



2022 Year End Report: Huntsville Golden Pheasant Wastewater Treatment Plant (WWTP)



Environmental Compliance Approval: # 6591-&M9LU6 amended under ECA#9847B6KR4X
Jan 14, 2019

Engineering and Public Works Department

70 Pine Street, Bracebridge, Ontario P1L 1N3

Phone: 705-645-6764

Toll-Free: 1-800-281-3483

Fax: 705-645-7599

Email: publicworks@muskoka.on.ca

Website: www.muskoka.on.ca

Introduction

The Huntsville Golden Pheasant Wastewater Treatment Plant (WWTP), which services the Town of Huntsville, is owned and operated by the District Municipality of Muskoka. The plant is located at 620 Highway 60, Huntsville. It services a population of approximately 7,900 people.

The Plant operated under the MECP Environmental Compliance Approval (Sewage) # 6591-7M9LU6, issued December 2008 and under MECP Environmental Compliance Approval (ECA) (Air) #66234YLK6T issued August 2001. On January 14, 2019, the ECA #9847-B6KR4X was issued by the Ministry of Environment as an amended ECA to account for upgrades to the UV disinfection system, the installation of a Soda Ash batching system for alkalinity addition and to provide for the construction of a Sludge Thickening System. Also, the amended ECA allows for the addition of an additional process tank and conversion of the aeration/mixing systems from coarse air to fine bubble diffusion which have significantly improved plant efficiency since completion in 2021/2022. Under the terms of the ECA, the plant is permitted to treat an average daily flow of 4,456 meters cubed per day, and a peak flow of 13,330 meters cubed per day. Additionally, effluent limit criteria are as follows:

Table 1 Effluent Limit Criteria

Effluent Parameter	Concentration
CBOD	15 mg/L
Total Suspended Solids	15 mg/L
Total Phosphorous	0.30 mg/L 227.9 kg/year (combined with the Huntsville Mountview WWTP)
Total Ammonia Nitrogen Summer (May 15 to September 30)	NA
Total Ammonia Nitrogen Winter (October 01 to May 14)	NA
E. coli	80 counts/100mL
pH	NA

The plant is a conventional activated sludge treatment process, consisting of primary and secondary clarifiers with aeration basins. Tertiary filtration and Ultra-Violet disinfection are also part of the treatment process. The facility is also equipped with anaerobic digesters for bio-solids stabilization and a dewatering process for final disposal.

Waste sludge from the plant process is digested anaerobically at the plant and periodically hauled off site for disposal.

General Information

A review of the District of Muskoka's infrastructure needs is conducted annually by the Director of Water and Sewer Services, Area Manager and Chief Operator, and recommendations for maintenance, rehabilitation and renewal programs are considered.

Efforts to eliminate the discharge of untreated or partially treated wastewater to receiving waters are being accomplished by a long-term financial commitment to correct excessive infiltration into the wastewater collection system by means of sewer main rehabilitation / replacement,

manhole rehabilitation and pumping station rehabilitation programs.

The treatment facility is capable of effective operation during emergencies, maintenance shutdowns, and power failures. This is achieved through such measures as preventive maintenance of duty / standby units, the duplication of major treatment components, the provision of standby power sources and extensive use of the SCADA systems. All pumping stations and treatment control systems use SCADA (Supervisor Control and Data Acquisition), in combination with Data Highway Plus, and programmable logic controllers.

All operators are qualified to operate the systems efficiently and effectively in order to achieve the highest level of treatment at all times. A commitment to provide Operator training and certification is being sustained.

Regulatory sampling is carried out to meet the requirements outlined in the ECA, and additional in-house operational sampling beyond these regulatory requirements is being performed on a routine basis. These efforts have resulted in an effective treatment process which ensures that effluent discharges consistently meet effluent objectives and are environmentally safe. All final effluent sample results for the MBR facilities met their effluent limits.

