Magic Lake Estates Water and Sewer System

2020 Annual Report

CRD | Drinking Water and Wastewater

Introduction

This report provides a summary of the Magic Lake Estates Water and Sewer Service for 2020 and provides a description of the water and sewer services including: summary of the water supply, demand and production, drinking water quality, wastewater treatment flows, effluent quality, operations highlights, capital project updates and financial report.

WATER SYSTEM

Water Service Description

The community of Magic Lake Estates is primarily a rural residential development with some community properties located on Pender Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private water utility and in 1981 the service converted to the Capital Regional District (CRD). The Magic Lake Estates water service is made up of 1,202 parcels, of which there are 1,044 single family equivalents (or approximately the same amount of customers) obtaining service from the water system.

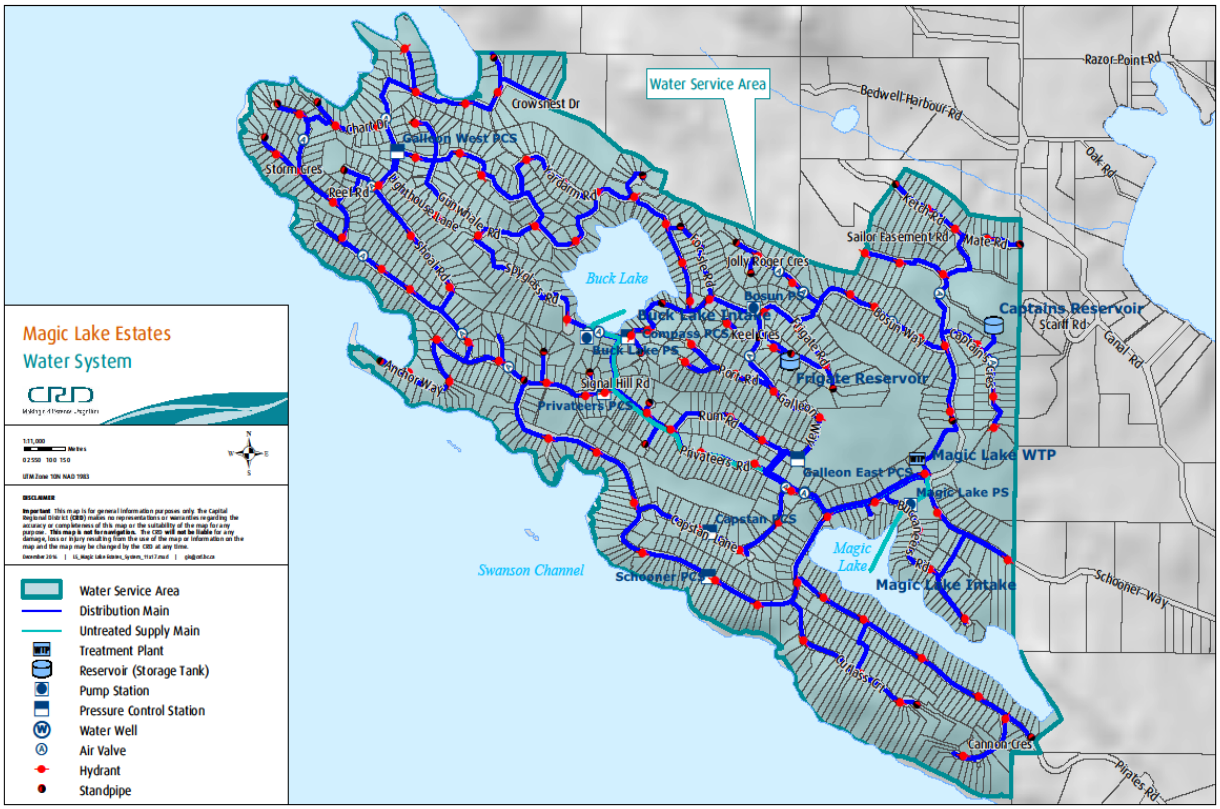

Figure 1: Map of Magic Lake Estates Water System

The Magic Lake Estates water system is primarily comprised of:

- Two (2) raw water sources; Buck Lake (primary source) and Magic Lake (secondary source).
- Four earthen dam structures (two at Buck Lake and two at Magic Lake).
- Two raw water pump stations, one each related to the raw water supplies, with pretreatment oxidation equipment to treat and control dissolved manganese and iron in the raw water source.
- Centralized water treatment plant consisting of a dual process including dissolved air flotation, filtration, ultraviolet light disinfection and chlorine disinfection.
- One booster pump station / pressure reducing station (Bosun).
- Two steel storage tanks, Frigate and Captains (volumes; Frigate 750 cubic metres or 200,000 USg and Captains 341 cubic metres or 90,000 USg).
- Supervisory Control and Data Acquisition (SCADA) system.
- Distribution system and supply pipe network (in excess of 27 kilometers of water mains).
- Other water system assets: 1,035 water service connections and meters, approximately 70 fire hydrants, 6 pressure reducing valve stations, 100 gate valves and standpipes.

Water Supply

Surface water supply monthly water levels are provided in Figures 2 and 3 for Buck Lake and Magic Lake respectively. It is important to note that under normal operating conditions, Buck Lake provides 80% and Magic Lake provides 20% of the annual raw water demand for the service.

