2024 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 Clean Wastewater Treatment Plant, 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 7,500 people.

The Plant operated under the Ministry of Environment Conservation and Parks (MECP) Environmental Compliance Approval (ECA) # 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 will significantly improve plant efficiency. Under the terms of the ECA, the plant is permitted to treat an average daily flow of 4,456 m^3/day, and a peak flow of 13,330 m^3/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 CWP)
E. coli	80 counts/100mL
pH	6.0 – 9.5 inclusive

The plant is a conventional activated sludge treatment process, consisting of primary and secondary clarifiers with aeration basins. Tertiary filtration and Ultra-Violet disinfection is 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 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 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. Regarding CBOD5, Exceedance Notification # 1-4KV6PG was created for the month of December when the plant experienced an unusual influent flow that challenged the process. Operations observed, sampled, and adjusted accordingly until the process was regained.

Overall, the plant treatment processes performed satisfactorily and are deemed to be adequate. All sample test results 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 m^3/day. The actual average daily flow for the 2024 was 3091m^3/day, however, the 3-year average is 2828m^3/day, which represents 64% of the plant capacity. None of the individual system components exceeded the design flow rating.

Plant Operational Upsets or Process Failures

Event # 1-4NYFSF – UV failure from utility loss of power created partially treated discharge
Event # 1-6OUL0H – final effluent pH objective exceeded on 4 occasions
Event # 1-6XVS9W - loss of utility power coupled with transfer switch failure created partially-treated discharge

Summary of Maintenance in 2024

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 2022. (5-year cycle)

Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 64% 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 Plan is scheduled for conversion to a pump station in 2026 and then decommissioned in 2027, and the flows from Mountview collection area directed then to Golden Pheasant, a suite of phased projects is underway to provide sufficient treatment capacity. Worked commenced again in 2024 to upgrade capacity at Golden Pheasant to receive these flows from Mountview. Completion of these upgrades is expected in 2026.

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

- Installation of additional high efficiency blowers and aeration diffusers.
- Additional process tankage including one new clarifier unit with provision for a fourth clarifier in future.
- Increase to waste activated sludge thickening systems capacity.
- New filtration system
- Increased UV disinfection capacity
- New inlet works equipment

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 which are now complete. Further application was submitted in December of 2023 and approval is underway. Phase two construction activities commenced in spring of 2024 and are expected to be completed in 2026.

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)	15	298	128.28	280.35
Suspended Solids (mg/L)	52	860	175.29	409.4
Total Phosphorus (mg/L)	0.93	8.47	2.74	9.12
Total Ammonia Nitrogen (mg/L)	13.1	168	35.0	49.17
pH	6.53	8.13	7.33	N/A

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

Event# 1-6OUL0H – final effluent pH objective exceeded on 4 occasions within the month of April, with the lowest inhouse recorded value of 6.20. Operations adjusted the necessary process controls to overcome the event.

Final Effluent Analysis Summary

All final effluent samples tested for suspended solids, ammonia, E. Coli, and total phosphorous were below non-compliance limits outlined in the ECA.
Event# 1-6OUL0H – final effluent pH objective exceeded on 4 occasions, within the month of April, with the lowest inhouse recorded value of 6.20. Operations adjusted the necessary process controls to overcome the event.

Table 3 Final Effluent Analysis Summary

Parameter	Minimum	4 Week Average Maximum	Annual Average	Average Loading kg/day
COBD5 (mg/L)	2	5.0	3.76	11.62
Suspended Solids (mg/L)	2	5.0	2.99	9.24
Ammonia (mg/L)	0.1	9.8	0.37	1.14
E. Coli (#/100 mL)	0	18.8	1.86	N/A
Total Phosphorus (mg/L)	0.03	0.11	0.04	0.12
pH	6.20	8.15	7.18	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 period 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 2025-year, 24-hour composite samples will be collected on Monday rather than Thursday of each week as was done in 2024.

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 additional treatment and re-use. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2024 and will continue to do so in 2025. It is not anticipated that there will be a significant increase in the total volume of bio solids produced in 2025.

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 landfill site. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2024 and will continue to do so in 2025. It is not anticipated that there will be a significant increase in the total volume of bio solids produced in 2025.

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 41 customers connected to existing sewer laterals in 2024.

New Sewer Mains:
Approximately 630m of new 200mm sewer main was installed in Huntsville in 2024.

New Maintenance Holes:
There were 0 maintenance holes installed in 2024.

Sewer Main Replacements:
There were no sewer main replacements in 2024.

Low Pressure Sewer Breaks:
There were no low-pressure sewer breaks in 2024.

Sewer Force Main Breaks:
There were no sewer forcemain breaks in 2024.

Sewer Force Main Replacement
There were no sewer force mains replaced in 2024.

