TABLE OF CONTENTS

LIST OF MAPS

LIST OF TABLES

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9.0 REGIONAL MUNICIPALITY OF HALTON

9.1 Community of Acton

The Community of Acton, with a population of approximately 9,500 (2016), is located in the Town of Halton Hills, on Highway 7 and Regional Road 25 in the Credit Valley Source Protection Area. Acton has six wells in three well fields: Davidson wells 1 and 2, Prospect Park wells 1 and 2, and 4th Line wells A and B. Portions of WHPA-B, C and D for the Acton wells cross into the Grand River Source Protection Area. **Map 9-1** shows the wellhead protection areas for the Acton wells, and **Map 9-2** shows the vulnerability scoring.

For further information on the Acton Water Supply System, please see the Assessment Report for the Credit Valley Source Protection Area.

9.1.1 Drinking Water Quality Threats Assessment

The *Clean Water Act, 2006* defines a Drinking Water Threat as "an activity or condition that adversely affects or has the potential to adversely affect the quality of any water that is or may be used as a source of drinking water, and includes an activity or condition that is prescribed by the regulation as a drinking water threat." A Prescribed Drinking Water Threats table in Chapter 3 lists all possible drinking water threats.

Identification of Significant, Moderate and Low Drinking Water Threats for the Acton Supply System

The identification of a land use activity as a significant, moderate, or low drinking water threat depends on its risk score, determined by considering the circumstances of the activity and the type and vulnerability score of any underlying protection zones, as set out in the Tables of Drinking Water Threats available through www.sourcewater.ca. Information on drinking water threats is also accessible through the Source Water Protection Threats Tool: http://swpip.ca. The information above can be used with the vulnerability scores shown in **Map 9-2** to help the public determine where certain activities are or would be significant, moderate and low drinking water threats.

Table 9-1 provides a summary of the threat levels possible in the Acton Supply System for Chemical, Dense Non-Aqueous Phase Liquid (DNAPL) and Pathogens. A checkmark indicates that the threat classification level is possible for the indicated threat type under the corresponding vulnerable area / vulnerable score; a blank cell indicates that it is not. The colours shown for each vulnerability score correspond to those shown in **Map 9-2**.

Table 9-1: Identification of Drinking Water Threats in the Acton Supply System Wellhead Protection Areas within the Grand River Watershed

Threat Type	Vulnerable Area	Vulnerability Score	Threat Classification Level		
			Significant 80+	Moderate 60 to <80	Low >40 to <60
Chemicals	WHPA-B	8	✔	✔	✔
	WHPA-C	6		✔	✔
	WHPA-C/D	2 & 4			
Handling / Storage of DNAPLs	WHPA-B/C	Any Score	✔		
	WHPA-D	2 & 4			
Pathogens	WHPA-B	8		✔	✔

9.1.2 Drinking Water Quality Issues Evaluation

The objective of the Issues evaluation is to identify drinking water Issues where the existing or trending concentration of a parameter or pathogen at an intake, well or monitoring well would result in the deterioration of the quality of water for use as a source of drinking water. The parameter or pathogen must be listed in Schedule 1, 2 or 3 of the Ontario Drinking Water Quality Standards (ODWQS) or Table 4 of the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (Technical Rules XI.1 (114 – 117)).

Once a drinking water Issue is identified, the objective is to identify all sources and threats that may contribute to the Issue within an Issue Contributing Area and manage these threats appropriately. If at this time the Issue Contributing Area can not be identified or the Issue can not be linked to threats then a work plan must be provided to assess the possible link.

If an Issue is identified for an intake, well or monitoring well, then all threats related to a particular Issue within the Issue Contributing Areas are as significant drinking water threats, regardless of the vulnerability.

Methodology for Identifying Drinking Water Quality Issues

As part of the issues evaluation, available water quality data was reviewed to assess whether any contaminants are impacting or have the potential to impact or interfere with the Town of Acton drinking water sources. This included the following steps:

- Collection of water quality data.
- Comparison of water quality data to the ODWQS to see if any parameters were in exceedance.
- Concentrations of parameters of consideration over time were plotted to evaluate if there were any increasing trends.