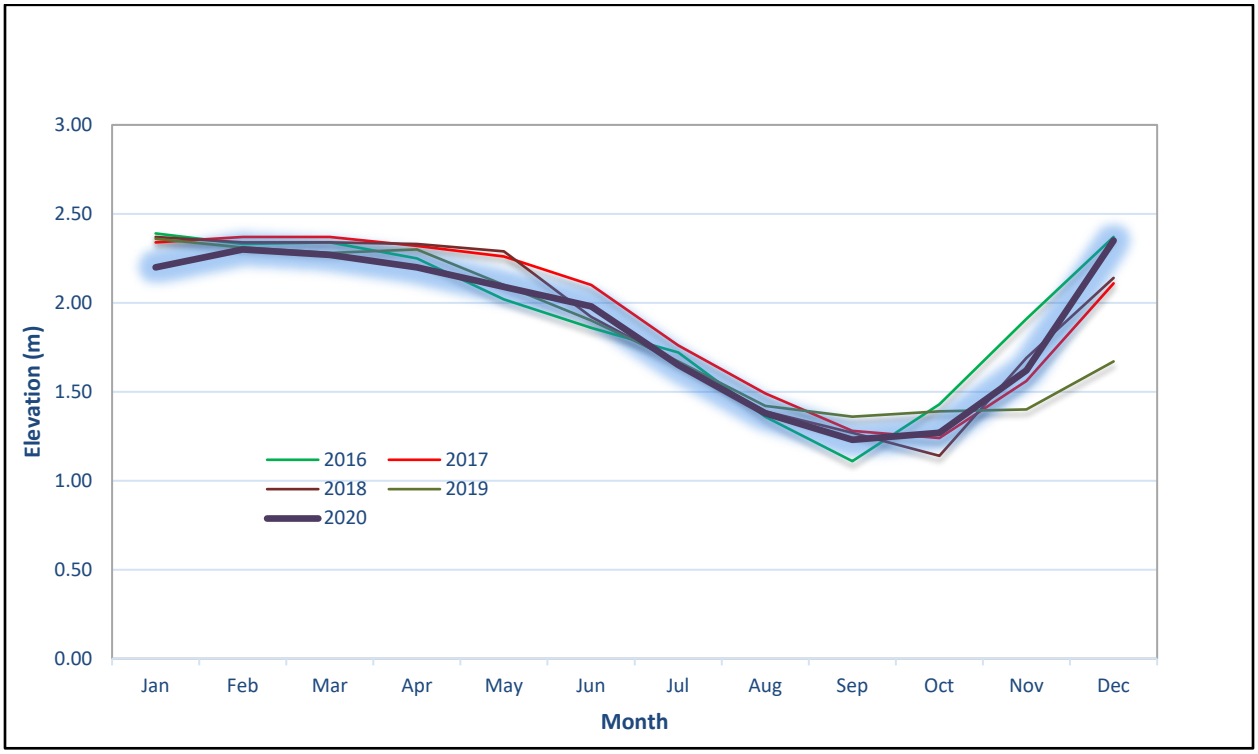

Figure 2: Buck Lake Monthly Water Level

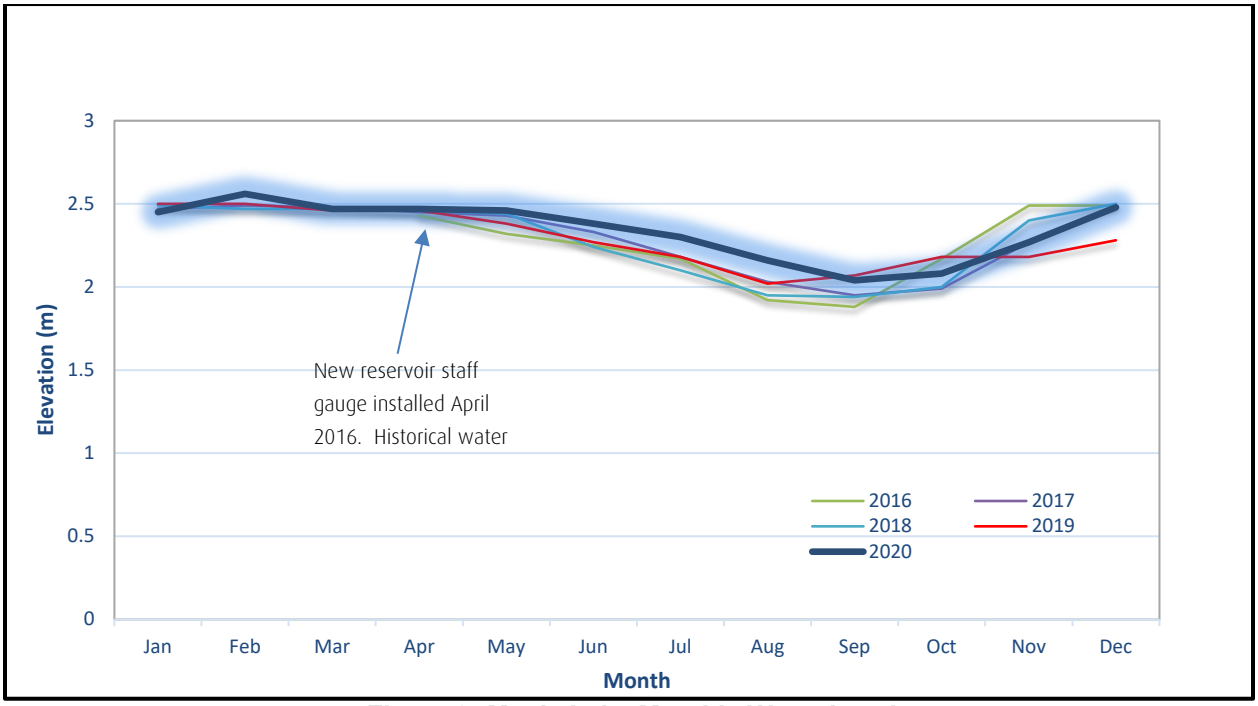

Figure 3: Magic Lake Monthly Water Level

Water Production and Demand

Referring to Figure 4, 192,447 cubic meters of water was extracted (water production) from both Buck Lake and Magic Lake water sources in 2020; a 5% increase from the previous year and an 18% increase in the five year average. Water demand (customer water billing) for the service totaled 124,811 cubic meters of water; a 5% decrease from the previous year and a 3% increase from the rolling five year average. The higher water production and lower water demand is primarily the result of water system leaks and repairs that occurred during this period.

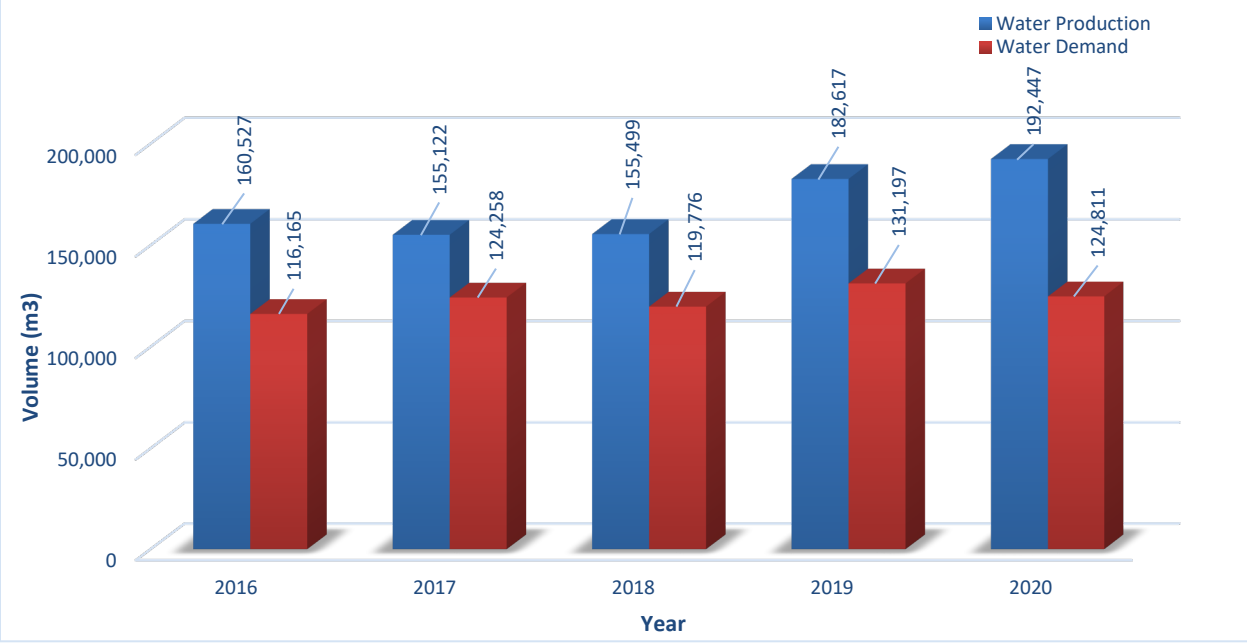

Figure 4: Magic Lake Estates Water System Annual Water Production and Demand.

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 (67,636 cubic meters) represents about 35% of the total water production for the service area. However, approximately 5,000 cubic meters of the non-revenue water can be attributed to operational use. Therefore, the non-revenue water associated with system losses is approximately 33% which is an increase from the previous year and considered to be high for a water distribution system the size of Magic Lake Estates. This is primarily the result of a number of water system leaks that occurred during the year.

Figure 5 below illustrates the monthly water production for 2020 is highlighted along with the historical water production information. The monthly water production trends are typical for smaller water systems such as Magic Lake Estates. In review of monthly water production for 2020, the monthly trend is higher than the previous years and is primarily the result of water system leaks.

