11.0 BUILDING 1421: MENDENHALL FIRE HALL

11.1 Description of Existing Water Supply System

Building 1421, the Mendenhall Fire Hall, is currently serviced by a water supply system that delivers water from an approximately 43 m deep well (depth of well is anecdotal). The wellhead is located in a well house adjacent to the fire hall as indicated on Figure 1421-A. The coordinates of the wellhead, as measured by a hand held GPS device, were recorded as:

- UTM ZONE 8
- Northing: 6736960
- Easting: 436161

A site plan is provided as Figure 1421-A in Appendix A11.

Water from the well is delivered to an 8000 L storage tank located in the well house. From the initial storage tank the water is then pumped to a water fill station attached to the well house for use of local residents, a pressure tank inside the fire hall for domestic use, and two 5000 L storage tanks for fire fighting use. There is no treatment or disinfection system anywhere on the water supply system.

Field notes and a system schematic, shown by Figure 1421-B, are located in Appendix A11.

11.2 Description of Existing Wastewater Systems

The septic tank for the Mendenhall Fire Hall is located on the south side (opposite the well) of the fire hall, approximately 50 m from the wellhead. The septic tank discharges effluent to a field located south of the tank. The septic tank and effluent field are both located downslope from the well.

11.3 Water Quality Results

11.3.1 Water Quality Results from Previous Sampling

Bacteriological

Bacteriological sampling of water from the Mendenhall Fire Hall water system has previously been completed under a YTG contract. EBA was provided access to the YTG database in order to review the results of this previous bacteriological sampling. 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 1421-1.

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. Results of bacteriological testing on three occasions (Jan 10, 2004, July 7, 2003, Feb. 25, 2003) are also posted on the wall in the water fill station. Each of these samples did not have *E.Coli* nor Total Coliform present.

Detailed Potability Analyses

There were no water sample results available for review for this system prior to the system assessment. There is no treatment of any kind on the water system; decisions on additional analytical were made with this information in mind.

11.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Mendenhall Fire Hall that was included during the water system assessments is detailed below:

- UV absorbance, to determine potential for UV treatment as a disinfection option.
- Since there were no previous detailed potability results available for review, the Drinking Water Package was recommended. This analysis will aid in identifying the areas that will need to be given special attention with regards to further analysis and recommendations for a treatment system.
- Ammonia was also included.

- Measurements in the field for total dissolved solids, conductivity, pH, and temperature, as well as residual chlorine have been completed at the time of sampling for all systems.

Additional Analytical Results

Water samples were obtained during the water system assessment on May 10, 2005, and were submitted for analysis to ALS Environmental in Vancouver BC for UV absorbance, detailed potability, and an ammonia concentration analysis. These results are summarized in Table 1421-2 in Appendix A11 and the laboratory reports are included in Appendix B.

- The raw water quality for the sample obtained on May 10, 2005 indicated that the groundwater source was calcium bicarbonate type with very high hardness and a pH of approximately 8.
- At 0.0554 mg/L, the total uranium concentration exceeded the maximum acceptable concentration (MAC) of 0.02 mg/L.
- At 0.757 mg/L, the total iron concentration exceeded the Canadian Drinking Water Quality Guidelines (CDWQG) aesthetic objective of 0.3 mg/L.
- The water quality results indicated with the exception of uranium and turbidity, which exceeded the respective maximum acceptable concentrations (MAC) established within the CDWQG, all other tested parameters were below their respective CDWQG MACs.
- For all parameters analyzed, with the exception of iron, the aesthetic objectives set out in the CDWQG were met.
- The hardness (as $CaCO_3$) was reported to be 259 mg/L, may be considered poor for aesthetic purposes.

Upon receiving the water quality results, EBA notified Tom Renwick of the YTG Property Management Agency of the uranium exceedence. Tom Renwick then notified the YTG Environmental Health and Social Services (EHSS) Department of the exceedence. EHSS checked their records, and previous analytical testing completed on this system had similar uranium concentrations. Follow-up routine sampling completed by YTG PMA on June 15th 2005 confirmed the elevated iron, uranium and turbidity. It is our understanding that the Fire hall, and Mendenhall community members who utilize this well for drinking water have been notified by EHSS who have issued an advisory and held public consultation. The water source at present is not be used for a drinking water source.

