Cedars of Tuam Water Service

2020 Annual Report

CCD | Drinking Water

INTRODUCTION

This report provides a summary of the Cedars of Tuam Water Service for 2020. 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 and 17 connection to the system.



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, unfortunately the amount of water extracted (water production) from the ground water in 2020 is unknown. This is the result of inaccurate water meter readings due to sand intrusion of the ground water source. Sand builds up in the meter creating a false under reading. Water demand (customer water billing) for the service totaled 1,476 m³ of water; a 2% decrease from the previous year and a 18% increase 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 2020, 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 in 2021 to address this issue.

WATER QUALITY

The analytical results (biological, chemical and physical parameters) of water samples collected in 2020from 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 turbidity in the raw and treated water periodically exceeded 1 NTU throughout the year. The well water improved since 2019 and was not subject to the severe sand intrusion that was noted in previous years. As a result of this improvement, the raw water turbidity levels were consistently low and well below 1 Nephelometric Turbidity Units (NTU). However, sand intrusion from previous years appears to have accumulated in the storage tank and contributed in 2020 to frequent high treated water turbidity levels. This water storage tank is scheduled to be drained and cleaned later in 2021. Indicator bacteria were non-detect or in very low concentrations in the raw water. As part of the capital project CE.670.5901 (see next section), the well will be thoroughly inspected and potentially rehabilitated or replaced with a new well. This will address the current risk of well failure leaving the utility without its only water source.

Typical Cedars of Tuam Water System drinking water quality characteristics for 2020 are summarized asfollows:

- Source water from the well was free of *E. coli* bacteria throughout the year and exhibited only low concentrations of total coliform bacteria on one occasion; December 8, 2020.
- The raw water turbidity was consistently below 1 NTU throughout the year. The highest raw water turbidity was 0.65 NTU which was much lower than in previous years.
- Manganese concentrations were low throughout the year as usual but iron concentrations increased in the late summer. The iron concentrations, however, did not exceed the aesthetic objective of 300 µg/L This increase in iron concentration in the late summer / fall has been observed in previous yearsand seems to coincide with aquifer recharge after the first post-summer rains.
- Treated water was bacteriologically safe to drink all year in 2020. One sample from the treated water in the distribution system tested positive for total coliform bacteria. An immediate resample tested negative and did not confirm an actual drinking water contamination.
- The treated water turbidity was generally over 1 NTU during the wet season. On October 20, the highest treated water turbidity of the year was recorded with 6.8 NTU. The location of this adverse result was at a standpipe at the end of the distribution system where particles and pipe sediments accumulate. Flushing usually exacerbated the problem as high flows would mobilize more particulate matter settled in the storage tank. This emphasizes the need for cleaning the storage tank.
- Disinfection by-product concentrations were well below the GCDWQ limits. Total organic carbon concentrations were very low throughout 2020.
- The median annual free chlorine concentration in the system was an acceptable 0.40 mg/L.

Table 1 and 2 below provide a summary of the 2020 raw and treated water test results. Water Quality data collected from this drinking water system can be reviewed on the CRD website:<u>https://www.crd.bc.ca/about/data/drinking-water-quality-reports/</u>

OPERATIONAL HIGHLIGHTS

The following is a summary of the major capital improvements including year ending spending for 2020: reporting period:

- Replace reservoir level transducer.
- Well pump troubleshooting efforts

CAPITAL IMPROVEMENTS

The following is a summary of the major capital improvements including year ending spending for 2020:

<u>Asset Management Plan (CE.091.4603)</u>: A prioritized list of infrastructure replacements, which will serve as the basis for future capital spending plans.

Project	Spending
Budget	\$11,300
Project Management	(\$3,189)
Contract	(\$7,445)
Project Closed Balance Returned to CWF	\$666

<u>Well Hook up (CE.670.5901)</u>: A summary of the design criteria, conceptual design and calculations, and regulatory guidelines applicable to the conceptual design of connecting a new well to the existing Cedars of Tuam Local Water Service. Includes a new water treatment facility, above-ground reservoir tank, pumping system, and associated piping.

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Project	Spending
Budget	\$10,500
Project Management	(\$267)
Supplies/Materials	(\$8,229)
Project Closed Balance Returned to CRF	\$2,004

<u>Safe Work Procedures (CE.699.4502)</u>: The work scope includes reviewing and developing safe work procedures for operational and maintenance tasks.

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

2020 FINANCIAL REPORT

Please refer to the attached Financial Report below. Revenue includes fixed user fees (User Charges), interest on savings (Interest Earnings), a transfer 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. 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.

