BLACK MOUNTAIN IRRIGATION DISTRICT
285 Gray Road
Kelowna, B.C.
V1X 1W8

Office: (250) 765-5169
Fax: (250) 765-0277
www.bmid.ca

MONTHLY REPORTING PERIOD - SEPTEMBER, 2017

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in September, 2017. Documentation and figures are provided on the following pages to support this submission.

	September 2017	
Source	**Total (US Gals)**	**Total (Mega Litres)**
Mission Creek	440,566,000	1,667.54
Well 4	0	0
Well 5	28,958,000	109.61
Scotty Creek (Irrigation Only)	5,897,000	22.32
Total	475,421,000	1,799.47

1. Turbidity levels at the Distribution Intake remained below 1.0 NTU for all of September. Peak turbidity at the Distribution Intake was 0.26 NTU on September 10,13 and 28, 2017;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.37 NTU on September 22, 2017 and average monthly turbidity was 0.32 NTU;
3. Mission Creek experienced low flows for all of September as dry conditions in the watershed continued throughout September, similar to previous months. The watershed witnessed above-average temperatures and very little precipitation throughout September. As a result, BMID began to release water from its upstream reservoirs in July which continued into September;
4. BMID's Scotty Creek intake, used for irrigation water, was utilized throughout the summer due to high irrigation usage in the north-end for the entire month. The Scotty Creek source was shut-off for the season on September 10, 2017;
5. *E.Coli* levels at Mission Creek's Point of Diversion were average during September. The highest raw water *E.Coli* count was 14 on September 7, 2017;
6. *E.Coli* levels at the Distribution Intake had low counts on all samples during September, with a peak count of 2 on September 25, 2017;
7. No *E.Coli* and no *Coliforms* were found in treated water in the distribution system through third-party analysis. In addition, no positive bacteria tests were found from the in-house presence-absence tests;
8. Well #5 was used throughout September as a source for domestic and irrigation water in the north-end of the system in conjunction with Mission Creek system water as determined by usage and pressures in the area;
9. BMID's Water Treatment Plant continued operations as water quality in Mission Creek required chemical treatment to achieve desired turbidity and colour levels;

1.0 FLOWS - SEPTEMBER, 2017

Maximum est. Daily Flow was on September 2, 2017 at 28,601,000 US gallons (108.25 ML)

Minimum est. Daily Flow was on September 23, 2017 at 10,843,000 US gallons (41.04 ML)

Mission Creek provided 94% of domestic flow throughout September.

