TORONTO Water

ASHBRIDGES BAY WASTEWATER TREATMENT PLANT

2017 Annual Report

March 31, 2018

EXECUTIVE SUMMARY

The Ashbridges Bay Treatment Plant (ABTP) is one of four wastewater treatment facilities operated by the City of Toronto. This facility, located at 9 Leslie Street, has a rated capacity of 818,000 m^3/day, or 818 ML/day, and serves an equivalent population of approximately 1,560,400. The Ashbridges Bay Treatment Plant discharges into Lake Ontario and operates under Environmental Compliance Approval (ECA) Sewage No.8047-ABZNY9, issued on July 21, 2016.

The average daily flow rate in 2017 was 659.8 ML/day. Influent concentrations of Biochemical Oxygen Demand (BOD_5), Total Phosphorus (TP) and Total Suspended Solids (TSS) averaged 201.9 mg/L, 6.4 mg/L, and 279.5 mg/L, respectively.

Ashbridges Bay Treatment Plant achieved the following effluent quality and loading rates in 2017 in comparison to ECA limits:

	ECA[1]	2017 Secondary Treatment Effluent
Total Suspended Solids (TSS)	25.0 mg/L	5.2 mg/L
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	25.0 mg/L	4.1 mg/L
Total Phosphorus (TP)	1.0 mg/L	0.7 mg/L
Escherichia Coli (E. Coli)[2]	200 CFU/100mL	53 CFU/100mL
pH	6.0 - 9.5	6.8
TSS Loading Rate	20,450 kg/day	3,415 kg/day
$CBOD_5$ Loading Rate	20,450 kg/day	2,668 kg/day
TP Loading Rate	818 kg/day	458 kg/day

[1] Referenced from Condition 7 of ECA No. 8047-ABZNY9 issued July 21, 2016.

[2] Arithmetic mean of monthly geometric mean data.

During 2017, the biosolids generated at Ashbridges Bay were managed through agricultural land application, soil amendment use, pelletization, and mine reclamation. The total amount of biosolids generated at the plant in 2017 was 159,288 wet tonnes at an average of 27.9% total solids (TS). The biosolids generated met all the metal concentration requirements set out in O.Reg 267/03.

Ferrous chloride consumption for phosphorus removal was 7.04 tonnes as iron (Fe) per 1000 ML of wastewater treated. Polymer consumption in 2017 for waste activated sludge (WAS) thickening and sludge dewatering totalled 0.604 and 2.23 tonnes per 1000 ML treated, respectively. The total chlorine and sodium hypochlorite (12%) consumption for 2017 was 436.81 tonnes and 1132.52 m^3, respectively.

There were seven secondary treatment system bypass occurrences in 2017 where portions of the flow received preliminary treatment, primary treatment, and nutrient removal before being disinfected and discharged into Lake Ontario. Total bypassed flows were estimated to be 1,570 ML.

The plant continued with numerous capital projects. Notable projects included: tender of a new ultraviolet (UV) disinfection facility; design of a new influent pumping station; design of a new WAS thickening facility; design of a new plant outfall and construction of the outfall site clearing; construction of a new phosphorous removal facility; design of a dewatering polymer system; construction of P Building headworks upgrades; and construction of Digesters 9-12 upgrade. A variety of scheduled, preventative, predictive and reactive maintenance was performed, including annual calibration of effluent monitoring equipment.

Total annual consumption for potable water, hydro, and natural gas was 326,779 m^3, 131.7M kWh, and 6.8M m^3, respectively. The plant operating costs for 2017 totalled $57.7M. In 2017, the Ashbridges Bay Treatment Plant had 166 employees. As of March 31, 2018, there were six health and safety incidents and 70 lost time days due to work related injuries in 2017.

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GLOSSARY OF ABBREVIATIONS

AAC	Annual Average Concentration
ABTP	Ashbridges Bay Treatment Plant
BOD_5	Five-Day Biochemical Oxygen Demand
$CBOD_5$	Five-Day Carbonaceous Biochemical Oxygen Demand
CFU	Colony Forming Units
DAF	Dissolved Air Flotation
E. Coli	Escherichia Coli
ECA	Environmental Compliance Approval
Fe	Iron
HP	Horsepower
HRT	Hydraulic Retention Time
kg	kilogram
kWh	Kilowatt-hour
M	Million
MAC	Monthly Average Concentration
MGMD	Monthly Geometric Mean Concentration
MOECC	Ministry of Environment and Climate Change
MWh	Megawatt-hour
m3	Cubic metre
m3 /day	Cubic metre per day
mA	Milliamps
mg/L	Milligrams per litre
mL	Millilitre
ML	Megalitre
No.	Number
Q	Flow Rate
RAS	Return Activated Sludge
SBS	Sodium Bisulphite
SBS (P)	Sodium Bisulphite Presence
SS	Suspended Solids
TCR	Total Chlorine Residual
TP	Total Phosphorus
TRS	Total Reduced Sulphur
TS	Total Solids
TSS	Total Suspended Solids
TVS	Total Volatile Solids
TWAS	Thickened Waste Activated Sludge
µg/L	Micrograms per litre
UV	Ultraviolet
WAS	Waste Activated Sludge

Definitions

$$Percent\ Removal\ (\%) = 1 - \frac{Concentration\ (Final)}{Concentration\ (Initial)}$$

$$Aeration\ Loading = \left(\frac{kg\ cBOD}{m^3\ aeration\ capacity}\right) = \frac{(Q_{Primary\ Effluent} + Q_{RAS}) \times [cBOD_{5}{}_{primary\ effluent}]}{V_{aeration\ Tanks}}$$

$$Solids\ Capture\ (\%) = \frac{Centrifuge\ Feed\ TS - Centrate\ TSS}{Centrifuge\ Feed\ TS} \times 100$$

1. INTRODUCTION

The Ashbridges Bay Treatment Plant (ABTP) is one of four wastewater treatment facilities operated by the City of Toronto under the responsibility of the Wastewater Treatment section of Toronto Water. The facility is located at 9 Leslie Street, in Toronto's east end and also includes two raw sewage pump stations located north of Lake Shore Boulevard at 1091 Eastern Avenue. The Ashbridges Bay Treatment Plant services a sewershed of approximately 25,000 ha and an estimated connected population of 1,560,400; bounded by Steeles Avenue on the north, the Humber sewershed on the west, the Highland Creek sewershed on the east, and the lakeshore on the south. The plant also provides disposal of biosolids, including the biosolids that are generated and transferred from the Humber and North Toronto Treatment Plants. The Ashbridges Bay Treatment Plant has a rated capacity of 818,000 m3/day, or 818 ML/day

Major liquid treatment processes include screening and grit removal, primary treatment, secondary treatment, phosphorus removal, and effluent disinfection. Treated effluent is discharged to Lake Ontario. Solids handling processes include waste activated sludge thickening, sludge stabilization by anaerobic digestion, dewatering using high speed centrifuges and biosolids management. Numerous auxiliary systems are required for proper operation of plant processes and include: potable water, process water (i.e. "plant water"), heating, ventilation and air conditioning (HVAC), electrical power distribution, natural gas, chemicals, and instrument air.

The Ministry of the Environment and Climate Change (MOECC) has classified the Ashbridges Bay Treatment Plant as a Class IV wastewater treatment facility under Regulation 129/04. The facility operates under ECA No.8047-ABZNY9, issued on July 21, 2016.

This report is a summary of plant operations and performance in 2017. Highlights of the report include a discussion of effluent quality and summaries of process operations, maintenance, chemical and utility consumption, capital projects, operational costs and human resources.

2. PLANT PROCESS OVERVIEW

A description of the plant process is included below. A Plant process flow diagram is available in Appendix A. Additional information on the plant's process can be found on the City of Toronto website[1].

2.1. Influent

The Ashbridges Bay Treatment Plant treats wastewater flows from the Mid-Toronto, High Level, Low Level, and Lakefront Interceptor Sewers, as well as the Queen Street and Coxwell Avenue Trunk Sewers. The Mid-Toronto Interceptor flows are pumped to the plant via the Pumping Station known as "T Building". The High Level and Low Level Interceptor Sewers, and the Queen Street Trunk Sewer flows are pumped to the plant via the Pumping Station known as '"M Building". The Lakefront Interceptor Sewer flows are pumped to the plant via the M Building or the T Building. The Coxwell Avenue Trunk Sewer flows come to the plant by gravity. Once wastewater enters the plant, it flows by gravity through the plant's processes.

Influent to the Ashbridges Bay Treatment Plant also includes sludge flows received from the Humber Treatment Plant and the North Toronto Treatment Plant via the Mid-Toronto Interceptor and Coxwell Sanitary Trunk Sewer, respectively.

2.2. Preliminary Treatment

Raw wastewater enters the Headworks (known as "P" and "D" Buildings) for grit and screenings removal. The P Building has six aerated clam shell bucket type grit channels and six automatic bar screens. D Building has five mechanical screens and four aerated grit channels. The removed grit and screenings from P and D Buildings are hauled to a sanitary landfill site. Ferrous chloride is applied for nutrient removal (i.e. phosphorous removal) to the distribution conduits upstream of the aerated grit channels.

Throughout 2017, P Building was under renovation as the P Building Preliminary Treatment Upgrades Project was in construction.

2.3. Primary Treatment

Primary Treatment occurs in the Primary Clarification Tanks, where the flow velocity of the wastewater is reduced to allow heavier solids to settle to the bottom. There are 12 Primary Clarification Tanks. Sludge collectors in the tanks sweep the settled sludge, called "primary" or "raw"

[1] *https://www.toronto.ca/services-payments/water-environment/managing-sewage-in-toronto/wastewater-treatment-plants-and-reports/*

sludge, into sludge hoppers. Floating solids, called "scum", are collected from the top of the water and swept into scum hoppers. The primary sludge and scum are then pumped out for further treatment and the wastewater, called "primary effluent", continues onto secondary treatment.

2.4. Secondary Treatment

The primary effluent receives secondary treatment through a conventional, suspended biomass activated sludge process in the Aeration Tanks. The mixed liquor consists of primary effluent mixed with return activated sludge (RAS), which is removed from the Final Clarification Tanks and contains micro-organisms that naturally occur in wastewater and facilitate its degradation. In the presence of oxygen, these micro-organisms break down organic material in the wastewater. Air is supplied to the Aeration Tanks through 10 electrically driven blowers. There are a total of 11 Aeration Tanks that employ a step feed aeration process with four passes per tank. Aeration Tank No.1 and 3 – 9 are equipped with plastic disc coarse air bubble diffusers; Aeration Tank No. 10 and 11 are equipped with stainless steel coarse bubble diffusers; and Aeration Tank No. 2 is equipped with a mix of ceramic and membrane fine bubble diffusers.

The mixed liquor from the Aeration Tanks flows to 11 large Final Clarification Tanks, where the activated sludge is allowed to settle. A controlled quantity of this sludge is returned to the Aeration Tanks as RAS in order to maintain a sufficient biomass concentration. The excess is removed as waste activated sludge (WAS).

The plant has 10 Dissolved Air Flotation (DAF) Tanks to thicken WAS with the use of air and a thickening polymer, which is used as a coagulant. The plant also has the capacity to co-settle WAS from the Final Clarification Tanks in the Primary Clarification Tanks. At the DAF facility, incoming WAS first enters an inlet splitter box, dividing the inlet flow between the DAF tanks in operations. This splitter box also contains an overflow pipe which allows the excess WAS flow to return to the Aeration Tanks.

2.5. Final Effluent

Through operating and maintaining preliminary, primary, and secondary treatment processes, final effluent is treated to meet Condition 6(2)(c) of the ECA. Liquid chlorine is used to disinfect and kill pathogens in the final effluent. Sodium hypochlorite is also used for backup disinfection when the chlorine system is not available and to disinfect plant water for housekeeping.

The final effluent is discharged to Lake Ontario through an outfall pipe equipped with diffusers and extending approximately 1000 m into the lake from the shore. During periods of wet weather flows, the plant also has the capability of discharging final effluent through the seawall gates to prevent flooding.

2.6. Solids Handling

All primary sludge, thickened WAS (TWAS), co-settled WAS from the Primary Clarification Tanks, and scum from the Primary and Secondary Clarification Tanks, collectively called "sludge", is treated, handled and disposed of in a similar manner, consisting of anaerobic digestion, dewatering and then hauled or pelletized.

Anaerobic digestion is the biological degradation (stabilization) of organic materials in the absence of oxygen – it reduces volume of solids, destroys pathogens and mitigates sludge odour. The process produces digester gas, made up predominantly of methane. This gas is used as a supplementary fuel for plant needs, including process and space heating, thereby reducing the plant's operating costs and carbon footprint. The digesters are operated in the mesophilic temperature range (34 – 38^{o}C). The Digestion process at Ashbridges Bay Treatment Plant consists of 20 primary digesters.

The resulting anaerobically digested sludge, called "biosolids", is subsequently conditioned with a polymer and dewatered by centrifugation. Twelve solid bowl dewatering centrifuges are used to dewater the biosolids. The resulting biosolids "cake" is pumped either to the plant's Truck Loading Facility for haulage and disposal, or to the onsite pelletizer facility for further processing.

2.7. Solids Management

The dewatered biosolids are managed in a number of ways, including agricultural land application, third party process stabilization, pelletization, landfilling, and mine reclamation.

3. PROCESS SUMMARY

3.1. Process Parameters

In 2017, the Ashbridges Bay Treatment Plant continued to produce a high quality effluent. A summary of key secondary treatment effluent and final effluent parameters against the ECA objectives and limits are shown in Table 1. Regulated parameters are highlighted. Influent and effluent performance charts are available in Appendix B. Historical performance data is included in Appendix C.

Table 1: Effluent Parameters

Parameter	$cBOD_5$ (mg/L)	TSS (mg/L)	TP (mg/L)	Chlorine Residual (mg/L)	E. Coli (count/100mL)
Secondary Treatment Effluent					
January	4.3	5.3	0.6	0.5	76
February	4.5	2.9	0.8	0.6	65
March	4.6	4.8	0.8	0.6	123
April	6.4	5.8	0.8	0.6	21
May	5.3	7.0	0.5	0.6	50
June	4.0	4.7	0.6	0.6	32
July	3.5	5.1	0.6	0.6	35
August	2.3	4.8	0.5	0.5	28
September	3.3	4.8	0.8	0.5	12
October	4.1	5.5	0.8	0.5	60
November	4.0	7.3	0.9	0.6	119
December	2.6	4.6	0.8	0.6	10
Annual Average	4.1	5.2	0.7	0.6	53
Loading (kg/d)	2668	3415	458	N/A	N/A
Removal Efficiency[2] (%)	97%	98%	89%	N/A	N/A
Final Effluent					
Annual Average	4.1	5.4	0.7	N/A	N/A
ECA Requirements[1, 2]					
Final Effluent Objective[1, 3]	AAC: 25 mg/L	AAC: 25 mg/L	MAC: 1 mg/L	N/A	N/A
Secondary Treatment Effluent Objective[1, 3]	AAC: 15 mg/L	AAC: 15 mg/L	MAC: 0.9 mg/L	N/A	MGMD: 200 CFU/100 mL
Secondary Treatment Effluent Limit[1, 3]	AAC: 25 mg/L	AAC: 25 mg/L	MAC: 1 mg/L	N/A	N/A
Average Waste Loading Limit[1, 3]	20,450 kg/d	20,450 kg/d	818 kg/d	N/A	N/A

[1] Referenced from Condition 7 of ECA No. 8047-ABZNY9 issued July 21, 2016.

