

27.0 BUILDING 6746: ROSS RIVER HALL

27.1 Description of Existing Water system

Building 6746, the Ross River Fire Hall, is served by a water system that delivers water from a 110 m deep well located in a locked pit approximately 1 m from the fire hall. The well location and other site details are provided in Figure 6746-A in Appendix A27. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6874869
- Easting: 633545

This water system is equipped with a chlorination system. The water services both the domestic water supply for the fire hall as well as an approximately 10,000 L water storage tank. In addition to serving the fire hall, this well also serves a water delivery fill station obtains water from the same water storage tank. This water delivery service is used as the main source of water for the community of Ross River, and is maintained by the Government of Yukon Community Services Department.

27.2 Description of Existing Wastewater Systems

There is septic holding tank approximately 17 m to the east of the well. A site diagram showing the location of the septic system is provided as Figure 6746-1 in Appendix A27. Additionally, there is a septic disposal field for the nearby TND Hotel that is located approximately 30 m south of the well, which reportedly, may not be constructed properly (Jacobsen, 2002).

27.3 Water Quality Results

27.3.1 Identification of Additional Analytical Testing Required

Bacteriological

Five samples were collected from the Ross River Fire Hall water system between September 2004 and March 2005 and were tested for total coliform and *E. coli* by

Yukon Environmental Health Services using the presence/absence test method. Results are tabulated in Table 6746-1 in Appendix A27. Coliform bacteria and *E. coli* were reported as absent in each of the seven samples for which results were provided.

Potability

A water sample was collected by a YTG representative from the Ross River Fire Hall water system on October 26, 2000. The sample was submitted to ASL Analytical Service Laboratories for detailed potability analyses. The results of these analyses are summarized in Table 6746-2 and are included in Appendix A27.

- The water quality analysis indicated that the groundwater source is calcium bicarbonate type water with very high hardness (277 mg/L as CaCO₃);
- At 0.0171 mg/L, the arsenic concentration, though it does not exceed the current MAC of 0.025 mg/L exceeds the proposed CDWQG MAC of 0.005 mg/L. The dissolved arsenic concentration was 0.0163 mg/L, and therefore the arsenic content can be attributed almost entirely to dissolved particles;
- At 0.078 mg/L, the manganese concentration exceeds the CDWQG aesthetic objective of 0.05 mg/L. The dissolved manganese concentration was 0.076 mg/L, and therefore the manganese content can be almost entirely attributed to dissolved particles;
- All other health based and aesthetic objectives were met for the parameters analyzed.
- The elevated hardness is considered to be generally poor for aesthetic purposes.

27.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Ross River Fire Hall that was identified for inclusion during the water system assessments is detailed below:

- Trihalomethane parameters (THM) were analyzed, as there is an existing chlorine disinfection system. These include (bromodichloromethane, bromoform, chloroform, dibromochloromethane). THMs and other disinfection by-products are formed when chlorine disinfectants react with naturally occurring organic matter in the source water. Some studies have linked THMs to increased risk of cancer.

- Haloacetic Acid (HAA) analysis has been included as well due to the presence of the chlorination system. Similar to THMs, HAA can be present in chlorinated drinking water as a disinfectant byproduct formed when the chlorine reacts with natural organic matter in raw water supplies.
- Samples were obtained for the full suite of both total and dissolved metals for comparison. The analysis included vanadium for use in future arsenic treatment system design;
- Samples were also obtained for silicate and phosphate in order to determine the effectiveness of an arsenic removal system;
- Measurements in the field for free available chlorine.

Additional Analytical Results

A water sample was collected by EBA during the field program on June 23, 2005, and was submitted for analysis to ALS Environmental in Vancouver, BC. The results are summarized in Table 6746-2 in Appendix A27 and the laboratory reports are included in Appendix B.

- At 0.0150 mg/L, the arsenic concentration, though it does not exceed the current MAC of 0.025 mg/L exceeds the proposed CDWQG MAC of 0.005 mg/L; and,
- At 0.0851 mg/L, the manganese concentration exceeds the CDWQG aesthetic objective of 0.05 mg/L.
- The residual chlorine concentration at the time of the assessment was 0.01 mg/L which is significantly less than the required FAC of 0.2 mg/L at the point of consumption.

27.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surface water sources or septic waste. No elevated concentrations of indicator parameters were observed in the sample results reviewed.

