

# Rockland Wastewater System

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Waterworks # 110001159

## Annual Report

Prepared For: City of Clarence Rockland

Reporting Period of January 1<sup>st</sup> – December 31<sup>st</sup> 2019

Issued: March 30, 2020

Revision: 0

Operating Authority:



This report has been prepared to meet the requirements set out in the facility Environmental Compliance Approval #1990-9P3PRG issued October 28, 2014.

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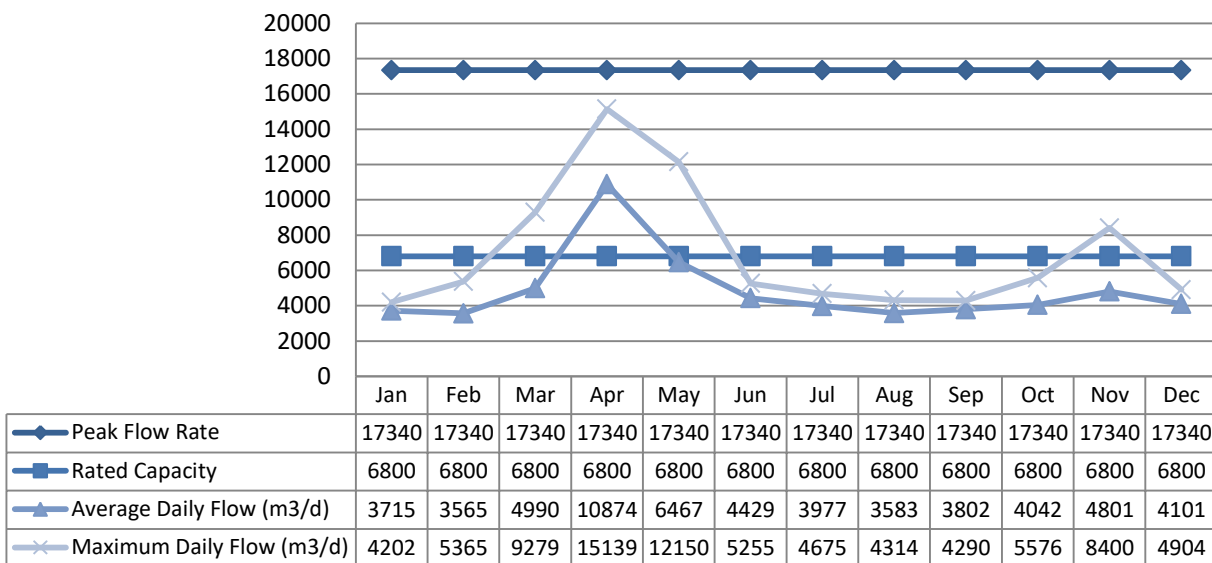
## Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	0
Bypass/Overflow	2
Spills	1
Community Complaints	0

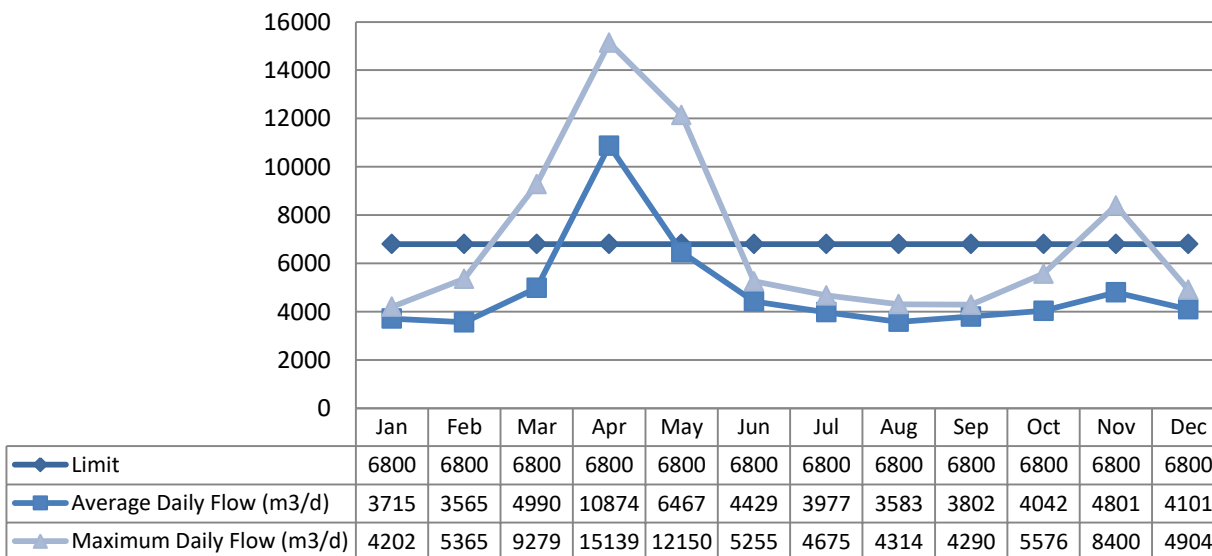
## Treatment Flows

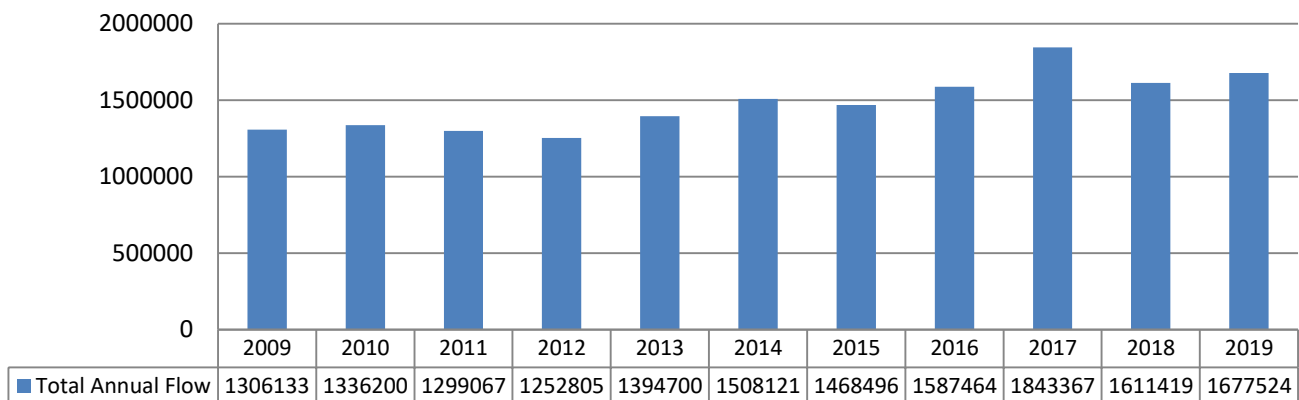
### Raw Flow (m<sup>3</sup>/d)

The Average Day Flows (ADF) reaching the Wastewater Pollution Control Plant in 2019 was 4862 m<sup>3</sup>/d. The ADF remained 28.5% below the 6,800 m<sup>3</sup>/d rated capacity of the facility. A peak flow of 15 139 m<sup>3</sup>/d occurred on April 27, 2019, representing 87.3% of the 17 340 m<sup>3</sup>/d maximum design flow capacity. This took place following a period of heavy rainfall and extreme snow melt, during which time the Ottawa River was in a flooding condition.



### Effluent Flow (m<sup>3</sup>/d)



Annual Comparison (m3)**Uncommitted Reserve Capacity**

Based on the past 3 years of operation, the Rockland Wastewater Pollution Control Plant currently has a Hydraulic Reserve Capacity (Cr) of 2024 m<sup>3</sup>/d and an average per capita flow (F) of 0.311 m<sup>3</sup>/cap/d. The facility currently has an Uncommitted Hydraulic Reserve Capacity (Cu) of 559 m<sup>3</sup>/d.

