

## **23.0 BUILDING 4962: LIARD FIRE HALL**

### **23.1 Description of Existing Water system**

Building 4962, the Liard Fire Hall, is supplied water from a well located inside the fire hall washroom. The well location and other site details are provided in Figure 4962-A, provided in Appendix A23. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 9
- Northing: 6656947
- Easting: 504733

There is no treatment system present on this water system. The water services both the domestic water supply for the fire hall as well as a 4300 L steel water storage tank for fire fighting use. A schematic detailing the water system is provided as Figure 4962-B in Appendix A23.

### **23.2 Description of Existing Wastewater Systems**

The septic tank for the Liard Fire Hall is located west of the fire hall, approximately 8 m from the wellhead. A site plan that shows the position of the septic system relative to the well is given by Figure 4962-A in Appendix A23. During the site inspection it appeared that the septic system was not constructed in accordance with regulation. It is likely that the tank discharges effluent to a field located east of the tank and less than 30 m from the well; however, this should be confirmed.

### **23.3 Water Quality Results**

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

##### *Bacteriological*

Six samples collected from the Liard Fire Hall water system between September 2004 and March 2005 were tested for total coliform and *E. coli* by Yukon Environmental Health Services using the presence/absence test method. According to the YTG database, *E. coli* and Total Coliform bacteria and *E. coli* were reported as absent in each of the six samples for which results were provided.

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### *Potability*

A water sample was collected by YTG representatives from the Liard Fire Hall water system on September 13, 2004. The sample was submitted to Northwest Labs for detailed potability analyses. Additional analytic results were also provided by YTG for a sample collected on June 22, 2005. The results of these analyses are summarized in Table 4962-2 and included in Appendix A23. EBA reviewed the analytical results to compare them with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality, to identify and recommend additional sampling and analytical, and to identify potential indicators of contamination.

- Turbidity results of 3.0 and 16.4 NTU, were in exceedence of the CDWQG MAC of 1.0 NTU;
- The total iron was reported at 1.4 mg/L on June 22, 2005 which is above the CDWQG aesthetic objective of 0.30 mg/L;
- At 0.118 and 0.0537 mg/L, the manganese concentration was reportedly in exceedence of 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 of approximately 220 mg/L is considered poor for aesthetic purposes.

#### 23.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Liard Fire Hall 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;
- As turbidity was previously in exceedence of CDWQG MAC, a sample was taken to retest for this parameter,
- As total manganese had previously exceeded CDWQG aesthetic objectives, samples were taken to analyze for total and dissolved manganese;
- Total organic carbon concentration to assist with treatment system selection; and,
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

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### *Additional Analytical Results*

A water sample was obtained by EBA during the field program on June 22, 2005, and was submitted for analysis to ALS Environmental in Vancouver, BC. These results are summarized in Table 4862-2 and the laboratory reports are included in Appendix B.

- The turbidity was 49.9 NTU, above the CDWQG MAC of 1.0 NTU, and significantly higher than the previously reported turbidity of 3.0 NTU;
- The total manganese concentration had reportedly decreased to 0.0589 mg/L from the 0.118 mg/L reported during previous sampling, but is above CDWQG aesthetic objectives of 0.05 mg/L. Additionally, the dissolved manganese content was reportedly 0.0573 mg/L, signifying that the manganese content can be almost entirely attributed to dissolved particles.

#### 23.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surface water sources or septic waste. Variations in turbidity can also indicate seasonal fluctuations in water quality caused by infiltration pathways of surface water. Nitrate, nitrite, and chloride concentrations for this site are low and were within the normal background range for the Watson Lake area. The severe increase in turbidity between September and June, however, does indicate that the aquifer from which the Liard Fire Hall receives its water supply may be subject to seasonal fluctuations in water quality and as such may be under the direct influence of surface water.

