

Cedars of Tuam Water Service

2022 Annual Report



INTRODUCTION

This report provides a summary of the Cedars of Tuam Water Service for 2022. 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 Cedars of Tuam Water Utility is a rural residential community located on Salt Spring Island. The service was created in 1970 and became a CRD service in 2002. The Cedars of Tuam Water Utility (Figure 1) is comprised of 16 parcels of land 17 single-family equivalent connections.



Figure 1: Cedars of Tuam Water Service

The Cedars of Tuam water system is primarily comprised of:

- One ground water source well
- a water treatment plant (WTP) that has a vortex sand separator and provides disinfection using sodium hypochlorite;
- 1 water reservoir – 46 m³ (10,000 lg);

- 650 meters of water distribution pipe;
- standpipes and gate valves;
- water service connections complete with water meters.

WATER PRODUCTION AND DEMAND

Referring to Figure 2, the amount of water extracted (water production) from the groundwater in 2022 is unknown. This is the result of inaccurate water meter readings due to sand intrusion of the groundwater source. Sand builds up in the meter creating a false under reading. Water demand (customer water billing) for the service totalled 1,362 m³ of water; a 2% decrease from the previous year and a 2% decrease from the 5-year rolling average.

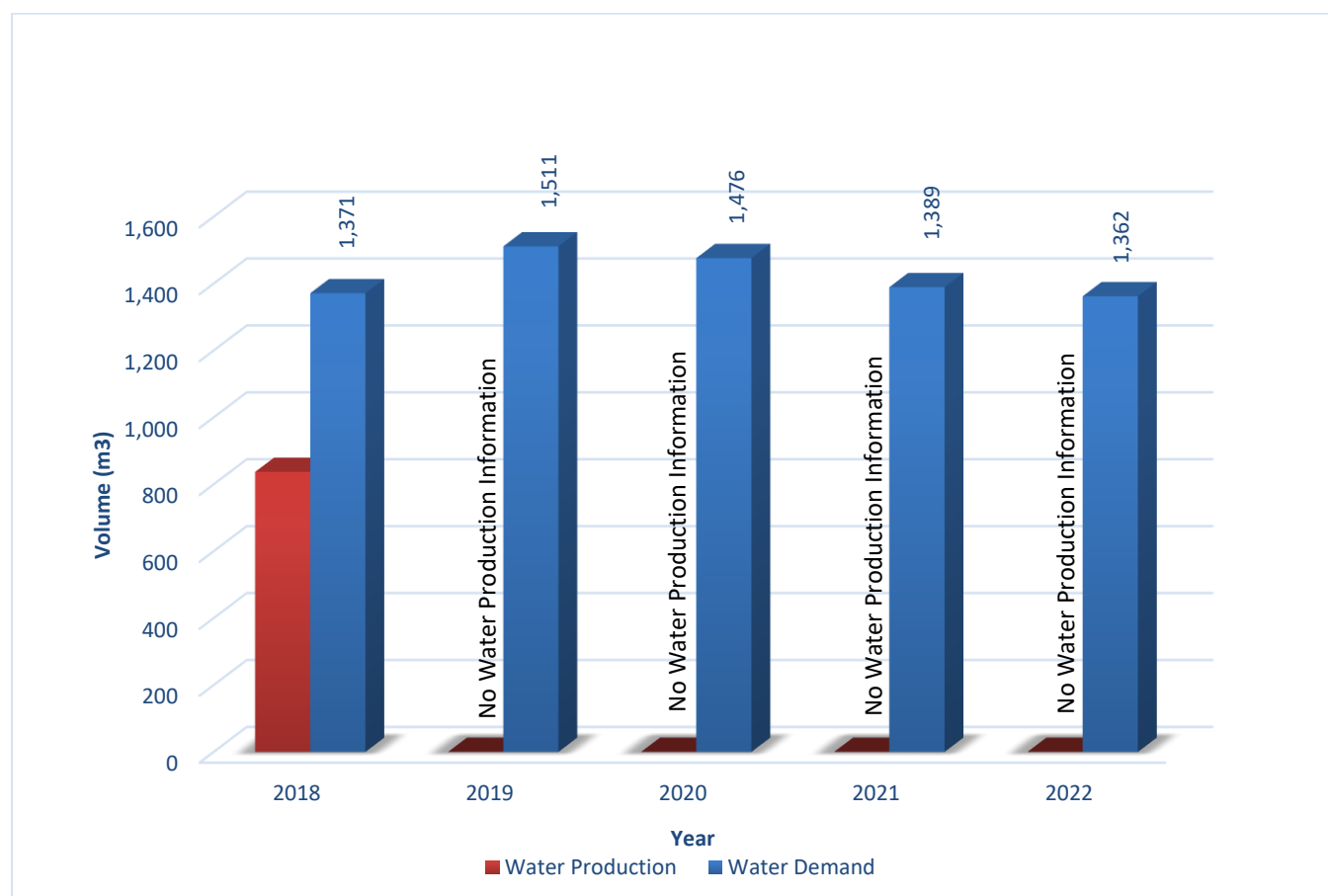


Figure 2: Cedars of Tuam Water Service Annual Water Production and Demand

The Cedars of Tuam 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 standpipe usage, distribution system maintenance and process water for the treatment plant. For 2022, the non-revenue water cannot be calculated due to the erroneous raw water meter production information. This inaccurate water production information will need to be resolved by either replacing the water meter with a different technology that is not influenced by sand or grit in the raw water source or investigating and eliminating the sand intrusion into the well. Capital improvements are planned.

WATER QUALITY

The analytical results (biological, chemical and physical parameters) of water samples collected in 2022 from the Cedars of Tuam Water System indicated that the drinking water was safe to drink and mostly within Guidelines for Canadian Drinking Water Quality (GCDWQ) limits, including disinfection by-products. Only the iron concentrations slightly exceeded the aesthetic limit for a short period in the fall. The treated water turbidity levels were consistently low and well below 1 Nephelometric Turbidity Units (NTU) which was a significant improvement over previous years. No indicator bacteria were found in the raw or treated water in 2022.

