

2021 Annual Water Public Report

TABLE OF CONTENTS

| | |
|--|---|
| Water Distribution System History..... | 2 |
| Water Distribution Description..... | 2 |
| Standards..... | 2 |
| Manganese | 3 |
| Water Storage Facilities | 4 |
| Well Maintenance..... | 4 |
| Valve Maintenance..... | 4 |
| Water Main Flushing | 5 |
| Summary of Completed Projects..... | 6 |
| Future Plans..... | 6 |

2021 APPENDICES

Ministry of Health Permit
Analytical Report

Appendix "A"
Appendix "B"

Water Distribution System History

Since 1992, water purveyors in B.C. have been required to possess an Operating Permit issued by their Regional Health Authority, which includes following the [Guidelines for Canadian Drinking Water Quality](#)), and the [British Columbia Drinking Water Protection Act](#) and [Drinking Water Protection Regulation](#)

Water Distribution System Description

The Town of Smithers water system currently draws water from three wells. Well #1 (19th Avenue) is located about 30 feet away from the original well and is connected to the same pumphouse. It is 268 feet deep and, in a sand and gravel aquifer with a 12-inch telescoping screen between 234 and 265 feet. This pumphouse is used for annual chlorine application for Spring Water Main Flushing.

Well #2 (Victoria Street well) is 244 feet deep, in the same aquifer, well confined from potential contamination from an old landfill site, and with a similar screen from 193 to 235 feet. Its capacity is unknown, but lower than Well #1.

Well #3 (Riverside Park) is located adjacent to the Bulkley River, is 92 feet deep gravel aquifer with a similar screen from 64 to 85 feet.

The Town reported that the Well #1 (19th Avenue) currently produces about 70 L/s (1,100 USGPM), the Well #2 (Victoria Street) produces about 17 L/s (270 USGPM) and the Well #3 (Riverside Park) produces about 60 L/s (950 USGPM). The system serves approximately 5,400 people.

Standards

The Town of Smithers has a Northern Health Authority (NHA) permit to operate a drinking water system with 301 -10000 connections (copy of permit attached – Appendix “A”). The Emergency Response Plan is reviewed and updated annually or as required.

Samples are collected weekly and tested for Bacteria. This schedule was setup with the NHA Environmental Health Officer in 2018 to accommodate the limited days that are available to send out the samples weekly. Overall, the Town of Smithers tests at least 8 different locations each month. These samples are taken to the local Northern Health Authority Office and sent to an accredited lab for testing and analyzed for presence of Total Coliform and *E. coli*.

In 2021, there were a total of 141 samples collected, and of the samples collected 4 were positive for Total Coliforms and 6 tested positive background growth, which could be attributed to many things including handling and testing practices. Each of these sites were carefully re-sampled and came back negative of any background growth or total Coliforms.

Please note that when background growth counts are **greater than 200**, a follow-up investigation by Northern Health and sampling would be initiated as a high count like that could indicate that the water system may be under potability stress. A complete breakdown of Total Coliforms and E. coli results can be found at [Healthspace.ca/nha](https://healthspace.ca/nha) - [Smithers Community Water Systems - Samples](#)

Chemical testing is done annually from each source, or at the request of the Environmental Health Officer, and are sent to an accredited lab from Northern Health Authority for testing and are analyzed for chemical and physical parameters including potability, metals and mercury. A copy of the Analytical Report can be found in Appendix "B".

Health Canada has established a new **Health-Based Guideline** in 2019 for manganese with a **Maximum Acceptable Concentration (MAC)** of 0.12 mg/L and an **Aesthetic Objective (AO)** of 0.02 mg/L. Lab analysis indicated that the water was slightly soft with relatively low mineral content. It met objectives except that the manganese level in two of the wells were 0.130 mg/L and 0.173 mg/L, both of which are slightly above the Maximum acceptable concentration level of 0.12 mg/L.

