


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:

 Highways and Public Works
 Property Management Branch

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
 WHITEHORSE REGION

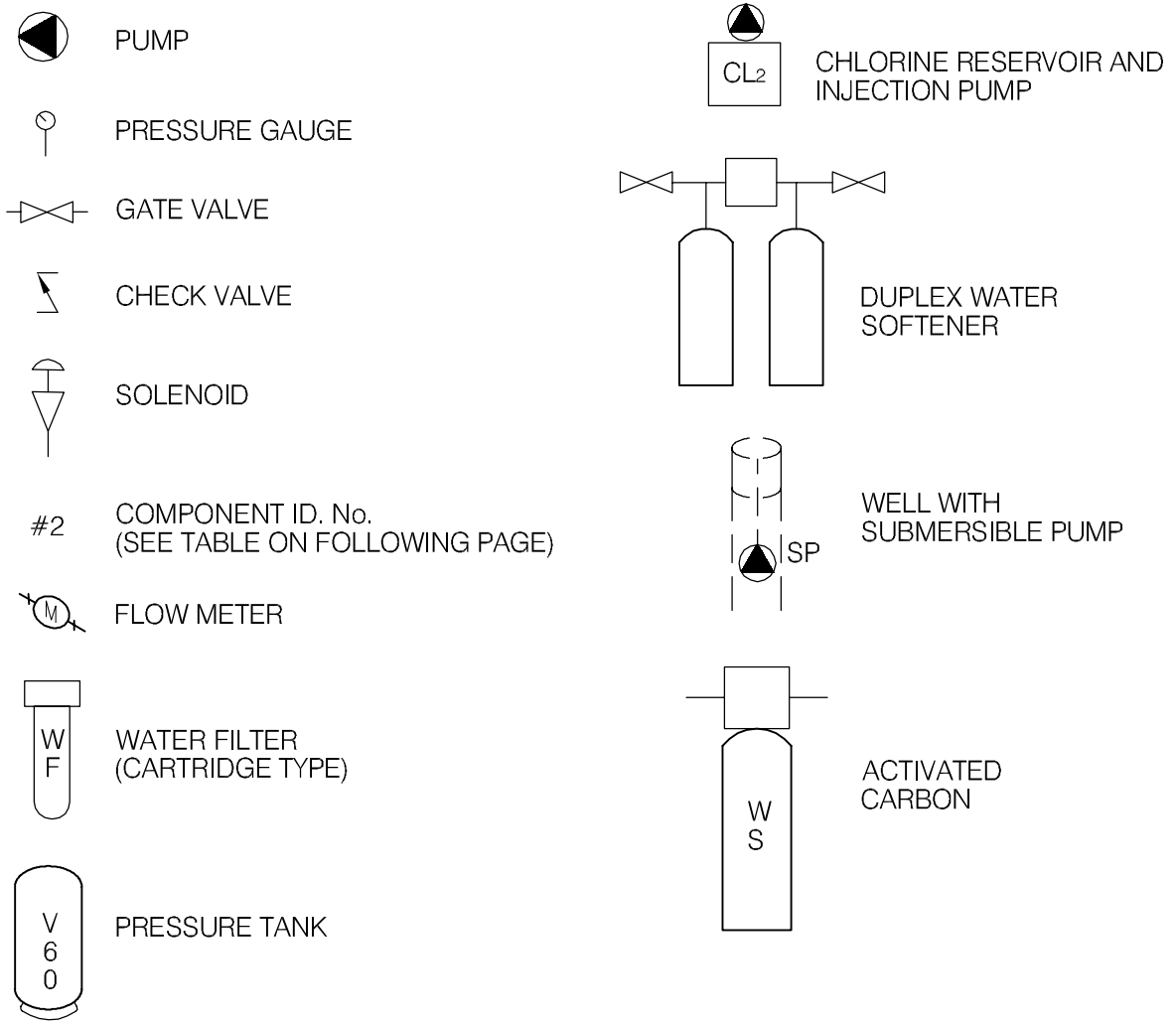
GOVERNMENT OF YUKON
 HIGHWAYS & PUBLIC WORKS

