Hamilton

2021 SALT MANAGEMENT PLAN

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INTRODUCTION

The City of Hamilton has approximately 6,500 lane kilometers of roadways within the framework of a classification system, which provides for the safe, efficient and affordable means of transportation for pedestrians, cyclists and motorists.

Road salt (primarily sodium chloride) is the conventional deicing/anti-icing chemical for maintaining winter safety because of its cost, effectiveness and ease of handling. The amount of salt used is a function of level of service policies, budgets, the transportation network, weather conditions and operational practices.

In 2001, Environment Canada released an assessment report stating that road salts were entering the environment in large amounts and were posing a risk to plants, animals, lake and stream ecosystems and groundwater. Prior to this assessment, road salts were placed on the Canadian Environmental Protections Act's Priority Substance List (CEPA PSL) at the recommendation of the Minister's Expert Advisory Panel in order to assess the effects of road salts. Based on the assessment, Environment Canada recommended that road salts be considered "toxic" under the Canadian Environment Protection Act (CEPA 1999). Toxic meaning that it is harmful to the environment if used in excessive amounts. Environment Canada has stated that they will not ban road salts, but rather will encourage users to develop their own salt management strategy. **Health Canada identifies that road salts are not harmful to humans.**

Elevated concentrations of sodium and chloride in groundwater can make the water taste salty and render it unusable as a drinking water. Residents of rural Hamilton use groundwater for their public and private drinking water supplies and are being impacted by road salt use. Furthermore, individuals on salt-restricted diets are unable to drink or cook with water with elevated sodium concentrations, or water with lower concentrations that what causes the water to taste salty.

Purpose of Plan

This plan is intended to set out a policy and procedural framework for ensuring that the City of Hamilton continuously improves the management of road salt used in its winter maintenance operations. The plan demonstrates the City's commitment to reducing the environmental effects of excessive salt use, consistent with Environment Canada's stated objectives.

Any modifications to winter maintenance activities must be carried out in a way that provides roadway safety and user mobility consistent with the weather conditions experienced during the snow and ice control season.

The plan should:

- contain best management practices to protect the environment from the negative impacts of road salts;
- include all areas where road salt is used such as roads, cycling infrastructure, sidewalks and pathways; and
- apply to all winter maintenance personnel – both staff and hired contractors

The plan is dynamic and allows the City to phase in new approaches and technologies in a way that is responsive to fiscal demands and the need to ensure that roadway safety is not compromised.

A successful Salt Management Plan is based on the following principles (Transportation Association of Canada, 2013):

- It is activity based, with each activity being assessed at the outset against clearly established standards and/or objectives to determine how that can be carried out with minimal environmental impact;
- Deficiencies in current operations are identified and corrective action established and implemented;
- Required actions are documented in policies and procedures and communicated throughout the organization – including contractors hired to deliver snow and ice control;
- Activities are recorded, monitored, audited and reported periodically to assess progress and identify areas for further improvement; and
- Gaps between actions and desired outcomes are identified and corrective actions are developed and implemented, with necessary modification being made to policies and procedures and appropriate training.

Legislative Context

As stated within the Municipal Act 2001, c.25 s. 44 (1) any City that has jurisdiction over a highway or bridge shall keep it in a state of repair that is reasonable in the circumstances, including the character and location of the highway or bridge.

CODE OF PRACTICE: Environmental Management of Road Salts

The Ministry of Environment, Conservation and Parks (MECP) released a “Code of Practice for the Environmental Management of Road Salts” (Environment and Climate Change Canada 2004). As part of the Code of Practice, the City of Hamilton maintains a Salt Management Plan (SMP) and reports on the status annually. The content of this SMP is consistent with recommendations for SMP content found in the Code of Practice and assesses current City practices against industry best practices.

Source Water Protection

The Clean Water Act, 2006 ensures clean, safe and sustainable drinking water for Ontarians, but by protecting sources of municipal drinking water including lakes, rivers and well water. Source Protection Plans (SPP) contain policies that recommend or require actions to be taken to address activities identified as threats to drinking water.

The Clean Water Act defines “vulnerable areas” as:

a) a significant groundwater recharge area,
b) a highly vulnerable aquifer,
c) a surface water intake protection zone, or
d) a wellhead protection area.

Source Water Protection continued...

The City of Hamilton lies within the Halton-Hamilton source protection region (SPR), the Grand River source protection area and the Niagara Peninsula source protection area. Each has a source protection plan, approved by the MECP, which contain policies to manage or prohibit the identified threats to drinking water sources. Reference document for the Hamilton and Halton Region Source Protection Plan.

The source protection plans include the following policies relating to road salt use applicable to the City of Hamilton:

Source Protection Plan Policy	How is this addressed in the SMP?
1 SMP must identify the location of wellhead protection areas, issue contributing areas, and intake protection zones.	The location of wellhead protection areas, issue contributing areas, and intake protection zones is found within all three SPR's. Refer to Appendix "B" and "C".
2 The municipalities shall amend their SMP's to enhance best management practices in identified vulnerable areas.	This SMP assesses current practices against recommended best management practices and identifies opportunities for improvement. This SMP is reviewed annually and updated approximately every five years.
3 The municipalities shall advise the Source Protection Authority of revisions to the SMP when completed and provide a status update by February 1st of each year until completed.	The Source Protection Authority will be updated on the status of annual SMP reviews.

Salt Vulnerable Areas

The Code of Practice: The Environmental Management of Road Salts, Environment and Climate Change Canada (ECCC), 2004, defines “vulnerable area” as an area particularly sensitive to road salts where additional salt management measures may be necessary to mitigate the environmental effects of road salts in that area. ECCC has the target of 96% of road organizations having salt vulnerable areas identified and action plans prepared by 2024.

The SPP’s identifies areas of vulnerability specifically relating to municipal drinking water sources as well as “highly vulnerable aquifers”. The municipal drinking water sources are in Lynden, Carlisle, Freelton and Greensville.

For more information on vulnerable areas delineated under the Clean Water Act, 2006 please visit the MECP link.

The Municipal Act, 2001

The Municipal Act, 2001 (Section 44 (1)) provides that a municipality must keep its highways “in a state of repair that is reasonable in the circumstances”. Here is the link to The Municipal Act, 2001, O. Reg. 239-02 made under the Act which further prescribes maintenance standards for municipal highways.

