

21.0 BUILDING 3957: DESTRUCTION BAY HEALTH CENTRE

21.1 Description of Existing Water Supply System

Building 3957, the Destruction Bay Health Centre, is currently served by a water supply system that delivers water from an approximately 68.9 m deep artesian well. In addition to serving the health centre, the well also serves two nursing residences (referred to as Nursing Residence #1 and Nursing Residence #2). The well is located in a pumphouse near Nursing Residences # 1. The well location and other details about the surrounding area are provided in Figure 3957-A in Appendix A21. The coordinates of the wellhead, as measured by a handheld GPS device, were recorded as:

- UTM ZONE 7
- Northing: 6792941
- Easting: 617983

The system is equipped with a water softener, a pH neutralizer, and a colour removal system. The treatment system is located in one of the nursing residences and is piped to the health centre. Nursing residence #2 was formerly served by an independent well, but that well has been abandoned and this residence is currently served by this well. The reason for the well abandonment is unknown. Proper infrastructure connecting Nursing Residence # 2 to this water system was not completed at the time of the water system assessment, but was temporarily connected through a garden hose from Nursing Residence # 1. Nursing Residence # 1, in addition to other treatment mentioned, is equipped with a reverse osmosis treatment system at the point of use in the kitchen. A schematic detailing the well supply system is provided as Figure 3957-B in Appendix A21.

21.2 Description of Existing Wastewater Systems

All three buildings served by this water system use a community sewer collection system. There is a community septic field located approximately 65 m east and downgradient from the well, and another community septic field located approximately 75 m northwest and potentially upgradient from the well. A site plan showing both community septic fields is given by Figure 3957-A in Appendix A21.

21.3 Water Quality Results

21.3.1 Water Quality Results from Previous Sampling

Bacteriological

Nine samples were collected from the Destruction Bay Health Centre water system between September 2004 and June 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 3957-1 in Appendix A21. Coliform bacteria and *E. coli* were reported as absent in each of the nine samples for which results are provided.

Potability

Water samples were previously collected from the Destruction Bay Health Centre water system on September 21, 2004 and June 15, 2005. The samples were submitted to Northwest Labs in Surrey, BC and ALS Environmental in Vancouver, BC for potability analyses. The results of these analyses are summarized in Table 3957-2 in Appendix A21. EBA reviewed the analytical results to compare them with the Canadian Drinking Water Quality Guidelines (CDWQG) to observe general water quality, identify and recommend additional sampling and analytical, and to identify indicators of potential contamination.

- The arsenic concentration during the first sampling event was 0.0148 mg/L, and 0.114 mg/L during the second sampling event, which although is not in exceedence of the current CDWQG MAC of 0.025 mg/L, is in exceedence of the proposed new MAC of 0.005 mg/L;
- The pH was 8.79 during the first sampling event and 8.68 during the second sampling event, and is in exceedence of the CDWQG aesthetic objective of 8.5;
- The water quality results indicated that the groundwater from which this system receives its water supply is highly mineralized. Although the low hardness indicates that the water softener is functioning properly, the most recent sampling event reported that the total dissolved solids concentration as 525 mg/L, which is in exceedence of the CDWQG aesthetic objective of 500 mg/L; and,
- The water quality results indicated that all other health based and aesthetic objectives were met for the parameters analyzed.

21.3.2 Identification of Additional Analytical Testing Required

Additional analytical for the Destruction Bay Health Centre that was identified to be included during the water system assessments is detailed below:

- Total and dissolved arsenic as arsenic had been in exceedence of the new proposed CDWQG MAC;
- Total and dissolved vanadium, as well as silica and phosphate to determine potential for a point of entry arsenic removal system;
- UV absorbance and UV transmissivity, as well as tannins and lignin, to determine potential for UV treatment as a disinfection option for this water system;
- Total organic carbon (TOC); and,
- Measurements in the field for total dissolved solids, conductivity, pH, and temperature.

Additional Analytical Results

A water sample was obtained during the water system assessment on July 28, 2005, and was submitted to ALS Environmental in Vancouver, BC for analysis. These results are summarized in Table 3957-2 in Appendix A21 and the laboratory reports are included in Appendix B.

- The total arsenic concentration was 0.012 mg/L, which is above the proposed maximum acceptable concentration of 0.005 mg/L. Since the dissolved arsenic concentration was 0.0119 mg/L, the arsenic concentration can be entirely attributed to dissolved particles; and,
- The water quality results from additional analytical sampling indicated that all other health based and aesthetic objectives were met for the parameters analyzed.