## **23.4 Conceptual Hydrogeology**

There is no log available for this well. Examination of other well logs in the Upper Liard area indicate alternating sand and gravel sediments with occasional silt and peat. Most wells in the area are completed at depths of 10 m to 16.5 m within a sand and gravel aquifer, with no significant fine grained material or confining layer. The depth and static water level of this well are unknown. The well is located approximately 500 m west of the Liard River and 200 m south of Albert Creek. The direction of groundwater flow is likely east to north towards the Liard River and Albert Creek.

### **23.5 Potential Contaminant Sources**

Potential contaminant sources observed during the site investigation are provided in field notes in Appendix A23. Photos of potential contaminant sources are also provided at the end of the appendix.

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

- Septic tank 8 m from well (required to be 15 m by regulation);
- Septic field (if present) is less than 30 m from well; and,
- Well is located in fire hall washroom.

#### **23.5.1 Spills Records and Contaminated Sites Search Results**

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any contaminant issues for this property or neighbouring properties. One spill record was identified for the Upper Liard area. On May 9, 1996, it was reported that a fuel tank near the Upper Liard Wash House tipped over, spilling approximately 113 L of fuel oil. The spill occurred a significant distance from the fire hall and there is no risk associated with this water system.

### **23.6 Identified Water System Deficiencies and Associated Risk**

#### **23.6.1 High and Medium Risk Deficiencies**

Site investigations and system inspections of the Liard Fire Hall water system found the following high and medium risk deficiencies:

- The well is located within 30 m of potential contaminant sources, including the fire hall septic system;
- The fire hall septic system did not appear to be constructed in compliance with existing regulations;
- Turbidity levels are consistently above the CDWQG MAC and are variable, which may indicate that the well is under direct influence surface water;
- The water system is not equipped with a disinfection or treatment system;

- 
- Poor surface completion of the well (the well is located in the fire hall washroom and the casing does not extend above grade);
  - 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 there is no information on the completion depth and because it does not meet the requirements of the Guidelines for Water Well Construction; and,
  - There is no backflow preventer on the waterline to the water storage tank, and water could potentially flow back to the domestic system and well.

#### 23.6.2 Low Risk Deficiencies

- The manganese concentration exceeded the CDWQG aesthetic objective of 0.05 mg/L.

### 23.7 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).

#### 23.7.1 Priority 1

Evidence from the water quality samples for this well show that it may be under the direct influence of surface water, and considering all of the known deficiencies with the current well, it is recommended that a new well should be drilled and the current well be decommissioned. The following recommendations should be carried out as a temporary, interim measure until the new well can be drilled:

- The well and water system should be superchlorinated and the casing should be raised to a minimum of 500 mm above grade;
- A softener system, cartridge filtration and an NSF/ANSI 55 certified UV disinfection system should be installed. This is a conceptual design recommendation based on the information available, and is intended to be used for planning and budgeting purposes. Engineering input will be required for final system specifications or design.

- An investigation should be done in order to determine if the existing septic system is properly installed and up to current standards; and,
- A backflow preventer should be installed on the waterline to the fire storage tank in order to prevent water from siphoning back down from the tank into the domestic system or the well.

### 23.7.2 Priority 2

It is recommended that a new well be constructed in consideration of the following:

- The well should be equipped with a surface seal to at least 6 m and the casing should be extended above grade (500 mm) within a lockable enclosure that is inaccessible to animals and unauthorized personnel;
- The well must be located at a distance greater than 30 m and upgradient from any potential source of contamination, including the above ground storage tank and all parts of the septic system;
- 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. The treatment/disinfection system installed for Priority 1 mitigative options can be used for this new water system; and,
- Pending results from the assessment on the septic system, if it is malfunctioning or not up to standards then a new septic system should be installed that is at least 30 m downgradient from the new well.

### 23.7.3 Priority 3

- If the new well continues to have high manganese, then a reverse osmosis system should be considered to provide water to a dedicated drinking water tap.

