

**Town of Midland
Water and Wastewater Operations
Large Municipal Residential Drinking Water System**

Annual Summary Report
(Prepared in accordance with Section 11 and Schedule 22 of Ontario Regulation
170/03)

For the Period of
January 1, 2014 to December 31, 2014



The purpose of this report is to provide information to several stakeholders and to satisfy the regulatory requirements of the Safe Drinking Water Act (SDWA) including the Drinking Water Quality Management Standard (DWQMS), and regulatory reporting required under O.Reg. 170/03 (Section 11 and Schedule 22) found in Appendix A and B. The Summary Report must be presented and accepted by Council by March 31st of each year.

This Regulation also requires the owner to produce an Annual Report, as found in Section 11. This report must include the following:

- Description of the system
- Summary of any adverse water quality reports and corrective actions
- Summary of all required testing results
- Description of any major expenses incurred to install, repair or replace required equipment.
- The Annual Report must be completed by February 28th of each year

Prior to amendments made to O. Reg.170/03 in 2006, the Annual Report had to be submitted to the Ministry of the Environment; this is no longer a requirement. As a result, the Summary and Annual Reports have been combined into one document, which is submitted to Council for acceptance.

The report is a compilation of information that helps to demonstrate the ongoing provision of a safe, consistent supply of high quality drinking water to customers located within the Town of Midland.

The Town of Midland is a municipally owned and operated water utility. The Midland Drinking Water System is a Class 3 Water Distribution and Supply Subsystem and a Class 1 Water Treatment System.



The Midland Drinking Water System is required to comply with the Safe Drinking Water Act (SDWA) and Regulations as well as requirements contained in Permits to Take Water (PTTW), Municipal Drinking Water Licenses (MDWL), and Drinking Water Works Permits (DWWP). Having met the quality management system requirements of the SDWA, Midland Public Works Water Operations is an accredited Operating Authority with an up-to-date Operational Plan (OP). The OP is available upon request from the Town of Midland Public Works Water Operations, at 200 Bay St. The source of Midland's drinking water is a series of 10 operational groundwater wells with some groundwater under the direct influence of surface water (GUDI) sources (i.e. Highway #12 Treatment System, Vindin Treatment System). The town has approximately 5900 fully metered water service connections, 118 kilometers of underground water mains, and a population of approximately 17000 within the Town of Midland.

As the Operating Authority, the Town of Midland Public Works Water Operations is annually inspected by the Ontario Ministry of the Environment (MOE) for compliance

with regulatory requirements. In the fall of 2014, the Midland Drinking Water System was inspected (for the period of Jun. 1, 2014 to Aug. 31, 2014) and received a compliance score of 87.5%. There were no incidents of non-compliance associated with the Midland Drinking Water System in 2014 (Jan. 01 to Dec. 31) that were identified outside of the MOE Annual Inspection.

From Jan. 1 to Dec. 31, 2014, Midland Water Operations reported six Adverse Water Quality Incidents (AWQIs) in the Midland Drinking Water System: the six incidents involved the detection of Total Coliform in the distribution system above regulatory limits. In conjunction with Simcoe-Muskoka Public Health Unit and the MOE, all appropriate corrective action and reporting were completed.

The system is operated to meet daily, seasonal, and other operational demands (fire demands) with various combinations of supplies in operation at any given time. From Jan. 01 to Dec. 31, 2014, a total of 2,093,830 cubic metres of water was treated and pumped to the system. The average daily water demand was 5516 cubic metres. All water was treated with sodium hypochlorite (for chlorine disinfection) and ultraviolet disinfection (UV). All water was tested and met all regulatory standards. The Town of Midland Drinking Water System is in a fit state of repair and followed best industry practices during the repair and maintenance of the system. Infrastructure review occurs regularly between the various divisions within the Public Works and Water Operations to optimize priority projects and minimize common costs. The Town of Midland maintains a robust backflow prevention program overseeing 471 facilities with 999 backflow prevention devices installed. There were no reported backflow incidents. The Town of Midland has completed this Annual & Summary Report to satisfy the regulatory requirements of the Safe Drinking Water Act, O. Reg. 170/03 (Section 11 and Schedule 22).

For more information please contact Town of Midland Public Works Water Operations at (705) 526-4268

Drinking Water System Overview

The Town of Midland Water Distribution System consists of approximately 118 km of water mains including 5,900 customer connections serving a population of approximately 16,700 persons. There are approximately 29 sampling stations, 573 fire hydrants and 1089 valves and other appurtenances within the Distribution System. The distribution consists of four pressure zones (four main pressure zones, East, West, Lescaut, and Harbourview areas), four Booster Pumping Stations (Dominion,

Everton, Montreal, and Penetanguishene) as well as five above ground Storage Facilities (Hanly Tower, Dominion Standpipe, Montreal Tank, Everton Tank, and Mountainview Tank) with a total finished water storage capacity of approximately 14,834 m³. No storage exists within the Lescaut Pressure Zone which relies upon pumped storage supplied from the Hanly Tower.

Treated water is also supplied across the Wye River in two places to non-residential consumers in Tay Township - namely Martyrs' Shrine and Sainte-Marie among the Hurons museum, which in turn supplies the Wye Marsh Wildlife Centre.

Legislation

Since the issuance of the Walkerton Reports I and II in 2002, many legislative and regulatory changes have occurred for those supplying drinking water in Ontario. The following are the primary pieces of legislation that have directly affected the operation of the Town of Midland Water Distribution System.

Safe Drinking Water Act

As recommended by Commissioner O'Connor, the government passed the Safe Drinking Water Act in 2002, which expands on existing policy and practice and introduced new features to protect drinking water in Ontario. The Act's purpose is to protect human health through the control and regulation of drinking water systems and drinking water testing. The Act also provides legislative authority to implement the recommendations made in Commissioner O'Connor's Walkerton Part One and Two Reports. As of August 2007, all 28 recommendations made in Part One, and all 93 in Part Two have been implemented. The Act also has the benefit of gathering in one place all legislation and regulations relating to the treatment and distribution of drinking water.

Parts of the Act address:

- Accreditation of operating authorities
- Municipal drinking water systems
- Drinking water testing
- Inspections
- Compliance and Enforcement

Ontario Regulation 170/03: Drinking Water Systems Regulation

The Drinking Water Systems Regulation (O. Reg. 170/03) regulates municipal and private water systems that provide water to year-round residential developments. This regulation stipulates treatment equipment usage, operational checks and sampling, chemical and microbiological testing requirements, corrective actions, and reporting requirements.

Amendments to O. Reg. 170/03 came into effect on June 5, 2006. The amendments are risk-based and are designed to safeguard the quality of Ontario's drinking water, while making the regulation more workable and affordable for residential drinking water

systems and systems serving designated facilities. They add clarity and flexibility to the testing and operational regimes set out in O. Reg. 170 and in some cases, has reduced the cost of regulatory compliance.

On July 26th, 2007, further amendments were made requiring additional lead sampling for water distribution systems. The purpose of the new lead testing requirements is to determine whether communities have a problem with lead in drinking water at the tap. Random testing throughout the Town would provide the basis on which to initiate actions to reduce lead levels through control of lead corrosion and would provide evidence of any changes in lead levels over time.

Authorization Documents

The Town of Midland owns and operates a Large Municipal Residential Drinking Water System which has been provided the drinking water system number of 220001156 by the Ministry of the Environment.

The Ministry has issued the following authorization documents for the Town of Midland Drinking Water System;

- Drinking Water System License #122-101
- Drinking Water System Permit # 122-201
- Drinking Water System Operational Plan # 122-401

Ontario Regulation 128/04: Certification of Drinking-Water Operators and Water

The Water Operator Certification Program was initiated for drinking water operators in 1987 as a voluntary program. On May 14, 2004, O. Reg. 128/04 was issued, increasing the requirements for drinking water operators' certification. The regulation also establishes ongoing training requirements for these operators. Details note the different types of licenses, reissuance and transferability, overall and operator in charge responsibilities, record keeping, and operations/maintenance manuals.

Of special note, this regulation stipulates that all new water operators must complete an Entry-Level Course of Study within the first 16 months of obtaining their operator-in-training (OIT) certificate. As of August 1, 2005, these operators must complete a 40 hour at-home study manual and successfully pass a written test based on this manual. After this, they must attend a five day in-class training seminar and examination facilitated by the Walkerton Clean Water Centre. Once these requirements have been met, the new operator's license is valid for three years, allowing them time to meet the requirements needed for a Level One License.

