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BMID FILE: 486

MONTHLY REPORTING PERIOD - DECEMBER, 2024

SUMMARY

This document provides a summary of the water quantity and quality information collected by BMID in December 2024. Documentation and figures are provided on the following pages to support this submission.

WATER SUPPLY & USAGE SUMMARY

1. Water usage data for December, 2024 is as follows:

Source	Total (US Gallons)	Total (Mega Litres)
Mission Creek	55,080,311	208.48
Well 4	2,910,744	11.02
Well 5	0	0
Well 6 (Irrigation Only)	0	0
Scotty Creek (Irrigation Only)	0	0
Rutland Water Works (est)	7,740,401	29.30
Total (est)	65,731,456	248.79

2. Commencing on November 4th, and continuing until December 6th, BMID began working on a new transmission main to the existing distribution system. During the construction period, BMID shut down the primary Mission Creek water supply and utilize groundwater supplies from Rutland Water Works to supply the distribution system;
3. BMID began refilling Hadden Reservoir on December 2nd with Mission Creek water from the Water Treatment Plant headgates. On December 4th the primary transmission main and existing tunnel were slowly refilled with chlorinated water. By December 6th, BMID switched from Rutland Water Works' temporary groundwater supply to BMID's normal Mission Creek water source;
4. The Scotty Creek source, used to supplement irrigation flows in the north-end of the system during periods of high irrigation demands, was placed in stand-by mode for the year on September 3rd. Scotty Creek remained in stand-by mode for all of December and will remain off until summer 2025 ;
5. Well #5, used as the primary water source in the north-end of the system for both irrigation and domestic consumption during high consumption periods, was placed in stand-by mode on Sep 17th and will remain in stand-by until summer 2025;
6. Well #4, used as a primary source for domestic water in the north-end of the distribution system during low-flow periods was in operation throughout December. Well #4 will remain operational for the remainder of the year as system flows reduce during the autumn and into the winter;

7. Well #6, which supplies water to the north-end irrigation distribution system during times of high irrigation demands, ceased operations on September 24th. Well #6 will resume operation in summer 2025;
8. A portion of the BMID's transmission main west of the Mission Creek Intake and east of the tunnel is located on an unstable slope. Slope movement continues to be monitored. It is currently stable and is not moving;

WATER QUALITY SUMMARY

1. On November 4th, a series of crossties between BMID and Rutland Water Works were utilized to supply BMID with potable groundwater to the BMID distribution system. BMID resumed normal operations utilizing the Mission Creek water source on December 6th. BMID continued its sampling schedule for all potable tests throughout the event;
2. Raw water turbidity levels in Mission Creek peaked at 1.27 NTU on December 1st. Average daily raw water turbidity for December was 0.69 NTU at the Mission Creek Intake;
3. The highest turbidity level at the Distribution Intake was 2.26 NTU on December 3rd while refilling Hadden Reservoir. The refilling process stirred up settled particulate leading to a temporary increase in turbidity. Average settled water turbidity for December was 0.63 NTU at the Distribution Intake at the lower end of Hadden Reservoir. Refilling the reservoir was started on December 2nd and completed on December 4th 2024;
4. The highest turbidity level at the first customer (Booster #1) was 1.06 NTU on December 10th. Turbidity was above 1.00 NTU for less than 24 hours. Average monthly turbidity at the first customer was 0.55 NTU;
5. BMID is investigating the use of Well #6 as a possible future potable water source. A monthly sample was taken at the well on December 31st. Testing will continue for the next year to verify its water quality characteristics;
6. BMID's Ultraviolet Treatment Facility treated 208,502 m^3 of water in December. On December 5th and 6th, a significant percentage of water was labelled as Off-Spec, as the turbidity at the station increased during the refilling process. In total 9,884 m^3 of water was Off-Spec (4.976%). After the initial refilling, the UV plant operated under normal conditions;
7. *E.Coli* levels at Mission Creek's Point-of-Diversion (creek intake prior to WTP) had normal counts for December. The December 16th sample had the peak count of 7 *E.Coli* Coliforms. The average monthly *E.Coli* count was 1.8, based on 5 samples;
8. *E.Coli* levels in the raw water at the water distribution system intake at the east end of Hadden Reservoir, immediately prior to disinfection, had zero counts on all four samples. Reduction in *E.Coli* levels is due to the effectiveness of the settling of particles as water passes through Stevens and Hadden Reservoirs;
9. No *E.Coli* or *Total* Coliforms were found in treated water in the distribution system through third-party analysis. In addition, zero positive samples were detected by BMID's in-house presence/absence testing throughout December;

