Town of Latchford

LATCHFORD ANNUAL SEWAGE TREATMENT REPORT 2021

Annual Compliance Report 2021
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EXECUTIVE SUMMARY

The Latchford Water Pollution Control Plant (WPCP) was granted an Environmental Compliance Approval (ECA) #3106-7M8PWK on September 17, 1974 for the construction of an extended aeration package sewage treatment plant, the Latchford lift station and a number of sanitary sewers to serve the community of Latchford.

The Ministry of the environment issued a Provincial Officer's Order No. 5744-9YMKWN on July 22, 2015 which required the owner of the system to prepare and submit a performance report to the Ministry's District Manager on an annual basis within 90 days following the end of the period being reported upon. The 2021 Annual Performance Report was prepared by the ORO of the Latchford STP on behalf of the Town of Latchford and is based on information kept on record by the town. The report has been completed in accordance with item 5(4) of the order and contains the following information:

- A summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Item 2, including an overview of the success and adequacy of the works;
- A description of any operating problems encountered and corrective actions taken;
- A summary of any effluent quality assurance or control measures undertaken in the reporting period;
- A summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the works;
- A summary of any effluent quality assurance or control measures undertaken in the reporting period;
- A summary of the calibration and maintenance carried out on all effluent monitoring equipment;
- A tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed.

The Latchford sewage treatment facility produced high quality effluent throughout the reporting period meeting the compliance limits specified in the ministry's Provincial Officer's Order. All requirements specified under Item 3 of the Order and any issues experienced at the facility are further explained throughout the report.

Name of Sewage Plant:	Latchford Water Pollution Control Plant
Address:	Lot 17, Concession 1, Latchford
MOE Works Number:	110001774
ECA Number:	3106-7M8PWK (issued September 17, 1974)
Provincial Officer's Order:	5744-9YMKWN (issued July 22, 2015)
Plant Capacity:	340.5 m^3/day
Report Period:	January 1, 2021 to December 31, 2021

1.0 Facility Description

The Latchford Water Pollution Control Plant (WPCP) is A Class 2 wastewater treatment facility that is owned and operated by the Corporation of the Town of Latchford. The treatment facility is located on 1 McLeod Avenue approximately 50 meters west of Highway 11.

The Latchford WPCP is an extended aeration facility which is rated for treating 75,000 imperial gallons per day (IGPD) or 341 m^3/day. It is equipped with twin grit channels for removing large debris, one 304,000 IGPD comminutor, a 73,000 IG aeration section, one 15,700 IG settling tank, one 2,440 IG sludge holding tank and one 1,585 IG chlorine contact tank. The treated effluent discharges into the Montreal River through a 21 inch outfall. Seasonal disinfection is set to occur May to October of each year, as per the ECA. However a directive from the MOE encourages disinfection to begin mid June in order to help protect the fish spawning season. The chlorination period is June 15th to September 30th.

A V-notch weir is in place to measure sewage effluent. Bypasses that occur are disinfected, tested, monitored and reported to the Spills Action Center (SAC). Disinfection is achieved using sodium hypochlorite.

2.0 Monitoring Program

2.1 Monitoring Program as Outlined in Provincial Officer Order No. 5744-9YMKWN

BOD_5 ≡ Five-day biochemical oxygen demand measured in an unfiltered sample
TSS ≡ Total Suspended Solids
TP ≡ Total Phosphorus
TAN (NH_3 + NH_4) N ≡ Nitrogen as Ammonium and Ammonia (Total Ammonia Nitrogen)
TRC ≡ Total Residual Chlorine
E.coli ≡ Escherichia coli
pH = Potential of Hydrogen

2.1.1 ***Raw Sewage (Influent)***

Parameter	Type of Sample	Minimum Frequency
BOD_5	8 hour composite	monthly
TSS	8 hour composite	monthly
TP	8 hour composite	monthly

2.1.2 ***Final Effluent***

Parameter	Type of Sample	Minimum Frequency
BOD_5	24 hour composite	monthly
TSS	24 hour composite	bi-weekly
TP	24 hour composite	monthly
Total Ammonia Nitrogen (TAN)	24 hour composite	monthly
pH	24 hour composite	monthly
E. coli	24 hour composite	bi-weekly*
TCR	grab	daily**