11.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. The chloride concentration (4.69 mg/L) in the sample obtained on May 10, 2005 is relatively low and can be considered to be within the normal background ranges for groundwater in the area. Nitrate, nitrite, and ammonia concentrations for this sample are also relatively low and considered to be within the normal background range for the area. Therefore, these water quality results do not suggest that the aquifer from which the groundwater is obtained for Well 1421 is under the influence of surfacewater sources or septic wastes.

11.4 Conceptual Hydrogeology

The well log for this well has not yet been located. Well logs for four other wells within 1 km of the site; however, were available. The static water levels reported at the time of drilling were consistently greater than 15 m. The lithology of the area generally consists of sand, silt, gravel and cobbles overlying bedrock. The depth to bedrock varies from 3 m below grade to 30 m below grade. All wells drilled below 30 m in depth were completed in bedrock, and it is considered highly probable that Well 1421 is also completed in bedrock. There is insufficient information to establish a definite groundwater flow direction in this area; however, based on topography, and proximity to surfacewater, it is inferred that the groundwater flow direction is likely south or east. The depth of the wells in this area, and the deep sequence of overburden deposits over the bedrock decrease the vulnerability of the bedrock aquifer to surface sources of contamination.

11.5 Potential Contaminant Sources

Potential contaminant sources from observations during the site investigation are compiled in Table 1421-4 in Appendix A11. Photos of potential contaminant sources are also provided in Appendix A11.

Potential contaminant sources within 30 m of the wellhead included:

- Distance to ASTs: 1 m and 20 m.

11.5.1 Spills Records and Contaminated Sites Search Results

The Government of Yukon Environment Branch did not identify any recorded spill events, nor contaminated sites for this site or neighbouring sites.

11.6 Identified Water System Deficiencies and Associated Risk

11.6.1 High and Medium Risk Deficiencies

- Elevated uranium concentrations above CDWQG maximum acceptable concentration for drinking water;
- Elevated turbidity above 1 NTU;
- Lack of disinfection for a well that serves as a drinking water pick-up station and is accessible to the public, does not likely have a surface seal to 6 m below grade, and is less than 30 m from a part of the sewage system;
- 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.
- Poor storage tank design for the potable water within the pumphouse makes it inaccessible for cleaning, and the tank has likely never been cleaned which could lead to deterioration of water quality; and
- Above ground heating oil tank is within 2 m of the wellhead, and overfilling, spills or leaks could compromise the safety of the water supply.

11.6.2 Low Risk Deficiencies

Two other potential sources of contamination are within 30 m of the wellhead.

- The rock pit is approximately 30 m from the wellhead; however, given the distance, and depth of the well, it is not likely a significant concern.
- A double walled above ground storage 4500 L above ground storage tank is located approximately 20 m away from the wellhead on the other side of the Fire hall, and in a downslope direction. The tank has a Kam lock fitting for filling, and a small overflow container. Given the tank design, and the depth of the well, it is not likely a significant concern.

11.7 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).

11.7.1 Priority 1

- Install a point of entry (POE) treatment system for uranium removal. It is recommended that a suitable POE system be designed through small scale pilot testing, and that the system be installed in advance of the potable water storage tank. Uranium removal to below the CDWQG is necessary to utilize this water source as a drinking water supply.
- It is recommended that a commercially sized 1-micron NSF 61 certified filtration system (to reduce turbidity below 1 NTU, and prevent passage of protozoa) and a chlorine disinfection system be installed at the POE. The system should be equipped with a suitable digital dosing chlorine injection pump with spill containment deck and appurtenances.
- The 2000 US gal polyethylene tank should be dismantled and removed from the building and replaced with a sectional tank that can meet the demand of the fire hall and water pick-up station. It is anticipated that the tank could be replaced with a 1250 US gal tank of suitable design for potable water storage and with an accessible cleaning port. Once the tank is replaced, it is recommended that a regular cleaning program (every 6 months) be initiated.
- The above ground heating oil tank that is immediately adjacent to the pumphouse should be relocated. At the time of the assessment, it was noted that the pumphouse is equipped with an electric baseboard heater. The AST may not be in use, nonetheless, it should be relocated to a distance at least 30 m from the wellhead, and built on a platform with containment capacity.

These are conceptual design recommendations based on the information available for the purpose of planning and budgeting. Engineering input will be required for final system specifications.

11.7.2 Priority 2

No medium risk deficiencies were identified.

11.7.3 Priority 3

With approval of YTG Environmental Health, it is considered likely that for the reasons stated above, the set back distances to these two existing potential contaminant sources (rock pit and double walled AST) could be relaxed.

