

Surfside Water System

2024 Annual Report



Introduction

This report provides a summary of the Surfside Park Estates Water Service for 2024 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 Surfside is a rural residential development located on Mayne Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility. In 2003 the service converted to the Capital Regional District (CRD). The Surfside Water Service (Figure 1) area is made up of 127 parcels of which 105 parcels can be inhabited encompassing a total area of approximately 25 hectares. Of the 105 parcels, 70 were actively connected to the water system in 2024.

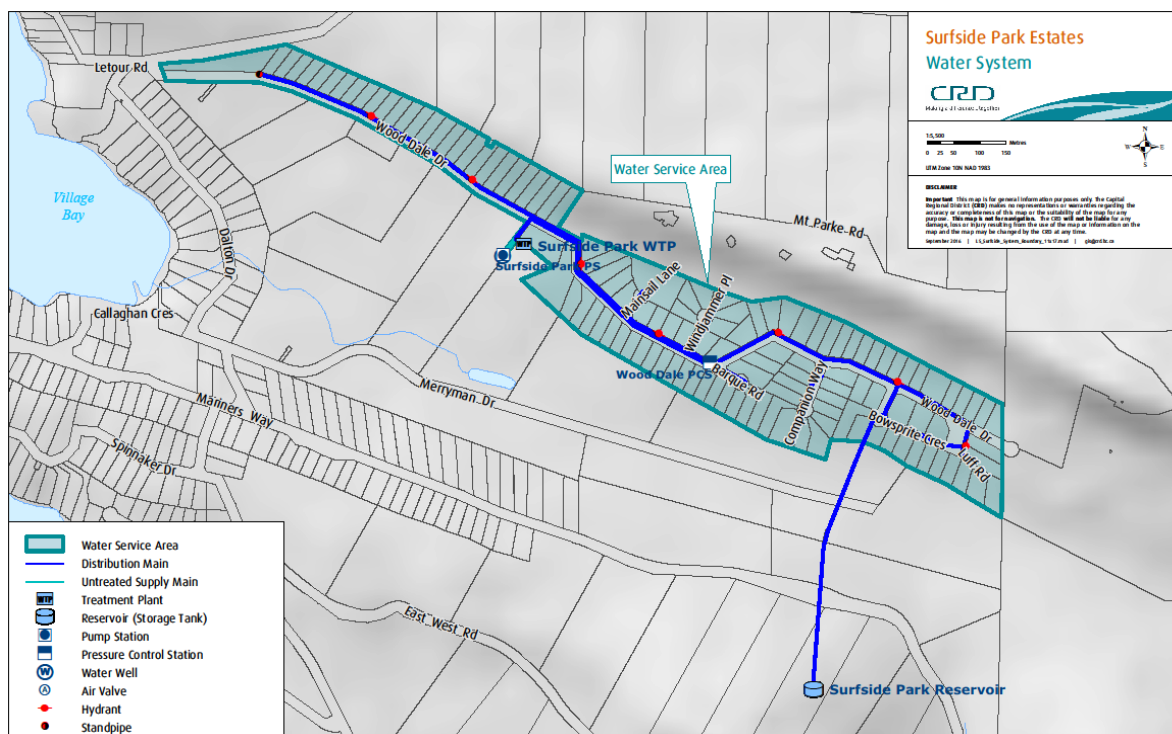


Figure 1: Surfside Park Estates Water Service

The Surfside water system is primarily comprised of:

- One groundwater well, related pumping and control equipment and building.
- Disinfection process equipment (filters, ultraviolet [UV] light and chlorine).
- Two steel storage tanks (total volume is 113 cubic meters).
- Distribution system (3,800 meters of water mains).
- Other water system assets: 70 service connections and water meters, five hydrants, three standpipes, 30 gate valves, one air release valve, Supervisory Control and Data Acquisition (SCADA) system and portable generator.

Water Supply

Groundwater supply monthly water levels are highlighted for 2024 in Figure 2. Groundwater levels for 2024 are 19% lower than the 5-year average. Aquifer levels are trending down, likely the result of water system leaks and ongoing drought in which the Province declared level 5 drought conditions for the Southern Gulf Islands for a third consecutive year.

