Duffin Creek Water Pollution Control Plant

2021 Annual Performance Report

The Regional Municipality of Durham
Duffin Creek Water Pollution Control Plant 2021 Annual Performance Report

Environmental Compliance Approval (ECA): 5531-9FJJT5 Dated March 3, 2014
Environmental Compliance Approval (ECA): 5547-C43QV9 Dated October 26,2021
Environmental Compliance Approval (Air): 3730-BJLNVD Dated May 20, 2020
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International Organization for Standardization (ISO) 14001 Certification: CA05/3563/E

The Duffin Creek Water Pollution Control Plant (WPCP) Annual Performance Report provides staff, stakeholders and customers an overview of the performance of the Duffin Creek WPCP in 2021. Further, this report fulfills the annual reporting requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) and demonstrates the commitment of ensuring the WPCP continues to deliver wastewater services to our customers in an environmentally responsible manner.

Water Pollution Control Plant Process Description

General

The Duffin Creek WPCP is jointly owned by The Regional Municipality of Durham and The Regional Municipality of York. It is operated in accordance with the terms and conditions of the ECAs noted above. The plant, located in the City of Pickering, is operated by The Regional Municipality of Durham. This MECP Class 4 conventional activated sludge treatment plant is designed to treat wastewater at an average daily flow rate of 630,000 cubic metres per day (m^3/d). The Duffin Creek WPCP is ISO 14001 certified.

The Duffin Creek WPCP treats wastewater for approximately 226,617 residents in the Town of Ajax and the City of Pickering in the Regional Municipality of Durham as well as 1,011,160 residents in the Regional Municipality of York, which includes the Municipalities of Vaughan, King, Newmarket, Whitchurch-Stouffville, Aurora, East Gwillimbury, Richmond Hill, and Markham. The total population served by Duffin Creek WPCP is approximately 1,237,777.

The Duffin Creek WPCP utilizes the following processes to treat wastewater;

- raw influent pumping,
- preliminary treatment,
- primary treatment,
- phosphorus removal,
- secondary treatment,
- disinfection (chlorination/dechlorination),
- solids management, and
- incineration.

Raw Influent Pumping

Wastewater collected through approximately 687 kilometres (km) of sanitary sewers in Ajax and Pickering is conveyed to the plant by gravity and by the following sanitary sewage pumping stations located in the collection system: Bayly Street, Jodrel Road, Toy Avenue, Finch Avenue and Liverpool Road. Wastewater collected from York Region is conveyed to the Water Pollution Control Plant (WPCP) via the Primary Trunk Sewer and the twin South East Collector Trunk Sewers which are part of the York Durham Sewage System (YDSS). Wastewater from York Region accounted for 81.7% of the plant flow treated in 2021. The remaining sanitary sewage flow of 18.3% was generated by the Town of Ajax and the City of Pickering in Durham Region. The combined flows enter a diversion chamber, which then splits the flow between Stages 1, 2 and 3 process areas at the Duffin Creek WPCP. There are two Influent Pumping Stations (IPS), each with eight submersible pumps, that direct the wastewater to the preliminary treatment process. From the IPS, the wastewater flows by gravity through the treatment processes.

Preliminary Treatment

Screening: Eight mechanically cleaned screens remove rags and large debris that could harm pumps and process equipment. Screenings are compacted for disposal in landfill.

Grit Removal: There are eight grit tanks equipped with coarse bubble diffusers to provide aeration in the grit removal process. Heavy suspended material such as sand and small stones (grit) is settled to the bottom of the tanks while lighter organic particles are kept in suspension and passed through the tanks for further treatment. The grit removed is dewatered for landfill disposal.

Primary Treatment

Fourteen primary clarifiers each equipped with a travelling bridge system utilize the physical process of sedimentation, which cause heavy particles to settle to the bottom of the tank as raw sludge and lighter particles to float to the surface as scum. The sludge, along with waste activated sludge from the secondary treatment process is collected by scraper blades, which push the sludge into hoppers. The sludge is then pumped to anaerobic digestion and/or dewatering holding tanks. The scum is collected by the travelling bridge and pumped to anaerobic digestion.

Phosphorus Removal

Ferric chloride is added throughout the treatment process to aid in phosphorus and suspended solids removal. Chemical addition can be supplemented by the addition of polymer at various locations throughout the plant for enhanced treatment.

Secondary Treatment

Aeration Tank: There are fourteen aeration tanks each containing anoxic and aerobic zones. In the first part of the tank no oxygen is introduced (anoxic), this is for denitrification. The second part of the

tank is where fine bubbled air is diffused into the wastewater (aerobic) to remove dissolved and suspended organics and nutrients from the wastewater.

