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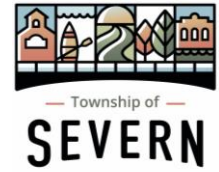
SEVERN

Wastewater Treatment and Collection System
Westshore
2023 Annual Report



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Introduction

Township of Severn prepared the 2023 annual summary report for the Westshore Wastewater Treatment Plant (WWTP). This report summarizes notable operating events, repair and maintenance, non-compliance issues, effluent quality, sludge quantity and flow data for 2023. This report is based on operating data collected and compiled by the Township of Severn.

Summary of Monitoring Requirements

Table 7 and 8 lists the parameters that must be monitored, and the monitoring frequency as stated in the Certificate of Approval (C of A) No. 6791-62EJW5, issued by the Ministry of the Environment, Conservation and Parks (MECP) on June 29, 2004.

Raw Sewage Quality

Table 1 illustrates the monthly and annual average raw sewage quality results.

Table 1: 2023 Monthly Raw Influent Quality

Month	CBOD ₅ (mg/L)	TSS (mg/L)	Total Phosphorus (mg/L)	TKN (mg/L)
January	113	123	2.94	28.2
February	88	130	3.68	34.1
March	151	174	3.91	41.4
April	100	143	3.15	27.1
May	174	178	3.91	33.6
June	246	280	6.91	58.3
July	161	239	4.68	37.9
August	172	222	5.45	48.4
September	342	257	6.84	64.3



October	291	251	3.48	61.7
November	87	103	2.56	25.4
December	188	196	3.57	35.7
Average	176	191	4.26	41.3

Effluent Quality

Tables 2, 3, and 4 illustrate the monthly and annual average effluent quality results.

Table 2: 2023 Monthly Average Effluent Quality

Month	TKN (as Nitrogen) (mg/L)	Alkalinity (as CaCO ₃) (mg/L)	Temperature (°C)	Unionized Ammonia (as Nitrogen) (mg/L)	Nitrite (as Nitrogen) (mg/L)	Nitrate (as Nitrogen) (mg/L)
January	3.5	143	9.8	0.018	5.83	3.07
February	9.3	148	10.5	0.044	3.54	3.00
March	7.6	149	10.9	0.044	5.74	3.88
April	1.9	131	10.5	0.006	1.93	8.72
May	0.7	121	13.3	0.001	0.04	11.32
June	0.6	100	15.5	0.001	0.06	10.22
July	0.9	136	18.3	0.001	0.04	5.64
August	0.9	120	19.8	0.013	0.03	3.52
September	1.2	93	19.3	0.001	0.08	8.58
October	1.1	95	18.3	0.002	0.05	9.16
November	0.7	86	13.4	0.001	0.07	16.42
December	1.3	135	9.9	0.001	0.20	10.31
Average	2.5	121	14.1	0.011	1.47	7.82

Table 3: 2023 Monthly Average Effluent Quality

Month	Effluent ADF	CBOD		TSS		Total Phosphorus	
	<i>m³/day</i>	<i>mg/L</i>	<i>kg/d</i>	<i>mg/L</i>	<i>kg/d</i>	<i>mg/L</i>	<i>kg/d</i>
<i>Effluent Objective</i>	1390	5	6.95	5	6.95	0.12	0.17
<i>Effluent Limit</i>	1390	10	13.9	10	13.9	0.15	0.21
January	990	5.6	5.54	7.0	6.93	0.18	0.18
February	972	6.3	6.12	5.3	5.15	0.14	0.14
March	1026	9.0	9.23	7.5	7.69	0.17	0.17
April	1157	5.0	5.78	5.5	6.36	0.07	0.08
May	905	2.2	1.99	4.4	3.98	0.06	0.05
June	911	3.0	2.73	2.8	2.55	0.05	0.05
July	1040	2.0	2.08	3.8	3.95	0.05	0.05
August	806	2.0	1.61	2.4	1.93	0.06	0.05
September	736	2.0	1.47	2.5	1.84	0.05	0.04
October	779	2.0	1.55	3.0	2.33	0.05	0.04
November	827	2.0	1.65	3.0	1.65	0.08	0.07
December	1021	3.5	3.57	4.5	4.59	0.06	0.06