27.4 Conceptual Hydrogeology

The log for this well indicates that the well is completed at a depth of 110 m within a highly confined sand and gravel aquifer. Permafrost was encountered during drilling from 8.2 to 18.6 m below grade. The presence of silt and clay sediments from 0 to 101.5 m provides protection from surficial sources of contamination. The static water level is 7.7 m below grade. The well is located approximately 500m

southwest of the Pelly River. The direction of groundwater flow is likely northeast towards the Pelly River.

27.5 Potential Contaminant Sources

Potential contaminant sources observed during the site investigation can be found in field notes in Appendix A27, and are summarized below:

- Fire hall septic tank is approximately 14 m;
- TND Hotel septic system is approximately 28 m;
- Underground storage tank at fire hall is approximately 13 m;
- Former Service station on adjacent property (66 m to tank nest); and,
- Above ground fuel storage tank is approximately 30 m from well.

27.5.1 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 with the Ross River Fire Hall. There were several spill records for the region, however, it seems that none of the identified spills were within 300 m of the site.

27.6 Identified Water System Deficiencies and Associated Risk

27.6.1 High or Medium risk Deficiencies

Several high and medium risk deficiencies were identified for the Ross River Fire Hall water system including:

- Potential contaminant sources within 30 m of the well, including the fire hall septic tank and the septic system from the nearby TND Hotel;
- An underground fuel storage tank is located only 13 m from the well, and an above ground fuel storage tank 29 m from the well;
- Poor surface completion of the well (located in a pit below 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 it does not meet the requirements of the Guidelines for Water Well Construction;

-
- Low residual chlorine concentration at the point of consumption;
 - At the time of the inspection, a flow switch controlled the Grundfos digital dosing meter chlorine injection pump. Apparently, the switch had been “sticking”. We understand that Community Development had ordered a flow meter to install with the DME system to ensure proportional feed of chlorine to the system.
 - The arsenic concentration, although it is not in exceedence of the current MAC, is in exceedence of the proposed CDWQG MAC of 0.005 mg/L; and,
 - There is an abandoned service station approximately 66 m from the site that potentially has hydrocarbon impacted soil and groundwater.

27.6.2 Low Risk Deficiencies

The following deficiencies were identified as being low-risk for the Ross River Fire Hall:

- Manganese concentrations are in exceedence of the CDWQG aesthetic objective of 0.05 mg/L;

27.7 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).

27.7.1 Priority 1

- Initiate a residual chlorine-monitoring program and adjust chlorination system as required to maintain residual chlorine concentration above 0.2 mg/L at the point of consumption within the fire hall. If not already completed, the existing flow switch should be replaced with a pulse water meter to effect proportional chlorine feed;
- At least once every 6 months, all internal areas of the water tank shall be cleaned and disinfected;
- It is recommended that Environmental Health Services proceed with action to have the existing non-conforming in-ground sewage systems at the TND Hotel (former Welcome Inn) removed from service. This may result in the installation of sewage holding tanks that conform to the required setback distances; and,
- The underground fuel storage tank should be removed and replaced with an above ground double-walled EnviroTank fuel storage tank with secondary

containment. Due to size constraints of the property and the location of the well with respect to the building it is unlikely that the fuel tank could be placed at a distance greater than 30 m from the well, but it should be placed on the side of the fire hall opposite from the well at least 15 m from the well.

27.7.2 Priority 2

- The wellhead completion should be improved. This would involve raising the well casing to a minimum of 500 mm above ground level in a lockable enclosure, and retrofitting a proper surface-seal to at least 3 m below grade;
- The ground surface around the wellhead should be graded to promote surface drainage away from the well;
- The fire hall's septic holding tank should be removed and relocated to a distance greater than 30 m from the well. Since this well is the source for a community system, the new septic system can only be a holding tank and cannot discharge effluent as long as it is within 60 m of the well; and,
- A point of entry (POE) treatment system for arsenic removal should be installed. It is recommended that a suitable POE system be designed through pilot testing. It is suggested that this site could be the initial pilot site to investigate the feasibility of such a system to be applied at other sites in the Yukon. Arsenic removal to below the proposed CDWQG guideline will ultimately be necessary to utilize this water source as a drinking water supply; and,
- It is recommended that the owner investigate the potential vulnerability of the community well from hydrocarbon contamination that may be present in soils at the nearby abandoned service station.

27.7.3 Priority 3

- Consideration should be given to installing a point of use RO system for manganese removal in the fire hall. This would also ensure a redundant arsenic removal in the event that the POE system failed.

