15.0 BUILDING 1955: MOUNT LORNE FIRE HALL

15.1 Description of Existing Water Supply System

Building 1955, the Mount Lorne Fire Hall, is currently serviced by a well that is approximately 35 m deep. The wellhead is located in a pit approximately 4.5 m away from the fire hall. A site plan is provided as Figure 1955-A in Appendix A15. The coordinates of the wellhead, as measured by a hand held GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6704424
- Easting: 507749

The water is delivered from the well to a pressure tank and then splits to serve the domestic water supply and two 5000 L water storage tanks for fire fighting use. A system schematic is shown by Figure 1955-B in Appendix A15. There is no treatment or disinfection system installed for this water supply system.

15.2 Description of Existing Wastewater Systems

The septic tank for the Mount Lorne Fire Hall is located south of the fire hall, approximately 30 m from the wellhead. A site plan that shows the position of the septic system relative to the well is provided as Figure 1955-A in Appendix A15. The septic tank discharges effluent to a field located south of the tank. The septic tank and effluent field are located at approximately the same elevation as the well.

15.3 Water Quality Results

15.3.1 Water Quality Results from Previous Sampling

Bacteriological

Bacteriological sampling of water from the Mount Lorne Fire Hall water system has previously been completed on a number of occasions by EBA for the Property Management Agency as part of a separate contract. EBA was provided access to the YTG database in order to review the results of this previous bacteriological sampling. Six

samples were collected from this system between October 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 1955-1 located in Appendix A15.

According to the YTG database, *E. coli* and Total Coliform Bacteria were reported as absent in each of the six samples for which results were provided.

Detailed Potability Analyses

A water sample was previously collected from the Mount Lorne Fire Hall water system on October 4, 2004. The sample was collected from the kitchen tap; however, there is no treatment or disinfection, and therefore the water sample is considered to be representative of raw groundwater quality. The sample was submitted to ETL EnviroTest in Surrey BC for detailed potability analyses. The results of these analyses are summarized in Table 1955-2 and included in Appendix A15. EBA reviewed the analytical results to compare them with the CDWQG and to observe general water quality, identify and recommend additional sampling and analytical, and to identify potential indicators of contamination. Relevant details are provided below:

- The raw water quality for the sample obtained on October 4, 2004 indicated that the groundwater source is calcium bi-carbonate type water with a pH of 8.
- The water quality results indicated that all health based and aesthetic objectives were met for the parameters analyzed. The hardness (as $CaCO_3$), reported to be 206 mg/L, is considered as poor for aesthetic purposes.

15.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Mount Lorne Fire Hall that was identified to be included during the water system assessments is detailed below:

- UV absorbance, to determine potential for UV treatment as a disinfection option.
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature were completed at the time of collecting.

Additional Analytical Results

A water sample was obtained during the water system assessment on May 10, 2005, and was submitted for analysis to ALS Environmental in Vancouver BC for UV absorbance. These results are summarized in Table 1955-2 (Appendix A15) and the laboratory reports are included in Appendix B.

15.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. Chloride concentrations for the sample obtained on October 4, 2004 were low and are considered to be within the normal background ranges for groundwater in the Whitehorse area. Nitrate and nitrite concentrations for this sample were also low and within the normal background range for the Whitehorse area. Therefore, these water quality results do not suggest that the aquifer from which the groundwater is obtained for the Mount Lorne Fire Hall is under the direct influence of surfacewater sources or septic wastes.

15.4 Conceptual Hydrogeology

According to the driller's well log, the well is completed through approximately 2 m of silt, which is underlain by sand with varying degrees of silt to the depth of completion (35 m). The static water level as recorded on the drillers well log is 18.3 m below grade. Based on the lithology and water level, the aquifer in which the well is completed is inferred to be unconfined. Although unconfined aquifers are more vulnerable to contamination than confined aquifers, the thickness of the unsaturated zone and the presence of the silt layer at surface offers some protection of the aquifer from surface sources of contamination. The local groundwater flow direction is unknown at this time.

15.5 Potential Contaminant Sources

Potential contaminant sources from observations during the site investigation are compiled in Table 1955-4 in Appendix A15. Photos of potential contaminant sources are provided in Appendix A15.