1.0 FLOWS - DECEMBER, 2024

The minimum recorded Daily Flow was on December 7th at 1,766,660 US gallons (6.69 ML)

The maximum recorded Daily Flow was on December 5th, at 4,141,257 US gallons (15.67 ML). The increase in consumption is due to the refilling of the primary transmission main.

Mission Creek provided and estimated 84% of domestic flow supplied in December.

Figure 1.1 - Domestic Water System Flow

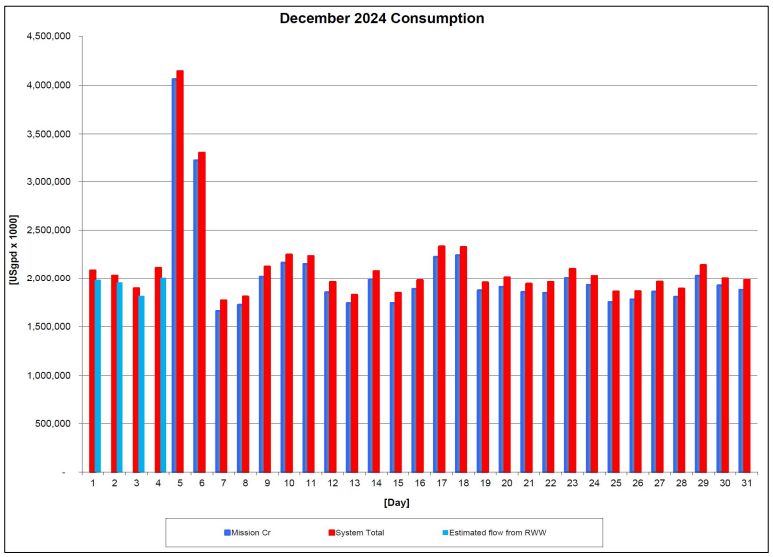


Table 1.2 - December 2024 - Daily Consumption Report

Year	Mission Cr	Estimated flow from RWW	Well #4	Well #5	System Total	System Total
2024	Usgpd	Usgpd	Usgpd	Usgpd	Usgpd	ML/Day
1-Dec	-	1,974,414	109,337	-	2,083,751	7.89
2-Dec	-	1,947,603	82,138	-	2,029,742	7.68
3-Dec	-	1,810,786	79,682	-	1,890,468	7.16
4-Dec	-	2,007,597	102,868	-	2,110,465	7.99
5-Dec	4,058,607	-	82,651	-	4,141,257	15.67
6-Dec	3,217,377	-	79,975	-	3,297,352	12.48
7-Dec	1,658,789	-	107,874	-	1,766,663	6.69
8-Dec	1,721,239	-	84,981	-	1,806,220	6.84
9-Dec	2,019,357	-	104,585	-	2,123,942	8.04
10-Dec	2,165,735	-	81,552	-	2,247,287	8.51
11-Dec	2,150,254	-	82,463	-	2,232,718	8.45
12-Dec	1,849,627	-	106,635	-	1,956,262	7.40
13-Dec	1,740,761	-	83,451	-	1,824,213	6.90
14-Dec	1,990,589	-	86,571	-	2,077,160	7.86
15-Dec	1,739,890	-	105,047	-	1,844,937	6.98
16-Dec	1,884,128	-	89,818	-	1,973,945	7.47
17-Dec	2,225,306	-	105,494	-	2,330,799	8.82
18-Dec	2,240,575	-	84,408	-	2,324,982	8.80
19-Dec	1,869,123	-	81,539	-	1,950,661	7.38
20-Dec	1,905,499	-	106,157	-	2,011,656	7.61
21-Dec	1,855,148	-	82,067	-	1,937,215	7.33
22-Dec	1,845,215	-	111,871	-	1,957,086	7.41
23-Dec	2,006,122	-	93,577	-	2,099,699	7.95
24-Dec	1,924,995	-	101,602	-	2,026,597	7.67
25-Dec	1,751,038	-	107,375	-	1,858,412	7.03
26-Dec	1,776,583	-	84,157	-	1,860,740	7.04
27-Dec	1,855,623	-	103,954	-	1,959,577	7.42
28-Dec	1,803,951	-	82,289	-	1,886,240	7.14
29-Dec	2,029,581	-	109,631	-	2,139,211	8.10
30-Dec	1,919,738	-	84,183	-	2,003,921	7.58
31-Dec	1,875,463	-	102,815	-	1,978,278	7.49
Totals Usgpd	55,080,311	7,740,401	2,910,744	0.00	65,731,456	248.79
Totals ML	208.48	29.30	11.02	0.00	248.79	
Avg's	1,773,495		6.71		2,125,105.94	8.04
Max	4,058,607		15.36		4,141,257.39	15.67
Min	0.00		0.00		1,766,662.64	6.69

