17.0 BUILDING 4836: WATSON LAKE GRADER STORAGE BUILDING

17.1 Description of Existing Water system

Building 4836, the Watson Lake Grader Storage Building, is served by a water system that delivers water from a 17.8 m deep well located in an addition off from the garage of the grader storage building. The well location and other details about the surrounding area are provided in Figure 4836-A in Appendix A17. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 9
- Northing: 6658289
- Easting: 515871

The grader storage building is equipped with water softening treatment system. The well also serves the grader station maintenance garage and the Property Management Agency Office in Watson Lake. A schematic detailing the water system is provided as Figure 4836-B in Appendix A17.

17.2 Description of Existing Wastewater Systems

The grader storage building is served by a piped sewer collection system provided by the Town of Watson Lake. There are service lines, and potentially sewer mains within 30 m the well.

17.3 Water Quality Results

17.3.1 Water Quality Results from Previous Sampling

Bacteriological

No test results were provided to EBA for review. Bacteriological sampling of water from the Watson Lake Grader Storage Building water system may not have been previously completed.

Potability

A water sample was collected by YTG representatives from the Watson Lake Grader Storage Building water system on September 13, 2004. The sample was submitted to Northwest Labs in Surrey, BC for potability analyses. The results of these analyses are

summarized in Table 4836-2 in Appendix A17. 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. Note that the water quality results presented below are from a sample obtained prior to the recent treatment system upgrades (softener system).

- The water quality for the water sample obtained from previous sampling indicated that the water is a calcium bicarbonate type water with very high hardness;
- At 79.6 NTU, turbidity exceeded both CDWQG health based upper limit of 1.0 NTU and aesthetic objective of 5.0 NTU;
- At a level of greater than 60 CU, the colour exceeded the CDWQG aesthetic objective of 15 CU;
- At 1.14 mg/L, the barium concentration exceeded the CDWQG health based upper limit of 1.0 mg/L;
- At 5.35 mg/L, the iron concentration exceeded the CDWQG aesthetic objective of 0.3 mg/L;
- At 1.18 mg/L, the manganese concentration exceeded the CDWQG aesthetic objective of 0.05 mg/L;
- The water quality results indicated that all other health based and aesthetic objectives were met for the parameters analyzed; and,
- The hardness (as $CaCO_3$) was 422 mg/L, and is considered very hard.

17.3.2 Identification of Additional Analytical Testing Required

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

- A sample for potability analysis including physical parameters of the water, as well as dissolved anions, nutrients, and total metals;
- Ammonia to provide a more detailed assessment of nutrient concentrations in order to determine if the water is under the direct influence of septic sources;
- The total organic carbon concentration (TOC); and,
- 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 4836-2 in Appendix A17 and the laboratory reports are included in Appendix B.

It was observed during the site inspection that the water system at this site is equipped with a new water softener. Results from previous sampling show that there was no functioning water softening system at the time when baseline water quality analysis was taken. Additional analytical results show a significant improvement of the water quality:

- At 0.60 NTU, turbidity was below both the CDWQG health based upper limit and aesthetic objective;
- The colour had been reduced from greater than 60 CU to less than 5.0 CU, and was below the CDWQG aesthetic objective;
- The barium concentration had been reduced from 1.14 mg/L to 0.043 mg/L, and below the CDWQG health based upper limit;
- The iron concentration had been reduced from 5.35 mg/L to 0.062 mg/L, and below the CDWQG aesthetic objective;
- Manganese was in exceedence of the CDWQG aesthetic objective; and,
- As expected, the hardness had been lowered from 422 mg/L to 53.5 mg/L (as $CaCO_3$).
- Additionally, it was observed that at 749 mg/L, the total dissolved solids concentration is in exceedence of the CDWQG AO of 500 mg/L, and is considered highly mineralized.

17.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surface water sources or septic waste. Chloride concentrations reported from baseline and additional analytical water quality results were found to be high, reported at 190 mg/L and 184 mg/L. Nitrate, nitrite, and ammonia concentrations reported from baseline and additional analytical water quality results were found to be low and were within the normal background range for the Watson Lake area. The Watson Lake Grader Storage Building is located downgradient from the Town of Watson Lake's sewage lagoon, and this is likely the cause of the reported high chloride concentrations. Surrounding wells show similar evidence in water quality and it is therefore likely that the aquifer from which the Watson Lake Grader Storage Building obtains its water supply is being impacted by leachate from the sewage lagoon.

