Cedar Lane Water Service

2021 Annual Report

CRD | Drinking Water

INTRODUCTION

This report provides a summary of the Cedar Lane Water Service for 2021. It includes a description of the service, summary of the water supply, demand and production, drinking water quality, operations highlights, capital project updates and financial report.

SERVICE DESCRIPTION

The Cedar Lane Water Utility is a rural residential community located on Salt Spring Island. The service was created in 1970 and became a CRD service in 2007. The Cedar Lane Water Utility (Figure 1) is comprised of 37 parcels of land of which all are connected to the system.

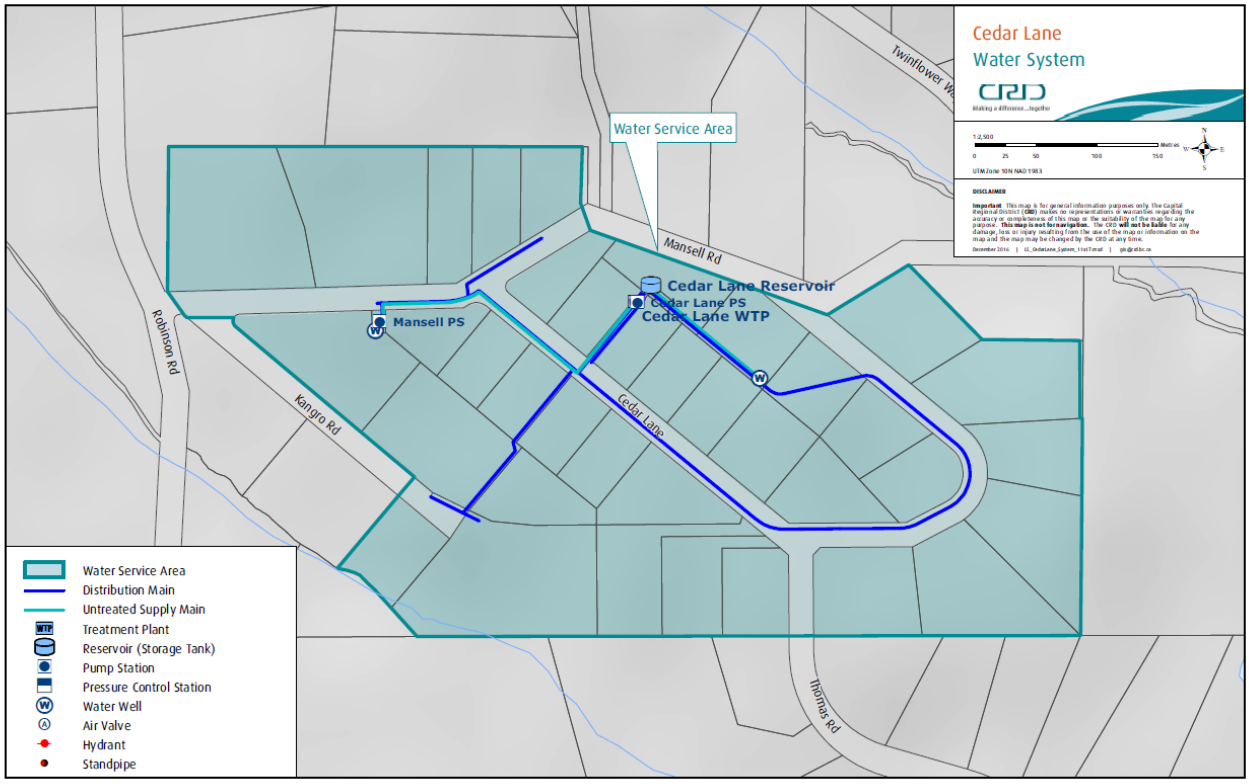

Figure 1: Cedar Lane Water Service

The Cedar Lane water system is primarily comprised of:

- two ground water source wells (#1 and #5)
- a water treatment plant (WTP) that provides primary disinfection with ultraviolet (UV) radiation and residual disinfection using sodium hypochlorite;
- 1 water reservoir – 136 m^3 (30,000 Ig);
- 1,260 metres of water distribution pipe;
- fire hydrant, standpipes, and gate valves;
- water service connections complete with water meters**.**

WATER PRODUCTION AND DEMAND

Referring to Figure 2, 3,411 cubic meters (m^3) of water was extracted (water production) from two ground water wells in 2021; the same as the previous year and is a 6% decrease from the five year rolling average. Water demand (customer water billing) for the service totaled 3,197 m^3 of water; a 5% decrease from the previous year and a 6% decrease from the five year rolling average.

