

# Sticks Allison Water System

## 2022 Annual Report

### Introduction

This report provides a summary of the Sticks Allison Water Service for 2022 and 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 community of Sticks Allison is a rural residential development located on the north side of Galiano Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility. In 1996 the service converted to the Capital Regional District (CRD). The Sticks Allison water service (Figure 1) is made up of 38 parcels encompassing a total area of approximately 23 hectares. Of the 38 parcels, 37 were customers connected to the water system in 2022.

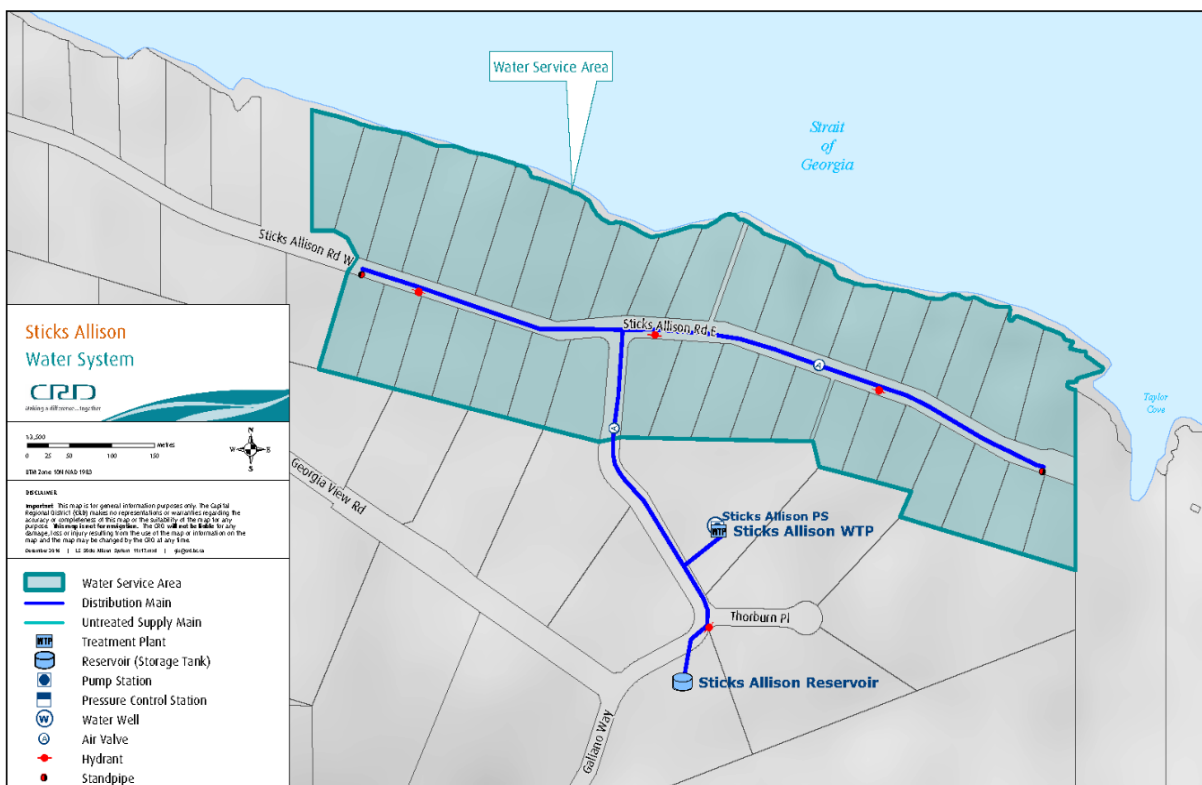


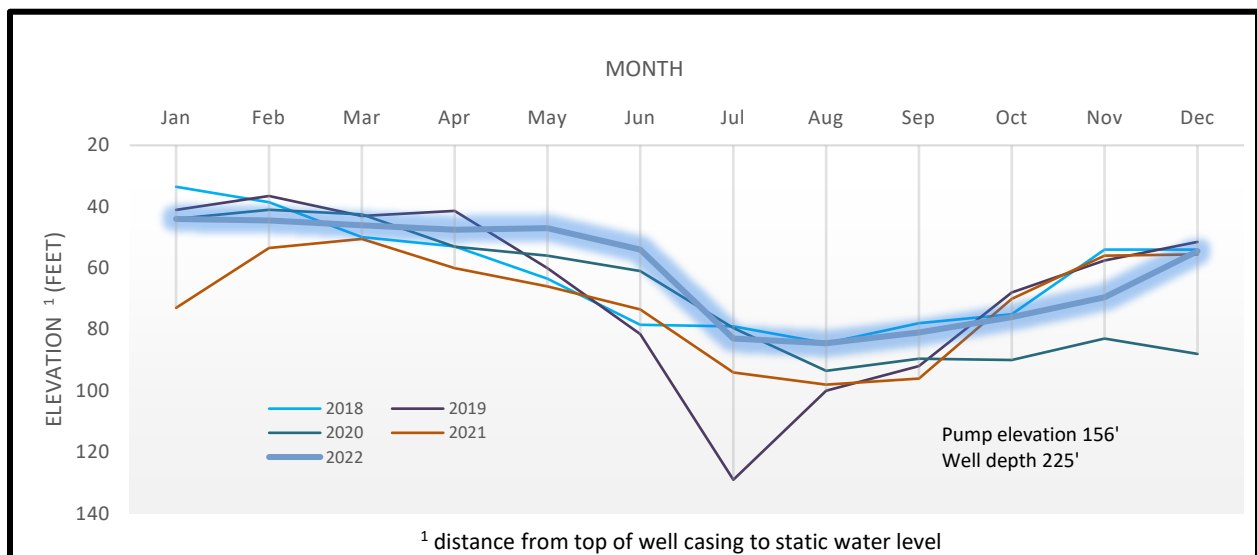
Figure 1: Map of Sticks Allison Water System

