

24.0 BUILDING 6542: CARMACKS FORESTRY DISTRICT OFFICE

24.1 Description of Existing Water Supply System

The water system for Building 6542, the Carmacks Forestry Department District Office, is currently supplied from a 12 m deep well located in a small underground addition off from the basement of the district office. A site plan that shows the location of the well and gives other details about the property is provided as Figure 6542-A in Appendix A24. There is no treatment at present. A system schematic is provided as Figure 6542-B in Appendix A24. The coordinates of the wellhead, measured by a hand held GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6884838
- Easting: 432758

24.2 Description of Existing Wastewater Systems

The Carmacks Forestry Department District Office is serviced by a piped sewer collection system provided by the Village of Carmacks. There are service lines, and potentially sewer mains that are within 30 m the well. There is rudimentary sewage manhole (MH20E) that collects wastewater from the adjacent building 6528, and does not appear to be constructed properly. MH20E is approximately 24 m from the well that serves these buildings. There is a risk of sewage leakage to the subsurface, or overflow if it the system were to back up.

24.3 Water Quality Results

24.3.1 Water Quality Results from Previous Sampling

Bacteriological

Bacteriological sampling of water from the Carmacks Forestry Department District Office water system has previously been completed by YTG this year. EBA was provided access to the YTG database in order to review the results of this previous bacteriological sampling. Only two samples were collected from this system in 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 6542-1 located in Appendix A24.

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

Detailed Potability Analyses

A water sample was previously collected from the Carmacks Forestry Department District Office water system on October 5, 2004. The sample was submitted to ETL EnviroTest in Surrey BC for analysis and included a detailed potability analyses. The results of this analysis are summarized in Table 6542-2 and are included in Appendix A24. EBA reviewed the analytical 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 was bicarbonate type water with a pH of approximately 8.
- The turbidity of the water was reported to be 1.2 NTU, which exceeds CDWQG MAC of 1.0 NTU. A sample collected during a subsequent routine sampling event completed by PMA representatives also had a turbidity reading that was slightly above 1 NTU.
- The water quality results indicated that all health based and aesthetic objectives were met for the parameters analyzed. The hardness (as CaCO₃) was reported to be 197 mg/L, and is generally poor for aesthetic purposes.

24.3.2 Identification of Additional Analytical Testing Required

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

- UV absorbance, to determine potential for UV treatment as a disinfection option.
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature were completed at the time of sampling.

Additional Analytical Results

A water sample was obtained during the field investigation on May 13, 2005, and was submitted for analysis to ALS Environmental in Vancouver BC for UV absorbance. These results are summarized with historical results in Table 6542-2 included in Appendix A24, and the laboratory reports are included in Appendix B.

24.3.3 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 indicate that the aquifer from which the groundwater is obtained for the Carmacks Forestry Department District Office was not being impacted by anthropogenic sources of nutrients or anions such as septic wastes at the time of sampling.

24.4 Conceptual Hydrogeology

Residents of the main Village of Carmacks obtain their water supply from wells completed in a permeable unconfined sand and gravel aquifer in glaciofluvial and recent alluvial deposits. The regional groundwater flow direction in the vicinity of the Village core is northeast toward the Yukon River.

24.5 Potential Contaminant Sources

Potential contaminant sources from observations during the site investigation are compiled in Table 6542-4 in Appendix A24. Photos of potential contaminant sources are provided in Appendix A24.

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

- Two above ground fuel storage tanks at 5 m and 24 m; and,
- An improperly constructed sewer manhole 24 m from well.

24.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environment Branch did not identify any recorded spill events or contaminated sites issues for this site or neighbouring sites.

