



Report No.

ES10-21

File No.

Directed to: Mayor Joe Preston and Members of City Council

Date Authored:

Feb 8, 2021

Meeting Date:

March 1, 2021

Department: Environmental Services

Attachment

Prepared By: Chris Andrew
Manager of Water and Sewer

2020 Summary and Annual Report for St. Thomas Water Distribution System

Subject: 2020 Summary and Annual Reports for the St. Thomas Water Distribution System

Recommendation:

THAT: Report ESX10-21, 2020 Summary and Annual Reports for the St. Thomas Water Distribution System, be received for information.

Background:

The St. Thomas Water Distribution System directly supplies water to the residents of St. Thomas as well as portions of the interconnected Municipality of Central Elgin and the Township of Southwold. The water is purchased from the Elgin Area Primary Water Supply Board and the St. Thomas Area Secondary Water Supply Board. The system complies with the Ontario Safe Drinking Water Act, Regulation 170/03 and with the terms and conditions of the applicable Municipal Drinking Water Licence and Drinking Water Works Permit.

Analysis:

The City of St. Thomas owns the St. Thomas Water Distribution System. As per the requirements of Ontario Regulation 170/03 the owner of the system shall prepare an Annual Report and Summary Report for the operations of the system during the previous calendar year. The reports have been prepared, summarizing the operations of the St. Thomas Water Distribution System for the 2020 calendar year, and are amended as attachment #1.

The Annual Report has been completed by the required date of February 28th, 2021, on standard forms provided by the Ministry of Environment, Conservation and Parks (MECP), and will be filed as required. The Summary Reports have been completed prior to the required submission date of March 31st, 2021.

As required by the regulations, arrangements have been made to post the annual report on the City's web site and copies will be sent to the drinking water systems that receive water from the St. Thomas Water Distribution System. Copies of the reports will be made available to the Public upon request at the Environmental Services Department.

The water system remains safe, efficient, extensively tested, and well maintained. It meets all of the stringent regulatory requirements. The rates established by Council contribute to a sustainable asset for this and future generations.

Respectfully,

Chris Andrew
Manager of Water and Sewer

Reviewed By: _____

ES

Treasury

City Manager

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ST. THOMAS WATER DISTRIBUTION SYSTEM

License Number: 057-101
Permit Number: 057-201

Ontario Regulation 170/03
Summary Report

For the Period
January 1, 2020 – December 31, 2020



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1 Summary Report Requirements

1.1 Introduction

The 2020 Summary Report for the St. Thomas Water Distribution System is being submitted to satisfy Schedule 22 of Ontario Regulation 170/03, the requirement to prepare and distribute a summary report of water system operations, outlining regulatory non-compliance with respect to water quality and water system management and administration and evaluating the water system infrastructure adequacy, with respect to its ability to continue to meet the communities water demands).

As per Ontario Regulation 170/03, the summary report must:

- a. List the requirements of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report; and
- b. For each requirement referred to in clause (a) that was not met, specify the duration of the failure and the measures that were taken to correct the failure.

The report must also include the following information for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system:

- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows.
- A comparison of the summary to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water licence, or if the system is receiving all of its water from another system under an agreement, to the flow rates specified in the written agreement.

The information provided is for the purpose of enabling the owner of the system to assess the capacity of the system. This report covers the reporting period from January 1, 2020 to December 31, 2020.

1.2 System Description

The St. Thomas Water Distribution System has three entry points into the network from the St. Thomas Area Secondary Water Supply System, the East Chamber located at the Elgin Middlesex Booster Station (490 South Edgeware Road), the West Chamber located in Water Works Park (2 South Edgeware), and the Wellington Road Chamber (Ford Line and Wellington Road). The system also receives water from one entry point into the network from the Elgin Area Primary Water Supply System at the Albert Robert Booster Station (8754 Tyke Road) in the Municipality of Central Elgin and one entry point into the network from the Southwold Water Distribution System on Fingal Line at the municipal boundary.