Drinking Water Quality Management Standard (DWQMS)

On November 28, 2005, The Ontario Ministry of the Environment posted the Drinking Water Quality Management Standard (DWQMS) on the Environmental Registry for comment until January 27, 2006. On October 30, 2006, the finalized standard was issued on the Environmental Bill of Rights Registry. The purpose of this Standard is to assist owners and operating authorities in the effective management and operation of

their municipal residential drinking water systems. This Standard outlines requirements for a Quality Management System (QMS) to ensure high quality drinking water. In the development of a QMS, the Operating Authority must create an Operational Plan; this document will define the QMS and will be subject to external audits for accreditation. As referenced in the Standard, the QMS must be embraced by all those with active rolls in the water system, from front line staff to the highest level of management. Town Staff have developed and implemented a QMS specific to the Town of Midland. The developed Operational Plan was submitted to the Ministry of the Environment by the imposed deadline with external auditing and final accreditation by the Canadian General Standards Board (CGSB) for full-scope DWQMS certification. Re-certification occurred on July 15, 2014.

Ontario Regulation 435/07: Financial Plans

In 2007, MOE developed the Financial Plans Regulation (O. Reg. 453/07) under the SDWA that prescribes the requirements for Financial Plans. The Financial Plans Regulation requires all owners of municipal residential drinking water systems to prepare Financial Plans that detail the system's financial information projected forward for at least six years. The Financial Plans must include income statements (which set out revenues and expenses), as well as balance sheets (which include financial assets, non-financial assets, total liabilities, cash flow, etc.).

The Financial Plans must then be formally approved by the owner of the municipal system through a resolution of the municipal council. The Financial Plan requires regular updates before every license renewal application (every 5 years). This report formed the foundation for the Financial Plan that was then submitted to the Ministry of the Environment prior to the July 2010 deadline. This is a legal requirement under O. Reg. 453/07 and is to be resubmitted to the Ministry as a part of the Operator License Renewal Program under the DWQMS.

Major Expenses during 2014

Major expenses during 2014 are categorized as follows:

- Distribution Upgrades (Variable Frequency Drives i.e. Control Panels)
- Well Rehabilitation (#7 Pump, #11 and #14)
- Infrastructure (Fifth Street Water main Reconstruction between Yonge Street and Hugel Avenue

Water treatment chemicals

The only water treatment chemical used during by the system, during the reporting year was a 12% Sodium Hypochlorite solution. This is used as secondary disinfection in the water treatment process.

Detailed Water System Descriptions

Well 7A Raw Water

Well #7A is located at the southern boundary of the Town of Midland along Highway 12 (Heritage Drive). This well was constructed in 1972 (Well Record #5707896) and is drilled to a depth of 64.9 meters and has a 300 mm diameter steel casing. The well, which is screened from 56.7 to 64.9 meters, is located within the pump house equipped with a vertical turbine pump rated at 57 L/s at a TDH of 103.7 m. Groundwater is directed to treatment equipment at the High 12 Treatment System pump house.

According to the 2002 GUDI Hydrogeological Report, Wells 7A and 7B are located within the 50 day horizontal travel time from a pond and drainage ditches which collect runoff from Highway #12. The report further states that given the absence of aquitards, the location of the well field in a major recharge area, and the gradual increase of sodium and chloride, suggests potential susceptibility of the aquifer to contamination and provides enough evidence to suggest that wells 7A and 7B are potentially GUDI wells as per the MOE Terms of Reference.

Well 7B Raw Water

Well #7B, located at the southern boundary of the Town of Midland along Highway 12 (Heritage Drive) was constructed in 1989 (Well Record #5709697), approximately 9 meters North of the pump house and 30 meters South of Highway 12. The well is drilled to a depth of 64.9 meters, has a 300 mm diameter steel casing and is screened from 56.7 to 64.9 meters. The well is equipped with a deep well submersible pump having an approximate capacity of 49 L/s at 105.5 metres TDH, and has a pit less adaptor directing groundwater to the Highway 12 treatment pump house.

According to the 2002 GUDI Hydrogeological Report, Wells 7A and 7B are located within the 50-day horizontal travel time from a pond and drainage ditches which collect run off from Highway #12. The report further states that given the absence of aquitards, the location of the well field in a major recharge area, and the gradual increase of sodium and chloride, suggests potential susceptibility of the aquifer to contamination and provides enough evidence to suggest that wells 7A and 7B are potentially GUDI wells as per the MOE Terms of Reference.

Highway 12 Treatment System

The Highway 12 pump house, situated at the corner of Highway 12 and Beamish Road, is a direct pumping type system consisting of two GUDI supply wells; 7A and 7B and treatment works. Both pumps operate independently of each other in response to the water level in the Hanly elevated water tower. Water is discharged following treatment into the distribution system at system pressure.

Inlet piping from each well pump consists of isolation valves, air relief valves, flow measuring devices (installed on each header), pressure sustaining valves and

discharge to waste piping. Prior to treatment the raw water Ultraviolet Light Transmittance (UVT) is measured by a continuous online meter; with measurements used in determining UV dosage and trended on Midland's SCADA system.

The chlorine contact time necessary to complete the process of primary disinfection is provided by a dedicated section of the piping upstream of the first consumer connection. To ensure the continuous monitoring equipment installed for the purposes of measuring free available chlorine residual for primary disinfection purposes is supplied with a continuous sample adequately simulating contact time, the Owner has installed a 1.2 metre length of 100 mm diameter chlorine contact simulation piping. One Wallace and Tiernan free chlorine residual and pH analyzer is provided with continuous samples taken off this chlorine contact simulation pipe, and measures free available chlorine residual concentration in mg/L. Treatment. This is comprised of:

- Two UV irradiation units for Primary Disinfection purposes; each rated at 9185 m³/day at 90% UVT. They have a design dose of 40 mj/cm², with electrically actuated control valves to allow switchover between units, automatic cleaning systems, cooling systems and control system functionality.
- A chemical disinfection system utilizing sodium hypochlorite solution for both Primary and Secondary Disinfection purposes, and consisting of one 550 L sodium hypochlorite solution tank and two chemical metering pumps (one duty, one standby) with individual nameplates indicating a capacity of 14.82 L/hr, each equipped with alarms and automatic switch over on duty pump failure.
- One continuous, on-line turbidimeter measuring Turbidity in NTU's is supplied with continuous samples from the same location as identified for the chlorine analyzer. The turbidimeter is equipped with signal outputs connected to SCADA for continuous monitoring and reporting purposes. The turbidimeter is installed for operational monitoring purposes only.
- One flow measuring device, equipped with 4-20 outputs is installed on each of the well headers and used to measure and trend water conveyed into treatment units and the distribution system.
- A Residue Management system consisting of one and two sump pumps collects processed wastewater and discharges to a drainage ditch adjacent to the pump house.
- One standby diesel generator with a nameplate indicating a rating of 330 Kw is installed within a separate room in the pump house and designed to power key components of the facility during power interruptions.

Well 9 Raw

Well #9 is located in the west end of the Town of Midland approximately 20 meters South-East of the Dominion Treatment pump house and was constructed in 1975 (Well Record #5710939). The well is equipped with a deep well submersible pump having an approximate capacity of 23 L/s vs 38 m TDH and pit less adaptor. The well is drilled to a

depth of 93.9 metres and is 178 mm in diameter. The well casing is steel and is screened from 87.5 to 93.9 meters. Raw water is directed to the Dominion Treatment System pump house.

According to the 2002 GUDI Hydrogeological Report, the aquifer supplying Well #9 is susceptible to contamination, due to its partially unconfined and sandy conditions and the presence of a thick unsaturated zone. Well #9 is not considered to be GUDI.

Dominion Treatment System

The Dominion pump house is a single level building, located at the southeast corner of Dominion Street and Penetanguishene Road and houses the treatment and control facilities, inlet piping, valves, flow meter with bypass, discharge piping and discharge to waste, electrical panel with motor starter, electrical heater, ventilation, and associated appurtenances from the pump house to the 150 mm water main. The 150 mm diameter water main has no service connections from pump house to Penetanguishene Road. Well #9 conveys water to and through the treatment works into the Distribution System operated based on pressures and water levels in the West Pressure Zone, the Montreal and the Dominion Street Reservoir.

