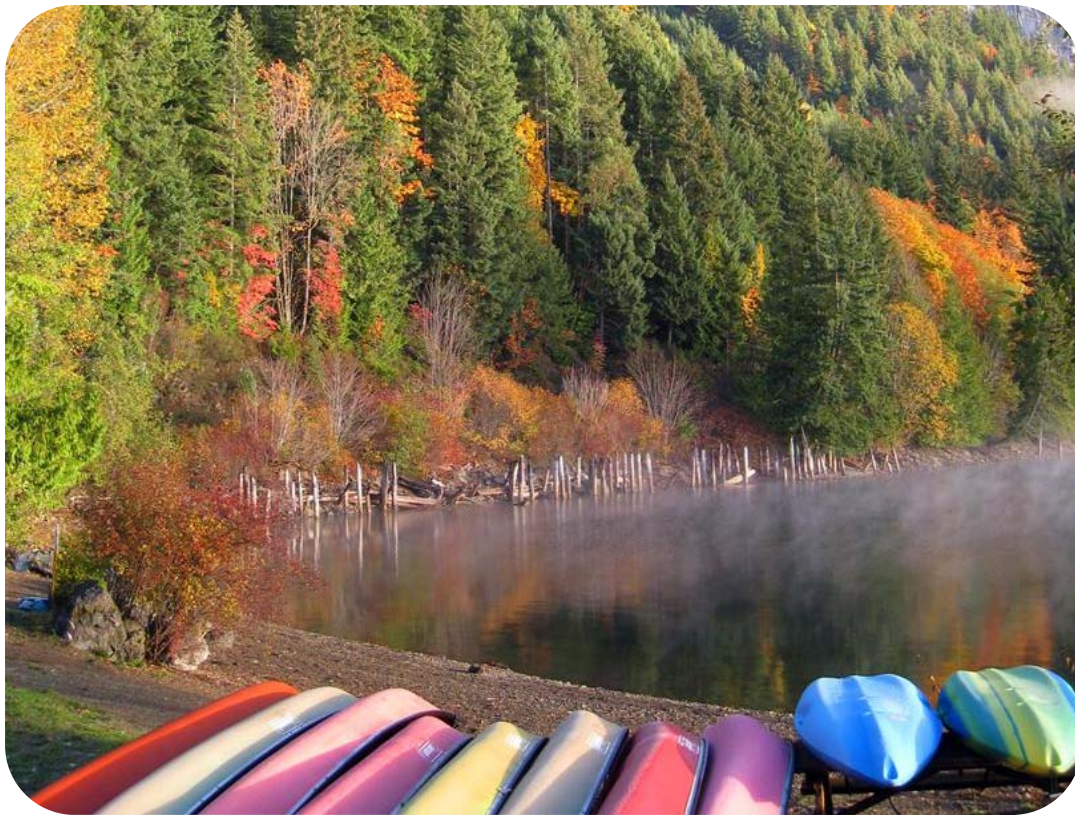


REGIONAL DISTRICT OF NANAIMO

Water Service Area Annual Report 2018



Horne Lake Regional Park

Water System



June 2019

REGIONAL DISTRICT OF NANAIMO
Water & Utility Services Department

6300 Hammond Bay Rd, Nanaimo, BC Canada V9T 6N2 | Ph 250-390-6560 | Fax 250-390-1542



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Appendix A - Map of Horne Lake Regional Park Water System

Appendix B - Water Quality Testing Results

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1. Introduction

The following annual report describes the Horne Lake Regional Park Water System and summarizes the water quality, the completed and proposed maintenance activities, Operator Certification, the Emergency Response Plan, and the Cross Connection Control Program for the year 2018. This report is to be submitted to Island Health by the Spring of 2019.