1.3 System Approvals and Regulatory Requirements

Operation and Maintenance of the STDWS is governed by the Safe Drinking Water Act, 2002, and the regulations established under this Act. In accordance with the Safe Drinking Water Act, The City of St. Thomas holds a Municipal Drinking Water Licence and Drinking Water Works Permit, which provide approval for the establishment of drinking water infrastructure and provide the authority to operate and maintain said water system.

During the reporting period, The St. Thomas Drinking Water System was operated pursuant to the approvals, licences and permits listed below:

- City of St. Thomas Water Distribution System

- MDWL No. 057-101, issued on July 15, 2016
- DWWP No. 057-201, issued on July 15, 2016

Ontario Regulation 170/03 – Drinking Water Systems, governs the operation, maintenance and water quality monitoring requirements for municipal drinking water systems in Ontario. Ontario Regulation 128/04 – Certification of Drinking Water System Operations and Water Quality Analysts sets out the requirements for persons performing operational or maintenance activities on the water system. The Safe Drinking Water Act, 2002 and the associated regulations are enforced by the Ministry of Environment, Conservation and Parks (MECP) and monitored through annual inspections by Ministry personnel. Any non-compliant conditions identified during the course of the annual inspection are listed in the Inspection Report issued at the conclusion of the inspection period and are summarized in section 4.1 of this report.

Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards sets the limits for parameters of concern in drinking water. Drinking water quality is monitored by the Operating Authority and any exceedance of the Drinking Water Quality Standards must be reported to the MECP and Public Health Unit, verbally and in written form through the use of a Notice of Adverse Test Results and Issue Resolution Form. Any non-compliant conditions identified through water quality monitoring exercises over the reporting period have been documented on a Notice of Adverse Test Results and Issue Resolution Form and are summarized in section 4.2 of this report.

2 Evaluation of Water Quantities and Flow Rates

2.1 Albert Roberts Booster Station – Elgin Area Primary Water Supply System

The Albert Roberts Booster Station (ARBS) receives treated water from the Elgin Area Primary Water Supply System, which pumps water from the water treatment plant located on the shores of Lake Erie to the east of the Town of Port Stanley. Water is pumped from a connection point on the transmission main that connects the water treatment plant to the Elgin Middlesex Pump Station and reservoir.

The ARBS is comprised of four high lift pumps that deliver water through a transmission main that services the St. Thomas Distribution System. The station maintains the operating pressure and includes a flow meter, chlorine analyzer, monitoring control, alarm system and instrumentation. Remote monitoring and control of the pumps are possible through the St. Thomas SCADA system.

All pumps use a common header and the firm rated pumping capacity (2 pumps operating) of the ARBS is 170.3 l/s or a total of 14,714 m³/d.

The Table below compares the flows experienced in 2020 to the capacity of the Albert Roberts Booster Station's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2020 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2020 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
Albert Roberts BS	14,714	5926	40	10,686	72

2.2 East Chamber – St. Thomas Area Secondary Water Supply System

The East Chamber is one of three entry points into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The East Chamber is located on the grounds of the Elgin Middlesex Pumping Station. Flow through the East Chamber is restricted to 25,920 m³/day, based on the maximum instantaneous flow rate being 300 L/s.

Monthly flows experienced through the East Chamber for the 2020 calendar year are provided in Appendix B to this report.

The Table below compares the flows experienced in 2020 to the capacity of the East Chamber's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2020 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2020 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
East Chamber	25,920	3395	13	7006	27

The peak instantaneous flow rate experienced in 2020 at the East Chamber was 175 L/s.

2.3 West Chamber – St. Thomas Area Secondary Water Supply System

The West Chamber is the second of three entry points into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The West Chamber is located at 2 South Edgeware Road, within Waterworks Park. Flow through the West Chamber is restricted to 25,920 m³/day, based on the maximum instantaneous flow rate being 300 L/s.