The Sticks Allison water system is primarily comprised of:

- One groundwater well, related pumping and control equipment and building.
- Disinfection process equipment (ultraviolet light and chlorine).
- One steel storage tank (total volume is 90 cubic meters).
- Distribution system (1,400 meters of water mains).
- Other water system assets: service connections and meters, four hydrants, two standpipes, 10 gate valves, Supervisory Control and Data Acquisition (SCADA) system and auxiliary generator.

## Water Supply

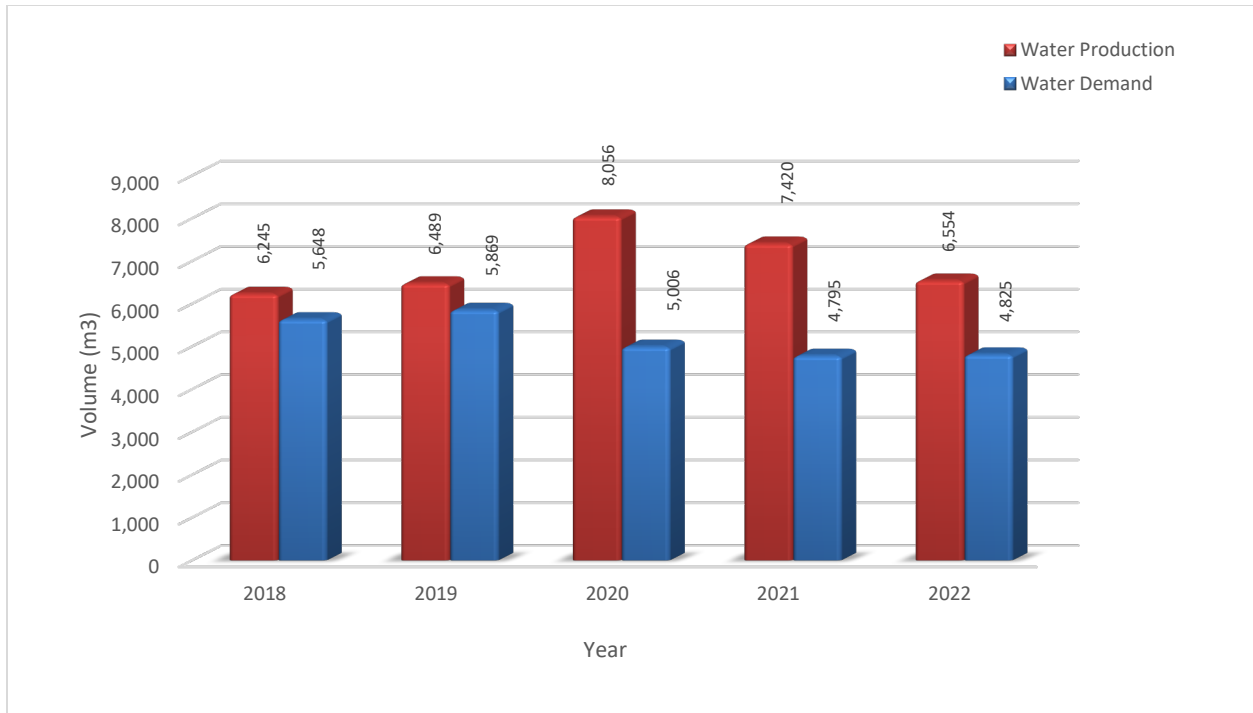
Groundwater supply monthly water levels are highlighted for 2022 in Figure 2. Groundwater levels for the most part during 2022 are within the typical historical range.



