

2005 Annual Compliance Report

**Operation & Maintenance of the
Chesley Wastewater System
Municipality of Arran-Elderslie**

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1.0 INTRODUCTION

The Chesley wastewater treatment and collection system comprises of a wastewater treatment plant and four (4) pumping stations, namely the Riverside Park, North End, Arena East and South End Pumping Stations. The wastewater generated within the collection area of Chesley is collected into the sewer system and pumped to the wastewater treatment plant, which comprises of three (3) aerated lagoons, Parshall flume for flow monitoring and an alum dosing system for phosphorus removal. The treated effluent from the aerated lagoons is discharged into the Saugeen River.

The Municipality of Arran-Elderslie retained the services of Oweson Water Services, a Division of Oweson Ltd., to prepare the Annual Compliance Report for the Chesley Sewage Works. The Ministry of Environment has issued a Certificate of Approval (CofA) # 3-0483-82-006 dated July 15, 1982 and was revoked and replaced on October 12, 2005 by CofA # 4546-6G6J22. Refer to **Appendix A** for the Certificate of Approval. The annual report prepared addresses the following items.

1. Summary of all monitoring data and a comparison to the effluent limits.
2. Summary of improvements and maintenance carried out.
3. Summary of all by-pass, spill or abnormal discharge events.

The annual report also includes conclusions and recommendations that the Municipality shall undertake in order to continue to meet the regulatory requirements.

During the reporting period of this Annual Report (January 1, 2005 to December 31, 2005), the Chesley Sewage Works was operated by the Municipality of Arran-Elderslie.

This report is prepared based on the information provided by the Municipality of Arran-Elderslie.

2.0 DESCRIPTION OF FACILITIES

2.1 Wastewater Treatment Plant

The wastewater treatment plant consists of three (3) aerated lagoons. Cell 1 has a volume of 34,430 m³, Cell 2 has a volume of 33,070 m³ and Cell 3 has a volume of 35,910 m³. All three lagoons are provided with a diffused aeration system; however, the air flow into the lagoons is maximum for Cell 1 and minimum for Cell 3. The air is supplied by way of three (3) positive displacement air blowers, each having a capacity of 6.6 m³/min. The air flow meters have been provided to monitor the flow of air into Cells 1, 2 and 3. A gas cleaning system has also been provided that uses hydrochloric acid gas for the weekly cleaning of air piping.

The incoming wastewater flow is measured by way of a Parshall flume, complete with an ultrasonic transducer and remote readout. Alum is added to the incoming wastewater for the phosphorus removal. Two (2) alum pumps have been provided - one working, one standby. The alum pump injects the required flow-paced amount of alum into the wastewater.

2.2 Riverside Park Pumping Station

This pumping station is the main sewage pumping station and is located next to the former PUC building north of the Chesley Public School. The facility consists of an aboveground building housing a 65 kW standby power diesel generating set along with electrical controls. Next to the control building is an underground wet well/dry well-type pumping system. The dry well is provided with two (2) dry pit wastewater pumps to pump the wastewater collected in the wet well to the sewage treatment plant. The wet well has an overflow into the North Saugeen River.

2.3 North End Pumping Station

The North End Pumping Station is located on the west side of 1st Avenue North in Chesley. The pumping station consists of a 2.4 m diameter wet well, complete with two pumps, each having a capacity of 6.7 L/sec at 16.8 m TDH. The pumps are submersible raw sewage pumps. The standby power has been provided by way of a 30-kW standby diesel generator, which has been installed in a control building located next to the wet well.

2.4 Arena East Pumping Station

This pumping station comprises of a wet well approximately 2.4 m in diameter and 6 m deep, complete with benching, access ladder and intermediate platform and ventilation. The wet well is provided with two (2) submersible sewage pumps, and each rated at 10.35 L/sec at 18 m TDH. The wastewater enters the wet well by way of 200 mm diameter sewer pipe. The wet well is also provided with 200 mm diameter emergency flow pipe that discharges into an existing 900 mm diameter storm sewer, which ultimately discharges into the north branch of the Saugeen River.

2.5 South End (Garner Street) Pumping Station

The South End Pumping Station is located on the north side of Garner Street and includes a wet well equipped with two (2) submersible sewage pumps, each capable of pumping 18.2 L/sec at 13.1 m TDH. The wet well is provided with a bypass manhole. Emergency standby power has been provided by way of a 100-kW standby diesel generator set, which is located in the control building next to the pumping station location.

