

# Skana Water System

2020 Annual Report

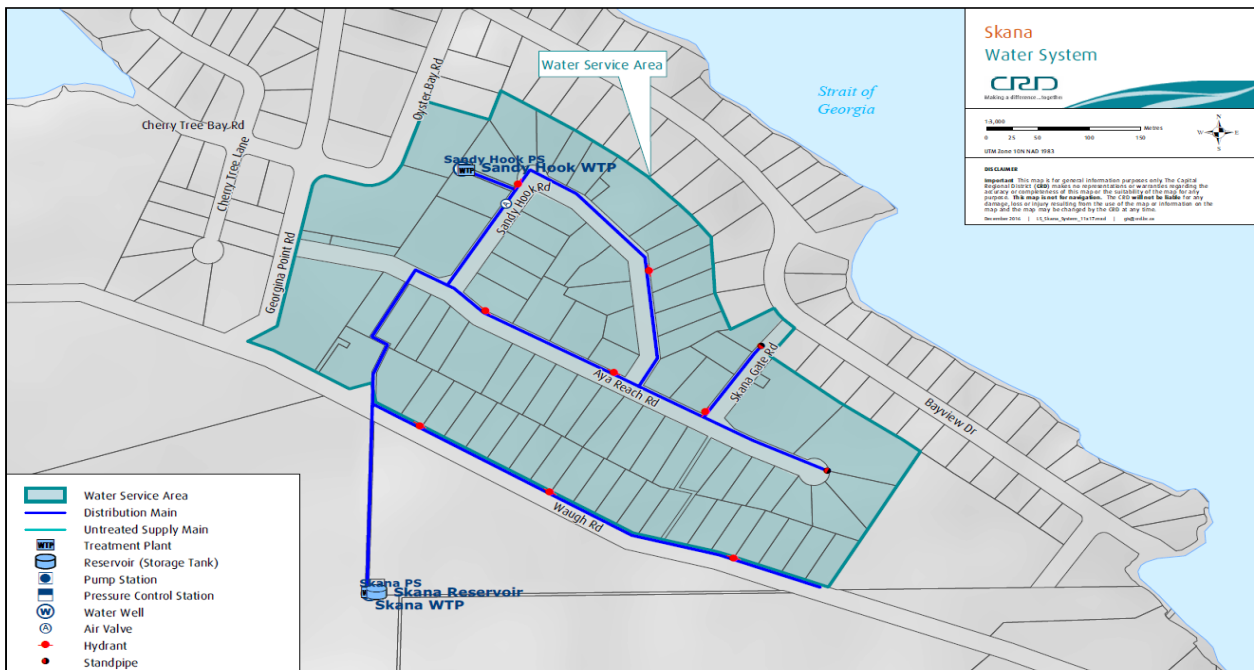
CRD | Drinking Water

## Introduction

This report provides a summary of the Skana Water Service for 2020 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 Skana is a rural residential development located on the north side of Mayne Island in the Southern Gulf Islands Electoral Area, originally serviced by a private water utility. In 2003, the service converted to the Capital Regional District (CRD). The Skana Water Service (Figure 1) is made up of 73 parcels encompassing a total area of approximately 19 hectares. Of the 73 parcels, 48 were customers of the water system in 2020.



