job #; WL0402

Type and Model of pump used; 10So5-9 Grundfos

Pump depth for test: 49 feet

Start Time; 9:15 Am.

Static level at Start. 9 feet

Static Level Finish; 9 feet

Min. to recover to static; 5 min

Average GPM. Flow. 17 gallons per minute

Name of Pump Tester, Shawn Stone

Signature of pump Tester.

## Draw Down Chart

Time	1	2	3	4	5	6	7	8	9	10	12
	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.
WL ft	11	13	22	25	26	28	31	32	35	35	37
Time	14	16	18	20	25	30	35	40	45	50	60
	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.
WL ft	38	38	38	38	38	38	38	38	38	38	38

## Recovery Chart

Time	1	2	3	4	5	6	7	8	9	10	12
	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.
WL ft	39	32	30	29	22	18	16	14	12	11	9
Time	14	16	18	20	25	30	35	40	45	50	60
	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.	min.

### Special notes, recommendations, or observations during test.

Water showed signs of surging and cloudy bursts effected flow rates. Water was cloudy and cleared enough for toilet usage. Recommend filter for system and no odour was present. Completed depth was recommended by contractor involved.



# NORTHWIND DRILLING AND PUMP SALES

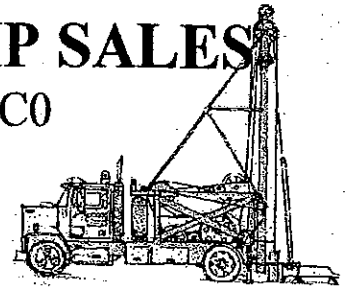
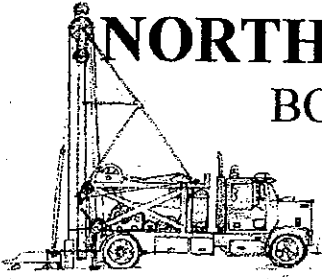
BOX 284 WATSON LAKE, YUKON Y0A 1C0

PHONE/FAX: 867-536-2009

E-MAIL: [yknstone@yknet.yk.ca](mailto:yknstone@yknet.yk.ca)

Member of BCGWA & CGWA

Owner/operator; Shawn Stone



~ Commercial ~ Residential ~ Industrial ~ Well Recovery ~ Soil Sampling ~ Consultations~

## Scale well recommendation

Friday, August 20, 2004

Well is finished in an unstable state and could have an undetermined future. During the pull back process it was noted that the well conditions were changing and bottom measurements were inconsistent. At one point the material added was washed away overnight and changed the footage 9 feet overnight. I feel that there is a strong flow at 70 – 80 feet and this water is in motion causing erosion. When this layer was drilled into it was found to be a void of 6 feet and was assessed as being water bearing sand. This may cause problems in the future as it may erode into top surface layers with the assistance of a high static level. At this point Northwind would recommend that this well be sealed to prevent a development of a possible sinkhole. Relocation of the well would be viable as the surface water is still having an effect on the well head as it is still flowing to well head from the parking lot and I do not feel that the surface seal is at adequate depth to stop the contamination of the source. When the well head was landscaped it was noted during work that the water was running under the back fill and to well head. At present this well it is to be put on line. The well was tested at being 18 gallons per min with the drawdown depth of 32 feet. Water was cloudy and will require filtration to obtain adequate clarity to prevent damage to all auxiliaries. In closing the final recommendation would be to relocate well to a location that would have no influence from the parking lot (salts and road material that wash off trucks) and prepare a larger surface casing to continue through the unstable layers to prevent erosion or contamination of multiple layers of water bearing strata's. This well has had enough violation and is unable to provide accurate information.

# Northwind Drilling And Pump Sales

Box 284 Watson Lake, Yukon Y0A 1C0

867-536-2009

# BC Environment

Groundwater Section

Water Management Branch

IDENTIFICATION	
Well I.D. No.:	401 Plate #:
Name:	Bergeron (Last) Steve (First)
Address:	16 Alaska Hwy./ scale (Street No.) (Street Name)
Consultant Co.:	Na

DATE	
Started:	6/9/2004 Completed: 7/12/2004
Rig #:	01
Other Equipment:	pump developement

WELL LOCATION	
BCGS:	
Lot:	50 Plan: 27641 District Lot:
Location:	Watson Lake, Yukon
Section:	Township: Range:
PID:	Land Dist: Block:
Legal Misc.:	
GPS Lat:	GPS Long:
Proposed Use:	DOM Type of Work: NEW
Owner's Number of Well:	401 Type of Rig: CAB

DEPTH		CREW	
Overburden:	92 ft.	Driller:	Don Stone
Bedrock:	ft.	Helper:	Shawn Stone
Total:	ft.		

DIMENSIONS	
Diameter of Well	6 inches
Drilled:	92 ft. Depth of completed well: 92 ft.
Liner From:	0 ft. To: 0 ft. Diameter: in.