24.6 Identified Water System Deficiencies and Associated Risk

24.6.1 High and Medium Risk Deficiencies

The following deficiencies were identified as being high-risk for the Carmacks Forestry District Office:

- The wellhead construction is susceptible to flooding because it is below ground in an attachment to the basement;
- The wellhead is located within 30 m of potential sources of contamination. There are two above ground fuel storage tanks within 30 m, one located 5 m from the wellhead inside the same basement of the office building and the other 24 m from the well outside near a neighboring building;
- Turbidity was in exceedence of CDWQG MAC for both samples collected.
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Well Construction Guidelines);
- The well has been recorded to be 12.2 m in depth, and as thus would be considered to be a shallow well.
- 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;
- The hydrogeology of the area also indicates that there are no protective low permeability layers between ground surface and the water table.
- The well is considered to be at high-risk of contamination from surface sources.

24.6.2 Low Risk

Due to the location of the well in a small, enclosed attachment to the basement of the district office, and because it is incased in a PWF wooden enclosure that is covered by a layer of soil, it is very difficult to access the wellhead for maintenance purposes.

24.7 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).

24.7.1 Priority 1

There are two options provided herein to mitigate the Priority 1 deficiencies identified for the Carmacks Forestry Department District Office. The current well should ultimately be decommissioned once a safer water supply is obtained. The two mitigative options for water system improvement are outlined below.

Option 1:

A new well has recently been drilled for the new school in Carmacks. The first option to mitigate the high-risk deficiencies identified in this report would involve abandoning the current well and connecting to this new well. The following recommendations would have to be carried out for this proposed option to be put in place:

- A pitless unit would have to be installed on the existing wellhead for the new well;
- The water distribution line with proper cover, heat trace and insulation would need to be installed between the building and the well (a distance of approximately 80 m). The distribution line would cross underneath the existing road.

Option 2:

It is likely that within the next two to five years the Village of Carmacks will be developing a municipal water distribution system that will service all of the central village, and will likely include this site. To save on the capital cost of constructing an approximately 80 m distribution line and connecting to a well that would likely only be used by the district office for two to five years, the following option could be considered:

- The existing well construction could be upgraded. The well casing should be extended above grade and a pitless adapter and near surface seal should be installed;
- A disinfection treatment system should be installed, and considering the water quality, a pretreatment system would need to be installed;
- Secondary containment should be installed on both above ground storage tanks identified at the site; and,
- Once the community system piped distribution system is installed, the treatment system would likely no longer be needed and could be reinstalled at another PMA maintained site.

-

24.8 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.

24.8.1 Priority 1

Class D cost estimates for mitigative option to address the well deficiencies for this site are as follows:

- For both mitigative options presented above, the existing well will ultimately be decommissioned in accordance with the Guidelines for Water Well Construction. It is estimated that this would cost approximately **\$1000**.

