City of Morden
Public Water System Annual Report 2021

This report is available online at the City of Morden website www.mymorden.ca as of March 31st, 2022

Email Town address info@mymorden.ca

Paper copies are available at the Morden Civic Center office at 100-195 Stephen St.

Notifications will be in the quarterly water bills, the Quarterly Newsletter and on the City of Morden website, indicating how users can acquire copies of the report.

City of Morden
Annual Water System Operation Report 2021

Where does our water come from?
The City of Morden gets its water supply from Lake Minnewasta. Lake Minnewasta is a reservoir created by the construction of a PFRA dam on Dead horse Creek. The reservoir is approximately 1.4 km long and 500m wide at its widest point. The watershed of the creek upstream from the reservoir encompasses about 130 sq km of land area.

In 2021 Morden along with Southern Manitoba, encountered a severe drought in our area and as a result the level of water in the Lake dropped substantially below full supply level. Water use restrictions were implemented, and additional water supply was arranged from PVWC to slow the drawdown of the lake.

Why do we treat our water?
We treat our water to ensure that safe and pleasing drinking water is supplied to the homes and businesses in the City of Morden. Provincial Regulations have set health based drinking water standards for all public water systems and are becoming more stringent all the time. The City of Morden is committed to meeting or exceeding these new standards set by the province to provide the best tap water possible to the City of Morden.

What type of treatment do we use?
Due to the high hardness count (400- 900 Mg/l) of Morden's raw water supply we use a Lime- Soda Ash softening process followed by filtration, UV disinfection and chlorination. These processes are designed to soften and clarify the water and remove microbial contaminants, such as bacteria and organic materials that are naturally found in lake waters.

Why and how do we disinfect our water?
The final step in the treatment of safe drinking water is disinfection. Disinfection is the selective destruction or inactivation of disease causing organisms in water. The Drinking Water Safety Act and Office of Drinking Water require that water is disinfected to a set standard before it leaves the water treatment plant and that an adequate amount is maintained in the distribution system to ensure the water is safe right to the consumer's tap. The City of Morden disinfects its water through

chlorination. Chlorine is added to kill bacteria and viruses that are commonly found in surface waters such as rivers and lakes. An adequate amount of Chlorine is added before the water leaves the treatment plant to ensure an effective kill of bacteria and to provide a disinfectant residual throughout the distribution system to combat any contamination in the system.
In 2016 the City of Morden added UV light disinfection as an added barrier of disinfection to treat pathogens- bacteria that are resistant to chlorine.

Are chemicals added to our water? Why?
We add Powder Activated Carbon and Fluoride to the water

Powder Activated Carbon is added to the water to help control taste and odour issues caused by Algae etc.

Fluoride is added as part of the Provincial Fluoridation Program at regulated levels to help prevent tooth decay. This process is monitored by Manitoba Health and Healthy Living. Note the optimum level of Fluoride in water used to be 1 mg/l (part per million) with a Maximum containment level of 1.5 mg/l. As of March 15, 2011 Manitoba Health changed the optimum level to 0.7 ppm with a range of 0.5 to 0.9 ppm. This change was brought about to acknowledge the fact that consumers are getting other sources of Fluoride such as toothpastes and mouthwashes etc. While there is naturally occurring Fluoride in our source water this is taken into account and the final total amount is kept as close to .7ppm as possible.

How much water storage do we have?
When the new water plant was built in 1998 a 500,000 gal reservoir was built underneath it. Another underground reservoir with a capacity of 880,000 gal was constructed and put in service in May 2014. In addition to these reservoirs the Morden WTP has a standpipe with a design capacity of 400,000 gal. The total storage is available is 1.78 million gals which is sufficient to address the City of Morden's water storage needs for years to come. The standpipe condition, however, is deteriorated and replacement is needed in the coming couple of years.

What is the "distribution system"?
The system is a network of underground pipes that supply water to all areas of City. The chart shown below identifies the type and length of watermain piping in service.

Type of Waterline	Total Meters
Asbestos cement	36273.21
Ductile iron	1760.08
Plastic	30,101

The mains are flushed through hydrants and regular maintenance including hydrant testing is done annually usually in fall.

