DISTRICT OF TUMBLER RIDGE

BOX 100
TUMBLER RIDGE BC V0C 2W0
DATE: JUNE 30, 2020

WWW.DISTRICTOFTUMBLERRIDGE.CA

WATER SYSTEM ANNUAL REPORT 2019

Table of Contents

1.0 Introduction

The District of Tumbler Ridge (District) has prepared this Annual Water System Report for 2019, in accordance with the Drinking Water Protection Act, Section 15 (b). This is in recognition of the importance of a multi-barrier approach to safe drinking water, which includes system monitoring and reporting, as well as a number of other facets. An Annual Water System Report is a public document intended to provide consumers with sufficient information to understand various aspects required to provide safe drinking water.

This report outlines the District's:

- Water system infrastructure:
  - Operator certification;
- Operation and maintenance activities;
  - Water quality monitoring;
- 2019 challenges and successes; and
- Recently completed and upcoming capital and other initiatives.

Much of the information provided in this report is technical in nature.
Please contact the District of Tumbler Ridge at 250-242-4242 if you have any questions.

2.0 Water System Overview

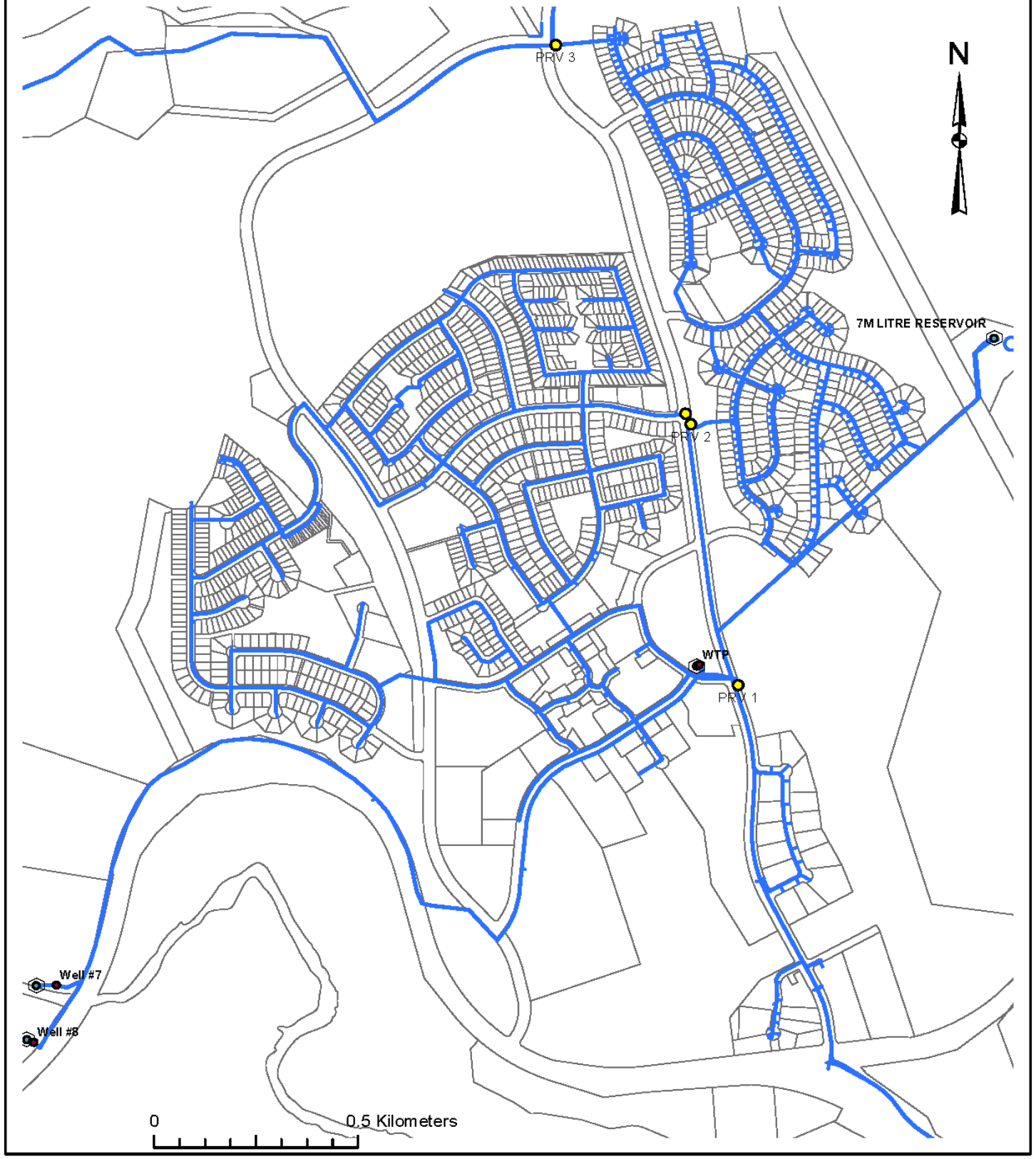
The community of Tumbler Ridge is located at the intersection of Highway 52 (Heritage Highway) and Highway 29, approximately 90 km southeast of Chetwynd, and 115 km southwest of Dawson Creek. The resident population of Tumbler Ridge is approximately 1916 (2019 BC Assessment 2019 Report) and the primary industries are mining, forestry, oil and gas exploration, and tourism.