2. Horne Lake Regional Park Water System

The Horne Lake Regional Park and campground was acquired by the RDN in 2002, and comprises an area of 109 hectares (269 acres) on the west side of Horne Lake, near Central Vancouver Island. The park is located at 3890 Horne Lake Caves Road, and is split into 'North Park' and 'South Park'. The water sources come from shallow wells located within the park. The water supply to the staff residence and yard hydrant is filtered, chlorinated and distributed via a small pressure tank. An on-site generator is present as BC Hydro electrical service is not available at the site. The water system operates all year round as a caretaker lives at the staff residence. Maps of the Horne Lake Regional Park Water System are provided in Appendix A for reference.

2.1 Groundwater Wells

The well for the staff residence and yard hydrant in North Park is located approximately 10 metres east of the staff residence. The well is 12 metres deep and is treated using multi-stage pre-filtration, reverse osmosis, iron filtration, and chlorination.

There is one hand-pump for the campground, located in the South Park. The water supply to the hand pump comes from a shallow well directly under the hand pump. The water available from this hand-pump is not potable, and there are posted signs indicating the hand-pump water is not to be used for drinking or cooking. Potable water is only available in the North Park at the staff residence and yard hydrant.



Horne Lake Regional Park

← Staff Residence

← Sea Can for water filtration and chlorination units

← Summer water storage tank

2.2 Reservoirs

Two small water storage reservoirs are present at Horne Lake Regional Park. Drinking water from the well near the staff residence is filtered, chlorinated, and pumped to a small 50 gallon holding tank inside the Sea Can container during the winter. Then the drinking water is pumped via a pressure tank to the staff residence and yard hydrant on demand.

An alternate, larger, 500 gallon outdoor water storage tank is present on the ground outside and adjacent to the Sea Can container. This reservoir is used in the summer when the demand for water is greater. Both the summer and winter storage reservoirs are composed of white PVC plastic. These reservoirs are drained and cleaned alternately before use each season.

**Summer water storage tank at
Horne Lake Regional Park**



2.3 Distribution System

The water distribution system is comprised of 50 metres of 1-inch polyethylene (black, flexible) pipe. The distribution system consists of the well supply to the Sea Can, and then from the Sea Can to the staff residence and yard hydrant. There are no fire hydrants in this water system.

3. **Water Sampling and Testing Program**

Water sampling and testing is carried out monthly from a standpipe in the water system. The following table includes a summary of all testing:

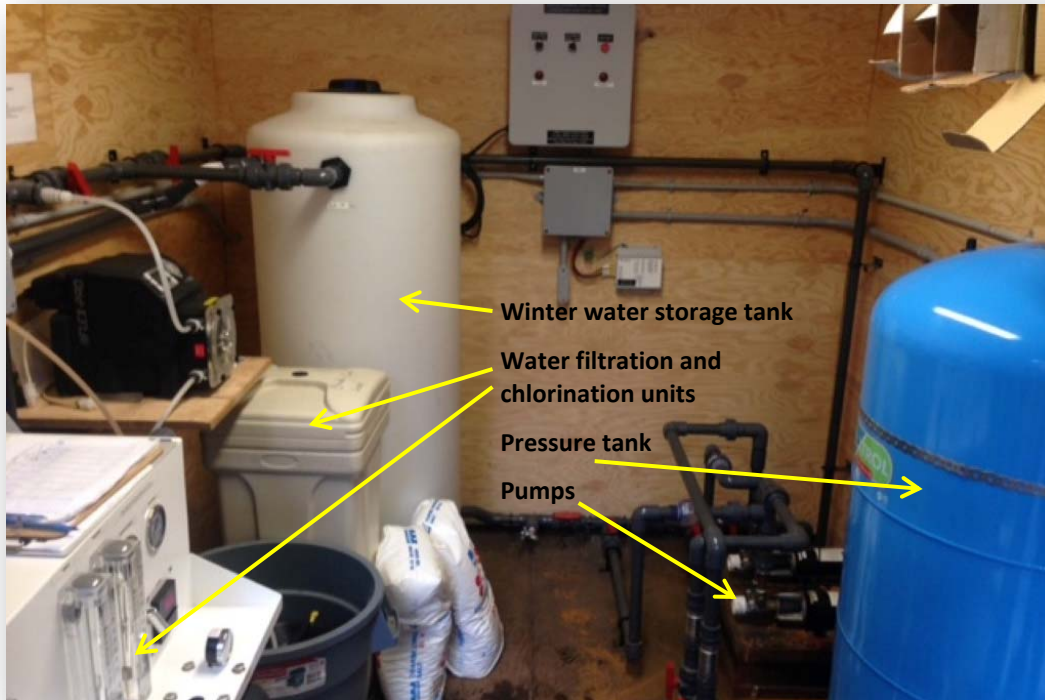
Timing	Location	Tests
North Park Standpipe: 1/month April -Sept 2/month Oct-March	BC Centre for Disease Control	Total coliforms, E.Coli
South Park Hand Pump: 2/month April-Sept (Closed Oct-March)	BC Centre for Disease Control	Total coliforms, E.Coli
Bi-Annually (twice/yr) (May and October)	Bureau Veritas (formerly Maxxam Labs)	Complete potability testing of raw well water at wellhead
Bi-Annually (twice/yr) (May and October)	Bureau Veritas (formerly Maxxam Labs)	Complete potability testing of treated water

