REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2021

Melrose Terrace Water Service Area

June 2022

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department
6300 Hammond Bay Rd, Nanaimo, BC Canada V9T 6N2 | Ph 250-390-6560

Table of Contents

1.0 Introduction

The following annual report describes the Melrose Water Service Area and summarizes the water quality and production data from 2021. This report also includes a summary of inquiries and complaints, completed and proposed maintenance activities, Operator Certification, the Emergency Response & Contingency Plan, and the Cross-Connection Control Program.

This report is to be submitted to Island Health by the spring of 2022.

2.0 Melrose Terrace Water Service Area

The Melrose Water Service Area was established in April 2005 when the RDN acquired the existing Melrose Terrace Strata Plan VIS3747 water system. The water service area is comprised of 28 residential properties on Melrose Road located near the Alberni Highway, west of Coombs. The water source for the Melrose Water Service Area comes from one groundwater well located nearby. The water is chlorinated and stored in a single reservoir. The water is then filtered through sand and charcoal filters before entering the distribution system. A portable generator is available in the event of a power outage. A map of the Melrose Water Service Area is provided in Appendix A for reference.

2.1 Groundwater Wells

One groundwater production well is present at the reservoir site on Melrose Road, west of Coombs, B.C.

Well / Name	Well Depth	Wellhead Protection In Place	Treated/Untreated with Chlorine
#1	26.2 m	Yes	Treated

2.2 Reservoirs

One service reservoir (steel structure) is present at 3853 Melrose Road, and has a capacity of 136 m^3 (30,000 imperial gallons).

2.3 Distribution System

The water distribution system in Melrose is comprised of 0.3 km of 150mm PVC watermains. There are no fire hydrants located within the system.

Note: 'PVC' is poly-vinylchloride (plastic)

Melrose Well and Pumphouse

3.0 Water Sampling and Testing Program

Water sampling and testing is carried out weekly in the distribution system. Notably, the chlorine residual levels are tested weekly to ensure the absence of bacterial regrowth in the watermains. The following table includes a summary of all testing.

Timing	Location	Tests
Weekly	RDN (in-house) Laboratory	Total coliforms, E.Coli, Temperature, pH, Conductivity, Chlorine residual, Salinity, TDS
Monthly	BC Centre for Disease Control	Total coliforms, E.Coli
Annual Source Water Testing (every Fall)	Bureau Veritas	Complete potability testing of raw well water, including T-Ammonia
Annual System Water Testing (every Spring)	Bureau Veritas	Complete potability testing of distribution system, including T-Ammonia

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/melrose-terrace. 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.

Melrose Road Bridge

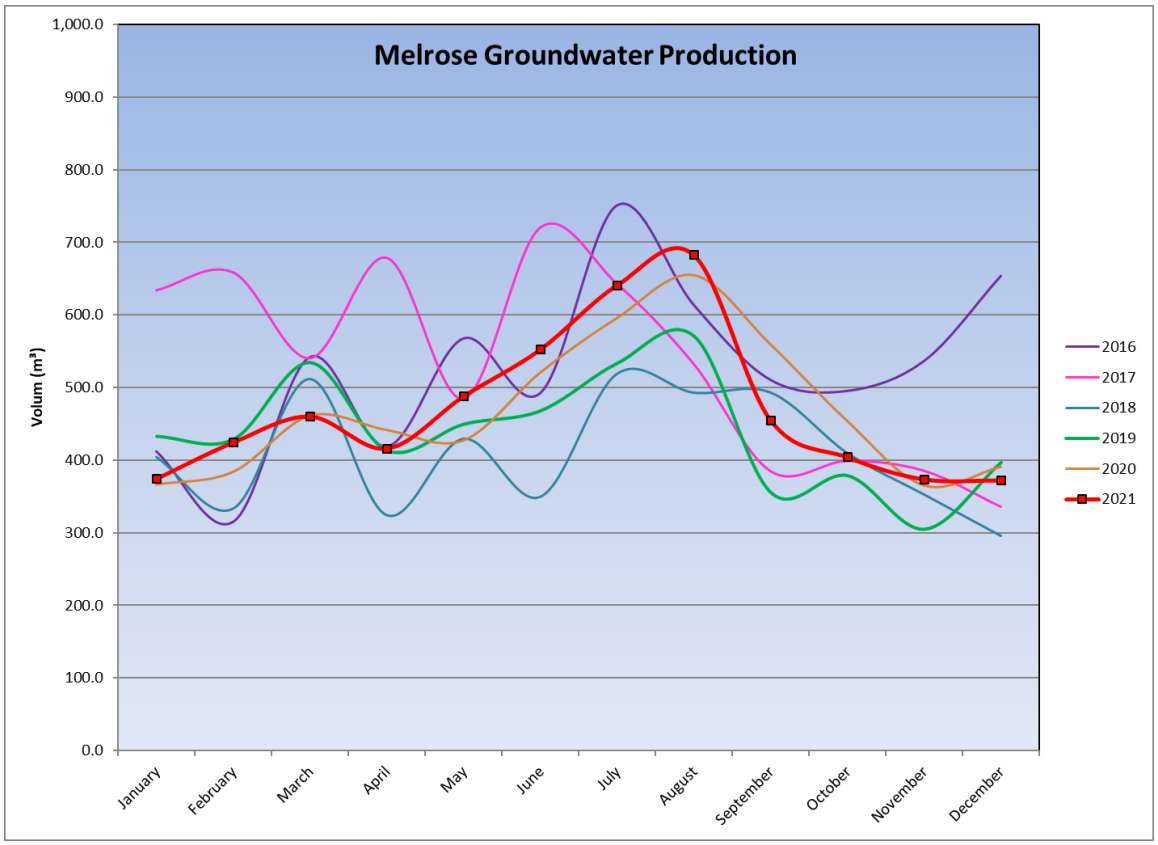
5.0 Water Quality Inquiries and Complaints