2.0 RAW WATER QUALITY - BACTERIOLOGICAL MONITORING

Raw water samples were taken at three points at BMID settling ponds before chlorination. Samples were taken at the Mission Creek raw water intake, the outlet for Stevens Pond, and the point of disinfection at the end of Hadden Reservoir.

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

Samples at Stevens Outlet and Hadden Outlet did not take place for the first week of December as these reservoirs were drained as part of the infrastructure upgrade on the primary transmission water main.

Figure 2.1 - Raw Water *E.Coli* Readings (CARO Lab results) November 2024 - December 2024

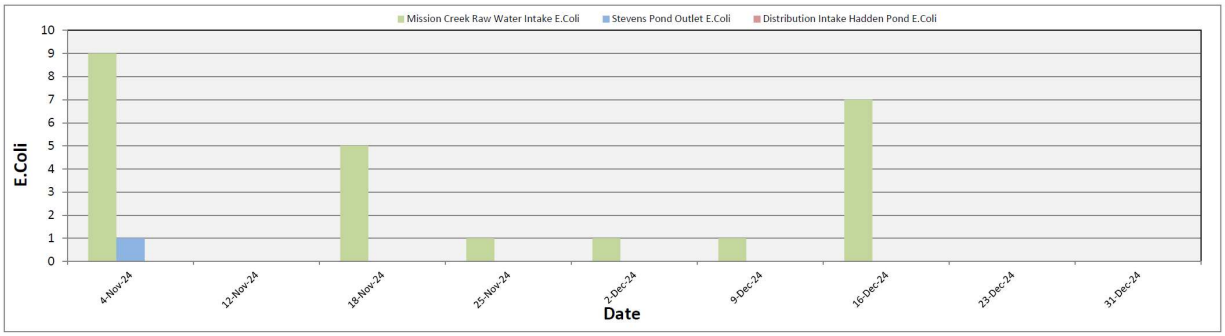


Table 2.1 - *E.Coli* Readings (CARO Labs)

Date	Mission Creek Raw Water Intake E.Coli	Stevens Pond Outlet E.Coli	Distribution Intake Hadden Pond E.Coli
4-Nov-24	9	1	0
12-Nov-24	0	NA	NA
18-Nov-24	5	NA	NA
25-Nov-24	1	NA	NA
2-Dec-24	1	NA	NA
9-Dec-24	1	0	0
16-Dec-24	7	0	0
23-Dec-24	0	0	0
31-Dec-24	0	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 is measured online at four locations, Mission Creek raw water intake, the Distribution Intake, the UV treatment plant, and Booster#1. The first user of the BMID system is located near Booster #1. The highest turbidity level recorded at this location was 1.06 NTU on December 10th, 2024. BMID utilized groundwater from RWW as its domestic water source for the first 4 days of December. Average monthly turbidity was 0.63 NTU.

