

# REGIONAL DISTRICT OF NANAIMO

## Water Service Area Annual Report 2020



## Whiskey Creek Water Service Area

June 2021

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Appendix A - Map of Whiskey Creek Water Service Area

Appendix B - Water Quality Testing Results

Appendix C - Emergency Response Plan

## 1.0 Introduction

The following annual report describes the Whiskey Creek Water Service Area and summarizes the water quality and production data from 2020. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program.

This report is to be submitted to Island Health by the spring of 2021.

## 2.0 Whiskey Creek Water System

The Whiskey Creek water system was constructed in the 1970s and was initially operated by the subdivision developer, Westerlea Estates Ltd. The water system is located eight kilometres southwest of Qualicum Beach on the south side of Highway 4. There are 130 residential lots connected to the water system. In January 2011, the ownership and operation of the Whiskey Creek Water District was transferred to the RDN. A map of the Whiskey Creek Water Service Area is provided in Appendix A for reference.

### 2.1 Source Water

Two water licenses allow surface water to be extracted from nearby Crocker Creek. A permanent emergency backup generator is available in the event of a power failure. Water from Crocker Creek is temporarily stored in a raw water storage pond next to the pumphouse on Hebert Road. Perforated pipe under the bed of the pond carries water into a concrete wet well containing two submersible pumps. These pumps deliver water through a pressure filter to a water storage reservoir. The water is dosed with a polymer upstream of the filter and then chlorinated. Drinking water is then pumped into the water system via two booster pumps.

A groundwater source is being pursued as an alternative source to Crocker Creek. In 2020, two test wells were drilled near Carson Road and source approval was received from Island Health. The next steps are to design the location and depth of the well supply lines to the water storage reservoir, and then installation of these lines once funding has been secured.

### 2.2 Reservoirs

One service reservoir (concrete) is present at 979 Poplar Way, and has a capacity of 195 m<sup>3</sup> (43,000 imperial gallons).

### 2.3 Distribution System

The water distribution system in Whiskey Creek is summarized in the table below. There are 9 fire hydrants and 4 flush-outs in the system.

Watermain Material	Length of mains in Whiskey Creek Water Service Area	Prevalence in Water Service Area
<u>Asbestos-concrete:</u> 100mm or smaller	1,280 m	40%
150mm or larger	1,920 m	60%

### 3.0 Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. The following table includes a summary of all testing:

Timing	Location	Tests
Weekly	BC Centre for Disease Control	Total coliforms, E.Coli
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli Temperature, pH, Conductivity TDS, Chlorine residual, Salinity Monthly- Total Iron and Manganese
Quarterly	Bureau Veritas	Trihalomethanes (THMs), Total coliforms, and E.Coli tested at the reservoir site and 844 Carson Rd.
Annual Source Water Testing (every Fall)	Bureau Veritas	Complete potability testing of raw source water incl. tannins and lignins
Annual System Water Testing (every Spring)	Bureau Veritas	Complete potability testing of distribution system water

### 4.0 Water Quality - Source Water and Distribution System

Up-to-date water quality reports and lab data are posted monthly on the RDN website at [www.rdn.bc.ca/whiskey-creek](http://www.rdn.bc.ca/whiskey-creek). Tables of water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B.

The turbidity of water in the distribution system is closely monitored with an online turbidity meter and alarm. Occasionally, during high turbidity events, such as heavy rainfall in/near Crocker Creek, the filtration system cannot effectively filter the surface water. In these cases, the surface water intake is temporarily shut down while drinking water is trucked-in from another RDN water system nearby to top up the water storage reservoir until the high turbidity event passes.

### 5.0 Water Quality Inquiries and Complaints

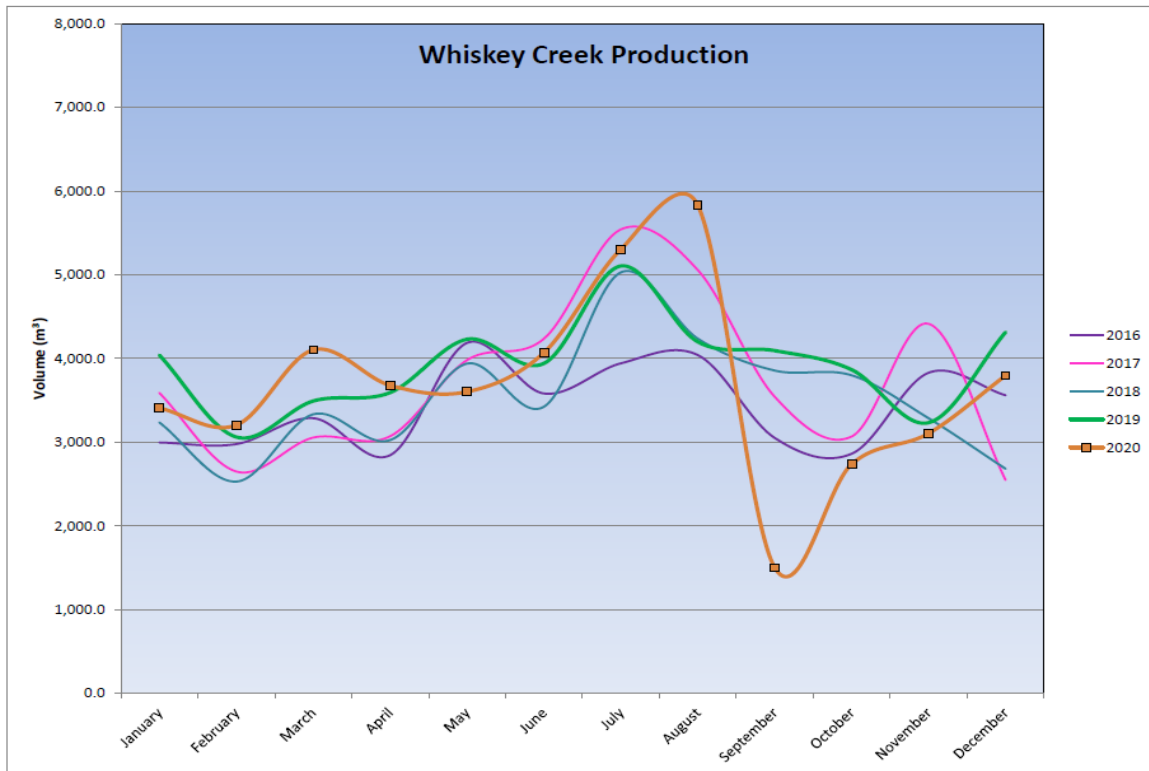
A few inquiries were received from the Whiskey Creek water service area in 2020 and were typically related to water billing.

