

Wastewater Treatment Facility
249 Bradford Street

2023 Annual Monitoring Report
Environmental Compliance Approval 0284-B2ML52

March 28, 2024

The City of Barrie
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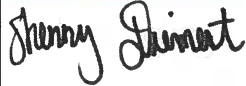



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Review and Sign-Off

Wastewater Treatment Facility 2022 Annual Report Approved by:	Signature
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Overview and Summary

The City of Barrie's Wastewater Treatment Facility (WwTF) is located at 249 Bradford Street and operates under Amended Environmental Compliance Approval No. 0284-B2ML52 ("the ECA") dated August 24th, 2018, issued by the Ministry of the Environment, Conservation and Parks (MECP). Compliance for 2023 will be evaluated against Section 11 reporting requirements of the ECA; a copy of which is in Appendix "A".

On December 19, 2019, the City applied for an amendment to Amended Certificate of Approval (Air) 1316-5MKTGU dated October 23, 2006 (the "Air ECA") to update operations of air pollution control equipment, noise levels and dispersion modelling. Amended ECA # 6401-C2FKWA was issued June 2, 2021 (see copy in Appendix "A"). The City continues to upgrade the operations and maintenance manual as is required by this approval.

In 2023, sewage treatment processes included:

- Mechanical bar screens,
- Grit removal,
- Primary settling,
- Selector tank,
- High purity oxygen activated sludge treatment (UNOX process),
- Dual point chemical addition for removal of phosphorus and suspended solids,
- Secondary settling,
- Nitrification by Rotating Biological Contactors (RBC),
- Sand filtration,
- Ultraviolet disinfection,
- Treated effluent is discharged to Kempenfelt Bay through a staged diffuser,
- Biosolids are separated from the liquid sewage and are processed via dual digestion of sludge (aerobic & anaerobic), and
- Methane gas generated from biosolids processing is 'scrubbed' and used for co-generation of heat and electricity to offset plant energy demands.

The 2023 effluent average daily flow of 51.0 Megalitres per day (MLD) of treated sewage represents approximately 67% of the plant's rated capacity of 76 MLD. The maximum daily effluent flow was 72.9 MLD on April 1st, due to excessive precipitation and runoff accessing the sanitary collection system.

The WwTF continues to accept volumes of imported sewage. A total of 11,867.09 m³ of septage waste was deposited at the WwTF's Septage Receiving Facility from four (4) haulage companies.

During the reporting period, the WwTF remained in full compliance with all effluent concentration and loading limits. In addition, the plant met all ECA objectives on a monthly average basis, with some daily exceptions within the total phosphorous (TP), total suspended solids (TSS), and minimum pH parameters. Effluent pollutants such as total phosphorus, dissolved phosphorus, cBOD₅, and E. coli were often below analytical detection limits.

The City continues to submit Municipal Utility Monitoring Program (MUMP) reports on-line using the MECP digital reporting system.

The WwTF continues to function well, producing high quality treated effluent as indicated by minimal effluent nutrient levels. The effluent phosphorous monthly average concentrations all met the 0.18 mg/L monthly average compliance limit, and the effluent annual average phosphorous concentration of 0.038 mg/L (rounded to 0.04 mg/L) was well below the Lake Simcoe Phosphorus Reduction Strategy limit of 0.1 mg/L. The final effluent phosphorous annual loading was 743 kg/year representing 26.8% of the annual compliance loading limit of 2,774 kg. The average ammonia-N effluent concentration based on all samples was 0.13 mg/L and all ammonia-N limits, objectives and loadings were consistently met.

The WwTF had one sewage overflow, which occurred on June 5th. Raw sewage pump #3 failed in the raw sewage building. While the pump was in operation, the gland failed allowing untreated wastewater to leak from the shaft onto the floor of the raw sewage pump room. The On-Call Operator noticed untreated wastewater spilling from the raw sewage building, running towards Hotchkiss Creek, reaching the grass on the creek side of the WwTF's perimeter fence located to the south of the property. The overflow was

stopped, and environmental impacts were mitigated. The incident was reported to the MECP in accordance with all regulatory requirements. A Corrective Action Report was completed and filed within the Wastewater Operations Branch. Corrective measures stemming from the report have been completed or initiated.

The reporting sections in this report follow the specific reporting requirements of Section 11(4) of the ECA. Copies of relevant ECAs, approvals and Notices of Modifications are contained in Appendix “A”; Biosolids Land Application Summary in Appendix “B”, and Overflows/Bypasses and Abnormal Events in Appendix “C”.

Effluent reporting statistics such as monthly average or yearly average concentrations in this report are calculated as per Schedule F of the ECA (i.e. arithmetic mean of all single sample results obtained during a month or calendar year respectively).

Reporting Section 11(4) (a): Summary/Interpretation of Influent & Imported Sewage Quality and Flows and Historical Trends

WwTF influent sampling was conducted as per the requirements of the ECA and results are presented in Table 1:

Table 1- WwTF 2023 Monthly Average Influent Concentrations and Total Flows

Month (2023)	Total Effluent Flow (m ³)	BOD ₅ (mg/L)	Total Suspended Solids (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Total Phosphorus (mg/L)	Dissolved Reactive Phosphorus (mg/L)	NH ₃ -N (mg/L)
January	1,555,589	184	256	45.39	4.9	1.30	29.05
February	1,417,778	174	264	44.45	5.0	1.27	27.55
March	1,635,962	163	235	41.99	4.6	1.24	26.59
April	1,674,199	178	252	43.95	5.2	1.10	27.43
May	1,662,922	189	258	42.01	4.9	1.13	25.42
June	1,582,194	177	259	37.29	4.6	1.12	21.21
July	1,593,974	191	296	34.76	4.7	1.00	19.77
August	1,496,441	217	349	37.97	5.4	1.04	19.42
September	1,424,682	191	300	39.13	5.2	1.10	21.49
October	1,513,879	193	266	37.69	4.9	1.13	20.91
November	1,450,773	224	323	40.04	5.5	1.26	23.08
December	1,567,183	213	245	40.63	4.8	1.32	24.46
AVERAGE	1,547,965	191	275	40.44	5.0	1.17	23.87
SUM	18,575,578						

Table 1 sampling and flow monitoring data was previously sent to MECP in monthly R1 and R2 MUMP reports. Influent concentrations are typical of domestic sewage.

Five years of historical trending of WwTF influent concentrations and flow data is shown in Figures 1- 4 below:

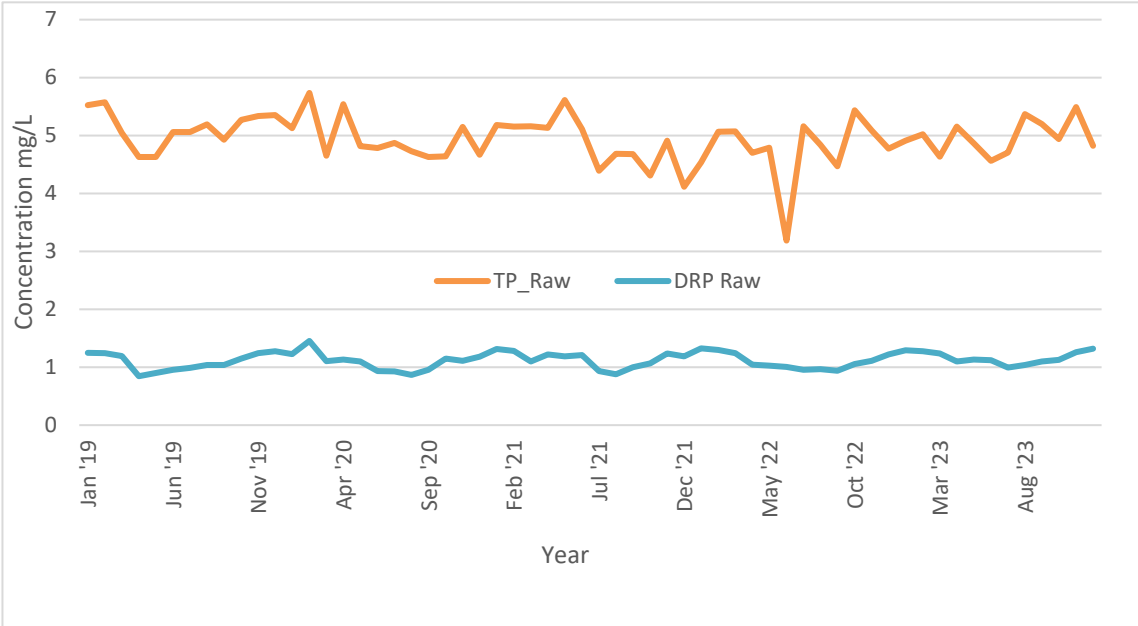


Figure - 1 WwTF Average Monthly Influent Total Phosphorus and Dissolved Reactive Phosphorus (DRP) Concentrations (mg/L)

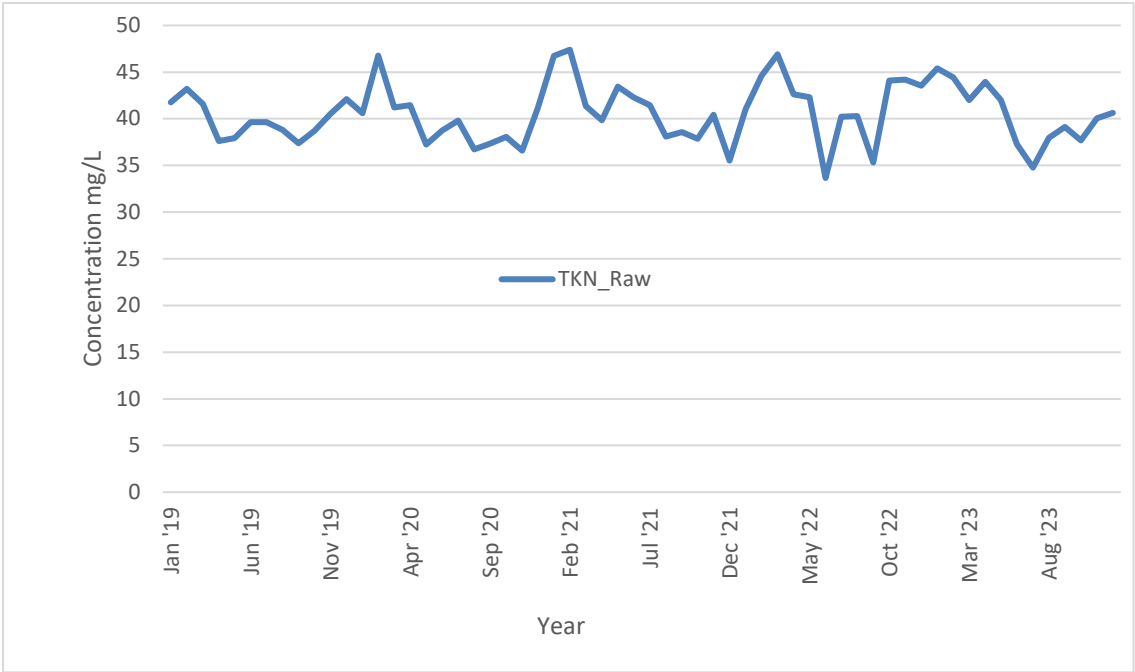


Figure - 2 WwTF Average Monthly Influent Total Kjeldahl Nitrogen (mg/L)



Figure - 3 WwTF Average Monthly Influent Five-Day Biochemical Oxygen Demand and Total Suspended Solids Concentrations (mg/L)

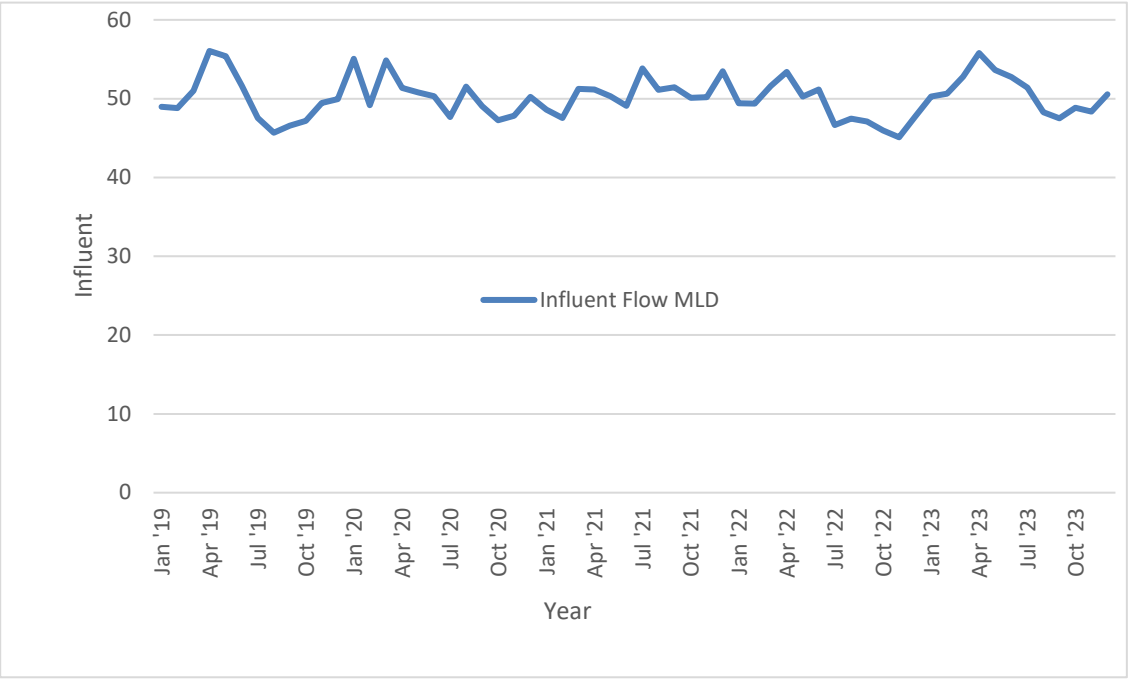


Figure 4 WwTF Average Monthly Influent Flow (MLD)

Table 3 compares average daily average effluent flow per month with maximum daily effluent flow for that month. A maximum daily effluent flow of 72.9 MLD occurred on April 1, due to heavy rain. This resulted in rain and water runoff accessing the sanitary collection system.

Table 2 - WwTF 2023 Monthly Average and Monthly Maximum Daily Influent Flows (MLD)

Month (2023)	Average Daily Flow (MLD)	Maximum Daily Flow (MLD)
January	50.180	59.019
February	50.635	56.608
March	52.773	67.304
April	55.807	72.924
May	53.643	57.329
June	52.740	64.029
July	51.419	66.147
August	48.272	53.259
September	47.489	50.158
October	48.835	59.736
November	48.359	51.994
December	50.554	55.511
AVERAGE	50.892	59.501

The WwTF continued to accept hauled septage over the reporting period. Imported sewage originating from the Royal Victoria Regional Health Centre field hospital was received throughout the year, transported by Pump My Tank. This concluded on November 20, 2023, when the field hospital was officially closed. The WwTF continued to accept domestic septic tank and holding waste from residential, industrial/commercial, and educational facility sources. Samples were taken from the WwTF receiving tank. The monthly volumes and analytical results are shown below in Table 2:

Table 3 - Total Monthly Volumes Results of Sampling and Analysis of Imported Sewage

Monthly Vol. Received (m ³)	Sample Date (2023)	BOD ₅ (mg/L)	TSS (mg/L)	TKN (mg/L)	TP (mg/L)
January					
359.42	Jan 3	2800	543	206	22400
	Jan 4	2000	361	47.5	6500
	Jan 11	2930	442	101	10900
	Jan 16	3780	623	135	15100
	Jan 18	1390	298	65.2	6740
	Jan 31	1520	223	36.4	3630
February					
370.59	Feb 2	1290	198	59.9	2920
	Feb 14	2240	397	73.3	6980
	Feb21	770	177	40.1	2800
March					
438.73	Mar 1	1550	317	56	3620
	Mar 8	2180	389	114	7570
	Mar 13	1260	321	81	6300
	Mar20	1300	332	58.7	6030
April					
763.90	Apr. 11	4180	512	92.2	10500
May					
1249.56	May 2	4310	473	70.9	9350
	May 9	4010	520	61.7	8280
	May 16	3520	517	94.5	10700
	May 23	5200	941	243	33000
	May 30	1520	250	41.8	3390
June					
1565.46	Jun. 21	1580	1100	236	34800
	Jun. 28	1660	456	69.9	9900
July					
1711.38	Jul. 18	3060	385	81.6	9030
	Jul. 25	130	437	99.4	12200
August					
926.67	Aug. 1	2200	375	54.5	8000
	Aug. 23	3090	479	94.5	10600
	Aug. 29	3540	415	177	10000

September					
1247.67	Sept. 19	4300	401	68.5	8170
October					
1636.06	Oct. 11	2500	425	99.8	10500
November					
1050.83	Nov 1	3060	453	110	14100
	Nov 6	4090	696	230	23100
	Nov 7	1220	403	74	8070
	Nov 8	2640	492	106	12900
	Nov 9	3470	465	71.3	9700
	Nov 14	3840	517	194	13500
	Nov. 15	1940	569	141	19600
	Nov. 16	3710	726	962	45600
	Nov. 28	4000	468	85.2	17100
	Nov. 30	1240	395	62.5	7700
December					
546.81	Dec 5	4420	707	209	26700
	Dec. 7	1810	333	43.9	4700
	Dec. 12	1520	331	44.5	5170
	Dec. 19	2180	323	52.1	5270
TOTAL: 11,867.09					

Volumes of imported sewage increased from 5,194.5 m³ in 2022, to 11,867.09 m³ in 2023. The imported sewage was received from four haulage companies, Pump My Tank, Regional Septic, Innisfil Disposal, and Swaffield Septic. Most of the annual volume was contributed by Pump My Tank with a total hauled volume of 10,829.88 m³, Innisfil Disposal delivered 891.85 m³, Regional Septic delivered 131.73 m³, and Swaffield Septic delivered 13.63 m³. The imported sewage sampling data indicated that BOD and Total Phosphorous (TP) parameters have increased significantly in many samples when compared to previous years data however remain typical characteristics of septage. Large variances in septage strength are expected due to the nature of the waste, storage time and/or biological action in the receiving tank, sampling procedures, or a combination thereof. All imported sewage received full treatment and did not create any treatment process issues or regulatory concerns. In 2023, samples were taken a minimum of once a month up to twice weekly depending on process monitoring initiatives within the facility. The septage receiving station was down for cleanout and maintenance the week of August 14th and the week of November 20th.

Individual Sewage Waste Manifests were not included in this report and are available upon request.

Reporting Section 11(4) (b): Summary and Interpretation of All Final Effluent Monitoring Data and Comparison to Design Objectives and Limits

City of Barrie Final Effluent monitoring data results are often below the analytical detection limits of laboratory methods. Detection limits for target parameters are as follows: total phosphorus (TP), 0.02 mg/L; dissolved reactive phosphorus (DRP), 0.01 mg/L; carbonaceous biochemical oxygen demand (cBOD₅), 2.0 mg/L and ammonia-N, 0.03 mg/L. E. coli counts of <1 CFU/100 mL are recorded as 1.0 CFU/100 mL to allow calculation of the geometric mean. E. coli is monitored in two (2) locations; the North UV effluent channel and the South UV effluent channel. The higher monthly average E. coli result is used for comparison with regulatory requirements.

The City of Barrie assumes that non-detect results are at the limit of detection for averaging purposes. Hence, the average effluent concentrations stated for cBOD₅, TP, dissolved reactive P and E. coli are usually an over-estimation of the actual effluent concentration. Effluent ammonia-N concentrations are usually above detection limits.

The fact that effluent data are frequently below detection reflects the City of Barrie's commitment to continuous improvement, environmental stewardship, and an effluent quality that far surpasses standards of a secondary treatment facility. The WwTF design objectives were based on achieving 0.15 mg/L effluent total phosphorus and 3 - 8 mg/L ammonia-N depending on season. WwTF effluent meets and exceeds these objectives on average by an order of magnitude for ammonia and by almost an order of magnitude for total phosphorus.

Tables 4, 5 and 6 summarize all effluent monitoring results, flow rates and loadings and evaluate compliance with all effluent limits, objectives and loadings stipulated in the ECA. As noted above, where concentrations of pollutants are below detection limits the concentration is assumed to be at the limit of detection.

Table 4 shows that no monthly average effluent concentration **limits** were exceeded.

Table 4 - WwTF 2023 Monthly Effluent Concentrations vs Effluent Limits

Month (2023)	Avg. cBOD ₅ (mg/L)	Avg. TSS (mg/L)	Avg. NH ₃ - N (mg/L)	Avg. NH ₃ - N (mg/L)	Avg. Total P (mg/L)	Log Avg. E. coli CFU per 100 ml	Avg. pH	Min. pH	Max. pH
January	2.0	3.1		0.07	0.03	1.00	6.52	6.39	6.63
February	2.4	5.9		0.24	0.15	1.06	6.54	6.42	6.63
March	2.0	2.9		0.15	0.04	1.00	6.55	6.44	6.66
April	2.1	5.5		0.11	0.07	1.04	6.55	6.39	6.68
May	2.5	2.3		0.12	0.02	1.00	6.52	6.34	6.62
June	2.0	2.1	0.13		0.02	1.00	6.61	6.49	6.73
July	2.0	2.1	0.13		0.02	2.17	6.46	6.37	6.57
August	2.0	2.1	0.10		0.02	1.00	6.57	6.41	6.65
September	2.0	1.9	0.17		0.02	1.00	6.63	6.55	6.73
October	2.0	2.0	0.07		0.02	1.00	6.70	6.53	6.82
November	2.0	2.3		0.11	0.02	1.00	6.55	6.47	6.64
December	2.2	1.7		0.16	0.02	1.00	6.59	6.48	6.70
ECA Sch. "C" Limit	15	15	4	10	0.18	200		6.0	9.5
Number of ECA Limit exceedances	0	0	0	0	0	0		0	0

Table 5 and Table 6 evaluate compliance with effluent concentration **objectives** for the WwTF. In Table 6, non-compliant values are highlighted in orange. In terms of meeting monthly effluent objectives on a daily basis, three (3) results (41 mg/L on February 16th, 16 mg/L on March 27th, 30 mg/L on April 3rd) exceeded the TSS objective of 10 mg/L, ten (10) results (See Table 6) exceeded the TP objective of 0.12 mg/L, the highest being 1.35 mg/L on February 10th, and sixty-six (66) results (see Table 6), did not meet the minimum pH objective of 6.5, the lowest being 6.34 on May 4th. The elevated concentrations of TSS and TP were a result of high flows due to rain and snowmelt runoff entering the sanitary collection system, causing solids to accumulate in secondary clarifiers and carry over into the tertiary filters. Additionally, a secondary clarifier was out of service in February for emergency repairs, and there were programming issues with the return activated sludge system, which also contributed to increased solids and TP in the final effluent for those exceedances.