All data in this report is a compilation of test results received from SGS Canada and their accredited laboratory, Lakefield Research. All in-plant sampling, analysis and recording of results conforms, in order of precedence, to the following 3 standards: Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the American Water Works Association/Water Environment Federation (AWWA/WEF) publication "Standard Methods for the Examination of Water and Wastewater".

Executive Summary

In all respects, test results of the treated effluent for the parameters of CBOD5, suspended solids, ammonia, total phosphorous, and E. Coli are in compliance with the limits outlined in the ECA regarding monthly allowable concentrations and total effluent loading throughout the entire year. During this year, a consistent reduction in total ammonia nitrogen concentration in the final effluent was achieved and maintained throughout the year. This is a significant success due to the upgrades completed in 2021 at Golden Pheasant. The next phase of upgrades to the Golden Pheasant Wastewater Treatment Plant is scheduled to commence in 2023. If approved under a new ECA, the filtration system will be removed and replaced with a disk filter system, upgrades to inlet works, UV disinfection, addition of a third clarifier and additional process tankage will commence construction to increase plant capacity prior to the planned Mountview Wastewater Treatment Plant conversion to sewage pump station which will deliver flows to Golden Pheasant WWTP. In addition, a new gravity outfall will be installed to Fairy Lake.

Overall, the plant treatment processes performed satisfactorily and are deemed to be adequate. All sample test results (aside from the pH anomalies reported) of the final effluent were within levels outlined in the plant ECA #9847-B6KR4X.

Quantity of Flow Summary

The plant has a daily average flow design capacity of 4,456 meters cubed per day. The actual

average daily flow for the 2022 was 2,219 meters cubed per day, however, the 3-year average is 2,178 meters cubed per day, which represents 48.9% of the plant capacity. None of the individual system components exceeded the design flow rating.

Plant Operational Upsets or Process Failures

In early 2022 an electrical surge was experienced by the plant resulting in damage to one of the programmable logic controllers responsible for automatic control of the filtration and effluent pumping systems. Operators manually operated these systems while an electrical contractor replaced the damaged equipment with shelf spare equipment the District keeps on hand. The cause of the surge was determined and electrically isolated to prevent recurrence.

Long delivery time for parts and services was again experienced in 2022 due to the COVID-19 pandemic's effect on supply chains globally.

Summary of Maintenance

In 2022, significant upgrades were completed at Golden Pheasant under phase one, contract two (2) improvements. The second contract of phase one (1) construction was completed adding additional process tankage, a waste activated sludge thickening process and conversion of the aeration systems from coarse aeration to fine bubble diffusion. This second phase of this construction was substantially completed in August of 2021 however additional work was required into 2022 for final completion. New process tankage, conversion to fine bubble aeration and modernized process controls have contributed to pronounced improvements in plant effluent quality.

All equipment information at this plant is entered into a computer database. From this information, a scheduled preventive maintenance program has been established. The maintenance program includes (and not limited to):

- Monthly testing of emergency testing (under load) of the standby generators.
- Annual servicing of emergency standby generators.
- Annual replacement of U.V. bulbs.
- Periodic infrared inspection of Motor Control panels.
- Annual calibration of flow metering devices.
- Annual cleaning of all sewage pumping stations if required.
- Marine inspection of effluent outfall and diffuser completed in 2017. (5-year cycle)

Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 49.8% and is in compliance with specified effluent parameter criteria. In addition, there has been no significant treatment process upsets and plant bypasses. As a result, there is no need for improvements to the existing works for these reasons, however, as Mountview Wastewater Treatment Plant is scheduled for conversion to a pump station then decommissioned, and the flows from Mountview collection area, then directed to Golden Pheasant, a suite of phased projects is

underway to provide sufficient treatment capacity. These projects are expected to commence construction in 2023 to provide adequate treatment capability for many years in the future.

To achieve the required treatment capabilities required by the ECA, the following upgrades will be necessary:

- Replacement of blowers and process tank diffusers
- Additional process tankage installed including at least one new clarifier unit
- Addition to Waste Activated Sludge Thickening systems completed in 2022
- New plant outfall to Fairy Lake
- New filtration system
- Increased UV disinfection capacity.