Tumbler Ridge is a relatively new community, and the majority of the infrastructure for the District was constructed during the creation of Tumbler Ridge in 1981.

The District's community water system has several sources, including two high production groundwater well sources at Flatbed Creek (Wells 7 & 8), which are the primary supply wells for the community water system. Two other wells off Highway 52 supply water to the Industrial Park, and are used to supplement flows from Wells 7 & 8 during high water demand situations.

A bulk water facility also supplies water to commercial water haulers from the community water system.

Figure 1 Displays the overall Water system.

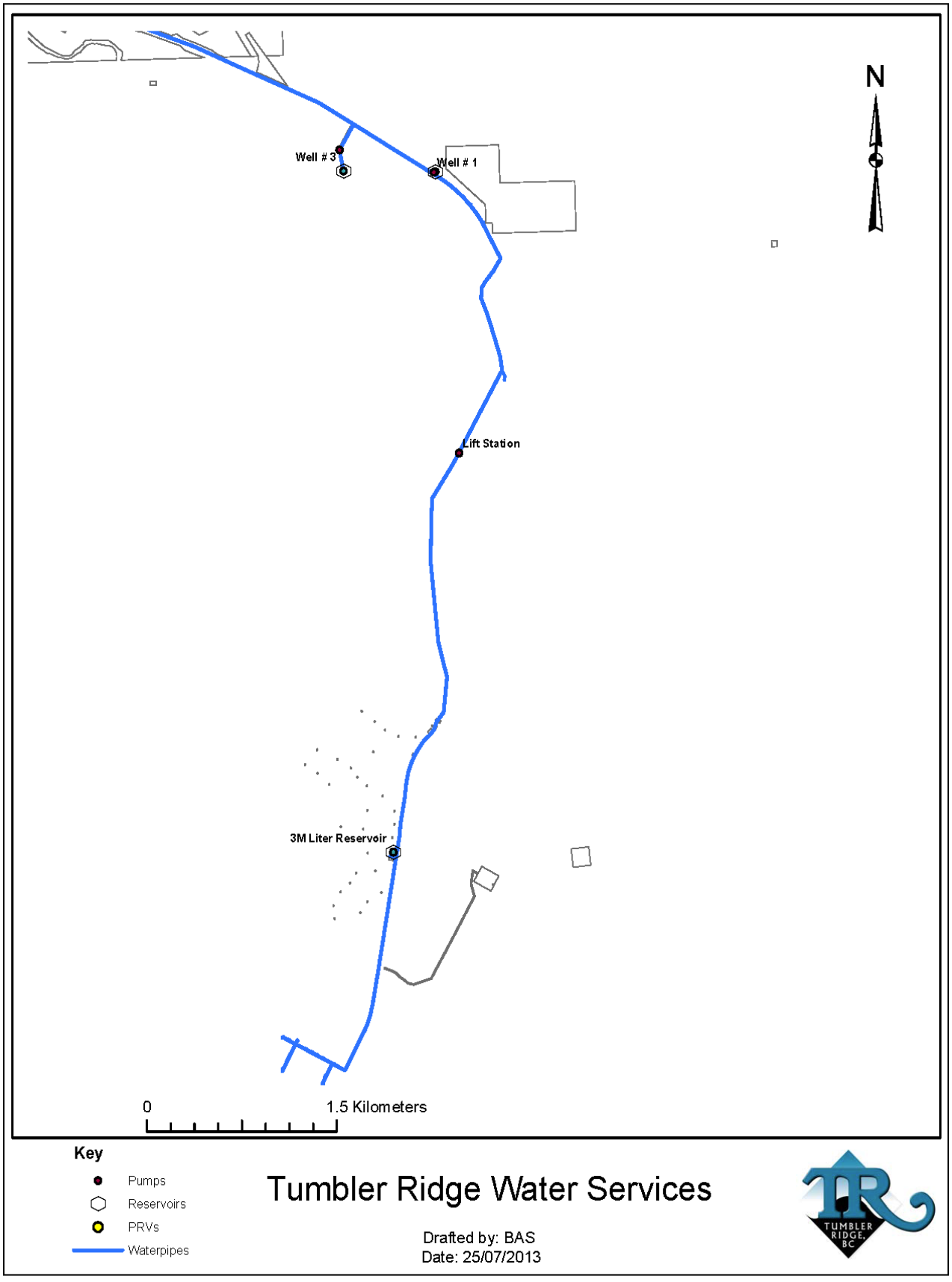


Key

- Pumps
- Reservoirs
- PRVs
- Waterpipes

Tumbler Ridge Water Services

Drafted by: BAS
Date: 25/07/2013


N
Well # 3
Well # 1
Lift Station
3M Liter Reservoir
0
1.5 Kilometers
Key
Pumps
Reservoirs
PRVs
Waterpipes
Tumbler Ridge Water Services
Drafted by: BAS
Date: 25/07/2013
TUMBLER RIDGE, BC

2.1 Water Supply Wells 7 & 8

Well 7 & Well 8 are the two high production wells for the District of Tumbler Ridge located near Flatbed Creek. Both wells exceed the aesthetic limit for iron and manganese based on the Guidelines for Canadian Drinking Water Quality. Iron and manganese are considered aesthetic parameters, and can cause staining, and the accumulation of sediments in the distribution system. They are not considered a health concern. Well water quality is reviewed further in Section 6.0.

The water is pumped from Wells 7 & 8 to the Water Treatment Plant located on Pioneer Loop.

Wells 7 & 8 rarely operate at the same time. They alternate duty, unless both are required to meet system demands.

2.2 Water Supply Wells 1 & 3

The District also has two additional, lower capacity wells (1 & 3) that can provide water to the main community system if required for high demand situations (e.g. golf course watering), but are primarily used to supply water to the Tumbler Ridge Industrial Park.
Water from Wells 1 and 3 are pumped to distribution system/reservoirs, where they mix with chlorinated water from the water treatment plant.