There is a solid waste transfer station in the vicinity of the Mount Lorne Fire Hall. The perimeter of the solid waste transfer station is located 180 m to the north of the fire hall. Although no actual burying of refuse has recently been done, the solid waste transfer station used to be a burn pit, and then was converted into a landfill before being again converted into a solid waste transfer station. The solid waste transfer station is greater than the minimum 120 m required between any refuse disposal site and water well according to the draft Part III Small Public Drinking Water System Guidelines, but since the solid waste transfer station is potentially upgradient from the well (groundwater flow direction is unknown), the solid waste transfer station still has the potential to pose a risk to the water supply at Mount Lorne Fire Hall.

Government of Yukon's Environment Department generally requires that landfills implement a groundwater-monitoring plan as a condition of their Solid Waste Permit Number. It is our understanding that there are currently no groundwater monitoring wells in the vicinity of the site, and as such a groundwater-monitoring program is not in place. It is recommended that this be discussed with YTG Environment and Community Services Departments to determine who has responsibility to implement such a program.

15.5.1 Spills Records and Contaminated Sites Search Results

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

15.6 Identified Water System Deficiencies and Associated Risk

15.6.1 High and Medium Risk Deficiencies

The following deficiencies were identified as being high or medium risk for the Mount Lorne Fire Hall water system:

- The wellhead is located in a pit below grade. The pit is prone to flooding and at the time of inspection the wellhead was no longer visible due to the silt that had built up over the wellhead due to prolonged flooding (over several years) or from the recent snowmelt event. At the time of the assessment, the well would be considered to be under the direct influence of surfacewater. Furthermore, by definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because it does not meet the requirements of the Guidelines for Water Well Construction.

- The well is located in an enclosure that is not locked and may be accessible to animals and unauthorized personnel.
- There is no sanitary surface seal between the well casing and the well formation.
- There is no disinfection treatment system for this well.
- The well is in close proximity to a former landfill and active waste transfer station.

15.6.2 Low Risk Deficiencies

The following deficiencies were identified as being low risk for the Mount Lorne Fire Hall water system:

- The overflow from the water storage tank is higher than the tank so that if the tank were to be over-filled the water would spill over inside the building.

15.7 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).

15.7.1 Priority 1

The following Priority 1 upgrades were recommended in the draft report submitted in June 2005:

- The wellhead completion should be improved to prevent potential for surfacewater to travel through the top of the casing, or down the annulus between the casing and the formation. This would involve raising the well casing to a minimum of 500 mm above ground level and retrofitting a proper surface seal to 3 m depth around the well casing;
- A proper wellhead enclosure that is inaccessible to animals and unauthorized personnel should be constructed;
- The ground surface should then be graded to promote surface drainage away from the well; and,
- The well and water system should be shock chlorinated.

The Property Management Agency has commissioned Energy North Solutions to carry out the Priority 1 upgrades indicated above. These upgrades are in progress under the direction of EBA at the time that this final report is being completed. A separate report will be produced to provide well upgrade completion details as well as recommendations for the "standard wellhead upgrade" process for future well systems to be refurbished.

Additional Priority 1 Upgrades that are not currently in progress include:

- Because it is not feasible to install a surface seal to 6 m on an existing well the following disinfection system is proposed:
  - An NSF-61 certified filtration system capable of filtering particles down to 1 micron in diameter should be installed; and,
  - The adequacy of a chlorination system vs. a UV system should be considered. This is dependent on pre-treatment requirements, and demand. At this time it is assumed that a NSF/ANSI 55 certified UV disinfection system would be adequate, and would not require pre-treatment. This would be determined during pre-design.

