2022 Annual Water Report

East Selkirk Public Water System

Operating Licence PWS-12-523-02

RM of St. Clements East Selkirk Public Water System

2022 Annual Water Report

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1.0 Introduction

The 2022 Annual Water Report for the East Selkirk Public Water System is provided to inform residents of the steps taken to ensure ongoing safety, reliability, and quality of the water supplied by the RM of St. Clements. The *Manitoba Regulation 40/2007, Drinking Water Safety Act* and the *Guidelines for Canadian Drinking Water Quality* regulate water suppliers in the Province of Manitoba. The Rural Municipality of St. Clements East Selkirk Public Water System Operating Licence requires regular monitoring of water quality and reporting of the monitoring program as per the *Drinking Water Safety Act* and its regulations.

2.0 Description of the Water System

The East Selkirk Water Treatment Plant (WTP) provides high quality potable drinking water to the community of East Selkirk since commissioned in October 2012. The plant, located at 1147 Strathcona Road, currently serves approximately 750 persons as well as two public schools through existing 302 service connections in East Selkirk. Plant upgrades initiated in 2021 allow for expansions on servicing capacities to accommodate future population growth the community of East Selkirk as well as neighboring communities such as Lockport to the south. The plant is serviced by a new 500kW diesel backup generator which is automatically switched over to in the event of power interruption to maintain plant and distribution operations. Treated water produced from the East Selkirk Water Treatment Plant located in East Selkirk is monitored by certified water operators and meets or exceeds all health and aesthetic objectives set out in the Guidelines for Canadian Drinking Water Quality.

2.1 Water Supply Source

The East Selkirk WTP sources its groundwater supply from the lower carbonate aquifer at the northeast corner of the community. The East Selkirk WTP holds Licence No. 2017-147 under the Water Rights Act which permits drawing of up to 199, 000 cubic meters from the aquifer annually. Two 200mm diameter groundwater wells approximately 67 meters deep contain pumps that are setup to draw groundwater at 12.5 liters per second at 30.5 meters TDH (Total Dynamic Head).

A high concentration of dissolved calcium carbonate is typical in a fractured limestone aquifer such as the one feeding the East Selkirk WTP. Due to the limestone source the water is naturally scale forming, and commonly referred to as hard water, which presents itself by leaving deposits on plumbing fixtures and leads to a higher consumption of soap to create a lather. There are no health concerns regarding hardness but as per the Guidelines for Canadian Drinking Water Quality the Aesthetic Objective for hardness is 500 mg/L to limit nuisance concerns. As the water from the groundwater supply wells consistently tests above this aesthetic target (518 to 576 mg/L) the RM of St. Clements elected to invest in a treatment process to reduce the hardness and total dissolved solids to produce a softer quality water for the community to enjoy without having to rely on the use of in-home ion exchange softening methods.

2.2 Water Treatment Process

The St. Clements East Selkirk WTP processes and distributes high quality safe drinking water through an implemented multistep process. The plant has undergone significant capital upgrades which commenced in August 2021 and recently concluded in the first quarter of 2023, which among other things, included Reverse Osmosis technology to produce a softer water quality.

The WTP begins by treating the raw water with ultraviolet light to inactivate any bacteria, viruses, molds, algae, and other microorganisms. The water is then filtered through a 5 micron prefilter to remove any solids that may be present in the water before it undergoes Reverse Osmosis (RO) which uses pressure to push water through semi-permeable membranes to remove dissolved compounds from the water. The RO system employed at this plant uses parallel two stage high pressure membranes. As RO technology removes 99% of dissolved minerals and metals it can leave water too soft, so a 25% by-pass rate is used to blend the reverse osmosis permeate water with filtered well water to create a final blend with that achieves targeted water quality. This water is then injected with sodium hypochlorite from two parallel dosing pumps to achieve residual disinfection necessary for distribution and is also adjusted for pH by using sodium hydroxide to achieve a neutral pH before entering the reservoir where it remains until required for distribution.

