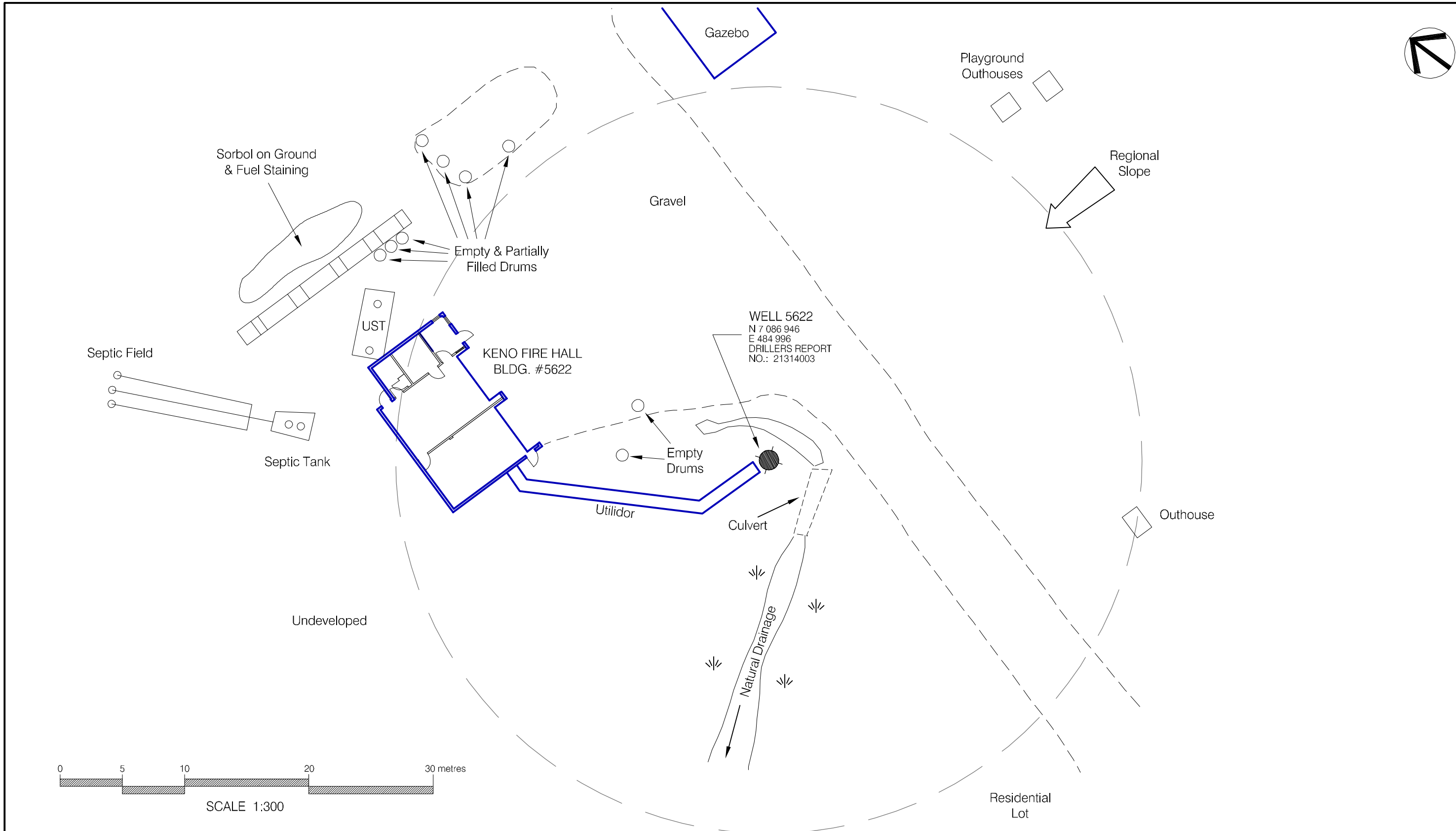


NOTES:

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:	SEPT. 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.004
ACAD FILENAME:	004–NORTHERN REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
NORTHERN REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

