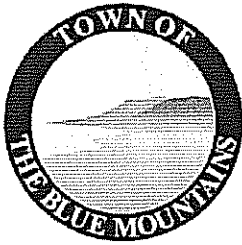


STAFF REPORT: ENGINEERING AND PUBLIC WORKS DEPARTMENT



REPORT TO: Engineering and Public Works Committee
MEETING DATE: August 12, 2008
REPORT NO.: EPW.08.89
SUBJECT: Water and Wastewater Capacity
 Assessment - 2007 Year End Report
PREPARED BY: John Caswell, Manager, Water and
 Wastewater Services

A. Recommendations

THAT Council receive the Water and Wastewater Capacity Assessment - 2007 Year End Report; and

FURTHER THAT Council approve forwarding the 2007 Year End Report to the Grey County Planning Department.

B. Background

The Town is required to annually complete a year end water and wastewater capacity assessment report and provide the report to the upper tier government being Grey County. This report is used as a monitoring tool for the provision of allocation and reservation of water and wastewater capacity for new development and also provides current information on flows from existing development.

The 2007 Year End Water and Wastewater Capacity Assessment Report was prepared by Town Staff.

The Thornbury Water Treatment Plant continues to deliver a high quality of drinking water which adheres to all Provincial Regulations and stringent testing requirements. There were no significant water quality concerns arising from the 2007 reporting period.

Both the Thornbury Wastewater Treatment Plant and the Craigeith Wastewater Treatment Plant continue to experience a high degree of suspended solids, BOD⁵, and phosphorous removal efficiency. As a result, both facilities operate well within their Certificate of Approval design objective.

A review of the 2007 capacity status has identified that the following systems are over allocated and require detailed designs and Certificates of Approval for expansion or upgrading prior to additional connections.

The following works are proposed:

Water Supply

- Increase in the water supply by increasing the supply from Thornbury, or by advancing the Collingwood Supply. This was assessed in the Combined EA Phase 2 Report, which was completed in the summer of 2006. The Phase 4 ESR will be completed in 2008.
- The Town has awarded a tender to replace Neptune and Trident filters at Thornbury WTP to return the Water Treatment Plant to its Certificate of Approval capacity.
- Increase in water supply to the Craigeith Area by advancing the Collingwood Supply by constructing a watermain link on Osler Bluff Road. This was assessed in the Combined EA Phase 2 Report, which was completed in the summer of 2006.
- The need for additional water storage was identified in the Master Servicing Plan. Hydraulic Modeling is required to confirm the need and size for additional storage. Once the model is finalized Certificates of Approval's will be obtained.

Thornbury Wastewater Treatment Plant

- The Town has awarded the design for the expansion of the Thornbury Wastewater Treatment Plant to Stantec Consulting Inc. It is expected the design will be completed in 2008 and construction of Phase 1(A) will be completed in 2009 and 2010.

C. The Blue Mountains' Strategic Plan

The 2007 Water and Wastewater Year End Report furthers the Town's Strategic Plan Goal # 2 "Addressing the Town's Municipal Infrastructure Needs".

D. Environmental Impacts

The Year End Report provides the baseline data required for reporting and forecasting and is integral to development of the waste and wastewater services for the Town of The Blue Mountains. It is instrumental in environmental compliance reporting and in reducing the municipality's impact on the ecology of Georgian Bay.

E. Budget Impact

None directly, but the Year End Report forecasts the need for capital expansions in both water and wastewater.


F. Attached

1. 2007 Year End Report – Executive Summary - July 2008

Respectfully submitted,



John Caswell
Manager, Environment Services



Reg Ruswurm
Director, Engineering and Public Works

Executive Summary

Provided below is brief summary of the 2007 Year End Report.