## 23.8 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.

### 23.8.1 Priority 1

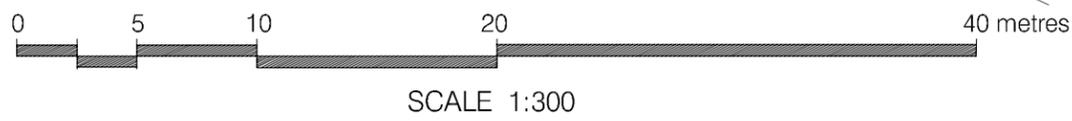
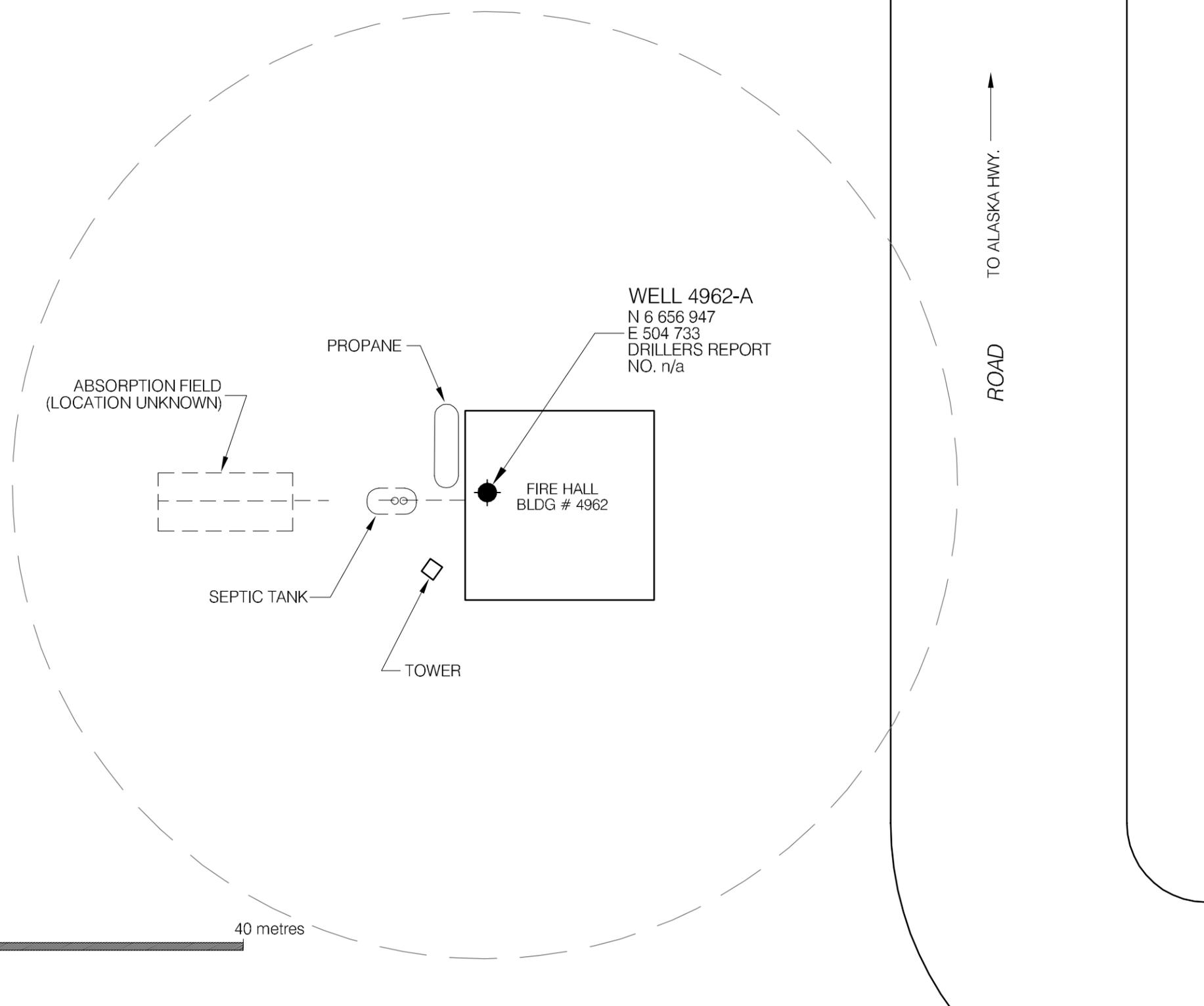
- To superchlorinate the well and water system and extend the casing would cost approximately **\$500**;
- The proposed treatment/disinfection system would cost in the order of **\$7,000**;
- Additional assessment on the existing septic system should incur minimal cost; and,
- To install a backflow preventer would cost approximately **\$400** for materials and labour.

