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Central Elgin
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Belmont Water System

Water Works # 260002468

2021 Summary Report

For the Period
January 1, 2021 to December 31, 2021

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INTRODUCTION

The Belmont Water System is located in the Hamlet of Belmont within the Municipality of Central Elgin. The Belmont water system is owned and operated by the Municipality of Central Elgin.

The system itself consists of two ground water artesian wells, well pumps, a chlorine contact pipe, chemical feed equipment, distribution system water pipes, flow meters, valves, fire hydrants and one elevated water tower. There are approximately 1950 people in Belmont that benefit from this water system.

The Belmont Water Treatment facility saw an extensive upgrade in 2007 to bring the plant into compliance with all government regulations. This upgrade included re-lining of the two wells, new well pumps, new chemical feed systems, additional on line water quality monitors, new internal plant piping and valves, new chemical pumps and control systems, building upgrades and other mechanical and electrical upgrades.

The Belmont Water System operates under the Safe Drinking Water Act (S.D.W.A.), Ontario Regulation 170/03, Drinking Water Works Permit 046-202, Municipal Drinking Water License 046-102 and Permit to Take Water (P.T.T.W.) number 4026-A82QSJ. These regulatory documents outline among other things, how the water system is to be operated, how water samples are to be taken, and how much water can be produced.

Ontario Regulation 170/03 requires an annual Summary Report to be completed for the Belmont Water System. This Summary Report includes, among other things a description of measures taken to comply with the above mentioned regulatory documents, non compliance with any of the regulatory documents or any Ministry of the Environment Order, a summary of water supplied to the system, a summary of water sampling results and a summary of process chemicals used in the production of water.

A detailed summary of the microbiological test results and the chemical test results for the year can be found in a separate report called the Annual Report for the Belmont Water System that is located in the appendices of this summary report. Also, in the appendices of this report is a more detailed summary of raw and treated water supplied and process chemicals used in the production of water.

The following will be the Summary Report for the year of 2021.

WATER SYSTEM CLASSIFICATION

The Ministry of the Environment Rates and Classifies each Water System based on the complexity of the system. Other considerations include population served, size and nature of the equipment in use as well as the source of water. The classification number of systems range from Class 1 to Class 4, class 1 being the simplest and class 4 being the most complex. The class of the facility also determines the level of operator certificate that must be obtained for an operator to be able to work in that facility. For example, a Class 1 Facility must have at least a Class 1 operator responsible for the operations, while a Class 4 Facility must have a Class 4 operator responsible for operations.

The Belmont Water System was classified in 2005 as a Class 3 Distribution & Supply Water System.

REGULATORY COMPLIANCE

The Municipality of Central Elgin has taken all of the necessary steps to comply with the terms and conditions of the Safe Drinking Water Act (S.D.W.A.), Ontario Regulation 170/03, Ontario Regulation 128/04, Drinking Water Works Permit 046-202, Municipal Drinking Water License 046-102 and Permit to Take Water (P.T.T.W.) 4026-A82QSJ.

The following is a detailed description of some of the measures that the Municipality of Central Elgin has taken to ensure compliance.

Chlorine Contact Pipe

In 2003, the Municipality of Central Elgin constructed a chlorine contact pipe at the Belmont Water Treatment Facility. The pipe itself is 136 meters long with a diameter of 750 mm. The pipe is located under ground to the east of the water treatment building. In process water that has been dosed with chlorine enters at one end of the pipe and forces treated water out the opposite end.

CT is the product of the concentration of the disinfectant (free chlorine) and the contact time with the water being disinfected. The chlorine contact pipe provides a CT value over the minimum requirement of 15 mg-min/L. This ensures all water leaving the Water Treatment Plant has been properly disinfected. The Water Treatment Plant is programmed in such a manner that if the CT value falls below 15 mg-min/L the treatment train will automatically shut down preventing any water that has not been adequately disinfected from entering the distribution system.

Sampling Line

During the construction of the chlorine contact pipe, a 3/4 inch water line was installed to supply water for sampling. The sampling line is tapped off the piping immediately after the chlorine contact pipe but before the water enters the distribution system, so that the water sampled has completed the required contact time. The sampling line is routed into the water treatment facility and supplies treated water to the on-line water quality analyzers and grab sampling ports.

Supervisory Control and Data Acquisition System (S.C.A.D.A.)

