ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT
Woodstock Water System

1. GENERAL INFORMATION

This report is intended to fulfill the requirements of Ontario Regulation 170/03 Section 11.(1) and Schedule 22. A copy is available on the internet by the end of February each year at www.oxfordcounty.ca/drinkingwater or by requesting a copy from the Public Works Department.

All efforts have been made to ensure the information presented in this report is as accurate as is possible. If you have any questions or comments concerning the report please contact the County of Oxford at the address and phone number listed below or by email at ltruscott@oxfordcounty.ca.

Drinking Water System:	Woodstock Water System
Drinking Water System Number:	220000709
Drinking Water System Owner & Contact Information:	Oxford County Public Works Department Water Services P.O. Box 1614 21 Reeve Street Woodstock, ON N4S 7Y3 Telephone: 519-539-9800 Toll Free: 866-537-7778
Reporting Period:	January 1, 2011 – December 31, 2011

1.1. System Description

The Woodstock Water System is a Large Municipal Water system as defined by Regulation 170/03 and serves a population of approximately 38,000. The system consists of ten well sources, six of which are classified as GUDI, (Groundwater Under Direct Influence of Surface Water) with effective in situ filtration and four are secure groundwater wells. There are three treatment facilities, each housing pumps, monitoring equipment and standby power.

The Thornton Water Treatment Facility (WTF) has ultra violet (UV) and gas chlorination for disinfection. The Sutherland Park WTF treats Well 7 and uses filtration for iron removal and gas chlorination for disinfection. At the Southside Park WTF Wells 6 and 9 are disinfected by chlorine gas. In 2011, approximately 6,664 kg of chlorine gas was used in the water treatment process. Approximately 1.2 m^3 of sodium hypochlorite was added in the distribution system to maintain chlorine residual. The chemicals are certified to meet standards set by the Standards Council of Canada or American National Standards Institution.

Reservoirs at Bower Hill and Southside Park provide 26,400 m^3 of water storage. Two water towers, one near County Road 2 and Hwy 401 and another in the north west section of Woodstock provide 5,300 m^3 and 3,600 m^3 of storage respectively and maintain system pressure. There are pressure boosting stations on Athlone and Nellis Streets that maintain pressure and monitor chlorine residual in segments of the distribution system.

Standby power is available to run treatment facilities in the event of a power failure. The treated water is continuously monitored for free chlorine residual and turbidity. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Microbiological and chemical tests are analyzed at certified laboratories. Alarms notify a qualified operator in the event of failure of critical operational requirements.

1.2. Major Expenses

In addition to expenses incurred for routine operation and maintenance of the system approximately 5.2 km of new water mains were installed and 1.67 km of water mains were replaced.

2. MICROBIOLOGICAL TESTING

2.1. *E. coli* and Total Coliform

Bacteriological tests for *E. coli* and total coliforms are required weekly on the raw and treated water at the facility. Any *E. coli* or total coliform results above 0 in treated water are reported to the Ministry of Environment and Board of Health. Resamples and any other required actions are taken as quickly as possible. The results from the 2011 sampling program are shown on the table below. There was one adverse test result from 790 treated water samples in this reporting period.

	Number of Samples	*Range of E. coli Results Min - Max MAC = 0*	*Range of Total Coliform Results Min - Max MAC = 0*
Raw	497	0	0 - 61
Treated	149	0	0 -1
Distribution	641	0	0

2.2. Heterotrophic Plate Count (HPC)

HPC analyses are required from the treated and distribution water. The tests are required weekly for treated water and for 25 % of the distribution system samples. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indictor of unsafe water.

	Number of Samples	*Range of HPC Min - Max*
Treated	149	0 - 67
Distribution	160	0 - >500

3. CHEMICAL TESTING

Results for inorganic and organic chemical parameters listed in Schedules 23 and 24 of Reg. 170/03 are provided in Appendix A. The sampling frequency varies for different types and sizes of water systems. If the concentration of a parameter is above half of the Maximum Allowable Concentration (MAC) under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by the Regulation. Where concerns regarding a parameter exist, the Ministry of the Environment can also require additional sampling be undertaken. Weekly testing for nitrates is required for the Woodstock Water System. The results are summarized below in Appendix B.