Manganese (Mn)

Manganese is an essential element for humans and occurs naturally in the environment and is widely distributed in air, water, and soil. The main problem with manganese in drinking water has to do with undesirable taste and discoloration (black) of the water. Aesthetic Quality Guidelines address parameters, which may affect consumer acceptance of drinking water, such as taste, odour, and color. Operational guidelines are set for parameters that may affect processes at a treatment plant or in the drinking water distribution system. The Maximum Acceptable Concentration (MAC) for manganese in drinking water is 0.12 mg/L. As with iron, the presence of manganese in water may lead to the accumulation of microbial growths in the distribution system. Even at concentrations below 0.12 mg/L, manganese may form coatings on water distribution pipes that may slough off as black precipitates. We are actively looking for grant money to upgrade our system and treatment plant.

Manganese levels for Well # 1 (19th Avenue) 0.130 mg/L, Well #3 (Riverside) 0.173 mg/L and Well #3 (Victoria Street) 0.104 mg/L. The Manganese levels are above the MAC as per the Canadian Drinking Water Guidelines and the Town of Smithers is working with Northern Health for future considerations.

For more information regarding drinking water, please refer to Health Canada and the Canadian Drinking Water Guidelines (CDWG) [Canadian Drinking Water Guidelines - Manganese](#).

Water Storage Facilities

The distribution system includes two reservoirs, both of which float on the system. The Float on the System is a method of operating a water storage facility. Daily flow into the facility is approximately equal to the average daily demand for water. When consumer demands for water are low, the storage facility will be filling. During periods of high demand, the facility will be emptying. The reservoir levels are lowered and raised significantly each day. One reservoir is 265,000 gallons and is approximately 10 feet deep. The other is 1,000,000 gallons and 25 feet deep. Both have a single inlet/outlet, and the distribution system is flushed annually.

The main Moncton Road reservoir was built in 1975. The reservoir has been tested and the Condition Survey is on file in the Chief Operator's Office as well as in the Engineering Department at the Town Office. This reservoir was cleaned in 2005 and is scheduled for cleaning in 2023.

The small reservoir on Zobnick Road was built in 1950; it contains two compartments and is underground. Access is by manhole. The Zobnick reservoir was cleaned in September 2015.

Well Maintenance

Well maintenance is a critical component of our water infrastructure maintenance program. As the water from the three wells is introduced into our distribution grid untreated, we conduct maintenance and monitoring. The water levels are measured and recorded to ensure the aquifer is not over utilized and the system is checked for malfunctions. The system is flushed regularly and all activities around the wells are closely monitored and regulated. The Environmental Operators Certification Program of British Columbia certifies the employees who maintain this facility. Smithers has a Class 1 system, and the Town has three employees who are all level 2 certified that maintain the facilities.

Valves

The Town of Smithers has 871 flow control valves (including the airport) attached to the underground network. The valves are primarily used to control the direction of water flow and to isolate areas of the network for inspection or repair. The expected service life of a flow control valve is 40 to 50 years without cathodic protection and 100 years with cathodic protection. Cathodic Protection (CP) is a technique used to control the corrosion of metal surface by making it the cathode of an electrochemical cell.

Water Main Flushing

The Town of Smithers initiated a water main flushing program in 1978. In 2002, the Town of Smithers replaced the old chlorine gas system used in flushing water mains with a new hypochlorite (liquid chlorine) system. Each main is flushed annually in the month of May during daytime hours and flushes its 49.2 km of water mains. The Hypochlorite is added two weeks before and during flushing.

The Town of Smithers follows the Guidelines for Canadian Drinking Water Quality (GCDWQ) protocols regarding the levels of Chlorine that is used. More information regarding Chlorine can be found at [Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Chlorine](#).

In addition to accumulated debris, some areas of the water system are susceptible to water stagnation, where water usage is low, or water mains terminate at a cul-de-sac or water main dead ends. Accumulated debris and stagnant water inhibit flow through mains, cause dirty water and create a favourable environment for bacteria growth. In response to these concerns, chlorine is added during flushing to offset any bacteria that might be disturbed during the flushing program.