2.3 Water Treatment Plant

The Water Treatment Plant (WTP) is located on Pioneer Loop and treats water from Wells 7 & 8. A dedicated water-main transmits water from the wells to the WTP. The water treatment process consists of pre-treatment using chlorine followed by filtration through manganese greensand filters for removal of iron and manganese. The water is then chlorinated to maintain a residual in the distribution system and ensure that good microbiological water quality is maintained all the way to consumers' taps.

The system then pumps to the reservoir from which water is fed to the majority of the developed community.

2.4 Distribution System

The District's water distribution system includes over 40 km of water-mains. The system was constructed in the 1980s, and is comprised of polyvinyl chloride (PVC) pipe (approximately 31 km) and ductile iron (DI) pipe (approximately 10 km). The District serves 1916 residential 70 commercial and 108 light industrial customers. The District also operates 1 bulk water station.

There are two reservoirs that are used to:

- Provide and stabilize pressure to the water system;
- Store water for fire flows; and
- Provide equalization to the system by supplying water to users during periods of low and high demands.
- The primary reservoir is adjacent to Highway 52 and has a capacity of 7 million litres. The other reservoir is located near the Industrial Park and has a capacity of 3 million litres.

There are also four pressure reducing valve (PRV) stations that ensure that pressures are not elevated in lower areas of the water system.

3.0 System Classification, Staffing & Operator

The District's water system was classified by the British Columbia Water and Wastewater Operators Certification Program (BCWWOCP) in 1993 as a Class II system. A copy of the classification certificate is provided in Appendix A.

The District currently employs three certified operators of the Environmental Operators Certification Program (EOCP) capable of maintaining the water system: Sean Shea, Level 2; Chris Gies, Level 1, Al Guske, Level 1.

The operators are therefore certified at a level that is appropriate for the water system.