3.0 SUMMARY OF WASTEWATER FLOWS

The plant operator recorded the incoming wastewater flow into the lagoon every day at approximately the same time. The total monthly flow, monthly average and maximum daily flow for the year 2005 has been provided in **Table 1**. The maximum daily flow was in January, which was 5,405 m³/day, indicating significant extraneous flows into the wastewater collection system.

The calibration of the flow meter was checked on June 8, 2005. Percentage error was less than 4.5% (reading low). Refer to **Appendix E** for the calibration report.

It should be noted that the design capacity of the wastewater treatment plant is 2,307m³/day average flow (January 1 to April 15, 2005) and 1,460 m³/day (April 16 to December 31, 2005). Therefore, the plant operated at approximately 62% of the design capacity from January 1 to April 15 and at approximately 73% of the design capacity from April 16 to December 31.

3.1 Pump Hours

The 2005 pump hours for each of the four (4) pumping stations has been provided in **Table 2**. During the 2005 year, the pumps at each pumphouse were rotated so that each had approximately equal operation time.

From reviewing **Table 2**, it can be seen that the pump hours for Pump #1 and Pump #2 were approximately the same for the South End and River Side End Pumping Stations. The pump hours at the North End Pumping Station are somewhat different with Pump #2 running for 266 hours or 36% longer than Pump #1. The pump hours at the Arena East Pumping Station are substantially different with Pump #2 running for 279.7 hours, compared to 521 hours for Pump #1.

TABLE 1

Summary of Raw Wastewater Flow: 2005

Month	Total Flow (m³)	Average Daily Flow (m³/day)	Maximum Daily Flow (m³/day)
January	57,518	1,855	5,405
February	28,478	1,017	2,253
March	40,191	1,296	4,181
April (1 to 15)	24,094	1,606	2,730
April (16 to 30)	23,718	1,581	4,838
May	24,593	793	1,522
June	25,317	844	1,457
July	23,996	800	978
August	25,970	838	1,479
September	26,994	900	1,987
October	27,383	880	1,095
November	43,284	1,443	3,552
December	53,612	1,729	4,374
Total	425,148	1,166	5,405

Design Flow

January 1 to April 15 2,307 m³/day
 April 16 to December 31 1,460 m³/day

Average Daily Flow

January 1 to April 15 1,444 m³/day
 April 16 to December 31 1,090 m³/day

TABLE 2

Summary of Pumphouse Hours: 2005

Pumping Station	Pump #1	Pump #2
North End	464.0	729.8
Riverside Park	667.5	717.5
Arena East	521.0	279.7
South End	209.3	224.8

4.0 SUMMARY OF EFFLUENT QUALITY MONITORING AND COMPLIANCE

The plant operator has been taking grab samples for incoming wastewater samples and composite samples for effluent samples once a month and has been sending it to the Caduceon Laboratories in Nepean Ontario. In **Table 3**, a summary has been provided for the year 2005 for effluent quality relating to BOD₅, suspended solids, total phosphorus, ammonia, TKN, pH and H₂S.

A review of **Table 3** indicates that parameters in the treated effluent have not exceeded the permissible limits specified in the Certificate of Approval.

5.0 SUMMARY OF MAINTENANCE

The following improvements were made to the Chesley Wastewater Treatment System in 2005.

The standby diesel engines were serviced in February 2005 with the portable standby at Arena East operated and tested in March 2005.

Header repairs were made on aeration lines in Lagoon Cell #1 before lowering Cell #2 in April.

Company by the name of Cepps spray coated three brick man-holes in Chesley to protect against infiltration. Manhole #36, #40 and #50 were sealed May 30, 2005.

Chesley sewer mains were flushed in house intermit from May till the end of July. Foster Sewer services came November 30, 2005 to flush some trouble spots in Chesley.

On June 8, 2005 there was a flow meter calibration completed at the Sewage Lagoons. Accuracy in the level reading was 4.5% (reading low).

Arena East had the check valve on pump #1 rebuilt in June.

Manhole #262, #284, #402, #404, #408 and #426 were concrete benched in September.

There was one commercial (Credit Union) and two new residential sewer connections made in Chesley in 2005.

6.0 RAW SEWAGE OVERFLOWS

There were no incidents of overflows from the Riverside Park sewage pumping station in 2005.