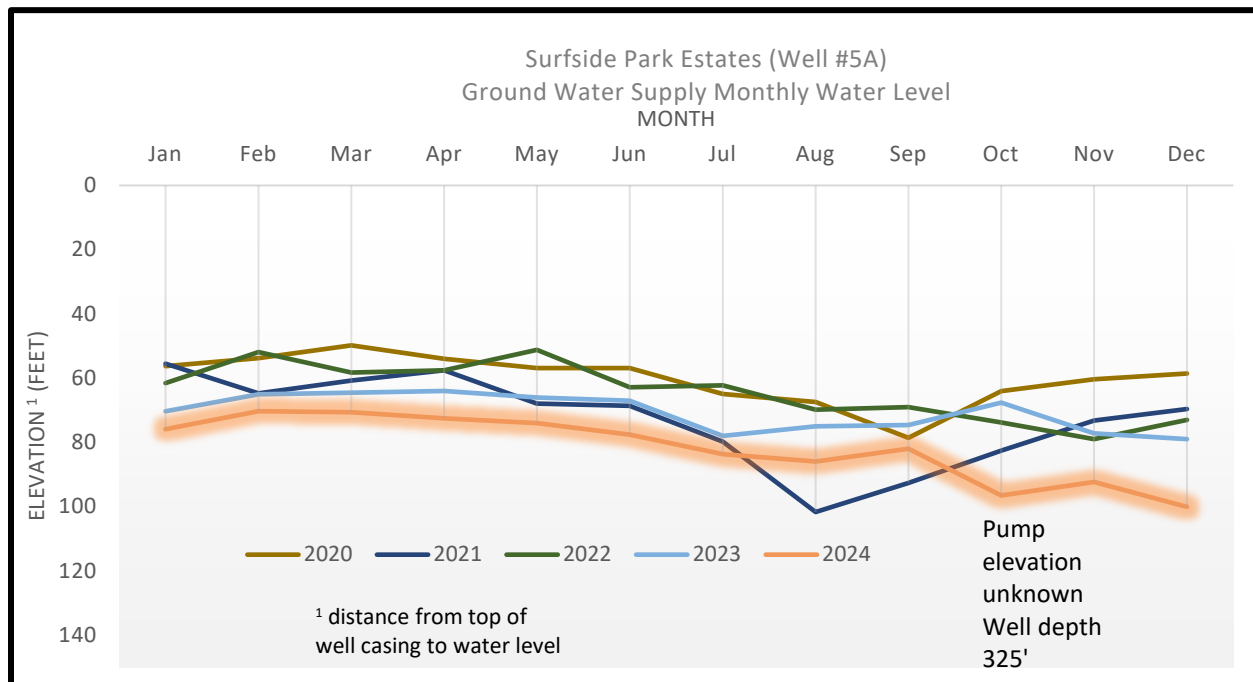


Figure 2: Surfside Park Estates Well #5A Groundwater Supply Monthly Water Level

Water Production and Demand

Referring to Figure 3, 17,069 cubic meters of water was extracted (water production) from the groundwater source (Well #5) in 2024; a 24% increase from the previous year and a 43% increase from the five-year average. Water demand (customer water billing) for the service totaled 5,348 cubic meters of water; a 18% increase from the previous year but right in line with the five-year average.