Secondary Clarifier: Twenty-two secondary clarifiers receive effluent from the aeration tanks where solids settle quickly as activated sludge leaving a clear effluent on top. A portion of the activated sludge collected on the bottom of the clarifier is pumped back to the front of the aeration tanks and any excess activated sludge is 'wasted' to the primary clarifier to co-settle with primary sludge.

Disinfection (chlorination/dechlorination)

Chlorine in the form of liquid sodium hypochlorite is metered into the effluent stream for pathogen control. Adequate contact time is provided by the chlorine contact chambers. Disinfected effluent is dechlorinated with a sodium bisulphite solution before being discharged to Lake Ontario through a 3.05 metre (m) diameter outfall pipe, approximately 1,100 m long with a 183 m long diffuser pipe.

Solids Management

Anaerobic Digestion: A portion of the raw sludge collected from the primary clarifiers is pumped into one of the four primary digesters, which overflow into two secondary digesters for thickening. Digested sludge is pumped to dewatering storage tanks where it is blended with additional raw sludge from the primary clarifiers before being dewatered. All solids produced are dewatered and incinerated on site.

Imported Sludge: Durham's Regional Biosolids Management Program imports sludge from other Regionally owned Water Pollution Control Plants (WPCP) within Durham Region. In addition, sludge may be imported from York Region's facilities.

Dewatering: Duffin Creek WPCP utilizes eight dewatering solid bowl centrifuges in order to separate the heavier material and the liquid supernatant (centrate). All dewatered solids (sludge cake) are sent to incineration. The centrate is pumped to the head of the plant where it combines with the influent to undergo treatment.

Incineration

There are four fluidized bed process trains, which feeds the sludge cake through the combustion process to burn off organic substances contained in the sludge cake and convert the cake into ash and flue gas. Steam boilers are utilized for waste heat recovery. All solids at the Duffin Creek WPCP were incinerated during the reporting period. The ash from the incineration process is sent to St. Mary's Cement in Bowmanville, Ontario for reuse. No land application or landfill of biosolids occurred in 2021 from this facility.

Environmental Compliance Approval (ECA)

Under Condition 11.5 of ECA 5547-C43QV9 the Region of Durham must produce an annual performance report that contains the following information:

a) A summary and interpretation of all influent, imported sewage monitoring data, and a review of the historical trend of sewage characteristics and flow rates;

Based on an average of daily flows for the past 11 years, flow has increased by 0.2%. Please see Figure 1 for detailed historical annual average daily flows.

Table 3 and Figures 2-5 outline the historical characteristics of the raw influent.

b) A summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

The Duffin Creek Water Pollution Control Plant (WPCP) effluent was determined to be compliant with the Environmental Compliance Approval limits during the reporting period.

The plant operated at 53% of its approved capacity of 630,000 cubic metres (m^3) for this reporting period. The plant received a maximum daily flow of 686,292 m^3 on September 23, 2021.

Refer to Table 4 Final Effluent Analyses for detailed final effluent monitoring data.

c) Summary of all operating issues encountered and corrective actions taken;

Sludge blend tank foaming – different ratios of raw and digested sludge were pumped to the blend tanks to help reduce foaming issues.

Influx of influent rags/wipes – the influent pumping station was flushed periodically to help reduce buildup.

d) Summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

Operations

- Replaced mixers for primary digesters 3 and 4,
- Cleaned primary digester 2,
- Banded draft tube,
- Replaced gear box for secondary clarifier 5,
- Inspected concrete for contact chambers 5 and 6,
- Retrofitted soft start controls for aeration blower 5,
- Installed soft starter and supply for aeration blower 6,
- Replaced flow meter in return building 3,
- Upgraded diesel generator controller for stage 3,
- Performed maintenance on substation for stages 1 and 2,

- Performed yearly maintenance on standby generator,
- Repaired chains, wear strips, and flights for secondary clarifiers 17, 20, 21, and 22,
- Replaced gearbox for secondary clarifier 5,
- Repaired air headers for aeration tanks 5 and 6,
- Replaced 8 aeration tank mixers,
- Performed maintenance on Influent Pumping Station pumps for stages 1,2 and 3.

Dewatering

- Replaced housing for Schwing pump 362,
- Replaced feed screws for Schwing pump 462.

Incineration

- Replaced two electro deionized unit modules,
- Inspected waste heat boilers 3 and 4,
- Replaced gear box and coupling for reactor 2,
- Replaced scrubber effluent water line for reactor 3,
- Replaced fixed bed granulated activated carbon units with sorbent polymer composite for reactor 3,
- Repaired refractory for reactor 1,
- Repaired windbox and refractory for reactor 4,
- Performed and completed stack test.

e) Summary of any effluent quality assurance or control measures undertaken;

In-house laboratory test results are compared to the results of the Regional Environmental Laboratory on comparable samples to determine the in-house accuracy. All results were found to be within an acceptable range.

