TOWNSHIP OF NORTH DUNDAS

NORTH DUNDAS DRINKING WATER SUPPLY SYSTEM CAPACITY EXPANSION

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

# PHASE 1 REPORT

SEPTEMBER 15, 2020

Prepared for:

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**JLR 28855-000**

# Table of Contents

## List of Figures



## List of Tables



## List of Appendices

# 1.0 INTRODUCTION

## 1.1 Background

The Township of North Dundas' Drinking Water Supply System (DWSS) supplies treated water to residents of the Village of Winchester and the Village of Chesterville, in addition to industrial, commercial and institutional users (notably Lactalis® Canada in Winchester). Villages of Winchester and Chesterville are located approximately 50 km south of downtown Ottawa with populations of 2,394 and 1,677 (based on the 2016 Census), respectively. With their proximity to Ottawa, the populations of both Villages are projected to increase due to future developments. Refer to Figure 1 for a Location Plan of the Township of North Dundas.

Currently, the DWSS is comprised of eight active groundwater wells, five pump houses with chlorine disinfection, two storage reservoirs, two elevated storage tanks and approximately 41.5 km of distribution system piping. The DWSS is owned by the Township of North Dundas (the Township) and is currently operated by Ontario Clean Water Agency (OCWA).

In August 16, 2019, the Township retained J.L. Richards & Associates Limited (JLR) in association with Golder Associates Ltd. (Golder) to undertake a Schedule 'C' Municipal Class Environmental Assessment (Class EA) for the Township DWSS to address long-term potable water supply needs and evaluate servicing solutions for the 20-year planning horizon. This Report fulfills the requirements of Phase 1 of the process. The project is currently proceeding as a Schedule 'C' undertaking; however, the project schedule will be reviewed at the completion of Phase 2 to determine whether the project should be modified to a Schedule 'B' Class EA.

The objectives of this Phase 1 Report are to:

- Provide an overview of the Class EA process;
- Identify conditions and constraints associated with the existing communal potable water system;
- Define a problem and/or opportunity statement for the project;
- Identify future system requirements for the 20-year planning period and include provision for build-out conditions (i.e., design basis); and
- Notify agencies, the public, and other stakeholders of this project.

## 1.2 Class Environmental Assessment Process

The *Ontario Environmental Assessment Act* (EA Act), enacted in 1976, formally recognizes the Class EA process and outlines requirements for environmental assessment approval. The Municipal Class EA applies to municipal infrastructure projects, including roads, water, and wastewater projects. To ensure that environmental impacts and effects are considered for each project as per the EA Act, proponents are required to generally follow the planning process set out in the Municipal Class EA Guidelines, prepared by the Municipal Engineers Association (MEA) (2015) (www.municipalclassea.ca). The Class EA process includes the following stages:

Phase 1: Problem or opportunity identification.

Phase 2: Identification and evaluation of alternative solutions to determine a preferred solution to the problem or opportunity. This Phase also compiles an environmental 'inventory', identifies impacts, and outlines mitigation measures.

Phase 3: Identification and evaluation of design concepts for the preferred solution. A detailed evaluation of the environmental effects and mitigation measures will be addressed during this project Phase.

Phase 4: Complete and place Environmental Study Report (ESR) on public record. The ESR documents Phases 1 through 3 and summarizes the consultation undertaken throughout the planning process.

Phase 5: Implementation and monitoring.

Class EA graphic.

Since projects may vary in their environmental impact, they are classified in terms of the following schedules:

- Schedule 'A' projects usually have minimal environmental effects and generally include normal or emergency operational and maintenance activities. These projects are pre-approved under the Class EA planning process.

- Schedule 'A+' projects are pre-approved similar to Schedule 'A', however, the public is to be advised prior to project implementation.

- Schedule 'B' projects have potential for some adverse environmental impacts and, therefore, the proponent is required to proceed through a screening process, including consultation with affected parties. Generally, these projects include improvements and minor expansions to existing facilities. Projects within this category are subject to Phases 1, 2 and 5.

- Schedule 'C' projects have potential for greater environmental impacts and are subject to all five Class EA Phases. Generally, these projects include the construction of new facilities and major expansions to existing facilities.

Based on the following excerpt from the MEA Guidelines, this project has been undertaken as a Schedule 'C' Class EA, and thus Phases 1 through 4 of the Class EA process will be completed. Once the Class EA is complete, the Township will be able to proceed with Phase 5.