LITHOLOGY		
Unit of Measurement: FT		
FROM	TO	LITHOLOGY
0	27	surface gravels,sand,light grey
28	32	hard pan,gravels
33	44	grey sands,fine,silty
45	52	hardclays,sharp gravels,water bearing,perma frost,small flow, static of 9 feet
53	77	grey sands,silty water bearing,warm
78	82	clays,sharp gravels,wood, cold waterbearing with static of 26 feet
83	92	cemented gravels,clay,silts.

CASING DETAILS 1	
Material:	STL Table Used: SCHEDULE
Size:	6" Diameter: 6.625 Wall: 188
From:	To: Total Length: 96

CASING DETAILS 2	
Material:	Table Used:
Size:	Diameter: Wall:
From:	To: Total Length:

PERFORATIONS	
Perforations:	<input type="checkbox"/>
Misc.:	

Development Total Hrs.:	16
Development Notes	All attempts at developement was found to have poor results.Grey silts cloudy.

SCREENS	
Screens:	<input type="checkbox"/> Material: Stainless Steel
Manufacture:	johnson
Type:	Wire: V Wire
I.D.:	inches Slot Size 1: 20 77 ft. to 81 ft.
I.D.:	inches Slot Size 2: ft. to
Total Length of Assembly Including Blanks and Riser:	4 ft.

GENERAL COMMENTS	
Well was not completed to a producing status.	

GRAVEL PACKED	
Gravel Packed:	<input type="checkbox"/> Size of Gravel:
Gravel placed from:	ft. to ft.

PRODUCTION DATA AT TIME OF DRILLING	
Static Level:	ft. Tidal: <input type="checkbox"/>
Rec'd Max. Pump Output:	BAIL at at ft.
Rec'd Pump Setting:	86 ft. at 12 GPM from GrdLvl

SURFACE SEAL	
Surface Seal:	<input type="checkbox"/> Depth:
Material Used in Seal:	bentonite
Method of Sealing strata off:	bentonite/

DISCLAIMER: The Province disclaims all responsibility for the accuracy of this information. This information should not be used as a basis for making financial or any other commitments.

# Northwind Drilling And Pump Sales

Box 284 Watson Lake, Yukon Y0A 1C0

867-536-2009

# BC Environment

Groundwater Section

Water Management Branch

IDENTIFICATION	
Well I.D. No.:	4012 Plate #:
Name:	Bergeron (Last) Steve (First)
Address:	16 Alaska Hwy/scale (Street No.) (Street Name)
Consultant Co.:	Na

DATE	
Started:	8/5/2004 Completed: 8/10/2004
Rig #:	01
Other Equipment:	pumping equipment

WELL LOCATION	
BCGS:	
Lot: 50	Plan: 27641 District Lot:
Location:	Watson Lake, Yukon
Section:	Township: Range:
PID:	Land Dist: Block:
Legal Misc.:	
GPS Lat: n 60 03 00	GPS Long: w128.39.20
Proposed Use:	DOM Type of Work: NEW
Owner's Number of Well:	401 Type of Rig: CAB

DEPTH		CREW	
Overburden:	92 ft.	Driller:	Shawn Stone
Bedrock:	ft.	Helper:	Roger
Total:	92 ft.		

DIMENSIONS	
Diameter of Well	8 inches
Drilled:	92 ft. Depth of completed well: 51 ft.
Liner From:	ft. To: ft. Diameter: in.

LITHOLOGY		
Unit of Measurement:	FT	
FROM	TO	LITHOLOGY
0	32	hard pan clays, overburden, permafrost at 32 feet
33	51	shard gravels with some sand ending in clay silts with large water flow.

CASING DETAILS 1	
Material:	STL Table Used: SCHEDULE
Size: 6"	Diameter: 6.625 Wall:
From: 0	To: 51 Total Length: 51

CASING DETAILS 2	
Material:	Table Used:
Size:	Diameter: Wall:
From:	To: Total Length:

PERFORATIONS	
Perforations:	<input type="checkbox"/>
Misc.:	

Development Total Hrs.:	16
Development Notes	Cloudy, warm flow intrusion. two desctive static levels. with permafrost.

SCREENS	
Screens:	<input checked="" type="checkbox"/> Material: Stainless Steel 19.2-21.6
Manufacture:	Johnson
Type:	continuous slot Wire: V Wire
I.D.:	5.5 inches Slot Size 1: 20 71 ft. to 67 ft.
I.D.:	5.5 inches Slot Size 2: 20 67 ft. to 63 ft.
Total Length of Assembly including Blanks and Riser:	8 ft.

GENERAL COMMENTS	
this work was to find an adequit suppy in surface layer of water.	

GRAVEL PACKED	
Gravel Packed:	<input type="checkbox"/> Size of Gravel:
Gravel placed from:	ft. to ft.

PRODUCTION DATA AT TIME OF DRILLING	
Static Level:	13 ft. Tidal: <input type="checkbox"/>
Rec'd Max. Pump Output:	PUMP at 18 GPM at 45 ft.
Rec'd Pump Setting:	45 ft. at 18 GPM from Casing

SURFACE SEAL	
Surface Seal:	<input checked="" type="checkbox"/> Depth: 10
Material Used in Seal:	Bentonite/
Method of Sealing strata off:	oversized

DISCLAIMER: The Province disclaims all responsibility for the accuracy of this information. This information should not be used as a basis for making financial or any other commitments.