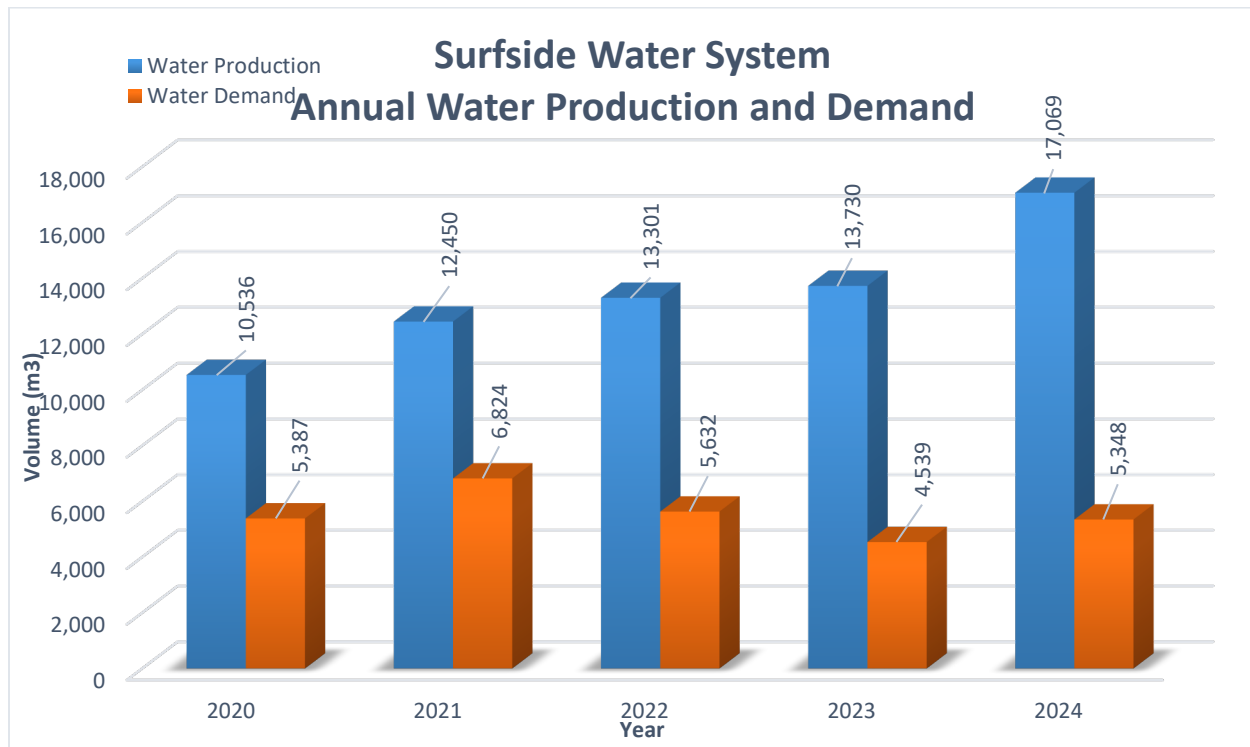


Figure 3: Surfside Park Estates Water Service Annual Water Production and Demand

The difference between annual water production and annual customer 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 2024 non-revenue water (11,721 cubic meters) represents approximately 69% of the total water production for the service area. Approximately 264 cubic meters of water can be attributed to operational use so the remaining amount (67%) of non-revenue water is considered significant for a small water service. It is important to note that leak detection and repair efforts continue to be prioritized including a more robust and focused leak detection program.

Figure 4 below illustrates the monthly water production for 2024 along with the historical water production information for the previous four years. Typically, the monthly water production trend is greatest during the summer period (June to September). However, monthly water production for the most part is consistent throughout the year which indicates limited outdoor water use. The second half of 2024 including a major peak in November is a result of increasing water loss in the distribution system.