Excerpt from MEA guidelines for a Schedule 'C' undertaking:

> "1. Construct new water system including a new well and water distribution system".

### 1.3 Project Team

The following Technical Steering Committee was involved in carrying out this Class EA:

**Proponent: Township of North Dundas**
636 St. Lawrence Street
PO Box 489
Winchester, ON K0C 2K0
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**Project Manager and Operating Authority: Ontario Clean Water Agency**
5 Industrial Drive
Chesterville, ON K0C 1H0
Telephone: 613-448-3098

**Prime Consulting Engineer: J.L. Richards & Associates Limited**
864 Lady Ellen Place
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**Sub-Consulting Engineer: Golder Associates Ltd.**
1931 Robertson Road
Ottawa, ON K2H 5B7
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## 2.0 PHASE 1 METHODOLOGY

### 2.1 Project Initiation Meeting

A project initiation meeting was held on September 6, 2019 with the Township to confirm roles and responsibilities and to establish a basis for this Class EA. Refer to Appendix 'A' for Meeting Minutes.

### 2.2 Compilation of Documentation

Available documentation related to the Township's DWSS was compiled and provided by the Township and OCWA to JLR. The information was used to establish the existing conditions of the system (refer to Appendix 'C' for the list of available documents).

### 2.3 Review of Existing Studies and Analysis of Data

Available reports and correspondence were reviewed to determine the history and existing conditions of the Study Area. Digital base maps of the collection, pumping and treatment systems were developed using available drawings, which illustrate key infrastructure and planning information.

Historical water meter records and operations data for the Township DWSS between 2015 and 2019 were summarized and analyzed. Historical pumping rates from each groundwater well were reviewed and compared to the applicable Drinking Water Works Permits (DWWP) along with operator consultation to understand potential water system constraints.

### 2.4 Consultation Planning and Contact with Stakeholder

A Consultation Plan was developed and reviewed with the Township and OCWA, taking into consideration mandatory requirements and objectives of effective consultation with the public and other potential stakeholders, as outlined in the MEA Guidelines (refer to Appendix 'B' for a copy of the Consultation Plan). The Consultation Plan identifies potential stakeholders, defines the level of consultation, establishes appropriate means of contact, and provides a schedule highlighting the general timing of contact. As a minimum, consultation includes project notification to the public and potential stakeholders, and two Public Information Centres.

A Project Initiation Notice was posted on the Township's website (www.northdundas.ca) on September 27, 2019 and project initiation letters were distributed directly to potential stakeholders, with a request to provide comments if applicable. Refer to Appendix 'B' for a copy of the Project Initiation Notice and letter, responses received to date and an updated stakeholder distribution list.

A stakeholder consultation meeting was held with Lactalis® on December 19, 2019 (refer to Appendix 'B' for meeting minutes and follow-up OCWA email) to understand and project long-term water supply requirements as the single largest water user serviced by the water distribution system.

### 2.5 Problem and Opportunity Identification

A Problem/Opportunity Statement was developed based on the existing conditions, constraints and opportunities identified during Phase 1 and is included in Section 4.0 of this Phase 1 Report.

### 2.6 Phase 1 Report

This Phase 1 Report is the culmination of the first phase of the Class EA process. The Phase 1 Report will be used as a background document for Phase 2 and can be made available to stakeholders upon request.

## 3.0 EXISTING CONDITIONS

### 3.1 Existing Communal Potable Water Infrastructure

The Township of North Dundas DWSS supplies treated water to the two communities of Winchester and Chesterville, including the Lactalis® plant (large volume ICI consumer). This water system is comprised of eight active wells, five pump houses with chlorine disinfection, two storage reservoirs (Chesterville underground reservoir and Winchester at-grade reservoir), two elevated tanks (Chesterville elevated storage tank and Winchester elevated storage tank) and approximately 41.5 km of distribution system piping. The DWSS operates in accordance with

various Permits to Take Water (PTTW) as identified in Table 1, Municipal Drinking Water License No. 180-101, Issue No. 3, dated March 22, 2016 and Drinking Water Works Permit No. 180-201, Issue No. 4, dated July 31, 2018. It is noted that the Township has applied to renew the PTTW for Winchester wells No. 5 and No. 7.