A summary of the water system incidents in 2020 is given in the table below.

Activity in 2020	Date(s)	History/Notes
Boil Water Advisories	None	None
High Turbidity Events	Spring and Fall	Trucked-in water
Equipment Malfunction	None	None
Water Main Breaks	None	None
Pump Failures	Monthly	Temp power outages

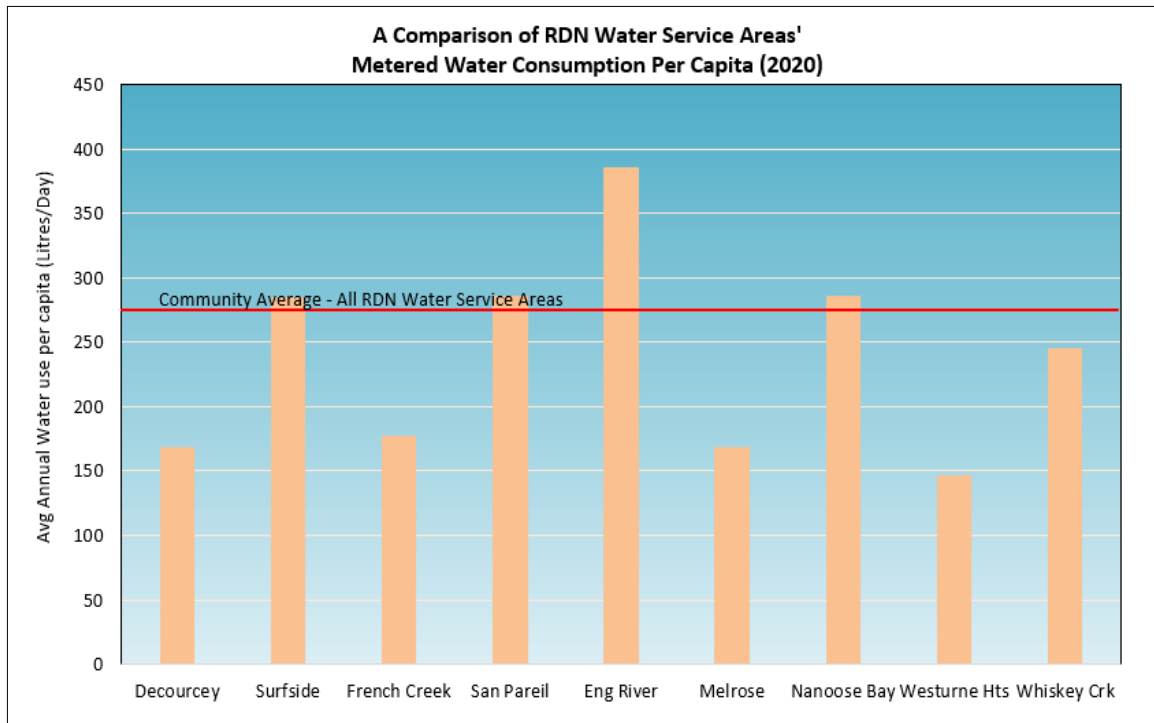
### 6.0 Water Consumption

Monthly water production for the Whiskey Creek Water Service Area for the past 5 years is shown in the chart below. Water production in 2020 was above average in comparison to previous years.



**Consumption**

In the Fall/Winter of 2020, the average usage per home in Whiskey Creek was 0.55 cubic metres per day (121 imperial gallons). In the summer, the average water usage was 0.67 cubic metres per day (147 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 245 L/day (based on 2.4 people/household). This consumption is *12% less* than the RDN system average of 278 L/day/capita in 2020.



**7.0 Maintenance Program**

Daily pump station inspections are carried out to reduce or eliminate the risk of contamination and system failure, and to ensure the consistent application of chlorine for treatment purposes. Watermains are flushed once annually in the spring. Fire hydrants (9) are serviced once per year (either 'A-level' or 'B-level' maintenance) in the fall. The water intake is cleaned weekly. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

Fire hydrants in the Whiskey Creek water system cannot be relied on for fire insurance purposes due to insufficient supply and capacity for fire flows. Upgrades to water supply volumes and reservoir storage may be required in the future but would not proceed without community support and financing.

**8.0 Operator Certification**

The Regional District Water & Utility Services staff are comprised of one Manager, one Project Engineer, one Engineering Technologist, one Engineering Technician, one Chief Operator, and seven certified operators.

The operators receive ongoing training and certification in:

- |                            |   |                            |
|----------------------------|---|----------------------------|
| ✓ Water Treatment          | ✓ Chlorine Handling                                       | ✓ Confined Space Awareness |
| ✓ Water Distribution       | ✓ WHMIS (Workplace Hazardous Material Information System) | ✓ Traffic Control          |
| ✓ Wastewater Collection    | ✓ TDG (Transportation of Dangerous Goods)                 | ✓ Fall Protection          |
| ✓ Cross Connection Control |   | ✓ First Aid                |
| ✓ Asbestos Awareness       |   | ✓ Silica Awareness         |

## 9.0 Water Service Area Projects

### 9.1 2020 Completed Studies & Projects

- Acquired a statutory right-of-way over Crown Land and drilled 2 test wells near Carson Rd;
- Received source approval from Island Health for the drilled wells;
- Installed Aquifer Protection Signage within the service area;
- Updated asset database with new assets;
- Calibrated and serviced all Hach spectrophotometer lab equipment;
- Completed a Water System Condition Assessment report and Capital Plan;
- Corresponded with residents regarding water conservation;
- Enforced outdoor sprinkling regulations;
- Completed irrigation checks for high-water users;
- Advised residents regarding water leak repairs;
- Completed the 2020-2030 Water Conservation Plan;
- Implemented a Water Systems SCADA Master Plan;
- Completed regular watermain flushing, and hydrant maintenance;
- Maintained a high level of water quality; and
- Continued quality control through regular testing and monitoring of water system.