KENO FIRE HALL
BUILDING # 5622
SITE LOCATION DIAGRAM
WELL ID: 5622

REVISION ISSUE 0

FIGURE No. FIGURE 5622–A

\\eba.local\corp\Whitehorse\Data\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\keno\1260002004 Keno Fire Hall_5622A Site Plan.dwg, 1/13/2006 11:30:11 AM, Adobe PDF, jbuyck

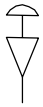
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

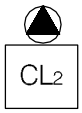

SOLENOID

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

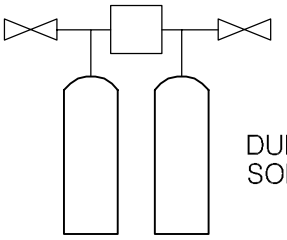
FLOW METER

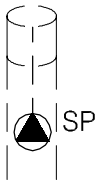
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

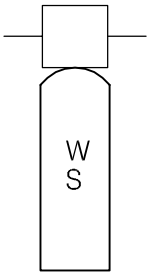


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

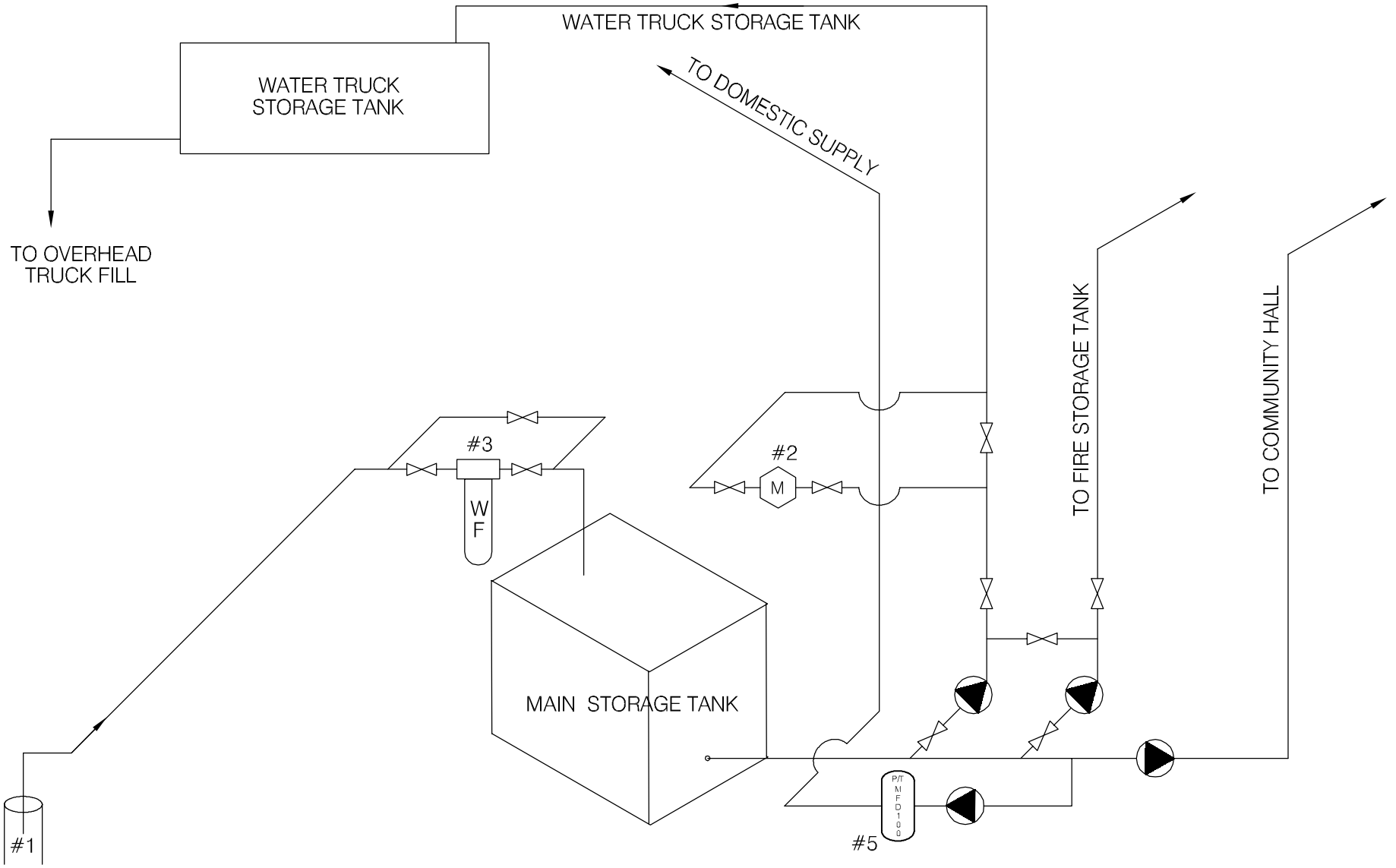


WELL WITH
SUBMERSIBLE PUMP



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



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

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT NORTHERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 5622 KENO FIRE HALL - KENO, YT.	
DATE SEPT. 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.004		DWG.: FIGURE 5622-B

Z:\0201Drawings\1260002 Water Assessment YTG\004 - Northern Region\keno\1260002004 Keno Fire Hall_5622B Schematic.dwg, 4/5/2006 2:58:30 PM, Adobe PDF, jbuyck

Northern Region – Keno Firehall
Building # 5622

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB PUMP	GRUNDFOS	15SQ15C-29	96033888	P10049	3"
2	INLINE FILTER	AMETEK	1½" BB			10" BB
3	FILTER CARTRIDGE	PENTEK	CP5BB			10" BB
4	JET PUMP	MONARCH	JKS-1			⅓HP
5	PRESSURE TANK	RED LION	MFD-100			20 GALLON
6						
7						
8						
9						
10						

TABLE 5622 - 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?
5622	Keno City Fire Hall	3	Feb-05 to Jun-05	no	0/3	no	9-Jun-05	no

Table 5622 - 2: Water Quality Results