It should be noted that wells in the surrounding area also show signs of elevated barium. It is possible that a barite plant located upgradient from the grader storage building is causing the elevated barium observed in groundwater in the region. It is recommended that

additional hydrogeological assessment be completed to determine if the barite plant and the sewage lagoon are contaminating the aquifer in this region of Watson Lake.

17.4 Conceptual Hydrogeology

The log for this well indicates that the well is completed at a depth of 17.8 m with a static water level of 11.1 m below grade. The well is completed within a semi-confined sand aquifer from 17.0 to 17.8 m depth. The lithology indicates the presence of fine-grained silty sediments from 2.5 to 6.4 m and from 12.9 to 15.0 m depth. 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. Given the heterogeneity in the lithology and the intermittent distribution of the silty sediments it is unlikely that they provide any significant amount of protection from surficial sources of contamination in the vicinity. The well is located on the north side of a groundwater divide and groundwater flow in this area is likely north to northeasterly towards Wye Lake.

17.5 Potential Contaminant Sources

Potential contaminant sources observed during the site investigation are provided in field notes in Appendix A17. Photos of potential contaminant sources are provided in Appendix A17.

A summary of potential contaminant sources within 30 m of the well is provided below:

- Waste oil burner at 16 m; and,
- Above ground fuel storage tank at 11 m.

Additionally, there is a barite plant and a sewage lagoon that are both likely upgradient from the well.

17.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any contaminated site issues for this site or neibouring sites. There was, however, one spill record identified. Details from the spill

record and discussion with a representative from the YTG Highways Departement is outlined below.

On October 2, 2000, a transformer had reportedly been struck by a maintenance vehicle and the resultant damage had caused approximately 90 L of transformer oil to spill on the northeast corner of the property. This transformer oil contained a concentraion of greater than 50 ppm of PCBs. The spill had, however, reportedly been properly cleaned up to remove all contamination, and the water system at this site had been regularly tested with no reported traces of PCBs in the time after the spill occurred (personal comm, Rick Harder). Based upon conceptual hydrogeology, the spill area is likely downgradient from the well.

17.6 Identified Water System Deficiencies and Associated Risk

17.6.1 High and Medium Risk Deficiencies

The following deficiencies were identified as high-risk for the Watson Lake Grader Storage Building:

- Water quality results for this water system and surrounding well water systems indicate that the aquifer from which groundwater for this well is obtained is likely being impacted by leachate from the sewage lagoon and the barite plant located upgradient;
- There is no surface sanitary seal (grout or bentonite seal as required 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;
- There is no disinfection system;
- Poor surface completion of the wellhead (located in an attachment to the garage, the wellhead is only 100 mm above grade).
- Previous water quality results indicated exceedences in CDWQG health based parameters of turbidity and barium, as well as CDWQG of colour, iron, and manganese. Although there is a water softening system that has been installed that has significantly reduced these parameters, should it malfunction, concentrations of these parameters would likely again be in exceedence of these standards.
- There were no bacteriological results for this site available for review.

17.6.2 Low Risk Deficiencies

The following deficiencies were identified as low-risk for the Watson Lake Grader Storage Building:

- The wellhead is located within 30 m of potential sources of contamination, including sewer service lines within 30 m and a waste oil burner at 16 m;
- There is an above ground fuel storage tank located 16 m from the well;
- The manganese concentration in the water is in exceedence of CDWQG aesthetic objectives;
- There is and above ground fuel storage tank located 7 m from the well, but it is a double-walled EnviroTank with secondary containment;
- A transformer oil spill at the site, and,
- Total dissolved solids, however, continue to be high post-treatment;

17.7 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).

17.7.1 Priority 1

The following mitigative options should be carried out to address the high-risk deficiencies associated with the water system at the Watson Lake Grader Storage Building:

- The well and water system should be superchlorinated;
- Reverse osmosis systems should be installed in both the grader station maintenance garage and the Property Management Agency office building. Grader station staff should be informed to not use the facilities in the grader storage building for drinking water. Signs should be posted;
- The water softener should be regularly monitored and maintained;
- It is recommended that NSF-61 certified filtration system (to 1 micron absolute) followed by a UV disinfection system be installed at the point of entry. This is a conceptual design recommendation based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications; and,
- Samples for bacteriological analysis should be taken on a regular basis.

