22.0 BUILDING 6522: CARMACKS AIRPORT TERMINAL

22.1 Description of Existing Water Supply System

Building 6512, the Carmacks Airport Terminal, has water supplied from a 24 m deep well that is located in a pit approximately 17 m away from the terminal building. A site diagram that shows details of the property and the wellhead location is provided as Figure 6522-A, located in Appendix A22. The coordinates of the wellhead, as measured by a hand held GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6887553
- Easting: 437781

The water system is equipped with a submersible pump, sediment filter, pressure tank and pump controls. A system schematic detailing the water system is offered by Figure 6522-B and is located in Appendix A22.

22.2 Description of Existing Wastewater Systems

The septic tank for the Carmacks Airport Terminal is located northeast of the terminal building and 22 m north of the wellhead. The septic tank discharges effluent to a field located north of the tank at a distance of 25 m from the wellhead. The septic tank and effluent field are at approximately the same elevation as the wellhead, but are likely upgradient of the well. Details of the location of the wastewater system are provided as Figure 6522-A located in Appendix A22.

22.3 Water Quality Results

22.3.1 Water Quality Results from Previous Sampling

Bacteriological

Bacteriological sampling of water from the Carmacks Airport Terminal 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. Five 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 6522-1 and are located in Appendix A22.

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

Detailed Potability Analyses

A water sample was previously collected from the washroom sink in the Carmacks Airport Terminal building on October 5, 2004. The sample was submitted to ETL EnviroTest in Surrey BC for detailed potability analyses. The results are summarized in Table 6522-2 and are included in Appendix A22. EBA reviewed the 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.

- The raw water quality for the sample obtained on October 5, 2004 indicated that the groundwater source is calcium bicarbonate type with very high hardness and a pH of approximately 8.
- At 2.9 NTU, the turbidity exceeded the CDWQG MAC of 1.0 NTU. Subsequent routine testing in July 2005 had turbidity that was reported at 17.6 NTU.
- At 0.4975 mg/L, the iron concentration exceeded the CDWQG aesthetic objectives (AO) of 0.3 mg/L. Likely due to the elevated turbidity in the sample collected in July 2005 the total iron concentration at 1.44 mg/L was significantly higher than the previous test result and well above the AO.
- At 0.25 mg/L, the manganese concentration exceeded the CDWQG aesthetic objective of 0.05 mg/L.
- Water quality results indicated that all other health based and aesthetic objectives were met for the parameters analyzed.
- The hardness (as CaCO3) was reported to be 331 mg/L, and is generally poor for aesthetic purposes.

22.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Carmacks Airport Terminal that was identified to be included during the water system assessments is detailed below:

- Since total iron and total manganese had previously exceeded the CDWQG aesthetic objectives, an analysis for dissolved iron and manganese was recommended in order to identify potential treatment or rehabilitation measures.

- UV absorbance was included to determine the potential for UV treatment as a disinfection option.
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

22.3.3 Additional Analytical Results

A water sample obtained during field investigation on May 10, 2005 was submitted for analysis to ALS Environmental in Vancouver BC for dissolved iron and manganese, as well as UV absorbance. Results are summarized in Table 6522-2, located in Appendix A22, and the laboratory reports are included in Appendix B.

The additional analysis indicated that the dissolved iron concentration in the sample collected on May 13, 2005 was less than 0.03 mg/L, which is significantly less than the previously reported total iron concentration, and less than the CDWQG aesthetic objectives. The dissolved manganese concentration; however, for this most recent sample was 0.296 mg/L. This value is higher than the previously reported concentration of total manganese and is higher than the CDWQG aesthetic objective. The significance of the high concentration of dissolved manganese shows that the overall manganese content cannot be attributed to suspended particles. Therefore, although well rehabilitation to decrease turbidity, and/or filtration to remove suspended particles could be sufficient to reduce the iron content of the water, it would not likely reduce manganese concentrations to meet the aesthetic objectives.