### 23.8.2 Priority 2

- Assuming the well would be drilled in overburden to a depth of approximately 30 m, it is recommended that **\$30,000** be budgeted for materials and labour to drill, test, complete and hook-up the well.
- If the new well is successful, the old well should be properly decommissioned in accordance with the Guidelines for Water Well Construction. It is estimated that this would cost approximately **\$1,000**.

### 23.8.3 Priority 3

- **\$600** should be allocated to install a reverse osmosis system.



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

LIARD FIRE HALL  
 BUILDING # 4962  
 SITE LOCATION DIAGRAM  
 WELL ID: 4962-A

REVISION	ISSUE
	0
FIGURE No.	4962-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)

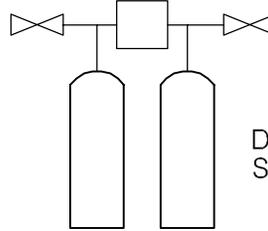


PRESSURE TANK

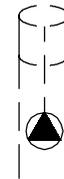


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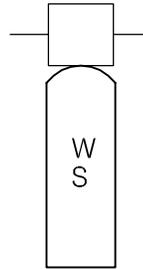
CHLORINE RESERVOIR AND  
INJECTION PUMP



DUPLEX WATER  
SOFTENER



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



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PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT  
EASTERN REGION