11.8 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.

11.8.1 Priority 1

- A point of entry (POE) treatment system for uranium removal is anticipated to cost in the order of **$5000** for materials and labour.
- The filtration system would cost approximately **$ 2500**.
- A chlorine injection system is estimated at **$5000** for materials and labour.
- The cost to remove and replace the existing water storage tank with a suitable tank is estimated to cost approximately **$4000** including parts and labour.
- Relocation of the above ground storage tank costs are negligible assuming that the tank is no longer needed. Allow **$100** for disposal.

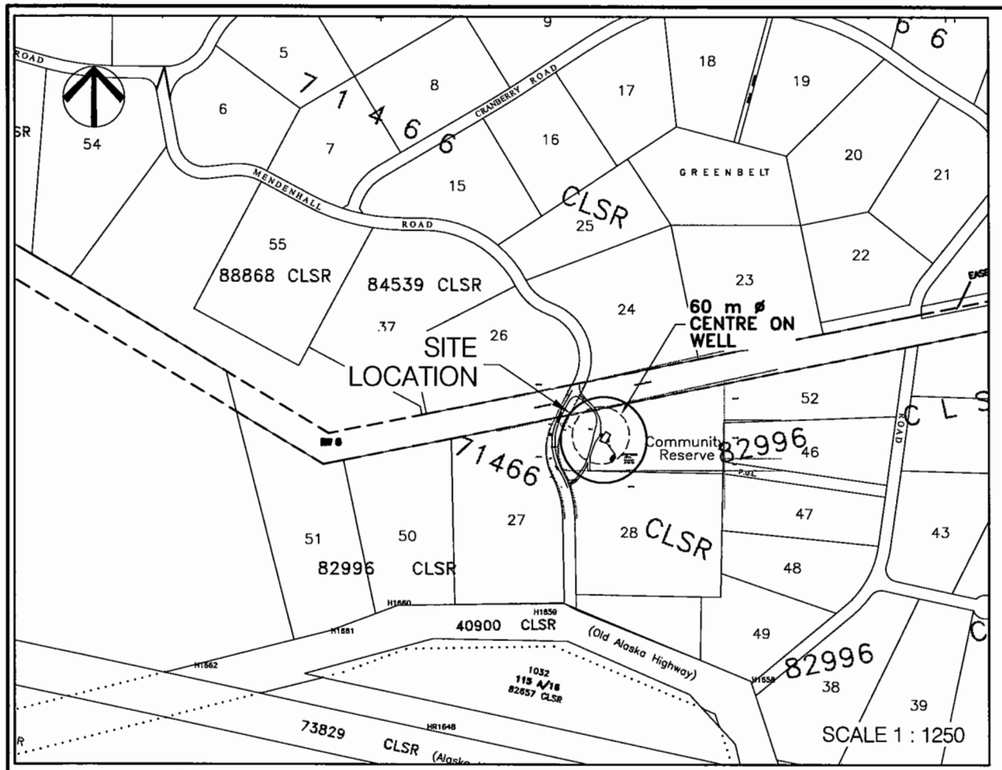
An additional 20% engineering and project management fee should be included, and a 20% contingency for budgetary purposes is suggested.