17.7.2 Priority 2

- The wellhead completion should be improved. This would involve, among other things, raising the well casing to a minimum of 500 mm above ground level; and,
- A detailed hydrogeological study and water quality assessment should be performed in the area to determine the cause of the elevated barium and chloride concentrations.

17.7.3 Priority 3

- A surface sanitary seal (grout or bentonite) to a depth of at least 3 m below grade should be installed. The ground surface in the vicinity of the wellhead should then be graded to promote surface drainage away from the well.

17.8 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.

17.8.1 Priority 1

- The cost for a suitable disinfection system such as filtration and UV treatment/disinfection system would cost approximately **$3,700**;
- To install point of use reverse osmosis systems in the maintenance garage and the Property Management Agency office would cost approximately **$1,200** for both systems;
- The cost associated with maintaining the softening system would fall under normal operation and maintenance costs; and,
- The cost to perform regular bacteriological tests would fall under the normal operation and maintenance budget.

17.8.2 Priority 2

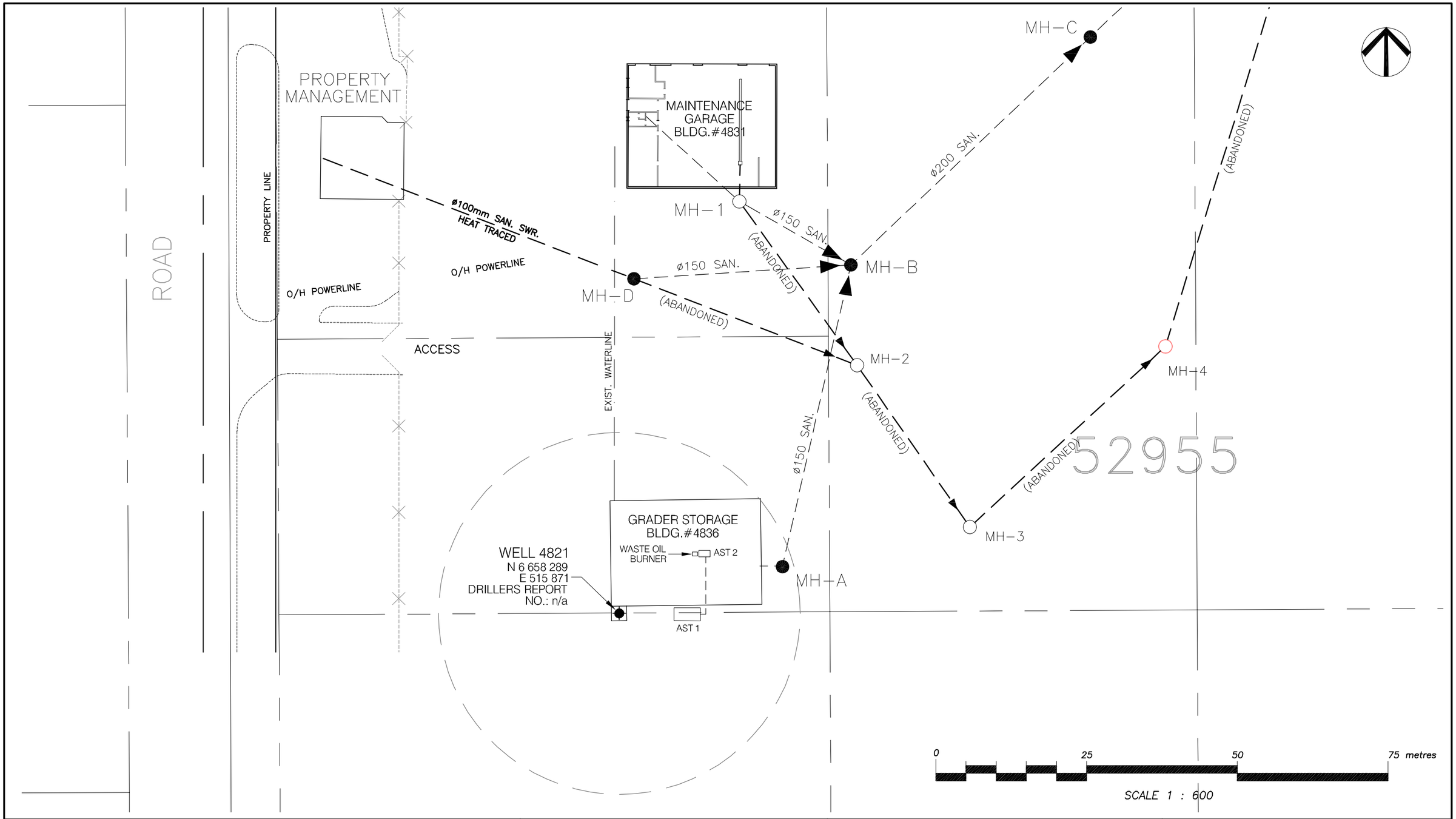
Class D cost estimates for medium-risk mitigative options to address the well deficiencies for this site are as follows:

- The cost for the wellhead upgrades would cost in the order of **$2,000**; and,

- Conducting a detailed hydrogeological study, including drilling a series of monitoring wells, to determine if the sewage lagoon and barite plant are contaminating the local aquifer, would cost in the order of **$20,000**. The cost to this system would be one-third of this amount, in the order of **$6,700**;

17.8.3 Priority 3

- The cost to install a surface sanitary seal, considering that the enclosure around the wellhead must be demolished and a new addition be built, would be approximately **$8,000**.



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 GRADER WORKSHOP
BUILDING # 4836
SITE LOCATION DIAGRAM
WELL ID: 4836–A

REVISION ISSUE: 0

FIGURE No.: 4836–A

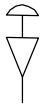
LEGEND

PUMP

PRESSURE GAUGE

GATE VALVE

CHECK VALVE



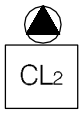
SOLENOID

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

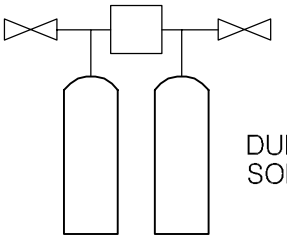
FLOW METER

WATER FILTER
(CARTRIDGE TYPE)

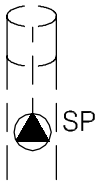
PRESSURE TANK



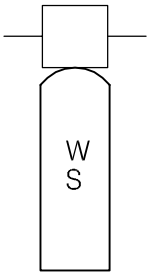
CHLORINE RESERVOIR AND
INJECTION PUMP



DUPLEX WATER
SOFTENER

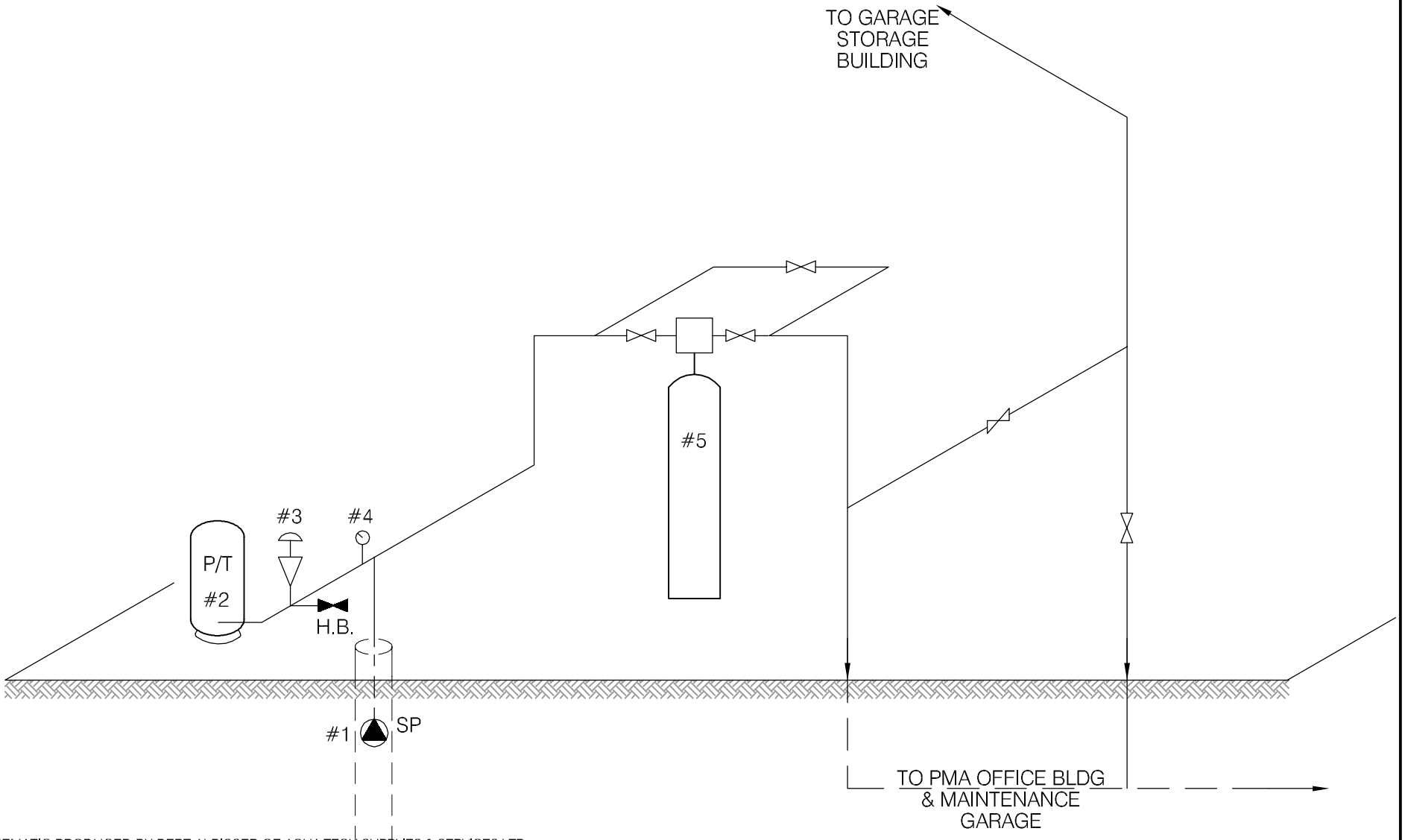


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT EASTERN 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



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

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT EASTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 4836 WATSON LAKE GRADER STORAGE BUILDING	
DATE JULY 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.002		DWG.: FIGURE 4836-B

Z:\0201Drawings\1260002 Water Assessment YTG\002 - Eastern Region\watson\Schematics\1260002 Grader Station_4836 Schematic.dwg, 7/21/2005 10:07:46 AM, Adobe PDF

W.L. GRADER STATION

Eastern Region – ~~Ambulance Building~~
Building # ~~4976~~ 4833

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB. PUMP.					4" - 3/4HP.
2	PRESSURE TANK	WEL-RITE	WR-260-03			