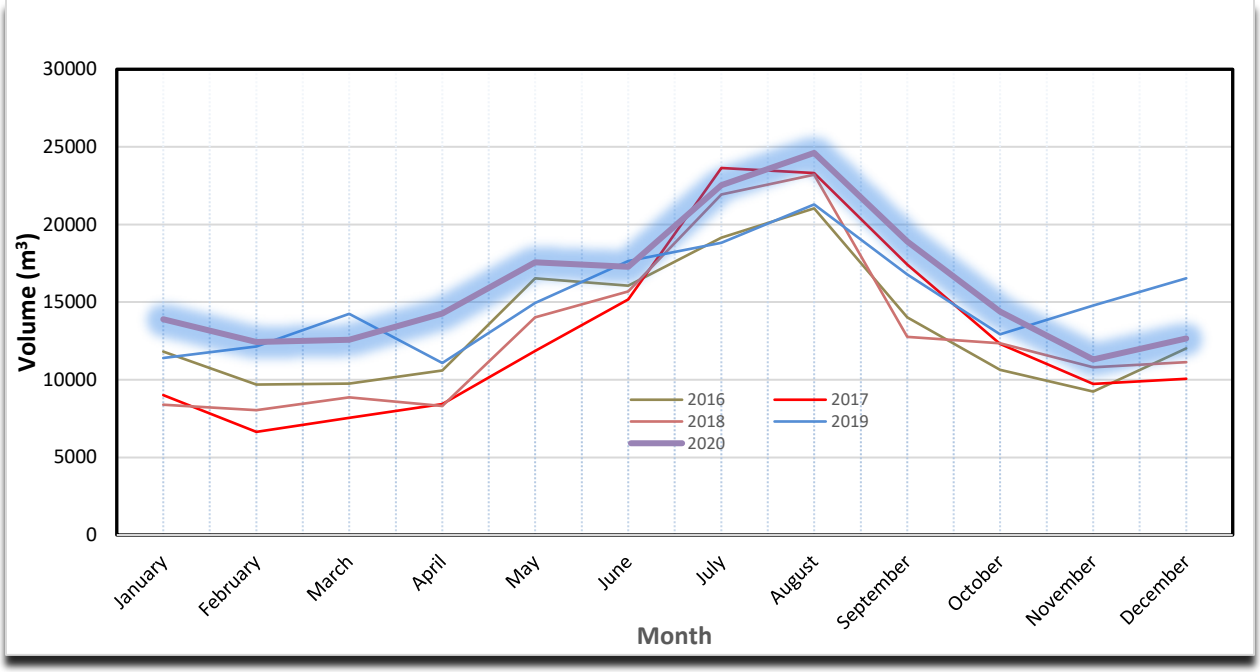

Figure 5: Magic Lake Estates Water System Monthly Water Production.

Drinking Water Quality

Two intake lines from Buck Lake and Magic Lake provide blended source water to the Dissolved Air Flotation (DAF) treatment plant. The typical intake blending ratio in 2020 was 80/20 Buck/Magic lakes unless water quality concerns or operational needs required a temporary adjustment. Due to a cyanobacteria bloom in Magic Lake, the source water supply came from Buck Lake only from September 9 until October 21, 2020. Throughout the summer of 2020, Buck Lake was subject to several algae blooms that caused or had the potential to cause taste and odour issues in the drinking water. The treatment plant includes an additional potassium permanganate treatment system that was continuously operated in 2020 to address periodically elevated iron and manganese levels in the raw water.

The drinking water supplied to the service area was safe for consumption at all times. The existing multi-barrier treatment system was able to deal with several algal as well as high iron and manganese events in both source lakes throughout the year. The treatment system was also able

to reduce the total organic carbon (TOC) concentration by >50%, however, the high organic loading of the raw water still resulted in a high organic carbon concentration in the treated drinking water which can have taste and odour implications and can lead to high disinfection by-product concentrations. As in previous years, operations staff successfully mitigated localized adverse water quality events due to aging and stagnant water through spot-flushing.

Overall Magic Lake Estates drinking water quality characteristics for 2020 are summarized below.

Raw Water:

- Both lake sources exhibited low concentrations of total coliform bacteria throughout the winter months but higher concentration during the summer period. In Magic Lake, the total coliform bacteria concentrations rose to about 3,500 CFU/100mL in late summer. This is in line with previous years. Buck Lake only saw an increase to 330 CFU/100mL summer which was much lower than in previous years.
- *E. coli* bacteria concentrations were generally low in both lakes throughout the year. During the summer months the concentration were slightly higher than during the rest of the year. This is a typical pattern for lakes.
- Raw water from both sources was medium hard (57 - 64 mg/L $CaCO_3$).
- Buck Lake exhibited a raw water turbidity range from 0.5 to 2.9 nephelometric turbidity units (NTU) with an annual median of 1.1 NTU, and Magic Lake a range from 0.7 to 5.0 NTU with an annual median of 1.50 NTU. The higher turbidity occurred typically during the periods of increased algal activity in late summer and fall. The turbidity in both lakes was generally consistent with historical turbidity trends, albeit slightly higher than 2019.
- Buck Lake, with an annual median total organic carbon (TOC) of 6.8 mg/L, and Magic Lake, with a median TOC of 8.1 mg/L, are considered mesotrophic lakes (medium productive).
- Both lakes exhibited seasonal elevated iron and manganese concentrations which reached peaks of 337 µg/L (Fe) and 57.5 µg/L (Mn) in Magic Lake in August, and 244 µg/L (Fe) and 251 µg/L (Mn) in Buck Lake in November. Spring and summer are the two common periods for high concentrations of these metals in Magic Lake, whereas these episodes are more prevalent in the fall in Buck Lake.

Treated Water:

- Treated water was bacteriologically safe to drink with no confirmed positive of either *E. coli* or total coliforms in the treated water. Once sample from the distribution system in January tested positive for total coliform bacteria. Resampling did not confirm an actual drinking water contamination.
- Treated water turbidity (cloudiness) was typically well below the *Guidelines for Canadian Drinking Water Quality* (GCDWQ) limit of 1 (NTU) with the exception of very few isolated samples exceeding this limit (two samples at 3.9 and 1.9 NTU in July and September respectively), mostly associated with operational activities such as flushing or pipe repairs.
- Total organic carbon (TOC median 3.8 mg/L) was in line with results in previous years. A 46% reduction of TOC indicates a satisfactory performance of the DAF plant. TOC concentrations of > 4 mg/L are considered a strong precursor for disinfection by-product formation and potential guidelines exceedance.
- Metals were below maximum acceptable concentration (MAC) and the aesthetic objective (AO) limits confirming the efficacy of the potassium permanganate treatment system in removing in particular iron and manganese.
- Disinfection by-products such as trihalomethanes (THM) did not exceed the GCDWQ limit of 100 µg/L. THM concentrations fluctuated between 56 and 87 µg/L for an annual average of

73 µg/L. Treated water samples were not tested for haloacetic acids (HAA) in 2020 due to a solid history of very low results (20.2 µg/L in 2016 compared to the MAC of 80 µg/L) in this water system. HAA will be tested for in 2021.

- Both water sources were subject to occasional, naturally occurring algal blooms that periodically affected taste and odour.
- The water temperature exceeded the GCDWQ aesthetic limit of 15ºC between May and October.
- The newly established GCDWQ MAC for aluminum was at no time in 2020 exceeded.

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

Water System Operational Highlights

The following is a summary of the major operational issues that were addressed by CRD Integrated Water Services staff:

- Emergency storm response event on January 10, 2020
- Replacement of the primary water treatment plant server
- Water system leak repairs:
    - 2705 Anchor Way
    - 2646/2648 Galleon Way
    - 27142 Schooner Way
    - Schooner Way/Shoal Road
    - 3748 Privateers Road
    - 4755 Bosuns Way
    - 3727 Bosuns Way
    - 3703 Signal Hill
    - 37254 Privateers
    - 2616 Crowsnest Drive

- Emergency storm response event on December 21, 2020
- Buck Lake raw water pump tear down and clean

Water System Capital Project Updates

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

1. WTP Roof Snowguard Installation – This work was completed within budget.
2. Buck Lake Dam Safety Review – A report was delivered in 2020 with recommendations incorporated into the 2021 5-year capital plan.