On Wednesday, April 21, 2021, while preparing to conduct our annual flushing program, a large “plug” of Hypochlorite was accidentally introduced to the water distribution system. The high chlorine level was detected almost immediately, and the injector pump shut down. The Town’s ERP (Emergency Response Plant) was then activated, and information was sent out to the public. Town staff, in conjunction with Northern Health, were able to identify the location of the plug and the affected areas using chlorine test strips and colorimeters. Through the operation of specific calves and fire hydrants, staff was able to control the flow of the affected water and flush it out before it was spread through the system. Chlorine residual testing was then performed throughout the system the next day without any detection of high levels of chlorine. The public notice was then cancelled. Although there was a large quantity of water flushed containing high chlorine levels, staff was able to ensure that no water was flushed into the storm water collection system or any ditches leading directly to freshwater streams. There were no reports to the Town from the public that anyone was adversely affected by the incident or detected high chlorine levels.

This incident was attributed to a lack of information being passed down from one Utility Operator to another and lack of written procedures being available. Before restarting the chlorine injection pumps, the Town had eliminated this problem by creating step by step procedures for operating the chlorination injector pump system. Staff has all reviewed and understand these procedures and they have been posted next to all injection pumps. Also, the ERP has been updated for 2022 to include procedures for this type of event.

The Town of Smithers takes the responsibility of a water supplier very seriously and takes pride in the fact that we maintain a system that provides the Town of Smithers with the highest quality of potable water.

SUMMARY

In summary, the Town of Smithers undertook the following in the year 2021:

- Flushed every water main
- Installed 5 new services
- Maintained 3 pump stations
- Repaired 2 water main valves
- Repaired 11 water serviced boxes
- Repaired 1 fire hydrants
- Turned on/off 18 water services
- Conducted 141 microbiological tests and continued a dedicated water sampling and testing program.
 - There were no E. coli tests reported.
 - Detected 6 fecal coliform tests and they were retested and were cleared. PIR had 5 of the detected fecal coliform tests. The location for testing was switched to the Mill Coffee Room because of unreliable sample results and no unsatisfactory results were reported afterwards.
- Installed 5 new water meters with R-900i meters
- Total water pumped in 2021 = 955,916 cubic meters
- Maintained emergency generator by running it once a month for an hour

FUTURE PLANS

In 2022, the Town of Smithers plans to continue flow testing on all sections of the water distribution lines. This will provide information on system pressures and flow rates, assess conditions and operability, water quality characteristics. It will also provide valuable information for firefighting and is an opportunity for customer interaction.

Respectfully submitted,

Darren Fuerst
Utilities Supervisor

DF/jb



2021 Annual Water Public Report

APPENDIX "A"

2021 Ministry of Health Permit

PERMIT TO OPERATE

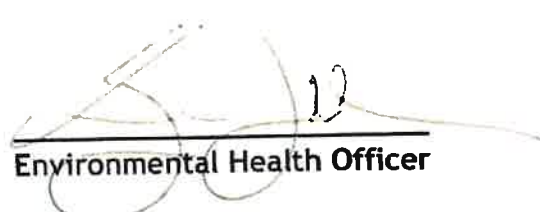
A Drinking Water System with
301-10000 Connections

System Name: Smithers Community Water System
Physical Location: Smithers Community Water System
1027 Aldous Street
Smithers BC
Owner Name: Town of Smithers

Conditions of Permit

- > Bacteriological sampling required minimum of twice weekly, from locations that are representative of the distribution system, as approved by the Environmental Health Officer.
- > Chemical sampling is required minimum yearly, from each source, or at the request of the Environmental Health Officer.
- > An Emergency Response plan shall be maintained and updated annually; or as required.

1-Jul-1992
Effective Permit Date


Environmental Health Officer

30-Jun-2016
Permit Revised Date
*This permit must be displayed
in a conspicuous place and is non-transferable*



2021 Annual Water Public Report

APPENDIX "B"

