



REVISED APRIL 2021
2020 ANNUAL DRINKING WATER SYSTEM SUMMARY REPORT
Drumbo-Princeton Water System

1. GENERAL INFORMATION

Oxford County prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the Oxford County website at www.oxfordcounty.ca/drinkingwater or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. 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 publicworks@oxfordcounty.ca.

Drinking Water System:	Drumbo-Princeton Water System
Drinking Water System Number:	220007515
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 Email: publicworks@oxfordcounty.ca
Reporting Period:	January 1, 2020 – December 31, 2020

1.1. System Description

The Drumbo-Princeton Drinking Water System is a Large Municipal Water system as defined by Regulation 170/03 and serves a population of approximately 1,573.

The system consists of three wells that are secure groundwater, connected to a central treatment facility all located in Drumbo. The facility houses high lift pumps, monitoring equipment, and a 516 m³ reservoir. Treatment consists of the addition of sodium hypochlorite for disinfection and sodium silicate to sequester iron. A standby generator is available to run the facility in the event of a power failure. The two communities are linked by a transmission main. In Princeton, there is a pressure control facility with chlorine residual monitoring, re-chlorination equipment, and a 271 m³ storage standpipe.

In 2020, approximately 3,280 L of sodium hypochlorite and 1,845 L (2,610 kg) of sodium silicate were used in the water treatment process. These chemicals are certified to meet standards set by the Standards Council of Canada or American National Standards Institute.

The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by the Regulation. Alarms automatically notify operators in the event of failure of critical operational requirements.

1.2. Major Expenses

The Drumbo-Princeton Water System is one of 14 water systems that have revenues and expenses pooled for economy of scale purposes. The systems are combined into the Township Water financial system and in 2020 had forecasted operating and maintenance expenditures of approximately \$2,000,000.

In addition to regular operational and maintenance expenditures Capital Improvement projects included:

- \$350,000 for replacement of distribution water mains in the Township systems
- \$36,000 for improvements to water facilities

Capital Improvement projects for all systems included:

- \$280,000 to develop Countywide SCADA Master Plan for all water systems
- \$50,000 Updated Water Modelling
- \$10,000 Asset Management valuation for all treatment, pumping and storage facilities
- \$75,000 Two mobile generators

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 and in the distribution system. Extra samples are taken after major repairs or maintenance work. Any *E. coli* or total coliform results above 0 in treated water must be reported to the Ministry of Environment and Climate Change (MECP) and Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the 2020 sampling program are shown on the table below. There were no adverse test results from 176 treated water samples in this reporting period.

	<i>Number of Samples</i>	<i>Range of E. coli Results Min - Max MAC = 0</i>	<i>Range of Total Coliform Results Min - Max MAC = 0</i>
Raw	142	0	0 - 3
Treated	52	0	0
Distribution	124	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 required distribution system bacteriological 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 indicator of unsafe water. 2020 results are shown in the table below.

	<i>Number of Samples</i>	<i>Range of HPC Min - Max</i>
Treated	52	0 - 2
Distribution	36	0 - 7

3. CHEMICAL TESTING

The Safe Drinking Water Act requires periodic testing of the water for approximately 60 different chemical parameters. The latest results for all parameters are provided in Appendix A. The sampling frequency varies for

different types and sizes of water systems and chemical parameters. 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 MECP can also require additional sampling be undertaken.

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

3.1. Hardness, Iron and Manganese

These are aesthetic parameters that may affect the appearance of the water but are 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, improve soap efficiency and reduce iron levels. This information is included here to help set the water softener at the level recommended by the manufacturer. Levels of iron less than 0.30 mg/L (ppm) are not considered to cause aesthetic problems such as discoloured water. In Drumbo-Princeton, sodium silicate is added to keep the iron in suspension at wells 1 and 2A. Manganese is commonly found in conjunction with iron and also causes discoloured water. Manganese levels in this system are above a new proposed aesthetic objective of 0.02 mg/L

- Hardness is 298 mg/L (equivalent to 21 grains)
- Iron level is 0.34 mg/L (ppm)
- Manganese level is 0.03 mg/L (ppm)

3.2. Additional Testing Required by MECP

None.

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 checked twice weekly 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 2020. 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, as a change in turbidity can indicate an operational problem. The turbidity of untreated water from the well is checked weekly. 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 2020 is provided in the table below.