Assuming the existing per capita wastewater flows remains constant, there should be sufficient uncommitted reserve capacity at the Rockland WPCP for an additional 668 equivalent residential units in addition to the 1,751 already committed units.

(Refer to Appendix A: 2019 Uncommitted Reserve Capacity – Sewage)

**Effluent Quality Assurance or Control Measures**

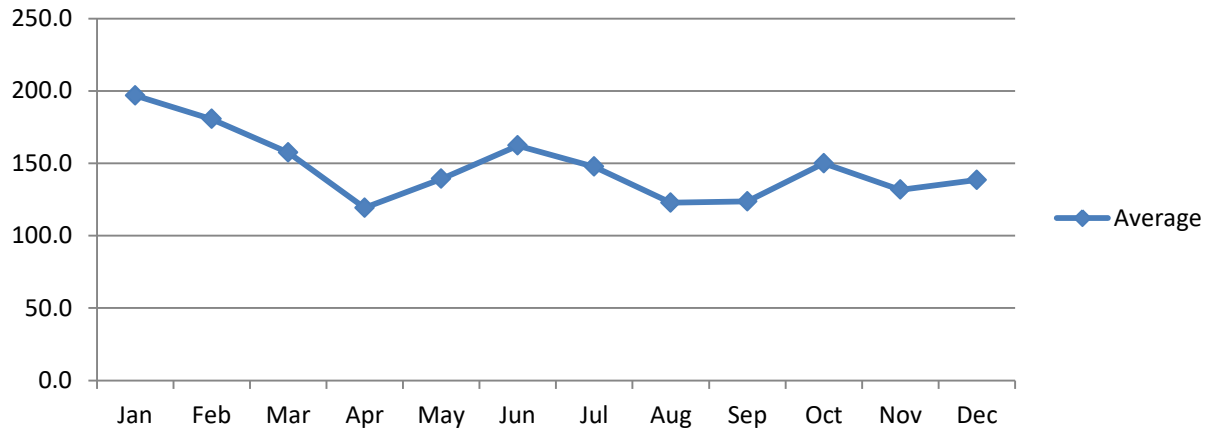
Effluent control measures include in-house sampling and testing for operational parameters such as suspended solids, chlorine residual, pH, soluble phosphorus, and dissolved oxygen. In-house testing provides real time results which are then used to enhance process and operational performance. All in-house sampling and analysis are performed by certified operations staff utilizing approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet ECA sampling requirements were submitted to Caduceon Environmental Laboratory for analysis, with the exception of pH, temperature and unionized ammonia. Caduceon Environmental Laboratory has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis. The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained.

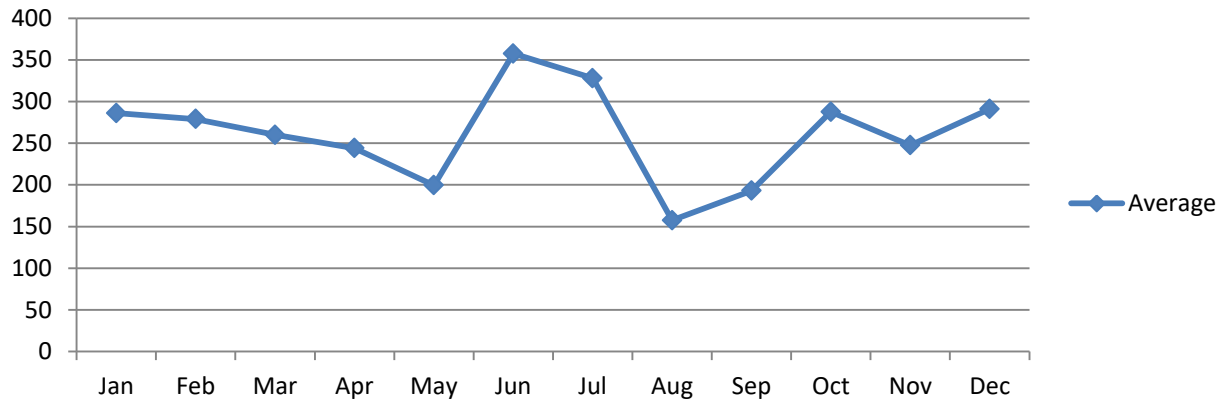
For detailed report of individual sample results for both raw sewage and final effluent, please refer to Appendix A: Performance Assessment Report.

## Raw Sewage Quality

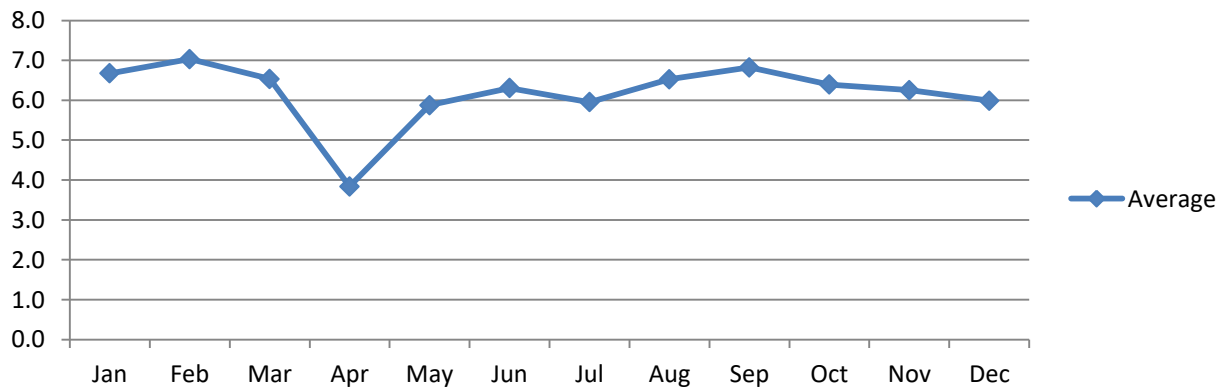
### BOD5 (mg/L)



### Total Suspended Solids (mg/L)



### Total Phosphorus (mg/L)



## Effluent Quality

The Rockland WPCP performed well throughout the 2019 reporting year, with all required lab results having concentrations below the compliance limits outlined in the facility’s environmental compliance approval. Although meeting its compliance limit throughout the year, the facility’s final effluent TSS did exceed its concentration objective for eight months of the reporting year.

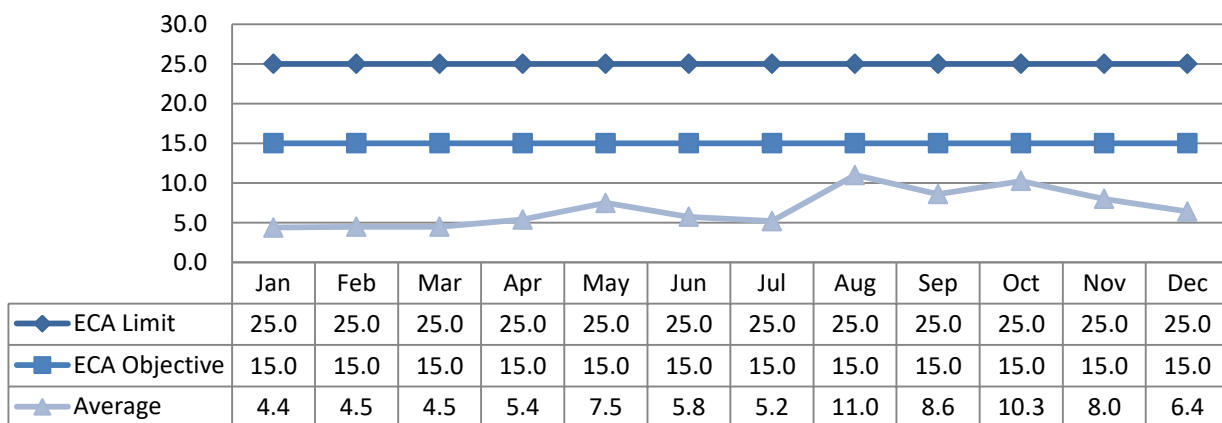
Effluent samples were collected weekly and as indicated above sent to Caduceon Environmental Laboratories for analysis with respect to cBOD<sub>5</sub>, Total Suspended Solids, Total Phosphorus, and E. coli.