9.1.2 Drinking Water Quality Issues Evaluation for the Acton Water Supply

Water quality data and information were accessed through DWS Ont. Reg. 170/03 Reports (2003 and 2017), and through historic raw water quality records (from the mid-1980s) provided by Halton Region. The data were reviewed to assess whether any contaminants are impacting or have the potential to impact the quality of the town's groundwater-based drinking water sources. A review of water quality at the wellheads is presented in Section 2.4. Based on this review, several issues were identified, and these have been outlined below:

Sodium (Na) and Chloride (Cl)

Over the last two decades, the average annual sodium and chloride concentrations in raw water for each of Acton's wells, except for the Prospect Park wells, have exhibited slight increases in trends for both parameters. The ODWS standard for Na and Cl are 200 mg/L and 250 mg/L, respectively. Over the years, Na concentrations in the Davidson and Fourth Line wells have ranged from approximately 10 to 32 mg/L, and Cl concentrations have ranged from approximately 0 to 63 mg/L.

Prospect Park Well 1—Na and Cl concentration doubled between 1996 and 2012, with a distinct rise in concentrations to 2017.

During this period, Na concentration increased from around 25 mg/L (1986) to the current level in 2017 of just under 50 mg/L.

During this last period, Cl concentration increased from levels of 50 mg/L (1986) to the current level in 2017of just under 100 mg/L.

Given the trends and the projections, and the implications on the quality of water used for municipal drinking water supply, both Na and Cl were orginally identified as issues at Prospect Park well 1. However, based on the findings of recent analyses, it was determined that sodium and chloride concentrations will not likely rise to the level of their respective ODWS within a thirty year timeline. As such, a decision was taken to rescind both the sodium and chloride issues initially assigned to Prospect Park Well 1 (CVC, 2015).

Prospect Park Well 2 (Acton)—This is a relatively new well (2004), and the available data available does not indicate an increasing trend, but shows a fluctuation of Cl concentration between 56 and 84 mg/L since being brought on line, and should be carefully monitored in the future.Nitrates (NO_3)

The ODWS standard for NO_3 is 10 mg/L. Over the last two decades most of the wells, except for the Davidson wells, have exhibited relatively slight increase in trends for NO_3. At Prospect Park, concentrations have hovered around 0.1 mg/L since 2004, while the Fourth Line well has shown fluctuations between and 2 and 3 mg/L, with a relative slight increase in trend over the two-decade period.

All wells show NO_3 concentrations below the ODWS, but concentrations at Davidson wells 1 and 2 have remained elevated since 2000. In Well 1, the concentration generally varied between 1 mg/L and 5 mg/L between 1987 and 2000, rising to over 6 mg/L in 2002. Since then, it has remained elevated, while exhibiting seasonal fluctuations most recently levels were between 2 and 6 mg/L (2017). At Well 2, NO_3 concentrations rose sharply from around 2 mg/L in 2000 to over 6 mg/L in 2001. Since then, the NO_3 concentration has mimicked fluctuations observed at Well 1, and has decreased to a level of about 2.5 mg/L (2009).

The historical data for the Davidson Wellfield has shown a great deal of variability in the NO_3 concentration at the wells since 1985. Statistical analyses (CTC, 2013) concluded that for Well 1, the ODWS could be met as early as 2049. Following this assessment, sampling frequency was increased and an update to the previously completed analyses suggested the ODWS could be met as early as 2103. The NO_3 concentration in Well 2 is not expected to meet or exceed the criterion until much later (2127). In addition, the data for both wells exhibited repeated spikes over the 1/2 MAC throughout the 2000 to 2009 period. Between 2010 and 2017, a decreasing trend was observed, but it is not certain whether this trend will continue into the future, as similar decreases in past have been followed by periods of increase.

Since the future land use will revolve around rural / agricultural land usage with expected ongoing nutrient applications, a new study recommends that the original nitrate issue assignment be retained only around Well 1 and reassessed as additional research as new data become available (CVC, 2015).