[2] The ECA effluent objective and limit for pH is 6.5 to 8.5 and 6.0 to 9.5 respectively, inclusive, at all times. Effluent pH in 2017 was within the required objective and limit.

[3]AAC refers to Annual Average Concentration, MAC refers to Monthly Average Concentration, and MGMD revers to Montly Geometric Mean Density

Influent and Final effluent concentrations of 10 select heavy metals have been included in Appendix D. Any discharge into City sewers must meet the sewer use By-law limits. Final effluent concentrations are presented to assess the treatment plant's removal capacity.

A summary of process parameters over the past three years are shown in Table 2.

Table 2: Process Summary

Parameter	Units	2017	2016	2015
Influent				
Flow	ML/day	659.8	549.8	585.2
Total Annual Flow	ML	240,817	201,229	212,831
Total Suspended Solids (TSS)	mg/L	279.5	318.6	334.6
Biochemical Oxygen Demand (BOD_5)	mg/L	201.9	244.6	274.9
Total Phosphorus (TP)	mg/L	6.4	7.5	7.5
Transfer from Humber TP: liquid biosolids	Dry tonnes/ day	80.1	67.4	74
Transfer from Humber TP: WAS	m^3/day	553	598	822
Transfer from North Toronto TP: sludge (primary sludge, WAS, and scum)	ML/day	0.40	0.48	0.3
Preliminary Treatment				
Grit and Screenings	Tonnes/day	5.5	5.7	5.6
Primary Treatment				
TSS	mg/l	142.9	123.9	233.3
cBOD5	mg/L	68.7	84.3	98.9
Secondary Treatment				
Aeration Loading	kg $CBOD_5$/ m^3/day	0.25	0.25	0.32
Mixed Liquor Suspended Solids	mg/L	2372	2643	2969
Flow through Seawall Gates	ML	3187	2004	2908
Solids Handling				
Primary Sludge Treated	m^3/day	5,640	6420	4440
Primary Sludge TS	%	2.5	2.6	3.0
Primary Sludge TVS	%	73.0	73.8	73.5
WAS co-settled in Primary Clarification Tanks or excess WAS to Aeration	m^3/day	1260	2130	12040
WAS to Thickening	m^3/day	7380	7360	8470
WAS TS	mg/L	0.7	0.7	0.8
TWAS Treated	m^3/day	1440	1600	2090
TWAS TS	%	3.7	3.4	3.3
TWAS TVS	%	73.2	71.6	71.0
Volume to Digestion	m^3/day	7080	8020	6530
Digesters Hydraulic Retention Time	days	20.2	18.1	23.3
Organic Loading to Digesters	TVS per m3 of digester capacity per day	0.9	1.1	1.0
Digester Gas Volume	m^3/day	61,640	62,330	64,560
Dewatering Centrifuge Feed TS	%	1.7	1.8	1.8
Dewatered Biosolids TS	%	27.9	28.1	27.7

Parameter	Units	2017	2016	2015
Centrate Quality	mg/L	299	319	665.32
Solids Capture Rate	%	98	98	96.44
Centrifuge Run Time	hours	52,400	52,329	48049

A 20% increase in plant flow over 2016 was the result of a greater amount of wet weather events and high lake levels. High lake levels contributed to greater plant flows as the lake entered the Low Level Interceptor though CSO points from lateral sewers, increasing the average flow through this interceptor and overall plant flow during the months of May to August 2017. As influent flow was increased by high lake levels, the influent parameters of TSS, BOD_5 and TP were diluted.

Overall WAS flow was reduced from 2016 by 40% as WAS is preferentially thickened rather than co-settled in the Primary Clarification Tanks. Overall, WAS rates were optimized to achieve high quality effluent.

In 2017, there was no abnormal events that resulted in abnormal operating conditions. Ashbridges Bay Treatment Plant continued to produce a high quality effluent which surpassed requirements of the effluent objectives as described in Condition 6 of the plant's ECA. This was achieved through continuous improvement in operations and maintenance of treatment processes, and infrastructure delivery.

3.2. Biosolids Management

In 2017, the daily average inflow to the Ashbridges Bay Treatment Plant was 659.8 ML/day. The flow projections for 2018 do not exceed the plant rated capacity of 818 ML/day and are expected to generate a sludge volume that will be +/- 5% of the given volume for 2017.

Concentrations of 11 select heavy metals in the biosolids are included in Appendix E and compared against the *Ontario Regulation 267/03 under the Nutrient Management Act*, which govern the maximum acceptable metal concentration in biosolids that are applied to land. The average metal concentrations met all criteria as designated in O.Reg 267/03.

Biosolids management from the Ashbridges Bay Treatment Plant in 2017 totalled 159,288 wet tonnes and was managed as follows.

3.2.1 Agricultural Land Application

A total of 32,653 wet tonnes of biosolids were sent to approved agricultural land application sites in Ontario. During the 2017 land application season, the City contracted an independent field inspector to monitor the practices of the City's land appliers. The independent field inspector observed the application of biosolids on numerous agricultural land sites in Ontario. The inspector was responsible for ensuring the Nutrient Management Act and accompanying Regulations were adhered to, site specific requirements were followed, and monitoring and recording of odour measurements were taken before, during and after application.

3.2.2 Third Party Process Stabilization (Soil Amendment)

In 2017, a total of 35,745 wet tonnes of biosolids was further processed off-site by licensed external biosolids service providers and used as a soil amendment.

3.2.3 Pelletization

The operation and maintenance of the facility and marketing of pellets is managed by an outside contractor. In 2017, 82,938 wet tonnes of biosolids were processed by the on-site pelletizer. Pellet quality in 2017 met the standards set out by the Canadian Fertilizers Act.

3.2.4 Landfill Management of Biosolids

A total of 0 wet tonnes was transported to landfill sites.

3.2.5 Mine Reclamation

A total of 7,952 wet tonnes of biosolids was utilized at mine reclamation sites.

Table 3 below summarizes the biosolids management methods utilized and the total amount of biosolids sent to each management option.

Table 3: Biosolids Management Methods

Biosolids Management Method	Wet Tonnes		
	2017	2016	2015
Agricultural Land Application	32,653	35,414	33,115
Third Party Process Stabilization (Soil Amendment)	35,745	37,968	37,515
Pelletization	82,938	72,886	71,911
Landfill	0	0	0
Mine Land Reclamation	7,952	3,465	2,780
Total	**159,288**	**149,733**	**145,321**

3.3. Chemical Usage

Several chemicals are used during the treatment process at the plant. Table 4 outlines the chemical consumption and cost based on 1000 ML of wastewater treated in the facility for the past three years. Costs listed are plus applicable taxes.

Table 4: Chemical Usage Summary

Process	Chemical	2017 Usage (/1000ML treated)	2017 Unit Cost	2016 Usage (/1000ML treated)	2016 Unit Cost	2015 Usage (/1000ML treated)	2015 Unit Cost
Phosphorus Removal	Ferrous Chloride as Fe	7.04 tonnes	$720/ tonne Fe	10.43	$720/ tonne Fe	9.11 tonnes	$720/ tonne Fe
Biosolids Dewatering	Polymer	2.23 tonnes	$3090/ tonne	2.73 tonnes	$3090/ tonne	2.29 tonnes	$3390/ tonne
WAS Thickening	Polymer	0.604 tonnes	$4160/ tonne	0.700 tonnes	$4160/ tonne	1.05 tonnes	$4160/ tonne

There was a 32% reduction in ferrous chloride consumption from 2016 as a result of process optimization improvements made to the control system for ferrous chloride dosing.

The total chlorine and sodium hypochlorite (12%) consumption for 2017 was 436.81 tonnes and 1132.52 m^3, respectively. There was a 21% increase in consumption of liquid chlorine and a 30% decrease in sodium hypochlorite because liquid chlorine was the primary disinfecting chemical in 2017. The increase in wet weather events and high lake levels also contributed to the increase in chlorine demand. The two disinfecting chemicals were used interchangeably during the course of the year to accommodate capital project related requirements. Chlorine was purchased at a cost of $190 per tonne, and sodium hypochlorite was purchased at a cost of $132 per m^3, plus applicable taxes.

3.4. Bypasses, Overflows and Spills

3.4.1 Bypasses

There were seven secondary treatment system bypasses in 2017, where portions of the flow received preliminary treatment, primary treatment, and nutrient removal before being disinfected and discharged into Lake Ontario. Each instance was reported to the MOECC Spills Action Center and recorded into the plant's monthly report. Secondary treatment system bypasses occur due to high wet weather flows that exceed the plant's secondary treatment capacity. In 2016, a year of relatively low precipitation, there were four secondary treatment system bypasses.

A summary of secondary treatment system bypasses occurring in 2017 is presented in Table 5. Secondary bypass resulted in a total annual bypass volume of 1,570 ML. Total precipitation in the Toronto area[2] was 784 mm in 2017, a 36% increase from 2016.

Condition 6(2)(e) of the plant's ECA sets an objective for Secondary Treatment System Bypass to be continuously disinfected during a bypass event with an average chlorine dose of 9 mg/L. Chlorine dose for April, June and July was less than the objective due to infrastructure limitations.

Table 5: Secondary Treatment System Bypass Summary

Date	Duration (hours)	Volume (m^3)	Average Chlorine Dose (mg/L)
January 10 - January 11, 2017	2.08	40,378	11
January 12, 2017	2.97	75,740	9
April 6, 2017	6.40	210,338	8
May 1, 2017	5.00	192,317	9
May 25, 2017	10.55	405,789	9
June 23, 2017	9.80	479,469	7
July 20, 2017	4.25	165,940	8

3.4.2 Overflows

There were no overflow events at the Ashbridges Bay Treatment Plant in 2017.

3.4.3 Spills

There were seven spill events reported to the MOECC in 2017. They are summarized in the table below.

Table 6: Summary of Spill Events

Date	Volume	Nature of event	Description
January 17, 2017	25L + 10-12L	Digested Sludge Spill	Release of 25L of washed digested sludge onto the asphalt street, and 10-12L of washed digested sludge into the catch basin by contractor.
March 13, 2017	50L + 20L	Digested Sludge Spill	Release of 50L of sludge onto the asphalt street and 20L of sludge into the catch basin
March 16, 2017	40 m^3	Digested Sludge Spill	Digested sludge spilled from a flushing connection valve on Digester No. 20 onto the roadway surrounding the digesters and into the nearby catch basin.

[2] *Adapted from http://climate.weather.gc.ca/historical_data/search_historic_data_e.html, Toronto City Station*

Date	Volume	Nature of event	Description
March 24, 2017	100L	Sanitary Sewage Spill	100L of sewage overflowed onto a grass area from a sanitary sewer pump at the Contractor Trailer park site due to sump pump failure.
May 1, 2017	20 m^3	Secondary Influent Spill	As a result of high storm water flow into the plant, the secondary influent channel discharged 20 m^3 to the surrounding road way and catch basins during a 15 minute period.
July 20, 2017	20 m^3	Raw Sewage Spill	As a result of extreme high storm water flows into the plant, the D Building diversion channel discharged approximately 20m^3 to the surrounding grass area.
September 26, 2017	30 L	Digested Sludge Spill	Approximately 30L of digested sludge spilled to a grass area in front of P Building due to a defective new hose coupling.

3.5. Complaints

The Ashbridges Bay Treatment Plant received six complaints related to odour and one complaint related to noise. All complaints were recorded, investigated by Toronto Water staff, and followed up with the complainant. After investigation, only two of the seven complaints received were determined to be plant related, which was promptly rectified. For additional information, please refer to Section 7.6 – MOECC/MOL Correspondence.

3.6. Effluent Quality Assurance or Control Measures

Analytical tests to monitor required parameters are performed by the Toronto Water Laboratory which is accredited to ISO/IEC 17025 by Canadian Association for Laboratory Accreditation Inc. Plant operation and performance is monitored by licensed plant technicians as well as by the facility management team. Standard Operation Procedures, emergency plans, equipment preventative and predictive maintenance, and a network of support staff, help ensure a rapid an effective response to issues, and maintain the high quality of the plant's effluent and biosolids.

3.7. Odour Reduction Plan

As per Section 22 of the ABTP Amended ECA – Air No. 3771-92NP7X issued January 15, 2015, a review of the Odour Reduction Plan summarizing the work progress in 2017, including odour and total sulphur reduction activities undertaken with associated reduction levels achieved, can be found in Appendix F.

4. CAPITAL PROJECTS

Under Toronto Water's capital program, the Ashbridges Bay Treatment Plant commenced or continued with the capital works projects and studies listed in Table 7 in 2017.

Table 7: Capital Projects

Project Name	Project Description	Project Stage (Dec 31, 2017)
Vacuum Truck Unloading	New location to unload vacuum trucks operating on site back into the Headworks.	Construction
Digester 9-12, I	Digester cleaning and minor upgrades in preparation for future upgrade contract.	Construction
Digester 9-12, II	Complete upgrade of Digester 9-12 cluster.	Design
Disinfection	New UV disinfection facility. Also includes new secondary west bypass conduits, plant water station upgrades, seawall substation upgrades, and seawall gate refurbishment.	Design
Integrated Pumping Station (IPS) Contract 1	Site preparation for future IPS contract.	Design
IPS Contract 2	Preliminary civil work for the future IPS.	Design
IPS Contract 3	Replacement of M&T pumping station with new Integrated sewage/wet weather flow pumping station located South of Lakeshore.	Design
Outfall	New plant outfall.	Design
Outfall Site Clearing	Preparation of worksite for new Outfall Project.	Construction
P Building	Preliminary treatment upgrades including grit, screenings, odour control, bypass and gallery. Also includes Chemically Enhanced Primary Treatment and replacement of Gallery 7, 8, and 9 primary sludge pumping equipment.	Construction
Phosphorous Removal	Replacement of existing ferrous chemical gallery with new ferrous chemical facility.	Construction
Polymer Upgrades	Replacement of dewatering polymer system, dewatering centrifuges, upgrades to sludge feed system, centrate storage, as well as the WAS polymer system.	Design
Project Management Office	Renovation of the old administration building to include a new project management office.	Design
Rugby Field	Relocation of Rugby Field.	Design
Thickening	New WAS thickening facility using centrifuges and overhaul of South Substation.	Design
Thickening – Temporary Hypo	Temporary sodium hypochlorite disinfection upgrades.	Construction
Truck Loading Facility Biofilter (TLF)	Replacement of TLF biofilter; new pelletizer up blast fans; conversion of scrubber building into workshop and admin space. Includes upgrades to TLF facility.	Construction
Waste Gas Burners	Replacement of Waste Gas Burners.	Construction
Air Header Painting	Recoating of above ground aeration air header.	Design
Blower Building Upgrades	Upgrades to blower building admin space and stores.	Design

Project Name	Project Description	Project Stage (Dec 31, 2017)
Digester 14 Cleaning	Cleaning program for Digesters 13, 14 and 16. Additional digester clusters to follow.	Construction
Digester 13 and 16 Cleaning	Cleaning program for Digesters 13, 14 and 16. Additional digester clusters to follow.	Design
RPU Upgrade	Upgrade of all RPUs to new standard.	Design
TAB ECAP 03 and 05	Electrical upgrades in blower building and aeration gallery.	Construction
TAB ECAP 04	Electrical upgrades in North Substation.	Construction
Z Building Heat Conversion	Conversion of all steam loads in Z Building to hot water.	Construction
Facility Condition Assessment	Assess life and condition of facilities onsite.	Design
Process Road Map	Process planning for the future of Ashbridges Bay Treatment Plant.	Design

5. MAINTENANCE

Staff from the Ashbridges Bay Treatment Plant performed a variety of scheduled, preventative, predictive and reactive maintenance on a diverse spectrum of equipment. Equipment availability and reliability ensures operational requirements are achieved.