Low effluent pH is attributed to the high degree of biological treatment at the WwTF and insufficient natural buffering capacity of the sewage. Since the final pH sampling point is hundreds of meters upstream from the effluent diffuser in the bay, the actual pH of the final discharge may be higher than that measured. This is a result of carbon dioxide de-gasification which takes place naturally in the effluent, raising the pH. The monthly average effluent pH did not fail to meet the objective of 6.5 for any month.

Table 5 - WwTF 2023 Compliance Summary with Effluent Objectives

	Avg. cBOD ₅ (mg/L)	Avg. TSS (mg/L)	Avg. NH ₃ - N (mg/L)	Avg. NH ₃ - N (mg/L)	Avg. Total P (mg/L)	Log Avg. E. coli CFU per 100 ml	Min. pH	Max. pH
ECA Sch. "B" Objective	10	10	3	8	0.12	100	6.5	8.5
Number of ECA Objective exceedances*	0	3	0	0	10	0	66	0

*Compliance with Concentration objectives is based on any single sample.

Table 6 - WwTF Individual Daily Non-Compliances with Effluent Objectives

Date	cBOD Final	SS Final	NH3 Final	TP Final	pH Final
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	
1/1/2023				0.02	6.39
1/2/2023				0.02	6.41
1/5/2023	2	8	0.26	0.16	6.46
1/17/2023			0.03	0.02	6.46
1/18/2023	2	3	0.08	0.02	6.47
1/21/2023				0.02	6.45
1/22/2023				0.02	6.47
1/27/2023				0.02	6.49
1/29/2023				0.02	6.49
2/4/2023					6.47
2/5/2023				0.02	6.46
2/8/2023	2	2	0.11	0.02	6.46
2/9/2023	2	1	0.52	0.02	6.42
2/10/2023				1.35	6.51
2/16/2023	6.8	41	0.18	0.95	6.59
2/17/2023				0.62	6.55
2/20/2023				0.34	6.54
3/4/2023				0.02	6.47
3/17/2023				0.03	6.44
3/26/2023				0.25	6.59
3/27/2023	2	16	0.32	0.32	6.53
4/1/2023				0.02	6.46
4/2/2023				0.6	6.6
4/3/2023	3.3	30	0.14	0.66	6.64
4/6/2023				0.16	6.51
4/12/2023	2	3	0.17	0.03	6.47
4/13/2023	2	4	0.19	0.03	6.43
4/14/2023				0.03	6.39
4/15/2023				0.02	6.39
4/16/2023				0.02	6.48
4/22/2023				0.02	6.46
5/3/2023	2	2	0.12	0.02	6.45
5/4/2023	2	3	0.25	0.03	6.34
5/5/2023				0.02	6.38
5/7/2023				0.02	6.49

5/11/2023	2	5	0.09	0.02	6.49
5/20/2023				0.02	6.49
5/27/2023				0.02	6.48
5/28/2023				0.02	6.48
5/29/2023	2	3	0.15	0.02	6.48
5/30/2023			0.13	0.02	6.49
6/30/2023				0.02	6.49
7/1/2023				0.02	6.44
7/2/2023				0.02	6.44
7/3/2023				0.02	6.41
7/4/2023	2	2	0.06	0.02	6.45
7/5/2023	2	2	0.07	0.02	6.45
7/6/2023	2	1	0.1	0.02	6.42
7/7/2023				0.02	6.47
7/8/2023				0.02	6.44
7/9/2023				0.02	6.41
7/10/2023	2	2	0.1	0.02	6.46
7/11/2023			0.07	0.02	6.43
7/12/2023	2	2	0.09	0.02	6.45
7/13/2023	2	2	0.06	0.02	6.37
7/14/2023				0.02	6.47
7/15/2023				0.02	6.48
7/16/2023				0.02	6.44
7/17/2023	2	2	0.06	0.02	6.49
7/18/2023			0.07	0.02	6.44
7/19/2023	2	2	0.06	0.02	6.41
7/20/2023	2	2	0.08	0.02	6.41
7/21/2023				0.02	6.47
7/23/2023				0.02	6.46
7/24/2023	2	2	0.1	0.02	6.45
7/25/2023			0.08	0.02	6.45
7/26/2023	2	3	0.09	0.02	6.49
7/27/2023	2	3	0.9	0.02	6.48
8/1/2023			0.34	0.02	6.49
8/10/2023	2	2	0.1	0.02	6.41
8/30/2023	2	2	0.07	0.02	6.46
11/5/2023				0.02	6.47
12/27/2023	2	2	0.32	0.02	6.49
12/28/2023	2	1	0.36	0.02	6.49
12/29/2023				0.02	6.48

Table 7 summarizes pollutant loadings and ECA loading limits. The Monthly Average Daily Effluent Loadings are calculated as follows:

$$\text{Monthly Average Daily Effluent Loadings (kg/d)} = \text{Monthly Average Effluent Concentrations (mg/L from Table 4)} \times \text{Monthly Average Daily Flow (MLD from Table 3)}$$

ECA Schedule C Loading Limits are shown, and the number of exceedances summarized at the bottom of the table. Hence there were **no exceedances** of monthly effluent loading limits. None of the monthly average flows exceeded the plant rated capacity of 76 MLD.

Table 7 - WwTF 2023 Monthly Average Daily Effluent Loadings

Month (2023)	Avg. Daily Flow (MLD)	cBOD ₅ (kg/d)	TSS (kg/d)	NH ₃ - N (kg/d)	NH ₃ -N (kg/d)	Total Phosphorus (kg/d)
January	50.180	100	158		4	1.3
February	50.635	122	300		12	7.7
March	52.773	106	155		8	2.1
April	55.807	118	307		6	4.1
May	53.643	133	123		6	1.2
June	52.740	105	110	7		1.1
July	51.419	103	107	7		1.0
August	48.272	97	100	5		1.1
September	47.489	95	91	8		0.9
October	48.835	98	98	3		1.0
November	48.359	97	111		5	1.0
December	50.554	112	84		8	1.0
ECA Schedule "C" Limit	76*	1140	1140	304	760	13.7
Number exceeding Schedule "C" Limit	0	0	0	0	0	0

*Rated Capacity

Table 8 summarizes compliance with the Lake Simcoe Phosphorus Reduction Strategy (LSPRS) Compliance Limits set forth in Schedule C of the ECA. The average annual effluent concentration of total phosphorus is the arithmetic mean of all single sample results. The total flow is the sum of monthly total flow volumes. The annual loading is the product of these two quantities. The result is that the WwTF met effluent phosphorus concentration and loading compliance limits set by the ECA and the LSPRS.

Table 8 - WwTF 2023 Final Effluent Quality Comparison with Lake Simcoe Phosphorus Reduction Strategy Total Phosphorus Loading Limits

Effluent Parameter	Annual Average TP Concentration (mg/L)	Annual Total TP Loading (kg/yr.)
WwTF	0.04	743
ECA Schedule "C" Limit	0.1	2,774
Number exceeding Schedule "C" Limit	0	0

The final effluent is sampled quarterly for leachate-related parameters. The analytical results of each sample are shown below in Table 9:

Table 9 - WwTF 2023 Sampling and Analytical Results for Leachate Parameters in Final Effluent

Effluent Parameter	Detection Limit (mg/L)	Result (Jan 25, 2023)	Result (April 26, 2023)	Result (July 26, 2023)	Result (October 25, 2023)
Bis (2-ethyhexyl) phthalate	0.002 mg/L	<0.002 mg/L	<0.002 mg/L	<0.002 mg/L	<0.002 mg/L
Boron	0.050 mg/L	0.280 mg/L	0.174 mg/L	1.99 mg/L	0.170 mg/L
Cobalt	0.007 mg/L	<0.007 mg/L	<0.007 mg/L	<0.007 mg/L	<0.007 mg/L
Magnesium	0.02 mg/L	13.4 mg/L	16.7 mg/L	16.8 mg/L	17.7 mg/L
Manganese	0.020 mg/L	0.047 mg/L	0.046 mg/L	0.048 mg/L	0.055 mg/L
Potassium	0.05 mg/L	15.6 mg/L	15.8 mg/L	16.6 mg/L	17.0 mg/L
Strontium	0.020 mg/L	0.360 mg/L	0.418 mg/L	0.421 mg/L	0.367 mg/L

All samples were analyzed by E3 Laboratories Inc. except for Bis (2-ethyhexyl) phthalate in quarter 3, that was sub-contracted to ALS Canada Ltd.

Except for strontium, the leachate parameter values appear to be consistent with expected contributions from domestic water use and are consistent with the previous five (5) years of sample results. Strontium results were consistent in 2022 and 2023.

Effluent acute lethality monitoring was conducted quarterly in accordance with the federal Wastewater Systems Effluent Regulations (WSER). Sampling dates were January 25, April 27, July 26, and October 25. All four quarterly effluent samples were determined to be not acutely lethal according to methods EPS 1/RM/14 and EPS 1/RM/13.

Laboratory data sheets have been omitted and are available upon request.

Figures 5 and 6 offer a 10-year overview of WwTF final effluent nutrient level trends which demonstrate the ongoing success and adequacy of the sewage works in protecting the Lake Simcoe aquatic habitat.

The average annual effluent concentration shown is the arithmetic mean of all single sample results for the year.

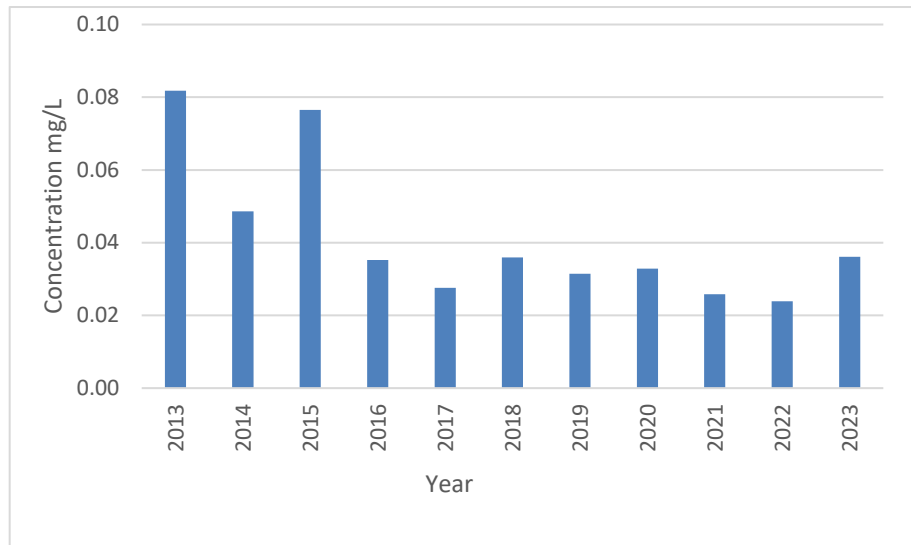


Figure - 5 WwTF Average Annual Effluent Total Phosphorus Concentration (mg/L)

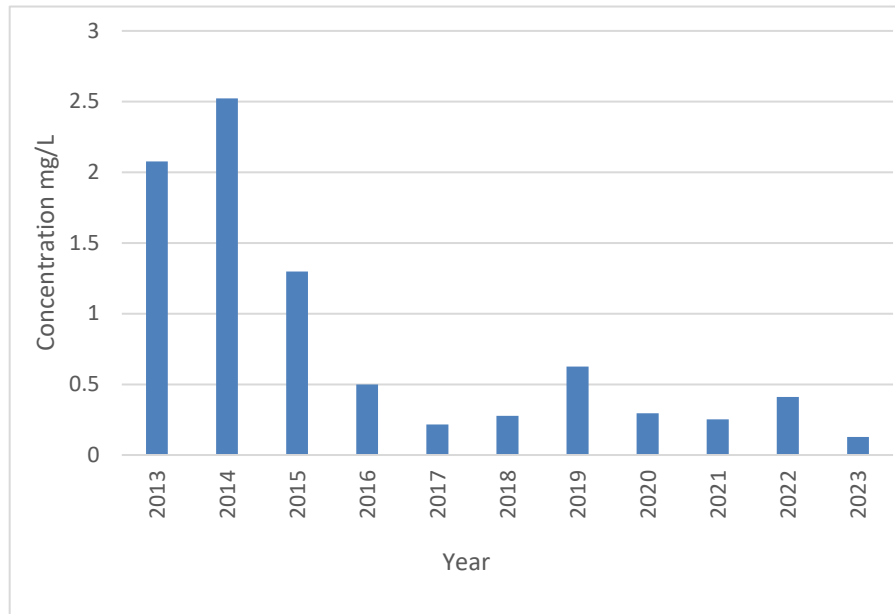


Figure - 6 WwTF Average Annual Effluent Ammonia-N Concentration (mg/L)

It is evident from the figures and tables above that the Barrie WwTF achieved aggressive removal of two (2) nutrients – total phosphorus and ammonia-N. These target parameters have the potential to cause toxicity and eutrophication in the aquatic environment of Lake Simcoe.

In summary, final effluent from the Barrie WwTF was of very high quality when evaluated against provincial and federal regulatory standards.

Reporting Section 11(4) (c): Summary of Deviations from Monitoring Schedule

The City of Barrie sampling schedule meets or exceeds the minimum sampling requirements stipulated by Schedule “D” of the ECA. For example, the City monitors effluent phosphorus daily (7 days per week) including weekends and holidays. Although this ensures that the City meets its sampling requirements, it raises the number of potential exceedances of effluent objectives which are applied daily for purposes of compliance. However, it also provides a more accurate estimate of pollutant concentrations and loadings.

Regarding the four (4) sampling schedules prescribed in Schedule D, the City’s performance was as follows:

- Influent Sampling: Minimum weekly sampling requirements 100% completed in accordance with the ECA.
- Imported Sewage: Imported sewage was received 12 months of the year and samples were taken and analyzed a minimum of once per month, in accordance with the ECA. The sample

collection dates were not consistent so in 2024, samples are scheduled to be taken weekly on Monday or Wednesdays in the event Monday is a holiday.

- Effluent Sampling: Minimum weekly sampling requirements 100% completed in accordance with the ECA.
- Leachate Related: Four quarterly samples 100% completed in accordance with the ECA.

Section 9 of the ECA requires that a sampling schedule for Schedule D parameters be created and rotated annually except where sampling is conducted three (3) or more times per week. The sampling schedule that was utilized for Schedule D influent and effluent parameters is shown in Table 11 and is in full compliance with all sampling requirements.

Table 10 - WwTF Schedule 'D' Sampling Schedule

Day	Total Suspended Solids	CBOD ₅	BOD ₅	E. coli	Total Kjeldahl Nitrogen	Total Ammonia Nitrogen	Nitrate as Nitrogen	Total Phosphorus	Dissolved Reactive Phosphorus
Influent									
Monday	X		X		X			X	X
Tuesday	X		X		X			X	X
Wednesday	X		X		X			X	X
Thursday	X		X		X			X	X
Friday									
Saturday									
Sunday									
Effluent									
Monday	X	X			X	X	X	X	X
Tuesday				X		X		X	X
Wednesday	X	X		X	X	X	X	X	X
Thursday	X	X		X	X	X	X	X	X
Friday								X	
Saturday								X	

Sunday								X	
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Any deviations from the above schedule resulted from lab closures over the Christmas and statutory holidays, however minimum regulatory sampling requirements were maintained at all times. Hauled sewage sampling was scheduled for a minimum of once per month, with actual frequency adjusted based on operational and process needs or initiatives.

E. coli sampling was performed Tuesday to Thursday. E. coli samples and/or composite samples are not analyzed on Fridays, with the exception of TP, as several of the parameters tested have a 48-hour holding time and the contracted external lab is unable to analyze them within that timeframe. In 2024, E.coli will be sampled on Monday through Wednesday, with the exception of the weeks following long weekend where Monday is a recognized statutory holiday the sample schedule will shift to Tuesday to Thursday

Leachate parameters were sampled as per the schedule in the 2023 report. In 2024 the Leachate-related sampling schedule will be rotated as shown in Table 12.

Table 11 - Final Effluent Leachate Related Regulatory Sample Schedule 2024

Quarter	Date	Parameters
First	Tuesday, January, 23	Boron, Cobalt, Magnesium, Manganese, Potassium, Strontium, Bis (2-ethylhexyl) Phthalate
Second	Tuesday, April 23	
Third	Tuesday, July 23	
Fourth	Tuesday, October22	

Reporting Section 11(4) (d): Summary of All Operating Issues and Corrective Actions

There were no major sewage treatment operating challenges that affected treatment efficiency, as is evidenced by the performance data in Reporting Section 11(4) (b). However, there were some notable operating challenges throughout 2023. A summary of challenges and corrective actions is as follows:

1. Primary Digester #2 has been out of service since September 7, 2021, for concrete rehabilitation and relining. This caused the WWOB to readjust the feed rate to the other Primary Digesters 1 and 3 while having reduced capacity. The Primary Digester #2 is scheduled to be put back into service in 2024.
2. On February 6th Secondary Clarifier #1 was taken out of service for repair of the scum skimmer trough. On February 9th there were higher than normal flows and malfunctioning underflows in the remaining clarifiers causing solids to accumulate in the clarifiers, resulting in rising sludge blanket levels, possible denitrification, and carryover into the tertiary filters, resulting in elevated Final Effluent TP. The underflows were repaired, the clarifier maintenance was completed, and it was returned to service at the end of February.

3. Primary Clarifier #2 was taken out of service for maintenance in October of 2023. It was determined that a complete mechanical rebuild was needed including all shafts and collector assembly. Work began by maintenance staff immediately and the clarifier is anticipated to be back in service in 2024.
4. Raw Pump #3 failed on June 5th resulting in an overflow of wastewater, which was reported and explained in greater detail in Sec 11 (4)(k) of this report. The pump was immediately taken out of service and repaired.
5. The waste gas flare stack was found to be in poor structural and operational condition and causing flare capacity issues. The stack component was replaced on June 6th and returned to service the same day.

See also ss. 11(4)(j) (Complaints) and 11(4)(k) (Abnormal events).

Reporting Section 11(4) (e): Normal and Emergency Repair Summary on Major Equipment Items

4,547 work orders were issued and completed in 2023 related to WwTF treatment processes and equipment; 310 of which were classified as repairs, 49 were corrective action related to internal health and safety inspections, 537 scheduled preventative maintenance and 3,651 preventative maintenance inspections. A more detailed summary of work order designation is in Table 12 below.

Table 12 - WwTF Work Order and Repair Summary

Work Order Type and Process Section	Number of Work Orders
Repair	
Preliminary Treatment	33
Primary Treatment	47
Aeration/Secondary Treatment	28
Tertiary and Disinfection	51
Digesters/Gas System/Hot water System	90
Sludge Thickening	11
Process Control/Laboratory/Chemical System	42
Septage	8
TOTAL	310
Safety Corrective Action	
Preliminary Treatment	4
Primary Treatment	1
Aeration/Secondary Treatment	8
Tertiary and Disinfection	9
Digesters/Gas System/Hot water System	18
Sludge Thickening	3
Process Control/Laboratory/Chemical System	6
Septage	0
TOTAL	49
Preventative Maintenance	
Preliminary Treatment	4

Primary Treatment	21
Aeration/Secondary Treatment	28
Tertiary and Disinfection	140
Digesters/Gas System/Hot water System	149
Sludge Thickening	27
Process Control/Laboratory/Chemical System	168
Septage	0
TOTAL	537
Preventative Maintenance Inspections	
Preliminary Treatment	342
Primary Treatment	389
Aeration/Secondary Treatment	889
Tertiary and Disinfection	233
Digesters/Gas System/Hot water System	1155
Sludge Thickening	122
Process Control/Laboratory/Chemical System	521
Septage	0
TOTAL	3651

Reporting Section 11(4) (f): Summary of Effluent QA/QC Program

The City of Barrie currently uses a member of the Canadian Association for Laboratory Accreditation (CALA), E3 Laboratories Inc., (“E3”), for analysis of all samples taken for regulatory reporting purposes. The following chapter is excerpted from E3’s Lab Quality Manual dated September 1st, 2015, and describes QA/QC procedures that were in place for 2023.

7.0 QUALITY CONTROL

Quality Control Samples are used, as appropriate, to ensure that the analytical process is in control. The various types of quality control samples and the characteristics they monitor are summarized as follows:

Type of Quality Control Samples	Characteristic Monitored
Standards/Lab QC	verify
Reference	calibration/stability
Material*	method accuracy
Duplicate	method precision
Samples Analyte	method recovery
Spike Reagent	contamination
Blank	(chemical)
Matrix Spike	sample recovery

* Reference materials may be either certified reference materials or can be prepared by the laboratory using the same compound as the calibration but standards using a different lot# or manufacturer of the

chemical.

These Quality Control samples are defined as follows:

Standards/ Lab QC: A solution prepared by the use of a primary standard or purchased pre-made from a supplier who certifies its concentration. The analyst performing the applicable tests for which that standard will be used usually prepares standards. Standard preparation is documented in the Standard Logbook.