2.3 Distribution System

Treated water from the reservoir is pumped throughout the community of East Selkirk via four pumps capable of providing pumping capacity to achieve a Class 3 fire protection rating for the core of the community and a Class 2 fire protection rating for the outer limits at 60 and 30 litres per second respectively. The distribution system is comprised of high-density polyethylene, a thermoplastic known as HDPE, at approximately 13 kilometers long. Water main diameters range between 150mm to 250mm.

Pump condition points are as follows:

- Well Pump WP1 & WP2: 12.5 L/s at 30.5 meters TDH (5.6 kilowatts)
- Jockey Pump JP1: 2.5 L/s at 56 meters TDH (2.2 kilowatts)
- Domestic Pump DP1 through DP3: 10.1 L/s at 56 meters TDH (11 kilowatts)
- Emergency Pump EP1: 60 l/S at 56 meters TDH (45 kilowatts)

2.4 Truck Fill

A public Potable Water Truck Fill Station has been recently added to the existing East Selkirk WTP at the northwest corner extending frontwards of the original portion of the building. The system operates using a pre-paid card system to allow around the clock access to the potable water truck fill dispenser. Cards can be paid for at the RM of St. Clements Office located at 1043 Kittson Rd.

Only potable water tanks are permitted for filling at the new truck fill station. No spray tanks, spray equipment, or chemicals are allowed on site by order of the Medical Officer of Heath.

2.5 Storage Reservoir

The storage reservoir ensures adequate chlorine contact time with the water for microbiological inactivation prior to distribution to the community. It has also been sized to provide adequate volumes of water to provide fire flows and emergency requirements to the existing community as well as for the anticipated community growth.

The WTP reservoir is comprised of three interconnected reinforced concrete cells. The overall reservoir capacity has been increased by recent upgrades to achieve a total storage capacity of approximately 1, 000 m^3 or 1, 000, 000 L. The water treatment building sits atop of the reservoir cells.

2.6 Water Use

The East Selkirk WTP distributed 42,970 cubic meters of treated potable water to the community of East Selkirk in 2022 which is an average of 118 cubic meters (118,000 L) daily provided to 302 service connections.

Table 1 Monthly Distribution Report

Month	Amount (m3)
January	3,471
February	3,110
March	3,421
April	3,549
May	3,971
June	3,962
July	3,610
August	3,348
September	3,644
October	3,927
November	3,540
December	3,417
Average m3 per month	3,581

*Supporting data can be made available upon request.

2.7 Classification and Certifications

In accordance with the *Water & Wastewater Facility Operators Regulation* under the *Environment Act* this facility has been classified by the Province of Manitoba as a Class 2 Water Treatment Facility and Class 1 Water Distribution. The RM of St. Clements has five certified water operators on staff.

3.0 Drinking Water Quality Standards and Testing

Under the *Drinking Water Safety Act* and the *Drinking Water Quality Standards Regulation*, the East Selkirk Public Water Treatment System is monitored for microbiological, chemical, radiological, and

physical parameters at frequencies set forth in Operating Licence PWS-12-523-02 as part of a multi-barrier approach to ensure safe drinking water. Raw water from the source, treated water leaving the plant, and distributed water in the community are all tested to ensure the safety of drinking water.

3.1 Water Quality Standards

For 2022, East Selkirk Public Water System met all health and regulatory requirements regarding monitoring and reporting of the various water quality parameters as adopted by the Province of Manitoba from the *Guidelines for Canadian Drinking Water Quality.*

