



Public Water System Annual Report

- 2018 -

Name of the Public Water System: Selkirk Public Water System
Name of the Local Owner: City of Selkirk
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Water Treatment and Water

Distribution Emergency Number: 785-3943
Name of Operator: Dale Scott, Manager of Utilities
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City of Selkirk

Date prepared: January 17, 2019
Printed copies of this report are available
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Introduction:

The 2018 Annual Report for the City of Selkirk summarizes the Water Utility's ability to produce safe potable water and meet provincial regulations.

The Selkirk Public Water System provides potable drinking water to an estimated population of 9,989 residents. Treated water produced from the Water Treatment Plant (WTP) meets all health and aesthetic objectives as stated in the Guidelines for Canadian Drinking Water Quality.

Source Water:

The Selkirk WTP has four source wells located within the City and two wells in the RM of St. Andrews to provide raw water for the treatment process. Five of these wells draw water from a deep carbonate bedrock aquifer, which leads to scale build up and gradual loss of productivity. The City has in place a redevelopment regime to maintain production rates. The Tower Well is a shallower well located in the upper part of the aquifer, but still within the bedrock. The raw source water has high hardness and dissolved solids as well as dissolved chloride concentrations. Bacteriological testing typically records low counts for both Total Coliforms and E.coli. The details of the six source wells are as follows:

Christie Well (old)

- Constructed in 1968
- Sustainable pumping rate 21.6 L/s
- Depth 83.2 m
- Redeveloped in 1996 and 2006
- Now used as standby only as new well drilled in 2015

Christie Well (new)

- Constructed in 2015
- Sustainable pumping rate 19.24 L/s
- Depth 83.5 m

McLean Well

- Constructed in 1959

- Sustainable pumping rate 12.9 L/s
- Depth 85.3 m
- Redeveloped 1997
- New submersible pump installed in 2006

Rosser Well

- Constructed in 1987
- Sustainable pumping rate 7.6 L/s
- Depth 79.3 m
- Redeveloped 1997
- New submersible pump installed in 2004

Tower Well

- Constructed in 1997
- Sustainable pumping rate 5.1 L/s
- Depth 14.2 m
- Well is developed in upper aquifer

Render Well North

- Commissioned in 2017
- Sustainable pumping rate 50 L/s
- Depth 98 m
- Pumps 30 ft below ground
- 50 Hp submersible pumps (575v)

Render Well South

- Commissioned in 2017
- Sustainable pumping rate 50 L/s
- Depth 98 m
- Pumps 30 ft below ground
- 50 Hp submersible pumps (575v)

Water Treatment:

The Selkirk Water Treatment Plant uses a lime softening treatment process to treat the raw source water before pumping it to the distribution system. The treatment process is comprised of the following components:

- Lime softening clarifier
- Recarbonation basin
- Gravity filters
- Clear well/disinfection basin
- Sludge dewatering

In the past, source water from the four wells was combined at the WTP and conveyed by a 400 mm asbestos cement pipe to the treatment facility. Currently, one of the two Render wells supplies all City water through 9.88 kms of 12" 300 mm HDPE welded pipe. Upon reaching the treatment facility, the raw water enters the clarifier where it is mixed with lime and a polymer coagulant. The clarifier has a surface area of 176 m² and a design overflow rate of 2.58 m³/hr. The reaction with lime forms calcium carbonate and some residual calcium oxide that can precipitate in the clarifier.

The calcium carbonate sludge from the clarifier is collected and pumped into the sludge handling facility. The dewatering facility utilizes two rotating permeable cylinders to concentrate the sludge prior to disposal. A vacuum pump draws water from the sludge through a filter cloth on the exterior of the drum. The extracted water is returned to the clarifier, while the dewatering sludge is scraped off the filter cloth and disposed in a landfill via a tandem dump truck.