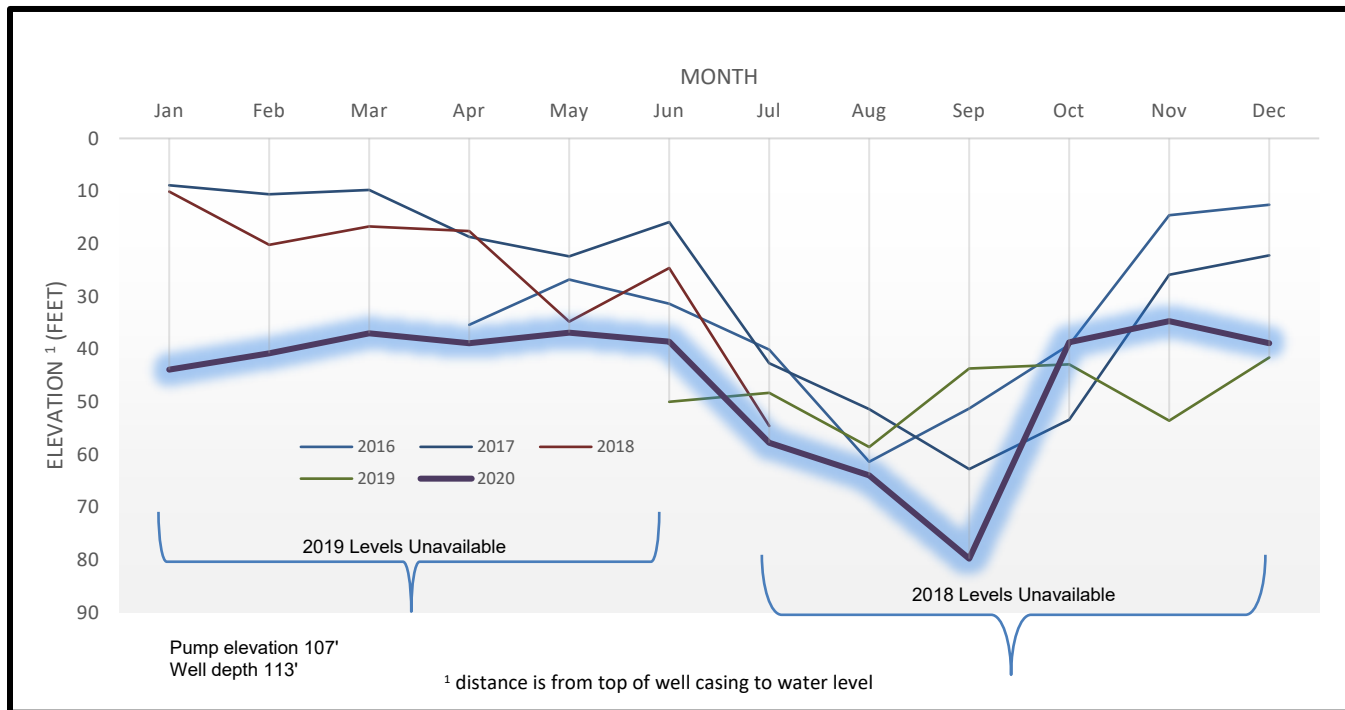
**Figure 1: Map of Skana Water System.**

The Skana water system is comprised of:

- Two ground water wells, related pumping and control equipment and buildings (Production Wells #8 and Well #13);
- Disinfection process equipment (ultraviolet light and chlorine at each well);
- Two steel storage tanks (total volume is 91 cubic metres);
- Distribution system (1,977 m of water mains); and,
- Other water system assets: 48 service connections and meters, 8 flushing hydrants, 3 flushing standpipes, 15 gate valves, 1 air release valve, SCADA system and auxiliary generator.