Is our water tested? What for? When?
Water tests are taken on a routine basis to ensure the quality and safety of our water and to monitor how well the treatment facility is operating. We daily test the water at the water plant for: Chlorine residual, hardness, PH, turbidity, Alkalinity, Fluoride. All water test results associated with water safety are submitted to the Office of

Drinking Water for review. The tests sent to The Office of Drinking Water are: Bacterial tests, Trihalomethane ,Haleoacetic acid, Flouride tests, Turbidity and chlorine residuals

Bacterial testing: We test the raw water (untreated lake water), the treated water leaving the plant, and the water in the distribution system, every two weeks for the presence of Total coliforms and E-Coli bacteria at a provincially accredited lab in Wpg.

Disinfectant testing is done daily on the treated water leaving the water plant and chlorine levels are also tested in the distribution system every time we take samples for bacterial sampling to ensure there is a proper Chlorine residual in the system.

Turbidity testing is done via on-line continuously monitoring equipment and verified daily by desktop testing. Turbidity is measurement of the clarity of the water and is used to determine how well our treatment system is working.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. The province has set a standard based on an average of four samples per year. We test THM levels in two locations on a quarterly basis.

Haloacetic Acid testing: The Office of Drinking Water initiated a Haloacetic Acid testing program in 2016. Halocetic Acid is a disinfection by- product formed by a reaction with Chlorine. Testing is done at the same time as THMs on a quarterly basis.

Fluoride sampling: Daily sampling of Fluoride levels are done at the water plant and every two weeks a composite sample for that period is submitted for testing and verification at a provincially credited lab

In addition to the above a detailed chemical analysis is performed annually.

What are the results of the tests? Are copies available?
As a result of the testing the Office of Drinking Water has determined that " The City of Morden has been fulfilling its obligations with regard to bacteriological and disinfection monitoring and reporting"

Copies of test results are kept at the Water plant and copies can be made available by contacting the foreman at the Water plant. Ph# 204-822-5707.
Below are the test results for components that have Maximum Acceptable Concentration limits. The rest of the tests results taken can have an Aesthetic Objective. Copy of the complete analysis report is attached as Annexure-A.

ANNUAL WATER ANALYSIS

Type		Raw	Treated	Distribution	Max Acceptable Concentration	Units
Nitrite-N		<0.0050	<0.0050	-	1	Ug/L
Dissolved Fluoride	F	0.290	0.56	-	1.5	Mg/L
Nitrate-N		<0.025	0.082	-	10	Mg/L
Antimony	Sb	0.00067	0.00065	0.00069	0.006	Mg/L
Arsenic	As	0.00957	00.00248	0.0155	0.010	Mg/L
Barium	Ba	0.0378	0.00665	0.0108	2.0	Mg/L
Boron	B	0.135	0.114	0.115	5	Mg/L
Cadmium	Cd	0.0000154	<0.0000050	0.0000054	0.005	Mg/L
Chromium	Cr	0.00017	0.00054	0.00050	0.05	Mg/L
Lead	Pb	0.000209	<0.000050	0.000686	0.005	Mg/L
Selenium	Se	0.000891	0.000919	0.000953	0.05	Mg/L
Strontium	Sr	0.573	0.201	0.206	7.0	Mg/l
Uranium	U	0.0142	0.000760	0.000706	0.02	Mg/L

