

## Greater Vernon Water (GVW) Water Quality Report for November 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 21<sup>st</sup> 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 28<sup>th</sup>, 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**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli <sup>2</sup>	Caro	MPN/100 mL	6	-----	<1	3	1
E.coli <sup>2</sup>	GVW	MPN/100 mL	6	-----	<1	3.1	1.9
Total Coliform	Caro	MPN/100 mL	6	-----	100	308	249.5
Total Coliform	GVW	MPN/100 mL	6	-----	96	344.1	221.9
Turbidity	GVW Grab Sample	NTU	5	-----	0.90	1.07	1.00
Turbidity	SCADA <sup>1</sup> Hourly Average	NTU	30 Days	-----	0.55	0.85	0.65

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

<sup>2</sup>Drinking 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.

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

**Table 2 Kalamalka Lake Intake**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
E.coli <sup>3</sup>	Caro	MPN/100 mL	6	-----	1	11	5.5
E.coli <sup>3</sup>	GVW	MPN/100 mL	6	-----	<1	22.8	9.6
Total Coliform	Caro	MPN/100 mL	6	-----	5	28	18
Total Coliform	GVW	MPN/100 mL	6	-----	7.5	43.9	19.2
Turbidity <sup>2</sup>	GVW Grab Sample	NTU	6	-----	0.76	1.64	1.10
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Hourly Average	NTU	30 Days	-----	0.40	1.09	0.67

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

<sup>3</sup>Drinking 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 2022 irrigation season ended on September 15.

## 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 Flootation (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 3 Duteau Creek Water Treatment Plant Reservoir**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
<b>Free Chlorine<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	mg/L	30 Days	-----	1.86	1.96	1.91
<b>E.coli</b>	Caro	CFU/100 mL	5	-----	<1	<1	<1
<b>E.coli</b>	GVW	MPN/100 mL	6	-----	<1	<1	<1
<b>Total Coliform</b>	Caro	CFU/100 mL	5	-----	<1	<1	<1
<b>Total Coliform</b>	GVW	MPN/100 mL	6	-----	<1	<1	<1
<b>Turbidity<sup>2</sup></b>	SCADA <sup>1</sup> Daily Average	NTU	30 Days	-----	0.25	0.34	0.29
<b>Pre UVT<sup>3</sup></b>	SCADA <sup>1</sup>	%	30 Days	-----	88.74	91.65	90.76

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

<sup>3</sup>UVT 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 4 DCWTP – Log Removal of Viruses**

<b>Log Removal of Viruses<sup>1</sup></b>	
<b>Days Monitored</b>	30
<b>Days 4 Log Removal Achieved</b>	30

<sup>1</sup>4-log virus removal logged by the minute on SCADA.

**Table 5 Mission Hill Water Treatment Plant**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine (483 Pressure Zone)	SCADA <sup>1</sup> Daily Average	mg/L	30 Days	-----	1.96	2.21	2.15
E.coli	Caro <sup>4</sup>	CFU/100 mL	6	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	7	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	6	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	7	-----	<1	<1	<1
Turbidity <sup>2</sup>	SCADA <sup>1</sup> Daily Average	NTU	30 Days	-----	0.42	0.99	0.61
Pre UVT	SCADA <sup>1</sup>	%	30 Days	-----	90.01	91.00	90.48

<sup>1</sup>SCADA: Supervisory Control and Data Acquisition.

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

This month, 1.38 m<sup>3</sup> of off-spec water occurred at MHWTP, representing less than 0.01% of the water treated.

#### 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.

During the large infrastructure project the Mission Hill WTP will be supplying the normal distribution system as well as supplementing flows into the 580 Zone when demand in the distribution system normally fed from Duteau Creek source cannot be met by Duteau WTP.

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 6 Volumes for GVW Distribution Systems over the Month**

Volumes	DCWTP	MHWTP
Min (ML/Day)	3.30	11.12
Max (ML/Day)	5.90	15.49
Average (ML/Day)	4.77	12.45
Monthly Total (ML)	143.00	373.55

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

**Table 7 Duteau Distribution**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine <sup>1</sup>	GVW grab sample	mg/L	62	5 <sup>2</sup>	0.06	1.88	0.90
Total Chlorine	GVW grab sample	mg/L	62	-----	0.11	2.18	1.07
E.coli	Caro	CFU/100 mL	24	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	30	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 mL	24	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	30	-----	<1	<1	<1
Turbidity <sup>1</sup>	GVW grab sample	NTU	62	6 <sup>3</sup>	0.20	1.71	0.64

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

<sup>2</sup>Five samples at three sites had Free Chlorine <0.20 mg/L: Golfview Place SS, Boss Creek 1 PS Return and Boss Creek 2 PS Return.

<sup>3</sup>Six samples at five sites had turbidity >1 NTU: 9848 Aberdeen Road, Husband Road PS, Golfview Place SS, Brookside Road BO and Ravine Drive PS

**Table 8 Kalamalka Distribution**

Parameter	Laboratory		# of Samples	# of Deviations	Min	Max	Average
Free Chlorine <sup>1</sup>	GVW grab sample	mg/L	88	1 <sup>2</sup>	0.03	2.02	1.24
Total Chlorine	GVW grab sample	mg/L	88	-----	0.22	>2.2	1.51
E.coli	Caro	CFU/100 mL	52	-----	<1	<1	<1
E.coli	GVW	MPN/100 mL	29	-----	<1	<1	<1
Total Coliform	Caro	CFU/100 MI	52	-----	<1	<1	<1
Total Coliform	GVW	MPN/100 mL	29	-----	<1	<1	<1
Turbidity <sup>1</sup>	GVW grab sample	NTU	88	-----	0.28	1.98	0.79

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

<sup>2</sup>One site had Free Chlorine <0.20 mg/L: Brassey Place SS

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 9 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 9 customer calls in November.

**Table 10 Customer calls for the month**

NUMBER OF CALLS	TYPE OF CALL	ISSUE	INVESTIGATION	COMMENTS
4	Inquiry	WQA questions	na	Questions answered
1	water quality	odour issue	yes	Water quality sampled
1	water quality	taste and odour issue	na	City of Vernon Operations will flush area
1	water quality	taste issue	yes	Water quality sampled
2	water quality	coloured water	no	customers did not return phone calls

**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 November.

**Table 11 Monthly operational work and maintenance for the City of Vernon**

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