## Water Supply

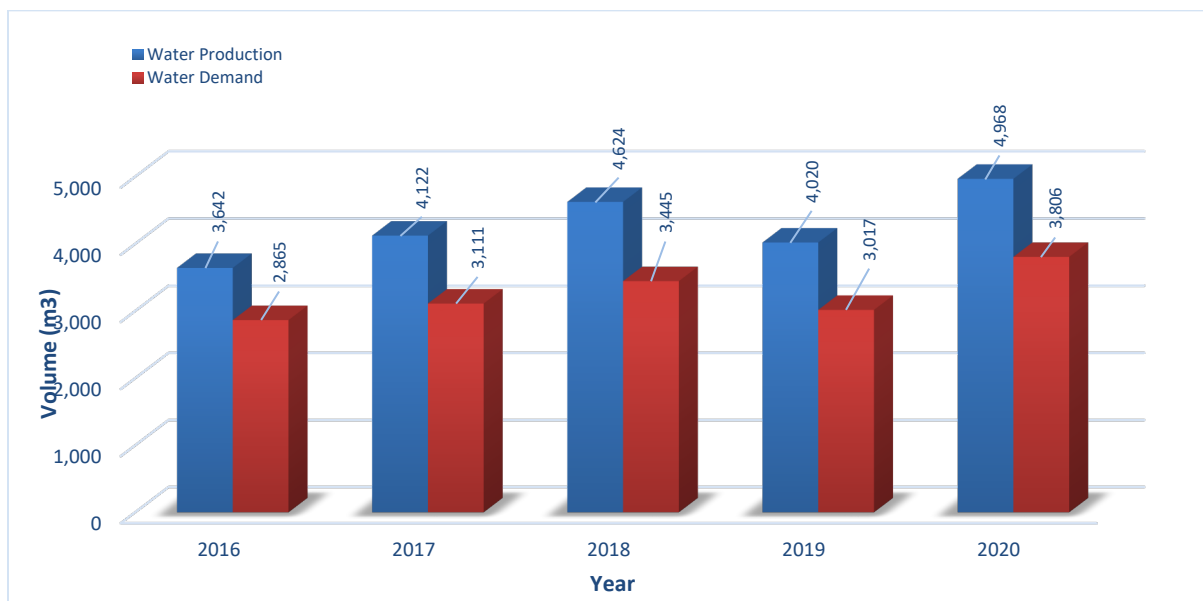
Ground water supply water levels are highlighted for 2020 in Figure 2. As of July 2018 until June of 2019 well water levels were not recorded due to well head accessibility issues. Resource water levels for the most part in 2020 were lower than historical readings during most of 2020.



**Figure 2: Skana Well #13 Ground Water Supply Monthly Water Level**

## Water Production and Demand

4,968 cubic meters (m<sup>3</sup>) of water was extracted (water production) from the ground water source (Well #13) in 2020; a 24% increase from the previous year and a 26% increase from the five year average (Figure 3). Water demand (customer water billing) for the service totaled 3,806 cubic meters of water; a 26% increase from the previous year and a 28% increase from the five year average. The increase in water production and water demand for the year is partially the result of water system leaks identified on a number of private properties.