No complaints or inquiries were received from the Melrose water service area in 2021. A summary of the water system incidents in 2021 is given in the table below.

Activity in 2021	Date(s)	History/Notes
Boil Water Advisories	None	None, ever.
High Turbidity Events	None	None, ever.
Equipment Malfunction	None	None.
Water Main Breaks	None	None.
Pump Failures	None	Temp power outages.

6.0 Groundwater Production and Consumption

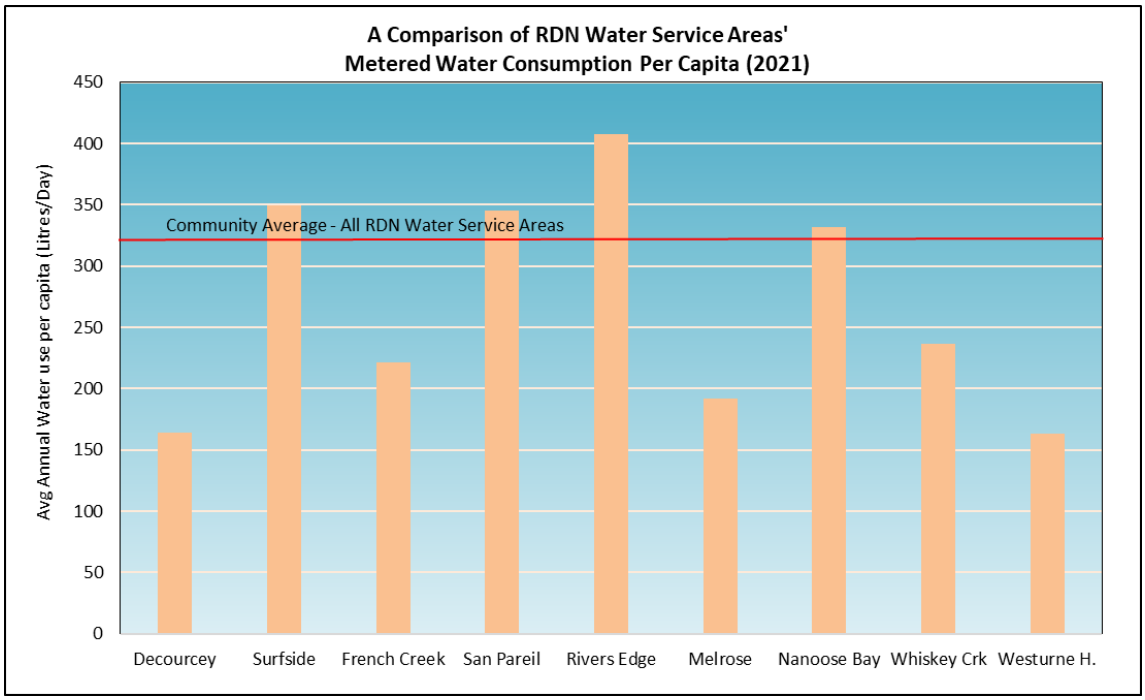
The monthly groundwater production in the Melrose system for the past 6 years is shown in the chart below. Overall groundwater production in 2021 was average in comparison to previous years.