4.0 System Operation & Maintenance

Regular inspections, maintenance and water quality testing are performed by the system operators to ensure optimal operation of the District's water system. Water quality monitoring is an aspect of this and is discussed in Section 6.0. Operation and maintenance of the water system involves several daily, weekly, and periodic, or 'as-needed' tasks.

Daily tasks performed in 2019 included:

- Checking and recording well pump run times per pump;
- Checking and recording potassium permanganate and chlorine chemical use at the Water Treatment Plant;
- Checking and recording chlorine residual at the Water Treatment Plant;
- Determining the head loss across filters at the Water Treatment Plant;
- Pressure gauge recording for wells;
- Inspecting the building and piping for leaks;

Monthly tasks performed in 2019 included:

- Chlorine residual testing and recording within the distribution system

Periodic, or "as-needed" tasks included:

- Inspection of various infrastructure;
- Troubleshooting minor electrical and mechanical equipment problems;
- Replacing chemicals;
- Recording the time and nature of any alarms received on the water system and taking appropriate action;
- Exercising manual valves at the wells;
- Recording the water level at the wells;
- Hydrant flushing, exercising, and inspection;
- Preparing select hydrants for winter use (drain and fill with antifreeze); and
- Security/vandalism inspection.

5.0 2019 Water Consumption

In 2019, the District used a total of approximately 821265 m^3 of water (or 877 Million Litres). The average daily demand (ADD) in 2019 was approximately 2350 m^3/d. Per capita water use values can be informative for interpreting water use. With an assumed service population of 1916 people in 2019, provided by BC Assessment Report 2019, the ADD is 1205 L/cap/d. Figure 5-1 displays the total monthly water use in 2019.

6.0 Water Quality Monitoring Program & Results

Drinking water quality is a function of source water quality, water treatment, and changes to water quality in the distribution system. Therefore, water quality monitoring programs normally consist of three main components: source water monitoring, monitoring after treatment, and distribution system monitoring.

1. Source Water Monitoring

The source water monitoring includes both field and lab tests to assess well water quality. These tests are used to assess general water chemistry in comparison to the Guidelines for Canadian Drinking Water Quality (GCDWQ) which are published by Health Canada, and to determine treatment requirements.

The Guidelines for Canadian Drinking Water Quality are available on the Health Canada website at:

http://www.hc-sc.gc.ca/ewh-semt/water-eau/drink-potab/guide/index-eng.php

2. Treatment System Monitoring

As the Tumbler Ridge water system includes treatment, additional treatment system performance monitoring is completed to assess how well manganese and iron are removed by the manganese greensand filters.

3. Distribution System Monitoring

The Drinking Water Protection Regulation (DWPR) requires that water suppliers monitor for total coliform bacteria and *Escherichia coli* at a certified lab. This testing is used to monitor the distribution system, and to notify consumers of potential issues. The distribution system is also monitored for chlorine residuals to ensure safe levels are maintained.

The standards for water quality are set out in Schedule A of the DWPR as follows:

Parameter:	Standard:
Fecal coliform bacteria	No detectable fecal coliform bacteria per 100 mL
Escherichia coli	No detectable *Escherichia coli* per 100 mL
Total coliform bacteria	
(a) 1 sample in a 30 day period	No detectable total coliform bacteria per 100 mL
(b) more than 1 sample in a 30 day period	At least 90% of samples have no detectable total coliform bacteria per 100 mL and no sample has more than 10 total coliform bacteria per 100 mL

Note: Total coliforms are organisms that are found all around us in the environment (ie on plants, animals and humans). They may or may not be harmful and are used as indicator organisms. If total coliforms are found in the water, it is an indication that other organisms may also be present. Fecal Coliforms are bacteria that indicate contamination from human or animal waste (feces). Escherichia coli are a species of bacteria that also indicate that there is contamination from human or animal waste (feces).

6.1 Water Quality Testing Results

Table 6-1 provides a summary of the District's water quality monitoring program for 2019. In addition to these tests, comprehensive water quality testing was undertaken for the raw well water and filtered water from the water treatment plant.