Evaluation Summary of Proposed Work Requiring Approval under OWRA

All upgrade works described are subject to approval under OWRA. An application for amendment to the facility ECA was submitted and approval received in January 2019 which permits alteration/improvement of the works as part of the first phase of contracts. Further application will be required prior to commencement of construction of the second phase of contracts once design is complete in 2023.

Interpretation of Analytical Results

All sample results for Raw Sewage and Final Effluent are reported in this section. Other tables in this report include Chemical Usage, Biosolids Quality, and Biosolids Quantity.

Raw Sewage

The information reported in the Raw Sewage sample results summary table consists of test results of analysis conducted on composite samples of the plant influent flow as required by the plant ECA. Samples are sent for analysis to Lakefield Research, as well as analysis conducted on site using Standard Methods or equivalent. Weekly analysis has been performed and reported as specified under the terms outline in the ECA.

Influent Analysis

Table 2 Influent Analysis

Influent Parameter	Minimum	4 Week Average Maximum	Annual Average	Average loading kg/day
BOD5 (mg/L)	40	212	154	69.4
Suspended Solids (mg/L)	42	723	323	145.6
Total Phosphorus (mg/L)	0.83	30	7.1	3.20
Total Ammonia Nitrogen (mg/L)	6.8	53.4	31.4	14.2

Effluent Analysis

The information reported in the Final Effluent sample results summary table 3 consists of test results of analysis conducted on final effluent composite samples. Bacteriological samples, however, consisted of grab samples. Weekly analysis has been performed and reported as specified under the terms outlined in the ECA.

Effluent Objective Analysis

The effluent objectives were met during all sample periods. A short-lived issue with final effluent ammonia concentration was experienced in the spring during a period of higher plant flows. Operations was able to identify the issue and adjust plant processes to rapidly reduce final effluent ammonia concentration.

Final Effluent Analysis Summary

All final effluent samples tested for CBOD5, suspended solids, ammonia, E. Coli, and total phosphorous were below non-compliance limits outlined in the ECA.

Table 3 Final Effluent Analysis Summary

Parameter	Minimum	4 Week Average Maximum	Annual Average	Average Loading kg/day
COBD5 (mg/L)	<2	2.5	2.2	0.99
Suspended Solids (mg/L)	<2	7.0	3.4	1.53
Ammonia (mg/L)	<0.1	1.95	0.42	0.19
E. Coli (#/100 mL)	0	864	0.75	N/A
Total Phosphorus (mg/L)	<0.03	0.08	0.05	0.02
pH	7.11	8.01	7.64	N/A

Average daily flow comparisons by day of week ensure ECA requirements for scheduled sampling are taken at a time, and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored. Average daily flow rates by day of the week compare the flow to the average daily flow for the entire year. This data is used to determine if a particular day of the week is best to ensure samples are taken to meet the requirements of scheduled monitoring sections of the ECA's. Sampling plans are reviewed and updated yearly based on the previous yearly flow data.

Final Effluent Sampling Summary

All samples were collected following the frequency and methods required by the facility approval. For the coming year, 2023, no changes to the sampling plan are being considered at this time.

Biosolids Generation

The quality and volume of biosolids hauled from the facility for disposal is outlined in the table provided. Dewatered biosolids from the plant was hauled to an approved site for disposal or reuse. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2022 and will continue to do so in 2023. It is not anticipated that there will be a

significant increase in the total volume of bio solids produced in 2023.

Biosolids Co-Treatment

The quality and volume of biosolids hauled from the facility for disposal is outlined in the table provided. Dewatered biosolids from the plant was hauled to an approved disposal site. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2022 and will continue to do so in 2023. It is not anticipated that there will be a significant increase in the total volume of bio solids produced in 2023.

Summary of Complaints received throughout the reporting period.

There were no complaints received in the reporting period.