Consumption

In the Fall/Winter of 2021, the average usage per home in the Melrose Terrace water service area was approximately 0.41 cubic metres per day (90.2 imperial gallons). In the summer, the

average water usage was 0.55 cubic metres per day (121 imperial gallons). Based on these figures, the annual consumption per capita is estimated to be 192 L/day (based on 2.4 people per household). This consumption is *40% less* than the RDN system average of 321 L/day/capita in 2021.



7.0 Maintenance Program

Weekly 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 a year in the Spring. The water storage reservoir is drained and cleaned once a year. Twenty-four hour on-call coverage is in place to respond to water system emergencies and alarms.

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

9.0 Water Service Area Projects

9.1 2021 Completed Studies & Projects

- Cleaned the Melrose reservoir in 2021;
- Corresponded with residents regarding water conservation;
- Enforced outdoor sprinkling regulations;
- Advised residents regarding water leak repairs;
- Implemented the 2021-2030 Water Conservation Plan;
- Completed regular watermain flushing and hydrant maintenance;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system;
- Implemented the Water Systems SCADA Master Plan; and
- Began valve maintenance program.

9.2 2022 Proposed Projects & Upgrades

- Clean the Melrose reservoir in early 2022;
- Complete irrigation checks for high-water users;
- Continue watermain flushing program and hydrant maintenance;
- Implement Phase 2 Water Systems SCADA Master Plan;
- Utilize leak detection equipment;
- Continue valve maintenance program;
- Continue the 2021-2030 DWWP Water Conservation Plan; and
- Continue to offer numerous water-saving incentives via rebates.

Melrose Pumphouse and Reservoir

10.0 Emergency Response & Contingency Plan

The Regional District Emergency Response & Contingency Plan (ERCP) 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 ERCP 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 ERCP is also attached to this report in Appendix C.

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 2022 will be prepared and submitted to Island Health in the spring of 2023. Annual reports are also available on our website at www.rdn.bc.ca/melrose-terrace.