<i>Parameter</i>	<i>Number of Tests or Monitoring Frequency</i>	<i>Range of Results (Min – Max) and Average</i>
Chlorine residual in distribution (mg/L)	Continuous	(0.51 – 3.10) 1.33
Chlorine residual after treatment (mg/L)	Continuous	(0.30 – 3.34) 1.43
Turbidity after treatment (NTU)	Continuous	(0.20 – 3.19) 0.31

5. WATER QUANTITY

Continuous monitoring of flowrates 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 issued by the MECP regulate the amount of water that can be utilized over a given time period. A summary of the 2020 flows are provided in the Table below and presented graphically in Appendix B.

<i>Flow Summary</i>	<i>Quantity</i>
Permit to Take Water Limit	1,329 m ³ /d
Municipal Drinking Water License Limit	1,329 m ³ /d
2020 Average Daily Flow	291 m ³ /d
2020 Maximum Daily Flow	538 m ³
2020 Average Monthly Flow	8,890 m ³
2020 Total Amount of Water Supplied	106,678 m ³

A review of the available supply capacity and the anticipated growth forecasted for the community indicates that the system has sufficient capacity over the 20 year planning horizon.

6. 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 MECP Drinking Water Inspectors. The issues and associated required actions are documented by the Inspectors in the system's Annual Inspection Report. All non-compliance issues are investigated, corrective actions taken and documented using the County's Drinking Water Quality Management System (DWQMS) procedures.

6.1. Non-Compliance Findings

The 2020 MECP annual inspection took place in March 2021. There was one non-compliance finding. A distribution residual sample was not taken every hour during a power outage. Continuous monitoring resumed when the power was restored. The 2020 Inspection Report rating was 96%.

6.2. 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 are taken. Below is a summary of the one adverse/reportable occurrences for 2020 along with the corresponding resolution.

Observations that the Drinking Water Quality may be Affected		
Loss of pressure at Princeton for 40 minutes due to power failure when standpipe was offline, July 7, 2020	Reported, issued a precautionary boil water advisory to Princeton customers. Restored pressure, flushed and collected samples.	Sample results were acceptable and the advisory was removed July 9, 2020

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 in the MECP document at https://cvc.ca/wp-content/uploads/2011/03/std01_079707.pdf PSIB 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 is acceptable in Municipal drinking water and can be found in the MECP 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 nitrite samples are required every 3 months in normal operation.

<i>Parameter</i>	<i>Result Range Min – Max (mg/L)</i>	<i>Average Result (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Nitrite	ND	ND	1.0	0.003
Nitrate	0.744 – 0.897	0.812	10.0	0.006

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every 3 months from the distribution system.

<i>Parameter</i>	<i>Annual Average</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Trihalomethane (THM)	2020	12	100	0.37
Haloacetic Acids (HAA)	2020	ND	80	5.3

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

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (mg/L)</i>	<i>MAC (mg/L)</i>	<i>MDL (mg/L)</i>
Sodium	Aug 22/16	10.5	20.0*	0.01
Fluoride	"	0.18	1.5**	0.06

*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 Table summarizes the most recent results for the Lead Testing Program. Lead samples are taken every 3 years. Levels of alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

<i>Parameter</i>	<i>Result Range (Min - Max)</i>	<i>Number of Samples</i>	<i>Acceptable Level</i>
Distribution Alkalinity	2.44 - 2.60	4	30 – 500mg/L
Distribution pH	7.8	4	6.5 – 8.5
Distribution Lead 2018	0.12 - 0.40	4	10 ug/L MAC

