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

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

BMID FILE: 486

MONTHLY REPORTING PERIOD - FEBRUARY, 2018

1. SUMMARY

The list below provides a summary of the water quality information collected by BMID in February, 2018. Documentation and figures are provided on the following pages to support this submission.

	February 2018	
Source	**Total (US Gals)**	**Total (Mega Litres)**
Mission Creek	46,997,000	177.88
Well 4	0	0
Well 5	841,000	3.18
Scotty Creek (Irrigation Only)	0	0
Total	47,838,000	181.07

1. Turbidity levels at the Distribution Intake remained below 1.0 NTU for all of February. Peak turbidity at the Distribution Intake was 0.31 NTU at various times during late February, 2018;
2. The highest monthly turbidity level recorded at the first customer (Booster #1) was 0.47 NTU on February 14, 2018 and average monthly turbidity was 0.43 NTU;
3. Mission Creek experienced normal flows for winter as freezing conditions in the watershed continued throughout February;
4. BMID's Scotty Creek source, used for irrigation in the north end, was shut-off for the season on September 10, 2017;
5. Well #5 was used throughout February as a source for domestic water in the north-end of the system, in conjunction with Mission Creek system water, as determined by usage and pressures in the area;
6. A new dedicated sample location was added at 170 Kneller Rd which will take the place of the former sample site previously located at #5, 217 Franklyn Rd;
7. *E.Coli* levels at Mission Creek's Point of Diversion were average during February. The highest raw water *E.Coli* count was 8 on February 16, 2018;
8. *E.Coli* levels at the Distribution Intake had low counts on all samples throughout the month, with a peak count of 3 on February 16, 2018;
9. 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 during routine testing;
10. BMID's Water Treatment Plant was first placed on stand-by on October 13, 2017. The WTP remains able to resume operations if Mission Creek is not of sufficient quality to by-pass treatment. Throughout February 2018, the WTP has remained on stand-by;

1.0 FLOWS - FEBRUARY, 2018

Maximum est. Daily Flow was on February 5, 2018 at 2,017,000 US gallons (7.63 ML)

Minimum est. Daily Flow was on February 6, 2018 at 1,353,000 US gallons (5.12 ML)

Mission Creek provided 98% of domestic flow throughout February.