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

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
	Glenn Harris, Ph.D., R.P.Bio., Senior Manager, Environmental Protection
	Rianna Lachance BCom CPA CA Senior Manager Financial Services
	Karla Campbell, BPA, Senior Manager, Salt Spring Island Electoral Area
Concurrence	Ted Robbins, BSc, C.Tech, General Manager, Integrated Water Services

Attachments:

Table 1: 2020 Summary of Raw Water Test Results, Cedars of Tuam Water System

Table 2: 2020 Summary of Treated Water Test Results, Cedars of Tuam Water System

Attachment 1: 2020 Financial Report

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

PARAMETER		20	20 ANALYT	ICAL RESUL	TS	CANADIAN GUIDELINES		2010 - 201	9 RESULTS
Parameter	Units of	Annual	Samples	Ra	nge	Less the second state		Samples	Range
Name	Measure	Median	Analyzed	Minimum	Maximum	\leq = Less than or equal to	Median	Analyzed	Minimum-Maximu
means Not Detected by analytical n	nethod used								
		Phv	sical Pa	rameters	/Biologi	cal			
Hardness as CaCO ₂	ma/L	67.65	4	61.4	76.8	No Guideline Required	62.9	18	43.8 - 89.8
Turbidity	NTU	0.30	11	0.25	0.65	no ouldonno noqui ou	0.70	29	0.17 - 28.0
Ha	pH Units	7.05	2	7.00	7.10	7.0-10.5 AO	6.63	15	6.30 - 7.06
Carbon. Total Organic	ma/L	0.88	3	0.52	1.00		0.86	7	0.50 - 1.09
Water Temperature	Degrees C	11.0	12	9.0	15.0	≤ 15 AO	11.0	11	8.0 - 16.0
			Microb	ial Paran	neters				
Indicator Bacter	ia								
Coliform, Total	CFU/100 mL	ND	12	ND	2		ND	133	ND - 600
E. coli	CFU/100 mL	ND	12	ND	0		ND	132	ND - 1
Hetero. Plate Count, 7 day	CFU/1 mL		Not teste	ed in 2020			200	41	ND - 3630
Parasites						No MAC Established			
Cryptosporidium, Total oocysts	oocysts/100 L		Last teste	ed in 2014		Zero detection desirable	0	7	0
Giardia, Total cysts	cysts/100 L		Last teste	ed in 2014	1	Zero detection desirable	0	7	0
				Metals					
Aluminum	ug/L as Al	8.0	4	4.8	11.6	2900 MAC / 100 OG	15.8	19	ND - 166
Antimony	ug/L as Sb	ND	4	ND	0.0	6 MAC	ND	19	ND - 1.02
Arsenic	ug/L as As	ND	4	ND	0.0	10 MAC	ND	19	ND - 0.0
Barium	ug/L as Ba	4.80	4	4.30	6.20	1000 MAC	5.00	19	ND - 11.8
Beryllium	ug/L as Be	ND	4	ND	0.0		ND	19	ND - 0.0
Bismuth	ug/L as Bi	ND	4	ND	0.0		ND	11	ND - 0.0
Boron	ug/L as B	58.5	4	56.0	83.0	5000 MAC	ND	19	ND - 116.0
Cadmium	ug/L as Cd	ND	4	ND	0.0	5 MAC	ND	19	ND - 0.01
Calcium	mg/L as Ca	20.75	4	18.6	23.3	No Guideline Required	19.3	19	13.0 - 29.9
Chromium	ug/L as Cr	ND	4	ND	0.0	50 MAC	ND	19	ND - 0.0
Cobalt	ug/L as Co	ND	4	ND	0.0		ND	19	ND - 0.0
Copper	ug/L as Cu	2.60	4	2.31	3.44	2000 MAC / ≤ 1000 AO	5.40	19	ND - 45.0
Iron	ug/L as Fe	39.55	4	31.5	113.0	≤ 300 AO	56.0	20	ND - 374
Lead	ug/L as Pb	ND	4	ND	0.0	5 MAC	ND	19	ND - 1.90
Lithium	ug/L as Li	ND	1	ND	0.0		ND	4	ND - 0.0
Magnesium	mg/L as Mg	3.92	4	3.44	4.50	No Guideline Required	3.74	19	2.75 - 5.70
Manganese	ug/L as Mn	1.05	4	ND	2.10	120 MAC / ≤ 20 AO	2.00	19	ND - 8.00
Molybdenum	ug/L as Mo	ND	4	ND	0.0		ND	19	ND - 0.0
Nickel	ug/L as Ni	ND	4	ND	0.0		ND	19	ND - 0.0
Potassium	mg/L as K	0.88	4	0.87	0.94		0.79	19	0.04 - 2.59
Selenium	ug/L as Se	ND	4	ND	0.0	50 MAC	ND	19	ND - 0.11
Silicon	ug/L as Si	6925	4	6630	7320		6810	19	ND - 10500
Silver	ug/L as Ag	ND	4	ND	0.0	No Guideline Required	ND	19	ND - 0.0
Sodium	mg/L as Na	16.7	4	15.6	19.8	≤ 200 AO	16.9	19	12.9 - 22.8
Strontium	ug/L as Sr	80.35	4	69.7	98.4	7000 MAC	75.9	19	ND - 92.1
Sultur	mg/L as S	ND	4	ND	0.0		ND	11	ND - 0.0
Tin	ug/L as Sn	ND	4	ND	0.0		ND	19	ND - 0.0
Titanium	ug/L as Ti	ND	4	ND	0.0		ND	19	ND - 8.70
Thallium	ug/L as TI	ND	4	ND	0.0	001	ND	11	ND - 0.0
Uranium	ug/L as U	ND	4	ND	0.0	20 MAC	ND	11	ND - ND
Vanadium	ug/L as V	ND	4	ND	0.0		ND	19	ND - 0.0
∠inc	ug/L as Zn	5.95	4	ND	7.90	≤ 5000 AO	13.9	19	ND - 177
Zirconium	ug/Las Zr	ND	4	ND	0.0		ND	11	ND - 0.0