Information on the health effects and allowable limits of components in drinking water may be found on the Ministry of Environment web page through the link provided in Appendix A. Additional information on common chemical parameters specific to the Woodstock system is provided below.

3.1. Sodium

Sodium levels up to 200 mg/L are acceptable for consumption. Sodium above 20 mg/L must be reported once every five years. The required action is to resample for confirmation, notification to the MOE and Medical Offer of Health (MOH). The MOH provides information on exceedences to local Health Care Providers. The sodium level at the Sutherland WTF is 41.2 mg/L. All other locations are under 20 mg/L.

3.2. Lead

In 2007 the requirements for lead testing in distribution systems and plumbing that serves customers was changed. Sampling is required between December 15 to April 15 and June 15 to October 15 each year. If repeated testing indicates low levels of lead are present then the municipality may first reduce then discontinue sampling from private plumbing. The reduced sampling schedule has been initiated for the Woodstock Water System. Residential samples will be collected in 2012.

3.3. Hardness

This is an aesthetic parameter that may affect the appearance of the water but is not related to health. Well water commonly has high levels of hardness and other minerals from being in contact with underground rock formations. Many households have water softeners to help reduce white calcium deposits and improve the efficiency of soaps. This information is included here to help set the water softener at the level recommended by the manufacturer. Hardness in the Woodstock System is approximately 365 mg/L (equivalent to 26 grains).

4. OPERATIONAL MONITORING

4.1. Chlorine Residual

Free chlorine levels of the treated water are monitored continuously at the discharge point of the Water Treatment Facility. In the distribution system, free chlorine is continuously monitored at various locations. As a target, free chlorine residual within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. There were no reportable incidents in 2011. A summary of the chlorine residual readings is provided in the table below.

4.2. Turbidity

Turbidity of treated water is continuously monitored at the treatment facility. A change in turbidity can indicate an operational problem. The turbidity of untreated water from each well is checked monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under Regulation 170/03 turbidity in groundwater is not reportable however turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the monitoring results for 2011 is below.

Parameter and Location	*Number of Samples or Tests*	*Range of Results (Min – Max) and Average*
Chlorine Residual in Distribution mg/L	Continuously Monitored	(0.21 – 1.93) 1.05
Thornton WTP		
Chlorine mg/L	"	(0.31 – 2.86) 1.16
Turbidity NTU	"	(0.00 – 4.00) 0.03

Table continued

Parameter and Location	*Number of Samples or Tests*	*Range of Results (Min – Max) and Average*
Southside WTP		
Chlorine mg/L	"	(0.24 – 2.00) 1.10
Turbidity NTU	"	(0.00 – 4.00) 0.14
Sutherland WTP		
Chlorine mg/L	"	(0.21 – 3.03) 0.93
Turbidity NTU	"	(0.00 – 4.00) 0.07

4.3. Distribution and Supply Well Flow Rates

Continuous monitoring of flow rates from supply wells into the treatment system and from the facility into the distribution system is required by Regulation 170/03. The Municipal Drinking Water License and Permit to Take Water limit the amount of water that can be utilized over a given time period. A summary of the 2011 flows is provided in Appendix B.

4.4. Ultra Violet (UV) Disinfection

Supply wells that have been classified as being GUDI with effective in-situ filtration require "enhanced disinfection" through ultra violet (UV) irradiation. A minimum UV dosage of 40 mj/cm^2 is maintained to inactivate any microorganisms that may be present from contact with surface water. Water is treated with chlorine after UV to maintain a disinfectant residual as it proceeds to the distribution system. Insufficient dosage of UV must be reported as Inadequate Disinfection even when the chlorine residual is acceptable. There were no occurrences of inadequate UV disinfection in this reporting period.

5. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS

This section documents any known incidents of non-compliance or adverse results and the associated correction actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the Ministry of the Environment Drinking Water Inspectors. The issues and associated required actions are documented by the Inspectors in the system's Annual Inspection Report. Adverse results are identified and subsequently reported by the Operating Authority with corrective actions followed up on by the Inspectors.

5.1. Non-Compliance Findings

The annual MOE Inspection 2011 for the Woodstock Water System took place in December 2011 and the rating was not available at the writing of this report. The 2010 inspection rating was 97%.

5.2. Adverse Results

Any adverse results from bacteriological, chemical samples or observations of operational conditions that indicate adverse water quality are reported as required and corrective actions taken. Below is a summary of the adverse/reportable occurrences for 2011 along with the corresponding resolution.

BACTERIOLOGICAL and CHEMICAL

Incident /Date	*Corrective Action*	*Resolution/Date*
May 20/11 Sodium 51.1 mg/L exceeds MAC of >20.0 mg/L.	Report and resample.	June 17/11 Result of 41.2 mg/L confirmed elevated sodium at Well 7.
November 30/11 2 Total coliforms in a treated sample	Report and resample.	December 2/11 Results acceptable.

APPENDIX A: SUMMARY OF CHEMICAL RESULTS

UNDERSTANDING CHEMICAL TEST RESULTS

The following tables summarize the laboratory results of the chemical testing Oxford County is required to complete. Different types of parameters are required to be tested for at different frequencies as noted below. Explanations on the health impacts of these parameters can be found at the MOE web site www.ene.gov.on.ca/envision/gp/4449e01.pdf document # 4449e01 titled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines".

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (ug/L). 1 mg/L is equal to 1000 ug/L. The Maximum Acceptable Concentration (MAC) is the highest amount of a parameter that the MOE finds acceptable in Municipal drinking water and can be found in the MOE Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of "ND" stands for "Not Detected" and means that the concentration of the chemical is lower than the laboratory's equipment is capable of measuring.

Nitrate and nitrate samples are required every 3 months in normal operation. Weekly nitrate sampling required at Thornton WTF is included here.

Parameter & Location	*Result Range* Min – Max *(mg/L)*	*Average Result (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Nitrite			1.0	0.005
Thornton WTF	ND	ND		
Southside WTF	ND	ND		
Sutherland WTF	ND	ND		
Nitrate			10.0	0.013
Thornton WTF	5.43 – 8.84	6.38		
Southside WTF	4.99 – 5.93	5.57		
Sutherland WTF	ND – 0.122	0.04		

A Trihalomethane (THM) sample is required every 3 months from the distribution system. THM is a by-product of the disinfection process.

Parameter	*Annual Average*	*Result Value (ug/L)*	*MAC (ug/L)*	*MDL (ug/L)*
Trihalomethane (THM)	2011	8.7	100	0.37

The following Table summarizes the most recent test results for Sodium and Fluoride. Testing and reporting any adverse results is required every 5 years.

Parameter & Location	*Sample Date*	*Result Value (mg/L)*	*MAC (ug/L)*	*MDL (ug/L)*
Sodium			20.0*	0.01
Thornton WTF	July 20/09	8.22		
Southside WTF	Mar 11/08	12.4		
Sutherland WTF	June 17/11	41.2		
Fluoride			1.5**	0.06
Thornton WTF	Sept 8/09	0.20		
Southside WTF	Mar 11/08	0.24		
Sutherland WTF	May 18/11	0.73		

*Sodium levels between 20 – 200 mg/l must be reported every 5 years.
**Natural levels of fluoride between 1.5 – 2.4 mg/l must be reported every 5 years.

The following Tables summarize the most recent test results for Schedule 23. Testing is required annually for GUDI wells and every 3 years for Non GUDI wells.