Poplar Way in Whiskey Creek

## 9.2 2021 Proposed Projects & Upgrades

- Clean the water storage reservoir;
- Develop an aluminum monitoring and sampling plan;
- Design and install UV disinfection unit at well site;
- Construct a temporary transmission main to bring well water to reservoir;
- Upgrade the pumphouse at the reservoir site;
- Continue watermain flushing program and hydrant maintenance;
- Continue implementing the Water Systems SCADA Master Plan;
- Implement the 2020-2030 DWWP Water Conservation Plan; and
- Continue to offer numerous water-saving incentives via rebates.

## 10.0 Emergency Response Plan

The Regional District Emergency Response Plan (ERP) contains procedures and contact information to efficiently respond to water system emergencies such as contamination of water supply, loss of supply, pump failure, and drought management. The ERP was reviewed and updated in 2020, and copies are available on our website, at each RDN office, in each pumphouse, and in each Water Services vehicle. A copy of the ERP is also attached to this report in Appendix C.



**Water Source Area Protection sign on Hebert Rd.**

## 11.0 Cross Connection Control

The RDN's Cross Connection Control Program was put in place to protect the public health by reducing the risk of contaminants flowing back into the public water supply. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

The RDN's Cross Connection Control Program addresses cross connection threats through operating policies and procedures, as well as assisting customers with backflow preventer selection, installation, testing, maintenance and reporting. The program receives its authority from *RDN Cross Connection Control Regulation Bylaw No. 1788*, and the *British Columbia Building Code, Part 7*, which requires that potable water be protected from contamination. Additionally, a webpage has been established at <https://rdn.bc.ca/cross-connection-control-program> to educate RDN water service customers about cross connection hazards, and lists the relevant links to current standards and resources. Two of the RDN's water system operators received certification as backflow assembly testers through the British Columbia Water & Waste Association (BCWWA).



## 12.0 Cyber Security

The RDN uses a multi-level approach to cyber-security. Corporate network security is employed via a universal threat management gateway that implements various methods of data security, which includes daily definition updates to block known cyber threats. In addition, all RDN PC's are protected with anti-virus software. RDN water systems are connected to the corporate network via IP-Sec VPN's for remote management by information technology and equipment operators. Future infrastructure upgrades will see our water systems located on segregated networks to limit the vulnerability from cybersecurity threats.

## 13.0 Closing

An annual report for the year 2021 will be prepared and submitted to Island Health in the spring of 2022. Annual reports are also available on our website at: [www.rdn.bc.ca/whiskey-creek](http://www.rdn.bc.ca/whiskey-creek).