21.3.3 Indicators of Potential Contamination

Chloride, nitrate and nitrite concentrations can indicate impacts from surfacewater sources or septic waste. Chloride concentrations were slightly elevated, however, this may be a result of the water treatment system. Raw water quality results were not available for review. Nitrate and nitrite concentrations for this sample were low and within the normal background range for this area. These water quality results do not suggest that the aquifer from which the groundwater is obtained for the Beaver Creek Health Centre is under the influence of surfacewater sources or septic wastes.

21.4 Conceptual Hydrogeology

The log for this well indicates that the well was originally drilled to a depth of 25.2 m and completed within a gravel aquifer. Several years later it appears that the well was deepened to 68.9 m and completed within a confined artesian aquifer. The well log indicates variable gravel, silt, clay and till with a significant confining layer from 46.9 to 60.3 m. This is the only known artesian well in the Destruction Bay area. The depth of this well, presence of a confining layer, and artesian flow indicate that there is significant protection from surficial sources of contamination. The expected direction of groundwater flow in the vicinity of the site is likely east towards Kluane Lake.

21.5 Potential Contaminant Sources

Potential contaminant sources from observations during the water system assessment are compiled in field notes in Appendix A21. Photos of potential contaminant sources are also provided in Appendix A21.

Potential contaminant sources within 30 m of the wellhead are:

- An indoor fuel storage tank at 20 m; and,
- An above ground fuel storage tank at 26 m.

In addition an abandoned well is located on the property. The closest portion of a septic system to the well is a septic field located at 65 m.

21.5.1 Spills Records and Contaminated Sites Search Results

The Environment Canada Environmental Protection Branch did identify recorded spill events near this site.

On September 26, 2003, approximately 500 L of diesel fuel spilled at the Yukon Electrical Company complex in Destruction Bay due to a faulty vent. The spill had reportedly been cleaned up but the soil was reportedly not removed.

There had been multiple spill events of raw sewage due to failures with the community sewage system in Destruction Bay. On two occasions in 1993, a mechanical failure caused approximately 37 800 L and 11 340 L of raw sewage to spill. The sewage had in both cases reportedly flowed over the ground surface and ponded near Kluane Lake. Additionally, four recorded spill events occurred in 1995 and 1996 caused by leaking or broken sewer mains, spilling raw sewage in the Destruction Bay area. Two events recorded spills of approximately 200 L each, but the other two events spilled an unknown amount.

The Government of Yukon Environmental Programs Branch and Environment Canada Environmental Protection Branch did not identify any other recorded spill event or any contaminated sites issues for this site or neighbouring sites. Spill records are provided in Appendix A21.

21.6 Identified Water System Deficiencies and Associated Risk

21.6.1 High and Medium Risk Deficiencies

- Poor surface completion of the well (located in an enclosure below grade);
- There is no surface sanitary seal (grout or bentonite seal as required by the Canadian Groundwater Association's Guidelines for Water Well Construction;
- By definition of the Draft Yukon GUDI Assessment Guideline, the well is potentially under the direct influence of surface water because does not meet the requirements of the Guidelines for Water Well Construction;
- The well is located approximately 60 m downgradient from a community septic field; and,
- There is no disinfection system.

21.6.2 Low Risk Deficiencies

- The well is within 30 m of an above ground fuel storage tank located in Nursing Residence #1, however, since the well is 26 m away and in a building, it is considered to pose minimal risk;
- The well is located approximately 36 m downgradient from an underground fuel storage tank;
- The arsenic concentration, although not in exceedence of the current MAC, has consistently been in exceedence of the proposed new CDWQG MAC of 0.005 mg/L. The most elevated reported concentration was 0.0148 mg/L;

- The pH has consistently been in exceedence of the CDWQG aesthetic objective of 8.5 and elevated above the normal background pH for the region. Field measurements reported the pH to be 9.11. This is likely caused over-adjustments by the pH neutralizer, and the pH would likely drop if the neutralizer were properly adjusted;
- At 525 mg/L, the most recent previous sampling event reported the total dissolved solids concentration to be in exceedence of the CDWQG aesthetic objective of 500 mg/L; and,
- The NSF 61 filtration system has not been installed to code.

21.7 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).

It is assumed that a proper water distribution line has been installed to Nursing Residence #2 to replace the garden hose connection that was observed at the time of the assessment. If this is not completed, it should be done as soon as possible.