4. Water Quality - Source Water and Distribution System

Water quality testing results for both the source water and distribution system are provided at the end of this report under Appendix B. Bacteriological results are posted on the Vancouver Island Health Authority (VIHA) website at:

http://www.healthspace.ca/Clients/VIHA/VIHA_Website.nsf/Water-Samples-Frameset?OpenPage, then click on [Browser](#), then click [Horne Lake Regional Park](#).

Photo depicting the inside of the Sea Can container at Horne Lake Regional Park



5. Water Quality Inquiries and Complaints

No complaints or inquiries were received from the Horne Lake Regional Park Water System in 2018. A summary of the water system incidents in 2018 is given in the table below.

Activity in 2018	Date(s)	History/Notes
Boil Water Advisories	Ongoing	Only at the hand-pump in the South Park
High Turbidity Events	None	None.
Equipment Malfunction	None	None.
Water Main Breaks	None	None.
Pump Failures	None	None.

6. Groundwater Production and Consumption

The groundwater pumped from the well near the staff residence and the yard hydrant is not metered. The volume of groundwater used in 2018 is estimated to be 200 m³. The volume of water used at the South Park hand pump is not monitored.

7. Maintenance Program

In the summer season, a pump station inspection is carried out three times per week to reduce or eliminate the risk of contamination and system failure. In the winter (off-season), a pump station inspection takes place once per week, or sooner if required. The water storage cisterns are drained and cleaned alternately in the summer/winter seasons. Twenty-four hour on-call coverage is in place to respond to water system emergencies.

8. Operator Certification

The Regional District Water & Utility Services staff is comprised of one Manager, one Project Engineer, one Engineering Technologist, one Engineering Technician, one Chief Operator, and seven certified operators. The Park Operator has the Small Water Systems Operator certification. 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 | | |

9. Water System Projects

9.1 2018 Completed Studies & Projects

- Completed a Cross Connection Control Bylaw in draft format;
- Updated the online GIS Water Map for aquifer and watershed info;
- Maintained a high level of water quality;
- Continued quality control through regular testing and monitoring of water system;
- Updated the online GIS Water Map update for aquifer and watershed info;
- Began Water Systems SCADA Master Plan project;
- Initiated a New Drinking Water and Watershed Protection Action Plan;
- Completed Water Conservation Evaluation Report;
- Completed additional educational programs.

9.2 2019 Proposed Projects & Upgrades

- Adopt a Cross Connection Control Bylaw;
- Implement a Water Systems SCADA Master Plan;
- Begin DWWP Water Conservation Plan development;
- Implement new Drinking Water and Watershed Protection Action Plan;
- Continue to offer numerous water-saving incentives via rebates;
- Develop Cross Connection Control educational material.



10. 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 2018, 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.