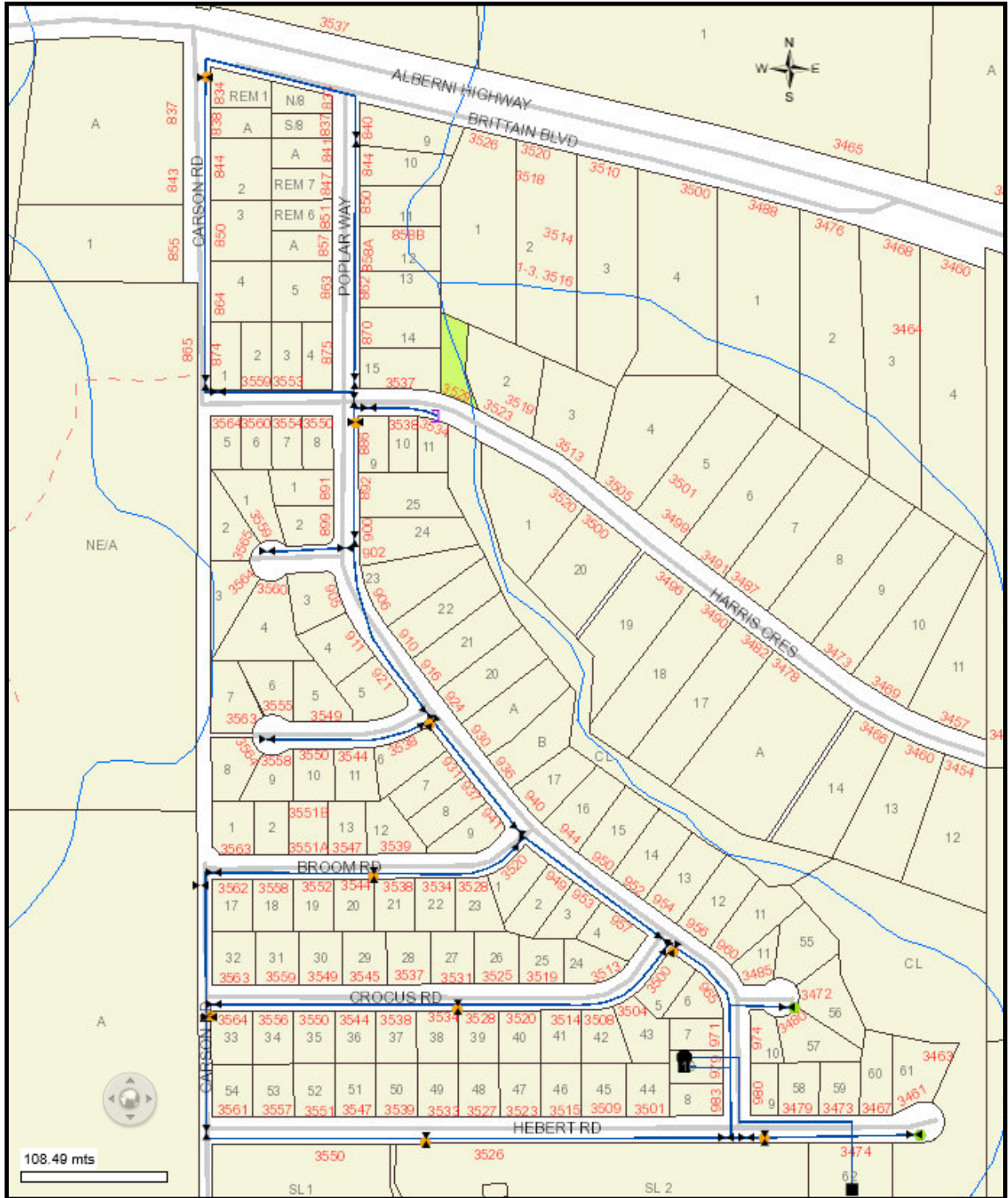


Land clearing and well site  
construction in Whiskey Creek

**APPENDIX A**

**MAP OF WHISKEY CREEK  
WATER SERVICE AREA**

WHISKEY CREEK WATER SERVICE AREA



## APPENDIX B

### WATER QUALITY TESTING RESULTS

# WHISKEY CREEK WATER SERVICE AREA



**Facility Location:**

979 Poplar Way, Qualicum Beach

**Facility Information:** Facility Type: 15-300 connections DWC

**Facility Sampling History:**

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	14-Dec-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	7-Dec-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	7-Dec-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	1-Dec-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	23-Nov-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	16-Nov-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	9-Nov-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	2-Nov-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	26-Oct-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	19-Oct-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	13-Oct-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	5-Oct-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	14-Sep-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	14-Sep-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	8-Sep-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	2-Sep-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	24-Aug-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	17-Aug-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	12-Aug-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	4-Aug-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	27-Jul-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	20-Jul-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	13-Jul-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	8-Jul-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	22-Jun-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	15-Jun-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	8-Jun-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	1-Jun-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	25-May-2020	LT1	LT1

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	20-May-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	11-May-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	4-May-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	28-Apr-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	20-Apr-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	14-Apr-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	6-Apr-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	23-Mar-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	16-Mar-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	9-Mar-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	2-Mar-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	24-Feb-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	18-Feb-2020	LT1	LT1
Whiskey Crk. Sample Port, 844 Carson Rd.	10-Feb-2020	LT1	LT1
Whiskey Crk. Sample Port, 3537 Harris Cres.	3-Feb-2020	LT1	LT1
Whiskey Crk. Sample Port, 3533 Hebert Rd.	28-Jan-2020	LT1	LT1
Whiskey Crk. Sample Port, 3564 Foxglove Rd.	20-Jan-2020	L1	L1
Whiskey Crk. Sample Port, 844 Carson Rd.	13-Jan-2020	L1	L1
Whiskey Crk. Sample Port, 3537 Harris Cres.	6-Jan-2020	L1	L1

### **Interpreting Sample Reports**

In VIHA, the results of drinking water sampling are reported using the following coding system:

LT1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present

L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present



# Regional District of Nanaimo - Water Services Department

## Whiskey Creek Water Analysis - 2020 Monthly Report

Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
1-Dec-20	3537 Harris	0	0	0	0	9	7.00	1.22	61.1	0.05	128.7	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at <a href="https://www.rdn.bc.ca/whiskey-creek">https://www.rdn.bc.ca/whiskey-creek</a>	
7-Dec-20	844 Carson	0	0	0	0	9	7.20	1.04	65.3	0.06	138.1		
7-Dec-20	3533 Hebert	0	0	0	0	9	7.24	1.39	67.1	0.06	135.9		
14-Dec-20	3564 Foxglove	0	0	0	0	9	7.24	1.13	66.2	0.07	140.1		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

**Legend:**

\* Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

**Comments:**

Iron and Manganese are no longer being tested in-house.

A full potability scan is completed once per year at an external lab that includes metals and minerals.



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Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
2-Nov-20	3537 Harris	0	0	0	0	12	7.20	0.87	76.0	0.08	160.1	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at <a href="https://www.rdn.bc.ca/whiskey-creek">https://www.rdn.bc.ca/whiskey-creek</a>	
9-Nov-20	844 Carson	0	0	0	0	11	7.20	1.11	82.0	0.08	173.0		
16-Nov-20	3564 Foxglove	0	0	0	0	11	6.81	1.03	72.8	0.07	152.7		
23-Nov-20	3522 Hebert	0	0	0	0	9	6.90	1.64	69.9	0.07	147.0		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
5-Oct-20	3537 Harris	0	0	0	0	16	6.89	1.26	77.1	0.08	162.7	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at <a href="https://www.rdn.bc.ca/whiskey-creek">https://www.rdn.bc.ca/whiskey-creek</a>	
13-Oct-20	844 Carson	0	0	0	0	15	7.20	0.86	84.8	0.08	178.7		
19-Oct-20	3564 Foxgolve	0	0	0	0	14	6.83	1.26	80.2	0.08	169.1		
26-Oct-20	3533 Hebert	0	0	0	0	12	7.00	1.11	72.1	0.07	152.2		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

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2-Sep-20	3537 Harris	0	0	0	0	17	6.63	1.46	89.0	0.09	187.2	0.32	
8-Sep-20	844 Carson	0	0	0	0	17	6.70	0.78	88.4	0.10	185.1		
14-Sep-20	3564 Foxglove	0	0	0	0	17	6.92	1.01	93.9	0.11	192.9		
21-Sep-20	3533 Hebert	0	0	0	0	17	6.96	0.80	82.5	0.08	173.8		
28-Sep-20	3533 Hebert			0	0	17	7.31	1.12	103.1	0.10	216.7		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

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Date	Sample Location (Address)	E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
4-Aug-20	3537 Harris	0	0	0	0	15	6.94	1.17	66.1	0.07	139.7	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at <a href="https://www.rdn.bc.ca/whiskey-creek">https://www.rdn.bc.ca/whiskey-creek</a>	
12-Aug-20	844 Carson	0	0	0	0	15	6.87	0.82	67.8	0.07	143.4		
17-Aug-20	3564 Foxglove	0	0	0	0	19	7.02	1.12	97.8	0.10	205.5		
24-Aug-20	3533 Hebert	0	0	0	0	15	7.18	0.80	96.0	0.10	201.9		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

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		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Jul-20	3537 Harris	0	0	0	0	14	7.18	1.05	64.3	0.07	135.7	0.11	0.001
13-Jul-20	844 Carson	0	0	0	0	15	7.33	1.35	65.3	0.06	138.1		
20-Jul-20	3465 Foxglove	0	0	0	0	15	7.34	1.62	63.9	0.06	134.9		
27-Jul-20	3533 Hebert	0	0	0	0	17	6.93	0.82	64.3	0.06	135.9		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

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### Comments:

Notes below about Manganese (2019) from: <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html>

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.