Monthly flows experienced through the West Chamber for the 2020 calendar year are provided in Appendix B to this report.

The Table below compares the flows experienced in 2020 to the capacity of the West Chamber's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2020 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity	2020 Max Day Flow (m ³ /day)	Max Day % of Entry Point Capacity
West Chamber	25,920	892	3	2646	10

The peak instantaneous flow rate experienced in 2020 at the West Chamber was 108 L/s.

2.4 Wellington Road Chamber – St. Thomas Area Secondary Water Supply System

The Wellington Road Chamber is the third entry point into the St. Thomas DWS from the St. Thomas Area Secondary Water Supply System. The Chamber is located at the intersection of Wellington Road and Ford Line. Flow will typically only enter the St. Thomas DWS through the Wellington Road Chamber during periods of very high demand in the WDS. 0 m³ went through the Wellington Road Chamber during 2020, as a result of maintenance and testing activities.

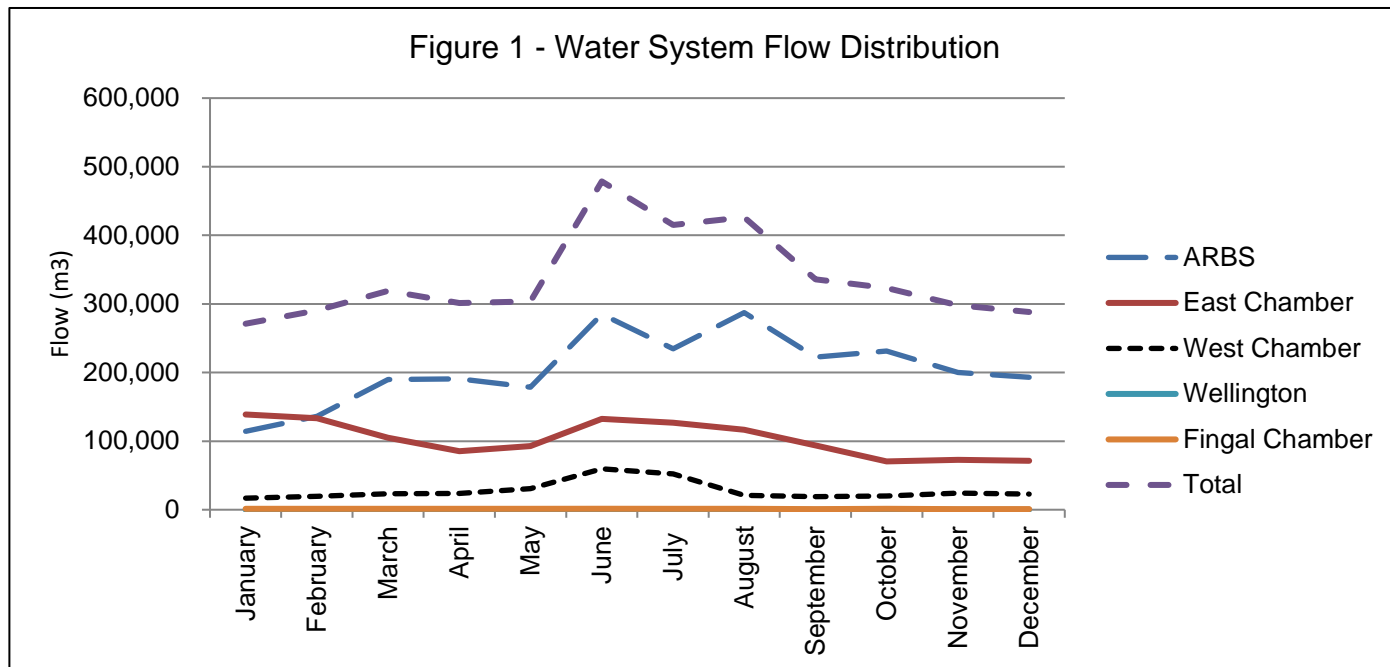
2.5 Fingal Line Chamber – Southwold Water Distribution System