Table 6-1: Water Quality Monitoring Program Summary Table

Parameter	Frequency	Analysis Type	Locations
Source and Treatment System Monitoring			
Temperature	Daily	WTP lab	WTP raw water
pH	Daily	WTP lab	WTP raw and filtered water
Iron	Daily	WTP lab	WTP raw and filtered water
Manganese	Daily	WTP lab	WTP raw and filtered water
Free chlorine residual	Daily	WTP lab	WTP filtered water
Distribution System Monitoring			
Escherichia coli, Total Coliforms	Monthly	Off-site lab	7 distribution system locations
Free chlorine residual	Monthly	Portable Analyzer	Various distribution system locations

6.1.1 Source & Treatment System Monitoring Results

Results of source water quality sampling for general parameters are summarized in Table 6-2. The source water quality for the smaller Wells 1 and 3 are very good and meets the Guidelines for Canadian Drinking Water Quality (GCDWQ). Source water quality for Well 7 and 8 (both are very similar) are also good, with the exception of iron and manganese, which are both aesthetic parameters. Data from 2019 shows that Well 7 turbidity is also elevated, which is likely related to the elevated iron concentration.

This section provides some additional information regarding specific parameters, and the interpretation of the water quality results.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2424235-1	L2424235-2			
	Description	Water	Water			
	Sampled Date	03-MAR-20	03-MAR-20			
	Sampled Time	08:45	08:45			
	Client ID	TRIP RESERVOIR	MAIN RESERVOIR			
Grouping	**Analyte**					
WATER						
Physical Tests	Colour, True (CU)	<5.0	<5.0			
	Conductivity (uS/cm)	642	670			
	Hardness (as CaCO3) (mg/L)	317 HTC	324 HTC			
	pH (pH)	8.28	8.02			
	Total Dissolved Solids (mg/L)	389	396			
	Turbidity (NTU)	<0.10	<0.10			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	252	258			
	Chloride (Cl) (mg/L)	11.1	10.5			
	Fluoride (F) (mg/L)	<0.10 DLDS	<0.10 DLDS			
	Nitrate (as N) (mg/L)	<0.025 DLDS	<0.025 DLDS			
	Nitrite (as N) (mg/L)	<0.0050 DLDS	<0.0050 DLDS			
	Sulfate (SO4) (mg/L)	81.0	85.7			
Bacteriological Tests	E. coli (MPN/100mL)	<1	<1			
	Coliform Bacteria - Fecal (CFU/100mL)	<1	<1			
	Coliform Bacteria - Total (MPN/100mL)	<1	<1			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.010	<0.010			
	Antimony (Sb)-Total (mg/L)	<0.00050	<0.00050			
	Arsenic (As)-Total (mg/L)	<0.00010	<0.00010			
	Barium (Ba)-Total (mg/L)	0.210	0.222			
	Boron (B)-Total (mg/L)	<0.10	<0.10			
	Cadmium (Cd)-Total (mg/L)	<0.00020	<0.00020			
	Calcium (Ca)-Total (mg/L)	88.4	90.3			
	Chromium (Cr)-Total (mg/L)	<0.0020	<0.0020			
	Copper (Cu)-Total (mg/L)	<0.0010	<0.0010			
	Iron (Fe)-Total (mg/L)	<0.030	<0.030			
	Lead (Pb)-Total (mg/L)	<0.00050	<0.00050			
	Magnesium (Mg)-Total (mg/L)	23.4	23.8			
	Manganese (Mn)-Total (mg/L)	<0.0020	<0.0020			
	Mercury (Hg)-Total (mg/L)	<0.00020	<0.00020			
	Potassium (K)-Total (mg/L)	1.02	0.96			
	Selenium (Se)-Total (mg/L)	<0.0010	<0.0010			
	Sodium (Na)-Total (mg/L)	10.7	9.7			
	Uranium (U)-Total (mg/L)	0.00077	0.00082			
	Zinc (Zn)-Total (mg/L)	<0.050	<0.050			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Table 6-2: Source Water Quality Testing Results (Raw Water)

Table Notes:
GCDWQ = Guideline for Canadian Drinking Water Quality
AO = Aesthetic Objective
MAC = Maximum Acceptable Concentration
TCU = true colour unit
CFU = colony forming units

Hardness

Water hardness is an aesthetic consideration that is traditionally thought of as the capacity of water to react with soap. Hard water requires more soap to produce lather. More importantly, it leads to scaling of pipes, hot water tanks, and other household appliances.