2021 Analytical Water Report

ANALYTICAL REPORT

Town of Smithers - Drinking water

Work Order: N22B037

| LAB # | | N22B037-01 | N22B037-02 | N22B037-03 | N22B037-04 | |
|--------------------------------------|------------------|---------------|----------------|------------|-------------|-----------|
| SAMPLED DATE | | 07-Feb-22 | 07-Feb-22 | 07-Feb-22 | 07-Feb-22 | |
| SAMPLED TIME | | 12:45 | 13:05 | 13:22 | 13:33 | |
| SAMPLE ID | | 19th Ave Well | Riverside Well | Firehall | Town Office | |
| | MRL Units | CDWG | | | | |
| General Parameters (Water) | | | | | | |
| pH | 1.0 pH units | 7.0-10.5 | 7.6 | 7.8 | 7.8 | 7.8 |
| Alkalinity (total, as CaCO3) | 1 mg/L | - | 200 | 100 | 120 | 200 |
| Conductivity | 1.0 uS/cm | - | 430 | 237 | 248 | 399 |
| Colour | 1 PTCu units | AO <= 15 | 2 | 6 | 54 | 4 |
| Turbidity | 0.05 NTU | MAC = 1 | 0.18 | 0.17 | 0.23 | 0.26 |
| Solids, Total Dissolved / TDS | 1.0 mg/L | AO <= 500 | 270 | 150 | 160 | 250 |
| Carbon, Total Organic | 0.50 mg/L | - | 0.76 | 0.99 | 0.67 | 0.54 |
| Ammonia (total as N) | 0.03 mg/L | - | 0.16 | 0.18 | 0.15 | 0.13 |
| Nitrogen, Total Kjeldahl | 0.200 mg/L | - | 0.244 | 0.768 | 0.592 | 0.260 |
| Calculated Parameters (Water) | | | | | | |
| Nitrate (as N) | 0.10 mg/L | MAC = 10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Nitrogen, organic | 0.0500 mg/L | - | 0.0840 | 0.588 | 0.440 | 0.132 |
| Hardness, Total (as CaCO3) | 0.500 mg/L | - | 84.4 | 85.7 | 84.4 | 72.2 |
| Anions (Water) | | | | | | |
| Chloride | 1.0 mg/L | AO <= 250 | 15.6 | 4.3 | 4.5 | 7.5 |
| Fluoride | 0.05 mg/L | MAC = 1.5 | 0.14 | <0.10 | <0.10 | 0.14 |
| Nitrite (as N) | 0.01 mg/L | MAC = 1 | <0.01 | <0.01 | <0.01 | <0.01 |
| Nitrate + Nitrite (as N) | 0.10 mg/L | MAC = 10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Sulfate | 1.0 mg/L | AO <= 500 | 1.9 | 9.5 | 9.1 | 5.1 |
| Total Metals (Water) | | | | | | |
| Aluminum, total | 0.0050 mg/L | OG < 0.1 | 0.0058 | 0.0054 | <0.0050 | <0.0050 |
| Antimony, total | 0.00020 mg/L | MAC = 0.006 | <0.00020 | <0.00020 | <0.00020 | <0.00020 |
| Arsenic, total | 0.00050 mg/L | MAC = 0.01 | 0.00156 | 0.00341 | 0.00248 | 0.00215 |
| Barium, total | 0.0050 mg/L | MAC = 1 | 0.0885 | 0.0533 | 0.0676 | 0.0764 |
| Beryllium, total | 0.00010 mg/L | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Bismuth, total | 0.00010 mg/L | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Boron, total | 0.0500 mg/L | MAC = 5 | <0.0500 | <0.0500 | <0.0500 | <0.0500 |
| Cadmium, total | 0.000010 mg/L | MAC = 0.005 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Calcium, total | 0.20 mg/L | - | 20.6 | 20.7 | 20.5 | 17.6 |
| Chromium, total | 0.00050 mg/L | MAC = 0.05 | <0.00050 | <0.00050 | <0.00050 | 0.00051 |
| Cobalt, total | 0.00010 mg/L | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 |