The Fingal Line Chamber supplies water from the Southwold Water Distribution System to a section of the St. Thomas Water Distribution System along Fingal Line. The water in the Southwold Water Distribution System originates from the St. Thomas Area Secondary Water Supply System. The water is rechlorinated within the Southwold Water Distribution System. Flow through the Fingal Line Chamber is restricted to 13,824 m³/day, based on the maximum instantaneous flow rate being 160 L/s.

The Table below compares the flows experienced in 2020 to the capacity of the Fingal Line Chamber's entry point into the St. Thomas Distribution Water System.

Entry Point	Flow Capacity (m ³ /day)	2020 Avg. Day Flow (m ³ /day)	Avg. Day % of Entry Point Capacity
Fingal Line	13,824	40	1

Figure 1 provides a graphical overview of the flows entering the St. Thomas Water Distribution System. Based on the 2020 flow data, the distribution of flows into the distribution system between the water supplied from the Albert Roberts Booster Station versus the St. Thomas Area Secondary Water Supply System (through the East, West, Wellington and Fingal Chambers).

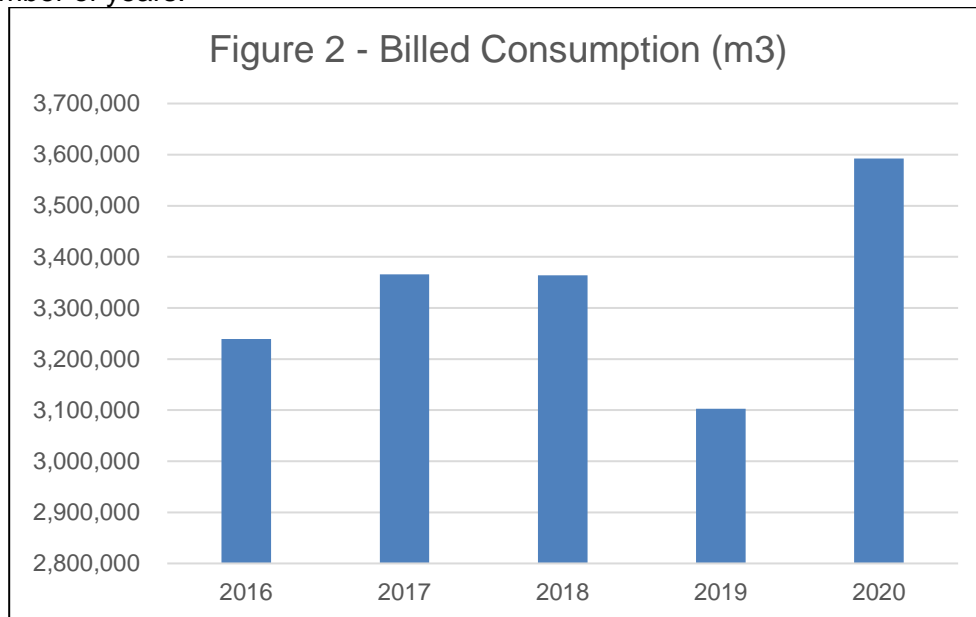


The total billed consumption by customers of the St. Thomas Water Distribution System increased by 16% from 3,102,505 m³ in 2019 to 3,592,206 in 2020.

The total flow into the St. Thomas Water Distribution System increased by 8% in 2020 from 3,757,559 m³ in 2019 to 4,050,391 m³ over the 2020 year.

The unaccounted water loss in the St. Thomas Water Distribution System was 11%. This can be attributed capital improvements and monitoring of all water uses from fire fighting and training exercises, maintenance programs and capital projects.

Figure 2 provides an overview of the billed consumption flows in the St. Thomas Water Distribution System over the last number of years.