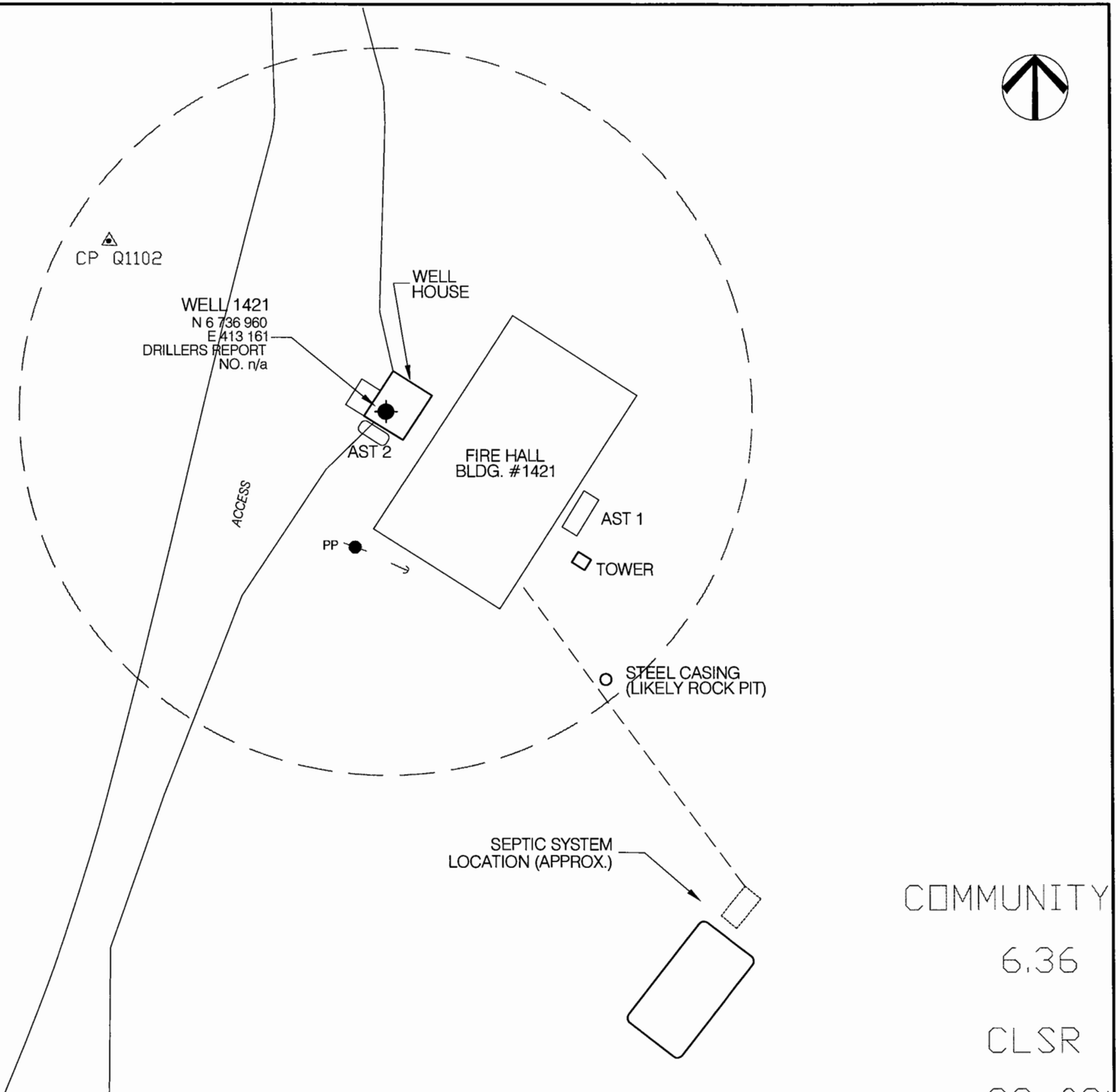
11.8.2 Priority 2

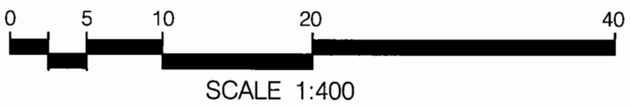
No medium risk deficiencies were identified.

11.8.3 Priority 3

Assuming that EHSS relaxes the setback distances for these potential contaminant sources in consideration of the hydrogeological conditions and the fact that the rock pit is 30 m and downslope from the well, and the UST has secondary containment and other anti spill devices, there would be no cost associated with these deficiencies.







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	DD/MM/YY	APPROVED
0	ISSUED FOR CLIENT REVIEW		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

MENDENHALL FIRE HALL
BUILDING 1421
SITE LOCATION DIAGRAM
WELL ID: 1421

REVISION ISSUE: 0

DRAWING No.: FIGURE 1421A

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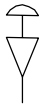
LEGEND


PUMP


PRESSURE GAUGE


GATE VALVE


CHECK VALVE

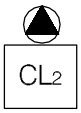

SOLENOID

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

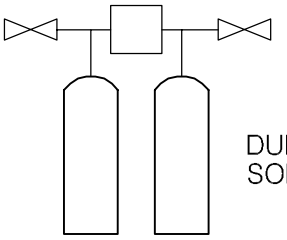
FLOW METER

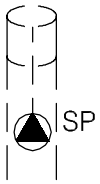
WATER FILTER
(CARTRIDGE TYPE)