CARMACKS RCMP RESIDENCE
 BUILDING M0064
 LOCATION DIAGRAM
 WELL ID: M0064A



REVISION ISSUE
 0

DRAWING No.
 FIGURE M0064A

LEGEND



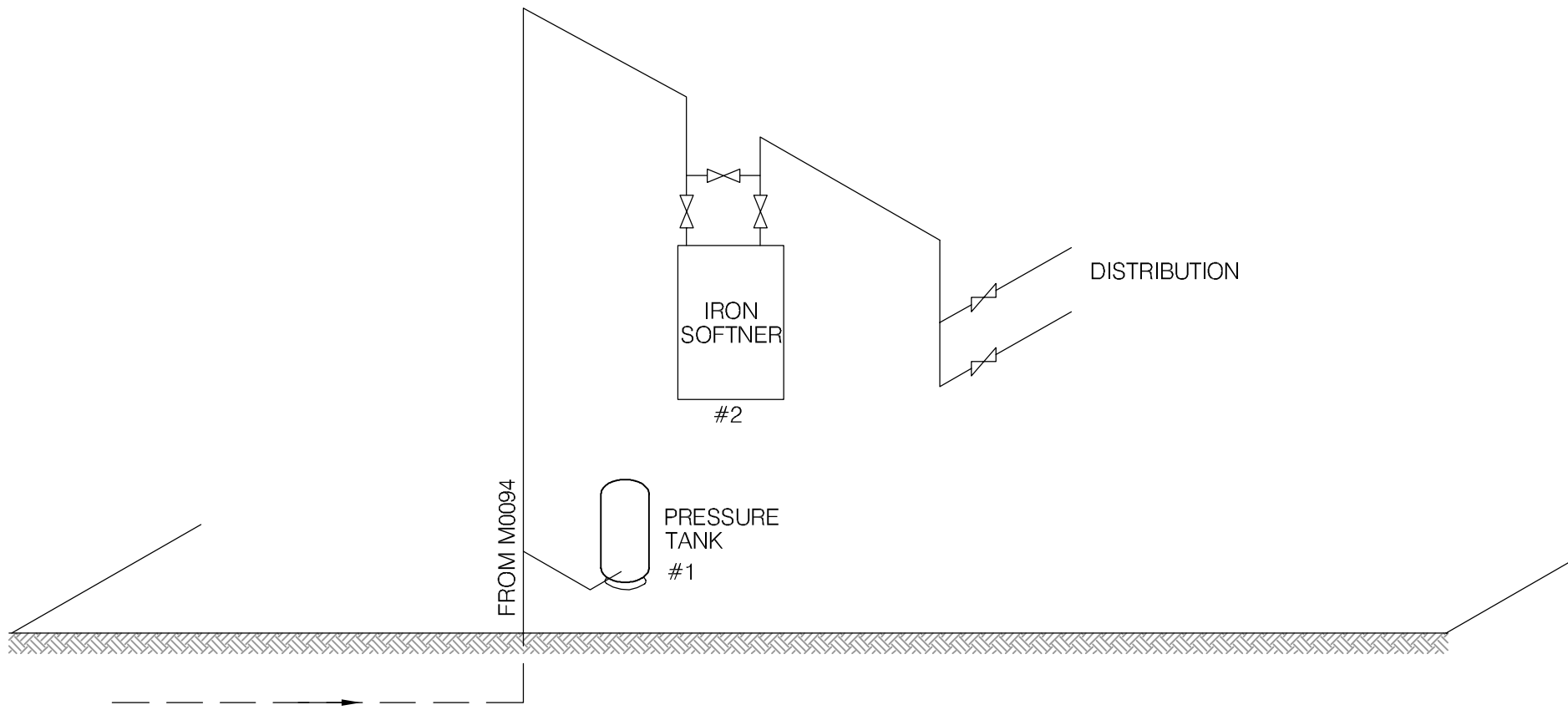
Z:\0201\Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\1260002003 Whitehorse Schematic_LEGEND.dwg, 4/11/2006 10:28:07 AM, Adobe PDF, jbuyck

 EBA Engineering Consultants Ltd.	PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT WHITEHORSE REGION
CLIENT <div style="text-align: center;">  Highways and Public Works Property Management Branch </div>	TITLE <h2 style="text-align: center;">SCHEMATIC SYSTEM LEGEND</h2>
DATE APRIL 2006 DWN. JSB CHKD. RMM	FILE NO. 1260002 DRWG. LEGEND



Whitehorse Region – R.C.M.P. Housing
Building # MO064

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	4" SUB. PUMP.					4" - 1/2 HD.
2	HOLDING TANK		1250 V.			1250 GALLONS
3	JET PUMP	DURO	CONVEYABLE			3/4 HD.
4	PRESS TANK.	AQUA FLO	AF 2665			307 L
5	WATER SOFTENER	MYERS	NISF30IN		1192	
6	PRESSURE SWITCH	SO. D	FSG-2			1/4" FIPT
7						
8						
9						
10						