ANALYTICAL REPORT

Town of Smithers - Drinking water

Work Order: N22B037




| LAB # | | N22B037-01 | N22B037-02 | N22B037-03 | N22B037-04 | |
|---------------------------------|---------------|--------------------------|----------------|------------|-------------|-----------|
| SAMPLED DATE | | 07-Feb-22 | 07-Feb-22 | 07-Feb-22 | 07-Feb-22 | |
| SAMPLED TIME | | 12:45 | 13:05 | 13:22 | 13:33 | |
| SAMPLE ID | | 19th Ave Well | Riverside Well | Firehall | Town Office | |
| | MRL Units | CDWG | | | | |
| Total Metals (continued) | | | | | | |
| Copper, total | 0.00040 mg/L | AO = 1 MAC = 2 | <0.00040 | 0.00239 | 0.00187 | 0.0661 |
| Iron, total | 0.010 mg/L | AO <= 0.3 | <0.010 | 0.019 | 0.024 | <0.010 |
| Lead, total | 0.00020 mg/L | MAC = 0.005 | 0.00022 | <0.00020 | <0.00020 | <0.00020 |
| Lithium, total | 0.00010 mg/L | - | 0.00307 | 0.00061 | 0.00083 | 0.00312 |
| Magnesium, total | 0.010 mg/L | - | 7.99 | 8.24 | 8.07 | 6.86 |
| Manganese, total | 0.00020 mg/L | AO <= 0.02 MAC = 0.12 | 0.147 | 0.158 | 0.137 | 0.0448 |
| Mercury, total | 0.000010 mg/L | MAC = 0.001 | <0.000010 | <0.000010 | <0.000010 | <0.000010 |
| Molybdenum, total | 0.00010 mg/L | - | 0.00403 | 0.00124 | 0.00164 | 0.00412 |
| Nickel, total | 0.00040 mg/L | - | <0.00040 | <0.00040 | <0.00040 | <0.00040 |
| Phosphorus, total | 0.050 mg/L | - | 0.051 | <0.050 | <0.050 | 0.053 |
| Potassium, total | 0.10 mg/L | - | 1.46 | 0.56 | 0.64 | 1.24 |
| Selenium, total | 0.00050 mg/L | MAC = 0.05 | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Silicon, total | 1.0 mg/L | - | 7.4 | 5.6 | 5.9 | 7.2 |
| Silver, total | 0.000050 mg/L | - | <0.000050 | <0.000050 | <0.000050 | <0.000050 |
| Sodium, total | 0.10 mg/L | AO <= 200 | 60.9 | 12.6 | 16.5 | 58.8 |
| Strontium, total | 0.0010 mg/L | MAC = 7 | 0.270 | 0.222 | 0.230 | 0.238 |
| Sulfur, total | 3.0 mg/L | - | <3.0 | 3.4 | 3.6 | <3.0 |
| Tellurium, total | 0.00050 mg/L | - | <0.00050 | <0.00050 | <0.00050 | <0.00050 |
| Thallium, total | 0.000020 mg/L | - | <0.000020 | <0.000020 | <0.000020 | <0.000020 |
| Thorium, total | 0.00010 mg/L | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 |
| Tin, total | 0.00020 mg/L | - | <0.00020 | <0.00020 | <0.00020 | <0.00020 |
| Titanium, total | 0.0050 mg/L | - | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Tungsten, total | 0.0010 mg/L | - | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Uranium, total | 0.000020 mg/L | MAC = 0.02 | 0.000633 | 0.000074 | 0.000147 | 0.000575 |
| Vanadium, total | 0.0010 mg/L | - | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Zinc, total | 0.0040 mg/L | AO <= 5 | <0.0040 | <0.0040 | <0.0040 | <0.0040 |
| Zirconium, total | 0.00010 mg/L | - | <0.00010 | <0.00010 | <0.00010 | <0.00010 |

ANALYTICAL REPORT

Town of Smithers - Drinking water

Work Order: N22B037

Glossary of Terms

| | |
|---|--|
| MRL | Method Reporting Limit |
| < | Less than the reported detection limit (RDL) |
| mg/L | Milligrams per Litre |
| NTU | Nephelometric Turbidity Units |
| pH units | pH units |
| PtCo units | Platinum Colbalt colour units |
| uS/cm | Micro Siemens per centimeter |
|  | Maximum Acceptable Concentration. Values above MAC are formatted with red text and solid outline. |
|  | Aesthetic Objective (not health related). Values above AO are formatted with a dashed outline. |
|  | Operational guideline (for treated water) |

Standards / Guidelines Referenced

| | |
|-------------|--|
| CDWG | Canadian Drinking Water Quality Guidelines (2019) https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/water-eau/sum_guide-res_recom/sum_guide-res_recom-eng.pdf |
|-------------|--|