Figure 3.1 – Daily Turbidity Readings (Mission Creek Raw - Distribution Intake - Booster Station 1 and UV Plant)

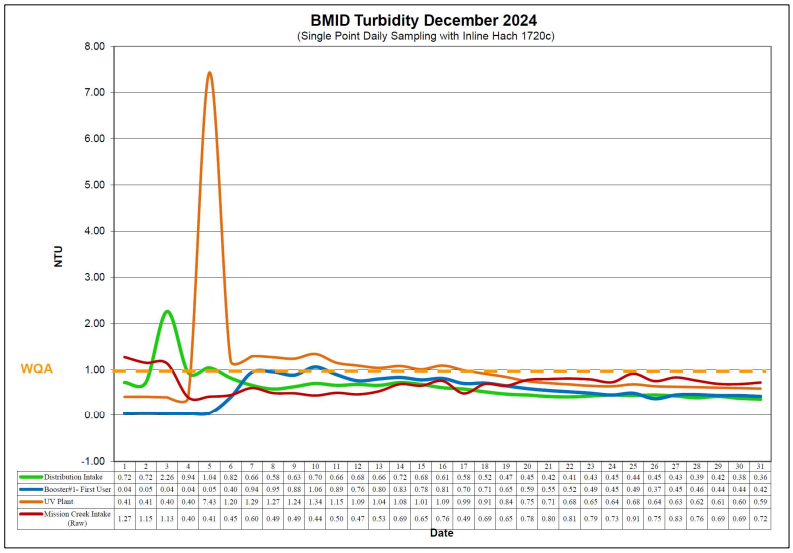


Table 3.1 - Daily Monitoring Record – Turbidity at On-Line Turbidity Analyzers

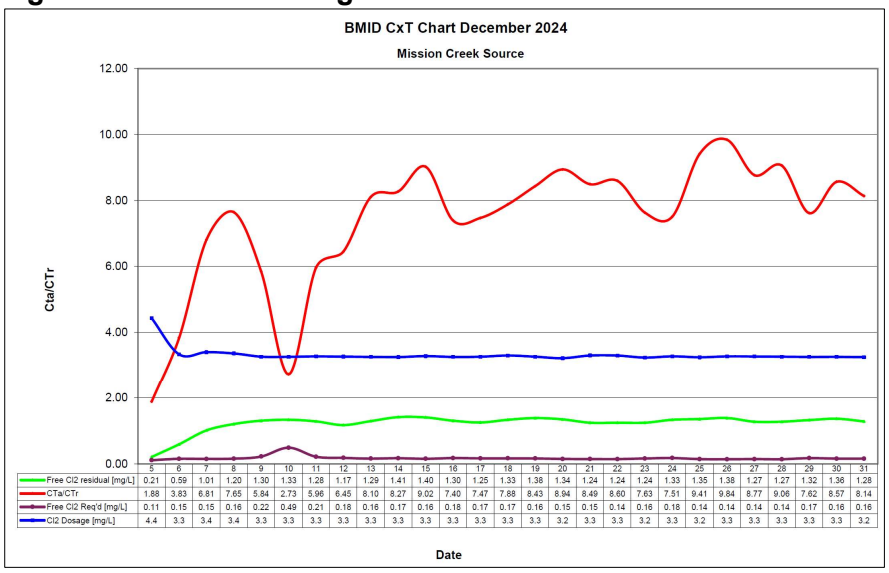
Turbidity Point Sampling for December 2024				
Date	Mission Creek Intake (Raw)	Distribution Intake	Booster#1- First User	UV Plant
	Daily Average NTU	Daily Average NTU	Daily Average NTU	Daily Average NTU
1	1.27	0.72	0.04	0.41
2	1.15	0.72	0.05	0.41
3	1.13	2.26	0.04	0.40
4	0.40	0.94	0.04	0.40
5	0.41	1.04	0.05	7.43
6	0.45	0.82	0.40	1.20
7	0.60	0.66	0.94	1.29
8	0.49	0.58	0.95	1.27
9	0.49	0.63	0.88	1.24
10	0.44	0.70	1.06	1.34
11	0.50	0.66	0.89	1.15
12	0.47	0.68	0.76	1.09
13	0.53	0.66	0.80	1.04
14	0.69	0.72	0.83	1.08
15	0.65	0.68	0.78	1.01
16	0.76	0.61	0.81	1.09
17	0.49	0.58	0.70	0.99
18	0.69	0.52	0.71	0.91
19	0.65	0.47	0.65	0.84
20	0.78	0.45	0.59	0.75
21	0.80	0.42	0.55	0.71
22	0.81	0.41	0.52	0.68
23	0.79	0.43	0.49	0.65
24	0.73	0.45	0.45	0.64
25	0.91	0.44	0.49	0.68
26	0.75	0.45	0.37	0.64
27	0.83	0.43	0.45	0.63
28	0.76	0.39	0.46	0.62
29	0.69	0.42	0.44	0.61
30	0.69	0.38	0.44	0.60
31	0.72	0.36	0.42	0.59
AVG	0.69	0.63	0.55	1.04

4.0 CHLORINE CONTACT TIME

Temperature, pH, peak 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 December, 2024.