Certified Reference Material: A sample that contains the analytes of interest in concentrations that are known from a previous in-house analysis or provided by an outside source. In-house reference material preparation is documented in the Standard Logbook.

Analyte Spike: A sample prepared by adding a measured amount of a reference standard to reagent water or sample.

Reagent Blank: A sample containing laboratory high quality water which is analyzed as though it were a sample.

The quality control results for each run are monitored and verified by the analyst against the established control limits, which have been determined for the tests and/or specific parameters analyzed. The Laboratory Manager reviews quality control results on a regular basis. The values outside the established limits are automatically flagged by LTMS to warn the analysts of the outlier results. The Laboratory Manager will review all flagged data. The analyst in consultation with the Laboratory Manager reviews raw data and the steps followed

in the test procedure and take the appropriate action(s) to identify and resolve the situation.

If any quality control sample results fall outside the control limits, the acceptance or rejection of the results is at the discretion of the analyst in consultation with the Laboratory Manager. The Laboratory Manager has the final authority to accept or reject results.

If necessary, the analysis will be repeated, if sufficient sample remains. The Laboratory Manager will review the repeated test results.

7.1 Proficiency Testing and Inter-/Intra-laboratory Studies

An important part of our Quality Assurance program is the participation in proficiency testing and inter- and intra-laboratory studies. The Laboratory Manager ensures that the lab participates in external proficiency testing.

These include proficiency samples for CALA and other PT sample suppliers.

If a proficiency test study provides results that cause doubt concerning test method performance, the Laboratory Manager may initiate a Quality Audit. Based on the audit findings, corrective action is initiated.

The results of this audit and any actions taken shall be documented and maintained on file by the Laboratory Manager.

7.2 Control Charts and Control Limits

7.2.1 Control Charts

Control charts are used, as appropriate, to monitor and evaluate the quality of the QC data generated. Such charts relate on-going test method performance to either statistically defined (± 3 STD) or protocol defined control limits. The values that are outside these limits are automatically or manually flagged to notify the analyst of the deviation. The supervisor or senior analyst designated to the co-ordination/supervision of the respective test is responsible to ensure the continual monitoring of the method's performance. Prescribed control charting practices are contained in the method SOP. All control charts are maintained by the LIMS.

7.2.2 Control Limits

Control limits, or other specified limits, when exceeded, are automatically or manually flagged. The analyst responsible for the test or reviewing the data is then expected to intervene and document the reason for the non-conformity or outlier result. This is realized through the LIMS or recorded in the appropriate logbook. Action limits may be assigned by the Laboratory Manager for results that impact the customer or regulatory limits.

Reporting Section 11(4) (g): Calibration and Maintenance on Influent, Imported Sewage and Effluent Monitoring Equipment

Influent/effluent monitoring consists of using automatic samplers and in-line pH/temp meters. In-line pH/temp meters are calibrated using the services of the external contractor Lacey Inst. These are

checked or calibrated as per Table 13. In addition, effluent monitoring equipment consists of using various flow meters used to record flow volumes from which final effluent flow is calculated, that are calibrated annually by external contractor Franklin Empire. A summary of these calibration activities is shown in Table 13.

Table 13 - Calibration Summary of Monitoring Equipment

Activity	Date (2023)	By
Calibrate hand-held temp/pH meter & check autosampler volumes	daily	operator
Clean and disinfect raw and final autosampler sample jugs	weekly	operator
Clean and disinfect raw and final autosampler sample tubing	monthly	operator
Calibrate in-line final temp/pH meter AIT_2156	monthly	Lacey Inst.
Calibrate Biosolids flow meter FIT_1969	Oct 31	Franklin Empire
Calibrate Raw Sewage flow meters FIT0812_01/02/03/04/05/06	Nov 2	Franklin Empire
Calibrate HPEW flow meter FIT_2157	Jan 23 (2024)	Franklin Empire
Calibrate WAS flow meter FIT_6145_01/02/03	Oct 31	Franklin Empire
Calibrate TWAS flow meter FIT 6162_01	Oct 31	Franklin Empire
Calibrate Bioaugmentation tank flow meter FIT_1491	Nov 2	Franklin Empire
Calibrate Grit tank flow meters FIT_2420_01/02/03/04	Nov 2	Franklin Empire
Calibrate Septage tank flow meter FIT_1293	Jan 23 (2024)	Franklin Empire

Imported sewage was tested and quantified manually, not automatically. Due to scheduling conflicts two (2) of the flow meters indicated in the table above were not calibrated in 2023. Calibration was complete in January of 2024.

Calibration certificates and/or proof of calibration are available upon request.

Reporting Section 11(4) (h): Efforts Made in Meeting Effluent Objectives

The WwTF normally meets and surpasses all design objectives, and the average annual daily flow has not yet reached 80% of design flow (=60.8 MLD). Although not yet required as a condition of the ECA, the City of Barrie made the following efforts in 2023 to maintain a high level of service:

1. A major capital project is underway to implement membrane bioreactor (MBR) technology. This will enhance a continued ability to produce final effluent that will meet the effluent limit of 0.10 mg/L total phosphorus imposed by the LSPRS.
2. A dedicated process optimization engineer and analyst is kept on permanent staff.
3. The primary clarification process was optimized to produce a thicker primary sludge and reduce hydraulic loading rates on digesters. Another raw sludge pump will be added to provide operational flexibility and added redundancy (Notice of Modification of Sewage Works #2021-002 dated March 17, 2022)
4. Annual voluntary participation in the Canadian Infrastructure Benchmarking Initiative (CIBI) formerly the National Water and Wastewater Benchmarking Initiative (NWWBI) has continued.
5. The Wastewater Operations Branch undertook a Hazard Identification and Risk Assessment study to predict and anticipate threats to wastewater operations. The study is ongoing.
6. Started the installation of additional Variable Frequency Drive (VFD) to more reliably achieve the required Return Activated Sludge rate. Project will continue in 2024.
7. Implemented a refined procedure to allow Treatment Operators to optimize F:M ratio and calculation of solids in the secondary process to achieve full nitrification in the secondary process with the least amount of mass. In 2023, the lowest levels of Nitrogen as ammonia were released over the past 10 years.

Reporting Section 11(4) (i): Biosolids Volumes and Disposal Locations

Biosolids generated at the WwTF were transported to the Oro-Medonte Biosolids Storage Facility (BSF) or directly to appropriate agricultural land in accordance with the Nutrient Management Act. Supernatant from the BSF is returned on empty trucks to the WwTF for treatment. WESSUC Inc., the City's Biosolids contractor, conducted all biosolids land application activities and transported biosolids and supernatant between the WwTF, BSF and Non-Agricultural Source Material (NASM) application sites. Biosolids laboratory analysis and land application was completed in accordance with the Nutrient Management Act and O. Reg. 267/03.

Table 14 summarizes the volumes of biosolids, and supernatant produced, hauled and volumes of biosolids land applied by month. The WwTF produced a total of 112,737 m³ of biosolids of which 46,321 m³ were applied directly to land and 66,417 m³ were sent to storage at the BSF. From the BSF, 63,254 m³ of biosolids were applied to land while 26,542 m³ of supernatant was returned to the WwTF. The amount of biosolids produced increased by approximately 4% from the previous year. WWOB staff believe this is a result of the increased amount of flow and solids received from hauled septage.

Table 14 - 2023 Biosolids Haulage Volume Summary

Month (2023)	Plant to Field (m ³)	Plant to Storage (m ³)	Storage to Field (m ³)	Total from Plant (m ³)	Total to Field (m ³)	Supernatant Returned to WwTF (m ³)
January	0.00	8,944.70	0.00	8,944.70	0.00	6,096.50
February	0.00	8,730.89	0.00	8,730.89	0.00	1,912.50
March	0.00	10,956.16	0.00	10,956.16	0.00	4,361.00
April	2,048.68	7,348.31	2,198.00	9,396.99	4,246.68	10,745.38
May	7,632.65	2,702.04	13,487.83	10,334.69	21,120.48	2,314.00
June	5,068.79	4,400.98	3,562.00	9,469.77	8,630.79	0.00
July	2,579.82	7,432.49	2,507.50	10,012.31	5,087.32	1,112.50
August	7,570.61	1,914.34	18,066.96	9,484.95	25,637.57	0.00
September	8,415.68	178.00	17,524.00	8,593.68	25,939.68	0.00
October	7,125.06	2,092.69	2,176.00	9,217.75	9,301.06	0.00
November	5,879.63	3,118.68	3,731.50	8,998.31	9,611.13	0.00
December	0.00	8,597.26	0.00	8,597.26	0.00	0.00
TOTAL	46,320.92	66,416.54	63,253.79	112,737.46	109,574.71	26,541.88

The biosolids land application summary and identifies associated NASM Plan application sites, biosolids sources, total volume of biosolids applied and application dates is attached in Appendix “C” of this report.

Reporting Section 11(4) (j): Complaint Summary and Resolution

The WwTF received no complaints.

Reporting Section 11(4) (k): Bypass/Overflow/Abnormal Events

There was one overflow event on June 5th. Raw sewage pump #3 failed in the raw sewage building located at the WwTF. While the pump was in operation the gland failed allowing untreated wastewater to leak from the shaft onto the floor of the raw sewage building. Despite the leak, the pump was able to operate with normal flow levels recorded on SCADA, therefore no alarms were triggered. The on-call operator received an unrelated alarm and upon arrival at the WwTF noticed untreated wastewater spilling from the raw sewage building, into the parking lot, and running towards Hotchkiss Creek, located to the south of the property. A copy of the Spill report and Corrective Action Report created by the Wastewater Operations Branch is attached in Appendix “C” of this report.

Reporting Section 11(4) (l): Status of Notices of Modification

Notice of Modification of Sewage Works #2021-002 dated October 13, 2021, and signed by G. Jorden was issued to install and operate a 6th raw sludge pump to the existing gallery of 5 pumps. The new pump is identical in size and capacity as the existing 5 pumps (13L/s at 12 m TDH) and was added for

purposes of redundancy. The 6th pump allows 2 pumps to be dedicated to each of 3 primary clarifiers. As of December 31, 2023, construction was ongoing.

In 2015, under a Notice of Modification #2 to MECP the main alum addition point was moved from pre-aeration to post-aeration resulting in much better nutrient removal. This innovation resulted in a dramatic improvement in treatment and effluent quality. In 2021 installation of new alum pumps was commenced such that each secondary clarifier will have its own dedicated alum metering pump for better flow control. A Notice of Modification of Sewage Works #2021-001 dated November 15, 2021 and signed by B. Araniyasundaran P. Eng., PMP, Director of Infrastructure, City of Barrie. The project reached substantial completion on May 20, 2022

Copies of Notices of Modification are attached in Appendix "A".

Reporting Section 11(4) (m): Summary of Efforts Re: Procedure F-5-1

Procedure F-5-1 Determination of Treatment Requirements For Municipal and Private Sewage Treatment works sets requirements for treatment of municipal and private sewage discharge in surface waters. This involves meeting certain effluent criteria stipulated in the procedure, preventing upsets and breakdowns and avoiding overflows and bypasses. The WwTF meets and consistently exceeds the Advanced Treatment standards set by Procedure F-5-1 (BOD=10 mg/L, TSS = 5 mg/L and TP=0.3 mg/L) as demonstrated in Table 4.

This section summarizes various strategies the City of Barrie currently uses to avoid overflows, bypasses, upsets and breakdowns:

- Routine bi-weekly cleaning of all sand filters using sodium hypochlorite.
- Routine weekly cleaning of WwTF raw wet well and pump station wet wells.
- Routine daily inspections of all WwTF critical equipment.
- Routine quarterly cleaning of pump station wet wells and float alarms.
- Balancing flows and sludge levels between tanks daily.
- Using good engineering practice to design and operate the WwTF equipment and treatment processes.
- Using the wet well and sewer system to equalize flows and prevent bypasses and overflows.
- Using ultrasonic level detectors in tanks to automatically control pump rates.
- 24/7 automated tank level monitoring with redundant level detection systems.
- Using SCADA systems and controls on all critical wastewater infrastructure.
- Expansion of SCADA access stations throughout the WwTF and at some Sewage Pumping Stations to allow Operations staff to respond to alarms and potential issues more efficiently.
- Maintaining redundant backup generators at WwTF in case of power failure.
- Weekly testing of WwTF standby generators, transfer switches and switchgear.
- Annual cleaning and inspection of high voltage equipment, transformers etc.
- Using a remote dialing system connected to SCADA to alarm a standby operator on call 24/7.
- Using electronic security measures at pump stations and entry doors at WwTF.
- Permanent staffing of an in-house Optimization Section one senior optimization engineer and one analyst.
- Maintaining a computerized work management system which tracks and prioritizes maintenance and repairs.
- Maintaining and enforcing a sewer use by-law.
- Providing ample funding for repairs and upgrades.
- Twinning all force mains at pump stations for redundancy.
- Maintaining a separated sewer system.

- Undertaking infiltration and inflow studies.
- Maintaining sufficient staffing and providing adequate training.
- Sampling at multiple process locations in the WwTF to have a good understanding of plant process and pinpoint potential problems.
- Maintaining an in-house laboratory and two lab technicians for redundancy and responsiveness.
- Ongoing study to evaluate new wastewater equalization facilities.
- Supplying all operators with cell phones to facilitate communications.
- Conducting routine condition assessments of infrastructure.
- Minimizing solids carryover in secondary effluent to maintain optimum operating efficiency.

Maximizing nitrification in secondary process it is difficult to attach a discrete cost to each bullet above due to overlap, the generality of some costs and the frequency that the costs are incurred. Most items fall within the annual operating budget of the WwTF which remains at approximately \$16 million per year. Some items fall within capital works projects while others comprise capital engineering or planning projects.

Reporting Section 11(4) (n): Changes or Updates to Schedules for Proposed Works

There were no uncompleted Proposed Works for 2023.

Appendix “A”: Environmental Compliance Approvals



Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 0284-B2ML52
Issue Date: August 24, 2018

The Corporation of the City of Barrie
70 Collier St
Post Office Box, No. 400
Barrie, Ontario
L4M 4T5

Site Location: City of Barrie Wastewater Treatment Facility
249 Bradford St Reference Plan 51R-11568
City of Barrie, County of Simcoe

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

usage and operation of existing municipal sewage works, for the treatment of sanitary sewage and disposal of effluent to Lake Simcoe via a Sewage Treatment Plant (City of Barrie Wastewater Treatment Facility) and Final Effluent disposal facilities as follows:

Classification of Collection System: Nominally Separate Sewer System

Classification of Sewage Treatment Plant: Secondary

Design Capacity of Sewage Treatment Plant

Design Capacity with All Treatment Trains in Operation	Prior to Completion of Construction of All Proposed Works	Upon Completion of Construction of All Proposed Works
Rated Capacity	76,000 m ³ /d	76,000 m ³ /d



Influent, Imported Sewage and Processed Organic Waste

Receiving Location	Types
In Collection System	Sanitary Sewage/Septage/Holding Tank Waste/Portable Toilet Waste/Leachate/Pretreated Leachate/Pretreated Industrial Wastewater
At Sewage Treatment Plant	Septage/Holding Tank Waste/Portable Toilet Waste/Leachate

Proposed Works:

Secondary Treatment Systems

- Biological Treatment
 - relocate existing three (3) mixers within the selector tank at different location within the tank.
 - installation of three (3) new mixers within the selector to increase the number of mixers to six (6) in within the selector.

Sludge Management System

- Sludge Digestion
 - Primary Digesters
 - combine the two existing 100 kW circuits of the 200 kW existing heat exchanger to serve primary digester No.3 into one.
 - installation of two (2) new heat exchangers to serve primary digester No.3, each having a capacity of approximately 300 kW.

Existing Works:

Sanitary Sewage Pumping Stations

Raw Sewage Pumping Station

- three (3) inlet overflow channels into the wet well with manually raked bar screens.
- five (5) raw sewage pumps and one (1) standby pump rated at a nominal capacity of 34,560 m³/d with a discharge flow measurement device.

Secondary Pumping Station

- six (6) pumps, each rated at a nominal capacity of approximately 35,000 m³/d.

City of Barrie Wastewater Treatment Facility

Influent Sewers

- two (2) 1050 mm diameter inlet sewers to the Preliminary Treatment System;

Imported Sewage Receiving Facilities

- one (1) 300 m³ capacity (active volume) equalization/pretreatment hauled sewage holding compartment equipped with coarse bubble diffused aeration system, two (2) 7.5 kW positive displacement air blowers and two (2) submersible pumps, each rated at approximately 7 L/s against 4.2 m TDH discharging to the WTF influent sewer.
- one (1) in-line grinder capable of handling hauled sewage flowrate of approximately 28 L/s.

Biosolids Supernatant Compartment and Bioaugmentation Compartment

- one (1) approximately 500 m³ capacity (active volume) biosolids supernatant holding compartment equipped with one (1) rail mounted submersible propeller type mixer and three (3) submersible pumps, each rated at approximately 3 L/s against 5.0 TDH discharging to the WTF influent sewer.
- one (1) 132 m³ capacity (active volume) bioaugmentation holding compartment equipped with two (2) submersible pumps, each rated at approximately 76 L/s against 11 m TDH discharging to the WTF primary clarifier effluent. Also included are piping for enhanced nitrification.

Preliminary Treatment System

- Screening
 - 2 multi-rake bar screens (12.7 mm stainless steel mechanically cleaned bar screens), each coupled with a screenings washer compactor to reduce the quantity of organics captured in the screened material, designed to handle up to a peak instantaneous flow of 250,100 m³/d combined.
- Grit Removal
 - four (4) covered aerated grit tanks, each capable of handling approximately 130 m³ nominal liquid capacity.
 - four (4) horizontal screw conveyors to transport settled grit collected in aerated grit tanks for grit tanks (Nos. 1, 2, 3 and 4) conveyors, each having a rated capacity of approximately 0.5 m³/hr at

10% loading.

- four (4) horizontal, centrifugal screw impeller grit pumps, each having a normal operating rated capacity of approximately 13 L/s at 7.0 m Total Dynamic Head (TDH).
- three (3) grit blowers (2 duty, one standby), each rated at approximately 430 m³/hr.
- two (2) grit classifiers, each with two (2) hydrocyclones designed for a grit quantity of 10 to 100 mL grit/m³ wastewater and feed flow rate to each cyclone of approximately 13 L/s at 8.5m TDH.

Influent Flow Measurement and Sampling Point

- flow measurement devices to measure flow from the discharge of each raw sewage pump, then add the measured flows to get the total influent flow.
- automatic composite sampler at the Headworks Building;

Primary Treatment System

- three (3) covered primary clarifiers: Primary Clarifier 1 and 2 each measuring approximately 45.7 m x 16.5 m x 3.65 m in Side Water Depth (SWD), Primary Clarifier 3 measures approximately 46.1 m x 16.5 m x 3.65 m in SWD. Each is equipped with three (3) longitudinal collectors and one (1) cross collector, non-metallic chain and flight style sludge collectors.
- five (5) primary raw sludge pumps to the aerobic reactor / sludge blending tank and/or digester, each having a normal operating rated capacity of approximately 13 L/s at 12 m TDH.
- one (1) primary scum pump rated at approximately 13 L/s.
- nine (9) scum skimmers and nine (9) scum collection troughs.

Secondary Treatment Systems

- Biological Treatment
 - one (1) selector tank with nominal operating capacity of approximately 2,000 m³.
 - primary effluent flow splitter box.
 - the selector or the splitter or both may be used at any given time.
 - three (3) mixers for selector tank (approx. 3 kW per mixer) - **(to be replaced as per Proposed**

Works)

- five (5) high purity oxygen covered Reactors (UNOX): Reactors 1 and 2 each having a normal operating capacity of approximately 2,400 m³, Reactor 3 having a capacity of approximately 2,400 m³ and reactors 4 and 5 each having a normal operating capacity of approximately 2,400 m³.
- one (1) 30 kW and two (2) 20 kW mixers per each UNOX Reactors 1 to 5 inclusive.
- one (1) centrifugal blower to purge off gases from the aerobic reactors to the UNOX reactors, and having a rated capacity of 31 L/s at a discharge pressure of 695 mm water column with a direct drive of approximately 5.6 kW.
- one (1) centrifugal purge air blower for UNOX reactor no. 4 and 5, with a rated capacity of approximately 900 L/s at a discharge pressure of 4.5 kPa with a direct drive of approximately 12 kW.
- two (2) Thermax SG1700 HF ambient vaporizers with a combined capacity of 21.6 metric tonnes of liquid oxygen per day at a minimum ambient temperature of -30 °C. Liquid oxygen will be stored in a 48.5 m³ liquid oxygen storage tank.
- one (1) 75 kW electric oxygen vaporizer plus trim heater.
- Secondary Sedimentation
 - two (2) Return Activated Sludge (RAS) Chambers.
 - six (6) covered Secondary Clarifiers (2 cells each): Secondary Clarifiers 1, 2 and 3 each measuring approximately 63.6 m x 12.2 m x 3.3 in SWD and Secondary Clarifiers 4, 5, and 6 each measuring approximately 64.6 m x 12.2 m x 3.3 in SWD, each equipped with four (4) longitudinal collectors; one (1) cross collector; and two (2) scum skimmers, non-metallic chain and flight style sludge collectors.
 - six (6) Return Activated Sludge pumps, (three (3) for each RAS Chamber), each pump with a rated capacity of approximately 22,000 m³/d at 7.9 m TDH.
 - one (1) Secondary Scum Pump with a rated capacity of approximately 13 L/s (1,090 m³/d) at 15 m TDH.
 - twelve (12) geotextile inlet membrane baffles; two (2) in each of the six (6) secondary clarifiers.

Post-Secondary Treatment System

- Rotating biological contactors
 - thirty-six (36) rotating biological contactors (RBCs) for tertiary nitrification. Each RBC has a

contacting surface area of approximately 15,500m² for a total of approximately 558,000m². The RBC system has been designed to treat secondary effluent at an ammonia loading rate of 1.5 to 2 g/m²/day, and therefore has an approximate ammonia treatment capacity of 1,116 kg/day.