POLICY, SCOPE AND COMMITTMENT

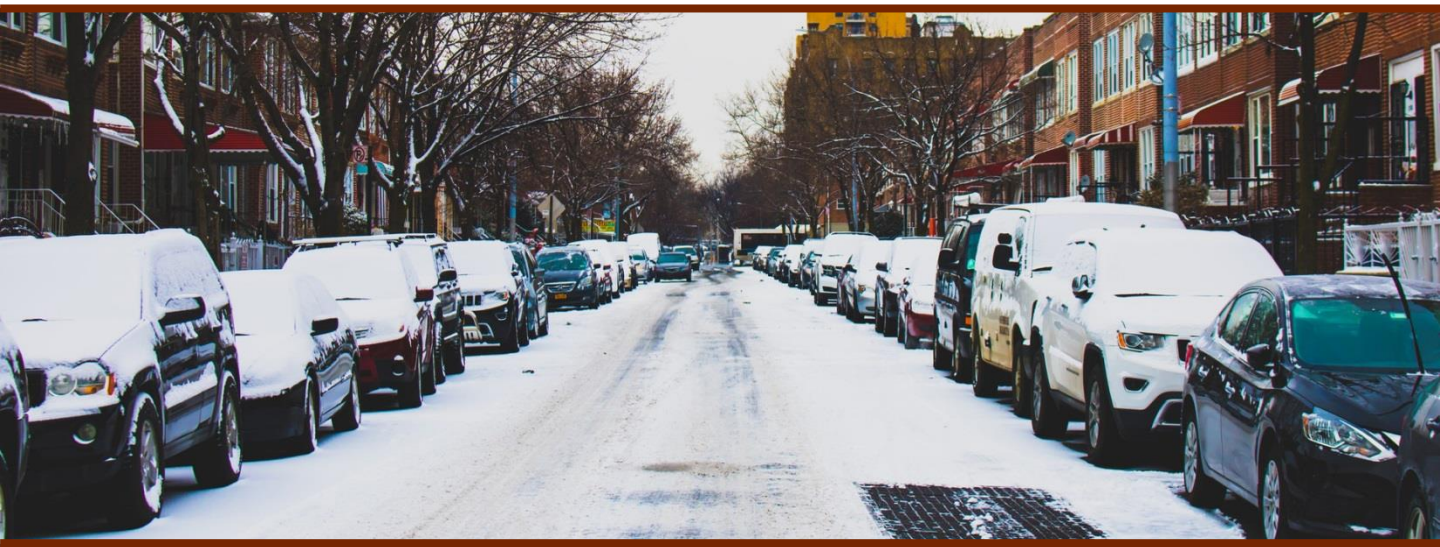
The City of Hamilton's Road Maintenance Policy

The City of Hamilton will provide a safe, reliable, efficient and environmentally responsible road maintenance service within the City in accordance to Council-Approved report PW-18096(a) Maintenance Standards for Municipal Highways Policy (please refer to Appendix "A" and accepted standards).

Salt Management Policy

The following is the City of Hamilton's policy on the use and management of road salt:

- To comply with all applicable federal and provincial legislation regarding the storage and use of snow and ice control products;
- To use road salt in an environmentally responsible manner, and minimize the negative environmental effects of handling, storage and application of salt on the environment; and
- In providing the stated Maintenance Standards for Municipal Highways Policy, the City of Hamilton will conserve the use of salt by utilizing the most current and cost-effective technologies and practices.



The City of Hamilton's Strategic Plan

Community Engagement & Participation
Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.

Economic Prosperity & Growth
Hamilton has a prosperous and diverse local economy where people have opportunities to grow and develop.

Healthy & Safe Communities
Hamilton is a safe and supportive city where people are active, healthy, and have a high quality of life.

Clean & Green
Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.

Built Environment & Infrastructure
Hamilton is supported by state of the art infrastructure, transportation operation, building and public spaces that create a dynamic City.

Culture & Diversity
Hamilton is a thriving, vibrant place for arts, culture, and heritage where diversity and inclusivity are embraced and celebrated.

Our People & Performance
Hamiltonians have a high level of trust and confidence in their City government.

Scope

This Salt Management Plan applies to public roads, bicycle infrastructure, sidewalks and pathways for which the City undertakes winter maintenance.

Salt Management Principles

- Road safety is a top priority of the City of Hamilton;
- The City of Hamilton will strive to reduce the amount of salt release to the environment through effective salt management practices;
- The City of Hamilton will show leadership locally, provincially and nationally in their area of road salt management by leading by example and sharing their knowledge and experiences with agencies; and
- The City of Hamilton will provide the necessary training and encouragement to its winter maintenance personnel

Commitment

This original policy was adopted by Hamilton City Council on March 31, 2003 and applies to all employees involved in winter maintenance operations. The same commitment will be made by all employees within the winter maintenance operations with the approval of this most recent Salt Management Plan update.

Communication

The City is committed to informing all levels of the organization and the public on its road salt management policies and practices, including this plan. See Appendix “A” regarding the City’s operational response guidelines.

Plan Review and Update

The Salt Management Plan will be reviewed annually for:

- Planning and implementation of identified opportunities for improvement;
- Consistency with corporate and Maintenance Standards for Municipal Highways Policy and procedures; and
- Incorporation of feedback

A comprehensive review and update will occur every five years. This will include a re-evaluation of continuous improvement goals and updates of best and current City of Hamilton practices.

Implementation

This Salt Management Plan is activity based and follows an Environment Management System framework consistent with the City's Environmental Management Policy.

It includes the following elements:

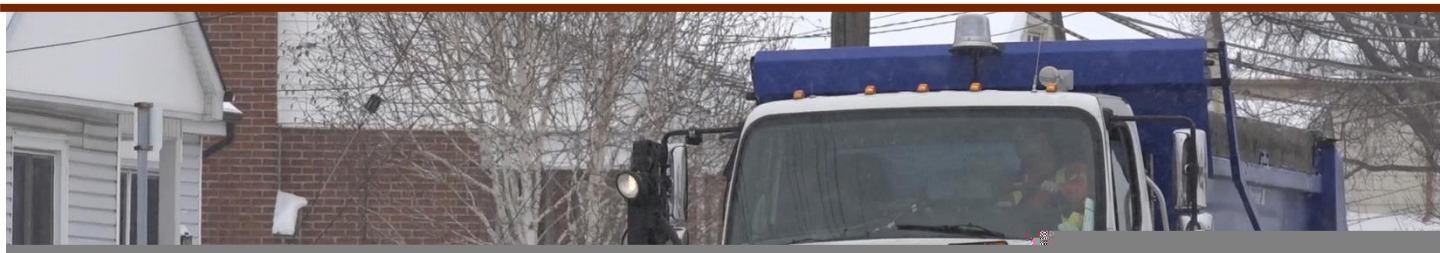
- Periodic review and analysis of industry practices;
- Implementation and documentation of the plan;
- Education and training of staff;
- Monitoring and analysis of operations;
- Management review and revision;
- Environmental review; and
- Policy and practices revision

The implementation and improvement of the Salt Management Plan will promote the continuous development of practices and procedures to improve winter maintenance activities and procedures while striving to reduce the environmental effects of road salt use. The Plan is a dynamic document.

It will be reviewed and refined on an on-going basis and embraced at all levels of the organization. All personnel involved with the winter control program are responsible for ensuring that this plan is implemented, monitored, improved and updated.

Managers are encouraged to negotiate adoption of the policies and procedures in this Plan by other parties involved in snow and ice control activities including:

- Private operators
- General Contractors



OPERATIONAL RESPONSE GUIDELINE

Transportation Operations & Maintenance
Roadway Maintenance Winter Control

OPERATIONAL RESPONSE GUIDELINE 2021

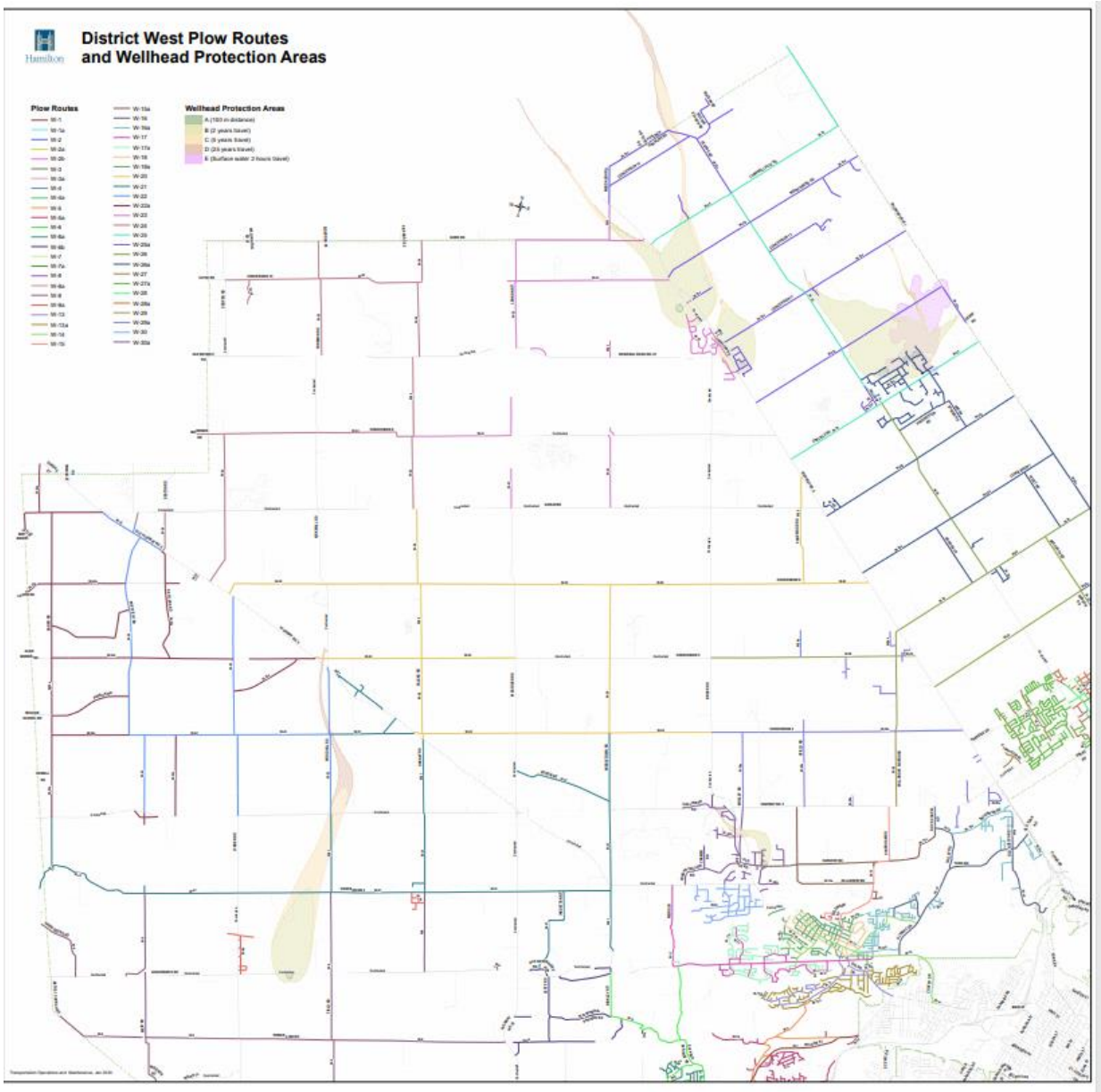
FORECAST		FORECAST		FORECAST	
Accumulation:	15 cm or less	Accumulation:	15 cm to 25 cm	Accumulation:	25 cm plus
Duration:	Less than 12 hours	Duration:	12 to 24 hours	Duration:	Beyond 24 hours
Wind Speed	Less than 20 km/hr	Wind Speed	20-40 km/hr or variable	Wind Speed	More than 40 km/hr
Drifting:	None	Drifting:	Limited in exposed areas	Drifting:	Extreme Anything
Temperature:	Above -15 C	Temperature:	-15 C to -40 C	Temperature:	

PLAN 'A'		PLAN 'B'		PLAN 'C'	
Priority 1 Roads:	No reductions	Priority 1 Roads:	Bare to centre bare	Priority 1 Roads:	Mountain accesses bare/centre bare
Priority 2 Roads:	See approved Level of	Priority 2 Roads:	Reduced to Priority 3	Priority 2 Roads:	Reduced to Priority 3
Priority 3 Roads:	Service Standards	Priority 3 Roads:	Plowing at 15 cm accumulation first pass Final plowing at the end of the storm Duration beyond 24 hours	Priority 3 Roads:	Plowing at 15 cm accumulation first pass Final plowing at the end of the storm Duration unknown

GO TO PLAN 'B' IF:	GO TO PLAN 'C' IF:	GO TO PLAN 'B' IF:
Greater accumulation/duration Wind speed increase with drifting Prolonged freezing rain Simultaneous emergencies Temperature falls Major equipment breakdowns Early/late season storm	Greater accumulation/duration Wind speed increase with drifting Variable precipitation Simultaneous emergencies Snow emergency declared/driving ban Major equipment breakdowns Extreme temperature variations …Go to Plan A if conditions improve	a) Conditions improve

APPENDIX “B”

CITY OF HAMTILTON PLOW ROUTES NEW ENVIRONMENTALLY VULNERABLE AREAS MAPPING



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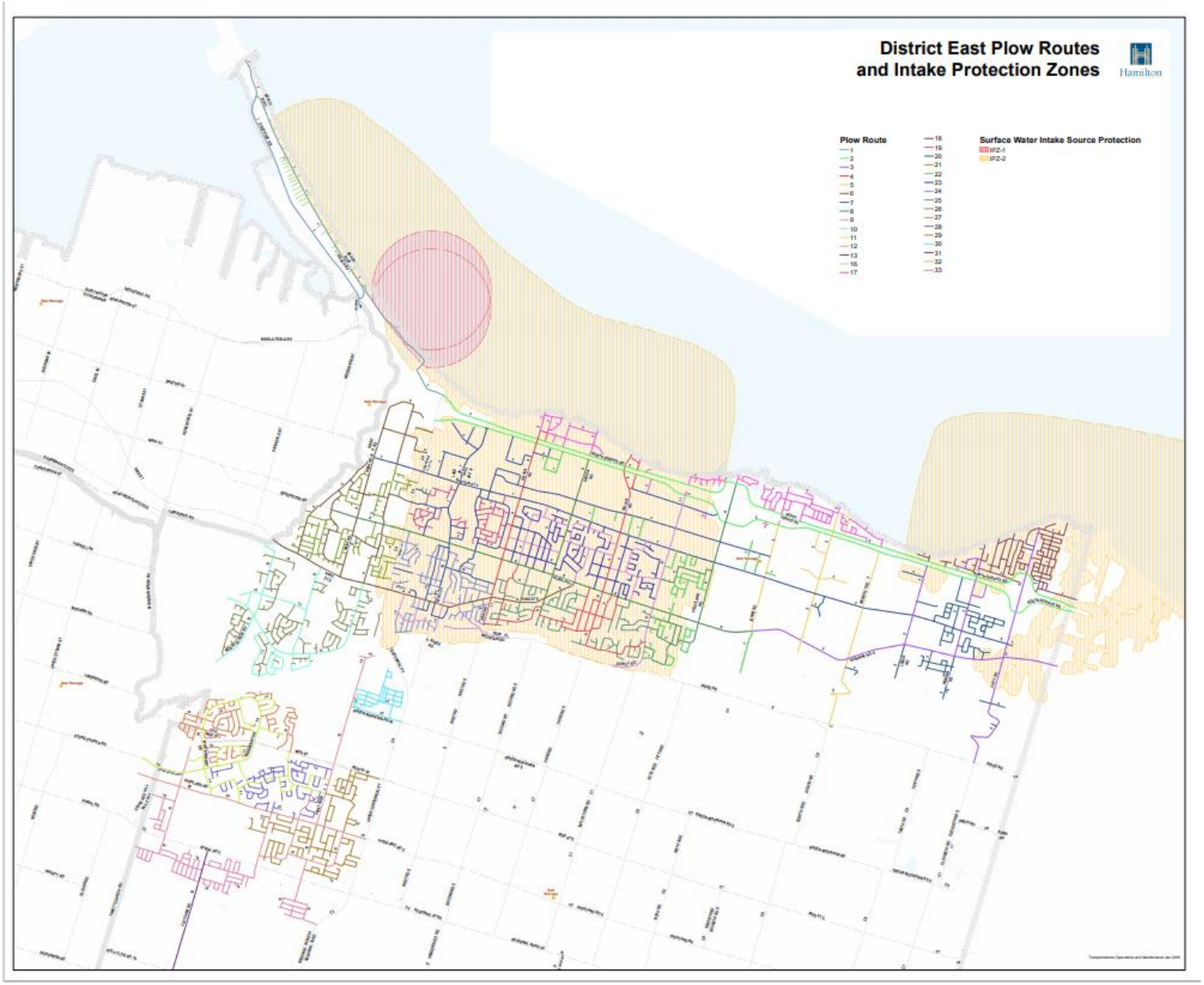