Table 2: 2020 Summary of T	reated Water To	<u>est Resul</u> ts	s, Cedars o	of Tuam W	later Syste	em			
PARAMETER	2020 AN	IALYTICAL F	RESULTS			CANADIAN GUIDELINES		2010-2019	RESULTS
Parameter	Units of	Annual	Samples	Rai	nge			Samples	Range
Name	Measure	Median	Analyzed	Minimum	Maximum	\leq = Less than or equal to	Median	Analyzed	MinMax.
ND means Not Detected by analytica	l method used								
Physical Parameters									
Hardness	mg/Las CaCO3	79.75	4	69.7	91.8		72.6	7	497-908
Hardhese	nH units	7.1	7	7	7.3	AO pH 7.0 -10.5	67	13	6.50 - 7.02
Turbidity	NTU	0.43	30	0.15	6.8		0.83	86	0.20 - 17.0
Total Organic Carbon	ma/L	ND	3	ND	0.56		0.75	13	ND - 7.00
Water Temperature	deg C	11	40	6.5	16	< 15 AO	10.5	90	0.0 - 17.0
Microbial Parameters									
Indicator Pactoria									
		ND	44		F 4	0.040.0	0	250	0.6
	CFU/100 mL	ND	41			0 MAC	0	259	0-6
E. COII	CFU/100 mL	ND	41 Not too to		0	U IVIAC	70	260	10 120
Hetero. Flate Courit, 7 day	CF0/THL		NUL LESTE	u III 2020		No Guideline Required	70	2	10 - 130
Disinfostanta									
DISINTECTANTS									
Disinfectants									
Chlorine, Free Residual	mg/L as Cl2	0.4	53	0.2	1.14		0.42	1351	0.00 - 2.4
Chlorine, Total Residual	mg/L as Cl2	0.47	37	0.22	1.42		0.5	1355	0.02 - 2.5
			······			1		,	
Disinfection By-Produ	icts								
Disnfection Byproducts									
Bromodichloromethane	ug/L	6.3	3	4.9	8.6		7.4	13	0.61 - 13.0
Bromoform	ug/L	1.3	3	ND	2		0.5	13	ND - 1.82
Chloroform	ug/L	4.1	3	3.8	9.8		8.92	13	3.83 - 16.0
Chlorodibromomethane	ua/L	5.5	3	5.3	6.6		5.3	13	ND - 27.8
Total Trihalomethanes	ug/L	19	3	15	24	100 MAC	22.5	13	8.73 - 49.9
	0								
Metals									
Aluminum	الا عد المب	57	4	35	10.1	2000 MAC / 100 OC	93	7	ND - 276 0
Antimony	ug/L as Ai	5.7 ND	-	0.0	0	2900 WAC / 100 OG		7	ND 0.0
Anumony	ug/Las Sb	ND	4		0.15			7	ND - 0.0
Arsenic	ug/L as As	ND 10.0	4	ND	0.15	10 MAC			ND - 0.62
Barium	ug/L as Ba	10.2	4	9.50	10.80	1000 MAC	10.2	/	ND - 15.8
Beryllium	ug/L as Be	ND	4	ND	0.0		ND		ND - 0.0
Bismuth	ug/L as Bi	ND 77.5	4	ND	0.0	5000 MA 0	ND	6	ND - 0.0
Boron	ug/L as B	//.5	4	58.0	112.0	5000 MAC	ND	/	ND - 93.0
Cadmium	ug/L as Co	ND 00.05	4	ND	0.01	5 MAC	ND	/	ND - 0.0
Calcium	mg/L as Ca	28.25	4	24.1	35.0	No Guideline Required	27.3	/	14.4 - 33.8
Chromium	ug/L as Cr	1.05	4	ND	1.70	50 MAC	1.10	/	ND - 2.00
Cobalt	ug/L as Co	ND	4	ND	0.0		ND	7	ND - 0.35
Copper	ug/L as Cu	5.2	4	1.53	16.5	2000 MAC / ≤ 1000 AO	7.08	7	ND - 25.1
Iron	ug/L as Fe	45	4	21.1	86.9	≤ 300 AO	67.5	7	32.8 - 2440.0
Lead	ug/L as Pb	0.5	4	0.24	2.33	5 MAC	0.32	7	ND - 5.76
Lithium	ug/L as Li	ND	1	ND	0.0			_	ND - 0.0
Magnesium	mg/L as Mg	2.24	4	1.05	2.31	No Guideline Required	2.47	7	1.04 - 4.69
Manganese	ug/L as Mn	ND	4	ND	2.90	120 MAC / ≤ 20 AO	1.60	7	ND - 73.0
Molybdenum	ug/L as Mo	ND	4	ND	0.0		ND	7	ND - 0.0
Nickel	ug/L as Ni	ND	4	ND	0.0		ND	7	ND - 0.0
Potassium	mg/L as K	0.89	4	0.84	0.94		0.86	7	0.74 - 1.17
Selenium	ug/L as Se	ND	4	ND	0.0	50 MAC	ND	7	ND - 0.0
Silicon	ug/L as Si	7345	4	6610	7920		7,050.00	7	3690 - 8210
Silver	ug/L as Ag	ND	4	ND	0.0	No Guideline Required	ND	7	ND - 0.0
Sodium	mg/Las Na	17.6	4	16.5	18.4	≤ 200 AO	19.0	7	17.8 - 29.8
Strontium	ug/L as Sr	83.95	4	73.7	90.4	7000 MAC	82.4	7	61.0 - 94.5
Sulphur	mg/L as S	ND	4	ND	0.0		ND	6	ND - 0.0
Thallium	ug/L as TI	ND	4	ND	0.0		ND	7	ND - 0.0
Tin	ug/L as Sn	ND	4	ND	0.0		ND	7	ND - 0.0
Titanium	ug/L as Ti	ND	4	ND	0.0		ND	6	ND - 16.0
Uranium	ug/L as U	ND	4	ND	0.0	20 MAC	ND	6	ND - 0.0
Vanadium	ug/L as V	ND	4	ND	0.0		ND	7	ND - 16.0
Zinc	ug/L as Zn	17.8	4	12.1	54.6	≤ 5000 AO	8.4	7	1.00 - 10.5
		ND	4	ND	0.0		ND	6	