### cBOD<sub>5</sub>

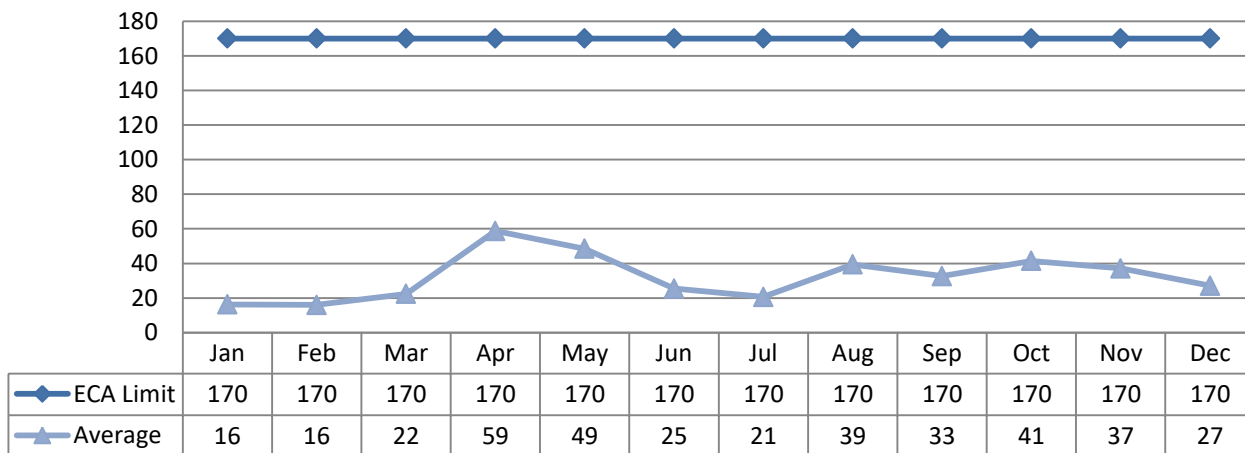
#### Compliance

Date	Exceedance of	Limit	Value	Corrective Action
CBOD was within compliance for 2019				

#### Concentration (mg/L)



#### Loading (kg/d)



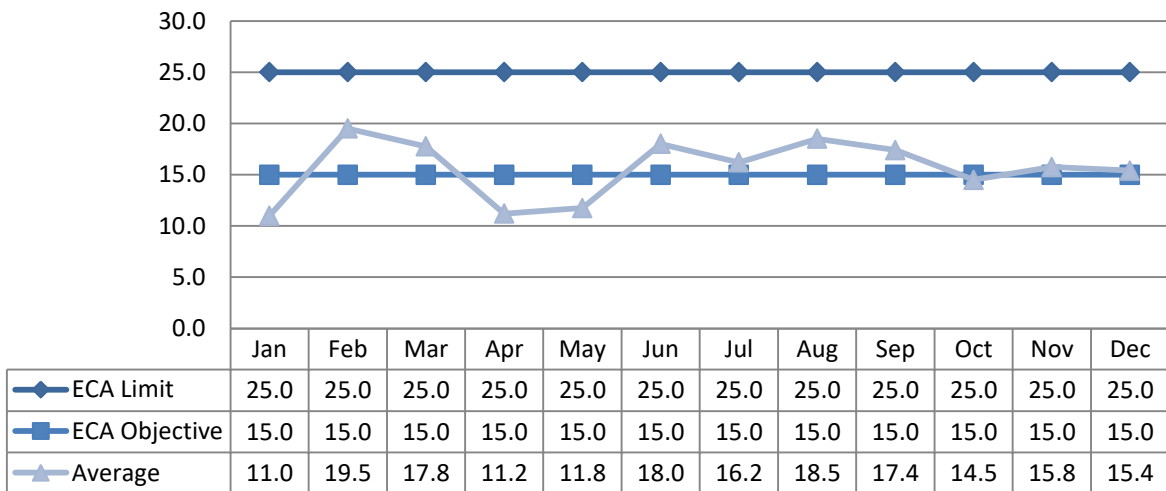


## Total Suspended Solids

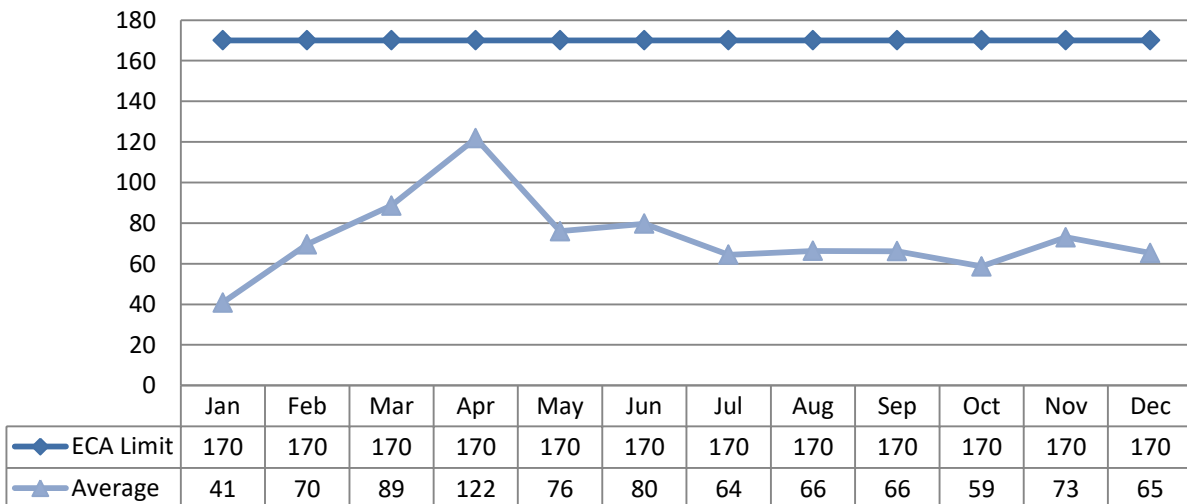
### Compliance

Date	Exceedance of	Limit	Value	Corrective Action
February	Objective	15.0	19.5	Planned upgrades/modifications to grit removal and screening, as well as the addition of an equalization tank are expected to help optimize treatment. (see "Notice of Modifications")
March	Objective	15.0	17.8	
June	Objective	15.0	18.0	
July	Objective	15.0	16.2	
August	Objective	15.0	18.5	
September	Objective	15.0	17.4	
November	Objective	15.0	15.8	
December	Objective	15.0	15.4	