Figure 1.1 - Domestic Water System Flow

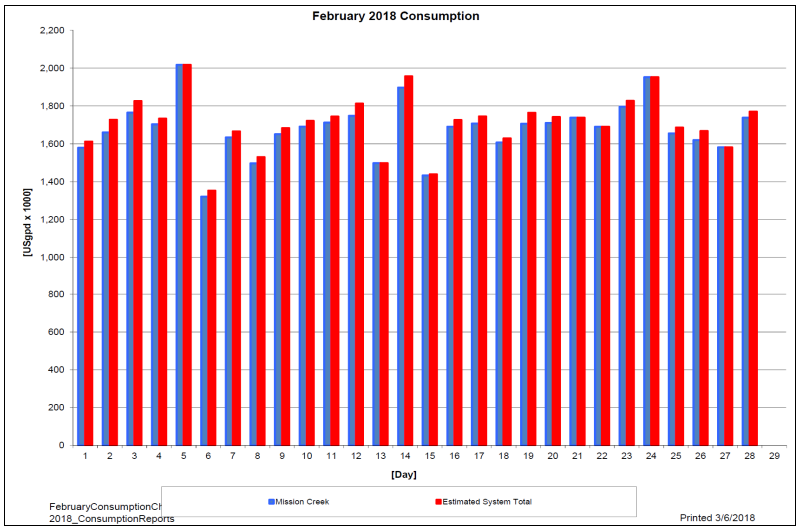

Table 1.2 - February, 2018 Daily Consumption Report

Year	Mission Creek	Well #4	Well #5	System Total	System Total
2018	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Feb	1,579,000	0	33,000.0	1,612,000	6.10
2-Feb	1,660,000	0	67,000.0	1,727,000	6.54
3-Feb	1,765,000	0	61,000.0	1,826,000	6.91
4-Feb	1,703,000	0	30,000.0	1,733,000	6.56
5-Feb	2,017,000	0	0.0	2,017,000	7.63
6-Feb	1,321,000	0	32,000.0	1,353,000	5.12
7-Feb	1,634,000	0	32,000.0	1,666,000	6.31
8-Feb	1,497,000	0	33,000.0	1,530,000	5.79
9-Feb	1,651,000	0	32,000.0	1,683,000	6.37
10-Feb	1,691,000	0	30,000.0	1,721,000	6.51
11-Feb	1,712,000	0	32,000.0	1,744,000	6.60
12-Feb	1,748,000	0	65,000.0	1,813,000	6.86
13-Feb	1,498,000	0	0.0	1,498,000	5.67
14-Feb	1,897,000	0	60,000.0	1,957,000	7.41
15-Feb	1,433,000	0	6,000.0	1,439,000	5.45
16-Feb	1,690,000	0	36,000.0	1,726,000	6.53
17-Feb	1,707,000	0	38,000.0	1,745,000	6.60
18-Feb	1,607,000	0	22,000.0	1,629,000	6.17
19-Feb	1,706,000	0	58,000.0	1,764,000	6.68
20-Feb	1,710,000	0	32,000.0	1,742,000	6.59
21-Feb	1,738,000	0	0.0	1,738,000	6.58
22-Feb	1,690,000	0	0.0	1,690,000	6.40
23-Feb	1,796,000	0	31,000.0	1,827,000	6.92
24-Feb	1,952,000	0	0.0	1,952,000	7.39
25-Feb	1,655,000	0	31,000.0	1,686,000	6.38
26-Feb	1,620,000	0	48,000.0	1,668,000	6.31
27-Feb	1,582,000	0	0.0	1,582,000	5.99
28-Feb	1,738,000	0	32,000.0	1,770,000	6.70
Totals Usgpd	46,997,000	0	841,000	47,838,000	181.07
Totals ML	177.88	0.00	3.18		
Avg's	1,678,464	6.35		1,708,500	6.47
Max	2,017,000	7.63		2,017,000	7.63
Min	1,321,000	5.00		1,353,000	5.12

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) January 2018 - February 2018

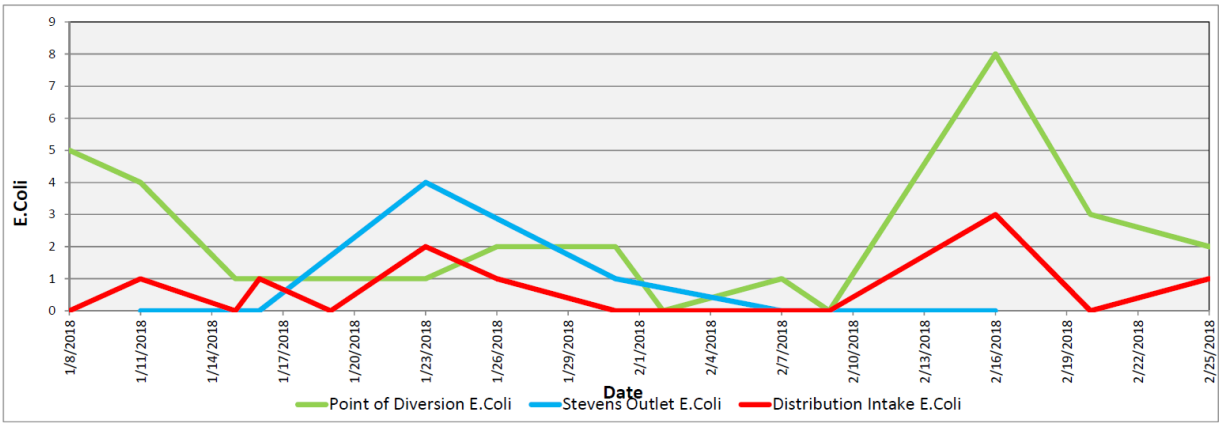

Table 2.2 - E.Coli Readings (CARO Labs)

Date	Point of Diversion E.Coli	Stevens Outlet E.Coli	Distribution Intake E.Coli
8-Jan-18	5		0
11-Jan-18	4	0	1
15-Jan-18	1		0
16-Jan-18	1	0	1
19-Jan-18	1		0
23-Jan-18	1	4	2
26-Jan-18	2		1
31-Jan-18	2	1	0
2-Feb-18	0		0
7-Feb-18	1	0	0
9-Feb-18	0		0
16-Feb-18	8	0	3
20-Feb-18	3		0
25-Feb-18	2		1

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 February 2018. The highest turbidity recorded at this location was 0.47 NTU on February 14, 2018.