Melrose Water Storage Reservoir

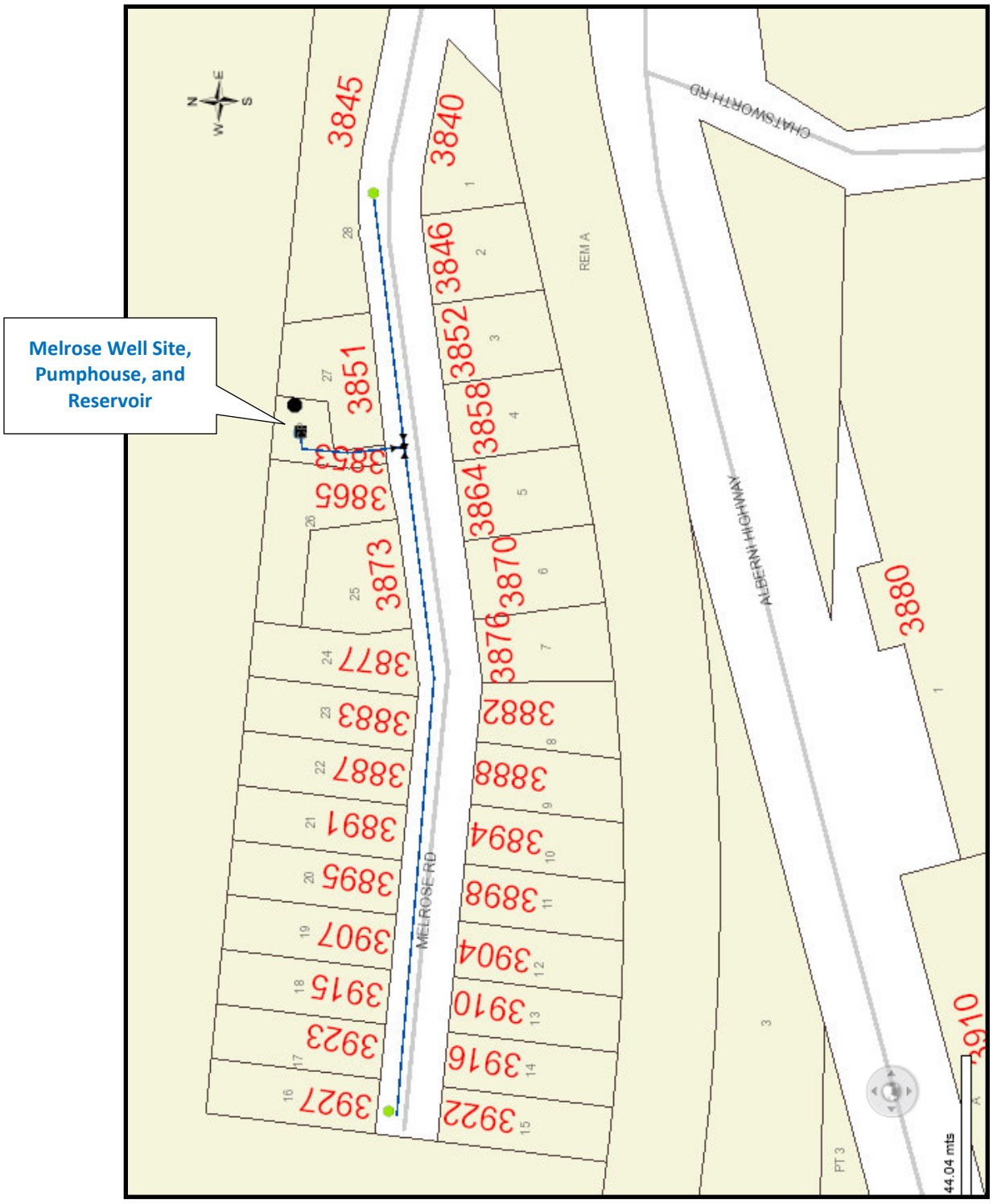
APPENDIX A

MAP OF MELROSE TERRACE

WATER SERVICE AREA

MELROSE TERRACE

WATER SERVICE AREA



APPENDIX B

WATER QUALITY TESTING RESULTS

MELROSE TERRACE COMMUNITY WATER SYSTEM

Facility Location:
3887 Melrose Road, Qualicum Beach

Facility Information: Facility Type: 15-300 connections DWC

Facility Sampling History:

Date Collected	Drinking Water System	Total E. Coli	Total Coliform	Site Name
01/06/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
02/03/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
03/03/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
04/06/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
05/03/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
06/01/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
07/06/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
08/03/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
09/07/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
10/04/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
11/01/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road
12/07/2021	MELROSE TERRACE COMMUNITY WATER SYSTEM	LT1	LT1	Melrose Terrace Sample Port - 3927 Melrose Road

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

Melrose Water Analysis - 2021 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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)
07-Dec-21	3927 Melrose			0	0	8	7.19	0.04	224.0	0.22	464.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
14-Dec-21	3927 Melrose			0	0	8	7.20	0.10	269.0	0.21	451.0		
20-Dec-21	3927 Melrose			0	0	6	7.17	0.05	222.0	0.26	528.0		
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

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.

