

The facility did not experience any by-pass spill or abnormal discharge event during the reporting period. Therefore, there were no serious operational problems encountered during this period.

The facility was not inspected by Ministry of the Environment Officials in 2011.

The Town continues to successfully operate its Wastewater System in accordance with all regulatory requirements and as noted in the attached report, the 2011 operating year was successful with no immediate problems encountered.

C. The Blue Mountains' Strategic Plan

The acceptance of this Report by Council furthers the Town Strategic Plan Goal # 2 "Addressing the Town Municipal Infrastructure Needs" and Goal # 6 "Providing a Strong, Well-Managed Municipal Government."

D. Environmental Impacts

The preparation of this report ensures that the Wastewater Treatment Plant operations run efficiently and adequately to guarantee the protection of water resources.

E. Budget Impact

None

F. In Consultation With

None.

G. Attached

1. Thornbury Wastewater Treatment Plant – 2011 Annual Performance Report

Respectfully submitted

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2011 Annual Performance Report Thornbury Wastewater Treatment Plant

Prepared by Wastewater Operations Staff

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Executive Summary

This report has been prepared as required by the Certificate of Approval No. 6870-7YRLAR, Section 11 issued to the Thornbury Wastewater Treatment Plant.

Section 11 requires the Owner to prepare and submit a performance report to the District Manager on an annual basis by March 31 for the preceding calendar year.

All of the requirements listed in Section 11 have been met and will be further explored throughout the report. The Town continues to successfully operate its Wastewater System in accordance with all regulatory requirements.

Facility Information

The Thornbury Wastewater Treatment Plant is a modification of the extended aeration treatment process. The original plant was a lagoon system constructed in 1975.

In 1993 the plant was expanded to a mechanical facility utilizing the “Sutton Concept” for sludge disposal. The plant design included provision for phosphorus removal facilities and U.V. disinfection with continued use of existing outfall to the Beaver River on a continuous basis.

The Sutton process was developed in the early 1980’s following a research project which involved installing a package treatment facility in line with active lagoons.

The system provides nitrification and denitrification for the control of ammonia and hydrogen sulphide in waste stabilization lagoon effluents. A highly nitrified effluent is obtained from an extended aeration activated sludge process which provides a high sludge age and high solids level in the aeration cells (low F/Mv ratio).

The high concentration of nitrates in the secondary effluent, prevents the reduction of sulphates to hydrogen sulphide in the lagoon.

The Thornbury Wastewater Treatment Plant is currently rated at 3,580 m³/d operating under Certificate of Approval # 6870-7YRLAR.



1.0 Monitoring and Compliance

The facility shall ensure that at all times the sewage works and related equipment and appurtenances which are installed or used to achieve compliance are properly operated and maintained.

2.0 Interpretation of Monitoring Data and Analytical Data

A comprehensive interpretation of all monitoring data and analytical data collected during the reporting period, and in comparison to the effluent quality and quantity criteria, is outlined below:

Capacity Assessment

Table No. 1

| Year | 2011 | 2010 | 2009 | 2008 | 2007 |
|--|---------|---------|---------|---------|---------|
| Average Day Flow (m ³ /d) | 2,452 | 2,028 | 2,136 | 2,558 | 1,930 |
| Average Design Capacity (m ³ /d) | 3,580 | 3,580 | 3,580 | 3,580 | 3,580 |
| % of capacity (based on average daily flows) | 68% | 56% | 59% | 71% | 54% |
| Peak Day Flow (m ³ /d) | 7,178 | 7,366 | 7,695 | 8,652 | 8,216 |
| Peak Design Capacity | 7,196 | 7,196 | 7,196 | 7,196 | 7,196 |
| Raw Sewage Total Flow (m ³) | 895,257 | 742,400 | 776,868 | 935,790 | 879,203 |