BMID's Mission Creek source was in use starting on December 4th after the source was bypassed to allow for infrastructure upgrades starting in November. Domestic water was provided by Rutland Water Works for the first six days of December.

Figure 4.1 - CT Trending – BMID Mission Creek Source – December 2024



CTa – CT achieved
CTr – CT Required

The minimum CT that BMID achieved was 1.88 X that of what was required

Table 4.2 - CT Table – Mission Creek Source

	BMID December 2024 Mission Creek Source												
DATE	pH (Average)	TEMP Present	PEAK FLOW	Free Cl_2 residual	CT achieved	CT req'd	CTa/CTr	Free Cl_2 Req'd	Cl_2 Dosage	VOLUME TOTAL	TIME	FLOW Daily Average	CL_2 DOSAGE Average
December		[°C]	[Usgpm]	[mg/L]				[mg/L]	[mg/L]	[USgal]	[mins]	[USGPM]	[PPD]
5	7.32	2.4	1740	0.21	319.9	170.1	1.88	0.11	4.4	2649600	1523	595	32
6	7.22	2.4	2130	0.59	733.8	191.4	3.83	0.15	3.3	2649600	1244	926	37
7	7.20	2.5	1923	1.01	1391.9	204.5	6.81	0.15	3.4	2649600	1378	1177	48
8	7.19	2.6	2003	1.20	1587.6	207.7	7.65	0.16	3.4	2649600	1323	1215	49
9	7.18	2.4	2776	1.30	1240.7	212.3	5.84	0.22	3.3	2649600	954	1423	56
10	7.17	2.4	6086	1.33	579.1	212.1	2.73	0.49	3.3	2649600	435	1509	59
11	7.16	2.4	2711	1.28	1250.9	209.9	5.96	0.21	3.3	2649600	977	1511	59
12	7.15	2.4	2331	1.17	1330.0	206.2	6.45	0.18	3.3	2649600	1137	1308	51
13	7.14	2.5	2033	1.29	1681.4	207.5	8.10	0.16	3.3	2649600	1303	1232	48
14	7.13	2.7	2187	1.41	1708.6	206.6	8.27	0.17	3.3	2649600	1212	1423	56
15	7.12	2.4	1964	1.40	1888.9	209.3	9.02	0.16	3.3	2649600	1349	1210	48
16	7.11	2.5	2260	1.30	1523.9	206.1	7.40	0.18	3.3	2649600	1172	1345	53
17	7.10	2.5	2174	1.25	1523.5	203.9	7.47	0.17	3.3	2649600	1219	1574	62
18	7.09	2.5	2182	1.33	1615.2	204.9	7.88	0.17	3.3	2649600	1214	1544	61
19	7.08	2.5	2116	1.38	1728.0	204.9	8.43	0.16	3.3	2649600	1252	1299	51
20	7.07	2.5	1954	1.34	1816.7	203.2	8.94	0.15	3.2	2649600	1356	1363	53
21	7.06	2.5	1931	1.24	1701.8	200.4	8.49	0.15	3.3	2649600	1372	1284	51
22	7.05	2.5	1916	1.24	1714.5	199.5	8.60	0.14	3.3	2649600	1383	1290	51
23	7.04	2.5	2168	1.24	1515.8	198.6	7.63	0.16	3.2	2649600	1222	1440	56
24	7.03	2.5	2350	1.33	1499.7	199.7	7.51	0.18	3.3	2649600	1128	1342	53
25	7.02	2.9	1958	1.35	1826.6	194.1	9.41	0.14	3.2	2649600	1353	1257	49
26	7.01	3.1	1942	1.38	1883.1	191.3	9.84	0.14	3.3	2649600	1365	1239	49
27	7.00	2.1	1902	1.27	1769.1	201.8	8.77	0.14	3.3	2649600	1393	1319	52
28	6.99	2.7	1927	1.27	1746.6	192.8	9.06	0.14	3.3	2649600	1375	1262	50
29	7.24	2.8	2169	1.32	1612.4	211.7	7.62	0.17	3.3	2649600	1222	1449	57
30	7.24	2.9	1992	1.36	1808.6	211.1	8.57	0.16	3.3	2649600	1330	1357	53
31	7.24	2.9	1992	1.28	1702.2	209.2	8.14	0.16	3.2	2649600	1330	1324	52
Averages	7.14	2.54	1961.79	1.10	#DIV/0!	200.42	#DIV/0!	#DIV/0!	#DIV/0!	2649600	#DIV/0!	1136	47

