

12.0 BUILDING 5636: MAYO AIR TANKER BASE DAY USE BUILDING

12.1 Description of Existing Water Supply System

The Mayo Air Tanker Base Day Use Building (Building 5636) is currently serviced by a typical “camp” style seasonal water system that sources water from bulk water delivery. Water is delivered to a 3700 L polyethylene water storage tank located outside on the north side of the building. The water source is presumed to be from the Village of Mayo operated well with delivery by the Na Cho Nyak Dun First Nation. The coordinates of the water storage tank, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 8
- Northing: 7054867
- Easting: 456503

There is a sign posted at each point of use in the building stating “ Do not Drink the Water – it will make you really sick”. A schematic detailing the water supply system is provided as Figure 5636-B in Appendix A12. Photos of the well and water system are also included at the back of this appendix.

12.2 Water Quality Results

12.2.1 Water Quality Results from Previous Sampling

There are no bacteriological or water quality results from previous sampling available.

12.2.2 Identification of Additional Analytical Testing Required

It is presumed that the water source is the Village of Mayo well which is a shallow well system operated by the Village of Mayo that is treated through chlorination at the source. Delivery is likely from the Na Cho Nyak Dun operated water delivery truck. Field chemistry done at the time of the water system assessment indicated that the residual concentration was 0.02 mg/L, which is below the required 0.2 mg/L required at a point of use.

12.3 Identified Water System Deficiencies and Associated Risk

12.3.1 High and Medium Risk Deficiencies

As the water in this system is not used for drinking water, all deficiencies are considered low-risk for this system at present. PMA should consult with Environmental Health and Social Services (EHSS) to ensure that the advisories are adequate and appropriate. Low risk deficiencies are detailed in the following section.

12.3.2 Low Risk Deficiencies

- The water storage tank is located outside the building, is exposed to direct sunlight, and is not secure;
- There was some sediment in the bottom of the tank and it appeared that the tank may not be cleaned regularly;
- The residual chlorine concentration was measured at the time of assessment was below the required 0.2 mg/L at a point of use; and,
- There are no records of bacteriological analyses taken from this system.

12.4 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).

12.4.1 Priority 1 and 2

No Priority 1 and 2 upgrades were identified because the water supply is not currently used to provide drinking water.

12.4.2 Priority 3

The following recommendations are made to ensure safe drinking water should the existing water delivery system be relied on for a drinking water supply at some time in the future:

- Install a disinfection consisting of duplex filtration (NSF 61) and a NSF/ANSI 55 certified UV system. These are conceptual design recommendations based on the information available for planning and budgeting purposes. Engineering input will be required for final system specifications.
- Secure the storage tank by constructing an add-on enclosure to ensure that it cannot be tampered with and is not exposed to direct sunlight;
- Ensure that the tank is cleaned and disinfected on a regular schedule (once per year is considered adequate in consideration of the seasonal use); and,
- Initiate routine bacteriological testing.

12.5 Cost Estimates for Mitigative Options

Engineering costs for mitigative options are estimated to be 20% of construction costs, and would include inspection and completion reporting. The costs for materials and labour (not including engineering) are provided in the sections below. An additional contingency allowance of 20% is suggested for budgetary purposes.

12.5.1 Priority 3

- The recommended duplex filtration and UV system (NSF/ANSI approved) would cost approximately **\$3,000** installed.
- An add-on enclosure to house the water storage tank would cost approximately **\$5,000** (assuming that heating is not required because the building is only used seasonally).

Consideration could be given to drilling a cluster type water well to serve both the ATB day use building and the adjacent crew quarters which currently has a similar “camp” style seasonal use system.