Figure 1.1 - Domestic Water System Flow

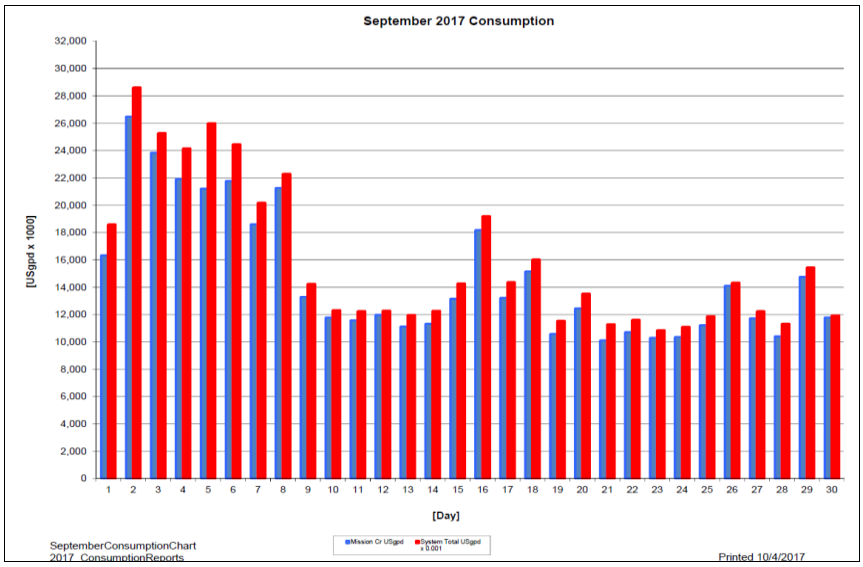

Table 1.2 - September, 2017 Daily Consumption Report

Year	Mission Cr	Well #4	Well #5	Scotty Crk	System Total	System Total
2017	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Sep	16,332,000	0	1,108,000.0	1,136,000.0	18,576,000	70.31
2-Sep	26,481,000	0	1,132,000.0	988,000.0	28,601,000	108.25
3-Sep	23,839,000	0	986,000.0	439,000.0	25,264,000	95.62
4-Sep	21,904,000	0	1,442,000.0	792,000.0	24,138,000	91.36
5-Sep	21,211,000	0	3,817,000.0	953,000.0	25,981,000	98.34
6-Sep	21,770,000	0	1,679,000.0	996,000.0	24,445,000	92.52
7-Sep	18,605,000	0	1,034,000.0	532,000.0	20,171,000	76.35
8-Sep	21,253,000	0	996,000.0	40,000.0	22,289,000	84.36
9-Sep	13,286,000	0	922,000.0	18,000.0	14,226,000	53.85
10-Sep	11,772,000	0	526,000.0	3,000.0	12,301,000	46.56
11-Sep	11,575,000	0	655,000.0	0.0	12,230,000	46.29
12-Sep	11,975,000	0	297,000.0	0.0	12,272,000	46.45
13-Sep	11,115,000	0	837,000.0	0.0	11,952,000	45.24
14-Sep	11,323,000	0	937,000.0	0.0	12,260,000	46.40
15-Sep	13,150,000	0	1,109,000.0	0.0	14,259,000	53.97
16-Sep	18,182,000	0	1,004,000.0	0.0	19,186,000	72.62
17-Sep	13,218,000	0	1,137,000.0	0.0	14,355,000	54.33
18-Sep	15,146,000	0	870,000.0	0.0	16,016,000	60.62
19-Sep	10,574,000	0	950,000.0	0.0	11,524,000	43.62
20-Sep	12,445,000	0	1,073,000.0	0.0	13,518,000	51.17
21-Sep	10,109,000	0	1,161,000.0	0.0	11,270,000	42.66
22-Sep	10,706,000	0	895,000.0	0.0	11,601,000	43.91
23-Sep	10,289,000	0	554,000.0	0.0	10,843,000	41.04
24-Sep	10,358,000	0	729,000.0	0.0	11,087,000	41.96
25-Sep	11,213,000	0	648,000.0	0.0	11,861,000	44.89
26-Sep	14,101,000	0	220,000.0	0.0	14,321,000	54.20
27-Sep	11,714,000	0	509,000.0	0.0	12,223,000	46.26
28-Sep	10,394,000	0	912,000.0	0.0	11,306,000	42.79
29-Sep	14,746,000	0	683,000.0	0.0	15,429,000	58.40
30-Sep	11,780,000	0	136,000.0	0.0	11,916,000	45.10
Totals Usgpd	440,566,000	0	28,958,000	5,897,000	475,421,000	1799.47
Totals ML	1,667.54	0.00	109.61	22.32		
Avg's	14,685,533	55.58			15,847,367	59.98
Max	26,481,000	100.23			28,601,000	108.25
Min	10,109,000	38.26			10,843,000	41.04

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination

Samples were taken twice per week at the Distribution Intake's Point of Disinfection and at the Mission Creek raw water Point of Diversion; one sample is taken per week at Stevens Pond outlet (point halfway between WTP Outlet and Distribution Intake).