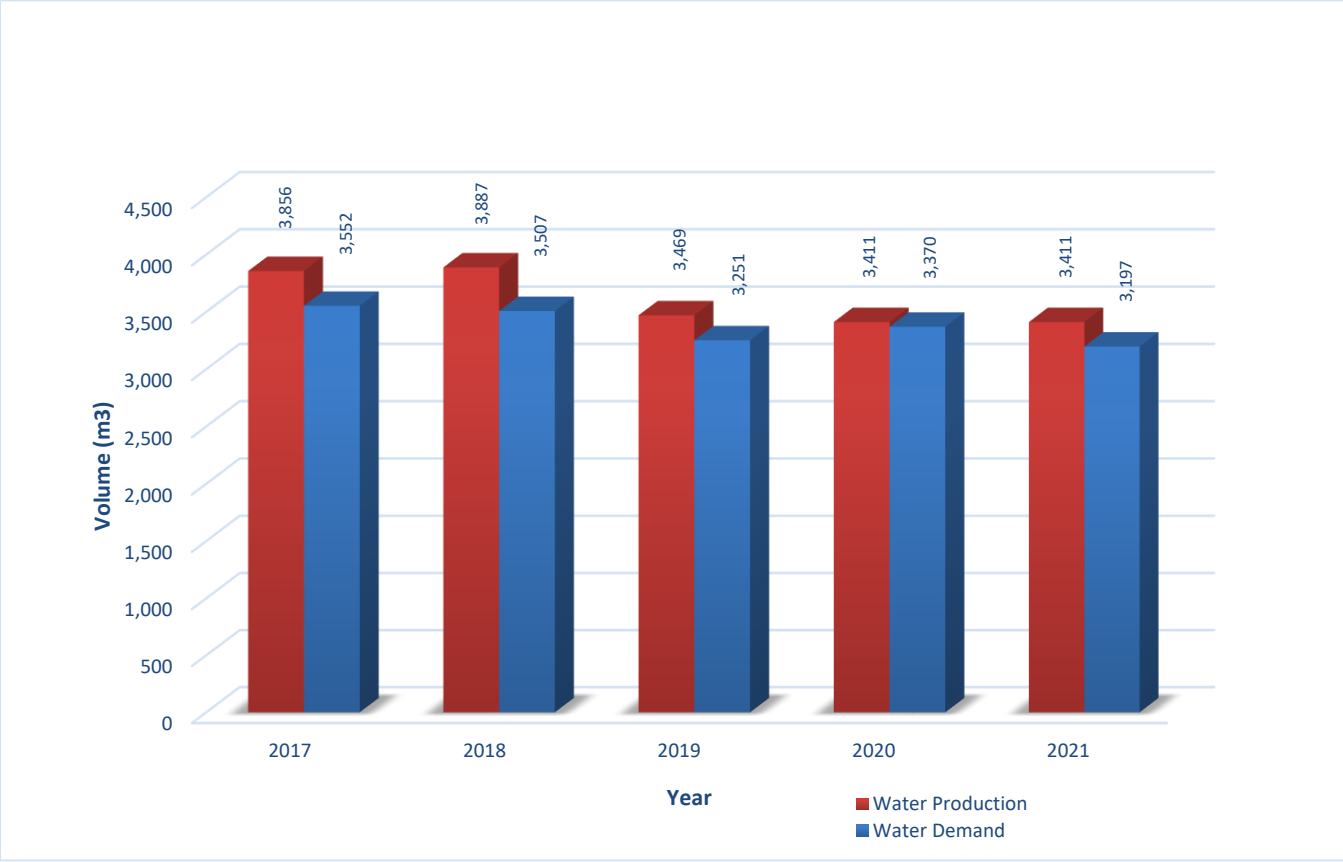

Figure 2: Cedar Lane Water Service Annual Water Production and Demand

Water production by month for the past five years is shown in Figure 3. Water consumption, for most water systems, is greatest during the summer months. Water usage for Cedar Lane is fairly consistent throughout the year likely the result of conservative indoor and outdoor water use.