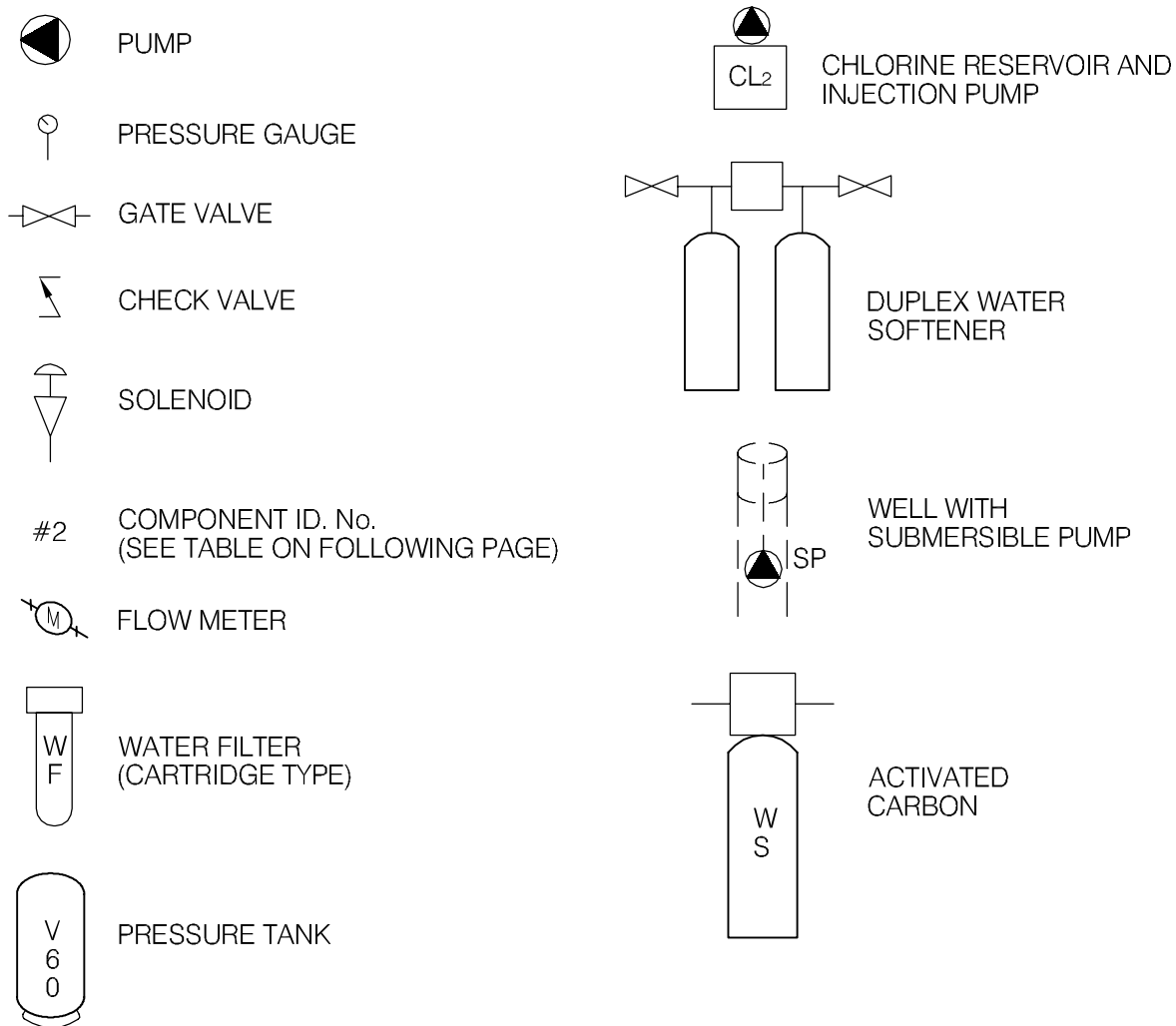
Option 1:

- The cost for a pitless connection to the new school well is estimated to be **\$3,000**.
- The cost of installing the water line is uncertain until further study can be completed, but will likely be in the order of **\$20,000**.
- The cost for a treatment system is estimated at **\$9,000** assuming a NSF-61 certified filtration system and a NSF/ANSI 55 certified UV disinfection system and duplex water softener for pretreatment.

Option 2:

- Wellhead upgrades would cost in the order of **\$500**.
- The capital cost for the interim treatment system is estimated at approximately **\$9,000** assuming a commercial in-line filtration system and a UV disinfection system with a duplex water softener to act as pretreatment.
- Replacing the existing above ground fuel storage tanks with double walled secondary containment tanks would likely cost approximately **\$2,600** for each tank.
- The cost of a service connection to the community distribution system would be approximately **\$3,000**.

LEGEND



EBA Engineering Consultants Ltd.