15.7.2 Priority 2

- Given the relatively close proximity to the landfill, it is recommended that a drilling program be completed and monitoring wells be installed in the vicinity of the landfill and transfer station to determine groundwater flow direction and to ensure that leachate is not deriving from the former landfill. Similar groundwater monitoring programs are required for many other landfills in Yukon. A minimum of three monitoring wells would be required. PMA should consult with the Community Services and Environment departments of YTG to determine who would be responsible to implement a groundwater-monitoring program. Additional sampling of water from this well was completed on March 8, 2006 by EBA. A sample was collected to analyze for potential indications of contamination from the adjacent landfill. ALS Environmental in Vancouver analyzed the sample for Volatile Organic Chemicals, Polycyclic Aromatic Hydrocarbons and Organochlorine Pesticides. All parameters analyzed were below analytical detection limit, and below all Canadian Drinking Water Quality Guidelines for these chemicals. There were no chemicals identified in the water quality results from this most recent sampling event or the previous sampling that would suggest that there was impact on the water quality from the adjacent landfill at the time of sampling. The results of this sampling program will be reported in a letter report detailing well upgrades.

15.7.3 Priority 3

- The overflow for the water storage tank should be re-piped so that it is below the level of the tank.

15.8 Cost Estimates for Mitigative Options

Engineering costs for pre-design and preparation of process diagrams and specifications for project tendering for water treatment systems are estimated to be 25% of construction costs.

Engineering costs for other 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.

15.8.1 Priority 1

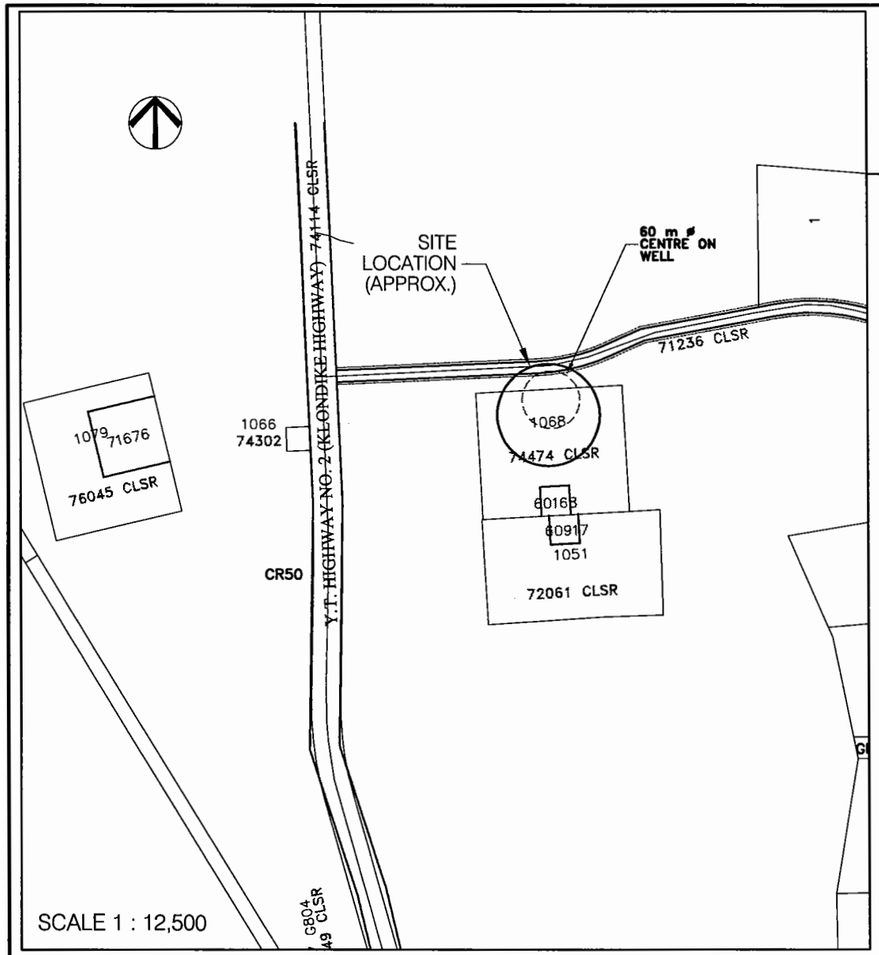
- Because this work is being completed with frozen ground conditions, the cost of raising the well casing to at least 500 mm above ground level, installing a surface seal to 3 m or deeper, and building a new wellhead enclosure, would be in the order of **$9,000** for materials and labour (including grading).
- It is expected that installation of the filtration system would cost in the order of **$2500** for materials and labour.
- The installation of the UV disinfection system would likely cost in the order of **$2500** for materials and labour.