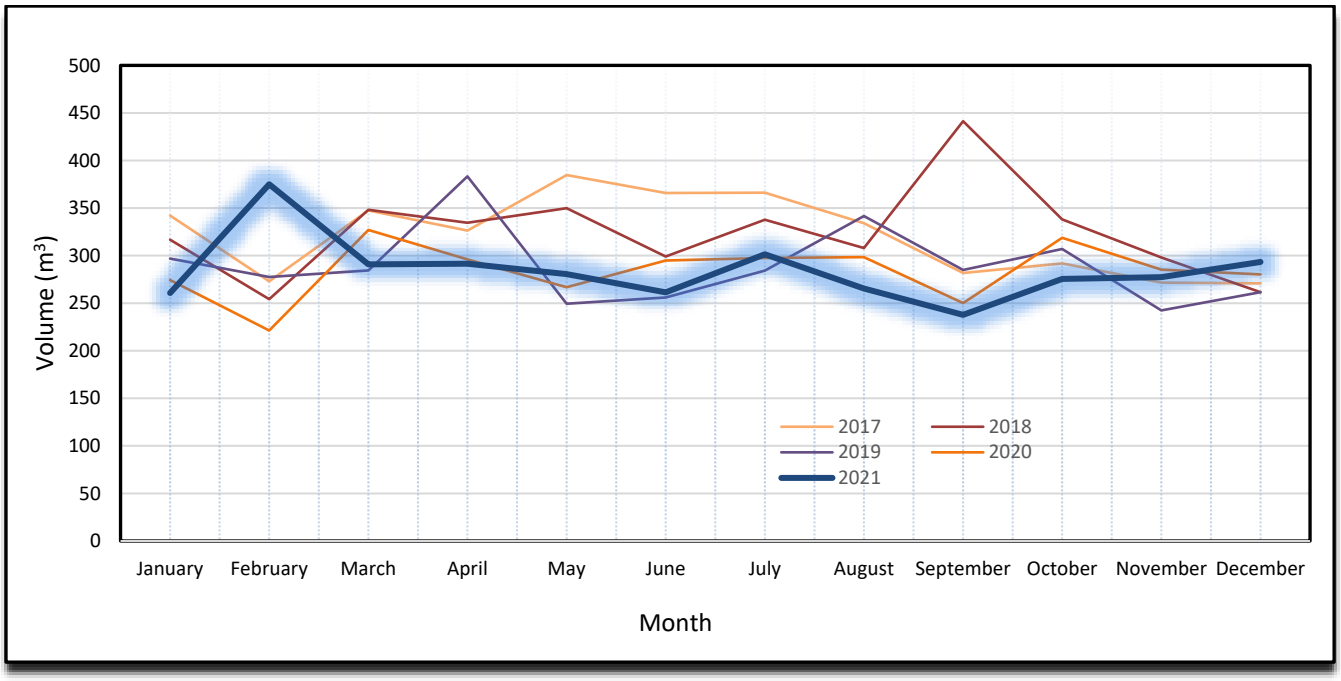

Figure 3: Cedar Lane Water Service Monthly Water Production

The Cedar Lane Water System is fully metered, and water meters are read quarterly. Water meter information enables water production and consumption to be compared in order to estimate leakage losses in the distribution system. The difference between water produced and water demand (total metered consumption) is called non-revenue water and includes distribution leaks, meter error, and unmetered uses such as fire hydrant usage, distribution system maintenance and process water for the treatment plant. Non-revenue water is approximately 6.7% which is a higher this year than the previous year; this is the result of a water system leak that occurred in early 2021.

WATER QUALITY

The analytical results (biological, chemical and physical parameters) of water samples collected in 2021 from the Cedar Lane Water System indicated that the water was mostly safe to drink. Naturally high manganese concentrations in the well water remain insufficiently treated and regularly exceeded the aesthetic limits in most parts of the system, and frequently, in certain parts of the system, the health limits established in the Guidelines for Canadian Drinking Water Quality (GCDWQ). Particularly, areas immediately downstream from the treatment plant are vulnerable to manganese concentrations in exceedance of the health limit. Iron and manganese precipitates have been a significant nuisance problem in parts of the Cedar Lanewater system and have caused discolouration of the drinking water. In order to meet the newly introduced health limit for manganese concentrations in drinking water, the existing treatment system must be upgraded or a new water source must be found. A public advisory for manganese exceedance in the drinking water was issued to all customers in July 2021.