CLIENT



TITLE

**SCHEMATIC SYSTEM  
LEGEND**

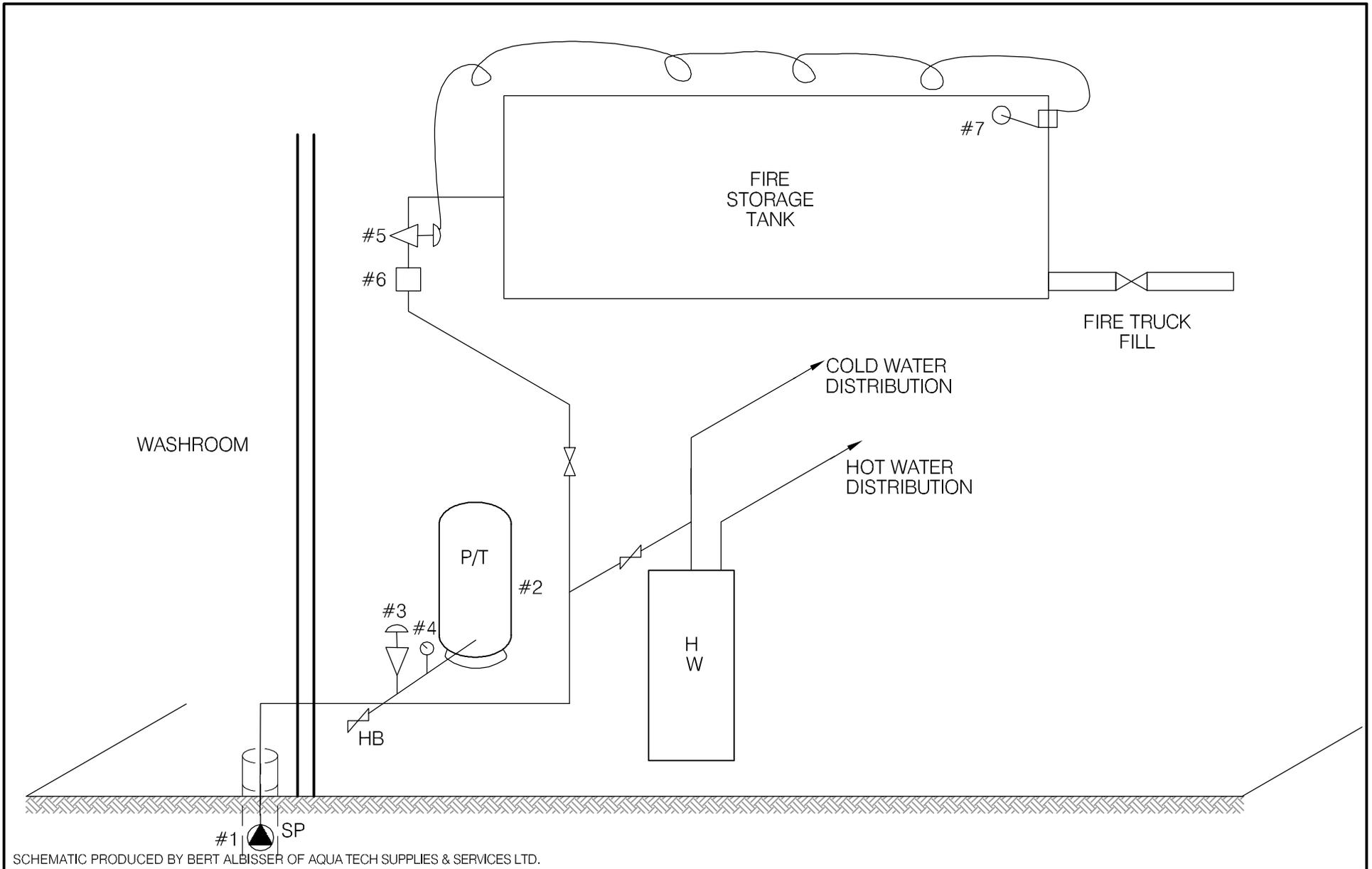
DATE APRIL 2006

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.: 4962 LIARD FIRE HALL	
DATE	JULY 2005	DWN.	JSB
CHKD.	FMM	FILE NO.	1260002.002
		DWG.:	FIGURE 4962-B

Eastern Region – Liard Firehall  
Building # 4962

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB. PUMP	GOULDS	13EM05412		T047455	4" 1/2 HP.
2	PRESSURE TANK	A.O. SMITH	V200		CK8615	
3	PRESSURE SWITCH.	SQ. D	FSG-2			2HP - 1/4" FIPT
4	PRESSURE GAUGE	MARSH	0-100			2" 1/4" FIPT.
5	SOLENOID VALVE	ASCO	1"			
6	IN LINE Y STRAINER	SARCO	1"			
7	TANK FLOAT CONTROL	HC CONNELL	1"			
8						
9						
10						

**TABLE 4962- 1: SUMMARY OF BACTERIOLOGICAL RESULTS**

		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?
Building #	Building Name							
4962	Liard Fire Hall	6	Sept-04 to Mar-05	no	0/6	no	9-Mar-05	no