# Regional District of Nanaimo - Water Services Department

## Whiskey Creek Water Analysis - 2020 Monthly Report

Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
1-Jun-20	3537 Harris	0	0	0	0	13	6.86	1.07	66.1	0.07	139.7	0.06	0.008
8-Jul-20	844 Carson	0	0	0	0	13	7.04	1.46	49.9	0.09	140.0		
15-Jun-20	3564 Foxglove	0	0	0	0	12	7.30	0.93	71.6	0.07	151.1		
22-Jun-20	3533 Hebert	0	0	0	0	14	7.32	1.51	66.5	0.07	140.4		
29-Jun-20	3533 Hebert			0	0	15	7.09	1.04	64.0	0.06	135.4		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

\* Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)

Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

### Comments:

Notes below about Manganese (2019) from: <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html>

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.



# Regional District of Nanaimo - Water Services Department

## Whiskey Creek Water Analysis - 2020 Monthly Report

Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
4-May-20	3537 Harris	0	0	0	0	10	7.26	1.04	67.1	0.07	141.8	0.03	0.011
11-May-20	844 Carson	0	0	0	0	10	7.38	0.55	68.3	0.07	146.0		
19-May-20	3564 Foxglove	0	0	0	0	11	7.35	1.06	70.7	0.07	148.1		
25-May-20	3533 Hebert	0	0	0	0	11	7.24	0.43	45.7	0.04	97.1		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

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I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.



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Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Apr-20	3537 Harris	0	0	0	0	8	7.40	1.24	56.7	0.05	119.9	0.04	0.013
14-Apr-20	844 Carson	0	0	0	1	8	7.40	0.82	63.2	0.06	134.9		
16-Apr-20	844 Carson RE			0	0			0.91					
20-Apr-20	3564 Foxglove	0	0	0	0	10	7.70	0.76	63.4	0.06	134.0		
27-Apr-20	3533 Hebert	0	0	0	0	10	6.98	1.36	66.1	0.07	139.3		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

\* Coliforms are measured in colony forming units (CFU) per 100 millilitres of water (CFU/100mL)

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### Comments:

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Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I = Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.



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Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
2-Mar-20	3537 Harris	0	0	0	0	7	7.45	1.11	55.1	0.05	116.7	0.05	0.005
9-Mar-20	844 Carson	0	0	0	0	7	7.52	0.99	58.6	0.06	123.8		
16-Mar-20	3564 Foxglove	0	0	0	0	7	7.38	0.99	60.3	0.06	127.5		
23-Mar-20	3533 Hebert	0	0	0	0	7	7.80	1.09	58.8	0.06	124.1		
30-Mar-20	3564 Foxglove			0	0	8	7.32	0.77	63.2	0.06	133.5		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

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## Whiskey Creek Water Analysis - 2020 Monthly Report

Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
3-Feb-20	3537 Harris	0	0	0	0	7	7.33	1.16	54.8	0.05	116.2	0.03	0.011
10-Feb-20	844 Carson	0	0	0	0	7	7.26	1.24	57.0	0.05	109.9		
18-Feb-20	3564 Foxglove	0	0	0	0	7	7.15	1.14	60.1	0.06	127.1		
24-Feb-20	3533 Hebert	0	0	0	0	6	7.14	1.21	55.4	0.05	117.1		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

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Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
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Date	Sample Location (Address)	BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
		E. coli *	Total Coliform *	E.coli *	Total Coliform *	Temp. (°C)	pH	Free Chlorine Residual (mg/L)	Total Dissolved Solids (mg/L)	Salinity (%)	Conductivity (µS/cm)	Total Iron (mg/L)	Manganese (mg/L)
6-Jan-20	3537 Harris	0	0	0	0	8	6.95	1.06	76.3	0.08	160.9	0.03	0.029
13-Jan-20	844 Carson	0	0	0	0	7	7.11	1.08	67.6	0.07	142.9		
20-Jan-20	3564 Foxglove	0	0	0	0	8	7.14	1.15	68.4	0.06	140.1		
28-Jan-20	3537 Hebert	0	0	0	0	6	7.02	1.27	52.6	0.05	111.5		
CDN Drinking Water Guidelines		<1	<1	<1	<1	n/a	7.0-10.5	n/a	500	n/a	n/a	0.3	0.02 AO 0.12 MAC

### Legend:

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Orange font indicates non-compliance with the Aesthetic Objective (AO) in the Canadian Drinking Water Guidelines (CDWG)

Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG

### Comments:

Notes below about Manganese (2019) from: <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html>

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
I= Inorganic chemical parameter	Manganese (2019)	0.12	AO: <0.02	Dissolution of naturally-occurring minerals commonly found in soil and rock. Other sources include industrial discharge, mining activities and leaching from landfills.	<b>Health Basis of MAC:</b> Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. <b>Other:</b> Formula-fed infants (where water containing manganese at levels above the MAC is used to prepare formula) may be especially at risk.	AO based on minimizing the occurrence of discoloured water, consumer complaints and staining of laundry.

CDWG=Canadian Drinking Water Guidelines  
OG= Operational Guidance Value

 MAC=Maximum Acceptable Concentration  
AO=Aesthetic Objective

**Orange font indicates non-compliance with the Aesthetic Objective in the Canadian Drinking Water Guidelines (CDWG)**  
**Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG**