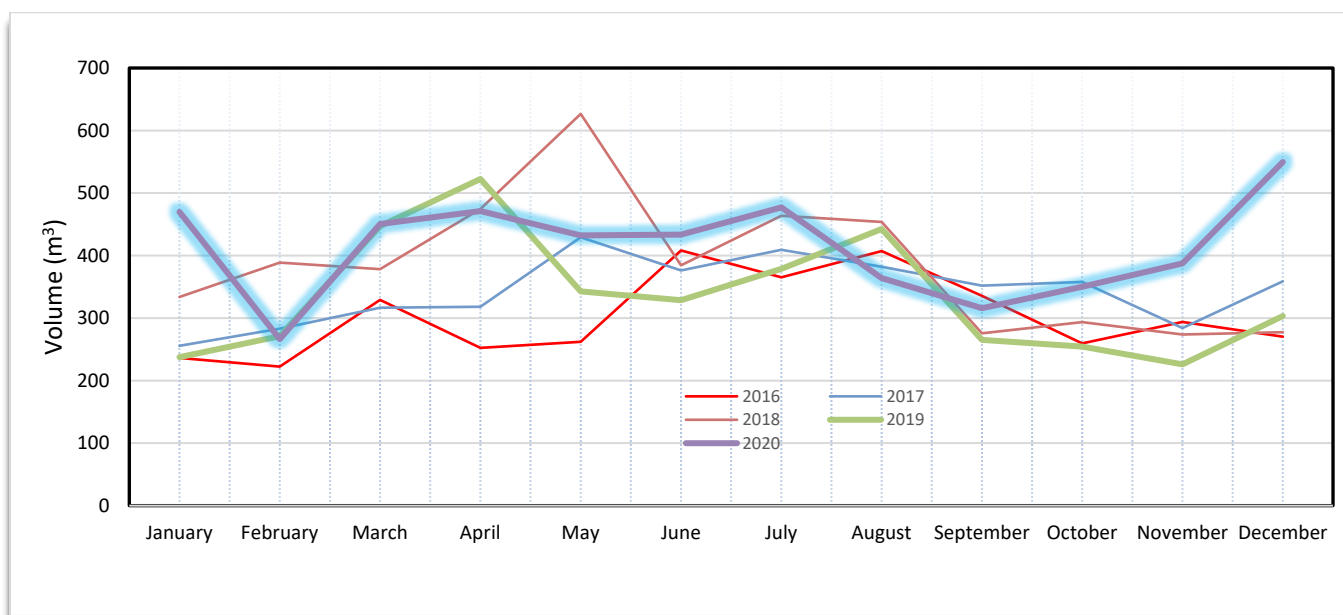


**Figure 3: Skana Water Service Annual Water Production and Demand.**

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 2020 non-revenue water (1,162 cubic meters) represents approximately 23% of the total water production for the service area. However, approximately 600 cubic meters is attributed to operational use resulting in a non-revenue water volume of approximately 11%. This is considered to be acceptable for a small water system.

Figure 4 below illustrates the monthly water production for 2020 along with the historical water production information. The monthly water production trends are typical for small water systems such as the Skana water system. However, monthly water production during November and December 2020 is noticeably higher compared to previous years. This is the result of an increased water demand compared to previous years and a water system leak that was identified and repaired during this period.



**Figure 4: Skana Water Service Monthly Water Production.**

### Drinking Water Quality

The water quality monitoring program at Skana was carried out in 2020 based on regulatory requirements and system specific risks. Samples were collected at regular frequencies from the raw water, at the treatment plant as well as from a number of sampling stations in the distribution system. The samples were shipped for various analyses to CRD's Water Quality Lab or to external laboratories for special analyses such as disinfection by-products or metals.

The water system performed well in 2020 and consistently supplied drinking water of good quality to its customers. The Skana source water (raw/untreated) from Well #13 was of good quality and typically free of *E.coli* bacteria and total coliform bacteria, except for a period in mid-October when the well water samples tested positive for total coliforms and *E.coli*. This indicates that Well#13 is still under surface water influence during the rainy season. Well upgrade works in previous years have much reduced this adverse water quality effect, but not completely eliminated it. The source water from Well#13 exhibited low turbidity, well under 1 NTU, throughout the entire year. As Well# 13 experienced difficulties meeting daily demands between August 1 and 5, Well# 8 was brought online for these few days until static levels in Well# 13 recovered. As typical for Well# 8, the raw water turbidity during this short period of time was elevated at 1.3 NTU with no consequences for the bacteriological safety of the treated water. The treated water supplied to the customers was of good quality and safe to drink. Total Trihalomethanes (TTHM) disinfection by-product concentrations in the distribution system were below the maximum acceptable

concentration (MAC) listed in the Guidelines for Canadian Drinking Water Quality. This is an improvement to 2019 when the TTHM concentrations exceeded the MAC. A monthly spot flush to achieve water turnover at the end of the distribution system was successful in mitigating this situation.