### Concentration (mg/L)



### Loading (kg/d)

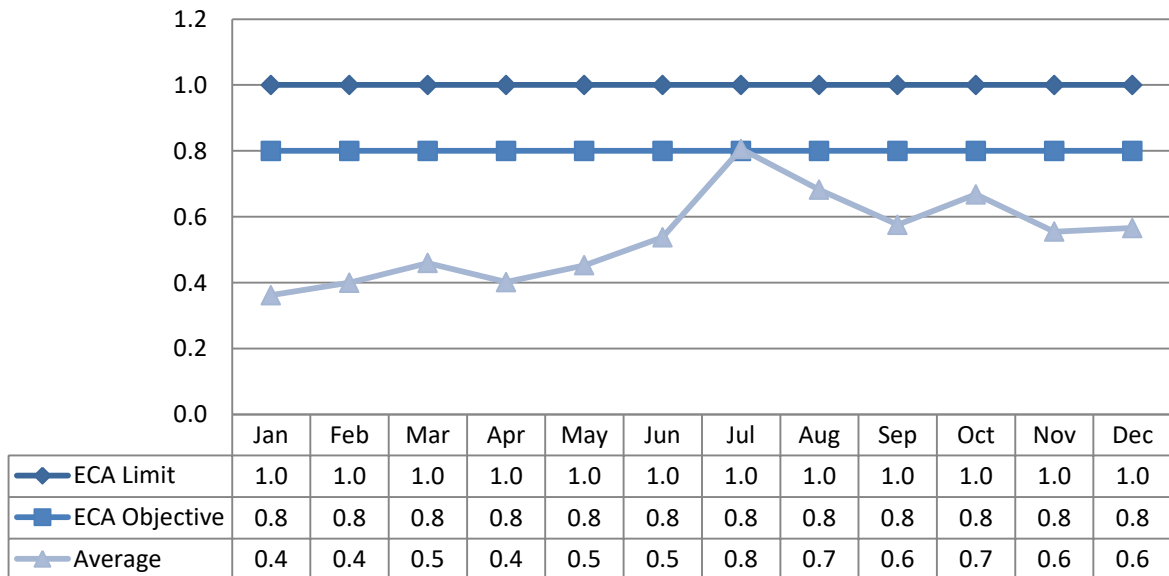


## Total Phosphorus

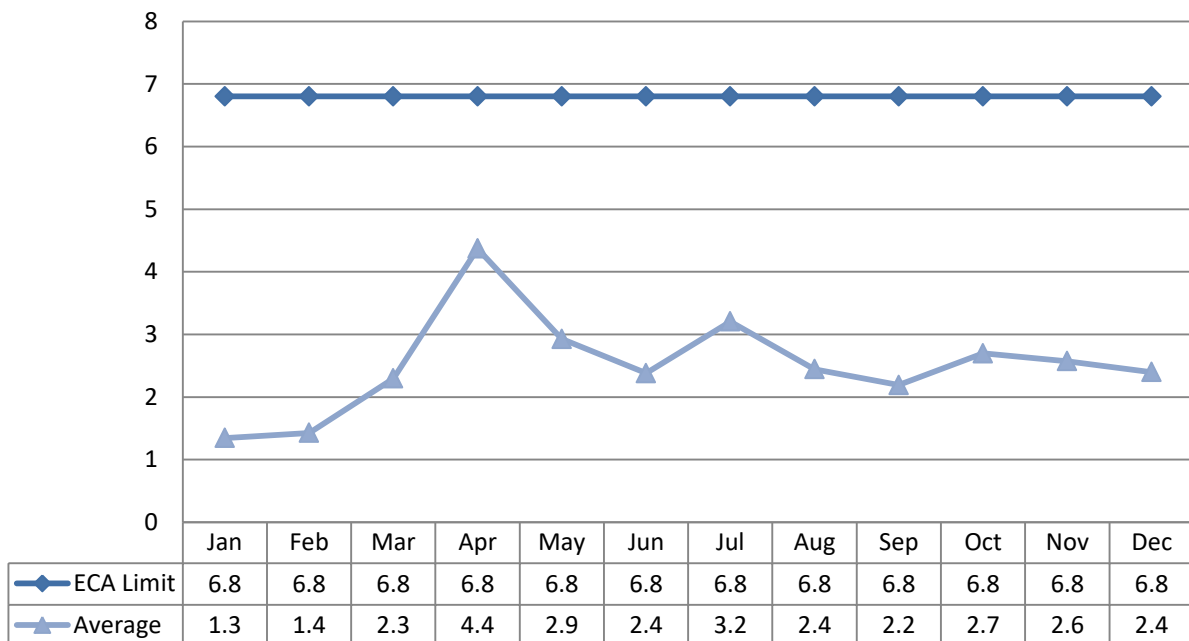
### Compliance

Date	Exceedance of	Limit	Value	Corrective Action
Total Phosphorus was within compliance for 2019				

### Concentration (mg/L)



### Loading (kg/d)

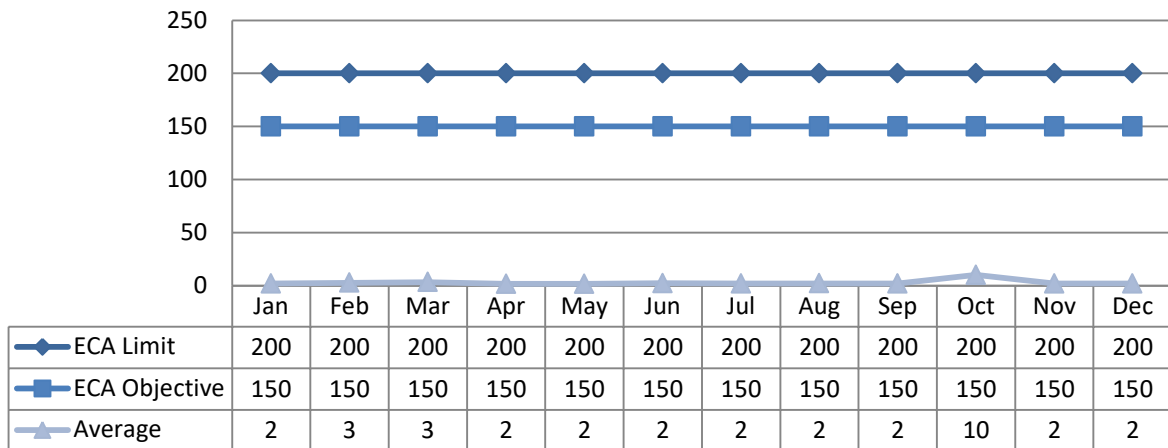


## E-coli

### Compliance

Date	Exceedance of	Limit	Value	Corrective Action
E-Coli was within compliance for 2019				

### Geometric Mean (cfu/100mL)

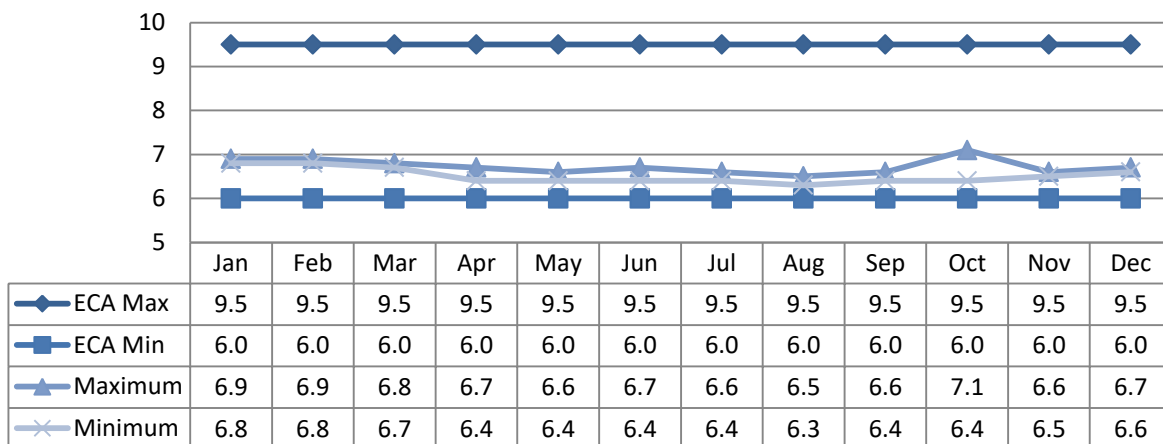


## pH

### Compliance

Date	Exceedance of	Limit	Value	Corrective Action
There were no reported pH Non-Compliance				

pH is to remain in the range of 6.0-9.5 inclusive. Each instance the pH is outside of that range is reported as a non-compliance.