The eight active wells are located at five separate locations within Winchester and Chesterville. Refer to Figure 2 for an overview of the study area and identification of key infrastructure. The age of the wells range between 16 to 61 years; Winchester Well #1 is the oldest well and was drilled in 1958, whereas Chesterville Well #6 is the most recent well that was drilled in 2003.

From available DWWP documentation, the total combined rated capacity of the wells within the DWSS is 102.75 L/s and the DWSS has a firm capacity of 72.5 L/s with the largest well pump out of service. However, based on operational information provided by the Township and OCWA, with the exception of Winchester Wells #7a, #7b and #7c, the wells are currently unable to operate at their rated capacity for a continuous period of time. The operating limits have been established through years of operation and proven yield. In contrast, the initial well capacity ratings were developed shortly after the wells were originally drilled. Therefore, the operational limits for the wells are lower than their rated capacities as summarized in the following table (refer to Appendix E for complete well summary).

**Table 1: Well Rated and Operational Capacity Comparison**

| Location | Rated Capacity (L/s) | Operating Limit (L/s) | Current Rate (L/s) |
|---|---|---|---|
| Winchester Well #1 | 9.5 | 5.0 – 6.0 | 4.5 |
| Winchester Well #5 | 6.4 | 3.5 – 5.0 | 3.85 |
| Winchester Well #6 | 11.4 | 5.5 – 9.0 | 6.5 |
| Winchester Wells #7a, b, and c | 22.5 | 22.5 | 17.2 |
| Chesterville Well #5 | 22.7 | 15.0 – 17.0 | 16.5 |
| Chesterville Well #6 | 30.3 | 20 – 23.0 | 11 (was 18) |
| Total | 102.8 | 71.5 – 82.5 | 59.5 |

The Township has indicated that in addition to the lower operating capacities, there are other issues that have been experienced in past years with the current system, such as periods of drought which limited well water recharge in the area. The Township has also identified difficulty in producing sufficient water when either the supply from Winchester Wells #7a, #7b and #7c or the Chesterville Well #6 is interrupted and/or out of commission for an extended period of time. Furthermore, the Township has indicated that there has been a history of breaks in the transmission main that supplies water from Winchester Wells #7a, #7b and #7c that are attributed to hydraulic pressure transients that develop upon pump shutdown. OCWA indicated Well #7a is regularly exercised as a back-up well, but not typically run to mitigate potential transient concerns as the motor remains equipped with a direct-on-line (DOL or across-the-line) starter. OCWA advised that only one well operates at a time (i.e., not in parallel as originally designed) and Wells #7b and 7c have been equipped to with VFD to gradually slow down the well pumps upon shutdown to mitigate pressure transients. It is understood that Chesterville Well #6 is prone to fouling overtime. The impact of these constraints on the systems ability to adequately produce and deliver water to consumers are being reviewed as part of this Class EA.

Refer to Table 2 below for a brief summary of some of the key characteristics of the Township's existing potable water system infrastructure.

**Table 2: Township Potable Water System Infrastructure**

| Parameter | Value |
|---|---|
| Municipal Drinking Water License (180-101)(1) | 102.75 L/s (72.5 L/s with largest well pump out of service) |
| Winchester Well #1 | |
| Permit to Take Water (4175-9C3GPW) | 9.5 L/s |
| Well Pump(2) | Submersible pump rated at 8.7 L/s |
| Depth / Diameter(2) | 57.9 m / N/A |
| Capacity(1) / Operating Limit(3) / Current Rate(4) | 9.5 L/s / 5.0 - 6.0 L/s / 4.5 L/s |
| Winchester Well #5 | |
| Permit to Take Water (2181-83S8E)(6) | 6.4 L/s |
| Well Pump(2) | Submersible pump rated at 7.6 L/s |
| Depth / Diameter(2) | 28 m / N/A |
| Capacity(1) / Operating Limit(3) / Current Rate(4) | 6.4 L/s / 3.5 – 5.0 L/s / 3.85 L/s |
| Winchester Well #6 | |
| Permit to Take Water (0088-9C3JG4) | 11.4 L/s |
| Well Pump(2) | Submersible pump rated at 8.3 L/s |
| Depth / Diameter(2) | 15.9 m / N/A |
| Capacity(1) / Operating Limit(3) / Current Rate(4) | 11.4 L/s / 5.5 – 9.0 L/s / 6.5 L/s |
| Winchester Well #7a, 7b, 7c | |
| Permit to Take Water (0816-838SXR)(6) | 22.5 L/s |
| Well Pump(2) | Each equipped with a submersible pump rated at 11.4 L/s |
| Depth(2) / Diameter(5) | 24.5 m / 300 mm |
| Capacity of Two Pumps Combined(1) / Operating Limit(3) / Current Rate(4) | 22.5 L/s / 22.5 L/s / 17.2 L/s |
| Chesterville Well #5 | |
| Permit to Take Water (3380-AC3QF9) | 22.7 L/s |
| Well Pump(2) | Submersible turbine pump rated at 23 L/s |