The data below provides a summary of the water quality characteristics in 2020:

#### Raw Water:

- Well #13, the primary source, supplied raw water free of indicator bacteria except for the month of October when total coliform and *E.coli* bacteria were detected.
- Two set of samples from Well #8 were collected August and September. No indicator bacteria were found but an elevated turbidity of 1.3 NTU, which is typical for this well.
- The median raw water turbidity was 0.38 NTU.
- The raw water was hard (hardness 88 mg/L CaCO<sub>3</sub>).
- The median pH was 7.0.
- The total organic carbon (TOC) concentration in the raw water ranged from 1.7 to 5.0 mg/L with the higher concentrations recorded in the fall and winter during rainy periods. Episodes of high TOC have the potential for high disinfection by-product concentrations.

#### Treated Water:

- The treated water was bacteriologically safe to drink with no confirmed *E. coli* or total coliform bacteria. One sample on July 13, 2020 tested positive for total coliform bacteria. Immediate resamples were negative and confirmed that no actual drinking water contamination occurred.
- The median treated water turbidity was 0.45 NTU.
- The annual average levels of the disinfection by-products TTHM were below the MAC of 100 µg/L at the 223 Skana Gate Road sampling location (95.8 µg/L) and also at the 537/539 Waugh Road sampling location (84.8 µg/L). This improvement over the 2019 TTHM results were due to monthly spot flushed at these locations to decrease the water age.
- The free chlorine residual concentrations ranged from 0.18 to 2.2 mg/L with a median of 0.67 mg/L in the distribution system indicating satisfactory secondary disinfection.

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:

<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 Integrated Water Services staff:

- Replace reservoir water level pressure transducer.
- Replace chemical feed pump.
- Corrective maintenance performed on the UV system (wiper motor replacement)
- Water system leak repair at 530 Sandy Hook Road.

### **Capital Project Updates**

The Capital Projects that were in progress or completed in 2020 included:

- Repair the north wall on pump house #13. The wall was rotten and required repairs as electrical and mechanical equipment are mounted to it necessitating repair to maintain operation of the station.

- A consultant was retained to carry out the Groundwater Study and Water Quality Study in 2019. The project was completed in May 2020 with recommendations incorporated into the 2021 5-year Capital Plan.

### Financial Report

Please refer to the attached 2020 Statement of Operations. Revenue includes parcel taxes (Transfers from Government), 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. 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.

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Attachment: 2020 Financial Summary (Statement of Operations)