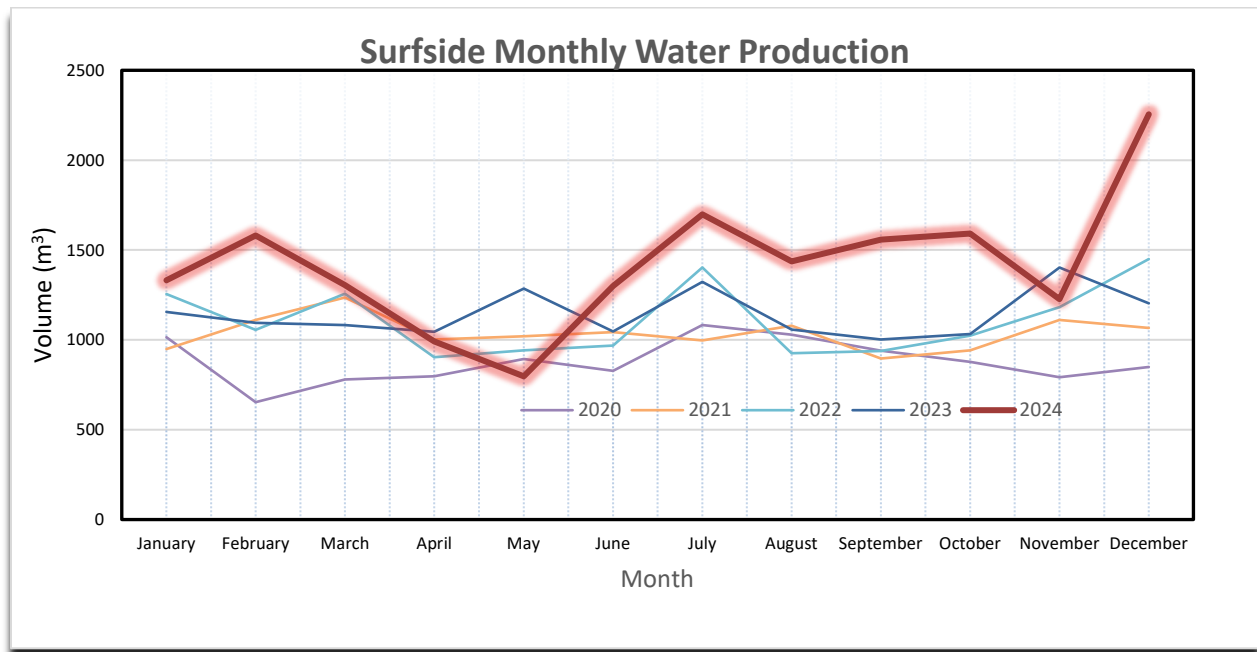


Figure 4: Surfside Park Estates Water Service Monthly Water Production

Drinking Water Quality

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

In general, the water system performed well in 2024 and supplied drinking water of good quality to its customers. None of the raw water samples tested positive for *E. coli* or total coliform bacteria in 2024. Also, all treated water samples tested negative for *E. coli* or total coliform bacteria in 2024. The raw water exhibited consistently high arsenic concentrations as well as elevated iron and manganese concentrations. A trend analysis confirmed that arsenic concentrations have slowly risen in Well #5 over the years. This, combined with exacerbating system leakage and high-water production, resulted in the arsenic filter media expiring more quickly and suddenly in 2024. On May 31, the system experienced an arsenic exceedance, and a water quality advisory was issued, which was resolved again on June 14. The system came close to a second exceedance in August but managed to avoid another advisory. To address the issue, CRD staff started testing weekly for arsenic levels and implemented a leak detection and repair program.

The data below provides a summary of the water quality characteristics in 2024:

Raw Water:

- Results from Well #5, the only water source, indicated that produced water contained no *E. coli* bacteria and no total coliform bacteria.
- The raw water continued to have naturally high concentrations of arsenic, iron and manganese. The arsenic concentration in the raw water ranged from 49.6 to 77.3 µg/L. That is slightly higher than in 2023. Manganese had a median concentration of 29.4 µg/L which is slightly lower than in 2023.
- The raw water turbidity was low with a median of 0.58 Nephelometric Turbidity Unit (NTU).
- The raw water was slightly hard (median hardness 27.1 mg/L (CaCO₃). Annual median pH was 9.0 which is much higher than historically. This could be due to inaccuracies with the pH probe.

Treated Water:

- The treated water was safe to drink with no *E. coli* or total coliform bacteria in any sample.
- The treated water turbidity was very low with a median of 0.15 NTU.
- The arsenic concentration after treatment was generally below the maximum allowable concentration (MAC) of 10 µg/L. The annual median arsenic concentration was 5.7 µg/L. Between May 31 and June 14, the water system was on an arsenic related water quality advisory due to an exceedance in the treated water leaving the treatment plant. After a filter media change, subsequent extensive system flushing, and testing confirmed safe levels of arsenic throughout the system, the advisory was rescinded. When a similar event was narrowly avoided in August, CRD staff started weekly testing for arsenic levels and commenced a leak detection and repair program. This will hopefully slow the filter media expiring and allow the operators to better assess the remaining lifespan of the filter media.
- In June and December, manganese and iron concentrations in the treated water slightly exceeded the aesthetic objective in the Health Canada guidelines. This is not typical for this system and indicates that the effectiveness of the iron and manganese filtration system may also have been affected by the system leakage induced high flows.
- The annual average levels of the disinfection by-product total trihalomethanes (TTHM) were well below the MAC. Haloacetic acids (HAA) were not tested in 2024. Typically, when THM concentrations are low, HAA are also low.
- The free chlorine residual concentrations ranged from 0.05 to 1.49 mg/L in the distribution system indicating good secondary disinfection in most parts of the system except for some dead-end sections with higher water age.