On-line instrumentation is verified by Water Pollution Control Plant operators using various field or lab test equipment.

Analytical balances are calibrated by Fisher Scientific Company Ltd.

In-house lab equipment was calibrated by operations staff and various manufacturers.

f) Summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment;

Plant flows are measured at the influent of this plant.

All influent flow meters were calibrated on January 4, 2021.

All monitoring and laboratory equipment was calibrated and maintained according to manufacturer’s specifications.

g) Summary of efforts made to achieve the design objectives in this Approval;

The annual average daily flow did not exceed the rated capacities of 540,000 cubic metres per day (m^3/d) or 630,000 m^3/d. In October 2021, the rated capacity was upgraded to 630,000 m^3/d as per the new Environmental Compliance Approval.

The final effluent met all effluent objectives and limits for the reporting period.

h) Tabulation of the volume of sludge generated, 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;

Refer to Table 8 Summary of Sludge Produced and Imported.

There is no increase of sludge volume expected in the next reporting period.

All sludge generated at Duffin Creek Water Pollution Control Plant is incinerated.

i) A summary of any complaints received and any steps taken to address the complaints;

There were no complaints during the reporting period.

j) Summary of all By-passes, Spill or Abnormal Discharge events;

There is no mechanism for by-passing untreated wastewater at this facility. There are no anticipated by-passes planned for the next reporting period. There were no spill or abnormal discharge events for the reporting period.

k) Summary of all Notice of Modifications to Sewage Works;

No notice of modifications was submitted in 2021.

l) Summary of efforts made to achieve conformance with the Ministry's Treatment and Collection System Requirements (Procedure F-5-1);

Receiving Water Assessment

In 2006, lake modelling was undertaken to assess the potential impacts of the expanded plant's treated effluent on Lake Ontario, the shoreline, surrounding water users, and to examine the feasibility of increasing the average flow capacity to 630,000 cubic metres per day (m^3/d). The outfall diffusers are currently being modified to accommodate the potential increase in flow capacity and to meet the 20:1 dilution requirement. The dilution guideline means that for every 1-part plant effluent, 20-parts of lake water dilute the effluent within the immediate area of the diffuser under normal lake water conditions.

Elimination of bypass/overflows

Currently, the outfall can accommodate a maximum flow of 1,050,000 m^3/day. A significant rainfall event resulted in the overflowing of the primary clarifiers, secondary clarifiers, and chlorine contact chambers. A thorough hydraulic capacity analysis concluded the capacity of 1,900,000 m^3/day can be achieved with the installation of variable diffusers for the outfall. The estimated completion date for this project is July 31st, 2022. This work will reduce the potential for future overflows.

Effluent Design Objectives and Effluent Guidelines

During the reporting period, the final effluent met all approval objectives and limits outlined in Table 1 of Procedure F-5-1.

Industrial Wastes

Durham Region's Sewer Use By-Law (55-2013) outlines concentration limits for discharge into land drainage works or the sanitary sewer system. Violations of the by-law can result in fines of up to $100,000 for personal or corporation offences. Durham Region may establish a Compliance Program that will permit an industrial user to discharge non-complying sewage upon such terms and conditions deemed appropriate by the Commissioner of Works. The compliance program allows industry to not be prosecuted for violating the concentration limits outlined in the by-law. The compliance program outlines the length of time necessary to plan, design, construct or install facilities to eliminate the non-compliance. A Sewage Surcharge Agreement is an agreement between Durham Region and a company, that permits the discharge of overstrength sewage to the Region's sanitary sewer collection system. Companies are billed for the overstrength sewage to pay for the additional cost of treatment and collection. The eligible parameters for a sewage Surcharge Agreement are Biochemical Oxygen Demand, Total Suspended Solids, Total Phosphorus, Total Kjeldahl Nitrogen, Animal/Vegetable Oil & Grease, and Sulphates. Sewer use by-law office staff routinely monitor and sample the wastewater collection system to ensure compliance with the by-law. Similarly, York Region has Sewer Use By-law programs in place to regulate discharges to the wastewater system. York Region's Environmental Monitoring and Enforcement team (EME) is responsible for administering the programs and enforcing the bylaw. These programs are being administered in ways that mostly align with Durham Region's programs, except York Region does not issue surcharge agreements for Animal/Vegetable Oil & Grease and Sulphates.

m) Changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Proposed Works;