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

**Table 1**

Table 1: 2020 Summary of Raw Water Test Results, Skana Water System									
PARAMETER		2020 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2010-2019 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>									
Hardness as CaCO <sub>3</sub>	mg/L	88	5	27.5	97.8	No Guideline Required	87.4	21	28.1 - 114.0
Turbidity	NTU	0.38	14	ND	1.3		0.38	35	ND- 4.56
Water Temperature	deg C	6.25	14	5.8	7.3		10.3	118	5.8 - 21.3
pH	pH units	7	3	7	7.0	AO pH 7.0 -10.5	7.29	25	6.70 - 8.12
Total Organic Carbon	mg/L	2.7	5	1.70	5.0		2.19	13	1.30 - 6.09
<b>Metals</b>									
Aluminum	ug/L as Al	18.80	5	5	110.0	2900 MAC / 100 OG	30.3	22	ND - 85.0
Antimony	ug/L as Sb	ND	5	ND	0.0	6 MAC	ND	22	ND - 0.00
Arsenic	ug/L as As	0.19	5	0.16	1.0	10 MAC	0.23	22	ND - 0.21
Barium	ug/L as Ba	2.30	5	1.3	2.5	1000 MAC	3.6	22	ND - 9.00
Beryllium	ug/L as Be	ND	5	ND	0.0		ND	22	ND - 0.0
Bismuth	ug/L as Bi	ND	5	ND	0.0		ND	11	ND - 0.0
Boron	ug/L as B	123	5	65	345.0	5000 MAC	ND	22	ND - 144
Cadmium	ug/L as Cd	ND	5	ND	0.0	5 MAC	ND	22	ND - 0.0
Calcium	mg/L as Ca	27.6	5	10.1	31.3	No Guideline Required	27.4	22	10.1 - 36.0
Chromium	ug/L as Cr	ND	5	ND	0.0	50 MAC	ND	22	ND - 0.0
Cobalt	ug/L as Co	ND	5	ND	0.0		ND	22	ND - 0.0
Copper	ug/L as Cu	2.8	5	1.48	15.1	2000 MAC / ≤ 1000 AO	4.3	22	ND - 39.0
Iron	ug/L as Fe	28.5	5	ND	67.0	≤ 300 AO	12.6	22	ND - 266
Lead	ug/L as Pb	ND	5	ND	0.3	5 MAC	0.25	11	ND - 0.93
Lithium	ug/L as Li	12.5	3	10.90	15.9		11.9	1	11.9 - 11.9
Magnesium	mg/L as Mg	4.57	5	0.57	4.8	No Guideline Required	4.78	22	0.67 - 6.36
Manganese	ug/L as Mn	5.1	5	1.1	18.8	120 MAC / ≤ 20 AO	3.4	22	ND - 48.6
Molybdenum	ug/L as Mo	ND	5	ND	0.0		ND	22	ND - 1.10
Nickel	ug/L as Ni	ND	5	ND	0.0		ND	22	ND - 0.0
Potassium	mg/L as K	0.23	5	0.16	0.3		0.26	22	0.09 - 0.82
Selenium	ug/L as Se	ND	5	ND	0.0	50 MAC	ND	22	ND - 1.07
Silicon	ug/L as Si	7880	5	7050	8770.0		7,960	22	ND - 12,100
Silver	ug/L as Ag	ND	5	ND	0.0	No Guideline Required	ND	22	ND - 0.0
Sodium	mg/L as Na	41.4	5	25.7	86.5	≤ 200 AO	45.9	22	25.7 - 84.3
Strontium	ug/L as Sr	80.7	5	54.4	83.4	7000 MAC	75.95	22	53.0 - 99.7
Sulfur	mg/L as S	8.5	5	3.20	10.5		9.9	11	8.5 - 12.6
Thallium	ug/L as Tl	ND	5	ND	0.0		ND	11	ND - 0.0
Tin	ug/L as Sn	ND	5	ND	0.0		ND	22	ND - 0.0
Titanium	ug/L as Ti	ND	5	ND	5.2		ND	22	ND - 0.0
Uranium	ug/L as U	ND	5	ND	0.1	20 MAC	0.11	11	ND - 0.18
Vanadium	ug/L as V	ND	5	ND	0.0		ND	22	ND - 0.0
Zinc	ug/L as Zn	ND	5	ND	7.8	≤ 5000 AO	7.7	22	ND - 198.0
Zirconium	ug/L as Zn	ND	5	ND	0.3		ND	11	ND - 0.28
<b>Microbial Parameters</b>									
<b>Indicator Bacteria</b>									
Coliform, Total	CFU/100 mL	ND	14	ND	43		0	140	0 - 200
<i>E. coli</i>	CFU/100 mL	ND	14	ND	11		0	144	0 - 2
Heterotrophic bacteria, 7 day	CFU/mL	Not analyzed in 2020							
<b>Parasites</b>									
<i>Cryptosporidium</i> , Total oocysts	oocysts/100 L	Last tested in 2015				Zero detection desirable	0	10	
<i>Giardia</i> , Total cysts	cysts/100 L	Last tested in 2015				Zero detection desirable	0	10	