Although hardness may have significant aesthetic effects, a maximum acceptable level has not been established in the GCDWQ, because public acceptance of hardness varies considerably. Water supplies with hardness greater than 200 mg/L are considered poor, but are often tolerated by consumers used to groundwater supplies. Those in excess of 500 mg/L are unacceptable for most domestic purposes. Because water softening by sodium ion exchange may introduce undesirably high quantities of sodium into drinking water, it is recommended that where such a process is employed, a separate unsoftened supply should be retained for drinking and cooking purposes.

The Tumbler Ridge well water hardness is somewhat elevated, but is within what is generally considered an accepted range.

PH

The following excerpt from Health Canada's Technical Document on pH discusses the acceptable range for drinking water pH:

> *"There are no specific health effects on which to base limits for the pH of drinking water. The main purpose in controlling pH is to produce water in which corrosion and incrustation are minimized. These processes, which can cause considerable damage to the water supply system, result from complex interactions between pH and other parameters such as dissolved solids, dissolved gases, hardness, alkalinity and temperature.*
>
> *As a generalization, metal corrosion may become significant below a pH of about 6.5; incrustation and scaling problems are most commonly encountered above about pH 8.5.*
>
> *The acceptable range for drinking water pH is therefore from 6.5 to 8.5.*

The pH readings for the District wells are within this acceptable range with an average of 7.4 based on readings at the water treatment plant.

Iron

Well water quality from Wells 7 and 8 usually exceeds the aesthetic objective of 0.3 mg/L for iron in the GCDWQ. Health Canada's Technical Document states that iron in domestic water is objectionable for a number of reasons unrelated to health. Iron can precipitate, which can cause it to appear unpalatable, and stain laundry and plumbing fixtures. Iron can also settle out in the distribution system and gradually affect the capacity of the water-mains. Furthermore, iron can promote the growth of "iron bacteria", which can cause a slimy coating in the distribution system.

The District water treatment plant removes iron and the occurrence of these types of aesthetic issues. Results from the water treatment plant indicate that iron was reduced to below the aesthetic objective on a consistent basis. The following table provides a brief summary of the raw and treated water quality based on on-site testing completed at the WTP.

2019 Summary	Iron (mg/L)	
	Raw	Treated
Average	0.03	0.010
Maximum	1.45	0.025

Manganese

Well water quality from Wells 7 and 8 usually exceeds the aesthetic objective for manganese of 0.05 mg/L in the GCDWQ. Manganese, similar to iron, is objectionable for a number of reasons unrelated to health. Manganese can precipitate, which can cause the water to appear unpalatable, and stain laundry and plumbing fixtures.

The District water treatment plant is designed to remove both iron and manganese and the occurrence of these types of aesthetic issues. Results from the water treatment plant indicate that manganese was reduced to below the aesthetic objective on a relatively consistent basis. The following table provides a brief summary of the raw and treated water quality based on on-site testing completed at the WTP.

2019 Summary	Manganese (mg/L)	
	Raw	Treated
Average	0.1	0.010
Maximum	1.10	0.030

As the filtration system and wells are getting older, further work is recommended in the near future to assess the infrastructure and determine whether upgrades or system maintenance is required. This could include replacement of the filter media or optimization of the chemical pre-treatment process to achieve better removals of manganese.

Turbidity

The GCDWQ for turbidity is currently under review and may change. The current guideline provides turbidity targets that vary depending on the filtration system being used with a goal of reducing turbidity to 0.1 NTU for surface water systems. For groundwater systems, a health based turbidity guideline does not apply to secure groundwater sources such as the wells used in Tumbler Ridge. It is considered good practice to ensure that water entering the distribution system has a low turbidity level of around 1 NTU.

As noted in Table 6-2, the turbidity of Well 7 is elevated. This is not deemed to be a health concern as it is being caused by iron particles/precipitate in the source water, and should therefore be removed by the filtration plant.

6.1.2 DISTRIBUTION SYSTEM MONITORING

Coliform Testing

Table 6-2 provides a summary of coliform monitoring results for 2019. The results meet the requirements of the Drinking Water Protection Regulation as previously described with no detections of fecal coliforms or E-Coli, and <90% of samples showing a detection of total coliform bacteria.