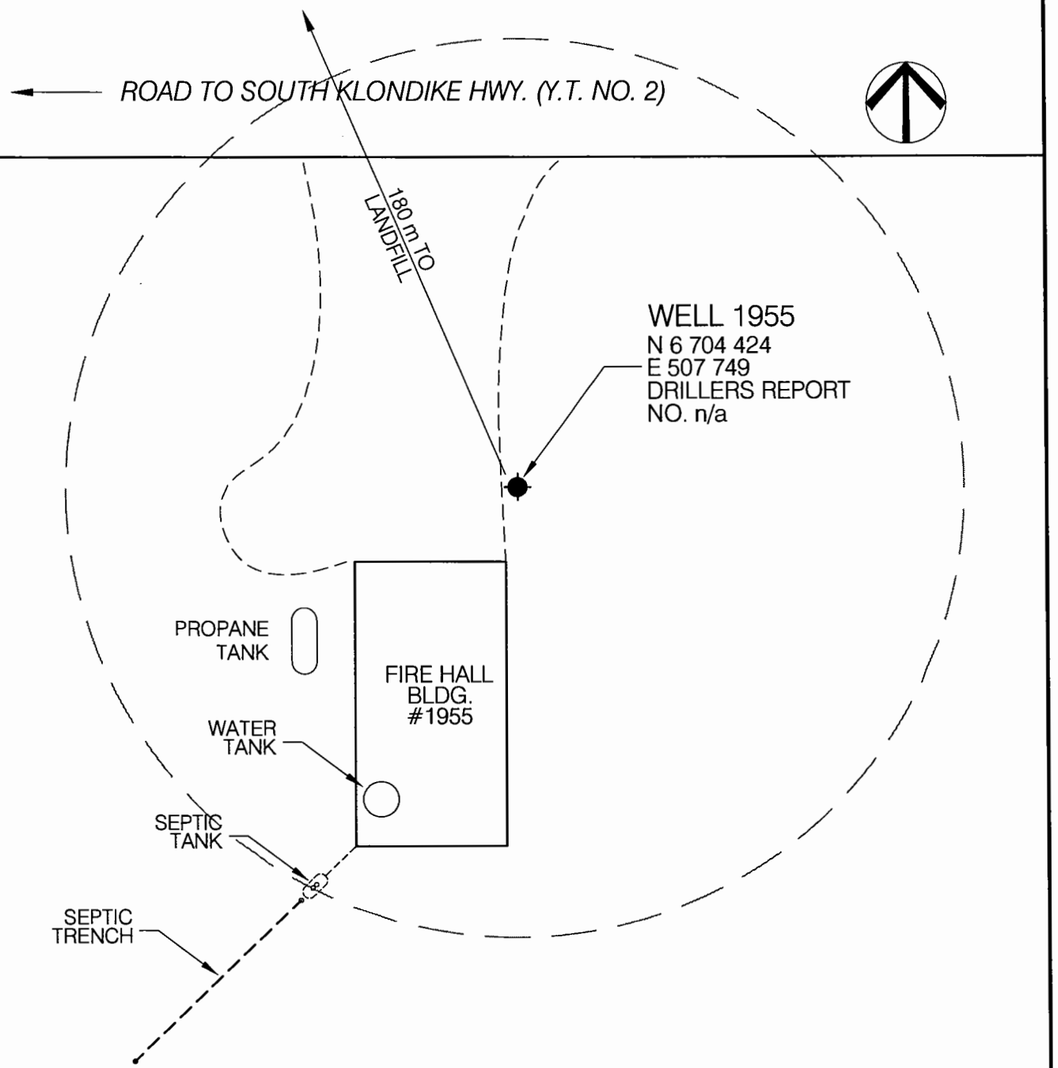
15.8.2 Priority 2

A hydrogeological investigation and groundwater-monitoring program would likely cost in the order of **$15,000** including drilling, installing 3 monitoring wells, testing and reporting.

15.8.3 Priority 3

- To re-pipe the overflow for the water storage tank it would likely cost in the order of **$1000** for materials and labour.