Both wells ran very low during the dry summer months. Well #1 exhibited repeatedly elevated turbidity throughout the summer and also following heavy rainfall events.

Typical Cedar Lane Water System drinking water quality characteristics for 2021 are summarized as follows:

- Source water from both wells was free of *E. coli* bacteria. Source water from well #1 had a few low concentration total coliform bacteria results, often coinciding with heavy rainfall events.
- Well #1 registered periods with elevated turbidity throughout the year. The periods were predominantly during the summer months when the well levels were the lowest, but also during the winter months, likely coinciding with heavy rainfall events. These raw water turbidity excursions reached levels of up to 23 NTU on September 13, 2021. This event was likely related to extremely low water levels in the well during the late summer period. The treated water turbidity remained under 1 NTU throughout all these events. Therefore, these events have not been a public health concern yet.
- Source water is characterized as hard (141 mg/L $CaCO_3$).
- Both wells exhibited elevated iron and especially high manganese concentrations.
- Treated water was bacteriologically safe to drink and contained no total coliform or *E.coli* bacteria.
- Free chlorine residual concentrations were acceptable and within the desired range (i.e., 0.22 – 1.46 mg/L)
- Disinfection by-products: trihalomethanes (THM) were well below (37.0 µg/L) the GCDWQ limit of 100 µg/L, haloacetic acids (HAA) were well below (6.8 µg/L) the GCDWQ limit of 80 µg/L.
- Metals were typically below all limits except for elevated manganese concentrations. The median annual manganese concentration of 109.5 µg/L in the treated water indicates consistent exceedance of the aesthetic objective in the GCDWQ (20 µg/L) and also frequent exceedances of the health limit 120 µg/L. The health concerning exceedances occurred mostly in parts of the system that are immediately downstream of the treatment plant. A public health advisory was put in place in July 2021. CRD staff are working on mitigation strategies for this issue.
- Between July and September, the water temperature was in exceedance of the aesthetic objective (15ºC) in the distribution system.

Table 1 and 2 below provide a summary of the 2021 raw and treated water test results.

Water Quality data collected from this drinking water system can be reviewed on the CRD website: https://www.crd.bc.ca/about/data/drinking-water-quality-reports

OPERATIONAL HIGHLIGHTS

The following is a summary of the major operational issues that were addressed during the 2021 operating period:

- Water system leak investigation and subsequent repairs that included a boil water advisory being issued for the service in February 2021.
- Emergency service line connection repairs for:
    - 103 Thomas Road

- 151 Cedar Lane Road
- 171 Cedar Lane Road

- Completed water tank draining cleaning and inspection as planned in December 2021

CAPITAL IMPROVEMENTS

The following is a summary of the major capital improvements including year ending spending for 2021:

Safe Work Procedures (CE.699.4505): The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks.

Project	Spending
Budget	$5,000
Contract	($930)
Supplies/Materials	($432)
Project Management	($3,878)
Expenses	($90)
Balance Remaining	**($330)**

Back-up Power Design (CE.735.4503): The work scope includes a study to provide back-up power to the service. On-going.

Project	Spending
Budget	$5,000
Project Management	($49)
Balance Remaining	**$4,951**

Manganese Treatment System Design (CE.780.4501): This work scope includes the preliminary and detailed design for a manganese treatment system for the service.

Project	Spending
Budget	$35,000
Project Management	($1,789)
Study and Design	$0
Balance Remaining	**$33,211**

2021 FINANCIAL REPORT

Please refer to the attached 2021 Statement of Operations and Reserve Balances.

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), Water Sales (Sale-Water), interest on savings (Interest earnings), and miscellaneous revenue such as late payment charges (Other revenue).

Expenses includes all costs of providing the service. General Government Services includes budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs includes CRD staff time as well as the costs of equipment, tools and vehicles. Debt servicing costs are interest and principal payments on long term debt. Other Expenses includes all other costs to administer and operate the water system, including insurance, supplies, water testing and electricity.

The difference between Revenue and Expenses is reported as Net revenue (expenses). Any transfers to or from capital or reserve funds for the service (Transfers to Own Funds) are deducted from this amount and it is then added to any surplus or deficit carry forward from the prior year, yielding an Accumulated Surplus (or deficit) that is carried forward to the following year.