### Acute Lethality

There is one (1) sample collected each year and tested for acute lethality. This sampling is required under the Federal Fisheries Regulations. Results are displayed as % mortality.

An adverse result is a > 50% mortality rate.

Date	Rainbow Trout
16-April-2019	0% mortality

## Operating Issues

Heavy rainfall and snow melt resulted in increased flows and caused the Ottawa River to rise to flooding conditions during the latter part of April continuing well into May. This led to hydraulic overloading at the WPCP, which in turn led to a treated effluent overflow from the manhole between the facility's discharge line and its outfall in the Ottawa River.

Although the facility remained in compliance during this flooding event, because of the increased flow to the plant the effluent loadings increased as well.

## Maintenance

OCWA uses a risk-based preventative maintenance framework that ensures assets are maintained to manufacturer's and/or industry standards. Maintenance is completed using various tools and operational supports. The Eastern Regional Hub has specialized and certified staff such as Millwrights, Electricians and Instrumentation Specialists to name a few.

OCWA uses a Workplace Maintenance System (WMS). WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out. Emergency and capital repair maintenance is completed and added to the system.

Capital projects are listed and provided to the City of Clarence-Rockland in the form of a "Major Maintenance Recommendations" list. This list is developed by facility staff and provides recommendations for facility components requiring upgrading or improvement.

### Non-Routine Maintenance, Repairs & Replacement

Date	Description
Jan – Dec 2019	Weekly basket cleaning at SPS #1 with Aqua Drain
13-Jan-2019	Flush sewer at 1276 Laurier Street
04-Feb-2019	Flush sewer on Laurier East between Simoneau & Notre Dame with CWW
05-Feb-2019	Flush sewers on Lawrence and Alma Streets with CWW
28-Feb-2019	Re-did the bottom drains in the east lagoon
11-Apr-2019	Flush & pass CCTV on Topaz, Lawrence, and Helene Streets with CWW
25-Apr-2019	Flush sewer at 134 Jasper Street

Jun-2019	Built a drying pad area for lagoon biosolids from west cell contents
02-Jun-2019	Sewer backup at 360 Zircon
17-Jun-2019	Replace/repair gravity sewer on Albert Street from Pouliotte St. to SPS 4 with Poupart Excavation
18-Jun-2019	Clean SBR #3
21-Jun-2019	Fix broken check valve on LPS at 446 Edwards Street
21-Jun-2019	Repair LPS sewer pipe at 403 Edwards Street
24-Jun-2019	Repair LPS sewer pipe at 449 Edwards Street
09-Jul-2019	Clean SBR #2
23-Jul-2019	Install new air release in wet well at SPS #7
29-Jul-2019	Clean digester with AquaDrain and Beaver
01-Aug-2019	Flush drain pipes from lagoon to sanitary with Hydrocam
13-Aug-2019	Haul biosolids to municipal dump with Poupart
13-Aug-2019	Clean SBR #1
03-Sep-2019	Spread 26 MT of lime over bisolids lagoon for odour control
10-Sep-2019	Pump digester from WPCP to West Lagoon with Lamoureux Pumping
24-Sep-2019	Repair broken pipe on LPS pump at Mr. Gas
09-Oct-2019	Replaced effluent valve actuator on SBR #1
17-Oct-2019	Flush sanitary at 837 Notre Dame with AquaDrain
04-Nov-2019	Repair leaking NaOCl tank
07-Nov-2019	Change water separator on compressor
13-Nov-2019	Clean all SPS wet wells (finished 22-Nov-19)
14-Nov-2019	Install new mixing pump with Gord Mechanical
18-Nov-2019	Clean effluent tank
18-Nov-2019	Haul digester to East Lagoon with Lamoureux Pumping
10-Dec-2019	Clean golf course sanitary line with Hydrocam and Beaver
17-Dec-2019	Manually clean/pump down LPS at Mr. Gas

## Notice of Modifications

The City of Clarence-Rockland is undertaking upgrades to the Sewage Pumping Station #1 and the wastewater treatment plant to improve odor control through increased grit removal and screening, to normalize peak flows from inflow and infiltration through storage equalization and also to increase the pumping and conveyance capacity to the plant. Construction of the expansion has started in March 2020 and is anticipated to be completed by December 2021.

## Flow Meter Calibrations

Calibration of the facility's influent and effluent flow meters was carried out as per the manufacturer instructions on July 12, 2019. Calibration reports are retained at the Rockland WTP.

## Sludge Generation

### Sludge Disposal Summary

Throughout the 2019 reporting year, 4525 m<sup>3</sup> of biosolids were transferred from the facility's aerated digester to the two onsite drying lagoon cells.

Furthermore, 2908 m<sup>3</sup> of partially dried biosolids were hauled from the lagoon cells to the locations outlined below:

Disposal Location	Date	Approval Number	Total Volume (m <sup>3</sup> )
Pilon Farm	09-Sep-2019	22756	1310
Municipal Landfill	Aug-Sep 2019		180
Ethier Farm	10-Dec-2019	22764	1418
Total Annual Volume (m3)			2908

It is anticipated that sludge volumes in 2020 will remain similar to the 2019 volumes.

(See Appendix B: Biosolids Quality Report)

## Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
N/A			

## Summary of Abnormal Discharge Events

### Bypass/Overflow

Location	Date of Incident	Ref #	Details	Corrective Action Taken	Volume (m3)	Duration (h)
SPS 2	27-Apr-2019	903219	Heavy rain, snow melt and Ottawa River flooding conditions resulted in high collection system flows.	Investigated collection to determine and use best efforts to control	2500	102.25

### Spills

Location	Date of Incident	Ref #	Details	Corrective Action Taken	Volume (m3)	Duration (h)
403 Edwards Street	19-Mar-2019	4524-BAR5FF	Leak in collection system	Cleaned with vacuum Truck	0.08	8
Effluent	27-Apr-2019	903221	Flooding event. River water pushing back effluent out maintenance hole on discharge line.	Monitored and sampled	5600	112

### Abnormal Discharges

There were no abnormal discharge events during the reporting period.

# Appendix A

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## Uncommitted Reserve Capacity

**2019 UNCOMMITTED RESERVE CAPACITY - SEWAGE**

**MUNICIPALITY:** City of Clarence-Rockland

**LOCATION IN MUNICIPALITY:** Rockland Sewage Works

**Uncommitted Hydraulic Reserve Capacity (Cu)**

Uncommitted hydraulic reserve capacity for water supply and treatment facilities is based on:

$$Cu = Cr - (P / H) \times F \times L$$

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**Cr = Hydraulic Reserve Capacity**

= Treatment Facility Average Daily Flow Design of 6,800 m<sup>3</sup>/day less Existing Average Daily Flow of 4,776 m<sup>3</sup>/day (based on average of past 3 years: 5,050 m<sup>3</sup>/day in 2017 and 4,415 m<sup>3</sup>/day in 2018 and 4,862 in 2019.

$$= 6,800 \text{ m}^3/\text{day} - 4,776 \text{ m}^3/\text{day} = 2,024 \text{ m}^3/\text{day}$$

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**P = Existing Connected Population**

$$= 15,373$$

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**H = Number of Connected Residential Units**

$$= 5,715$$

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**F = Existing Per Capita Flow**

$$= 4,776 \text{ m}^3/\text{day} / 15,373 \text{ Connected Pop} = 0.311 \text{ m}^3/\text{cap}/\text{day}$$

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**L = Number of Unconnected Approved Lots** (equivalent number of residential units). Please refer to the attached 2019 letter from the City of Clarence-Rockland.