**Table 2**

Table 2: 2020 Summary of Treated Water Test Results, Skana Water System									
PARAMETER		2020 ANALYTICAL RESULTS				CANADIAN GUIDELINES	2010-2019 RESULTS		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum Maximum		≤ = Less than or equal to	Median	Samples Analyzed	Range Min.-Max.
ND means Not Detected by analytical method used									
<b>Physical Parameters</b>									
Hardness	mg/L as CaCO3	83.6	9	26.8	94.8		89.15	22	59.4 - 107
pH	pH units	7	6	6.9	7.1	AO pH 7.0 - 10.5	7.7	2	7.70 - 7.70
Turbidity	NTU	0.45	27	0.15	3.4		0.51	84	ND - 10.7
Total Organic Carbon	mg/L	1.8	8	0.86	5		1.8	15	0.77 - 4.0
Water Temperature	deg C	6.4	110	5.6	7.5		10.2	1263	0.0 - 23.4
<b>Microbial Parameters</b>									
<b>Indicator Bacteria</b>									
Coliform, Total	CFU/100 mL	ND	52	ND	6	0 MAC	0	270	0 - 10
<i>E. coli</i>	CFU/100 mL	ND	52	ND	0	0 MAC	0	270	ND - 0
Hetero. Plate Count, 7 day	CFU/1 mL		Not tested in 2020			No Guideline Required	ND	45	ND - 15000
<b>Disinfectants</b>									
<b>Disinfectants</b>									
Chlorine, Free Residual	mg/L as Cl2	0.67	108	0.18	2.2		0.53	1351	0.16 - 4.80
Chlorine, Total Residual	mg/L as Cl2	0.66	87	0.23	1.7		0.57	1351	0.18 - 5.90
<b>Disinfection By-Products</b>									
<b>Disinfection Byproducts</b>									
Bromodichloromethane	ug/L	18.0	8	16.0	20.0		16.9	35	9.15 - 25.0
Bromoform	ug/L	ND	8	ND	0		ND	35	ND - 1.20
Chloroform	ug/L	42.5	8	23	170		54.8	35	10.6 - 150
Chlorodibromomethane	ug/L	4.3	8	1	8.7		2.85	36	0.77 - 73.8
Total Trihalomethanes	ug/L	65	8	47	190	100 MAC	73.8	35	23.1 - 170
<b>Metals</b>									
Aluminum	ug/L as Al	13.2	9	3.1	121	2900 MAC / 100 OG	26.65	22	4.4 - 81.1
Antimony	ug/L as Sb	ND	9	ND	0	6 MAC	ND	22	ND - 0.0
Arsenic	ug/L as As	0.19	9	0.14	0.97	10 MAC	0.18	22	ND - 0.22
Barium	ug/L as Ba	2.3	9	1.40	2.70	1000 MAC	2.45	22	2.10 - 3.00
Beryllium	ug/L as Be	ND	9	ND	0.0		ND	22	ND - 0.0
Bismuth	ug/L as Bi	ND	9	ND	0.0		ND	22	ND - 0.0
Boron	ug/L as B	121	9	58.0	347.0	5000 MAC	ND	22	ND - 148.0
Cadmium	ug/L as Cd	ND	9	ND	0.0	5 MAC	ND	22	ND - 0.0
Calcium	mg/L as Ca	26.7	9	9.80	30.5	No Guideline Required	28.3	22	18.5 - 34.3
Chromium	ug/L as Cr	ND	9	ND	0.0	50 MAC	ND	22	ND - 1.0
Cobalt	ug/L as Co	ND	9	ND	0.0		ND	22	ND - 0.0
Copper	ug/L as Cu	5.92	9	3.85	13.4	2000 MAC / ≤ 1000 AO	6.9	22	4.96 - 24.0
Iron	ug/L as Fe	50.8	9	14.3	191.0	≤ 300 AO	48.7	22	16.2 - 303.0
Lead	ug/L as Pb	0.26	9	ND	1.65	5 MAC	0.42	22	ND - 10.0
Lithium	ug/L as Li	11.8	5	11.0	15.9		8.10	3	7.6 - 11.7
Magnesium	mg/L as Mg	3.4	9	0.55	4.67	No Guideline Required	4.5	22	3.14 - 5.15
Manganese	ug/L as Mn	3.4	9	ND	15.3	120 MAC / ≤ 20 AO	2.60	22	1.70 - 42.9
Molybdenum	ug/L as Mo	ND	9	ND	0.0		ND	22	ND - 1.10
Nickel	ug/L as Ni	ND	9	ND	8.5		ND	22	ND - 9.10
Potassium	mg/L as K	0.23	9	0.16	0.27		0.26	22	0.18 - 0.35
Selenium	ug/L as Se	ND	9	ND	0.0	50 MAC	ND	22	ND - 0.0
Silicon	ug/L as Si	7910	9	7090	9230		8,465.00	22	7790 - 8820
Silver	ug/L as Ag	ND	9	ND	0.0	No Guideline Required	ND	22	ND - 0.0
Sodium	mg/L as Na	43.9	9	28.2	87.4	≤ 200 AO	43.9	22	28.5 - 58.3
Strontium	ug/L as Sr	77	9	54.1	84.7	7000 MAC	75.8	22	53.5 - 89.7
Sulphur	mg/L as S	8.2	9	3.10	10.2		9.05	22	6.10 - 12.8
Thallium	ug/L as Tl	ND	9	ND	0.02		ND	22	ND - 0.05
Tin	ug/L as Sn	ND	9	ND	0.0		ND	22	ND - 0.0
Titanium	ug/L as Ti	ND	9	ND	5.60		ND	22	ND - 0.0
Uranium	ug/L as U	ND	9	ND	0.12	20 MAC	ND	22	ND - 0.18
Vanadium	ug/L as V	ND	9	ND	0.0		ND	22	ND - ND
Zinc	ug/L as Zn	8.6	9	ND	30.3	≤ 5000 AO	7.85	22	ND - 34.2
Zirconium	ug/L	ND	9	ND	0.38		ND	22	ND - 0.32