BI-WEEKLY BACTERIAL TESTS

Date	#1 Raw	#2 Treated	#3 Distribution @PWG	#4 Dist. @PVWC	#5 Dist. @Morden Rec.	#6 Dist. @ Civic centre	#7 Dist. @ Fire Hall
January 11 2021							
Chlorine Free	0	0.98	0.10	0.76	0.10	0.32	0.36
Chlorine Total	0	1.48	0.65	1.41	0.63	0.86	0.89
Total Coliforms	9	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.19	0.46	0.18	0.55	0.28	0.29
January 27, 2021							
Chlorine Free	0	0.84	0.38	0.62	0.41	0.52	0.63
Chlorine Total	0	1.40	0.95	1.27	1.06	1.03	1.21
Total Coliforms	9	0	0	0	0	0	0
Escherichia Coli	0	0	0	0.0	0	0	0
Turbidity		0.20	0.24	0.27	0.36	0.23	0.35
February 08,2021							
Chlorine Free	0	0.94	0.49	0.51	0.16	0.20	0.22
Chlorine Total	0	1.54	1.14	1.14	1.02	0.94	0.80
Total Coliforms	10	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.18	0.27	0.17	0.23	0.57	1.28
February 22.2021							
Chlorine Free	0	1.05	0.36	0.49	0.33	0.50	0.14
Chlorine Total	0	1.62	0.98	1.16	0.94	1.06	0.74
Total Coliforms	4	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.14	0.37	0.15	0.25	0.30	0.69
March 8, 2021							
Chlorine Free	0	1.00	0.44	0.69	0.12	0.42	0.28
Chlorine Total	0	1.44	01.05	1.29	1.64	1.05	0.92
Total Coliforms	9	0	0	0	0	0	0
Escherichia Coli	0	0.13	0	0	0	0	0
Turbidity			0.37	0.15	0.42	0.42	0.44
March 22,2021							
Chlorine Free	0	0.90	0.41	1.27	0.10	0.34	0.43
Chlorine Total	0	1.53	0.98	1.96	0.60	1.00	1.02
Total Coliforms	4	0	0	0	0	0	0

Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.16	0.38	0.16	0.39	0.33	0.51
April 6.2021							
Chlorine Free	0	1.17	0.59	1.10	0.28	0.53	0.56
Chlorine Total	0	1.53	1.11	1.59	1.07	1.13	1.10
Total Coliforms	12	0	0	0	0	0	0.
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.16	0.49	0.14	0.32	0.22	0.31
April 19,2021							
Chlorine Free	0	0.82	0.55	0.96	0.18	0.43	0.10
Chlorine Total	0	1.44	1.04	1.46	0.64	1.04	0.65
Total Coliforms	10	0	0	0	0	0	0
Escherichia Coli	1	0	0	0	0	0	0
Turbidity		0.21	0.31	0.19	0.27	0.33	0.35
May 3, 2021							
Chlorine Free	0	1.16	0.30	1.34	0.34	0.28	0.42
Chlorine Total	0	1.81	0.71	0.87	0.89	0.98	1.14
Total Coliforms	50	0	0	0	0	0	0
Escherichia Coli	15	0	0	0	0	0	0
Turbidity		0.29	0.30	0.40	0.56	0.21	0.51
May 17,2021							
Chlorine Free	0	1.42	0.30	0.68	0.52	0.59	0.63
Chlorine Total	0	1.90	0.71	1.15	1.02	1.04	1.11
Total Coliforms	62	0	0	0	0	0	0
Escherichia Coli	5	0	0	0	0	0	0
Turbidity		0.15	0.30	0.14	0.27	0.21	0.22
May 31, 2021							
Chlorine Free	0	0.93	0.43	0.34	0.12	0.31	0.50
Chlorine Total	0	1.39	0.88	0.87	0.48	0.72	0.93
Total Coliforms	200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.12	0.21	0.40	0.28	0.16	0.28
June 14,2021							
Chlorine Free	0	0.88	0.31	0.79	0.87	0.34	0.35
Chlorine Total	0	1.41	0.76	1.23	1.37	0.83	0.82
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	1	0	0	0	0	0	0
Turbidity		0.24	0.26	0.17	0.26	0.16	0.28
June 28							
Chlorine Free	0	1.11	0.31	0.39	0.96	0.35	0.44
Chlorine Total	0	1.48	0.81	0.85	1.46	0.87	0.98
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.16	0.20	0.12	0.23	0.24	0.23
July 12,2021							
Chlorine Free	0	0.88	0.19	0.79	0.72	0.51	0.27
Chlorine Total	0	1.22	0.64	1.19	1.28	0.96	0.75
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	1	0	0	0	0	0	0
Turbidity		0.16	0.23	0.17	0.22	0.22	0.20
July 26,2021							
Chlorine Free	0	1.22	0.20	0.84	0.68	0.35	0.43
Chlorine Total	0	1.83	0.69	1.47	1.24	0.87	0.97
Total Coliforms	165	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.25	0.20	0.17	0.19	0.24	0.38
August 9,2021							
Chlorine Free	0	0.95	0.12	0.41	0.87	0.17	0.17
Chlorine Total	0	1.39	0..62	1.05	1.33	0.61	0.67

Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.16	0.20	0.14	0.25	0.17	0.17
August 23,2021							
Chlorine Free	0	1.11	0.14	0.52	0.87	0.23	.11
Chlorine Total	0	1.64	0.57	0.90	1.33	0.68	0.62
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.17	0.34	0.12	0.25	0.32	0.28
Sept 7,2021							
Chlorine Free	0	1.13	0.24	0.70	1.15	0.56	0.35
Chlorine Total	0	1.86	0.70	1.28	1.65	1.05	0.81
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.20	0.23	0.11	0.24	0.20	0.21
Sept 21,2021							
Chlorine Free	0	1.21	0..24	0.62	0.15	0.17	0.33
Chlorine Total	0	1.67	0.74	1.12	0.55	0.74	0.77
Total Coliforms	200	0	0	0	0	0	0
Escherichia Coli	1	0	0	0	0	0	0
Turbidity		0.23	0.23	0.31	0.22	0.23	0.21
October 5, 2021							
Chlorine Free	0	1.03	0.23	0.55	0.12	0.25	0.25
Chlorine Total	0	1.42	0.66	1.06	0.47	0.81	0.75
Total Coliforms	>200	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.23	0.30	0.14	0.24	0.18	0.18
October 19,2021							
Chlorine Free	0	0.99	0.32	0.87	0.19	0.34	0.38
Chlorine Total	0	1.56	0.89	1.25	0.49	0.86	0.85
Total Coliforms	95	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.21	0.30	0.20	0.25	0.24	0.25
Nov 1, 2021							
Chlorine Free	0	1.09	0.18	0.98	0.15	0.42	0.36
Chlorine Total	0	1.65	0.70	1.50	0.53	1.01	0.82
Total Coliforms	25	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.22	0.33	**0.19**	0.27	0.22	0.19
Nov 15, 2021							
Chlorine Free	0	1.11	0.22	1.04	0.14	0.21	0.56
Chlorine Total	0	1.78	0.82	1.52	0.63	0.90	1.11
Total Coliforms	66	0	0	0	0	0	0
Escherichia Coli	1	0	0	0	0	0	0
Turbidity		0.33	0.40	**0.11**	0.21	0.37	0.38
Nov 29,2021							
Chlorine Free	0	1.05	0.28	0.53	0.10	0.36	0.53
Chlorine Total	0	1.70	0.87	1.19	0.61	0.90	0.93
Total Coliforms	18	0	0	0	0	61	0
Escherichia Coli	3	0	0	0	0	0	0
Turbidity		0.22	0.43	0.24	0.36	0.47	0.26
Dec. 13,2021							
Chlorine Free	0	0.79	0.23	0.51	0.13	0.46	0.46
Chlorine Total	0	1.65	0.75	1.09	0.69	1.09	0.89
Total Coliforms	0	0	0	0	0	0	0
Escherichia Coli	0	0	0	0	0	0	0
Turbidity		0.24	0.34	0.15	0.30	0.19	0.20
Dec. 29, 2021							
Chlorine Free	0	0.71	0.13	0.66	0.14	0.27	0.33
Chlorine Total	0	1.65	0.57	1.19	0.69	0.89	0.78

Total Coliforms Escherichia Coli Turbidity	0 0	0 0 0.24	0 0 0.30	0 0 0.09	0 0 0.23	0 0 0.19	0 0 0.18

How well Morden complied with standards and license during 2021?
The table below provides the city's compliance with the license/standards.