Fourth Line Well (Acton)—though a 20-year time series plot does not show an identifiable trend suggesting that NO_3 may pose a future threat to the use of the well for municipal supply, concentration levels over the last five years do seem to indicate the beginning of what can potentially become an increasing trend.

Additional data are required to make a clearer definition/pronouncement on this trend. The plot suggests a cyclical stress, but whether the variations are a result of pumping volume changes, seasonal or climatic variations, land-use changes, increased commercial fertilizer applications, or a combination of all four, or other stressors, should be further assessed.

Summary of Drinking Water Quality Issues Evaluation for the Acton Water Supply

Based on the above water quality analysis, nitrate was identified as an Issue at the Davidson Well 1 under Technical Rule 114 for the Acton supply system.

Issue Contributing Area - Nitrate

The most probable sources of nitrates are septic systems and fertilizer application. The ICA for NO_3 has been delineated to extend over the WHPAs A, B, and E of the Davidson Well 1, to include all managed lands and septic systems occurring within the 2-year time of travel, and the area where a GUDI connection is inferred to exist.

9.1.3 Enumeration of Significant Drinking Water Quality Threats

The Technical Rules require an estimation of the number of locations at which an Activity is a significant drinking water threat and the number of locations at which a Condition resulting from past activity is a significant drinking water threat.

Enumeration of Significant Drinking Water Issues for the Acton Water Supply

As per the Technical Rules; Assessment Report (Clean Water Act, 2006), the enumeration of significant threats is required for the completion of the Assessment Report. **Table 9-2** summarizes the significant threats for the Acton Water Supply within the Grand River watershed. The data provided in the table is preliminary and will be updated as more information becomes available from the Credit Valley Source Protection Area

Table 9-2: Acton Water Supply Significant Drinking Water Threats within the Grand River Watershed

PDWT[1] #	Threat Subcategory[2]	Number of Activities	Vulnerable Area
2	Sewage Systems Or Sewage Works – Septic System	3	WHPA-B WHPA-C ICA
3	The Application Of Agricultural Source Material To Land.	2	WHPA-B WHPA-C ICA
4	The Handling and Storage Of Agricultural Source Material.	2	WHPA-B WHPA-C ICA
8	The Application Of Commercial Fertilizer To Land.	3	WHPA-B WHPA-C ICA
9	The Handling And Storage Of Commercial Fertilizer.	3	WHPA-B WHPA-C ICA
10	The Application of Pesticides to Land	2	WHPA-B WHPA-C ICA

Table 9-2: Acton Water Supply Significant Drinking Water Threats within the Grand River Watershed

PDWT[1] #	Threat Subcategory[2]	Number of Activities	Vulnerable Area
11	The Handling and Storage of Pesticides	1	WHPA-B WHPA-C ICA
15	The Handling and Storage of Fuel	1	WHPA-B WHPA-C ICA
17	The Handling And Storage of Organic Solvents	1	WHPA-B WHPA-C ICA
21	Management Or Handling Of Agricultural Source Material - Agricultural Source Material (ASM) Generation (Grazing and Pasturing)	3	WHPA-B WHPA-C ICA
Total Number of Activities		**21**	
Total Number of Properties		**3**	

1: Prescribed Drinking Water Threat Number refers to the prescribed drinking water threat listed in O.Reg 287/07 s.1.1.(1).