(a) Infilling of vacant lots/units in registered plans of subdivision or created by consent to split existing registered lots in serviced area: (single family, semi-detached, multiple units, and condominiums.

**= 187 units**

(b) Residential lots/units in draft plans of subdivision.

**= 1,485 units**

(c) Proposals with approved zoning for multiple residential development.

**= 76 units**

(d) Proposals with approved zoning for institutional, commercial, or industrial which would significantly change the proportion of non residential flow in the total flow.

**= 3 units**

**Total L = (a) + (b) + (c) + (d) = 187+1485+76+ 3 = 1,751**

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**SUMMARY:**

$$\begin{aligned} \text{Cu} &= \text{Cr} - (\text{P} / \text{H}) \times \text{F} \times \text{L} \\ &= 2,024 - (15,373/5,715) \times 0.311 \times 1,751 \\ &= 2,024 - (2.69 \times 0.311 \times 1,751) \\ &= 2,024 - 1,465 \\ &= 559 \text{ m}^3/\text{day} \text{ Uncommitted Hydraulic Reserve Capacity for} \\ &\quad \text{Average Daily Flow.} \end{aligned}$$

The Uncommitted Hydraulic Reserve Capacity (Cu) assumes that future daily sewage flows per capita for both existing and future residents will be similar to historical flows.

**Compliance with Certificate of Approval:**

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**By-passing:** ( in collection systems, at pumping stations or at treatment facilities-caused by inflow/infiltration, not be operational resolvable problems)

**Historic:** High inflows occur at the sewage plant during the spring thaw, flows return to normal once the snow melt ends. These flows often surpass the facility design flow of 6800m<sup>3</sup>/day.

**Projected:** No anticipated problems

**Effluent Quality:** Compliance with Environmental Compliance Approval (ECA)

**Historic:** The Rockland Wastewater Pollution Plant (WWTP) met all Effluent Quality limits outlined in the ECA over the past 10 years with the exception of a Total Phosphorus exceedance in February of 2015. The Facility met all ECA limits during 2019, and with the exception of total suspended solids met all effluent concentration objectives as well.

Please refer to the Appendix A for the 2019 Performance Assessment Report.

**Projected:** The City of Clarence-Rockland is undertaking upgrades to the Sewage Treatment Plant and Pump Station #1 to improve odor control through increased grit removal and screening, to normalize peak flows from inflow and infiltration through storage equalization and to increase the pumping and conveyance capacity to the plant. Construction of the expansion has started in March 2020 to be completed by December 2021.

### **Uncommitted Number of Lots (Lu)**

The **Cu** indicated sufficient uncommitted hydraulic reserve capacity **without further conservation measures** for an additional

$$\begin{aligned} \text{Lu} &= \text{Cu} / (\text{D} \times \text{F}) \text{ where } \text{D} = \text{P} / \text{H} \\ &= 559 / (2.69 \times 0.311) \\ &= 668 \end{aligned}$$

residential unit, or the equivalent, **in addition to the 1751 units already committed.** By-passing and effluent quality non-compliance problems are not expected with full utilization of the **Cu**.

### **RECOMMENDATIONS**

- Continued efforts of conducting camera inspection of the collection system to remediate inflow/infiltration. Resolving the infiltration issues could provide the City with additional capacity to accommodate additional residential units, in addition to those currently committed.
- The City should inquire on the unconnected approved lots which have not been constructed within the last 5 years.

### **CONCLUSIONS:**

- Assuming that the existing per wastewater flows of **0.311 m<sup>3</sup>/cap/day** (311 L/cap/day) remains constant, there should be sufficient uncommitted reserve capacity at the Rockland WPCP for an additional **668 equivalent residential units** in addition to the 1,751 already committed units.

- As part of the Rockland WWTP Review initiated by OCWA's ES in the fall of 2014, process treatment issues have been identified and solutions were recommended to improve the current WWTP performance.

**PREPARED BY:** Maurice Benoit, Senior Operations Manager, OCWA

**DATE:** March 25<sup>th</sup>, 2020

**Attachments:** Urban Area Statistiques - 2019

## Urban Area Statistiques- Lots approuvés (2019)

### **P : Population (Urban Area)**

	<b>Pers./ménage</b>	<b>Population</b>
Nbre total des ménages en 2004 (voir H = 3586)	2.69	<b>9,646</b>
Nbre total des ménages en 2005 (voir H = 3756)	2.69	<b>10,104</b>
Nbre total des ménages en 2006 (voir H = 3854)	2.69	<b>10,367</b>
Nbre total des ménages en 2007 (voir H= 3983)	2.69	<b>10,714</b>
Nbre total des ménages en 2008 (voir H = 4140)	2.69	<b>11,137</b>
Nbre total des ménages en 2009 (voir H = 4271)	2.69	<b>11,489</b>
Nbre total des ménages en 2010 (voir H = 4561)	2.69	<b>12,269</b>
Nbre total des ménages en 2011 (voir H = 4724)	2.69	<b>12,708</b>
Nbre total des ménages en 2012 (voir H = 4882)	2.69	<b>13,133</b>
Nbre total des ménages en 2013 (voir H = 5007)	2.69	<b>13,469</b>
Nbre total des ménages en 2014 (voir H = 5092)	2.69	<b>13,698</b>
Nbre total des ménages en 2015 (voir H = 5184)	2.69	<b>13,945</b>
Nbre total des ménages en 2016 (voir H = 5229)	2.69	<b>14,066</b>
Nbre total des ménages en 2017 (voir H = 5399 )	2.69	<b>14,523</b>
Nbre total des ménages en 2018 (voir H =5549 )	2.69	<b>14,927</b>
Nbre total des ménages en 2019 (voir H =5715 )	2.69	<b>15,373</b>

### **H : Existing Connected population :**

<b>Année</b>	<b>Nbr d'unités total</b>	<b>Rockland (0,80)</b>	<b>Ménages</b>
2001 (Statistiques Canada)/juin	---	---	2990
2001 – Juin-Dec	174/2	70	70
2002	243	194	194
2003	165	132	132
2004	250	200	200
2005	213	170	170
2006	98		98
2007	129		129
2008	157		157
2009	131		131
2010	290		290
2011	163		163
2012	158		158
2013	125		125
2014	85		85
2015	92		92

2016	45		45
2017	170		170
2018	150		150
2019	166		166
<b>Total</b>			<b>5715</b>

\*Historically, residential development in urban area represents approximately 80% of growth. Accurate building statistics from 2006 exist and as such reflect the actual number of units created in that year.

## L

### (a) Terrains vacants dans un lotissement urbain au 31 décembre 2019

	Unités
Rue Yves Phase 1 (M. Chartrand, 50M-268)	22
Regional Group (mix)	14
Spacebuilders Stage 4 (50M-308) – single family	6
Loda Development	6
Spacebuilders Stage 5 (50M-336) – single family	89
Spacebuilders Stage 5 - towns	50
<b>Total</b>	<b>187</b>

### (b) Ébauches de plan de lotissement urbain approuvées au 31 décembre 2019

	Unités
Brigil	716
Stage 5 Morris Village	653
CH Clément- Caron	116
<b>Total</b>	<b>1485</b>

### (c) Condos et immeubles à appartements urbain approuvés au 31 décembre 2019

	Unités
Regional Group	12
Masters	64
<b>Total</b>	<b>76</b>

### (d) Bâtiments commerciaux, institutionnel et industriels urbain approuvés/construit au 31 décembre 2019

	Unités
ATG industries	24,628 sq.ft
Rockland fire station	20,380 sq.ft
Starbucks	2195 sq.ft

<b>Total</b>	<b>47,203 sq.ft (3)</b>
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### Population de Clarence-Rockland