Parameter	Monitoring Requirement	Quality Standard	Performance
Total Coliform	Biweekly sampling program with each set of samples consisting of one raw, one treated and a minimum of 5 distribution samples	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water	100% Compliance
E. coli		Less than one E. coli bacteria detectable per 100 mL in all treated and distributed water	100% Compliance
Chlorine Residuals			
Free chlorine (treated water)	Treated water – Continuous sampling (online monitoring) of water entering the distribution system following 20 minutes of contact time A confirmatory sample to be taken daily at the online analyzer sampling or effluent point	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes	100% Compliance
Free chlorine (distribution system)	At the same times and location(s) as bacteriological distribution sampling	A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system	100% Compliance
Total chlorine (treated water)	One sample per day of water entering the distribution system following at least 20 minutes of contact time		100% Compliance
Total chlorine (distribution system)	At the same times and location(s) as bacteriological distribution sampling		
Ultraviolet Disinfection	Continuous monitoring of UV dosage for each operating UV unit	95% of water produced per month is disinfected within validated conditions	100% Compliance
Turbidity	One raw water sample per day Continuous (online monitoring) sampling of the	Less than or equal to 0.3 NTU in 95% of the measurements in a month of the effluent from each operating filter Not exceed 0.3 NTU for more than	2 incidents were recorded in 2021 where filtered water turbidity exceeded 1.0 NTU for a brief period of time.

	effluent from each operating particulate filter A confirmatory sample to be taken daily at the online turbidity analyzer sampling or effluent point	12 consecutive hours of filter operation Not exceed 1.0 NTU for any measurement	
Total trihalomethanes (THMs)	Two preserved samples taken on a quarterly basis during February, May, August and November, every year at the furthest points in the distribution system.	Less than or equal to 0.10 mg/L as locational running annual average of quarterly samples	**Non-compliant (results below)**
Total Haloacetic Acids (HAAs)	Two preserved samples taken on a quarterly basis during February, May, August and November, every year at the furthest points in the distribution system.	Less than or equal to 0.08 mg/L as locational running annual average of quarterly samples	100% Compliance
Arsenic	One raw and one treated sample taken every year	Less than or equal to 0.01 mg/L	100% Compliance
Lead	As per instructions of the Drinking Water Officer	Less than or equal to 0.005 mg/L	100% Compliance
Manganese	One raw and one treated water sample every year One distribution sample taken on a quarterly basis during February, May, August and November	Less than or equal to 0.12 mg/L	100% Compliance
Total Microcystins	One raw water sample in August every year and event based testing as per ODW guidelines	Less than or equal to 0.0015 mg/L	100% Compliance

How do we plan to meet Standards for Trihalomethanes? (THM's)

As stated previously Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Because of the nature of Lime Soda-Ash softening plants and the amount of chemicals we need to add for softening the water. Treating surface water to meet trihalomethane standards can be challenging. The standard for total THMS is 0.1 mg/l based on a running average of quarterly samples The City of Morden is currently exceeding this standard based on the running average of our quarterly samples with results of 0.157 and 0.147 mg/l, which are above the regulated limit.

The City of Morden through assistance from Water Services Board and Associated Engineering is working on exploring the best option for future upgrades to Morden Water treatment Plant to address THM issues. A pilot plant study using three different water filter/treatment systems was conducted in 2021 to determine which treatment process is best suited for our raw water. Suez ran the pilot system from April to October and observed their performance during various water quality situations throughout the spring and summer. Associated Engineering is now in the process of finalizing its recommendations for the WTP upgrades. The City is also considering the ultrasonic algae treatment for lake Minnewasta to improve the raw water quality and to reduce the organic content in the raw water and a new standpipe with air stripping option to address THM issue.

Haloacetic acids are currently below regulatory guidelines.

Trihalomethane Test Results

Date	**#1** **Public Works Garage**	**#2** **Recreation Centre**
February 08, 2021 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Dibromochloromethane mg/l • **THMs mg/l** • **Total Haloacetic Acid mg/l**	 0.0342 <0.00010 0.119 0.00651 **0.159** **0.0604 (Firehall)**	 0.0347 <0.00010 0.120 0.00679 **0.151** **0.0577 (civic centre)**
May 03,2021 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Dibromochloromethane mg/l • **THMs mg/l** • **Total Haloacetic acid mg/l**	 0.0256 <0.00010 0.0792 0.00801 **0.113** **0.0479 (Civic centre)**	 0.0274 <0.00010 0.0848 0.00865 **0.121** **0.0466 (firehall)**