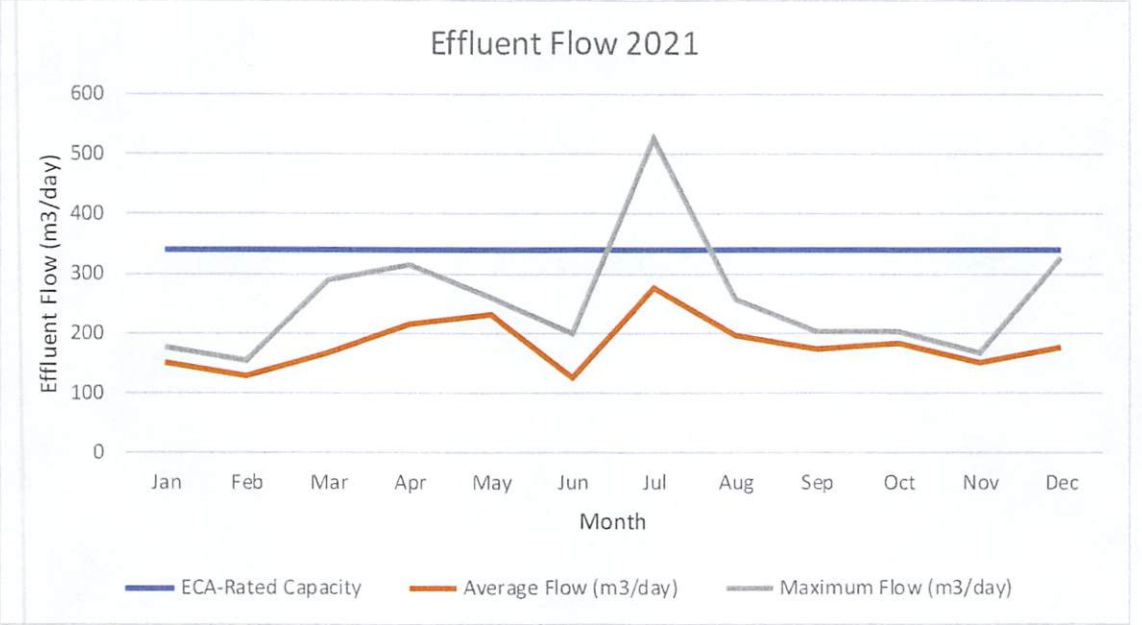
**During the chlorination period*
***Except weekends and statutory holidays during chlorination*

2.2 Interpretation of Monitoring and Analytical Data

2.2.1 Summary of Effluent Flow 2021

Month	Average Flow (m^3/day)	Maximum Flow (m^3/day)
January	150	176
February	129	155
March	167	289
April	216	314
May	231	261
June	127	198
July	275	526
August	195	256
September	175	203
October	183	202
November	151	168
December	178	327

2021 Total Flow	65,275 m^3
2021 Max Daily Flow:	526 m^3/day
2021 Average Daily Flow:	181.4 m^3/day
Design Capacity	341 m^3/day
% of Design Capacity:	53.2 %



The Latchford Sewage Treatment System operated within its required capacity throughout 2021. Compliance is achieved when the annual average daily flow does not exceed 341 m^3/day. The average daily flow for 2021 was 181.4 m^3/day which represents 53.2% of the design capacity. The maximum flow occurred in July when heavy precipitation and snow melt contributed to a maximum flow of 526 m^3/day.

2.2.2 Raw Sewage (Influent)

A summary of the annual average and maximum influent parameter concentrations are listed below. A Process Data Report is presented in Appendix A which provides a monthly summary of the 2021 influent data.

Parameter (mg/L)	Annual Minimum	Annual Maximum	Annual Average
BOD_5	5.3	69.2	32.8
TSS	13.5	56	29.6
TP	0.919	2.98	1.80

2.2.3 Effluent

In 2021, the Latchford wastewater treatment system produced high quality effluent which surpassed the effluent design limits. Annual summaries of the final effluent parameter concentrations are presented below. Refer to Appendix A for the Monthly Process Data Report which summarizes the effluent data for the reporting period.

Parameter (mg/L)	Annual Minimum	Annual Maximum	Annual Average	Compliance
BOD_5	0.7	6.9	3.22	25 *(annual average)*
TSS	<1	32	6.26	25 *(annual average)*
TP	0.041	0.914	0.21	1.0 *(annual average)*
TAN (NH_3 + NH_4) N	<0.01	0.32	0.138	N/A
pH (units)	7.03	7.70	7.43	Between 6.0 and 9.5
E. coli (cfu/100mL)	800	42,000	11,513	N/A
TCR	0.01	0.05	0.021	N/A

"<" means values include results that were less than the laboratory's method detection limit

2.3 Sewage Treatment Program Success and Adequacy

Table *2.3.1 Performance Summary* presents the system's efficiency through pollutant removal rates from raw sewage concentrations through to final effluent for BOD_5, suspended solids and total phosphorus.