SEWER SYSTEM

Service Description

The community of Magic Lake Estates is primarily a rural residential development located on Pender Island in the Southern Gulf Islands Electoral Area which was originally serviced by a private sewer utility and in 1981 the service converted to the CRD. The sewer service is approximately 210 hectares in size and includes 714 parcels of which 635 are serviced. Some of the sewer infrastructure includes: 16km of sewer pipe, 316 manholes, 6 pump stations, and two treatment plants each with an outfall into Swanson Channel.

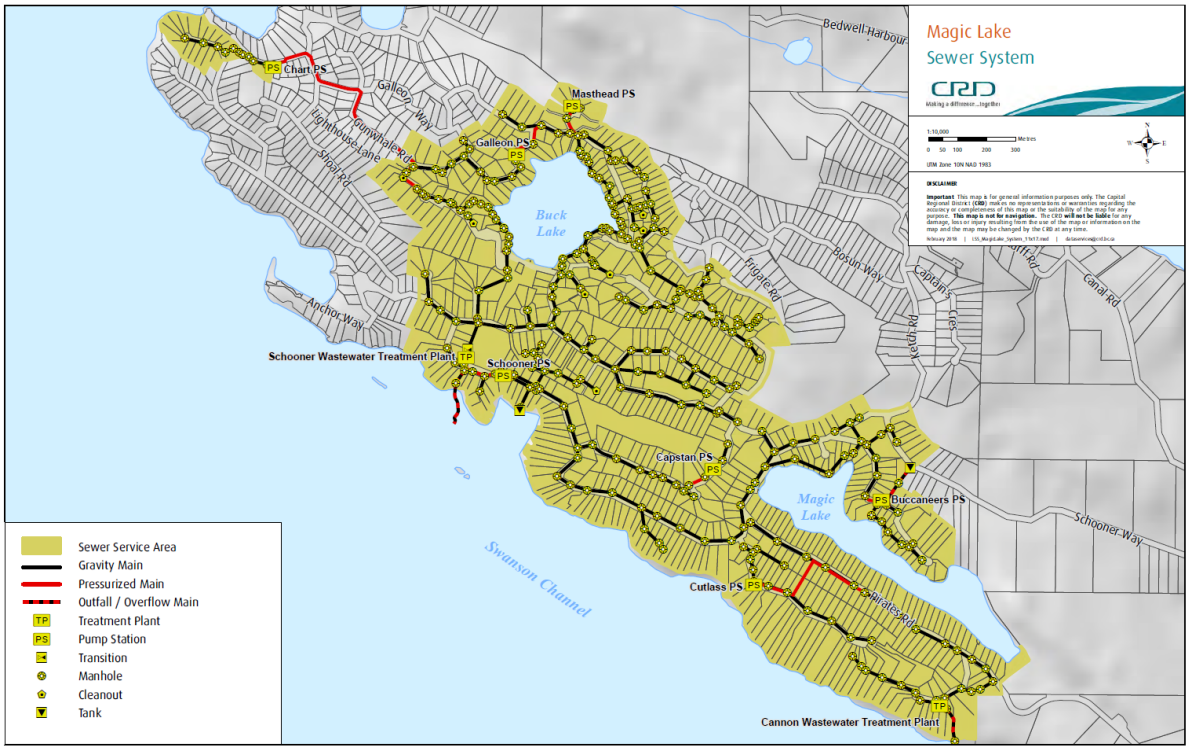

Figure 5: Map of Magic Lake Estates Sewer System

Wastewater Flows

The total monthly and 5-year total annual flows are shown in Figures 6 and 7 below. The graphs indicate that the 2020 wastewater flows were about 18% higher than 2019 and about 11% higher than the 5-year average. The monthly flows show some seasonal variation in the summer due to peak tourist times (i.e. August is about 7% higher than June or September), but the more significant variation occurs in the winter due to inflow and infiltration (where January has almost 2.5 times the flow as June).

The Municipal Sewage Regulation (MSR) contains requirements for the treatment, reuse and discharge of municipal wastewater effluent. The regulation includes a requirement that sewer flows reaching treatment plants should not exceed 2.0 times “average dry weather flow” during storm events with less than a 5-year return period. Based on the measured flow rates, the Magic Lake Estates sewer system does not meet that requirement.

The peak winter flows have also resulted in a number of exceedances at each treatment plant as shown in Figure 8 below.

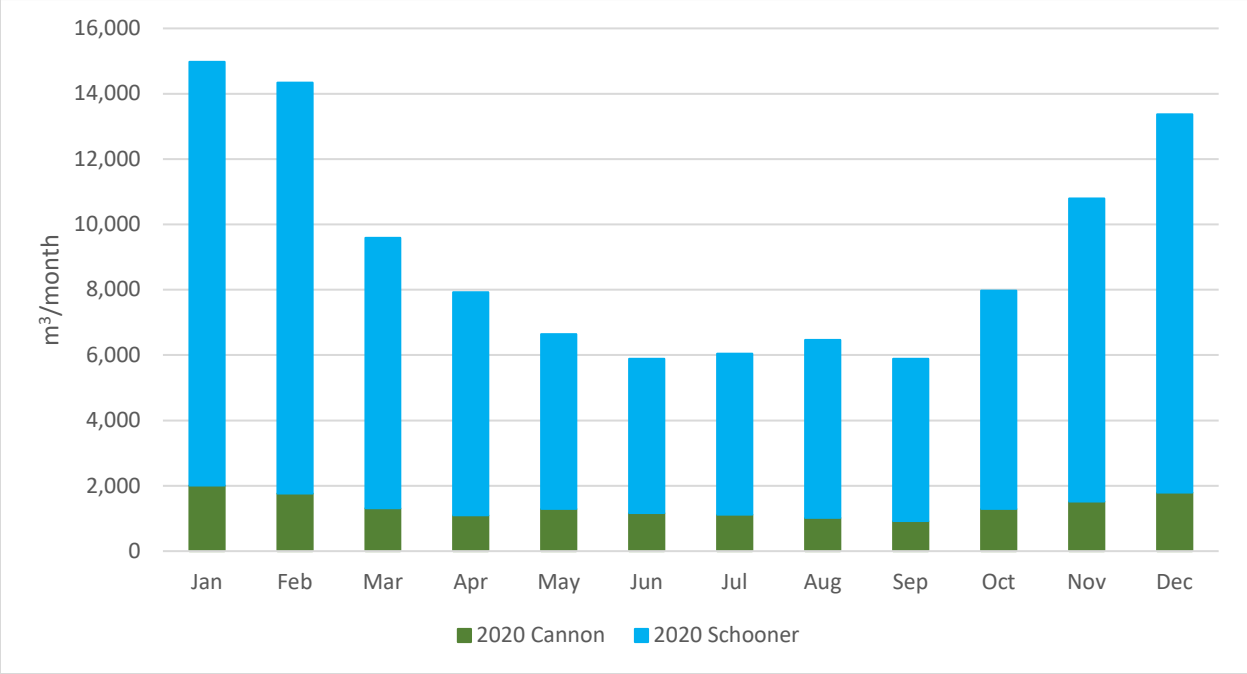

Figure 6: 2020 Total Monthly Flows (m^3/month)