August 09, 2021 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Dibromochloromethane mg/l • **THMs mg/l** • **Total Haloacetic Acid**	 0.0481 <0.0010 0.164 0.0171 **0..230** **0.0668 Civic centre**	 0.0398 <0.0010 0.127 0.0138 **0.181** **0.0586 (firehall)**
November 15, 2021 THM Preserved • Bromodichloromethane mg/l • Bromoform mg/l • Chloroform mg/l • Dibromochloromethane mg/l • **THMs mg/l** • **Total Haloacetic Acid**	**Fire Hall** 0.0339 0.0025 0.0642 0.0236 **0.124** **0.0343 (Rec Centre)**	**Civic centre** 0.0345 0.0019 0.0783 0.0201 **0.135** **0.0444 (pwg)**

Does the City of Morden have certified trained personnel?
The water plant is a Level III Water Treatment Facility. We currently have Two Certified Level III WT / Level II Dist operators and one Level I operator working at the water treatment plant.

The distribution system is a Level II facility. There are two certified distribution Level II operators and one Level I at the water plant. Public Works has 3 operators, who have Water Distribution Class II, Wastewater collection II, and Wastewater treatment class I. One of the operators in Public Works also has Water Treatment Class III. Public Works also has 2 operators-in-training.

How do we alert Public Works Staff to water emergencies?
The Public Works Department has staff on call 24 hrs. When emergencies arise after hours, residents who call the regular office no. are transferred to the on call staff.

Were there emergencies, regulatory compliance issues or other operational issues to report for 2021?
There were two precautionary boil water advisories during the planned replacement of 2 water mains. Tests were sent away when completed. They came back good and the advisories were rescinded.

Were there any major expenses incurred in 2021?

Following major expenses were incurred in2021.

- Replacement of all the older water meters in the city with new Radio read water meters and advanced metering infrastructure at a cost of approximately $1,000,000. This should ensure more accurate readings for both the city and the customers and should virtually eliminate estimated readings.
- Completion of water main renewals on 9th Street Block 100 and 4th and 5th Street Block 400 at a cost of approximately $800,000.
- Functional design of water treatment plant upgrades to address THM issues, Standpipe and any other required upgrades
- Feasibility study to augment the raw water supply for the WTP.
- Investment in to PVWC water infrastructure to arrange more water for Morden.

Future system expansion or expenses expected?

City has budgeted for following upgrades/renewals in 2022.

- Raw water intake pumps upgrade
- Ultrasonic algae treatment to improve raw water quality
- Preliminary design for Pembina River to Dead Horse Creek water diversion to augment raw water supply
- Standpipe upgrade design
- PVWC booster station upgrade along PTH 23 to secure more water from PVWC for Morden.

In future, the City is planning to construct Pembina River to Dead Horse Creek water diversion to ensure raw water for future needs, construction of a new standpipe with air stripping for THM removal and decommissioning existing standpipe and upgrades to WTP to be identified in the Associated Engineering report. In addition to these upgrades, City will continue to invest in the renewal of the old watermains.

Who can we call with questions or concerns regarding drinking water?

For general questions during business hours , call the City of Morden office from 9:00 a.m. to 4:30 p.m. or email info@mymorden.ca

Annexure-A

City of Morden - PWS
ATTN: ALAN SPEARMAN
Morden - PWS
100 - 195 Stephen Street
Morden MB R6M 1V3

Date Received: 23-JUL-21
Report Date: 29-JUL-21 15:40 (MT)
Version: FINAL

Client Phone: 204-822-5707

Certificate of Analysis

Lab Work Order #: L2617773

Project P.O. #: NOT SUBMITTED
Job Reference: MORDEN - PWS 145.00
C of C Numbers:
Legal Site Desc: 16133

Hua Wo
Chemistry Laboratory Manager

Physical Tests (WATER)