| Parameter | Value |
|---|---|
| Depth / Diameter(2) | 12.2 m / 250 mm |
| Capacity(1) / Operating Limit(3) / Current Rate(4) | 22.7 L/s / 15.0 – 17.0 L/s / 16.5 L/s |
| Chesterville Well #6 | |
| Permit to Take Water (3380-AC3QF9) | 30.3 L/s |
| Well Pump(2) | Submersible turbine pump rated at 30.3 L/s |
| Depth / Diameter(2) | 12.2 m / 305 mm |
| Capacity(1) / Operating Limit(3) / Current Rate(4) | 30.3 L/s / 20 – 23.0 L/s / 11 (was at 18) L/s |

(1) Municipal Drinking Water Licence - Schedule C - Table 1: Rated Capacity (March 22, 2016)
(2) Drinking Water Works Permit - Schedule A (July 31, 2018)
(3) Township of North Dundas TOR for Consulting Engineering Services - Table 1: Well Capacity Summary
(4) Township of North Dundas TOR for Consulting Engineering Services - Appendix D: North Dundas Drinking Water Systems - Supply Wells
(5) Winchester Water Supply System Upgrade Class Environmental Assessment Project File Report (August 2009) - Appendix B: Golder Associates and Sauriol Environmental Inc., Environmental Study Report Phase I and II Hydrogeological Components (January 2005) - Figure H-1
(6) Township has applied to renew the PTTW for Winchester Wells No. 5 and No. 7

### 3.2 Current Water Demands

The Township's historical potable water demands from all eight wells between 2015 and 2019 were obtained from operating data provided by OCWA. Over the past five years, the Township is operating at average and maximum day production rates of 27.9 L/s (2,411 $m^3$/d) and 54.9 L/s (4,746 $m^3$/d), respectively as shown in Table 3 below.

**Table 3: Township Historic Potable Water Demands (2015 to 2019)**

| Year | Average Day Demand (1) | Maximum Day Demand (1) | Peaking Factor |
|---|---|---|---|
| 2015 | 25.2 L/s (2,177 $m^3$/d) | 40.5 L/s (3,498 $m^3$/d) | 1.61 |
| 2016 | 25.6 L/s (2,211 $m^3$/d) | 54.9 L/s (4,746 $m^3$/d) | 2.15 |
| 2017 | 27.9 L/s (2,409 $m^3$/d) | 53.2 L/s (4,599 $m^3$/d) | 1.91 |
| 2018 | 30.6 L/s (2,642 $m^3$/d) | 48.8 L/s (4,214 $m^3$/d) | 1.60 |
| 2019 | 30.2 L/s (2,613 $m^3$/d) | 51.7 L/s (4,465 $m^3$/d) | 1.71 |
| **Average** | **27.9 L/s (2,411 $m^3$/d)** | | |
| **Maximum** | | **54.9 L/s (4,746 $m^3$/d)** | |

(1) Well production data for each well was provided by the Township/OCWA.

The largest water consumer in the community is the dairy processing plant, Lactalis®. This plant currently utilizes approximately half of the total treated water produced in the Township. In the last few years, the daily average consumption at the plant has changed significantly, rising from 861 $m^3$/d (2015) to a high of 1,378 $m^3$/d (2018). The plant's daily average consumption from 2015 to 2019 was approximately 1,121 $m^3$/d, while maximum day consumption was estimated at 1.5 times the average consumption or 2,067 $m^3$/d, as shown in Table 4 below.