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

 EBA Engineering Consultants Ltd.		PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT WHITEHORSE REGION							
CLIENT 		TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: M0094 CARMACKS RCMP DETACHMENT							
DATE	APRIL 2006	DWN.	JSB	CHKD.	FMM	FILE NO.	1260002.001	DWG.:	FIGURE M0094B

Whitehorse Region – R.C.M.P. Housing
Building # ~~M0084~~ M0094

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	PRESSURE TANK	WELL RITE	WR260-02			
2	IRON SOFTNER	MYERS	MISF30IN		1192	
3						
4						
5						
6						
7						
8						
9						
10						

TABLE M0064 - 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?
M0064	R.C.M.P Housing	9	Oct-04 to Mar-05	yes	3/9	no	11-Mar-05	no
M0094	R.C.M.P Housing	12	Sept-04 to Mar-05	yes	2/12	no	11-Mar-05	no



Table M0064-2: Water Quality Results

SOURCE:	Building M0064 - R.C.M.P. Housing		Building M0094 - R.C.M.P. Housing		GCDWQ Criteria		
Location/ Resident	Carmacks		Carmacks				
Address	Lot B-12		Lot B-12				
Treatment	No, Water Softener Only		No, Water Softener Only				
Source of Water	On-Site Well, Shares with		On-Site Well, Shares with				
Purpose of Sampling	Baseline	Additional Sampling	Baseline	Additional Sampling			
Sample Location		Downstairs Laundry Tub Tap		Kitchen Tap			
Date Sampled	8-Oct-04	12-May-05	5-Oct-04	12-May-05	Lower Limit	Upper Limit	
Physical Tests (ALS)					AO	MAC	AO
Colour (CU)	5		5				15
Conductivity (uS/cm)	373		481				
Total Dissolved Solids	231		284				500
Hardness CaCO3	214		4		AO >200 = poor, > 500 unacceptable ^A		
pH	8.0		8.3		6.5		8.5
Turbidity (NTU)	0.15		0.3			1	5
UV Absorbance		<0.0010		<0.0010			
Dissolved Anions (ALS)							
Alkalinity-Total CaCO3	201		215				
Chloride Cl	3		3				250
Fluoride F	0.2		0.2			1.5	
Sulphate SO4	21.4		21.8				500
Nitrate Nitrogen N	0.1		0.1			10	
Nitrite Nitrogen N	<0.05		<0.05			1	
Total Metals (ALS)							
Aluminum T-Al	<0.02						
Antimony T-Sb	0.0006		<0.02			0.006	
Arsenic T-As	<0.0004		0.0008			0.025	
Barium T-Ba	0.0643		<0.0004			1	
Boron T-B	<0.02		0.0009			5	
Cadmium T-Cd	<0.0002		<0.02			0.005	
Calcium T-Ca	63.9		<0.0002				
Chromium T-Cr	<0.0008		1.2			0.05	
Copper T-Cu	0.07	0.0116	0.0015			1	
Iron T-Fe	0.009		0.068				0.3
Lead T-Pb	0.0005		0.031			0.01	
Magnesium T-Mg	13.4		0.0002				
Manganese T-Mn	0.001		0.1				0.05
Mercury T-Hg	<0.0002		<0.001			0.001	
Potassium T-K	2.3		<0.0002				
Selenium T-Se	<0.0004		48.6			0.01	
Sodium T-Na	7		<0.0004				200
Uranium T-U	0.0011		81			0.02	
Zinc T-Zn	0.007		0.0009				5
			0.007				
Dissolved Metals							
Copper D-Cu		0.0078					1.0
Field Chemistry (EBA)							
pH		8.08		8.10	6.5		8.5
TDS		194		199			500
EC (uS/cm)		383		392			
Temperature		13.1		15.0			
Free Available Chlorine							250

Notes:

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

Shading indicates exceedence of Proposed MAC guideline (arsenic).

Bold Underline with Yellow shading indicates exceedence of CDWQG MAC

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

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)



**Table M0064-3: 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)
M0064 M0094	R.C.M.P. Housing	Carmacks	6884798	432697	526

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-btwc)
150	?	No	?	No, shallow well	?	1/2hp submersible pump (shared between 2 residences) Size of pump meets needs	?