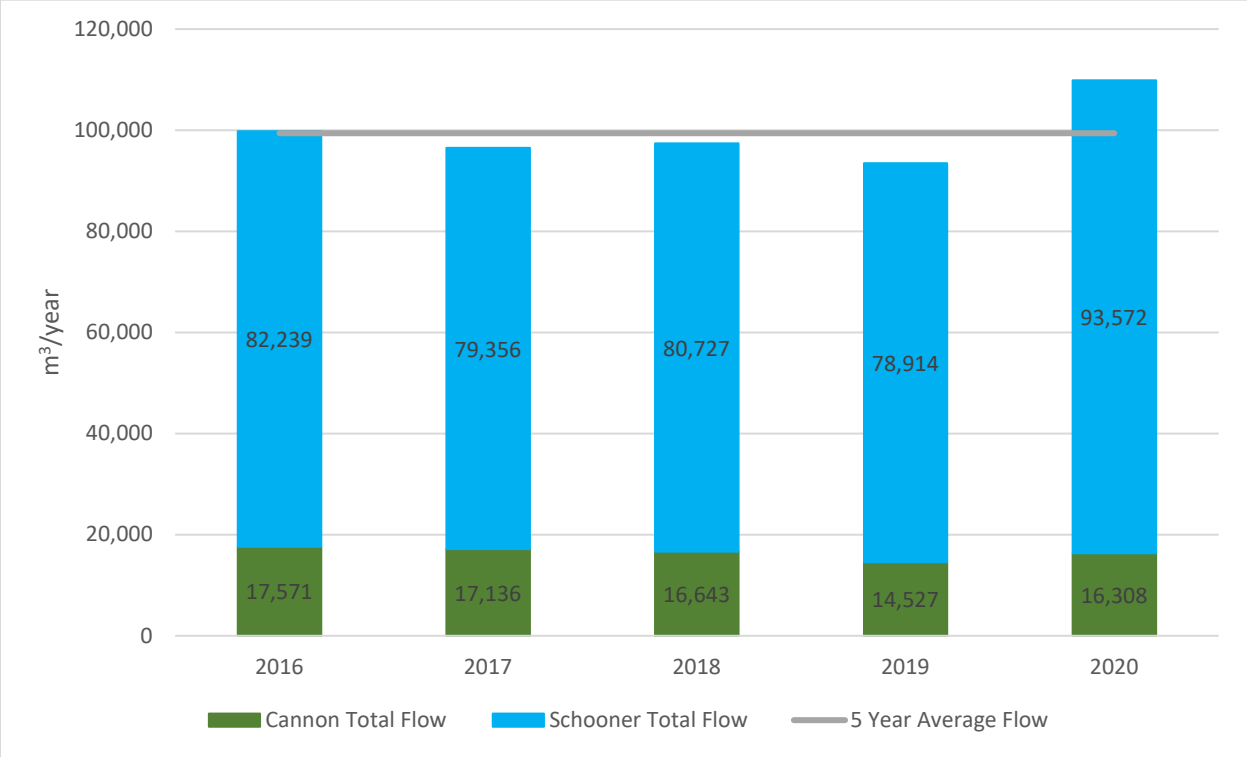

Figure 7: Total Wastewater Flows (m^3/year)

Treated Effluent - Regulatory Compliance

Flow and effluent quality are assessed for compliance with the federal regulatory limits (Schooner only) and provincial discharge permits (both Schooner and Cannon) on a daily and monthly basis, respectively. Treated wastewater from Cannon was in compliance throughout 2020, unlike 2019

where there were several TSS exceedances. There were three TSS exceedances at Schooner during 2020, unlike 2019 when there were none. These TSS exceedances were associated with heavy rain events when sludge washes out into the final effluent. Both plants exceeded their permitted daily flow allowances in 2020 on multiple occasions. The exceedances all occurred during storm events when inflow and infiltration occurs and because neither plant has equalization tanks to attenuate the peak flows. Figure 8 shows the number of exceedances at each plant along with the annual precipitation. In 2020 there was more than 2 times the number of flow exceedances than 2019, with 9 at Schooner and 34 at Cannon (totaling 43 in 2020 versus 18 in 2019). The BC Ministry of Environment and Climate Change Strategy has issued non-compliance warning letters for these two treatment facilities and is expecting upgrades to bring them back into compliance.

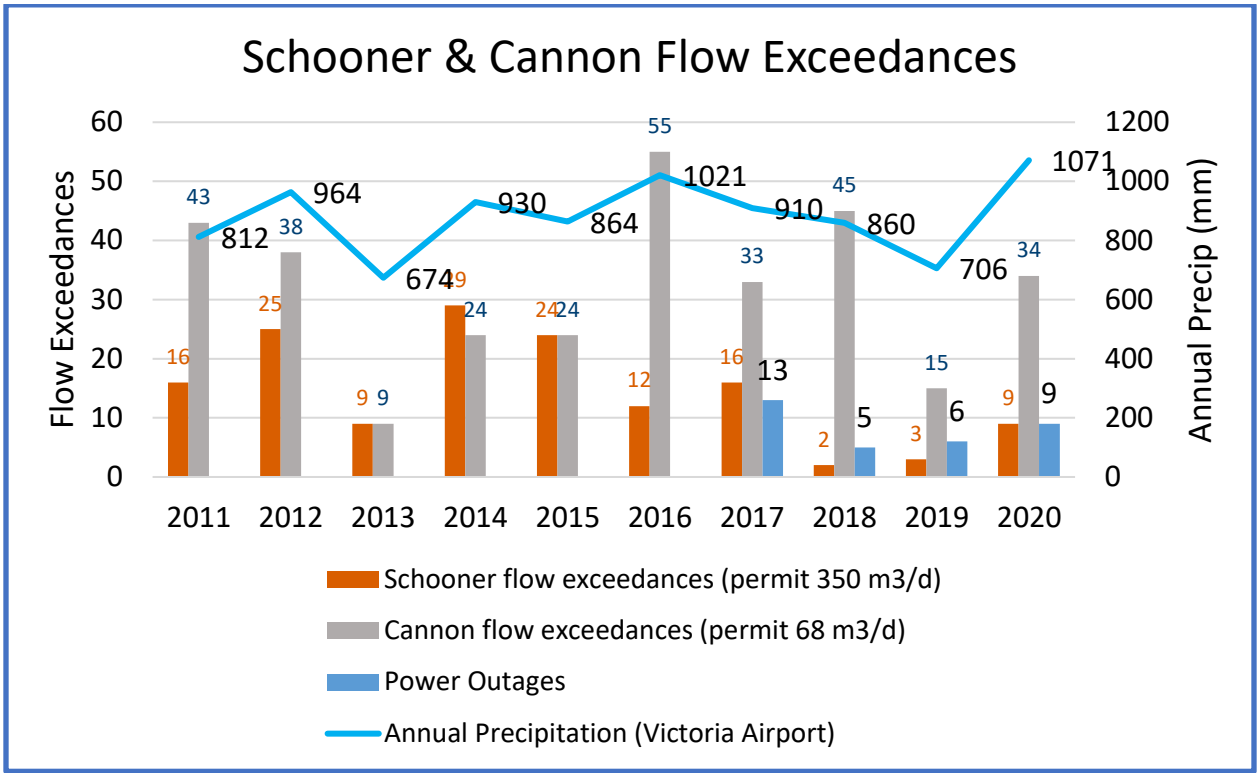

Figure 8: Schooner and Cannon WWTP Flow Exceedances

Receiving Water

Routine receiving water monitoring was required for both Magic Lake Estates WWTPs in 2020. This monitoring is required every 4 years unless there are planned bypasses, plant failures/overflows, or wet weather overflows that exceed 3 days duration in the winter or 1 day duration in the summer. Bypass or overflow sampling is only required once per season for events that are similar in nature as long as the first seasonal sampling confirms results were within guidelines set to protect human primary contact for recreation.