	Units	CDWG		October 25 2018	October 3 2019	October 21 2020
<b>Miscellaneous Inorganics</b>						
Fluoride	mg/L	1.5	MAC	0.033	<0.05	<0.05
Alkalinity (total as CaCO <sub>3</sub> )	mg/L			42.8	41	36
<b>Anions</b>						
Dissolved Sulphate	mg/L	500	AO	<1.0	<1.0	<1
Dissolved Chloride	mg/L	250	AO	3	8.8	5.5
Nitrite	mg/L	1	MAC	<0.0050	<0.005	<0.005
<b>Miscellaneous</b>						
Apparent Colour	Colour Unit			15	15	80
Tannins & Lignins	mg/L			0.43	0.35	1.25
<b>Nutrients</b>						
Total Ammonia	mg/L			<0.020	0.06	<0.015
<b>Physical Properties</b>						
Conductivity	µS/cm			93	110	96
pH	pH	7.0:10.5	OG	7.74	7.55	7.02
TDS	mg/L	500	AO	72	78	94
Turbidity	NTU			0.17	0.15	0.28
<b>Microbiological Parameters</b>						
E.coli	MPN/100mL	<1	MAC	1	0	0
Total Coliforms	MPN/100mL	<1	MAC	34	170	24
<b>Calculated Parameters</b>						
Total Hardness (CaCO <sub>3</sub> )	mg/L			41	44.6	41.5
Nitrate	mg/L	10	MAC	<0.020	0.06	0.123
<b>Elements</b>						
Total Mercury	mg/L	0.001	MAC	0.000077	<0.000002	0.0000028
<b>Total Metals</b>						
Total Aluminum	mg/L	0.1	OG	0.0162	0.0143	0.0464
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0006
Total Arsenic	mg/L	0.01	MAC	<0.0001	<0.0001	0.000169
Total Barium	mg/L	2	MAC	<0.001	<0.001	0.000794
Total Beryllium	mg/L			<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	<0.050	<0.05	<0.05
Total Cadmium	mg/L	0.007	MAC	<0.00001	<0.00001	0.0000066
Total Chromium	mg/L	0.05	MAC	<0.001	0.0011	0.00071
Total Cobalt	mg/L			<0.0002	<0.0002	0.00004
Total Copper	mg/L	1	AO	0.00206	0.0017	0.0036
Total Iron	mg/L	0.3	AO	0.0395	0.0494	0.128
Total Lead	mg/L	0.01	MAC	<0.0002	<0.0002	0.000222
Total Manganese	mg/L	0.02 0.12	AO MAC	0.0019	0.0021	0.00848
Total Molybdenum	mg/L			<0.001	<0.001	0.000173
Total Nickel	mg/L			<0.001	<0.001	0.00029
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	0.000045
Total Silicon	mg/L			8.9	8.8	8.9
Total Silver	mg/L			<0.00002	<0.00002	<0.000010
Total Strontium	mg/L			0.024	0.027	0.0271
Total Thallium	mg/L			<0.00001	<0.00001	<0.000002
Total Tin	mg/L			<0.005	<0.005	<0.0002
Total Titanium	mg/L			<0.005	<0.005	<0.002
Total Uranium	mg/L	0.02	MAC	<0.0001	<0.0001	<0.000005
Total Vanadium	mg/L			<0.005	<0.005	0.00164
Total Zinc	mg/L	5	AO	<0.005	<0.005	0.006
Total Zirconium	mg/L			<0.0001	<0.0001	<0.0001
Total Calcium	mg/L			10.9	11.7	10.9
Total Magnesium	mg/L			3.35	3.71	3.46
Total Potassium	mg/L			0.139	0.173	0.601
Total Sodium	mg/L	200	AO	3.22	3.59	3.65
Total Sulphur	mg/L			<3.0	<3.0	<0.6

CDWG=Canadian Drinking Water Guidelines  
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration  
AO= Asthetic Objective.

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Red font indicates non-compliance with the Maximum Acceptable Concentration (MAC) in the CDWG  
Green font indicates non-compliance with the Operational Guideline (OG) in the CDWG

	Units	CDWG		May 13 2014	March 25 2015	May 19 2015	May 10 2016	May 8 2017	May 7 2018	May 13 2019	May 21 2020
<b>Miscellaneous Inorganics</b>											
Fluoride	mg/L	1.5	MAC	<0.05	0.015	0.034	0.026	0.026	0.025	0.022	<0.05
Alkalinity (total as CaCO <sub>3</sub> )	mg/L			28	21.5	32	32.7	31.1	27.1	29.1	26
<b>Anions</b>											
Dissolved Sulphate	mg/L	500	AO	3.2	3.23	2.76	2.91	2.82	3.9	3	4.2
Dissolved Chloride	mg/L	250	AO	18.7	18	12	12	12	12	21	23
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005
<b>Miscellaneous</b>											
Apparent Colour	Colour Unit			<5	<5	<5	10	10	10	<2	5
<b>Nutrients</b>											
Total Ammonia	mg/L			<0.02	0.0059	0.0057	0.0096	0.12	<0.020	<0.015	0.041
<b>Physical Properties</b>											
Conductivity	µS/cm			131	114	111	105	105	103	136	140
pH	pH	7.0:10.5	AO	6.9	7.03	7.67	7.56	7.62	7.53	6.99	7.13
TDS	mg/L	500	AO	102	84	80	52	80	56	100	100
Turbidity	NTU			<0.5	0.27	0.17	0.14	0.19	0.17	0.22	0.12
<b>Microbiological Parameters</b>											
E.coli	MPN/100mL	<1	MAC	<1.0	<2	<1.0	<1.0	<1.0	<1.0	0	0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<2	<1.0	<1.0	<1.0	<1.0	0	0
<b>Calculated Parameters</b>											
Total Hardness (CaCO <sub>3</sub> )	mg/L			43	35.2	40.8	34.4	42.9	35.7	47.1	41
Nitrate	mg/L	10	MAC	0.09	0.076	0.066	0.072	0.071	0.067	0.056	0.07
<b>Elements</b>											
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	<0.000002	<0.0000019
<b>Total Metals</b>											
Total Aluminum	mg/L	0.1	OG	0.304	0.385	0.302	0.126	0.256	0.123	0.026	0.0865
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Arsenic	mg/L	0.01	MAC	<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Barium	mg/L	1	MAC	0.00141	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Beryllium	mg/L			<0.00025	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	<0.010	<0.05	<0.050	<0.050	<0.050	<0.050	<0.05	<0.05
Total Cadmium	mg/L	0.005	MAC	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	<0.0025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Cobalt	mg/L			<0.0005	<0.0005	<0.0005	<0.0005	<0.0002	<0.0002	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.01	0.0007	0.00983	0.0059	0.00521	0.00931	0.00493	0.00704
Total Iron	mg/L	0.3	AO	0.044	0.017	0.0245	<0.005	0.0114	0.0079	<0.005	0.0071
Total Lead	mg/L	0.01	MAC	0.0014	<0.0002	0.00051	0.00021	0.00028	0.00095	0.00025	0.00044
Total Manganese	mg/L	0.02 0.12	AO MAC	<0.0050	0.0047	0.0031	0.0023	0.0028	0.0024	0.0018	0.0038
Total Molybdenum	mg/L			<0.00025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			<0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Silicon	mg/L			8.82	8.65	9.43	8.96	10.4	8.55	8.01	8.25
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.0239	0.0203	0.0231	0.0215	0.0233	0.0229	0.0288	0.0272
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001
Total Tin	mg/L			<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			<0.0025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Uranium	mg/L	0.02	MAC	<0.00005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Vanadium	mg/L			0.0008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.024	<0.005	0.0084	<0.005	0.0062	0.0056	<0.005	<0.005
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001
Total Calcium	mg/L			12	9.29	11.2	9.01	11.5	9.52	12.6	10.9
Total Magnesium	mg/L			3.06	2.93	3.13	2.88	3.42	2.9	3.81	3.36
Total Potassium	mg/L			<0.5	0.127	0.137	0.134	0.233	0.173	0.216	0.413
Total Sodium	mg/L	200	AO	9.4	7.08	6.14	6.07	6.95	5.75	6.19	7.66
Total Sulphur	mg/L					<3.0	<3.0	<3.0	<3.0	<3	<3