22.3.4 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. The chloride concentration for the sample obtained on October 5, 2004 was reported to be low and can be considered to be within the normal background ranges for groundwater in the Carmacks area. Nitrate and nitrite concentrations from this sample were also reported to be low and within the normal background range for the Carmacks area. These water quality results suggest that the aquifer from which the groundwater is obtained was not under the influence of anthropogenic sources of nutrients or anions such as septic wastes at the time of sampling.

22.4 Conceptual Hydrogeology

Based on topography and proximity to surfacewater bodies, the groundwater flow direction in the vicinity of the site is inferred to be south or southwest towards the Yukon River.

22.5 Potential Contaminant Sources

Potential contaminant sources from observations during the site investigation are compiled in Table 6522-4 in Appendix A22. Photos of potential contaminant sources are provided in Appendix A22.

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

- Septic field at 25 m, which is in contravention of the proposed regulation;
- Aviation fuel drums at 30 m, and
- Fuel storage trailer (at time of inspection) at 20 m.

22.5.1 Spills Records and Contaminated Sites Search Results

Investigation of available spills record information and contaminated sites search results did not identify any concerns for this site.

22.6 Identified Water System Deficiencies and Associated Risk

22.6.1 High and Medium Risk Deficiencies;

The following deficiencies were identified as being high-risk for the Carmacks Airport Terminal:

- Turbidity at 2.9 NTU is in exceedence of the CDWQG MAC of 1.0 NTU.
- The wellhead is located within 30 m of potential sources of contamination. During the site inspection it was identified that there were aviation fuel drums located 30 m from the well and there was a mobile fuel storage trailer located 20 m from the well. The well is located on the gravel apron for the airport tarmac and there is potential that any aircraft, mobile fuel storage trailer, or other vehicle, can be moved within 30 m of the well and pose a risk of contamination.
- The septic field is less than 30 m in a direction inferred to be upgradient from the well.
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Well Construction Guidelines).

- Poor surface completion of the wellhead below ground (in a pit below ground level).
- 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.

22.6.2 Low Risk Deficiencies

There were no low-risk deficiencies identified at this site. All deficiencies are considered to be high-risk.

22.7 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).

22.7.1 Priority 1

Due to the location of the well on the airport apron, traffic and fuel handling activities within 30 m of the well are probable. In addition, based on the inferred groundwater flow direction, and the fact that the well is potentially downgradient of the airport terminal's septic field, it is being recommended that a new well be drilled at a safe location with respect to potential contaminants. The new water well should be sited and constructed in consideration of the following recommendations:

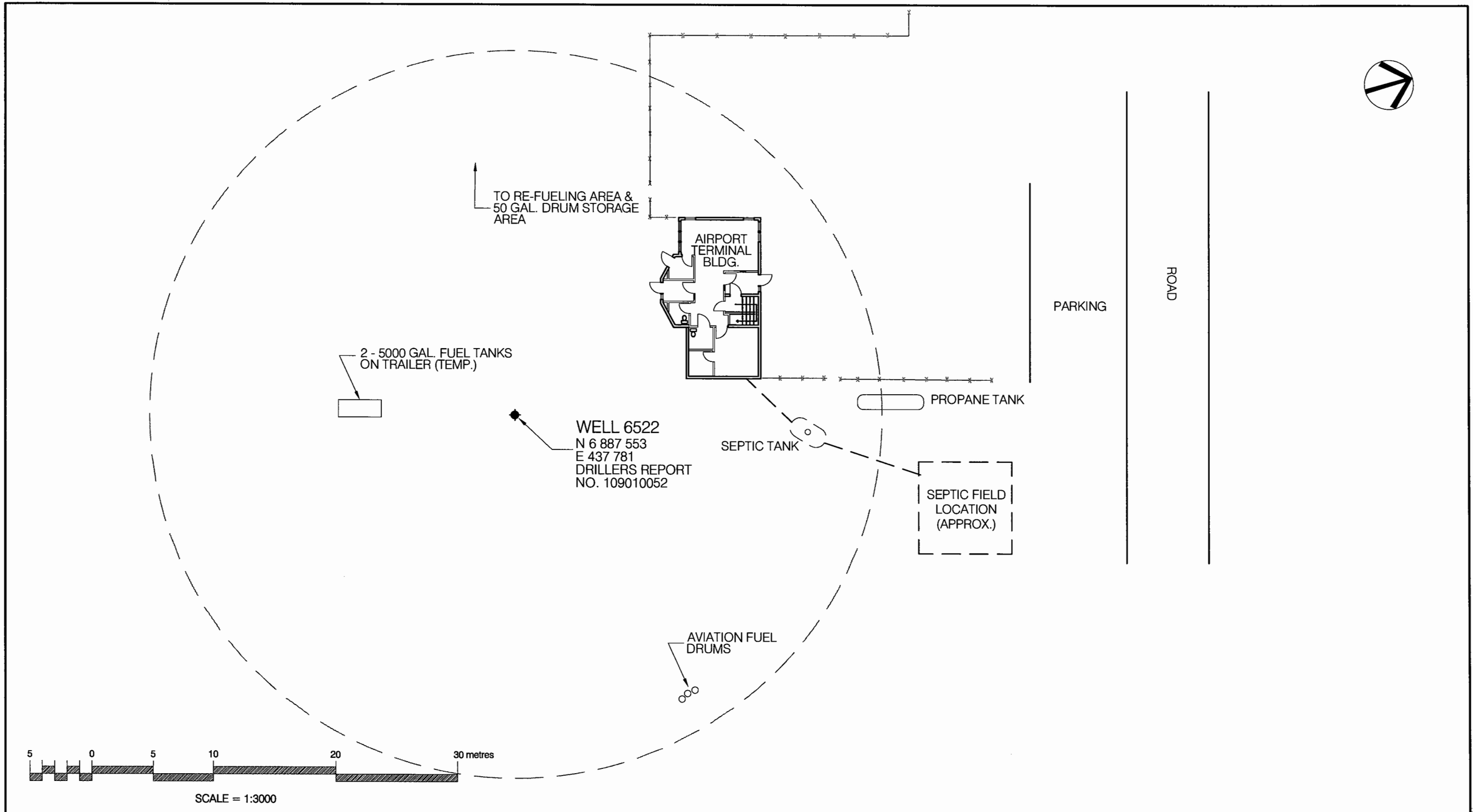
- The well must be located at least 30 m away from, and upgradient from any potential sources of contamination;
- The well should be equipped with a surface seal to at least 6 m below grade and the casing should be extended above grade (500 mm) so that it is lockable and not accessible to animals and unauthorized persons;
- 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. It is likely that a treatment and disinfection system may be recommended.
- If the new well is successful, the old well should be properly decommissioned in accordance with the Guidelines for Water Well Construction.

22.8 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.

22.8.1 Priority 1

- Assuming overburden to a depth of approximately 30 m, it is recommended that **$25,000** be budgeted for materials and labour to drill, test, and complete the well.
- It is estimated that a pitless unit adapter and 40 m of distribution pipe to hook-up the well would cost approximately **$8,000**.
- 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 **$1000**.
- **$9,000** should be allocated for water treatment if required.



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

CARMACKS AIRPORT
TERMINAL BUILDING 6522
SITE LOCATION DIAGRAM
WELL ID: 6522

REVISION ISSUE: 0

DRAWING No.: FIGURE 6522A

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\carmacks\1260002 Carmacks Overall Plan.dwg, 6/13/2005 10:41:10 AM, \\whi-eb-dc001\WHI201COMMON

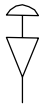
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

