

Greater Vernon Water (GVW) Water Quality Report for March 2021

The following is the water quality summary for the Greater Vernon Water (GVW) utility.

1. Sources

GVW has two sources that are used for potable water. The two sources are Duteau Creek and Kalamalka Lake. Raw (untreated) water samples are taken at the intakes of Duteau Creek and Kalamalka Lake once a week. Tables 1 and 2 summarize the results for bacteria and turbidity.

Table 1 Duteau Creek Intake – Headgates

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli²	Caro	MPN/100 mL	5	-----	<1	114	38.4
E.coli²	GVW	MPN/100 mL	5	-----	<1	56	22.4
Total Coliform	Caro	MPN/100 mL	5	-----	24	155	71
Total Coliform	GVW	MPN/100 mL	5	-----	23.8	73.8	42.54
Turbidity	GVW Grab Sample	NTU	5	-----	0.94	1.31	1.14
Turbidity	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.76	1.11	0.91

¹SCADA: Supervisory Control and Data Acquisition.

²Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

Table 2 North Kalamalka Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	5	----	<1	2.0	0.6
E.coli ³	GVW	MPN/100 mL	5	----	<1	3.1	1.2
Total Coliform	Caro	MPN/100 mL	5	----	<1	8	2.6
Total Coliform	GVW	MPN/100 mL	5	----	<1	5.3	2.1
Turbidity ²	GVW Grab Sample	NTU	5	----	0.46	0.67	0.60
Turbidity ²	SCADA ¹ Hourly Average	NTU	31 Days	----	0.35	1.27	0.56

¹SCADA: Supervisory Control and Data Acquisition.

²Operation Guideline: As outlined in Deviation Response Plan, turbidity < 3 NTU.

³Drinking Water Treatment Objectives_ BC (Sec 4.3): The number of raw water samples should not exceed 20/100 mL in at least 90% of the weekly samples from the previous six months.

2. Agriculture/ Irrigation Sources

The Agriculture irrigation supply is scheduled to be turned on April 13, 2021. The sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, and Well #2 located on Coldstream Ranch. Table 3 summarizes the daily flows for each irrigation system.

The majority of the Duteau Creek water (approx. 85%) is treated but the other sources are separated from the potable system and are not chlorinated.

Irrigation water used before April 13 mainly comes from Ranch Wells #2 and Ranch Well #3 along with King Edward. This water is mainly used for livestock watering.

Table 2 Monthly Flows for Irrigation Sources

Irrigation Sources	DCWTP	Well 3	Well 2	King Edward
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	0.00	0.22	0.06	0.04
Average (ML/Day)	0.00	0.04	0.00	0.00
Monthly Total (ML)	0.01	1.05	0.11	0.10

3. Treatment Plants

GVW has two treatment plants: Duteau Creek Water Treatment Plant (DCWTP) and Mission Hill Water Treatment Plant (MHWTP). At the DCWTP water is first treated with a coagulant and mixed to create a floc, next clarification is achieved by Dissolved Air Floatation (DAF). Chlorine is added after treatment to ensure contact time for the removal of viruses, followed by Ultra-violet (UV) disinfection, and finally chlorine is added before entering the distribution system for residual. MHWTP uses a dual disinfection process of UV and chlorine.

Tables 4 and 6 summarize results for chlorine, bacterial, turbidity, UV Transmittance (UVT) and UV Dosage (UVD). Table 5 summarizes the log removal of viruses at the DCWTP.

Table 4 Duteau Creek Water Treatment Plant Reservoir

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ²	SCADA ¹ Daily Average	mg/L	31 Days	-----	1.89	1.91	1.90
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.33	0.45	0.38
UVT (unfiltered)	GVW	%	14	-----	87.5	90.1	88.4
Pre UVT ³	SCADA ¹	%	31 Days	-----	85.76	88.33	87.18

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – Free Chlorine >0.20 mg/L Turbidity < 1.0 NTU.

³UVT is monitored pre-UV treatment which is used to determine UV dosage.

This month, 0 m³ off-spec water occurred at DCWTP.