The Township has been in discussions with Lactalis® regarding their water usage and how the plant's water demand may change in future years. Lactalis® has indicated that their water demand is projected to remain stable for the foreseeable future and that their future daily average water demand will remain consistent with current demand at approximately 1,200 $m^3$/d +/- 200 $m^3$/d. For planning purposes of this Class EA water consumption of 1,400 $m^3$/d and 2,100 $m^3$/d will be assessed for average and maximum demand, respectively. Also, these values closely match Lactalis'® 2018 historical water consumption. During the Phase 1 review meeting, OCWA advised that Lactalis' recently commissioned sewage treatment system may increase their average water demand by approximately 15 $m^3$/day. OCWA also reviewed Lactalis' 2020 average water demand from January to June which ranged from 999 $m^3$/day to 1380 $m^3$/day, remaining consistent with the Class EA's water demand projections.

**Table 4: Lactalis® Water Consumption (2015 to 2019)**

| Year | Daily Average Consumption (1) | Maximum Day Demand (2) |
|---|---|---|
| 2015 | 10.0 L/s (861 $m^3$/d) | 15.0 L/s (1,292 $m^3$/d) |
| 2016 | 10.9 L/s (939 $m^3$/d) | 16.3 L/s (1,409 $m^3$/d) |
| 2017 | 13.5 L/s (1,170 $m^3$/d) | 20.3 L/s (1,755 $m^3$/d) |
| 2018 | 16.0 L/s (1,378 $m^3$/d) | 23.9 L/s (2,067 $m^3$/d) |
| 2019 | 14.6 L/s (1,258 $m^3$/d) | 21.8 L/s (1,887 $m^3$/d) |
| **Average** | **13.0 L/s (1,121 $m^3$/d)** | **19.5 L/s (1,682 $m^3$/d)** |
| **Maximum** | **16.0 L/s (1,378 $m^3$/d)** | **23.9 L/s (2,067 $m^3$/d)** |
| **Class EA (3)** | **16.2 L/s (1,400 $m^3$/d)** | **24.3 L/s (2,100 $m^3$/d)** |

(1) Lactalis® water consumption was provided by the Township.
(2) Maximum day demand estimated at 1.5 times average consumption.
(3) Projected Lactalis® water demand based stakeholder consultation and OCWA email correspondence.

Based on data for the past five years, the Township is operating at an approximate average and maximum day production rates of 14.9 L/s (1,289 $m^3$/d) and 38.6 L/s (3,337 $m^3$/d), respectively, excluding Lactalis® water usage. This is equivalent to an average daily per capita consumption of 316 L/c/d based on the 2016 population of 4,071 people. This per capita consumption is typical for communities of similar size and comparable to the MECP Design Guidelines for Drinking Water Systems (2008) that identifies typical values between 270 to 450 L/c/d. Refer to Table 5 below which summarizes historical potable water demands for the Township's potable water system, excluding Lactalis® water usage.

**Table 5: Township Water Consumption Excluding Lactalis® (2015 to 2019)**

| Year | Daily Average Consumption (1) | Maximum Day Demand (2) | Peaking Factor |
|---|---|---|---|
| 2015 | 15.2 L/s (1,316 $m^3$/d) | 25.5 L/s (2,206 $m^3$/d) | 1.67 |
| 2016 | 14.7 L/s (1,272 $m^3$/d) | 38.6 L/s (3,337 $m^3$/d) | 2.62 |
| 2017 | 14.3 L/s (1,239 $m^3$/d) | 32.9 L/s (2,844 $m^3$/d) | 2.30 |

| | | | |
|---|---|---|---|
| 2018 | 14.6 L/s (1,264 $m^3$/d) | 24.8 L/s (2,147 $m^3$/d) | 1.70 |
| 2019 | 15.7 L/s (1,356 $m^3$/d) | 29.8 L/s (2,578 $m^3$/d) | 1.90 |
| **Average (2015-2019)** | **14.9 L/s (1,289 $m^3$/d)** | | |
| **Class EA** | **14.9 L/s (1,289 $m^3$/d)** | **38.6 L/s (3,337 $m^3$/d)** | **2.59** |
| (1) Daily average consumption illustrates the difference between values shown in Table 3 and Table 4. | | | |

Based on the foregoing table, the Class EA will use 14.9 Ls (1,289 $m^3$/d) and 38.6 L/s (3,337 $m^3$/d) for current average and maximum day water demands based on the historical data.