Table 4: 2023 Monthly Average Effluent Quality

Month	Total Ammonia (Nitrogen)				pH	E. Coli
	mg/L	kg/d	mg/L	kg/d		
	May 15 - Oct 15		Oct 16 - May14			
Effluent Objective	2.0	2.78	5.0	6.95		
Effluent Limit	3.0	4.17	7.0	9.73		
January			3.0	2.97	7.66	3
February			8.0	7.78	7.45	4
March			6.8	6.98	7.40	4
April			1.10	1.27	7.28	2.5
May	0.2	0.09			7.18	2
June	0.1	0.09			6.90	2
July	0.1	0.10			7.05	5
August	0.1	0.08			6.86	2
September	0.2	0.15			6.88	4
October	0.1	0.08			7.08	4
November			0.1	0.08	6.76	6
December			0.3	0.31	7.18	11

Influent Flows

The rated capacity of the Westshore WWTP is 1,390 m³/day (ADF - average daily flow), with a peak flow rate of 4,768 m³/day, as listed in the C of A.

As shown in Table 5 and Figures 1 and 2, all flows were below the ADF-rated capacity and the peak flow capacity of the plant during 2023.



Table 5: Summary of Influent Flows

Month	Total Monthly Flow (m ³)	Average Daily Flow (m ³ /day)	Average Daily Flow (% of Rated Capacity)	Peak Daily Flow (m ³ /day)	Peak Daily Flow (% of Rated Capacity)	Peak Daily Flow (% of Rated Peak Flow)
January	30698	990	71%	1723	124%	36%
February	27225	972	70%	1434	103%	30%
March	31810	1026	74%	1412	102%	30%
April	34705	1157	83%	2138	154%	45%
May	28047	905	65%	1258	91%	26%
June	27330	911	66%	1882	135%	39%
July	32225	1040	75%	1474	106%	31%
August	24993	806	58%	1040	75%	22%
September	22075	736	53%	892	64%	19%
October	24149	779	56%	943	68%	20%
November	24798	827	59%	1119	81%	23%
December	31644	1021	73%	1482	107%	31%
Average	28308	931	67%	1400	101%	29%
Max	34705	1157	83%	2138	154%	45%
Total	34705					

Figure 1: Westshore WWTP 2023 monthly flow total values are in (m3)

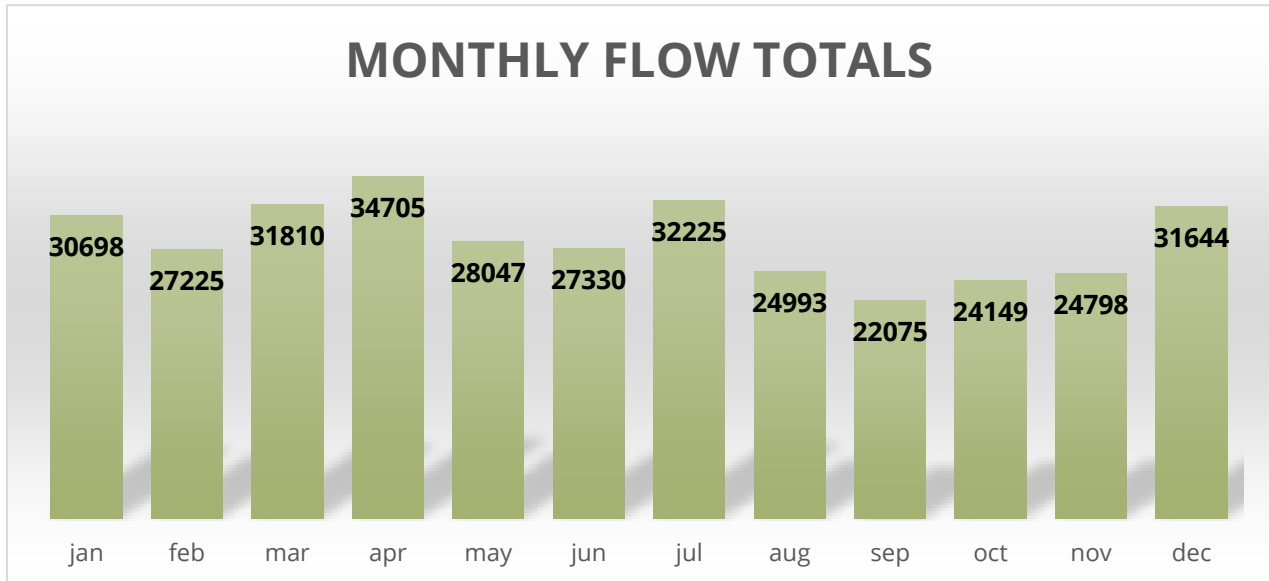
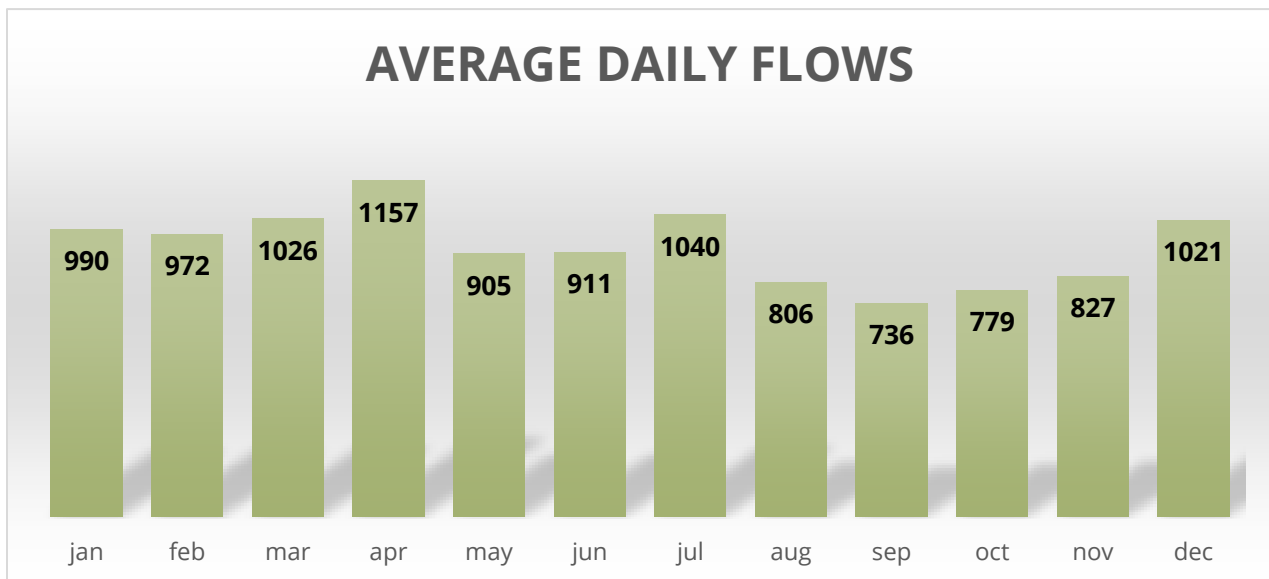