Contract Number	Project Description	Original Projected Completion Date	Updated Projection Completion Date
D-2021-09	Blower Building 1&2 Control Upgrades	Nov 28 2021	Dec 28 2021
D-2018-029	Sludge Blending Tank Restoration & Connection to Digester Gas System	May 9 2020	Aug 14th 2021
T-20-94	Outfall Diffuser Upgrades	July 31 2022	July 31 2022
T-20-93	Phosphorus Reduction Action Plan Upgrades	July 31 2024	July 31 2024
T-1025-2021	Replacement of Variable Frequency Drives for Blower Buildings 1&2 at Duffin Creek WPCP	April 8 2022	December 1 2022

Proposed Alterations, Extensions or Replacements

Replacement of Incineration Units 1 and 2

Detailed design of the new incinerator systems to replace Units 1 and 2 is underway. The detailed design is anticipated to be completed by the end of 2022 due to delays in receipt of pre-purchase equipment information required to complete the detailed design. Stage 1 of construction is estimated to be tendered in March of 2023. Overall program completion is scheduled to occur in 2030.

Stage 3 Rehabilitation and Retrofit Work

A consultant has been retained to complete the conceptual design. Completion of the conceptual design phase is anticipated to occur by the end of 2022.

Ministry of the Environment, Conservation and Parks (MECP) Inspection

The last previous plant inspection was February 12, 2015. An inspection is scheduled for January 2022.

