26.0 BUILDING 1131 – CARCROSS SEARCH AND RESCUE OFFICE

26.1 Description of Existing Water Supply System

Water for Building 1131, The Carcross Search and Rescue Office, is currently supplied by bulk water delivery from the Village of Carcross community water system that is chlorinated at the source. Delivered water is stored in a 1200 L polyethylene water storage tank located within the building. Field chemistry completed during this assessment found free available chlorine concentration to be 0.01 mg/L, which is well below the required 0.2 mg/L at a point of use.

A schematic detailing the water supply system is provided as Figure 1131-B in Appendix A26. Photos of the water system are also included at the back of this appendix. The coordinates of the water intake, as measured by a hand held GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6670005
- Easting: 516351

An abandoned well is located in an enclosure on the northwest corner of the building. It is anticipated that use of this well was discontinued due to elevated arsenic concentrations that are found in groundwater in the Carcross area.

26.2 Water Quality Results

26.2.1 Water Quality Results from Previous Sampling

Regular bacteriological sampling and detailed potability analyses have not been previously completed at this site. Routine sampling is however, completed for the treated source water.

26.2.2 Identification of Additional Analytical Required

It was assumed at the time of the site visit that this system would also be added to the routine sampling program that YTG is currently completing, and that potability results would be made available for this system. Additional analytical for the Carcross Search and

Rescue Office that was identified to be included during the water system assessments (assuming potability results would also be available) is detailed below:

- UV absorbance and UV transmissivity, as well as tannins and lignin, to determine potential for UV treatment as a disinfection option for this water system;
- Total organic carbon (TOC); and,
- Measurements in the field for total dissolved solids, conductivity, pH, temperature, and Free Available Chlorine (FAC).

A water sample was obtained during the water system assessment on August 10, 2005, and was submitted to ALS Environmental in Vancouver BC for analysis of the parameters indicated. These results are summarized in Table 1131-2 in Appendix A26 and the laboratory reports are included in Appendix B.

26.3 Potential Contaminant Sources

Potential contaminant sources on the property observed during the water system assessment are compiled in field notes in Appendix A26. Photos of potential contaminant sources are also provided in Appendix 23.

Potential contaminant sources within 30 m of the abandoned well include:

- An above ground storage tank (AST) located 17 m away; and
- A septic tank and field located approximately 18 m from the wellhead.

As the system is supplied by water delivery, the abandoned well does not pose a threat to the safety of the water supply. However, if the aquifer was ever to be used as a drinking water source the abandoned well could act as a preferential pathway for contaminants to reach the aquifer. It is recommended that this well be properly decommissioned.

26.4 Identified Water System Deficiencies and Associated Risk

26.4.1 High or Medium Risk Deficiencies

High and Medium risk deficiencies identified for this system include:

- FAC at the point of use was 0.01 mg/L, below the required 0.2 mg/L, and there is no routine monitoring of residual chlorine concentrations;
- The vent/overlow does not have a vermin proof screen; and,
- The water tank is not easily accesssible for routine inspection and cleaning. It may be difficult to intall a watertight access hatch in a polyethylene tank. If it is not possible to clean this tank in its current state, a replacment tank with suitable access should be installed.

26.4.2 Low Risk Deficiencies

The following low risk deficiencies were observed for this water system:

- Piping is constructed of ABS and is not suitable for drinking water;
- Vent and fill lines are not labelled on the exterior of the building; and,
- The abandoned well has not been properly decommissioned.

26.5 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).

26.5.1 Priority 1

The following recommendations are made to mitigate immediate risk to the water system:

- Install secondary disinfection consisting of a NSF/ANSI 55 certified UV system with filtration pretreatment (15 micron). We understand that the source water is filtered to 1 micron at source. The sample collected at the time of the assessment had a UV Transmittance % that is below the level recommended for UV treatment. Other samples from the same source (Bennett Lake) were found to be suitable to UV disinfection. It is considered likely that the sample was anomalous and that ANSI/NSF 55 certified UV treatment would be adequate. This is, however, only a conceptual design recommendation based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications;
- Install a vermin proof screen on the overflow/vent;

- Undertake immediate cleaning of holding tank including superchlorination. If it is not possible to clean this tank in its current state, a new tank should be installed with suitable access for routing cleaning;
- Implement a regular water storage tank cleaning program every 6 months; and,
- Initiate a routine bacteriological testing program.