CLIENT



PROJECT

SMALL PUBLIC WATER SYSTEMS ASSESSMENT
WHITEHORSE REGION

TITLE

SCHEMATIC SYSTEM
LEGEND

DATE APRIL 2006

DWN. JSB

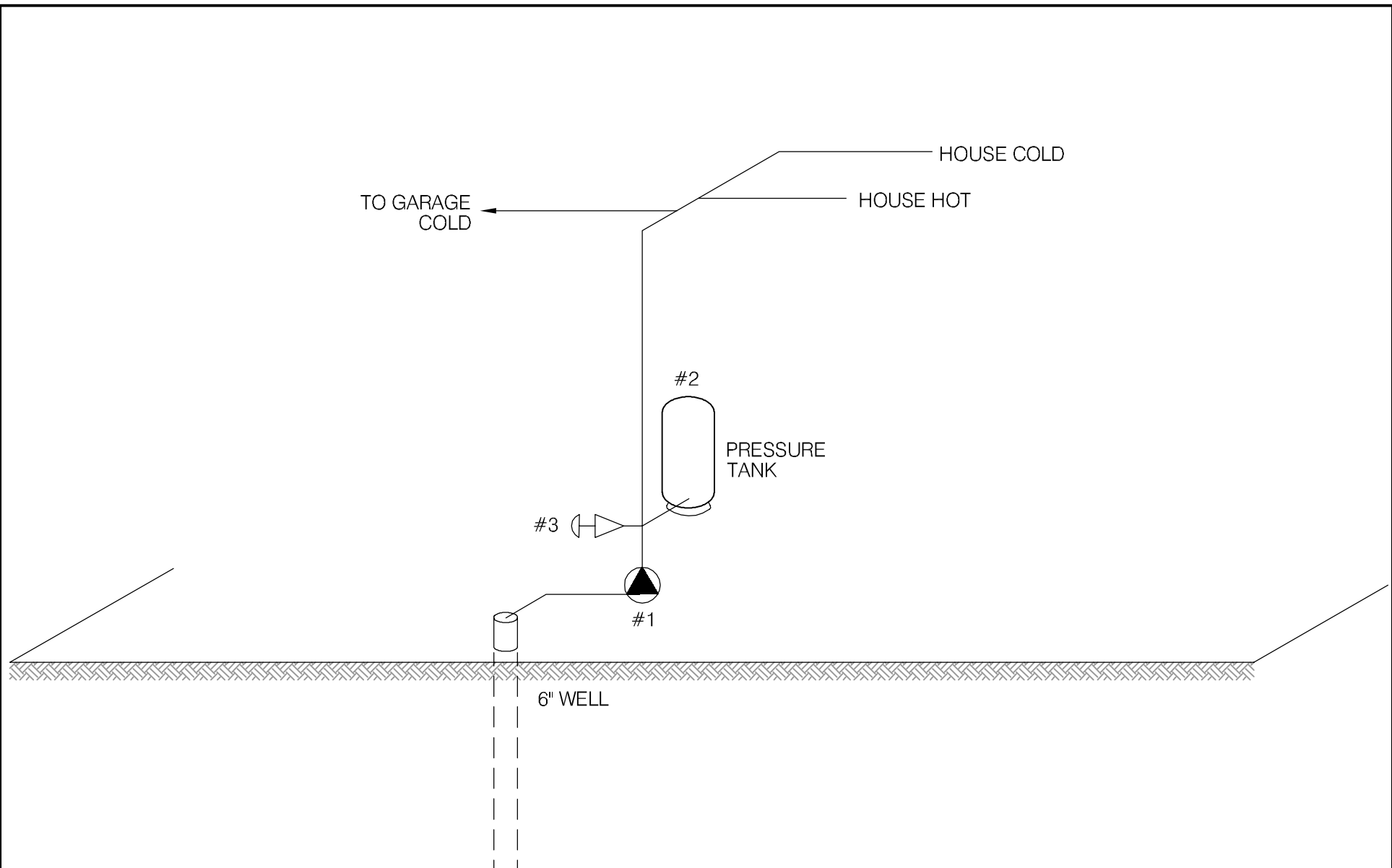
CHKD. RMM

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  | | | TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 6542 CARMACKS FORESTRY OFFICE | |
| DATE APRIL 2006 | DWN. JSB | CHKD. RMM | FILE NO. 1260002.001 | DWG.: FIGURE 6542B |