3	PRESSURE SWITCH	SQ. D	FSG-M4			2HP 1/4" FIPT
4	PRESSURE GAUGE	WINTERS	0-100			4" - 1/4" FIPT
5	SOFTENER	PETWA	01-400015-278-963		Z4813	16 x 65
6						
7						
8						
9						
10						

TABLE 4836- 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?
4836	Grader Storage Building	NO BACTERIOLOGICAL RESULTS ARE AVAILABLE FOR THIS SITE						

Table 4836-2: Water Quality Results

SOURCE:	Building 4836 - Grader Storage Building		GCDWQ Criteria		
Location/ Resident	Watson Lake				
Address					
Treatment	Water Softener				
Disinfection	No				
Source of Water	On-Site Well				
Purpose of Sampling	Baseline	Additional Sampling			
Sample Location		Laundry Sink			
Date Sampled	13-Sep-04	21-Jun-05	**Lower**	**Upper Limit**	
Physical Tests *(ALS)*			**AO**	**MAC**	**AO**
Colour (CU)	**>60**	<5.0			15
Conductivity (uS/cm)		1150			
Total Dissolved Solids	492	**749**			500
Hardness CaCO3	**422**	53.5	AO >200 = poor, > 500 unacceptable[A]		
pH	7.86	8.05	6.5		8.5
Turbidity (NTU)	**79.6**	0.60		1	5
Dissolved Anions *(ALS)*					
Alkalinity-Total CaCO3	212	222			
Chloride Cl	190	184			250
Fluoride F	<0.05	<0.20		1.5	
Sulphate SO4	4.13	<5.0			500
Nitrate Nitrogen N	<0.1	<1.0		10	
Nitrite Nitrogen N	<0.05	<1.0		1	
Ammonia Nitrogen N		<0.020			
Total Metals *(ALS)*					
Aluminum T-Al	<0.005	<0.010			
Antimony T-Sb	<0.0002	<0.00050		0.006	
Arsenic T-As	0.0018	0.00049		0.025	
Barium T-Ba	**1.14**	0.043		1	
Boron T-B	0.007	<0.10		5	
Cadmium T-Cd	<0.00001	<0.00020		0.005	
Calcium T-Ca		15.8			
Chromium T-Cr	0.0012	<0.0040		0.05	
Copper T-Cu	0.003	0.0174		1	
Iron T-Fe	**5.35**	0.062			0.3
Lead T-Pb	0.0003	0.0012		0.01	
Magnesium T-Mg		3.37			
Manganese T-Mn	**1.18**	**0.39**			0.05
Mercury T-Hg		<0.00020		0.001	
Potassium T-K		350			
Selenium T-Se		<0.0010		0.01	
Sodium T-Na	17.5	<2.0			200
Uranium T-U	<0.0005	0.00019		0.02	
Zinc T-Zn	0.11	0.244			5
Organic Parameters					
Total Organic Carbon C		1.75			
Field Chemistry (EBA)					
pH		8.02	6.5		8.5
TDS (ppm)		**559**			500
EC (uS/cm)		1115			
Temperature (°C)		9.4			