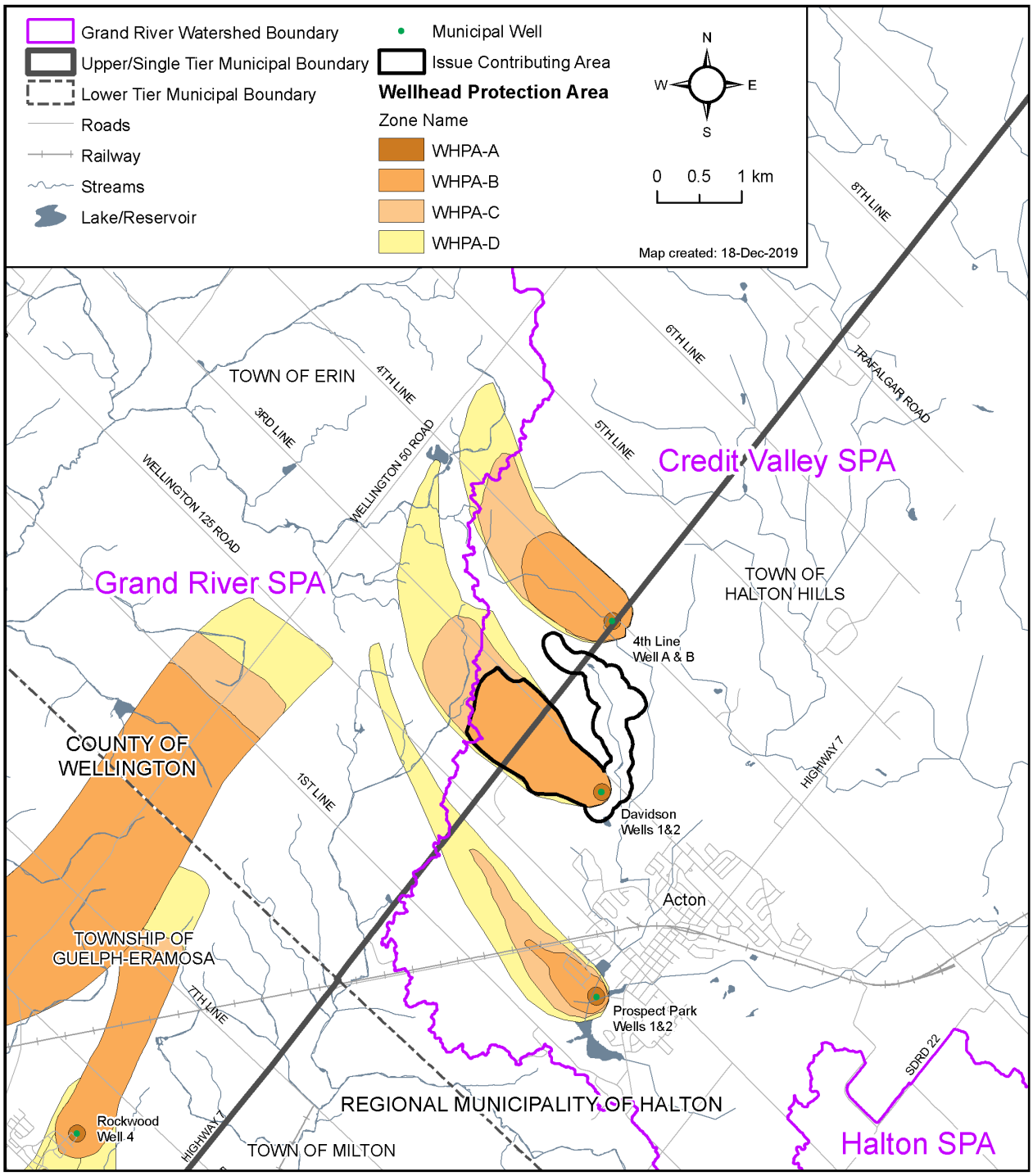
2: Where applicable, waste, sewage, and livestock threat numbers are reported by sub-threat; fuel and DNAPL by Prescribed Drinking Water Threat category

Note: Storm sewer piping is not considered to be part of a storm water management facilty

9.2 Community of Georgetown

Modeling undertaken by the Credit Valley Source Protection Authority has determined that vulnerable areas for the Georgetown drinking water system do not overlap into the Grand River Source Protection Area. Subsequently, the section for the Georgetown system has been removed from this Assessment Report. Information about the Georgetown system can be obtained through the CTC Source Protection Region's website at www.ctcswp.ca.

Map 9-1 **Wellhead Protection Areas and Issue Contributing Areas for the Acton Water Supply located within the Grand River Source Protection Areas**



Map 9-2 Acton Water Supply Wellhead Protection Area Vulnerability