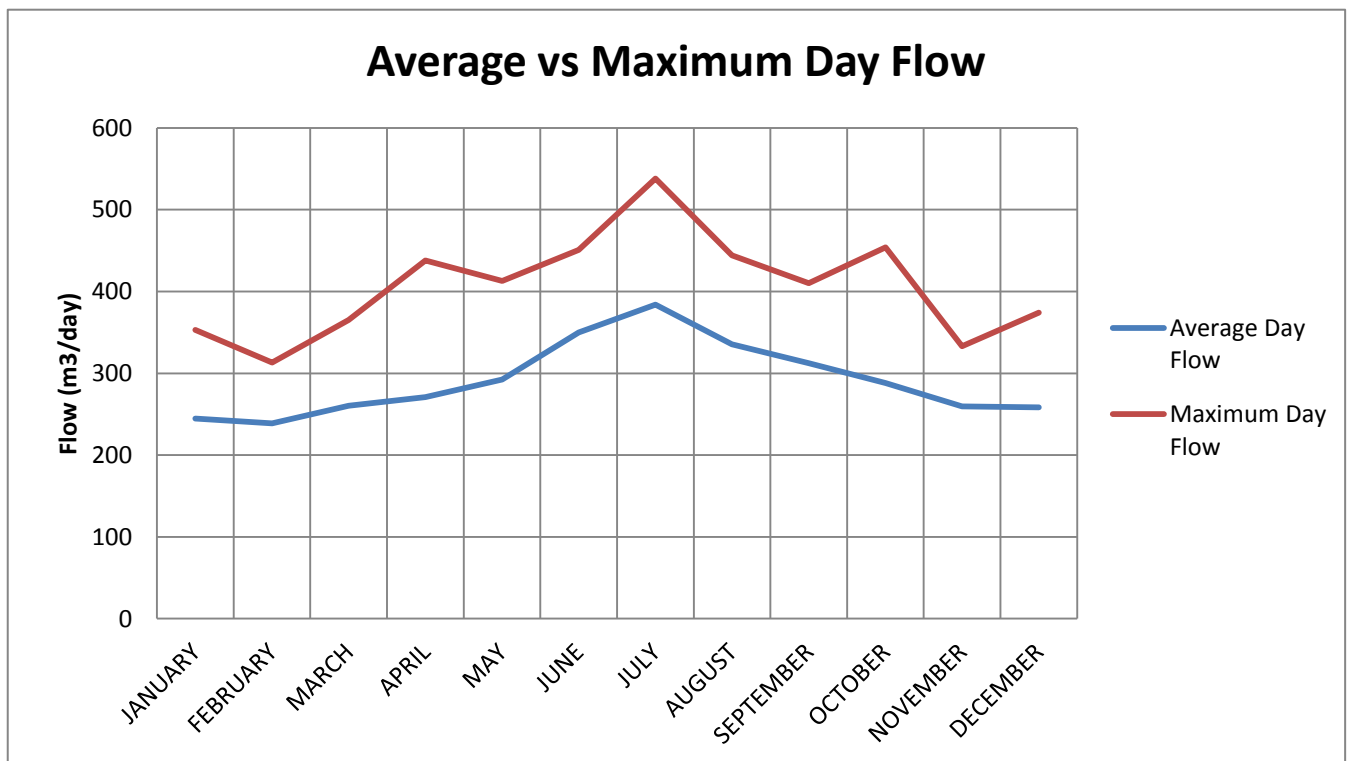
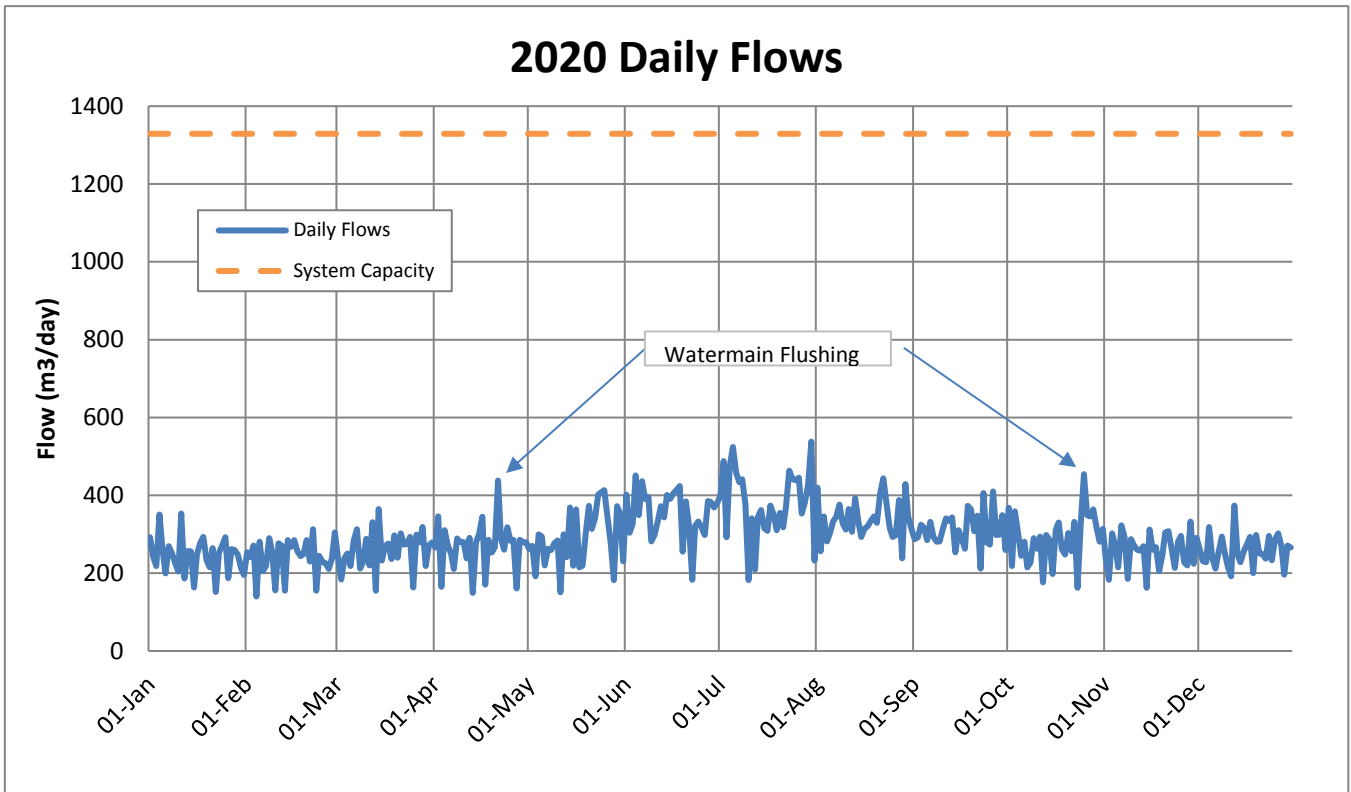
The following Table summarizes the most recent test results for Schedule 23. Testing is required every 3 years for secure groundwater wells.