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

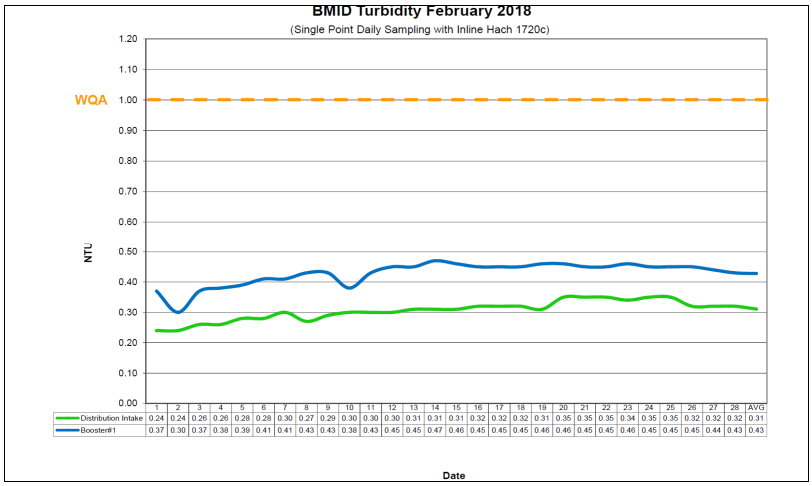

Table 3.2 - Daily Monitoring Record – Turbidity at Distribution Intake & Bst Stn 1

Turbidity Point Sampling for February 2018				
Date	Distribution Intake		Booster#1	
	Sample Time	[NTU]	Sample Time	[NTU]
1	8:42 AM	0.24	8:09 AM	0.37
2	8:55 AM	0.24	7:46 AM	0.30
3	10:08 AM	0.26	9:38 AM	0.37
4	10:15 AM	0.26	9:45 AM	0.38
5	2:51 PM	0.28	1:33 PM	0.39
6	9:06 AM	0.28	8:03 AM	0.41
7	8:40 AM	0.30	8:15 AM	0.41
8	9:36 AM	0.27	7:57 AM	0.43
9	9:59 AM	0.29	8:03 AM	0.43
10	9:03 AM	0.30	8:21 AM	0.38
11	9:11 AM	0.30	8:32 AM	0.43
12	10:50 AM	0.30	10:15 AM	0.45
13	8:42 AM	0.31	8:04 AM	0.45
14	12:47 PM	0.31	10:38 AM	0.47
15	9:00 AM	0.31	8:20 AM	0.46
16	8:38 AM	0.32	8:02 AM	0.45
17	9:44 AM	0.32	9:18 AM	0.45
18	9:03 AM	0.32	8:21 AM	0.45
19	9:09 AM	0.31	8:29 AM	0.46
20	8:42 AM	0.35	9:36 AM	0.46
21	9:17 AM	0.35	8:39 AM	0.45
22	8:39 AM	0.35	8:05 AM	0.45
23	9:38 AM	0.34	8:59 AM	0.46
24	12:25 PM	0.35	11:59 AM	0.45
25	10:35 AM	0.35	9:49 AM	0.45
26	10:55 AM	0.32	8:25 AM	0.45
27	9:35 AM	0.32	9:08 AM	0.44
28	9:18 AM	0.32	8:02 AM	0.43
AVG		0.31		0.43

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 February, 2018.