	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>
	<b>19 612*</b> <b>19 844</b>					<b>20,790</b>
	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
					<b>23 185</b>	
	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
				<b>24 512</b>	<b>24 912</b>	<b>25 247</b>
	<b>2019</b>					
	<b>25 636</b>					

(Stat Can Juin 2001 = 19,612) (Stat Can Feb 2006 = 20,790) (Stat Can Feb 2011 = 23,185)  
(Stat Can 2016=24,512)

2001 = 174 units/2= 87 x 2,67 =232 personnes  
2002 = 243 unités X 2,67 = 649 personnes  
2003 = 165 unités X 2,67 = 441 personnes  
2004 = 250 unités X 2,69 = 673 personnes  
2005 = 213 unités X 2,69 = 573 personnes  
2006 = 156 unités X 2,69 = 420 personnes  
2007 = 177 unités X 2,69 = 476 personnes  
2008 = 210 unités X 2,69 = 565 personnes  
2009 = 172 unités X 2,69 = 463 personnes  
2010 = 339 unités X 2,69 = 912 personnes  
2011 = 214 unités X 2,69 = 576 personnes  
2012 = 190 unités X 1.87 = 355 personnes  
2013 = 158 unités X 1.87 = 295 personnes  
2014 = 123 unités X 1.87 = 230 personnes  
2015 = 104 unités X 1.87 = 194 personnes  
2016 = 136 unités X 1.87 = 254 personnes  
2017 = 214 unités X 1.87 = 400 personnes  
2018 = 179 unités X 1.87 = 335 personnes  
2019 = 208 unités X 1.87 = 389 personnes

# Appendix B

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## Performance Assessment Report (PAR)

# Ontario Clean Water Agency - Performance Assessment Report

From: 01/01/2019 to 31/12/2019

**Facility Org Number:** 6816  
**Facility Name:** ROCKLAND WASTEWATER TREATMENT FACILITY  
**Facility Owner:** City of Clarence Rockland  
**Receiver:** Ottawa River  
**Service Population:** 10000  
**Total Design Capacity:** 6800.0 m3/day

	01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	12/2019	Total	Avg	Max	Min
<b>Raw Sewage / Flow - m³/d</b>																
Maximum	4202	5365	9279	15139	12150	5255	4675	4314	4290	5576	8400	4904			15139	
Mean	3715.1	3564.75	4989.74	10873.82	6466.74	4428.83	3976.58	3583.06	3802.17	4042.35	4801.39	4101.19		4862.143		
Minimum	3362	3281	3333	6916	4844	3811	3586	3356	3478	3514	3888	3644				3281
Total	115168	99813	154682	239224	200469	132865	123274	111075	114065	125313	134439	127137	1677524			
<b>WPCP Effluent / Flow - m³/d</b>																
Maximum	4202	5365	9279	15139	12150	5255	4675	4314	4290	5576	8400	4904			15139	
Mean	3715.1	3564.75	4989.74	10873.82	6466.74	4428.83	3976.58	3583.06	3802.17	4042.35	4801.39	4101.19		4862.143		
Minimum	3362	3281	3333	6916	4844	3811	3586	3356	3478	3514	3888	3644				3281
Total	115168	99813	154682	239224	200469	132865	123274	111075	114065	125313	134439	127137	1677524			
<b>Raw Sewage / Biochemical Oxygen Demand: BOD5 - mg/L</b>																
Count	5	4	4	5	4	4	5	4	5	4	4	5	53			
Maximum	275	203	183	174	180	221	190	149	184	173	164	171			275	
Mean	196.8	180.5	157.5	119.2	139.25	174	147.6	122.75	123.6	150	131.75	138.4		148.4458		
Minimum	152	164	132	57	95	148	115	97	95	113	101	115				57
<b>Raw Sewage / Total Suspended Solids: TSS - mg/L</b>																
Count	5	4	4	5	4	4	5	4	5	4	4	5	53			
Maximum	340	410	270	360	240	700	620	210	330	370	410	520			700	
Mean	286	279	260	244	199.5	356.667	328	157.5	193	287.5	247.5	291		260.8056		
Minimum	230	190	240	150	138	160	170	120	140	140	150	150				120
<b>Raw Sewage / Total Kjeldahl Nitrogen: TKN - mg/L</b>																
Count	5	4	4	5	4	4	5	4	5	4	4	5	53			
Maximum	64.2	64.7	66	36.7	48.5	51.5	84.8	70.6	65.8	63.6	60.3	69.1			84.8	
Mean	58.26	61.825	53.425	27.24	46.925	50.1	55.04	60.575	60.02	55.025	51.825	55.74		53		
Minimum	52.2	57.7	36.4	13.4	45.6	48.6	42.2	50.6	55.5	42.3	44.8	44.4				13.4
<b>Raw Sewage / Total Ammonia Nitrogen: NH3 + NH4+ as N - mg/L</b>																
Count	5	4	4	5	4	4	5	4	5	4	4	5	53			
Maximum	36.6	41	38.7	18.9	25.5	30.1	45	52	53.9	52.9	38.7	40.6			53.9	
Mean	31.66	37.45	29.075	12.002	22.875	29.6	33.88	45.475	49.36	44.925	33.275	30.62		33.34975		
Minimum	23.6	35.6	18.3	5.56	20.8	29.2	29.4	38.5	43.7	32.3	28	16.3				5.56
<b>Raw Sewage / Total Phosphorus: TP - mg/L</b>																
Count	5	4	4	5	4	4	5	4	5	4	4	5	53			
Maximum	7.7	7.86	7.79	5.26	6.39	7.77	7.75	7.43	8.72	6.74	7.46	7.41			8.72	
Mean	6.676	7.033	6.535	3.838	5.875	6.423	5.954	6.525	6.822	6.395	6.255	5.99		6.193417		
Minimum	6.03	6.19	5.14	2.14	4.94	5.61	5.2	5.51	5.93	6.01	5.16	4.66				2.14
<b>Chemical addition / Coagulant Dosage - mg/L</b>																
Maximum	101.48	96.95	96.99	96.89	90.13	103.81	103.72	10.15	90.14	90.16	69.38	76.19			103.81	
Mean	93.776	96.707	95.123	74.954	86.125	98.084	103.123	5.665	79.1	81.124	69.29	70.308		79.44825		
Minimum	90	94.99	72.45	20.77	34.67	90.02	100.92	3.02	69.19	62.33	69.22	69.23				3.02
<b>WPCP Effluent Disinfection / Chlorine Dosage - mg/L</b>																
Maximum	6.82	7.08	7.38	6.26	7.73	6.36	5.32	10.15	11.84	7.03	7.4	6.85			11.84	
Mean	6.29	6.311	6.036	4.372	5.425	4.667	4.755	5.665	6.493	6.143	6.115	6.425		5.72475		
Minimum	5.6	5.39	4.55	0	0.95	3.61	4.27	3.02	5.83	5.6	4.1	5.9				0