SCALE 1 : 400

NOTES:
1. UTM COORDINATES OBTAINED WITH A HAND HELD GPS USING NAD83 SYSTEM AND ARE CONSIDERED TO BE ACCURATE TO 10.0 m, APPROXIMATELY.
2. LOCATION OF BUILDING ON PROPERTY IS APPROXIMATE ONLY.

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:	JUNE 2005
SCALE:	AS SHOWN
PROJECT No.:	1260002.001
ACAD FILENAME:	001-WHITEHORSE_REGION

CLIENT: Yukon
Highways and Public Works
Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WHITEHORSE REGION

GOVERNMENT OF YUKON
HIGHWAYS & PUBLIC WORKS

MOUNT LORNE FIRE HALL
BUILDING 1955
SITE LOCATION DIAGRAM
WELL ID: 1955

REVISION ISSUE: 0

DRAWING No.: FIGURE 1955A

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\mt lorne\1260002 Mt Lorne 1955.dwg, 6/10/2005 3:08:29 PM, \\whi-eb-dc001\WHI201COMMON

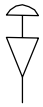
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

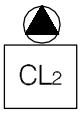

SOLENOID

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

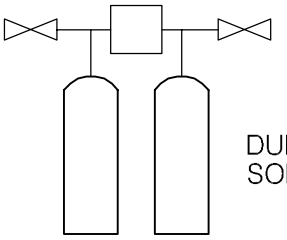
FLOW METER

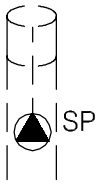
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