Table 1 and 2 below provide a summary of the 2024 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 by CRD Infrastructure & Water Services staff:

- Water treatment plant:
 - Well #5A pump electrical cable corrective maintenance.
 - Water Treatment Plant (WTP) extraction fan corrective maintenance.
 - WTP failed exterior lighting replaced.
 - Public Service Announcement (PSA) issued in May regarding elevated arsenic concentrations in the treated water system.
 - Multiple unbudgeted arsenic media replacements through 2024 due to high water loss.
 - Replacement of the water reservoir failed solar power battery system.
 - Corrective maintenance and repairs made on chemical feed pump .
 - Emergency callout due to hydro power outage in November and December. Standby generator was deployed due to the length of time the water treatment plant was without power.
- Significant leak detection efforts in the distribution system through 2024 including some testing requiring service disruptions.
- Water service line repair near Barque Road.
- Wooddale pressure regulating valve station - replacement of a failed isolation valve.
- Additional water sampling and water system flushing performed due to higher arsenic levels.

Capital Projects Update

The Capital Projects that were in progress or completed in 2024 include:

- System Review Project – A system review and tank replacement options assessment was completed in 2023 and in 2024 staff began reviewing options to fund these replacement works, including the alternative approval process (AAP) or petition process.

Financial Report

Please refer to the attached 2024 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. Debt servicing costs are interest and principal payments on long term debt. Other Expenses include all other costs to administer and operate the water system, including insurance, 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). In alignment with Local Government Act Section 374 (11), any deficit must be carried forward and included in next year's financial plan.

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

Table 1

Table 1: 2024 Summary of Raw Water Test Results, Surfside Water System										
PARAMETER		2024 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2014-2023 ANALYTICAL RESULTS			
Parameter	Units of	Annual	Samples	Range		≤ = Less than or equal to	Median	Samples	Range	
Name	Measure	Median	Analyzed	Minimum	Maximum				Analyzed	Minimum
ND means Not Detected by analytical method used										
Physical Parameters										
Hardness as CaCO ₃	mg/L	27.1	14	4.77	37.8	No Guideline Required	36.6	48	4.28	60.3
Turbidity	NTU	0.575	12	0.3	11		0.415	58	0.12	1.34