## CAPITAL REGIONAL DISTRICT

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### SKANA WATER Statement of Operations (Unaudited) For the Year Ended December 31, 2020

	2020	2019
<b>Revenue</b>		
Transfers from Government	23,070	23,070
User Charges	43,651	43,440
Other revenue from own sources:		
Interest Earnings	2	153
Transfer from Operating Reserve	-	1,500
Other Revenue	164	2,530
<b>Total Revenue</b>	<b>66,887</b>	<b>70,693</b>
<b>Expenses</b>		
General Government Services	2,841	2,892
Contract for Services	12,462	10,250
CRD Labour and Operating costs	24,984	19,874
Debt Servicing Costs	2,124	8,944
Capital Purchases	-	3,140
Other Expenses	14,374	11,625
<b>Total Expenses</b>	<b>56,785</b>	<b>56,726</b>
<b>Net revenue (expenses)</b>	<b>10,101</b>	<b>13,967</b>
Transfers to own funds:		
Capital Reserve Fund	9,061	12,947
Operating Reserve Fund	1,040	1,020
<b>Annual surplus/(deficit)</b>	<b>-</b>	<b>-</b>
Accumulated surplus/(deficit), beginning of year	-	-
<b>Accumulated surplus/(deficit), end of year</b>	<b>\$ -</b>	<b>-</b>



## CAPITAL REGIONAL DISTRICT

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### SKANA WATER Statement of Reserve Balances (Unaudited) For the Year Ended December 31, 2020

	Capital Reserve	
	2020	2019
<b>Beginning Balance</b>	77,042	53,429
Transfer from Operating Budget	9,061	12,947
Transfers from Completed Capital Projects	9,470	12,771
Transfer to Capital Projects	(15,000)	(3,677)
Interest Income	1,451	1,572
<b>Ending Balance</b>	<b>82,024</b>	<b>77,042</b>

	Operating Reserve	
	2020	2019
<b>Beginning Balance</b>	8,604	8,818
Transfer from Operating Budget	1,040	1,020
Transfer to Operating Budget	-	(1,500)
Interest Income	177	265
<b>Ending Balance</b>	<b>9,820</b>	<b>8,604</b>