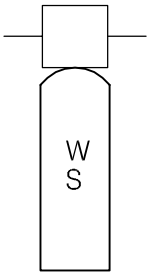


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

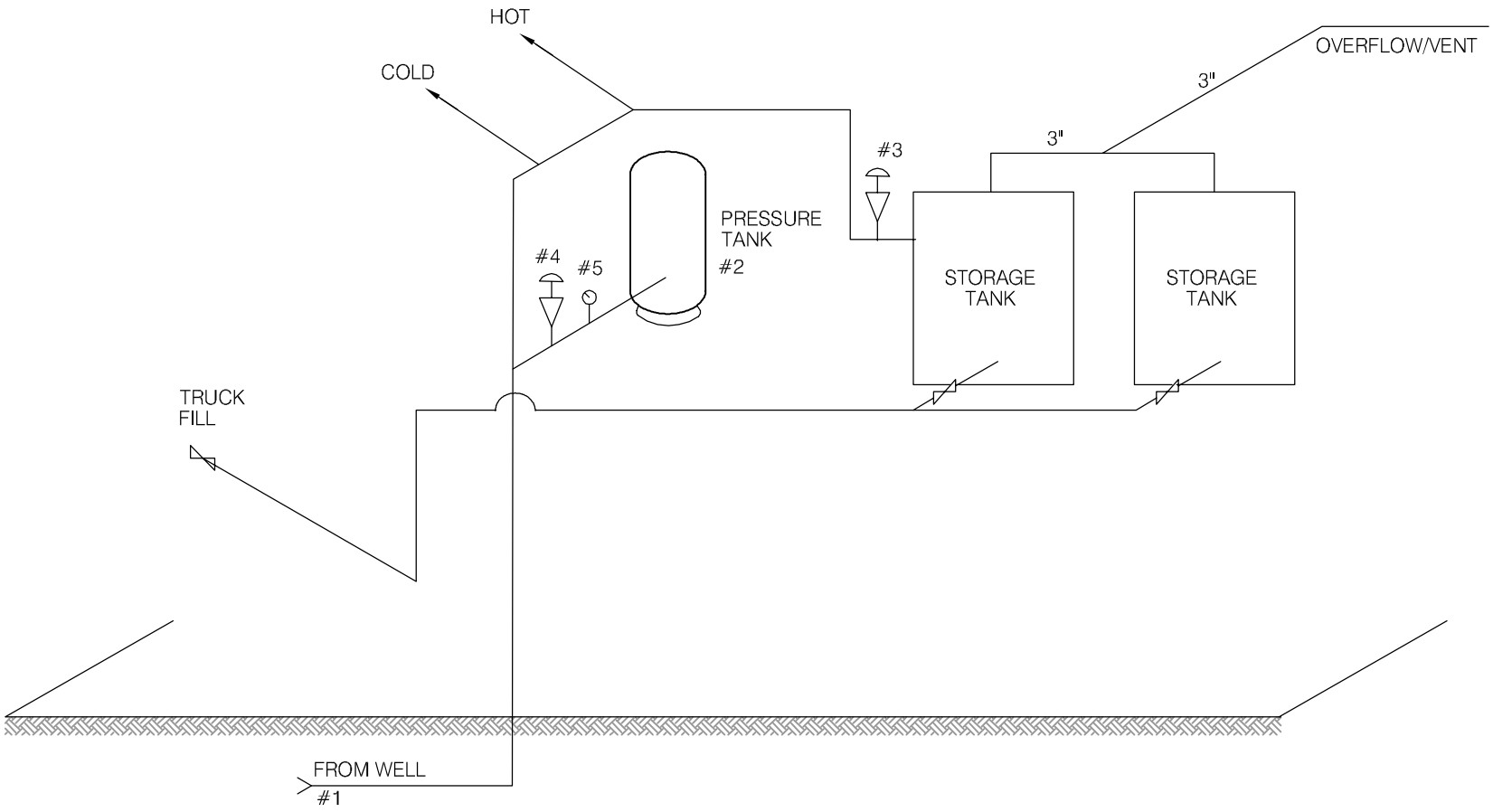


WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT WHITEHORSE 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.: 1955 MOUNTE LORNE FIRE HALL - WELL ID.: 1955	
DATE JULY 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.002		DWG.: FIGURE 1955B

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\mt lorne\1260002 Schematic 1955 Mt Lorne.dwg, 4/6/2006 9:15:09 AM, Adobe PDF, jbuyck

Whitehorse Region – Mount Lorne Firehall
Building # 1955

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	4" SUB. PUMP	?	?			4" – 2 HP.
2	PRESSURE TANK	CHALLENGER	PC266			
3	FLOAT CONTROL	MC CONNELL	# 21			3/4"
4	PRESSURE SWITCH	SQ. D.	FSG 2			1/4" FIPT
5	PRESSURE GAUGE	MARSH	0-100			1/4 MIPT
6						
7						
8						
9						
10						

TABLE 1955 - 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?
1955	Mount Lorne Firehall	6	Sept-04 to Mar-05	no	0/6	no	2-Feb-05	no

Table 1955-2: Water Quality Results

SOURCE:	Building 1955 - Mount Lorne Firehall		GCDWQ Criteria		
Location/ Resident	Mount Lorne				
Address					
Treatment	No				
Source of Water	On-Site Well				
Purpose of Sampling	Baseline	Additional Sampling			
Sample Location	Kitchen Tap	Kitchen Tap			
Date Sampled	4-Oct-04	19-May-05	**Lower Limit**	**Upper Limit**	
Physical Tests *(ALS)*			**AO**	**MAC**	**AO**
Colour (CU)	5				15
Conductivity (uS/cm)	301				
Total Dissolved Solids	220				500
Hardness CaCO3	206		AO >200 = poor, > 500 unacceptable[A]		
pH	8.0		6.5		8.5
Turbidity (NTU)	0.8			1	5
UV Absorbance		0.0073			
Dissolved Anions *(ALS)*					
Alkalinity-Total CaCO3	177				
Chloride Cl	<1				250
Fluoride F	0.17			1.5	
Sulphate SO4	32				500
Nitrate Nitrogen N	0.1			10	
Nitrite Nitrogen N	0.11			1	
Ammonia Nitrogen N					
Total Metals *(ALS)*					
Aluminum T-Al	<0.02				
Antimony T-Sb	0.0008			0.006	
Arsenic T-As	<0.0004			0.025	
Barium T-Ba	0.0318			1	
Boron T-B	<0.02			5	
Cadmium T-Cd	<0.0002			0.005	
Calcium T-Ca	62.1				
Chromium T-Cr	<0.0008			0.05	
Copper T-Cu	0.016			1	
Iron T-Fe	0.131				0.3
Lead T-Pb	0.0012			0.01	
Magnesium T-Mg	9.6				
Manganese T-Mn	0.004				0.05
Mercury T-Hg	<0.0002			0.001	
Potassium T-K	1.3				
Selenium T-Se	<0.0004			0.01	
Sodium T-Na	4				200
Uranium T-U	0.0028			0.02	
Zinc T-Zn	0.019				5
Field Chemistry (EBA)					
pH		7.70	6.5		8.5
TDS		181			500
EC (uS/cm)		358			
Temperature		15.9			
Free Available Chlorine					250

Notes:

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

Shading indicates exceedence of Proposed MAC guideline (arsenic).