21.7.1 Priority 1

The following recommendations are provided in order to mitigate deficiencies that are of immediate concern for the Destruction Bay Health Centre Building and Nursing Residences. Priority 1 remedial recommendations include:

- Superchlorinate the well and water system, and install a chlorination tap at the wellhead for future disinfection; and,
- Install filtration (to 1 micron absolute) and NSF/ANSI 55 certified UV disinfection system in Nursing Residence # 1 to provide disinfected water to all buildings.
- Bring filter installation to code (NSF 61) by ensuring proper air gaps on drains and restraint on tanks. Adjust pH neutralizer to bring pH down to below 8.5 pH units.

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

21.7.2 Priority 2

Priority 2 upgrade options to mitigate long-term risk and meet the proposed regulation would include standard wellhead improvements consisting of a pitless unit installation, extending the casing to at least 500 mm above grade, and retrofitting of a surface sanitary seal (grout or bentonite to at least 3 m in depth).

21.7.3 Priority 3

For Priority 3 upgrades, it is recommended that point of use RO systems be installed in the Health Centre and Nursing Residence # 2 and to provide drinking water that will meet proposed PMAC for arsenic and lower TDS.

21.8 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.

21.8.1 Priority 1

The estimated costs for the recommended Priority 1 upgrades are detailed below:

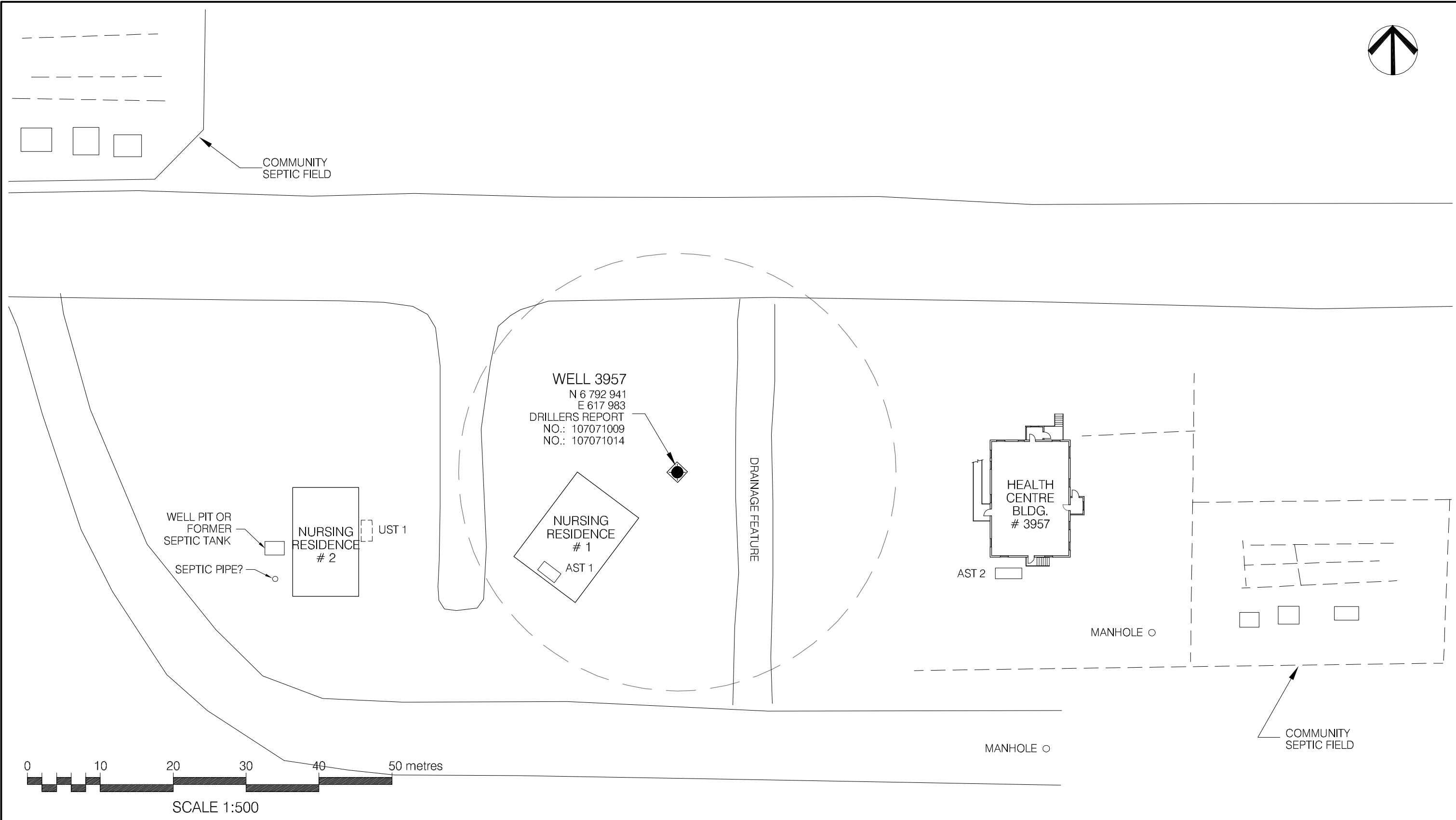
- Installation of a chlorine tap on the wellhead, and superchlorination of the well and water system would cost approximately **\$400** for materials and labour.
- A UV system and filtration would cost approximately **\$3,000**.
- Alterations to the filtration system and adjustment of the pH neutralizer would cost in the order of **\$200**.