The 2020 results were all well below human health guidelines, indicating that both marine outfalls were operating as expected and that there was low risk to recreational activities in their vicinity.

Overflow sampling was required twice in 2020 around the Cannon outfall, following plant overflows each lasting longer than three days in January and February. All results were well below human health guidelines.

Sewer Service Operational Highlights

The following is a summary of the major operational issues that were addressed by CRD Integrated Water Services staff:

- Chart Drive Pump Station discharge check valve troubleshooting and replacement
- Significant operational effort throughout the year for non-compliance reporting for both Schooner and Cannon Wastewater Treatment Plants.
- Emergency storm response event on December 21, 2020
- Corrective maintenance performed on portable standby generator (primarily used for Galleon Way Pump Station).

Sewer Service Capital Project Updates

The Capital Projects that were in progress in 2020 included:

1. Wastewater Infrastructure Renewal – Sewer Replacement - after public consultation a referendum was held on November 23, 2019 to borrow up to $6,000,000 to complete Phase 1 upgrades. The referendum was successful and a design consultant (Stantec) was retained to complete the design of about 3km of sewer pipe replacement. The design was tendered in December 2020 and closed in February 2021. A contract was awarded and construction will commence in 2021. Refer to the website *https://www.crd.bc.ca/project/capital-projects/magic-lake-estates-wastewater-system-infrastructure-replacement-project-infrastructure-replacement-project* for more information.
2. Staff also prepared and submitted a grant application to the "Investing in Canada Infrastructure Program" for $5.65M of additional funding that would enable most all of the work identified in Phase 1, 2 and 3 to be completed. The Province has indicated that the results of the grant application could be announced in Spring 2021.

Financial Report

Please refer to the attached 2020 Financial Summary Statement of Operations. *Revenue* includes parcel taxes (*Transfers from Government*), fixed user fees (*User Charges*), interest on savings (*Interest Earnings),* a transfer from the maintenance reserve account, 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 cost 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 accounts 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.

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Attachment: 2020 Financial Summary

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

Table 1

Table 1: 2020 Summary of Raw Water Test Results, Magic Lake Estates Water System									
PARAMETER		**2020 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2010 - 2019 RESULTS**		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Minimum	Range Maximum	≤ = Less than or equal to	Median	Samples Analyzed	Range Minimum-Maximum
(ND means Not Detected by analytical method used)									
Physical/Biological Parameters									
Buck Lake									
Carbon, Total Organic	mg/L	**6.80**	11	5.70	7.50		6.62	57	5.60 - 9.84
Colour, True	TCU	**14.0**	17	8.0	23.0	≤ 15 AO	12.9	84	7.8 - 28.0
Hardness as $CaCO_3$	mg/L	**63.75**	4	61.8	64.9	No Guideline Required	66.1	33	32.6 - 91.9
pH	pH units	**7.17**	6	6.86	7.67	7.0 - 10.5 AO	7.74	28	6.97 - 8.78
Turbidity	NTU	**1.10**	17	0.50	2.90		1.14	168	0.36 - 10.0
Magic Lake									
Carbon, Total Organic	mg/L	**8.10**	11	7.60	11.0		8.65	53	6.76 - 11.0
Colour, True	TCU	**28.0**	17	23.0	50.0	≤ 15 AO	22.0	76	6.0 - 36.0
Hardness as $CaCO_3$	mg/L	**57.5**	4	51.4	63.4	No Guideline Required	60.9	32	30.9 - 96.0
pH	pH units	**6.98**	2	6.90	7.05	7.0 - 10.5 AO	7.57	27	7.08 - 8.13
Turbidity	NTU	**1.50**	17	0.70	5.00		1.49	142	0.19 - 24.5
Non-Metallic Inorganic Chemicals									
Buck Lake									
Silicon	mg/L as Si	**4.57**	4	3.86	5.21		5.11	33	0.004 - 11.9
Magic Lake									
Silicon	mg/L as Si	**1.28**	4	0.663	3.01		1.13	32	ND - 5.76
Metals									
Buck Lake									
Aluminum	ug/L as Al	**13.2**	4	ND	72.7	2900 MAC / 100 OG	14.3	33	ND - 194
Antimony	ug/L as Sb	**ND**	4	ND	0.0	6 MAC	ND	33	ND - 0.58
Arsenic	ug/L as As	**0.41**	4	0.34	0.44	10 MAC	0.38	33	ND - 1.25
Barium	ug/L as Ba	**10.0**	4	7.8	12.6	1000 MAC	10.2	32	ND - 21.9
Beryllium	ug/L as Be	**ND**	4	ND	0.0		ND	33	ND - 0.0
Bismuth	ug/L as Bi	**ND**	4	ND	0.0		ND	23	ND - 0.07
