

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

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

GVW is starting work on a large infrastructure project. 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. Therefore, GVW has issued three notices: Water Quality Advisory, Water Source Change and Stage 2 water restrictions.

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	4	-----	6	3080	1954
E.coli ²	GVW	MPN/100 mL	5	-----	920.8	2419.6	1809.2
Total Coliform	Caro	MPN/100 mL	4	-----	5	10	6.75
Total Coliform	GVW	MPN/100 mL	5	-----	3.1	5.2	3.92
Turbidity	GVW Grab Sample	NTU	4	-----	1.19	3.6	2.08
Turbidity	SCADA ¹ Hourly Average	NTU	30 Days	-----	0.61	1.93	0.99

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	5	-----	2	6	3.75
E.coli ³	GVW	MPN/100 mL	5	-----	2	7.5	4.4
Total Coliform	Caro	MPN/100 mL	5	-----	3	15	8.6
Total Coliform	GVW	MPN/100 mL	5	-----	6.3	23.1	15.1
Turbidity ²	GVW Grab Sample	NTU	4	-----	1.40	1.85	1.61
Turbidity ²	SCADA ¹ Hourly Average	NTU	30 Days	-----	1.04	1.43	1.22

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 during the off season is used mainly for livestock watering. This water comes from Ranch Wells #2 and Ranch Well #3, King Edward, Duteau Creek and Kalamalka Lake, due to the source change during the infrastructure project.

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)	10.00	1.44	2.05	9.35
Average (ML/Day)	3.96	0.27	0.37	3.78
Monthly Total (ML)	122.88	8.35	11.48	117.05

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	30 Days	----	1.89	1.96	1.91
E.coli	Caro	CFU/100 mL	4	----	<1	<1	<1
E.coli	GVW	MPN/100 mL	5	----	A	A	A
Total Coliform	Caro	CFU/100 mL	4	----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	5	----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	30 Days	----	0.23	0.42	0.31
Pre UVT ³	SCADA ¹	%	30 Days	----	85.63	90.93	87.43

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	30
Days 4 Log Removal Achieved	30

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	30 Days	-----	2.15	2.22	2.20
E.coli	Caro ⁴	CFU/100 mL	5	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	5	-----	A	A	A
Total Coliform	Caro	CFU/100 mL	5	-----	<1	2	0.4
Total Coliform	GVW	MPN/100 mL	5	-----	A	A	A
Turbidity ²	SCADA ¹ Daily Average	NTU	30 Days	-----	1.01	1.45	1.22
Pre UVT	SCADA ¹	%	30 Days	-----	89.55	90.68	89.92

¹SCADA: Supervisory Control and Data Acquisition.

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

This month, 46 m³ of calculated off-spec water occurred at MHWTP due to power outages. This represents less than 0.01% of the total flow.

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 Volumes for GVW Distribution Systems over the Month

Volumes	DCWTP	MHWTP
Min (ML/Day)	3.10	21.92
Max (ML/Day)	66.20	32.48
Average (ML/Day)	30.35	26.93
Monthly Total (ML)	940.80	834.89

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	52	4 ²	0.05	1.97	0.89
Total Chlorine	GVW grab sample	mg/L	52	-----	0.19	2.3	1.08
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	52	6 ³	0.24	1.54	0.59

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

²Four samples had Free Chlorine <0.20 mg/L: Springfield Road SS, Cosens Bay SS, Boss Creek 1 PS Return and Boss Creek 2 PS Return.

³Six sites had turbidity >1 NTU: McMechan Booster, Pleasant Valley Road SS, Rugg Road SS, Braeburn Drive SS, North BX 2 PS and PRV 109.

Table 9 Kalamalka Distribution

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine ¹	GVW grab sample	mg/L	72	-----	0.22	1.98	1.38
Total Chlorine	GVW grab sample	mg/L	72	-----	0.47	2.2	1.7
E.coli	Caro	CFU/100 mL	42	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	24	-----	A	A	A
Total Coliform	Caro	CFU/100 MI	42	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	24	-----	A	A	A
Turbidity ¹	GVW grab sample	NTU	72	----	0.37	2.78	1.16

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 6 customer calls in September.

Table 11 Customer calls for the month

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
1	water quality / information	update on project	na	currently waiting on permits
1	information	GVW add Fluoride to water	na	no GVW does not add Fluoride to water
1	information	water quality data	na	discussions with customer
1	water quality	dirty water	na	lines stirred up due to source change; flush home; if continues customer will call back
1	information	customer on WQA	na	yes customer is on WQA and source change
1	water quality	white residue in kettle and pots	na	due to source change, Duteau to Kalamalka which has higher calcium which is what the white residue is

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 30 operational activities in September.

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

NUMBER OF LOCATIONS	TYPE OF WORK
13	Hydrant Maintenance
0	Hydrant Maintenance – Corrective
0	New Hydrant Install
1	Water Service GIS Locate
4	Water Main Break Repair
1	Property Damage Repair
0	Water Valve Maintenance
1	Water Valve Repair
0	Water Service Install
10	Water Service Repair
0	Reservoirs Cleaned
0	New Hydrant Sticker Install