Parameter	*Results (ug/L) Thornton WTF Dec 5/11*	*Results (ug/L) Southside WTF Dec 6/10*	*Results (ug/L) Sutherland WTF June 22/09*	*MAC (ug/L)*	*MDL (ug/L)*
Antimony	ND	ND	ND	6	0.02
Arsenic	0.6	0.03	1.7	25	0.2
Barium	52.7	50.7	159	1000	0.01
Boron	13	29	40.1	5000	0.2
Cadmium	ND	0.005	ND	5	0.003
Chromium	0.8	ND	ND	50	0.5
Mercury	ND	ND	ND	1	0.02
Selenium	ND	ND	ND	10	1
Uranium	0.893	0.711	0.148	20	0.001

Summary of Organic parameters in Schedule 24 sampled during this reporting period or the most recent sample results. Testing is required annually for GUDI wells and every 3 years for Non GUDI wells.

Parameter	*Results (ug/L) Thornton Dec 5/11*	*Results (ug/L) Southside Dec 6/10*	*Results (ug/L) Sutherland June 22/09*	*MAC (ug/L)*	*MDL (ug/L)*
Alachlor	ND	ND	ND	5	0.02
Aldicarb	ND	ND	ND	9	0.01
Aldrin + Dieldrin	ND	ND	ND	0.7	0.01
Atrazine + N-dealkylated metobolites	ND	ND	ND	5	0.01
Azinphos-methyl	ND	ND	ND	20	0.02
Bendiocarb	ND	ND	ND	40	0.01
Benzene	ND	ND	ND	5	0.32
Benzo(a)pyrene	ND	ND	ND	0.01	0.004
Bromoxynil	ND	ND	ND	5	0.33
Carbaryl	ND	ND	ND	90	0.01
Carbofuran	ND	ND	ND	90	0.01
Carbon Tetrachloride	ND	ND	ND	5	0.16
Chlordane (Total)	ND	ND	ND	7	0.01
Chlorpyrifos	ND	ND	ND	90	0.02
Cyanazine	ND	ND	ND	10	0.03
Diazinon	ND	ND	ND	20	0.02
Dicamba	ND	ND	ND	120	0.20
1,2-Dichlorobenzene	ND	ND	ND	200	0.41
1,4-Dichlorobenzene	ND	ND	ND	5	0.36
Dichlorodiphenyltrichloroethane (DDT) + metabolites	ND	ND	ND	30	0.01
1,2-Dichloroethane	ND	ND	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	ND	ND	ND	14	0.33
Dichloromethane	ND	ND	ND	50	0.35
2-4 Dichlorophenol	ND	ND	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	ND	ND	ND	100	0.25
Diclofop-methyl	ND	ND	ND	9	0.40
Dimethoate	ND	ND	ND	20	0.12
Dinoseb	ND	ND	ND	10	0.36
Diquat	ND	ND	ND	70	1
Diuron	ND	ND	ND	150	0.03
Glyphosate	ND	ND	ND	280	6
Heptachlor + Heptachlor Epoxide	ND	ND	ND	3	0.01
Lindane (Total)	ND	ND	ND	4	0.01
Malathion	ND	ND	ND	190	0.02

Parameter	*Results (ug/L) Thornton Dec 5/11*	*Results (ug/L) Southside Dec 6/10*	*Results (ug/L) Sutherland June 22/09*	*MAC (ug/L)*	*MDL (ug/L)*
Methoxychlor	ND	ND	ND	900	0.01
Metolachlor	ND	ND	ND	50	0.01
Metribuzin	ND	ND	ND	80	0.02
Monochlorobenzene	ND	ND	ND	80	0.30
Paraquat	ND	ND	ND	10	1
Parathion	ND	ND	ND	50	0.02
Pentachlorophenol	ND	ND	ND	60	0.15
Phorate	ND	ND	ND	2	0.01
Picloram	ND	ND	ND	190	0.25
Polychlorinated Biphenyls(PCB)	ND	ND	ND	3	0.04
Prometryne	ND	ND	ND	1	0.03
Simazine	ND	ND	ND	10	0.01
Temephos	ND	ND	ND	280	0.01
Terbufos	ND	ND	ND	1	0.01
Tetrachloroethylene	ND	ND	ND	30	0.35
2,3,4,6-Tetrachlorophenol	ND	ND	ND	100	0.14
Triallate	ND	ND	ND	230	0.01
Trichloroethylene	ND	ND	ND	5	0.43
2,4,6-Trichlorophenol	ND	ND	ND	5	0.14
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	ND	ND	ND	280	0.22
Trifluralin	ND	ND	ND	45	0.02
Vinyl Chloride	ND	ND	ND	2	0.17