MOE Guideline for Calculating Reserve Capacity

The Ministry of Environment has a guideline entitled “Calculating and Reporting Uncommitted Reserve Capacity at Sewage and Water Treatment Plants”, dated March 1995. A copy of this document is included in Appendix D. The reserve capacity calculation is intended to ensure that the committed developments do not exceed the design capacity of the wastewater and/or water works.

In general, the Guideline recommends calculating reserve capacity as follows:

$$\text{Reserve Capacity} = \text{Design Capacity} - \text{Existing Flows} - \text{Committed Flows}$$

Where:

<i>Design Capacity</i>	of a water treatment plant is described as the quantity of water that can be delivered to the distribution system when operating the plant under design conditions and is sufficient to meet the maximum day demand. The design capacity can be obtained from the Certificate of Approval, Water Taking Permit, design documents, or design/operating manuals.
<i>Design Capacity</i>	of a wastewater treatment plant is described as the capacity that may be defined in a Design Report or in the Certificate of Approval. The components of wastewater flow may include domestic wastewater, commercial and/or industrial wastewater, inflow/infiltration.
<i>Existing Flow</i>	flow based on an average of 3 year historical flow (average flow for wastewater treatment plants, peak flow for wastewater pumping stations, maximum day demand for water plants and pumping stations)
<i>Committed Flows</i>	includes all approved development & existing development not connected.

The MOE suggests that the calculation may be modified, to account for any of the following deviations:

- Widely variable seasonal flow fluctuations due to infiltration or seasonal population.
- Rapid development/growth which may dramatically increase the forecasted flows.
- Large industrial facilities which may impact on flows.
- Per capita flow projection which may be substantially different from historical flows.

Attachment 1

In addition, operating conditions at water and wastewater treatment facilities may necessitate the need to modify the formula. For example, a plant may be in poor condition and not capable of meeting the maximum day demands, or water quality / effluent quality parameter.

Water Supply

The following table summarizes the average day demand (ADD) and maximum day demand that occurred in the summer (MDD_s) and winter (MDD_w) over the period from 1999 to 2007. MDD_w typically occurred in December or January, and MDD_s typically occurred in July or August of the year. The MDD is the higher of MDDs and MDDw for a given year.

Table 4.1: Historical Water Demands and Connection Status

Year	# of Units	ADD (m ³ /day)	ADD (m ³ /unit/d)	MDD _s (m ³ /day)	MDD _s (m ³ /unit/d)	MDD _w (m ³ /day)	MDD _w (m ³ /unit/d)	MDD (m ³ /unit/d)
1999	4,329	3,390	0.783	8,430	1.947	4,600	1.063	1.947
2000	4,464	3,000	0.672	5,270	1.181	5,200	1.165	1.181
2001	4,763	3,420	0.718	9,430	1.980	4,510	0.094	1.980
2002	5,161	3,710	0.719	8,452	1.638	5,503	1.066	1.638
2003	5,518	3,489	0.632	6,287	1.139	5,353	0.970	1.139
2004	5,839	3,831	0.656	6,987	1.197	7,668	1.313	1.313
2005	6,456	4,303	0.666	8,910	1.380	6,498	1.006	1.380
2006	6,967	4,608	0.661	8,655	1.242	7,197	1.033	1.242
2007	7,260	4,850	0.668	9,815	1.351	7,476	1.029	1.351
		3 Yr. Avg. 0.665				3 Yr Max Avg.		1.324

Thornbury Wastewater Treatment Plant

The following table summarizes the average day flow (ADF) and peak day flow (PDF) that occurred over the period from 1999 to 2007.