### 3.3 Water Quality

As outlined in Golder's Technical Memorandum dated March 11, 2020 (refer to Appendix 'E'), the Township's 2018 annual report (OCWA, 2019) indicate good water quality, with occasional raw water detections of non-pathogenic bacteria. Current water treatment was sufficient to reduce these detections below the Ontario Drinking Water Quality Standards. Organic and inorganic parameters also met the standards based on the testing completed by OCWA in accordance with Ontario Regulation 170/03.

### 3.4 Land Use and Planning

According to the United Counties of Stormont, Dundas and Glengarry Official Plan (2018), the project Study Area consists mainly of commercial, residential, industrial and institutional zoning. The Official Plan projects a population growth of 1,522 people and an increase of 875 housing units to the year 2036 for the Township of North Dundas.

Based on discussions with the Township, and Council consultation and approval on March 3, 2020, the following population growth scenarios are to be considered for this Class EA (refer to Appendix 'D' for a copy of Technical Memorandum No. 1 Population Growth and Development Projection for further details).

Low Growth:

- Winchester: Projected annual growth rate of 1.5% from 2016 to 2019. Projected population growth from 2019 to 2039 based on the future potential development within Winchester provided by the Township (including Phase 1 of the Welling's of Winchester development). This represents a total population growth of 1,236 and additional commercial area of 25.65 ha to 2039.

- Chesterville: Projected at an annual growth rate of 3.5% from 2016 to 2019 and at an annual growth rate of 1.5% from 2019 to 2039. This represents a total growth of 732 people to 2039.

High Growth:

- Winchester: Projected annual growth rate of 1.5% from 2016 to 2019. Projected population growth from 2019 to 2039 based on the future potential development within Winchester

provided by the Township (including Phase 2 to Phase 5 of the Welling's of Winchester development). This represents a total population growth of 1,808 people and additional commercial area of 25.65 ha to 2039.

- Chesterville: Projected at an annual growth rate of 3.5% from 2016 to 2019 and an annual growth rate of 3.5% from 2019 to 2039. This represents a total population growth of 1,350 people to 2039.

### 3.5 Population and Future Water Demand Projections

Based on census information for Winchester and Chesterville, the serviced population in the Study Area (Villages of Winchester and Chesterville) in 2016 was 4,071 people. This population was used as a baseline to determine the current population for 2019. In order to establish future water demands, population projections and future commercial development areas, per the low and high growth scenarios identified in Section 3.3 - Land Use and Planning, as well as the anticipated future demand for Lactalis®, were used. For the purpose of this study, future water demands are being assessed using design values recommended by MECP design guidelines. Average day demand for future residential population was estimated using a per capita consumption of 350 L/c/d. The existing maximum day peak factor was not applied to future demand because the MECP design guidelines recommend that as serviced populations increase maximum day peak factors decrease. A maximum day peaking factor of 2 was used for residential growth, whereas a maximum day peaking factor of 1.5 was used for the future commercial developments and Lactalis®.

Table 6 provides a summary of the projected service population, average day, and maximum day, for the Study Area for the low and high growth scenarios in 2039. These water demands will be used as the design basis for this Class EA.

**Table 6: Existing and Projected Future Water Demands (2016 - 2039)**

| Parameters | Existing (Class EA) | Projected Growth & Demand from Existing | | 2039 | |
|---|---|---|---|---|---|
| | | Low Growth | High Growth | Low Growth | High Growth |
| Service Population | 4,355[1] | 1,684 | 2,874 | 6,039[1] | 7,229[1] |
| Average Day Demand ($m^3/d$) | 1,289[2] | 589[3] | 1,006[3] | 1,878[4] | 2,295[4] |
| Maximum Day Demand ($m^3/d$) | 3,337[2] | 1,178[5] | 2,012[5] | 4,515[4] | 5,349[4] |
| Lactalis® Average Day Demand ($m^3/d$) | 1,400[6] | | | 1,400[6] | 1,400[6] |
| Lactalis® Max Day Demand ($m^3/d$) | 2,100[7] | | | 2,100[7] | 2,100[7] |
| Winchester Future Potential Commercial Development Average Day Demand ($m^3/d$) | | | | 752[8] | 752[8] |

| | | | | | |
|---|---|---|---|---|---|
| Winchester Future Potential Commercial Development Max Day Demand ($m^3/d$) | | | | 1,128[8] | 1,128[8] |
| **Total Average Day Demand ($m^3/d$)** | **2,689** | | | **4,030** | **4,447** |
| **Total Maximum Day Demand ($m^3/d$)** | **5,437** | | | **7,736** | **8,570** |