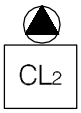

SOLENOID

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

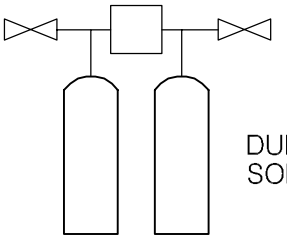
FLOW METER

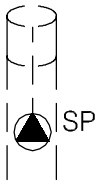
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

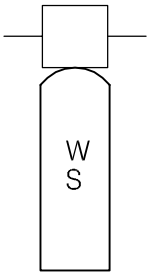


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

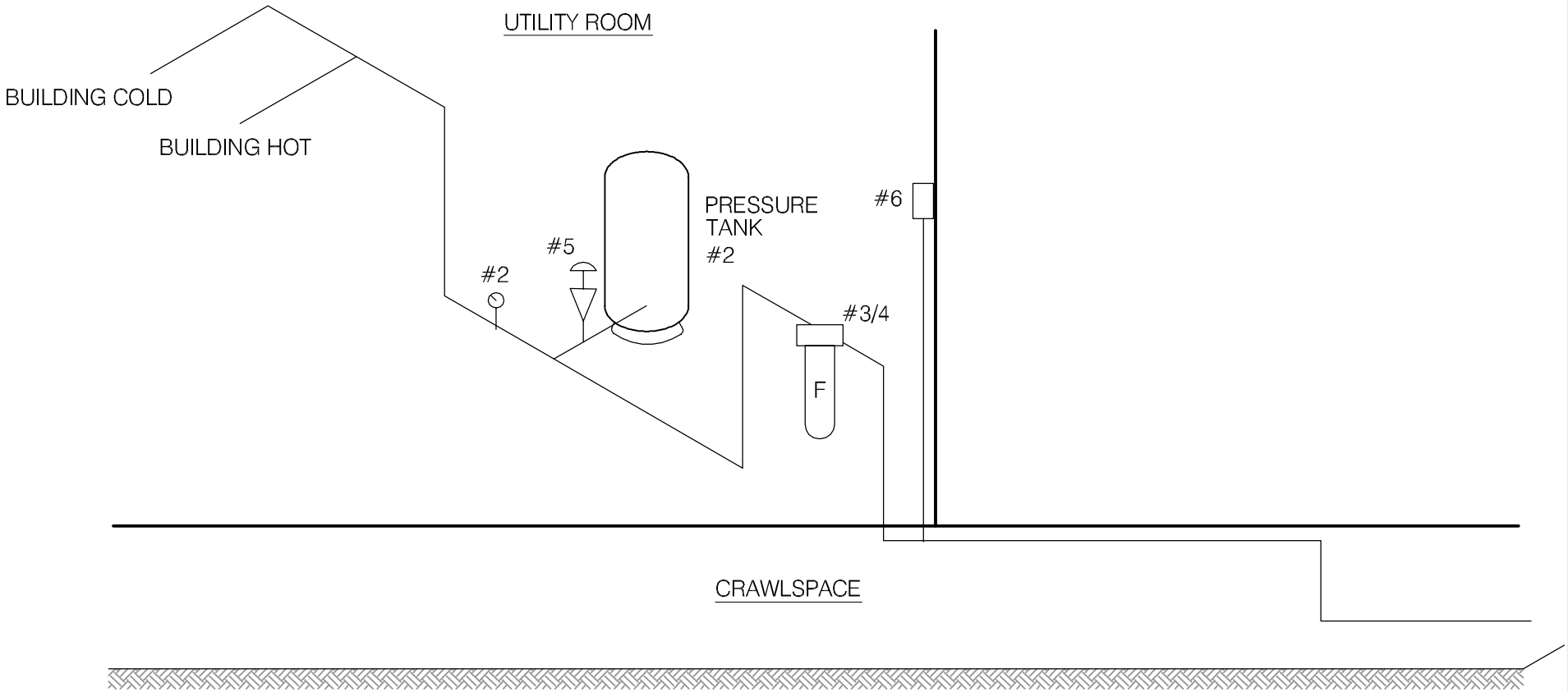


WELL WITH
SUBMERSIBLE PUMP



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 WHITEHORSE REGION	
CLIENT Yukon Highways and Public Works Property Management Branch			TITLE	WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 6522 CARMACKS AIRPORT	
DATE APRIL 2006	DWN. JSB	CHKD. RMM	FILE NO. 1260002.001		DWG.: FIGURE 6522B