13.0 BUILDING 5640: MAYO PROPERTY MANAGEMENT AGENCY SHOP

13.1 Description of Existing Water Supply System

Building 5640, the Mayo PMA Shop, is currently serviced by water delivery. Delivered water is stored in a 1100 L polyethylene water storage tank located in the building. The water source is presumed to be from the Village of Mayo operated well and treatment system with delivery by the Na Cho Nyak Dun First Nation. A site plan is included as Figure 5640-A in Appendix A13. The coordinates of the water storage tank, as measured by a handheld GPS device were recorded as:

- UTM ZONE 8
- Northing: 7054007
- Easting: 456481

A schematic detailing the water supply system is provided as Figure 5640-B in Appendix A13. Photos of the well and water system are also included at the back of this appendix.

13.2 Water Quality Results

13.2.1 Water Quality Results from Previous Sampling

There are no bacteriological or water quality results from previous sampling available.

13.2.2 Identification of Additional Analytical Testing Required

It is presumed that the water source is the Village of Mayo well which is a shallow well system operated by the Village of Mayo that is chlorinated at the source. Field chemistry done at the time of the water system assessment indicated that the residual concentration was 0.01 mg/L, which is below the required 0.2 mg/L required at a point of use.

13.3 Identified Water System Deficiencies and Associated Risk

13.3.1 High and Medium Risk Deficiencies

The deficiencies observed that may result in a medium to high health risk are summarized below:

- Field chemistry determined that the residual chlorine concentration was below the required 0.2 mg/L at the point of use;
- There are no records of bacteriological analyses taken from this system and the tank may not be cleaned routinely; and,
- There is no vermin proof screen on the overflow/vent.

13.3.2 Low Risk Deficiencies

No low risk deficiencies were identified.

13.4 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).

13.4.1 Priority 1

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

- Install disinfection consisting of NSF 61 certified duplex filtration and a NSF/ANSI 55 certified UV system (or equivalent). These are conceptual design recommendations 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.
 - Ensure that the tank is cleaned and disinfected on a regular schedule (every 6 months); and,
 - Initiate a routine bacteriological testing program.
-