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CEDARS OF TUAM WATER Statement of Operations (Unaudited) For the Year Ended December 31, 2020

	2020	2019
Revenue		
User Charges	33,163	31,310
Sale - Water	2,144	2,142
Other revenue from own sources:		
Interest earnings	74	68
Transfer from Operating Reserve	2,000	-
Other revenue	69	114
Total Revenue	37,450	33,633
Expenses		
General government services	2,239	1,670
Contract for Services	102	56
CRD Labour and Operating costs	23,991	19,954
Other expenses	7,442	3,551
Total Expenses	33,774	25,231
Net revenue (expenses)	3,676	8,402
Transfers to own funds:		
Capital Reserve Fund	926	5,702
Operating Reserve Fund	2,750	2,700
Annual surplus/(deficit)	-	-
Accumulated surplus/(deficit), beginning of year		
Accumulated surplus/(deficit), end of year	\$ -	-

CEDARS OF TUAM WATER Statement of Reserve Balances (Unaudited) For the Year Ended December 31, 2020

	Capital Reserve		
	2020	2019	
Beginning Balance	13,155	6,562	
Transfer from Operating Budget	926	5,702	
Transfers from Completed Capital Projects	2,004	3,709	
Transfer to Capital Project	-	(3,000)	
Interest Income	283	182	
Ending Balance	16,367	13,155	

Operating Reserve		
2020	2019	
10,977	8,007	
2,750	2,700	
(2,000)	-	
111	271	
11,838	10,977	
	Operating R 2020 10,977 2,750 (2,000) 111 11,838	