The annual calibration and maintenance records of flow meters, automatic samplers and on-line analysers for regulated parameters was completed in 2017, and found to be within acceptable limits. A summary of effluent monitoring equipment calibration and maintenance performed in 2017 is included in Table 8.

Table 8: Summary of Effluent Monitoring Equipment Calibration and Maintenance

Calibration and/or Maintenance Record	Completion Date
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: cleaning of flow indication transmitter sensor	January 24, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: offset correction for the water level for flow transmitter	January 24, 2017
South Secondary Effluent Auto-sampler Repaired	February 10, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004:: cleaning of flow indication transmitter sensor	February 28, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004:: offset correction for the water level for flow	March 02, 2017
pH Analyzer: TAB-DIS-AIT-3003, -3006 Calibrated	April 10, 2017
South Secondary Effluent Auto-sampler Inspected	April 22, 2017
East Bypass Auto-sampler Repaired	May 04, 2017
Online Chlorine Analyzer (CL 17) (S/N-131200489314) - North - Calibrated	May 29, 2017
Online Chlorine Analyzer (CL 17) (S/N-131200489314) - North - Repaired	May 29, 2017
Online Chlorine Analyzer (CL 17) (S/N-131100488310) - South - Calibrated	May 29, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: offset correction for the water level for flow	June 09, 2017
North Secondary Effluent Auto-sampler Adjusted	July 25, 2017
South Secondary Effluent Auto-sampler Serviced	July 26, 2017
West Bypass Auto-sampler Tested	August 02, 2017
West Bypass Auto-sampler Adjusted	August 17, 2017
Chlorine Gas Detection Sensors Calibrated	August 17, 2017
West Bypass Auto-sampler Calibrated	August 18, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: cleaning of flow indication transmitter sensor	August 28, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: offset correction for the water level for flow	August 28, 2017
pH Analyzer: TAB-DIS-AIT-3003, 3006 Calibrated	October 10, 2017
pH Analyzer: TAB-DIS-METR-3009 Calibrated	October 10, 2017
pH Analyzer: TAB-DIS-METR-3018 Calibrated	October 10, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: cleaning of flow indication transmitter sensor	November 09, 2017

Calibration and/or Maintenance Record	Completion Date
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8003, -8004: offset correction for the water level for flow	November 09, 2017
Secondary Treatment Effluent Flow Meters TAB-STR-FIT-8004: calibration of conduit flow indication Transmitter	November 29, 2017

The Ashbridges Bay Treatment Plant's eight work areas include all major and auxiliary processes. The following is a summary of significant maintenance activities completed in 2017; these are considered to be maintenance and/or minor modifications as per Conditions 10(6)(c) of the ECA. Under condition 10(6)(j) of the ECA, relating to Limited Operability Flexibility, no Notices of Modifications to Sewage Works were submitted to the Water Supervisor, the MOECC, as no work performed in 2017 fell under Schedule B of the ECA.

5.1. Preliminary and Primary Treatment (Work Area 1)

Work Area 1 includes two raw sewage pumping stations (M and T Buildings), preliminary treatment areas (P and D Buildings), and three primary treatment areas (Primary Clarification Tanks No. 1 to 6, Tanks No. 7 to 9, and Tanks No. 10 to 12). The following maintenance was completed in 2017 for Work Area 1.

Regular Scheduled (WMS) Maintenance Work Completed:

- Air compressor inspections carried out
- Auxiliary portable sump pumps inspection and start up
- Biofilter Fan inspection and maintenance
- Primary bridge wheel lubrication and inspection
- Busbar/MCC Panel single line diagram update inspection
- Charcoal filter inspection for Biofilters
- Classifier inspection and maintenance
- Washer compactor inspection and maintenance
- Primary scum collector gearbox lubrication
- Combustible Gas Detectors and Alarm tests
- Grit Tank and Channel Blowers inspection and maintenance
- Oil analysis of raw sewage pumps in M and T Buildings
- Perforated Plate Screen inspection, maintenance and lubrication.
- Lubricated Bar Screen Sprocket – Wheel and Chains
- Screw Conveyor inspection and maintenance
- Submersible pump inspection and maintenance
- Exercised and inspected sluice gate valves throughout work area

Process Specific Maintenance Projects:

M Building

- Repaired VFD on pump No.4
- General upgrades on M Building pumps and associated equipment to extend life of pumping station until new Integrated Pumping Station is built

T Building

- General upgrades on T Building pumps and associated equipment to extend life of pumping station until new Integrated Pumping Station is built

P, D and OPS Building

- Overhauled screw conveyors for grit tanks No.13, 14 and 15 in D Building
- Repaired VFD for P-3209 in D Building
- Overhauled broken frame on primary bridge No.11 in D Building
- Installed anti-derailing devices on tanks No. 10, 11 and 12 in D Building
- Overhauled an older sampler in D Building
- Installed new odour control units on OPS tanks
- Overhauled the Vogelsang grinder in D Building
- Replaced one old Rotork actuator with an AUMA actuator
- Overhauled one chemical dosing pump for ferrous chloride in D Building
- Overhauled perforated screen No.4 machine's inlet gate in D Building
- Replaced and installed three compactor screws in D Building
- Modified screw conveyors in D Building

General Area Maintenance Projects:

- Retrofitted existing lights on OPS tanks to LED type
- Retrofitted existing lights on D Building Primary tanks to LED type

5.2. Secondary Treatment (Work Area 2)

Work Area 2 includes eleven Aeration Tanks, eleven Final Clarification Tanks, and the Plant Water System. The following maintenance was completed in 2017 for Work Area 2.

Regular Scheduled (WMS) Maintenance Work Completed:

- Annual blower lubrication
- Daily plant water pump and piping inspection
- Weekly D.O. online analyzer cleaned
- Bi-annual blower motor winding analysis completed
- Daily ferrous chloride dosing system inspection
- Quarterly sump pump inspections

- RAS Pump Lubrication PM
- Routine blower inspections
- Weekly Standby generator inspection
- Completed clarifier collection mechanism yearly inspections
- Odour control system – routine lubrication

Process Specific Maintenance Projects:

- Overhauled collector mechanisms on final clarifiers No.5, 10, 11
- Replaced VFD on Odour Control Fan No.10
- Overhauled heat exchanger on blower 4004
- Repaired couplings on process header "A"
- Installation of Plant Water filter on blower cooler line
- Structural Concrete upgrade at STR-G-0001
- Lubrication system Leak Repairs for BL 4008

General area maintenance projects:

- Repaired various pipe and pump leaks/plugs throughout work area 2
- Workshop upgrades (New workbench/grinder installation)
- Lighting Upgrades in work area 2 storage shed and basement

Safety projects:

- Annual fall arrest equipment inspection/certification
- Installation of actuator chains for difficult to reach valves within the work area
- Lighting upgrades outdoor/unloading area and the filter room
- Sink and drainage repairs in washrooms
- Oil storage area organization

5.3. Dewatering (Work Area 3)

Work Area 3 includes the Centrifuges, Schwing Silo Pumps, Polymer/Sludge Feed Pumps and all electrical control equipment for dewatering operations. The following maintenance was completed in 2017 for Work Area 3.

Regularly Scheduled (WMS) Maintenance Work Completed:

Schwing Pumps:

- All discharge valves inspected and exercised
- All lubricators inspected and greasing
- All electrical sensors inspected

Sludge centrifuges:

- Centrifuges maintenance
- Overhauled centrifuges when it reached 8000 running hours
- All lubrication pumps inspected and oil sampling completed
- All bearings monitored

Sludge feed and polymer feed pumps:

- All grinders inspected
- All feed pumps inspected
- All check valve inspected
- All Shut-up valves inspected and exercised
- All float meters inspected
- All level sensors inspected
- All Odour systems inspected

Process Specific Maintenance Projects:

Electrical Safety/Control/Process related improvement projects:

- Completed polymer transfer pumps automation project
- Completed sludge density meter upgrades and automation project in basement
- Replaced existing polymer flow meter for centrifuge No.5 with new unit
- Setup a standard method to verify polymer feed flow and sludge feed flow on twelve centrifuge units
- Installed two 100A power supply stations for hot water power washer
- Modified Basement Plant Filter Room Sump Pump control logic to enable "Duty Switching Function" between two Sump pumps

Schwing Pumps Improvement Projects:

- Silo sliding frame upgrade (two Silos)
    - Installed new guides with a clearance of 1/16''
    - Installed Chesterton seals, being monitored to compare with Schwing seals
    - Machined and installed new gland guide.
    - Machined and installed a new brass bush.
- Installed a new six inch polymer Line 3 for polymer day tank, this created a dedicated line per tank
- Installed two Schwing pump poppet units on Schwing pump No.3 and 4
- Overhauled four poppet unit housing
- Installed two new sludge cake line lubricating pumps
- Installed filters and seals for plant water filter systems
- Installed new hydraulic pump on Schwing pump No.1 Hydraulic power unit.
- Serviced one hydraulic pump and kept it as a spare resource
- Installed new hydraulic power unit solenoid valve and temperature sensors

- Completed all assigned PMs within the works management system

Centrifuge Improvement Projects:

- Centrifuge 1 major overhaul; replaced broken spline shaft, replaced conveyor, bearings and gearbox
- Centrifuge 2 major overhaul; conveyor and bowl was sent out for balancing and overhaul, replaced conveyor bearings, all drive belts,
- Centrifuge 3 major overhaul; replaced gearbox, stub shaft, bearings and back drive belt
- Centrifuge 6 major overhaul; replace conveyor, bearings, new sealing ring and bearing cover.
- Centrifuge 9 major overhaul; conveyor and bowl was sent out for balancing and overhaul, replaced all pillow block bearings and seals, gearbox and all drive belts
- Modified flushing lines on centrifuge cake chutes to facilitate easy flushing in the event of a blockage, completed on centrifuges No.1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12

Sludge Feed and Polymer Feed Pumps Area Improvement Projects:

- Replaced two plug valves in Sludge Transfer Lines for Sludge Holding Tank No.1
- Replaced two plug valves in Sludge Transfer Lines for Sludge Holding Tank No.3
- Replaced Polymer Feed Pumps No.3, 5, 7, 11
- Replaced Sludge Feed Pumps No.9, 12
- Flushed all Polymer Feed lines
- Removed Sludge Feed Interchange Line between Pumps No.9 and 10
- Removed Sludge Feed Interchange Line between Pumps No.11 and 12
- Modified discharge line for Sludge Feed Pumps No.9, 10, 11, 12
- Repaired leak in the polymer line from polymer mixture storage tank No.1 and 2 to polymer day tank and modified for future smoother operation
- Modified Sludge Density Meter
- Cleaned and flushed sludge sampling lines from each sludge feed pumps
- Replaced drive unit for polymer mixer tank No.3, 6
- Cleaned Polymer Mixer Tank No.3 and flushed its lines
- Emptied and cleaned Equalization Tanks No.1, 2
- Emptied and cleaned Sludge Holding Tanks No.1, 2, 3
- Replaced media in odour control scrubbers for Sludge Holding Tank No.1, 2, 3
- Replaced media odour control scrubbers for Equalization Tank No.1, 2
- Modified Polymer Transfer Pump No.1 and 2, and replaced pulleys

General Area Maintenance Projects:

- Connected city water to all eye wash stations
- Replaced Sump Pump in New Plant Water Filtration Room and replaced both check valves
- 5S programme initiative; drew up the plan and organized work sites

- Installed four new lock-out stations throughout work area
- Installed two additional eyewash stations in Dewatering building.
- Wired all eyewash stations to triggered alarms to SCADA system when activated
- Repaired lighting system through dewatering building
- Installed motion sensors in particular areas to extend lighting device's lifetime and to save energy

5.4. Solids Handling (Work Area 4):

Work Area 4 includes Disinfection, the Biosolids Storage Silos, Sludge Cake Transfer Pumps, Truck Loading Facility and Biofilters, Odour Control Building, and maintenance for the Lab Building. The following maintenance was completed in 2017 for Work Area 4.

Regular Scheduled (WMS) Maintenance Work Completed:

Schwing Pumps – KSP 80 – Biosolids Transfer Pumps

- Regular lubrication and inspection task for Schwing pumps No.1, 2 and 3
- Power pack oil cooler annual maintenance (6x)
- Material rams replacement every 1000 hours on three pumps

Chlorine Building

- Cleaning of Evaporators No.2, 6, 8; water bath and sent out Cl2 pressure vessel for Hydrostatic testing/certified (5 years).
- Overhauled Chlorinators No.2, 4, 8

Process Specific Maintenance Projects:

Schwing Pumps – KSP 80 – Biosolids Transfer Pumps

- Schwing Pump Screw feeder main gear box overhaul
- Re-design and installation of new style Chesterton packing on Screw feeder stuffing box
- Schwing Pump Transition gear box overhauled
- Differential cylinder repair and assembly (3x)
- Power pack hydraulic oil replacement
- Sliding frame's hydraulic cylinder replacement (2x)
- Replace extension rods on silo's sliding frame
- Re-design and installation of new style packing on sliding frame's stuffing box

Chlorine Building

- Replacement of "crack" PVC pipe section for EAST Cl2 solution downstream pipe.

Sodium Hypochlorite (NaOCl) Dosing System –NaOCl pumps

- Replaced worn pump support for chemical metering pumps

- Modified downstream PVC pipe to enable NaOCL to fill up the two 1,000 liters totes for North/ South Final effluent channel
- NaOCl Bypass area – Temporary Bypass –Staged NaOCl Tanker
- NaOCl Bypass manifold assembly, fabrication and installation of PVC manifold for 2" & 2 ½" flowmeters for NaOCl tank car
- NaOCl support frame fabrication

Major Electrical Work:

Biosolids SCADA Sequence Improvement – Scale hauler registration to SCADA – Schwing Pump Discharge Pressure Display

- Worked with engineers and PCS people to resolve remained issues regarding Sequence Change in Biosolids system program.
- Worked with engineers and PCS to implement new data transfer system regarding Truck Weigh Scale loading information to SCADA. It bypassed and cleared the old system issues through PLC Profibus. Operations can read reliable and accurate loads data on SCADA.
- Added discharge pressure transmitter for Schwing pump No.2

Final Effluent Disinfection – NaOCl dosing pumps

- Built an Emergency Power Transfer Control Panel for sodium hypochlorite disinfection dosing pumps. For backup power in the event of Hydro power outage.