Boron	ug/L as B	**ND**	4	ND	0.0	5000 MAC	ND	33	ND - 656
Cadmium	ug/L as Cd	**ND**	4	ND	0.0	5 MAC	ND	33	ND - 0.0
Calcium	mg/L as Ca	**17.6**	4	17.1	17.8	No Guideline Required	18.2	33	6.58 - 21.4
Chromium	ug/L as Cr	**ND**	4	ND	0.0	50 MAC	ND	33	ND - 0.0
Cobalt	ug/L as Co	**ND**	4	ND	0.0		ND	33	ND - 0.20
Copper	ug/L as Cu	**0.62**	4	0.36	1.48	2000 MAC / ≤ 1000 AO	2.00	33	ND - 27.3
Iron	ug/L as Fe	**99.8**	4	26.4	244.0	≤ 300 AO	60.5	34	12.0 - 507.0
Lead	ug/L as Pb	**ND**	4	ND	0.0	5 MAC	ND	33	ND - 3.70
Lithium	ug/L as Li	**ND**	1	ND	0.0		ND	12	ND - 0.88
Magnesium	mg/L as Mg	**4.84**	4	4.66	4.96	No Guideline Required	5.07	33	3.56 - 9.34
Manganese	ug/L as Mn	**63.8**	4	16.4	251.0	120 MAC / ≤ 20 AO	30.9	34	6.00 - 506
Molybdenum	ug/L as Mo	**ND**	4	ND	0.0		ND	33	ND - 28.0
Nickel	ug/L as Ni	**ND**	4	ND	0.0		ND	33	ND - 1.20
Potassium	mg/L as K	**1.19**	4	1.07	1.24		1.16	33	ND - 8.53
Selenium	ug/L as Se	**ND**	4	ND	0.0	50 MAC	ND	33	ND - 0.74
Silver	ug/L as Ag	**ND**	4	ND	0.0	No Guideline Required	ND	33	ND - 0.0
Sodium	mg/L as Na	**10.8**	4	10.5	11.0	≤ 200 AO	11.1	33	6.12 - 23.2
Strontium	ug/L as Sr	**123.5**	4	110.0	127.0	7000 MAC	115	33	77.0 - 134
Sulphur	mg/L as S	**ND**	4	ND	0.0		ND	23	ND - 4.10
Tin	ug/L as Sn	**ND**	4	ND	0.0		ND	33	ND - 20.0
Titanium	ug/L as Ti	**ND**	4	ND	0.0		ND	33	ND - 0.0
Thallium	ug/L as Tl	**ND**	4	ND	0.0		ND	23	ND - 0.0
Uranium	ug/L as U	**ND**	4	ND	0.0	20 MAC	ND	23	ND - 0.01
Vanadium	ug/L as V	**ND**	4	ND	0.0		ND	33	ND - 0.28
Zinc	ug/L as Zn	**ND**	4	ND	5.80	≤ 5000 AO	ND	33	ND - 205
Zirconium	ug/L as Zr	ND	4	ND	0.15		ND	23	ND - 0.17
Magic Lake									
Aluminum	ug/L as Al	**35.4**	4	3.6	232.0	2900 MAC / 100 OG	32.5	32	ND - 713
Antimony	ug/L as Sb	**ND**	4	ND	0.0	6 MAC	ND	32	ND - 0.0
Arsenic	ug/L as As	**0.42**	4	0.36	0.64	10 MAC	0.46	32	ND - 2.75
Barium	ug/L as Ba	**14.4**	4	12.2	15.6	1000 MAC	15.1	32	ND - 84.9
Beryllium	ug/L as Be	**ND**	4	ND	0.0		ND	32	ND - 0.0
Bismuth	ug/L as Bi	**ND**	4	ND	0.0		ND	21	ND - 0.0
Boron	ug/L as B	**ND**	4	ND	0.0	5000 MAC	ND	32	ND - 0.0
Cadmium	ug/L as Cd	**ND**	4	ND	0.0	5 MAC	ND	32	ND - 0.02
Calcium	mg/L as Ca	**14.6**	4	13.1	16.3	No Guideline Required	15.1	32	5.01 - 19.8
Chromium	ug/L as Cr	**ND**	4	ND	0.0	50 MAC	ND	32	ND - 0.0
Cobalt	ug/L as Co	**ND**	4	ND	0.0		ND	32	ND - 0.0
Copper	ug/L as Cu	**0.96**	4	0.44	1.63	2000 MAC / ≤ 1000 AO	1.87	32	ND - 57.0
Iron	ug/L as Fe	**244.0**	4	106.0	337.0	≤ 300 AO	188	32	50.0 - 4260
Lead	ug/L as Pb	**ND**	4	ND	0.0	5 MAC	ND	32	ND - 1.42
Lithium	ug/L as Li	**ND**	1	ND	**0.0**		ND	15	ND - 0.0
Magnesium	mg/L as Mg	**5.13**	4	4.56	5.52	No Guideline Required	5.63	32	4.46 - 11.5
Manganese	ug/L as Mn	**22.8**	4	8.40	57.5	120 MAC / ≤ 20 AO	48.1	32	2.80 - 5000
Molybdenum	ug/L as Mo	**ND**	4	ND	0.0		ND	28	ND - 27.0
Nickel	ug/L as Ni	**ND**	4	ND	0.0		ND	32	ND - 1.70
Potassium	mg/L as K	**1.13**	4	1.09	1.15		1.07	32	0.17 - 10.8
Selenium	ug/L as Se	**ND**	4	ND	0.0	50 MAC	ND	32	ND - 0.0
Silver	ug/L as Ag	**ND**	4	ND	0.0	No Guideline Required	ND	32	ND - 27.0
Sodium	mg/L as Na	**10.95**	4	10.3	11.2	≤ 200 AO	11.2	32	6.48 - 153
Strontium	ug/L as Sr	**105.5**	4	88.2	120.0	7000 MAC	108.5	32	70.0 - 158
Sulphur	mg/L as S	**ND**	4	ND	0.0		ND	21	ND - 3.70
Tin	ug/L as Sn	**ND**	4	ND	0.0		ND	32	ND - 0.0
Titanium	ug/L as Ti	**ND**	4	ND	8.90		ND	32	ND - 22.0
Thallium	ug/L as Tl	**ND**	4	ND	0.0		ND	21	ND - 0.0
Uranium	ug/L as U	**ND**	4	ND	0.0	20 MAC	ND	21	ND - 0.19
Vanadium	ug/L as V	**ND**	4	ND	0.0		ND	32	ND - 0.0
Zinc	ug/L as Zn	**ND**	4	ND	0.0	≤ 5000 AO	ND	32	ND - 215
Zirconium	ug/L as Zr	**ND**	4	ND	0.26		ND	21	ND - 0.16
Microbial Parameters									
Indicator Bacteria (Buck Lake)									
Coliform, Total	CFU/100 mL	**32**	17	3	330		68	193	0 - 10 400
E. coli	CFU/100 mL	**ND**	17	ND	12		2	193	0 - 200
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2020					1345	64	330 - 5800
Indicator Bacteria (Magic Lake)									
Coliform, Total	CFU/100 mL	**750**	15	230	3500		200	141	0 - 8 400
E. coli	CFU/100 mL	**1**	17	ND	10		1	146	0 - 115
Hetero. Plate Count, 7 day	CFU/1 mL	Not tested in 2020					2600	59	370 - 20000
Parasites (Buck Lake)									
Cryptosporidium, Total oocysts	oocysts/100 L	**ND**	1	ND		Zero detection desirable	ND	14	0 - 1.45
Giardia, Total cysts	cysts/100 L	**ND**	1	ND		Zero detection desirable	ND	14	ND - 0
Parasites (Magic Lake)									
Cryptosporidium, Total oocysts	oocysts/100 L	**ND**	1	ND		Zero detection desirable	ND	13	0 - 5.30
Giardia, Total cysts	cysts/100 L	**ND**	1	ND		Zero detection desirable	ND	13	0