**Figure 2: Sticks Allison Monthly Groundwater Water Level**

## Water Production and Demand

Referring to Figure 3, 6,554, cubic meters of water were extracted (water production) from the ground water source in 2022. This is an 8% decrease from the previous year and a 14% increase from the five year average. Water demand (customer water billing) for the service totaled 4,825 cubic meters of water; a 1% increase from the previous year and a 9% decrease from the five year average.

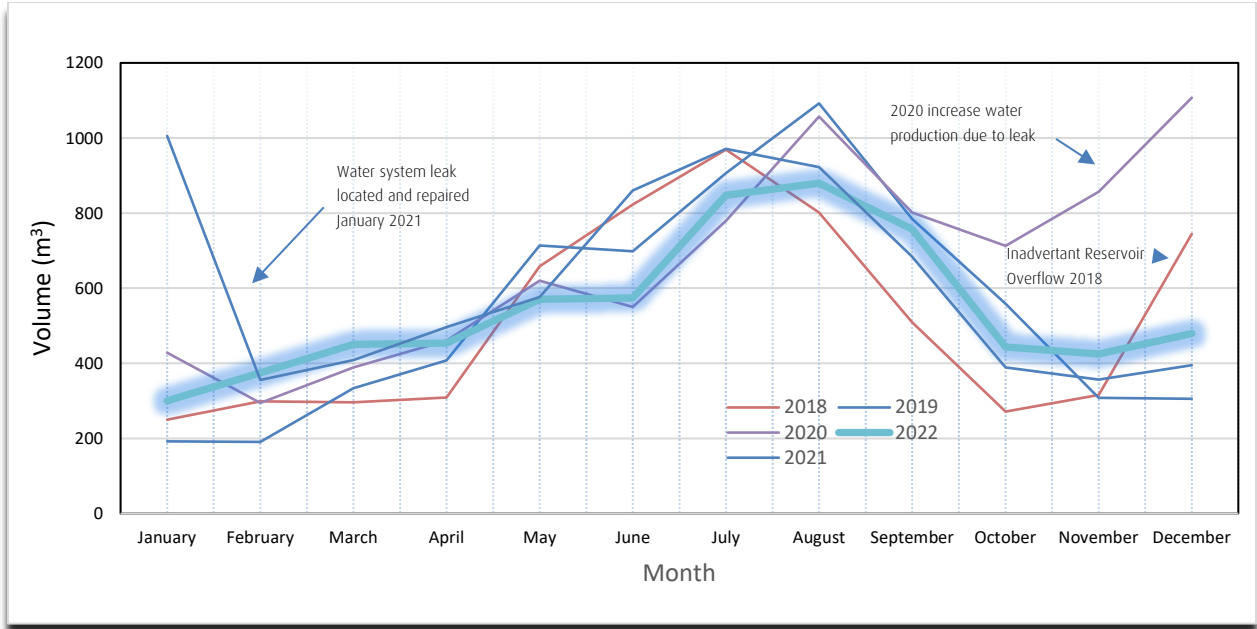


**Figure 3: Sticks Allison Water Service Annual Water Production and Demand**

The difference between annual water production and annual water demand is referred to as non-revenue water and can include water system leaks, water system maintenance and operational use (e.g. water main flushing, filter system backwashing), potential unauthorized use and fire-fighting use.