Bold Underline with Yellow shading indicates exceedence of CDWQG MAC

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

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

Table 1955-3: Summary of Well Assessment Results
SMALL PUBLIC DRINKING WATER SYSTEMS

Well Identification and Location					
Building #	**Building Name**	**Location**	**Northing (+/- 10 m)**	**Easting (+/- 10 m)**	**Grade Elevation (+/- 10 m)**
1955	**Mount Lorne Firehall**	**Robinson Subdivision**	6704424	507749	784

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)**
Unknown	?	No	?	?	?	?	?

Well Construction Details				
Wellhead Above ground (m)	**Well Cap**	**Well Screen**	**Surface Seal**	**Apron Grading**
Greater than 0.85m below ground	?	?	Unlikely	Slopes towards pit

Table 1955-4: Potential Contaminant Sources
Building 1955 – Mount Lorne Fire Hall

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	***Organic*** and inorganic chemicals.	180 m		
Cemetery	***Biological***[1]***,*** inorganic[2] and organic parameters.	>120 m		
Sewage lagoon	***Biological,*** inorganic and organic parameters.	>300 m		
Sewage lines, tanks and lift stations	***Biological,*** inorganic and organic parameters.	**Approx. 26 m**		
Septic fields	***Biological and Inorganic*** parameters.	30 m	6704391	507729
Gas stations	***Organic and Inorganic*** parameters.	>>30 m		
Undergrounds Fuel Storage Tanks (USTs)	***Organic*** parameters.	>>30 m		
Above ground storage tanks (ASTs)	***Organic*** *parameters.*	N/A		
Naturally occurring sources of contamination	***Radionuclides, Bacteria and Viruses from surfacewater sources.***	>150 m		

Notes: ***Bold highlighting of distances indicates non-compliance with proposed guidelines***

1- Biological parameters include: bacteria, viruses, protozoa (parasitic organisms), helminthes (intestinal worms), and bio aerosols (inhalable moulds and fungi).

2 – Inorganic contaminants could include arsenic in embalming chemicals (prior to early 1900's), and heavy metals in caskets.

Required Setback Distances Draft Guidelines for Part III – Small Public Drinking Water Systems:

300 m (1,000 ft) from a sewage lagoon or pit and manure heaps
120 m (400 ft) from a solid waste dump or a cemetery
30 m (100 ft) from any other potential source of contamination

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin
Luke Lebel

Date May 19, 2005

WELL ID #	Owner	Location Description
1955	YYG	Mount Lorne Firehall

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: 507749 Easting 6704424 Northing 784m elevation ± 13m

d Is there electric power? ☐ Yes ☐ No

e. Does the well system have:

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

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

f. Nearest building, specify Mount Lorne Firehall

g. Distance from well to building 4.5m

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

i. Distance from well to nearest point of known field: ~30m

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

123
180
240
283

k. 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
Septic Tank ~ 30m away. Field begins ~2m after that

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

m. Is the well located within 120 m from a solid waste site or dump, cemetery? ☐ Yes ☐ No
Solid waste dump 180m away

n. 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 Entrance by animals? ☐ Yes ☒ No
untastened lid. No lock No evidence of animals, Access possible

o. Is well site subject to flooding? ☒ Yes ☐ No Well head is inaccessable due to sediment
Extremely serious flooding, carried down by flooding

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

q. 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 _____

r. 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: Dump ; Distance from well to Potential Source 1: 2180m refuse @ 123m

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

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

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

s. 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 _____ 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

e. Surface casing: ☐ Yes Diameter _____ ☒ No

f. Well casing: Diameter _____ Material: ☐ steel ☐ plastic ☐ concrete
Unknown due to sediment and flood damage

✱g. Depth of well: _____ ☐ 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) _____
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
Inside wood & (part exterior) and insulated prt.