13.4.2 Priority 2 and 3

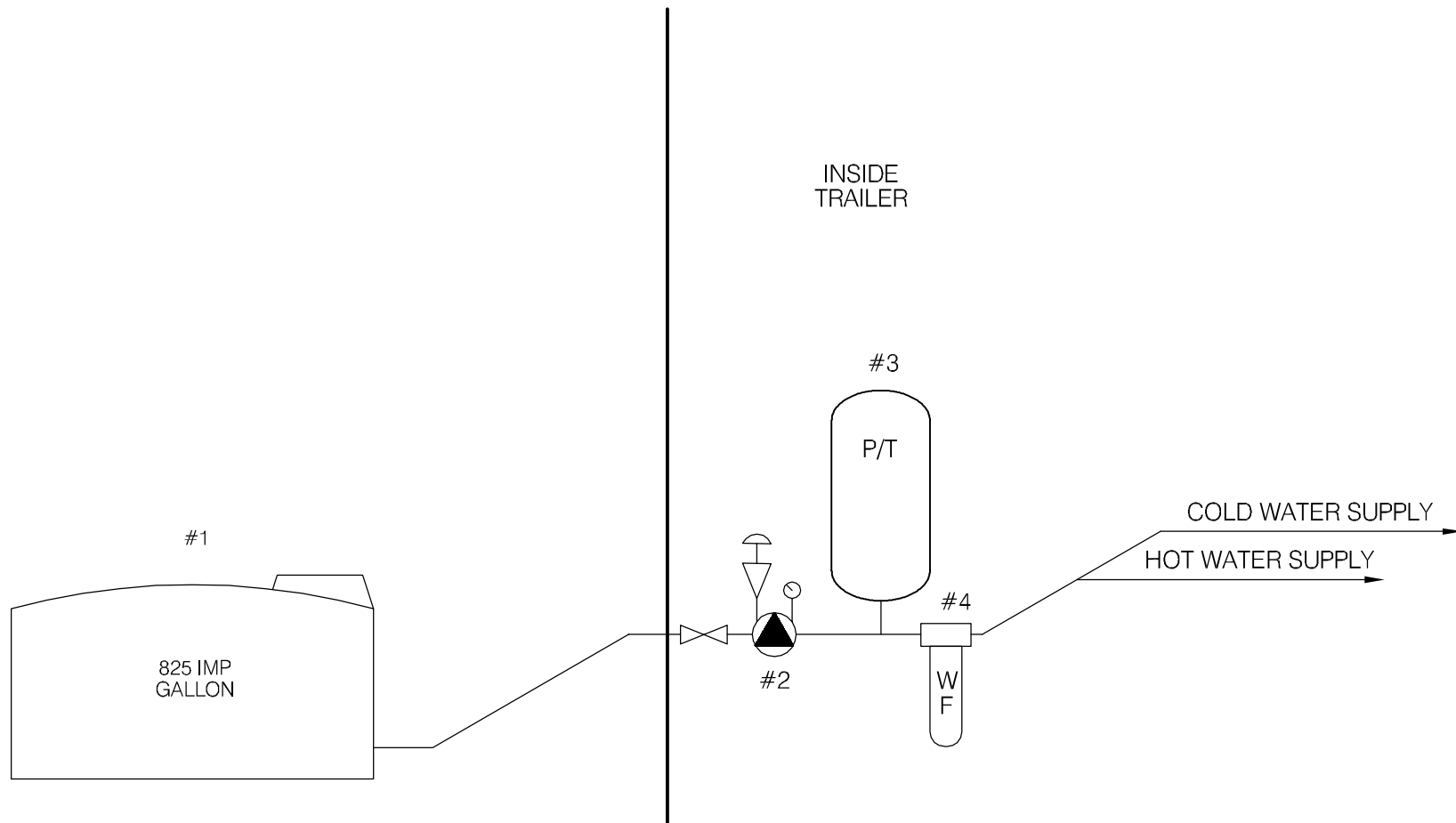
No Priority 2 or 3 upgrades are recommended at this time. All health risks should be mitigated through Priority 1 upgrades.

13.5 Cost Estimates for Mitigative Options



13.5.1 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.

- Duplex filtration and UV system (NSF/ANSI approved) would cost approximately **\$3,000** installed.
- A vermin proof screen on the vent/overflow would be negligible and could be installed at the same time as the previous work.



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

 EBA Engineering Consultants Ltd.	PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT NORTHERN REGION			
CLIENT 	TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 5636 DAY USE BUILDING - MAYO, YT.			
DATE SEPT. 2005	DWN. JSB	CHKD. RMM	FILE NO. 1260002.004	DWG.: FIGURE 5636-B

**Northern Region – Mayo Day Use Building
Building # 5636**

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	STORAGE TANK	PENBINA PLASTICS	825 IMP.			825 I. GALLONS
2	JET PUMP.	MONKRECH	JKC-2			1/2 HP.
3	PRESSURE TANK	RED LION	JR-15			4.5 GALLON
4	INLINE FILTER	AMSTEREK	10" / 3/4"			
5						
6						
7						
8						
9						
10						

Table 5636 - 2: Water Quality Results

	Building 5636 - Mayo ATB Day Use Building	GCDWQ Criteria		
SOURCE:				
Location/ Resident	Mayo			
Address				
Treatment	None			
Disinfection	None			
Source of Water	Water delivery			
Purpose of Sampling	Base Line			
Sample Location				
Date Sampled	N/A	Lower	Upper Limit	
Field Chemistry (EBA)		AO	MAC	AO
pH	8.31	6.5		8.5
TDS (ppm)	94			500
EC (uS/cm)	190			500
Temperature (°C)	15.1			
Free Available Chlorine	0.02			

Notes:

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

Italics and underline indicates exceedence of proposed MAC (ie. arsenic)

Bold with Yellow highlighting indicates exceedence of CDWQG Aesthetic Objective (AO)

