The City of Flin Flon

PUBLIC WATER SYSTEM ANNUAL REPORT

2022

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Description of the Water System

The City of Flin Flon Public Water System provides potable water to approximately 5,099 persons, about 159 of who live in Flin Flon, Saskatchewan (Statistics Canada 2021 Census). With the new Water Treatment Plant being online as of August 2013, treated water currently meets all health and aesthetic objectives as regulated by the Guidelines for Canadian Drinking Water Quality.

Water Supply Source

The City of Flin Flon Cliff Lake Pumphouse receives water from Cliff Lake, located approximately 2200 meters North of the Water Treatment Plant (WTP). Raw water is pumped through twin feeder mains (installed in 2008) from the Cliff Lake Pumphouse to the new Water Treatment Plant.

Water Treatment Process

The new treatment process consists of raw water flash mixing with Aluminum Chlorohydrate and flocculation before splitting to feed two ultrafiltration process trains to purify the water. These processes are designed to clarify the water and remove microbial contaminants, such as bacteria, and organic materials that are naturally found in surface waters before chlorination. The filtered water is chlorinated using chlorine gas and pH adjustment is achieved with Sodium Hydroxide (Caustic Soda) before being stored below the Water Treatment Plant in the dual cell 4,000 m^3 storage reservoir. Chlorination is adjusted using sodium hypochlorite port located at No. 1 Heating Plant.

Distribution System

The City of Flin Flon's distribution system currently consists of a raw water pumphouse, two supply mains, a water treatment plant (including a below-ground reservoir, distribution/re-circulation/heating plant), a ground-level reservoir, 2 heating/re-circulating plants, 1 secondary distribution plant, and a double main re-circulating system.

Water from the Cliff Lake Water Pumphouse is pumped to the Water Treatment Plant, which is the first distribution point. Water is then pumped from the Water Treatment Plant to the Hilltop Reservoir which supplies No. 1 Heating Plant as a distribution point, and No. 3 Heating Plant as a secondary distribution point.

The distribution system is a double-main re-circulating system that is fed by supply mains to all connections. Return mains bring unused water back to a common header where this water is then re-distributed by the supply mains. Due to above-ground and shallow bury water mains, re-circulation is required to keep the water moving so it will not freeze during the winter months.

The distribution piping is mainly comprised of cast iron, ductile iron, PVC, polyethylene, and copper.

Storage Reservoirs

Water Reservoir	Capacity	675,000	gallons	(3,068	m^3)
Water Treatment Plant	Capacity	879,877	gallons	(4,000	m^3)

Total water storage represents approximately 1 day of potable water storage.

Number of Connections, Population Served, and Types of Water Users

The City of Flin Flon is comprised of approximately 2280 service connections, 303 of which are metered, and the remaining are residential flat rate accounts.

Recent Major Infrastructure Upgrade Projects Done in 2019

The City of Flin Flon's above ground concrete Hilltop Reservoir was constructed in 1978 as part of a Manitoba Water Services Board project to provide additional in-town water storage. Structural remediation and the installation of a new drop-in low-density polyurethane liner in the interior of the cast-in-place concrete reservoir fixed the leakage plaguing the reservoir for years. As part of the upgrade, the exterior metal cladding, roofing, and insulation was removed and replaced.

Heating Plant #1 was constructed in 1950 and provides water supply and recirculation to approximately half of the City of Flin Flon, including the Ross Park, Hapont, and Callinan recirculation zones. The plant was upgraded when the Reservoir was constructed in 1978. The plant was retrofitted with new piping, pumps, boilers, electrical, and a backup generator.

Classification and Certification

Under Regulation 77/2003, Water and Wastewater Facility Operators Regulation, The Environment Act, C.C.S.M. E125, the Province requires every Provider of water to have its system classified. It is the responsibility of the Provider to ensure its employees have minimum certification level, to the classified level of its systems. The City of Flin Flon's water facilities have the following classifications:

Class 3 Water Treatment Facility Classification and Class 2 Water Distribution Facility Classification The

City of Flin Flon's employees are certified as follows:

Employee	Water Treatment	Water Distribution
Regan BAILEY		Class I
Anthony BATTENSON		Class I
Tyler BOUTEILLER	Class II	Class II
Tony CIANFLONE		Class II
Jon EVANS	Class II	Class II
Curtis FORD	Class I	Class II
Ken KITTLE		Class II
Michelle KRYSCHUK	Class I	Class II
Brian MEIKLE	OIT	Class I
Mike WESEEN	Class II	Class II
James REITLO	Class IV	Class II
Jon SMALLEY		Class II

Disinfection System In Use

The City of Flin Flon uses chlorine as its only form of disinfection. Sodium hypochlorite port, located at #1 Heating Plant, boosts the chlorine residual in the distribution system.

As per The Drinking Water Safety Act, The City of Flin Flon must ensure that a disinfection residual of at least:

- 0.5 mg of free chlorine per liter of water is detectable at the point where water enters the distribution system, after a minimum contact time of 20 minutes.
- 0.1 mg of free chlorine per liter is detectable at all times at any point in the distribution network.