Typical Cedars of Tuam Water System drinking water quality characteristics for 2022 are summarized as follows:

- Source water from the well was free of *E.coli* and total coliform bacteria throughout the year.
- The raw water turbidity was almost consistently below 1 NTU throughout the year. Only on November 9 did the raw water sample record a turbidity of 2.0 NTU. By December 6, the raw water turbidity had dropped to 0.5 NTU again.
- Manganese concentrations were low throughout the year as usual, but iron concentrations increased in the fall. On November 9, the iron concentrations exceeded the aesthetic objective of 300 µg/L (test result: 305 µg/L). This increase in iron concentration in the late summer/fall has been observed in previous years and seems to coincide with aquifer recharge after the first post-summer rains.
- Treated water was bacteriologically safe to drink all year in 2022, no indicator bacteria were found in any sample.
- The treated water turbidity leaving the treatment plant was consistently below 1 NTU during the year. This was a significant improvement over previous years.
- Disinfection by-product concentrations were well below the GCDWQ limits. Total organic carbon concentrations were very low throughout 2022.
- The median annual free chlorine concentration in the system was an acceptable 0.34 mg/L.

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

The following is a summary of the major operational issues that were addressed by during the 2022 reporting period:

- Replacement of water treatment plant/pump house failed space heaters
- Replacement of failed well pump equipment
- Replacement of water treatment plant/pump house lighting

CAPITAL IMPROVEMENTS

The following is a summary of the major capital improvements including year-ending spending for 2022:

Safe Work Procedures (CE.699.4502): The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks. On-going as capital improvements necessitate.

Project	Spending
Budget	\$3,000
Contract	(\$558)
Supplies/Materials	(\$102)
Balance Remaining	\$2,340

Water Systems Upgrade (CE.792.1601): The work scope includes replacing a chlorinator, level transducer and flow meter.

Project	Spending
Budget	\$36,000
Project Management	(\$573)
Installation	(\$2,738)
Supplies - Instrumentation	(\$2,078)
Balance Remaining	\$30,611

Public Engagement for Future Projects (CE.802.8301): Inform and engage public within service area on upcoming projects that will require borrowing for funding.