The treated water from the clarifier flows by gravity in a channel to the recarbonation basin. The water enters this 39.5 m³ chamber through an open channel, where carbon dioxide gas is used to neutralize the pH. After neutralization, the water passes through a bank of gravity sand filters. There are three filter beds with a combined surface area of 55.7 m². The backwash uses an

integrated air scour system to improve filter cleaning efficiency. The water used for the backwash is recycled to the front end of the plant. After filtration, the treated water passes to the disinfection chamber where chlorine gas is injected to provide final disinfection before moving to the clearwell. The treated water is then pumped over to the storage reservoir located approximately 100 m to the northwest. Treated water quality from the existing WTP is consistently within the limits for health parameters. The chlorine residual is 0.5 – 1.0 mg/L leaving the plant into the city system.

Water hardness entering the plant is approximately 700 ppm and leaving the plant at approximately 150 ppm.

Water Storage:

A 643.5 m³ clear well built underneath the Selkirk Water Treatment Plant, a 9092 m³ underground reservoir next to the WTP and a 40 m high 945.6 m³ Water Tower, ensure that enough water is available to meet water users' needs and for fire fighting. The total of 10,681.1 is approximately a maximum 2 days worth of storage. The reservoir is designed so that the water is always moving and never gets stale.

Water Distribution:

The water distribution system is the network of underground pipes used to carry the treated water from the WTP to the homes and businesses in Selkirk. We have:

- 39.75 km of asbestos cement
- 16.52 km of polyvinyl chloride
- 4.10 km of cast iron

pipings through Selkirk. The piping is interconnected (looped) to ensure that fresh safe water is continuously supplied. We carry out regular maintenance in the distribution system such as seasonable flushing in the summer and fire hydrant testing in cooperation with the Selkirk Volunteer Fire Department.

Water Testing:

Water tests are taken on a routine basis to ensure that the water is safe, and to monitor how well the treatment facility is performing. We test the water at the WTP, and in the distribution systems, at various locations and times. It is a regulatory requirement that all water test results associated with water safety be submitted to the Provincial Office of Drinking Water for review.

Bacterial testing: We test the raw water (well water), treated water (leaving Reservoir II) and the water in the distribution system (within City limits) every two weeks for the presence of Total Coliform and E.coli bacteria. If these bacteria are present in the water it is an indication that disease causing organisms may also be present.

Disinfectant testing: We test the level of chlorine in the treated water every day to ensure that the water leaving the WTP has enough chlorine to ensure proper disinfection. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

Turbidity testing: Turbidity is a measurement of the clarity of water. The new plant tests turbidity. Well water turbidity is almost nonexistent.

Trihalomethane (THM) testing: Trihalomethanes are formed when chlorine reacts with naturally occurring organic matter in the water. Studies have shown a link between high levels of THMs and cancer. For that reason, the Province has set a health based standard for THMs of 100 micrograms per litre of water. This testing is only required once a year, in August, and only on plant effluent.

Iron testing: The raw water has naturally occurring iron levels above the aesthetic limits established by Health Canada's Guidelines for Canadian Drinking Water Quality. As per City of Selkirk Ground Water Study by UMA, all metals analyzed were below the CCME and CEQG requirements (0.3 – 2.0 mg/L in raw water). Elevated iron levels do not pose a risk to health. However, excessive iron can produce unpleasant tastes and odors in the water and can cause the water to

appear discolored and stain plumbing fixtures and laundry. Tested once per year on effluent.

Results of Testing: Bacterial

| | Regulatory Requirement | Selkirk Public Water System Performance |
|---|------------------------|---|
| Number of raw/incoming water samples | 26 | 100% |
| Number of treated water samples | 26 | 100% |
| Number of distribution water samples | 104 | 100% |
| Frequency of testing | Bi-weekly | 100% |
| Total Coliform present in samples | 0 TC per 100 mL | 0% |
| E.Coli present in samples | 0 EC per 100 mL | 0% |
| No corrective action reporting was required | | |