5.0 ULTRAVIOLET DISINFECTION

Total Water Treated:	208,512 m^3	100.00%
On-Spec Water:	198, 618 m^3	95.024%
Off-Spec Water:	9,994 m^3	4.976%

Average monthly chlorine residual before UV Treatment was 1.44 mg/L
The average monthly chlorine residual after UV treatment and re-chlorination was 1.38 mg/L.

The BMID UV treatment plant was not in operation from November 4th to December 5th when BMID was supplied from RWW. Off-spec water occurred on December 5th and into December 6th when the primary transmission main leading to the UV station was refilled with Mission Creek water causing increased turbidity.

Figure 5.1 - UV Disinfection – BMID Mission Creek Source – December 2024

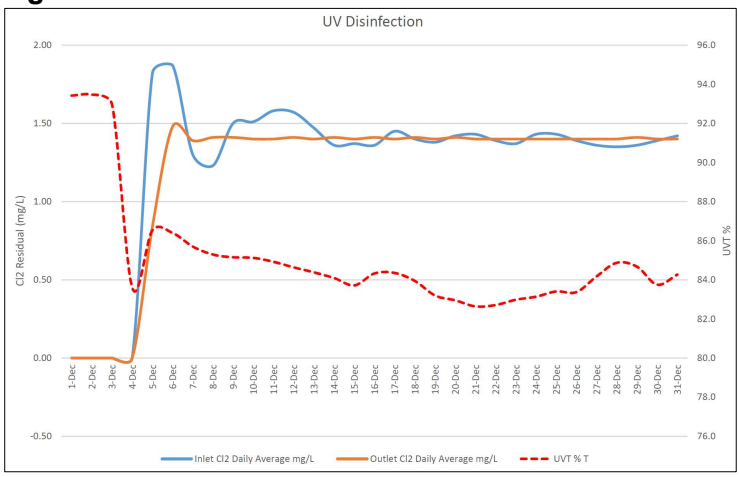


Table 5.2 - UV Disinfection Table – Mission Creek Source

Date	Inlet Cl2 Daily mg/L	Outlet Cl2 Daily mg/L		UVT % T	Turbidity NTU		In Spec Water Volume Cubic Meters	Off Spec Water Cubic Meters	Off Spec % of Water Percentage
1-Dec	-	-		93.4	0.41		-	-	-
2-Dec	-	-		93.5	0.41		-	-	-
3-Dec	-	-		93.0	0.40		-	-	-
4-Dec	-	-		83.6	0.40		-	-	-
5-Dec	1.82	0.84		86.5	7.43		9,220	6144	66.63%
6-Dec	1.87	1.48		86.4	1.20		8,524	3655	42.88%
7-Dec	1.30	1.39		85.7	1.29		6,279	0	0.00%
8-Dec	1.23	1.41		85.3	1.27		6,516	0	0.00%
9-Dec	1.50	1.41		85.2	1.24		7,644	0	0.00%
10-Dec	1.51	1.40		85.1	1.34		8,113	85	1.05%
11-Dec	1.58	1.40		84.9	1.15		8,140	0	0.00%
12-Dec	1.57	1.41		84.6	1.09		7,002	0	0.00%
13-Dec	1.47	1.40		84.4	1.04		6,590	0	0.00%
14-Dec	1.36	1.41		84.1	1.08		7,535	0	0.00%
15-Dec	1.37	1.40		83.7	1.01		6,586	0	0.00%
16-Dec	1.36	1.41		84.3	1.09		7,132	0	0.00%
17-Dec	1.45	1.40		84.4	0.99		8,424	0	0.00%
18-Dec	1.40	1.41		83.9	0.91		8,482	0	0.00%
19-Dec	1.38	1.40		83.2	0.84		7,075	0	0.00%
20-Dec	1.42	1.41		83.0	0.75		7,213	0	0.00%
21-Dec	1.43	1.40		82.6	0.71		7,023	0	0.00%
22-Dec	1.39	1.40		82.7	0.68		6,985	0	0.00%
23-Dec	1.37	1.40		83.0	0.65		7,594	0	0.00%
24-Dec	1.43	1.40		83.1	0.64		7,287	0	0.00%
25-Dec	1.43	1.40		83.4	0.68		6,628	0	0.00%
26-Dec	1.39	1.40		83.4	0.64		6,725	0	0.00%
27-Dec	1.36	1.40		84.2	0.63		7,024	0	0.00%
28-Dec	1.35	1.40		84.9	0.62		6,829	0	0.00%
29-Dec	1.36	1.41		84.7	0.61		7,683	0	0.00%
30-Dec	1.39	1.40		83.8	0.60		7,267	0	0.00%
31-Dec	1.42	1.40		84.3	0.59		7,099	0	0.00%