Project	Spending
Budget	\$5,000
Project Management	(\$0)
Balance Remaining	\$5,000

2022 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), water sales (Sale-Water), interest on savings (Interest earnings), transfers from the Operating Reserve Fund, 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). In alignment with Local Government Act Section 374 (11), any deficit must be carried forward and included in the next year's financial plan.

WATER SYSTEM PROBLEMS - WHO TO CALL:

To report any event or to leave a message regarding the Cedars of Tuam 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.

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Attachment: [2022 Statement of Operations and Reserve Balances](#)

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

Table 1: 2022 Summary of Raw Water Test Results, Cedars of Tuam Water System										
PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012 - 2021 ANALYTICAL RESULTS			
Parameter	Units of	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/Biological										
Hardness as CaCO ₃	mg/L	62.05	4	60.5	76.8	No Guideline Required	62.2	23	43.8	89.8
Turbidity	NTU	0.5	11	< 0.14	2	7.0-10.5 AO	0.35	53	< 0.14	28
pH	pH Units	6.95	2	6.8	7.1		6.785	22	6.3	7.4
Carbon, Total Organic	mg/L	0.535	2	0.4	0.67		0.815	12	0.5	1.09
Water Temperature	Degrees C	11	9	6.5	16	≤ 15 AO	12	62	1.47	16
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	11	< 1	< 1		< 1	138	< 1	600
<i>E. coli</i>	CFU/100 mL	< 1	11	< 1	< 1		< 1	137	< 1	< 1
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2022					200	41	< 10	3630
Parasites						No MAC Established				
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2014				Zero detection desirable	<1	5	<1	3630
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2014				Zero detection desirable	<1	5	<1	3631
Metals										
Aluminum	ug/L as Al	7.7	4	< 3	12.1	2900 MAC / 100 OG	10.1	24	3.5	142
Antimony	ug/L as Sb	< 0.5	4	< 0.5	< 0.5	6 MAC	< 0.5	24	< 0.5	1.02
Arsenic	ug/L as As	< 0.1	4	< 0.1	< 0.1	10 MAC	< 0.1	24	< 0.1	< 0.5
Barium	ug/L as Ba	4.3	4	4.1	10.2	1000 MAC	5.25	24	4.2	11.8
Beryllium	ug/L as Be	< 0.1	4	< 0.1	< 0.1		< 0.1	24	< 0.1	< 3
Bismuth	ug/L as Bi	< 1	4	< 1	< 1		< 1	19	< 1	< 1
Boron	ug/L as B	98.5	4	83	260	5000 MAC	58.5	24	< 50	435
Cadmium	ug/L as Cd	< 0.01	4	< 0.01	< 0.01	5 MAC	< 0.01	24	< 0.01	< 0.1
Calcium	mg/L as Ca	19.2	4	18.5	25.9	No Guideline Required	19.35	24	13	29.9
Chromium	ug/L as Cr	< 1	4	< 1	< 1	50 MAC	< 1	24	< 1	< 10
Cobalt	ug/L as Co	< 0.2	4	< 0.2	0.29		< 0.2	24	< 0.2	< 20
Copper	ug/L as Cu	4.2	4	2.42	7.63	2000 MAC / ≤ 1000 AO	5.175	24	2.31	24
Iron	ug/L as Fe	39.2	4	33.3	305	≤ 300 AO	44.7	25	< 10	679
Lead	ug/L as Pb	0.265	4	< 0.2	0.45	5 MAC	0.285	24	< 0.2	1.9
Lithium	ug/L as Li	< 2	4	< 2	< 2		< 2	9	< 2	< 5
Magnesium	mg/L as Mg	3.315	4	2.96	3.77	No Guideline Required	3.655	24	2.75	5.07
Manganese	ug/L as Mn	< 1	4	< 1	14	120 MAC / ≤ 20 AO	2.05	24	< 1	10.9
Molybdenum	ug/L as Mo	< 1	4	< 1	< 1		< 1	24	< 1	< 20
Nickel	ug/L as Ni	< 1	4	< 1	< 1		< 1	24	< 1	< 50
Potassium	mg/L as K	0.8445	4	0.802	0.879		0.844	24	0.043	1.99
Selenium	ug/L as Se	< 0.1	4	< 0.1	< 0.1	50 MAC	< 0.1	24	< 0.1	< 0.5
Silicon	ug/L as Si	7045	4	6860	7930		6925	24	2240	10500
Silver	ug/L as Ag	< 0.02	4	< 0.02	< 0.02	No Guideline Required	< 0.02	24	< 0.02	< 10
Sodium	mg/L as Na	18.7	4	14.3	22.3	≤ 200 AO	17.25	24	12.9	22.8
Strontium	ug/L as Sr	75.55	4	70.7	77.9	7000 MAC	76.2	24	51	98.4
Sulfur	mg/L as S	< 3	4	< 3	< 3		< 3	19	< 3	< 3
Tin	ug/L as Sn	< 5	4	< 5	< 5		< 5	24	< 5	< 20
Titanium	ug/L as Ti	< 5	4	< 5	< 5		< 5	24	< 5	< 10
Thallium	ug/L as Tl	< 0.01	4	< 0.01	< 0.01		< 0.01	19	< 0.01	< 0.05
Uranium	ug/L as U	< 0.1	4	< 0.1	< 0.1	20 MAC	< 0.1	19	< 0.1	< 0.1
Vanadium	ug/L as V	< 5	4	< 5	< 5		< 5	24	< 5	< 10
Zinc	ug/L as Zn	5.25	4	< 5	6.9	≤ 5000 AO	8	24	4	177
Zirconium	ug/L as Zr	< 0.1	4	< 0.1	< 0.1		< 0.1	19	< 0.1	< 0.5