Truck Load Facility

- Replace all worn solenoids on Pneumatic Valves (36)
- Replace 3 of Chain wheel supporting beams from angle to square tube
- The supporting beams for chain wheels was 20 feet angle with welded on bracket to support the chain wheel pillow blocks (bearing inside). These angles are supported by the threaded rods hanger attached to the reinforced structure I beam of Hopper.

General Area Maintenance Projects:

- Inventory of all lifting devices in WA4

5.5. Digestion, Air Flotation, and Bio-Gas (Work Area 5)

Work Area 5 includes twenty Anaerobic Digesters, ten DAF tanks and three Waste Gas Burners. The following maintenance where completed in 2017 for Work Area 5.

Process Specific Maintenance Projects:

DAF (Air Flotation):

- Tank No.4: overhaul completion including chain jig fabrication and installation of new skimmer, drive and idler shafts.

- Tank No.6: major repairs to worn skimmers and chain, new skimmers drive shaft with BRG
- Tanks No. 2, 6, 8: Recycle pump overhaul/rebuild/installation
- Polymer transfer pump No.5: modify pump suction, inter connection to tank No.1 and 2
- Polymer powder feeders No.2 and 3: fabricate and install new auger and screw shafts
- Tank No.8: manufacturing of replacement components for rebuilding tank in 2018
- TWAS Pumps No. 1, 5: rebuilt/installed, modified coupling drive assembly
- TWAS Pumps No.2, 6: Rebuilt/installed, modified coupling drive assembly
- TWAS Pumps No.2, 5: rebuilt/installed gearbox, re-designed mechanical seal assembly
- TWAS to Digesters No.13-16 and 19-22: flowmeter replaced and by-bass line retro fit

Digestion:

- Digester No.4: recirculating pump rebuilt/installed, modified mechanical seal
- Digester No.4: Mixing pump complete overhaul and modified mechanical seal
- Digester No.13: Manometer retrofit, upgraded seals and o-rings.
- Digester No.13: Recirculating pump retro fit (gauge and valves)
- Digester No.14: Manometer retrofit
- Digester No.6, 8: Mixing pumps overhaul/rebuilt /installed
- Digester No.10, 12: Implement new modify nitrogen purging procedure. Shutdown and complete isolation.
- Digester No.13, 15: recirculating pump rebuilt/installed. Modify mechanical seal.
- Digester Cluster No.13-16: Removal/Installation of 10 x (8'') knife gate valves on RAW-1 and RAW-2, mechanical rebuild of Gas mixing compressors No.2 and 5

Electrical/Instrumentation Upgrades:

- Digester No.1 to 8: Complete upgrade of heating loop system; modified system from manual control to automatic. Calibration of heating loop modulating valves.
- Digester Cluster No.1-4: replaced gas flow meter (sensor and receiver unit)
- Flotation tank No. 2, 5: Installed new AC high torque motor with VFD and associated controls
- Ongoing overhaul of the pneumatic air switches Digester No.13-16 and No.19-22. Switches are failing due to age of "o-rings". (Continued from 2016)
- Gas mixing compressors No.2 and 5: modify/replace flow and temperature limit switches. Modify control panel.
- Assisted with the transfer of all loads to the new generator back up panels, commissioning and testing of generators.
- Calibration and tested heating control loops Digesters No.1-8. Documented and verified calibration with outside contractor.
- Sump pumps in Digesters No.1-4 and No.5-8 upgrade pumps discharge install new automatic float controls.

- Replaced two of the process sump pumps Digesters No.13-16 west side with brand new Flight sump pumps and floats.
- Sub-basement "Z" building: replaced both sump pumps with new Flight pumps.
- Repair lighting in "M" tunnel with new ballasts and lamps.
- Upgraded gas sensors Digester No.13-22.
- Repaired and replaced lighting fixtures Seawall tunnel west side.

Trailer Park:

- Install two "E-One" Duplex Station Sewer System
- Modify control panel, install new level switches LIT and LHH.

Gas Control Building:

- Compressor No.2: 400 HP Electric Motor completely overhaul mechanical/electrical. Stator was rewind, RTD's install, new bearings install.
- Compressor No.1: 400 HP Electric Motor completely overhaul mechanical/electrical .RTD's install to protect bearing from overheating.
- Compressor No.3: 400 HP Electric Motor completely overhaul mechanical electrical .RTD's install to protect motor from overheating.
- Compressor No.2: complete overhaul by WA-5 Staff.

5.6. Boilers, Air Compressors, and HVAC (Work Area 6)

Work Area 6 includes the plant-wide hot water system, heating, ventilation, and air conditioning (HVAC), and instrument air compressors (Auxiliary Building). The following maintenance was completed in 2017 for Work Area 6.

Regularly Scheduled (WMS) Maintenance Work Completed:

HVAC, Steam, Plant Service Air & Hot Water System:

- Most of Work Area 6 equipment's schedule on WMS and completed in required time frame
- Centrifuge process chiller system maintenance and repaired as required
- Plant wide HVAC system maintenance and repaired as required
- Continues routine overhaul and maintenance of hot water circulating pumps such as primary loop pump, No.3 boiler feed pump, Digesters No. 13 to 16, 19 to 22, and 1 to 4 sludge heating circulating pump, and ventilation fans and all auxiliary equipment.
- M and T building Boilers maintenance done as per annual maintenance.

Process Specific Maintenance Projects:

HVAC, Steam, Plant Service Air & Hot Water System:

- Cooling unit for VFD in M building replaced complete unit.
- T building cooling unit condenser replaced

- Cooling units are replaced in Z building bell room, Work Area 5 office, De-watering MCC room, Dewatering workshop, Digester No.19 to 22 MCC room, Blower building computer room in basement, Lab building, and in Biosolid MCC room.
- One of the Domestic hot water tank cleaned, reline and replaced anode protection.
- Z building office cooling roof top unit VFD replaced.
- Installed two new 12" valves in tunnels to hot water feed to Digesters No.13 to 16 sludge heating.
- Replaced 16" check valve connect secondary and primary loop in the boiler room.
- Boilers shut down and drained loop to install valves in Z building basement to installed new isolation valves for new HVAC upgrade project.
- Hot water loop in the sea wall tunnel shut down to install isolation valves for Waste gas burner project.
- Regular safety inspection and testing done on all boilers, gas streams and all associated equipment.
- Hot Water Boiler No.1, 2, 3, 4 and 6 Isolation valves are exercised and tested for leaks.
- Pressure tested and calibrations done on necessary safety relief valves as per TSSA requirement.
- New Air compressors operate according to warranty condition and maintain.
- Auxiliary building and in I tunnel all sumps pumps are renewed, repaired and tested.
- Boiler No.4 commissioned and run as per warranty
- Installed a tribble duty valve on hot water boiler No.4.
- Fixed leak on glycol system, steam, and on hot water piping.
- Replaced heat exchanger and piping in dewatering building.
- Replace some of leaking heat exchangers and re-locate in hypo room in plant water building.
- Steam boilers burner removed and cleaned inside**,** tested performance of steam system.
- Boiler #2 panels removed and inspected waiting for repair panels with new SS plates.
- Repaired leaking cooling water at Z building roof chiller.
- M and T building hot water system pumps overhaul and fixed leaking pipes.

Instrumentation:

- All boiler instruments calibrated, air-fuel ratio adjusted, and damaged instruments replaced.
- Calibrated water softener system and replaced damaged instruments.
- Overhauled and calibrated feed water to steam boilers and all steam regulators.
- Boiler flue gas analyser calibrated.
- Boiler #4 SCADA system fixed as per operational needs.
- MSA gas detection system calibrated in the boiler room.
- Calibrated and replaced three way valves
- Calibrated and repaired all portable gas detectors

5.7. Consumables, Mechanical and Welding, Grounds Keeping and Licensed Vehicles (Work Area 7)

Work Area 7 includes consumables, mechanical and welding, grounds keeping, licensed vehicles, and maintenance for the Training Centre. The following maintenance was completed in 2017 for Work Area 7.

Regular Scheduled (WMS) Maintenance Work Completed:

- Inspected and overhauled all overhead cranes including lifting devices
- Inspected, overhauled and completed preventative maintenance on all fork lift vehicles including Gators, Kubotas, Polaris and Bobcat.
- Preventative maintenance done on all licensed vehicles in the plant
- Rail tracks in the plant inspected and rail tracks ties renewed as required
- All backflow preventers are tested annually, maintaining city legislative records
- Inspected, tested and repaired all elevators to meet TSSA compliance throughout the Plant
- Inspected and tested all fire alarm systems throughout the plant, replaced where required Ensure all entrance gates are functioning at all times
- Maintained catch basins throughout the plant and organized cleaning as required
- Snow removal executed as required
- All windsocks and flags in the plant inspected and replaced torn ones
- Waste oil storage areas maintained and oil shipped off site using a licensed vendor

Process Specific Maintenance Projects:

Machinist Fabrication

- Fabricated return pump wear rings for WA-2
- Fabricated Schwing pumps dog bones couplings for WA-4
- Fabricated gearbox shafts for WA-3
- Fabricated bridge wheels and shafts for WA-8
- Fabricated drive shaft distant bushings for WA-4
- Fabricated check valve flappers for WA-3
- Fabricated coupling for Gas Control Building – WA-5
- Overhauled sump pumps for all work areas

General Area Maintenance Projects:

- Developed tailgate for all RTVs.
- All overgrown vegetation was removed from between the channels in the aeration tanks, overgrown trees were pruned within the plant and around the perimeter of the plant

- To improve building appearance, the re-painting and repair of the supports for the coverings of the walkway from the security house along the western side of primary tank #12 and cross beams along the roadway that have limitation signs that help improving safety
- Developed water shutdown procedure to the requirements of water services shutdown
- Spill response program developed with trained team and equipment
- Identified items and areas in the machine as per 5S program.

5.8. Electrical Department (Work Area 8)

Work Area 8 includes all non-process related electrical activities, such as Main Substations, Mobile Generators, Standby Generators, office and grounds lighting, and electrical aspects of grounds maintenance. The following maintenance was completed in 2017 for Work Area 8.

Regularly Scheduled (WMS) Maintenance Work Completed:

- Carry out maintenance of BUS A at North Substation
- Carry out Generator bus maintenance for the Mo-Gens
- Transformer oil sampling and testing
- Ultrasonic and IR testing of cables to the M & T buildings
- Carryout bi-annual maintenance on Mobile Generators (Mo-Gens)
- Carryout bi-annual maintenance on Standby Generators
- Implemented IR scanning program in the various work areas.

Process Specific Maintenance Projects:

- Upgraded the lights in the south parking lot from regular High Pressure Sodium Vapour to LED lighting.
- Upgraded the lights on all the roadway in plant from regular High Pressure Sodium Vapour to LED lighting.
- Upgraded the exterior lights along the fence area of the Gas Control Building from regular High Pressure Sodium Vapour to LED lighting.
- Installed 13 new phone lines and cables in the “D” Building of Work Area 1.
- Emergency repair on BUS 1502.
- Repaired Transformer No.4 oil leak at the North Substation.
- Overhauled the ATS at the Pelletizer.

6. UTILITIES

A summary of monthly utility consumption for the previous three years at Ashbridges Bay Treatment Plant is provided in Figure 1. Table 9 below summarizes the total cost and average unit cost for water, hydro, and natural gas. Total annual consumption for potable water, hydro, and natural gas was 326,779 m^3, 131.7M kWh, and 6.8M m^3, respectively.

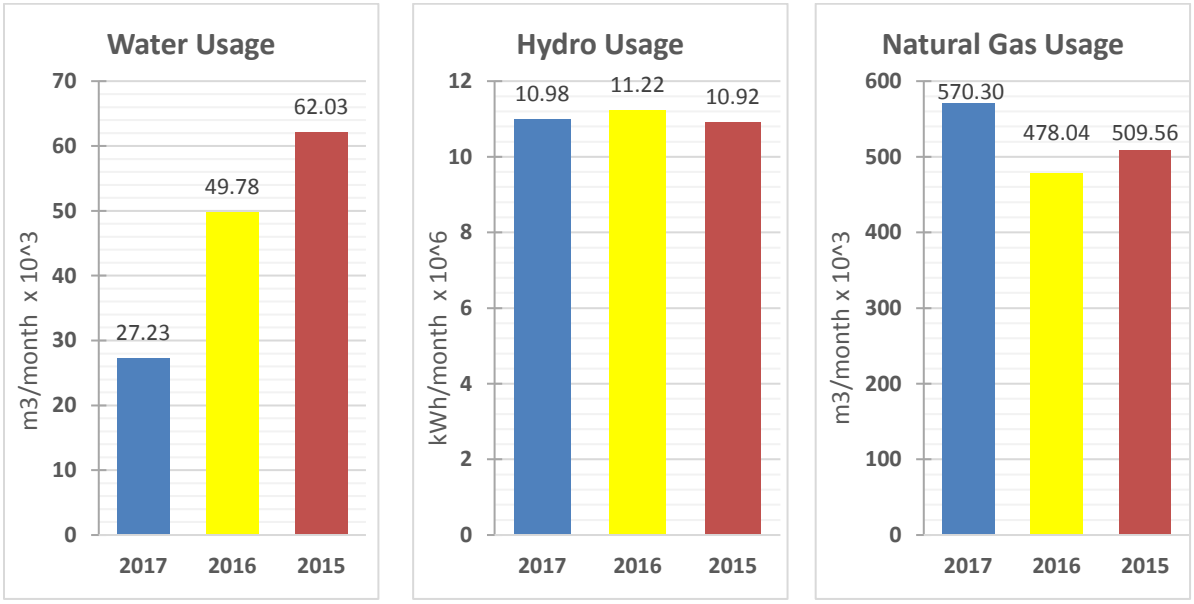


Figure 1: Monthly Utility Consumption (Water, Hydro, Gas)

Table 9: Average Unit and Total Utility Cost

Utility	2017	2016	2015
Water Unit Cost ($/$m^3$)	3.81	3.62	3.32
Water Total Cost ($/year)	1.24 M	2.17 M	2,47 M
Hydro Unit Cost ($/kWh)	0.10	0.10	0.10
Hydro Total Cost ($/year)	12.88 M	13.74 M	12.51 M
Natural Gas Unit Cost ($/$m^3$)	0.24	0.24	0.26
Natural Gas Total Cost ($/year)	1.63 M	1.35 M	1.57 M

There was a 45% decrease in the measured potable water consumption, a 2% decrease in hydro consumption, and a 19% increase in natural gas consumption. The reduction of potable water use is associated with a series of plant services projects for water conservation. The most notable projects include installing plant water filters for the polymer makeup system in the Dewatering Building, which will allow the use of plant water for polymer make-down; Silo Building Operation Optimization; and the Service Air Compressor Project. The increase in natural gas consumption is associated with the increase in the pelletizer production.

7. ADMINISTRATION

7.1. Operationions and Maintenance Costs

The 2017 plant operational costs are broken down into five categories: Salaries and Benefits, Materials and Supplies, New Equipment, Services and Rents, and Inter-Divisional Charges. Materials and Supplies is further segregated into Utilities, Machine and Equipment Parts, Chemicals and Other Materials and Supplies. A breakdown of annual operations and maintenance costs for the past three year is illustrated in Figure 2 . Overall, operations costs decreased by 2.3% from 2016.