Figure 2: Westshore WWTP 2023 average monthly flow total values are in (m3)



Sludge Analysis

The results of the sludge analysis are summarized in Table 6.

Table 6: Sludge Analysis

Parameter	Limits	Annual Average	
		Sludge Concentration (mg/L)	Metal Concentration (mg/kg)
Total Solids		11713	
Ammonia +		4.9	
TKN		487	
Nitrate + Nitrite		72.2	
Phosphorus		232	
Arsenic	170	0.10	9
Cadmium	34	0.01	1
Cobalt	340	0.02	2
Chromium	2800	0.11	10
Copper	1700	2.25	196
Mercury	11	0.002	0
Potassium		31.1	2654
Molybdenum	94	0.05	5
Nickel	420	0.11	10
Lead	1100	0.10	9
Selenium	34	0.10	9
Zinc	4,200	3.7	318
E. Coli (cfu/1g)	< 2,000,000	223623	

Operational Issues and Corrective Actions

Operational issues in 2023 are listed below:

- Operational objectives for CBOD were not achieved in January, February, and March.
- Operational objectives for TSS were not achieved in January, February, March, and April.
- Operational objectives for Total Phosphorus were not achieved in February and March.
- Operational objectives for Total Ammonia were not achieved in February and March.
- Operational objectives that exceeded the C of A are highlighted in Table 3 and 4.

Westshore WPCP had three limit exceedances in 2023. Exceedances are listed below.

- In January, Total phosphorus exceeded the limit of 0.15 mg/l. Monthly average for January was 0.18 mg/l.
- In March, Total Phosphorus exceeded the limit of 0.15 mg/l. Monthly average for March was 0.17 mg/l.
- In February, Total Ammonia exceeded the limit of 7.0 mg/l. Monthly average for February was 8.0 mg/l.

Operational limits that exceeded the C of A are highlighted in Table 3.

Maintenance Summary

All maintenance that was completed in 2023 on major structures, apparatus and/or mechanical equipment is summarized below.