11. Cross Connection Control

In 2017, a more robust Cross Connection Control Plan was prepared that fully defines the CCC program, including standard operating procedures, plumbing code references, reporting procedures, survey schedules, backflow prevention standards, detailed installation schematics, blank test forms, testing reminders, and non-compliance letters. A minimum of two RDN

Operators are certified in Backflow Assembly Testing at all times. The RDN Manager of Water Services is the designated Cross Connection Control Manager.

In 2019, a stand-alone Cross Connection Control Bylaw will be adopted that contains definitions, authorizations, applications, liability, rules, regulations, testing requirements, and reporting requirements. The bylaw will address retrofits, prohibitions, special circumstances, reclaimed water use, alternate water sources, failure to comply, inspections, testing, offences, penalties and more. A webpage will be established on the Water Services website that will educate RDN customers about cross connections and list the relevant links to current standards and resources.

12. 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. Closing

An annual report for the year 2019 will be prepared and submitted to Island Health in the spring of 2020. The Horne Lake Regional Park Water System Annual Reports are also available on our website at: <https://www.rdn.bc.ca/horne-lake-regional-park-water-system>.

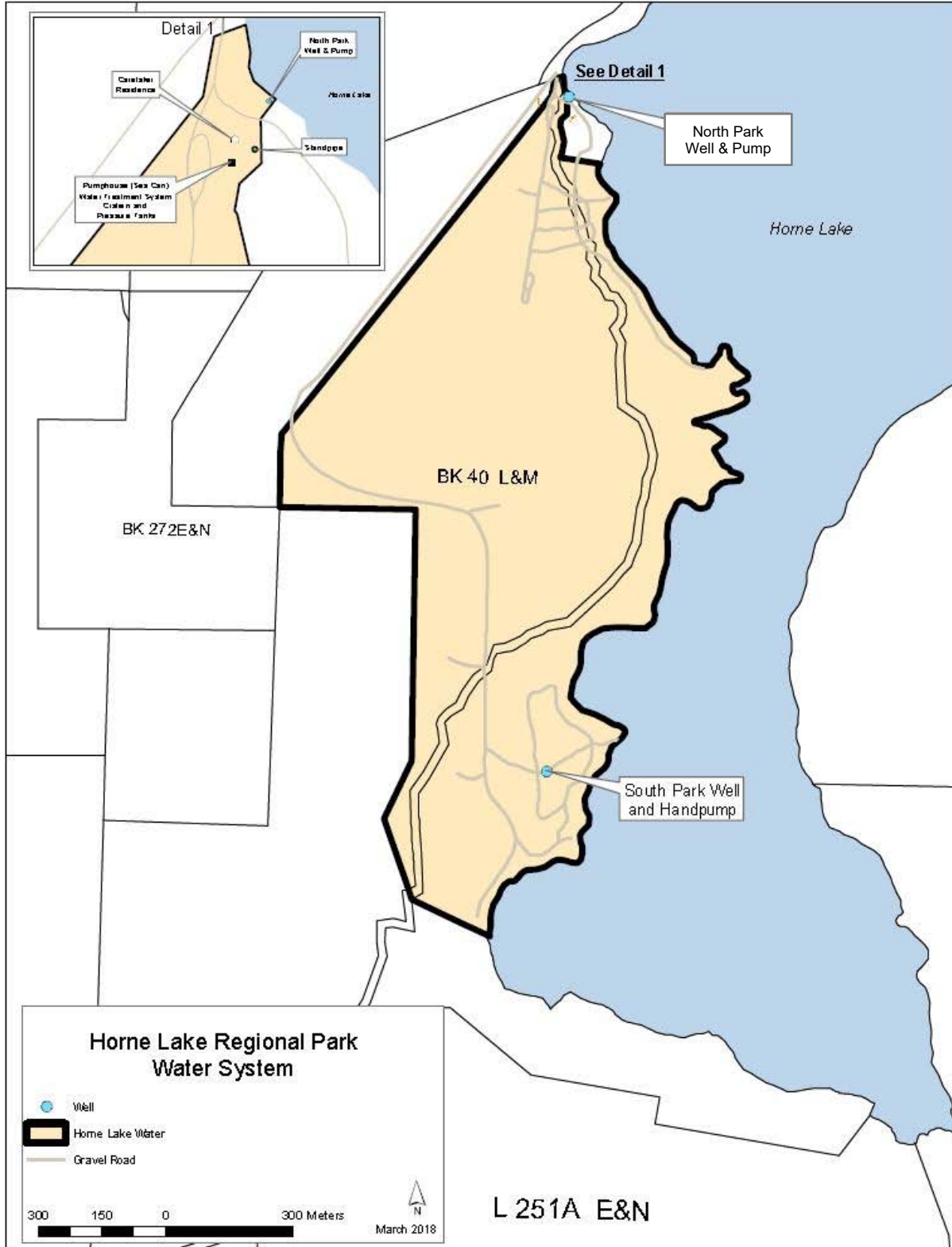


Sign above the hand-pump
in the South Park
campground

APPENDIX A

**MAP OF HORNE LAKE REGIONAL PARK
WATER SYSTEM**

HORNE LAKE REGIONAL PARK WATER SYSTEM



APPENDIX B

WATER QUALITY TESTING RESULTS

HORNE LAKE REGIONAL PARK WWS



Facility Location:

830 Island Highway West, Bowser

Facility Information: Facility Type: 2-14 (DWS)

Facility Sampling History:

<u>Location</u>	<u>Date</u>	<u>Total Coliform</u>	<u>E. Coli</u>
Northpark Standpipe	4-Dec-2018	L1	L1
Caretaker’s House, North Park	7-Nov-2018	L1	L1
Caretaker’s House, North Park	1-Oct-2018	L1	L1
Northpark Standpipe	18-Sep-2018	L1	L1
Northpark Standpipe	10-Sep-2018	L1	L1
South Park Hand Pump	10-Sep-2018	L1	L1
Northpark Standpipe	5-Sep-2018	L1	L1
Caretaker’s House, North Park	3-Sep-2018	A	
South Park Hand Pump	3-Sep-2018	A	
Northpark Standpipe	15-Aug-2018	L1	L1
South Park Hand Pump	15-Aug-2018	L1	L1
Caretaker’s House, North Park	31-Jul-2018	L1	L1
South Park Hand Pump	31-Jul-2018	L1	L1
Northpark Standpipe	18-Jul-2018	L1	L1
South Park Hand Pump	18-Jul-2018	L1	L1
Northpark Standpipe	4-Jul-2018	L1	L1
South Park Hand Pump	4-Jul-2018	L1	L1
Northpark Standpipe	18-Jun-2018	L1	L1
South Park Hand Pump	18-Jun-2018	L1	L1
Northpark Standpipe	4-Jun-2018	L1	L1
South Park Hand Pump	4-Jun-2018	L1	L1
Northpark Standpipe	14-May-2018	L1	L1
South Park Hand Pump	14-May-2018	L1	L1
South Park Hand Pump	7-May-2018	L1	L1
Northpark Standpipe	1-May-2018	L1	L1
Northpark Standpipe, Horne Lake , Northpark	2-Apr-2018	A	
Northpark Standpipe	12-Mar-2018	L1	L1
Northpark Standpipe	7-Feb-2018	L1	L1
Northpark Standpipe	3-Jan-2018	L1	L1

Interpreting Sample Reports

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

- L1 Less than 1 (no detectable bacteria) - Meaning: No bacteria present
- OG Overgrown - Meaning: Too many background bacteria to give an accurate count
- EST Estimated Count
- A Sample not tested; Too long in transit
- C Sample leaked/broken in transit
- D Sample not tested; No collection date given
- T Sample submitted unsatisfactory. Exceeded 30 hours holding time, please resample.
- NS No sample received with requisition

CDWG=Canadian Drinking Water Guidelines
OG= Operational Guidance Value

MAC=Maximum Acceptable Concentration
AO= Asthetic Objective.