Table 6-3: Coliform Monitoring Results

Quarterly Reports	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Date Range	Jan 1-Mar 31	Apr 1-Jun 30	Jul 1-Sep 30	Oct 1-Dec 31
Total Number of Samples	12	11	11	11
Samples that contain coliform	0	0	0	0
Samples that contain fecal coliform	0	0	0	0
Samples that contain E. Coli	0	0	0	0
Number of consecutive samples that contain total coliform	0	0	0	0

Table Note: these samples both contained 2 CFU/100 mL

Chlorine Residual

Chlorine is primarily used as a disinfectant in water systems to kill micro-organisms that could cause waterborne illness. Primary disinfection is used to inactivate micro-organisms in source water. Secondary (or residual disinfection) is used to prevent bacterial growth in the distribution system. In the case of Tumbler Ridge, chlorine is being used for secondary disinfection.

Health Canada's Technical Document states that:

"It is not considered necessary to establish a guideline for chlorine in drinking water, based on its low toxicity at concentrations found in drinking water as a result of treatment. Any measures taken to limit the concentration of chlorine or its by-products in drinking water supplies must not compromise the effectiveness of disinfection.

Most drinking water treatment plants in Canada use chlorine as a disinfectant. The use of chlorine in the treatment of drinking water has virtually eliminated waterborne diseases, because chlorine can kill or inactivate most microorganisms commonly found in water. All drinking water supplies should be disinfected, unless specifically exempted by the responsible authority. The majority of drinking water treatment plants in Canada use some form of chlorine to disinfect drinking water: to treat the water directly in the treatment plant and/or to maintain a chlorine residual in the distribution system to prevent bacterial regrowth. Disinfection is an essential component of public drinking water treatment; the health risks associated with disinfection by-products are much less than the risks from consuming water that has not been adequately disinfected. Free chlorine concentrations in most Canadian drinking water distribution systems range from 0.04 to 2.0 mg/L."

In general, most water suppliers target having a minimum chlorine residual of 0.2 to 0.5 mg/L throughout the distribution system. The District met this target through 2019 for water leaving the water treatment plant, which had an average free chlorine residual of 0.35 mg/L. Monthly monitoring of free chlorine in the distribution system is also undertaken at 8 locations with a free residual from 0.12 – 0.20 mg/L

As groundwater is being used as a water source and a low chlorine residual is being maintained, the risk of disinfection by-products being elevated in the Tumbler Ridge system is very low.

7.0 2019 Challenges and Successes

Installation of new Control Valve at our Production Well (8)

Completion of SCADA System Phase 1 on our water system

8.0 Capital Works and Other Initiatives

This section provides a summary of initiatives that were completed in 2016, are underway, or are in the planning stages.

8.1 Anticipated in 2020

In addition to regular maintenance and inspection of the water system, the following works are scheduled to be completed in 2020: Introduction of a new SCADA system in the Utilities Department..

- Installation of a couple of 6" service valves in the downtown area
- Designing a Asset Management program for Water System to track work performed
- Pump replacement for PW7 schedulled for October 2020

8.2 Future

The following works are currently in discussion or planning stages and are likely to be scheduled for completion 2020 and onward:

- Watershed / Aquifer protection plan
- Installing new Raw Water Pumps
- Upgrades to our Pressure Reducing Valves
- New lighting for all Water Stations Buildings
- Scada System Phase 2
- New water / sewer lines at Day's Society Park

Appendix A

BCWWOCP System Classification Certificate


EOCP
CERTIFICATE of CLASSIFICATION
Environmental Operators Certification Program
This is to certify that:
District of Tumbler Ridge Water Distribution System
Facility No. 355
has been classified as a
Class II System
CHAIR, BOARD OF DIRECTORS
CHIEF EXECUTIVE OFFICER
Dated: July 21, 2017
At: Burnaby, BC
A society incorporated under the Society Act, S.B.C. S-28724

EOCP

CERTIFICATE of CLASSIFICATION

Environmental Operators Certification Program

This is to certify that:

District of Tumbler Ridge Water Treatment Facility

Facility No. 354

has been classified as a

Class II WT Facility

CHAIR, BOARD OF DIRECTORS

CHIEF EXECUTIVE OFFICER

Dated: August 05, 2020
At: Burnaby, BC
Valid until: August 05, 2025

A society incorporated under the Society Act, S.B.C. S-28724

Appendix B

Permit Conditions

northern health

PERMIT
TO OPERATE

A Drinking Water System with
301-10000 Connections

System Name: **Tumbler Ridge CWS**
Physical Location: **Tumbler Ridge CWS**
203 Pioneer Loop
Tumbler Ridge BC
Owner Name: **District of Tumbler Ridge**

Conditions of Permit

1. Monthly Bacteriological Sampling required.
2. Minimum Chemical Sampling frequency required every 2 years.
3. Current flushing program must be maintained.