COUNTY OF OXFORD 2011 SUMMARY

WATER SYSTEM: WOODSTOCK WELL SUPPLY

TREATMENT SYSTEM: THORNTON UV TREATED FLOWS

2011 MONTH	TREATED FLOW FLOW m3	AVERAGE DAY FLOW m3	MAXIMUM DAY FLOW m3	MAXIMUM DISTRIBUTION FLOW RATE (L/s)
JANUARY	444,824	14,349	20,900	330
FEBRUARY	377,481	13,481	16,766	273
MARCH	410,558	13,244	18,188	272
APRIL	370,401	12,347	16,928	284
MAY	394,362	12,721	18,528	182
JUNE	454,739	15,158	19,057	277
JULY	500,832	16,156	21,427	307
AUGUST	420,109	14,004	18,182	296
SEPTEMBER	406,180	13,539	17,574	284
OCTOBER	435,421	14,046	19,808	302
NOVEMBER	398,756	13,292	16,700	298
DECEMBER	377,187	12,167	18,793	305
TOTAL	4,990,851			

SUMMARY

Drinking Water Licence Limit (m3/d)	44,669
Average Day Flow (m3)	13,674
Maximum Day Flow (m3)	21,427
MDWL Capacity Used	48.0%

Last revised on 130212

COUNTY OF OXFORD 2011 SUMMARY

WATER SYSTEM: WOODSTOCK WELL SUPPLY

TREATMENT SYSTEM: SOUTHSIDE WTF FLOWS

2011 MONTH	WELLS 6 & 9 FLOW m3	DISTRIBUTION FLOW m3	AVERAGE DAILY FLOW m3	MAXIMUM DAY FLOW m3	MAXIMUM DISTRIBUTION FLOW RATE (L/s)
JANUARY	30,265	316,328	10,204	13,559	191
FEBRUARY	29,081	228,404	8,157	16,552	182
MARCH	34,806	223,823	7,220	13,599	185
APRIL	39,607	264,953	8,832	13,582	179
MAY	32,078	375,952	12,127	16,499	179
JUNE	460	376,288	12,543	17,127	289
JULY	36,831	284,820	9,188	16,526	278
AUGUST	30,931	235,135	7,585	15,867	199
SEPTEMBER	32,842	201,087	6,703	9,159	207
OCTOBER	0 *	0 *	0	0	0
NOVEMBER	0	0	0	0	0
DECEMBER	0	0	0	0	0
TOTAL	266,901	2,506,790			

SUMMARY

Southside Distribution treats Wells 6 & 9 and combines flow wth treated water from Thornton

Drinking Water Licence Limit (m3/d)	4,493
Average Day Flow (m3)	731
Maximum Day Flow (m3)	2,393
MDWL Capacity Used	53%