As of December 31, 2021, the accumulated deficit was $10,090 for Cedar Lane Water Service. In alignment with Local Government Act Section 374 (11), if actual expenditures exceed actual revenues, any deficiency must be included in the next year's financial plan. The financial plan approved by CRD Board on March 16, 2022 incorporated this deficit.

WATER SYSTEM PROBLEMS - WHO TO CALL:

To report any event or to leave a message regarding the Cedar Lane water system, call either:

CRD water system emergency call centre:	**1-855-822-4426 (toll free)**
	1-250-474-9630 (toll)
CRD water system general enquiries (toll free):	**1-800-663-4425**

When phoning with respect to an emergency, please specify to the operator, the service area in which the emergency has occurred.

Submitted by:	Matthew McCrank, MSc., P..Eng., Senior Manager, Wastewater Infrastructure Operations
	Rianna Lachance, BCom, CPA, CA, Senior Manager Financial Services
	Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection
	Karla Campbell, BPA, Senior Manager, Salt Spring Island Electoral Area
Concurrence	Robert Lapham, MCIP, RPP, Chief Administrative Officer

Attachment: 2021 Statement of Operations and Reserve Balances

For questions related to this Annual Report please email saltspring@crd.bc.ca

Table 1: 2021 Summary of Raw Water Test Results, Cedar Lane Water System									
PARAMETER		**2020 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2011 - 2020 RESULTS**		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum-Maximum
ND means Not Detected by analytical method used									
Physical Parameters/Biological									
Colour, True	TCU	Last analyzed in 2013				≤ 15 AO	2.8	2	2.5 - 3.1
Conductivity @ 25C	uS/cm	Last analyzed in 2009							
Hardness as $CaCO_3$	mg/L	**141.0**	10	106.0	177.0	No Guideline Required	131.0	56	90.5 - 188.0
pH	pH Units	**7.3**	8	7.0	7.5	7.0-10.5 AO	7.44	36	7.26 - 8.60
Total Organic Carbon	mg/L	**1.1**	10	0.77	1.40		1.15	32	ND - 2.35
Turbidity	NTU	**0.48**	24	ND	23.0		0.67	96	ND - 21.0
Water Temperature	Degrees C	**12.5**	24	11.0	15.0	≤ 15 AO	12.0	233	5.0 - 17.0
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	**ND**	24	ND	7		ND	221	0 - 800
E. coli	CFU/100 mL	**ND**	24	ND	ND		ND	220	ND - 19