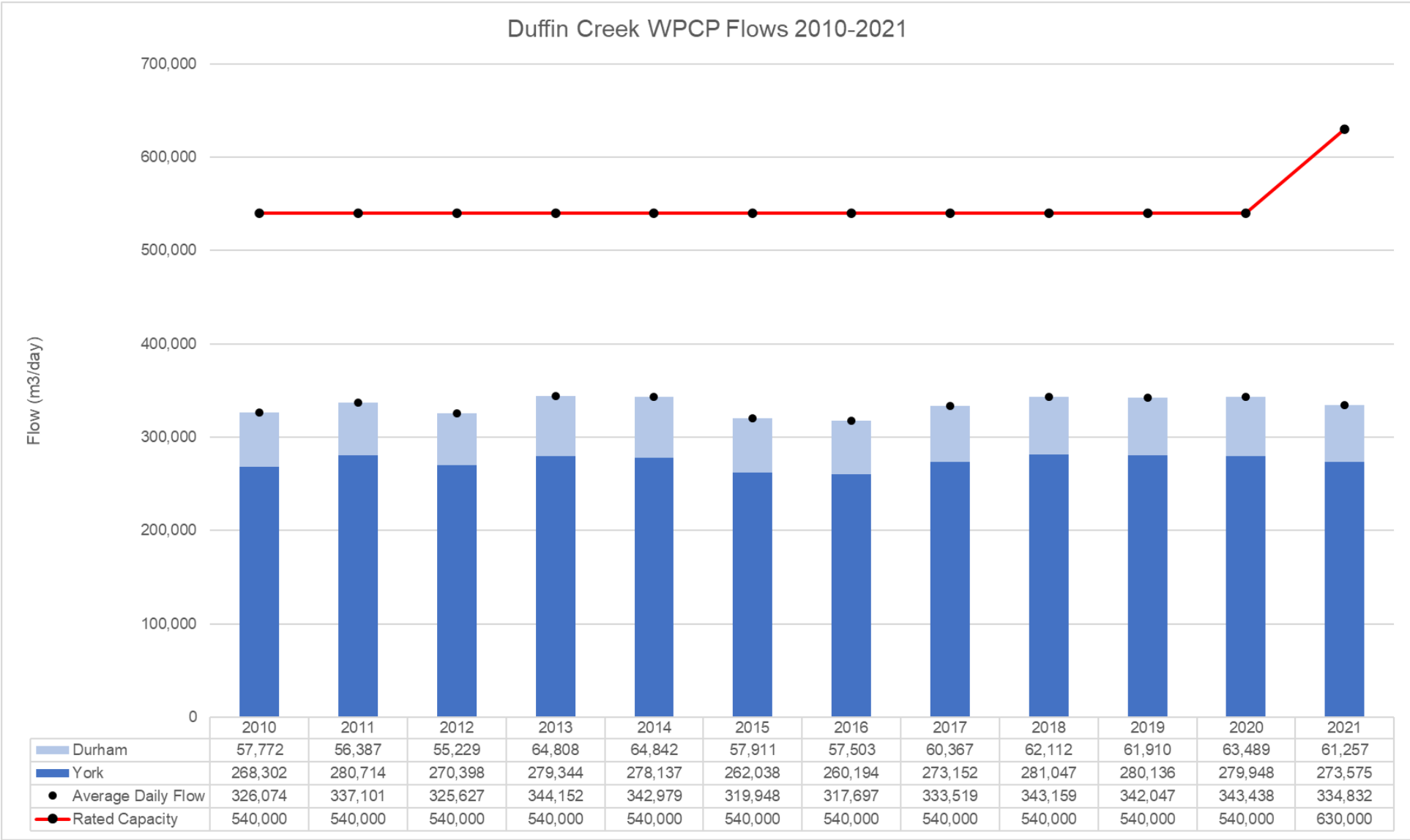
Table 1 Raw Influent Flows

Month	York Region Plant Flow cubic metre (m^3)	Durham Region Plant Flow m^3	Total Flow to Plant metered at the raw influent m^3	Average Daily Flow cubic metre per day (m^3/d)	Maximum Daily Flow m^3/d
January	8,492,605	1,937,937	10,430,542	336,469	370,529
February	7,577,170	1,663,801	9,240,971	330,035	365,498
March	8,844,903	1,896,762	10,741,665	346,505	452,495
April	8,155,434	1,903,469	10,058,903	335,297	381,637
May	8,138,213	1,810,481	9,948,694	320,926	341,682
June	7,788,918	1,697,094	9,486,012	316,200	365,915
July	8,086,984	1,830,235	9,917,219	319,910	382,772
August	8,095,807	1,720,903	9,816,710	316,668	364,014
September	8,628,188	1,919,639	10,547,827	351,594	686,292
October	8,722,017	2,012,317	10,734,334	346,269	426,464
November	8,304,449	1,860,824	10,165,273	338,842	357,362
December	9,020,139	2,105,421	11,125,560	358,889	450,082
Total (%) *	99,854,827 (81.7%)	22,358,883 (18.3%)	122,213,710 (100%)		
Average *	8,321,236	1,863,240	10,184,476	334,832**	
Minimum	7,577,170	1,663,801	9,240,971		
Maximum	9,020,139	2,105,421	11,125,560		686,292
ECA Limit				630,000	
Compliance Met				Yes	

*Total and average values reflect rounding of decimal places

**Annual average daily flow

Figure 1 – Annual Average Flow 2010-2021



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Durham	57,772	56,387	55,229	64,808	64,842	57,911	57,503	60,367	62,112	61,910	63,489	61,257
York	268,302	280,714	270,398	279,344	278,137	262,038	260,194	273,152	281,047	280,136	279,948	273,575
Average Daily Flow	326,074	337,101	325,627	344,152	342,979	319,948	317,697	333,519	343,159	342,047	343,438	334,832
Rated Capacity	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	630,000

Table 2 Raw Influent Analyses

Month	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus (TP) average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L
January	194	267	5.9	44.23
February	199	278	6.2	47.77
March	184	264	5.9	46.91
April	203	262	6.1	47.42
May	188	278	6.1	49.51
June	180	317	6.6	48.10
July	207	333	6.3	51.44
August	215	395	7.3	52.93
September	271	542	6.7	52.91
October	203	295	6.1	50.72
November	230	294	6.8	55.64
December	180	259	5.8	49.86
Average	204	315	6.3	49.79
Minimum	180	259	5.8	44.23
Maximum	271	542	7.3	55.64
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes

Table 3 Historical Raw Influent Characteristics

Year	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus (TP) average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L
2010-2020	198	329	6.3	47.53
2021	204	315	6.3	49.79
Percent Change	2.8%	-4.6%	0%	4.5%