The Municipality has an extensive S.C.A.D.A. system that incorporates all of the water and wastewater sites. The S.C.A.D.A. system provides operations staff with 24 hour a day real time interactive contact through a unique wireless system that operators can view remotely through a wireless lap top computer. This wireless system provides operators with the ability to view and control the equipment at each site.

The S.C.A.D.A. system is constantly recording and tracking many aspects of the systems including security, flows, pump run times, water quality results, tower water levels, water pressures, etc. All of these results are stored on the S.C.A.D.A. computer server that is located in the Central Elgin main office's computer server room. The S.C.A.D.A. computer tracks and generates daily, monthly and yearly reports for each site that summarizes all of this data for review by operations staff.

Each site has unique alarm settings for such things as free chlorine, pressure, security, etc. The S.C.A.D.A. computer will automatically notify operators by phone if an alarm is generated from any of the sites.

On Line Water Quality Analyzers

Treated Water Quality Analyzers

There are on line water quality analyzers located inside the Belmont Water Treatment Facility. These water quality analyzers are continuously analyzing the treated water before the water enters the distribution system. The on line water quality analyzers are continuously testing for free chlorine, total chlorine, turbidity and pH. All of the water quality analyzer results are recorded on the S.C.A.D.A. system for review by operators. These analyzers have pre-programmed alarms that will sound if a test result falls out of a preset range. The alarms are tied

to the S.C.A.D.A. system and will notify water operators by phone.

This free chlorine analyzer provides the process logic computer (P.L.C.) with the free chlorine residual used in the CT value calculation that will shut down the treatment train if it falls below the CT value of 15 mg-min/L.

In Process Water Quality Analyzers

There are also in process on-line water quality analyzers located inside the Water Treatment Facility. These in process analyzers monitor the water that has just been dosed with sodium hypochlorite and sodium silicate. These on-line water quality analyzers are continuously testing free chlorine, turbidity and pH. All of the water quality analyzer results are tracked on the S.C.A.D.A. system for review by operators. These analyzers have pre-programmed alarms that will sound if the test result falls out of a preset range. The alarms are also tied to the S.C.A.D.A. system and will notify water operators by phone.

The purpose of these on line analyzers is to notify operators of an in process problem so that process adjustments can be made to prevent problems further along in the treatment train.

Water Tower Water Quality Analyzers

Located inside the elevated water tower is a set of on-line water quality analyzers that continuously test free chlorine, pH and temperature of the tower discharge water. All of the water quality analyzer results are tracked on the S.C.A.D.A. system for review by operators. These analyzers also have pre-programmed alarms that will sound if the test result falls out of a preset range. The alarms are tied to the S.C.A.D.A. system that will notify water operators by phone.

These analyzers provide operators with water quality information on the discharge water of the water tower. Process adjustments can be made at the water treatment plant based on this information.

Flow Meter Calibration

There are three flow meters in the Belmont Water System that are calibrated annually. All flow data is recorded on the S.C.A.D.A. system.

- Two 4-inch Flow meters. One located at each of the two wellheads.
    - These meters record the instantaneous flow rates as well as the total volume of water taken from each well.
- One 10-inch flow meter located on the discharge piping of the elevated water storage tower.
    - This meter records the discharge from the elevated water tower.

The well flows are summarized in the Appendices.

Certified Operators

The Municipality of Central Elgin operates the Belmont Water System with its own certified operators. The Municipality of Central Elgin owns and operates several water and wastewater facilities of which the Belmont Water System is one. The Municipality has eight certified/licensed operators who collectively operate all of these facilities. This integration of water/wastewater operators ensures that the Municipality will always have a certified water operator available to operate this water system.

Ontario Regulation 128/04 outlines the training requirements of certified water operators in Ontario. The Municipality of Central Elgin ensures that all of its certified operators are properly trained to conform to Ontario Regulation 128/04.

Accredited Laboratories

The Municipality of Central Elgin uses accredited laboratories for all of the sampling that is required for the Belmont Water System. For microbiological samples, the Municipality uses S.G.S. Environmental Services Limited from London Ontario. For the chemical samples, the Municipality uses S.G.S. Environmental Limited from Lakefield Ontario.