☒ 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 > 85cm below grade, Inaccessable due to flood damage/sediment

ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? ☒ Yes ☐ No
very very serrous flood damage, sediment carried down by flooding lenough to burry all piping and well head, insulation plywood interior walls (non-part). Evidence of water damage to

iii. Is the wellhead enclosed by fiberglass insulations? ☒ Yes ☐ No
However, evidence that it is quite wet

iv. Any evidence of rodents? Specify Unknown No evidence. May have been covered by flood damage

v. Does the well casing have a proper seal cap? ☐ Yes ☐ No
unknown due to flood damage

If no, describe condition _____

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…) _____

---

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

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
unknown due to flood damage

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
unknown

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

k. Is the pump and piping protected from freezing? ☐ Yes ☐ No
unknown due to flood damage

If yes, describe: _____

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

_____

_____

_____

_____

_____

_____

_____

b.Recommendations: _____

_____

_____

_____

_____

_____

_____

PART B: EBA Site Inspection

Inspector: _____ Date May 31/05

WELL ID #	Owner	Location Description
1955	VTG.	Mount Lorne Firehall

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:

Where is it located?
Comments: UPSTAIRS IN FIRE HALL

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?
2 x AG 1250 1250 GALLON EACH.

What material is the tank constructed of? FIBREGLASS.

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 ABOVE TANK LID

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:

REASONABLY GOOD INSTALLATION.
TANK OVERFLOW IS ABOVE TANKS - TANKS WILL OVERFLOW INTO BUILDING.

b. Recommendations:

INSTALL IN LINE COMMERCIAL FILTER ON LINE FROM WELL PUMP. INSTALL CHLORINATOR BETWEEN FILTER & PRESSURE TANK.
LOWER OVERFLOW LINE TO TOP OF TANK LEVEL, AND EXTEND OVERFLOW LINE TO GROUND LEVEL. SCREEN OVERFLOW PIPE

MIDNIGHT SUN DRILLING CO. LTD.
PH. 667-6144
WHITEHORSE, Y.T.
P.O. Box 4391

FIELD REPORT

W-1959

Started. Nov. 14 ...19.94
Completed. Nov. 15 ...19.94

drilled ✓

NAME AND ADDRESS OF CLIENT	DESCRIPTION OF WORK	LOCATION OF WORK
Lay/Wire Industrial Tony Kern	W/W	Fire Hall Robinson Subdiv.

FORMATION LOG

FROM	TO	FORMATION
2	7	silt
7	10	Gr. Sand.
10	22	fine sand
22	46	fine sand some Gr.
46	71	Gr. sand
71	97	Gr. silt sand.
97	114	Gr. sand some silt

DESCRIPTION OF WORK	DATE	TIME FROM	TIME TO	HOURS
MOVE				
Loading	Nov. 14	8:00	9:00	1
move on set up	"	9:00	11:30	2.5
	"	11:30	5:00	5.5
crew travel	"	5:00	6:00	1
crew travel	Nov. 15	8:00	9:00	1
set screen	"	9:00	10:30	1.5
Develop	"	10:30	1:00	2.5
move eSS to shop	"	1:00	2:30	1.5

Record of Casing & Pipe

Size	Type	Size	Type
Feet	Inch	Feet	Inch
2			

Remarks: 30-GPM.
1- drive shoe
20 slot screen
2' riser K Packer
5 3/8" bit P.in

STATIC LEVEL		Total Rig Time	hrs.
Ground level	60'	Total Standby	hrs.
Top of casing		Drilling Mud	sacks

SIGNATURES

MIDNIGHT SUN.....
TITLE.....

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

Photo 0192: 1955 Well Head Enclosure

Photo 0191: 1955 Well Head

Photo 0193: 1955 180 Meters to Landfill Site

Photo 0194: 1955 Septic Field

Photo 0018: 1955 Hot Water Tank (left) and Pressure Tank (right)

Photo 0021: 1955 Water Storage Tanks

Photo 0020: 1955 Fill Control

Photo 0022: 1955 Storage Tank Piping