Samples from the previous month are also provided to show a two month trend

Figure 2.1 - E.Coli Readings (CARO Lab results) August 2017 - September 2017

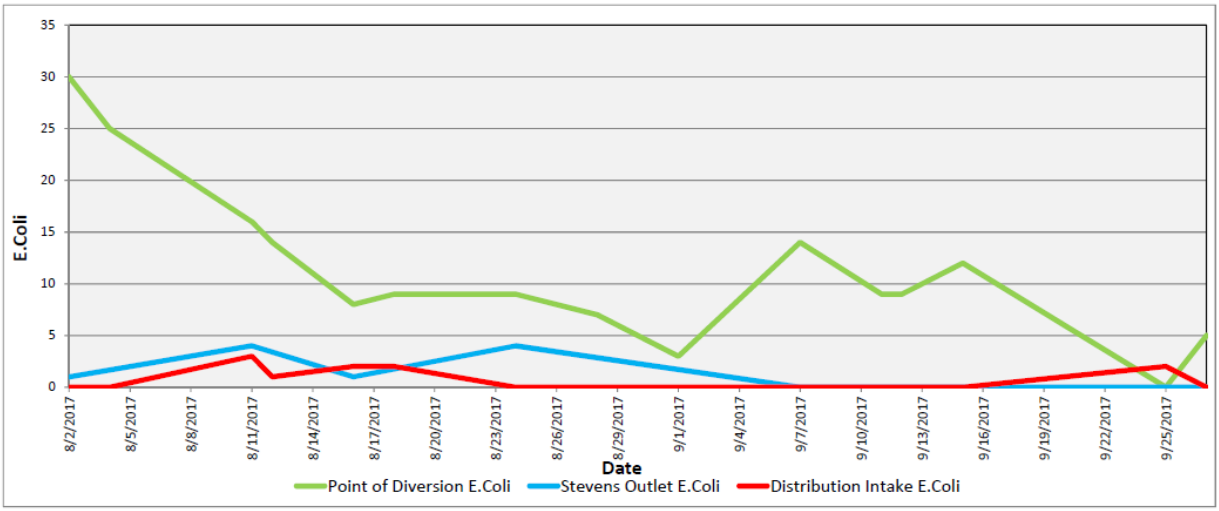

Table 2.2 - E.Coli Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
2-Aug-17	30	1	0
4-Aug-17	25		0
11-Aug-17	16	4	3
12-Aug-17	14		1
16-Aug-17	8	1	2
18-Aug-17	9		2
24-Aug-17	9	4	0
28-Aug-17	7		0
1-Sep-17	3		0
7-Sep-17	14	0	0
11-Sep-17	9		0
12-Sep-17	9	0	0
15-Sep-17	12		0
20-Sep-17	6	0	1
25-Sep-17	0		2
27-Sep-17	5	0	0

Stevens or WTP Intake (Raw) - Sampling of raw water at intake from Mission Creek
Stevens Outlet (Raw) - Sampling point after exiting 142,000 m^3 1st upper balancing reservoir (Stevens Res.)
Hadden Outlet (Raw) - Sampling point after exiting 75,000 m^3 2nd lower balancing reservoir (Hadden Res.)
(*Hadden Outlet = Distribution Intake - Point of Disinfection*)

3.0 RAW AND TREATED WATER TURBIDITY

Turbidity for the Mission Creek source was measured at Booster Station No. 1 on Gallagher's Road, the first-customer, through September 2017. The highest turbidity recorded at this location was 0.37 NTU on September 22, 2017.

Figure 3.1 – Daily Turbidity Readings (Distribution Intake and Booster Station 1)