27.8 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.

27.8.1 Priority 1

- The cost to initiate and conduct a residual chlorine-monitoring program would fall under normal operation and maintenance costs. We understand that Community Services is currently in the process of ordering and arranging for the installation of the flow meter to initiate proportional feed.
- It is anticipated that the cost to inspect, remove and replace the septic system(s) at the TND hotel would be covered by others.
- The cost to remove the existing underground storage tank, and to install a new 5000 L above ground EnviroTank would be in the order of **\$10,000** depending on the amount of hydrocarbon impacted soil (if any) requires removal and treatment.

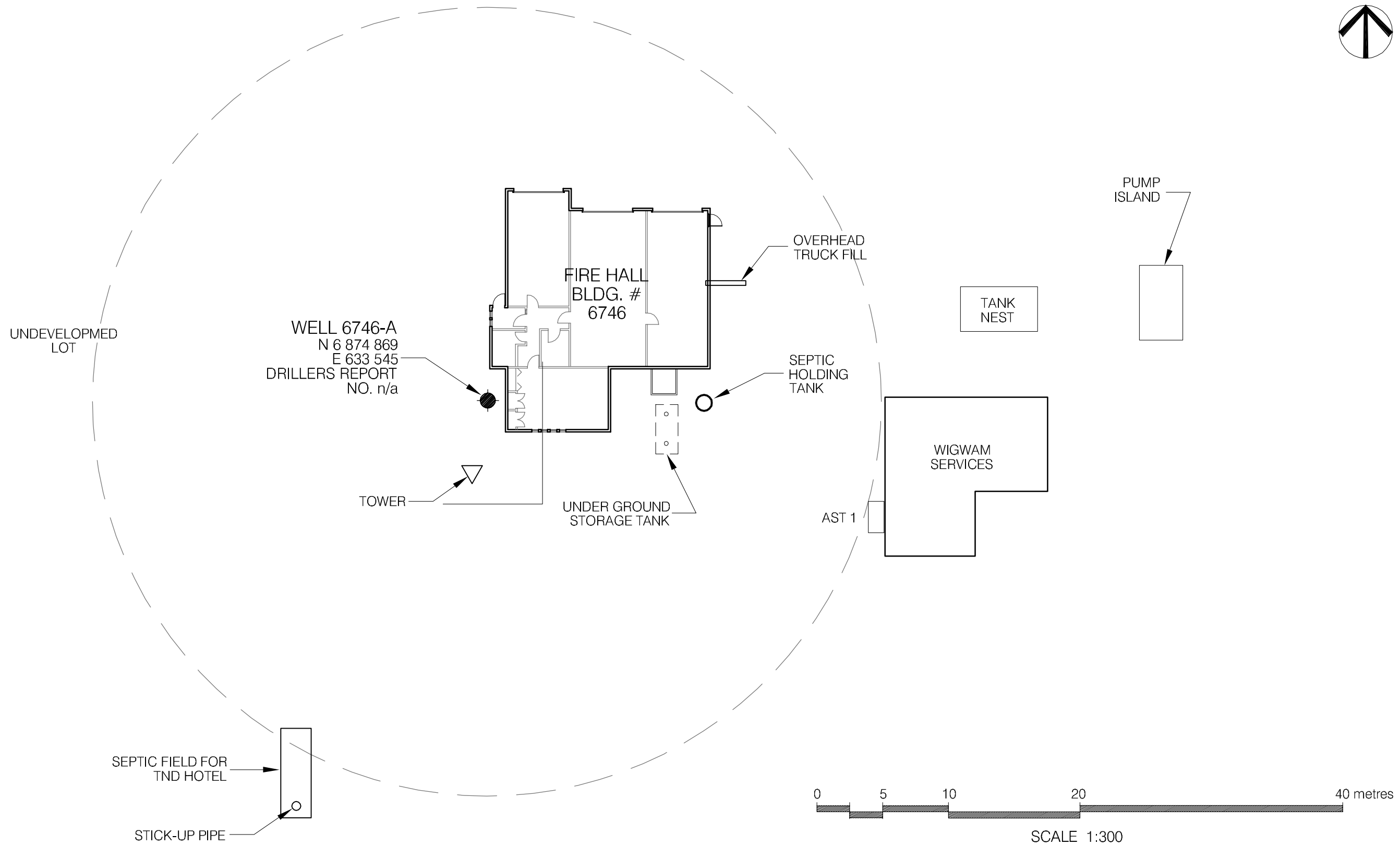
27.8.2 Priority 2

Class D cost estimates for Priority 2 upgrades for this site are as follows:


- The cost to upgrade the wellhead completion is estimated to be about **\$5,000**.
- Relocating the fire hall septic holding tank would cost in the order of **\$5,000**.
- A point of entry (POE) treatment system for arsenic removal is anticipated to cost in the order of **\$4,500** for materials and labour.
- An investigation to determine whether hydrocarbon contamination resulting from the former service station on the property adjacent to the site is impacting on the subsurface conditions on this site, would cost in the order of **\$10,000**. It is envisioned that this environmental assessment would involve drilling of two or three monitoring wells just inside the fire hall property line.

27.8.3 Priority 3

- Installing a point of use RO system would cost in the order of **\$600**.




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

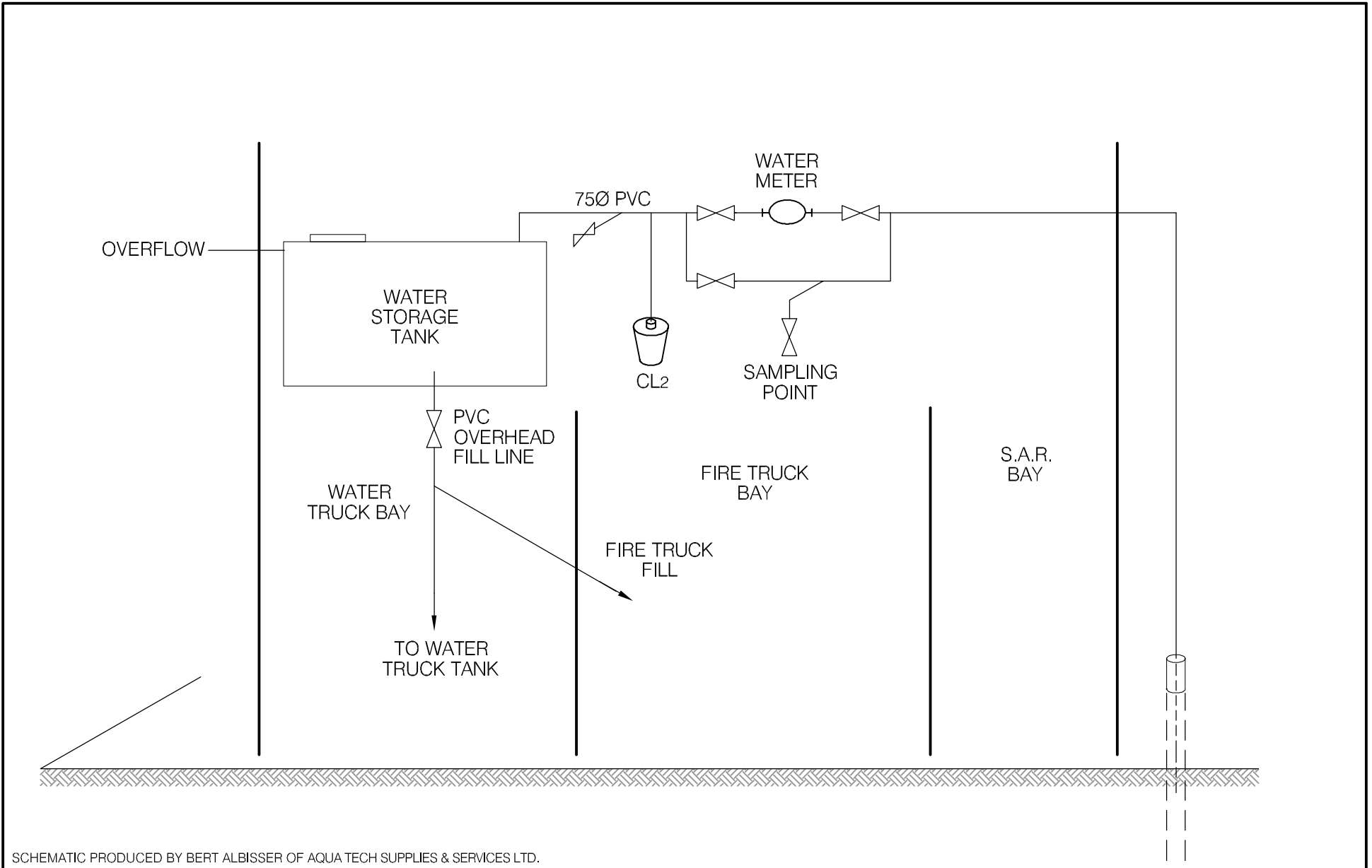
CLIENT:

 Highways and Public Works
 Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
 EASTERN REGION



GOVERNMENT OF YUKON
 HIGHWAYS & PUBLIC WORKS

ROSS RIVER FIRE HALL
 BUILDING # 6746
 SITE LOCATION DIAGRAM
 WELL ID: 6746-A

REVISION ISSUE
 0
 FIGURE No.
 6746-A



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

 EBA Engineering Consultants Ltd.	PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT EASTERN REGION			
CLIENT 	TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 6746 ROSS RIVER FIRE HALL			
DATE JULY 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.002	DWG.: FIGURE 6746-B

**Eastern Region – Ross River Firehall
Building # 6746**

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	JET PUMP	MONARCH	MJC-50		2004	1/2 HP.
2	PRESSURE TANK	JET RITE	JR15			4.5 GAL
3	PRESSURE SWITCH	SOD	FSG-2			2HP 1/4" FIPT
4	PRESSURE GAUGE	MARSH	0-100			2" - 1/4" FIPT
5						
6						
7						
8						
9						
10						

TABLE 6746- 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?
6746	Ross River Fire Hall	5	Sept-04 to Mar-05	no	0/5	no	3-Mar-05	no



Table 6746-2: Water Quality Results

SOURCE:		Building 6746 - Ross River Fire Hall		GCDWQ Criteria	
Location/ Resident		Ross River			
Address					
Treatment		Softner, Filtration			
Disinfection		Chlorination			
Source of Water		On-Site Well			
Purpose of Sampling		Baseline	Additional Sampling		
Sample Location		Washroom Tap			
Date Sampled		26-Oct-00 (ASL)	23-Jun-05	Lower Limit	Upper Limit
Physical Tests (ALS)				AO	MAC
Colour (CU)		<5			15
Conductivity (uS/cm)		596			
Total Dissolved Solids		395			500
Hardness CaCO3		277	305	AO >200 = poor, > 500 unacceptable ^A	
pH		8.09		6.5	8.5
Turbidity (NTU)		0.4			1
Dissolved Anions (ALS)					
Alkalinity-Total CaCO3		223			
Chloride Cl		1.2			250
Fluoride F		0.36		1.5	
Silicate SiO4			18.2		
Sulphate SO4		118			500
Nitrate Nitrogen N		<0.1		10	
Nitric Nitrogen N		<0.1		1	
Total Phosphate PO4			0.0499		
Total Metals (ALS)					
Aluminum T-Al		<0.005	<0.010		
Antimony T-Sb			<0.00050		0.006
Arsenic T-As		0.0171	0.015		0.025
Barium T-Ba		0.040	0.041		1
Boron T-B		<0.05	<0.10		5
Cadmium T-Cd		<0.0002	<0.00020		0.005
Calcium T-Ca		58.8	62.3		
Chromium T-Cr		<0.002	<0.0020		0.05
Copper T-Cu		0.001	0.0372		1
Iron T-Fe		0.05	0.082		0.3
Lead T-Pb		<0.001	<0.0010		0.01
Magnesium T-Mg		33.3	36.7		
Manganese T-Mn		0.078	0.0851		0.05
Mercury T-Hg		<0.00005	<0.00020		0.001
Potassium T-K		3.34	3.71		
Selenium T-Se		<0.001	<0.0010		0.01
Sodium T-Na		17.0	17.2		200
Uranium T-U		0.00393	0.00384		0.02
Vanadium T-V			<0.030		
Zinc T-Zn		<0.005	<0.050		5
Dissolved Metals (ALS)					
Aluminum D-Al		<0.005	<0.010		0.1
Antimony D-Sb			<0.00050		0.006
Arsenic D-As		0.0163	0.0134		0.025
Barium D-Ba		0.039	0.041		1.0
Boron D-B		<0.05	<0.10		5
Cadmium D-Cd		<0.0002	<0.00020		0.005
Calcium D-Ca		57.7	61.9		
Chromium D-Cr		<0.002	<0.0020		0.05
Copper D-Cu		0.003	0.0286		1.0
Iron D-Fe		0.05	<0.030		0.3
Lead D-Pb		<0.001	<0.0010		0.01
Magnesium D-Mg		32.3	36.6		
Manganese D-Mn		0.076	0.0763		0.05
Mercury D-Hg		<0.00005	<0.00020		0.001
Potassium D-K		3.30	3.86		
Selenium D-Se		<0.001	<0.0010		0.01
Sodium D-Na		17.3	17.4		200
Uranium D-U		0.00391	0.00378		0.02
Vanadium D-V			<0.030		
Zinc D-Zn		<0.005	<0.050		5.0
Trihalomethanes					
Bromodichloromethane		<0.0010			
Bromoform		<0.0010			
Chloroform		<0.0010			
Dibromochloromethane		<0.0010			
Total Trihalomethanes		<0.0040			0.1
Haloacetic Acids					
Bromoacetic Acid		<0.0020			
Bromochloroacetic Acid		<0.0020			
Chloroacetic Acid		<0.020			
Dibromoacetic Acid		<0.0020			
Dichloroacetic Acid		<0.0020			
Trichloroacetic Acid (TCA)		<0.0020			
Field Chemistry (EBA)					
Free Available Chlorine		0.01			