Huntsville Golden Pheasant Wastewater Collection Summary

New Sewer Services:

A total of 35 customers connected to existing sewer laterals in 2022, 1 of which were installed in 2022.

One 125 mm PVC sewer service was installed by the owner's contractor. This service is located at 30 West Street N.

New Sewer Mains:

A total of 140 meters of 200 mm gravity sewer was replaced in 2022 on Main Street West as part of the "Diggin' Downtown" infrastructure upgrades.

A total of 680 meters of 200mm gravity sewer was installed in 2022 on Eagle Crest Ave by Owner's contractor.

New Maintenance Holes:

Two maintenance holes were replaced in 2022 on Main Street West as part of the Diggin Downtown infrastructure upgrades.

Thirteen maintenance holes were installed by Owner's contractor in 2022 on Eagle Crest Ave.

Two maintenance hole top sections were repaired or replaced with auto stable frame and covers in 2022.

Low Pressure Sewer Breaks:

There were no low-pressure sewer breaks in 2022.

Sewer Force Main Breaks:

There were no sewer forcemain breaks in 2022.

Sewer Force Main Replacement

No sewer forcemains were replaced in 2022.

Main Line Sewer Blockage

There were no sewer main blockages in 2022.

Sewer Lateral Blockage

There was 1 sewer lateral blockage in 2022. The cost to repair was \$24,931.88.

Service Low Pressure Sewer Blockages:

There were no low-pressure sewer blockages in 2022.

Frozen Sewer Force Mains:

No sewer forcemains froze in 2022.

Frozen Sewer Service Laterals:

No sewer service laterals froze in 2022.

Frozen Low Pressure Sewer Services:

No low-pressure sewer services froze in 2022.

Air Release Valve Inspections:

All 41 air-vacuum release valves were inspected in 2022.

Sewer Locates:

Field staff addressed 858 written locate requests in 2022.

Table 4 Effluent Flow Summary - 2022

Month	Plant Total Monthly (m ³)	Average Day Flow (m ³ /d)	Maximum Day Flow (m ³ /d)	Minimum Day Flow (m ³ /d)	Lagoons Monthly Flow (m ³)	Facility Total Monthly Flow (m ³)
January	51,729	1,669	2,542	893	645.32	52,374
February	48,617	1,736	2,349	1,465	620.37	49,237
March	71,848	2,318	3,604	1,519	696.42	72,544
April	80,433	2,681	3,913	2,225	611.55	81,045
May	64,607	2,084	2,643	1,682	491.99	65,099
June	66,826	2,228	2,841	1,799	734.95	67,561
July	61,352	1,979	2,285	1,647	951.88	62,304
August	62,893	2,029	2,641	1,640	915.12	63,809
September	58,641	1,955	2,956	1,641	399.16	59,040
October	71,012	2,291	3,131	1,735	972.37	71,984
November	77,153	2,572	3,215	2,254	372.47	77,525
December	94,936	3,062	4,905	2,507	599.58	95,536

Total Flow: 818,058m³
 Average Day: 2,219m³
 Maximum Day: 4,905m³
 Minimum Day: 893m³

Table 5 Influent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 1

Sample Date	Sample Identification Number	BOD5 mg/L	Phosphate	Total Phosphorus mg/L	Suspended Solids mg/L
Feb 01/22	CA13073	161	0.27	2.82	257
May 10/22	CA12527	122	0.86	2.99	330
Aug 02/22	CA12101	157	< 0.50	7.62	204
Nov 08/22	CA13290	112	< 0.39	8.50	259
Yearly Average		138	0.51	5.48	263
Maximum		161	0.86	8.50	330
Minimum		112	0.27	2.82	204

Table 6 Influent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
Feb 01/22	CA13073	22.1	<0.06	<0.03	19.1
May 10/22	CA12527	23.2	<0.06	<0.03	18.7
Aug 02/22	CA12101	41.7	0.06	0.03	37.1
Nov 08/22	CA13290	43.4	0.06	0.03	39.3
Yearly Average		32.6	0.06	0.03	28.6
Maximum		43.4	0.06	0.03	39.3
Minimum		22.1	0.06	0.03	18.7