21.8.2 Priority 2


Standard wellhead upgrades with a pitless unit and retrofitting of a surface seal would cost approximately **\$5,000** for materials and labour.

21.8.3 Priority 3

Point of use Reverse Osmosis systems could be installed for approximately **\$700** per system for a total of **\$1,400** including materials and labour.



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.

PLAN IS BASED UPON FIELD MEASUREMENTS ONLY AS EXISTING PLANS, IF IN EXISTANCE, WERE NOT ABLE TO BE LOCATED.

| 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: AUG. 2005
 SCALE: AS SHOWN
 PROJECT No.: 1260002.003
 ACAD FILENAME: 003-WESTERN REGION

CLIENT:

Yukon
 Highways and Public Works
 Property Management Branch

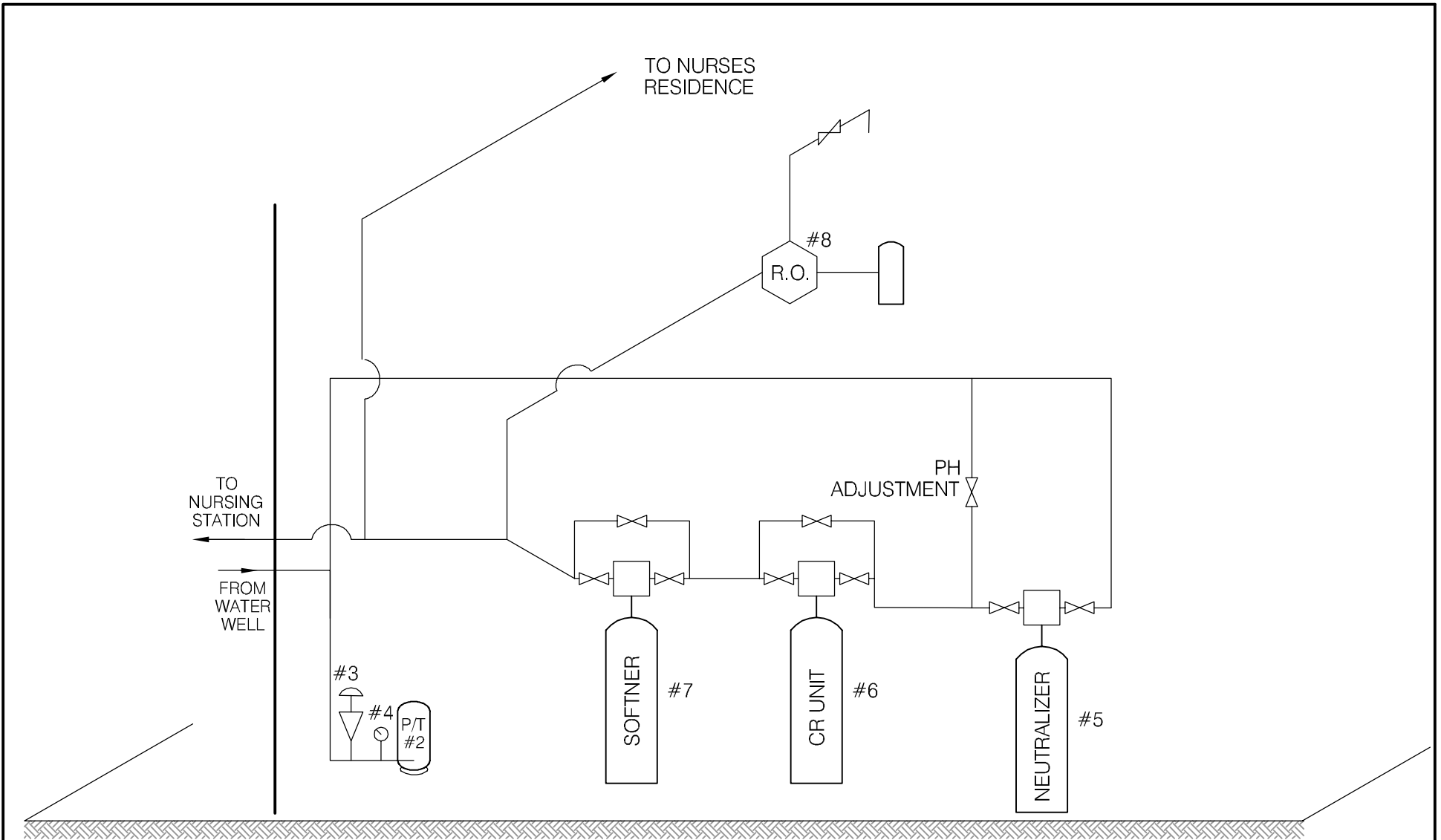
SMALL PUBLIC WATER SYSTEMS ASSESSMENT
 WESTERN REGION