26.5.2 Priority 2

There were no Priority 2 mitigative options identified.

26.5.3 Priority 3

At some time in the future, the ABS piping should be replaced with PVC piping and the vent and fill pipes should be labelled on the exterior of the building.

26.6 Cost Estimates for Mitigative Options

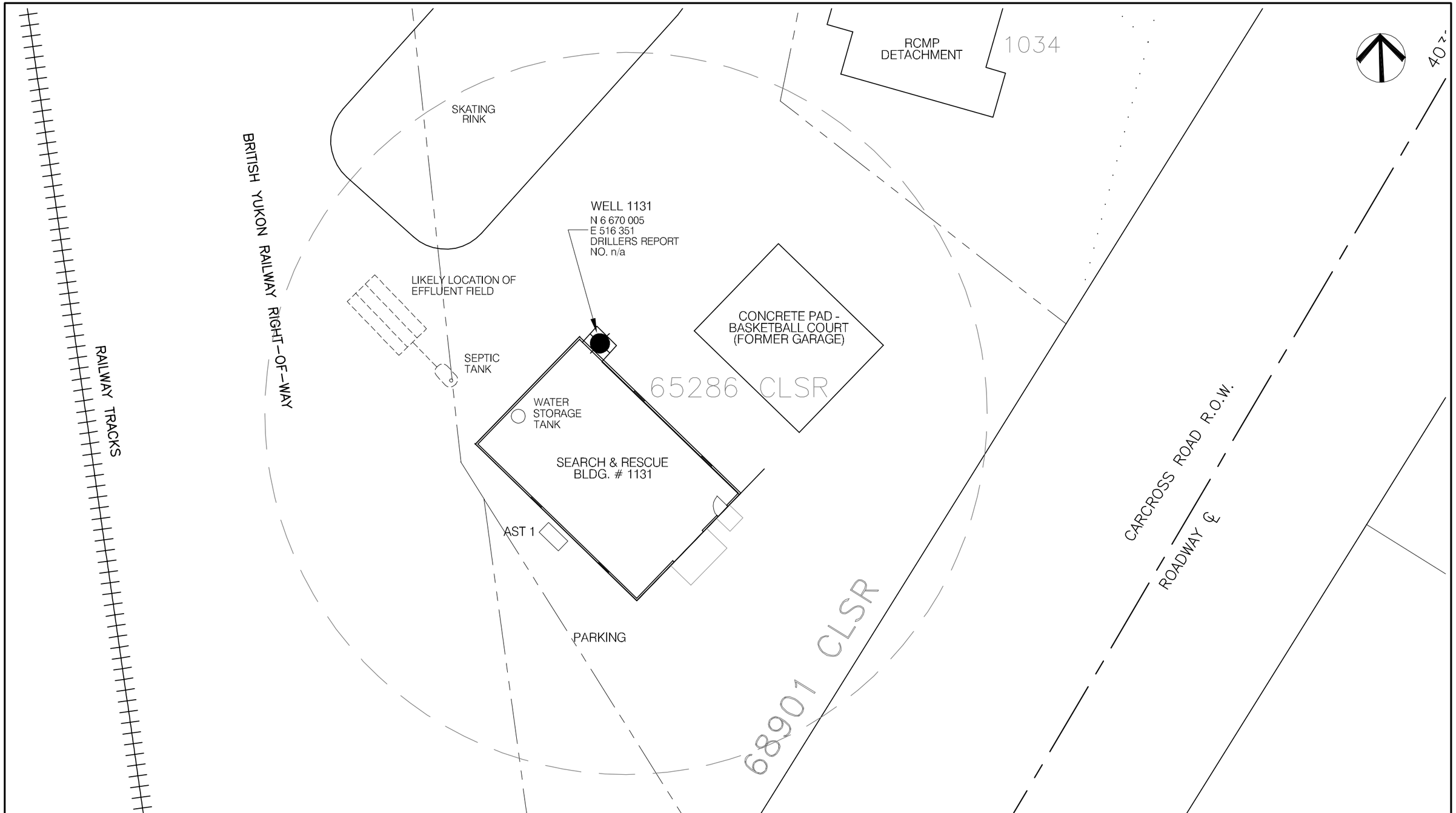
26.6.1 Priority 1

Estimated costs for materials and labour for recommended Priority 1 upgrades are provided below. An additional contingency allowance of 20% is suggested for budgetary purposes.

- A UV system (NSF/ANSI certified) with pretreatment would cost approximately **$2,200** installed.
- The cost to install a vermin proof screen on the vent/overflow would be negligible and could be installed at the same time as the previous work.
- Should tank replacement be necessary, it is estimated that a replacement tank could be supplied and installed for approximately **$2,500**.
- Initiating a routine water storage tank cleaning program and monitoring should fall under normal operations and maintenance costs. Monitoring of residual chlorine concentrations would not be necessary if the recommended UV system is installed.

26.6.2 Priority 3