2.3.1 Performance Summary

Parameter (mg/L)	Influent *(annual average)*	Effluent *(annual average)*	% Removal
BOD_5	32.80	3.22	90.2%
TSS	29.58	6.26	78.8%
TP	1.79	0.21	88.3%

"<" means values include results that were less than the laboratory's method detection limit

As indicated by the effluent concentrations and performance summary, the Latchford WPCP continues to experience a high degree of removal efficiency, and as a result, is operating well within the Ministry limits.

3.0 Operating Problems and Corrective Actions

- SPS Control Failure – A glitch in the program was repaired. Station is working well.
- Blower #2 Failed and was taken out of service. – A new blower has been purchased and is being installed ASAP
- Clarifier Bearing Failure caused an extended STP shutdown. MOE provided a permission to bypass letter. Both top and bottom bearings were replaced. Clarifier was put back in service.
- Repaired Bar Screen/ Grit Channel structure. Re-cemented channels and lined with metal plating. Major repair completed.
- Clarifier Rake support broke jamming the Clarifier causing significant damage. MOE provided another letter of permission to bypass. Clarifier rake mounts were rebuilt, rake supports were fabricated new and replaced. The entire rake system and drive were re-aligned. The clarifier is back in service.
- The clarifier drive chain is in poor shape. A replacement chain is no longer available. A new drive motor sprocket and main shaft gear sprocket as well as new chain will be required. I will be contacting a millwright for assistance.

4.0 Maintenance Performed on the Works

- Effluent flow calibration verified April 7 / 2021
- Instrumentation and electrical equipment inspected and repaired as required.
- SPS wet well cleaned, STP Digester and Sludge holding tank cleaned
- Aeration Pipe Repairs – Finished Repairs to pipes and diffusers in tank
- Blowers greased & Oil changed

5.0 Effluent Quality Assurance and Control Measures

The following activities are included in regular operator and supervisory activities to assure the quality of the sewage treatment operations including effluent quality and flow monitoring data:

- The facility is inspected by certified operators on a regular basis
- Certified operators conduct regular tests and monitor data from certain equipment at the plant and record this information on facility spreadsheets
- Certified operators monitor chemical usage and make adjustments as required
- Operation and Compliance staff review process data and laboratory reports to keep track of routine operation of the treatment plant to ensure compliance with the Ministry Guidelines.

- All laboratory results and selected operational data are logged in a process data management system, as well as on spreadsheets located at the WTP.
- All effluent quality data is reviewed by the Operations and Compliance staff to identify any changes in concentrations and/or emerging trends.
- All instrumentation is tested and maintained as per manufacturer's recommendations.
- All routine maintenance has been scheduled in Plant Workplace Maintenance System (WMS) and was completed in 2021.

Quality Control elements of the monitoring program include the following:

- Samples are collected as required and analyzed by Testmark Laboratories located in Kirkland Lake, Ontario. Analyses are conducted in accordance with the Standard Council of Canada (SCC), in cooperation with the Canadian Association for Laboratory Accreditation Inc. (CALA).
- Quality control procedures are method specific and include laboratory duplicate samples, spiked blanks and spiked duplicates.
- Any bypass or upset events that occur at the pumping stations or plant site are tested, monitored and reported to the local Health Unit and Spills Action Center (SAC).

6.0 Calibration and Maintenance of All Monitoring Equipment

Plant maintenance is conducted as per plant Preventative Maintenance Schedules. Monitoring equipment is calibrated based on the manufacturer's recommendations. All routine and preventative maintenance measures were conducted as scheduled in 2021. Refer to Table 6.1 for a summary of calibrations conducted in 2021.

6.1 Calibration Summary

Date	Instrument	% Accuracy
April 7/21	Effluent Flow Meter	98.9%

Note: The flow is metered with a V-notch weir and flow readings are confirmed at various levels at the weir plate and compared to manufacturer's standards. The % value above is an average of the accuracy at each level.

7.0 Efforts made to Meet Effluent Limits

Latchford staff use a number of best efforts to achieve the *Effluent Limits*.