Whitehorse Region – District Office
Building # 6542

DISTRIBUTION & TREATMENT SYSTEM DATA

| Item | Description | Manufacturer | Model | Part No. | Serial No. | Size |
|------|-----------------|------------------------|-----------|----------|------------|----------------|
| 1 | JET Pump | THE MONARCH | R120 | | 782 | 1" x 1 1/2 Hp. |
| 2 | PRESSURE TANK | PNEUMATIC TANK | STECHARGE | 30FG. | | |
| 3 | PRESSURE SWITCH | SEQ. D | FSG-2 | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

TABLE 6542-1: SUMMARY OF BACTERIOLOGICAL RESULTS

| | | Number of Sampling Events | Time Period over which Sampling was Done | Any Positive Total Coliform Results? (yes or no) | Fraction of Positive Total Coliform Results vs. Total Sampling Events | Any positive E.Coli results? (yes or no) | Most Recent Sampling Event Available for EBA Review | Is Most Recent Result Positive? |
|-------------------|----------------------|---------------------------------|---|--|--|--|--|--|
| Building # | Building Name | | | | | | | |
| 6542 | District Office | 2 | Apr-05 to May-05 | no | 0/2 | no | May 05 | no |



Table 6542-2: Water Quality Results

| SOURCE: | | Building 6542 - Forestry District Office | | | GCDWQ Criteria | | |
|----------------------------------|--|--|---------------------|----------|---|-------------|------|
| Location/ Resident | | Carmacks | | | | | |
| Address | | | | | | | |
| Treatment | | No | | | | | |
| Source of Water | | On-Site Well | | | | | |
| Purpose of Sampling | | Baseline | Additional Sampling | Baseline | | | |
| Sample Location | | Washroom Tap | | | | | |
| Date Sampled | | 5-Oct-04 | 13-May-05 | 6-Jul-06 | Lower Limit | Upper Limit | |
| Physical Tests (ALS) | | | | | AO | MAC | AO |
| Colour (CU) | | 5 | | <5 | | | 15 |
| Conductivity (uS/cm) | | 309 | | 376 | | | |
| Total Dissolved Solids | | 213 | | 225 | | | 500 |
| Hardness CaCO3 | | 197 | | 181 | AO >200 = poor, > 500 unacceptable ^A | | |
| pH | | 8.0 | | 8.25 | 6.5 | | 8.5 |
| Turbidity (NTU) | | 1.2 | | 1.23 | | 1 | 5 |
| UV Absorbance | | | <0.0010 | | | | |
| Dissolved Anions (ALS) | | | | | | | |
| Alkalinity-Total CaCO3 | | 189 | | 199 | | | |
| Chloride Cl | | 2 | | 1.18 | | | 250 |
| Fluoride F | | 0.21 | | 0.168 | | 1.5 | |
| Sulphate SO4 | | 18.3 | | 19.3 | | | 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 | | 0.0008 | | <0.0005 | | 0.006 | |
| Arsenic T-As | | 0.001 | | 0.00103 | | 0.025 | |
| Barium T-Ba | | 0.723 | | 0.073 | | 1 | |
| Boron T-B | | <0.02 | | <0.010 | | 5 | |
| Cadmium T-Cd | | <0.0002 | | <0.0002 | | 0.005 | |
| Calcium T-Ca | | 55.7 | | 53.4 | | | |
| Chromium T-Cr | | 0.0011 | | <0.0020 | | 0.05 | |
| Copper T-Cu | | 0.002 | | <0.0010 | | 1 | |
| Iron T-Fe | | 0.149 | | 0.149 | | | 0.3 |
| Lead T-Pb | | 0.0002 | | <0.0010 | | 0.01 | |
| Magnesium T-Mg | | 12.3 | | 11.6 | | | |
| Manganese T-Mn | | 0.022 | | 0.025 | | | 0.05 |
| Mercury T-Hg | | <0.0002 | | <0.0002 | | 0.001 | |
| Potassium T-K | | 2.3 | | 2.06 | | | |
| Selenium T-Se | | <0.0004 | | <0.0010 | | 0.01 | |
| Sodium T-Na | | 6 | | 6.6 | | | 200 |
| Uranium T-U | | 0.0011 | | 0.00106 | | 0.02 | |
| Zinc T-Zn | | <0.004 | | <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 | | | | | | | 0.3 |
| Lead D-Pb | | | | | | 0.01 | |
| Lithium D-Li | | | | | | | |
| Magnesium D-Mg | | | | | | | |
| Manganese D-Mn | | | | | | | 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 | | | | | | | |
| Benz(a)pyrene | | | | | | 0.00001 | |
| Benz(b)fluoranthene | | | | | | | |
| Benz(g,h,i)perylene | | | | | | | |
| Benz(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 | | 7.89 | | | 6.5 | | 8.5 |
| TDS | | 182 | | | | | 500 |
| EC (uS/cm) | | 358 | | | | | |
| Temperature | | 6.6 | | | | | |
| 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 6542-3: 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) |
| 6542 | District Office | Carmacks | 6884838 | 432758 | 534 |