PRESSURE TANK

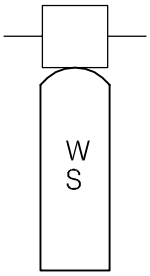


CHLORINE RESERVOIR AND
INJECTION PUMP


DUPLEX WATER
SOFTENER

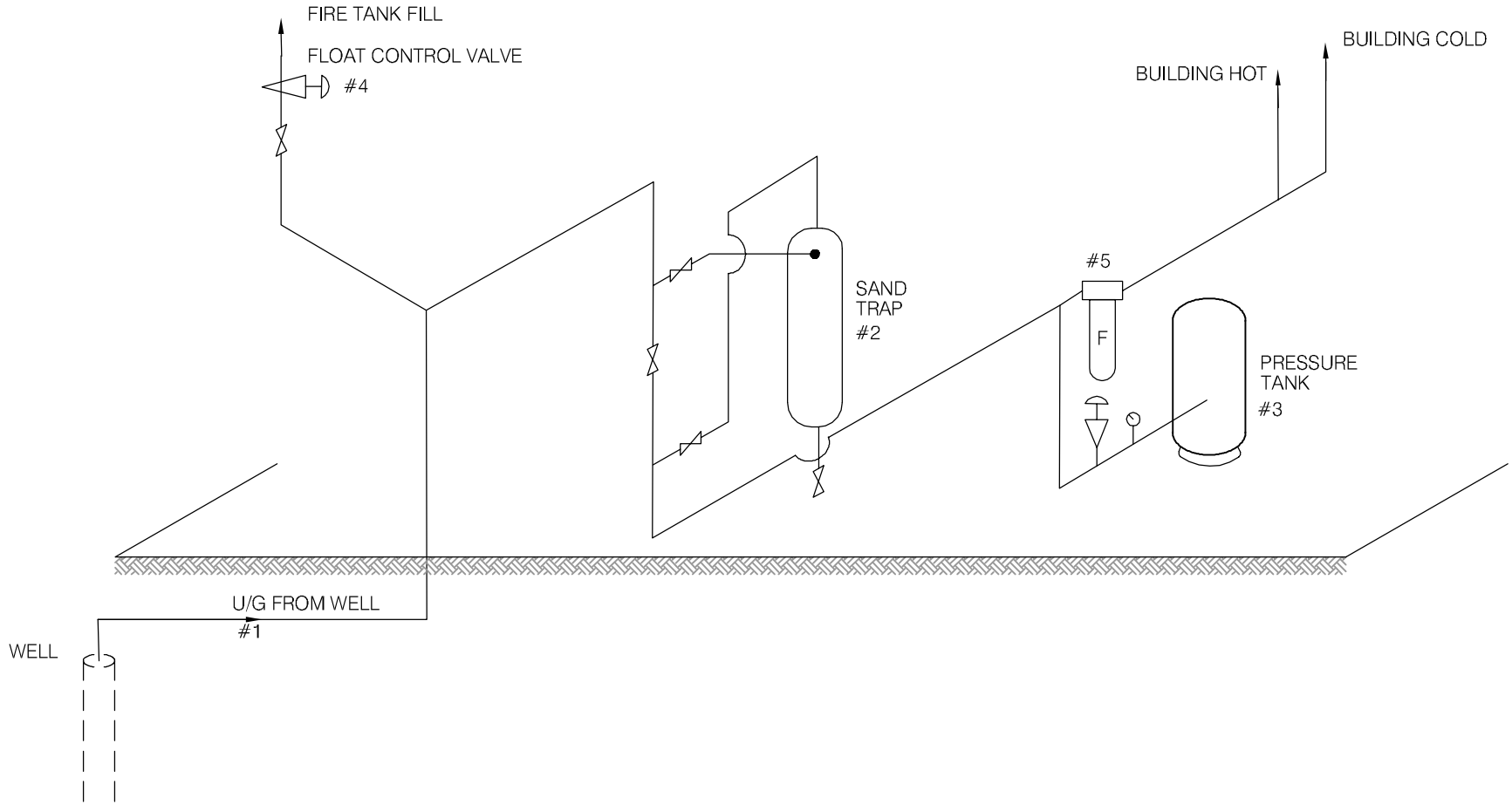


WELL WITH
SUBMERSIBLE PUMP



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.: 1391 HOOTALINQUA FIRE HALL	
DATE APRIL 2006	DWN. JSB	CHKD. RMM	FILE NO. 1260002.001		DWG.: FIGURE 1391B

Z:\0201Drawings\1260002 Water Assessment YTG\001 - Whitehorse Region\hootalinqua\1260002 Hootalinqua 1391 Schematic .dwg, 4/6/2006 9:48:34 AM, Adobe PDF, jbuyck