Treatment and monitoring consists of:

- An Ultraviolet (UV) Disinfection System consisting of one ultraviolet reactor system is installed for Primary Disinfection purposes. It is capable of treating 23 L/s at 95% UVT with a design dose of 40 mj/cm².
- a Chemical System utilizing sodium hypochlorite addition for Secondary Disinfection purposes consisting of two chemical metering pumps with nameplates indicating rated capacities of 3.6 L/hr and equipped with automatic switchover capabilities and alarms, and one (1) 200 L sodium hypochlorite storage tank and discharge feed connections;
- One continuous on-line chlorine residual analyzer measuring free available chlorine residual concentration in mg/L with pH supplied with a treated water sample prior to the conveyance of the treated water to the distribution system is used to evaluate the secondary disinfection system. The analyzer is equipped with signal outputs connected to the SCADA system for continuous monitoring/control and reporting purposes;
- One continuous, online turbidimeter measuring in NTU's, supplied with continuous samples from the same location as identified for the chlorine analyzer. The analyzer is equipped with signal outputs connected to SCADA for continuous monitoring and reporting purposes and is used for operational monitoring purposes only; and
- Flow measuring devices equipped with 4-20mA outputs linked with the SCADA system for continuous monitoring and control purposes.

Well 15 Raw Water

Well #15 is located within a removable structure directly adjacent and attached to the Hanly Treatment System pump house approximately 160 meters East of Lakeview

Cemetery. The well was constructed in 1985 (Well Record #5717683) and has a depth of 46.6 meters with a 200 mm diameter steel casing. The well is screened from 40.3 to 46.6 meters and is equipped with a submersible well water pump having an approximate capacity of 15.2 L/s at 42 m TDH.

The municipal groundwater source is located in a primarily residential area. A cemetery is located approximately 100 metres southwest of the well. According to the Hydrogeological reports, approximately half of the cemetery is located within the 2-year Well Head Protection Area (WHPA), with the remainder located within the 25-year WHPA. The 2002 MacViro GUDI Hydrogeological report stated that the cemetery is likely "the most significant risk to the well field" and further states that contaminants released from the cemetery could be drawn to the well field due to the continuous and long-term pumping of the well. Well 15 is not considered to be Groundwater Under the Direct Influence (GUDI) of surface water.

Hanly Treatment System

The Hanly pump house is located at the southwest corner of Hanly and Russell Street. It houses treatment and control facilities, inlet piping and flow meter, electrical panel with motor starter, electrical heater, ventilation, and associated appurtenances.

Well 15 convey water to and through the treatment works into the distribution system via a 150 mm water main based on pressures and water levels in Sector 5 and the Hanly Street Tower. Pressures in Sector 5 are maintained by a SCADA controlled actuated valve located at the corner of Hanly and Russell Street. The 150 mm diameter water main reportedly has no service connections from the pump house to Hanly Street, and provides some chlorine contact time prior to first user.

Treatment and monitoring consists of:

- An Ultraviolet (UV) Disinfection System, consisting of one ultraviolet reactor installed for Primary Disinfection purposes; having a reactor capable of treating 15.2 L/s at 95% UVT with a design dose of 40 mj/cm²;
- a Chemical System utilizing sodium hypochlorite addition for Secondary Disinfection purposes, consisting of two chemical metering pumps with nameplates indicating rated capacities of 3.6 L/hr equipped with automatic switchover capabilities and alarms, and one (1) 200 L sodium hypochlorite storage tank and discharge feed connections;
- One continuous on-line chlorine residual analyzer measuring free available chlorine residual concentration in mg/L with pH compensation supplied with a treated water sample prior to the conveyance of the treated water to the distribution system is used to evaluate the secondary disinfection system. The analyzer is equipped with signal outputs connected to the SCADA system for continuous monitoring/control and reporting purposes;
- One continuous, on-line turbidimeter measuring in NTU's, supplied with continuous samples from the same location as identified for the chlorine analyzer. The analyzer is

equipped with signal outputs connected to SCADA for continuous monitoring and reporting purposes, and is used for operational monitoring purposes only; and

- flow measuring devices equipped with 4-20mA outputs linked with the SCADA system for continuous monitoring and control purposes.

Well 6 Raw

Well #6 is located within the Vindin well field approximately 430 meters South-West of the Vindin pump house and approximately 15 meters East of the nearest surface water body. Well #6 was constructed in 1971 (Well Record number unknown) and is equipped with a submersible well water pump having an approximate capacity of 19 L/s, pit less adaptor and control building equipped with raw water flow meter and shut off valve. The well is drilled to a depth of 35.8 meters and has a 600 mm diameter steel casing. The well is screened from 26.7 to 35.8 meters and is equipped with a submersible well pump rated at 19 L/s at a TDH of 30 m.

The Well pump house is located adjacent to the building housing the natural gas generator (refer to Flume Station pump house notes). The well is constructed in an aquifer exhibiting artesian conditions. The well casing is incorporated into a concrete pedestal extending approximately 15 cm above the pump house floor and was equipped with a screened vent extending to approximately 60 cm above the floor.

According to the 2002 GUDI Hydrogeological Report, the Vindin Flume well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50 day travel time assessment. The same report further concluded that the wells provide effective in-situ-filtration.

Well 11 Raw

Well #11 is located within the Vindin well field approximately 710 meters West of the Vindin pump house and approximately 20 meters South East of the nearest surface water body. It was constructed in 1971 (Well Record #5715187) and is equipped with a submersible well water pump having an approximate capacity of 22.7 L/s. An adjacent below grade control chamber houses a check valve, raw water flow meter, isolation valve and is equipped with a sump pump and drain. The well is constructed in an aquifer exhibiting artesian conditions.

According to the 2002 GUDI Hydrogeological Report, the Vindin Flume well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50 day travel time assessment. The same report further concluded that the wells provide effective in-situ-filtration.

Well 12 Raw

Well #12 is located within the Vindin well field approximately 635 meters South-West of the Vindin pump house and approximately 70 meters South of the nearest surface water

body. It was constructed in 1979 (Well Record #5716076) and is equipped with a submersible well water pump having an approximate capacity of 7.6 L/s, pit less adaptor, and an adjacent below grade control building equipped with a check valve, raw water flow meter and isolation valve. The well is drilled to a depth of 30.8 meters and has a 200 mm diameter steel casing. The well is screened from 23.8 to 30.8 meters. The well casing extended approximately 65 cm above grade. The well is constructed in an aquifer exhibiting artesian conditions.

According to the 2002 GUDI Hydrogeological Report, the Vindin Flume well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50-day travel time assessment. The same report further concluded that the wells provide effective in-situ-filtration.

Well 14 Raw

Well #14 is located within the Vindin well field approximately 540 meters South-West of the Vindin pump house and approximately 70 meters South West of the nearest surface water body. It was constructed in 1979 (Well Record #5716078) and is equipped with a submersible well water pump having an approximate capacity of 11.4 L/s. An adjacent below grade control chamber houses a check valve, raw water flow meter, and isolation valve. The below grade control chamber is equipped with a sump pump and drain. The well is drilled to a depth of 35.5 meters and has a 200mm diameter steel casing. The well is screened from 29.1 to 35.5 meters. The well is constructed in an aquifer exhibiting artesian conditions. The well casing extends approximately 60 cm above grade and is fitted with a well cap.

According to the 2002 GUDI Hydrogeological Report, the Vindin Flume well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50-day travel time assessment. The same report further concluded that the wells provide effective in-situ-filtration.

Well 16 Raw

Well #16 is located within the Vindin well field approximately 310meters West of the Vindin pump house and approximately 10 meters West of the nearest surface water body. It was constructed in 1987 (Well Record #5722487) and is equipped with a submersible well water pump having an approximate capacity of 15.2 L/s. An adjacent below grade control chamber houses a check valve, raw water flow meter and isolation valve and is equipped with a sump pump and drain. The well is drilled to a depth of 35.1 meters and has a 200 mm diameter steel casing. The well is screened from 29.0 to 35.1 meters. The casing extends approximately 45 cm above grade.

According to the 2002 GUDI Hydrogeological Report, the Vindin Flume Well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50 day travel time assessment. The same report further concluded that the wells provide effective in-situ-filtration.

Well 17 Raw

Well #17 is located within the Vindin well field approximately 200 meters South-West of the Vindin pump house and approximately 10 meters South of the nearest surface water body. It was constructed in 1987 (Well Record #5722489) and is equipped with a submersible well water pump having an approximate capacity of 14.2 L/s, pit less adaptor, and a below grade control chamber equipped with a check valve, raw water flow meter, and isolation valve. In 2005 the below grade chamber (well pit), in which the well was originally installed, was filled and the above noted appurtenances relocated to a similar below grade chamber adjacent to the well. At that same time re-grading was also performed in the vicinity of the well to ensure positive drainage away from the well casing, this now extends approximately 0.4 metres above adjacent grade. The Well is reportedly drilled to a depth of 25.6 meters consisting of 200 mm diameter steel casing. The well is screened from 20.6 to 25.6 meters.