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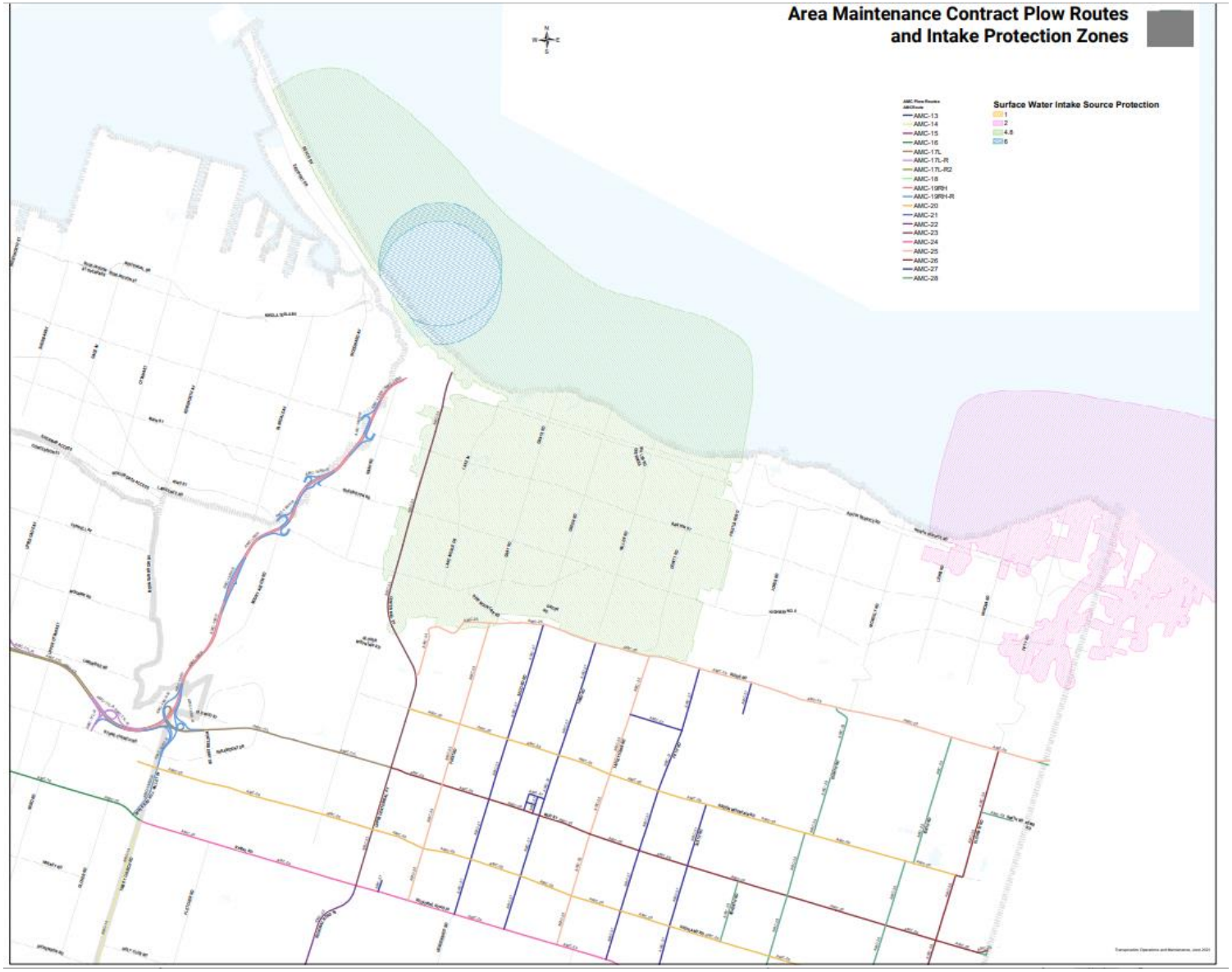