Regional District of Nanaimo - Water Services Department

Melrose Water Analysis - 2021 Monthly Report

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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)
01-Nov-21	3927 Melrose	0	0	0	0	11	7.65	0.05	218.1	0.22	452.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
08-Nov-21	3927 Melrose			0	0	11	7.46	0.06	218.9	0.22	455.0		
15-Nov-21	3927 Melrose			0	0	9	7.65	0.04	222.0	0.22	459.0		
22-Nov-21	3927 Melrose			0	0	8	7.64	0.04	221.0	0.22	459.0		
29-Nov-21	3927 Melrose			0	0	8	7.06	0.03	221.0	0.22	458.0		
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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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)
05-Oct-21	3927 Melrose	0	0	0	0	15	7.61	0.05	214.8	0.21	445.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
13-Oct-21	3927 Melrose			0	0	14	7.65	0.01	216.0	0.21	447.0		
18-Oct-21	3927 Melrose			0	0	14	7.32	0.04	213.8	0.21	443.0		
25-Oct-21	3927 Melrose			0	0	13	7.72	0.04	214.8	0.21	445.0		
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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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)
07-Sep-21	3927 Melrose	0	0	0	0	17	7.66	0.05	208.0	0.24	440.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
13-Sep-21	3927 Melrose			0	0	18	7.29	0.04	218.0	0.22	444.0		
20-Sep-21	3927 Melrose			0	0	17	7.46	0.03	209.2	0.21	434.0		
28-Sep-21	3927 Melrose			0	0	16	7.71	0.02	215.0	0.21	444.0		
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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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)
03-Aug-21	3927 Melrose	0	0	0	0		7.21	0.06	208.0	0.21	432.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
09-Aug-21	3927 Melrose			0	0	21	7.20	0.03	212.0	0.21	439.0		
16-Aug-21	3927 Melrose			0	0	20	7.28	0.03	209.0	0.21	433.0		
23-Aug-21	3927 Melrose			0	0	20	7.36	0.04	208.0	0.21	431.0		
30-Aug-21	3927 Melrose			0	0	19	7.27	0.04	211.0	0.21	439.0		
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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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)
06-Jul-21	3927 Melrose	0	0	0	0	21	7.01	0.02	215.4	0.21	447.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
12-Jul-21	3927 Melrose			0	0	19	7.04	0.03	216.9	0.22	451.0		
19-Jul-21	3927 Melrose			0	0	20	7.21	0.02	213.0	0.21	441.0		
27-Jul-21	3928 Melrose			0	0	19	7.09	0.01	218.0	0.22	452.0		
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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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)
01-Jun-21	3927 Melrose	0	0	0	0	13	7.20	0.05	221.0	0.22	458.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
07-Jun-21	3927 Melrose			0	0	14	7.35	0.04	222.0	0.22	459.0		
14-Jun-21	3927 Melrose			0	0	14	7.27	0.02	218.0	0.22	453.0		
21-Jun-21	3927 Melrose			0	0	16	7.17	0.05	217.0	0.22	450.0		
29-Jun-21	3927 Melrose	0	0	0	0	18	6.79	0.01	216.7	0.22	448.0		
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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Notes below about pH (2015) from https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#_ftn1

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
Treatment-related	pH (2015)	None	7.0-10.5	Not applicable	Not applicable	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.

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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)
03-May-21	3927 Melrose	0	0	0	0	11	7.20	0.03	215.0	0.22	446.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
10-May-21	3927 Melrose			0	0	10	7.21	0.04	221.0	0.22	457.0		
17-May-21	3927 Melrose			0	0	11	7.18	0.03	221.0	0.22	457.0		
25-May-21	3927 Melrose			0	0	13	7.16	0.05	218.0	0.21	444.0		
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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)
06-Apr-21	3927 Melrose	0	0	0	0	8	6.62	0.03	211.2	0.21	438.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
12-Apr-21	3927 Melrose			0	0	9	7.15	0.03	212.0	0.21	440.0		
19-Apr-21	3927 Melrose			0	0	9	7.14	0.06	215.0	0.21	455.0		
28-Apr-21	3927 Melrose			0	0	10	7.26	0.02	210.0	0.21	434.0		
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Notes below about pH (2015) from https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/water-quality/guidelines-canadian-drinking-water-quality-summary-table.html#_ftn1

Type	Parameter (published, reaffirmed)	MAC (mg/L)	Other value (mg/L)	Common sources of parameter in water	Health considerations	Comments
Treatment-related	pH (2015)	None	7.0-10.5	Not applicable	Not applicable	The control of pH is important to maximize treatment effectiveness, control corrosion and reduce leaching from distribution system and plumbing components.

Regional District of Nanaimo - Water Services Department

Melrose Water Analysis - 2021 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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)
03-Mar-21	3927 Melrose	0	0	0	0	6	7.35	0.06	207.0	0.21	427.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
08-Mar-21	3927 Melrose			0	0	7	7.40	0.02	210.0	0.21	435.0		
15-Mar-21	3927 Melrose			0	0	7	7.18	0.02	211.0	0.21	438.0		
22-Mar-21	3927 Melrose			0	0	7	7.20	0.08	208.0	0.20	429.0		
28-Mar-21	3827 Melrose			0	0	7	7.30	0.02	209.0	0.21	433.0		
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

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.

Regional District of Nanaimo - Water Services Department

Melrose Water Analysis - 2021 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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)
03-Feb-21	3927 Melrose	0	0	0	0	6	7.04	0.02	218.0	0.22	453.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
08-Feb-21	3927 Melrose			0	0	7	7.44	0.06	212.0	0.21	440.0		
17-Feb-21	3927 Melrose			0	0	6	7.25	0.07	206.9	0.21	429.0		
22-Feb-21	3927 Melrose			0	0	8	7.42	0.03	205.4	0.21	426.0		
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

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.