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\carmacks\Schematics\1260002 Airport 6522 Schematic.dwg, 4/6/2006 10:03:09 AM, Adobe PDF, jbuyck

Whitehorse Region – Carmacks Airport Terminal
Building # 6522

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	SUB PUMP.					4" x 1/2 HP.
2	PRESSURE TANK	WELLXTROL	WX-202			
3	SEDIMENT FILTER	CUNO	3/4" x 10"			2"x10
4	FILTER CART.	STRING WOUND.	10 MICRON			
5	PUMP CONTROL	SQ. D.	FSG-2			1/4" NPT
6	HEAT T/STAT	PYROTENAX	INDOOR.			
7						
8						
9						
10						

TABLE 6522 - 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?
6522	Carmacks Airport Terminal	5	Oct-04 to Feb-05	no	0/5	no	23-Feb-05	no

Table 6522-2: Water Quality Results

SOURCE:	Building 6522 - Carmacks Airport			GCDWQ Criteria		
Location/ Resident	Carmacks					
Address	Lot 1066 Quad 115 I/1					
Treatment	No					
Source of Water	On-Site Well					
Purpose of Sampling	Baseline	Additional Sampling	Baseline			
Sample Location	Washroom Tap	Washroom Tap				
Date Sampled	5-Oct-04	13-May-05	6-Jul-05	**Lower Limit**	**Upper Limit**	
Physical Tests *(ALS)*				**AO**	**MAC**	**AO**
Colour (CU)	5		<5			15
Conductivity (uS/cm)	532		652			
Total Dissolved Solids	365		417			500
Hardness CaCO3	331		336	AO >200 = poor, > 500 unacceptable[A]		
pH	7.9		8.19	6.5		8.5
Turbidity (NTU)	**2.9**		**17.6**		1	5
UV Absorbance		<0.0010				
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	229		247			
Chloride Cl	1		0.93			250
Fluoride F	0.24		0.204		1.5	
Sulphate SO4	109		133			500
Nitrate Nitrogen N	<0.1		<0.10		10	
Nitrite Nitrogen N	<0.05		<0.10		1	
Ammonia Nitrogen N						
Total Metals *(ALS)*						
Aluminum T-Al	<0.02		<0.010		0.1	
Antimony T-Sb	0.0007		<0.0005		0.006	
Arsenic T-As	<0.0004		0.00052		0.025	
Barium T-Ba	0.018		0.021		1	
Boron T-B	0.05		<0.10		5	
Cadmium T-Cd	<0.0002		<0.0002		0.005	
Calcium T-Ca	61.2		65.2			
Chromium T-Cr	0.0012		<0.0020		0.05	
Copper T-Cu	<0.001		0.0042		1	
Iron T-Fe	**0.497**		**1.44**			0.3
Lead T-Pb	0.0017		<0.0010		0.01	
Magnesium T-Mg	40.4		42.2			
Manganese T-Mn	**0.25**		**0.255**			0.05
Mercury T-Hg	<0.0002		<0.0002		0.001	
Potassium T-K	2.5		2.49			
Selenium T-Se	<0.0004		<0.0010		0.01	
Sodium T-Na	11		10.9			200
Uranium T-U	0.0034		0.00244		0.02	
Zinc T-Zn	0.01		<0.050			5
Dissolved Metals						
Aluminum D-Al					0.1	
Antimony D-Sb					0.006	
Arsenic D-As					0.025	
Barium D-Ba					1.0	
Beryllium D-Be						
Boron D-B					5	
Cadmium D-Cd					0.005	
Calcium D-Ca						
Chromium D-Cr					0.05	
Cobalt D-Co						
Copper D-Cu						1.0
Iron D-Fe		<0.030				0.3
Lead D-Pb					0.01	
Lithium D-Li						
Magnesium D-Mg						
Manganese D-Mn		***0.296***				0.05
Mercury D-Hg					0.001	
Molybdenum D-Mo						
Nickel D-Ni						
Selenium D-Se					0.01	
Silver D-Ag						
Sodium D-Na						200
Thallium D-Tl						
Titanium D-Ti						
Uranium D-U					0.02	
Vanadium D-V						
Zinc D-Zn						5.0
Polycyclic Aromatic Hydrocarbons						
Acenaphthene						
Acenaphthylene						
Acridine						
Anthracene						
Benz(a)anthracene						
Benzo(a)pyrene					0.00001	
Benzo(b)fluoranthene						
Benzo(g,h,i)perylene						
Benzo(k)fluoranthene						
Chrysene						
Dibenz(a,h)anthracene						
Fluoranthene						
Fluorene						
Indeno(1,2,3-c,d)pyrene						
Naphthalene						
Phenanthrene						
Pyrene						
Quinoline						
Extractable Hydrocarbons						
EPH10-19						
EPH19-32						
LEPH						
HEPH						
Field Chemistry (EBA)						
pH		7.66		6.5		8.5
TDS		320				500
EC (uS/cm)		625				
Temperature		13.0				
Free Available Chlorine						