The 2022 non-revenue water (1,729 cubic meters) represents approximately 26% of the total water production for the service area. However, approximately 80 cubic meters can be attributed to operational use resulting in a non-revenue water volume of approximately 25%. Historically, non-revenue water for the service has been about 8%-10%. The higher percentage of non-revenue water for 2022 suggests there is likely ongoing water system leak or leaks that require further investigation.

Figure 4 below illustrates the monthly water production for 2022 along with the historical water production information. The monthly water production trends are typical for small water systems such as the Sticks Allison water system.



**Figure 4: Sticks Allison Water Service Monthly Water Production.**

### Drinking Water Quality

Staff completed the water quality monitoring program at Sticks Allison based on the regulatory requirements and system specific risks. Samples were collected at regular frequencies from the raw water as well as from a number of sampling stations at the treatment plant and in the distribution system. The samples were shipped for various analyses to the CRD's Water Quality Lab or to external laboratories for special analyses, including disinfection by-products or metals.

The water system performed well in 2022 and consistently supplied safe drinking water to its customers. The groundwater well produced generally good quality source water. It contained low levels of iron but slightly elevated manganese concentrations. Accumulation effects at the end of the system have occasionally exacerbated these manganese concentrations. Manganese concentrations were regularly in exceedance of the Guidelines for Canadian Drinking Water Quality (GCDWQ) aesthetic objective at the east end of Sticks Allison Road. Such exceedances can lead to brown/yellow water discoloration. Monthly spot flushes at the system ends were performed as mitigation to prevent these metals from accumulating in higher concentrations that would potentially exceed the maximum acceptable concentration, and/or lead to water customer complaints. However, this level of mitigation was unable to keep the metal concentrations below the aesthetic limits, and during the summer months water conservation considerations often competed with water quality concerns. Therefore, treatment to remove these metals should be considered for this water system. The well water was free of indicator bacteria in 2022.

The data below provides a summary of the water quality characteristics in 2022:

#### Raw Water:

- The Sticks Allison well water was free of the indicator bacteria *E.coli* and total coliforms.
- The raw water had a median manganese concentration of 11.6 µg/L which is consistent with previous years. It was also below the aesthetic objectives in the GCDWQ. Iron concentrations were also low and well below the aesthetic objective.
- The raw well water had a median hardness of 32.9 mg/L (CaCO<sub>3</sub>). pH was not tested in 2022 but is typically between 7.5 and 8.0.
- The raw water turbidity was consistently under 1 Nephelometric Turbidity Unit (NTU) with an annual median of 0.2 NTU.

#### Treated Water:

- The treated water was safe to drink and free of *E.coli* and total coliform bacteria.
- The treated water turbidity was consistently below 1 NTU with an annual median of 0.33 NTU.
- The manganese concentrations in the distribution system regularly exceeded the aesthetic limits in the GCDWQ at the east end of Sticks Allison Road. While the manganese concentrations exceeded the aesthetic limit, they never reached the health limit. Iron concentrations were also elevated through accumulation effects but remained well below the aesthetic limit. It is expected that the west end of Sticks Allison Road experienced similar concentrations but this was not tested. No customer complaints were received. Regular spot flushes were carried out by the operators.
- The annual average levels of the disinfection by-product total trihalomethanes (TTHM) were well below the maximum allowable concentration. Haloacetic acids (HAA) were not tested in 2022 but are typically low when THM are low.
- The free chlorine residual concentrations in the distribution system ranged from 0 to 1.17 mg/L with a median of 0.22 mg/L indicating that on occasion the secondary disinfection could be insufficient at the ends of the system. Staff will try to balance the need for proper secondary disinfection and the risk of disinfection by-product formation through higher chlorine levels.

Table 1 and 2 below provide a summary of the 2022 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**

There were no significant operating issues for the Sticks Allison water system in 2022. However, during routine operations of the water system, that includes weekly water quality field testing, there was an inadvertent impact on water system pressures while flushing the system resulting in water loss for some customers. Operations has reviewed the procedures and improved water system pressure monitoring capabilities to ensure this routine activity does not have a negative impact for water system users.

## Capital Projects Updates

No capital works were planned or completed in 2022. In alignment with the approved capital plan, funds were held for replacement of failed/leaking service lines, which did not end up being utilized.

## Financial Report

Please refer to the attached 2022 Statement of Operations and Reserve Balances.