According to the 2002 GUDI Hydrogeological Report prepared by MacViro Consultants on behalf of the Owner the Vindin Flume well field (Wells # 6, 11, 12, 14, 16, and 17) is considered to be GUDI due to the results of isotope analysis, the similarity of groundwater and surface water chemical signatures, the reversal of gradients during pumping and the 50 day travel time assessment. The same report further concluded that the wells provide effective in-situ filtration.

Vindin Treatment System

The Vindin pump house, also referred to as the Vindin Flume is situated near the northwest corner of Vindin Street and Sunnyside Drive. The Flume treatment facility receives water via a 200 metre combined raw water header from six ground water sources (Wells 6, 11, 12, 14, 16 and 17) which have been determined to be groundwater under the Influence of surface water with effective in-situ filtration.

Each well operates independently in response to the water level in the raw water high lift wet well at the pump house.

Three high lift pumps draw raw water from the wet well at a discharge pressure of approximately 113 psi and convey that water through the treatment units and into the distribution system. The Flume supplies water to the East Pressure Zone with excess water used to fill the reservoirs in this zone of the Distribution System. Two of the pumps have an individual capacity of 37.9L/s and can be controlled to operate as either lead or lag pumps. The third larger pump has a capacity of 63.1 L/s and operates as either lead or lag. Normal operation is the 63.1 L/s pump as lead, and the two 37.9 L/s pumps as lag. The start/stop operation of the high lift pumps at the Vindin Flume is controlled by the water level in the Dominion Avenue standpipe.

Prior to treatment, the raw water Ultraviolet light Transmittance (UVT) is measured by a continuous online meter; with measurements used in determining UV dosage and trended on Midland's SCADA system. Treatment is comprised of:

- Two UV irradiation units for Primary Disinfection purposes, each rated at 7785 m³/day at 90% UVT with design dose of 40 mj/cm² with electrically actuated control valves to allow switchover between units, automatic cleaning systems, cooling systems and control system functionality.
- A chemical disinfection system utilizing sodium hypochlorite solution for both Primary and Secondary Disinfection purposes, and consisting of one 550 L sodium hypochlorite solution tank and two chemical metering pumps (one duty, one standby) with individual nameplates indicating a capacity of 2.25 g/hr (8.5 L/hr) at 116psi, and each equipped with alarms and automatic switch over on duty pump failure.
- A 400 mm diameter chlorine contact pipe, approximately 215 m long, is installed within abandoned parts of the former Flume reservoir, providing approximately 26 cubic metres of effective chlorine contact volume.
- Two continuous on-line chlorine residual analyzers with pH have been installed and measure free available chlorine residual concentration in mg/L. The "Pre-contact" analyzer is supplied with a water sample prior to the conveyance of the chlorinated water into the dedicated chlorine contact pipe and is used for operational purposes to ensure operation of the chlorination system. The "Post-contact" analyzer is supplied with a treated water sample prior to the conveyance of the treated water into the Distribution System and is used for legislative monitoring required for primary disinfection purposes. Each of the analyzers are equipped with signal outputs connected to the SCADA system for continuous monitoring/control and reporting purposes.
- One standby diesel generator with a rating of 330 Kw is installed within an adjacent room in the Vindin Pump house and another natural gas generator rated at 45 KW is located in a stand-alone building adjacent to Well #6.
- One continuous, on-line turbidimeter, measuring Turbidity in NTU's, is supplied with continuous samples from the same location as identified for the "Pre-contact" chlorine analyzer. The turbidimeter is equipped with signal outputs connected to SCADA for continuous monitoring and reporting purposes. The turbidimeter is installed for operational purposes only.
- One flow measuring device, equipped with 4-20 outputs, is installed on the high lift discharge header used to measure and trend water conveyed into the distribution system.
- A residue management system, consisting of one sump and two sump pumps, collects process wastewater and discharges to a drainage ditch adjacent to the pump house.
- One standby diesel generator with a nameplate indicating a rating of 330 Kw, is installed within a separate room in the pump house and designed to power key components of the facility during power interruptions.

Hanly Storage Facility

The Hanly Storage Facility, located at 365 Hanly Street, was constructed in 1947 and is described as a multi-column elevated steel tank with a capacity of 950 cubic meters of storage supplying the East Pressure Zone.

Mountainview Storage Facility

The Mountainview Storage Facility, located at 55 Wilson Road, was constructed in 2010 and is a cylindrical glass-fused-to-steel storage facility with 4,430 cubic meters storage capacity supplying the West Pressure Zone. The tank is equipped with a mixing system, overflow piping, level measuring devices and a flow meter.

Dominion Storage Facility

The Dominion Storage Facility, located at 755 Dominion Avenue was constructed in 1901 and is a steel standpipe with 713 cubic meters of storage capacity supplying the West Pressure Zone.

Montreal Storage Facility

The Montreal Storage Facility, located at 837 Montreal Street was constructed in 1989, and is a large diameter cylindrical glass-fused steel storage facility with 2,881 cubic meters of storage capacity supplying the West Pressure Zone.

Everton Tank

The Everton Tank, located at 300 Frontenac Street, was constructed in 2009, and is a cylindrical glass-fused-to-steel storage facility with a geodesic dome with 5863 cubic meters storage capacity supplying the Everton Pressure Zone. Installed equipment includes a mixing system comprised of a header within the standpipe with tide flex nozzles mounted on 45 degree elbows and water check valves on the outlet.

Distribution

The Town of Midland Distribution System consists of approximately 118km of water mains including 5,375 customer connections serving a population of approximately 16,700 persons. There are approximately 29 sampling stations, 573 fire hydrants and 1089 valves and other appurtenances within the Distribution System. The distribution consists of four pressure zones (four main pressure zones, East, West, Lescaut, and Harbourview areas), four Booster Pumping Stations (Dominion, Everton, Montreal, and Penetanguishene) as well as five above ground storage facilities (Hanly Tower, Dominion Standpipe, Montreal Tank, Everton Tank, and Mountainview Tank) with a totally finished water storage capacity of approximately 14,834 m³. No storage exists within the Lescaut Pressure Zone which relies upon pumped storage supplied from the Hanly Tower.

Treated water is also supplied across the Wye River in two places to non-residential consumers in Tay Township - namely Martyrs' Shrine and Sainte-Marie Among the Huron's museum, which in turn supplies the Wye Marsh Wildlife Centre.

Non-Compliances with Legislation

Schedule 22 requires that all non-compliance with applicable legislation be discussed in the Summary Report. The Ministry of the Environment carried out their annual system inspection on November 26, 2014 for the period of October 1, 2013 to October 31, 2014; during this time period, 10 issues of non-compliance were found:

1. The owner was not maintaining the production well(s) in a manner sufficient to prevent entry into the well of surface water and other foreign materials.

The Municipality is currently supplied by ten active groundwater wells, six of which are located within the Vindin Flume area, two at the Highway 12 site, one at the Dominion Avenue site and one at the Hanly site. On 11/26/2014, the day of physical inspection, a visual assessment of the above-ground portion of the active production wells at;

- Highway 12 Treatment System Wells #7A and Well #7B; and
- Vindin Treatment System Well #6, Well #11, Well #12, Well #16, and Well #17.

The Town was able to provide well inspection and maintenance records of production wells. It appears that the owner is maintaining the wells in a manner sufficient to prevent the entry into the wells of surface water and other foreign materials with the exception of Well #16. At the time of inspection no screen was in place on the vent for Well #16. It was further noted that this well had been not placed into production since approximately September 2013 as the flow meter was removed for repair. Within the valve pit, a piping tee was left uncapped with a slight water surge observed spilling over the open fitting.

Action(s) Required:

By 1/26/2015, the Municipality shall apply to the Ministry for a 'Schedule C: Authorization to Alter the Drinking Water System' to reflect the decommissioning of the Harbourview Treatment System. The Municipality had provided a draft from review to the undersigned Inspecting Officer on 12/19/2014.

2. The owner had not ensured that all equipment was installed in accordance with Schedule A and Schedule C of the Drinking Water Works Permit.

Existing physical components of the drinking water system were cross-referenced to those listed on Drinking Water Works Permit #122-201 issued 8/29/2011. The Harbourview Treatment System and source wells were removed from service and subsequently decommissioned in December 2012 without appropriate approval from the Director contrary to section 31(1) of the Safe Drinking Water Act.

Action(s) Required:

By 1/26/2015, the Municipality shall apply to the Ministry for a 'Schedule C: Authorization to Alter the Drinking Water System' to reflect the decommissioning of the

Harbourview Treatment System. The Municipality had provided a draft form for review to the undersigned Inspecting Officer on 12/19/2014.