Table 2 Water Quality/Treatment Standards Schedule & Results

Parameter	Quality Standard	Frequency	Treated Water Results
Total coliform	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water	Bi-weekly	100% Compliance
E. coli	Less than one E. coli bacteria detectable per 100 mL in all treated and distributed water	Bi-weekly	100% Compliance
Chlorine Residual	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	Daily	100% Compliance
Chlorine Residual	A free chlorine residual of at least 0.1 mg/L at all times at any point in the distribution system	Bi-weekly	100% Compliance
Arsenic	≤ 0.01 mg/L	One raw and one treated water sample once every three years	0.0013 mg/L [t]
Benzene	≤ 0.005 mg/L		<0.0005 mg/L * [t]
Ethylbenzene	≤ 0.14 mg/L		<0.0005 mg/L * [t]
Fluoride	≤ 1.5 mg/L		0.253 mg/L [t]
Lead	≤ 0.005 mg/L		0.001 mg/L [t]
Manganese	≤ 0.12 mg/L		0.0015 mg/L [t]
Nitrate	≤ to 45 mg/L measure as nitrate		4.47 mg/L [t]
Nitrite	≤ 3 mg/L measured as nitrite		<0.0010 mg/L [t]
Trichloroethylene	≤ 0.005 mg/L		<0.0005 mg/L * [t]
Tetrachlorethylene	≤ 0.01 mg/L		<0.0005 mg/L * [t]
Toluene	≤ 0.06 mg/L		<0.0005 mg/L * [t]
Total Xylenes	≤ 0.09 mg/L		<0.00064 mg/L * [t]
Uranium	≤ 0.02 mg/L		0.0115 mg/L [t]

* Raw water is sampled and analyzed for Volatile Organic Compounds

[t] Results of General Water Chemistry as collected by the Office of Drinking Water March 31, 2022 and analyzed by ALS Environmental Labs

3.2 Disinfection Residuals

The average chlorine residuals in the water treatment plant and in the distribution system have been maintained above regulated minimums for the year 2022. The monthly averages and distributed minimums observed have been summarized in the following Table 3:

Table 3 Disinfection Residuals

Month	Average of Chlorine Residuals in Treated Water (mg/L)		Lowest Free Chlorine Residuals in Distribution– Various Locations (mg/L)
	Free Chlorine	Total Chlorine	
January	1.22	1.85	0.93
February	1.14	1.55	1.08
March	1.09	1.59	0.78
April	1.05	1.53	0.74
May	1.13	1.56	0.90
June	1.16	1.58	1.03
July	1.25	1.72	1.12
August	1.01	1.45	0.80
September	1.12	1.50	0.70
October	1.07	1.40	0.69
November	0.99	1.39	0.92
December	1.14	1.47	0.57

*Supporting data can be made available upon request

4.0 Compliance and Corrective Actions

The East Selkirk Public Water System is monitored for water quality from source to tap. St. Clements submits monthly reports to the Province of Manitoba including chlorination, consumption, and UV monitoring. Bacteriological test result and reports with chlorine residuals are provided to the Office of Drinking Water by the analytical laboratory that performs the testing. All/any Incidents and Corrective action reports are filed with Manitoba Water Stewardship as per the *Guidelines for Canadian Drinking Water Quality*.

4.1 Drinking Water Safety Orders

No Drinking Water Safety Orders were issued for the East Selkirk Public Water System in 2022.

4.2 Boil Water Advisories Issued and Actions Taken

A precautionary Boil Water Advisory (BWA) was issued for the necessary work to extend the distribution network into a new phase of development in the Waytiuk subdivision. Once the new section of distribution piping was installed, tested, and connected to existing section, the section of pipe was put into commission. After this the bacteriological monitoring and testing was completed, met compliance, and the precautionary BWA was rescinded.

4.3 Warnings Issued or Charges Laid on the Public Water Supply System

No warning or charges were laid on the East Selkirk Public Water System in 2022.

5.0 Future Water System Upgrades/Expansions

The Rural Municipality of St. Clements jointly with Manitoba Water Services Board retained WSP Canada Inc to provide capacity studies, detailed design, and construction administration services for the expansion the East Selkirk Water Treatment Plant to increase its capacity to serve as a regional water treatment plant. The WTP upgrades have been designed such that additional components can be added in phases to serve a growing population in East Selkirk as well as Lockport to the south, and potential for connection to other neighboring communities.

A potable water line has been approved for joint funding between the Manitoba Water Services Board and the RM of St. Clements which will convey treated water from the WTP to the community of Lockport. Detailed designs are currently underway for a 300mm water main with tendering for construction work anticipated to follow in 2023.

Additionally, the water supply well pumps and motors are anticipated to be upgraded to increase raw water supply for the short term. Long term plans include development of new raw water supply wells to offer supply redundancy which mitigates downtime risks as well as provide adequate water supply to meet projected community population growths.