<i>Parameter</i>	<i>Sample Date</i>	<i>Result Value (ug/L)</i>	<i>MAC (ug/L)</i>	<i>MDL (ug/L)</i>
Antimony	May 21/19	ND	6	0.09
Arsenic	"	1.0	10	0.2
Barium	"	175	1000	0.01
Boron	"	18	5000	2
Cadmium	"	0.009	5	0.003
Chromium	"	0.14	50	0.03
Mercury	"	ND	1	0.01
Selenium	"	ND	5	0.04
Uranium	"	0.884	20	0.002

The following Table summarizes the most recent test results for Schedule 24. Testing is required every 3 years for secure groundwater wells.

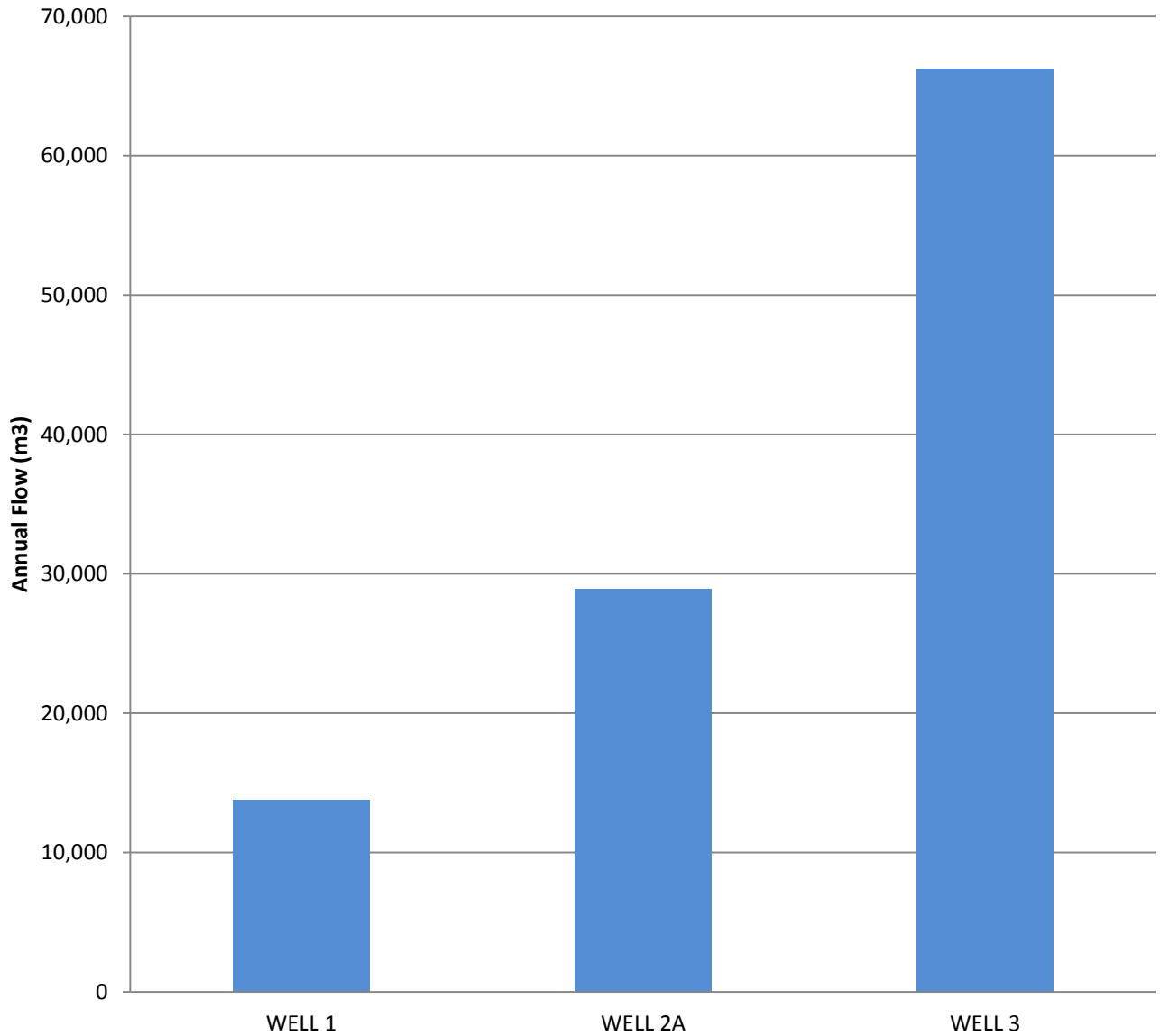
Parameter	Sample Date	Result Value (ug/L)	MAC (ug/L)	MDL (ug/L)
Alachlor	June 4/18	ND	5	0.11
Atrazine + N-dealkylatedmetabolites	"	ND	5	0.12
Azinphos-methyl	"	ND	20	0.21
Benzene	"	ND	1	0.37
Benzo(a)pyrene	"	ND	0.01	0.004
Bromoxynil	"	ND	5	0.33
Carbaryl	"	ND	90	0.16
Carbofuran	"	ND	90	0.37
Carbon Tetrachloride	"	ND	2	0.41
Chlorpyrifos	"	ND	90	0.18
Diazinon	"	ND	20	0.081
Dicamba	"	ND	120	0.20
1,2-Dichlorobenzene	"	ND	200	0.50
1,4-Dichlorobenzene	"	ND	5	0.21
1,2-Dichloroethane	"	ND	5	0.43
1,1-Dichloroethylene(vinylidene chloride)	"	ND	14	0.41