Figure 2 – Raw Influent – Annual Average Biochemical Oxygen Demand

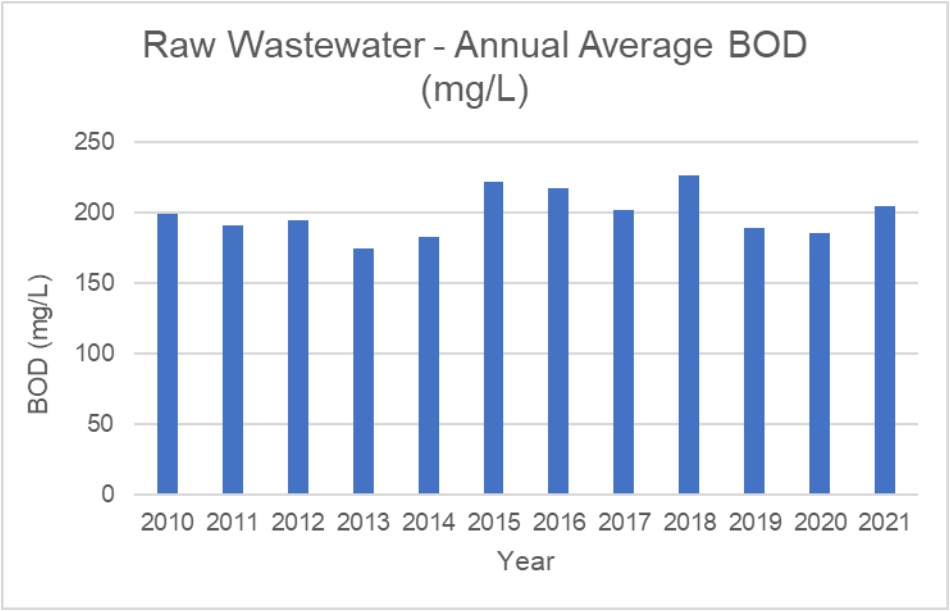


Figure 3 – Raw Influent - Annual Average Total Suspended Solids

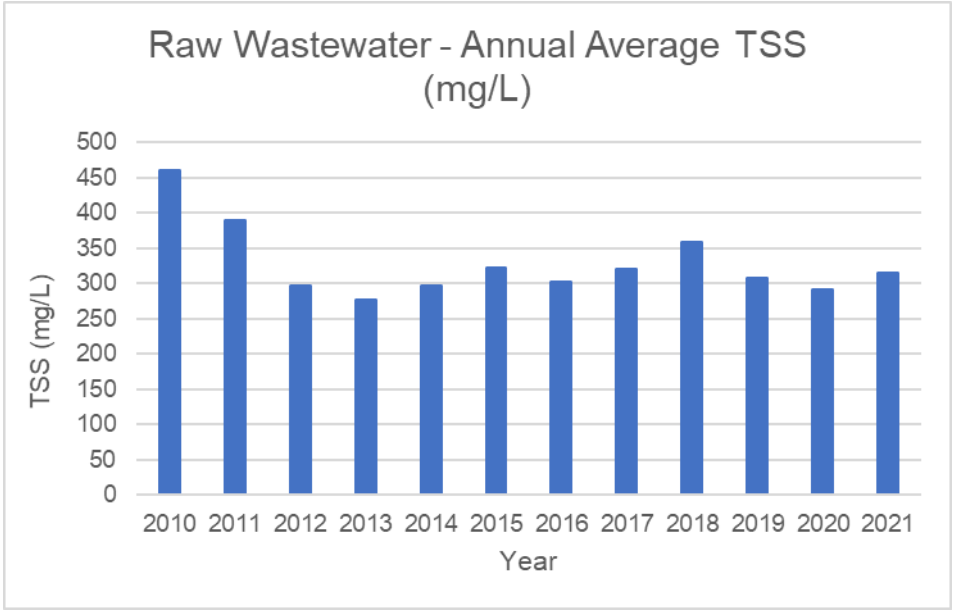


Figure 4 – Raw Influent – Annual Average Total Phosphorus

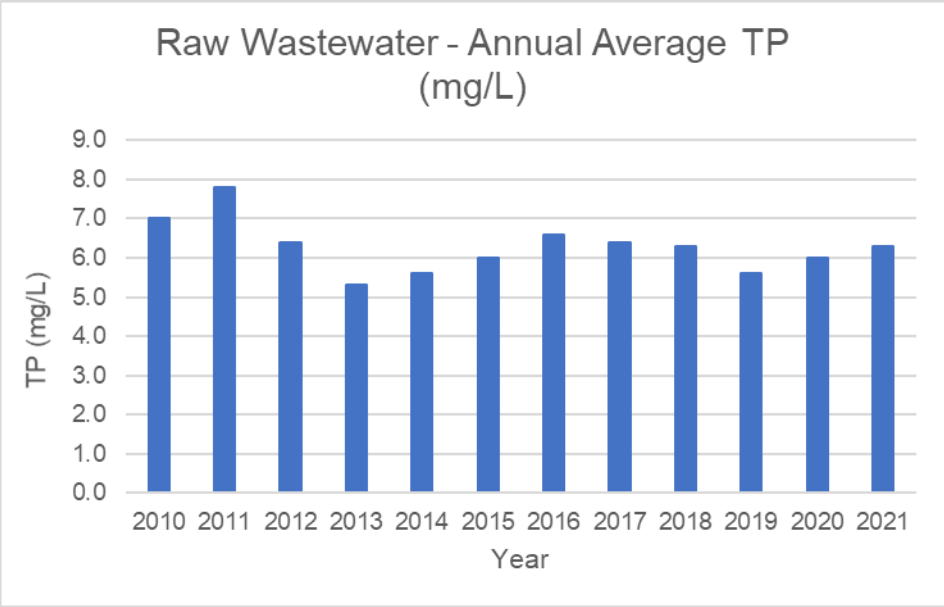


Figure 5 – Raw Influent – Annual Average Total Kjeldahl Nitrogen

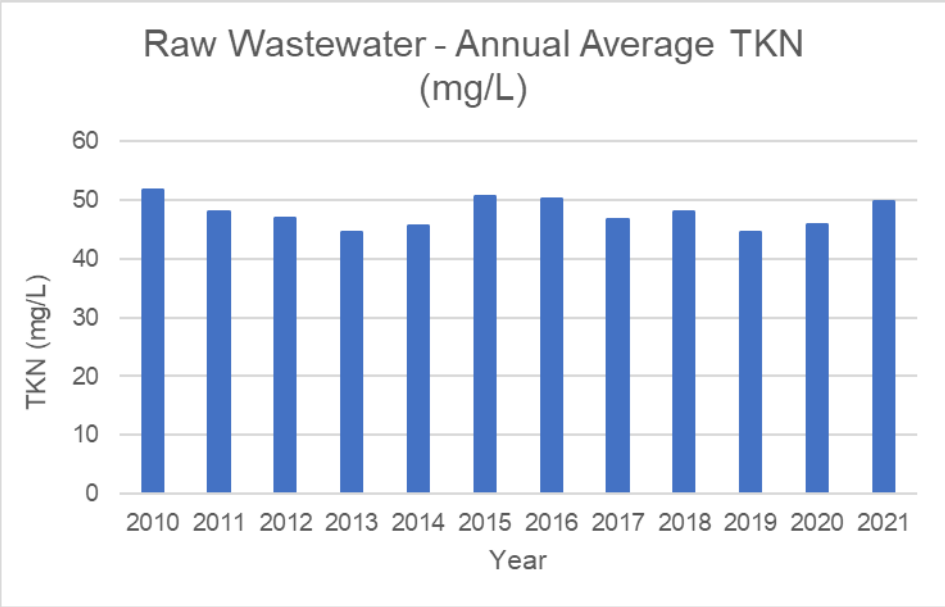


Table 4 Final Effluent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus average conc. mg/L	Total Phosphorus average loading kilogram per day – year to date	Total Ammonia Nitrogen average conc. mg/L winter	Total Ammonia Nitrogen average conc. mg/L summer
January	2.6	8.5	0.33	111	0.19	
February	2.6	7.1	0.32	108	0.73	
March	2.3	5.1	0.23	99	0.37	
April	1.3	4.7	0.25	95	0.32	
May	1.2	5.7	0.31	96		0.31
June	1.1	4.9	0.29	95		0.45
July	1.2	7.2	0.30	96		0.62
August	1.0	5.2	0.29	95		0.80
September	1.0	4.8	0.28	95		0.29
October	1.0	3.1	0.27	95	0.27	
November	1.1	4.2	0.27	95	0.27	
December	1.1	3.4	0.25	95	0.21	
Average	1.5	5.3	0.28	94	0.34	0.49
Minimum	1.0	3.1	0.23	95	0.19	0.29
Maximum	2.6	8.5	0.33	111	0.73	0.80
ECA Limit	25.0	25.0	0.8	311	10.0	6.0
ECA Objective	15.0	15.0	0.6		5.0	5.0