(1) Estimated growth based on Township consultation (refer to growth memo in Appendix 'D') and by applying 350 L/cap/day on future development.
(2) Refer to Table 5.
(3) Projected average day demand calculated at 350 L/cap/day in accordance with MECP Design Guidelines.
(4) Average day demand, max day demand and peak hour demand for 2039 was calculated based on Class EA demand plus projected demand.
(5) Estimated by applying average day peaking factors of 2 and 3 for maximum day and peak hour, respectively (MECP Guidelines 2008).
(6) Based on review of water usage data provided by the Township, December 11, 2019 stakeholder meeting and follow-up OCWA email of 2019 demands (Refer to Appendix 'B')
(7) Estimated by applying an industrial development peaking factors of 1.5 for maximum day (Ottawa Design Guidelines – Water Distribution July 2010).
(8) Estimated by applying 28 $m^3$/ha day, and a commercial development peaking factor of 1.5 for maximum day (Ottawa Design Guidelines – Water Distribution July 2010).

In summary, the 20 year design basis for the projected maximum day demands are 7,736 $m^3/d$ and 8,570 $m^3/d$ for the low growth and high growth scenarios, respectively. It is noted that the current operational limit of the existing wells is 59.5 L/s (5,140 $m^3/d$), which includes the largest well out of service (currently Well #7b or c, refer to Table 2).

Any water supply system with elevated water storage must be capable of meeting the maximum day demand of the system, but the current MECP Design Guidelines are not specific on the level of redundancy or firm capacity of a groundwater source system. As a minimum, it is reasonable to expect that a groundwater supply system meet the average day demand with the largest well out of service.

While a more recent and stricter guideline published by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2012 Edition, (the Province of Ontario is a member), recommends that: "the total developed groundwater source capacity, unless otherwise specified by the reviewing authority, shall equal or exceed the design maximum day demand with the largest producing well out of service". This Class EA plan to target this stricter recommendation to help address long-term reliability and redundancy. 3.5 Existing and Future Servicing System Constraints

Water supply capacity was reviewed to assess the communal potable water system's ability to accommodate existing and future water demand scenarios. The following general servicing issues are noted:

- Based on the 2039 projected maximum day demand for both low growth and high growth scenarios, there is a future deficit of 2,595 $m^3/d$ and 3,429 $m^3/d$, respectively, compared to the current operational limit of the existing wells of 59.5 L/s (5,141 $m^3/d$) with the largest well out of service.

The following constraints have been identified for the Study Area based on existing conditions:

- As previously discussed, with the exception of Well #7a, 7b and 7c, wells are unable to operate at their rated capacity for a continuous period of time.

- Ductile iron transmission main is prone to breaks for Well #7a, 7b and 7c that is attributed to pressure transients during well pump shutdown.

- Winchester Wells #1 and #5 can maintain higher flows than the operational capacity, but not for longer than 10 hours.

  Initial construction for Winchester Well #6 recommended a reduced flow during August and September. However, aquifer is sensitive to use and rainfall/spring melt.
- Steady state was not reached during 30-day pump test for Chesterville Well #5. Stable capacity for Chesterville Wells is considered ~75% listed capacity.

- Chesterville Well #6 is prone to well screen fouling.

- Given the age of the Wells, the reliability of all wells for long-term operation is unknown. Therefore, it would be difficult for the Township's Wells to provide sufficient water when either Well #7a, 7b, and 7c or the Chesterville Well #6 are out of commission for an extended period of time.

- The Township has experienced periods of drought that limited well water recharge in the area. Present climate change projections for Ontario presents the North Dundas area to receive more precipitation during the winter and spring, and less during the summer and fall months. This projection will lead to an increased chance of experiencing extended periods with reduced recharge of the aquifer.

- There is no standby power on site in the event of a power outage for Well #7a, 7b and 7c.