SOURCE:	Building 5622 - Keno City Fire Hall			GCDWQ Criteria		
Location/ Resident	Keno					
Address						
Treatment	None					
Disinfection	Chlorination (manual)					
Source of Water	On-site well					
Purpose of Sampling	Base Line	Base Line	Additional Sampling			
Sample Location			Washroom faucet			
Date Sampled	2-Jul-04	8-Jun-05	17-Aug-05	Lower	Upper Limit	
Physical Tests *(ALS)*				**AO**	**MAC**	**AO**
Colour (CU)	5	<5.0				15
Conductivity (uS/cm)	559	583				
Total Dissolved Solids	360	361				500
Hardness CaCO3	297	272		AO >200 = poor, > 500 unacceptable[A]		
pH	7.85	7.96		6.5		8.5
Turbidity (NTU)	0.26	**3.24**			1	5
UV Absorbance						
% UV Transmittance						
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	156	158				
Chloride Cl	9.6	7.62				250
Fluoride F	0.038	0.046			1.5	
Silicate SiO4						
Sulphate SO4	120	124				500
Nitrate Nitrogen N	1.66	1.37			10	
Nitrite Nitrogen N	0.1	<0.10			1	
Ammonia Nitrogen N			0.048			
Total Phosphate PO4						
Total Metals *(ALS)*						
Aluminum T-Al	0.01	<0.010			0.1	
Antimony T-Sb		<0.00050			0.006	
Arsenic T-As	0.003	0.00188			0.025	
Barium T-Ba	0.157	0.138			1	
Boron T-B	0.1	<0.10			5	
Cadmium T-Cd	0.00099	0.00092			0.005	
Calcium T-Ca	88	79.9				
Chromium T-Cr	0.002	<0.0020			0.05	
Copper T-Cu	0.01	0.011			1	
Iron T-Fe	0.03	0.085				0.3
Lead T-Pb	0.001	<0.0010			0.01	
Magnesium T-Mg	18.7	17.6				
Manganese T-Mn	0.0025	0.0039				0.05
Mercury T-Hg	0.0002	<0.00020			0.001	
Potassium T-K	0.35	0.28				
Selenium T-Se	0.0037	0.0023			0.01	
Sodium T-Na	2.6	2.5				200
Uranium T-U	0.0116	0.00953			0.02	
Vanadium T-V						
Zinc T-Zn	0.224	0.163				5
Organic Parameters						
Tannin and Lignin						
Total Organic Carbon C			0.58			
Field Chemistry (EBA)						
pH			8.12	6.5		8.5
TDS (ppm)			317			500
EC (uS/cm)			635			
Temperature (°C)			7.4			
Free Available Chlorine			0.00			