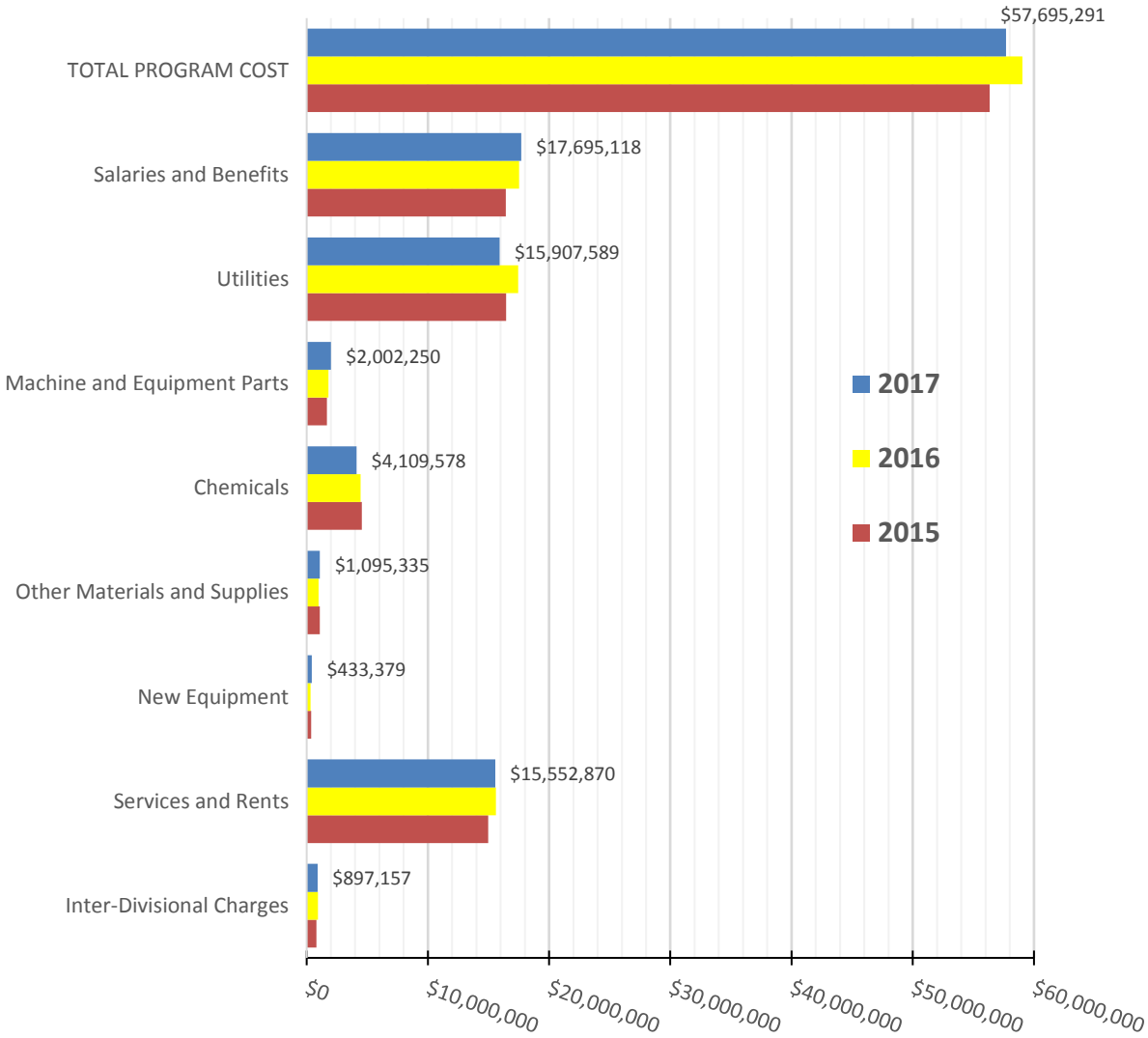


Figure 2: Operations and Maintenance Cost Breakdown

7.2. Human Resources

Plant Staffing at the Ashbridges Bay Treatment Plant in 2017 is shown in Table 10.

Table 10: Plant Staffing

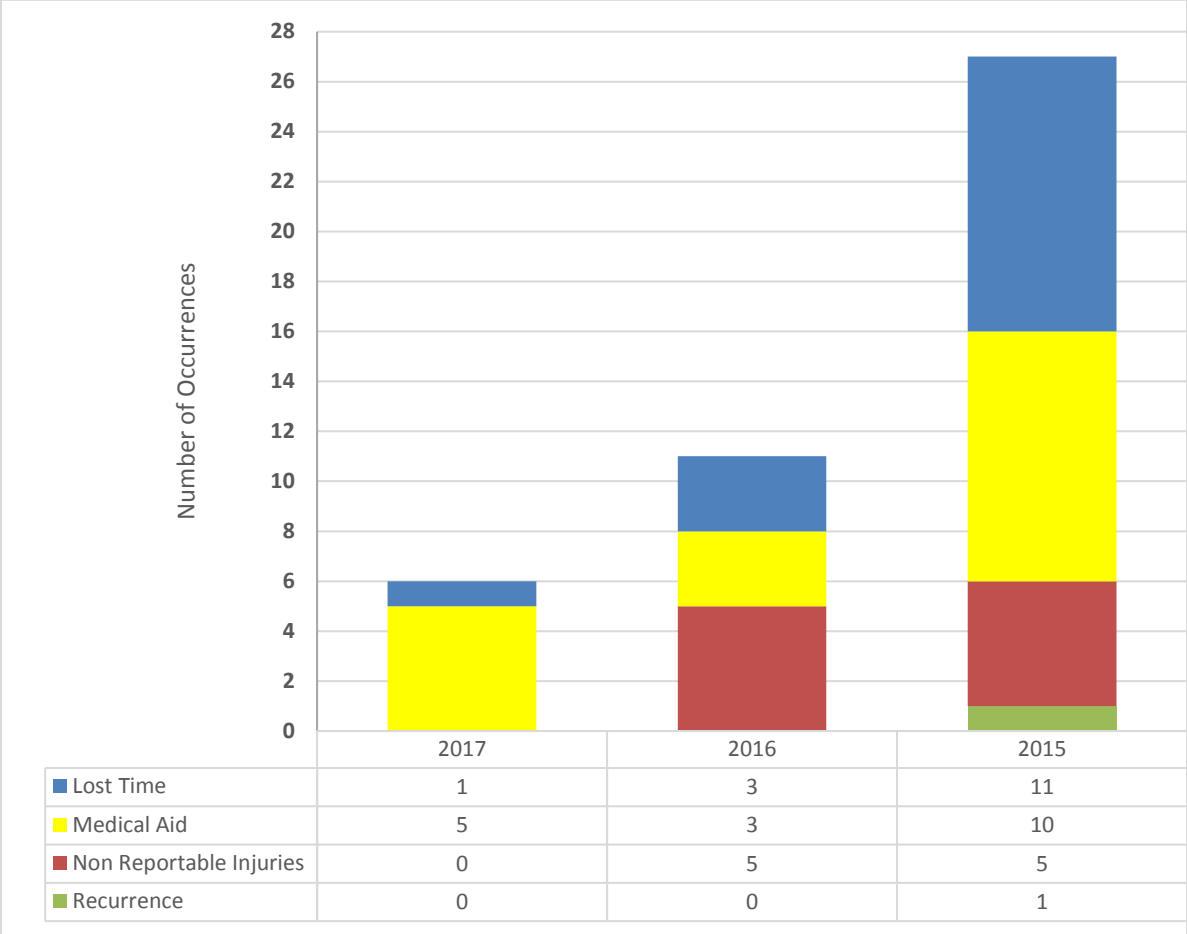
Positon	Number of FTE[1]
Senior Plant Manager	1
Manager, Engineering Services	2
Superintendent, Plant Process and Operations	2
Senior Engineer	2
Engineer	2
Area Supervisor Plant Operations and Maintenance	9
Supervisor, Operational Support	1
Supervisor, Operating Engineers A/R-C	1
Stationary Engineer Operator	7
Electronic Instrumentation Specialist	2
Engineering Technologist Technician	2
Plant Technician/Wastewater	43
Plant Maintenance Operator	1
Developmental Plant Technician	3
Industrial Millwrights	49
Electrical Instrumentation Control Tech (EICT)	24
Support Assistant	2
Systems Integrator 1	1
Materials Management Assistant	1
Wastewater Plant Worker	7
Seasonal Temporary	4
Total FTE Positions	**166**

[1] FTE refers to Full Time Equivalent staff. Seasonal staff are considered 0.5 FTE staff.

7.3. Occupational Health & Safety

Continuous efforts are made to ensure a safe working environment at Ashbridges Bay Treatment Plant facility. The Joint Health and Safety Committee (JHSC) assisted management in resolving issues through bi-monthly meetings and conducting monthly workplace inspections. Plant Health and Safety statistics for the Ashbridges Bay Treatment Plant are included in Figure 3.

As of March 31, 2018, there were 70 lost time days due to work related injuries in 2017 [3].



	2017	2016	2015
Lost Time	1	3	11
Medical Aid	5	3	10
Non Reportable Injuries	0	5	5
Recurrence	0	0	1

Figure 3: Ashbridges Bay Health and Safety Injury Summary

7.4. Staff Training and Development

The Strategic Planning and Workforce Development unit of Toronto Water facilitates comprehensive training programs that expands the abilities of the staff, resulting in better service to the public.

All Ashbridges Bay Treatment Plant operating staff and skilled trades staff attended training which was held at various Toronto Water facilities. Courses were eligible for Continuing Education Units (CEU's) from the Ontario Environmental Training Consortium (OETC). The Ashbridges Bay Treatment Plant offered its operations and skilled trade staff the training courses below in 2017. Training to support the capital program was provided as required.

[3] Two Non Reportable Injuries are pending for 2017 and have not been included.

a) Technical and Health and Safety Training:

- 2015 Ontario Electrical Safety Code (26th Edition) New And Amended Requirements General Level 1
- 2015 Ontario Electrical Safety Code (26th Edition) New And Amended Requirements General Level 2
- ABTP - Articulate Storyline 3 & 360: Advanced
- ABTP - Articulate Storyline 3 & 360: The Essentials
- ABTP - Asset Condition Monitoring
- ABTP - Decanter Centrifuge Systems
- ABTP - North Toronto TP CSO Tank Improvements Project
- ABTP - Schwing Bioset KSP Service Training
- ABTP - Tailgate 2017 Avoiding Electrical Shocks
- ABTP - Tailgate 2017 Confined Space Awareness
- ABTP - Tailgate 2017 Eyewash Station And Emergency Shower
- ABTP - Tailgate 2017 Fall Protection Equipment SP24
- ABTP - Tailgate 2017 Ladder Safety
- ABTP - Tailgate 2017 Lockout, Tag & Test
- ABTP - Tailgate 2017 Rigging And Lifting
- ABTP - Tailgate 2017 Safe Lifting
- ABTP - Tailgate 2017 Slips, Trips, And Falls
- ABTP - Tailgate 2017 WHMIS 2015: New Chemical Safety Info System
- ABTP - Tailgate 2017 Work Area Site Visit Procedure
- ABTP - Vogelsang Positive Displacement Rotary Lobe Pump
- Activity And Process Cost Management
- Advanced Water Treatment (2016)
- Air Purifying Respirators (2017)
- Arc Flash Awareness For Non-Electrical Personnel (ABTP)
- Arc Flash For Non-Qualified Persons
- Asbestos Awareness
- Backflow Prevention Awareness (2016-2018)
- Basic Spill Response
- Basic Vibration Analysis
- Behaviour And Effects Of Air In Water Distribution Systems
- Centrifugal And Positive Displacement Pump Operation
- Chlorination And Disinfection Refresher (2016-2018)
- Chlorine 'C' Kit Training
- Chlorine Safety / "B" Kit (2016-2018)
- Chlorine Tank Car Leak Response Training
- Classroom Review Of Common Wear Items For Plant Machinery (2016-2018)
- Conductors (2016-2018)
- Confined Space Awareness

- Confined Space Entry & Rescue Training Awareness
- Confined Space Rescue - 2 Day
- Critical Pump Maintenance
- Cross Connection Specialist Backflow Tester - Certification
- Designated Substances Awareness
- Disinfection Of Potable Water Piping
- Distracted Driving (February 2017 Tailgate)
- Drinking Water Operator Training And Certification Requirements Overview
- Electrical Awareness
- Electrical Safety For Maintenance Staff (2016-2018)
- Emergency First Aid Level 'A' CPR (2016-2018)
- Emergency Response Information For Employees With Disabilities - (Tailgate)
- Equipment: Inspect It Before You Use It (August Tailgate)
- Fall Protection Awareness
- Fire Hydrant & Valve - Operation, Inspection, Maintenance & Installation
- Flushing Techniques
- Fundamentals Of Ladder Safety Awareness
- Genie Aerial Work Platform AWP 30S - Safe Equipment Operation
- GIS Basics
- GIS In The City
- Hazard Identification And Reporting (August 2017 Tailgate)
- Hazard Recognition, Prevention and Reporting
- Hazard Reporting: Procedure and Form (T)
- Health And Safety Aspects Of Contracts For Services
- Health And Safety Competency For Front-Line Supervisors
- Health And Safety Orientation
- Hot Work Permit System Awareness (2016-2018)
- Industrial Maintenance Technician (IMT) M Certification
- In-Service Health & Safety Orientation
- Introductory Course On Hydraulic Transients
- Joint Health And Safety Committees - (JHSC) Certification Training Part I - Basic
- Joint Health And Safety Committees - (JHSC) Certification Training Part Ii - Workplace Specific Hazard Training
- Joint Health And Safety Committees - Roles And Responsibilities
- Level "C" CPR Renewal (2016-2018)
- Lifting Safely - Posture Matters- Safety Tailgate
- Lockout, Tag Out And Test Awareness
- Log Book Entry Workshop – Facilities
- Machinery Installation Using Laser Based Measurement
- Mathematics For Operators: Module 1 (2016-2018)
- Mathematics For Operators: Module 2 (2016-2018)

- MMR - Self-Contained Breathing Apparatus
- MOECC Entry-Level Course For Drinking Water Operators (Operators-In-Training)
- Mould Awareness
- Power Elevated Work Platform Operator Training – Skyjack & Genie
- Quatrosafety Incident Reporting
- Respiratory Protection - Use, Care & Selection Of Air Purifying Respirators (APRS)
- Rigging Safety Awareness (2016-2018)
- Safety Data Sheet Interpretation For WHMIS 2015
- Safety In A High Voltage Environment (2016-2018)
- Sampling and Testing In The Distribution System (2016-2018)
- Scaffolding Awareness Course (2016-2018)
- Slip-Free, Trip-Free, Fall-Free (November Tailgate)
- Source Water Protection (2016-2018)
- Standard First Aid - Level "C" CPR & AED - 2 Day (2016-2018)
- The Business Of Environmental Compliance
- The Distribution System / Maintaining Water Quality To The Last Tap
- The Fundamentals Of The Strategic Planning Process For Supervisors
- Ticks And Lyme Disease
- Traffic Control And TCP Training
- Traffic Control Roadway Work (2016-2018)
- Transportation Of Dangerous Goods (2016-2018)
- Trenching & Excavation Awareness (2016-2018)
- Trenching And Excavating Awareness
- TW Emergency Plan Awareness (Tailgate May 2017)
- Wastewater Laboratory Procedures (2016-2018)
- Wastewater Plant Technician Process Training
- Wastewater Treatment Certification Program 1 and 2 (3 Days)
- Wastewater Treatment Certification Program Level 3 and 4
- Water Leak Detection Listening Course
- Water Valve Training, Selection, Operation, Maintenance
- Watermain Tapping And Repair (2016-2018)
- WHMIS 1988 Refresher & WHMIS 2015 Intro
- WHMIS 2015: New Chemical Safety Info System (November 2017 Tailgate)
- Winterwise: The Cold Facts About Distribution Systems
- WMS Avantis Workshop - Review
- Working At Heights (2016-2018)
- Working With Wastewater

b) Other Training:

- 2018 Performance Management Refresher Sessions
- ABTP - Articulate Storyline 3 & 360: Advanced
- ABTP - Articulate Storyline 3 & 360: The Essentials
- ABTP - Human Rights In The Workplace
- ABTP - Tailgate 2017 Acceptable Use Of It Policy
- ABTP Pilot - Introduction
- Access To Information And Protection Of Privacy
- Achieving Goals - Creating Results!
- Activity And Process Cost Management
- Agile Project Management
- Attendance Management
- Basics Of Staffing
- Building A Stronger, High-Performing Team
- Clear Writing
- Clear, Concise, Engaging And Energized Presentations
- Coaching For Effectiveness, Improvement And Growth
- Communicating Change Effectively I: Create Compelling Change Messages
- Communicating Change Effectively Ii: Deliver With Impact
- Communication Essentials: Taking Your Interpersonal Communication Skills To The Next Level
- Conflict Resolution And Negotiation Skills
- Conflict Resolution And Negotiation Skills For Supervisors
- Content Server - EDOCs
- Coping With Shift Work (2016-2018)
- Corporate Orientation For New Toronto Public Service Employees
- Customer Service Essentials For Administrative Support And Frontline Staff
- Customer Service Excellence For The Internal Customer
- Customer Service: Interpersonal Skills
- Customer Service: Telephone, Active Listening And Speaking Skills
- Developing Effective Partnerships With The Private Sector
- Developing Resilience In The Face Of Change
- Dispute Resolution, The Grievance Procedure And Arbitration Process
- Distracted Driving (February 2017 Tailgate)
- Effective Technical Communication
- Emerging Leaders Certificate Program For Supervisors -Capstone And Graduation
- Enhancing Diversity Competency
- Enhancing Work Satisfaction Through Active Engagement
- Essentials In Creating Accessible Documents
- Financial Management For Non-Financial Managers: Accounting
- Fundamentals Of Purchasing

- How To Conduct Workplace Investigations
- Human Rights In The Workplace
- Incident Management Team Training (EHSC)
- Incident Reporting (2017)
- Incident/Accident Reporting
- Inclusive Customer Service
- Inclusive Workplace Practices
- Leadership Skills For Non-Managers
- Lessons In Leadership
- Local 416 Collective Agreement Information Session
- Make Better Decisions By Understanding: Use Effective Thinking Strategies
- Managing Conflict: Foundation Skills For Front-Line Staff
- Managing Difficult Conversations For Win-Win Outcomes
- Managing Human Rights Today
- Managing Through A Labour Disruption
- Managing Upward Communication And Working Relationships
- Managing Your Time And Your Manager's Time
- Masterful Mentoring
- My Roles, Goals, & Action Plans
- Onenote 2013 Fundamentals
- Outlook 2013 - Increase Your Productivity With Outlook
- Outlook 2013: All About Outlook 2013
- Performance Management In A Unionized Environment
- Persuasion And Impact: The Role Of Logic And Emotion In Persuasive Communication
- Preparing To Move Into Supervision
- Project Management Professional (PMP) Exam Prep
- Project Management: An Introduction
- Project Management: Concepts
- Project Management: Methodology
- Preparing To Move Into Supervision
- Request For Proposal (RFP) Preparation and Award
- Request For Quotation (RFQ)/Tender Preparation And Award
- Respect In Our Workplace
- Responding To Discrimination And Harassment Complaints
- Sharing Knowledge For Success
- Speaking Clearly And Confidently
- Taking Effective Minutes
- The Fundamentals Of The Strategic Planning Process For Supervisors
- Toronto Water Orientation
- Transition To Manager I: Developing Your Plan

- Understanding Differences – Leveraging Strengths (Personality Dimensions®)
- Understanding Municipal Governance
- Understanding Windows 10
- Using Talentflow Effectively
- Violence In The Workplace
- Webtrends - Getting Started
- Wellness And Resiliency
- Workplace Innovation: Critical Thinking And Creative Problem Solving
- Workplace Violence
- Workplace Violence Awareness
- Writing Better Emails
- Writing Clearly On Technical Subjects

7.5. Utility Operator Certification

Toronto Water has incorporated the requirement of a Class I operating licence for all skilled trade job profiles at Wastewater Treatment facilities. As part of this initiative, general operational/process training was delivered in order to prepare staff for the certification examination. Table 11 summarizes the status of operator certification at the Ashbridges Bay Treatment Plant in 2017.

Table 11: Wastewater Treatment Certificates

Class Level	Licensed
Class IV	35
Class III	6
Class II	12
Class I	41
O.I.T.	42
Total	**136**

7.6. MOECC/MOL Correspondence

There were no orders issued by the Ministry of the Environment and Climate Change (MOECC) or the Ministry of Labour (MOL).

Reports were submitted to the MOECC for the 6 odour complaints and 1 noise complaint received at the plant in 2017, as well as the 7 bypass events. Table 12 summarizes the correspondence submitted to the MOECC for the Ashbridges Bay Treatment Plant

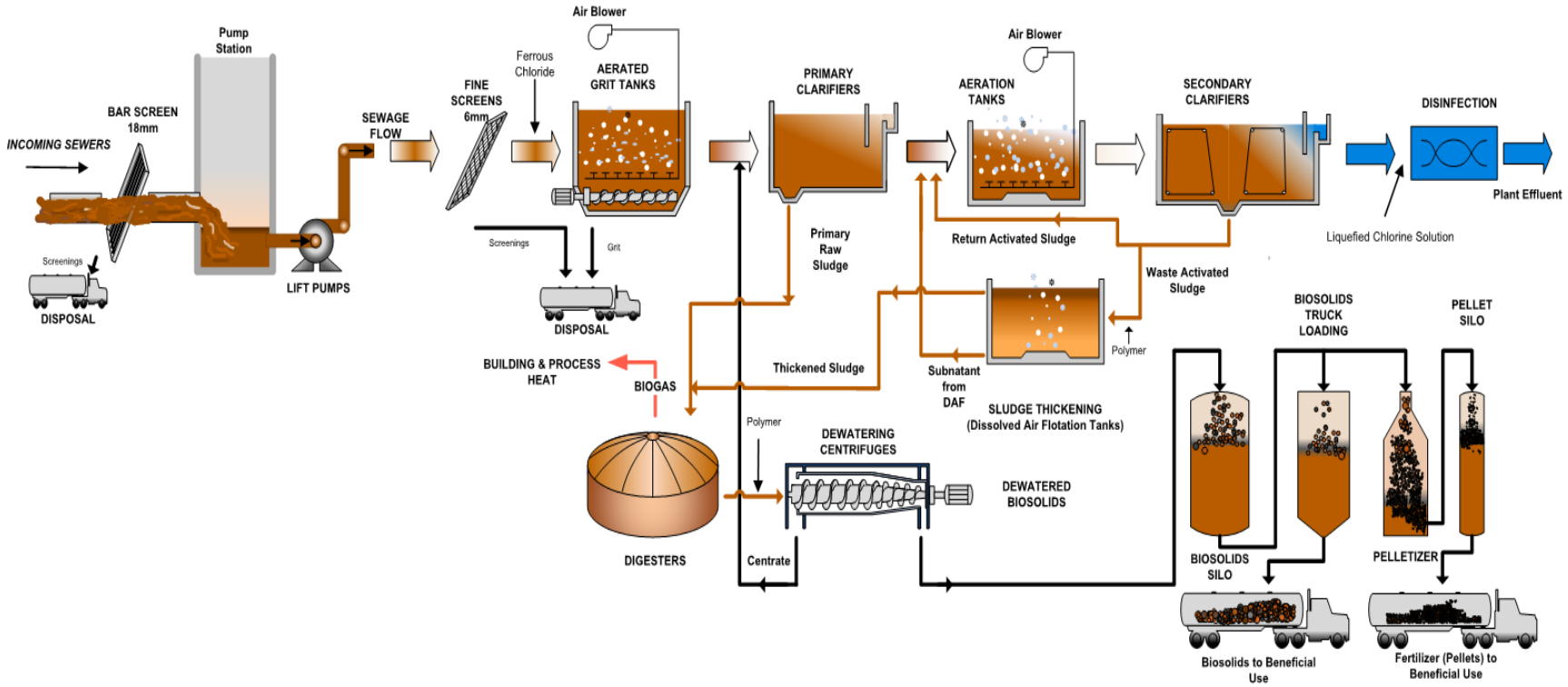
Table 12: Correspondence submitted to the MOECC

Date	Type	Description
January 26, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor regarding an odour complaint; the investigation revealed that it was not plant operation related.
January 30, 2017	10 Day Report as per Amended ECA	Written report regarding January 17 spill event.
March 24, 2017	10 Day Report as per Amended ECA	Written report regarding March 13 spill event.
March 29, 2017	10 Day Report as per Amended ECA	Written report regarding March 16 spill event.
April 3, 2017	10 Day Report as per Amended ECA	Written report regarding March 24 spill event.
April 3, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding an odour complaint; the investigation revealed that it was not plant operation related.
April 11, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding an odour complaint; the investigation revealed that it was not plant operation related.
May 9, 2017	Communication regarding a suspect release of secondary effluent	Communicated with Demetra Koros, MOECC Water Supervisor regarding a suspect release of secondary effluent; the test results of the sample taken are not indicative of any wastewater stream in the area.
May 11, 2017	10 Day Report as per Amended ECA	Written report regarding May 1 spill event.
May 15, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding an odour complaint; the investigation revealed that it was not plant operation related.
August 1, 2017	10 Day Report as per Amended ECA	Written report regarding July 20 spill event.
August 9, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding an odour complaint. The gate suspected of being the odour source and was sealed to prevent the release of odour.
September 11, 2017	Communication regarding a noise complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding a noise complaint. Investigation revealed it could be the vibration at the waste gas burner; the setting was changed to eliminate the noise.
September 14, 2017	Communication regarding an odour complaint	Communicated with Demetra Koros, MOECC Water Supervisor, regarding an odour complaint. On the afternoon of Sept 11, 2017, one of the aeration Odour Control Stack Fans failed due to a broken drive belt. The belts were replaced on Sept 12 and this fan was put back into service on the afternoon of Sept 12.
October 2, 2017	10 Day Report as per Amended ECA	Written report regarding September 26 spill event.
Consent Letters		
August 21, 2017	Director Consent Letter	Request for Consent – Primary tanks 1-6 odour control scrubber replacement.
August 25, 2017	Director Consent	Consent Granted – Primary tanks 1-6 odour control scrubber replacement.
November 7, 2017	Director Consent Letter	Request for Consent – Shutdown of the Aeration Odour Control System for the winter.
November 8, 2017	Director Consent	Consent Granted – Shutdown of the Aeration Odour Control System for the winter.

Date	Type	Description
November 21, 2018	Director Consent Letter	Request for Consent – Planned Digester Gas Venting
December 28, 2017	Director Consent Letter	Request for Consent – Planned Digester Gas Venting
Notice of Start-up		
No Start-ups		
MOE Inspection		
No Inspection		