Chart No. 1

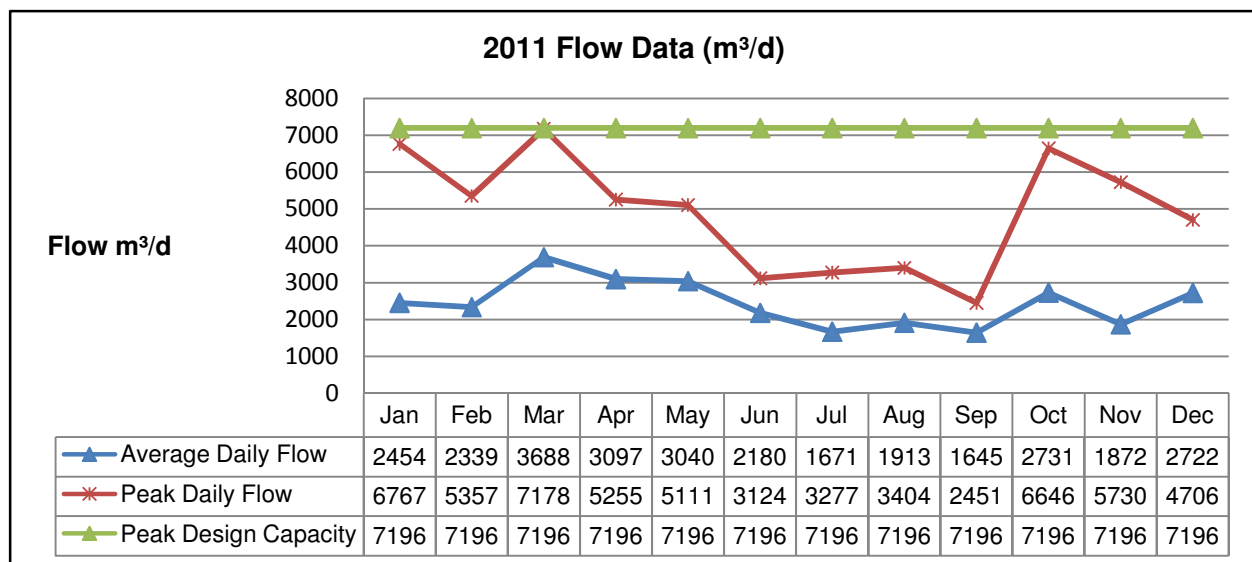
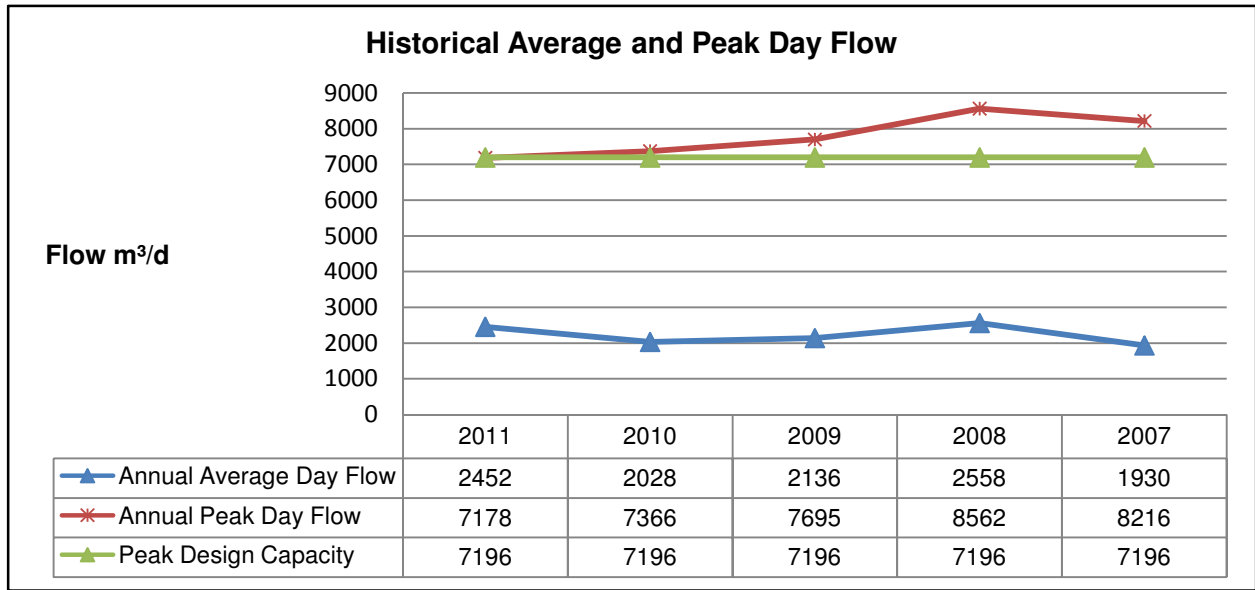