Notes below about Aluminum from: [www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html](http://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html)

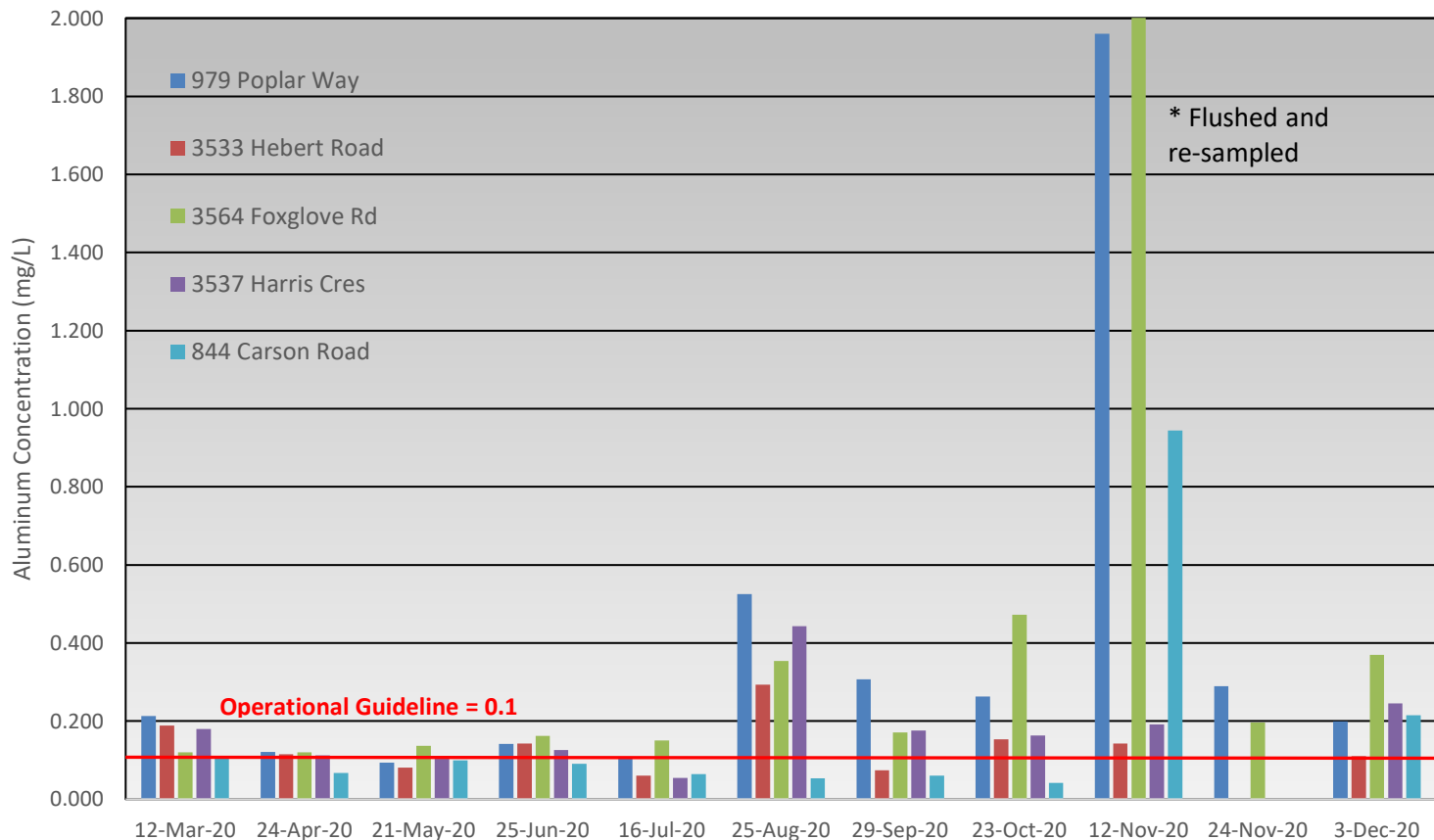
Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
T - treatment related parameter	Aluminum (1998)	None	Operational Guideline: <0.1 (conventional treatment); or <0.2 (other treatment types)	Aluminum salts used as coagulants in drinking water treatment; naturally occurring.	There is no consistent, convincing evidence that aluminum in drinking water causes adverse health effects in humans.	The operational guideline applies to treatment plants using aluminum-based coagulants; it does not apply to naturally occurring aluminum found in groundwater. For treatment plants using aluminum-based coagulants, monthly samples should be taken of the water leaving the plant; the OGs are based on a running annual average of monthly samples.