| 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 | 1973 | Yes | 12.20 | No, shallow well | ? | ? | 1.52 |

| Well Construction Details | | | | |
|---------------------------------|------------------|------------------------|-----------------|------------------|
| Wellhead Above ground (m) | Well Cap | Well Screen | Surface Seal | Apron Grading |
| 1.2 below grade | Split Cap Gasket | Yes 1.5m perforated | Unlikely | Inside building |

**Table 6542-4: Potential Contaminant Sources
Building 6542 – Carmacks Forestry District Office**

| Potential Contaminant Source | Potential Contaminants | Distance from Water Source | Northing | Easting |
|--|--|----------------------------|--------------------|------------------|
| Dump or Landfill | Organic and inorganic chemicals. | 1300 m | | |
| Cemetery | Biological¹ , inorganic ² and organic parameters. | 450 m | | |
| Sewage lagoon | Biological , inorganic and organic parameters. | >300 m | | |
| Sewage lines, tanks and lift stations | Biological , inorganic and organic parameters. | Unknown | | |
| Septic fields | Biological and Inorganic parameters. | >150 m | | |
| Gas stations | Organic and Inorganic parameters. | 200 m | | |
| Undergrounds Fuel Storage Tanks (USTs) | Organic parameters. | >>30 m | | |
| Above ground storage tanks (ASTs) | Organic parameters. | 5 m and 24 m | 6884835 6884839 | 432764 432736 |
| Naturally occurring sources of contamination | Radionuclides, Bacteria and Viruses from surfacewater sources. | 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

SMALL PUBLIC WATER SYSTEM ASSESSMENT**PART A: EBA Site Inspection**Inspector: Ryan Martin
Luke LeberDate May 13, 2005

| WELL ID # | Owner | Location Description |
|-------------|------------|--|
| <u>6542</u> | <u>YTG</u> | <u>Carmacks Forestry District Office</u> |

1. Well Location and Potential Contaminant Sources

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

Carmacks

- Well serves both building
on-site
- some use for drinking water
- get water from store usually
but some drink from well.

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

Carmacks Forestry District Officec. GPS location: 432758 Easting, 6884838 Northing, 534m elev. ± 9md. 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 _____well serves both buildings on site☐ 5 or more delivery sites on a trucked distribution system? If so how many _____f. Nearest building, specify Forestry office, attached to basement
inside

g. Distance from well to building _____

h. If there is an effluent disposal field, is its location known? ☐ Yes ☒ Noi. Distance from well to nearest point of known field: N/Aj. Well location relative to field: ☐ upslope ☐ downslope ☐ lateralN/A

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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

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
Solid waste dump ~1km away

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

Unauthorized access by humans? ☒ Yes ☐ No *Located inside forestry building. Buildings can be locked*
Entrance by animals? ☐ Yes ☒ No *Nothing to prevent animals. no traces, however*

o. Is well site subject to flooding? ☐ Yes ☒ No
no evidence

p. Is the well site well drained? ☒ Yes ☐ No
No apparent water staining

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: FAST 7 ; Distance from well to Potential Source 1: ~5m *inside same building on the basement*