Table 2: 2022 Summary of Treated Water Test Results, Cedars of Tuam Water System										
PARAMETER		2022 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2012-2021 ANALYTICAL RESULTS			
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range		≤ = Less than or equal to	Median	Samples Analyzed	Range	
		Median	Analyzed	Minimum	Maximum				Minimum	Maximum
ND means Not Detected by analytical method used										
Physical Parameters										
Hardness	mg/L as CaCO3	67.7	4	61.5	71.3		75.55	14	69.7	91.8
pH	pH units	7.4	7	6.9	7.6	AO pH 7.0 -10.5	7	49	6.5	7.9
Turbidity	NTU	0.3	47	0.1	0.6		0.375	102	< 0.14	17
Total Organic Carbon	mg/L	0.495	2	0.33	0.66		0.72	17	< 0.3	3.99
Water Temperature	deg C	11	36	5	16	≤ 15 AO	11	224	5.3	20
Microbial Parameters										
Indicator Bacteria										
Coliform, Total	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	75	< 1	1
E. coli	CFU/100 mL	< 1	48	< 1	< 1	0 MAC	< 1	312	< 1	< 1
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2022				No Guideline Required	40	3	10	130
Disinfectants										
Disinfectants										
Chlorine, Free Residual	mg/L as Cl2	0.34	48	0.18	0.96		0.39	1301	0.1	2.4
Chlorine, Total Residual	mg/L as Cl2	0.505	10	0.37	0.68		0.49	1004	0	2.5
Disinfection By-Products										
Disinfection Byproducts										
Bromodichloromethane	ug/L	5.5	2	5.3	5.6		9.1	17	0.609	13
Bromoform	ug/L	< 1	2	< 1	1.0		< 1	17	< 0.1	2
Chloroform	ug/L	5.9	2	5.8	6.0		9.8	17	7	18
Chlorodibromomethane	ug/L	4.6	2	4.4	4.7		6.4	17	<0.1	27.8
Total Trihalomethanes	ug/L	16.5	2	16.0	17.0	100 MAC	22	17	8.73	49.9
Haloacetic Acids (HAA)										
HAA5	ug/L	Not tested in 2022				80 MAC	< 5	3	3.61	5.9
Metals										
Aluminum	ug/L as Al	5.35	4	4.2	7.3	2900 MAC / 100 OG	6.5	14	3.5	276
Antimony	ug/L as Sb	< 0.5	4	< 0.5	< 0.5	6 MAC	< 0.5	14	< 0.5	< 0.5
Arsenic	ug/L as As	< 0.1	4	< 0.1	0.13	10 MAC	0.105	14	< 0.1	0.62