Whitehorse Region – Mendenhall Firehall
Building # 1421

DISTRIBUTION & TREATMENT SYSTEM DATA

Item	Description	Manufacturer	Model	Part No.	Serial No.	Size
1	WELL HOUSE STORAGE TANK		2000 VERT			2000 GAL
2	FIRE HALL STORAGE TANKS		1250 AG			1250 GAL
3	FIRE HALL STORAGE TANKS		1250 AG			1250 GAL
4	WELL PUMP ½ HP					4" x 1"
5	JET PUMP 1HP	MYERS	MJ100S-K			1¼ x 1"
6	PRESSURE TANK	WELL RITE	WRZ60R			32L
7	FILL CONTROL VALVE	ASCO				1" FIPT.
8						
9						
10						

TABLE 1421 - 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?
1421	Mendenhall Firehall	2	Apr-05 to May-05	no	0/2	no	May 05	no

Table 1421-2: Water Quality Results

SOURCE:	Building 1421 - Mendenhall Firehall			GCDWQ Criteria		
Location/ Resident	Mendenhall Subdivision					
Address						
Treatment	No					
Source of Water	On-Site Well					
Purpose of Sampling	Baseline	Additional Sampling	Baseline			
Sample Location	Mendenhall Community Association *(ASL)*					
Date Sampled	13-Mar-00	10-May-05	15-Jun-05	**Lower Limit**	**Upper Limit**	
Physical Tests *(ALS)*				**AO**	**MAC**	**AO**
Colour (CU)	<5	<5.0	<5			15
Conductivity (uS/cm)	563	575	579			
Total Dissolved Solids	347	355	353			500
Hardness CaCO3	240	259	275	AO >200 = poor, > 500 unacceptable[A]		
pH	7.87	8.22	7.87	6.5		8.5
Turbidity (NTU)	<0.1	**1.78**	**9.26**		1	5
UV Absorbance		<0.0010				
Dissolved Anions *(ALS)*						
Alkalinity-Total CaCO3	239	246	251			
Chloride Cl	2.4	4.69	4.85			250
Fluoride F	0.33	0.435	0.409		1.5	
Sulphate SO4	65	71.8	67.9			500
Nitrate Nitrogen N	0.2	0.24	0.22		10	
Nitrite Nitrogen N	<0.1	<0.10	<0.10		1	
Ammonia Nitrogen N		0.042				
Total Metals *(ALS)*						
Aluminum T-Al	0.008	<0.010	<0.010			
Antimony T-Sb		<0.00050	<0.0005		0.006	
Arsenic T-As	0.0001	0.00018	0.00012		0.025	
Barium T-Ba	0.037	0.043	0.041		1	
Boron T-B	<0.05	<0.10	<0.10		5	
Cadmium T-Cd	<0.0002	<0.00020	<0.0002		0.005	
Calcium T-Ca	68.8	72.6	77.7			
Chromium T-Cr	0.002	<0.0020	<0.0020		0.05	
Copper T-Cu	0.006	0.558	0.709		1	
Iron T-Fe	<0.03	**0.757**	**0.697**			0.3
Lead T-Pb	0.002	0.0034	0.0032		0.01	
Magnesium T-Mg	16.6	18.8	19.7			
Manganese T-Mn	<0.001	<0.0020	<0.0020			0.05
Mercury T-Hg	<0.00005	<0.00020	<0.0002		0.001	
Potassium T-K	3.63	3.4	3.31			
Selenium T-Se	0.002	0.0025	0.0019		0.01	
Sodium T-Na	24.7	24.6	23.2			200
Uranium T-U	**0.0622**	**0.0554**	**0.0578**		0.02	
Zinc T-Zn	0.019	0.091	0.091			5
Trihalomethanes						
Bromodichloromethane		-				
Bromoform		-				
Chloroform		-				
Dibromochloromethane		-				
Total Trihalomethanes		-			0.1	
Haloacetic Acids						
Bromoacetic Acid		-				
Bromochloroacetic Acid		-				
Chloroacetic Acid		-				
Dibromoacetic Acid		-				
Dichloroacetic Acid		-				
Trichloroacetic Acid (TCA)		-				
Field Chemistry (EBA)						
pH		7.76		6.5		8.5
TDS		276				500
EC (uS/cm)		535				
Temperature		17.4				
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 (^{o}C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)

Table 1421-3: 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)**
1421	**Mendenhall Fire Hall**	**Mendenhall**	6736960	436161	714

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	?	No	43.2	Likely Bedrock from ~4m to ~43m	?	1/2hp submersible pump Size of pump meets needs	?