Water Temperature	deg C	11.2	16	9.6	12.2	15°C AO	6.8	202	5.2	21.6
pH	pH units	9.05	2	8.9	9.2	AO pH 7.0 -10.5	8.7	24.0	7.0	9.0
Total Organic Carbon	mg/L	0.535	4	0.48	0.69		0.69	29	0.44	4.89
Metals										
Aluminum	ug/L as Al	17.00	14	8.3	90.6	2900 MAC / 100 OG	13.7	48	7.2	65
Antimony	ug/L as Sb	< 0.5	14	< 0.5	< 2	6 MAC	< 0.5	48	< 0.5	< 2.5
Arsenic	ug/L as As	54.05	14	49.6	77.3	10 MAC	53.7	130	32.4	91.6
Barium	ug/L as Ba	46.85	14	19.9	56.5	1000 MAC	56.05	48	15.5	75.5
Beryllium	ug/L as Be	< 0.1	14	< 0.1	< 0.4		< 0.1	48	< 0.1	< 3
Bismuth	ug/L as Bi	< 1	14	< 1	< 4		< 1	45	< 1	< 5
Boron	ug/L as B	1820.00	14	1630	3260	5000 MAC	1740	48	846	2800
Cadmium	ug/L as Cd	< 0.01	14	< 0.01	< 0.04	7 MAC	< 0.01	48	< 0.01	0.135
Calcium	mg/L as Ca	8.88	14	1.73	12.5	No Guideline Required	11.95	48	1.54	19.6
Chromium	ug/L as Cr	< 1	14	< 1	< 4	50 MAC	< 1	48	< 1	21.4
Cobalt	ug/L as Co	< 0.2	14	< 0.2	< 0.8		< 0.2	48	< 0.2	30
Copper	ug/L as Cu	1.68	14	< 0.2	114	2000 MAC / ≤ 1000 AO	0.6	48	< 0.2	21.7
Iron	ug/L as Fe	33.50	14	17	1850	≤ 100 AO	25.2	47	< 10	155
Lead	ug/L as Pb	0.42	14	< 0.2	2.55	5 MAC	< 0.2	48	< 0.2	3.11
Lithium	ug/L as Li	65.00	14	60.4	84.6		64.2	29	50.4	83.8
Magnesium	mg/L as Mg	1.18	14	0.11	1.66	No Guideline Required	1.655	48	0.1	2.85
Manganese	ug/L as Mn	29.40	14	< 2	57.4	120 MAC / ≤ 20 AO	37.15	48	< 4	76.4
Molybdenum	ug/L as Mo	< 1	14	< 1	< 4		< 1	48	< 1	23
Nickel	ug/L as Ni	< 2	14	< 1	5.5		< 1	48	< 1	93
Potassium	mg/L as K	1.66	14	1.34	1.81		1.835	48	1.18	2.56
Selenium	ug/L as Se	< 0.2	14	< 0.1	0.74	50 MAC	< 0.1	48	< 0.1	1.24
Silicon	ug/L as Si	7025.00	14	5870	8190		7205	48	5770	10300
Silver	ug/L as Ag	< 0.02	14	< 0.02	< 0.08	No Guideline Required	< 0.02	48	< 0.02	< 10
Sodium	mg/L as Na	130.50	14	121	188	≤ 200 AO	124.5	48	13.1	182
Strontium	ug/L as Sr	196.50	14	45.9	265	7000 MAC	254.5	48	0.312	410
Sulfur	mg/L as S	17.55	14	15.4	27.9		17.6	45	11.7	28.7
Thallium	ug/L as Tl	0.01	14	< 0.01	< 0.04		< 0.01	45	< 0.01	< 0.05
Tin	ug/L as Sn	< 5	14	< 5	< 20		< 5	48	< 5	< 25
Titanium	ug/L as Ti	< 5	14	< 5	< 20		< 5	48	< 5	< 25
Uranium	ug/L as U	< 0.1	14	< 0.1	< 0.4	20 MAC	< 0.1	45	< 0.1	< 0.5
Vanadium	ug/L as V	< 5	14	< 5	< 20		< 5	48	< 5	< 25
Zinc	ug/L as Zn	< 10	14	< 5	23.8	≤ 5000 AO	< 5	48	< 5	185
Zirconium	ug/L as Zn	< 0.1	14	< 0.1	< 0.4		< 0.1	45	< 0.1	< 0.5
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	12	< 1	< 1		< 1	120	0	< 10
<i>E. coli</i>	CFU/100 mL	< 1	12	< 1	< 1		< 1	120	< 1	< 10
Heterotrophic bacteria, 7 day	CFU/mL	Not analyzed in 2024					0	1	0	0
Parasites										
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2015				Zero detection desirable	< 1	2	< 1	< 1
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2015				Zero detection desirable	< 1	2	< 1	< 1