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 6746-3: 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)
6746	Ross River Fire Hall	Ross River	6874869	633545	699

Well Details							
Well Casing Diameter (mm)	Year Well Installed	Well Log?	Well Depth (m bg)	Reported Low Permeability Protective Layer?	Pump Setting (m bg)	Well Capacity - Tested, or Reported by User	Static Water Level Below Ground (m-btwe)
200	1986	Yes	110 m	Silt and clay from grade to 101.5 m, permafrost was encountered at 8.23 m		167 gpm	6.57

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
17	1	Greater than 60 m	AST	29	UST at 13 m UST best at 40 m Former service station (likely contaminated site at 66 m)

Well Construction Details					
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading	Comments
1.2 m below grade	Likely split seal gasket cap	25 slot from 105 m to 110 m	Unlikely	No	The well not only services the fire hall, but also services the community water delivery system



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SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin
Luke Lebel

Date June 23, 2008

WELL ID #	Owner	Location Description
6746	YTG	Ross River Fire Hall

1. Well Location and Potential Contaminant Sources

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

Ross River

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

Ross River Fire Hall

c. GPS location: 6874869 633545 699m

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 _____

Ross River Fire Hall and community trucking service

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

g. Nearest building, specify Ross River Fire Hall

h. Distance from well to building ~1m

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

j. Distance from well to nearest point of known field: 17m

k. Well location relative to field: upslope downslope lateral

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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

Septic from Fire Hall @ 17m, Septic from TND Hotel ~ 30m

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 Entrance by animals? Yes No
lid above pit is locked Access possible

p. Is well site subject to flooding? Yes No

q. Is the well site well drained? Yes No

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 13m

There is also a tank nest from a nearby service station @ 40m from well

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

Yes No Describe There is a former gas station @ ~66m from the well. Site is likely contaminated.

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

Potential Source 1: AST1; Distance from well to Potential Source 1: 29m

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

How many? _____ in use abandoned require proper sealing

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2. Well and Wellhead information:

a. When was well installed? Year 1986 Month _____

b. Type: drilled dug sand point other _____

c. Is there a drillers log for the well: Yes No
with previous report from Environmental Health Services (Niels Jacobson) -2003

d. Is there a surface seal to 6 m Yes No unknown unlikely

e. Surface casing: Yes Diameter 20cm No

to 32m, not proper surface casing (no grouting)

** permafrost was encountered at ~ 8m*

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

g. Depth of well: 110m measured (if possible) reported from log

h. Static water level below ground: 6.57m

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 3.66m slot size(s) 25 thou slot

Location of screen: from 105m to 110m 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

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 1.2m below grade
- ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? Yes No
- iii. Is the wellhead enclosed by ~~fiberglass~~ ^{Styrofoam} insulations? Yes No
- iv. Any evidence of rodents? Specify No, access is possible
- v. Does the well casing have a proper seal cap? Yes No

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...) Chlorination, filtration, softener

4. Aquifer Supplying This Well:

- a. The aquifer is: bedrock granular sediment unknown
permafrost present
- 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 use*

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: pump inside, piping in insulated enclosure

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

b. Recommendations: _____

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PART B: EBA Site Inspection

Inspector: BERT ALBISSEER

Date JUNE 23, 2005

WELL ID #	Owner	Location Description
<u>6746</u>	<u>VTG.</u>	<u>ROSS RIVER FIRE HAUL</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 0.01 reading.