Operational staff has the required certification to operate the facility and they continue to learn and gain knowledge with respect to the process and equipment. Staff also has a high level of regulatory competence.

The mechanical elements in the facility are regularly inspected, well maintained and kept in good repair. Latchford Staff use a maintenance management system which ensures maintenance of equipment is proactively performed.

Raw wastewater and effluent samples are collected as required and analyzed by Testmark Laboratories, an accredited laboratory. Latchford staff reviews these results on a regular basis to ensure compliance with regulatory limits.

In-house sampling and testing for operational parameters provide real time results which are used to enhance process and operational performance.

Operations, maintenance and emergency procedures are available to ensure facilities are operated in compliance with applicable legal instruments. Facility staff has access to a network of operational compliance and support experts at the region and corporate levels.

During this inspection period, the facility operated efficiently and met the annual effluent limits for cBOD5 (25.0 mg/L), TSS (25.0 mg/L), TP (1.0 mg/L) and pH range of 6.0 to 9.5 as outlined in Item No. 2 Provincial Officer Order No. 5744-9YMKWN.

8.0 Sludge Generation and Disposal

Sludge is hauled by Ray & Son's Industrial Services to approved sites at the Latchford Landfill. The landfill is approved to accept the sludge under Certificate of Approval number: S504LM10-01.

Date Sludge Hauled	Volume of Sludge Hauled m^3
Jan 27, 2021	31.5 m3
June 17, 2021	68.2 m3
Oct 6, 2021	45.9 m3
Nov 22, 2021	64.2 m3
Total Hauled	**209.8 m3**

The Total Sludge hauled in 2021 was abnormally high due to the emergency maintenance performed on the Sewage treatment plant clarifier. The clarifier needed to be emptied on two separate occasions (June / Nov).

It is expected that the Latchford WPCP will haul approximately 40 to 80 m3 of sludge in 2022 now that the sludge is being hauled on a regular basis.

According to the Ministry's procedure F-10-1; sludge is required to be sampled and tested annually. For a summary of sludge sampling results please refer to Appendix B for the Monthly Process Data Report for Sludge.

9.0 Complaints

According to records maintained by Latchford staff, no complaints were received during the 2021 reporting period.

10.0 Bypass, Spill and Abnormal Discharge Events

- June 17 2021 – Sewage Treatment Plant Bypass – Emergency Maintenance on Clarifier
  MOE provided a permission letter for bypass.

- Nov 22 2021 – Sewage Treatment Plant Bypass – Emergency Repair on Clarifier
  MOE provided a permission letter for bypass.

APPENDIX A

Monthly Process Data Report 2021

Influent (Raw) Parameters	01/2021	02/2021	03/2021	04/2021	05/2021	06/2021	07/2021	08/2021	09/2021	10/2021	11/2021	12/2021	Total	Avg	Max	Min
Influent / Biochemical Oxygen Demand: BOD5 - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	5.3	45	63.7	22	17	31	19	16	15	47	43	69.2			69.2	
Mean Lab	5.3	45	63.7	22	17	31	19	16	15	47	43	69.2		32.76667		
Min Lab	5.3	45	63.7	22	17	31	19	16	15	47	43	69.2				5.3
Influent / Total Suspended Solids: TSS - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	20	39	46	33.5	21	13.5	19	22	16	56	36	36			56	
Mean Lab	20	39	46	33.5	21	13.5	19	22	16	56	36	36		29.58333		
Min Lab	20	39	46	33.5	21	13.5	19	22	16	56	36	36				13.5
Influent / Total Phosphorus: TP - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	1.02	2.7	2.98	0.919	1.15	2.24	0.952	1.28	1.28	2.62	2.25	2.18			2.98	
Mean Lab	1.02	2.7	2.98	0.919	1.15	2.24	0.952	1.28	1.28	2.62	2.25	2.18		1.798417		
Min Lab	1.02	2.7	2.98	0.919	1.15	2.24	0.952	1.28	1.28	2.62	2.25	2.18				0.919