Analyte	Unit	Guide Limit #1	Guide Limit #2	ALS ID: L2617773-1 Sampled Date: 22-JUL-21 Sampled Time: 11:00 Sample ID: MORDEN 1 - RAW	ALS ID: L2617773-2 Sampled Date: 22-JUL-21 Sampled Time: 11:00 Sample ID: MORDEN 2 - TREATED
Colour, True	CU	15	-	15.2	<5.0
Conductivity	umhos/cm	-	-	1310	1230
Hardness (as CaCO3)	mg/L	-	-	551 HTC	185 HTC
Langelier Index (4 C)	No Unit	-	-	0.81	-1.0
Langelier Index (60 C)	No Unit	-	-	1.6	-0.26
pH	pH units	7.00-10.5	-	8.22	7.67
Total Dissolved Solids	mg/L	500	-	905	780
Transmittance, UV (254 nm)	%T/cm	-	-	56.2	83.4
Turbidity	NTU	-	-	4.26	<0.10

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)
#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
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Anions and Nutrients (WATER)

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Alkalinity, Total (as CaCO3)	mg/L	-	-	236	44.2
Ammonia, Total (as N)	mg/L	-	-	0.408	0.015
Bicarbonate (HCO3)	mg/L	-	-	288	53.9
Bromide (Br)	mg/L	-	-	<0.050 DLM	<0.050 DLM
Carbonate (CO3)	mg/L	-	-	<0.60	<0.60
Chloride (Cl)	mg/L	250	-	22.8	30.0
Fluoride (F)	mg/L	-	1.5	0.29	0.55
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	<0.025 DLM	0.082
Nitrite (as N)	mg/L	-	1	<0.0050 DLM	<0.0050 DLM
Sulfate (SO4)	mg/L	500	-	455	470

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Organic / Inorganic Carbon (WATER)

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Dissolved Organic Carbon	mg/L	-	-	11.9	7.15
Total Organic Carbon	mg/L	-	-	12.1	6.97

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ANALYTICAL REPORT

Total Metals (WATER)

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Aluminum (Al)-Total	mg/L	0.1	2.9	0.0520	0.0105	0.0285
Antimony (Sb)-Total	mg/L	-	0.006	0.00067	0.00065	0.00069
Arsenic (As)-Total	mg/L	-	0.01	0.00957	0.00248	0.00155
Barium (Ba)-Total	mg/L	-	2	0.0378	0.00665	0.0108
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.135	0.114	0.115
Cadmium (Cd)-Total	mg/L	-	0.005	0.0000154	<0.0000050	0.0000054
Calcium (Ca)-Total	mg/L	-	-	103	26.8	32.2
Cesium (Cs)-Total	mg/L	-	-	0.000021	0.000035	0.000036
Chromium (Cr)-Total	mg/L	-	0.05	0.00017	0.00054	0.00050
Cobalt (Co)-Total	mg/L	-	-	0.00034	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00965	0.0396	0.0134
Iron (Fe)-Total	mg/L	0.3	-	0.097	<0.010	0.152
Lead (Pb)-Total	mg/L	-	0.005	0.000209	<0.000050	0.000686
Lithium (Li)-Total	mg/L	-	-	0.0958	0.0935	0.0928
Magnesium (Mg)-Total	mg/L	-	-	71.2	28.7	27.5
Manganese (Mn)-Total	mg/L	0.02	0.12	0.566	0.00143	0.00400
Molybdenum (Mo)-Total	mg/L	-	-	0.00624	0.00594	0.00593
Nickel (Ni)-Total	mg/L	-	-	0.00456	0.00133	0.00115
Phosphorus (P)-Total	mg/L	-	-	0.421	<0.050	<0.030
Potassium (K)-Total	mg/L	-	-	10.3	10.7	10.7
Rubidium (Rb)-Total	mg/L	-	-	0.00389	0.00486	0.00475
Selenium (Se)-Total	mg/L	-	0.05	0.000891	0.000919	0.000953
Silicon (Si)-Total	mg/L	-	-	1.98	1.53	1.62
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	81.7	179	175
Strontium (Sr)-Total	mg/L	-	7	0.573	0.201	0.206
Sulfur (S)-Total	mg/L	-	-			172
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.000010	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010

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Titanium (Ti)-Total	mg/L	-	-	0.00087	<0.00030	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.0142	0.000760	0.000706
Vanadium (V)-Total	mg/L	-	-	0.00409	0.00255	0.00323
Zinc (Zn)-Total	mg/L	5	-	0.0099	0.0132	0.0340
Zirconium (Zr)-Total	mg/L	-	-	0.00022	<0.00020	<0.00020

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