GOVERNMENT OF YUKON
 HIGHWAYS & PUBLIC WORKS



DESTRUCTION BAY HEALTH
 CENTRE BUILDING # 3957
 SITE LOCATION DIAGRAM
 WELL ID: 3957

REVISION ISSUE
 0

FIGURE No.
 FIGURE 3957A



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

| | | | |
|---|------------|---|---------------|
|  EBA Engineering Consultants Ltd. | | PROJECT SMALL PUBLIC WATER SYSTEMS ASSESSMENT WESTERN REGION | |
| CLIENT  | | TITLE WATER SYSTEM DISTRIBUTION/TREATMENT SCHEMATIC SYSTEM ID.: 3957 DESTRUCTION BAY HEALTH CENTRE | |
| DATE | SEPT. 2005 | DWN. | JSB |
| CHKD. | FMM | FILE NO. | 1260002.003 |
| | | DWG.: | FIGURE 3957-B |

**Western Region – Destruction Bay Health Centre
Building # 3957**

DISTRIBUTION & TREATMENT SYSTEM DATA

| Item | Description | Manufacturer | Model | Part No. | Serial No. | Size |
|------|-----------------|--------------|---------------|-------------|------------|--------------|
| 1 | SUB PUMP. | MONARCH | | | | 4" |
| 2 | PRESSURE TANK | CHALLENGER | PC66 | | | 20 GALLON |
| 3 | PRESSURE SWITCH | SQUARE D | FSG-2 | | | 2HP 1/4" NPT |
| 4 | PRESSURE GAUGE | MARSH | 2" (0-100PSI) | | | |
| 5 | NEUTRALIZER | AQUA TECH | 1.5 Corosey | L5600CC-1.5 | 3330998 | 10" x 54 |
| 6 | COLOR REMOVAL | AQUA TECH | L5600-2.0 | L5600CC-2.0 | 3375876 | 12 x 52 |
| 7 | WATER SOFTENER | AQUA TECH | L5600-3MI | | 3375645 | 10 x 47 |
| 8 | R.O SYSTEM | ELITE | TFC24 | | | 24 GPD. |
| 9 | | | | | | |
| 10 | | | | | | |

TABLE 3957- 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 | | | | | | | |
| 3957 | Destruction Bay Health Centre | 9 | Sept-04 to Jun-05 | no | 0/9 | no | 16-Jun-05 | no |