Table 4.4: Thornbury Wastewater Treatment Plant Historical Flows

Year	# of Connections	ADF (m ³ /day)	ADF (m ³ /unit/d)	PDF (m ³ /day)	PDF (m ³ /unit/d)
1999	1,312	1,536	1.171	4,681	3,568
2000	1,316	1,711	1.300	3,896	2,960
2001	1,336	1,821	1.363	7,475*	5,595
2002	1,405	1,643	1.169	3,943	2,806
2003	1,414	1,888	1.335	4,988	3,528
2004	1,467	1,831	1.248	9,576*	6,528
2005	1,499	1,836	1.225	5,735	3,826
2006	1,658	2,209	1.332	8,455	5,100
2007	1,733	1,930	1.114	8,216	4,741
		3 Yr. Avg. 1.22		3 Yr. Avg. 4.55	
* Note: values include wastewater volumes diverted from the pumping station to lagoons at the Thornbury Wastewater Treatment Plant by pump truck during the peak flow event. A total of					

165 m³ was diverted on February 9, 2001, and 1,304 m³ was diverted on March 5th, 2003. Flows were also diverted from the pumping station on May 23rd, 2004 during a storm event.

The above data shows that the average day flows over the five year period have been fairly consistent and that there have been several occurrences of very high peak flows.

Craigleith Wastewater Treatment Plant

Table 4.7 summarizes the average day flow (ADF) and maximum day flow (PDF) recorded at the Craigleith Main Pumping Station over the period from 1999 to 2007. The data indicates that the yearly average day flow per connection has continually decreased from 1999 to 2003, while the peak flow rates have varied. This trend with average flow rates may be a reflection of the seasonal nature of the community, due to low occupancy during certain times of the year and as a result of water conservation.

Table 4.7: Craigleith Wastewater Treatment Plant Historical Flows

Year	# of Connections	ADF (m ³ /day)	ADF (m ³ /unit/d)	PDF (m ³ /day)	PDF (m ³ /unit/d)
1999	1,434	1,723	1.202	5,099	3.556
2000	1,552	1,492	0.961	2,928	1.887
2001	1,801	1,706	0.947	8,038*	4.463
2002	2,127	1,764	0.829	3,700	1.740
2003	2,505	2,025	0.808	8,124*	3.243
2004	2,746	2,307	0.840	8,443	3.075
2005	3,305	2,259	0.683	5,229	1.582
2006	3,756	2,616	0.696	7,793	2.075
2007	3,985	2,407	0.604	10,667	2.677
		3 Yr. Avg.	0.661	Avg. 3 Yr. Max	2.42

*Note: values include wastewater volumes diverted from the pumping station to lagoons at the Thornbury Wastewater Treatment Plant by pump truck during the peak flow event. A total of 472 m³ was diverted on February 9, 2001, and 778 m³ was diverted on March 16, 2003.

From 2001 to 2007 there has been a significant increase in the rate that new connections are added. The average increase in connections from 1999 to 2007 was 319 units per year, with the largest increase occurring in 2005. It is important to note that the Town records new connections at the end of the year. Therefore, new connections to the system in the later portion of the year have not contributed flow to the system during earlier periods. As the per unit flow rate is determined by dividing the number of connections by the average annual daily flow rate, per unit flow rates identified in Table 4.7 will be slightly underestimated.

Remaining Allocation and Reserve Capacity

Water

The Thornbury Water Treatment Plant plus the supplemental supply from the Town of Collingwood has 0 units available. The Town has awarded a tender to replace the Neptune and Trident filters with Pall Membrane Filtration. This will restore the plant capacity to 13,536 m³/d.

Wastewater

The Thornbury Wastewater Treatment Plant has 0 units available. The Town has hired a consultant to complete the design of the Thornbury WWTP and it is expected a Certificate of Approval will be received early in 2009 which will allow the Town to reserve further capacity. It is expected that construction will begin in 2009 and be completed in 2010 at which time the Town will be able to allocate further capacity.

The Thornbury Main WWPS has 737 units available. In the future, there will be the requirement for an additional forcemain to the WWPS.

The Craigleith Wastewater Treatment Plant has 5,105 units available. The Craigleith WWPS has 0 units available. The Town requires an additional pump to increase capacity. Recently, a second forcemain was installed and the additional pump will be installed in 2009.