- Replacing the ABS fill pipe with PVC, and attaching labels to the exterior of the building would likely cost in the order of $300 for materials and labour. Consideration should be given to completing this work at the same time as Priority 1 upgrades to save on contractor mobilization/demobilization costs.



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:	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

CARCROSS SEARCH & RESCUE BUILDING 1131
SITE LOCATION DIAGRAM
WELL ID: 1131

REVISION ISSUE: 0

DRAWING No.: FIGURE 1131-A

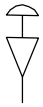
LEGEND


PUMP

PRESSURE GAUGE


GATE VALVE


CHECK VALVE

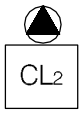

SOLENOID

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

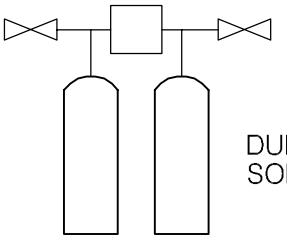
FLOW METER

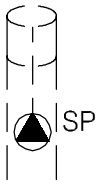
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

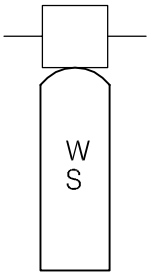


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER



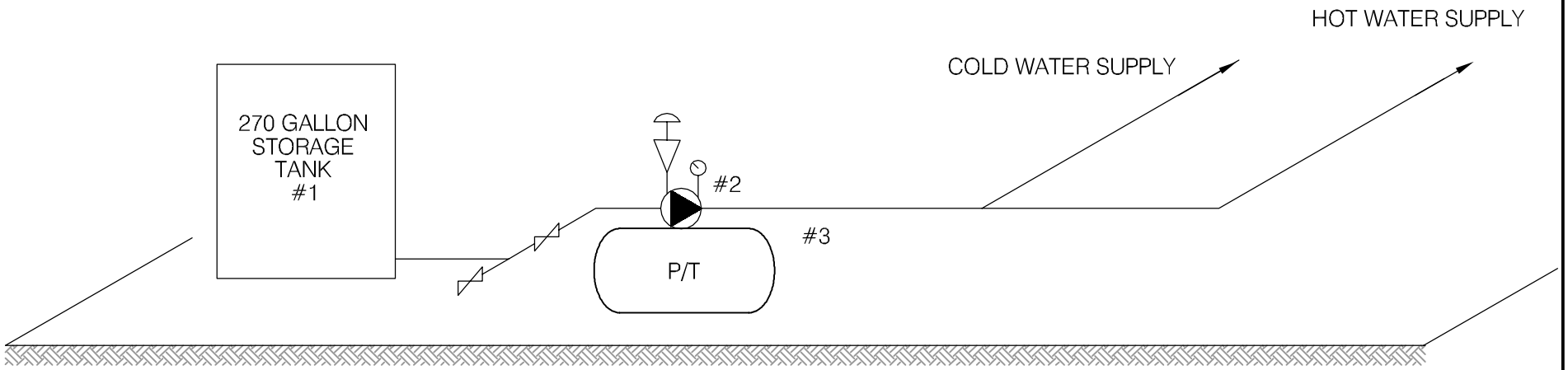
WELL WITH
SUBMERSIBLE PUMP



ACTIVATED
CARBON

EBA Engineering Consultants Ltd.			PROJECT	SMALL PUBLIC WATER SYSTEMS ASSESSMENT 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