- Filtration
 - six (6) shallow bed, single media tertiary filters; each having dimensions of approximately 34.4 m long x 4.8 m wide; with six (6) filters having a combined peak design flow capacity of 156,000 m³/d (all in service).
 - filters 1 & 2 have an automatic backwash system consisting of a travelling bridge equipped with one (1) submersible pump for backwash rated at approximately 13 L/s and one (1) washwater pump rated at approximately 13 L/s.
 - filters 3 & 4 have an automatic backwash system consisting of a travelling bridge equipped with one (1) submersible pump for backwash rated at approximately 17 L/s and one (1) washwater pump rated at approximately 17 L/s.
 - filters 5 & 6 have an automatic backwash system consisting of a travelling bridge equipped with one (1) washwater pump rated at approximately 14 L/s.
 - air scour system: Tertiary filters 5 and 6 are equipped with an air scour system with a shared positive displacement blower having a rated capacity of approximately 78 m³/min for cleaning the filter media as part of routine maintenance.

Supplementary Treatment Systems

- Phosphorus Removal
 - two (2) below grade storage tanks PVC lined, for storage of Alum, each with approximately 38,000 L capacity located in the Chemical Building.
 - two (2) double-head positive displacement metering pumps installed in the existing chemical building to dose alum at the inlet works, the aeration tank influent channel and the mixed liquor channel; each metering pump having a rated capacity of approximately 680 L/hr for total capacity of 1360 L/hr.
 - two (2) peristaltic hose pumps rated at 371 L/hr each for total capacity of 742 L/hr.
 - one (1) positive displacement transfer pump with a rated capacity of approximately 640 L/hr installed in the existing chemical building for alum transfer to day tank storage of alum for use in the flash mixing tanks.
 - one (1) day tank for storage of alum, with approximately 3,200 L capacity, located in existing

concrete chemical storage tank between Ultra Violet (UV) disinfection channels.

- four (4) positive displacement metering pumps installed in the existing high pressure effluent pump room for alum feed for phosphorus removal, each metering pump having a rated capacity of approximately 53 L/hr, to dose alum from the day tank to the flash mixing tanks.
- three (3) flash mixing tanks having dimensions of approximately 8.5 m long x 4.0 m wide x 4.5 m SWD, to provide flash mixing of alum in the RBC effluent for phosphorus removal, equipped with approximately 12kW motor driven, propeller type mixers, respectively.
- six (6) flocculation tanks, two (2) downstream of each flash mixing tank for phosphorus removal at an average daily flow of 76,000 m³/day, each tank having dimensions of approximately 8.5 m x 8.5 m x 4.5 m SWD, equipped with a 2.2 kW and 1.1 kW motor driven, propeller type mixers, respectively.

Disinfection System

- Effluent Disinfection – UV Disinfection
 - two (2) approximately 14 m long x 2.5 m wide x 2 m SWD parallel, ultraviolet disinfection open channels, each ultraviolet disinfection channel equipped with a system control centre and a power distribution centre.
 - 18 modules per flow channel, (6 rows with 3 columns), total of 36 modules combined for the two channels, installed vertically with associated appurtenances with a total capacity of approximately 195,000m³/day.
 - two (2) positive displacement blowers installed to supply air for scouring during UV lamp cleaning, each blower having a rated capacity of approximately 120 L/s at a discharge pressure of approximately 48 kPa with an electric drive of approximately 11 kW.
 - one (1) approximately 2 m long x 1m wide x 2 m deep UV cleaning tank installed for UV lamp cleaning (acid) solution complete with scouring blower.
- Sodium Hypochlorite Disinfection
 - sodium hypochlorite storage and feed system consisting of two (2) storage tanks of approximately 6,000 L (combined);
 - two (2) peristaltic hose pumps rated at 550 L/hr each.
 - piping for addition of sodium hypochlorite to the tertiary filters for filter cleaning.

Final Effluent Flow Measurement and Sampling Point

- automatic composite sampler at outlet of the UV disinfection system;

Sludge Management System

- Sludge Thickening
 - three (3) positive displacement waste activated sludge pumps, each pump rated at approximately 25.0 L/s at 21 m TDH with approximately 19 kW variable frequency drive.
 - one (1) polymer feed system having a rated capacity of approximately 30 L/hr, adjusted per demand, consisting of a volumetric feeder, a polymer hopper wetting assembly, three (3) positive displacement rated capacity of approximately 20 kg/hr, post dilution feed pumps with polymer solution to be dosed after the waste activated sludge pumps.
 - three (3) approximately 1.3 m diameter x 4.8 m long rotary drum thickeners.
 - two (2) positive displacement thickened activated sludge pumps, each pump rated at approximately 13 L/s at 42 m TDH with approximately 22 kW variable frequency drive.
- Sludge Pre-Treatment
 - two (2) cells within one tank to be used in either anaerobic sludge blending process mode or aerobic dual-digestion process mode, with an approximate volume of 620 m³ each.
 - one (1) external propeller type draft tube mixer per cell to provide sludge mixing, each mixer having a rated capacity of approximately 19 m³/min and 11 kW.
 - capability for addition of atmospheric air or high purity oxygen to holding cells of approximately 4 m³/min (150 scfm).
 - two (2) centrifugal pumps to provide sludge transfer to the primary anaerobic sludge digesters, each pump having an approximate capacity of 22 L/s at a TDH of approximately 14 m with a variable frequency drive of approximately 8 kW.
 - one (1) centrifugal blower to purge off gases from the cells to the UNOX reactors, and having an approximate capacity of 31 L/s at a discharge pressure of 0.7 m. water column with a direct drive of approximately 6kW.
- Sludge Digestion
 - Primary Digesters

- two (2) primary anaerobic digesters (No. 1 and No. 2) with a volume of approximately 1,580 m³ each.
- four (4) internal draft tube mixers on Primary Digesters No. 1 and No. 2 (two per tank) to provide sludge mixing, each mixer having an approximate capacity of 27 m³/min with a reversible, variable frequency drive of approximately 8 kW.
- digesters No. 1 and No. 2 sludge heating system consists of two (2) sludge recirculation heaters rated at approximately 300 kW each, which are installed in the control room of these digesters; and hot water jacket type heaters affixed to the mechanical mixers of approximately 60 kW for each mixer.
- two (2) sludge re-circulating pumps, each pump having an approximate capacity of 22 L/s at a TDH of approximately 14 m with a variable frequency drive of approximately 8 kW, also having in-line grinders with by-pass for maintenance.
- two (2) transfer/recirculation pumps, transferring to the secondary digester or Primary Digester No. 3, each pump having an approximate capacity of 22 L/s at a TDH of approximately 14 m with a variable frequency drive of approximately 8 kW.
- one (1) primary anaerobic digester (No. 3) with volume of approximately 3,800 m³ which may be used as secondary digester.
- primary Digester No.3 sludge heating system consisting of two (2) sludge recirculation heaters rated at approximately 100 kW **(each to be upgraded as per Proposed Works)**
- primary digester No.3 sludge heating system consisting of two (2) sludge recirculation heaters rated at approximately 100 kW each. Primary Digester No.3 may be used as a secondary digester as required.
- total combined primary digester volume of approximately 7,000 m³ with minimum HRT of approximately 15 days at 76 MLD. Primary Digesters 1, 2 and 3 may be operated in series or parallel.
- Secondary Digesters
 - one (1) secondary digester, at approximately 3,800 m³ capacity, which may be used temporarily as a primary digester".
 - two (2) transfer pumps, each pump having a rated capacity of approximately 1700 L/hr and a TDH of 24 m, transferring to the on-site Biosolids Holding Tank #1; or Sludge Loading Station No. 2 adjacent to the chemical storage building.
- Biosolids Storage and Disposal

- one (1) on-site sludge storage tank of approximately 772 m³ capacity (Biosolids Holding Tank #1)
- two (2) transfer pumps for loading sludge haulage trucks each pump having a rated capacity of approximately 16 L/s at 8.4 m TDH.
- one (1) propeller mixing pump equipped with an approximate 15 kW motor driven.

Final Effluent Disposal Facilities

- Approximately 316 m of 1200 mm diameter sewer outfall with seventeen (17) open diffuser ports discharging to Kempenfelt Bay of Lake Simcoe.

including all other mechanical system, electrical system, instrumentation and control system, standby power system, piping, pumps, valves and appurtenances essential for the proper, safe and reliable operation of the Works in accordance with this Approval, in the context of process performance and general principles of wastewater engineering only;

all in accordance with the submitted supporting documents listed in Schedule A.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Annual Average Effluent Concentration" is the mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year, calculated and reported as per the methodology specified in Schedule F;
2. "Annual Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar year divided by the number of days during which Final Effluent was discharged that year;
3. "Annual Total Effluent Loading" means the value obtained by multiplying the Annual Average Effluent Concentration of a contaminant by the cumulative total Final Effluent discharged during the same calendar year;
4. "Annual Average Daily Influent Flow" means the cumulative total sewage flow of Influent to the Sewage Treatment Plant during a calendar year divided by the number of days during which sewage was flowing to the Sewage Treatment Plant that year;
5. "Approval" means this environmental compliance approval and any schedules attached to it, and the application;
6. "BOD5" (also known as TBOD5) means five day biochemical oxygen demand measured in an unfiltered sample and includes carbonaceous and nitrogenous oxygen demands;

7. "Bypass" means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities;
8. "CBOD5" means five day carbonaceous (nitrification inhibited) biochemical oxygen demand measured in an unfiltered sample;
9. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;
10. "District Manager" means the District Manager of the appropriate local district office of the Ministry where the Works is geographically located;
11. "*E. coli*" refers to the thermally tolerant forms of *Escherichia* that can survive at 44.5 degrees Celsius;
12. "EPA" means the *Environmental Protection Act*, R.S.O. 1990, c.E.19, as amended;
13. "Equivalent Equipment" means alternate piece(s) of equipment that meets the design requirements and performance specifications of the piece(s) of equipment to be substituted;
14. "Event" means an action or occurrence, at a given location within the Works that causes a Bypass or Overflow. An Event ends when there is no recurrence of Bypass or Overflow in the 12-hour period following the last Bypass or Overflow. Overflows and Bypasses are separate Events even when they occur concurrently;
15. "Existing Works" means those portions of the Works included in the Approval that have been constructed previously;
16. "Final Effluent" means effluent that is discharged to the environment through the approved effluent disposal facilities, including all Bypasses, that are required to meet the compliance limits stipulated in the Approval for the Sewage Treatment Plant at the Final Effluent sampling point(s);
17. "Imported Sewage" means sewage hauled to the Sewage Treatment Plant by licensed waste management system operators of the types and quantities approved for co-treatment in the Sewage Treatment Plant, including hauled sewage and leachate within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended;
18. "Influent" means flows to the Sewage Treatment Plant from the collection system and Imported Sewage;
19. "Limited Operational Flexibility" (LOF) means the conditions that the Owner shall follow in order to undertake any modification that is pre-authorized as part of this Approval;
20. "Ministry" means the ministry of the government of Ontario responsible for the EPA and OWRA and

includes all officials, employees or other persons acting on its behalf;

21. "Monthly Average Effluent Concentration" is the mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month, calculated and reported as per the methodology specified in Schedule F;
22. "Monthly Average Daily Effluent Flow" means the cumulative total Final Effluent discharged during a calendar month divided by the number of days during which Final Effluent was discharged that month;
23. "Monthly Average Daily Effluent Loading" means the value obtained by multiplying the Monthly Average Effluent Concentration of a contaminant by the Monthly Average Daily Effluent Flow over the same calendar month;
24. "Monthly Geometric Mean Density" is the mean of all Single Sample Results of *E.coli* measurement in the samples taken during a calendar month, calculated and reported as per the methodology specified in Schedule F;
25. "Nominally Separate Sewer Systems" means wastewater collection systems that comprised of Sanitary Sewers and Nominally Separate Sewers while runoff from precipitation and snowmelt are separately collected in Storm Sewers;
26. "Nominally Separate Sewers" means Sanitary Sewers that also have connections from roof leaders and foundation drains, and are not considered to be Combined Sewers;
27. "Normal Operating Condition" means the condition when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity;
28. "Operating Agency" means the Owner or the entity that is authorized by the Owner for the management, operation, maintenance, or alteration of the Works in accordance with this Approval;
29. "Overflow" means a discharge to the environment from the Works at designed location(s) other than the approved effluent disposal facilities or via the effluent disposal facilities downstream of the Final Effluent sampling point;
30. "Owner" means The Corporation of the City of Barrie and its successors and assignees;
31. "OWRA" means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;
32. "Peak Daily Flow Rate" (also referred to as maximum daily flow or maximum day flow) means the largest volume of flow to be received during a one-day period for which the sewage treatment process unit or equipment is designed to handle;
33. "Peak Instantaneous Flow Rate" means the instantaneous maximum flow rate as measured by a metering device for which the sewage treatment process unit or equipment is designed to handle;

34. "Preliminary Treatment System" means all facilities in the Sewage Treatment Plant associated with screening and grit removal;
35. "Primary Treatment System" means all facilities in the Sewage Treatment Plant associated with the primary sedimentation unit process and includes chemically enhanced primary treatment;
36. "Processed Organic Waste" means organic waste within the meaning of R.R.O. 1990, Regulation 347: General – Waste Management, as amended, that is hauled to the Sewage Treatment Plant of the types and quantities approved for co-processing in the sludge management system;
37. "Proposed Works" means those portions of the Works included in the Approval that are under construction or to be constructed;
38. "Rated Capacity" means the Annual Average Daily Influent Flow for which the Sewage Treatment Plant is designed to handle;
39. "Secondary Treatment System" means all facilities in the Sewage Treatment Plant associated with biological treatment, secondary sedimentation and phosphorus removal unit processes;
40. "Sewage Treatment Plant" means all the facilities related to sewage treatment within the sewage treatment plant site excluding the Final Effluent disposal facilities;
41. "Single Sample Result" means the test result of a parameter in the effluent discharged on any day, as measured by a probe, analyzer or in a composite or grab sample, as required;
42. "Source Protection Plan" means a drinking water source protection plan prepared under the Clean Water Act, 2006;
43. "Storm Sewers" means pipes that collect and convey runoff resulting from precipitation and snowmelt (including infiltration and inflow);
44. "Works" means the approved sewage works, and includes Proposed Works, Existing Works and modifications made under Limited Operational Flexibility.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. GENERAL PROVISIONS

1. The Owner shall ensure that any person authorized to carry out work on or operate any aspect of the Works is notified of this Approval and the terms and conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
2. The Owner shall design, construct, operate and maintain the Works in accordance with the conditions of this Approval.
3. Where there is a conflict between a provision of any document referred to in this Approval and the conditions of this Approval, the conditions in this Approval shall take precedence.

2. CHANGE OF OWNER AND OPERATING AGENCY

1. The Owner shall, within thirty (30) calendar days of issuance of this Approval, prepare/update and submit to the District Manager the Municipal and Local Services Board Wastewater System Profile Information Form, as amended (Schedule G) under any of the following situations:
 - a. the form has not been previously submitted for the Works;
 - b. this Approval is issued for extension, re-rating or process treatment upgrade of the Works;
 - c. when a notification is provided to the District Manager in compliance with requirements of change of Owner or Operating Agency under this condition.
2. The Owner shall notify the District Manager and the Director, in writing, of any of the following changes within thirty (30) days of the change occurring:
 - a. change of address of Owner;
 - b. change of Owner, including address of new owner;
 - c. change of partners where the Owner is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act, R.S.O. 1990, c. B.17*, as amended, shall be included in the notification;
 - d. change of name of the corporation where the Owner is or at any time becomes a corporation, and a

copy of the most current information filed under the *Corporations Information Act, R.S.O. 1990, c. C.39*, as amended, shall be included in the notification.

3. The Owner shall notify the District Manager, in writing, of any of the following changes within thirty (30) days of the change occurring:
 - a. change of address of Operating Agency;
 - b. change of Operating Agency, including address of new Operating Agency.
4. In the event of any change in ownership of the Works, the Owner shall notify the succeeding owner in writing, of the existence of this Approval, and forward a copy of the notice to the District Manager.
5. The Owner shall ensure that all communications made pursuant to this condition refer to the environmental compliance approval number.

3. CONSTRUCTION OF PROPOSED WORKS / RECORD DRAWINGS

1. All Proposed Works in this Approval shall be constructed and installed and must commence operation within five (5) years of issuance of this Approval, after which time the Approval ceases to apply in respect of any portions of the Works not in operation. In the event that the construction, installation and/or operation of any portion of the Proposed Works is anticipated to be delayed beyond the time period stipulated, the Owner shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment application shall include the reason(s) for the delay and whether there is any design change(s).
2. Within thirty (30) days of commencement of construction, the Owner shall prepare and submit to the District Manager a schedule for the completion of construction and commissioning operation of the Proposed Works. The Owner shall notify the District Manager within thirty (30) days of the commissioning operation of any Proposed Works. Upon completion of construction of the Proposed Works, the Owner shall prepare and submit a statement to the District Manager, certified by a Professional Engineer, that the Proposed Works is constructed in accordance with this Approval.
3. Within one (1) year of completion of construction of the Proposed Works, a set of record drawings of the Works shall be prepared or updated. These drawings shall be kept up to date through revisions undertaken from time to time and a copy shall be readily accessible for reference at the Works.

4. BYPASSES

1. Any Bypass is prohibited, except:
 - a. an emergency Bypass when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of a treatment process or when an unforeseen flow condition exceeds the design capacity of a treatment process that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a

portion of the flow is not bypassed;

- b. a planned Bypass that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Bypass, including an estimated quantity and duration of the Bypass, an assessment of the impact on the quality of the Final Effluent and the mitigation measures if necessary, and the District Manager has given written consent of the Bypass;
2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) prior to bypassing.
3. At the beginning of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:
 - a. the type of the Bypass as indicated in Paragraph 1 and the reason(s) for the Bypass;
 - b. the date and time of the beginning of the Bypass;
 - c. the treatment process(es) gone through prior to the Bypass and the treatment process(es) bypassed;
 - d. the effort(s) done to maximize the flow through the downstream treatment process(es) and the reason(s) why the Bypass was not avoided.
4. Upon confirmation of the end of a Bypass Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:
 - a. the date and time of the end of the Bypass;
 - b. the estimated or measured volume of Bypass.
5. For any Bypass Event, the Owner shall collect daily sample(s) of the Final Effluent, inclusive of the Event and analyze for all effluent parameters outlined in Compliance Limits condition, except for *E. coli*, toxicity to Rainbow Trout and *Daphnia magna*, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia, following the same protocol specified in the Monitoring and Recording condition as for the regular samples. The sample(s) shall be in addition to the regular Final Effluent samples required under the monitoring and recording condition, except when the Event occurs on a scheduled monitoring day.
6. The Owner shall submit a summary report of the Bypass Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary reports shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5) and either a statement of compliance or a summary of the non-compliance notifications submitted as required under Paragraph 1 of Condition 11. If there is no Bypass Event

during a quarter, a statement of no occurrence of Bypass is deemed sufficient.

7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Bypass Event.

5. OVERFLOWS

1. Any Overflow is prohibited, except:
 - a. an emergency Overflow in an emergency situation when a structural, mechanical or electrical failure causes a temporary reduction in the capacity of the Works or when an unforeseen flow condition exceeds the design capacity of the Works that is likely to result in personal injury, loss of life, health hazard, basement flooding, severe property damage, equipment damage or treatment process upset, if a portion of the flow is not overflowed;
 - b. a planned Overflow that is a direct and unavoidable result of a planned repair and maintenance procedure or other circumstance(s), the Owner having notified the District Manager in writing at least fifteen (15) days prior to the occurrence of Overflow, including an estimated quantity and duration of the Overflow, an assessment of the impact on the environment and the mitigation measures if necessary, and the District Manager has given written consent of the Overflow;
2. Notwithstanding the exceptions given in Paragraph 1, the Operating Agency shall undertake everything practicable to maximize the flow through the downstream treatment process(es) and Bypass(es) prior to overflowing.
3. At the beginning of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:
 - a. the type of the Overflow as indicated in Paragraph 1 and the reason(s) for the Overflow;
 - b. the date and time of the beginning of the Overflow;
 - c. the point of the Overflow from the Works, the treatment process(es) gone through prior to the Overflow, the disinfection status of the Overflow and whether the Overflow is discharged through the effluent disposal facilities or an alternate location;
 - d. the effort(s) done to maximize the flow through the downstream treatment process(es) and Bypass(es) and the reason(s) why the Overflow was not avoided.
4. Upon confirmation of the end of an Overflow Event, the Owner shall immediately notify the Spills Action Centre (SAC) and the local Medical Officer of Health. This notice shall include, at a minimum, the following information:

- a. the date and time of the end of the Overflow;
 - b. the estimated or measured volume of the Overflow.
5. For any Overflow Event
- a. in the Sewage Treatment Plant, the Owner shall collect grab sample(s) of the Overflow, one near the beginning of the Event and one every eight (8) hours for the duration of the Event, and have them analyzed at least for CBOD₅, total suspended solids, total phosphorus, total ammonia nitrogen, nitrate as N, nitrite as N, total Kjeldahl nitrogen, *E. coli* , except that raw sewage and primary treated effluent Overflow shall be analyzed for BOD₅, total suspended solids, total phosphorus and total Kjeldahl nitrogen only.
6. The Owner shall submit a summary report of the Overflow Event(s) to the District Manager on a quarterly basis, no later than each of the following dates for each calendar year: February 15, May 15, August 15, and November 15. The summary report shall contain, at a minimum, the types of information set out in Paragraphs (3), (4) and (5). If there is no Overflow Event during a quarter, a statement of no occurrence of Overflow is deemed sufficient.
7. The Owner shall develop a notification procedure in consultation with the District Manager and SAC and notify the public and downstream water users that may be adversely impacted by any Overflow Event.
8. The Owner shall develop a response plan for any unplanned Overflows, consisting of measures to mitigate and prevent the contamination of drinking water.