Dichloromethane	"	ND	50	0.34
2-4 Dichlorophenol	"	ND	900	0.15
2,4-Dichlorophenoxy acetic acid (2,4-D)	"	ND	100	0.19
Diclofop-methyl	"	ND	9	0.40
Dimethoate	"	ND	20	0.12
Diquat	"	ND	70	1
Diuron	"	ND	150	0.87
Glyphosate	"	ND	280	6
Malathion	"	ND	190	0.091
Metolachlor	"	ND	50	0.092
2-methyl-4chlorophenoxyacetic acid (MCPA)	"	ND	100	0.12
Metribuzin	"	ND	80	0.12
Monochlorobenzene	"	ND	80	0.58
Paraquat	"	ND	10	1
Pentachlorophenol	"	ND	60	0.15
Phorate	"	ND	2	0.11
Picloram	"	ND	190	0.25
Polychlorinated Biphenyls(PCB)	"	ND	3	0.04
Prometryne	"	ND	1	0.23
Simazine	"	ND	10	0.15
Terbufos	"	ND	1	0.12
Tetrachloroethylene	"	ND	10	0.45
2,3,4,6-Tetrachlorophenol	"	ND	100	0.14
Triallate	"	ND	230	0.10
Trichloroethylene	"	ND	5	0.38
2,4,6-Trichlorophenol	"	ND	5	0.25
Trifluralin	"	ND	45	0.12
Vinyl Chloride	"	ND	1	0.17

APPENDIX B: 2020 WATER QUANTITY SUMMARY



Drumbo-Princeton Water System Capacity 1,329 m³/d

2020 Total Production by Well



Drumbo-Princeton Water System Capacity 1,329 m³/d