Average	1.44	1.38		85.10		Total	198,618	9884	4.976%

6.0 WATER DISTRIBUTION SAMPLING (TREATED)

Third Party Analysis (CARO Analytical Services)

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

Table 6.1 - CARO Independent Lab Testing – Total Coliforms – *E.Coli*

	2921 Belgo Rd		Booster 1		Ellison Blow-Off		Ellison School		3976 Highway 97		Prospect Reservoir		Tower Reservoir		Well #4		Kirschner Res		Pearson School	
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	Coliforms	E.coli	Coliforms	E.coli
1-Nov-24													0	0						
4-Nov-24			0	0	0	0	0	0	0	0			0	0	0	0				
12-Nov-24	0	0	0	0							0	0			0	0	0	0	0	0
18-Nov-24			0	0	0	0	0	0	0	0			0	0	0	0				
25-Nov-24	0	0	0	0							0	0			0	0	0	0	0	0
2-Dec-24			0	0	0	0	0	0	0	0			0	0	0	0				
9-Dec-24	0	0	0	0							0	0			0	0	0	0	0	0
16-Dec-24			0	0	0	0	0	0	0	0			0	0	0	0				
23-Dec-24	0	0	0	0							0	0			0	0	0	0	0	0
31-Dec-24			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 seven sites around the BMID service area.
- All 12 samples were found to be absent of both *Total Coliforms* and *E.Coli*.

Table 6.2 - BMID In-house Testing – Presence Absence

	12/3/2024				12/11/2024				12/16/2024				12/23/2024				12/31/2024			
Location	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.	Cl2	Temp.	Pres.	Abs.
Sylvania Cres	0.14	12.0	-	X									0.76	10.4	-	X				
170 Kneller Rd	0.12	12.2	-	X									0.71	11.0	-	X				
2105 Morrison					0.60	12.0	-	X									0.52	10.6	-	X
Staymen Rd					0.24	11.6	-	X									0.26	10.8	-	X
260 Campion Rd									0.26	5.8	-	X								
Fenwick Rd									0.34	0.1	-	X								
Solly Ct	0.37	11.8	-	X									0.9	11.6	-	X				

7.0 WELL #6 POTENTIAL POTABILITY TESTING

- BMID will take monthly bacterial samples on the raw water at Well #6 to determine the potential potability of the source. Results are as follows:

Well 6 Bacterial Testing		
Date	Total Coliforms	E.Coli Coliforms
24-Jun-24	0	0
29-Jul-24	0	0
26-Aug-24	0	0
28-Oct-24	0	0
25-Nov-24	0	0
31-Dec-24	0	0

- BMID Population = 28,000

RECOMMENDED TESTS

- Recommended number of samples per month = 28

  (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 = 30
- Total tests sampled in BMID treated distribution system = 42
- 0 Positive E.Coli and Total Coliform Samples