6. DESIGN OBJECTIVES

1. The Owner shall design and undertake everything practicable to operate the Sewage Treatment Plant in accordance with the following objectives:
 - a. Final Effluent parameters design objectives listed in the table(s) included in Schedule B.
 - b. Final Effluent is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discoloration on the receiving waters.
 - c. Annual Average Daily Influent Flow is within the Rated Capacity of the Sewage Treatment Plant.

7. COMPLIANCE LIMITS

1. The Owner shall operate and maintain the Sewage Treatment Plant such that compliance limits for the Final Effluent parameters listed in the table(s) included in Schedule C are met.
2. The Owner shall operate and maintain the Sewage Treatment Plant such that the Final Effluent is

disinfected continuously year-round / during the disinfection period between January 01 and December 31 inclusive.

8. OPERATION AND MAINTENANCE

1. The Owner shall ensure that, at all times, the Works and the related equipment and appurtenances used to achieve compliance with this Approval are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate staffing and training, including training in all procedures and other requirements of this Approval and the OWRA and regulations, adequate laboratory facilities, process controls and alarms and the use of process chemicals and other substances used in the Works.
2. The Owner shall update and maintain the operations manual for the Works within six (6) months of completion of construction of the Proposed Works, that includes, but not necessarily limited to, the following information:
 - a. operating procedures for the Works under Normal Operating Conditions;
 - b. inspection programs, including frequency of inspection, for the Works and the methods or tests employed to detect when maintenance is necessary;
 - c. repair and maintenance programs, including the frequency of repair and maintenance for the Works;
 - d. procedures for the inspection and calibration of monitoring equipment;
 - e. operating procedures for the Works to handle situations outside Normal Operating Conditions and emergency situations such as a structural, mechanical or electrical failure, or an unforeseen flow condition, including procedures to minimize Bypasses and Overflows;
 - f. a spill prevention and contingency plan, consisting of procedures and contingency plans, including notification to the District Manager, to reduce the risk of spills of pollutants and prevent, eliminate or ameliorate any adverse effects that result or may result from spills of pollutants;
 - g. procedures for receiving, responding and recording public complaints, including recording any followup actions taken.
3. The Owner shall maintain the operations manual up-to-date and make the manual readily accessible for reference at the Works.
4. The Owner shall ensure that the Operating Agency fulfils the requirements under O. Reg. 129/04, as amended for the Works, including the classification of facilities, licensing of operators and operating standards.

9. MONITORING AND RECORDING

1. The Owner shall, upon commencement of operation of the Works, carry out a scheduled monitoring program of collecting samples at the required sampling points, at the frequency specified or higher, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D and record all results, as follows:
 - a. all samples and measurements are to be taken at a time and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored.
 - b. a schedule of the day of the week/month for the scheduled sampling shall be created. The sampling schedule shall be revised and updated every year through rotation of the day of the week/month for the scheduled sampling program, except when the actual scheduled monitoring frequency is three (3) or more times per week.
 - c. definitions and preparation requirements for each sample type are included in document referenced in Paragraph 3.b.
 - d. definitions for frequency:
 - i. Daily means once every day;
 - ii. Weekly means once every week;
 - iii. Thrice per week means three times per week.
 - iv. Monthly means once every month;
 - v. Quarterly means once every three months;
 - vi. Annually means once every year;
2. In addition to the scheduled monitoring program required in Paragraph 1, the Owner shall collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions, by means of the specified sample type and analyzed for each parameter listed in the tables under the monitoring program included in Schedule D, except for *E. coli*, toxicity to Rainbow Trout and *Daphnia magna*, total residual chlorine / bisulphite residual, dissolved oxygen, pH, temperature and unionized ammonia.
3. The methods and protocols for sampling, analysis and recording shall conform, in order of precedence, to the methods and protocols specified in the following documents and all analysis shall be conducted by a laboratory accredited to the ISO/IEC:17025 standard or as directed by the District Manager:
 - a. the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended;

- b. the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater Version 2.0" (January 2016), PIBS 2724e02, as amended;
 - c. the publication "Standard Methods for the Examination of Water and Wastewater", as amended.
 - d. the Environment Canada publications "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout" (EPS 1/RM/13 Second Edition - December 2000) and "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* " (EPS 1/RM/14 Second Edition - December 2000), as amended, subject to the following:
 - i. the use of pH stabilization in the determination of acute lethality of Final Effluent to Rainbow Trout in accordance with the Environment Canada publication "Procedure for pH Stabilization during the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout (EPS 1/RM/50)" (2008), as amended, is permitted only if:
 - a. all the three criteria stipulated in the Environment Canada EPS 1/RM/50 are met; and
 - b. the Final Effluent is not discharged to a receiver in which the Final Effluent contributes more than 50% of the total flow in the receiving water, unless the District Manager, having reviewed additional information submitted regarding the Final Effluent and the receiving water approves on the use of RM50 on a site-specific basis.
4. If the Owner monitors Bisulphite Residual as a surrogate to Total Residual Chlorine, then detected levels of Bisulphite Residual in the sample shall be deemed to confirm absence of Total Residual Chlorine.
 5. The minimum monitoring frequency with respect to acute lethality to Rainbow Trout and *Daphnia magna* shall, after eight (8) consecutive quarters of monitoring results not indicating acute lethality, be reduced to annually. If any Final Effluent sample indicates acute lethality to Rainbow Trout or *Daphnia magna*, the monitoring frequency shall revert back to quarterly and the Owner shall carry out the following immediately:
 - a. Review the following:
 - i. Final Effluent quality and confirm that concentrations of ammonia are within the limits;
 - ii. plant operations around the time of the toxicity event; and
 - iii. all data available regarding plant operations and Final Effluent quality.
 - b. If the observed effluent toxicity is not associated with ammonia, an investigation shall be undertaken to determine the cause or source of the toxicity.
 - c. Upon determination of cause or source of acute lethality to Rainbow Trout and *Daphnia magna*, the Owner shall determine appropriate control measures to achieve non-acutely lethal effluent and time lines for the implementation of identified control measures. The Owner shall submit the proposed

control measures and implementation time lines for approval to the District Manager.

6. The Owner shall monitor and record the flow rate and daily quantity using flow measuring devices or other methods of measurement as approved below calibrated to an accuracy within plus or minus 15 per cent (+/- 15%) of the actual flowrate of the following:
 - a. Influent flow to the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates/details of other methods (e.g. top water elevation of lagoons), or in lieu of an actual installation of equipment, adopt the flow measurements of the Final Effluent for the purpose of estimating Influent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
 - b. Final Effluent discharged from the Sewage Treatment Plant by continuous flow measuring devices and instrumentations/pumping rates/details of other methods (e.g. level of lagoons), or in lieu of an actual installation of equipment, adopt the flow measurements of the Influent for the purpose of estimating Final Effluent flows if the Influent and Final Effluent streams are considered not significantly different in flow rates and quantities;
 - c. each type of Imported Sewage received for co-treatment at the Sewage Treatment Plant by flow measuring devices/pumping rates/haul truck manifests;
7. The Owner shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this Approval.

10. LIMITED OPERATIONAL FLEXIBILITY

1. The Owner may make pre-authorized modifications to the sewage pumping stations and Sewage Treatment Plant in Works in accordance with the document "Limited Operational Flexibility - Protocol for Pre-Authorized Modifications to Municipal Sewage Works" (Schedule E), as amended, subject to the following:
 - a. the modifications will not involve the addition of any new treatment process or the removal of an existing treatment process, including chemical systems, from the liquid or solids treatment trains as originally designed and approved.
 - b. the scope and technical aspects of the modifications are in line with those delineated in Schedule E and conform with the Ministry's publication "Design Guidelines for Sewage Works 2008", as amended, Ministry's regulations, policies, guidelines, and industry engineering standards;
 - c. the modifications shall not negatively impact on the performance of any process or equipment in the Works or result in deterioration in the Final Effluent quality;
 - d. where the pre-authorized modification requires notification, a "Notice of Modifications to Sewage Works" (Schedule E), as amended shall be completed with declarations from a Professional Engineer and the Owner and retained on-site prior to the scheduled implementation date. All supporting

information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the modifications conform with LOF shall remain on-site for future inspection.

2. The following modifications are not pre-authorized under Limited Operational Flexibility:
 - a. Modifications that involve addition or extension of process structures, tankages or channels;
 - b. Modifications that involves relocation of the Final Effluent outfall or any other discharge location or that may require reassessment of the impact to the receiver or environment;
 - c. Modifications that involves addition of or change in technology of a treatment process or that may involve reassessment of the treatment train process design;
 - d. Modifications that requires changes to be made to the emergency response, spill prevention and contingency plan; or
 - e. Modifications that are required pursuant to an order issued by the Ministry.

11. REPORTING

1. The Owner shall report to the District Manager orally as soon as possible any non-compliance with the compliance limits, and in writing within seven (7) days of non-compliance.
2. The Owner shall, within fifteen (15) days of occurrence of a spill within the meaning of Part X of the EPA, submit a full written report of the occurrence to the District Manager describing the cause and discovery of the spill, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation, in addition to fulfilling the requirements under the EPA and O. Reg. 675/98 "Classification and Exemption of Spills and Reporting of Discharges".
3. The Owner shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to Ministry staff, Source Protection Authority and any other parties identified in the Source Protection Plans.
4. The Owner shall prepare performance reports on a calendar year basis and submit to the District Manager by March 31 of the calendar year following the period being reported upon. The reports shall contain, but shall not be limited to, the following information pertaining to the reporting period:
 - a. a summary and interpretation of all Influent and Imported Sewage monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;
 - b. a summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

- c. a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;
- d. a summary of all operating issues encountered and corrective actions taken;
- e. a summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;
- f. a summary of any effluent quality assurance or control measures undertaken;
- g. a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;
- h. a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:
 - i. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;
 - ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;
- i. a tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;
- j. a summary of any complaints received and any steps taken to address the complaints;
- k. a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;
- l. a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification.
- m. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.
- n. any changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Proposed Works.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition 1 regarding general provisions is imposed to ensure that the Works are constructed and operated in the manner in which they were described and upon which approval was granted.
2. Condition 2 regarding change of Owner and Operating Agency is included to ensure that the Ministry records are kept accurate and current with respect to ownership and Operating Agency of the Works and to ensure that subsequent owners of the Works are made aware of the Approval and continue to operate the Works in compliance with it.
3. Condition 3 regarding construction of Proposed Works/record drawings is included to ensure that the Works are constructed in a timely manner so that standards applicable at the time of Approval of the Works are still applicable at the time of construction to ensure the ongoing protection of the environment, and that prior to the commencement of construction of the portion of the Works that are approved in principle only, the Director will have the opportunity to review detailed design drawings, specifications and an engineer's report containing detailed design calculations for that portion of the Works, to determine capability to comply with the Ministry's requirements stipulated in the terms and conditions of the Approval, and also ensure that the Works are constructed in accordance with the Approval and that record drawings of the Works "as constructed" are updated and maintained for future references.
4. Condition 4 regarding Bypasses is included to indicate that Bypass is prohibited, except in circumstances where the failure to Bypass could result in greater damage to the environment than the Bypass itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Bypass Events.
5. Condition 5 regarding Overflows is included to indicate that Overflow of untreated or partially treated sewage to the receiver is prohibited, except in circumstances where the failure to Overflow could result in greater damage to the environment than the Overflow itself. The notification and documentation requirements allow the Ministry to take action in an informed manner and will ensure the Owner is aware of the extent and frequency of Overflow Events.
6. Condition 6 regarding design objectives is imposed to establish non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.
7. Condition 7 regarding compliance limits is imposed to ensure that the Final Effluent discharged from the Works to the environment meets the Ministry's effluent quality requirements.
8. Condition 8 regarding operation and maintenance is included to require that the Works be properly operated, maintained, funded, staffed and equipped such that the environment is protected and deterioration, loss, injury or damage to any person or property is prevented. As well, the inclusion of a comprehensive operations manual governing all significant areas of operation, maintenance and repair is prepared, implemented and kept up-to-date by the Owner. Such a manual is an integral part of the operation of the Works. Its compilation and use should assist the Owner in staff training, in proper plant operation and in

identifying and planning for contingencies during possible abnormal conditions. The manual will also act as a benchmark for Ministry staff when reviewing the Owner's operation of the Works.

9. Condition 9 regarding monitoring and recording is included to enable the Owner to evaluate and demonstrate the performance of the Works, on a continual basis, so that the Works are properly operated and maintained at a level which is consistent with the design objectives and compliance limits.
10. Condition 10 regarding Limited Operational Flexibility is included to ensure that the Works are constructed, maintained and operated in accordance with the Approval, and that any pre-approved modification will not negatively impact on the performance of the Works.
11. Condition 11 regarding reporting is included to provide a performance record for future references, to ensure that the Ministry is made aware of problems as they arise, and to provide a compliance record for this Approval.

Schedule A

1. Application for Environmental Compliance Approval submitted by Robert Sutton, Director of Engineering of The City of Barrie received on September 11, 2017, including design report, final plans and specifications.

Schedule B

Final Effluent Design Objectives

Concentration Objectives

Final Effluent Parameter	Averaging Calculator	Objective (milligrams per litre unless otherwise indicated)
CBOD5	Single Sample Result	10.0 mg/L
Total Suspended Solids	Single Sample Result	10.0 mg/L
Total Phosphorus	Single Sample Result	0.12 mg/L
Total Ammonia Nitrogen	Single Sample Result	3.0 mg/L (June 01 - October 31) 8.0 mg/L (November 01 - May 31)
<i>E. coli</i>	Monthly Geometric Mean Density	*100 CFU per 100 mL (January 01 to December 31)
pH	Single Sample Result	6.5 - 8.5 inclusive

* If the MPN method is utilized for *E. coli* analysis the objective shall be 100 MPN/100 mL

Schedule C

Final Effluent Compliance Limits

Concentration Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Effluent Concentration	15.0 mg/L
Total Suspended Solids	Monthly Average Effluent Concentration	15.0 mg/L
Total Phosphorus	Monthly Average Effluent Concentration	0.18 mg/L
Total Ammonia Nitrogen	Monthly Average Effluent Concentration	4.0 mg/L (June 01 - October 31) 10.0 mg/L (November 01 - May 31)
<i>E. coli</i>	Monthly Geometric Mean Density	*200 CFU per 100 mL (January 01 to December 31)
pH	Single Sample Result	between 6.0 - 9.5 inclusive

* If the MPN method is utilized for *E. coli* analysis the limit shall be 200 MPN/100 mL

Loading Limits

Final Effluent Parameter	Averaging Calculator	Limit (maximum unless otherwise indicated)
CBOD5	Monthly Average Daily Effluent Loading	1,140 kg/d
Total Suspended Solids	Monthly Average Daily Effluent Loading	1,140 kg/d
Total Phosphorus	Monthly Average Daily Effluent Loading	13.7 kg/d
Total Ammonia Nitrogen	Monthly Average Daily Effluent Loading	304 kg/d (June 01 - October 31) 760 kg/d (November 01 - May 31)

Lake Simcoe Phosphorus Reduction Strategy (LSRPS) Compliance Limits

Final Effluent Parameter	Annual Average Concentration (maximum unless otherwise indicated)	Annual Total Loading (maximum unless otherwise indicated)
Total Phosphorus Baseline Concentration	0.1 mg/L	-
Total Phosphorus Baseline Load	-	2,774 kg/year

Schedule D

Monitoring Program

Influent - Influent sampling point

Parameters	Sample Type	Minimum Frequency
BOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Weekly
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Dissolved Reactive Phosphorus	24 hour composite	Weekly

Imported Sewage - Imported Sewage Receiving Station

Parameters	Sample Type	Minimum Frequency
BOD5	Grab	Monthly
Total Suspended Solids	Grab	Monthly
Total Phosphorus	Grab	Monthly
Total Kjeldahl Nitrogen	Grab	Monthly

Final Effluent - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
CBOD5	24 hour composite	Weekly
Total Suspended Solids	24 hour composite	Weekly
Total Phosphorus	24 hour composite	Thrice per week
Dissolved Reactive Phosphorus	24 hour composite	Thrice per week
Total Ammonia Nitrogen	24 hour composite	Thrice per week
Total Kjeldahl Nitrogen	24 hour composite	Weekly
Nitrate as Nitrogen	24 hour composite	Weekly
<i>E. coli</i>	Grab	Weekly (January 01 to December 31)
pH*	Grab/Probe/Analyzer	Thrice per week
Temperature*	Grab/Probe/Analyzer	Thrice per week
Un-ionized Ammonia**	As Calculated	Thrice per week

*pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen.

**The concentration of un-ionized ammonia shall be calculated using the total ammonia concentration, pH and temperature using the methodology stipulated in "Ontario's Provincial Water Quality Objectives" dated July 1994, as amended.

Leachate Related - Final Effluent sampling point

Parameters	Sample Type	Minimum Frequency
Boron	Grab	Quarterly
Cobalt	Grab	Quarterly
Magnesium	Grab	Quarterly
Manganese	Grab	Quarterly
Potassium	Grab	Quarterly
Strontium	Grab	Quarterly
Bis (2-ethylhexyl) Phthalate	Grab	Quarterly

Schedule E

Limited Operational Flexibility

Protocol for Pre-Authorized Modifications to Municipal Sewage Works

1. General

1. Pre-authorized modifications are permitted only where Limited Operational Flexibility has already been granted in the Approval and only permitted to be made at the pumping stations and sewage treatment plant in the Works, subject to the conditions of the Approval.
2. Where there is a conflict between the types and scope of pre-authorized modifications listed in this document, and the Approval where Limited Operational Flexibility has been granted, the Approval shall take precedence.
3. The Owner shall consult the District Manager on any proposed modifications that may fall within the scope and intention of the Limited Operational Flexibility but is not listed explicitly or included as an example in this document.
4. The Owner shall ensure that any pre-authorized modifications will not:
 - a. adversely affect the hydraulic profile of the Sewage Treatment Plant or the performance of any upstream or downstream processes, both in terms of hydraulics and treatment performance;
 - b. result in new Overflow or Bypass locations, or any potential increase in frequency or quantity of Overflow(s) or Bypass(es).
 - c. result in a reduction in the required Peak Flow Rate of the treatment process or equipment as originally designed.

2. Modifications that do not require pre-authorization:

1. Sewage works that are exempt from Ministry approval requirements;
 2. Modifications to the electrical system, instrumentation and control system.
- ##### 3. Pre-authorized modifications that do not require preparation of "Notice of Modification to Sewage Works"
1. Normal or emergency maintenance activities, such as repairs, renovations, refurbishments and replacements with Equivalent Equipment, or other improvements to an existing approved piece of equipment of a treatment process do not require pre-authorization. Examples of these activities are:
 - a. Repairing a piece of equipment and putting it back into operation, including replacement of minor

components such as belts, gear boxes, seals, bearings;

- b. Repairing a piece of equipment by replacing a major component of the equipment such as motor, with the same make and model or another with the same or very close power rating but the capacity of the pump or blower will still be essentially the same as originally designed and approved;
 - c. Replacing the entire piece of equipment with Equivalent Equipment.
2. Improvements to equipment efficiency or treatment process control do not require pre-authorization. Examples of these activities are:
- a. Adding variable frequency drive to pumps;
 - b. Adding on-line analyzer, dissolved oxygen probe, ORP probe, flow measurement or other process control device.
4. Pre-Authorized Modifications that require preparation of "Notice of Modification to Sewage Works"
1. Pumping Stations
 - a. Replacement, realignment of existing sewers including manholes, valves, gates, weirs and associated appurtenances provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved.
 - b. Extension or partition of wetwell to increase retention time for emergency response and improve station maintenance and pump operation;
 - c. Replacement or installation of inlet screens to the wetwell;
 - d. Replacement or installation of flowmeters, construction of station bypass;
 - e. Replacement, reconfiguration or addition of pumps and modifications to pump suctions and discharge pipings including valve, gates, motors, variable frequency drives and associated appurtenances to maintain firm pumping capacity or modulate the pump rate provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head or an increase in the peak pumping rate of the pumping station as originally designed;
 - f. Replacement, realignment of existing forcemain(s) valves, gates, and associated appurtenances provided that the modifications will not reduce the flow capacity or increase the total dynamic head and transient in the forcemain.
 2. Sewage Treatment Plant
 1. Sewers and appurtenances

- a. Replacement, realignment of existing sewers (including pipes and channels) or construction of new sewers, including manholes, valves, gates, weirs and associated appurtenances within the a sewage treatment plant, provided that the modifications will not add new influent source(s) or result in an increase in flow from existing sources as originally approved and that the modifications will remove hydraulic bottlenecks or improve the conveyance of sewage into and through the Works.
2. Flow Distribution Chambers/Splitters
 - a. Replacement or modification of existing flow distribution chamber/splitters or construction of new flow distribution chamber/splitters, including replacements or installation of sluice gates, weirs, valves for distribution of flows to the downstream process trains, provided that the modifications will not result in a change in flow distribution ratio to the downstream process trains as originally designed.
3. Imported Sewage Receiving Facility
 1. Replacement, relocation or installation of loading bays, connect/disconnect hook-up systems and unloading/transferring systems;
 2. Replacement, relocation or installation of screens, grit removal units and compactors;
 3. Replacement, relocation or installation of pumps, such as dosing pumps and transfer pumps, valves, piping and appurtenances;
 4. Replacement, relocation or installation of storage tanks/chambers and spill containment systems;
 5. Replacement, relocation or installation of flow measurement and sampling equipment;
 6. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity and waste loading of each type of Imported Sewage already approved for co-treatment.
4. Preliminary Treatment System
 - a. Replacement of existing screens and grit removal units with equipment of the same or higher process performance technology, including where necessary replacement or upgrading of existing screenings dewatering washing compactors, hydrocyclones, grit classifiers, grit pumps, air blowers conveyor system, disposal bins and other ancillary equipment to the screening and grit removal processes.
 - b. Replacement or installation of channel aeration systems, including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers.