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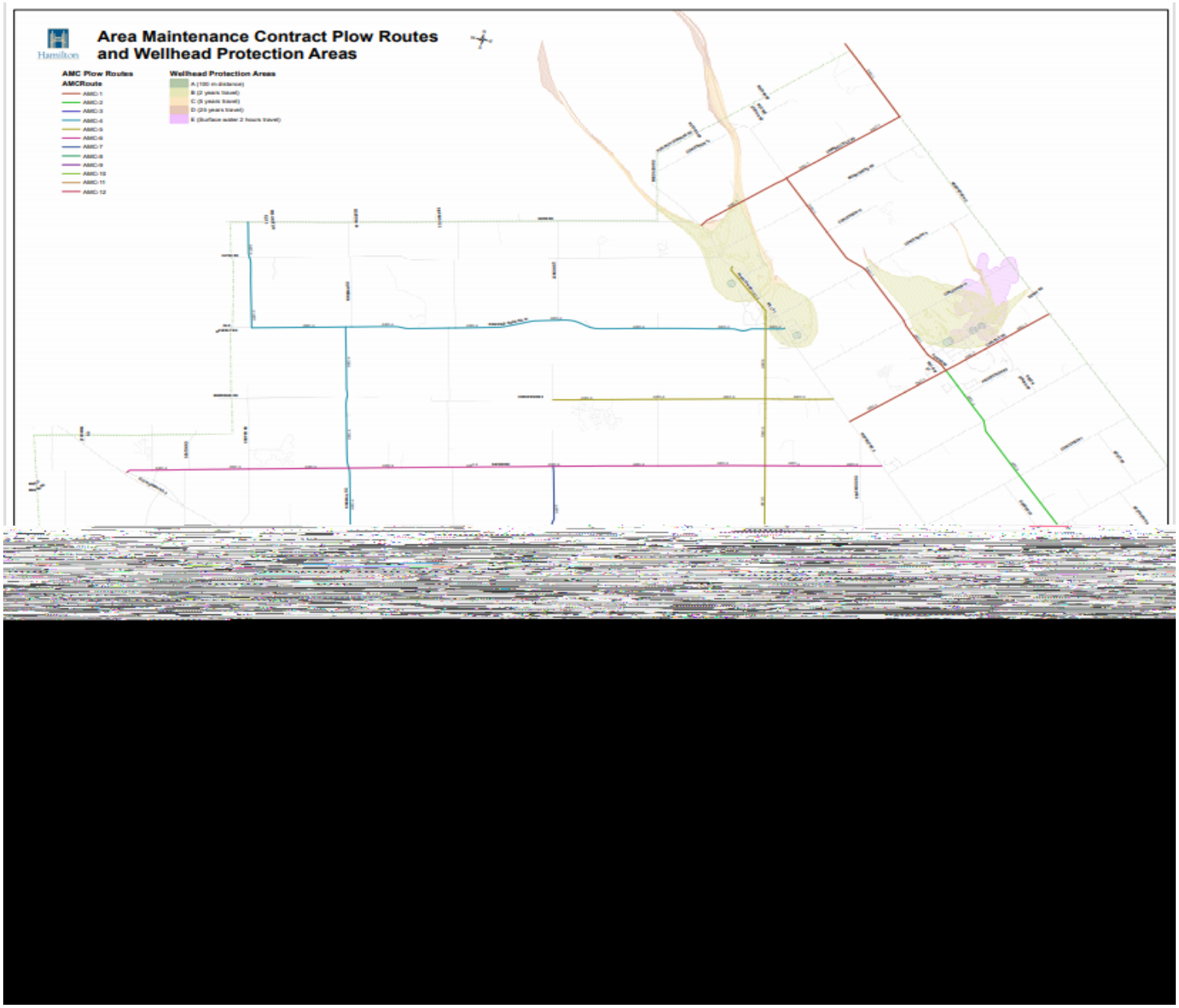
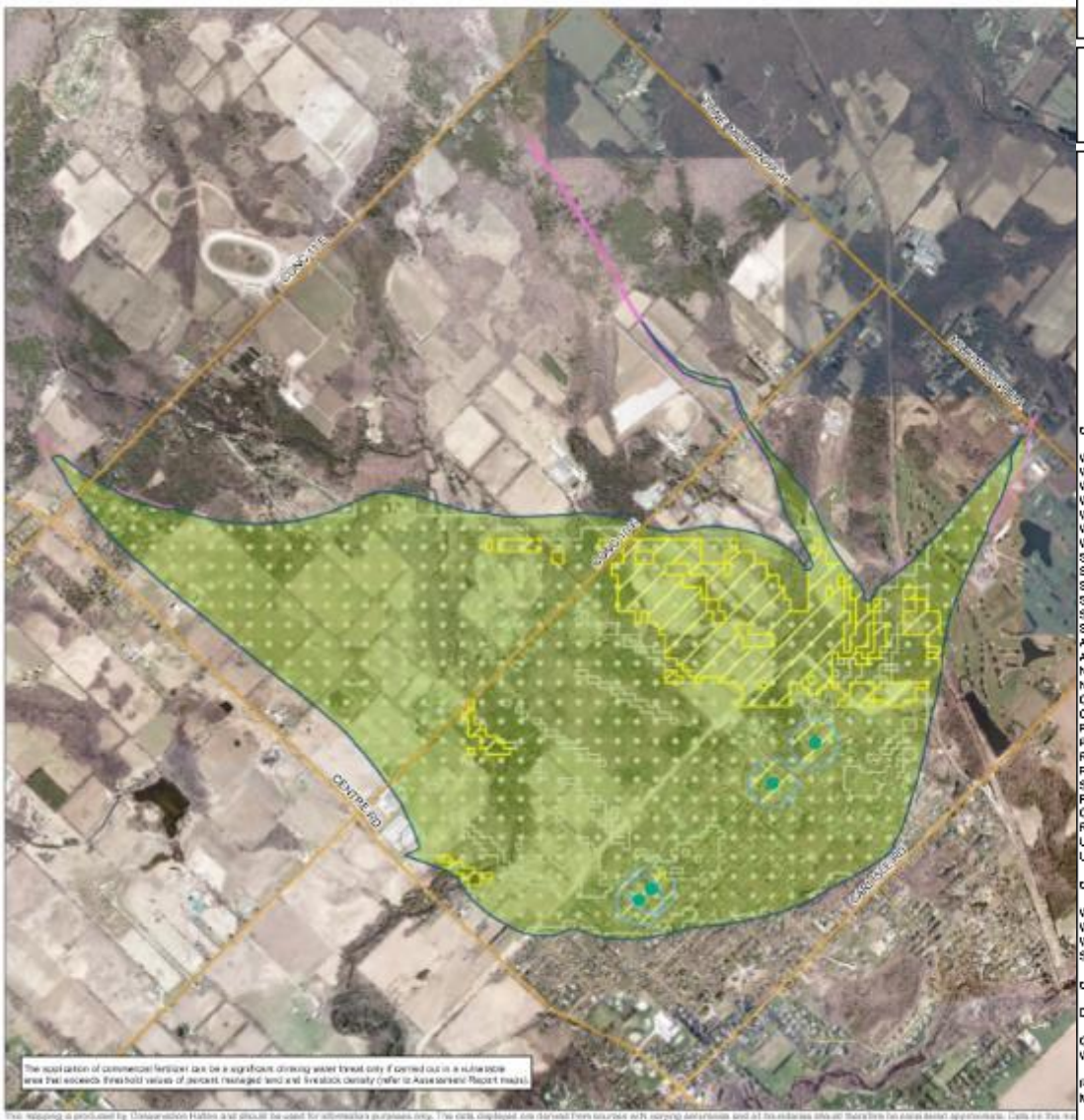


DRINKING WATER SOURCE PROTECTION WELLHEAD LOCATION MAPPING



DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Figure 6

Carlisle

Existing and would be significant groundwater threat areas

Legend

WHPA Boundary
- A
- B
- C

- GW - Significant Threats - Group 1
- GW - Significant Threats - Group 2
- GW - Significant Threats - Group 3

Roads
- Highway
- Regional
- Local

Municipal Well

Group 1: (WHPA-A-10, WHPA-B-10)

Waste Disposal Site - Application of Untreated Septage to Land (Chemical and Pathogen)
Waste Disposal Site - Mine Tailings (Chemical)
Waste Disposal Site - Landfarming of Petroleum Refining Waste (Chemical)
Waste Disposal Site - Landfilling (Hazardous Waste) (Chemical)
Waste Disposal Site - PCB Waste Storage (Chemical)
Waste Disposal Site - Storage of Hazardous Waste at Disposal Site (Chemical)
Waste Disposal Site - Storage of Waste Clauses (p),(q),(r),(s),(t),(u) (Chemical)
Sewage - Discharge from stormwater retention pond (Chemical and Pathogen)
Sewage - Sanitary Sewers and Related Pipes (Chemical and Pathogen)
Sewage - Septic System (Chemical and Pathogen)
Sewage - Septic System Holding Tank (Chemical and Pathogen)
Sewage - Sewage Treatment Plant Effluent Discharges (Chemical and Pathogen)
Sewage - Storage of Sewage (Pathogen)
ASM - Application (Chemical and Pathogen)
ASM - Handling and Storage (Chemical and Pathogen)
NASM - Application (Chemical and Pathogen)
NASM - Handling and Storage (Chemical and Pathogen)
Commercial Fertilizer - Application (Chemical)
Commercial Fertilizer - Handling and Storage (Chemical)
Pesticides - Application (Chemical)
Pesticides - Handling and Storage (Chemical)
Road Salt - Application (Chemical)
Road Salt - Handling and Storage (Chemical)
Snow - Storage (Chemical)
Fuel - Handling and Storage (Chemical)
Organic Solvent - Handling and Storage (Chemical)
Runoff Management - Aircraft De-icing Chemicals (Chemical)
Use of land for livestock - Grazing and Pasturing (Chemical and Pathogen)
Use of land for livestock - Confinement Yard (Chemical and Pathogen)

Group 2: (WHPA-A-10, WHPA-B-10, WHPA-B-8, WHPA-C-8)