## 3.6 Other Considerations

### 3.6.1 Geotechnical and Hydrogeological

A baseline hydrogeological and geotechnical desktop review was undertaken which reviewed the subsurface soil conditions, wells assessments, water quality, wellhead protection areas, existing and historic potential sources of contaminations and impacts to local wells. Refer to Appendix 'E' for the Geotechnical Technical Memorandum (Golder, March 11, 2020).

### 3.6.2 Cultural and Archaeological Environments

The Official Plan from The United Counties of South Stormont, Dundas and Glengarry (adopted July 2018) does not identify any specific areas of cultural importance within the Study Area. During Phase 2, the screening checklist for evaluating Archaeological Potential and Criteria for Evaluate Build Heritage Recourses and Cultural Heritage Landscapes, developed by the Ministry of Tourism, Culture and Sport will be completed for preferred alternative servicing solutions.

### 3.6.3 Natural Environment

Natural environment features are legacy components of the community landscape and represent important environmental areas to consider as part of the Class EA. According to studies previously undertaken in this area, the Wisconsinian Glaciation retreated from the area around 15,000 years ago, and the region was covered by the Champlain Sea up to approximately 9,000 years ago. The area is part of the Winchester Clay Plain which is indicated to have higher land capability classes for agriculture than many of the other plains within the South Nation Conservation area (Cataraqui Archaeological Research Foundation, 1997). Due to the high percentage of prime agricultural lands and forest clearing during the late 1800s and early 1900s, the Township of North Dundas does not contain a high percentage of forest cover. According to a report entitled Forest Cover and Trends Analysis (2014) prepared by the South Nation Conservation, the Township has approximately 13.3% forest area remaining (SNC, 2014).

Generally, the lands within the Township and study area are used or agricultural purposes with natural environment areas consisting of Provincially Significant Wetlands, limited woodlots, an Area of Natural and Scientific Interest (Wetland) and Well Head Protection Area (WHPA) associated with the existing communal drinking water system. The natural environmental constraints in the Study Area are illustrated in Figure 3.

# 4.0 PROBLEM / OPPORTUNITY STATEMENT

The following Problem / Opportunity Statement will be used as the basis for proceeding to Phase 2 of this Class EA:

> *The Township of North Dundas is serviced by a communal potable water supply system that generally consists of eight active groundwater wells, five pump houses with chlorine disinfection, two storage reservoirs, two elevated storage tanks and distribution system. While the system has been operating in accordance with all applicable legislation and is generally achieving all required water quality standards, it is anticipated that the Township will not be able to meet potable water supply requirements as recommended by the Ministry of the Environment, Conservation and Parks within the next 20 years timeframe if projected growth and associated water demand is realized. The Township is therefore in need of a solution that will address water supply constraints and improve the redundancy and reliability in delivering treated water to the community over the next 20 years.*

# 5.0 PHASE 2 - IDENTIFICATION OF ALTERNATIVE SOLUTIONS

Phase 2 of this Class EA will include the following tasks:

- Confirm sufficient hydraulic capacity required for the treatment facility for 2039;
- Identify and evaluate alternative communal potable water system solutions;
- Identify land use or property requirements, if any;
- Conduct a Public Information Centre to present the findings of Phase 2; and
- Select a preferred solution and confirm project schedule (i.e., Schedule ‘C’ process).

# 6.0 REFERENCES

MCEA, 2015. Municipal Class Environmental Assessment. Municipal Engineers Associations. October 2000, as amended in 2007, 2011 and 2015.

Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2012 Edition. Recommended Standards for Water Works

MECP, 2002. Safe Drinking Water Act, 2002. Ministry of the Environment. Ontario Regulation 169/03 Ontario Drinking Water Quality Standards.

MECP, 2008. Design Guidelines for Drinking-Water Systems. Ministry of the Environment. 2008.

This report has been prepared for the exclusive use of the Township of North Dundas, for the stated purpose, for the named facility. Its discussions and conclusions are summary in nature and cannot be properly used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report was prepared for the sole benefit and use of the Township of North Dundas and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited.

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# Appendix A

Project Initiation Meeting Minutes

# Appendix B

Public Consultation
Documentation

# Appendix C

List of Compiled Background Documentation

# Appendix D

North Dundas Drinking Water Supply System Capacity Expansion Class EA – Technical Memorandum No. 1

# Appendix E

Geotechnical Technical Memorandum (Golder, March 11, 2020)