*Southside not in service from Sept 28 to Dec 31, 2011

Last revised on 130212

COUNTY OF OXFORD 2011 SUMMARY

WATER SYSTEM: WOODSTOCK WELL SUPPLY

TREATMENT SYSTEM: SUTHERLAND PARK WTP and WELL 7 FLOW

2011 MONTH	TREATED FLOW m3	AVERAGE DAY FLOW m3	MAXIMUM DAY FLOW m3	MAXIMUM DISTRIBUTION FLOW RATE (L/s)	Well 7 FLOW m3
JANUARY	311	43	562	40	1326
FEBRUARY	15867	567	1372	45	15813
MARCH	15783	509	929	41	15823
APRIL	16988	566	1833	43	16476
MAY	18099	584	1267	43	17934
JUNE	17420	581	972	43	17911
JULY	17030	549	1009	43	17195
AUGUST	12442	401	948	43	12834
SEPTEMBER	16032	534	1531	41	15450
OCTOBER	13722	443	1030	42	13817
NOVEMBER	14270	476	901	44	14318
DECEMBER	14979	483	931	42	14500
TOTAL	172,944				173,397

SUMMARY

Drinking Water Licence Limit (m3/d)	3,888	Permit to Take Water Limit (m3/d)	3,900
Average Day Flow (m3)	474	Average Day Flow (m3)	475
Maximum Day Flow (m3)	1833	Maximum Day Flow (m3)	1781
MDWL Capacity Used	47%	PTTW Capacity Used	46%

Last revised on 090212

COUNTY OF OXFORD 2011 SUMMARY

WATER SYSTEM: WOODSTOCK THORNTON WELL SUMMARY

2011 MONTH	WELL 1 FLOW m3	WELL 3 FLOW m3	WELL 5 FLOW m3	WELL 8 FLOW m3	WELL 11 FLOW m3
JANUARY	104,188	637	22,501	51,662	59,855
FEBRUARY	84,306	2,766	26,517	32,437	54,028
MARCH	39,175	219	8,074	34,027	61,833
APRIL	20,709	29	966	28,170	71,379
MAY	10,580	15	91	26,336	91,311
JUNE	33,457	15	234	40,919	86,776
JULY	30,260	27,098	6,054	42,409	60,935
AUGUST	3,964	39,359	30,859	28,030	53,519
SEPTEMBER	3,458	34,362	13,459	35,098	49,796
OCTOBER	13	319	1,606	43,894	57,877
NOVEMBER	8	305	1,317	40,654	49,748
DECEMBER	38	359	1,528	42,099	49,861
TOTAL	330,156	105,483	113,205	445,735	746,919
SUMMARY					
Permit to Take Water Limit (m3/d)	9,100	2,700	5,900	3,200	3,900
Average Day Flow (m3)	905	289	310	1,221	2,046
Maximum Day Flow (m3)	5,452	1,942	4,871	2,591	3,528
PTTW Capacity Used	60%	72%	83%	81%	90%

Last revised on 090212

COUNTY OF OXFORD 2011 SUMMARY

WATER SYSTEM: WOODSTOCK TABOR and SOUTHSIDE WELLS SUMMARY

2011 MONTH	WELL 2 FLOW m3	WELL 4 FLOW m3	WELL 6 FLOW m3	WELL 9 FLOW m3
JANUARY	0	198,986	30,260	5
FEBRUARY	35,237	138,551	29,079	2
MARCH	151,156	115,140	34,805	1
APRIL	166,142	82,408	38,600	1,007
MAY	210,837	45,836	31,545	533
JUNE	202,304	87,585	64	396
JULY	166,220	159,825	36,709	122
AUGUST	144,688	139,582	30,926	5
SEPTEMBER	139,278	131,592	32,764	78
OCTOBER	170,087	167,973	0 *	0 *
NOVEMBER	152,616	149,192	0	0
DECEMBER	160,790	145,722	0	0
TOTAL	1,699,355	1,562,391	264,752	2,149

SUMMARY

Permit to Take Water Limit (m3/d)	10,000	10,000	4,500	1,300
Average Day Flow (m3)	4,656	4,281	725	6
Maximum Day Flow (m3)	8,601	9,469	2,393	236
PTTW Capacity Used	86%	95%	53%	18%

*Southside not in service from Sept 28 to Dec 31, 2011

Last revised on 071211