Waste Disposal Site - Landfilling - Municipal Waste (Chemical)
Waste Disposal Site - Landfilling - Solid Non Hazardous Industrial or Commercial (Chemical)
Waste Disposal Site - Liquid Industrial Waste Injection into Wells (Chemical)
Sewage - Storage of Sewage (Chemical)

Group 3: (WHPA-A, WHPA-B, WHPA-C)

DNAPL - Handling and Storage

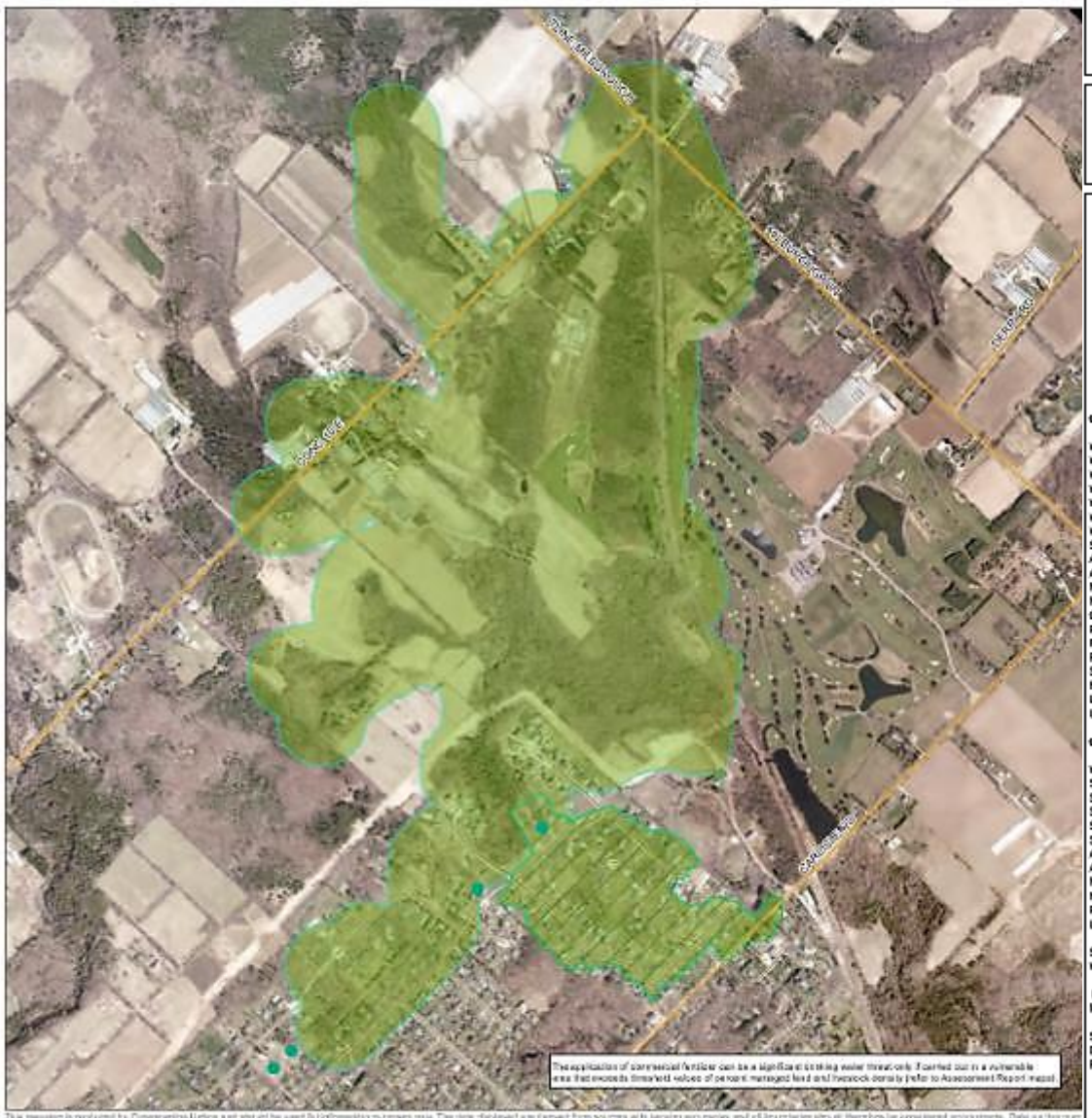
GW: Groundwater
WHPA-A-10: Wellhead Protection Area A - Vulnerability Score of 10

Reference: Prescribed threat circumstances as listed in the Ministry of the Environment Table of Drinking Water Threats (2009)

Source: Conservation Halton
Date: August 2015
Projection: UTM NAD 83 Zone 17

This mapping is produced by Conservation Halton and should be used for information purposes only. The data displayed are derived from sources with varying degrees and of boundaries should therefore be considered approximate. Data in this map Halton Region, City of Hamilton, Ministry of Environment, Ontario Geological Survey, Natural Resources Canada, Teranet Enterprises Inc. and other agencies. Copyright 2015.

DRINKING WATER SOURCE PROTECTION WELLHEAD LOCATION MAPPING



DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Figure 7

Carlisle

Existing and would be significant surface water threat areas

Legend

WHPA Boundary
- E
- SW - Significant Threats - Group 4
- SW - Significant Threats - Group 5

Roads
- Highway
- Regional
- Local

Municipal Well

Group 4: (WHPA-B-9)

Waste Disposal Site - Application of Untreated Septage to Land (Chemical)
Waste Disposal Site - Mine Tailings (Chemical)
Waste Disposal Site - Landfarming of Petroleum Refining Waste (Chemical)
Waste Disposal Site - Landfilling (Hazardous Waste) (Chemical)
Waste Disposal Site - Landfilling (Municipal Waste) (Chemical)
Waste Disposal Site - Landfilling of solid non hazardous industrial or commercial waste (Chemical)
Waste Disposal Site - Storage of Hazardous Waste at Disposal Site (Chemical)
Sewage - Storage (Pathogen)
ASM - Application (Chemical)
ASM - Handling and Storage (Chemical)
NASM - Application (Chemical)
NASM - Handling and Storage (Chemical)
Commercial Fertilizer - Application (Chemical)
Pesticides - Handling and Storage (Chemical)
Road Salt - Application (Chemical)
Road Salt - Handling and Storage (Chemical)
Snow - Storage (Chemical)
Runoff Management - Aircraft De-icing Chemicals (Chemical)
Use of land for livestock - Grazing and Pasturing (Chemical)
Use of land for livestock - Confinement Yard (Chemical)

Group 5: (WHPA-B-8.1, WHPA-B-9)

Waste Disposal Site - Application of Untreated Septage to Land (Pathogen)
Sewage - Combined sewage discharge to surface water (Chemical and Pathogen)
Sewage - Discharge from stormwater retention pond (Chemical)
Sewage - Industrial Effluent Discharges (Chemical and Pathogen)
Sewage - Sewage treatment plant bypass discharge to surface water (Chemical and Pathogen)
Sewage - Sewage treatment plant effluent discharges (Chemical and Pathogen)
ASM - Application (Pathogen)
ASM - Handling and Storage (Pathogen)
NASM - Application (Pathogen)
NASM - Handling and Storage (Pathogen)
Pesticides - Application (Chemical)
Use of land for livestock - (Pathogen)

SW: Surface Water
WHPA-B-9: Wellhead Protection Area B - Vulnerability score of 9

Reference: Prescribed threat circumstances as listed in the Ministry of the Environment Table of Drinking Water Threats (2009)