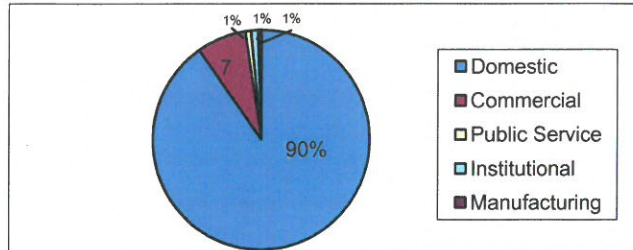
Results of Testing: Disinfection

| | Regulatory Requirement | Selkirk Public Water System Performance |
|--|------------------------|---|
| Free chlorine residual entering the distribution system | ≥ 0.5 mg/L | 100% |
| Frequency of testing entering the distribution system | Daily | 100% |
| Free chlorine residual in the distribution system | ≥ 0.1 mg/L | 100% |
| Frequency of testing in the distribution system | Bi-weekly | 100% |
| Report submissions | Monthly | 100% |
| <p>Comments:</p> <p>Measurements of disinfection residual were at all times at or above regulatory requirements.</p> <p>No corrective action reporting was required.</p> | | |

Distribution Connections and Users:

The City of Selkirk distribution system is comprised of 3393 connections (as of December 31, 2018). All service connections are metered.

| | |
|----------------|-------|
| Domestic | 3,060 |
| Commercial | 250 |
| Public Service | 29 |
| Institutional | 34 |
| Manufacturing | 20 |



Classification and Certification:

- Class 3 Water Treatment Facility Classification
- Class 2 Water Distribution Classification
- Certification level of operators

| | Water Treatment | Water Distribution |
|-------------------|-----------------|--------------------|
| Dale Scott | III | II |
| Troy Grobb | III | II |
| Ed Partyka | III | II |
| Jeremie Crawford | III | II |
| Derek Buchel | III | II |
| Dan McDermid | II | II |
| Brent Scherza | | II |
| Scott Parisian | II | I |
| Ken Burke | II | II |
| Pat Skrypnyk | | II |
| Eric Chipman | | II |
| Ted Skalesky | | II |
| Ryan Sicinski | | I |
| Jeremy Canada | II | II |
| David Lagimodiere | II | II |

Water System Incidents and Corrective Actions: 5 in 2018

- 1) **Date:** March 29, 2018
Location: 233 Main Street
Type of Problem: Watermain break
Length of Time Required to Correct Problem: 1 day
Number of Homes/Businesses Affected: 1 apartment, 1 business
Was Water Tested after Problem Corrected: yes **Reading:** 0.76

- 2) **Date:** May 17, 2018
Location: 366 Main Street
Type of Problem: Watermain break
Length of Time Required to Correct Problem: 1 day
Number of Homes/Businesses Affected: 4 businesses
Was Water Tested after Problem Corrected: yes **Reading:** 0.56

- 3) **Date:** June 7, 2018
Location: 200 block Taylor Avenue at Eveline
Type of Problem: Watermain break
Length of Time Required to Correct Problem: 1 day
Number of Homes/Businesses Affected: 12 houses
Was Water Tested after Problem Corrected: yes **Reading:** 0.32

- 4) **Date:** July 27, 2018
Location: 49/51 Main Street
Type of Problem: Watermain break
Length of Time Required to Correct Problem: 1 day
Number of Homes/Businesses Affected: 1 business
Was Water Tested after Problem Corrected: yes **Reading:** 0.59

- 5) **Date:** August 29, 2018
Location: 100 block Sutherland Avenue
Type of Problem: Watermain break
Length of Time Required to Correct Problem: 2 days

Number of Homes/Businesses Affected: 10 houses, 1 business
Was Water Tested after Problem Corrected: yes **Reading:** 0.77

Major Expenses incurred in 2018:

Installing geothermal at the Water Treatment Plant at a cost of \$265,000
(continued into 2019)

Watermain extension on Sutherland Avenue at a cost of \$60,000

Watermain renewal on Superior Avenue at a cost of \$180,000

New west end reservoir and pumping station at a cost of \$3,000,000 (continued into 2019)

Watermain installation north Main Street to new Wastewater Treatment Plant at a cost of \$300,000 (continued into 2019)

Future System Expansion or Expenses:

- Exterior painting of the Water Tower at a cost of \$450,000
- Remove and replace old clarifier at a cost of \$815,000
- Back-up generator and electrical upgrades at Water Treatment Plant at a cost of \$700,000
- Second channel installation from clarifier to CO2 chamber at a cost of \$80,000
- Water line extensions Main Street south at a cost of \$300,000
- Water line re-lining/ replacements at a cost of \$300,000 annually