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(°C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

Table 6522-3: 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)**
6522	**Carmacks Airport Terminal**	**Carmacks**	6887553	437781	545

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)**
150	1992	No	23.4 (May be pump)	?	?	?	15.315

Well Construction Details				
Wellhead Above ground (m)	**Well Cap**	**Well Screen**	**Surface Seal**	**Apron Grading**
0.6 below grade	Split Cap Gasket	?	Unlikely	No, ground is even

Table 6522-4: Potential Contaminant Sources
Building 6522 – Carmacks Airport Terminal

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	***Organic*** and inorganic chemicals.	5 km		
Cemetery	***Biological***[1]***,*** inorganic[2] and organic parameters.	5 km		
Sewage lagoon	***Biological,*** inorganic and organic parameters.	>300 m		
Sewage lines, tanks and lift stations	***Biological,*** inorganic and organic parameters.	**Approx. 19 m**		
Septic fields	***Biological and Inorganic*** parameters.	25 m likely up-gradient	6887575	437789
Airplane fueling station	***Organic and Inorganic*** parameters.	100 m		
Undergrounds Fuel Storage Tanks (USTs)	***Organic*** parameters.	>>30 m		
Aviation fuel drums (ASTs)	***Organic*** *parameters.*	30 m	6887562	437811
Mobile aviation fuel storage tanks	***Organic*** *parameters.*	**20 m (temporary)**		
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

EBA Engineering Consultants Ltd. * No well Log

Creating and Delivering Better Solutions

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date May 13, 2005

WELL ID #	Owner	Location Description
6522	YTG	Carmacks Airport Terminal

1. Well Location and Potential Contaminant Sources

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

b. Specific location: (Road or street, Building number, name of owner and/, legal description,
Carmacks Airport Terminal, Campbell Highway

c. GPS location: 6887553, 437781

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 NO

☐ 5 or more delivery sites on a trucked distribution system? If so how many NO

f. Nearest building, specify Terminal Building

g. Distance from well to building 17m.