Bold Underline with Yellow highlighting indicates exceedence of CDWQG MAC

Results are expressed as milligrams per litre except for pH and Colour (CU)

Conductivity (umhos/cm), Temperature (°C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)



EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel

Date August 17, 2005

WELL ID #	Owner	Location Description
5636	YTG	Mayo ATB Day Use Building

1. Well Location and Potential Contaminant Sources

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

Mayo

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

Mayo Airport

c. GPS location: N 7054867 E 456503 elev 509m ± 8m
of water storage tank

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 _____

Day Use Building → on water delivery

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

g. Nearest building, specify Water Storage Tank Located Outside 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: _____

k. Well location relative to field: upslope downslope lateral

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

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

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

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

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 *Tank is unlocked, located outside* Entrance by animals? Yes No *vermin proof fill. No vent*

p. Is well site subject to flooding? Yes No *n/a*

q. Is the well site well drained? Yes No *n/a*

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: Fire Retard Tanks; Distance from well to Potential Source 1: _____

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

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

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

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

How many? _____ in use abandoned require proper sealing

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

2. Well and Wellhead information:

- a. When was well installed? Year n/a - water delivery Month _____
- b. Type: drilled dug sand point other n/a
- c. Is there a drillers log for the well: Yes No n/a
- d. Is there a surface seal to 6 m Yes No unknown unlikely n/a
- e. Surface casing: Yes Diameter n/a No
- f. Well casing: Diameter n/a Material: steel plastic concrete
- g. Depth of well: n/a measured (if possible) reported from log
- h. Static water level below ground: n/a
 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 n/a
- j. (If bedrock) Does the well have a liner? yes No steel plastic
- k. If there is a well screen: length n/a slot size(s) _____
Location of screen: from _____ to _____ from log reported
- l. Is there a sump below the screen? Yes No n/a
- m. Is the well head: in pumphouse in pit pitless adaptor in a building
 in a wooden enclosure other, describe Tank is located outside building
- n. If the well head is located in a wooden enclosure,

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- i. Is the well head below grade? describe in detail n/a
 - ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? Yes No n/a
 - 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 n/a

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. n/a
- If yes is there treatment or disinfection Yes No
- Explain (filtration, disinfection etc...) _____

4. Aquifer Supplying This Well:

- a. The aquifer is: bedrock granular sediment unknown n/a
- b. Does water level and/or well capacity show seasonal fluctuation? Yes No n/a

5. Pump Installation:

- a. Is the ^{System} 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 _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- 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 *n/c*
- 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: Seasonal facility
- l. Comments on pump installation: _____

6. Conclusions

- a. Comments on overall installation:
System is on water delivery

TDS 94 ppm
EC 190 μ S
pH 8.31
Temp 15.1°C
FAC 0.02 mg/L

- b. Recommendations: _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

PART B: EBA Site Inspection

Inspector: _____

Date _____

WELL ID #	Owner	Location Description
5636	YTG	HAND DAY USE BUILDING

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 _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

- 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
MAYO TOWN WATER
- 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: OUTDOORS.

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: Poly TANK OUTDOOR

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: _____

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

Overall Tank

What are the tank size and dimensions?

825 HORIZONTAL CYLINDRICAL 84" x 40" HIGH

What material is the tank constructed of? POLYETHYLENE

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: EXPOSED TO DIRECT SUNLIGHT

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 IS A TYPICAL OUTDOOR TEMPORARY
CAMP SET UP.

b. Recommendations:

INSTALL DUPLEX INLINE FILTER 10 AND 1 MICRON
& 5 GPM NSF55 CERTIFIED UV SYSTEM.



Photo 033: 5636 Day use area and garage.



Photo 029: 5636 Seasonal water holding tank.



Photo 190: 5636 Jet pump and pressure tank.



Photo 036: 5636 Potential well location to service day use area and crew quarters.