Revenue includes parcel taxes (Transfers from Government), fixed user fees (User Charges), and interest on savings (Interest earnings), a transfer from the Operating Reserve Fund, and miscellaneous revenue such as late payment charges (Other revenue).

Expenses include all costs of providing the service. General Government Services include budget preparation, financial management, utility billing and risk management services. CRD Labour and Operating Costs include CRD staff time as well as the costs of equipment, tools and vehicles. Other Expenses include 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 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.

Submitted by:	Jason Dales, B.Sc., WD IV, Senior Manager, Wastewater Infrastructure Operations
	Joseph Marr, P.Eng., Acting Senior Manager, Infrastructure Engineering
	Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection
	Rianna Lachance, BCom, CPA, CA, Senior Manager, Financial Services
Concurrence:	Ian Jesney, P.Eng., Acting General Manager, Integrated Water Services
	Larisa Hutcheson, P.Eng., General Manager, Parks & Environmental Services

Attachments:     Table 1  
                      Table 2  
                      2022 Statement of Operations and Reserve Balances

For questions related to this Annual Report please email [IWSAdministration@crd.bc.ca](mailto:IWSAdministration@crd.bc.ca)

**Table 1**

<b>Table 1: 2022 Summary of Raw Water Test Results, Sticks Allison Water System</b>										
PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012-2021 RESULTS			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum Maximum	
ND means Not Detected by analytical method used										
<b>Physical Parameters</b>										
Carbon, Total Organic	mg/L	Not tested in 2022					5.2	1	5.2	5.2
Hardness as CaCO <sub>3</sub>	mg/L	32.9	4	29.2	34.2	No Guideline Required	28.8	18	24.2	41.3
pH	pH units	Not tested in 2022				7.0 - 10.5 AO	7.93	14	7.4	8.42
Turbidity	NTU	0.2	12	< 0.14	0.85		0.35	49	0.12	0.95
Water Temperature	°C	Not tested in 2022					10	80	9.5	13
<b>Metals</b>										
Aluminum	ug/L as Al	4.85	4	4.2	5.5	2900 MAC / 100 OG	9.6	18	3.4	127
Antimony	ug/L as Sb	< 0.5	4	< 0.5	< 0.5	6 MAC	< 0.5	18	< 0.5	2
Arsenic	ug/L as As	0.49	4	0.48	0.51	10 MAC	0.535	18	0.45	1.29
Barium	ug/L as Ba	< 1	4	< 1	< 1	1000 MAC	< 1	18	< 1	11