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)

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date August 16, 2005

WELL ID #	Owner	Location Description
5622	YTG	Keno Fire Hall

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: N 7086946 E 484996 elv 942m

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_____

☒ 5 or more delivery sites on a trucked distribution system? If so how many Keno City

g. Nearest building, specify Keno City Fire Hall

h. Distance from well to building ~18 m

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

j. Distance from well to nearest point of known field: Tank at 36m, field > 36m

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 Unfastened, 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 Drainage ditch runs beside wellhead enclosure.

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 31 m

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: Drainage Ditch ; Distance from well to Potential Source 1: 2 m

Potential Source 2: Outhouses ; Distance from well to Potential Source 2: 30, 32, and 36 m

Potential Source 3: Empty Drums ; Distance from well to Potential Source 3: ~10 m

Potential Source 4: Partly Filled drums; Distance from well to Potential Source 4: ~32 m

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 1987 Month August

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 20 cm to 36 m, 15 cm to 55 m (to bedrock) Material: ☒ steel ☐ plastic ☐ concrete

g. Depth of well: 93 m ☐ measured (if possible) ☒ reported ☒ from log

h. Static water level below ground: 55 m

☐ 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 n/a - bedrock well

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

k. If there is a well screen: length n/a slot size(s) _____
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 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 No, ~0.25m 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

iv. Any evidence of rodents? Specify No, access 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 or disinfection ☒ Yes ☐ No

Explain (filtration, disinfection etc…) No,

---

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 91 m

f. Drop pipe for submersible pump: ☒ steel ☐ plastic
possibly - unknown

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

If yes, describe: Heat trace + Heater

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

b. Recommendations:

PART B: EBA Site Inspection

Inspector: BERT ALBISSER Date AUG 16/05

WELL ID #	Owner	Location Description
5622	YTG	KENO CITY, YT

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: LARGE FIBRE GLASS TANK

Where is it located?
Comments: WATER TRUCK GARAGE

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?

75 x 75 x 144"

What material is the tank constructed of? FIBRE GLASS COVERED PLYWOOD

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 ?6

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 SYSTEM IS IN REASONABLY GOOD CONDITION. THE TANK IS RELATIVELY CLEAN WITH SOME IRON OXIDE AT THE BOTTOM. THE CHLORINATOR SYSTEM IS NOT IN SERVICE. THERE IS NO CHLORINE INJECTION PUMP ON SITE. THE PRESSURE TANK IS WATER LOGGED, THIS CAUSES THE JET PUMP TO SHORT CYCLE. THE TANK LID IS LOOSE.

b. Recommendations:

CLEAN THE STORAGE TANK, DISINFECT IT. INSTALL CHLORINE INJECTION PUMP WITH FLOW METER TO EFFECT PROPORTIONAL CHLORINATION. INSTITUTE FREE CHLORINE RESIDUAL TESTING AT REGULAR INTERVALS.