5. Primary Treatment System

- a. Replacement of existing sludge removal mechanism, including sludge chamber;
- b. Replacement or installation of scum removal mechanism, including scum chamber;
- c. Replacement or installation of primary sludge pumps, scum pumps, provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the primary sludge pump(s) and scum pump(s) are originally designed to handle.

6. Secondary Treatment System

1. Biological Treatment

- a. Conversion of complete mix aeration tank to plug-flow multi-pass aeration tank, including modifications to internal structural configuration;
- b. Addition of inlet gates in multi-pass aeration tank for step-feed operation mode;
- c. Partitioning of an anoxic/flip zone in the inlet of the aeration tank, including installation of submersible mixer(s);
- d. Replacement of aeration system including air blowers, air supply main, air headers, air laterals, air distribution grids and diffusers, provided that the modifications will not result in a reduction in the firm capacity or discharge pressure that the blowers are originally designed to supply or in the net oxygen transferred to the wastewater required for biological treatment as originally required.

2. Secondary Sedimentation

- a. Replacement of sludge removal mechanism, including sludge chamber;
- b. Replacement or installation of scum removal mechanism, including scum chamber;
- c. Replacement or installation of return activated sludge pump(s), waste activated sludge pump(s), scum pump(s), provided that the modifications will not result in a reduction in the firm pumping capacity or discharge head that the activated sludge pump(s) and scum pump(s) are originally designed to handle.

7. Post-Secondary Treatment System

- a. Replacement of filtration system with equipment of the same filtration technology, including feed pumps, backwash pumps, filter reject pumps, filtrate extract pumps, holding tanks associated with the pumping system, provided that the modifications will not result in a reduction in the capacity of

the filtration system as originally designed.

8. Disinfection System

1. UV Irradiation

- a. Replacement of UV irradiation system, provided that the modifications will not result in a reduction in the design capacity of the disinfection system or the radiation level as originally designed.

2. Chlorination/Dechlorination and Ozonation Systems

- a. Extension and reconfiguration of contact tank to increase retention time for effective disinfection and reduce dead zones and minimize short-circuiting;
- b. Replacement or installation of chemical storage tanks, provided that the tanks are provided with effective spill containment.

9. Supplementary Treatment Systems

1. Chemical systems

- a. Replacement, relocation or installation of chemical storage tanks for existing chemical systems only, provided that the tanks are sited with effective spill containment;
- b. Replacement or installation of chemical dosing pumps provided that the modifications will not result in a reduction in the firm capacity that the dosing pumps are originally designed to handle.
- c. Relocation and addition of chemical dosing point(s) including chemical feed pipes and valves and controls, to improve phosphorus removal efficiency;
- d. Use of an alternate chemical provided that it is a non-proprietary product and is a commonly used alternative to the chemical approved in the Works, provided that the chemical storage tanks, chemical dosing pumps, feed pipes and controls are also upgraded, as necessary..

10. Sludge Management System

1. Sludge Holding and Thickening

- a. Replacement or installation of sludge holding tanks, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;

2. Sludge Digestion

- a. Replacement or installation of digesters, sludge handling pumps, such as transfer pumps, feed pumps, recirculation pumps, provided that modifications will not result in reduction in the solids storage or handling capacities;
- b. replacement of sludge digester covers.

3. Sludge Dewatering and Disposal

- a. Replacement of sludge dewatering equipment, sludge handling pumps, such as transfer pumps, feed pumps, cake pumps, loading pumps, provided that modifications will not result in reduction in solids storage or handling capacities.

4. Processed Organic Waste

- a. Changes to the source(s) or quantity from each source, provided that changes will not result in an increase in the total quantity already approved for co-processing.

11. Standby Power System

1. Replacement or installation of standby power system, including feed from alternate power grid, emergency power generator, fuel supply and storage systems, provided that the existing standby power generation capacity is not reduced.

12. Pilot Study

1. Small side-stream pilot study for existing or new technologies, alternative treatment process or chemical, provided:
 - i. all effluent from the pilot system is hauled off-site for proper disposal or returned back to the sewage treatment plant for at a point no further than immediately downstream of the location from where the side-stream is drawn;
 - ii. no proprietary treatment process or propriety chemical is involved in the pilot study;
 - iii. the effluent from the pilot system returned to the sewage treatment plant does not significantly alter the composition/concentration of or add any new contaminant/inhibiting substances to the sewage to be treated in the downstream process;
 - iv. the pilot study will not have any negative impacts on the operation of the sewage treatment plant or cause a deterioration of effluent quality;
 - v. the pilot study does not exceed a maximum of two years and a notification of completion shall be

submitted to the District Manager within one month of completion of the pilot project.

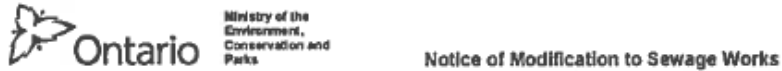
13. Lagoons

- a. installing baffles in lagoon provided that the operating capacity of the lagoon system is not reduced;
- b. raise top elevation of lagoon berms to increase free-board;
- c. replace or install interconnecting pipes and chambers between cells, provided that the process design operating sequence is not changed;
- d. replace or install mechanical aerators, or replace mechanical aerators with diffused aeration system provided that the mixing and aeration capacity are not reduced;
- e. removal of accumulated sludge and disposal to an approved location offsite.

3. Final Effluent Disposal Facilities

1. Replacement or realignment of the Final Effluent channel, sewer or forcemain, including manholes, valves and appurtenances from the end of the treatment train to the discharge outfall section, provided that the sewer conveys only effluent discharged from the Sewage Treatment Plant and that the replacement or re-aligned sewer has similar dimensions and performance criteria and is in the same or approximately the same location and that the hydraulic capacity will not be reduced.

This page contains an image of the form entitled "Notice of Modification to Sewage Works". A digital copy can be obtained from the District Manager.



RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility <small>(insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)</small>		
<small>ECA Number</small>	<small>Issuance Date (month/year)</small>	<small>Notice number (if applicable)</small>
<small>ECA Owner</small>	<small>Municipality</small>	

Part 2: Description of the modifications as part of the Limited Operational Flexibility <small>(Attach a detailed description of the sewage works)</small>
<p>Description shall include:</p> <ol style="list-style-type: none"> 1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.) 2. Confirmation that the anticipated environmental effects are negligible 3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e. submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer	
<p>I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:</p> <ol style="list-style-type: none"> 1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario; 2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA; 3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate.</p>	
<small>Name (Print)</small>	<small>PEO License Number</small>
<small>Signature</small>	<small>Date (month/year)</small>
<small>Name of Employer</small>	

Part 4 – Declaration by Owner	
<p>I hereby declare that:</p> <ol style="list-style-type: none"> 1. I am authorized by the Owner to complete this Declaration; 2. The Owner consents to the modification; and 3. This modification to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA. 4. The Owner has fulfilled all applicable requirements of the Environmental Assessment Act. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate.</p>	
<small>Name of Owner Representative (Print)</small>	<small>Owner representative's title (Print)</small>
<small>Owner Representative's Signature</small>	<small>Date (month/year)</small>

EAPB Form July 25, 2019

Schedule F

Methodology for Calculating and Reporting Monthly Average Effluent Concentration, Annual Average Effluent Concentration and Monthly Geometric Mean Density

1. Monthly Average Effluent Concentration

- Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed as follows depending on the result of the calculation:
- If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;
 - If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar month, then report and use this arithmetic mean as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval;
 - If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, then proceed to Step 2;
 - If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar month, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.
- Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar month and proceed depending on the result of the calculation:
- Group No Bypass Days (NBPD) data and Bypass Days (BPD) data during a calendar month separately;
 - Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar month and record it as **Monthly Average NBPD Effluent Concentration**;
 - Obtain the “**Total Monthly NBPD Flow**” which is the total amount of Final Effluent discharged on all NBPD during the calendar month;
 - Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar month

and record it as **Monthly Average BPD Effluent Concentration**;

- e. Obtain the “**Total Monthly BPD Flow**” which is the total amount of Final Effluent discharged on all BPD during the calendar month;
- f. Calculate the flow-weighted arithmetic mean using the following formula:

$$\frac{[(\text{Monthly Average NBPD Effluent Concentration} \times \text{Total Monthly NBPD Flow}) + (\text{Monthly Average BPD Effluent Concentration} \times \text{Total Monthly BPD Flow})]}{(\text{Total Monthly NBPD Flow} + \text{Total Monthly BPD Flow})}$$

It should be noted that in this method, if there are no Bypass Event for the month, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

- g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Monthly Average Effluent Concentration for this parameter where applicable in this Approval.

2. Annual Average Effluent Concentration

Step 1: Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed as follows depending on the result of the calculation:

- a. If the arithmetic mean does not exceed the compliance limit for the contaminant, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;
- b. If the arithmetic mean exceeds the compliance limit for the contaminant and there was no Bypass Event during the calendar year, then report and use this arithmetic mean as the Annual Average Effluent Concentration for this parameter where applicable in this Approval;
- c. If the arithmetic mean exceeds the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, then proceed to Step 2;
- d. If the arithmetic mean does not exceed the compliance limit for the contaminant and there was Bypass Event(s) during the calendar year, the Owner may still elect to proceed to Step 2 calculation of the flow-weighted arithmetic mean.

Step 2: Calculate the flow-weighted arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured during a calendar year and proceed depending on the result of the calculation:

- a. Group No Bypass Days (NBPD) data and Bypass Days (BPD) data during a calendar year

separately;

- b. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all NBPD during a calendar year and record it as **Annual Average NBPD Effluent Concentration**;
- c. Obtain the “**Total Annual NBPD Flow**” which is the total amount of Final Effluent discharged on all NBPD during the calendar year;
- d. Calculate the arithmetic mean of all Single Sample Results of the concentration of a contaminant in the Final Effluent sampled or measured on all BPD during a calendar year and record it as **Annual Average BPD Effluent Concentration**;
- e. Obtain the “**Total Annual BPD Flow**” which is the total amount of Final Effluent discharged on all BPD during the calendar year;
- f. Calculate the flow-weighted arithmetic mean using the following formula:

$$\frac{[(\text{Annual Average NBPD Effluent Concentration} \times \text{Total Annual NBPD Flow}) + (\text{Annual Average BPD Effluent Concentration} \times \text{Total Annual BPD Flow})]}{(\text{Total Annual NBPD Flow} + \text{Total Annual BPD Flow})}$$

It should be noted that in this method, if there are no Bypass Event for the calendar year, the calculated result would be the same as the non-flow-weighted arithmetic mean method;

- g. Report and use the lesser of the flow-weighted arithmetic mean obtained in Step 2 and the arithmetic mean obtained in Step 1 as the Annual Average Effluent Concentration for this parameter where applicable in this Approval.

3. Monthly Geometric Mean Density

Geometric mean is defined as the n^{th} root of the product of n numbers. In the context of calculating Monthly Geometric Mean Density for *E.coli*, the following formula shall be used:

$$\sqrt[n]{x_1 x_2 x_3 \cdots x_n}$$

in which,

“ n ” is the number of samples collected during the calendar month; and

“ x ” is the value of each Single Sample Result.

For example, four weekly grab samples were collected and tested for *E. coli* during the calendar month. The *E. coli* densities in the Final Effluent were found below:

Sample Number	<i>E. coli</i> Densities* (CFU /100 mL)
1	10
2	100
3	300
4	50

The Geometric Mean Density for these data:

$$\sqrt[4]{10 \times 100 \times 300 \times 50} = 62$$

*If a particular result is zero (0), then a value of one (1) will be substituted into the calculation of the Monthly Geometric Mean Density. If the MPN method is utilized for *E. coli* analysis, values in the table shall be in MPN/100 mL.

Schedule G

**Municipal and Local Services Board Wastewater System
Profile Information Form**

(For reference only, images of the form are attached on the next four pages. A digital copy can be obtained from the District Manger.)



Ontario

Ministry of the Environment, Conservation and Parks

Municipal and Local Services Board Wastewater System Profile Information Form

The information in this form is necessary to administer the Ministry's approvals, compliance and enforcement programs with respect to wastewater treatment and collection systems owned by municipalities and local services boards. These programs are authorized under the Ontario Water Resources Act, the Environmental Protection Act, the Nutrient Management Act and their respective regulations.

Email the completed form to: watforms@ontario.ca
For any questions call 1-866-793-2588.

[A] SYSTEM PROFILE INFORMATION					
Wastewater System Number (# assigned)		<input type="checkbox"/> New Profile <input type="checkbox"/> Update Existing Profile			
Name of System		Level of Treatment (select one*) <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary <input type="checkbox"/> Secondary Equivalent <input type="checkbox"/> Other (specify): <i>*See Terms and Concepts on page 4</i>			
Name of Municipality or Local Services Board					
Population Served	Population (Design)	Type of System <input type="checkbox"/> Treatment & Collection System <input type="checkbox"/> Collection System Only			
Design Rated Capacity (m ³ /day)	Peak Flow Rate (m ³ /day)	Current Environmental Compliance Approval (ECA) Number	Current ECA Issue Date (yyyy/mm/dd):		
The treatment plant receives sewage from: (Check all that applies. * If you have checked more than one option below, indicate the approximate %)					
<input type="checkbox"/> Sanitary Sewer		<input type="checkbox"/> Combined Sewer			
<input type="checkbox"/> Nominally Separated Sewer		<input type="checkbox"/> Partially Separated Sewer		<i>*See Terms and Concepts on page 4</i>	
[B] OWNER INFORMATION					
Legal Name of Municipality or Local Services Board					
Unit No.	Street No.	Street Name.		Street Type (St, Rd, etc)	Street Direction (N,S,E,W)
PO Box	City/Town			Postal Code	
<input type="checkbox"/> Dr <input type="checkbox"/> Mr <input type="checkbox"/> Ms	<input type="checkbox"/> Miss <input type="checkbox"/> Mrs	Owner Contact First Name	Owner Contact Last Name	Owner Contact Job Title	
Tel. No. () - ext.		Fax Number () -		Email address	
[C] OPERATING AUTHORITY <input type="checkbox"/> Check if same as owner					
Legal Name of Operator					
Unit No.	Street No.	Street Name.		Street Type (St, Rd, etc)	Street Direction (N,S,E,W)
PO Box	City/Town			Postal Code	
<input type="checkbox"/> Dr <input type="checkbox"/> Mr <input type="checkbox"/> Ms	<input type="checkbox"/> Miss <input type="checkbox"/> Mrs	Operator Contact First Name	Operator Contact Last Name	Operator Contact Job Title	
Tel. No. () - ext.		Fax Number () -		Email address	

[D] 24/7 CONTACT					
<input type="checkbox"/> Dr	<input type="checkbox"/> Miss	First Name	Last Name	Job Title	
<input checked="" type="checkbox"/> Mr	<input type="checkbox"/> Mrs				
<input type="checkbox"/> Ms					
Tel. No.		Fax Number		Email address	
() - ext.		() -			
[E] SYSTEM CIVIC LOCATION ADDRESS (I.E. ADDRESS OF TREATMENT PLANT)					
Unit No	Street No.	Street Name		Street Type (St., Rd., etc)	Street Direction (N,S,E,W)
PO Box	City/Town		Postal Code		
If the Wastewater System has no street address					
Geographical Township			Lot	Concession	
Geographical Referencing (if known, enter the Geographical Reference Information for this Wastewater System)					
Map Datum	Geo-Referencing Method		Accuracy Estimate	Location Reference	
Latitude	Longitude	Zone		Easting	Northing
[F] TREATMENT PROCESS					
Preliminary	Primary	Secondary	Secondary Equivalent	Post-Secondary	Additional Treatment
<input type="checkbox"/> Screening <input type="checkbox"/> Shredding/ grinding <input type="checkbox"/> Grit Removal <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Settling/sedimentation/ clarification <input type="checkbox"/> Scum Removal <input type="checkbox"/> Polymer Addition <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Conventional Activated Sludge (CAS) <input type="checkbox"/> Extended Aeration <input type="checkbox"/> Membrane Bioreactor (MBR) <input type="checkbox"/> Sequencing Batch Reactor (SBR) <input type="checkbox"/> Rotating Biological Contactor (RBC) <input type="checkbox"/> Tricking Filter (TF) <input type="checkbox"/> Biological Aeraled Filter (BAF) <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Aerated Lagoon <input type="checkbox"/> Facultative Lagoon <input type="checkbox"/> Anaerobic Lagoon <input type="checkbox"/> Aerobic Lagoon <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Filtration <input type="checkbox"/> Clarification <input type="checkbox"/> Intermittent Sand Filter (after lagoons) <input type="checkbox"/> Polishing Wetlands <input type="checkbox"/> Polishing Lagoons <input type="checkbox"/> Other(specify):	<input type="checkbox"/> Phosphorous Removal <input type="checkbox"/> Biological <input type="checkbox"/> Chemical If chemical is used, specify: <input type="checkbox"/> Nitrification <input type="checkbox"/> Denitrification <input type="checkbox"/> Other(specify):
[G] DISINFECTION					
Method of Disinfection			Disinfection Period		
<input type="checkbox"/> Chlorination If you chlorinate, do you practice de-chlorination? <input type="checkbox"/> Yes <input type="checkbox"/> No			<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal		
<input type="checkbox"/> Ultraviolet Irradiation			<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal		
<input type="checkbox"/> Other (specify):			<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal		

[H] SLUDGE	
Sludge Stabilization Process	Method of Sludge Disposal/Utilization
<input type="checkbox"/> Aerobic Digestion	<input type="checkbox"/> Agricultural
<input type="checkbox"/> Anaerobic Digestion	<input type="checkbox"/> Landfill
<input type="checkbox"/> Drying & Pelletization	<input type="checkbox"/> Incineration
<input type="checkbox"/> Lime Treatment	<input type="checkbox"/> Other (specify):
<input type="checkbox"/> Composting	
<input type="checkbox"/> Other (specify):	
Available Sludge Storage Capacity (m ³):	
[I] EFFLUENT	
Effluent Disposal Method	Effluent Discharge Frequency
<input type="checkbox"/> Surface Water Receiving Water Body Name:	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Subsurface	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
<input type="checkbox"/> Other (specify):	<input type="checkbox"/> Continuous <input type="checkbox"/> Seasonal
Is the effluent discharged in a vulnerable area identified in the local source protection assessment report approved under the Clean Water Act, 2006?	
<input type="checkbox"/> Yes <input type="checkbox"/> No	
[J] INFLUENT	
Does the plant receive sewage from another municipality or local services board either through an interconnected collection system or hauled sewage?	
<input type="checkbox"/> Yes <input type="checkbox"/> No (if yes, name(s) of other municipality or local services board):	
Plant receives:	<input type="checkbox"/> Leachate (approximate annual volume in m ³):
	<input type="checkbox"/> Septage (approximate annual volume in m ³):
	<input type="checkbox"/> Industrial Input (approximate annual volume in m ³): or (approximate volume in %):

Terms and Concepts

The following Terms and Concepts are provided to assist you when completing Wastewater System Profile Information Form.

In order to determine the level of treatment that applies to the wastewater system, the effluent quality objectives that the wastewater treatment plant was designed to meet must be considered. The process based approach often used in the past has led to confusion and is open to interpretation due to recent developments and practices in the wastewater treatment industry. For example, a plant with a high rate filter (often referred to as a tertiary filter) after its secondary treatment was considered a tertiary treatment in the past since the filter was designed and operated to produce a tertiary quality effluent. However, secondary plants are now being constructed with these filters as a safeguard against any potential secondary clarifier performance degradation and not for the purpose of ensuring tertiary treatment performance. Also, new technologies have evolved that can produce tertiary quality effluent without having these high rate filters (e.g., membrane bioreactors). Lagoons were considered in the past as being capable of providing only secondary equivalent treatment. However, with add-on treatment after the lagoons (e.g. Intermittent sand filters), many lagoon treatment systems are capable of producing secondary or tertiary quality effluent.

During the establishment of sewage works, site-specific effluent limits (including averaging periods) are provided by the Ministry's Regional Technical Support Section, considering the assimilative capacity of the receivers and the minimum treatment requirements provided in Procedure F-5-1. The designer of the sewage works then selects objective values that are acceptable to the Ministry and are less (i.e. more stringent) than the effluent limits, in order to provide an adequate safety factor based on the designer's confidence/experience with the technology chosen and other site-specific conditions. The sewage works are then designed (and operated) to meet these design objectives in a reliable and consistent manner. Therefore, the values that are to be used in the determination of the level of treatment that applies to the sewage works must be based on the design objectives, and not the effluent limits.

Two common parameters used in almost all sewage works designs and performance evaluations are CBOD₅ (carbonaceous biochemical oxygen demand) (BCOD₅ – biochemical oxygen demand - for primary sewage works) and total suspended solids (TSS). Therefore, it is logical that the objective values of these two parameters are used to determine the level of treatment at the sewage works.

Level of Treatment:

Primary:

Wastewater treatment plants that have only settling/sedimentation (with or without chemical addition) and providing 30% and 50% or better reduction of BOD₅ and TSS respectively are considered primary plants (MOE Procedures F-5-1 and F-5-5).

Secondary:

Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) or physical-chemical processes producing an effluent quality of CBOD₅ and TSS of 15 mg/L or better are considered secondary plants (MOE Design Guidelines for Sewage Works, 2008).

Secondary Equivalent:

Wastewater treatment plants producing an effluent quality of CBOD₅ of 25 mg/L and TSS of 30 mg/L or better are considered as secondary equivalent plants.

Note: Wastewater treatment plants that provide only primary settling of solids and the addition of chemicals to improve the removal of TSS (and phosphorus) are not considered as secondary treatment plants or secondary equivalent plants (MOE Design Guidelines for Sewage Works, 2008).