APPENDIX A – Plant Schematic

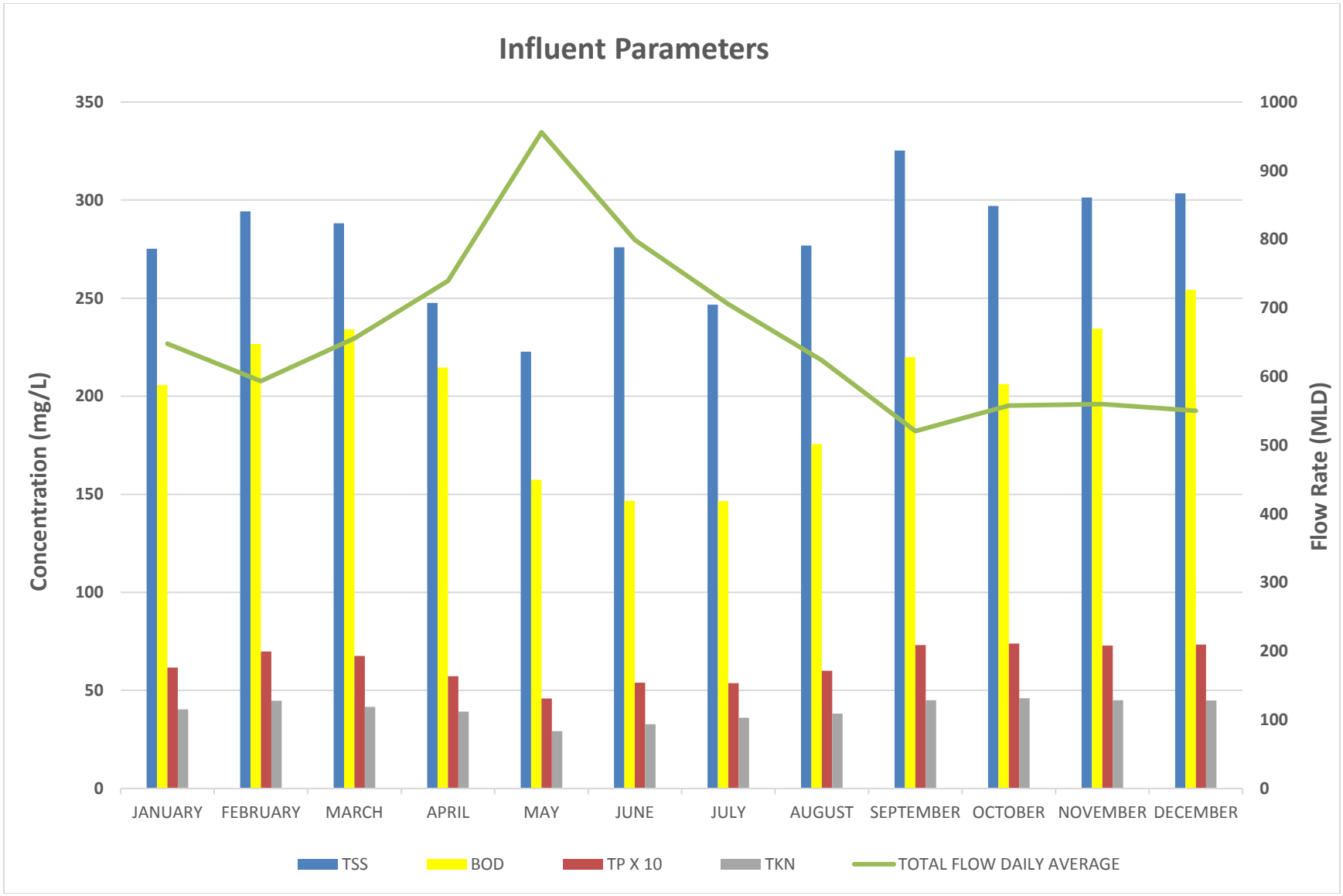
APPENDIX A: PLANT SCHEMATIC



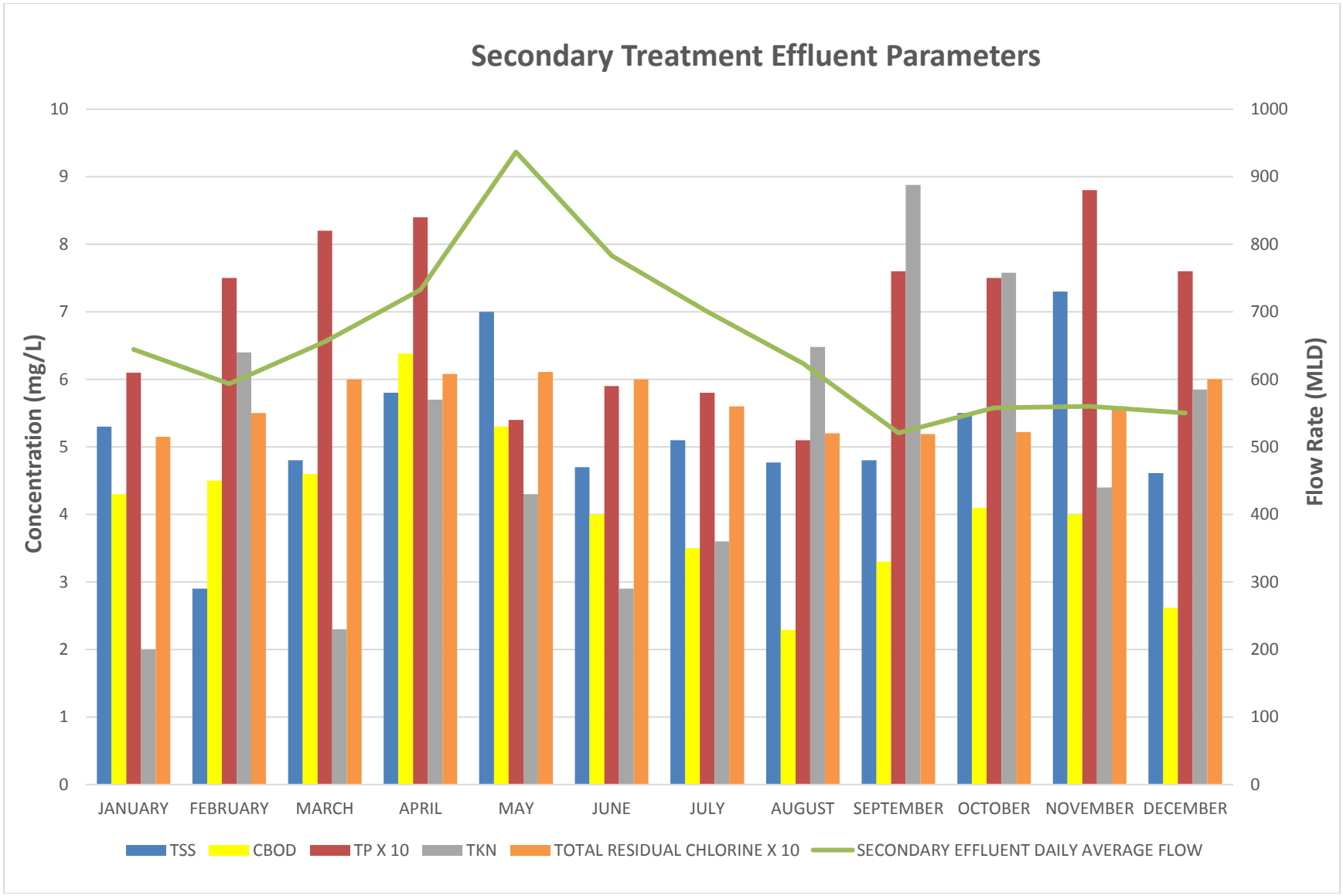
Process Flow Diagram for Ashbridges Bay Treatment Plant

APPENDIX B – Influent and Effluent 2017 Performance Charts

APPENDIX B: INFLUENT AND EFFLUENT 2017 PERFORMANCE CHARTS



APPENDIX B: INFLUENT AND EFFLUENT 2017 PERFORMANCE CHARTS



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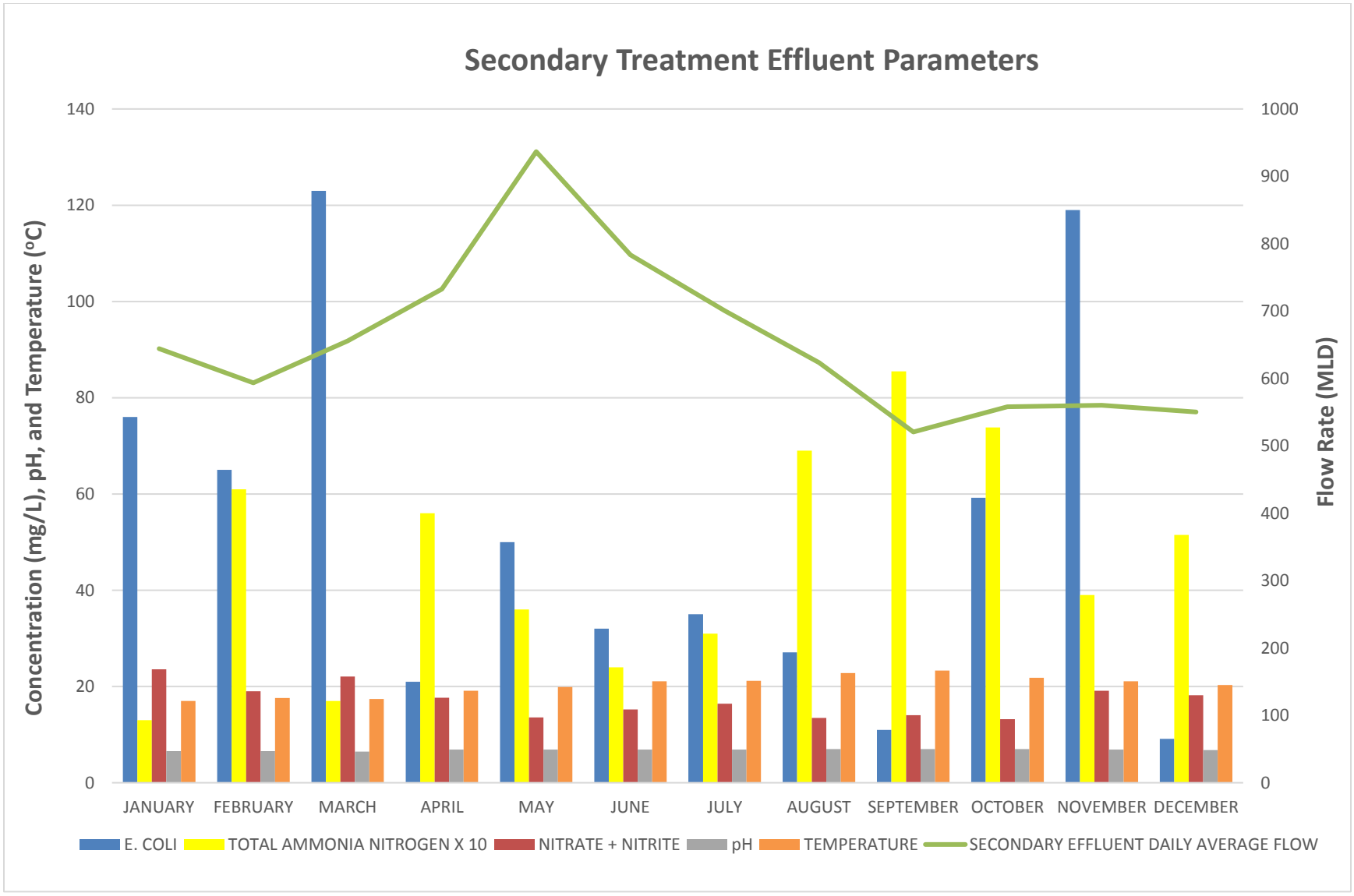

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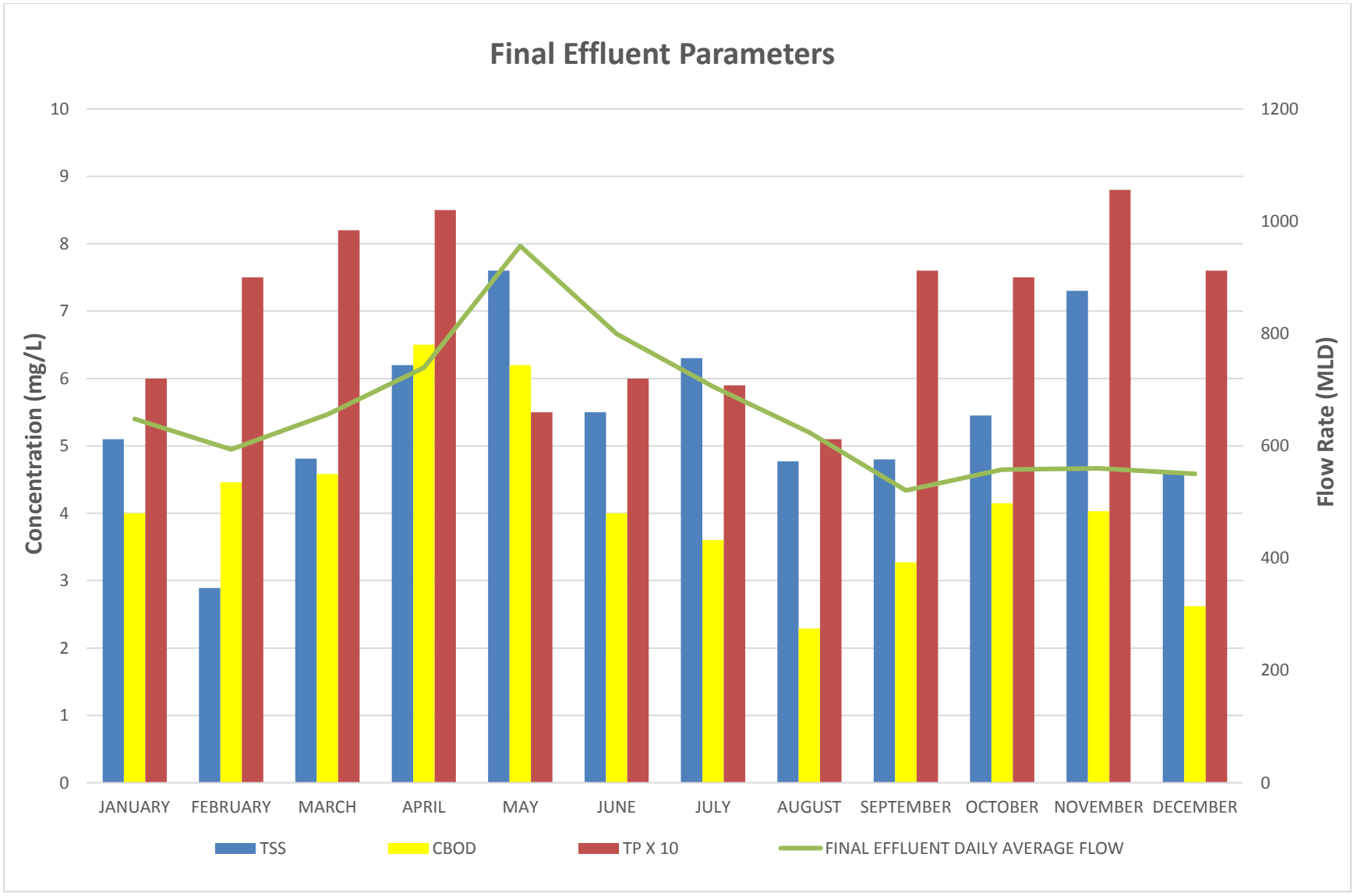

APPENDIX C –
Historical Performance Data

APPENDIX C: HISTORICAL PERFORMANCE DATA

	Units	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Influent Parameters												
Flow	ML/day	659.8	549.8	585.2	638.4	631.6	576.1	622.4	596.3	697.6	653.2	584.7
Total Annual Flow	ML	240,817	201,229	212,831	232,932	230,456	210,834	227,355	217,641	254,609	239,045	213,445
Total Suspended Solids (TSS)	mg/L	279.5	318.6	334.6	328.5	271.2	275.2	274.0	260	255.5	274.3	286.7
Biochemical Oxygen Demand (BOD_5)	mg/L	201.9	244.6	274.9	258.3	174.9	178.2	142.4	137	121.1	101.0	121.8
Total Phosphorus (TP)	mg/L	6.4	7.5	7.5	6.6	5.9	6.2	6.4	5.9	6.2	6.0	6.5
Preliminary Treatment												
Grit and Screenings	tonnes/ day	5.5	5.7	5.6	11	13	9.2	8.97	11.85	9.67	8.6	8.0
Primary Treatment												
TSS	mg/L	142.9	123.9	233.3	205.9	162.7	216.1	339.9	550.5	319.1	257.7	238.0
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	68.7	84.3	98.9	92.9	90.3	113.3	138.2	272.5	113.5	96.9	87.0
Secondary Treatment												
Aeration Loading	kg $CBOD_5$/ m^3.day	0.25	0.25	0.32	0.32	0.32	0.53	0.7	1.46	0.65	0.53	0.47
Mixed Liquor Suspended Solids	mg/L	2,372	2,643	2,969	2,696	1,830	1,467	2,309	2,002	2,215	2,014	1,612
Flow through Seawall Gates	ML	3,187	2,004	2,908	4,751	5,227.9	-	-	-	-	-	-
Secondary Treatment Effluent												
TSS	mg/L	5.2	6.4	10.1	8.2	8.0	8.4	11.1	7.8	8.7	9.4	8.3
TSS Loading Rate	kg/day	3,415	3,489	5,021	5,021	4,981	4,810	7,009	4,614	6,041	6,128	4,853
cBOD5	mg/L	4.1	4.3	5	4.6	8.5	6.9	7.0	5.3	4.7	3.6	4.5
cBOD5 Loading Rate	kg/day	2,668	2,381	2,838	2,837	5,262	3,926	4,298	3,131	3,239	2,347	2,631
TP	mg/L	0.7	0.7	0.8	0.8	0.6	0.6	0.6	0.7	0.7	0.7	0.8
TP Loading Rate	kg/day	458	365	495	495	330	330	389	407	482	464	468
Escherichia Coli (E. Coli)	CFU/100 mL	53	36.8	66.5	7.4	90.0	31.3	35.9	3.0	1.9	2	
pH	-	6.8	6.8	7.0	7.0	7.2	7.2	7.3	7.0	7.0	-	-
Final Effluent												
TSS	mg/L	5.4	6.5	10.4	9.2	-	-	-	-	-	-	-
cBOD5	mg/L	4.1	4.4	5.2	5.0	-	-	-	-	-	-	-
TP	mg/L	0.7	0.7	0.8	0.8	-	-	-	-	-	-	-
Solids Handling												
Primary Sludge Treated	m^3/day	5,640	6,420	4,440	4,292	5,067	5,546	6,900	6,590	5,767	5,575	6,460
Primary Sludge Total Solids (TS)	%	2.5	2.6	3	3.05	2.9	2.72	2.60	3.18	2.68	2.65	2.6
Primary Sludge Total Volatile Solids (TVS)	%	73	73.8	73.5	72.9	62.9	74.9	73.4	92.4	70.4	69.5	73.1