Chart No. 2



2011 Raw Sewage Loading Objectives (kg/d)

Table No. 2

| Influent Parameter | Design (kg/d) | Annual Average Loading (kg/d) | % of Design | Was Design Exceeded? |
|-------------------------|---------------|-------------------------------|-------------|----------------------|
| CBOD | 537 | 184 | 34% | No |
| Total Suspended Solids | 651 | 191 | 29% | No |
| Total Phosphorus | 25 | 2.8 | 11% | No |
| Total Kjeldahl Nitrogen | 86 | 26 | 30% | No |

2011 Effluent Objectives

Certificate of Approval Number 6870-7YRLAR establishes the following effluent limits:

Table No. 3

| Effluent Parameter | Concentration Objective (mg/L) | Concentration Achieved (mg/L) | Was Objective Met? |
|------------------------|--------------------------------|-------------------------------|--------------------|
| CBOD | 5 | 2.3 | Yes |
| Total Suspended Solids | 5 | 3.7 | Yes |
| Total Phosphorus | 0.3 | 0.11 | Yes |
| Ammonia Freezing | 3 | 0.40 | Yes |
| Ammonia Non-Freezing | 1 | 0.13 | Yes |
| E.Coli | 100 | 5.5 (Geometric Mean) | Yes |

pH was maintained at 7.8 which is compliant with the range of 6.5 to 9.0 inclusive, at all times.

2011 Plant Performance

Table No. 4

| Effluent Parameter | Annual Average Loading (kg/d) | Design Objective (kg/d) | Was Design Exceeded? |
|-----------------------------------|-------------------------------|-------------------------|----------------------|
| CBOD | 7.6 | 18 | No |
| Total Suspended Solids | 12 | 18 | No |
| Total Phosphorus | 0.36 | 1.1 | No |
| Ammonia Freezing ¹ | 1.3 | 11 | No |
| Ammonia Non-Freezing ² | 0.42 | 3.6 | No |

¹ Freezing Period – November 01 – March 31 each year

² Non-Freezing Period – April 01 – October 31 each year

Table No. 5

| Parameter | Maximum Month Average Effluent Concentration (mg/L) | | | Maximum Month Average Effluent Loading (kg/d) | | | Was Effluent Parameter Limit Met? |
|----------------------|---|------------------------------|--------------------------|---|------------------------------|--------------------------|-----------------------------------|
| | Achieved | Parameter Limit Non-Freezing | Parameter Limit Freezing | Achieved | Parameter Limit Non-Freezing | Parameter Limit Freezing | |
| BOD | 4 | 10 | 15 | 13 | 36 | 54 | Yes |
| Suspended Solids | 5.5 | 15 | 20 | 18 | 54 | 72 | Yes |
| Total Phosphorus | 0.18 | 0.5 | 0.8 | 0.59 | 1.8 | 2.9 | Yes |
| Ammonia Freezing | 0.70 | 5 | | 2.3 | 18 | | Yes |
| Ammonia Non-Freezing | 0.25 | 2 | | 0.82 | 7.2 | | Yes |

3.0 Effluent Quality Control Measures

Effluent quality assurance is controlled by monthly effluent concentrations and waste loading calculations submitted to the Owen Sound Office of the Ministry of the Environment.

As indicated by the effluent concentration and waste loading chart, the Thornbury Wastewater Treatment Plant continues to experience a high degree of removal efficiency, and as a result, this facility was operated well within its Certificate of Approval design objective.

Table No. 6

| Effluent Parameter | % Removal Efficiency (Annual Average) | % Removal Criteria | Comment |
|--------------------|---------------------------------------|--------------------|--------------------------|
| CBOD | 96% | Not Applicable | High Efficiency Achieved |
| Suspended Solids | 94% | Not Applicable | High Efficiency Achieved |
| Total Phosphorus | 87% | Not Applicable | High Efficiency Achieved |
| TKN | 96% | Not Applicable | High Efficiency Achieved |

4.0 Sampling

The influent and effluent samples are taken with an automated composite sampler. The composite samplers are located at the plant head-works and effluent channel after U.V.

Bi-weekly, effluent and influent samples are analyzed for BOD, Suspended Solids, Total Phosphorus and Total Ammonia. Lakefield Laboratory is used for chemical analysis.

For quality assurance purposes, the operator will split-sample. This means a sample is collected and split into two portions. One portion is sent to the lab for analyses while one portion is analyzed in-house. The results are compared and the precision of the in-house analysis is evaluated.