Source: Conservation Halton
Date: August 2015
Projection: UTM NAD 83 Zone 17

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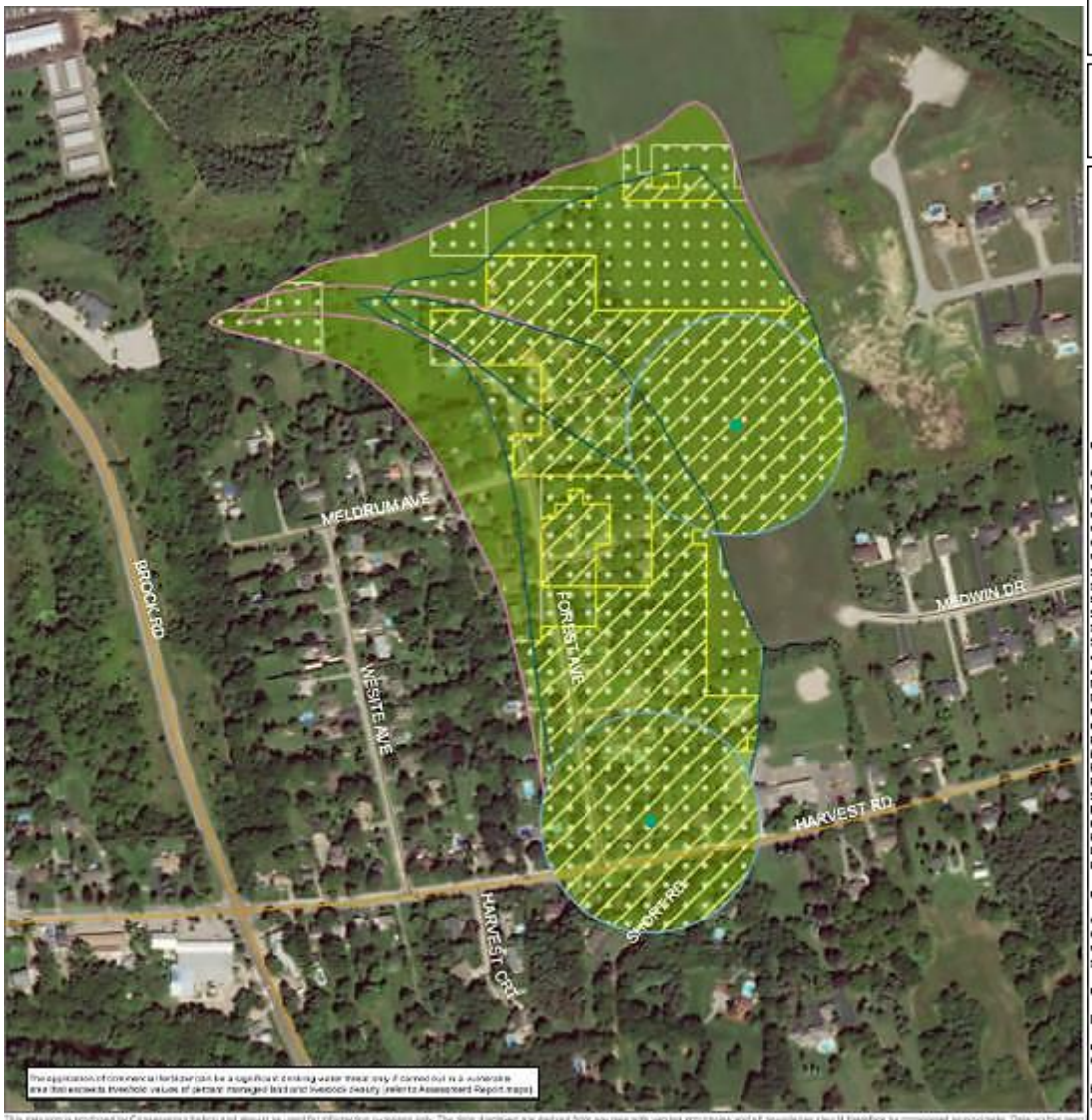
DRINKING WATER SOURCE PROTECTION WELLHEAD LOCATION MAPPING



DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Figure 11

Greensville
Existing and would be significant groundwater threat areas

Legend

WHPA Boundary
- A
- B
- C

GW - Significant Threats - Group 1
GW - Significant Threats - Group 2
GW - Significant Threats - Group 3

Roads
- Highway
- Regional
- Local

Municipal Well

Group 1: (WHPA-A-10, WHPA-B-10)

Waste Disposal Site - Application of Untreated Septage to Land (Chemical and Pathogen)
Waste Disposal Site - Mine Tailings (Chemical)
Waste Disposal Site - Landfarming of Petroleum Refining Waste (Chemical)
Waste Disposal Site - Landfilling (Hazardous Waste) (Chemical)
Waste Disposal Site - PCB Waste Storage (Chemical)
Waste Disposal Site - Storage of Hazardous Waste at Disposal Site (Chemical)
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Sewage - Septic System Holding Tank (Chemical and Pathogen)
Sewage - Sewage Treatment Plant Effluent Discharges (Chemical and Pathogen)
Sewage - Storage of Sewage (Pathogen)
ASM - Application (Chemical and Pathogen)
ASM - Handling and Storage (Chemical and Pathogen)
NASM - Application (Chemical and Pathogen)
NASM - Handling and Storage (Chemical and Pathogen)
Commercial Fertilizer - Application (Chemical)
Commercial Fertilizer - Handling and Storage (Chemical)
Pesticides - Application (Chemical)
Pesticides - Handling and Storage (Chemical)
Road Salt - Application (Chemical)
Road Salt - Handling and Storage (Chemical)
Snow - Storage (Chemical)
Fuel - Handling and Storage (Chemical)
Organic Solvent - Handling and Storage (Chemical)
Runoff Management - Aircraft De-icing Chemicals (Chemical)
Use of land for livestock - Grazing and Pasturing (Chemical and Pathogen)
Use of land for livestock - Confinement Yard (Chemical and Pathogen)

Group 2: (WHPA-A-10, WHPA-B-10, WHPA-B-8, WHPA-C-8)

Waste Disposal Site - Landfilling - Municipal Waste (Chemical)
Waste Disposal Site - Landfilling - Solid Non Hazardous Industrial or Commercial (Chemical)
Waste Disposal Site - Liquid Industrial Waste Injection Into Wells (Chemical)
Sewage - Storage of Sewage (Chemical)

Group 3: (WHPA-A, WHPA-B, WHPA-C)