Table 3957-2: Water Quality Results

| SOURCE: | | Building 3957 - Destruction Bay Health Centre | | | GCDWQ Criteria | | |
|------------------------------------|--|---|---------------|-----------------------|---|-------------|------|
| Location/ Resident Address | | Destruction Bay | | | | | |
| Treatment Disinfection | | Water softener, pH neutralizer and colour remover None | | | | | |
| Source of Water | | On-site well | | | | | |
| Purpose of Sampling | | Base Line | Base Line | Additional Analytical | | | |
| Sample Location | | | | | | | |
| Date Sampled | | 21-Sep-05 | Jun-15-05 | 28-Jul-05 | Lower | Upper Limit | |
| Physical Tests (ALS) | | | | | AO | MAC | AO |
| Colour (CU) | | <5 | <5.0 | - | | | 15 |
| Conductivity (µS/cm) | | | 810 | - | | | |
| Total Dissolved Solids | | 490 | 525 | - | | | 500 |
| Hardness CaCO ₃ | | <0.9 | <3.3 | - | AO >200 = poor, > 500 unacceptable ^A | | |
| pH | | 8.79 | 8.68 | - | 6.5 | | 8.5 |
| Turbidity (NTU) | | 0.6 | 0.45 | - | | 1 | 5 |
| UV Absorbance | | | | 0.0080 | | | |
| % UV Transmittance | | | | 98.2 | | | |
| Dissolved Anions (ALS) | | | | | | | |
| Alkalinity-Total CaCO ₃ | | 121 | 122 | - | | | |
| Chloride Cl | | 8.9 | 7.68 | - | | | 250 |
| Fluoride F | | 0.14 | 0.208 | - | | 1.5 | |
| Silicate SiO ₄ | | | | 14.4 | | | |
| Sulphate SO ₄ | | 169 | 190 | - | | | 500 |
| Nitrate Nitrogen N | | <0.1 | <0.10 | - | | 10 | |
| Nitrite Nitrogen N | | <0.05 | <0.10 | - | | 3.2 | |
| Ammonia Nitrogen N | | | | - | | | |
| Total Phosphate PO ₄ | | | | 0.0238 | | | |
| Total Metals (ALS) | | | | | | | |
| Aluminum T-Al | | <0.005 | <0.050 | - | | | |
| Antimony T-Sb | | <0.0002 | <0.0025 | - | | 0.006 | |
| Arsenic T-As | | <u>0.0148</u> | <u>0.0114</u> | <u>0.0120</u> | | 0.025 | |
| Barium T-Ba | | <0.001 | <0.10 | - | | 1 | |
| Boron T-B | | 1.31 | 1.28 | - | | 5 | |
| Cadmium T-Cd | | <0.00001 | <0.0010 | - | | 0.005 | |
| Calcium T-Ca | | | <0.50 | - | | | |
| Chromium T-Cr | | <0.0005 | <0.010 | - | | 0.05 | |
| Copper T-Cu | | 0.006 | 0.190 | - | | 1 | |
| Iron T-Fe | | 0.04 | 0.207 | - | | | 0.3 |
| Lead T-Pb | | 0.001 | 0.0064 | - | | 0.01 | |
| Magnesium T-Mg | | | <0.50 | - | | | |
| Manganese T-Mn | | <0.005 | <0.010 | - | | | 0.05 |
| Mercury T-Hg | | | <0.00020 | - | | 0.001 | |
| Potassium T-K | | | 222 | - | | | |
| Selenium T-Se | | | <0.0050 | - | | 0.01 | |
| Sodium T-Na | | 4.8 | 22.9 | - | | | 200 |
| Uranium T-U | | <0.0005 | <0.00050 | - | | 0.02 | |
| Vanadium T-V | | | | <0.030 | | | |
| Zinc T-Zn | | 0.007 | <0.25 | - | | | 5 |
| Dissolved Metals (ALS) | | | | | | | |
| Aluminum D-Al | | | | - | | 0.1 | |
| Antimony D-Sb | | | | - | | 0.006 | |
| Arsenic D-As | | | | <u>0.0119</u> | | 0.025 | |
| Barium D-Ba | | | | - | | 1.0 | |
| Boron D-B | | | | - | | 5 | |
| Cadmium D-Cd | | | | - | | 0.005 | |
| Calcium D-Ca | | | | - | | | |
| Chromium D-Cr | | | | - | | 0.05 | |
| Copper D-Cu | | | | - | | | 1.0 |
| Iron D-Fe | | | | - | | | 0.3 |
| Lead D-Pb | | | | - | | 0.01 | |
| Magnesium D-Mg | | | | - | | | |
| Manganese D-Mn | | | | - | | | 0.05 |
| Mercury D-Hg | | | | - | | 0.001 | |
| Potassium D-K | | | | - | | | |
| Selenium D-Se | | | | - | | 0.01 | |
| Sodium D-Na | | | | - | | | 200 |
| Uranium D-U | | | | - | | 0.02 | |
| Vanadium D-V | | | | <0.030 | | | |
| Zinc D-Zn | | | | - | | | 5.0 |
| Organic Parameters | | | | | | | |
| Tannin and Lignin | | | | <0.10 | | | |
| Total Organic Carbon C | | | | 0.52 | | | |
| Field Chemistry (ERA) | | | | | | | |
| pH | | | | 9.11 | 6.5 | | 8.5 |
| TDS (ppm) | | | | 414 | | | 500 |
| TC (µS/cm) | | | | 836 | | | |
| Temperature (°C) | | | | 21.7 | | | |
| Free Available Chlorine | | | | | | | |

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 (µmhos/cm), Temperature (°C) and Turbidity (NTU)

< = Less than the detection limit indicated.