Main Line Sewer Blockage
There were no sewer main blockages in 2024.

Sewer Lateral Blockage
There were no municipal side sewer lateral blockages in 2024.

Service Low Pressure Sewer Blockages:
There were no low-pressure sewer blockages in 2024.

Frozen Sewers:
There were no frozen sewer force mains, service laterals or low-pressure sewers in 2024.

Sewer Flushing/Video:
There was 1860m of sanitary sewer flushed. Approximately 1220m that was flushed, and video inspected in 2024.

Sewer Locates:
Field staff addressed 1091 written locate requests in 2024.

Air Release Valves:
All 41 air-vacuum release valves were inspected in 2024.

Table 4 Effluent Flow Summary - 2024

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	84,675	2,731	3,216	2,391	N/A	101882
February	87,445	3,015	3,857	2,535	N/A	78946
March	109,788	3,542	4,793	2,882	N/A	100340
April	114,506	3,817	5,374	2,877	N/A	134455
May	105,800	3,413	3,997	2,950	N/A	94603
June	98,572	3,286	6,200	2,394	N/A	75583
July	95,917	3,094	3,540	2,594	N/A	89154
August	75,907	2,449	3,406	1,671	N/A	82491
September	77,413	2,580	3,164	1,447	N/A	73097
October	86,029	2,775	3,411	1,789	N/A	80410
November	87,633	2,921	3,489	2,313	N/A	81420
December	104,528	3,372	5,447	2,668	N/A	89201

Total Flow: 1,128,213 m3
Average Day: 3091 m3
Maximum Day: 6200 m3
Minimum Day: 1447 m3

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-01-24	CA14018	46	0.06	1.77	125
May-02-24	CA13157	124	< 1.14	2.56	127
Aug-01-24	CA13123	240	< 0.69	3.3	213
Nov-07-24	CA12311	91	< 0.89	8.47	175
Yearly Average		125.3	0.695	4.03	160
Maximum		240.0	1.14	8.47	213
Minimum		46.0	0.06	1.77	125

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-01-24	CA14018	17.3	<0.06	<0.03	13.9
May-02-24	CA13157	22.9	<0.06	<0.03	19.5
Aug-01-24	CA13123	32.9	<0.06	<0.03	28.6
Nov-07-24	CA12311	108.0	<0.06	<0.03	106
Yearly Average		45.3	<0.06	<0.03	42.0
Maximum		108.0	<0.06	<0.03	106.0
Minimum		17.3	<0.06	<0.03	13.9

Table 7 Chemical Usage Summary: Clarion A405P

Month	Average Dosage mg/L	Total kg
January	31.1	5,058.4
February	31.8	5,340.1
March	20.8	4,380.6
April	29.7	6,520.4
May	27.1	5,505.9
June	27.1	5,128.4
July	32.6	6,010.1
August	37.9	5,521.4
September	35.4	5,265.8
October	37.3	6,156.3
November	35.7	6,014.5
December	28.7	5,758.4

Total Yearly Kilograms: 66,600 kg

Table 8 Chemical Usage Summary: Soda Ash

Month	Average Dosage mg/L	Total kg
January	48.7	2,896.0
February	46.8	2,917.5
March	37.4	2,926.3
April	49.8	4,221.4
May	65.0	4,990.8
June	66.2	4,764.0
July	67.1	5,010.0
August	51.0	3,295.8
September	83.1	4,739.7
October	77.4	4,611.5
November	70.7	4,031.8
December	53.8	3,595.5

Total Yearly Kilograms: 44,404 kg

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-01-24	CA14018	2	7.48	<0.03	0.04	4
May-02-24	CA13157	2	7.41	<0.03	0.03	<2
Aug-01-24	CA13123	3	7.79	<0.03	0.07	2
Nov-07-24	CA12311	2	7.90	<0.03	<0.03	<2
Maximum		2.3	7.645	<0.03	0.04	2.5
Minimum		2	7.9	<0.03	0.07	4

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-01-24	CA14018	1.7	12.8	<0.03	<0.1
May-02-24	CA13157	0.9	17.2	<0.03	0.1
Aug-01-24	CA13123	1	13.2	0.04	0.1
Nov-07-24	CA12311	0.7	17	<0.03	<0.1
Yearly Average		1.075	15.15	0.0325	0.1
Maximum		1.7	17.2	0.04	0.1
Minimum		0.7	12.8	0.03	0.1

Table 11 Effluent Loading and Concentration Summary 2024: COBD5

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	3.00	8.19	9.65
February	3.20	9.65	12.34
March	3.50	12.40	16.78
April	4.00	15.27	21.50
May	3.60	12.29	14.39
June	3.50	11.50	21.70
July	4.00	12.38	14.16
August	4.00	9.79	13.62
September	4.25	10.97	13.45
October	4.00	11.10	13.65
November	4.00	11.68	13.96
December	4.00	13.49	21.79
Annual Average	3.75	11.55858	15.58074
Effluent Objective	5		
Non-Compliance	15		