Hetero. Plate Count, 35C (2 day)	CFU/1 mL	Last tested in 2014							
Parasites						No MAC Established			
Cryptosporidium , Total oocysts	oocysts/100 L	Last tested in 2014				Zero detection desirable	ND	1	ND
Giardia , Total cysts	cysts/100 L	Last tested in 2014				Zero detection desirable	ND	1	ND
Metals									
Aluminum	ug/L as Al	**ND**	10	ND	5.4	2900 MAC / 100 OG	ND	56	ND - 108.0
Antimony	ug/L as Sb	**ND**	10	ND	ND	6 MAC	ND	56	ND
Arsenic	ug/L as As	**0.37**	10	0.19	0.65	10 MAC	0.38	56	0.14 - 1.64
Barium	ug/L as Ba	**8.1**	10	4.4	11.9	1000 MAC	ND	56	4.4 - 15.0
Beryllium	ug/L as Be	**ND**	10	ND	ND		ND	56	ND
Bismuth	ug/L as Bi	**ND**	10	ND	ND		ND	48	ND
Boron	ug/L as B	**55.5**	10	ND	62.0	5000 MAC	56.0	56	ND - 494.0
Cadmium	ug/L as Cd	**ND**	10	ND	ND	5 MAC	ND	56	ND
Calcium	mg/L as Ca	**43.1**	10	31.8	54.8	No Guideline Required	39.7	56	25.7 - 58.3
Chromium	ug/L as Cr	**ND**	10	ND	ND	50 MAC	ND	56	ND
Cobalt	ug/L as Co	**ND**	10	ND	0.21		ND	56	ND
Copper	ug/L as Cu	**1.48**	10	1.03	3.66	2000 MAC / ≤ 1000 AO	2.63	56	0.46 - 21.5
Iron	ug/L as Fe	**111.5**	10	12.0	1730	≤ 300 AO	115.0	56	11.4 - 4170
Lead	ug/L as Pb	**0.80**	10	ND	1.93	5 MAC	ND	56	ND - 9.29
Lithium	ug/L as Li	**18.4**	10	15.7	21.1		17.7	23	14.7 - 21.4
Magnesium	mg/L as Mg	**8.08**	10	6.56	9.68	No Guideline Required	8.10	56	6.15- 11.2
Manganese	ug/L as Mn	**404.5**	20	4.1	459.0	120 MAC / ≤ 20 AO	397.0	56	92.0 - 1140.0
Molybdenum	ug/L as Mo	**ND**	10	ND	ND		ND	56	ND
Nickel	ug/L as Ni	**ND**	10	ND	ND		ND	56	ND
Potassium	mg/L as K	**0.27**	10	0.21	0.29		0.26	56	ND - 0.58
Selenium	ug/L as Se	**ND**	10	ND	ND	50 MAC	ND	56	ND
Silicon	mg/L as Si	**9.35**	10.00	8.17	10.70		9.53	56	3.55 - 11.7
Silver	ug/L as Ag	**ND**	10	ND	ND	No Guideline Required	ND	56	ND
Sodium	mg/L as Na	**52.65**	10	43.9	60.2	≤ 200 AO	54.3	56	37.6 - 78.9
Strontium	ug/L as Sr	**444.0**	10	338.0	578.0	7000 MAC	399.5	56	280 - 559
Sulphur	mg/L as Si	**6.35**	10	5.0	7.6		6.45	56	3.70 - 8.80
Tin	ug/L as Sn	**ND**	10	ND	ND		ND	54	ND
Titanium	ug/L as Ti	**ND**	10	ND	ND		ND	56	ND
Thallium	ug as Tl	**ND**	10	ND	ND		ND	48	ND
Uranium	ug/L as U	ND	10	ND	ND	20 MAC	ND	48	ND - 0.14
Vanadium	ug/L as V	**ND**	10	ND	ND		ND	56	ND
Zinc	ug/L as Zn	**8.1**	10	ND	10.7	≤ 5000 AO	9.4	56	ND - 211.0
Zirconium	ug/L as Zr	ND	10	ND	ND		ND	48	ND