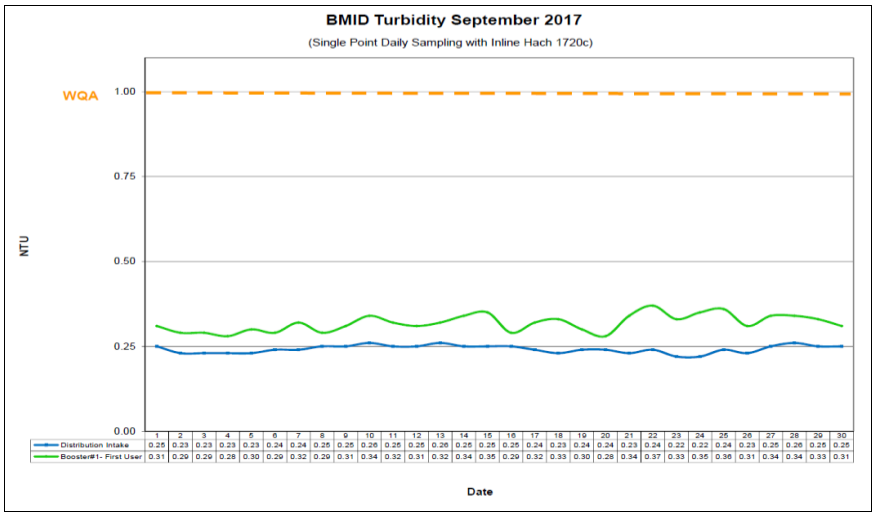

Table 3.2 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for September 2017				
Date	Distribution Intake		Booster#1- First User	
	Sample Time	[NTU]	Sample Time	[NTU]
1	9:22 AM	0.25	7:55 AM	0.31
2	11:39 AM	0.23	11:13 AM	0.29
3	11:29 AM	0.23	11:02 AM	0.29
4	10:31 AM	0.23	9:56 AM	0.28
5	8:25 AM	0.23	7:49 AM	0.30
6	11:26 AM	0.24	9:38 AM	0.29
7	8:20 AM	0.24	7:39 AM	0.32
8	11:52 AM	0.25	11:17 AM	0.29
9	7:49 AM	0.25	7:56 AM	0.31
10	8:01 AM	0.26	7:33 AM	0.34
11	8:47 AM	0.25	8:04 AM	0.32
12	8:18 AM	0.25	7:42 AM	0.31
13	8:41 AM	0.26	8:06 AM	0.32
14	8:30 AM	0.25	7:53 AM	0.34
15	9:35 AM	0.25	7:43 AM	0.35
16	1:00 PM	0.25	12:41 PM	0.29
17	10:42 AM	0.24	10:17 AM	0.32
18	2:03 PM	0.23	1:36 PM	0.33
19	9:15 AM	0.24	8:54 AM	0.30
20	9:35 AM	0.24	9:00 AM	0.28
21	9:21 AM	0.23	7:39 AM	0.34
22	10:08 AM	0.24	9:31 AM	0.37
23	8:19 AM	0.22	8:03 AM	0.33
24	9:36 AM	0.22	9:15 AM	0.35
25	8:35 AM	0.24	7:54 AM	0.36
26	9:30 AM	0.23	11:20 AM	0.31
27	10:33 AM	0.25	9:51 AM	0.34
28	11:21 AM	0.26	8:17 AM	0.34
29	2:07 PM	0.25	1:36 PM	0.33
30	12:12 PM	0.25	12:27 PM	0.31
Average		0.24		0.32

4.0 CHLORINE CONTACT TIME

Temperature, pH, current flow and chlorine residual levels are recorded to determine the CT levels that are required to provide 3 log inactivation of *Giardia*. Chlorine Contact times exceeded the CT levels required to provide 3 log (99.9%) inactivation of *Giardia Lamblia* throughout the month of September, 2017.