**Table 4962-2: Water Quality Results**

SOURCE: Building 4962 - Liard Fire Hall					GCDWQ Criteria				
Location/ Resident	Upper Liard								
Address									
Treatment	No								
Disinfection	No								
Source of Water	On-Site Well								
Purpose of Sampling	Baseline	Baseline	Additional Sampling						
Sample Location			Bathroom Sink						
Date Sampled	13-Sep-04	22-Jun-05	22-Jun-05	Lower	Upper Limit				
Physical Tests (ALS)				AO	MAC	AO			
Colour (CU)	8	<5				15			
Total Dissolved Solids	224	230				500			
Hardness CaCO3	<b>222</b>	<b>219</b>		AO >200 = poor, > 500 unacceptable <sup>A</sup>					
pH	7.93	8.03		6.5		8.5			
Turbidity (NTU)	<b>3.0</b>	<b>16.4</b>	<b>49.9</b>		1	5			
UV Absorbance			0.017						
Dissolved Anions (ALS)									
Alkalinity-Total CaCO3	230	237							
Chloride Cl	1.6	1.24				250			
Fluoride F	0.07	0.071			1.5				
Sulphate SO4	4.3	3.06				500			
Nitrate Nitrogen N	<0.1	<0.10			10				
Nitrite Nitrogen N	<0.05	<0.10			1				
Total Metals (ALS)									
Aluminum T-Al	<0.005	<0.010							
Antimony T-Sb	<0.0002	<0.0005			0.006				
Arsenic T-As	0.0004	0.00025			0.025				
Barium T-Ba	0.282	0.243			1				
Boron T-B	0.003	<0.10			5				
Cadmium T-Cd	<0.00001	<0.0002			0.005				
Calcium T-Ca		61.6							
Chromium T-Cr	0.0007	<0.0020			0.05				
Copper T-Cu	0.001	0.013			1				
Iron T-Fe	0.16	<b>1.4</b>				0.3			
Lead T-Pb	0.0002	0.0014			0.01				
Magnesium T-Mg		15.9							
Manganese T-Mn	<b>0.118</b>	<b>0.0537</b>	<b>0.0589</b>			0.05			
Mercury T-Hg		<0.0002							
Potassium T-K		0.93							
Selenium T-Se		<0.0010							
Sodium T-Na	2.2	2.3				200			
Uranium T-U	0.0009	0.00118			0.02				
Vanadium T-V									
Zinc T-Zn	0.008	<0.050				5			
Dissolved Metals (ALS)									
Manganese D-Mn			<b>0.0573</b>			0.05			
Organic Parameters									
Tannin and Lignin			0.36						
Total Organic Carbon C			1.22						
Field Chemistry (EBA)									
pH			7.84	6.5		8.5			
TDS (ppm)			207			500			
EC (uS/cm)			416						
Temperature (°C)			4.90						

**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 4962-3: 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)
4962	Liard Fire Hall	Upper Liard	6656947	504733	627

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-btwe)
150		No					

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
8	Located inside fire hall washroom	Greater than 60 m	No	N/A	

Well Construction Details					
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading	Comments
Wellhead is at grade	Split seal gasket cap		Unlikely	No	

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## SMALL PUBLIC WATER SYSTEM ASSESSMENT

### PART A: EBA Site Inspection

Inspector: Ryan Mardin  
Luke Lebel

Date June 22, 2005

WELL ID #	Owner	Location Description
4962	YTG	Liard Fire Hall

### 1. Well Location and Potential Contaminant Sources

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

Upper Liard

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

Upper Liard Subdivision

c. GPS location: N 6656947 E 504733 elev 627m ±16m

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 \_\_\_\_\_

Liard Fire Hall

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

g. Nearest building, specify Located in bathroom of Liard Fire Hall

h. Distance from well to building \_\_\_\_\_

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

j. Distance from well to nearest point of known field: ~ 7.5m

N 6656953  
E 504721

k. Well location relative to field:  upslope  downslope  lateral

likely upgradient

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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

*Unknown if it is a holding tank only - may or may not be an effluent field*

*There are no signs of cleanout or obvious digging*

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

*Located inside building, but building was unlocked and unalarmed at the time of inspection*

Entrance by animals?  Yes  No

*Access possible. There are mouse traps in surrounding rooms.*

p. Is well site subject to flooding?  Yes  No

*If washroom sink or toilet overflowed, then the well could be flooded. The wellhead is exactly at the level of the washroom floor*

q. Is the well site well drained?  Yes  No

*There are no other drains in the washroom*

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: Adjacent Septic; Distance from well to Potential Source 1: >30m

*(Home is ~50m from well)*

Potential Source 2: \_\_\_\_\_; Distance from well to Potential Source 2: \_\_\_\_\_

Potential Source 3: \_\_\_\_\_; Distance from well to Potential Source 3: \_\_\_\_\_

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

t. Are there other wells on this property?  Yes  No unlikely *→ There may be wells in surrounding properties (unknown)*

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

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## 2. Well and Wellhead information:

- a. When was well installed? Year unknown 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 15 cm Material:  steel  plastic  concrete
- g. Depth of well: unknown  measured (if possible)  reported  from log
- h. Static water level below ground: unknown  
 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  
located in washroom of five hall - The top of the well casing is exactly at the level of the concrete floor  
 in a wooden enclosure other, describe \_\_\_\_\_
- n. If the well head is located in a wooden enclosure,