Table 2: 2021 Summary of Treated Water Test Results, Cedar Lane Water System									
PARAMETER		**2021 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2011 - 2020 RESULTS**		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Min.	Range Max.	≤ = Less than or equal to	Median	Samples Analyzed	Range Min.-Max.
ND means Not Detected by analytical method used									
Physical Parameters									
Alkalinity, Total	mg/L	Last analyzed in 2009							
Carbon, Total Organic	mg/L as C	**0.93**	5	0.85	1.2		1.15	22	ND - 2.52
Colour, True	TCU	Last analyzed in 2009				≤ 15 AO			
Conductivity @ 25C	uS/cm	Last analyzed in 2009							
Hardness as $CaCO_3$	mg/L	**142.0**	20	62.9	148.0	No Guideline Required	142.0	53	123.0 - 161.0
pH	pH units	**7.7**	4	7.5	7.7	7.0-10.5 AO	7.7	24	7.50 - 8.10
Turbidity	NTU	**0.45**	15	0.2	0.75	1 MAC and ≤ 5 AO	0.41	71	0.22 - 1.2
Water Temperature	Degress C	**10.5**	51	7.0	21.5	≤ 15 AO	12.0	1955	0.0 - 22.0
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	**ND**	50	ND	ND	0 MAC	ND	273	ND
E. coli	CFU/100 mL	**ND**	51	ND	ND	0 MAC	ND	273	ND
Hetero. Plate Count 7 day	CFU/1 mL	Not tested in 2021				No Guideline Required	10	44	ND - 2600
Disinfectants									
Disinfectants									
Chlorine, Free Residual	mg/L as Cl2	**0.60**	302	0.22	1.46	No Guideline Required	0.58	2047	0.03 - 1.26
Chlorine, Total Residual	mg/L as Cl_2	**0.64**	153	0.30	1.76	No Guideline Required	0.67	2043	0.11 - 1.65
Disinfection By-Products									
Trihalomethanes (THMs)									
Bromodichloromethane	ug/L	**12.0**	5	8.2	14.0		10.4	26	5.29 - 15.0
Bromoform	ug/L	**ND**	5	ND	ND		ND	26	ND
Chloroform	ug/L	**17.0**	5	9.7	19.0		16.7	26	5.89 - 180
Chlorodibromomethane	ug/L	**7.6**	5	4.2	8.3		5.5	26	ND - 8.3
Total Trihalomethanes	ug/L	**37.0**	5	22.0	41.0	100 MAC	30.0	25	20.0 - 185
Haloacetic Acids (HAA)									
HAA5	ug/L	6.8	5	ND	7.4	80 MAC	3.25	2	0.96 - 5.55
Metals									
Aluminum	ug/L as Al	**ND**	20	ND	5.6	2900 MAC / 100 OG	ND	53	ND - 73.0
Antimony	ug/L as Sb	**ND**	20	ND	ND	6 MAC	ND	53	ND
Arsenic	ug/L as As	**0.29**	20	0.24	0.43	10 MAC	0.28	53	0.19 - 0.65
Barium	ug/L as Ba	**6.35**	20	2.9	7.1	1000 MAC	6.6	53	4.8 - 29.0
Beryllium	ug/L as Be	**ND**	20	ND	ND		ND	53	ND
Bismuth	ug/L as Bi	**ND**	20	ND	ND		ND	48	ND
Boron	ug/L as B	**52.0**	20	ND	54.0	5000 MAC	55.0	53	ND - 448.0
Cadmium	ug/L as Cd	**ND**	20	ND	ND	5 MAC	ND	53	ND
Calcium	mg/L as Ca	**44.8**	20	20.7	46.7	No Guideline Required	44.9	53	37.5 - 51.5
Chromium	ug/L as Cr	**ND**	20	ND	ND	50 MAC	ND	53	ND
Cobalt	ug/L as Co	**ND**	20	ND	0.41		ND	53	ND
Copper	ug/L as Cu	**13.3**	20	5.83	23.4	2000 MAC / ≤ 1000 AO	17.8	53	9.7 - 48.8
Iron	ug/L as Fe	**19.5**	20	ND	35.4	≤ 300 AO	25.0	53	ND - 65.0
Lead	ug/L as Pb	**0.57**	20	ND	1.18	5 MAC	0.54	53	0.21 - 2.27
Lithium	ug/L as Li	**18.0**	20	9.4	19.7		18.0	20	16.5 - 19.6
Potassium	ug/L as K	**0.27**	20	0.24	0.30		0.26	53	0.24 - 0.51
Magnesium	mg/L as Mg	**7.69**	20	2.71	7.99	No Guideline Required	7.53	53	6.47 - 9.39
Manganese	ug/L as Mn	**109.5**	40	ND	1790	120 MAC / ≤ 20 AO	77.9	53	6.4 - 357.0
Molybdenum	ug/L as Mo	**ND**	20	ND	ND		ND	53	ND
Nickel	ug/L as Ni	**ND**	20	ND	ND		ND	53	ND
Selenium	ug/L as Se	**ND**	20	ND	ND	50 MAC	ND	52	ND
Silicon	ug/L as Si	**9.76**	20	5.37	10.3		9.44	53	3500 - 10400.0
Silver	ug/L as Ag	**ND**	20	ND	ND	No Guideline Required	ND	53	ND
Sodium	mg/L as Na	**53.9**	20	25.9	55.8	≤ 200 AO	53.0	53	49.2 - 68.0
Strontium	ug/L as Sr	**437.0**	20	196.0	483.0	7000 MAC	421.0	53	343.0 - 497.0
Sulphur	mg/L as S	**6.1**	20	4.8	7.5		6.4	48	5.30 - 8.90
Tin	ug/L as Sn	**ND**	20	ND	ND		ND	53	ND
Titanium	ug/L as Ti	**ND**	20	ND	ND		ND	53	ND
Thallium	ug/L as Tl	**ND**	20	ND	ND		ND	48	ND
Uranium	ug/L as U	**ND**	20	ND	ND	20 MAC	ND	48	ND
Vanadium	ug/L as V	**ND**	20	ND	ND		ND	53	ND
Zinc	ug/L as Zn	**14.6**	20	ND	23.9	≤ 5000 AO	18.6	53	ND - 207.0
Zirconium	ug/L as Zr	**ND**	20	ND	ND		ND	489	ND