Potential Source 2: AST 6 ; Distance from well to Potential Source 2: 24m

Potential Source 3: septic manhole 1 ; Distance from well to Potential Source 3: 24m

Potential Source 4: septic manhole 2 ; Distance from well to Potential Source 4: 30m

s. Are there other wells on this property? ☐ Yes ☒ No
RCMP wells nearby ~80m and ~100m

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

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2. Well and Wellhead information:

- a. When was well installed? Year 1973 Month August
- 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 6 ☒ No
- f. Well casing: Diameter 6" Material: ☒ steel ☐ plastic ☐ concrete
- g. Depth of well: 40 ft ☐ measured (if possible) ☐ reported ☒ from log
- h. Static water level below ground: 5 ft at time of drilling
☐ 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 5 ft slot size(s) perforated
Location of screen: from 29 ft to 34 ft 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 AT PERMANENT 4FT BELOW
- 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 NO
- 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...) _____

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

unlikely, no reports of

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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PART B: EBA Site Inspection

Inspector: _____

Date _____

| WELL ID # | Owner | Location Description |
|-----------|-------|---|
| 6SA2 | YTG | CARMACKS FORESTLY Compound DISTRICT OFFICE |

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 30FG*

Where is it located?

Comments: *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:

THIS SYSTEM IS TOTALLY OBSOLETE. THE
EQUIPMENT IS 20 YEARS +, THE WORK IS
NOT ACCESSIBLE FOR SERVICING.

b. Recommendations:

DRILL A NEW WELL AND REPLACE THE
WATER SYSTEM TO SUIT NEW REGS.



Driller's Report 109010066

Page 1 of 1

Location: New Forestry House Well Lot 12 Parcel C-1 CRMK

NAD 83 Zone 8 Easting 432699 Northing 6884857 Elevation ASL 1716 ft.

Location Accuracy: Horizontal 300-1000 (topo)
Vertical 30.5 metres (100ft)

Purpose of well: Municipal - residences and other grouped structures

Permafrost encountered? No

LOG OF OVERBURDEN AND BEDROCK MATERIALS

| Layer | From | To | General Colour | Most Common Material | Secondary Material | General Description |
|-------|------|----|----------------|----------------------|--------------------|---------------------|
| 1 | 0 | 1 | ft. | Sandy CLAY | Gravel | |
| 2 | 1 | 15 | ft. | SAND and GRAVEL | | |
| 3 | 15 | 17 | ft. | SAND | | |
| 4 | 17 | 22 | ft. | SAND and GRAVEL | Cobbles | |
| 5 | 22 | 26 | ft. | SAND and GRAVEL | | wet |
| 6 | 26 | 27 | ft. | | | hard pan |
| 7 | 27 | 29 | ft. | SAND and GRAVEL | | water |
| 8 | 29 | 32 | ft. | | Cobbles | hard pan |
| 9 | 32 | 40 | ft. | SAND and GRAVEL | | |

WELL CONSTRUCTION

Well No. 1090100661 Completion date 8/ 7/1973 Drilling method Air Rotary (conventional) Well type Overburden

Casing: OS Diameter 5 in. Material Steel Wall thickness Depth to 40 ft.

Comments Bottom of casing is closed

Surface/Env'l seal: Material Diameter Depth from to Volume

Gravel Pack ? Material Diameter Depth from to

Well Screen Information

OS Diameter Material Screen Type Comments

Perforated

Screen Sections

Section From to Slot size/perforation diameter
1 25 30 ft.

WELL DEVELOPMENT AND STATUS

Well ID Developed by Wellhead completion Adapter depth Static water level Yield Estimate Estimate method

1090100661 Air lifting None 5 ft. 50 gpm Bailing

Final Status New, in use for intended purpose

No



Photo 0155: 6542 Forestry District Office (wellhead located inside underneath)



Photo 0023: 6542 Jet Pump



Photo 0020: 6542 Wellhead



Photo 0022: 6542 Pressure Tank