Tested at WASH ROOM TAP (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 H₂S 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:

Where is it located?

Comments: TANK FULL SIDE

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?

2000 GALLON

What material is the tank constructed of? FIBRE GLASS.

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: SLIGHT

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:

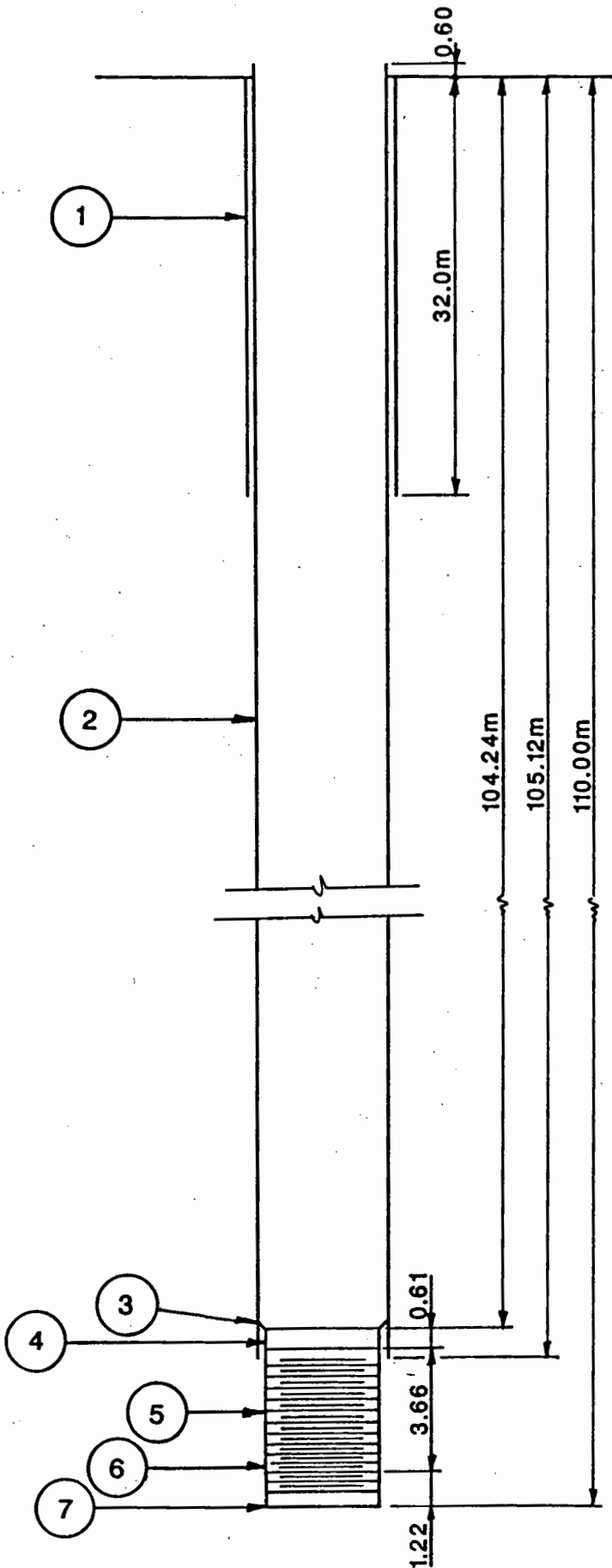
THIS IS AN ACCEPTABLE INSTALLATION
FLOW SWITCH IS STICKING - THIS
CONTROLS THE CHLORINE INJECTION PUMP.
THIS SYSTEM BELONG UNDER THE
JURISDICTION OF COMMUNITY OPERATIONS.

b. Recommendations:

REPLACE FLOW SWITCH WITH PULSE
WATER METER TO EFFECT PROPORTIONAL
CHLORINE FEED.