3. The owner did not have evidence that all required Director Notifications under Condition 2.4 of Schedule B of the Permit were made during the inspection period.

Existing physical components of the drinking water system were cross-referenced to those listed on Drinking Water Works Permit #122-201 issued 8/29/2011. The Harbourview Treatment System and source wells were removed from service and subsequently decommissioned in December 2012 without appropriate notification to the Director within 30 days contrary to Condition 2.4 of Drinking Water Works Permit # 122-201, issued 8/29/2011.

Action(s) Required:

By 1/26/2015, the Municipality shall apply to the Ministry for a 'Schedule C: Authorization to Alter the Drinking Water System' to reflect the decommissioning of the Harbourview treatment system.

4. Up-to-date plans for the drinking-water system were not available in accordance with the Permit and License issued under Part V of the SDWA.

Contrary to the requirements of 15 of DWS License # 122-101, the process flow and instrumentation diagrams for each point-of-entry treatment facility available does not provide the necessary level of detail to all persons responsible for all or part of the operation of the drinking water system. Specifically, by way of example, treatment facility Process Instrumentation Diagrams produced by Eramosa in 2003, employs acronyms conforming to ANSI/ISA-S5.1 standard in use by Institute of Electrical and Electronics Engineers such as "AIT" for 'Analysis Indicating Transmitter' which could be applied to describe a variety of analyzers, which allows for a level of uncertainty.

Action(s) Required:

By 1/26/2015, the Municipality shall produce new process flow diagrams which clearly provide a basic description as to the description of the individual process and process monitoring unit to ensure clarity to all persons responsible for all or part of the operation of the drinking water system.

Furthermore, by 1/30/2015, the Municipality shall supply each drinking water treatment facility with this process flow diagram to be displayed at a conspicuous location where it may come to the attention of staff.

The Municipality indicated in correspondence to the undersigned Inspecting Officer on 12/19/2014 that a consultant is to be retained to complete appropriate diagrams.

5. The operations and maintenance manuals did not contain plans, drawings and process descriptions sufficient for the safe and efficient operation of the system.

Section 28 of O. Reg. 128/04, requires that a comprehensive Operations and Maintenance Manual contain appropriate plans, drawings and process descriptions sufficient for the safe and efficient operation of the drinking water system.

The Municipality employs a Geographical Information System (GIS) mapping database which appears to be very well maintained and has up-to-date plans / drawings for the distribution systems which shows water mains, valves, hydrants, and other appurtenances associated with the distribution system.

Contrariwise to the requirements of section 28 of O. Reg. 128/04, the Operational Plan does not appear to adequate plans, drawings, and process descriptions. Specifically, the Operational Plan did not contain:

- a physical description and plans / drawings of the Mountainview Storage Facility and Sundowner Booster Station;
- a physical description of each Point-of-Entry chemical feed and storage equipment, including duty and standby;
- a physical description of each Point-of-Entry primary disinfection monitoring point(s) - location(s) of continuous chlorine analyzer(s) measuring the primary disinfection chlorine residual(s);
- an identification of the minimum chlorine residual(s) required to be achieved at the end of each chlorine contact unit used in the primary disinfection process,
- a 'CT' calculations table for various operating conditions (such as flows, temperatures, levels, and specific chlorine contact units if applicable); and
- the minimum and maximum alarm settings at each online analyzer monitoring primary disinfection process.

Actions(s) Required:

By 1/26/2015, the Municipality shall ensure that documentation provided within each Point-of-Entry treatment location contains at a minimum a description of each treatment process, including the purpose of the process, the equipment included in the process including treatment and monitoring, as well as process flow diagrams referencing these descriptions in concordance with section 28 of O. Reg. 128/04.

Furthermore, by 1/30/2015, the Municipality shall confirm to the undersigned Inspecting Officer on 12/10/2015 that some actions were already being taken to address this.

6. The operations and maintenance manuals did not meet the requirements of the Permit and License or Approval issued under Part V of the SDWA.

Minimum requirements for Operations and Maintenance Manual contents are detailed in section 16, Schedule B of DWS License # 122-101, issued on 8/30/2011.

It appears that the Municipality has approximately 70 standard operating procedures and emergency procedures which address most of the requirements. The Emergency Response Plan, although maintained digitally and accessible to operations staff, is also provided within treatment facilities and has not been updated since October 2012.

Specifically, emergency contact numbers are provided for key staff who are no longer within the organization. At the time of inspection, no documents were present

within treatment facilities which detail the operational criteria necessary to achieve primary disinfection within the Drinking Water System.

Action(s) Required:

At a minimum, the Emergency Response Plan within treatment facilities must make reference to the electronic documents and procedures available on the Municipal server and have an up-to-date listing of emergency numbers provided.

Furthermore, by 1/30/2015, the Municipality shall submit to the undersigned Inspection Officer that this action had been taken.

7. All microbiological water quality monitoring requirements for raw water samples were not being met.

Records reviewed indicate that the Municipality had not affected raw water microbiological sampling in accordance with section 10-4 Schedule 10 of O. Reg. 170/03.

Specifically, raw water samples were obtained from each production source before treatment was applied once per week and tested for Escherichia Coli and Total Coliform from the six Vindin production wells, the two Highway 12 wells, the Dominion well and the Hanly well.

The following exceptions were noted where it appears no sampling took place;

Well #16 - offline for some time

Well #14 week of 11/10/2014

Well #6 week of 10/12/2014

Well #7A week of 11/03/2014, week of 11/10/2014

Action(s) Required:

At the time of issuance of this Drinking Water Inspection Report, there had been no response from Municipality with documentation that these microbiological water quality samples were obtained.

The Municipality shall, by 1/26/2015, submit to the undersigned Inspecting Officer;

- Analytical laboratory reports for the identified missing sampling events, and/or
- Documentation that the raw water source was not placed into production during the times identified, and/or
- A summary of preventative measures taken to ensure further required sampling dates are not missed.

8. All specified corrective actions (as per Schedule 17) were not taken to address adverse conditions.

Contrary to the requirements of section 17-6 Schedule 17 of O. Reg. 170/03, the Municipality had failed to correctly resample and test as a result of the adverse microbiological analytical result (Incident Report # 1-4ZS4-3 - 6/4/2014, TC >80).

Specifically, the Municipality had obtained only one resample where a total of three was required:

- one from the same location as the sample that gave rise to the corrective action;
- one from a location that is a significant distance upstream from this location; and
- one from a location that is a significant distance downstream from this location.

Action(s) Required:

No Recommendation

The Municipality had provided to the undersigned Inspecting Officer on 12/15/2015, an amended the procedure “Emergency Procedure for Adverse Water Quality” – Low Chlorine” and have indicate Operations staff are to be orientated with the amendment.

The procedure now included the definition of “resample and test”, as provided with 1(1) of O. Reg. 170/03 to ensure that a resample set of three samples are obtained with respect to corrective action that arises from the test of a water sample for a microbiological parameter.

9. Summary Reports for municipal council were not completed on time, did not include the required content, and/or were not distributed in accordance with the regulatory requirements.

A copy of the ‘Midland Drinking Water System 2013 Summary Report’ (# PW2014-006) summary report to council, dated 2/27/2014 was reviewed and found not to comply with the minimum content requirements of section 22-2, Schedule 22 of O. Reg. 170/03.

Specifically, the summary report did not provide;

- A list the requirements of the Act, the regulations, the system’s approval, drinking water works permit, municipal drinking water license, and any orders applicable to the system that were not met at any time during the period covered by the report,
- 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 with a comparison to the rated capacity and flow rates approved in the system’s drinking water works permit / municipal drinking water license.

Action(s) Required:

By 1/26/2015, Operations staff shall prepare an updated Summary Report which shall conform to the minimum content requirements as prescribed in section 22(1) Schedule 22 of O. Reg. 170/03. By 1/30/2015, this updated Summary Report for municipal council shall be provided to Municipal Council with confirmation of this action to the undersigned Inspecting Officer.