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

Table 4836-3: 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)**
4836	**Watson Lake Grader Storage Building**	**Watson Lake**	6658289	515871	715

Well Details							
Well Casing Diameter (mm)	**Year Well Installed**	**Well Log?**	**Well Depth (m bg)**	**Reported Low Permeabilty Protective Layer?**	**Pump Setting (m bg)**	**Well Capacity - Tested, or Reported by User**	**Static Water Level Below Ground (m-btwc)**
150	1986	Yes	17.8	Silt from 2.5 m to 6.4 m and from 12.9 m to 15.0 m		20 gpm from log	11.0

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**
Community Sewage system	Located off from maintenance garage	Greater than 60 m	AST 1	7	Waste Oil Burner at 16 m
			AST 2	16	UST greater than 30 m away, and likely downgradient

Well Construction Details					
Wellhead Above ground (m)	**Well Cap**	**Well Screen**	**Surface Seal**	**Apron Grading**	**Comments**
0.1 m above grade	Split seal gasket cap	20 slot screen from 17.0 m to 17.8 m	No	Ground above wellhead enclosure is relatively flat	The well services the grader storage building and the maintenance garage, as well as the Property Management Agency Watson Lake office. It is likely downgradient from a barite plant and sewage lagoon.

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
4836	YTG	Watson Lake Grader Storage Building

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 Grader Station Complex

c. GPS location: N 6698289 E 515871 elv 715 m

d Is there electric power? ☒ Yes ☐ No

e Is there outside water access? ☐ Yes ☐ No inaccessable to the public

f. Does the well system have:

☐ 15 or more service connections to a piped distribution system ? If so how many_____
Grader Station, Storage Building, Property Management Agency office

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

g. Nearest building, specify located in alcove off of storage buildings

h. Distance from well to building n/a

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

j. Distance from well to nearest point of known field: _____

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
wastewater system on community sewage system - sewer manhole and likely main sewer line ~26m from well

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 Inside building in grader station complex

Entrance by animals? ☐ Yes ☒ No Access possible - no protection

p. Is well site subject to flooding? ☒ Yes ☐ No Alcove off of storage building leaks during rainfall

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

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

If yes, is it ☐ in use ☐ abandoned

Is the location known? ☐ Yes ☐ No

Distance from the well to known buried tank >30m down gradient (likely)

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

☐ Yes ☐ No Describe Garage sumps may drain into septic - unknown; there may be a rock pit whose location is unknown

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

Potential Source 1: AST 1 ; Distance from well to Potential Source 1: ~7m

Potential Source 2: AST 2 ; Distance from well to Potential Source 2: 16m

Potential Source 3: waste oil burner ; Distance from well to Potential Source 3: 16m