Operations Manual

The Municipality of Central Elgin has developed and maintains an up to date Water System Operations Manual that includes among other things:

- Procedures for monitoring and recording of in-process parameters necessary for the control of the treatment/water system and for assessing the performance of the water system.
- Procedures for the operation and maintenance of monitoring equipment.
- Contingency plans and procedures for the provision of adequate equipment and material to deal with emergencies, upset and equipment breakdown.
- Procedures for dealing with complaints related to the drinking water system, including the recording of the nature of the complaint and any investigation and corrective action taken in respect of the complaint.
- Up to date Process Flow Diagrams (PFD) and Process and Instrumentation Diagrams (P&ID) for the treatment system.

Permit to take Water (P.T.T.W.)

In 2016, there was a new Permit to Take Water issued for the Belmont water system that has a water taking capacity of 3034 cubic meters per day. The new permit number is 4026-A82QSJ that expires in 2026. This permit regulates the amount of water that can be either taken from each well, separately or combined.

Raw Water Samples

Raw water samples are taken at each wellhead before any treatment or chemicals have been applied to the water. On a regular basis, raw water grab samples are taken from each well and tested in house for turbidity. Once every week microbiological samples are taken from each well and tested for E-coli, Total Coliforms and Background Colony counts.

A detailed summary of the raw water microbiological test results can be found in the Annual Report for the Belmont Water System that is located in the appendices of this report.

Treated Water Samples

Operational Samples

Daily treated water operational grab samples are taken from the chlorine contact pipe sample line that samples the treated water just before it enters the distribution system. These grab samples are tested by certified operators for free chlorine, total chlorine and turbidity.

On-line continuous analyzers sample the treated water from the same sample line for free chlorine, total chlorine, pH, and turbidity. These on line analyzers provide operators with a constant trending of all test results that provides for greater detail and historical information.

Information from these sample results are used to make process adjustments at the water treatment plant.

A full summary of the treated operational test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Microbiological Samples

Microbiological water samples are taken weekly from the treated water and sent to an accredited laboratory and analyzed for E-Coli, Total Coliforms, Background Colony Counts and Heterotrophic Plate Counts. Samples are taken from the chlorine contact pipe sample line that samples the treated water just before it enters the distribution system. A free chlorine residual, total chlorine residual and turbidity test is done with each sample as per Ontario Regulation 170/03.

A full summary of the treated water microbiological test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Chemical Samples

There is a very comprehensive list of chemical tests required on the treated water as per Ontario Regulation 170/03. This list includes among others nitrates, sodium, fluoride, pesticides, herbicides, PCB’s and metal compounds. The frequency of these tests ranges from every 3 months to every 5 years. All of these samples are collected by operators and sent to an accredited laboratory for analysis.

A full summary of the treated chemical test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Distribution System Water Samples

Operational Samples

Distribution system water operational samples such as free chlorine, total chlorine and turbidity are taken from the water tower inlet and outlet points and various points in the distribution system to obtain a representative sampling of the entire system.

The information from these sample results is used to make process adjustments at the water treatment plant. If these sample results indicate deteriorating water quality in the distribution system, operations staff will flush the affected area.

A full summary of the distribution operational test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Microbiological Samples

Microbiological water samples are taken from the distribution system weekly, sent to an accredited laboratory, and analyzed for E-Coli, Total Coliforms, Background Colony Counts and Heterotrophic Plate Counts. Samples are taken from the water tower inlet and outlet points and various points in the distribution system to obtain a representative sampling of the entire system. A free chlorine residual, total chlorine residual and turbidity test is done with each sample as per Ontario Regulation 170/03.

A full summary of the distribution microbiological test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Chemical Samples

The Municipality is required by Ontario Regulation 170/03 to sample in the distribution system for trihalomethanes, haloacetic acids, lead, alkalinity and pH.

Trihalomethane samples are taken where the longest water residency time is experienced while haloacetic acids are taken close to the disinfection point.

Ontario Regulation 170/03 outlines how lead samples shall be taken from private plumbing sites and distribution sites. The Belmont Water System is on a reduced lead sampling program, which means samples are no longer required from private plumbing sites but samples must be taken in the distribution system every third twelve month period. This is due to the very low lead test results from previous samples.

A full summary of the distribution chemical test results can be found in the Annual Report for the Belmont Water System, which is located in the appendices of this report.

Drinking Water Quality Management System (DWQMS)

The Municipality of Central Elgin has developed and maintains a Drinking Water Quality Operational Plan along with associated Procedures that conforms to the Drinking Water Standard as outlined in the Safe Drinking Water Act. This Operational Plan and its associated procedures is followed, reviewed and kept current by staff.