While the Certificate of Approval requires monthly sampling for raw sewage parameters, operations have increased sampling to bi-weekly for increased risk assessment

5.0 Maintenance Summary

During 2011, a total of 382 preventative maintenance work orders were performed. A breakdown is listed below:

Monthly preventative maintenance – 312

Semi-annual – 26

Annual – 17

Corrective – 6

Operational - 214

Highlights of some operational expenditures are as follows:

- Safety railing installed around Clarifier # 1
- Rebuild pump # 2 at Moore SLS
- Rebuild pump # 1 and # 2 at Peel SLS

6.0 Operating Problems and Corrective Actions

The facility did not experience any by-pass spill or abnormal discharge event during the reporting period. Therefore, there were no serious operational problems encountered during this period.

The facility was not inspected by Ministry of the Environment Officials in 2011.

7.0 Proposed Alterations, Extensions, and Replacements for 2012

No major modifications and improvements are required during the next reporting period which may require approval under the Ontario Water Resources Act.

8.0 Volume of Sludge generated in 2011 / Anticipated Volumes in 2012

Sludge disposal incorporates the “Sutton concept” whereas a high sludge age and solids level combined with increased concentration of nitrates in the secondary effluent, prevents the reduction of sulphates to hydrogen sulphide in the lagoon.

9.0 Sludge Handling Methods and Disposal Areas to be used in 2012

The Sutton process digested sludge, if need be, will be applied by Wessuc Inc. in 2012. Land application of biosolids is now performed under Ontario Regulation 267/03, NASM Plan 20348.

10.0. Summary of Complaints received in 2011

A record of complaints is maintained and there were no complaints received in 2011.

11.0. Evaluation of Calibration and Maintenance Conducted on Monitoring Equipment

The Owner shall install and maintain a continuous flow measuring device, to measure the flowrate and quantity of septage added to the Works for co-treatment, with an accuracy to within plus or minus fifteen percent ($\pm 15\%$) of the actual flow rate for the entire design range of flow measuring device, and record the flowrate and volume added at a daily frequency.

Calibration of the monitoring equipment was completed in 2011 and is attached for reference as Appendix A.

**Town of Blue Mountain open channel flow verification results
Feb 4 2011
Technician: Bill Brend**

3. Influent Meter

**Model: Milltronics Multi-ranger Plus open channel flow meter
Location: Thornbury Waste Water Plant**

**Max head= 45.4 cm
Blanking distance= 30.48 cm
Empty distance= 81.92 cm
Measured head= 0 cm Display= 0 cm error = 0%
Measured head= 40 cm Display= 39.76cm= 0.29%**

PASSED

4. Effluent meter

**model: Milltronics Multi-ranger Plus open channel flow meter
Location: Thornbury Waste Water Treatment Plant**

**Max head= 29.84 cm
Blanking distance= 30.48 cm
Empty distance=112.8
Measured head= 14 cm Display= 14.8 cm error= 0.71%**

PASSED

5. Raw Activated Sludge meter

**model: Milltronics Muliti-Ranger Plus open channel flow meter
Location: Thornbury Waste Water Plant**

**Max head= 46.99 cm
Blanking distance=30.48 cm
Empty distance=101.1 cm
Measured head=43cm Display=41.2 error= 0.8%**

PASSED

Thornbury Waste Water Treatment Plant
 Clearspan P105 2 channel recorder verification
 Feb. 4 2011
 performed by Bill Brend

1) FIT-01 channel 1 units m3/day

| Input | % full scale | calculated output | actual | error | % error |
|-------|--------------|-------------------|------------|-------|---------|
| 4 mA | 0 % | 0 m3/day | 14 (1%) | 14 | 1% |
| 8 mA | 25 % | 350 m3/day | 350(25%) | 0 | 0% |
| 12 mA | 50 % | 700 m3/day | 714(51%) | 14 | 2% |
| 16 mA | 75 % | 1050 m3/day | 1064(76%) | 14 | 1.3% |
| 20 mA | 100% | 1400 m3/day | 1414(101%) | 14 | .01% |

PASSED

2) FIT-01 channel 2 units m3/day

| | | | | | |
|-------|------|--------|-----|-----|------|
| 4 mA | 0% | 0 | .01 | .01 | 0% |
| 8 mA | 25% | 239.25 | 240 | .75 | .1% |
| 12 mA | 50% | 478.50 | 479 | .50 | .1% |
| 16 mA | 75% | 717.75 | 718 | .25 | .03% |
| 20 mA | 100% | 957 | 957 | 0 | 0% |

PASSED