Type of Disinfection System Used

Chlorine is injected at 2 points in the distribution system – Water Treatment Plant, where chlorine gas is injected directly into the treated water before it enters the clear well; and #1 Heating Plant, where sodium hypochlorite 12% is injected via a single chlorine injection pump.

Equipment Redundancy & Monitoring Requirements

The overall operational reliability of the system is exceptionally good. The operation reliability is likely attributable to the level of competence of the operations and maintenance staff, as well as some redundancies built into the system. Much of the critical equipment has inline spares as per the requirements of The Drinking Water Safety Act. The City of Flin Flon ensures continuous disinfection is maintained.

Disinfectant residuals are monitored continuously at the Water Treatment Plant and entering the distribution system. Disinfectant residuals in the distribution system are also manually tested daily and recorded on the appropriate monitoring forms. Monthly Chlorination Forms are sent to the regional Drinking Water Officer at the end of each month.

Disinfectant Residual Overall Performance/Results

For 2022, The City of Flin Flon met all regulatory requirements in regard to monitoring and reporting disinfection residuals leaving the Water Treatment Plant and in the distribution system 100% of the time. The requirement to have free chlorine residual entering the distribution system was met 100% of the time, and at no time was the water tested and found to have zero chlorine residual (i.e. less than 0.10 mg/L).

List of Water Quality Standards

In accordance with water quality standards adopted by the Province of Manitoba, the 2021 results for The City of Flin Flon Public Water System are summarized in the following table:

Testing Parameter	Standard	Frequency		Test
Bacteriological – Treated Water	0 Total coliforms/100 mL	Bi-weekly		100%
	0 *E.coli*/100 mL	Bi-weekly		100%
Bacteriological – Distributed Water	0 Total coliforms/100 mL	Bi-weekly		100%
	0 *E.coli*/100 mL	Bi-weekly		100%
Chlorine (Treatment Plant)	0.5 mg/L	Daily		100%
Chlorine (Within Water Distribution System)	0.1 mg/L	Daily		100%
Trihalomethanes (THMs) (incl. Bromodichloromethane, bromoform, chloroform,	0.1 mg/L	Quarterly Average		100%
Haloacetic Acids (HAAs)	0.08 mg/L	Quarterly Average		100%
			Untreated Test Results	Treated Test
Lead	0.005 mg/L	Annually	<0.000050 mg/L	<0.000050 mg/L
Antimony	0.006 mg/L	Annually	0.00017 mg/L	0.00016 mg/L
Arsenic	0.010 mg/L	Annually	0.00234 mg/L	0.00083 mg/L
Barium	2.0 mg/L	Annually	0.0095 mg/L	0.0094 mg/L
Boron	5.0 mg/L	Annually	0.013 mg/L	<0.012 mg/L
Cadmium	0.005 mg/L	Annually	0.000314 mg/L	0.000244 mg/L
Chromium	0.05 mg/L	Annually	0.00010 mg/L	<0.00010 mg/L
Dissolved Fluoride	1.5 mg/L	Annually	0.059 mg/L	0.058 mg/L
Nitrate N	10 mg/L	Annually	0.0554 mg/L	0.0578 mg/L
Nitrite N	1 mg/L	Annually	<0.0010 mg/L	<0.0010 mg/L
Selenium	0.05 mg/L	Annually	0.000235 mg/L	0.000127 mg/L
Uranium	0.02 mg/L	Annually	0.000025 mg/L	<0.000010 mg/L
Turbidity			0.20 NTU	<0.22 NTU

List of Water Quality Standards cont'd.

TRIHALOMETHANES

Sample Date	Test	#1 HP Return	#1 HP Average	Mile 84 Return	Mile 84 Average	Guide Limit
March 2, 2021	1	0.066		0.048		
May 26, 2021	2	0.063		0.053		
August 19, 2021	3	0.125		0.108		
November 23, 2021	4	0.069		0.052		
March 2, 2022	1	0.076	0.083	0.058	0.068	0.100
May 24, 2022	2	0.070	0.085	0.060	0.069	0.100
August 30, 2022	3	0.126	0.085	0.103	0.068	0.100
November 29, 2022	4	0.064	0.084	0.053	0.068	0.100

Total Trihalomethanes (THMs) – Less than or equal to 0.10 mg/L as locational running annual average of quarterly samples.

Haloacetic Acids

Sample Date	Test	#1 HP Return	#1 HP Average	Mile 84 Return	Mile 84 Average	Guide Limit
March 2, 2021	1	0.043		0.028		
May 26, 2021	2	0.042		0.036		
August 19, 2021	3	0.061		0.040		
November 23, 2021	4	0.042		0.026		
March 2, 2022	1	0.037	0.039	0.038	0.035	0.080
May 24, 2022	2	0.044	0.038	0.048	0.038	0.080
August 30, 2022	3	0.040	0.042	0.062	0.043	0.080
November 29, 2022	4	0.031	0.045	0.037	0.046	0.080

Total Haloacetic Acids 5 – Less than or equal to 0.08 mg/L as locational running annual average of quarterly samples.

Water System Incidents & Corrective Actions

None