

Greater Vernon Water (GVW) Water Quality Report for October 2022

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

GVW continues to work on a large infrastructure project increasing the size of the spillway at Headgates Dam in our watershed. Throughout construction, UV treatment on the Duteau Creek source may be intermittently affected, and GVW has to maintain a lower level of water flow to complete the project. GVW has issued the following notices this month:

On October 21st a Water Notice Update was issued reminding customers of the Precautionary Water Quality Advisory with map, adjusting the source water change, and Stage 2 water restrictions.

On October 28th, a Water Notice Update was issued notifying customers that water restrictions have returned to Normal from Stage 2.

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.coli ²	Caro	MPN/100 mL	5	-----	2	8	4.4
E.coli ²	GVW	MPN/100 mL	4	-----	2	5.2	3.3
Total Coliform	Caro	MPN/100 mL	5	-----	687	2370	1249.8
Total Coliform	GVW	MPN/100 mL	4	-----	613.1	1732.9	1236.3
Turbidity	GVW Grab Sample	NTU	4	-----	1.04	2.55	1.45
Turbidity	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.46	1.32	0.64

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.

³GVW uses the MPN method which has a Detection Limit of 200.5 MPN/100 mL.

Table 2 North Kalamalka Intake

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli ³	Caro	MPN/100 mL	4	-----	<1	8	2.5
E.coli ³	GVW	MPN/100 mL	4	-----	<1	5.2	2.3
Total Coliform	Caro	MPN/100 mL	4	-----	5	24	10.8
Total Coliform	GVW	MPN/100 mL	4	-----	6.3	17.1	9.8
Turbidity ²	GVW Grab Sample	NTU	4	-----	1.20	1.39	1.27
Turbidity ²	SCADA ¹ Hourly Average	NTU	31 Days	-----	0.85	1.32	1.05

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 sources used for irrigation supply include Duteau Creek, King Edward/Deer Creek, Goose Lake, Coldstream Ranch Well #2 and Well #3. 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.

The irrigation season is from April 15 to September 15. Irrigation water used extended into the off season is used mainly for livestock watering. This water comes from Ranch Wells #2 and Ranch Well #3, King Edward, Duteau Creek.

The 2022 irrigation season ended on September 15. Table 3 summarizes the daily flows for each irrigation system.

Table 3 Irrigation Volumes for Irrigation Sources over the Month

Irrigation Sources	DCWTP	Well 3	Well 2	King Edward
Min (ML/Day)	0.00	0.00	0.00	0.00
Max (ML/Day)	253.52	0.53	0.95	1.06
Average (ML/Day)	13.82	0.02	0.05	0.14
Monthly Total (ML)	428.38	0.69	1.63	4.47

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	----	1.75	2.25	1.94
E.coli	Caro	CFU/100 mL	4	----	<1	<1	<1
E.coli	GVW	MPN/100 mL	4	----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	31 Days	----	0.24	0.30	0.28
Pre UVT ³	SCADA ¹	%	31 Days	----	90.05	92.59	91.59

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.

Due to the infrastructure project, low flows make it difficult to track volumes and UV offspec water.

Table 5 DCWTP – Log Removal of Viruses

Log Removal of Viruses ¹	
Days Monitored	31
Days 4 Log Removal Achieved	31

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	28 Days ³	-----	2.16	2.21	2.20
E.coli	Caro ⁴	CFU/100 mL	4	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	4	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	4	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	28 Days ³	-----	0.78	1.18	0.98
Pre UVT	SCADA ¹	%	28 Days ³	-----	98.08	91.22	89.98

¹SCADA: Supervisory Control and Data Acquisition.

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

³Three days of data could not be recovered from the SCADA Historian.

This month, 0 m³ of 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.

The following operational changes have occurred during the large infrastructure project:

- From the middle of September until October 13th - the 580 zone in Coldstream was a blend of Kalamalka Lake and Duteau Creek.
- From October 13th until October 20th most of the GVW system was fed from Kalamalka Lake during the 72 hour shutdowns.
- Since October 20th the system split is normal running conditions: split at McMechan but Middleton Mountain is currently on Kalamalka Lake.

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 Volumes for GVW Distribution Systems over the Month

Volumes	DCWTP	MHWTP
Min (ML/Day)	0.70	11.48
Max (ML/Day)	6.50	29.59
Average (ML/Day)	3.88	21.18
Monthly Total (ML)	116.50	635.36

Tables 8 and 9 summarize results for chlorine, bacterial, and turbidity for each distribution system. These systems are monitored by handheld instruments weekly.

Table 8 Duteau Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	50	5 ²	0.08	1.76	0.78
Total Chlorine	GVW grab sample	mg/L	50	-----	0.23	2.08	0.99
E.coli	Caro	CFU/100 mL	18	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	23	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	18	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	23	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	50	5 ³	0.23	1.28	0.68

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

²Five samples at three sites had Free Chlorine <0.20 mg/L: Galiano Road B/O, Boss Creek 1 PS Return and Boss Creek 2 PS Return.

³Five sites had turbidity >1 NTU: PRV 2, PRV 076, Goose Lake Road PS, Braeburn Drive SS and Galiano Road B/O.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	67	1 ²	0.13	2.07	1.24
Total Chlorine	GVW grab sample	mg/L	67	-----	0.22	2.46	1.50
E.coli	Caro	CFU/100 mL	40	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	21	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	40	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	21	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	67	----	0.39	1.76	0.91

¹Operation Guidelines: Free Chlorine >0.20 mg/L or <2.20 mg/L, Turbidity < 3 NTU.

The GVW distribution system contains six sampling sites (Table 10) that frequently have free chlorine < 0.2 mg/L due to the sample sites being located at the end of the distribution line. 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 10 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
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

5. Customer Calls and Notifications

Customer calls within the GVW Service area are tracked and recorded. There were a total of 5 customer calls in October.

Table 11 Customer calls for the month

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
1	Inquiry	WQA questions	na	Questions answered
1	water quality	dirty water	yes	power outage cause water in pipes to stir and cause turbidity
1	Operational	air in pipe	na	new main line caused air in pipes
1	water quality	staining / build up in toilet tank	yes	samples the water entering home; look at the build up from the toilet
1	water quality	yellow water	na	due to source change

6. Operational or Maintenance Activity

Operational activity within the GVW service area are tracked and recorded using an online database. There were a total of 26 operational activities in October.

Table 12 Monthly operational work and maintenance for the City of Vernon

NUMBER OF LOCATIONS	TYPE OF WORK
4	Hydrant Maintenance
0	Hydrant Maintenance – Corrective
0	New Hydrant Install
4	Water Service GIS Locate
6	Water Main Break Repair
3	Property Damage Repair
0	Water Valve Maintenance
0	Water Valve Repair
2	Water Service Install
7	Water Service Repair
0	Reservoirs Cleaned
0	New Hydrant Sticker Install