AO = Aesthetic Objective

MAC = Maximum Acceptable Concentration (Health Based)



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SMALL PUBLIC WATER SYSTEM ASSESSMENT

PART A: EBA Site Inspection

Inspector: Ryan Martin, Luke Lebel

Date July 28, 2005

| WELL ID # | Owner | Location Description |
|-----------|-------|-------------------------------|
| 3957 | YTG | Destruction Bay Health Centre |

1. Well Location and Potential Contaminant Sources

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

Destruction Bay

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

Km 1743 Alaska Highway

c. GPS location: N 6792941 E 617983 elev 798m ± 15m

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 _____

Health Centre and 2 Nursing Residences

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

g. Nearest building, specify Located inside pump house

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: community septic @ ~60m and ~60m upslope
downslope

k. Well location relative to field: upslope downslope lateral

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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

Service lines, likely mains

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

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

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
Pumphouse is unlocked

Entrance by animals? Yes No
Evidence of mice, squirrels, and insects

p. Is well site subject to flooding? Yes No

q. Is the well site well drained? Yes No

r. 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 ~36m

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: Indoor AST 1; Distance from well to Potential Source 1: ~20m

Potential Source 2: AST 2; Distance from well to Potential Source 2: ~26m

Potential Source 3: _____; 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? 1 in use abandoned require proper sealing

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2. Well and Wellhead information:

- a. When was well installed? Year 1989 Month October
Deepened in September 1993
- 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 15 cm Material: steel plastic concrete
- g. Depth of well: 226 ft 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 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 ~ 0.35 m below grade
- ii. Are there signs of ponding on the enclosure(e.g. water stains, etc.)? Yes No
rust on casing
- iii. Is the wellhead enclosed by fiberglass insulations? Yes No *styrofoam*
- iv. Any evidence of rodents? Specify Mice and Squirrels
- v. Does the well casing have a proper seal cap? Yes No

If no, describe condition split gasket cap modified for artesian well

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 or disinfection 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
capacity reduces to less than artesian when pumped for a period of time

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 unknown

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: Heat trace and insulation

l. Comments on pump installation: _____

6. Conclusions

a. Comments on overall installation:

One of the nursing residences is only supplied by a garden hose.

b. Recommendations: _____

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PART B: EBA Site Inspection

Inspector: BERT ALBISSER

Date JULY 28/05

| WELL ID # | Owner | Location Description |
|-----------|-------|----------------------|
| 3957 | YTG | D BAY HEALTH CENTRE |

6. Water Treatment

- a. Is well water treated? Yes No; Type of treatment:
- chlorination iron and or manganese removal other NEUTRALIZER FILTER
CR FILTER
WATER SOFTENER
R.O SYSTEM (NURSES RES)
- 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
- 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: PRESSURE TANK.

Where is it located?

Comments: NUREES RESIDENCE 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: _____

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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Creating and Delivering Better Solutions

8. Conclusions

a. Comments on overall installation:

THIS IS A REASONABLY GOOD INSTALLATION WITH THE
FOLLOWING EXCEPTION - FILTER DRAIN LINES HAVE
NO AIR GAP
FILTER TANKS ARE NOT RESTRAINT.

b. Recommendations:

BRING FILTER INSTALLATION TO CODE.
FILTER SYSTEM REQUIRES FINE TUNING A
NEUTRALIZER IS OVER ADJUSTING THE PH.
FIELD TESTS SHOWED 9.4.
ADD PREFILTER AND UV. SHOCK
CHLORINATE THE COMPLETE SYSTEM.
INSTITUTE BI-ANNUAL WELL MAINTENANCE
PROGRAM.



Spill Report Information

| | |
|----------------------------|---|
| Spill # | 0334 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | vent leak |
| Latitude | 61.25274646 |
| Longitude | -138.80244846 |
| Incident Date | 9/26/2003 12:00:00 PM |
| Lead Agency | Yukon Government - Environmental Programs |
| Other Agency | |
| Company(s) | Yukon Electrical Company Ltd |
| Amount | 500 |
| Units | Litres |
| Quantity | Estimate |
| Release Description | Spilled |
| Additional Quantiti | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Diesel |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | cleaned-up but soil had not been removed at time of report - no further information on file |