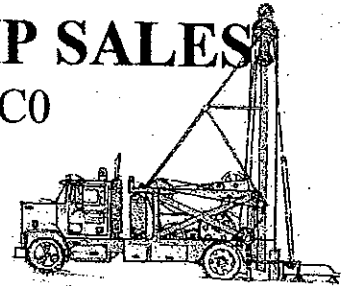
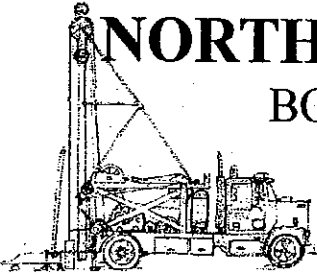
# NORTHWIND DRILLING AND PUMP SALES

BOX 284 WATSON LAKE, YUKON Y0A 1C0

PHONE/FAX: 867-536-2009

E-MAIL: [yknstone@yknet.yk.ca](mailto:yknstone@yknet.yk.ca)

Member of BCGWA & CGWA  
Owner/operator; Shawn Stone



~ Commercial ~ Residential ~ Industrial ~ Well Recovery ~ Soil Sampling ~ Consultations~

Sunday, August 22, 2004

## ESTIMATE FOR PUMP INSTALLATION AT SCALE #3

1	10S05- 9	Grundfos 1/2 horse 230 volt pump	\$808.16
1	Control Box		\$105.00
1	Pitless adapter		\$72.85
1	WX203 Tank and tee package		\$689.00
1	Torque arrestor		\$50.00
	Per foot of horizontal line installation		\$15.50
	Per foot of vertical line		\$8.50
	Approximate backhoe time	7 hours	\$500.00
	Approximate pump labour	12 hours	\$780.00

This is based on a line length of 150 feet horizontal and 40 feet vertical.

Sub total	\$5670.00
G.S.T.	\$396.90
Total estimate	\$6066.91

Estimate valid for 30 days. Materials will be charged out as actual field footage. Electrician required to hook up to control box also required. Extra materials charged out at cost plus. Horizontal line cost includes Reychem heat trace, wire, service line, insulation, and poly wrap.



## Spill Report Information

<b>Spill #</b>	8720
<b>Jurisdiction</b>	Yukon
<b>Community</b>	Watson Lake
<b>Address</b>	
<b>Highway</b>	
<b>Milepost</b>	
<b>Feature</b>	Watson Lake
<b>Location and Cause</b>	weigh station - overfill of tank truck - tank leaked
<b>Latitude</b>	60.049775
<b>Longitude</b>	-128.648933
<b>Incident Date</b>	10/20/1987 11:05:00 AM
<b>Lead Agency</b>	Environment Canada - Environmental Protection Service
<b>Other Agency</b>	
<b>Company(s)</b>	Teslin Lake Motors (Walter Duncan)
<b>Amount</b>	9
<b>Units</b>	Litres
<b>Quantity</b>	Estimate
<b>Release Description</b>	Leaked
<b>Additional Quantit</b>	
<b>Concentration</b>	
<b>Concentration Unit</b>	
<b>Phase</b>	Liquid
<b>Major Contaminant</b>	Diesel
<b>2nd Contaminant</b>	
<b>3rd Contaminant</b>	
<b>4th Contaminant</b>	
<b>Outcome</b>	min hazard to health and env - no surface water affected - weigh strn well approx 50m away - advised to contain spill with absorbant and repair leak



## Spill Report Information

<b>Spill #</b>	9627
<b>Jurisdiction</b>	Yukon
<b>Community</b>	Watson Lake
<b>Address</b>	
<b>Highway</b>	
<b>Milepost</b>	
<b>Feature</b>	Watson Lake
<b>Location and Cause</b>	200 ft W of Watson Lake Weight Station - product leaking from transport truck - truck carrying load of barrels
<b>Latitude</b>	60.050235
<b>Longitude</b>	-128.649861
<b>Incident Date</b>	5/27/1996 12:20:00 PM
<b>Lead Agency</b>	Yukon Government - Dangerous Goods
<b>Other Agency</b>	Municipality - identified in Community
<b>Company(s)</b>	Northern Industrial Carriers Ltd
<b>Amount</b>	115
<b>Units</b>	Litres
<b>Quantity</b>	Estimate
<b>Release Description</b>	Spilled
<b>Additional Quantit</b>	
<b>Concentration</b>	7
<b>Concentration Unit</b>	%
<b>Phase</b>	Liquid
<b>Major Contaminant</b>	Methanol
<b>2nd Contaminant</b>	
<b>3rd Contaminant</b>	
<b>4th Contaminant</b>	
<b>Outcome</b>	product from one barrel spilt - soaked up with absorbant and recovered - clean-up complete



**Photo 0291:** 4821 Weigh scale office (back right, as seen from wellhead), drainage stream (centre), and septic field (back left)



**Photo 0290:** 4821 Wellhead – pitless adapter



**Photo 0288:** 4821 Wellhead – notice damage due to impact with truck



**Photo 0023:** 4821 Pressure tank and controls