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- i. Is the well head below grade? describe in detail At 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 but inside insulated building
- iv. Any evidence of rodents? Specify Mousetraps in surrounding rooms
- 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...) \_\_\_\_\_

### 4. Aquifer Supplying This Well:

- a. The aquifer is:  bedrock  granular sediment  unknown  
*likely*
- 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 \_\_\_\_\_

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d. Date installed: \_\_\_\_\_ By: \_\_\_\_\_

e. For submersible pump, depth of setting below surface \_\_\_\_\_

f. Drop pipe for submersible pump:  steel  plastic

g. Pump delivers water to:  pressure tank  elevated tank  other  
*domestic fire truck Rm*

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: located inside heated building

l. Comments on pump installation: \_\_\_\_\_

## **6. Conclusions**

a. Comments on overall installation:

The wellhead is located in the fire hall washroom and is directly  
against the washroom floor - in one corner.

b. Recommendations: \_\_\_\_\_

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## PART B: EBA Site Inspection

Inspector: BERT ALBISSER

Date JUNE 22 2005

WELL ID #	Owner	Location Description
<u>4962</u>	<u>YTG.</u>	<u>LIARD FIRE HALL</u>

### 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 \_\_\_\_\_

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- 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. ; FIRE STORAGE

Where is it located?

Comments: ON PLATFORM.

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: \_\_\_\_\_

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## **Overall Tank**

What are the tank size and dimensions?

4' ~~Ø~~ x 12' LONG

What material is the tank constructed of?

STEEL

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:

NOT USED FOR DRINKING WATER.

## **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

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## **8. Conclusions**

a. Comments on overall installation:

THE WELL IS LOCATED IN THE WASH ROOM WITH CASING CUT AT FLOOR LEVEL. TOILET OVERFLOW WOULD FLOW INTO THE WELL.  
FIRE STORAGE TANK HAS NO BACKFLOW DEVICE.

b. Recommendations:

RAISE CASING AT LEAST 18" ABOVE FLOOR LEVEL, REPIPE AS NECESSARY. INSTALL FLOOR DRAIN TO ASSURE DRAINAGE IN CASE OF TOILET OVERFLOW. INSTALL SUITABLE WATER TREATMENT AND UV SYSTEM. INSTITUTE BI-ANNUAL TOTAL SYSTEM SHOCK CHLORINATION AND REGULAR MAINTENANCE PROGRAM FOR WATER TREATMENT.  
INSTALL 1" DCA IN TANK FILL.



## Spill Report Information

<b>Spill #</b>	9620
<b>Jurisdiction</b>	Yukon
<b>Community</b>	
<b>Address</b>	
<b>Highway</b>	
<b>Milepost</b>	
<b>Feature</b>	Upper Liard
<b>Location and Cause</b>	Upper Liard - wash house - fuel tank near building tipped over
<b>Latitude</b>	60.049166666667
<b>Longitude</b>	-128.905
<b>Incident Date</b>	5/9/1996
<b>Lead Agency</b>	
<b>Other Agency</b>	
<b>Company(s)</b>	
<b>Amount</b>	113
<b>Units</b>	Litres
<b>Quantity</b>	Estimate
<b>Release Description</b>	Spilled
<b>Additional Quantitit</b>	
<b>Concentration</b>	
<b>Concentration Unit</b>	
<b>Phase</b>	Liquid
<b>Major Contaminant</b>	Fuel Oil
<b>2nd Contaminant</b>	
<b>3rd Contaminant</b>	
<b>4th Contaminant</b>	
<b>Outcome</b>	fuel spilled on ground - no threat to surface water given small quantity - possible ground water contamination - clean-up difficult - Band Manager contacted - will do clean-up



**Photo 0299:** 4962 Liard Fire Hall



**Photo 0300:** 4962 Septic tank (front), propane tank and rear of fire hall (back)



**Photo 0301:** 4962 Wellhead (left) inside fire hall washroom



**Photo 0026:** 4962 Pressure tank