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

Table 1421-4: Potential Contaminant Source
Building 1421 – Mendenhall Fire Hall

Potential Contaminant Source	Potential Contaminants	Distance from Water Source	Northing	Easting
Dump or Landfill	***Organic*** and inorganic chemicals.	>>120 m		
Cemetery	***Biological***[1]***,*** inorganic[2] and organic parameters.	>>120 m		
Sewage lagoon	***Biological,*** inorganic and organic parameters.	>>300 m		
Sewage lines, tanks and lift stations	***Biological,*** inorganic and organic parameters.	**Approx. 20 m**		
Septic fields	***Biological and Inorganic*** parameters.	Approx 50 m	6736913	436185
Gas stations	***Organic and Inorganic*** parameters.	>>30 m		
Undergrounds Fuel Storage Tanks (USTs)	***Organic*** parameters.	>>30 m		
Above ground storage tanks (ASTs)	***Organic*** *parameters****.***	**1 m, 20 m**	6736960 6736956	436161 436175
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.

Creating and Delivering Better Solutions

*No Log, must Fill in Missing Information at a later Time

SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel Date May 10, 2005

WELL ID #	Owner	Location Description
1421	YTG	Mendenhall Fire Hall

1. Well Location and Potential Contaminant Sources

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

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

c. GPS location: 0436161 Easting; 6736960 Northing; elev: 714m; ±10m

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_____
There is a public filling station and a firehall supplied from the well

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

f. Nearest building, specify Mendenhall Fire Hall

g. Distance from well to building 7m to fire hall

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

i. Distance from well to nearest point of known field: ~60m

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

GPS Septic Tank/Effluent Field
0436189 Easting
6736913 Northing ±5m
721m Elevation

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
Effluent field/Septic Tank 50m 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
There is, however, a small recycling depot

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
The well is located inside a locked wellhouse with a cement floor

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

p. Is the well site well drained? ☒ Yes ☐ No
It is unlikely that any surface water will enter the well house

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

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: AST2 ; Distance from well to Potential Source 1: Adjacent to well house ~1m

Potential Source 2: AST1 ; Distance from well to Potential Source 2: 20m

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

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

436165
6736956
72Yw
±11m

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

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

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
Yet to be found

d. Is there a surface seal to 6 m ☐ Yes ☐ No ☐ unknown ☒ unlikely

e. Surface casing: ☐ Yes Diameter _____ ☒ No
The well head is within only a well house

f. Well casing: Diameter 15cm (6") Material: ☒ steel ☐ plastic ☐ concrete

g. Depth of well: 240' ☐ measured (if possible) ☒ reported ☐ from log

* h. Static water level below ground: cannot access

☐ 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
Heated and well insulated pumphouse

☐ 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 No, 43cm above grade, 26cm above concrete floor

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
The well house is well insulated and heated

iv. Any evidence of rodents? Specify There is no evidence, however it appears that the wellhouse is regularly cleaned, No mouse traps

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…) _____

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4. Aquifer Supplying This Well:

a. The aquifer is: ☐ bedrock ☐ granular sediment ☒ unknown
likely bedrock based on well log information from other wells in the area that are of similar depth.

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

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: It is all contained within a well insulated and heated well-house

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

See report

b. Recommendations: See report

PART B: EBA Site Inspection

Inspector: BERT ALBISSER Date MAY 10/05

WELL ID #	Owner	Location Description
1421	VTG	MENDEN HALL SUBDIVISON

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 ☐ H_2S ☐ Other _____

d. Is there an unpleasant taste? ☐ Yes ☑ No ☐ brackish ☐ Other _____

e. Is there a history of bad bacterial analyses? ☐ Yes ☑ No

f. Is there a chemical analysis? ☐ Yes ☑ No ☐ adequate ☐ incomplete

g. Is there analysis of trihalomethanes (THMs) where the water source is a surface water supply or a well under the direct influence of surface water? ☐ Yes ☑ No

h. Is the drinking water tested daily with an accurate reading chlorine test kit capable of reading in the range 0 to 3.5 mg/L of free chlorine residual in increments of 0.1mg/L? ☐ Yes ☑ No ☐ unknown

i. If yes is the test performed in accordance with manufactures directions? ☐ Yes ☑ No ☐ unknown

j. Is a record of the date, time,name of person performing the test and results of the drinking water sample kept? ☐ Yes ☑ No

TANK AND PIPING DETAILS

Tank Room

Is there a water tank? (Yes) No Details:

Where is it located?
Comments: 1-2000 GAL IN WELL HOUSE / 2- 1250 GAL IN FIREHALL

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?