Table 2

Table 2: 2020 Summary of Treated Water Test Results, Magic Lake Estates Water System									
PARAMETER		**2020 ANALYTICAL RESULTS**				**CANADIAN GUIDELINES**	**2010 - 2019 RESULTS**		
Parameter Name	Units of Measure	Annual Median	Samples Analyzed	Range Min.	Range Max.	≤ = Less than or equal to	Median	Samples Analyzed	Range Min.-Max.
ND means Not Detected by analytical method used									
Physical Parameters									
Carbon, Total Organic	mg/L as C	**3.80**	17	2.8	5.00		4.10	110	ND - 43.5
Colour, True	TCU	**ND**	67	ND	5.0	15 AO	1	445	ND - 7
Hardness as CaCO3	mg/L	**62.3**	12	59.4	65.4		65.9	61	58.8 - 72.1
pH	No units	Not tested in 2020				7.0-10.5 AO	7.16	29	6.89 - 7.40
Turbidity	NTU	**ND**	117	ND	3.90	1 MAC and ≤ 5 AO	0.15	745	ND - 3.40
Water Temperature	Degrees C	**7.10**	360	4.6	23.0	≤ 15 C°C	11.5	5741	4.5 - 23.0
Microbial Parameters									
Indicator Bacteria									
Coliform, Total	CFU/100 mL	**ND**	188	ND	4	0 MAC	0	1382	0 - 45
E. coli	CFU/100 mL	**ND**	188	ND	0	0 MAC	0	1383	0 - 2
Hetero. Plate Count, 7 day	CFU/1 mL	**60**	3	20	70	No Guideline Required	10	159	0 - 6700
Disinfectants									
Disinfectants									
Chlorine, Free Residual	mg/L as Cl2	**0.56**	370	0.05	1.68	No Guideline Required	0.31	6711	0.0 - 3.40
Chlorine, Total Residual	mg/L as Cl_2	**0.70**	357	0.19	1.98	No Guideline Required	0.67	6629	0.01 - 4.02
Disinfection By-Products									
Trihalomethanes (THMs)									
Bromodichloromethane	ug/L	**17.0**	8	15.0	23.0		17.5	49	11.2- 29.4
Bromoform	ug/L	**ND**	8	ND	0.0		ND	49	ND - 0.0
Chloroform	ug/L	**53.5**	8	39.0	61.0		49.0	49	18.8 - 100
Chlorodibromomethane	ug/L	**2.70**	8	ND	3.60		3.16	48	ND - 6.39
Total Trihalomethanes	ug/L	**73.5**	8	56.0	87.0	100 MAC	71.0	49	25.9 - 131
Haloacetic Acids (HAAs)									
HAA5	ug/L	Not tested in 2020				80 MAC	**ND**	1	ND - 0.0
Metals									
Aluminum	ug/L as Al	**31.3**	12	15.7	68.3	2900 MAC / 100 OG	25.7	61	11.7 - 186.0
Antimony	ug/L as Sb	**ND**	12	ND	0.0	6 MAC	ND	61	ND - 0.03
Arsenic	ug/L as As	**0.22**	12	0.17	0.27	10 MAC	0.22	61	0.14 - 0.32
Barium	ug/L as Ba	**7.55**	12	6.00	9.20	1000 MAC	7.90	61	ND - 10.7
Beryllium	ug/L as Be	**ND**	12	ND	0.0		ND	61	ND - 0.10
Bismuth	ug/L as Bi	**ND**	12	ND	0.0		ND	61	ND - 1.00
Boron	ug/L as B	**ND**	12	ND	0.0	5000 MAC	ND	61	ND - 0.0
Cadmium	ug/L as Cd	**ND**	12	ND	0.0	5 MAC	ND	61	ND - 0.0
Calcium	mg/L as Ca	**17.0**	12	16.2	17.9	No Guideline Required	17.8	61	16.0 - 19.8
Chromium	ug/L as Cr	**ND**	12	ND	0.0	50 MAC	ND	61	ND - 0.0
Cobalt	ug/L as Co	**ND**	12	ND	0.0		ND	61	ND - 0.02
Copper	ug/L as Cu	**11.5**	12	0.29	15.9	2000 MAC / ≤ 1000 AO	8.79	61	0.25 - 19.8
Iron	ug/L as Fe	**ND**	12	ND	18.4	≤ 300 AO	5.0	61	ND - 34.5
Lead	ug/L as Pb	**0.77**	12	ND	1.49	5 MAC	0.40	61	ND - 1.66
Lithium	ug/L as Li	**ND**	3	ND	0.0		ND	27	ND - 0.85
Magnesium	mg/L as Mg	**4.84**	12	4.56	5.16	No Guideline Required	5.14	61	4.44 - 5.70
Manganese	ug/L as Mn	**2.85**	12	ND	17.4	120 MAC / ≤ 20 AO	4.00	61	ND - 190.0
Molybdenum	ug/L as Mo	**ND**	12	ND	0.0		ND	61	ND - 0.05
Nickel	ug/L as Ni	**ND**	12	ND	0.0		ND	61	ND - 2.80
Potassium	mg/L as K	**1.43**	12	1.34	1.49		1.34	61	1.17 - 1.63
Selenium	ug/L as Se	**ND**	12	ND	0.0	50 MAC	ND	61	ND - 0.11
Silicon	ug/L as Si	**3575**	12	3120	4280		4170	61	4.13 - 5080
Silver	ug/L as Ag	**ND**	12	ND	0.0	No Guideline Required	ND	61	ND - 0.0
Sodium	mg/L as Na	**13.2**	12	12.3	13.6	≤ 200 AO	13.9	61	12.0 - 14.9
Strontium	ug/L as Sr	**118.5**	12	105.0	129.0	7000 MAC	119	61	102 - 133
Sulphur	mg/L as S	**ND**	12	ND	0.0		ND	61	ND - 4.50
Tin	ug/L as Sn	**ND**	12	ND	0.0		ND	61	ND - 0.0
Titanium	ug/L as Ti	**ND**	12	ND	0.0		ND	61	ND - 0.0
Thallium	ug/L as Tl	**ND**	12	ND	0.0		ND	61	ND - 0.0
Uranium	ug/L as U	**ND**	12	ND	0.0	20 MAC	ND	61	ND - 0.0
Vanadium	ug/L as V	**ND**	12	ND	0.0		ND	61	ND - 0.0
Zinc	ug/L as Zn	**6.45**	12	ND	15.8	≤ 5000 AO	ND	61	ND - 39.7
Zirconium	ug/L as Zr	**ND**	12	ND	0.33		ND	60	ND - 0.0

CAPITAL REGIONAL DISTRICT

MAGIC LAKE ESTATE WATER
Statement of Operations (Unaudited)
For the Year Ended December 31, 2020

	2020	2019
Revenue		
Transfers from government	568,517	568,990
User Charges	335,757	312,521
Water Sales	11,998	24,396
Leases	8,100	8,100
Fees and Charges	1,084	977
Other revenue from own sources:		
Interest earnings	112	1,634
Other revenue	2,854	1,170
Transfer from Operating Reserve	-	3,000
Total Revenue	928,422	920,788
Expenses		
General government services	24,529	20,709
CRD Labour and Operating costs	470,049	432,789
Debt Servicing Costs	203,312	220,379
Other expenses	187,758	156,070
Total Expenses	885,647	829,948
Net revenue (expenses)	42,774	90,841
Transfers to own funds:		
Capital Reserve Fund	32,775	80,841
Operating Reserve Fund	10,000	10,000
Annual surplus/(deficit)	-	-
Accumulated surplus/(deficit), beginning of year	-	-
Accumulated surplus/(deficit), end of year	$ -	-

CAPITAL REGIONAL DISTRICT

MAGIC LAKE ESTATE WATER
Statement of Reserve Balances (Unaudited)
For the Year Ended December 31, 2020

	Capital Reserve	
	2020	**2019**
Beginning Balance	754,542	676,988
Transfer from Operating Budget	32,775	80,841
Transfers from Completed Capital Projects	138,729	43,807
Transfer to Capital Projects	(124,000)	(65,000)
Interest Income	14,234	17,906
Ending Balance	816,280	754,542

	Operating Reserve	
	2020	**2019**
Beginning Balance	106,481	96,595
Transfer from Operating Budget	10,000	10,000
Transfer to Operating Budget	-	(3,000)
Interest Income	1,943	2,886
Ending Balance	118,424	106,481

CAPITAL REGIONAL DISTRICT

MAGIC LAKE ESTATE SEWER
Statement of Operations (Unaudited)
For the Year Ended December 31, 2020

		2020	2019
Revenue			
Transfers from government		698,611	526,770
User Charges		250,307	240,887
Allocation recovery revenue		10,424	10,200
Other revenue from own sources:			
Interest earnings		641	1,220
Other revenue		1,649	1,696
Transfer from Operating Reserve		-	10,000
Total Revenue		961,631	790,774
Expenses			
General government services		23,188	19,189
Contract for Services		81,758	92,275
CRD Labour and Operating costs		289,247	288,518
Debt Servicing Costs		174,435	174,430
Other expenses		163,076	172,480
Total Expenses		731,704	746,893
Net revenue (expenses)		229,927	43,881
Transfers to own funds:			
Capital Reserve Fund		106,667	30,621
Operating Reserve Fund		13,260	13,260
Sewer General Capital Fund		110,000	-
Annual surplus/(deficit)		-	-
Accumulated surplus/(deficit), beginning of year		-	-
Accumulated surplus/(deficit), end of year	$	-	-

CAPITAL REGIONAL DISTRICT

MAGIC LAKE ESTATE SEWER
Statement of Reserve Balances (Unaudited)
For the Year Ended December 31, 2020

	Capital Reserve	
	2020	**2019**
Beginning Balance	137,087	172,061
Transfer from Operating Budget	106,667	30,621
Transfers from Completed Capital Projects	31,164	-
Transfer to Capital Projects	-	(70,000)
Interest Income	3,472	4,405
Ending Balance	278,391	137,087

	Operating Reserve	
	2020	**2019**
Beginning Balance	30,744	26,515
Transfer from Operating Budget	13,260	13,260
Transfer to Operating Budget	-	(10,000)
Interest Income	737	968
Ending Balance	44,740	30,744