Effluent Parameters	01/2021	02/2021	03/2021	04/2021	05/2021	06/2021	07/2021	08/2021	09/2021	10/2021	11/2021	12/2021	Total	Avg	Max	Min
Effluent / Biochemical Oxygen Demand: BOD5 - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	1.8	2.1	3.3	1.6	6.9	0.8	0.7	0.7	1.8	1.9	1	1.6			6.9	
Mean Lab	1.8	2.1	3.3	1.6	6.9	0.8	0.7	0.7	1.8	1.9	1	1.6		3.210667		
Min Lab	1.8	2.1	3.3	1.6	6.9	0.8	0.7	0.7	1.8	1.9	1	1.6				0.7
Effluent / Total Suspended Solids: TSS - mg/L																
Count Lab	2	2	2	2	2	2	2	2	2	2	2	2	24			
Max Lab	1.8	2.9	4	29	32	8.5	2	7	14.5	12	3.5	2.5			32	
Mean Lab	0.9	2.45	2.75	14.5	16.5	5	1.75	6.26	9	12	1.75	2.25		6.253167		
Min Lab	0	2	1.5	<1	1	1.5	1.5	5.5	3.5	12	<1	2				<1
Effluent / Total Phosphorus: TP - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	0.041	0.051	0.118	0.061	0.914	0.05	0.054	0.16	0.059	0.361	0.524	0.074			0.914	
Mean Lab	0.041	0.051	0.118	0.061	0.914	0.05	0.054	0.16	0.059	0.361	0.524	0.074		0.207917		
Min Lab	0.041	0.051	0.118	0.061	0.914	0.05	0.054	0.16	0.059	0.361	0.524	0.074				0.041
Effluent / Total Ammonia Nitrogen: NH3 + NH4+ as N - mg/L																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	<0.01	0.01	0.32	0.01	<0.01	<0.01	<0.01	0.22	0.13	<0.01	<0.01	<0.01			0.32	
Mean Lab	<0.01	0.01	0.32	0.01	<0.01	<0.01	<0.01	0.22	0.13	<0.01	<0.01	<0.01		0.138		
Min Lab	<0.01	0.01	0.32	0.01	<0.01	<0.01	<0.01	0.22	0.13	<0.01	<0.01	<0.01				<0.01
Effluent / pH - --																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	7.1	7.03	7.12	7.7	7.58	7.6	7.52	7.51	7.32	7.54	7.62	7.52			7.7	
Mean Lab	7.1	7.03	7.12	7.7	7.58	7.6	7.52	7.51	7.32	7.54	7.62	7.52		7.43		
Min Lab	7.1	7.03	7.12	7.7	7.58	7.6	7.52	7.51	7.32	7.54	7.62	7.52				7.03
Effluent / E. Coli: EC - cfu/100ml																
Count Lab	3	0	0	0	0	2	2	2	2	0	0	0	8			
Max Lab						42000	3700	14000	11000						42000	
Mean Lab						23450	2250	11000	9350					11512.5		
Min Lab						4900	800	8000	7700							800
Effluent / Cl Residual: Total - mg/L																
Count Lab	0	0	0	0	0	4	21	22	22	0	0	0	69			
Max Lab						0.03	0.02	0.05	0.05						0.05	
Mean Lab						0.025	0.01	0.023	0.025					0.02075		
Min Lab						0.02	0.01	0.01	0.01							0.01
Effluent / CBOD																
Count Lab	1	1	1	1	1	1	1	1	1	1	1	1	12			
Max Lab	1.8	1.4	2.7	1.8	5.4	0.9	0.6	0.7	0.5	1.8	0.6	1.1			5.4	
Mean Lab	1.8	1.4	2.7	1.8	5.4	0.9	0.6	0.7	0.5	1.8	0.6	1.1		1.591667		
Min Lab	1.8	1.4	2.7	1.8	5.4	0.9	0.6	0.7	0.5	1.8	0.6	1.1				0.5

Appendix B – Annual Sludge Results

Sample Description	Parameter	MDL	Result	Units	ReceivedDate	AnalysisDate
LA S - Sludge Haul	Ammonia (as N)	0.01	2.84	mg/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Nitrate (as N)	0.05	<0.05	mg/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Arsenic	10	<10	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Cadmium	1	<1	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Chromium	10	<10	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Cobalt	1	8	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Copper	10	14	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Lead	1	<1	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Mercury	1	<1	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Molybdenum	10	<10	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Nickel	10	33	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Potassium	1000	58800	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Selenium	2	<2	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Zinc	10	1190	ug/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Total Phosphorus (as P)	3	597	mg/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Total Solids	20	21300	mg/L	2021-01-26	2021-01-28
LA S - Sludge Haul	Total Solids (Dup)	20	23100	mg/L	2021-01-26	2021-01-28