10. All changes to the system registration information were not provided within ten (10) days of the change.

Contrary to section 10.1(3) of O. Reg. 170/03, the Municipality had failed to update the Ministry's Drinking Water Information System profile information within ten days of a change. Specifically, the following items within the Drinking Water Information System require updating or modification;

- Owner contact information had changed - the contact listed retired in early 2013. The Harbourview (Sunnyside) Point-of-Entry treatment system and associated well field is listed as active whereas this system had been decommissioned in 2012.
- The Highway 12 Point-of-Entry treatment system lists only chlorination disinfection as being applied as primary disinfection where there is also Ultra Violet irradiation equipment installed.
- The Vindin Point-of-Entry treatment system lists only chlorination disinfection as being applied as primary disinfection where there is also Ultra Violet irradiation equipment installed.
- The Dominion Treatment System is listed as being located at 1060 Dominion Avenue, where it appears that the correct address is 215 Penetanguishene Road.
- The Highway 12 Treatment System is listed as being located at 16898 Highway 12, where it appears that the correct address is 16896 Highway 12.
- The Vindin Well pump house is listed as being located at 700 Vindin Street, where it appears that the correct address is 740 Vindin Street.

Action(s) Required:

By 1/26/2015, the Owner shall submit to the Ministry, with a copy to the undersigned inspecting officer, an updated 'Registration and Laboratory Services Notification (form 2001E, PIBS 6271E01,2011/04) to the Ministry's DWS registration group at **'reg170_formsubmission.moe@ontario.ca'** or by fax to 416-314-8716 with the updated information.

Adverse Water Quality Incidents

The following table lists the requirements of the Act, Regulations, System Approval (s), Adverse Water Quality Incidents and any Order that the system failed to meet at any time during this reporting period and the measures taken to correct each failure.

Drinking Water Legislation	Requirement(s) the System Failed to Meet	Duration	Corrective Action(s)	Status
AWQI #117824	Microbiological limits for Total Coliform exceeded on distribution sample	June 02, 2014 – June 07, 2014	Form for <i>Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled	Closed
AWQI#117853	Sample results from resample exceeded microbiological limits for Total Coliform	June 05, 2014 – June 07, 2014	Form for <i>Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled	Closed
AWQI# 117865	Sample results from resample exceeded microbiological limits for Total Coliform	June 06, 2014 – June 07, 2014	- Form for <i>Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled - Increased chlorine dosage at nearest treatment plant	Closed
AWQI# 117922	Sample results exceeded microbiological limits for Total Coliform	June 09, 2014 – June 11, 2014	- Form for <i>Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled	Closed
AWQI# 117976	Sample results from resample exceeded	June 11, 2014 – June 13, 2014	- Form for <i>Notice of Adverse Test Results and Other Problems and</i>	Closed

	microbiological limits for Total Coliform		<i>Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled - Chlorine increased - Sampling Station removed permanently	
AWQI# 120864	Microbiological limits for Total Coliform exceeded on distribution sample. This incident was generated from a weekly sample taken from the Fifth Street temporary main, during the reconstruction	October 6, 2014 – October 11, 2014	- Form for <i>Notice of Adverse Test Results and Other Problems and Notice of Issue Resolution at Drinking Water Systems</i> completed and water was Resampled	Closed

Water Usage

Water Consumption

The below table is a summary of 2013 area municipality wastewater and water billing. For more detailed information, please contact the Town of Midland Public Works Water Operations at 705.526.4268, ext. 4207.

* % loss includes water used for flushing to maintain water quality, firefighting, new water main commissioning/testing, routine maintenance activities, water main breaks, meter reading inaccuracies, and system leakage.

Description	Amount
Total water produced by the Town of Midland	2014131
Total water billed to consumers of the Town of Midland	1625009
m ³ Unbilled	389122
% Loss	19%

Attached Appendix Summaries

Annual amount of Sodium Hypochlorite used

The following table (*Appendix A*) lists the amount of Sodium Hypochlorite used for production. It is listed by month, at each treatment facility.

Assessment of System Flows and Rates of Water Taking

(*Appendix B*) lists the quantities and flows of the water supplied during the period covered by this report, including monthly average and maximum daily flows, daily instantaneous peak flow rates and a comparison to the maximum daily volumes and flow rates specified in the system approval. This is a comparison to the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water license.

Microbiological Sampling

(*Appendix C*) lists in detail the amount of microbiological samples taken. Raw and Treated samples are listed. For more information concerning the schedule in which we follow for determining sample location and type, refer to the Water Sampling Plan available at the Water Operations Office.

Schedule 23 Sampling

(*Appendix D*) lists the most recent results of the Schedule 23 In-Organic Chemical sampling required under Ontario Regulation 170. For more information concerning the schedule in which we follow for determining sample location and type, refer to the Water Sampling Plan available at the Water Operations Office.

Schedule 24 Sampling

(*Appendix E*) lists the most recent results of the Schedule 24 Organic Chemical sampling requires under Ontario Regulation 170. For more information concerning the schedule in which we follow for determining sample location and type, refer to the Water Sampling Plan available at the Water Operations Office.

Section 11 – Annual Reports

(*Appendix F*) is an excerpt from O. Reg.170. It lists the requirements for successfully completing the annual report.

Schedule 22 – Summary Reports

(*Appendix G*) is an excerpt from O. Reg. 170. It outlines additional requirements for successfully completing the summary report.

APPENDIX A

2014 Sodium Hypochlorite Usage

All numerical figures are in liters

MONTH	Vindin	Dominion	Hanly	Hwy #12	TOTAL
JAN	285	171	99	1,150	1,705
FEB	287	154	114	1,134	1,689
MAR	384	151	117	1,034	1,686
APR	399	160	111	1,199	1,869
MAY	475	180	138	1,426	2,219
JUN	564	221	201	1,380	2,366
JUL	549	170	152	1,364	2,235
AUG	502	215	258	1,113	2,088
SEP	363	194	266	1,029	1,852
OCT	413	189	181	1,072	1,855
NOV	292	131	225	854	1,502
DEC	301	164	185	878	1,528
					22,594
TOTALS	4,814	2,100	2,047	13,633	22,594

APPENDIX B 1.0

2014 Midland Drinking Water Production

All numerical figures are in cubic meters *Cubic meter=1,000 Litres

2014 RAW WATER PERMIT TO TAKE WATER SUMMARY													
All numerical figures are in cubic meters (m ³)													
2014	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Well # 11	8,407.60	8,013.32	16,516.61	16,937.09	15,677.82	18,848.88	17,418.55	16,971.90	14,130.47	14,516.10	13,266.49	8,768.52	169,473.35
Well # 12	3,757.15	3,714.48	5,255.42	5,718.14	5,740.43	6,544.20	7,330.53	6,671.34	4,901.08	5,349.29	4,921.33	4,434.59	64,337.98
Well # 14	5,816.79	5,460.68	11,323.05	11,783.85	10,326.90	12,036.16	11,480.56	11,156.70	8,628.70	8,691.34	3,087.96	6,268.70	106,061.39
Well # 06	5,467.02	5,986.00	2.73	2,207.30	13,798.43	17,559.67	17,041.19	15,893.47	11,547.61	12,239.66	11,277.27	9,915.95	122,936.30
Well # 16	0.00	373.60	153.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	527.39
Well # 17	10,641.92	10,953.85	12,891.15	13,626.48	13,313.67	13,863.75	15,481.96	14,717.30	11,657.44	12,508.17	11,468.33	11,161.44	152,285.46
Well # 09	13,582.72	13,520.84	15,395.92	14,839.81	16,891.60	21,461.49	16,504.36	22,080.44	18,494.08	18,682.01	14,927.47	17,864.51	204,245.25
Well # 15	18,769.58	16,617.81	19,440.05	18,017.56	19,114.27	27,860.32	24,365.91	27,767.77	27,754.46	22,598.05	34,699.53	22,525.98	279,531.29
Well # 7A	91,192.36	73,415.03	78,028.43	84,669.86	100,465.25	79,687.48	86,295.72	67,631.14	72,975.64	65,238.81	25,482.80	72,270.17	897,352.69
Well # 7B	26.29	5,969.22	2,003.75	2,655.48	27.84	15,242.77	6,306.24	7,468.60	3,305.16	9,214.60	33,731.14	54.35	86,005.44
Total	157,661.43	144,024.83	161,010.90	170,455.57	195,356.21	213,104.72	202,225.02	190,358.66	173,394.64	169,038.03	152,862.32	153,264.21	2,082,756.54
2014 TREATED WATER PRODUCTON SUMMARY													
All numerical figures are in cubic meters (m ³)													
2014	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Vindin TS	30,254.00	30,207.00	41,133.00	45,157.00	51,565.00	62,511.00	63,277.00	59,036.00	42,106.00	45,494.00	37,167.00	37,347.00	545,254.00
Dominion TS	13,583.00	13,521.00	15,396.00	14,840.00	16,892.00	21,461.00	17,114.00	22,500.00	19,206.00	18,682.00	14,927.00	17,865.00	205,987.00
Hanly TS	18,770.00	16,618.00	19,440.00	18,018.00	19,114.00	27,860.00	24,366.00	27,768.00	27,754.00	22,598.00	34,700.00	22,526.00	279,532.00
Hway 12 7A TS	91,192.00	73,415.00	78,028.00	84,670.00	100,465.00	79,687.00	86,296.00	67,631.00	72,976.00	65,239.00	25,483.00	72,270.00	897,352.00
Hway 12 7B TS	26.00	5,969.00	2,004.00	2,655.00	28.00	15,243.00	6,306.00	7,469.00	3,305.00	9,215.00	33,731.00	54.00	86,005.00
Total	153,825.00	139,730.00	156,001.00	165,340.00	188,064.00	206,762.00	197,359.00	184,404.00	165,347.00	161,228.00	146,008.00	150,062.00	2,014,130.00