**ROSS RIVER
LITHOLOGY**

Depth (m)	Lithology	Comments
0 - 2.7	Till - sandy - silty, pebbles to 15 mm, gravel lens from 2.1 - 2.74 m (no noticeable water)	
2.7 - 8.2	Till - dry, sandy to 4.57 m increase in moisture, dark grey, top of permafrost at approximately 8.23 m	Begin injecting water at 7.62 m
8.2 - 18.5	Till - sandy, silty, some bedrock	
18.5 - 60.0	Till - silty clay, some sand, black, continue injecting water	
60.0 - 101.5	Till - silty sandy, some clay, becomes saturated with depth	Sand is running and sloughing on each connection
101.5 - 110.0	Gravel to 25 mm size, round to sub-round, producing water in excess of 25 L/sec	



KEYNOTES

- 1 203mm O.D. STEEL CASING
- 2 168mm O.D. X 0.280mm WALL STEEL CASING
- 3 JOHNSON LEAD PACKER
- 4 141mm O.D. STEEL RISER
- 5 143mm O.D. X 124mm I.D. STAINLESS STEEL WELL SCREEN SLOTTED 0.64mm
- 6 143mm O.D. X 124mm I.D. STAINLESS STEEL WELL SCREEN SLOTTED 0.76mm
- 7 END CAP

ROSS RIVER WATER WELL COMPLETION DETAILS



Spill Report Information

Spill #	0105
Jurisdiction	Yukon
Community	Ross River
Address	
Highway	
Milepost	
Feature	Ross River
Location and Cause	Lot 105 Group 905 Plan 55118 - Trailer #17 - broken feed line between tank and furnace
Latitude	61.98215567
Longitude	-132.44665694
Incident Date	1/29/2001 4:30:00 PM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	
Amount	400
Units	Litres
Quantity	Estimate
Release Description	Spilled
Additional Quantitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Diesel
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	spill to ground outside of residence - contaminated snow and ground - plan to excavate contaminated ground when conditions allow - nearest well at Band Office ~400m



Spill Report Information

Spill #	0112
Jurisdiction	Yukon
Community	Ross River
Address	
Highway	
Milepost	
Feature	Ross River
Location and Cause	Lt 90-4 GR unit #873300 - rusty tank
Latitude	61.9807155
Longitude	-132.4455175
Incident Date	3/7/2001
Lead Agency	Yukon Government - Environmental Programs
Other Agency	
Company(s)	YHC
Amount	
Units	
Quantity	Unknown
Release Description	
Additional Quantit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Furnace Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	2m x 2m contaminated area of snow - snow was removed - hauled to dump - put "Gator" on ground - no call to spill line, fax only - no other info on file.



Spill Report Information

Spill #	8020
Jurisdiction	Yukon
Community	Ross River
Address	
Highway	
Milepost	
Feature	Ross River
Location and Cause	WPYR bulk plant - storage tank overflow - human error
Latitude	61.9826021
Longitude	-132.44942598
Incident Date	10/22/1980 9:00:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	
Company(s)	White Pass & Yukon Route
Amount	1890
Units	Litres
Quantity	Estimate
Release Description	Spilled
Additional Quantitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Furnace Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	contained and most soaked into ground within bermed area - damage to environment unknown but little expected - Pelly River 3/4 mile away



Spill Report Information

Spill #	8717
Jurisdiction	Yukon
Community	Ross River
Address	
Highway	
Milepost	
Feature	Ross River
Location and Cause	WPYR tank farm - bulk tank overfill - attempt to transfer fuel to a full storage tank
Latitude	61.9826021
Longitude	-132.44942598
Incident Date	11/24/1987 9:30:00 AM
Lead Agency	Environment Canada - Environmental Protection Service
Other Agency	Department of Indian Affairs and Northern Development
Company(s)	White Pass Petroleum Division
Amount	4.9
Units	Tonnes (Metric)
Quantity	Estimate
Release Description	Spilled
Additional Quantitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Furnace Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	low environmental hazard if contained - potential risk to groundwater if not - no surface water in immediate area - cleaned-up



Spill Report Information

Spill #	9825
Jurisdiction	Yukon
Community	Ross River
Address	
Highway	
Milepost	
Feature	Ross River
Location and Cause	Land Claims Office
Latitude	61.984709
Longitude	-132.450185
Incident Date	6/3/1998 10:45:00 AM
Lead Agency	Municipality - identified in Community
Other Agency	
Company(s)	
Amount	
Units	
Quantity	Unknown
Release Description	
Additional Quantitit	
Concentration	
Concentration Unit	
Phase	Liquid
Major Contaminant	Fuel Oil
2nd Contaminant	
3rd Contaminant	
4th Contaminant	
Outcome	250 ga tank not hooked up - fuel leaked overnight - looks like deliberate - fuel ran under another heating tank and soaked into ground - EC advised excavation of soil



Photo 0059: 6746 Jet pump and pressure tank



Photo 0060: 6746 Water storage tank