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\1260002003 Whitehorse Schematic_LEGEND.dwg, 4/11/2006 10:28:07 AM, Adobe PDF, jbuyck



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

EBA Engineering Consultants Ltd.			PROJECT	ADDITIONAL ASSESSMENT EASTERN REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 1131 CARCROSS SEARCH & RESCUE BUILDING	
DATE APRIL 2006	DWN. JSB	CHKD. RMM	FILE NO. 1260002.005		DWG.: FIGURE 1131-B

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\carcross\1260002 Carcross Search Rescue 1131B_Schematic.dwg, 4/6/2006 10:35:53 AM, Adobe PDF, jbuyck

Whitehorse Region – Carcross Search and Rescue
Building # 1131

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	Polyethylene Storage Tank		270			Upright 270 Gallon
2	Jet Pump	R.G.Ray	SPLC-2H		C95G	½ HP – 115 V.
3	Pressure Tank	Con Air	SCA15H		1A95N	4.5 Gallon
4						
5						
6						
7						
8						
9						
10						

Table 1131-2: Water Quality Results

SOURCE:	Building 1131- Carcross Search and Rescue	GCDWQ Criteria		
Location/ Resident	Carcross			
Address				
Treatment	Filtration			
Disinfection	Chlorination			
Source of Water				
Purpose of Sampling	Additional Sampling			
Sample Location	10-Aug-05			
Date Sampled		**Lower**	**Upper Limit**	
Physical Tests *(ALS)*		**AO**	**MAC**	**AO**
Colour (CU)				15
Conductivity (uS/cm)				
Total Dissolved Solids				500
Hardness CaCO3		AO >200 = poor, > 500 unacceptable[A]		
pH		6.5		8.5
Turbidity (NTU)			1	5
UV Absorbance	0.270			
% UV Transmittance				
Organic Parameters				
Tannin and Lignin	<0.10			
Total Organic Carbon C	1.55			
Field Chemistry (EBA)				
pH	8.16	6.5		8.5
TDS (ppm)	41			500
EC (uS/cm)	80			
Temperature (^{o}C)	21.0			
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 (^{o}C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A. EBA Site Inspection

Inspector: Luke Lebel Date August 10, 2005

WELL ID #	Owner	Location Description
1131	YTG	Carcross Search and Rescue Office

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: N 6670005 E 516351 elv 663m ± 12m

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
Search and Rescue Building

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

g. Nearest building, specify located in addition to Search and Rescue Building

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: ~12m

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

l. Is there any part of a sewage disposal system(s)or other potential sources of pollution that may pose a health and safety risk within 30 m? ☒ Yes ☐ No
Septic tank + Effluent field

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

n. Is the well located within 120 m from a solid waste site or dump, cemetery? ☐ Yes ☒ No unlikely

o. Is the infrastructure protecting the wellhead, pumphouse, storage tank and/or water treatment plant designed and secured to prevent:

Unauthorized access by humans? ☒ Yes ☐ No (located in locked building)
Entrance by animals? ☐ Yes ☒ No (Access possible)

p. Is well site subject to flooding? ☐ Yes ☒ No

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

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: AST 1 ; Distance from well to Potential Source 1: ~14m
Potential Source 2: _____ ; Distance from well to Potential Source 2: _____
Potential Source 3: AST 2+3 ; Distance from well to Potential Source 3: ~31m
Potential Source 4: _____ ; Distance from well to Potential Source 4: _____