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

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

How many? _____ ☐ in use ☐ abandoned ☐ require proper sealing

2. Well and Wellhead information:

a. When was well installed? Year 1986 Month February

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: 58 ft ☐ measured (if possible) ☐ reported ☒ from log

h. Static water level below ground: _____

☐ 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 _____ slot size(s) 20 slot
Location of screen: from _____ to _____ (from log) reported

l. Is there a sump below the screen? ☐ Yes ☒ No

m. Is the well head: ☐ in pumphouse ☐ in pit ☐ pitless adaptor ☒ in a building
in an enclosure off from storage 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 10 cm above 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 not directly but inside heated/insulated building

iv. Any evidence of rodents? Specify no, but access is possible

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

If no, describe condition split gasket cap

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 ☒ Yes ☐ No

Explain (filtration, disinfection etc…) softening system

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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 _____

d. Date installed: _____ 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
but tap is directly against floor

j. Is there a water meter on the system? ☐ Yes ☒ No

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

If yes, describe: located inside heated building

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

_____

_____

_____

_____

_____

_____

_____

b.Recommendations: _____

_____

_____

_____

_____

_____

_____

_____

PART B: EBA Site Inspection

Inspector: BERT ALBISSER Date JUNE 21 05

WELL ID #	Owner	Location Description
~~4976~~ 4836	YTG	WATSON LAKE GRADER ~~STATION~~ STORAGE BUILDING

6. Water Treatment

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

☐ chlorination ☐ iron and or manganese removal ☑ other WATER SOFTNER.

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: STORAGE BUILDING.

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:

INSTALLATION IS OF GOOD QUALITY & WORKMANSHIP THE SOFTNER DRAIN DOES NOT MEET PLUMBING CODE AND IS SUBJECT TO FREEZING. THIS WILL RENDER THE SOFTNER INOPERABLE.

b. Recommendations:

INSTALL PROPER DRAIN FACILITY FOR SOFTNER. SUPER CHLORINATE WELL & PIPING SYSTEM. INSTALL UV TREATMENT SYSTEM, AFTER WATER SOFTNER. INSTITUTE BI ANNUAL WELL SUPER CHLORINATION MAINTENANCE PROGRAM.

Field Report

MIDNIGHT SUN DRILLING CO. LTD.
WHITEHORSE Y.T.
PH. 633-3070
P.O. BOX 4391
WHITEHORSE, YUKON

Started Feb. 25 19 86
Completed Feb. 27 19 86

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
Y.T.G.	W/W	Grader station Watson Lake.

WATSON LK GRADER STATION

FORMATION LOG FROM	TO	FORMATION
0'	8'	Gr. sand.
8'	21	silt Gr.
21	26	sand Gr.
26	42	Till
42	49	sand Gr. some silt
49	58	Gr. sand.

DESCRIPTION OF WORK	TIME DATE	FROM	TO	HOURS
MOVE	~~Feb 25~~	~~8:00~~	~~4:00~~	~~8~~
loading	Feb. 25	8:00	4:00	8
Travel to Watson	Feb. 26	8:00	4:30	8.5
move on set up	"	4:30	5:30	1
	"	5:30	7:30	2
set screen	Feb 27	8:00	8:30	0.5
Develop	"	8:30	10:00	1.5
move off	"	10:00	10:30	0.5
travel to Whse	"	10:30	7:00	8.5

Rcrd. of Casing & Pipe

Size	Type	Size	Type
6			
Feet	Inch	Feet	Inch
55	6		

Remarks:
1 - drive shoe
2' riser lead pack.
20 slot
5 7/8" bit pin
20 GPM.

Static Level		Total Rig Time	hrs.
Ground Level	36'	Total Standby	hrs.
Top Of Casing		Drilling Mud	sacks

SIGNATURES

MIDNIGHT SUN..... CLIENT.....

TITLE..... TITLE.....

Widow Printers

Environment Canada Environnement Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

Spill #	0043
Jurisdiction	Yukon
Community	Watson Lake
Address	
Highway	
Milepost	
Feature	Watson Lake
Location and Cause	YTG Highways Compound/Complex - transfomer brought down by accident - transformer oil spilled from damaged equipment
Latitude	60.06230376
Longitude	-128.71344317
Incident Date	10/2/2000 2:05:00 PM
Lead Agency	Emergency Measures Organization
Other Agency	Yukon Government - Environmental Programs
Company(s)	YTG - Highways
Amount	90
Units	Litres
Quantity	Estimate
Release Description	Spilled
Additional Quanitit	>50 ppm PCB
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Transformer Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	contaminated soil excavated and put in barrels - transformer repaired - oil tested - previous tests (late 80's) showed >50 ppm PCB - soil to be remediated - no further info

Photo 0273: 4836 Grader Storage Building and wellhead enclosure addition (back), above ground fuel storage tank (right)

Photo 0275: 4836 Above ground fuel storage tank

Photo 0017: 4836 Wellhead (centre), pressure tank (left)

Photo 0018: 4836 Water softener and brine tank