Barium	ug/L as Ba	8.45	4	4.5	11.7	1000 MAC	10.6	14	5.4	15.8
Beryllium	ug/L as Be	< 0.1	4	< 0.1	< 0.1		< 0.1	14	< 0.1	< 0.1
Bismuth	ug/L as Bi	< 1	4	< 1	< 1		< 1	14	< 1	< 1
Boron	ug/L as B	96	4	72	120	5000 MAC	72	14	< 50	162
Cadmium	ug/L as Cd	< 0.01	4	< 0.01	< 0.01	5 MAC	< 0.01	14	< 0.01	0.011
Calcium	mg/L as Ca	21.85	4	18.5	25.9	No Guideline Required	26.9	14	20.4	35
Chromium	ug/L as Cr	< 1	4	< 1	1.8	50 MAC	1.1	14	< 1	2.7
Cobalt	ug/L as Co	< 0.2	4	< 0.2	0.67		< 0.2	14	< 0.2	0.35
Copper	ug/L as Cu	4.29	4	2.38	34.9	2000 MAC / ≤ 1000 AO	7.07	14	1.53	25.1
Iron	ug/L as Fe	22.85	4	20.4	33.7	≤ 300 AO	57.3	14	21.1	2440
Lead	ug/L as Pb	0.25	4	< 0.2	0.8	5 MAC	0.345	14	< 0.2	5.76
Lithium	ug/L as Li	< 2	4	< 2	< 2		< 2	5	< 2	< 2
Magnesium	mg/L as Mg	3.15	4	1.48	3.96	No Guideline Required	2.3	14	1.04	4.69
Manganese	ug/L as Mn	< 1	4	< 1	1.1	120 MAC / ≤ 20 AO	1.35	14	< 1	73
Molybdenum	ug/L as Mo	< 1	4	< 1	< 1		< 1	14	< 1	< 1
Nickel	ug/L as Ni	< 1	4	< 1	< 1		< 1	14	< 1	1.8
Potassium	mg/L as K	0.7935	4	0.765	0.895		0.8425	14	0.705	0.952
Selenium	ug/L as Se	< 0.1	4	< 0.1	< 0.1	50 MAC	< 0.1	14	< 0.1	< 0.1
Silicon	ug/L as Si	7225	4	6950	8140		7495	14	6170	8210
Silver	ug/L as Ag	< 0.02	4	< 0.02	< 0.02	No Guideline Required	< 0.02	14	< 0.02	< 0.02
Sodium	mg/L as Na	17.15	4	15.1	18.1	≤ 200 AO	18.5	14	16.5	20.7
Strontium	ug/L as Sr	77.9	4	72.6	78.3	7000 MAC	82.55	14	73.5	94.5
Sulphur	mg/L as S	< 3	4	< 3	< 3		< 3	14	< 3	< 3
Thallium	ug/L as Tl	< 0.01	4	< 0.01	< 0.01		< 0.01	14	< 0.01	< 0.01
Tin	ug/L as Sn	< 5	4	< 5	< 5		< 5	14	< 5	< 5
Titanium	ug/L as Ti	< 5	4	< 5	< 5		< 5	14	< 5	16
Uranium	ug/L as U	< 0.1	4	< 0.1	< 0.1	20 MAC	< 0.1	14	< 0.1	0.1
Vanadium	ug/L as V	< 5	4	< 5	< 5		< 5	14	< 5	6.4
Zinc	ug/L as Zn	10.9	4	< 5	25.4	≤ 5000 AO	10.3	14	5.5	54.6
Zirconium	ug/L	< 0.1	4	< 0.1	< 0.1		< 0.1	14	< 0.1	0.26