Figure 4.1 - CT Trending – BMID Mission Creek Source – February 2018

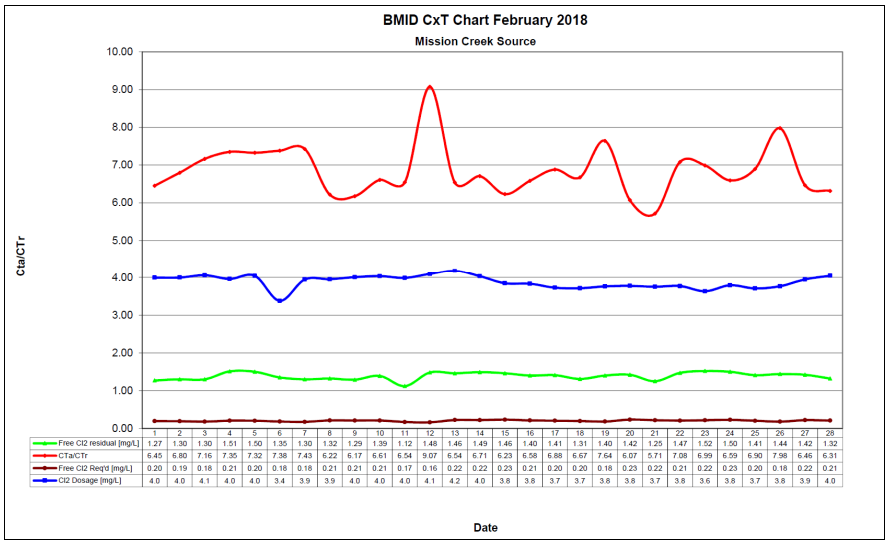

Table 4.2 - CT Table – Mission Creek Source

	BMID February 2018												
	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
February		[°C]	[Usgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	6873	[PPD]
1	7.79	2.0	1920	1.27	1752.6	271.6	6.45	0.20	4.0	2649600	1380	1313	63
2	7.80	1.9	1849	1.30	1862.9	274.1	6.80	0.19	4.0	2649600	1433	1125	54
3	7.79	2.2	1794	1.30	1920.0	268.1	7.16	0.18	4.1	2649600	1477	1272	62
4	7.80	2.0	1953	1.51	2048.6	278.8	7.35	0.21	4.0	2649600	1357	1472	70
5	7.81	2.0	1943	1.50	2045.5	279.3	7.32	0.20	4.0	2649600	1364	1153	56
6	7.81	2.0	1763	1.35	2028.9	274.9	7.38	0.18	3.4	2649600	1503	1257	51
7	7.81	2.0	1697	1.30	2029.7	273.3	7.43	0.18	3.9	2649600	1561	1161	55
8	7.80	2.1	2071	1.32	1688.8	271.7	6.22	0.21	3.9	2649600	1279	1770	84
9	7.80	2.1	2042	1.29	1673.8	271.1	6.17	0.21	4.0	2649600	1298	1725	83
10	7.81	2.0	2022	1.39	1821.4	275.7	6.61	0.21	4.0	2649600	1310	1444	70
11	7.82	2.0	1689	1.12	1757.0	268.6	6.54	0.17	4.0	2649600	1569	1566	75
12	7.57	2.0	1682	1.48	2331.4	257.0	9.07	0.16	4.1	2649600	1575	1403	69
13	7.79	2.0	2140	1.46	1807.7	276.6	6.54	0.22	4.2	2649600	1238	1650	83
14	7.79	1.8	2090	1.49	1888.9	281.7	6.71	0.22	4.0	2649600	1268	1032	50
15	7.82	1.8	2189	1.46	1767.2	283.8	6.23	0.23	3.8	2649600	1210	1927	89
16	7.83	1.8	1996	1.40	1858.4	282.4	6.58	0.21	3.8	2649600	1327	1912	88
17	7.83	1.7	1910	1.41	1956.0	284.2	6.88	0.20	3.7	2649600	1387	1564	70
18	7.84	1.7	1844	1.31	1882.3	282.1	6.67	0.20	3.7	2649600	1437	1458	65
19	7.82	1.5	1693	1.40	2191.0	286.7	7.64	0.18	3.8	2649600	1565	1173	53
20	7.81	1.5	2152	1.42	1748.3	288.1	6.07	0.23	3.8	2649600	1231	1787	81
21	7.79	1.4	2058	1.25	1609.3	281.7	5.71	0.22	3.7	2649600	1287	1265	57
22	7.80	1.5	1915	1.47	2033.9	287.2	7.08	0.21	3.8	2649600	1384	1259	57
23	7.78	1.5	2000	1.52	2013.7	288.1	6.99	0.22	3.6	2649600	1325	1169	51
24	7.79	1.4	2082	1.50	1908.9	289.5	6.59	0.23	3.8	2649600	1273	1230	56
25	7.79	1.6	1920	1.41	1945.8	282.1	6.90	0.20	3.7	2649600	1380	1370	61
26	7.79	1.7	1695	1.44	2251.0	282.2	7.98	0.18	3.8	2649600	1563	1216	55
27	7.80	1.7	2064	1.42	1822.9	282.0	6.46	0.22	3.9	2649600	1284	1751	83
28	7.79	1.7	1987	1.32	1760.2	278.8	6.31	0.21	4.0	2649600	1333	1297	63
Averages	7.80	1.8	1934	1.39	1907.4	278.6	6.85	0.20	3.9				

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
- 16 samples were found to be absent of Coliforms.
- 16 samples were found to be absent of *E.Coli*.

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

	PRV 7		Booster 1		Ellison Blow-Off		Ellison School		612 Adams Rd		Prospect Reservoir		Tower Reservoir		Well #5	
Date	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli	Coliforms	E.coli
11-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	/	/
23-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-Jan-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-Feb-18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-Feb-18	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

	2/5/2018				2/13/2018				2/19/2018				2/26/2018			
Location	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres					1.41	4.0	-	X								
170 Kneller Rd									0.18	3.6	-	X				
2105 Morrison					1.09	5.4	-	X								
Pearson School	0.88		-	X									1.05	5.4	-	X
Staymen Rd									0.81	4.0	-	X				
PRV #10					0.94	4.2	-	X								
260 Campion Rd	0.71		-	X									0.72	4.8	-	X
Fenwick Rd									0.99	3.2	-	X				
2931 Belgo Rd	0.74		-	X									0.83	4.8	-	X

- BMID Population = 22,550

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) = 12
- Total tests sampled by BMID and tested by Caro Labs = 28
- Total tests sampled in BMID treated distribution system = 28 (Zero Positive Samples)