Regional District of Nanaimo - Water Services Department

Melrose Water Analysis - 2021 Monthly Report

		BC Centre for Disease Control		RDN In-House Laboratory and Spectrophotometer									
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)
06-Jan-21	3927 Melrose	0	0	0	0	7	7.20	0.09	215.0	0.21	446.0	Fe and Mn are no longer tested in-house. See Annual Tap Water Results at https://www.rdn.bc.ca/melrose-terrace	
11-Jan-21	3927 Melrose			0	0	7.5	7.21	0.05	217.0	0.22	449.0		
18-Jan-21	3927 Melrose			0	0	7	7.24	0.10	221.0	0.22	457.0		
25-Jan-21	3927 Melrose			0	0	8	7.24	0.02	218.0	0.22	451.0		
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

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.

REGIONAL DISTRICT OF NANAIMO

Melrose #1 Raw Well Water Analysis
3853 Melrose Road

CDWG=Canadian Drinking Water Guidelines
MAC=Maximum Acceptable Concentration
OG= Operational Guidance Value
AO=Aesthetic Objective

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

	Units	CDWG		September 18 2017	October 25 2018	October 3 2019	October 21 2020	October 21 2021
Miscellaneous Inorganics								
Fluoride	mg/L	1.5	MAC	0.04	0.036	<0.05	<0.05	<0.05
Alkalinity (total as CaCO)	mg/L			89.8	92.5	87	99	110
Anions								
Dissolved Sulphate	mg/L	500	AO	<1.0	<1.0	<1.0	2.3	1.8
Dissolved Chloride	mg/L	250	AO	66	57	53	52	55
Nitrite	mg/L	1	MAC	0.0094	<0.0050	<0.005	<0.005	<0.005
Miscellaneous								
Apparent Colour	Colour Unit			300	100	200	200	200
Nutrients								
Total Ammonia	mg/L			0.23	0.24	0.31	0.3	0.29
Physical Properties								
Conductivity	µS/cm			388	371	340	350	370
pH	pH	7.0:10.5	OG	7.61	7.81	7.6	7.1	7.05
TDS	mg/L	500	AO	236	250	220	230	270
Turbidity	NTU			47	28	16	32	35
Microbiological Parameters								
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	0	0	0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	0	0	0
Calculated Parameters								
Total Hardness (CaCO)	mg/L			142	135	130	131	135
Nitrate	mg/L	10	MAC	0.023	<0.020	0.043	0.045	0.037
Elements								
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.000002	0.0000023	<0.0000019	<0.0000019
Total Metals								
Total Aluminum	mg/L	0.1	OG	0.0037	0.0044	<0.003	<0.003	<0.003
Total Antimony	mg/L	0.006	MAC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total Arsenic	mg/L	0.01	MAC	0.00046	0.00032	0.00034	0.00039	0.00034
Total Barium	mg/L	1	MAC	0.0329	0.0293	0.0281	0.0293	0.0289
Total Beryllium	mg/L			<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Bismuth	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001
Total Boron	mg/L	5	MAC	<0.050	<0.050	<0.050	<0.05	<0.05
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	<0.001	<0.001	0.0016	<0.001	<0.001
Total Cobalt	mg/L			<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.00783	0.00126	0.00314	0.00134	0.0124
Total Iron	mg/L	0.3	AO	**16.3**	**8.59**	**9.25**	**9.84**	**9.24**
Total Lead	mg/L	0.01	MAC	0.00033	0.00021	<0.0002	0.00026	0.00022
Total Manganese	mg/L	0.02 0.12	AO MAC	**0.271**	**0.259**	**0.254**	**0.246**	**0.242**
Total Molybdenum	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Silicon	mg/L			15.7	14.8	15.2	16.1	15.7
Total Silver	mg/L			<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.0705	0.0675	0.0644	0.0657	0.0696
Total Thallium	mg/L			<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Tin	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Titanium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Uranium	mg/L	0.02	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Vanadium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.0752	0.0272	0.0139	0.006	0.0243
Total Zirconium	mg/L			0.00015	0.00012	0.00014	0.00017	0.00017
Total Calcium	mg/L			35.8	34.9	33.9	34.1	35.4
Total Magnesium	mg/L			12.8	11.5	10.9	11.2	11.3
Total Potassium	mg/L			0.454	0.418	0.433	0.442	0.466
Total Sodium	mg/L	200	AO	17.2	17.4	17.9	17.5	17.5
Total Sulphur	mg/L			<3.0	<3.0	<3.0	<3	<3