Red font indicates non-compliance with Canadian Drinking Water Guidelines

	Units	CDWG		Feb. 25 2015	October 21 2015	May 11 2016	October 12 2016	April 12 2017	Nov 22 2018
Miscellaneous Inorganics									
Fluoride	mg/L	1.5	MAC	0.026	0.03	0.036	0.027	0.039	0.037
Alkalinity (total as CaCO ₃)	mg/L			76.5	81	83.2	77.1	<0.50	57.8
Anions									
Dissolved Sulphate	mg/L	500	AO	6.73	6.41	5.74	5.8	8.71	4.1
Dissolved Chloride	mg/L	250	AO	2.2	3.1	3.3	4	1.6	3.6
Nitrite	mg/L	1	MAC	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Miscellaneous									
Apparent Colour	Colour Unit			5	5	10	5		15
Nutrients									
Total Ammonia	mg/L			0.0061	0.03	0.012	0.067	0.021	<0.020
Physical Properties									
Conductivity	µS/cm			166	179	181	176	520	132
pH	pH	7.0:10.5	AO	7.57	7.77	7.58	7.8	3.27	7.6
TDS	mg/L	500	AO	92	112	100	104	90	66
Turbidity	NTU			2.82	0.89	1.84	2.58	0.68	1.23
Microbiological Parameters									
E.coli	MPN/100mL	<1	MAC	<1.0	<1.0	<1.0	118.4	<1	<1.0
Total Coliforms	MPN/100mL	<1	MAC	<1.0	1	40.6	>200.5	7.5	<1.0
Calculated Parameters									
Total Hardness (CaCO ₃)	mg/L			79.5	88.4	87.9	80	79.4	59.5
Nitrate	mg/L	10	MAC	0.146	0.089	0.106	0.099	0.263	0.054
Elements									
Total Mercury	mg/L	0.001	MAC	<0.000010	<0.00001	<0.00001	<0.00001	<0.00001	<0.000002
Total Metals									
Total Aluminum	mg/L	0.1	OG	<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
Total Arsenic	mg/L	0.01	MAC	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Barium	mg/L	1	MAC	0.019	0.0213	0.0212	0.0195	0.0198	0.015
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	<0.05	<0.050	<0.050	<0.050	<0.050
Total Cadmium	mg/L	0.005	MAC	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Total Chromium	mg/L	0.05	MAC	<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
Total Copper	mg/L	1	AO	0.00489	0.00752	0.00411	0.00222	0.00271	0.00764
Total Iron	mg/L	0.3	AO	0.0911	0.108	0.193	0.203	0.0929	1.33
Total Lead	mg/L	0.01	MAC	<0.0002	<0.0002	0.00125	<0.0002	<0.0002	0.00044
Total Manganese	mg/L	0.05	AO	0.0014	<0.001	0.0019	<0.001	0.0015	0.0053
Total Molybdenum	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Nickel	mg/L			<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Selenium	mg/L	0.05	MAC	0.00017	0.00014	0.00019	0.00018	0.0002	0.00013
Total Silicon	mg/L			5.5	5.45	5.61	4.53		4.39
Total Silver	mg/L			<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Total Strontium	mg/L			<0.0722	0.0876	0.0862	0.0801		0.0554
Total Thallium	mg/L			<0.00005	<0.00005	<0.00005	<0.00005		<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	<0.0001
Total Vanadium	mg/L			<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Total Zinc	mg/L	5	AO	<0.005	0.0067	<0.005	<0.005	<0.005	<0.005
Total Zirconium	mg/L			<0.0005	<0.0005	<0.0005	<0.0005		<0.0001
Total Calcium	mg/L			25.1	28.3	28	24.8	25.2	18.8
Total Magnesium	mg/L			4.09	4.31	4.37	4.38	4	3.05
Total Potassium	mg/L			0.173	0.203	0.211	0.188	0.192	0.158
Total Sodium	mg/L	200	AO	2.72	3.8	3.14	3.47	2.6	2.33
Total Sulphur	mg/L					<3.0	<3.0	<3.0	<3.0