3 Water Quality Summary

A summary of water quality testing completed by the City of St. Thomas – Environmental Services Dept. over the course of the reporting period is available in the Annual Report, attached as Appendix A.

4 Summary of Non-Compliant Conditions

4.1 Ministry of the Environment, Conservation and Parks Inspection

The Ontario Ministry of the Environment, Conservation and Parks (MECP) conducts an inspection of the St. Thomas Drinking Water System annually. An MECP inspection took place on October 8, 2020. The final inspection report was issued on November 10, 2020. Non-compliances identified in the inspection report, and actions taken to rectify the non-compliant condition are summarized in the table below.

The MECP Inspection Report identified an inspection risk rating of 1.43% and achieving an overall final inspection rating of 98.57%, indicating that the risk was minimal.

MECP Inspection Finding	Action Taken
Ontario Regulation 128/04 s. 27, stipulate the requirements for record keeping for the operations of a subsystem. The Owner/Operating Authority maintain a number of logbooks which are located at multiple locations throughout the system to document scheduled operational checks, manual free chlorine residuals and any other operational or maintenance activities that may have occurred within the distribution system. Daily summary sheets are produced from SCADA and are reviewed on a 72-hour basis for the system. A review of the Daily Summary sheets that were submitted for the inspection period to ensure compliance, indicated that a process analyzer that is located at the Albert Roberts Pumping station did not record on the SCADA historian for approximately 9 days in October 2019 and no explanation or corrective actions were recorded for the missing analyzer readings.	Record-keeping requirements for SCADA trend reviews were updated within the Sampling, Testing and Monitoring Procedure (DW-ADMIN-1400), emphasizing the importance of recording out of service equipment (including process analyzers) and corrective actions taken in the logbook.

4.2 Adverse Test Results and Issue Resolution

Any non-compliant conditions identified through water quality monitoring exercises over the reporting period, and actions taken are summarized in the table below.

Adverse Test Result (Date / Location)	Action Taken
None	

5 List of Appendices

Appendix A – St. Thomas Distribution System – 2020 Annual Report

Appendix B – Chamber and Station Flows - 2020

APPENDIX A



Ontario Drinking-Water Systems Regulation O. Reg. 170/03

Drinking-Water System Number:	260002187
Drinking-Water System Name:	St. Thomas Water Distribution System
Drinking-Water System Owner:	Corporation of the City of St. Thomas
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2020 through December 31, 2020

<p><u>Complete if your Category is Large Municipal Residential or Small Municipal Residential</u></p> <p>Does your Drinking-Water System serve more than 10,000 people? Yes [] No [X]</p> <p>Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No []</p> <p>Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.</p> <div style="border: 1px solid black; padding: 5px;"> <p>City of St. Thomas, City Hall Environmental Services 545 Talbot Street St Thomas, Ontario</p> </div>	<p><u>Complete for all other Categories.</u></p> <p>Number of Designated Facilities served: <div style="border: 1px solid black; padding: 2px; display: inline-block;">NA</div></p> <p>Did you provide a copy of your annual report to all Designated Facilities you serve? Yes [] No []</p> <p>Number of Interested Authorities you report to: <div style="border: 1px solid black; padding: 2px; display: inline-block;">NA</div></p> <p>Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility? Yes [] No []</p>
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List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
Municipality of Central Elgin	260004761
Township of Southwold	210001362

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [X] No []

Indicate how you notified system users that your annual report is available, and is free of charge.

[x] Public access/notice via the web

City of St. Thomas Website – www.city.st-thomas.on.ca

[x] Public access/notice via Government Office

[] Public access/notice via a newspaper

[x] Public access/notice via Public Request

[] Public access/notice via a Public Library

[] Public access/notice via other method _____



Describe your Drinking-Water System

The St. Thomas Water Distribution System services over 14,500 customers including 862 customers within the Municipality of Central Elgin and 53 customers within the Township of Southwold (Lynhurst Subdivision). The system purchases its water from the Elgin Area Primary Water Supply System, which extends from Lake Erie to the City of London. The St. Thomas Distribution System consists of approximately 226,000 metres of water main ranging in size from 50 mm to 450 mm in diameter with the oldest installation in 1909. Material types include Asbestos Cement, Cast Iron, Concrete Ductile, Iron Polyethylene, and PVC.