NON-COMPLIANCE

There were zero Non-Compliant issues with the Belmont Water System in 2021.

The Annual Ministry of the Environment, Conservation and Parks Inspection of the Belmont Water System found Water Operations to be in compliance scoring the system 100% compliant.

SUMMARY AND DISCUSSION OF THE QUANTITY OF WATER SUPPLIED

Raw Water

The consolidated Permit to take Water for well number one and two allows for a daily maximum of 3034 cubic meters of water to be taken from the wells each day. In 2021, the combined daily maximum taken from both wells was 1,298 cubic meters. This is 42.7 % of the rated capacity of the wells, leaving room for increases in production. The following chart will outline the combined flows for well one and two for 2021, a more detailed summary can be found in the Appendices.

Well Number One + Two

Maximum Day Well #1 and #2	**1,298 cubic meters**
Minimum Day Well #1 and #2	**0 cubic meters**
Average Day Well #1 and #2	**378 cubic meters**
Average Month Well #1 and #2	**11,539 cubic meters**
Yearly Total Well #1 and #2	**138,477 cubic meters**

Well Number One

The following chart will outline the flows for well one in 2021. A more detailed yearly summary of raw water taken can be found in the Appendices.

Maximum Day Well #1	1,298 cubic meters
Minimum Day Well #1	0 cubic meters
Average Day Well #1	233 cubic meters
Average Month Well #1	7,098 cubic meters
Yearly Total Well #1	85,181 cubic meters

Well Number Two

The following chart will outline the flows for well two in 2021. A more detailed yearly summary of raw water taken can be found in the Appendices.

Maximum Day Well #2	1,132 cubic meters
Minimum Day Well #2	0 cubic meters
Average Day Well #2	146 cubic meters
Average Month Well #2	4,441 cubic meters
Yearly Total Well #2	53,295 cubic meters

SUMMARY AND DISCUSSION OF WATER SAMPLING RESULTS

Water sampling in the Belmont Water System is done as required by Ontario Drinking Water Regulation 170/03. This Regulation requires the Belmont Water System to take a minimum of one microbiological sample per week from each well, one microbiological sample per week from the entrance point to the distribution system and a minimum of ten microbiological samples per month from the distribution system. A detailed summary of these sample results can be found in the Annual Report for the Belmont Water System, which is located in the Appendices of this report.

Ontario Drinking Water Regulation 170/03 also requires comprehensive chemical sampling of treated water that enters the distribution system. This sampling includes Volatile Organic substances, Inorganic substances, pesticides, P.C.B.'s and metals. Some of these parameters are sampled quarterly while other parameters are sampled yearly or at longer intervals. A detailed summary of these sample results can be found in the Annual Report for the Belmont Water System, which is located in the Appendices.

Daily chlorine and turbidity grab samples are taken from the entrance point to the distribution system and in the distribution system itself, as required by the Ontario Drinking Water Regulations. In addition to daily grab samples, there are on-line water quality analyzers at the treatment facility and the water tower that continually sample the water. Routine chlorine and turbidity tests are also done at the elevated water tower.

In 2021, there was one incident of adverse microbiological water samples found in the Belmont Water System. This incident is described below.

- June 22, 2021
  - One sample taken at a sample station located at 14091 Belmont Road returned with a result showing three (3) Total Coliform and three (3) E-coli.
    - Re-samples returned clear of all bacteria.

SUMMARY AND DISCUSSION OF TREATMENT CHEMICALS USED

Sodium Hypochlorite

Sodium Hypochlorite with 12% available chlorine is used to disinfect the water at the Belmont Water Treatment Facility. The Sodium Hypochlorite used meets all applicable standards of the American Water Works Association (AWWA) and meets all the safety criteria of the American National Standards Institute (ANSI). The Sodium Hypochlorite is added with chemical feed pumps. The following chart summarizes the amount of Sodium Hypochlorite used and the average chlorine dosage rate in 2021.

A more detailed summary can be found in the Process Chemical Summary located in the Appendices of this report.