## Whiskey Creek Total Aluminum (mg/L)

Operational Guideline (OG) = 0.1mg/L

Date	979 Poplar Way	3533 Hebert Road	3564 Foxglove Rd	3537 Harris Cres	844 Carson Road
12-Mar-20	0.213	0.189	0.120	0.180	0.108
24-Apr-20	0.121	0.115	0.120	0.112	0.067
21-May-20	0.094	0.081	0.137	0.103	0.100
25-Jun-20	0.142	0.143	0.162	0.126	0.090
16-Jul-20	0.106	0.061	0.150	0.055	0.064
25-Aug-20	0.525	0.293	0.354	0.443	0.053
29-Sep-20	0.307	0.074	0.171	0.176	0.061
23-Oct-20	0.263	0.153	0.472	0.163	0.042
12-Nov-20	1.960 *	0.143	14.800 *	0.192	0.944
24-Nov-20	0.289		0.196		
3-Dec-20	0.199	0.110	0.370	0.245	0.215
21-Jan-21	0.172	0.094	0.051	0.088	0.051
19-Feb-21	0.214	0.169	0.106	0.161	0.070
<b>Average</b>	<b>0.354</b>	<b>0.135</b>	<b>1.324</b>	<b>0.170</b>	<b>0.155</b>

### Whiskey Creek Monthly Aluminum Results



### Whiskey Creek Wet Well

Date	pH	Total Organic Carbon	Apparent Colour	True Colour	Tannins/Lignins
21-Aug-20	7.42		150	99.5	2.19
27-Aug-20		8.9			
23-Oct-20		7.8			1.25

## Individual THM Lab Results (mg/L)

Location	Date	Bromodichloro- methane	Bromoform	Chloroform	Chlorodibromo chloro- methane	Total Trihalo- methanes (MAC 0.1 mg/L)	Total Coliforms	E.coli
979 Poplar Way	21-Mar-17	0.0025	<0.001	0.032	<0.001	0.0345		
844 Carson	21-Mar-17	0.0027	<0.001	0.033	<0.001	0.0357		
979 Poplar Way	19-Jun-17	0.0032	<0.001	0.034	<0.001	0.0372		
844 Carson	19-Jun-17	0.0032	<0.001	0.034	<0.001	0.0372		
979 Poplar Way	30-Oct-17	0.0016	<0.001	0.017	<0.001	0.0186		
844 Carson	30-Oct-17	0.0025	<0.001	0.03	<0.001	0.0325		
979 Poplar Way	20-Dec-17	0.001	<0.001	0.021	<0.001	0.0220		
844 Carson	20-Dec-17	0.0018	<0.001	0.031	<0.001	0.0328		
	<b>AVERAGE</b>					<b>0.0313</b>		
979 Poplar Way	22-Mar-18	0.0017	<0.001	0.014	<0.001	0.0157		
844 Carson	22-Mar-18	0.002	<0.001	0.017	<0.001	0.0190		
979 Poplar Way	28-Jun-18	0.0017	<0.001	0.014	<0.001	0.0157		
844 Carson	28-Jun-18	0.0026	<0.001	0.019	<0.001	0.0216		
979 Poplar Way	26-Sep-18	0.0018	<0.001	0.03	<0.001	0.0318		
844 Carson	26-Sep-18	0.0027	<0.001	0.044	<0.001	0.0467		
979 Poplar Way	13-Dec-18	0.0022	<0.001	0.033	<0.001	0.035		
844 Carson	13-Dec-18	0.003	<0.001	0.036	<0.001	0.039		
	<b>AVERAGE</b>					<b>0.0281</b>		
979 Poplar Way	14-Mar-19	0.0023	<0.001	0.031	<0.001	0.033		
844 Carson	14-Mar-19	0.0032	<0.001	0.055	<0.001	0.033		
979 Poplar Way	13-Jun-19	0.0021	<0.001	0.009	<0.001	0.011	0	0
844 Carson	13-Jun-19	0.0026	<0.001	0.011	<0.001	0.014	0	0
979 Poplar Way	26-Sep-19	0.0026	<0.001	0.019	<0.001	0.022	0	0
844 Carson	26-Sep-19	0.0044	<0.001	0.036	<0.001	0.04	0	0
979 Poplar Way	12-Dec-19	0.002	<0.001	0.013	<0.001	0.015	0	0
844 Carson	12-Dec-19	0.0033	<0.001	0.025	<0.001	0.028	0	0
979 Poplar Way	12-Mar-20	0.0023	<0.001	0.02	<0.001	0.023	0	0
844 Carson	12-Mar-20	0.0031	<0.001	0.027	<0.001	0.03	0	0
979 Poplar Way	25-Jun-20	0.0036	<0.001	0.023	<0.001	0.026	0	0
844 Carson	25-Jun-20	0.0042	<0.001	0.026	<0.001	0.03	0	0
979 Poplar Way	27-Aug-20	0.0064	<0.001	0.037	0.0011	0.044		
844 Carson	27-Aug-20	0.0088	<0.001	0.056	0.0013	0.066		
979 Poplar Way	16-Sep-20	0.0062	<0.001	0.028	0.0014	0.036	0	0
844 Carson	16-Sep-20	0.01	<0.001	0.054	0.0019	0.066	0	0
979 Poplar Way	3-Dec-20	0.0025	<0.001	0.023	<0.001	0.026	0	0
844 Carson	3-Dec-20	0.0037	<0.001	0.039	<0.001	0.043	0	0

## Total Trihalomethanes (THMs)

(mg/L)

Location	Month	2016	2017	2018	2019	2020
979 Poplar Way	January					
979 Poplar Way	February					
979 Poplar Way	March**	0.0375	0.0345	0.0157	0.0330	0.0230
844 Carson Road	March*	0.0562	0.0357	0.0190	0.0580	0.0300
979 Poplar Way	April					
979 Poplar Way	09-May					
844 Carson Road	May 9 *					
979 Poplar Way	17-May					
844 Carson Road	May 17 *					
979 Poplar Way	24-May					
844 Carson Road	May 24 *					
979 Poplar Way	30-May					
844 Carson Road	May 30 *					
979 Poplar Way	07-Jun					
844 Carson Road	June 7 *					
979 Poplar Way	June**	0.0170	0.0372	0.0157	0.0110	0.0300
844 Carson Road	June*	0.0281	0.0372	0.0216	0.0140	0.0260
979 Poplar Way	August					0.0440
844 Carson Road	August					0.0660
979 Poplar Way	Sept**	0.0231	0.0186	0.0318	0.0220	0.0360
844 Carson Road	Sept*	0.0299	0.0325	0.0467	0.0400	0.0660
979 Poplar Way	Dec**	0.0213	0.0220	0.0350	0.0150	0.0260
844 Carson Road	Dec*	0.0250	0.0328	0.0390	0.0280	0.0430
	<b>AVERAGE</b>	<b>0.0298</b>	<b>0.0313</b>	<b>0.0281</b>	<b>0.0276</b>	<b>0.0390</b>