APPENDIX B 2.0

2014 Midland Drinking Water Production

All numerical figures are in cubic meters *Cubic meter=1,000 Liters

2014 RAW WATER ALLOWABLE VS ACTUAL LIMITS

All numerical figures are in cubic meters (m³)

2014	l/s	m ³ /day	Allowable m ³ /year	Actual m ³ /year
Well # 11	22.70	1,961.30	715,874.50	169,473.35
Well # 12	7.60	656.60	239,659.00	64,337.98
Well # 14	11.40	985.00	359,525.00	106,061.39
Well # 06	19.00	1,641.60	599,184.00	122,936.30
Well # 16	15.20	1,313.30	479,354.50	527.39
Well # 17	14.20	1,226.90	447,818.50	152,285.46
Well # 09	23.00	1,987.20	725,328.00	204,245.25
Well # 15	15.20	1,313.30	479,354.50	279,531.29
Well # 7A	57.00	4,924.80	1,797,552.00	897,352.69
Well # 7B	49.00	4,233.60	1,545,264.00	86,005.44
Total	234.3	20243.6	7,388,914.00	2,014,131.00

2014 TREATED WATER ALLOWABLE VS ACTUAL LIMITS

All numerical figures are in cubic meters (m³)

2014	l/s	m ³ /day	Allowable m ³ /year	Actual m ³ /year
Vindin TS	90.10	7,784.60	2,841,379.00	545,255.00
Dominion TS	23.00	1,987.20	725,328.00	205,987.00
Hanly TS	15.20	1,313.30	479,354.50	279,531.00
Highway 12 7A & 7B TS	106.00	9,158.40	3,342,816.00	983,358.00
Total	234.30	20,243.50	7,388,877.50	2,014,131.00

APPENDIX C

2014 Microbiological Sample Totals

Well or Plant LOCATION		Sampling Station LOCATION	
Well # 11	52	S1-SS-LE	23
Well # 12	52	S1-SS-GG	13
Well # 14	50	S2-SS-BS	15
Well # 6	49	S2-22-HV	21
Well # 16	6	S3-DS03	52
Well # 17	52	S3-SS-FH	5
Flume POE	52	S3-SS-BS	2
Well # 9	52	S3-SS-HC	6
Well #9 POE	52	S3-SS-GS	7
Well # 15	52	S4-DS01	14
Well#15 POE	52	S4-DS02	23
Well # 7A	50	S4-SS-CD	11
Well # 7B	52	S4-SS-MB	2
Well # 7 POE	52	S4-SS-MD	7
TOTAL	675	S4-SS-WD	2
		S5-SS-STH	5
		S5-SS-LR	32
		S6-DS03	8
		S6-SS-AS	14
		S6-SS-HD	3
		S6-SS-KS	1
		S6-SS-WY	13
		S6-SS-GM	11
		S6-SS-TR	2
		S6-SS-SF	10
		S6-SS-QS	1
		S6-SS-LR	1
		S6-SS-QH	2
		S6-SS-NS	1
		TOTAL	307

APPENDIX D

2014 Inorganic Chemical Samples Schedule 23

SCHEDULE 23 INOGANIC		LOCATION						
		Maximun Concentration mg/L	Date Collected	Hwy 12 Treatment System	Vindin Treatment System	Dominion Treatment System	Hanly Treatment System	Tiffin Pump Station S6-DS03
	Paramater							
1	Antimony	0.006	Jan 14/14	ND	ND	ND	ND	
2	Arsenic	0.025	Jan 14/14	0.0003	0.0004	0.0006	0.0008	
3	Barium	1.0	Jan 14/14	0.102	0.122	0.184	0.160	
4	Boron	5.0	Jan 14/14	0.0008	0.0008	0.013	0.013	
5	Cadminm	0.005	Jan 14/14	ND	ND	ND	ND	
6	Chromium	0.05	Jan 14/14	ND	ND	ND	ND	
7	Mercury	0.001	Jan 14/14	ND	ND	ND	ND	
8	Selenium	0.01	Jan 14/14	ND	ND	ND	ND	
9	Uranium	0.02	Jan 14/14	0.00112	0.00148	0.00155	0.00173	
10	Sodium	20.0	Mar 25/13	24.9	29.6	47.4	20.4	
11	Floride	1.5	Jan 7/10	0.2	0.2	0.2	0.2	
12	Nitrite	1.0	Oct 6/14	ND	ND	ND	ND	
13	Nitrate	10.0	Oct 6/14	0.4	0.9	1.6	1.4	
14	Trihalomethanes (THM's)	0.10	Oct 6/14					0.06
15	Lead	0.010	Jan 14/14					0.00088

APPENDIX E 1.0

2014 Organic Chemical Samples Schedule 24

SCHEDULE 24 ORGANIC		Maximum Concentration mg/L	Maximum Concentration ug/L	Date Collected	Hwy 12 Treatment System ug/L	Vindin Treatment System ug/L	Dominion Treatment System ug/L	Hanly Treatment System ug/L
	Paramater							
1	Alachlor	0.005	5	Jan 14/14	ND	ND	ND	ND
2	Aldicarb	0.009	9	Jan 14/14	ND	ND	ND	ND
3	Aldrin + Dieldrin	0.0007	0.7	Jan 14/14	ND	ND	ND	ND
4	Atrazine + Metabolites	0.005	5	Jan 14/14	ND	ND	ND	ND
5	Azinphos-methyl	0.02	20	Jan 14/14	ND	ND	ND	ND
6	Bendiocarb	0.04	40	Jan 14/14	ND	ND	ND	ND
7	Benzene	0.005	5	Jan 14/14	ND	ND	ND	ND
8	Benzo(a)pyrene	0.00001	0.01	Jan 14/14	ND	ND	ND	ND
9	Bromoxynil	0.005	5	Jan 14/14	ND	ND	ND	ND
10	Carbaryl	0.09	90	Jan 14/14	ND	ND	ND	ND
11	Carbofuran	0.09	90	Jan 14/14	ND	ND	ND	ND
12	Carbon Tetrachloride	0.005	5	Jan 14/14	ND	ND	ND	ND
13	Chlordane (Total)	0.007	7	Jan 14/14	ND	ND	ND	ND
14	Chlorpyrifos	0.09	90	Jan 14/14	ND	ND	ND	ND
15	Cyanazine	0.01	10	Jan 14/14	ND	ND	ND	ND
16	Diazinon	0.02	20	Jan 14/14	ND	ND	ND	ND
17	Dicamba	0.12	120	Jan 14/14	ND	ND	ND	ND
18	Dichlorobenzene, 1,2-	0.2	200	Jan 14/14	ND	ND	ND	ND
19	Dichlorobenzene, 1,4-	0.005	5	Jan 14/14	ND	ND	ND	ND
20	Dichlorodiphenyltrichloethane (DDT) + Metabolites	0.03	30	Jan 14/14	ND	ND	ND	ND
21	Dichloroethane, 1,2-	0.005	5	Jan 14/14	ND	ND	ND	ND
22	Dichloroethene, 1,1-	0.014	14	Jan 14/14	ND	ND	ND	ND
23	Dichloromethane (methylene Chloride)	0.05	50	Jan 14/14	ND	ND	ND	ND
24	Dichlorophenol, 2,4-	0.9	900	Jan 14/14	ND	ND	ND	ND
25	Dichlorophenoxy acetic acid, 2,4- (2,4-D)	0.1	100	Jan 14/14	ND	ND	ND	ND
26	Diclofop-methyl	0.009	9	Jan 14/14	ND	ND	ND	ND
27	Dimethoate	0.02	20	Jan 14/14	ND	ND	ND	ND
28	Dinoseb	0.01	10	Jan 14/14	ND	ND	ND	ND