7.0 MINISTRY OF THE ENVIRONMENT INSPECTION

A Ministry of the Environment Inspection was performed twice in 2005. See **Appendix B**.

On March 15, 2005 the Chesley Sewage works were inspected and Provincial Officers order number 4110-6B8JQ7. See **Appendix D** for additional Selected Correspondence.

The facility was inspected again on October 13, 2005 and no Provincial Officers Order were issued.

8.0 LAND APPLICATION OF SLUDGE

In early 2004, the Municipality of Arran-Elderslie identified suitable land for Land Application of Sludge from the Lagoon Cell #2. Various Certificates of Approval for Land Application of Sludge were issued by the Ministry of Environment in 2004 for the sites. Cell #2 at the Chesley Lagoons had the sludge removed in 2005. Salcin Haulage was awarded the tender and removed 6526.5 m³ of sludge. The liquid sludge was hauled out from Sept. 7, 2005 to Sept. 16, 2005.

The header and aeration lines were removed and reinstalled by Municipal staff. The headers were reused but the aeration lines were all replaced with new lines. See **Appendix C** for 2005 Hauled Sludge Lab Results.

9.0 COMRIF GRANT APPLICATION FOR SEWAGE SYSTEM IMPROVEMENTS

In January 2005, Henderson Paddon & Associates prepared a grant Application for the Municipality under the Canada Ontario Municipal Rural Infrastructure Fund (COMRIF). A total of \$4,950,000.00 eligible cost was presented for funding consideration for:

- 1) Improvements to the Chesley Riverside Park Sewage Pumping Station.
- 2) Replacement of poor condition sanitary sewers.
- 3) Diversion of Downtown core roof drainage to a new separate storm sewer.

The primary objective of these projects are to eliminate raw sewage bypassing at the Riverside Park Sewage Pumping Station.

10.0 CONCLUSIONS

1. The Certificate of Approval effluent requirements were met in 2005 for all parameters.
2. The calibration of the lagoon flow meter was performed on June 8, 2005. Percentage error was 4.5% (reading low).
3. There were no incidents of overflows from the Riverside Park sewage pumping station in 2005.
4. The plant operated at approximately 62% of the design capacity from January 1 to April 15 and at approximately 73% of the design capacity from April 16 to December 31, 2005.
5. The need to remove sludge from Cell #2 was identified in 2002, and the Municipal staff identified land in 2004, to land apply the sludge which occurred from September 7, 2005 through to September 16, 2005. Various Certificates of Approval for Land Application of Bio-solids Waste have been issued by the MOE for that purpose. Cell #2 at the Chesley Lagoons had the sludge removed in 2005. Salcin Haulage awarded the tender and removed 6526.5 m³ of sludge. The header and aeration lines were removed and reinstalled by Municipal staff. The headers were reused but the aeration lines were all replaced with new lines.
6. A grant application was made under the COMRIF Program in January 2005 for various improvements to the sanitary sewage system, primarily with a view to eliminating raw sewage bypassing at the Riverside Park Sewage Pumping Station.

11.0 RECOMMENDATIONS

1. Continue to operate in accordance with the Certificate of Approval and Regulations.
2. The air filters on the blower intake should be checked for dust accumulation twice a year and the filters replaced as required.
3. We advise the plant operators to continue to inform Henderson Paddon & Associates Limited immediately when the Certificate of Approval limits are exceeded.
4. Records must be maintained to indicate how much time each operator works as Operator-in-Charge.
5. Operators require 40 hours of training per year in accordance with Regulation 435/93. Records must be kept.
6. The recommendations in the report entitled "Chesley Sanitary Sewage Collection System Optimization Study, Henderson Paddon & Associates Limited , August 2000" should continue to be implemented to ensure continued reduction of the frequency and volume of raw sewage bypasses at the Riverside Park sewage pumping station. Funding under COMRIF has been applied for to facilitate this.
7. The revised contingency plan for sewage bypasses prepared by Henderson Paddon & Associates Limited in October, 2004, must continue to be followed closely in the event of sewage bypasses.
8. The flow meter should be calibrated again by June 8, 2006.

Respectfully submitted:

OWESON WATER SERVICES
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Appendix A

Certificate of Approval

Appendix B

Ministry of Environment Inspection Report

Appendix C

Summary of Hauled Sludge Lab Results

Appendix D

Selected Correspondence

Appendix E

Calibration Report