Total Litres Used	Avg. Chlorine Dosage mg/L
3,537	3.07

Sodium Silicate

Sodium Silicate N is added to the water in Belmont to sequester the iron and prevent the iron from precipitating out in the distribution system. The Sodium Silicate used, meets all applicable standards of the American Water Works Association (AWWA) and meets all the safety criteria of the American National Standards Institute (ANSI). The Sodium Silicate is added with chemical feed pumps. The following chart summarizes the amount of Sodium Silicate used and the average Sodium Silicate dosage rate for 2021.

A more detailed summary can be found in the Process Chemical Summary located in the Appendices of this report.

Total Litres Used	Avg. Silicate Dosage mg/L
2,953	8.53

SUMMARY AND DISCUSSION OF WORK DONE TO SYSTEM

In 2021, the sodium hypochlorite feed equipment was replaced in the Belmont Water Treatment Plant.

SUMMARY

The Belmont Water System continued to supply the residents of Belmont with high quality potable water in 2021. There is an extensive water quality sampling program in place that includes microbiological, chemical and chlorine residuals that range in frequency from daily to every five years. With all of the samples taken in 2021, there were no confirmed adverse water samples. The amount of water produced fluctuated as usual with seasonal demand. Daily visits by certified operators ensured the Belmont Water Treatment Facility was running smoothly.

The upgrades done at the treatment plant in 2007 provides the Hamlet of Belmont with a modern ground water treatment facility that will operate efficiently for many years.

The attached Appendices provide a more detailed summary of the water produced, water supplied to the distribution system, production chemicals used and sampling results. These summaries will further outline the diligence that the Municipality of Central Elgin takes in operating the Belmont Water System.

APPENDIX

A

RAW & TREATED FLOW SUMMARIES

FOR
THE BELMONT WATER SYSTEM

BELMONT WATER FACILITY

2021 WATER PRODUCTION SUMMARY

Month 2021	Well #1 Output Cubic m	Well #2 output Cubic m	Total for Both Well #1+ #2 Cubic m	Max Day Well #1 Cubic m	Min Day Well #1 Cubic m	Avg. Day Well #1 Cubic m	Max Day Well #2 Cubic m	Min Day Well #2 Cubic m	Avg. Day Well #2 Cubic m	Max Day Well #1+ #2 Cubic m	Min Day Well #1+ #2 Cubic m	Avg. Day Well #1+ #2 Cubic m
January	0.00	10928.00	10928.00	0.00	0.00	0.00	1001.00	0.00	352.52	1001.00	0.00	352.52
Feburary	6294.20	3083.50	9377.70	801.60	0.00	224.79	839.70	0.00	110.13	839.70	0.00	334.92
March	11291.90	0.00	11291.90	1120.60	0.00	364.25	0.00	0.00	0.00	1120.60	0.00	364.25
April	11639.60	0.00	11639.60	1199.90	0.00	387.99	0.00	0.00	0.00	1199.90	0.00	387.99
May	14703.20	0.00	14703.20	1229.40	0.00	474.30	0.00	0.00	0.00	1229.40	0.00	474.30
June	14099.20	87.50	14186.70	1212.20	0.00	469.97	86.20	0.00	2.92	1212.20	0.00	472.89
July	11810.40	0.00	11810.40	1298.80	0.00	380.98	0.00	0.00	0.00	1298.80	0.00	380.98
August	12885.10	0.00	12885.10	1268.60	0.00	415.65	0.00	0.00	0.00	1268.60	0.00	415.65
September	2386.50	8049.10	10435.60	1221.80	0.00	79.55	1128.80	0.00	268.30	1221.80	0.00	347.85
October	0.00	10297.70	10297.70	0.00	0.00	0.00	1132.10	0.00	332.18	1132.10	0.00	332.18
November	0.00	9979.90	9979.90	0.00	0.00	0.00	1102.80	0.00	332.66	1102.80	0.00	332.66
December	71.40	10870.00	10941.40	71.40	0.00	2.30	918.00	0.00	350.65	918.60	0.00	352.95
Yearly Total	85181.50	53295.70	138477.20	1298.80	0.00	233.37	1132.10	0.00	146.02	1298.80	0.00	378.35