Wastewater Treatment Plant

The following is a list of preventative and emergency maintenance completed at the WWTP in 2023:

- All critical alarms were tested monthly.
- All floats were inspected and cleaned monthly.
- The backup generator was tested monthly under load.
- The blowers and air compressors were serviced yearly to check belts, alignment, motor function and lubrication. The standby blower was run once a week.
- Equalization and reject tanks were drawn down and cleaned as needed.
- Plant headworks and Parkson filter headworks were drawn down and cleaned as needed.
- Replaced Parkson filter air feed tubes.
- Maintained filter media.
- New blower installed.
- A new alum feed system was installed.

Collection System

The following is a list of preventative and emergency maintenance completed on the sewer system in 2023:

- Sewage Pump stations were cleaned to remove grease, grit, and other debris.
- All sewage pumping station alarms were tested monthly.
- All floats in the sewage pumping stations were inspected and cleaned monthly.
- Debris was removed from several pumps in the sewage pumping stations as warranted.
- Approximately 25% of manholes were inspected.
- All generators were serviced.
- Flushed approximately 1631 m of sewer main.

- Inspected 1427 m of sewer main by video camera to identify any necessary repairs.

Summary of Effluent Quality Assurance or Control Measures

Tables 7 and 8 summarize which parameters are analyzed by the accredited laboratory, SGS Lakefield Research, Aquatic Laboratories, or Caduceon Laboratories, and which parameters are analyzed in-house.

In-house tests are conducted by licensed operators for monitoring purposes. Standard Methods are used by the operators and the test results are utilized for process control. All in-house monitoring equipment is calibrated based on the manufacturer's recommendations.

Table 7: Summary of Raw Influent Monitoring Requirements

Source	Parameter	Required	Method
Raw Influent	CBOD5	Monthly	SGS Lakefield or Caduceon
	Total Suspended Solids	Monthly	SGS Lakefield or Caduceon
	Total Phosphorus	Monthly	SGS Lakefield or Caduceon
	Total Kjeldahl	Monthly	SGS Lakefield or Caduceon

***Note: SGS Lakefield & Caduceon are both MECP approved accredited laboratories*



Table 8: Summary of Effluent Monitoring Requirements

Source	Parameter	Required	Method
Final Effluent	Flow	Daily	SGS Lakefield or Caduceon
	CBOD5	Weekly	SGS Lakefield or Caduceon
	Total Suspended Solids	Weekly	SGS Lakefield or Caduceon
	Total Phosphorus	Weekly	SGS Lakefield or Caduceon
	Total Ammonia	Weekly	SGS Lakefield or Caduceon
	Nitrate	Weekly	SGS Lakefield or Caduceon
	E. Coli	Weekly	SGS Lakefield or Caduceon,
	Total Chlorine Residual	Weekly	N/A (UV disinfection)
	pH	Weekly	In House Grab Sample
	Temperature	Weekly	In House Grab Sample
	Alkalinity	Weekly	SGS Lakefield or Caduceon
	Unionized Ammonia	Weekly	SGS Lakefield or Caduceon

****Note:** SGS Lakefield & Caduceon are both MECP approved accredited laboratories

In-house tests are conducted by licensed operators for monitoring purposes. Standard Methods are used by the operators and the test results are utilized for process control.

All in-house monitoring equipment is calibrated based on the manufacturer's recommendations.

Efforts and Results in Meeting Effluent Objectives of Certificate of Approval

The WWTP is operated and maintained such that all effluent quality objectives are strived for. Objectives and limits are based on a monthly average. Operational objective exceedances and limit exceedances are referenced in operational Issues and Corrective Actions section. Objectives and limits are also highlighted in table 3.

Sludge Volume and Disposal

Table 8 below summarizes the sludge volume generated in 2023, the anticipated volume to be generated next year, and the sludge disposal location.

Table 9: Sludge Generated and Disposal

Sludge Generated in 2023 (m ³)	Anticipated Volume for 2024 (m ³)	Sludge Disposal Location
267	3500	NASM 24303 Martin Farm, Con 7, Lot 8,9 Springwater
190		Rohes 4 Lagoon
168		Rohes 7 Lagoon
2037		Rohes 9 Lagoon
Total Volume – 2662 m ³		

Summary of Complaints

There were four complaints in 2023 related to Municipal infrastructure.

- 4 residential sewage back-ups

Summary of Calibration and Maintenance on Effluent Monitoring Equipment

Magnetic flow meters were calibrated by a certified technician on April 12, 2023.

All in-house monitoring equipment is calibrated based on manufacturer's recommendations.

Summary of By-Pass, Spills or Abnormal Discharge Events

There were no bypasses, spills, or abnormal discharge events in 2023.