APPENDIX C: HISTORICAL PERFORMANCE DATA

	Units	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Waste Activated Sludge (WAS) co-settled in Primary Clarification Tanks or excess WAS to Aeration	m^3/day	1,260	2,130	1,240	2,405	8,800	14,523	35,288	20,809	18,092	13,537	19,600
WAS to Thickening	m^3/day	7,380	7,360	8,470	8,163	10,469	9,665	8,992	11,279	12,308	13,850	11,000
WAS TS	mg/L	0.7	0.7	0.8	0.82	0.54	0.49	0.69	1.03	0.72	0.65	0.47
Thickened WAS (TWAS) Treated	m^3/day	1,440	1,600	2,090	2,366	876	677	980	1,064	1,851	1,800	1,260
TWAS TS	%	3.7	3.4	3.3	3.4	4.8	4.6	4.8	4.3	4.5	4.4	3.9
TWAS TVS	%	73.2	71.6	71	72.9	69.1	72.0	71.9	71.7	71.2	71.1	72.2
Volume to Digestion	m^3/day	7,080	8,020	6,530	6,658	5,933	6,222	5,900	7,634	7,617	7,390	7,700
Digesters Hydraulic Retention Time	days	20.2	18.1	23.3	23.1	21.8	21.1	19.1	16.6	16.2	16.8	-
Organic Loading to Digesters	TVS per m3 of digester capacity per day	0.9	1.1	1.0	1.0	2.1	1.3	-	-	-	-	-
Digester Gas Volume	m^3/day	61,640	62,330	64,560	65,921	77,781	115,174	60,782	63,100	71,483	86,400	-
Dewatering Centrifuge Feed TS	%	1.7	1.8	1.8	1.8	1.8	1.7	2.0	1.8	2.2	2.2	1.8
Dewatered Biosolids TS	%	27.9	28.1	27.7	26.5	27.8	28.3	28.3	28.0	28.0	28.6	27.0
Centrate Quality	mg/L	299	319	665.32	2091	1959	1196	5921	5066	5614	6167	1589
Solids Capture Rate	%	98	98	96.44	88	77	96	70	70	75	74	92.0
Centrifuge Run Time	hours	52,400	52,329	48,049	43,507	51,451	102,922	77,844	57,995	56,760	56,906	57,059
Biosolids Management	wet tonnes/ year	159,288	149,733	145,321	143,190	142,908	139,562	129,213	134,185	136,629	149,166	164,222

APPENDIX D – Influent and Effluent Metal Concentrations

APPENDIX D: INFLUENT AND EFFLUENT METAL CONCENTRATIONS

Influent (Daily Composite tested once/month for metals)

Parameter	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Iron**	**Lead**	**Manganese**	**Mercury**	**Nickel**	**Zinc**
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
January	*0.005*	*0.002*	0.0107	0.135	3.73	0.00758	0.0729	0.000338	0.00877	0.165
February	*0.005*	*0.002*	0.00863	0.125	3.45	0.00783	0.0687	0.000259	0.00721	0.171
March	*0.005*	*0.002*	0.011	0.144	4.2	0.00792	0.0794	0.000073	0.00892	0.185
April	*0.005*	*0.002*	0.00677	0.117	2.6	*0.0025*	0.0631	0.000105	*0.0025*	0.13
May	*0.005*	*0.002*	0.00487	0.0727	1.88	*0.0025*	0.0538	*0.00005*	*0.0025*	0.0968
June	*0.005*	*0.002*	0.00679	0.083	2.5	*0.0025*	0.061	*0.00005*	*0.0025*	0.11
July	*0.005*	*0.002*	0.0054	0.0731	2.22	*0.0025*	0.0572	0.000109	0.00852	0.152
August	*0.005*	*0.002*	0.00739	0.0777	2.09	*0.0025*	0.0524	*0.00005*	0.00798	0.127
September	*0.005*	*0.002*	0.00851	0.146	3.7	0.0073	0.0669	*0.00005*	0.00713	0.271
October	*0.005*	*0.002*	0.00824	0.147	3.88	0.006	0.0641	0.000142	0.00705	0.248
November	*0.005*	*0.002*	0.0119	0.137	3.64	0.00792	0.0641	0.000144	0.00777	0.177
December	*0.005*	*0.002*	0.00828	0.118	3.99	0.00562	0.0635	*0.00005*	0.00744	0.173
Average	***0.005***	***0.002***	**0.008**	**0.115**	**3.157**	**0.005**	**0.064**	**0.00012**	**0.007**	**0.167**

Secondary Treatment Effluent (Daily Composite tested once/month for metals)

Parameter	**Arsenic**	**Cadmium**	**Chromium**	**Copper**	**Iron**	**Lead**	**Manganese**	**Mercury**	**Nickel**	**Zinc**
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
January	*0.005*	*0.002*	*0.002*	0.0113	0.4	*0.0025*	0.0455	*0.00003*	*0.0025*	0.034
February	*0.005*	*0.002*	*0.002*	0.0094	0.293	*0.0025*	0.0488	*0.00003*	*0.0025*	0.0308
March	*0.005*	*0.002*	*0.002*	0.012	0.282	*0.0025*	0.036	*0.00003*	*0.0025*	0.0376
April	*0.005*	*0.002*	*0.002*	0.0121	0.147	*0.0025*	0.0368	*0.00003*	*0.0025*	0.0286
May	*0.005*	*0.002*	*0.002*	0.00884	0.407	*0.0025*	0.0366	*0.00005*	*0.0025*	0.0224
June	*0.005*	*0.002*	*0.002*	0.00676	0.263	*0.0025*	0.0435	*0.00005*	*0.0025*	0.0229
July	*0.005*	*0.002*	*0.002*	0.00866	0.333	*0.0025*	0.0408	*0.00005*	*0.0025*	0.051
August	*0.005*	*0.002*	*0.002*	0.00575	0.274	*0.0025*	0.0436	*0.00005*	*0.0025*	0.129
September	*0.005*	*0.002*	*0.002*	0.0114	0.399	*0.0025*	0.0533	*0.00005*	*0.0025*	0.029
October	*0.005*	*0.002*	*0.002*	0.00982	0.332	*0.0025*	0.0525	*0.00005*	*0.0025*	0.0473
November	*0.005*	*0.002*	*0.002*	0.00832	0.466	*0.0025*	0.0479	*0.00005*	*0.0025*	0.0235
December	*0.005*	*0.002*	*0.002*	0.0117	0.328	*0.0025*	0.0512	*0.00005*	*0.0025*	0.0292
Average	***0.005***	***0.002***	***0.002***	**0.010**	**0.327**	***0.0025***	**0.045**	***0.00004***	***0.0025***	**0.040**

Data in red and italic is half the Method Detection Limit

APPENDIX E –
Biosolids Metal Analyses

APPENDIX E: BIOSOLIDS METAL CONCENTRATIONS

Ashbridges Bay Treatment Plant - Summary of Dewatered Biosolids Analysis for 2017

Dewatered Cake	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max Allowable Dry Wt Conc mg/Kg [1]	Annual Average
TKN	64000	66400	64400	50700	52500	51050	47100	46850	48700	52000	55700	56000		54617
Ammonia (N)	5840	6780	6880	6975	7835	5975	6155	6630	5000	5715	6810	5855		6371
Nitrate as N	0.77	1.15	0.87	1.22	1.01	0.95	0.76	0.90	0.97	0.87	1.10	1.12		0.97
Nitrite as N	1.06	0.92	1.61	1.15	1.37	1.01	0.55	1.34	1.05	1.06	1.07	0.35		1.04
As	3.69	4.63	1.975	3.52	3.66	4.61	4.645	4.2	3.25	3.06	3.58	2.975	**170**	3.65
B**	20.1	18.1	19.7	19.6	16.1	16.85	19.35	22.55	23.7	20.3	19.3	17.7		19.4
Cd	0.82	0.85	0.96	1.01	1.31	0.94	0.93	0.84	1.05	1.14	1.06	1.00	**34**	0.99
Cr	119.5	114	103.6	100.1	94	112.5	109.5	107	91.65	121.55	95.65	92.9	**2,800**	105.2
Co	5.32	5.97	5.27	4.99	5.33	6.28	5.40	4.39	3.865	4.03	3.92	3.905	**340**	4.89
Cu	700	716	688	675	675	664	643	683	697	744	715	742	**1,700**	695
Pb	41.7	42.6	40.9	37.2	42.8	42.1	40.7	37.6	32.9	36.5	39.2	37.5	**1,100**	39.3
Mn	304	314	294	284	285	323	283	289	241	241	249	278		282
Hg	0.64	0.55	0.56	0.54	0.52	0.64	0.51	0.46	0.49	0.53	0.48	0.57	**11**	0.540
Mo	8.39	8.4	7.875	7.36	7.32	7.58	7.6	7.94	9.29	14.3	11	10.4	**94**	8.95
Ni	27.6	28.1	27.9	24.5	23.9	25.1	23.9	32.0	28.6	46.9	23.0	27.5	**420**	28.2
Total P	27000	27500	25250	24900	24850	25600	22600	25450	26800	28150	27900	28250		26188
K	905	1020	889	1135	1180	1090	1135	1080	1075	1085	1006	1002		1050
Se	3.80	2.20	3.68	4.16	4.06	4.14	4.03	4.27	4.00	3.83	4.31	3.86	**34**	3.86
Zn	741	794	747	700	753	751	744	745	765	921	838	749	**4,200**	771
TS%	27.6	27.0	27.4	27.9	29.3	28.2	28.4	28.7	27.7	27.5	27.3	26.9		27.8
VS%	63.8	64.5	63.8	65.1	62.9	62.1	61.9	63.8	66.0	66.1	64.1	66.3		64.2
E. Coli	306770	379928	356514	1378969	1129244	439152	1176975	780943	701955	759583	908955	800645	**2,000,000**	759969

APPENDIX F –
Odour Reduction Plan

ODOUR REDUCTION PLAN – Status as of December 31, 2017

1. Program Summary

The details of the Odour Reduction Plan status including odour reduction activities, scheduled completion, and estimated emissions reductions of odour are summarized in the following Sections. The plan provides details for Phases I and II, as approved under the Environmental Compliance Approval (Air) ECA number 3771-92NP7X dated January 23, 2013. The facility currently operates under an updated ECA (Air) number 2815-9PWTWV, dated January 15, 2015.

The goal of the Odour Reduction Program is to reduce the plant-wide odour and Total Reduced Sulphur (TRS) impact beyond the plant property. The program achieves this with a combination of air capture and ventilation, improved dispersion, process changes, and treatment. Of these, only process changes and treatment have the potential to reduce odour emissions. For all new odour sources, odour and TRS emissions were estimated on a conservative basis and are not necessarily reduced at each implementation step. However, the overall odour and TRS impact is always reduced, thus meeting the objectives of the odour reduction program.

Following each project, phase emission sampling will be performed and impact assessment will be calculated as required by the ECA (Air).

2. Phase I Scope by Building

The building-by-building details of the odour reduction activities for Phase I are presented in this section for the Ministry's information. The current status of the activities and estimated completion dates have been updated to reflect the current project status.

2.1 T Building

The scope for the T Building includes:

- New air collection and ventilation system
- Re-use of existing activated carbon scrubber
- 3 new roof stacks, all 4m above roof (wet well, dry Well, and scrubber)
- Monument Building – new activated carbon scrubber

	Odour (impact)	TRS (emission)
Previous	0.34 OU	3.43E-03 g/s
Current	0.34 OU	3.43E-03 g/s
Project Status	In Operation	
Estimated Completion Date	Completed 2012	

2.2 M Building

The scope for the M Building includes:

- New ventilation system
- Installation of new activated carbon scrubber
- One new exhaust stack

	Odour (impact)	TRS (emission)
Previous	0.32 OU	5.49E-03 g/s
Current	0.32 OU	5.49E-03 g/s
Project Status	In Operation	
Estimated Completion Date	Completed 2012	

2.3 Aeration Tanks

The scope for the Aeration Tanks includes:

- Process aeration air capture and exhausted to incinerator stack

	Odour (impact)	TRS (emission)
Previous	306 OU	2.23E-01 g/s
Current	1.8 OU	2.23E-01 g/s
Project Status	In Operation	
Estimated Completion Date	All construction completed in 2014. Process air capture and exhaust completed in 2013.	

2.4 D Building

The scope for the D Building includes:

- New enclosed loading bay
- New ventilation systems
- Odour segregation and treatment including collection of air from channels, weirs, grit tanks and screens for biological odour treatment
- New biofilter with 35 m stack
- New 40 m stack for dispersion of air from primary clarifiers building

	Odour (impact)	TRS (emission)
Previous	12.5 OU	2.55E-02 g/s
Current	3.5 OU	2.55E-04 g/s
Project Status	In Operation	
Estimated Completion Date	Completed 2014	

3. Phase II Scope by Building

3.1 Truck Loading Facility Biofilter

The scope for the Truck Loading Biofilter includes:

- Replacement of dewatering equalization tanks scrubber
- Replacement of the existing biofilters
- Future conveyance of odourous air from WAS thickening to biofilter
- A new dedicated 20m stack for dispersion of treated air

	Odour (impact)	TRS (emission)
Current	9.6 OU	2.67E-02 g/s
Future	0.62 OU	2.67E-02 g/s
Project Status	Under Construction	
Estimated Completion Date	February 2019	

3.2 P Building

The proposed upgrade of P Building is part of the City's overall strategy to rehabilitate and modernize aging infrastructure, enhance treatment processes, as well as to reduce odours emitted from the facility. In general, this upgrade comprises of the following:

- Selective odour collection of the preliminary clarifiers 7 to 9
- Replacement of the odour control system for primary clarifiers 1 to 6
- Odour segregation / treatment and a new odour collection system for the head works
- A new biofilter and stack

	Odour (impact)	TRS (emission)
Current	243 OU	1.32E-01 g/s
Future	106 OU [1]	1.22E-02 g/s
Project Status	Under Construction	
Estimated Completion Date	December 2019	

[1]The odour impact assessment of the P building has increased from 17.3 OU to 106 OU due to the primary clarifier 7 to 9 design scope change. After the completion of this project and the other Phase I and Phase II Odour projects, the City will reassess the odours at the facility to determine next steps.

4. Operational Initiatives

Plant staff implemented a number of operational changes to reduce odour. Below is a list of what's been done so far and what is on-going:

Odour initiative	Timing	Benefit
Regular replacement of activated carbon scrubber media for various locations.	On-going	Ensures existing odour control equipment operate at maximum efficiency.
Biosolids inventory management	On-going	Keeping in-plant biosolids inventory as low as possible reduces likelihood of septic conditions in certain open tanks.
Good housekeeping	On-going	Includes ensuring tanks taken out of service for maintenance are quickly washed down.
Odour Facility Re-Assessment	2020	The Facility's odour performance will be reassessed after all Phase I and Phase II Odour Projects are complete