APPENDIX

B

PROCESS CHEMICAL SUMMARY

FOR
THE BELMONT WATER SYSTEM

BELMONT WATER FACILITY

2021 PROCESS CHEMICAL SUMMARY

Month 2021	Well #1 Output Cubic m	Well #2 Output Cubic m	Well #1 and Well #2 Cubic m	Sodium Hypochlorite 12 Solution Litres Used	Chlorine Dosage Rate mg/L	Sodium Silicate Litres Used	Sodium Silicate Dosage Rate mg/L
January	0.00	10928.00	10928.00	235.56	2.59	230.09	8.42
February	6294.20	3083.50	9377.70	221.95	2.84	197.91	8.44
March	11291.00	0.00	11291.00	310.19	3.30	239.71	8.49
April	11639.60	0.00	11639.60	331.86	3.42	245.91	8.45
May	14703.20	0.00	14703.20	370.49	3.02	316.50	8.61
June	14126.20	86.20	14212.40	359.86	3.04	306.60	8.63
July	11810.40	0.00	11810.40	319.04	3.24	254.62	8.62
August	12885.10	0.00	12885.10	315.11	2.93	277.68	8.62
September	2386.50	8049.10	10435.60	283.81	3.26	224.85	8.62
October	0.00	10297.70	10297.70	283.63	3.31	221.83	8.62
November	0.00	9979.90	9979.90	226.41	2.72	214.30	8.59
December	71.40	10870.00	10941.40	279.92	3.07	223.41	8.17
	85207.60 Yearly Total	**53294.40 Yearly Total**	**138502.00 Yearly Total**	**3537.83 Yearly Total**	**3.07 Yearly Average**	**2953.41 Yearly Total**	**8.53 Yearly Average**

APPENDIX

C

ANNUAL REPORT

FOR
THE BELMONT WATER SYSTEM

Drinking-Water Systems Regulation O. Reg. 170/03

Part III Form 2
Section 11. ANNUAL REPORT.

Drinking-Water System Number:	**220002468**
Drinking-Water System Name:	**Belmont Water System**
Drinking-Water System Owner:	**Municipality of Central Elgin**
Drinking-Water System Category:	**Large Municipal Residential**
Period being reported:	**January 1, 2021 to December 31, 2021**

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [x]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [x] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

Central Elgin Administration Office
450 Sunset Drive St. Thomas
Ontario, Canada
N5R 5V1

Complete for all other Categories.

Number of Designated Facilities served:

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to:

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

Note: For the following tables below, additional rows or columns may be added or an appendix may be attached to the report.

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
-	-

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [ ] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

[x] Public access/notice via the web
[x] Public access/notice via Government Office
[ ] Public access/notice via a newspaper
[ ] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[ ] Public access/notice via other method_____

Describe your Drinking-Water System.

The Belmont water system is a Large Municipal Residential system located in the Hamlet of Belmont within the regional Municipality of Central Elgin.
The drinking water is drawn from two artesian ground water wells. Sodium hypochlorite is used for disinfection and sodium silicate is added for iron sequestration. Each well pumps water through a water treatment facility where these chemicals are added. The well pumps also provide the hydraulic force required to pump the disinfected water through a large 750mm diameter by 136 meter long chlorine contact pipe and into the distribution system and eventually into the elevated water tower. The contact pipe provides adequate contact time between the water and the chlorine that was added to ensure proper disinfection before water enters the distribution system. The elevated water tower stores 2100 cubic meters of water for peak demand and fire flows.
The Water Treatment facility and Water Tower utilize a Supervisory Control and Data Acquisition system (S.C.A.D.A.).
The treatment facility is located at 200 Caesar Road in the Hamlet of Belmont and serves a population of approximately 1950.

List all water treatment chemicals used over this reporting period.

There are two chemicals used in the treatment process in the Belmont Water System. They are Sodium Hypochlorite for disinfection and Sodium Silicate for iron sequestration. The amounts of these chemicals used in 2021 are as follows:

Sodium Hypochlorite: 3,537 Litres
Sodium Silicate: 2,953 Litres

Were any significant expenses incurred to?

[ ] Install required equipment
[ ] Repair required equipment
[X] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred.

In 2021, the sodium hypochlorite feed equipment was replaced at the Water Treatment Facility. No other major expenses were incurred.

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre.