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

i. Distance from well to nearest point of known field: 22 to tank, 25 to field

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

↳ could be upgradient

TANK = 6887575 N
437789 E

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 field and tank ~22m away

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

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
well is in part enclosed pit that is built shut. However, not locked

Entrance by animals? ☐ Yes ☒ No
There are few signs of mouse droping - access is possible however

o. Is well site subject to flooding? ☒ Yes ☐ No
There is some evidence of water standing

p. Is the well site well drained? ☐ Yes ☒ No
well is located next to a drainage (minor for hill run off) ditch

q. Is there a buried fuel tank on the property? ☐ Yes ☒ No
↳ NOT OBVIOUS

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 Fuel Storage

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

Potential Source 1: Drums ; Distance from well to Potential Source 1: ~

Potential Source 2: Temp Tanks ; 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 unlikely

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

2. Well and Wellhead information:

* a. When was well installed? Year 1992 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
grimey and rusty w/ open holes for heat trace and electrical

* g. Depth of well: 22.835 m bc ☒ measured (if possible) ☐ reported ☐ from log
(OR DEEPER (MAY BE PUMP)

* h. Static water level below ground: 15.345 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
put enclosed pit

☒ 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 Yes –

ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? ☒ Yes ☐ No
↳ some moisture evident on PWF @ bottom of enclosure

iii. Is the wellhead enclosed by fiberglass insulations? ☒ Yes ☐ No

iv. Any evidence of rodents? Specify None obvious, but likely accessible

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

If no, describe condition split cap & gasket
↳ obvious holes

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...) -sediment filter

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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

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
There is a raw water tap in pit

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

k. Is the pump and piping protected from freezing? ☒ Yes ☐ No
There is heat trace (All) styrofoam insulation protecting piping; fibreglass insulation in wellhead enclosure
If yes, describe: _____

l. Comments on pump installation: _____

_____

6. Conclusions

a. Comments on overall installation:

- Well Pit
- Potential Contam within 30m
- No GFI on Heat tape
- Requires Disinfection

b.Recommendations: _____

PART B: EBA Site Inspection

Inspector: _____ Date _____

WELL ID #	Owner	Location Description
6522	YTG	CHAMACKS AIRPORT

6. Water Treatment

a. Is well water treated? ☐ Yes ☑ No; Type of treatment:

☐ chlorination ☐ iron and or manganese removal ☑ other SED. FILTRATION

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 N/A

f. Is there a chemical analysis? ☐ Yes ☐ No ☐adequate ☐ incomplete N/A

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: PRESSURE TANK (UTILITY ROOM

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?

_____

What material is the tank constructed of? _____

Is tank and associated piping constructed of safe materials (i.e. CSA approved and material that does not affect the taste of the water)? YES NO

Comments: _____

Tank Inlet, Outlet and Lid

Is there adequate access on the tank for cleaning (i.e. min 15" access lid)? YES NO

Does the lid have a tight seal and is it watertight when closed? YES NO

Does the tank have an overflow or high level whistle? YES NO

Is the water tank drain accessible? YES NO

WATER TANK AND WATER QUALITY CONDITION

Are there signs of staining or biofouling? YES NO
Comments: _____

Is there any sediment or scum in bottom of tank? YES NO
Comments: _____

Is there any odour associated with the water or tank? YES NO

Have there been any bacteriological analyses conducted previously? YES NO

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:

THIS INSTALLATION REQUIRES TO BE UPGRADED TO MEET SPECIFICATIONS. CASING WILL NEED TO BE EXTENDED TO 18" ABOVE GRADE. SURFACE SEAL WILL NEED TO BE INSTALLED.

b. Recommendations:

INSTALL SURFACE SEAL
EXTEND CASING ABOVE GROUND.
INSTALL GFI PROTECTION ON HEAT TAPE.
INSTALL MOST SUITABLE TREATMENT SYSTEM.

Photo 0148: 6522 Wellhead Enclosure (pitt, front) and Mobile Aviation Fuel Storage

Photo 0149: 6522 Wellhead

Photo 0150: 6522 Wellhead Enclosure (pitt, front), Carmacks Airport Terminal Building (back left), and Septic Field (back center)

Photo 0153: 6522 Aviation Fuel Drums

Photo 0151: 6522 Fueling Station

Photo 0018: 6522 Pressure Tank (left) and Water Heater (right)