WPCP Effluent / Carbonaceous Biochemical Oxygen Demand: CBOD5 - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	8	< 9	< 8	15	12	7	13	21	16	14	15	12		< 21	
Mean	< 4.4	< 4.5	< 4.5	< 5.4	7.5	5.8	< 5.2	11	8.6	10.25	< 8	6.4		< 6.795833	
Minimum	< 3	< 3	< 3	< 3	4	4	< 3	6	3	8	< 3	4			< 3
WPCP Effluent / Total Suspended Solids: TSS - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	14	32	27	16	15	24	34	26	30	22	26	20		34	
Mean	< 11	19.5	17.75	11.2	11.75	18	16.2	18.5	17.4	14.5	15.75	15.4		< 15.57917	
Minimum	< 3	10	5	5	6	12	7	12	10	9	9	10			< 3
WPCP Effluent / Total Kjeldahl Nitrogen: TKN - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	26.9	30.7	28.3	13.4	18.5	22.7	27.7	30.3	29.9	35.3	37.1	33.5		37.1	
Mean	24.4	26.4	23.575	12.32	17.8	20.2	20.02	28.475	27.58	30.075	25.75	29.94		23.87792	
Minimum	21.6	22.7	19.5	10.3	16.9	15.9	6.7	25.4	24.3	22.7	15.5	22.6			6.7
WPCP Effluent / Total Ammonia Nitrogen: NH3 + NH4+ as N - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	23.4	24	22.5	10.8	14.1	18.8	21.2	24.1	25.2	28.3	22.8	25.3		28.3	
Mean	20.78	21.85	19.05	8.806	13.55	16.367	15.622	22.525	22.08	24.2	19.325	20.96		18.75958	
Minimum	18	19.2	14.9	7	12.6	13.3	5.61	19.7	19.3	18.2	12.7	18.2			5.61
WPCP Effluent / Nitrate as N: NO3-N - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	< 0.1	0.2	< 0.1	< 1.7	< 1.1	< 0.1	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.2		< 1.7	
Mean	< 0.1	< 0.125	< 0.1	< 0.92	< 0.4	< 0.1	< 0.1	< 0.125	< 0.1	< 0.1	< 0.1	< 0.12		< 0.199167	
Minimum	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 0.1
WPCP Effluent / Nitrite as N: NO2-N - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.2	< 0.3		< 0.3	
Mean	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.125	< 0.16		< 0.107083	
Minimum	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			< 0.1
WPCP Effluent / Total Phosphorus: TP - mg/L															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	0.43	0.81	0.63	0.5	0.53	0.64	2.62	0.95	0.82	0.96	0.85	0.76		2.62	
Mean	0.362	0.4	0.46	0.402	0.453	0.54	0.806	0.682	0.576	0.668	0.555	0.566		0.539167	
Minimum	0.28	0.21	0.22	0.3	0.34	0.49	0.19	0.53	0.43	0.53	0.26	0.45			0.19
WPCP Effluent / E. Coli: EC - cfu/100mL															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Geometric Mean Density	2	2.828	3.364	1.741	1.682	2.52	2	2.213	2	10.099	2	2			
WPCP Effluent / Temperature - °C															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	12.2	11.7	12.4	12.8	14.2	17.9	20.6	21	20.4	19.4	16.7	13.8		21	
Mean	11.3	10.7	11.175	11.52	13.575	16.667	19.62	20.575	19.7	18.575	15.45	12.9		15.14642	
Minimum	10.9	9.5	9.4	10.2	12.7	14.4	18.6	20.2	18.7	17.7	14.8	11.8			9.4
WPCP Effluent / pH - ---															
Count	5	4	4	5	4	4	5	4	5	4	4	5	53		
Maximum	6.9	6.9	6.8	6.7	6.6	6.7	6.6	6.5	6.6	7.1	6.6	6.7		7.1	
Mean	6.86	6.9	6.75	6.58	6.5	6.567	6.54	6.425	6.54	6.625	6.575	6.64		6.625167	
Minimum	6.8	6.8	6.7	6.4	6.4	6.4	6.4	6.3	6.4	6.4	6.5	6.6			6.3

# Appendix C

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## Biosolids Quality Report

Ontario Clean Water Agency - Rockland Wastewater Treatment Facility  
 2019 Biosolids Quality Report - Liquid  
 Digester Type: AEROBIC  
**Metals & Criteria**

Month	Arsenic (mg/L)	Cadmium (mg/L)	Cobalt (mg/L)	Chromium (mg/L)	Copper (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)
Parameter Short Name	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
T/s	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean
Jan	0.100	0.030	0.040	0.180	1.573	0.002	0.057	0.143	0.100	0.100	2.987
Feb	0.100	0.030	0.030	0.190	1.810	0.002	0.050	0.160	0.100	0.100	3.510
Mar	0.100	0.030	0.035	0.225	1.975	0.003	0.055	0.175	0.100	0.100	4.045
Apr	0.100	0.030	0.033	0.207	1.373	0.002	0.073	0.147	0.100	0.100	2.683
May	0.100	0.030	0.035	0.260	1.305	0.002	0.085	0.165	0.100	0.100	2.820
Jun	0.100	0.030	0.030	0.295	1.670	0.004	0.050	0.170	0.100	0.100	4.100
Jul	0.100	0.030	0.035	0.315	1.640	0.005	0.065	0.245	0.100	0.100	4.135
Aug	0.100	0.030	0.030	0.110	0.910	0.002	0.050	0.060	0.100	0.100	2.960
Sep	0.100	0.030	0.030	0.200	1.690	0.003	0.050	0.130	0.100	0.100	5.400
Oct	0.100	0.030	0.035	0.220	2.100	0.004	0.060	0.170	0.100	0.100	6.450
Nov	0.100	0.030	0.030	0.370	1.980	0.005	0.080	0.235	0.100	0.100	6.225
Dec	0.100	0.030	0.030	0.213	2.027	0.004	0.053	0.140	0.100	0.100	5.453
Average	0.100	0.030	0.033	0.232	1.671	0.003	0.061	0.162	0.100	0.100	4.231
Max. Permissible Metal Concentrations (mg/kg of Solids)	170.000	34.000	340.000	2,800.000	1,700.000	11.000	94.000	420.000	1,100.000	34.000	4,200.000
Metal Concentrations in Sludge (mg/kg)	7.751	2.325	2.541	17.988	129.524	0.239	4.704	12.530	7.751	7.751	327.911

Ontario Clean Water Agency - Rockland Wastewater Treatment Facility  
 2019 Biosolids Quality Report - Liquid  
 Digester Type: AEROBIC  
 Solids and Nutrients

Month	Avg. Total Solids (mg/L)	Avg. Volatile Solids (mg/L)	Avg. Total Phosphorus (mg/L)	Ammonia (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	TKN (mg/L)	Ammonia + Nitrate (mg/L)	Potassium (mg/L)
Parameter Short Name	TS	VS	TP	NH3p_NH4p_N	NO3-N	NO2-N	TKN	calculation in report - no T/S	K
T/s	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean		Lab Published Month Mean
Jan	11,166.667	8,166.667	214.333	2.957	0.100	0.133	690.333	1.528	45.733
Feb	14,900.000	10,500.000	234.000	0.100	0.100	0.100	747.000	0.100	53.500
Mar	15,750.000	11,300.000	268.000	5.370	0.100	0.100	812.500	2.735	64.000
Apr	11,766.667	7,006.667	225.000	0.950	1.067	0.100	584.333	1.008	39.933
May	12,100.000	7,400.000	216.000	14.950	0.100	0.100	582.000	7.525	34.850
Jun	14,000.000	8,650.000	213.500	4.740	0.100	0.100	469.000	2.420	39.400
Jul	13,750.000	8,370.000	263.000	8.055	0.100	0.100	674.500	4.078	36.350
Aug	7,640.000	5,040.000	149.000	9.700	52.400	2.000	427.000	31.050	27.200
Sep	11,600.000	7,260.000	287.000	7.900	0.100	0.100	627.000	4.000	34.600
Oct	11,900.000	7,900.000	301.500	4.150	0.150	0.100	597.500	2.150	33.700
Nov	17,650.000	10,690.000	317.000	44.890	0.100	0.100	575.500	22.495	37.700
Dec	12,600.000	8,600.000	306.000	3.750	0.100	0.100	784.667	1.925	39.833
<b>Average</b>	12,901.944	8,406.944	249.528	8.959	4.543	0.261	630.944	6.751	40.567
<b>Total</b>	154,823.333	100,883.333	2,994.333	107.512	54.517	3.133	7,571.333	81.014	486.800