1-Nov-1992
Effective Permit Date

Environmental Health Officer

19-April-2010
19-April-2010

northern health Expires March 2021 2133

northern health Expires March 2020 1411

northern health Expires March 2019 0989

northern health Expires March 2019 0988

This permit must be disp
n a conspicuous place and is non-transferable

#60-120-2005 Rev. 02/05 pc

Appendix C

Northern Health

Sample Range Report

Northern Health Authority - Northeast Division

Facility Name: Tumbler Ridge - Water System
Facility Type:
Date Range: Jan 1 2019 to Dec 31 2019
Date Created: Jan 24 2020

Operator

Sampling Site	Date Collected	Total Coliform	E. Coli	Fecal Coliform
Community Centre - Downstairs, 340 Front Street				
	1/8/2019	L1	L1	
	2/27/2019	L1	L1	
	3/26/2019	L1	L1	
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	7/23/2019	L1	L1	
	8/13/2019	L1	L1	
	9/10/2019	L1	L1	
	10/22/2019	L1	L1	
	12/10/2019	L1	L1	
	Total Positive :	0	0	0
Cariboo Road Service, Industrial Park, Tumbler Ridge, BC				
	1/8/2019	L1	L1	
	2/27/2019	L1	L1	
	3/26/2019	L1	L1	
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	7/9/2019	L1	L1	
	8/13/2019	L1	L1	
	12/10/2019	L1	L1	
	Total Positive :	0	0	0
RV Park, 99-100 Monkman Way				
	1/9/2019	NS		
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	7/9/2019	L1	L1	
	8/13/2019	L1	L1	
	9/10/2019	L1	L1	
	Total Positive :	0	0	0

Northern Health Authority, 220 Front Street				
	1/8/2019	L1	L1	
	2/27/2019	L1	L1	
	3/26/2019	L1	L1	
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	7/9/2019	L1	L1	
	8/13/2019	L1	L1	
	9/10/2019	L1	L1	
	10/22/2019	L1	L1	
	12/10/2019	L1	L1	
	Total Positive :	**0**	**0**	0
Tumbler Ridge Golf & Country Club, Golf Course Road				
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	7/9/2019	L1	L1	
	8/27/2019	L1	L1	
	Total Positive :	**0**	**0**	0
Elementary School, 355 Monkman Way				
	1/8/2019	L1	L1	
	2/27/2019	L1	L1	
	5/14/2019	L1	L1	
	6/11/2019	L1	L1	
	9/10/2019	L1	L1	
	10/22/2019	L1	L1	
	12/10/2019	L1	L1	
	Total Positive :	**0**	**0**	0

Result Values: **E - estimated** **L - less than** **G - greater than**

Samples that contain total coliform:	0	0.00% of total
Samples that contain e. coli:	0	0.00% of total
Samples that contain fecal coliform:	0	0.00% of total
Number of consecutive samples that contain total coliform:	0	
Number of samples that contain total coliform in last 30 days:	0/0	
Total number of samples:	45	

Comments:

Environmental Health Officer
Jan 24 2020

FOR FURTHER INFORMATION PLEASE CALL: Rakel Byrnes (250) 719-6500

Definitions:

- Total Coliforms: total coliforms are organisms that are found all around us in the environment (ie on plants, animals and humans). They may or may not be harmful. Northern Health uses these organisms as indicator organisms. If total coliforms are found in the water, that indicates to the Environmental Health Officer (EHO) that other organisms may also be present.
- Fecal Coliforms: bacterial contamination from human or animal waste (feces).
- Escherichia coli: bacterial contamination from human or animal waste (feces).

Codes:

- A: means not tested; likely sample is too long in transit to the lab.
- B# (number) or BG: means the number of non-coliform background bacteria colonies. High numbers (>200) may indicate deteriorating water quality
- CFU: colony forming units
- E. Coli: means Escherichia coli.
- EST: means estimated count.
- L1: means less than 1 (<1) – essentially 0. Satisfactory.
- OG: means overgrowth of bacterial colonies; not possible to count coliform bacteria – unsatisfactory.
- R: means not tested; resample is likely required
- T: means not tested; likely sample is too long in transit to the lab.
- TNTC: means too numerous to countSimilar to OG – unsatisfactory.