Well Construction Details				
Wellhead Above ground (m)	Well Cap	Well Screen	Surface Seal	Apron Grading
?	Split Cap Gasket	?	Unlikely	Inside building

**Table M0064-4: Potential Contaminant Sources
Building M0064 – RCMP Housing**

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	<i>Organic</i> and inorganic chemicals.	1250 m		
Cemetery	<i>Biological</i> ¹ , inorganic ² and organic parameters.	350 m		
Sewage lagoon	<i>Biological</i> , inorganic and organic parameters.	>300 m		
Sewage lines, tanks and lift stations	<i>Biological</i> , inorganic and organic parameters.	<15 m to service lines and <30 to main		
Septic fields	<i>Biological and Inorganic</i> parameters.	>150 m		
Gas stations	<i>Organic and Inorganic</i> parameters.	200 m		
Undergrounds Fuel Storage Tanks (USTs)	<i>Organic</i> parameters.	>>30 m		
Above ground storage tanks (ASTs)	<i>Organic parameters.</i>	18 m	6884810	432685
Naturally occurring sources of contamination	<i>Radionuclides, Bacteria and Viruses from surfacewater sources.</i>	>100 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

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SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin
Luke Lebel

Date May 12, 2005

WELL ID #	Owner	Location Description
<u>M0094 + M0064</u> (1 well)	<u>RCMP</u>	<u>RCMP Housing</u>

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 RCMP Detachment Housing

c. GPS location: 432697 Easting 6884798 Northing 526m elev. ±14m

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 _____

Services 2 RCMP Housing Houses

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

f. Nearest building, specify _____

g. Distance from well to building _____

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

i. Distance from well to nearest point of known field: _____

j. Well location relative to field: upslope downslope lateral

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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

There is a sewer line 30 m away

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

There is a solid waste dump ~ 1 km away

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 Entrance by animals? Yes No

o. Is well site subject to flooding? Yes No

p. Is the well site well drained? Yes No

q. Is there a buried fuel tank on the property? Yes No unlikely

If yes, is it in use abandoned

Is the location known? Yes No

Distance from the well to known buried tank _____

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

Yes No Describe _____

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

Potential Source 1: AST 3 + 4; Distance from well to Potential Source 1: 18 m

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

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

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

s. Are there other wells on this property? Yes No

How many? _____ in use abandoned require proper sealing

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2. Well and Wellhead information:

- *a. When was well installed? Year _____ Month _____
- b. Type: drilled dug sand point other _____
- *c. Is there a drillers log for the well: Yes No
- d. Is there a surface seal to 6 m Yes No unknown unlikely
- e. Surface casing: Yes Diameter _____ No
- f. Well casing: Diameter _____ Material: steel plastic concrete
- *g. Depth of well: _____ measured (if possible) reported from log
- *h. Static water level below ground: _____
 measured (if possible) reported from log flowing
- *i. (If granular) Is the well completed: open end casing with a well screen
 with slotted pipe unknown other _____
- *j. (If bedrock) Does the well have a liner? yes No steel plastic
- *k. If there is a well screen: length _____ slot size(s) _____
Location of screen: from _____ to _____ from log reported
- l. Is there a sump below the screen? Yes No unlikely
- 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 _____
- 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
- iv. Any evidence of rodents? Specify _____
- 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...) water softeners for both homes

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 _____

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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

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: _____

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 ALBISSEN

Date MAY 12-05

WELL ID #	Owner	Location Description
<u>M0064</u>	<u>YTG</u>	<u>CARMACIES RAMP RES.</u> <u>TAN HOUSE</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 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 *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: *Pressure TANK*

Where is it located?
Comments: *Pressure Basement*

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?

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

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8. Conclusions

a. Comments on overall installation:

INSTALLATION IS OF GOOD QUALITY &
WORKMANSHIP.
WELL CASING IS PRONE TOO FLOODING.

b. Recommendations:

INSTALL PITLESS ADAPTER & EXTEND CASING
18" ABOVE GRADE.

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PART B: EBA Site Inspection

Inspector: BERT ALBISSON

Date May 12-05

WELL ID #	Owner	Location Description
M009A	YTG	CARMACKS - RCMP

WHITE HOUSE

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

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- 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*

Where is it located?

Comments: *BASMENT*

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?

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

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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:

INSTALLATION IS OF GOOD QUALITY
MATERIAL & WORKMANSHIP.

b. Recommendations:

ADD UV SYSTEM & FILTRATION



Photo 0015: M0064 Water System



Photo 0147: M0064 and M0094 Above Ground Heating Fuel Storage Tank



Photo 0011: M0094 Water Softener (left) and Pressure Tank (right)



Photo 0012: M0064 Water Softener