Tertiary:

Wastewater treatment plants that have biological processes (e.g. activated sludge process and its variations, fixed film processes) and/or physical-chemical processes producing an effluent quality of CBOD₅ and TSS of 5 mg/L or better are considered tertiary plants.

Note: Biological processes such as nitrification, denitrification and enhanced biological phosphorus removal can be part of either a secondary or tertiary treatment plant. They may be described as secondary treatment plant with nitrification, secondary treatment plant with enhanced biological phosphorus removal, tertiary treatment plant with nitrification etc.

Sewer System Type:

Sanitary Sewers:

Pipes that convey sanitary sewage flows made up of wastewater discharges from residential, commercial, institutional and industrial establishments plus extraneous flow components from such sources as groundwater and surface run off.

Combined Sewers:

Pipes that convey both sanitary sewage and stormwater runoff through a single-pipe system.

Partially Separated Sewers:

Exist when either a portion of the combined sewer area was retrofitted to separate (sanitary and storm) sewers and/or a service area with combined sewers has had a new development area with separate sewers added to the service area, whatever the case may be, the final flows will be combined sewage.

Nominally Separated Sewers:

These sewers are constructed as separate sewers, but the sanitary sewers accept stormwater from roof and foundation drains (i.e., these are separated sewers in name only).

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s).
2377-ALXPQL issued on July 7, 2017.**

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

- a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
- b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of
the Environmental Protection Act
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 24th day of August, 2018



Fariha Pannu, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

YK/
c: DWMD Supervisor, MECP Barrie
Igor Sapun, Hatch Corporation



Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER 6401-C2FKWA

Issue Date: June 2, 2021

The Corporation of the City of Barrie
70 Collier St
Post Office Box, No. 400
Barrie, Ontario
L4M 4T5

Site Location: 249 Bradford Street
249 Bradford St
Barrie City, County of Simcoe
L4M 4T5

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

- one (1) cogeneration system consisting of:
 - o one (1) reciprocating engine (Source ID: COGEN1), firing digester gas and natural gas, having a rating of 298 kilowatts, discharging to the air at a maximum volumetric flow rate of 0.65 cubic metre per second through a stack having an exit diameter of 0.2 metre, extending 13.3 metres above grade;
 - o one (1) reciprocating engine (Source ID: COGEN2), firing digester gas and natural gas, having a rating of 298 kilowatts, discharging to the air at a maximum volumetric flow rate of 0.65 cubic metre per second through a stack having an exit diameter of 0.2 metre, extending 13.3 metres above grade;
 - o one (1) boiler (Source ID: BOILER1), having a maximum heat input of 1.94 million kilojoules per hour, discharging to the air at a maximum volumetric flow rate of 0.28 cubic metre per second through a stack having an exit diameter of 0.2 metre, extending 13.2 metres above grade; and
 - o one (1) boiler (Source ID: BOILER2), having a maximum heat input of 3.53 million kilojoules per hour, discharging to the air at a maximum volumetric flow rate of 0.51 cubic metre per

second through a stack having an exit diameter of 0.2 metre, extending 13.2 metres above grade;

- one (1) exhaust system (Source ID: FILTER1), serving the Tertiary Treatment/Filter Building, discharging to the air at a maximum volumetric flow rate of 4.0 metres per second through a stack having an exit diameter of 1.35 metres, extending 2.5 metres above grade;
- one (1) exhaust system (Source ID: FILTER2), serving the Tertiary Treatment/Filter Building, discharging to the air at a maximum volumetric flow rate of 4.0 metres per second through a stack having an exit diameter of 1.8 metres, extending 2.5 metres above grade;
- one (1) exhaust system (Source ID: FILTER3), serving the Tertiary Treatment/Filter Building, discharging to the air at a maximum volumetric flow rate of 4.0 metres per second through a stack having an exit diameter of 1.8 metres, extending 2.5 metres above grade;
- one (1) candlestick flare (Source ID: FLARE) to burn excess digester gas generated at the Facility, having a maximum heat input of 10.7 million kilojoules per hour, discharging to the atmosphere at a maximum volumetric flow rate of 1.4 cubic metres per second through a stack having an exit diameter of 1.48 metres, extending 7.5 metres above grade;
- one (1) exhaust system (Source ID: AEROBIC), serving the Aerobic Reactor Room Building, discharging to the air at a maximum volumetric flow rate of 1.5 cubic metres per second through a stack having an exit diameter of 0.5 metre, extending 5.5 metres above grade;
- one (1) standby diesel generator set (Source ID: GEN1), having a rating of 1180 kilowatts, to provide standby power to the Facility during emergency situation, discharging to the air at a maximum volumetric flow rate of 4.0 cubic metres per second through a stack having an exit diameter of 0.35 metre, extending 11.3 metres above grade;
- one (1) exhaust system (Source ID: SLPUMP), serving the Sludge Pumping Room, discharging to the air at a maximum volumetric flow rate of 1.5 cubic metres per second through a stack having an exit diameter of 0.5 metre, extending 5.5 metres above grade;
- one (1) exhaust fan (Source ID: INLET1), serving the Inlet Works Building, discharging to the air at a maximum volumetric flow rate of 1.67 cubic metres per second through a sidewall vent having an exit diameter of 0.87 metre, located 10 metres above grade;
- one (1) exhaust fan (Source ID: INLET2), serving the Inlet Works Building, discharging to the air at a maximum volumetric flow rate of 1.67 cubic metres per second through a sidewall vent having an exit diameter of 0.87 metre, located 10 metres above grade;
- one (1) odour control biotower (Source ID: OCU), serving the blending tank, sludge holding tank, Biosolids Loading Station No. 1, screening and grit handling equipment in the influent building, and the aerated grit chambers, equipped with irrigated upper heterotrophic attached growth media stages maintained temperatures between 15 degrees to 37 degrees Celsius, discharging to the air at a maximum volumetric flow rate of 0.84 cubic metre per second through a stack having an exit

diameter of 0.46 metre, extending 7.9 metres above grade;

- one (1) activated carbon adsorption unit (Source ID: SEPTAGE), serving Septage Receiving, equipped with 91 kilograms of activated carbon, discharging to the air at a maximum volumetric flow rate of 0.095 cubic metre per second through a stack having an exit diameter of 0.1 metre, located 1.2 metres above grade;
- one (1) exhaust system (Source ID: THICK), serving the Rotary Drum Thickener Building, discharging to the air at a maximum volumetric flow rate of 0.5 cubic metre per second through a sidewall exhaust located 3 metres above grade;
- one (1) exhaust system (Source ID: WETWELL), serving the Wet Well, discharging to the air at a maximum volumetric flow rate of 0.5 cubic metre per second through a sidewall vent having an exit diameter of 1.34 metres, located 4.3 metres above grade;

all in accordance with the Environmental Compliance Approval Application submitted by The Corporation of the City of Barrie, dated December 19, 2019, and signed by Sherry Diemert, P.Eng. Manager of Infrastructure Planning for Bala Araniyasundaran, P.Eng., Director of Infrastructure Planning; the supporting Emission Summary and Dispersion Modelling Report prepared by WSP Canada Inc., dated December 12, 2019, and signed by Willy de Wit, P.Eng.; the supporting Acoustic Assessment Report prepared by WSP Canada Inc., dated December 16, 2019, and signed by Kana Ganesh, P.Eng.; and the additional information provided by Valens Nicholson, P.Eng., City of Barrie, dated March 16, 2021, April 9, 2021 and May 21, 2021, and Willy de Wit, P.Eng., WSP Canada Inc., dated April 9, 2021 and April 27, 2021.

For the purpose of this environmental compliance approval, the following definitions apply:

1. "Approval" means this Environmental Compliance Approval, including the application and supporting documentation listed above;
2. "Biofilter" means the odour control biotower (Source ID: OCU) described in the Company's application, this Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval.
3. "Company" means The Corporation of the City of Barrie that is responsible for the construction or operation of the Facility and includes any successors and assigns in accordance with section 19 of the EPA;
4. "District Manager" means the District Manager of the appropriate local district office of the Ministry, where the Facility is geographically located;
5. "EPA" means the Environmental Protection Act, R.S.O. 1990, c.E.19;
6. "Exhausted" means the capacity of the Equipment to adsorb emissions is reached and the Equipment is no longer able to effectively reduce emissions;
7. "Equipment" means the equipment and processes described in the Company's application, this

Approval and in the supporting documentation submitted with the application, to the extent approved by this Approval;

8. "Facility" means the entire operation located on the property where the Equipment is located;
9. "Manual" means a document or a set of documents that provide written instructions to staff of the Company;
10. "Ministry" means the ministry of the government of Ontario responsible for the EPA and includes all officials, employees or other persons acting on its behalf;
11. "Publication NPC-300" means the Ministry Publication NPC-300, "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning, Publication NPC-300", August 2013, as amended.

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

1. OPERATION AND MAINTENANCE

1. The Company shall ensure that the Equipment is properly operated and maintained at all times. The Company shall:
 - a. prepare, not later than six (6) months after the date of this Approval, and update, as necessary, a Manual outlining the operating procedures and a maintenance program for the Equipment, including:
 - i. routine operating and maintenance procedures in accordance with good engineering practices and as recommended by the Equipment suppliers;
 - ii. emergency procedures, including spill clean-up procedures;
 - iii. procedures for any record keeping activities relating to operation and maintenance of the Equipment; and
 - iv. all appropriate measures to minimize noise and odorous emissions from all potential sources;
 - b. implement the recommendations of the Manual.
2. The Company shall ensure that the activated carbon in the Equipment is replaced before it is Exhausted.

2. RECORD RETENTION

1. The Company shall retain, for a minimum of two (2) years from the date of their creation, all records and information related to or resulting from the recording activities required by this Approval, and make these records available for review by staff of the Ministry upon request. The Company shall retain:
 - a. all records on the maintenance, repair and inspection of the Equipment; and
 - b. all records of any environmental complaints, including:
 - i. a description, time and date of each incident to which the complaint relates;
 - ii. wind direction at the time of the incident to which the complaint relates; and
 - iii. a description of the measures taken to address the cause of the incident to which the complaint relates and to prevent a similar occurrence in the future.

3. NOTIFICATION OF COMPLAINTS

1. The Company shall notify the District Manager, in writing, of each environmental complaint within two (2) business days of the complaint. The notification shall include:
 - a. a description of the nature of the complaint; and
 - b. the time and date of the incident to which the complaint relates.

4. MONITORING

1. The Company shall install, conduct and maintain a program to monitor and record the Biofilter parameters as outlined in Schedule A attached to this Approval.

5. NOISE

1. The Company shall, at all times, ensure that the noise emissions from the Facility comply with the limits set out in Ministry Publication NPC-300.

SCHEDULE A

Biofilter Parameters

The Company shall monitor and record the operational parameters of the Biofilter, either as specified in the Manual of the Biofilter manufacturer, or as deemed necessary in accordance with site operational conditions, as follows:

1. Pressure drop across the biofilter bed (kilopascals) weekly;
2. Process air flow through the biofilter (cubic metres per second) daily;
3. Biofilter bed moisture (percent) weekly;
4. Biofilter bed temperature (degrees Celsius) daily;
5. Inlet air temperature (degrees Celsius), after the pre-humidification chamber, daily;
6. Inlet air relative humidity (percent), after the pre-humidification chamber, daily;
7. pH of the water runoff from the biofilter bed, monthly; and
8. Water flow in the pre-humidification chamber and the media irrigation system, daily.

The reasons for the imposition of these terms and conditions are as follows:

1. Condition No. 1 is included to emphasize that the Equipment must be maintained and operated according to a procedure that will result in compliance with the EPA, the Regulations and this Approval.
2. Condition No. 2 is included to require the Company to keep records and to provide information to staff of the Ministry so that compliance with the EPA, the Regulations and this Approval can be verified.
3. Condition No. 3 is included to require the Company to notify staff of the Ministry so as to assist the Ministry with the review of the site's compliance.
4. Condition No. 4 is included to require the Company to gather accurate information so that the environmental impact and subsequent compliance with the EPA, the regulations and this Approval can be verified.
5. Condition No. 5 is included to provide the minimum performance requirements considered necessary to prevent an adverse effect resulting from the operation of the Facility.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s).
1316-5MKTGU issued on October 23, 2006.**

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

- a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
- b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1
of the Environmental Protection Act
Ministry of the Environment, Conservation and
Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 2nd day of June, 2021



Neryed Ragbar, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

ES/
c: District Manager, MECP Barrie
Willy de Wit, WSP Canada Inc.




Ministry of the
Environment,
Conservation and
Parks

Notice of Modification to Sewage Works


RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility <i>(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)</i>		
ECA Number: 0284-B2ML52	Issuance Date (8/24/2018)	Notice number (if applicable)2021-001
ECA Owner: The Corporation of the City of Barrie		Municipality: City of Barrie

Part 2: Description of the modifications as part of the Limited Operational Flexibility <i>(Attach a detailed description of the sewage works)</i>
<p>Supplementary Treatment Systems: Modification to the existing Aluminum (Alum) Sulphate Chemical addition system to improve WwTF phosphorus removal including:</p> <ol style="list-style-type: none"> 1. Removal of two (2) existing double head positive displacement metering pumps installed in the basement of the existing chemical building. 2. The two (2) existing peristaltic pumps, each rated at 371L/h, will be repurposed to be used as the backup to the transfer pump or, alternatively, to feed the front of the plant, if required. 3. Install six (6) new alum peristaltic hose pumps in the basement of the existing chemical building. The new alum dosing pumps are variable speed flow paced pumps; each metering pump has a rated capacity of approximately 500L/h for a total capacity of 3,000L/h. The new pumps provide multi-point alum flow proportional dosing to secondary clarifiers inlet channels 1-6. 4. Install six (6) area velocity flow meters in the secondary clarifier effluent channels 1-6 for flow pacing signals for the alum system pump upgrades. 5. There are no anticipated environmental effects due to the stated LOF application works. 6. Project related documents and amendments include: project drawings and specifications, building permit, operations and maintenance manuals, MECP Notice of Modification to Sewage Works. <p>Description shall include:</p> <ol style="list-style-type: none"> 1. A detail description of the modifications and/or operations to the sewage works (e.g. sewage work component, location, size, equipment type/model, material, process name, etc.) 2. Confirmation that the anticipated environmental effects are negligible. 3. List of updated versions of, or amendments to, all relevant technical documents that are affected by the modifications as applicable, i.e., submission of documentation is not required, but the listing of updated documents is (design brief, drawings, emergency plan, etc.)

Part 3 – Declaration by Professional Engineer	
<p>I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:</p> <ol style="list-style-type: none"> 1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario; 2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA; 3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations. <p>I hereby declare that to the best of my knowledge, information and belief that the information contained in this form is complete and accurate</p>	
<p>Name (Print) Sinclair Garner, B.E.S., C.C.M., L.E.L. (PEO)</p>	<p>PEO License Number 100-114-049</p>
<p>Signature </p>	<p>Date (mm/dd/yy) October 15, 2021</p>
<p>Name of Employer WSP Canada Inc.</p>	

Part 4 – Declaration by Owner

<p>I hereby declare that:</p> <ol style="list-style-type: none"> 1. I am authorized by the Owner to complete this Declaration; 2. The Owner consents to the modification; and 3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA. 4. The Owner has fulfilled all applicable requirements of the <i>Environmental Assessment Act</i>. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
<p>Name of Owner Representative (Print) Bala Araniyasundaran, P. Eng., PMP</p>	<p>Owner representative's title (Print) Director of Infrastructure</p>
<p>Owner Representative's Signature </p>	<p>Date (mm/dd/yy) Nov 15, 2021</p>

EAPB Form July 26, 2018



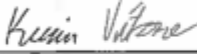
Ministry of the Environment, Conservation and Parks


Notice of Modification to Sewage Works

RETAIN COPY OF COMPLETED FORM AS PART OF THE ECA ON-SITE PRIOR TO THE SCHEDULED IMPLEMENTATION DATE.

Part 1 – Environmental Compliance Approval (ECA) with Limited Operational Flexibility		
<i>(Insert the ECA's owner, number and issuance date and notice number, which should start with "01" and consecutive numbers thereafter)</i>		
ECA Number 0284-B2ML52	Issuance Date (mm/dd/yy) August 24, 2018	Notice number (if applicable) 2021-002
ECA Owner The Corporation of the City of Barrie		Municipality City of Barrie, County of Simcoe

Part 2: Description of the modifications as part of the Limited Operational Flexibility
<i>(Attach a detailed description of the sewage works)</i>
<p>This modification is to improve redundancy of the five (5) primary raw sludge pumps that service primary clarifiers one (1) through three (3). This work includes the installation of a sixth primary sludge pump rated at the same capacity as the existing pumps of approximately 13 L/s at 12m TDH. This work includes new 150mm suction and discharge piping to plumb in the new pump, and valve work to isolate the pump suction header between each primary clarifier. The new pump would be installed to service primary clarifier 2 and be named Primary Raw Sludge Pump 04. With this pump in service each primary clarifier will have a dedicated duty/standby raw sludge pump configuration with the intention of improving operation and maintenance procedures for servicing raw sludge pumps and cleaning primary clarifiers.</p> <p>Upon completion of this work, Primary clarifier #01 will be serviced by Raw Sludge Pumps 01 & 02; Primary Clarifier #02 will be serviced by Raw Sludge Pumps 03 & 04 (new); and Primary Clarifier #03 will be serviced by Raw Sludge pumps 05 (Previously 04) and 06 (Previously 05).</p> <p>The addition of this pump will not create any environmental effects.</p> <p>Pump logic will need to be updated to operate pumps 1&2, and 3&4 on the same operating principle that is currently used by existing primary raw sludge pumps 4 (now 5) & 5 (now 6) as they operate in duty/standby configuration on primary clarifier #03.</p> <p>The City is responsible for updating their engineering design documentation that will be affected by the works described within this Notice of Modification to Sewage Works</p> <p>A non-exhaustive list of documents that may be affected by the works described herein are listed below:</p> <ul style="list-style-type: none"> • Design Brief • Barrie WWTF Engineering Record Drawings • Operation and Maintenance Manuals • Process Control Narrative/Process Narrative • Specifications

Part 3 – Declaration by Professional Engineer	
<p>I hereby declare that I have verified the scope and technical aspects of this modification and confirm that the design:</p> <ol style="list-style-type: none"> 1. Has been prepared or reviewed by a Professional Engineer who is licensed to practice in the Province of Ontario; 2. Has been designed in accordance with the Limited Operational Flexibility as described in the ECA; 3. Has been designed consistent with Ministry's Design Guidelines, adhering to engineering standards, industry's best management practices, and demonstrating ongoing compliance with s.53 of the Ontario Water Resources Act; and other appropriate regulations. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
Name (Print)	PEO License Number
Kevin Vitone	100503002
Signature	Date (mm/dd/yy)
	10/13/2021
Name of Employer	
Stantec Consulting Ltd.	