Within Compliance	Yes	Yes	Yes	Yes	Yes	Yes
Sampling Requirement Frequency Met	Yes	Yes	Yes		Yes	Yes

Table 4 Final Effluent Analyses continued

Month	Unionized Ammonia Nitrogen average concentration (conc.) milligram per litre (mg/L)	Total Chlorine Residual average conc. mg/L	pH minimum	pH maximum	Temperature Degree Celsius
January	0.0	0.00	6.5	6.9	14.8
February	0.0	0.00	6.6	6.9	14.4
March	0.0	0.00	6.5	7.2	14.8
April	0.0	0.00	6.7	7.2	16.0
May	0.0	0.00	6.7	7.1	18.0
June	0.0	0.00	6.7	7.3	20.3
July	0.0	0.00	6.7	7.5	21.8
August	0.0	0.00	6.7	7.3	23.6
September	0.0	0.00	6.9	7.7	21.2
October	0.0	0.00	6.8	7.4	19.6
November	0.0	0.00	6.8	7.4	16.5
December	0.0	0.00	6.6	7.1	15.8
Average	0.0	0.00			18.4
Minimum	0.0	0.00	6.5		14.4
Maximum	0.0	0.00		7.7	23.6
ECA Limit		0.02	6.0	9.5	
ECA Objective		Non-detectable	6.5	8.5	
Within Compliance		Yes	Yes	Yes	
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes	Yes

Table 5 *Escherichia coli* Sampling

Month	Monthly Geometric Mean Density	Number of Samples
January	42	20
February	23	19
March	29	23
April	30	20
May	17	19
June	13	22
July	15	21
August	8	21
September	41	20
October	22	20
November	40	21
December	76	19
ECA Limit	200	52
ECA Objective	100	
Within Compliance	Yes	
Sampling Frequency Requirement Met		Yes