Beryllium	ug/L as Be	< 0.1	4	< 0.1	< 0.1		< 0.1	18	< 0.1	< 3
Bismuth	ug/L as Bi	< 1	4	< 1	< 1		< 1	14	< 1	< 1
Boron	ug/L as B	360.5	4	350	385	5000 MAC	354	18	< 50	440
Cadmium	ug/L as Cd	< 0.01	4	< 0.01	< 0.01	5 MAC	< 0.01	18	< 0.01	< 0.1
Calcium	mg/L as Ca	11.3	4	9.92	11.7	No Guideline Required	9.825	18	6.82	15.5
Chromium	ug/L as Cr	< 1	4	< 1	< 1	50 MAC	< 1	18	< 1	< 10
Cobalt	ug/L as Co	< 0.2	4	< 0.2	< 0.2		< 0.2	18	< 0.2	< 20
Copper	ug/L as Cu	1.38	4	1.23	1.48	2000 MAC / ≤ 1000 AO	1.85	18	0.65	2670
Iron	ug/L as Fe	16.1	4	12.5	28.1	≤ 300 AO	86.3	18	18.5	395
Lead	ug/L as Pb	0.235	4	0.21	0.24	5 MAC	0.215	18	< 0.2	0.64
Lithium	ug/L as Li	12.5	4	12	13		12.2	7	11.6	13.9
Magnesium	mg/L as Mg	1.145	4	1.07	1.24	No Guideline Required	1.06	18	0.635	1.74
Manganese	ug/L as Mn	11.6	4	7.4	17.9	120 MAC / ≤ 20 AO	23.5	18	< 4	84.7
Molybdenum	ug/L as Mo	3.8	4	3.7	3.9		4.35	18	3.8	26
Nickel	ug/L as Ni	< 1	4	< 1	< 1		< 1	18	< 1	< 50
Potassium	mg/L as K	0.2915	4	0.276	0.295		0.294	18	0.264	0.587
Selenium	ug/L as Se	< 0.1	4	< 0.1	< 0.1	50 MAC	< 0.1	18	< 0.1	< 0.5
Silver	ug/L as Ag	< 0.02	4	< 0.02	< 0.02	No Guideline Required	< 0.02	18	< 0.02	< 10
Sodium	mg/L as Na	84.95	4	82.2	86.7	≤ 200 AO	84.25	18	3.68	101
Strontium	ug/L as Sr	46.25	4	41.4	48.9	7000 MAC	41.7	18	27	65.1
Sulphur	mg/L as S	9.6	4	7.6	10.9		9	14	7.3	10.6
Tin	ug/L as Sn	< 5	4	< 5	< 5		< 5	18	< 5	< 20
Titanium	ug/L as Ti	< 5	4	< 5	< 5		< 5	18	< 5	< 10
Thallium	ug/L as Tl	< 0.01	4	< 0.01	< 0.01		< 0.01	14	< 0.01	< 0.01
Uranium	ug/L as U	< 0.1	4	< 0.1	< 0.1	20 MAC	< 0.1	14	< 0.1	0.22
Vanadium	ug/L as V	< 5	4	< 5	< 5		< 5	18	< 5	< 10
Zinc	ug/L as Zn	8.8	4	7.5	10.8	≤ 5000 AO	10.55	18	< 5	63
Zirconium	ug/L as Zr	< 0.1	4	< 0.1	< 0.1		< 0.1	14	< 0.1	0.16
<b>Non-Metallic Inorganic Chemicals</b>										
Silicon	mg/L as Si	6965	4	6810	7300		6.42	15		0.004 - 11.5
<b>Microbial Parameters</b>										
<b>Indicator Bacteria</b>										
Coliform, Total	CFU/100 mL	< 1	12	< 1	< 1		ND	118		ND - 15
<i>E. coli</i>	CFU/100 mL	< 1	12	< 1	< 1		ND	116		ND
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2022								
<b>Parasites</b>										
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Not analyzed in 2022				Zero detection desirable	ND	5		ND
<i>Giardia</i> , Total cysts	cysts/100 L	Not analyzed in 2022				Zero detection desirable	ND	5		ND