List all water treatment chemicals used over this reporting period

12% Sodium Hypochlorite (Disinfection/Repairs)

Were any significant expenses incurred to?

- Install required equipment
- Repair required equipment
- Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Barnes Street area reconstruction	\$525,294.87
Centre and white St reconstruction	\$577,468.17
Stanley Street reconstruction	\$238,154.78
2020 Road rehab	\$12,868.96
Sinclair Ave. watermain	\$371,427.86

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to

Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
NA	NA	NA	NA	NA	NA



Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	NA	NA	NA	NA	NA
Treated	NA	NA	NA	NA	NA
St. Thomas	612	(0)-(0)	(0)-(0)	612	(<10)-(70)
Central Elgin	67	(0)-(0)	(0)-(0)	67	(<10)-(210)
Southwold	13	(0)-(0)	(0)-(0)	13	(<10)-(10)
Distribution Total	692	(0)-(0)	(0)-(0)	692	(<10)-(210)

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Chlorine (Grab Samples)	692	(0.22) - (1.69)
*Chlorine (Continuous Monitoring)	8760	(0.0) - (2.00)

NOTE: For continuous monitors use 8760 as the number of samples.

*Online locations- East and West chamber, Albert Roberts, Wellington and Southdale Panels. All incidents of <0.05 were investigated and determined to be under 5 minutes in duration.

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
NA	NA	NA	NA	NA

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
NA	NA	NA	NA	NA

Summary of lead testing under Schedule 15.1 during this reporting period

(applicable to the following drinking water systems; large municipal residential systems, small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	NA	NA	NA
Distribution	NA	NA	NA

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
HAA5	Mar 3 2020 Jun 3 2020 Sep 10 2020 Dec 11 2020	5.3	ug/L	no
THM (NOTE: show latest annual average)	Mar 3 2020 Jun 3 2020 Sep 10 2020 Dec 11 2020	17.25	ug/L	no

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
NA	NA	NA	NA

APPENDIX B

Albert Roberts

Month of the Year	Avg Daily Flow	Max Daily Flow	Discharge Volume
	l/s	l/s	m ³
January	49	100	131,455
February	50	99	126,200
March	67	138	174,798
April	72	170	159,498
May	75	170	165,548
June	91	170	236,967
July	100	170	213,854
August	95	154	112,192
September	90	156	231,956
October	81	170	218,003
November	80	170	190,151
December	76	124	202,404
Average	77	149	180,252
Yearly Total			2,163,029

East Chamber

Month of the Year	Avg Daily Flow	Max Daily Flow	Volume
	<i>l/s</i>	<i>l/s</i>	<i>m³</i>
January	57	61	154,684
February	58	127	145,464
March	38	121	104,743
April	35	128	90,723
May	39	139	105,259
June	46	164	119,025
July	50	174	135,390
August	43	117	116,396
September	36	102	93,697
October	27	104	73,157
November	29	135	72,562
December	30	127	71,288
Average	41	125	106,866
Yearly Total			1,282,392

West Chamber

Month of the Year	Flow	Max Daily Flow	Volume
	<i>l/s</i>	<i>l/s</i>	<i>m3</i>
January	10	56	17,604
February	12	62	20,680
March	13	57	22,594
April	14	77	23,743
May	19	65	33,124
June	28	71	53,512
July	26	79	55,286
August	12	74	20,630
September	11	72	18,364
October	12	100	17,717
November	14	107	21,766
December	13	68	20,426
Average	15	74	27,120
Yearly Total			325,447