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

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

2. Well and Wellhead information: Abandoned

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 15cm Material: ☐ steel ☐ plastic ☐ concrete

g. Depth of well: 760m ☒ measured (if possible) ☐ reported ☐ from log

h. Static water level below ground: 3.780 m bc

☒ 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

☐ in a wooden enclosure other, describe addition to building

n. If the well head is located in a wooden enclosure,

i. Is the well head below grade? describe in detail No, ~60 cm above grade

ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? ☐ Yes ☒ No

iii. Is the wellhead enclosed by fiberglass insulations? ☒ Yes ☐ No likely in walls of enclosure

iv. Any evidence of rodents? Specify Yes, mouse droppings

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

If no, describe condition Split gasket cap

3. Water Supplying This Well:

a. By definition is the water from a surface water source or under the direct influence of surface water?

☒ Yes ☐ No ☐ farther investigation required.

If yes is there treatment or disinfection ☐ Yes ☐ No well abandoned

Explain (filtration, disinfection etc…)

---

4. Aquifer Supplying This Well:

a. The aquifer is: ☐ bedrock ☒ granular sediment likely ☐ unknown

b. Does water level and/or well capacity show seasonal fluctuation? ☐ Yes ☐ No n/a

5. Pump Installation:

a. Is the well equipped with a pump? ☒ yes ☐ No

b. Type of pump: ☐ hand ☒ electric submersible ☐ jet no longer in use, but still in place

☐ 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

g. Pump delivers water to: ☐ pressure tank ☐ elevated tank ☐ other n/a

h. Are there automatic pump controls: ☐ Yes ☐ No n/a

i. Is there provision for taking water samples before water reaches storage? ☐ Yes ☐ No n/a

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

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

If yes, describe: _____

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

There is a well at this site, but it is no longer in use. This water system uses water from a delivered source. The fill pipe and vent is ABS piping and there is no vermin screen

b. Recommendations: _____

PART B: EBA Site Inspection
Inspector: MARK ROBINSON AQUA TECH Date AUG 10/05

WELL ID #	Owner	Location Description
1131		SEARCH AND RESCUE CARCROSS.

6. Water Treatment

a. Is well water treated? ☐ Yes ☒ No; Type of treatment: NO TREATMENT ON SITE. TREATED BY DELIVERY

☐ 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 OFFICE SINK 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 ☐ 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: 8'X10' Room with Hot Water Tank, Jet Pump, Electrical Panel, Shelves

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: Insulated Storage Room, Heated When Door is Left Open

Are there windows in the add-on that may allow direct sunlight onto the water holding tank? (YES) NO
Comments: 5'X3' Window Right Beside Top 2' of UpRight Poly Tank.

Are there other heat sources near the tank? (YES) NO
Comments: TOYO Stove. Room Beside Storage Room.

Is there waterproof flooring with a sealed base to contain spills? (YES) NO
Comments: Concrete Floor, 2" Below Room Next to It.

Overall Tank

What are the tank size and dimensions?
270 IMP. GALS/1227 LITRES 7' HIGH 3' ROUND 15" LID ON TOP

What material is the tank constructed of? POLY

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: 1/2" PVC + 1" POLY TUBING FOR SUCTION TO JET PUMP

THERE IS A 15" LID OPENING, BUT TOP OF TANK IS 10" FROM CEILING

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) ~~OVERFLOW PLUGGED OFF~~.

Is the water tank drain accessible? (YES) NO BUT 2" OFF BOTTOM

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: COULD NOT SEE INTO TANK.

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)

ONLY 10" BETWEEN TOP OF TANK (LID) AND CEILING.

8. Conclusions

a. Comments on overall installation:

STATION IS ON WATER DELIVERY INTO A 270 IMP. GAL UPRIGHT POLY TANK. THE WATER IS DRAFTED FROM THE TANK WITH A ½ HP., 115 V JET PUMP WITH 1" POLY TUBING FOR SUCTION AND 1" POLY TUBING (DISCHARGE) TIED INTO POLY B MANIFOLD.

b. Recommendations:

Photo 141: 1131 Water storage tank.

Photo 027: 1131 Abandoned well.

Photo 029: 1131 Carcross search and rescue building (former grader station).

Photo 028: 1131 Abandoned wellhead enclosure.