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
June 22, 2021	Total Coliforms	3	Count per 100 mL	Re-Sample	June. 23 & 24, 2021
June 22, 2021	E-Coli	3	Count per 100 mL	Re-Sample	June. 23 & 24, 2021

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)	Number of Back Ground Samples	Range of Background Results (min #)-(max #)
Raw	104	0 to 0	0 to 0	0	-	104	0 to 50
Treated	52	0 to 0	0 to 0	52	<10 to 20	52	0 to 0
Distribution	317	0 to 3	0 to 3	308	<10 to 110	317	0 to 16

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results of Grab Samples (min#)-(max#)	Number of Continuous Monitoring Samples	Range of Results of Continuous Monitoring (min#)-(max#)	Average of Continuous Monitoring Samples
Turbidity (Raw)	164	0.04 to 1.82 NTU	0	N/A	N/A
Turbidity (Treated)	365	0.05 to 0.57 NTU	8760	0.07 to 6.51 NTU	0.20
Turbidity (Distribution)	936	0.05 to 1.25 NTU	0	N/A	N/A
pH (Raw)	0	N/A	0	N/A	N/A
pH (Treated)	0	N/A	8760	7.61 to 8.11	7.78
pH (Distribution)	4	7.61 to 7.76	8760	7.64 to 8.04	7.87
Free Chlorine (Treated)	365	0.81 to 1.52 mg/L	8760	0.46 to 3.92 mg/L	1.22 mg/L
Free Chlorine (Distribution)	939	0.47 to 2.80 mg/L	8760	0.75 to 2.69 mg/L	1.06 mg/L
Total Chlorine (Treated)	365	0.84 to 1.56 mg/L	8760	0.43 to 2.00 mg/L	1.30 mg/L
Total Chlorine (Distribution)	939	0.51 to 2.99 mg/L	0	N/A	N/A
Temperature (Raw)	0	N/A	0	N/A	N/A
Temperature (Distribution)	0	N/A	8760	2.58 to 23.41 Celsius	12.76 Celsius

***NOTE**: Record the unit of measure if it is **not** milligrams per litre.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	M.A.C.	Result Value	Unit of Measure	Exceedance
Antimony	Mar. 1/21	0.006	<0.0009	Mg/L	No
Arsenic	Mar. 1/21	0.010	0.0046	Mg/L	No
Barium	Mar. 1/21	1.0	0.192	Mg/L	No
Boron	Mar. 1/21	5.0	0.06	Mg/L	No
Cadmium	Mar. 1/21	0.005	0.000003	Mg/L	No
Chromium	Mar. 1/21	0.050	0.0008	Mg/L	No
Lead	See	Table	Below		
Mercury	Mar. 1/21	0.001	<0.00001	Mg/L	No
Selenium	Mar. 1/21	0.050	<0.0004	Mg/L	No
Sodium	Mar. 1/21	20.0	19.9	Mg/L	No
Uranium	Mar. 1/21	0.02	0.000093	Mg/L	No
Fluoride	Mar. 6/18	1.5	0.85	Mg/L	No
Nitrite	2021 RAA	1	<0.003	Mg/L	No
Nitrate	2021 RAA	10	0.00625	Mg/L	No
Nitrite	Mar. 1/21	1	<0.003	Mg/L	No
Nitrate	Mar. 1/21	10	<0.006	Mg/L	No
Nitrite	June 1/21	1	<0.003	Mg/L	No
Nitrate	June 1/21	10	<0.006	Mg/L	No
Nitrite	Sept. 1/21	1	<0.003	Mg/L	No
Nitrate	Sept. 1/21	10	<0.006	Mg/L	No
Nitrite	Nov. 30/21	1	<0.003	Mg/L	No
Nitrate	Nov. 30/21	10	0.007	Mg/L	No

Summary of lead testing under Schedule 15.1 during this reporting period.

Location Type	Number of Samples	M.A.C.	Range of Lead Results	Number of Exceedances
Plumbing	0	0.10 mg/L	N/A	N/A
Distribution	2	0.10 mg/L	0.00012 to 0.00019 mg/L	0

Summary of alkalinity testing under Schedule 15.1 during this reporting period.