Table 7 Chemical Usage Summary: Clarion A405P

Month	Average Dosage mg/L	Total m ³
January	48.3	3.8
February	43.8	3.3
March	36.1	3.9
April	26.9	3.4
May	33.1	3.3
June	34.1	3.5
July	36.3	3.7
August	36.4	3.6
September	36.8	3.3
October	30.3	3.3
November	30.2	3.6
December	26.4	3.9
Average	34.9	3.6

Total Yearly m³: 42.8

Table 8 Chemical Usage Summary: Soda Ash

Month	Average Dosage mg/L	Total kg (dry)
January	68.5	3,900.4
February	76.7	3,681.5
March	59.0	4,607.5
April	50.1	3,916.1
May	56.9	3,582.6
June	59.4	3,785.0
July	72.8	4,336.9
August	72.6	4,336.9
September	75.4	4,189.4
October	72.6	4,323.0
November	79.3	4,183.5
December	68.5	4,323.0
Average	67.7	4097.1

Total Yearly Kilograms: 49,166

Table 9 Effluent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 1

Sample Date	Sample Identification Number	CBOD5 mg/L	pH	Phosphate	Total Phosphorus mg/L	Suspended Solids mg/L
Feb. 1/22	CA13073	<2	7.47	<0.03	0.04	4
May 10/22	CA12527	<2	7.43	<0.03	<0.03	2
Aug 02/22	CA12101	2	7.72	< 0.03	0.06	3
Nov 08/22	CA13290	2	7.68	< 0.03	0.06	5
Yearly Average		2	7.58	0.03	0.05	3.5
Maximum		2	7.72	0.03	0.06	5
Minimum		2	7.43	0.03	0.03	2

Table 10 Effluent Quarterly Analysis Summary – Weekly 24-Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
Feb. 1/22	CA13073	0.8	18.9	<0.03	<0.1
May 10/22	CA12527	<0.5	12.2	<0.03	0.3
Aug 02/22	CA12101	0.8	17.4	0.08	0.1
Nov 08/22	CA13290	0.6	20	0.03	0.1
Yearly Average		0.68	17.2	0.04	0.15
Maximum		0.8	20	0.08	0.3
Minimum		0.5	12.2	0.03	0.1

Table 11 Effluent Loading and Concentration Summary 2022: COBD5

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	2.00	3.34	5.08
February	2.25	3.91	5.29
March	3.40	7.88	12.25
April	2.00	5.36	7.83
May	2.00	4.17	5.29
June	2.00	4.46	5.68
July	2.00	3.96	4.57
August	2.00	4.06	5.28
September	2.00	3.91	5.91
October	2.00	4.58	6.26
November	2.00	5.14	6.43
December	2.00	6.12	9.81
Average Monthly	2.14	4.74	6.64
Effluent Objective	10	44.56	44.56
Non-Compliance	15	66.84	66.84

Table 12 Effluent Loading and Concentration Summary 2022: Suspended Solids

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	2.50	4.17	6.36
February	4.75	8.25	11.16
March	6.20	14.37	22.35
April	3.00	8.04	11.74
May	3.80	7.92	10.04
June	2.40	5.35	6.82
July	2.75	5.44	6.28
August	2.40	4.87	6.34
September	2.25	4.40	6.65
October	2.75	6.30	8.61
November	3.20	8.23	10.29
December	4.25	13.02	20.84
Average Monthly	3.35	7.53	10.62
Effluent Objective	10	44.56	44.56
Non-Compliance	15	66.84	66.84

Table 13 Effluent Loading and Concentration Summary 2022: Total Ammonia Nitrogen Summer