**Table 2**

Table 2: 2022 Summary of Treated Water Test Results, Sticks Allison Water System											
PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012-2022 ANALYTICAL RESULTS				
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum Maximum		
ND means Not Detected by analytical method used											
<b>Physical Parameters</b>											
Carbon, Total Organic	mg/L as C	3.25	4	2.2	4		2.555	22	1.08	7.73	
Hardness as CaCO3	mg/L	36.75	4	32.5	38.7		32.65	16	29.7	37.6	
pH	No Units	7.8	2	7.7	7.9		7.89	16	7.6	8.3	
Turbidity	NTU	0.325	12	0.2	0.5	>1 MAC	0.4	86	0.2	4.8	
Water Temperature	°C	9	52	4	14.5	≥15 AO	10	2415	4.5	22	
<b>Microbial Parameters</b>											
<b>Indicator Bacteria</b>											
Coliform, Total	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	310	< 1	64	
<i>E. coli</i>	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	306	< 1	< 1	
Hetero. Plate Count, 7 day	CFU/1 mL	85	10	20	530	No Guideline Required	380	13	< 10	11000	
<b>Disinfectants</b>											
<b>Disinfectants</b>											
Chlorine, Free Residual	mg/L as Cl2	0.215	52	0	1.17	3.0 MAC	0.3	2441	0	1.88	
Chlorine, Total Residual	mg/L as Cl2	0.2	4	0.14	0.96		0.41	2445	0	1.98	
<b>Disinfection By-Products</b>											
<b>Trihalomethanes (THMs)</b>											
Bromodichloromethane	ug/L	12.5	4	< 1	16		15	24	6.4	19.3	
Bromoform	ug/L	< 1	4	< 1	1.1		< 1	24	< 0.1	1.3	
Chloroform	ug/L	22	4	21	26		24	24	7.4	33	
Chlorodibromomethane	ug/L	6.15	4	4.2	9.9		5.8	24	2.5	11.3	
Total Trihalomethanes	ug/L	40.5	4	33	45	100 MAC	39.6	23	18	59.3	
<b>Haloacetic Acids (HAAs)</b>											
HAA5	ug/L	Not tested in 2022				80 MAC					
<b>Metals</b>											
Aluminum	ug/L as Al	10.55	4	9	13.8	2900 MAC / 100 OG	21.5	16	5	39.4	
Antimony	ug/L as Sb	< 0.5	4	< 0.5	< 0.5	6 MAC	< 0.5	16	< 0.5	< 0.5	
Arsenic	ug/L as As	0.53	4	0.51	0.58	10 MAC	0.605	16	0.51	0.89	
Barium	ug/L as Ba	1.25	4	1.1	1.4	1000 MAC	1.3	16	< 1	2.2	
Beryllium	ug/L as Be	< 0.1	4	< 0.1	< 0.1		< 0.1	16	< 0.1	< 0.1	
Bismuth	ug/L as Bi	< 1	4	< 1	< 1		< 1	16	< 1	< 1	
Boron	ug/L as B	365.5	4	342	381	5000 MAC	367.5	16	319	400	
Cadmium	ug/L as Cd	< 0.01	4	< 0.01	< 0.01	5 MAC	< 0.01	16	< 0.01	< 0.01	
Calcium	mg/L as Ca	13.2	4	11.5	13.8	No Guideline Required	11.7	16	10.7	14.1	
Chromium	ug/L as Cr	< 1	4	< 1	< 1	50 MAC	< 1	16	< 1	< 1	
Cobalt	ug/L as Co	< 0.2	4	< 0.2	< 0.2		< 0.2	16	< 0.2	< 0.5	
Copper	ug/L as Cu	14.8	4	12	23.9	2000 MAC / ≤ 1000 AO	12.15	16	0.87	46.2	
Iron	ug/L as Fe	87.75	4	47.8	109	≤ 300 AO	207.5	16	119	EXG 747	
Lead	ug/L as Pb	0.85	4	0.68	0.92	5 MAC	0.72	16	0.22	2.32	
Lithium	ug/L as Li	12.6	4	11.9	13		12.4	8	11.5	13.3	
Magnesium	mg/L as Mg	0.973	4	0.864	1.06	No Guideline Required	0.7575	16	0.476	1.3	
Manganese	ug/L as Mn	45.6	4	38	83.7	120 MAC / ≤ 20 AO	74.75	16	26.5	200	
Molybdenum	ug/L as Mo	2.55	4	1.6	3.5		3.75	16	1	5.6	
Nickel	ug/L as Ni	< 1	4	< 1	< 1		< 1	16	< 1	< 1	
Potassium	mg/L as K	0.294	4	0.278	0.302		0.3015	16	0.27	0.351	
Selenium	ug/L as Se	< 0.1	4	< 0.1	< 0.1	50 MAC	< 0.1	16	< 0.1	0.11	
Silicon	ug/L as Si	7145	4	7020	7400		6805	16	6340	7740	
Silver	ug/L as Ag	< 0.02	4	< 0.02	< 0.02	No Guideline Required	< 0.02	16	< 0.02	< 0.02	
Sodium	mg/L as Na	84.85	4	83.5	86.3	≤ 200 AO	84.35	16	79.6	92	
Sulphur	ug/L as S	9.3	4	8.4	10.9		9.25	16	7	11.6	
Strontium	ug/L as Sr	54.6	4	48.3	56.9	7000 MAC	50.7	16	46.3	60.3	
Tin	ug/L as Sn	< 5	4	< 5	< 5		< 5	16	< 5	< 5	
Thallium	ug/L as Tl	< 0.01	4	< 0.01	< 0.01		< 0.01	16	< 0.01	< 0.05	
Titanium	ug/L as Ti	< 5	4	< 5	< 5		< 5	16	< 5	< 5	
Uranium	ug/L as U	< 0.1	4	< 0.1	< 0.1	20 MAC	< 0.1	16	< 0.1	0.16	
Vanadium	ug/L as V	< 5	4	< 5	< 5		< 5	16	< 5	< 5	
Zinc	ug/L as Zn	16.9	4	11.6	20.5	≤ 5000 AO	16.35	16	5.9	34.1	
Zirconium	ug/L as Zr	0.12	4	< 0.1	0.14		0.18	16	< 0.1	< 0.5	