Location Type	Number of Samples	M.A.C.	Range of alkalinity Results	Number of Exceedances
Distribution	4	N/A	183 to 189 mg/L	N/A

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	M.A.C.	Result Value	Unit of Measure	Excee dance
Alachlor	Mar. 1/21	0.005	<0.00002	Mg/L	No
Atrazine + N-dealkylated metobolites	Mar. 1/21	0.005	<0.00001	Mg/L	No
Azinphos-methyl	Mar. 1/21	0.02	<0.00005	Mg/L	No
Benzene	Mar. 1/21	0.001	<0.00032	Mg/L	No
Benzo(a)pyrene	Mar. 1/21	0.00001	<0.000004	Mg/L	No
Bromoxynil	Mar. 1/21	0.005	<0.00033	Mg/L	No
Carbaryl	Mar. 1/21	0.09	<0.00005	Mg/L	No
Carbofuran	Mar. 1/21	0.09	<0.00001	Mg/L	No
Carbon Tetrachloride	Mar. 1/21	0.002	<0.00017	Mg/L	No
Chlorpyrifos	Mar. 1/21	0.09	<0.00002	Mg/L	No
Diazinon	Mar. 1/21	0.02	<0.00002	Mg/L	No
Dicamba	Mar. 1/21	0.120	<0.0002	Mg/L	No
1,2-Dichlorobenzene	Mar. 1/21	0.2	<0.00041	Mg/L	No
1,4-Dichlorobenzene	Mar. 1/21	0.005	<0.00036	Mg/L	No
1,2-Dichloroethane	Mar. 1/21	0.005	<0.00035	Mg/L	No
1,1-Dichloroethylene (vinylidene chloride)	Mar. 1/21	0.014	<0.00033	Mg/L	No
Dichloromethane	Mar. 1/21	0.05	<0.00035	Mg/L	No
2-4 Dichlorophenol	Mar. 1/21	0.9	<0.00015	Mg/L	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	Mar. 1/21	0.1	<0.00019	Mg/L	No
Diclofop-methyl	Mar. 1/21	0.009	<0.0004	Mg/L	No
Dimethoate	Mar. 1/21	0.02	<0.00006	Mg/L	No
Diquat	Mar. 1/21	0.07	<0.001	Mg/L	No
Diuron	Mar. 1/21	0.15	<0.00003	Mg/L	No
Glyphosate	Mar. 1/21	0.28	<0.001	Mg/L	No
Total Haloacetic Acids (HAA5)	2021 Avg.	R.A.A. 0.08	R.A.A. <0.0053	mg/L	No
Malathion	Mar. 1/21	0.19	<0.00002	Mg/L	No
Metolachlor	Mar. 1/21	0.05	<0.00001	Mg/L	No
Metribuzin	Mar. 1/21	0.08	<0.00002	Mg/L	No
Monochlorobenzene	Mar. 1/21	0.08	<0.0003	Mg/L	No
Paraquat	Mar. 1/21	0.01	<0.001	Mg/L	No
Pentachlorophenol	Mar. 1/21	0.06	<0.00015	Mg/L	No
Phorate	Mar. 1/21	0.002	<0.00001	Mg/L	No
Picloram	Mar. 1/21	0.19	<0.001	Mg/L	No
Mar. 1/21	Mar. 1/21	Mar. 1/21	Mar. 1/21	Mg/L	No
Prometryne	Mar. 1/21	0.001	<0.00003	Mg/L	No
Simazine	Mar. 1/21	0.01	<0.00001	Mg/L	No

THM (Total) (NOTE: show latest annual average)	**2021 Avg.**	**R.A.A. 0.10**	**R.A.A. 0.01975**	**Mg/L**	**No**
Terbufos	**Mar. 1/21**	**0.001**	**<0.00001**	**Mg/L**	**No**
Tetrachloroethylene	**Mar. 1/21**	**0.010**	**<0.00035**	**Mg/L**	**No**
2,3,4,6-Tetrachlorophenol	**Mar. 1/21**	**0.1**	**<0.0002**	**Mg/L**	**No**
Triallate	**Mar. 1/21**	**0.23**	**<0.00001**	**Mg/L**	**No**
Trichloroethylene	**Mar. 1/21**	**0.005**	**<0.00044**	**Mg/L**	**No**
2,4,6-Trichlorophenol	**Mar. 1/21**	**0.005**	**<0.00025**	**Mg/L**	**No**
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	**Mar. 1/21**	**0.1**	**<0.00012**	**Mg/L**	**No**
Trifluralin	**Mar. 1/21**	**0.045**	**<0.00002**	**Mg/L**	**No**
Vinyl Chloride	**Mar. 1/21**	**0.001**	**<0.00017**	**Mg/L**	**No**

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample

(Only if DWS category is large municipal residential, small municipal residential, large municipal non residential, non municipal year round residential, large non municipal non residential)