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
May	0.74	1.54	1.96
June	0.10	0.22	0.28
July	0.10	0.20	0.23
August	0.12	0.24	0.32
September	0.10	0.20	0.30
Average Monthly	0.23	0.48	0.62
Effluent Objective	N/A	N/A	N/A
Non-Compliance	N/A	N/A	N/A

Table 14 Effluent Loading and Concentration Summary 2022: Total Ammonia Nitrogen Winter

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.10	0.17	0.25
February	0.45	0.78	1.06
March	1.74	4.03	6.27
April	1.15	3.08	4.50
October	0.10	0.23	0.31
November	0.10	0.26	0.32
December	0.10	0.31	0.49
Average Monthly	0.53	1.27	1.89
Effluent Objective	N/A	N/A	N/A
Non-Compliance	N/A	N/A	N/A

Table 15 Effluent Loading and Concentration Summary 2022: Fecal Coliform

Month	Geomean (#/100mL)	Maximum Daily (#/100mL)
January	0.00	0.00
February	0.00	1.00
March	0.00	2.00
April	0.00	0.00
May	0.00	2.00
June	0.00	0.00
July	0.00	0.00
August	0.00	22.00
September	0.00	0.00
October	0.00	4.00
November	0.00	0.00
December	0.00	4.00
Average Monthly	0.00	2.9
Effluent Objective	80	80
Non-Compliance	200	200

Table 16 Effluent Loading and Concentration Summary 2022: Total Phosphorus

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.04	0.07	0.10
February	0.04	0.07	0.09
March	0.06	0.14	0.22
April	0.05	0.13	0.20
May	0.04	0.08	0.11
June	0.04	0.09	0.11
July	0.04	0.08	0.09
August	0.04	0.08	0.11
September	0.08	0.16	0.24
October	0.07	0.16	0.22
November	0.06	0.15	0.19
December	0.04	0.12	0.20
Average Monthly	0.05	0.11	0.16
Effluent Objective	0.30		
Non-Compliance	0.50		2.44

Table 17 Liquid Sludge Production Summary 2022

Month	Hauler	Cake Weight kg	Destination
January	n/a	0.00	Lystek
February	n/a	0.00	Lystek
March	Waste Con	60,320	Lystek
April	Waste Con	74,420	Lystek
May	Waste Con	99,413	Lystek
June	Waste Con	59,000	Lystek
July	Waste Con	27,940	Lystek
August	Waste Con	55,440	Lystek
September	Waste Con	48,260	Lystek
October	Waste Con	23,810	Lystek
November	Waste Con	20,100	Lystek
December	K&K Sanitation	71,750	Lystek

Yearly Total kg: 540,453
 Yearly Average kg/Month: 54,045
 Maximum Volume: 99,413
 Minimum Volume: 0.00

Table 18 Sludge Quality Analysis 2022

Parameter Sampled (mg/L)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Date	Feb 01, 2022	May 10, 2022	Aug 02, 2022	Nov 08, 2022
Sample ID	CA12559	CA12522	CA13457	CA13301
Nitrate	<0.3	<0.3	0.3	0.3
Mercury	0.007	0.005	0.006	0.006
Chromium	0.26	0.36	0.32	0.18
Cobalt	0.04	0.06	0.04	0.02
Copper	6.1	6.6	7.1	5.7
Lead	0.2	0.2	0.2	0.20
Molybdenum	0.07	0.09	0.13	0.07
Nickel	0.15	0.23	0.17	0.13
Selenium	<0.1	<0.1	< 0.10	< 0.10
Arsenic	<0.1	<0.1	< 0.1	< 0.1
Zinc	7	9	10	8
Cadmium	0.014	0.022	0.016	0.014
Ammonia+ Ammonium	419	465	420	244
Total Kjeldahl Nitrogen	941	1030	1040	844
Total Phosphorus	370	470	519	260
Total Solids	12900	13700	16500	13000
Nitrite	<0.2	<0.2	0.2	0.2

Certification of Reports

I certify that the information in this document and all attachments are correct, accurate, and complete to the best of my knowledge

Michael Currie
Director, Water and Wastewater Services