2000 Gal / 84" x 115" / 1250 AG.

What material is the tank constructed of? 2000 PE / 1250 FG.

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 FG / YES / PE

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:

PE TANK IN WELLHOUSE IS NOT SUITABLE FOR STORAGE OF DRINKING WATER.
NO TREATMENT IS IN PLACE.
TANK ACCESS IS NOT SUITABLE FOR CLEANING.

b. Recommendations:

REPLACE TANK IN WELL HOUSE WITH A TANK SIZE THAT IS ACCESSABLE FOR CLEANING. INITIATE REGULAR CLEANING SCHEDULE & INSTALL LIQUID CHLORINATION SYSTEM AND SCHEDULE REGULAR CHLORINE RESIDUAL [redacted] TESTING.

PART C: Property Manager/ System Operator Questionnaire

Inspector: TERRY JACKSON Date May 10/05

Property manager: YTG. Mendenhall fire Hall

1) Water Source:

a. Is the well water the major source of drinking water? ☑ Yes ☐ No

b. Is the well water used for other non-drinking purposes? ☑ Yes ☐ No

2) Well information:

a. When was your well installed? Year _____ Month _____

b. Type: ☑ drilled ☐ dug ☐ sand point ☐ other _____

c. Is there a driller's log for the well?: ☑ Yes ☐ No

d. Do you know the depth of your well? If so, please indicate: 240

e. Who was the well constructed by?

Indicate contractor's name: _____

f. Are you, the owner ☐ Yes or other: YTG

g. Who maintains the well? _____

h. Are there other wells on this property? ☐ Yes ☑ No

How many? ____; Are they: ☐ in use ☐ abandoned ☐ require proper sealing

i. Is there a buried fuel tank on the property? ☐ Yes ☑ No

If yes, is it ☐ in use ☐ abandoned

Is the location known? _____

How was it abandoned? _____

3) Pump Installation

a. Who installed your pump, and when did they install it? _____

b. What type of pump do you have? _____

c. Pump delivers water to: ☐ pressure tank ☑ elevated tank ☐ other _____

4) Water Treatment

a. Is your well water treated? ☐ Yes ☑ No

Type of treatment: ☐ chlorination ☐ iron and or manganese removal
other _____

5) Well Capacity:

a. Well capacity: User's opinion ☑ adequate ☐ inadequate

b. Are there any times of year when your well goes dry, or does not produce enough water?
_____

c. Has well capacity decreased since it was installed? ☐ Yes ☑ No

6) Water Quality:

a. In general, do you like your water?: ☑ yes ☐ no

b. Does the water stain household plumbing? ☐ yes ☑ No ☐ slight ☐ severe

Type of stain: ☐ brown ☐ red ☐ black

c. Does the water contain sediment? ☐ Yes ☑ No ☐ occasional ☐ constant

d. Is there an unpleasant odour? ☐ Yes ☑ No

☐ Sulpher (rotten egg smell) ☐ Other _____

e. Is there an unpleasant taste? ☐ Yes ☑ No ☐ brackish ☐ Other _____

f. Hardness: Is it hard to lather with soap?: ☐ yes, very ☐ moderate ☑ no

g. Is water softener being used? ☐ Yes ☑ No

h. Are samples for bacterial analysis (coliforms) taken regularly? ☐ Yes ☐ No
If so, at what time intervals? _____
Who takes them? _____

i. Is there a history of bad bacterial analyses? ☐ Yes ☐ No

j. Is there a chemical analysis? ☐ Yes ☐ No ☐ adequate ☐ incomplete

7) Do you have any overall comments or complaints about your water well system?

_____

_____

Photo 0091: 1421 Well house, Above Ground Storage Tank and Water-Pickup (front) and Mendenhall Firehall (back)

Photo 0087: 1421 Wellhead

Photo 0093: 1421 Above Ground Storage Tank

Photo 0094: 1421 Septic Field (front) and Mendenhall Firehall (back)

Photo 0089: 1421 Water-Pickup

Photo 0098: 1421 Pressure Tank and System

Photo 0088: 1421 Water Resevoir (in wellhouse)

Photo 0097: 1421 Water Storage Tanks (in firehall)