Field Report 213140003

MIDNIGHT SUN DRILLING CO. LTD. WHITEHORSE Y.T.
PH. 633-3070 TELEX 036-8496
P.O. BOX 4391
WHITEHORSE, YUKON

Started Aug. 18 1987

Completed Aug. 22 ... 1987

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
YTG	W/W	Keno Finc Hall Well

FORMATION LOG FROM	TO	FORMATION	DESCRIPTION OF WORK	TIME DATE	FROM	TO	HOURS
			MOVE 8"				
			Loading Gas well in Keno	Aug 18	8:30	5:30	9
			Travel to Keno	"	5:30	12:30	7
			move on set up	Aug 19	8:00	9:00	1
			Mounting Hammer	"	9:00	12:00	3
	14	silt	sand	"	12:00	10:00	10
	46	silt	Gr. cobbles				
	60	sand	Gr. cobbles				
	78	sand	Gr. cobbles	Aug 20	7:30	3:30	8
	109	silt					
	117	sand	Gr. cobbles				

No. of Casing & Pipe	Type	Size Feet	Size Inch	Type
1"				
set	Inch	Feet	Inch	
7'				

Remarks:

1 - 8" Drive shoe.

½ 7 7/8" Tri-cone

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

SIGNATURES

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

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

Intors

Field Report

MIDNIGHT SUN DRILLING CO. LTD.
WHITEHORSE Y.T.
PH. 633-3070 TELEX 036-8496
P.O. BOX 4391
WHITEHORSE, YUKON

Started Aug. 18 19 87

Completed Aug. 22 19 87

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
YTG	W/W. (2)	Keno Fire Hall W/Well

FORMATION LOG FROM	TO	FORMATION
	125	sand
	140	Till
	181	Till
	285	BR.
5	305	BR.

DESCRIPTION OF WORK	DATE	TIME FROM	TO	HOURS
MOVE 6"				
set 117' - 6" casing	Aug 20	3:30	6:30	(3)
Gr. cobbles	"	6:30	9:00	2.5
Cobbles Boulders.				
Cobbles Boulders	Aug 21	7:30	3:00	7.5
	"	3:00	7:30	4.5
Trip to Zap invest.	"	7:30	10:00	2.5
to look at site				
	Aug 22	6:30	7:00	0.5
Develop	"	7:00	11:00	(4)
move off.	"	11:00	2:00	(3)
Travel to whse	"	2:00	8:30	6.5
Water Sand 190'				
more from 298 to 301'				
and very lose ground.				

of Casing & Pipe			
e. Type	Size	Type	
t. Inch	Feet	Inch	
8' 6"			

Remarks:

1 - Drive shoe.
20 GPM.
(1) 5 7/8" Tri-cone
(1) 1/2" 5 1/2"

Static Level		Total Rig Time	hrs.
Ground Level	180'	Total Standby	hrs.
Top Of Casing		Drilling Mud	sacks

SIGNATURES

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

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

Field Report

MIDNIGHT SUN DRILLING CO. LTD. WHITEHORSE Y.T.
PH. 633-3070 TELEX 036-8496
P.O. BOX 4391
WHITEHORSE, YUKON

Started Sept. 8 1987
Completed Sept. 8 1987

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
GOV. OF YUKON	clean out well	Kono City Fire Hall Area

FORMATION LOG

FROM	TO	FORMATION

DESCRIPTION OF WORK	DATE	TIME FROM	TIME TO	HOURS
MOVE				
Load Rig	Sept 8	7:30	9:00	1.5
Travel to Kono	"	9:00	11:00	2
move on set up over well trip in No Hang ups.	"	11:00	1:00	2
Develop	"	1:00	2:30	1.5
move off Load Hadwal	"	2:30	4:30	2
travel to Dawson.	"	4:30	9:30	5
unload Rig	"	9:30	10:00	0.5
BIT STILL HAD TROUBLE INSTALLING Pump				

No. of Casing & Pipe

Type	Size	Type
Inch	Feet	Inch

Remarks:

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

SIGNATURES

MIDNIGHT SUN.... Staff.....LES TORGERSON CARTWRIGHT DWIGHT HURLEY
TITLE.....

CLIENT.....
TITLE.....

Printers

Photo 015: 5622 Keno Fire Hall facing west.

Photo 017: 5622 Wellhead.

Photo 179: 5622 Main water storage tank.

Photo 184: 5622 Booster pumps.