Spill Report Information

| | |
|-----------------------------|--|
| Spill # | 9303 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | untreated sewage spilled due to mechanical failure - rubber coupling separated on the force main pipe elbow |
| Latitude | 61.252546 |
| Longitude | -138.800598 |
| Incident Date | 2/5/1993 2:30:00 PM |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | Yukon Government - Transportation |
| Company(s) | Community of Destruction Bay |
| Amount | 37,800 |
| Units | Litres |
| Quantity | Estimate |
| Release Description | Spilled |
| Additional Quantitit | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | effluent flowed over natural terrain and collected in a pond beside Kluane Lake - some collected, most frozed - to be excavated to sewage lagoon |



Spill Report Information

| | |
|-----------------------------|--|
| Spill # | 9304 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | untreated sewage spilled due to mechanical failure - coupling/pipe separation again |
| Latitude | 61.252546 |
| Longitude | -138.800598 |
| Incident Date | 3/29/1993 |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | Yukon Government - Transportation |
| Company(s) | Community of Destruction Bay |
| Amount | 11340 |
| Units | Litres |
| Quantity | Estimate |
| Release Description | Spilled |
| Additional Quantitit | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | similar to PACY 9303 - sewage collected in same pond - repairs to sewage system to be completed - spill being cleaned up with vacuum truck |



Spill Report Information

| | |
|----------------------------|---|
| Spill # | 9515 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | pipeline sleeve broke 10m from final discharge - unknown cause for breakage |
| Latitude | 61.2480555555556 |
| Longitude | -138.793888888889 |
| Incident Date | 5/12/1995 |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | |
| Company(s) | YTG |
| Amount | 180 |
| Units | Litres |
| Quantity | Estimate |
| Release Description | Spilled |
| Additional Quantit | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | spill occurred sometime at the end of April 1995 - not reported to spill line - pipeline repaired - improvements to system to be made byt YTG in summer |



Spill Report Information

| | |
|----------------------------|---|
| Spill # | 9634 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | break in main sewer line |
| Latitude | 61.2480555555556 |
| Longitude | -138.793888888889 |
| Incident Date | 6/12/1996 |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | |
| Company(s) | YTG |
| Amount | |
| Units | |
| Quantity | Unknown |
| Release Description | Spilled |
| Additional Quantit | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | pump activated 3x per day - approx 500 ga each time but sewage doesn't reach lagoon - DIAND inspected - to be repaired - no risk to environment |



Spill Report Information

| | |
|----------------------------|---|
| Spill # | 9649 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | leaking sewer line |
| Latitude | 61.2480555555556 |
| Longitude | -138.793888888889 |
| Incident Date | 8/7/1996 |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | |
| Company(s) | YTG |
| Amount | 50 |
| Units | Gallons (US, liquid) |
| Quantity | Estimate |
| Release Description | Leaked |
| Additional Quantit | rate of spill reported at 1L/s |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | leak stopped 8/9/96 - line repaired by patching - Tony will take up with YTG on way back from site - no further information on file |



Environment
Canada

Environnement
Canada

Enforcement and Emergencies Section
91782 Alaska Highway, Whitehorse, YT Y1A 5B7
PH: 867.667.3400 FAX: 867.667.7962

Spill Report Information

| | |
|-----------------------------|---|
| Spill # | 9672 |
| Jurisdiction | Yukon |
| Community | Destruction Bay |
| Address | |
| Highway | |
| Milepost | |
| Feature | Destruction Bay |
| Location and Cause | leaking utilidor - similar to Spill No. 9649 |
| Latitude | 61.2480555555556 |
| Longitude | -138.793888888889 |
| Incident Date | 9/24/1996 2:30:00 PM |
| Lead Agency | Department of Indian Affairs and Northern Development |
| Other Agency | |
| Company(s) | YTG |
| Amount | |
| Units | |
| Quantity | Unknown |
| Release Description | Leaked |
| Additional Quantitit | |
| Concentration | |
| Concentration Unit | |
| Phase | Liquid |
| Major Contaminant | Raw Sewage |
| 2nd Contaminant | |
| 3rd Contaminant | |
| 4th Contaminant | |
| Outcome | education truck needed to pump up before it enters creek - no further information on file |



Photo 0586: 3957 Destruction Bay Health Centre



Photo 0595: 3957 Well house



Photo 0594: 3957 Wellhead in pit below floor at well house



Photo 0596: 3957 Nursing residence #2



Photo 0597: 3957 Abandoned well nursing residence # 2 (back)



Photo 0591: 3957 Above ground fuel storage tank



Photo 0588: 3957 Destruction Bay community septic system # 1



Photo 0590: 3957 Destruction Bay community septic system # 2



Photo 0116: 3957 (from left to right) Pressure tank, water softener and brine tank, colour remover, neutralizer and brine tank



Photo 0118: 3957 Reverse osmosis treatment system for nursing residence