Table 5 DCWTP – Log Removal of Viruses

Parameter	Days Monitored	Min (log)	Max (log)	Average (log)
Log Removal of Viruses ¹	31	13.81	40.99	27.81

¹4-log virus removal logged by the minute on SCADA.

Table 6 Mission Hill Water Treatment Plant

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (483 Pressure Zone)	SCADA ¹ Daily Average	mg/L	31 Days	-----	2.10	2.32	2.29
Free Chlorine (550 Pressure Zone)	SCADA ¹ Daily Average	mg/L	31 Days	-----	2.08	2.39	2.22
E.coli	Caro	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	6	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	6	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	-----	0.31	1.05	0.48
Pre UVT	SCADA ¹	%	31 Days	-----	90.92	91.60	91.38

¹SCADA: Supervisory Control and Data Acquisition.

²GVW WQ Deviation Response Plan – Free Chlorine >0.20 mg/L Turbidity < 3.0 NTU.

This month, 0 m³ off-spec water occurred at MHWTP.

4. Distribution

GVW has two distribution systems that interconnect: Duteau System supplied by Duteau Creek and Kalamalka System supplied by Kalamalka Lake. GVW has approximately 22,350 service connections.

Table 7 summarizes the daily flow for each distribution system. The Duteau and Kalamalka systems have many locations where they can be interconnected. This means there are areas where there is a blend of water quality and can be identified by the conductivity of the water.

Table 7 Monthly Usage for GVW Distribution Systems

Distribution Systems	DCWTP	MHWTP
Min (ML/Day)	6.50	9.21
Max (ML/Day)	11.20	16.86
Average (ML/Day)	8.11	12.11
Monthly Total (ML)	251.40	375.36

The GVW distribution system contains six sampling sites (Table 8) that frequently have free chlorine < 0.2 mg/L due to the sample sites being located at the end of the distribution line (Tables 9 and 10). Measures are currently in place to mitigate this issue including regular monitoring and flushing. The three sites at Boss Creek represent a localized area.

Table 8 Low Chlorine Sites and Mitigation Measures

Frequent Low Free Chlorine Sites	Mitigation Measures
O'Keefe Ranch SS	On a localized Water Quality Advisory, regular monitoring and flushing
9007 Aberdeen Rd SS	Regular monitoring and flushing
Noble Canyon B/O	Regular monitoring and flushing
Boss Creek PH 1 (Lower) Return/Inlet	Regular monitoring
Boss Creek PH 2 (Upper) Discharge/Outlet	Regular monitoring
Boss Creek PH 2 (Upper) return/inlet	Regular monitoring

Tables 9 and 10 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly

Table 9 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	63	-----	0.20	1.79	1.01
Total Chlorine	GVW grab sample	mg/L	63	-----	0.32	1.99	1.18
E.coli	Caro	CFU/100 mL	17	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	21	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	17	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	21	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	63	-----	0.13	1.37	0.55

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 1 NTU.

Table 10 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	99	-----	0.40	2.02	1.42
Total Chlorine	GVW grab sample	mg/L	99	-----	0.62	2.20	1.67
E.coli	Caro	CFU/100 mL	46	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	33	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	46	1²	<1	1	<1
Total Coliform	GVW	MPN/100 mL	33	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	99	-----	0.24	1.70	0.61

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 1 NTU.

²One sample had a total coliform count from Caro Analytical: Vernon Jubilee Hospital 1 CFU/100 mL. This site was resampled and came back <1 for Total Coliform and E.coli.

5. Customer Calls and Notifications

Customer calls within the GVW Service area are tracked and recorded. As of September, customer calls will include water quality inquiries, therefore the number of calls will increase. There were a total of 10 customer calls in March.

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
3	inquiry	na	na	hardness of water any changes in the water quality
3	water quality	na	na	these were within strata's therefore the strata needs to flush
1	water quality	coloured water	na	one had an in home system therefore cross connection looking into this home;
1	water quality	coloured water	na	water cleared up over the weekend
1	water quality	musty water	yes	sampled; all parameters are within guidelines
1	water quality	taste	yes	sampled; all parameters are within guidelines

6. Operational or Maintenance Activity

The annual water main flushing program will begin in May.
There were 2 water main break in the GVW system in March.