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29	Diquat	0.07	70	Jan 14/14	ND	ND	ND	ND
30	Diuron	0.15	150	Jan 14/14	ND	ND	ND	ND
31	Glyphosate	0.28	280	Jan 14/14	ND	ND	ND	ND
32	Heptachlor + Heptachlor Epoxide	0.003	3	Jan 14/14	ND	ND	ND	ND
33	Lindane (Hexachlorocyclohexane, Gamma)	0.004	4	Jan 14/14	ND	ND	ND	ND
34	Malathion	0.19	190	Jan 14/14	ND	ND	ND	ND
35	Methoxychlor	0.9	900	Jan 14/14	ND	ND	ND	ND
36	Metolachlor	0.05	50	Jan 14/14	ND	ND	ND	ND
37	Metribuzin	0.08	80	Jan 14/14	ND	ND	ND	ND
38	Monochlorobenzene (Chlorobenzene)	0.08	80	Jan 14/14	ND	ND	ND	ND
39	Paraquat	0.01	10	Jan 14/14	ND	ND	ND	ND
40	Parathion	0.05	50	Jan 14/14	ND	ND	ND	ND
41	Pentachlorophenol	0.06	60	Jan 14/14	ND	ND	ND	ND
42	Phorate	0.002	2	Jan 14/14	ND	ND	ND	ND
43	Picloram	0.19	190	Jan 14/14	ND	ND	ND	ND
44	Poly-Chlorinated Biphenyls (PCB's)	0.003	3	Jan 14/14	ND	ND	ND	ND
45	Prometryne	0.001	1	Jan 14/14	ND	ND	ND	ND
46	Simazine	0.01	10	Jan 14/14	ND	ND	ND	ND
47	Temephos	0.28	280	Jan 14/14	ND	ND	ND	ND
48	Terbufos	0.001	1	Jan 14/14	ND	ND	ND	ND
49	Tetrachloroethylene	0.03	30	Jan 14/14	ND	ND	ND	ND
50	Tetrachlorophenol, 2,3,4,6-	0.1	100	Jan 14/14	ND	ND	ND	ND
51	Triallate	0.23	230	Jan 14/14	ND	ND	ND	ND
52	Trichloroethylene	0.005	5	Jan 14/14	ND	ND	ND	ND
53	Trichlorophenol 2,4,6-	0.005	5	Jan 14/14	ND	ND	ND	ND
54	Trichlorophenoxy acetic acid 2,4,5-	0.28	280	Jan 14/14	ND	ND	ND	ND
55	Trifluralin	0.045	45	Jan 14/14	ND	ND	ND	ND
56	Vinyl Chloride	0.02	2	Jan 14/14	ND	ND	ND	ND

APPENDIX F

Annual Reports O. Reg. 170

Section 11 Annual reports

11. (1) The owner of a drinking water system shall ensure that an annual report is prepared in accordance with this section. O. Reg. 170/03, s. 11 (1); O. Reg. 247/06, s. 10 (1).

(2) The owner of a drinking water system, other than a large municipal residential system or a small municipal residential system, shall ensure that, when the annual report is prepared, a copy of the report is given to,

- (a) each designated facility served by the system; and
- (b) the interested authority for each designated facility served by the system. O. Reg. 170/03, s. 11 (2); O. Reg. 247/06, s. 10 (2).

(2.1) If a drinking water system is connected to and receives all of its drinking water from another drinking water system, the owner of the system from which the water is obtained shall ensure that, when the annual report for the system is prepared, a copy of the report is given to the owner of the system that obtains the water. O. Reg. 269/03, s. 6 (1); O. Reg. 247/06, s. 10 (3).

(3) In the case of the following drinking water systems, the annual report must cover the period from January 1 to December 31 in a year and must be prepared not later than February 28 of the following year:

- 1. Large municipal residential systems.
- 2. Small municipal residential systems.
- 3. Large municipal non-residential systems.
- 4. Small municipal non-residential systems.
- 5. Non-municipal year-round residential systems. O. Reg. 170/03, s. 11 (3); O. Reg. 247/06, s. 10 (4).

(4) In the case of non-municipal seasonal residential systems and large non-municipal non-residential systems, the annual report must cover the period from November 1 in a year to October 31 of the following year and must be prepared not later than December 31 of the latter year. O. Reg. 170/03, s. 11 (4); O. Reg. 247/06, s. 10 (5).

(5) In the case of small non-municipal non-residential systems, the annual report must cover the period from April 1 in a year to March 31 of the following year and must be prepared not later than May 31 of the latter year. O. Reg. 170/03, s. 11 (5); O. Reg. 247/06, s. 10 (6).

(6) The annual report must,

- (a) contain a brief description of the drinking water system, including a list of water treatment chemicals used by the system during the period covered by the report;
- (b) summarize any reports made to the Ministry under subsection 18 (1) of the Act or section 16-4 of Schedule 16 during the period covered by the report;
- (c) summarize the results of tests required under this Regulation, or under an approval, municipal drinking water license or order, including an OWRA order, during the period covered by the report and, if tests required under this Regulation in respect of a parameter were not required during that period, summarize the most recent results of tests of that parameter;
- (d) describe any corrective actions taken under Schedule 17 or 18 during the period covered by the report;
- (e) describe any major expenses incurred during the period covered by the report to install, repair or replace required equipment; and
- (f) in the case of a large municipal residential system or a small municipal residential system, include a statement of where a report prepared under Schedule 22 will be available for inspection under subsection 12 (4). O. Reg. 170/03, s. 11 (6); O. Reg. 418/09, s. 8.

(7) The owner of a drinking water system shall ensure that a copy of an annual report for the system is given, without charge, to every person who requests a copy. O. Reg. 269/03, s. 6 (2).

(8) If a drinking water system is connected to and receives all of its drinking water from another drinking water system, the owner of the system that obtains the water shall ensure that a copy of an annual report for the system from which the water is obtained is given, without charge, to every person who requests a copy. O. Reg. 269/03, s. 6 (2).

(9) Subsections (7) and (8) do not apply to an annual report that is more than two years old. O. Reg. 269/03, s. 6 (2).

(9.1) Every time that an annual report is prepared for a drinking water system, the owner of the system shall ensure that effective steps are taken to advise users of water from the system that copies of the report are available, without charge, and of how a copy may be obtained. O. Reg. 269/03, s. 6 (2).

(10) If a large municipal residential system serves more than 10,000 people, the owner of the system shall ensure that a copy of every report prepared under this section is available to the public at no charge on a website on the Internet. O. Reg. 170/03, s. 11 (10).

(11) The obligation to ensure that a report be given to the interested authority for a designated facility under subsection (2) does not apply to the following designated facilities:

1. A private school.
2. A children's camp.

3. A residence for seniors or retired persons, or any other similar residence, where attainment of a mature age is a factor in being accepted for occupancy. O. Reg. 170/03, s. 11 (11).

[\(12\)](#)-(17) Revoked: O. Reg. 253/05, s. 8 (1).

[\(18\)](#) If section 12 of Ontario Regulation 459/00 and section 15 of Ontario Regulation 505/01 did not apply to the owner of a system to which subsection (5) applies, no report is required to be prepared under subsection (5) until May 31, 2006 and, despite that subsection, the report required to be prepared not later than May 31, 2006 shall cover the period from June 1, 2005 to March 31, 2006. O. Reg. 247/06, s. 10 (7).

[\(19\)](#) Revoked: O. Reg. 253/05, s. 8 (2).

APPENDIX G

Schedule 22 Summary Reports for Municipalities

SCHEDULE 22

SUMMARY REPORTS FOR MUNICIPALITIES

Municipal: Large Residential

Small Residential

Application

22-1. This Schedule applies to the following drinking water systems:

1. Large municipal residential systems.
2. Small municipal residential systems.

Report

22-2. (1) The owner of a drinking water system shall ensure that, not later than March 31 of each year after 2003, a report is prepared in accordance with subsections (2) and (3) for the preceding calendar year and is given to,

- (a) in the case of a drinking water system owned by a municipality, the members of the municipal council;
- (b) in the case of a drinking water system owned by a municipal service board established under section 195 of the *Municipal Act, 2001*, the members of the municipal service board; or
- (c) in the case of a drinking water system owned by a corporation, the board of directors of the corporation.

(2) The 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.

(3) 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:

1. 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.
2. A comparison of the summary referred to in paragraph 1 to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water license, or if the system is receiving all of its water from another system under an agreement pursuant to subsection 5 (4), to the flow rates specified in the written agreement.

(4) If a report is prepared under subsection (1) for a system that supplies water to a municipality under the terms of a contract, the owner of the system shall give a copy of the report to the municipality by March 31.

(5) Revoked: O. Reg. 253/05, s. 18.