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.	**Health Basis of MAC:** Effects on neurological development and behaviour; deficits in memory, attention, and motor skills. **Other:** 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

Melrose Terrace Distribution (Tap Water) Analysis
3927 Melrose Road

CDWG=Canadian Drinking Water Guidelines
MAC=Maximum Acceptable Concentration
OG= Operational Guidance Value
AO= Asthetic 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		May 13 2014	May 19 2015	May 10 2016	May 8 2017	May 7 2018	May 13 2019	May 21 2020	May 6 2021
Miscellaneous Inorganics											
Fluoride	mg/L	1.5	MAC	0.05	0.042	0.039	0.038	0.038	0.039	<0.05	<0.05
Alkalinity (total as CaCO)	mg/L			84	84.9	102	110	109	109	99	110
Anions											
Dissolved Sulphate	mg/L	500	AO	1.2	0.82	0.83	0.98	1.3	3.1	1.2	<1.0
Dissolved Chloride	mg/L	250	AO	78	87	82	79	69	69	77	83
Nitrite	mg/L	1	MAC	<0.05	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.005	<0.005
Miscellaneous											
Apparent Colour	Colour Unit			<5	<5	10	10	5	9.2	5	15
Nutrients											
Total Ammonia	mg/L			<0.02	0.024	0.011	0.15	0.044	0.016	0.039	<0.015
Physical Properties											
Conductivity	µS/cm			458	468	472	460	455	444	430	470
pH	pH	7.0:10.5	AO	7	7.95	7.66	8.06	7.96	7.85	7.63	7.67
TDS	mg/L	500	AO	290	294	306	304	272	270	280	290
Turbidity	NTU			<0.5	0.12	0.14	0.13	0.17	0.19	0.11	0.15
Microbiological Parameters											
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	0	0	0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	<1.0	<1.0	0	0	0
Calculated Parameters											
Total Hardness (CaCO)	mg/L			140	144	146	152	144	137	131	130
Nitrate	mg/L	10	MAC	<0.05	<0.020	<0.020	0.029	0.024	0.042	0.044	0.031
Elements											
Total Mercury	mg/L	0.001	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002	<0.000002	<0.0000019	<0.0000019
Total Metals											
Total Aluminum	mg/L	0.1	OG	<0.025	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
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	0.0264	0.03	0.0328	0.038	0.031	0.0286	0.0289	0.0293
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	<0.050	<0.050	<0.050	<0.050	<0.05	<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	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Total Copper	mg/L	1	AO	0.0062	0.00147	0.00167	0.00218	0.00219	0.00452	0.00377	0.00407
Total Iron	mg/L	0.3	AO	0.135	0.0693	0.0704	0.0456	0.0689	0.0587	0.0361	0.0491
Total Lead	mg/L	0.01	MAC	0.0007	0.0004	0.00029	0.00043	0.0004	0.00055	0.00048	0.00059
Total Manganese	mg/L	0.02 0.12	AO MAC	<0.0050	0.0028	0.0027	0.0021	0.0029	0.0027	0.0021	0.0022
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			14.3	14.8	15.2	22.1	15.2	14.2	14.1	13.5
Total Silver	mg/L			<0.00025	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			0.0692	0.0691	0.0787	0.0913	0.0774	0.0668	0.0679	0.0698
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Tin	mg/L			<0.0005	<0.005	<0.005	0.0088	<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			<0.0005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	0.0892	0.0603	0.0316	0.0342	0.0212	0.0098	0.0087	0.0075
Total Zirconium	mg/L				<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Calcium	mg/L			36.4	37.8	36.8	38.8	37.1	35.9	34	32.6
Total Magnesium	mg/L			12.7	12	13.1	13.5	12.4	11.4	11.1	11.7
Total Potassium	mg/L			<0.5	0.426	0.469	0.51	0.45	0.467	0.456	0.482
Total Sodium	mg/L	200	AO	35.4	29	31.1	31.4	29.7	30.7	32.6	35.5
Total Sulphur	mg/L				<3.0	<3.0	<3.0	<3.0	<3	<3	<3