Table 12 Effluent Loading and Concentration Summary 2024: Suspended Solids

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	3.00	8.19	9.65
February	2.60	7.84	10.03
March	3.50	12.40	16.78
April	3.00	11.45	16.12
May	2.20	7.51	8.79
June	2.50	8.21	15.50
July	2.25	6.96	7.96
August	2.40	5.88	8.17
September	2.00	5.16	6.33
October	2.80	7.77	9.55
November	2.00	5.84	6.98
December	2.00	6.74	10.89
Annual Average	2.52	7.83	10.56
Effluent Objective	5		
Non-Compliance	15		

Table 13 Effluent Loading and Concentration Summary 2024: Total Ammonia Nitrogen Summer

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
May	0.10	0.34	0.4
June	0.10	0.33	0.62
July	0.10	0.31	0.35
August	0.10	0.24	0.34
September	0.10	0.26	0.32
October	0.10	0.26	0.34
Annual Average	0.10	0.29	0.36
Effluent Objective			
Non-Compliance			

Table 14 Effluent Loading and Concentration Summary 2024: Total Ammonia Nitrogen Winter

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.23	0.61	0.72
February	2.36	7.12	9.10
March	5.73	20.28	27.44
April	0.58	2.19	3.09
November	0.10	0.29	0.35
December	0.10	0.34	0.54
Annual Average	1.51	2.57	3.44
Effluent Objective			
Non-Compliance			

Table 15 Effluent Loading and Concentration Summary 2024: Fecal Coliform

Month	Geomean (#/100mL)	Maximum Daily (#/100mL)
January	0.25	2.00
February	0.60	3.00
March	0.00	0.00
April	0.00	0.00
May	18.80	109.00
June	0.34	2.00
July	0.50	2.00
August	1.40	7.00
September	0.00	0.00
October	0.40	2.00
November	0.00	0.00
December	0.00	0.00

Table 16 Effluent Loading and Concentration Summary 2024: Total Phosphorus

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.05	0.15	0.28
February	0.06	0.16	0.19
March	0.03	0.10	0.14
April	0.04	0.18	0.28
May	0.04	0.13	0.24
June	0.04	0.10	0.14
July	0.04	0.12	0.14
August	0.05	0.13	0.17
September	0.04	0.09	0.12
October	0.05	0.13	0.17
November	0.04	0.12	0.13
December	0.04	0.10	0.12
Annual Average	0.04	0.11	0.15
Effluent Objective	0.30		
Non-Compliance	0.30		

Table 17 Liquid Sludge Production Summary 2024

Month	Hauler	Liquid Volume m^3	Cake Weight kg	Destination
January	N/A	N/A	N/A	N/A
February	ROHES		68,350	ROHES
March	ROHES		143,310	ROHES
April	ROHES		94,940	ROHES
May	ROHES		84,520	ROHES
June	ROHES		66,190	ROHES
July	ROHES	966.4		ROHES Lagoon
August	ROHES	886.0		ROHES Lagoon
September	ROHES		14,880	ROHES
October	ROHES		119,220	ROHES
November	ROHES		84,330	ROHES
December	ROHES		88,010	ROHES

Liquid Yearly Total Volume: 1852.4 m3
Cake Yearly Total Volume: 763,750 kg

Table 18 Sludge Quality Analysis 2024

Parameter Sampled (mg/L)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Date	Feb 01/24 08:45	May 02-24 08:30	Aug 01/24 08:40	Nov 07/24 08:45
	CA12068	CA13155	CA13124	CA12317
Nitrate	<3	<3	<3	<3
Mercury	0.011	0.01	0.005	0.004
Chromium	0.18	0.20	0.18	0.15
Cobalt	0.02	0.03	0.03	0.02
Copper	5.00	4.00	5.40	4.50
Lead	0.20	0.30	0.20	0.10
Molybdenum	0.06	< 0.060	0.08	0.06
Nickel	0.13	0.12	0.13	0.1
Selenium	<0.1	<0.1	<0.1	<0.1
Arsenic	<0.1	<0.1	<0.1	<0.1
Zinc	6	5	7	6
Cadmium	0.009	0.011	0.01	0.008
Ammonia	318	411	396	339
Total Kjeldahl Nitrogen	827	884	925	782
Total Phosphorus	340	270	340	300
Total Solids	12700	12200	14000	10700
Volatile Acids	41	<40	<40	<40

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

Darren Ronson
Manager of Water and Wastewater Operations

Glenn Gardiner
Manager of Water and Wastewater Operations