Table 6 Imported Wastewater Analyses and Septage Amounts

Month	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L	Total Phosphorus average conc. mg/L	York Septage Solids dry tonnes	Durham Septage Solids dry tonnes	Total Septage Solids dry tonnes
January	8,474	14,858	3,631.20	260.4	8.4	12.9	21.2
February	2,843	2,399	1,986.20	117.8	1.2	1.4	2.6
March	3,913	9,383	2,219.85	216.3	4.4	12.6	17.0
April	4,204	6,910	2,558.80	197.8	2.4	10.1	12.5
May	3,993	7,929	2,276.40	217.1	4.9	11.8	16.7
June	6,783	9,237	2,792.50	224.1	6.9	12.3	19.1
July	4,331	12,364	2,162.20	333.1	8.0	10.9	18.9
August	4,640	4,609	2,151.67	207.7	2.6	5.5	8.0
September	4,247	10,944	1,675.20	251.0	4.9	8.5	13.4
October	3,051	9,048	1,856.40	148.7	3.6	5.2	8.8
November	4,510	11,507	2,895.83	217.9	3.7	7.7	11.5
December	3,206	9,568	3,404.00	221.8	4.2	4.8	8.9
Total					55.0	103.6	158.6
Average	4,516	9,063	2,467.52	217.8	4.6	8.6	13.2
Sampling Requirement Frequency Met	Yes	Yes	Yes	Yes			

Table 7 Energy and Chemical Usage

Month	Ferric Chloride Litre	Sodium Hypochlorite kilogram as chlorine	Sodium Bisulphite Litre	Anionic Polymer kilogram*	Hydro kilowatt hour	Natural Gas cubic metre
January	652,236	19,236	18,027		5,124,619	473,082
February	630,374	16,196	15,866	9,000	4,966,294	361,835
March	672,406	19,205	19,625		5,394,189	356,033
April	623,913	19,833	19,919		5,263,720	256,119
May	655,702	19,594	19,443	9,000	5,460,298	53,951
June	692,153	20,127	19,070		5,246,970	10,002
July	691,076	20,280	19,721		5,356,982	124,912
August	663,256	19,237	19,922	9,000	5,651,324	221,721
September	663,111	21,648	21,823		5,218,395	97,643
October	726,696	22,076	22,232		5,405,777	170,430
November	638,146	19,973	21,026		5,136,132	348,662
December	647,263	20,896	22,511	9,000	5,308,128	437,527
Total	7,956,332	238,300	239,185	36,000	63,532,828	2,911,917

*based on amount purchased

Table 8 Summary of Sludge Produced and Imported

Month	Sludge produced from York Influent Solids dry tonnes	Sludge produced from Durham Influent Solids dry tonnes	Total Sludge produced from all Influent Solids dry tonnes	York Imported Solids dry tonnes	Durham Imported Solids dry tonnes	Total Imported Solids dry tonnes
January	2,268	517	2,785	0	443	443
February	2,106	463	2,569	0	503	503
March	2,335	501	2,836	0	524	524
April	2,137	499	2,635	0	550	550
May	2,262	503	2,766	0	260	260
June	2,469	538	3,007	0	208	208
July	2,693	609	3,302	0	154	154
August	3,198	680	3,878	0	149	149
September	4,676	1,040	5,692	0	138	138
October	2,574	594	3,167	0	147	147
November	2,442	547	2,989	0	150	150
December	2,336	545	2,882	0	485	485
Total	31,496	7,037	38,532	0	3,711	3,711

Table 9 Dewatering and Incineration Summary

Month	Average Feed Solids percent (%) Total Solids (TS)	Average Sludge Cake % TS	Average Polymer Dosage kilogram per tonne	Total Sludge Output dry tonnes	Dewatered Sludge Incinerated dry tonnes	Ash Produced by Incineration tonnes
January	2.3	26.0	8.0	2,263	1,755	627
February	2.3	25.4	8.2	3,019	2,529	824
March	2.4	25.6	7.8	3,005	2,384	850
April	2.4	25.2	7.6	3,179	2,465	889
May	2.4	25.5	7.9	2,844	2,542	919
June	2.5	26.3	6.9	2,477	1,805	646
July	2.3	25.2	7.6	2,721	1,890	864
August	2.2	25.6	7.7	2,916	2,339	914
September	2.4	26.3	6.9	2,261	1,854	785
October	2.1	24.9	8.0	2,797	2,490	1,039
November	2.1	25.1	8.0	2,684	2,285	737
December	2.2	24.9	8.4	2,765	2,358	825
Average	2.3	25.5	7.7	2,744	2,225	827
Total				32,931	26,696	9,919