Table 2

Table 2: 2024 Summary of Treated Water Test Results, Surfside Water System										
PARAMETER		2024 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2014-2023 ANALYTICAL RESULTS			
Parameter	Units of Measure	Annual	Samples	Range		≤ = Less than or equal to		Samples	Range	
Name	Measure	Median	Analyzed	Minimum	Maximum		Median	Analyzed	Minimum	Maximum
ND means Not Detected by analytical method used										
Physical Parameters										
Hardness	mg/L as CaCO3	25.3	45	6.43	36.4	AO pH 7.0 -10.5	33.8	78	19	55.9
pH	pH units	7.8	3	6.8	9.2		8.5	26	7	8.9
Turbidity	NTU	0.15	12	0.1	0.65		0.15	118	0	1.8
Total Organic Carbon	mg/L	0.585	8	0.38	0.65	15°C AO	< 0.5	57	< 0.2	1.51
Water Temperature	deg C	11.9	178	3.6	20.1		7.75	1664	0.3	24.5
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	61	< 1	< 1	0 MAC	< 1	433	0	1
E. coli	CFU/100 mL	< 1	61	< 1	< 1	0 MAC	< 1	433	<1	< 1
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2024				No Guideline Required	< 10	44	<1	940
Disinfectants										
Disinfectants										
Chlorine, Free Residual	mg/L as Cl2	0.58	174	0.05	1.49		0.56	1676	0.04	2.06
Chlorine, Total Residual	mg/L as Cl2	0.65	3	0.39	1.09		0.59	1036	0.12	1.87
Disinfection By-Products										
Disinfection Byproducts										
Bromodichloromethane	ug/L	3.4	8	2.1	6.2	100 MAC	2.5	10	1.3	5.7
Bromoform	ug/L	5.0	8	2.6	18.0		5.8	59	< 0.1	15
Chloroform	ug/L	1.6	8	1.1	3.1		1.85	10	1.1	4.6
Chlorodibromomethane	ug/L	6.7	8	3.3	11.0		5.05	10	1.8	12
Total Trihalomethanes	ug/L	17.5	8	9.9	34.0		20	58	5.7	50
Haloacetic Acids (HAAs)										
HAA5		ug/L	Not tested in 2023			80 MAC	< 0.1	2	< 0.1	< 0.1
Metals										
Aluminum	ug/L as Al	9.9	45	< 3	42.2	2900 MAC / 100 OG	5	77	< 3	59
Antimony	ug/L as Sb	< 1	45	< 0.5	< 2	6 MAC	< 0.5	77	< 0.05	< 2.5
Arsenic	ug/L as As	5.7	45	< 0.2	21	10 MAC	4.455	172	< 0.09	31
Barium	ug/L as Ba	34.6	45	4	50.8	1000 MAC	44.6	77	3.2	69.9
Beryllium	ug/L as Be	< 0.2	45	< 0.1	< 0.4		< 0.1	77	< 0.1	< 3
Bismuth	ug/L as Bi	< 2	45	< 1	< 4		< 1	75	< 1	< 5
Boron	ug/L as B	1900	45	1460	2220	5000 MAC	1800	77	1200	2240
Cadmium	ug/L as Cd	< 0.02	45	< 0.01	< 0.04	7 MAC	< 0.01	77	< 0.01	< 0.1
Calcium	mg/L as Ca	8.11	45	2.4	11.7	No Guideline Required	10.3	78	5.91	18
Chromium	ug/L as Cr	< 2	45	< 1	< 4	50 MAC	< 1	77	< 1	< 10
Cobalt	ug/L as Co	< 0.4	45	< 0.2	< 0.8		< 0.2	77	< 0.2	24
Copper	ug/L as Cu	2.25	45	0.44	95.3	2000 MAC / ≤ 1000 AO	3.2	77	0.91	21.8
Iron	ug/L as Fe	13	45	< 5	185	≤ 100 AO	6.2	77	< 5	104
Lead	ug/L as Pb	< 0.4	45	< 0.2	4.95	5 MAC	< 0.4	77	< 0.2	1.55
Lithium	ug/L as Li	65.1	45	53.3	79.8		61.7	53	54.3	71.1
Magnesium	mg/L as Mg	1.27	45	0.104	1.79	No Guideline Required	1.855	78	1.04	3.05
Manganese	ug/L as Mn	< 2	45	< 1	27.8	120 MAC / ≤ 20 AO	< 1	77	< 1	31
Molybdenum	ug/L as Mo	< 2	45	< 1	< 4		< 1	77	< 1	< 20
Nickel	ug/L as Ni	< 2	45	< 1	13.4		< 1	77	< 1	< 50
Potassium	mg/L as K	1.64	45	1.37	1.85		1.79	78	1.47	2.35
Selenium	ug/L as Se	< 0.2	45	< 0.1	< 0.4	50 MAC	< 0.1	77	< 0.1	< 0.5
Silicon	ug/L as Si	6560	45	330	8160		7130	77	2350	8950
Silver	ug/L as Ag	< 0.04	45	< 0.02	< 0.08	No Guideline Required	< 0.02	77	< 0.02	< 10
Sodium	mg/L as Na	134	45	110	153	≤ 200 AO	127	78	102	147
Strontium	ug/L as Sr	193	45	15.2	294	7000 MAC	285	77	171	399
Sulphur	mg/L as S	18.5	45	14.5	22.4		17.7	76	13.8	22.4
Thallium	ug/L as Tl	< 0.02	45	< 0.01	< 0.04		< 0.01	75	< 0.01	< 0.05
Tin	ug/L as Sn	< 10	45	< 5	< 20		< 5	77	< 5	< 25
Titanium	ug/L as Ti	< 10	45	< 5	< 20		< 5	77	< 5	< 25
Uranium	ug/L as U	< 0.2	45	< 0.1	< 0.4	20 MAC	< 0.1	75	< 0.1	< 0.5
Vanadium	ug/L as V	< 10	45	< 5	< 20		< 5	77	< 5	< 25
Zinc	ug/L as Zn	< 10	45	< 5	31	≤ 5000 AO	7.8	77	< 5	167
Zirconium	ug/L	< 0.2	45	< 0.1	0.41		< 0.1	75	< 0.1	< 0.5