Figure 4.1 - CT Trending – BMID Mission Creek Source – September 2017

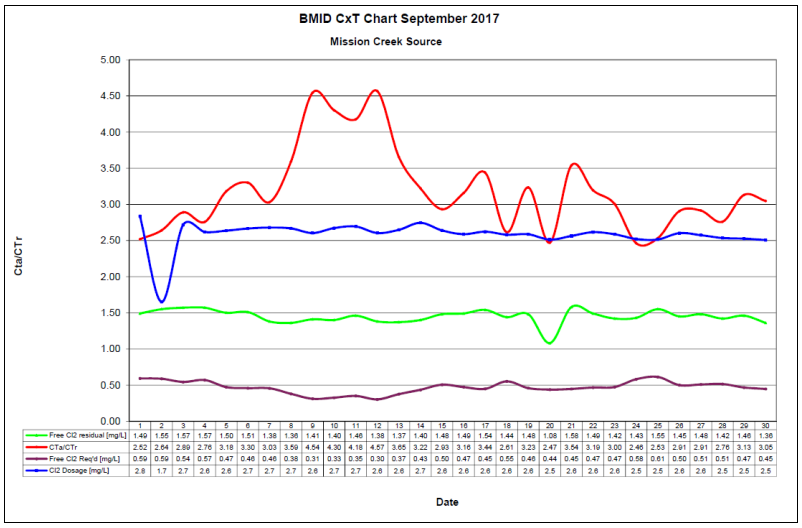

Table 4.2 - CT Table – Mission Creek Source

	BMID September 2017												
	Mission Creek Source												
DATE	pH	TEMP	PEAK	Free Cl_2	CT	CT	CTa/CTr	Free Cl_2	Cl_2	VOLUME	TIME	FLOW	CL_2 DOSAGE
	(highest)	(lowest)	FLOW	residual	achieved	req'd		Req'd	Dosage	TOTAL		PRESENT	PRESENT
September		[°C]	[Usgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[USGPM]	[PPD]
1	7.22	17.0	19622	1.49	201.2	79.9	2.52	0.59	2.8	2649600	135	14850	506
2	7.22	17.2	19627	1.55	209.2	79.3	2.64	0.59	1.1	2649600	135	15074	199
3	7.22	17.5	18504	1.57	224.8	77.8	2.89	0.54	2.7	2649600	143	16364	534
4	7.22	17.7	19661	1.57	211.6	76.7	2.76	0.57	2.6	2649600	135	15353	483
5	7.23	17.9	16567	1.50	239.9	75.4	3.18	0.47	2.6	2649600	160	14744	467
6	7.23	17.8	15946	1.51	250.9	76.0	3.30	0.46	2.7	2649600	166	13581	435
7	7.22	17.5	15816	1.38	231.2	76.3	3.03	0.46	2.7	2649600	168	13850	446
8	7.24	17.5	13079	1.36	275.5	76.7	3.59	0.38	2.7	2649600	203	10576	339
9	7.25	17.6	10693	1.41	349.4	76.9	4.54	0.31	2.6	2649600	248	8055	252
10	7.25	17.6	11229	1.40	330.3	76.8	4.30	0.33	2.7	2649600	236	8783	282
11	7.27	16.7	11178	1.46	346.1	82.9	4.18	0.35	2.7	2649600	237	7786	252
12	7.28	16.9	9844	1.38	371.4	81.3	4.57	0.30	2.6	2649600	269	8725	273
13	7.28	16.2	11645	1.37	311.7	85.3	3.65	0.37	2.6	2649600	228	6915	220
14	7.31	15.6	12764	1.40	290.6	90.2	3.22	0.43	2.7	2649600	208	7581	250
15	7.34	14.8	13756	1.48	285.1	97.2	2.93	0.50	2.6	2649600	193	10375	329
16	7.33	13.8	12036	1.49	328.0	103.9	3.16	0.47	2.6	2649600	220	9521	296
17	7.34	13.2	10861	1.54	375.7	109.3	3.44	0.45	2.6	2649600	244	10506	331
18	7.33	12.7	13082	1.44	291.7	111.6	2.61	0.55	2.6	2649600	203	9385	291
19	7.34	12.1	10346	1.48	379.0	117.2	3.23	0.46	2.6	2649600	256	7723	240
20	7.38	11.8	10000	1.08	286.2	115.8	2.47	0.44	2.5	2649600	265	8115	245
21	7.39	11.3	9282	1.58	451.0	127.4	3.54	0.45	2.6	2649600	285	6884	212
22	7.40	10.9	9480	1.49	416.4	130.4	3.19	0.47	2.6	2649600	279	7955	250
23	7.41	10.9	9641	1.42	390.3	129.9	3.00	0.47	2.6	2649600	275	7015	218
24	7.43	10.6	11505	1.43	329.3	133.7	2.46	0.58	2.5	2649600	230	7955	241
25	7.44	10.6	11943	1.55	343.9	135.8	2.53	0.61	2.5	2649600	222	7447	225
26	7.44	10.8	9968	1.45	385.4	132.6	2.91	0.50	2.6	2649600	266	9148	286
27	7.44	11.1	10330	1.48	379.6	130.3	2.91	0.51	2.6	2649600	256	9087	281
28	7.45	11.7	10936	1.42	344.0	124.7	2.76	0.51	2.5	2649600	242	7814	238
29	7.46	11.5	9700	1.46	398.8	127.4	3.13	0.47	2.5	2649600	273	9721	295
30	7.47	12.3	9885	1.36	364.5	119.7	3.05	0.45	2.5	2649600	268	7238	218
Averages	7.33	14.36	12631	1.45	319.762	102	3.19	0.47	2.56				

5.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

- Samples taken once per week at eight locations around the BMID service area
- 32 samples were found to be absent of Coliforms.
- 32 samples were found to be absent of *E.Coli*.

Table 5.1 - CARO Independent Lab Testing – Total Coliforms – E.Coli

Date	PRV 7		Booster 1		Ellison Blow-Off		Ellison School		612 Adams Rd		Prospect Reservoir		Tower Reservoir		Well #5	
	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
2-Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24-Aug-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27-Sep-17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

In-House Analysis (BMID Staff)

- Presence/Absence samples taken on a three week cycle at ten sites around the BMID service area.
- All samples were found to be absent of both Total Coliforms and *E.Coli*.

Table 5.2 - BMID In-house Testing – Presence Absence

Location	9/5/2017				9/11/2017				9/18/2017				9/25/2017			
	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
2670 Enterprise Way									0.91	19.0	-	X				
#5 217 Franklin Rd	0.83	20.6	-	X									1.00	12.0	-	X
2105 Morrison									1.03	17.6	-	X				
Pearson School					1.09	17.4	-	X								
800 Galbraith Ct	1.08	20.4	-	X									1.32	10.6	-	X
Stayman Rd	1.18	23.6	-	X									0.60	13.0	-	X
PRV #10									1.14	17.0	-	X				
260 Campion Rd					0.03	21.0	-	X								
2821 Fenwick Rd	0.67	25.0	-	X									0.68	16.0	-	X
2931 Belgo Rd					1.00	16.6	-	X								

- BMID Population = 22,400

RECOMMENDED TESTS

- Recommended number of samples per month = 22

  (as per Guide for Canadian Drinking Water Quality)

ACTUAL TESTS

- Total tests by BMID staff (presence/absence) = 14
- Total tests sampled by BMID and tested by Caro Labs = 32
- Total tests sampled in BMID treated distribution system = 46 (Zero Positive Samples)