Part 4 – Declaration by Owner	
<p>I hereby declare that:</p> <ol style="list-style-type: none"> 1. I am authorized by the Owner to complete this Declaration; 2. The Owner consents to the modification; and 3. This modifications to the sewage works are proposed in accordance with the Limited Operational Flexibility as described in the ECA. 4. The Owner has fulfilled all applicable requirements of the <i>Environmental Assessment Act</i>. <p>I hereby declare that to the best of my knowledge, information and belief the information contained in this form is complete and accurate</p>	
Name of Owner Representative (Print)	Owner representative's title (Print)
GREG JORDEN	MANAGER OF WASTEWATER OPERATIONS
Owner Representative's Signature	Date (mm/dd/yy)
	03/17/22

EAPB Form July 26, 2018

Appendix “B”: Land Application Summary

Date	Site#	NASM#	Barrie Plant	Concession	Lot	Township
April 17, 2023	S11081	24897	445.38	2	27	Springwater
April 18, 2023	S11081	24897	579.19	2	27	Springwater
April 19, 2023	S11081	24897	267.27	2	27	Springwater
April 20, 2023	S12042	24474	400.78	10	2	Oro-Medonte
April 28, 2023	S6015	60322	356.06	2	3&2	Tosorontio
May 9, 2023	S12042	24474	178.09	10	2	Oro-Medonte
May 9, 2023	S6015	60322	133.44	2	3&2	Tosorontio
May 10, 2023	S12042	24474	578.03	10	2	Oro-Medonte
May 11, 2023	S12042	24474	400.01	10	2	Oro-Medonte
May 11, 2023	S12020	60242	133.15	11	12	Oro-Medonte
May 12, 2023	S12020	60242	620.13	11	12	Oro-Medonte
May 15, 2023	S12020	60242	399.61	11	12	Oro-Medonte
May 15, 2023	S11004	24950	44.19	1	16	Springwater
May 16, 2023	S11004	24950	754.79	1	16	Springwater
May 17, 2023	S11004	24950	528.47	1	16	Springwater
May 18, 2023	S19061	60379	44.40	9	7	Mara
May 23, 2023	S11099	24949	754.52	1	15	Springwater
May 24, 2023	S11099	24949	621.67	1	15	Springwater
May 25, 2023	S11084	25041	577.37	1	18, 19	Springwater
May 26, 2023	S11084	25041	222.37	1	18, 19	Springwater
May 30, 2023	S11017	25157	754.80	9	9,10	Springwater
May 31, 2023	S11017	25157	577.56	9	9,10	Springwater
June 1, 2023	S11017	25157	621.95	9	9,10	Springwater
June 2, 2023	S11018	25157	533.42	10	8	Springwater
June 5, 2023	S11018	25157	533.52	10	8	Springwater
June 6, 2023	S11082	24925	666.86	2	26	Springwater
June 7, 2023	S11080	24923	310.90	3	8	Springwater
June 8, 2023	S11080	24923	222.06	3	8	Springwater
June 20, 2023	S12098	24293	534.01	10	13	Oro Medonte
June 21, 2023	S12099	24339	533.98	4	26,27	Oro Medonte
June 22, 2023	S12099	24339	311.56	4	26,27	Oro Medonte
June 29, 2023	S12027	23847	800.53	3	6	Oro Medonte
July 4, 2023	S12027	23847	578.61	3	6	Oro Medonte
July 5, 2023	S12027	23847	311.33	3	6	Oro Medonte
July 5, 2023	S5049	23828	44.53	3	18	Essa
July 6, 2023	S12075	23823	399.07	11	13	Oro Medonte

July 10, 2023	S12075	23823	445.24	11	13	Oro Medonte
July 11, 2023	S12075	23823	133.53	11	13	Oro Medonte
July 11, 2023	S5008	25065	311.49	10	24	Essa
July 28, 2023	S12057	25135	356.02	10	22,23	Oro-Medonte
August 1, 2023	S11075	24084	667.81	6	1	Springwater
August 2, 2023	S11075	24084	311.49	6	1	Springwater

Date	Site#	NASM#	Barrie Plant	Concession	Lot	Township
August 9, 2023	S12103	24688	623.32	10	21	Oro Medonte
August 10, 2023	S12056	24323	223.41	10	22,23	Oro-Medonte
August 11, 2023	S72056	24323	311.70	10	22,23	Oro-Medonte
August 14, 2023	S12056	24323	534.48	10	22,23	Oro-Medonte
August 15, 2023	S12056	24323	667.79	10	22,23	Oro-Medonte
August 16, 2023	S11011	60506	178.04	8	4	Springwater
August 16, 2023	S12056	24323	133.62	10	22,23	Oro-Medonte
August 17, 2023	S11011	60506	356.17	8	4	Springwater
August 18, 2023	S11011	60506	133.57	8	4	Springwater
August 21, 2023	S11011	60506	623.46	8	4	Springwater
August 22, 2023	S11011	60506	400.84	8	4	Springwater
August 22, 2023	S2027	60555	133.66	6	1,2	Innisfil
August 22, 2023	S11022	60513	44.50	8	1	Springwater
August 23, 2023	S11022	60513	89.18	8	1	Springwater
August 24, 2023	S11022	60513	356.18	8	1	Springwater
August 25, 2023	S11066	23871	311.64	12	4	Springwater
August 28, 2023	S11066	23871	579.16	12	4	Springwater
August 29, 2023	S11066	23871	489.95	12	4	Springwater
August 31, 2023	S11043	60593	222.49	13	2	Springwater
August 31, 2023	S11066	23871	222.65	12	4	Springwater
September 1, 2023	S11043	60593	222.83	13	2	Springwater
September 5, 2023	S11043	60593	534.47	13	2	Springwater
September 6, 2023	S11043	60593	222.78	13	2	Springwater
September 6, 2023	S5054	24053	178.23	11	26	Essa
September 7, 2023	S5054	24053	800.98	11	26	Essa
September 7, 2023	S12086	24181	1,196.50	3	21,22	Oro Medonte
September 8, 2023	S5054	24053	178.08	11	26	Essa
September 11, 2023	S12086	24181	579.12	3	21,22	Oro Medonte
September 13, 2023	S12086	24181	534.36	3	21,22	Oro Medonte
September 14, 2023	S12086	24181	222.69	3	21,22	Oro Medonte
September 14, 2023	S12078	23713	356.23	4	24	Oro Medonte
September 15, 2023	S12078	23713	489.66	4	24	Oro Medonte

September 18, 2023	S12078	23713	356.15	4	24	Oro Medonte
September 19, 2023	S12079	23711	668.06	7	23	Oro Medonte
September 20, 2023	S12079	23711	489.71	7	23	Oro Medonte
September 21, 2023	S12079	23711	89.07	7	23	Oro Medonte
September 22, 2023	S12079	23711	267.25	7	23	Oro Medonte
September 25, 2023	S12009	24938	801.61	5	16, 17	Oro-Medonte
September 26, 2023	S12009	24938	489.86	5	16, 17	Oro-Medonte
September 27, 2023	S12009	24938	311.34	5	16, 17	Oro-Medonte
September 28, 2023	S12009	24938	311.54	5	16, 17	Oro-Medonte
September 29, 2023	S11093	23710	311.66	8	6	Springwater

Date	Site#	NASM#	Barrie Plant	Concession	Lot	Township
October 3, 2023	S11093	23710	623.50	8	6	Springwater
October 4, 2023	S6005	24737	446.04	3	19, 20	I/1.djala Tosorontio
October 5, 2023	S6006	24738	357.47	3	3,4	I/1.djala Tosorontio
October 11, 2023	S11029	60567	445.23	4	18	Springwater
October 12, 2023	S11029	60567	222.51	4	18	Springwater
October 16, 2023	S11029	60567	267.54	4	18	Springwater
October 16, 2023	S11030	60568	267.19	3	19	Springwater
October 17, 2023	S11030	60568	712.84	3	19	Springwater
October 18, 2023	S11030	60568	311.68	3	19	Springwater
October 19, 2023	S11008	60843	267.15	3	18, 19	Springwater
October 20, 2023	S11008	60843	400.27	3	18, 19	Springwater
October 23, 2023	S11008	60843	668.33	3	18, 19	Springwater
October 24, 2023	S11008	60843	534.48	3	18, 19	Springwater
October 25, 2023	S11008	60843	178.19	3	18, 19	Springwater
October 26, 2023	S5041	25249	308.58	9	31	Essa
October 30, 2023	S5041	25249	890.65	9	31	Essa
October 31, 2023	S2004	60608	223.41	6	5	Innisfil
November 1, 2023	S2004	60608	668.29	6	5	Innisfil
November 2, 2023	S2004	60608	356.25	6	5	Innisfil
November 3, 2023	S2004	60608	489.90	6	5	Innisfil
November 6, 2023	S2004	60608	534.44	6	5	Innisfil
November 8, 2023	S2004	60608	311.80	6	5	Innisfil
November 10, 2023	S4016	60749	401.70	13	20	New Tecumseth

November 13, 2023	S4008	25122	579.10	13	14	New Tecumseth
November 14, 2023	S4008	25122	44.54	13	14	New Tecumseth
November 14, 2023	S4001	60629	356.54	14	22,23	New Tecumseth
November 16, 2023	S4001	60629	400.70	14	22,23	New Tecumseth
November 17, 2023	S3018	24132	177.93	11	1	Bradford
November 17, 2023	S4001	60629	89.02	14	22,23	New Tecumseth
November 20, 2023	S4019	25020	445.47	13	15	New Tecumseth
November 21, 2023	S4019	25020	445.19	13	15	New Tecumseth
November 23, 2023	S5048	24520	356.03	10	5	Essa
November 24, 2023	S5048	24520	222.73	10	5	Essa
		Total	47,251.87			

Date	Site#	NASM#	Barrie Storage 2	Concession	Lot	Township
April 17, 2023	S11081	24897	845.50	2	27	Springwater
April 18, 2023	S11081	24897	655.00	2	27	Springwater
April 20, 2023	S12042	24474	438.50	10	2	Oro-Medonte
April 28, 2023	S6015	60322	259.00	2	3&2	Tosorontio
May 11, 2023	S12042	24474	324.00	10	2	Oro-Medonte
May 11, 2023	S12020	60242	81.00	11	12	Oro-Medonte
May 12, 2023	S12020	60242	1,733.00	11	12	Oro-Medonte
May 13, 2023	S12020	60242	1,095.00	11	12	Oro-Medonte
May 15, 2023	S6015	60322	164.00	2	3&2	Tosorontio
May 15, 2023	S12020	60242	979.00	11	12	Oro-Medonte
May 15, 2023	S11004	24950	216.00	1	16	Springwater
May 16, 2023	S3020	24757	132.00	9	2	Bradford
May 16, 2023	S11004	24950	1,009.50	1	16	Springwater
May 17, 2023	S3020	24757	176.50	9	2	Bradford
May 17, 2023	S11004	24950	1,192.50	1	16	Springwater
May 18, 2023	S3020	24757	132.00	9	2	Bradford
May 19, 2023	S3020	24757	43.00	9	2	Bradford
May 19, 2023	S19061 + S19062	60379 + 24982	173.00	9+9	7+6	Mara
May 23, 2023	S11099	24949	661.00	1	15	Springwater
May 24, 2023	S11099	24949	178.00	1	15	Springwater
May 25, 2023	S11084	25041	625.00	1	18, 19	Springwater
May 26, 2023	S11084	25041	1,266.50	1	18, 19	Springwater
May 26, 2023	S19061 + S19062	60379 + 24982	129.33	9+9	7+6	Mara
May 27, 2023	S11084	25041	1,225.50	1	18, 19	Springwater
May 29, 2023	S19061 + S19062	60379 + 24982	471.50	9+9	7+6	Mara
May 30, 2023	S11017	25157	954.00	9	9,10	Springwater
May 30, 2023	S19061 + S19062	60379 + 24982	44.50	9+9	7+6	Mara
May 31, 2023	S11017	25157	482.00	9	9,10	Springwater

June 1, 2023	S11017	25157	438.50	9	9,10	Springwater
June 2, 2023	S11018	25157	509.00	10	8	Springwater
June 6, 2023	S11082	24925	44.50	2	26	Springwater
June 20, 2023	S12098	24293	677.00	10	13	Oro Medonte
June 21, 2023	S12099	24339	892.00	4	26, 27	Oro Medonte
June 22, 2023	S12099	24339	359.50	4	26, 27	Oro Medonte
June 29, 2023	S12027	23847	641.50	3	6	Oro Medonte
July 4, 2023	S12027	23847	351.50	3	6	Oro Medonte
July 5, 2023	S12027	23847	412.50	3	6	Oro Medonte
July 6, 2023	S12075	23823	412.50	11	13	Oro Medonte
July 10, 2023	S12075	23823	617.50	11	13	Oro Medonte
July 11, 2023	S12075	23823	135.00	11	13	Oro Medonte
July 28, 2023	S12057	25135	578.50	10	22,23	Oro-Medonte
August 1, 2023	S11075	24084	491.00	6	1	Springwater
August 2, 2023	S11075	24084	1,023.96	6	1	Springwater

Date	Site#	NASM#	Barrie Storage 2	Concession	Lot	Township
August 5, 2023	S12103	24688	1,325.50	10	21	Oro Medonte
August 9, 2023	S12103	24688	1,011.50	10	21	Oro Medonte
August 10, 2023	S12056	24323	203.00	10	22,23	Oro-Medonte
August 10, 2023	S2003	24021	218.50	3	1, 2	Innisfil
August 11, 2023	S12056	24323	1,041.00	10	22,23	Oro-Medonte
August 11, 2023	S2003	24021	217.50	3	1, 2	Innisfil
August 12, 2023	S2003	24021	255.50	3	1, 2	Innisfil
August 14, 2023	S12056	24323	584.00	10	22,23	Oro-Medonte
August 14, 2023	S2003	24021	261.00	3	1, 2	Innisfil
August 15, 2023	S12056	24323	742.50	10	22,23	Oro-Medonte
August 15, 2023	S5057	24612	260.00	11	8	Essa
August 16, 2023	S11011	60506	264.00	8	4	Springwater
August 16, 2023	S5057	24612	521.50	11	8	Essa
August 16, 2023	S12056	24323	311.50	10	22,23	Oro-Medonte
August 17, 2023	S11011	60506	845.50	8	4	Springwater
August 17, 2023	S5057	24612	299.00	11	8	Essa
August 17, 2023	S2027	60555	342.00	6	1,2	Innisfil
August 18, 2023	S11011	60506	357.00	8	4	Springwater
August 21, 2023	S11011	60506	933.00	8	4	Springwater
August 22, 2023	S11011	60506	336.50	8	4	Springwater
August 22, 2023	S2027	60555	261.00	6	1,2	Innisfil
August 23, 2023	S11022	60513	171.50	8	1	Springwater
August 23, 2023	S2027	60555	261.00	6	1,2	Innisfil

August 24, 2023	S11022	60513	1,017.00	8	1	Springwater
August 25, 2023	S11066	23871	845.50	12	4	Springwater
August 26, 2023	S11066	23871	1,076.00	12	4	Springwater
August 28, 2023	S11066	23871	883.50	12	4	Springwater
August 29, 2023	S11066	23871	805.50	12	4	Springwater
August 29, 2023	S11043	60593	173.00	13	2	Springwater
August 31, 2023	S11066	23871	223.50	12	4	Springwater
August 31, 2023	S11043	60593	802.00	13	2	Springwater
September 1, 2023	S11043	60593	930.00	13	2	Springwater
September 5, 2023	S11043	60593	823.00	13	2	Springwater
September 6, 2023	S11043	60593	448.00	13	2	Springwater
September 7, 2023	S5054	24053	1,034.00	11	26	Essa
September 8, 2023	S12086	24181	1,712.00	3	21,22	Oro Medonte
September 8, 2023	S5054	24053	1,207.00	11	26	Essa
September 9, 2023	S5054	24053	672.00	11	26	Essa
September 11, 2023	S12086	24181	520.00	3	21,22	Oro Medonte
September 13, 2023	S12086	24181	623.00	3	21,22	Oro Medonte
September 14, 2023	S12086	24181	350.00	3	21,22	Oro Medonte
September 14, 2023	S12078	23713	173.50	4	24	Oro Medonte
September 15, 2023	S12078	23713	721.50	4	24	Oro Medonte

Date	Site#	NASM#	Barrie Storage 2	Concession	Lot	Township
September 18, 2023	S12078	23713	760.00	4	24	Oro Medonte
September 19, 2023	S12079	23711	534.50	7	23	Oro Medonte
September 20, 2023	S12079	23711	802.50	7	23	Oro Medonte
September 21, 2023	S12079	23711	1,458.00	7	23	Oro Medonte
September 22, 2023	S12079	23711	626.00	7	23	Oro Medonte
September 25, 2023	S12009	24938	876.50	5	16, 17	Oro-Medonte
September 26, 2023	S12009	24938	843.50	5	16, 17	Oro-Medonte
September 27, 2023	S12009	24938	666.50	5	16, 17	Oro-Medonte
September 28, 2023	S12009	24938	534.00	5	16, 17	Oro-Medonte
September 29, 2023	S11093	23710	12.00	8	6	Springwater
October 18, 2023	S11030	60568	619.50	3	19	Springwater
October 19, 2023	S11008	60843	261.00	3	18, 19	Springwater
October 20, 2023	S11008	60843	627.00	3	18, 19	Springwater
October 23, 2023	S11008	60843	89.00	3	18, 19	Springwater
October 24, 2023	S11008	60843	133.50	3	18, 19	Springwater
October 25, 2023	S11008	60843	222.00	3	18, 19	Springwater
October 26, 2023	S5041	25249	90.00	9	31	Essa
October 31, 2023	S2004	60608	134.00	6	5	Innisfil

November 1, 2023	S2004	60608	173.00	6	5	Innisfil
November 2, 2023	S2004	60608	128.00	6	5	Innisfil
November 3, 2023	S2004	60608	83.00	6	5	Innisfil
November 6, 2023	S2004	60608	83.00	6	5	Innisfil
November 10, 2023	S4016	60749	172.00	13	20	New Tecumseth
November 11, 2023	S4016	60749	173.00	13	20	New Tecumseth
November 13, 2023	S4008	25122	89.50	13	14	New Tecumseth
November 14, 2023	S4008	25122	178.50	13	14	New Tecumseth
November 14, 2023	S4001	60629	45.00	14	22,23	New Tecumseth
November 16, 2023	S4001	60629	134.00	14	22,23	New Tecumseth
November 17, 2023	S3018	24132	82.50	11	1	Bradford
November 17, 2023	S4001	60629	127.50	14	22,23	New Tecumseth
November 18, 2023	S3018	24132	489.00	11	1	Bradford
November 20, 2023	S4019	25020	132.50	13	15	New Tecumseth
November 21, 2023	S4019	25020	177.00	13	15	New Tecumseth
November 23, 2023	S4019	25020	222.00	13	15	New Tecumseth
November 24, 2023	S5048	24520	172.00	10	5	Essa
November 25, 2023	S12040	24478	1,070.00	8	1, 2	Oro-Medonte
		Total	62,354.79			

Appendix “C”: Overflows/Bypasses/Abnormal Events

Report No.: 2023-001		
Date Issued: June 5, 2023		Issued By: Greg Jorden
Improvement Classification: Corrective Action <input checked="" type="checkbox"/> Preventive Action <input type="checkbox"/> Best Management Practice <input type="checkbox"/>		
Area of Problem or concern:		
Raw sewage pump #3 failed in raw sewage building located at the 249 Bradford St. Wastewater Treatment Facility (WwTF). While the pump was in operation the glade failed allowing a small amount of untreated wastewater to leak from the shaft onto the floor of the raw sewage building. Despite the leak, the pump was able to operate with normal flow levels recorded on SCADA, therefore no alarms were triggered. The on-call operator received an unrelated alarm and upon arrival at the WwTF the operator noticed untreated wastewater spilling from the raw sewage building and running to Hotchkiss creek, located to the south of the property.		
If required, Immediate actions taken to correct:		
<ul style="list-style-type: none"> - Pump #3 was turned off, stopping the overflow/spill. - Spill Action Center notified of untreated wastewater enter the natural environment. - City of Barrie Environmental Officer on call operator responded to the site to oversee clean up the spill and ensure all reporting and sampling requirements were completed. - Wastewater Collections and Treatment staff cleaned up the area using a vactor and hoses. 		
Root Cause Analysis:		Meeting Date: June 7, 2023 (follow up on June 13, 2023)
Team members:		
Allen Baker	Gwen Harrington	Dustin Brunne
Dan Parent	Greg Jorden	Martin Shaw
Pam Guenther		
Record of Information:		
<p style="text-align: center;">Pump Failure</p> <ul style="list-style-type: none"> - Unable to fully assess the pump and reason for seal failure until it is pulled by maintenance staff. - Pump was shaking prior; maintenance had requested for pump #3 to be taken out of service. - Could be used in emergency if required. - Pump was removed from service and was put back in service again by different operator on Friday before event in AM. - Reason for pump being out of service was not properly communicated to all ops staff (Area rotation?). - Pump was not powered down or locked out, operators potentially confused by the lock out tag out/remove from service procedure. - No immediate access to spare pump delaying repair work to pump 1 and 3. - No plans in place to mitigate failure. 	<p style="text-align: center;">Release of Sewage to Creek</p> <ul style="list-style-type: none"> - No threshold on double doors in raw sewage pump room. - Drains overwhelmed (possibly undersized and/or restricted?). - Security did not see spill. - No alarms. - Slope of pavement in parking lot eventually leads to creek. - No physical barrier between building and creek. - Sanitary maintenance hole in parking lot in front of the building was overwhelmed by volume of flow. - No Wastewater Operation staff onsite (afterhours). - On call response was close to an hour, responding to separate alarm. - Containment not accounted for in initial engineering design of process/building. 	

		1.
Action Proposed:		
<ul style="list-style-type: none"> - Finalize procedure to remove equipment from service, review procedure with all Wastewater staff. Waiting for all Out of Service tags and locks to arrive before Out of Service process can be fully utilized. - Add threshold drains to the Raw Sewage Building doorways to retain a spill. - Add alarm / leak detection for spill to the pumps. - Add additional drains in pump room to wet well below p-trap. - Create PM for drain cleaning and inspection. - Have quick access to spare pump. Raw Sewage pump will now be stored at Oro. - Add berm to parking lot along South fencing to provide some additional containment. - Replace sanitary maintenance hole cover with a catch basin grating. - Ability to tag out remotely via SCADA. Remote access to SCADA. - Refresh operators training on Spill/bypass response. - Review Security Protocol. - Add PM for Raw Sewage Pump inspection and/or pump rebuild. - Facilities to add door sweeps to the bottom of the doors to help prevent the spill from escaping the building envelope. - Out of Service equipment on SCADA for operators as a notification to operators. 		
Action to Taken:		Who?
1. Spare Raw Sewage Pump to be stored at a Wastewater Owned Facility for easy access (Oro BSF).		Dustin Brunne
2. Berm to be constructed at south end of admin parking lot to create addition containment.		Daniel Parent
3. Additional drains/threshold drains to be installed in raw sewage pump room to wet well below for additional containment.		Dustin Brunne
4. Pump leak and/or room flooding SCADA alarms to be developed.		Daniel Parent
5. Preventative Maintenance Work Order to be created to test floor drains in raw sewage pump room weekly.		Allen Baker
6. Ensure that afterhours security contractor understands what to do if water is observed exiting any building or structure on the site.		Martin Shaw
Action Item Log:		Date Completed:
1. Spare raw sewage pump will be stored as a rebuild kit located at BSF.		October 2023
2. Facilities built a retaining wall along the south fence line close to the staff facility building. The retaining wall will provide spill retention time before entering the creek. In addition to the retaining wall, the Maintenance hole located in the parking lot outside the raw pump house, was lowered to allow water to flow to the maintenance hole and drain back into the collection system. October 6, 2023 the maintenance hole was lowered to driver flow away from the creek and towards the maintenance hole.		August 2023
3. Additional drains were added in front of the doors of the raw sewage pump room. Capacity was increased from a 4" to 6" and drains to the wet well below.		September 2023
4. Maintenance staff researching the best possible sensor and installation for this type of application.		October 2023
5. SOP was created for cleaning floors, test floor drains and verify alarms are functioning once connected SCADA. Work Order still needs to be created and issued to operators.		October 2023
6. Confirmed with Wade Leblanc, Facility Supervisor, that Security is doing hourly rounds of the wastewater facility and reviewed the post order with the Root Cause Analysis Team Members before circulating to Security. Additionally, a sign will be created and posted in the		October 2023

guard house. The sign will reiterate to security staff that in the event of unusual conditions i.e. fire, flooding, etc. please contact OIC.		
Effectiveness Assessment:	Meeting Date:	
Assessment Notes:		
Effective <input type="checkbox"/> Partially Effective <input type="checkbox"/> Ineffective <input type="checkbox"/>		
Closed Date:	Wastewater Manager Signature:	