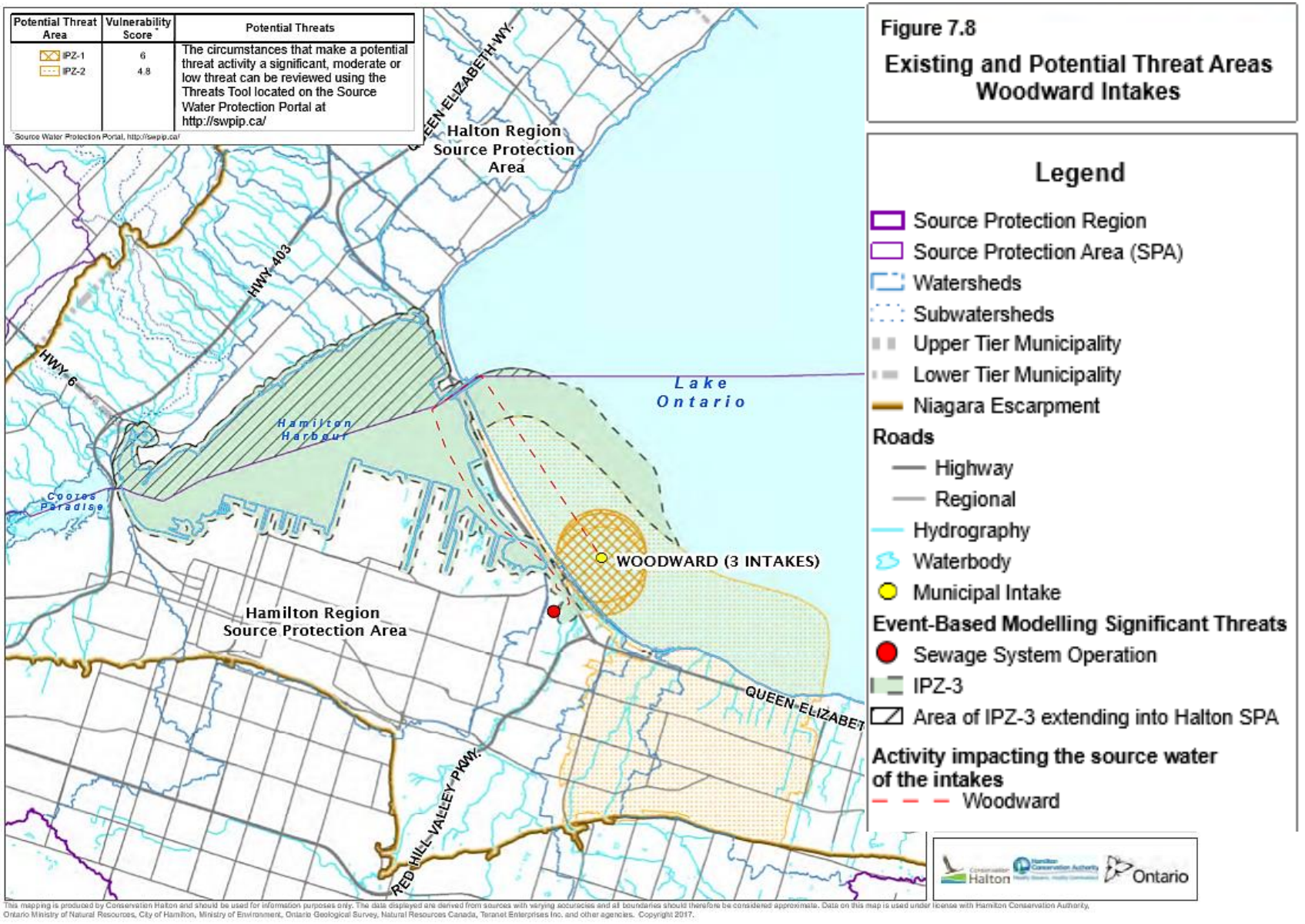
DNAPL - Handling and Storage

GW: Groundwater
WHPA-A-10: Wellhead Protection Area A - Vulnerability Score of 10

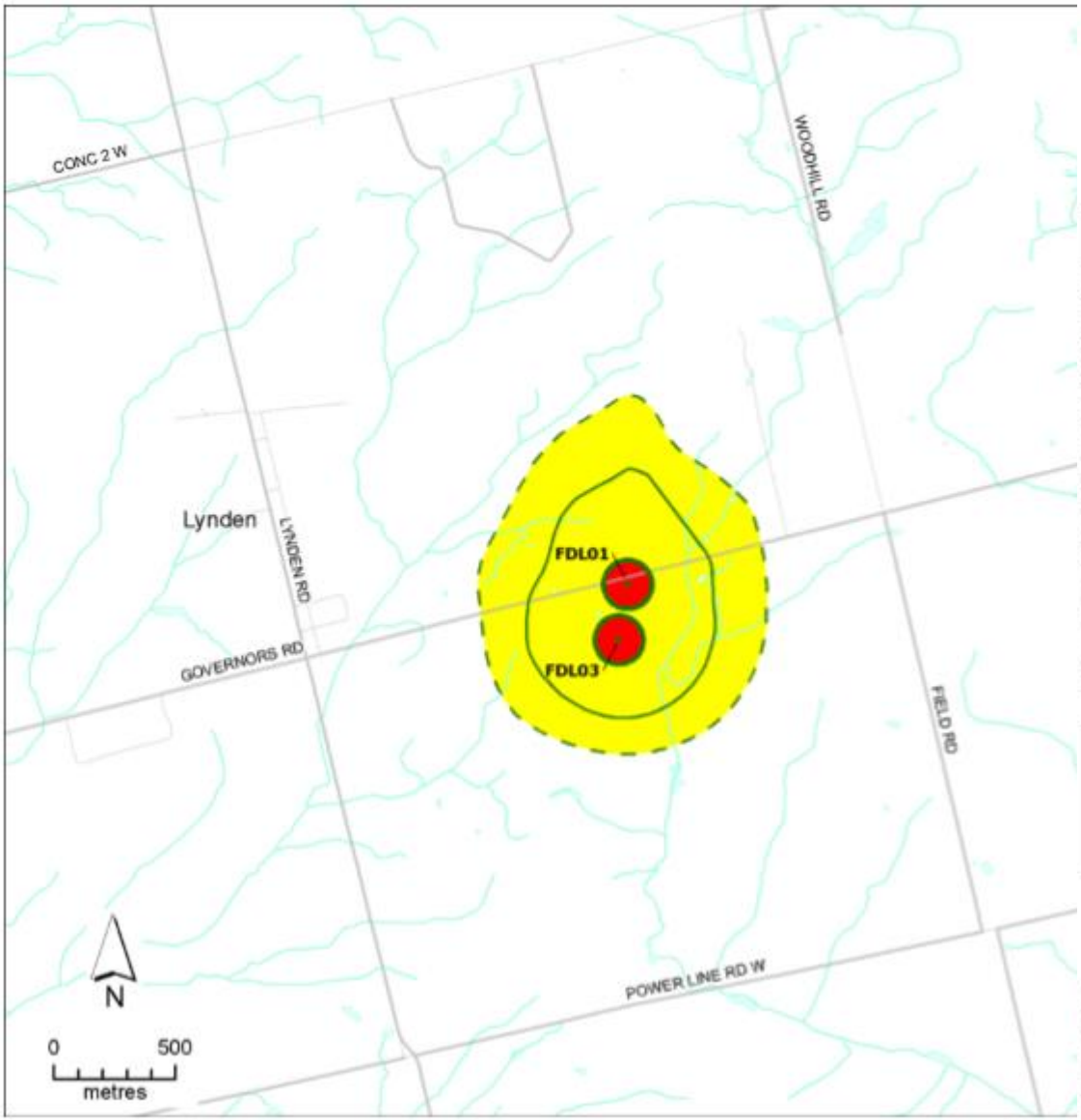
Reference: Prescribed threat circumstances as listed in the
Ministry of the Environment Table of Drinking Water Threats (2009)

Date: August 2017
Projection: UTM NAD 83 Zone 17

DRINKING WATER SOURCE PROTECTION WELLHEAD LOCATION MAPPING



DRINKING WATER SOURCE PROTECTION WELLHEAD LOCATION MAPPING



DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Significant Drinking Water Threat Policy Applicability

	Significant Drinking Water Threat Policy Categories	Vulnerability Scores on Map		
		10	8	2,4,6
1.	Waste Disposal			
2.	Sewage Systems			
3, 4.	Agricultural Source Material			
6, 7.	Non-Agricultural Source Material*			
8, 9.	Commercial Fertilizer*			
10, 11.	Pesticide			
12, 13.	Road Salt*			
14.	Storage of Snow			
15.	Fuel			
16.	DNAPLs			
17.	Organic Solvents			
18.	Aircraft De-icing			
21.	Livestock Area			
Local Threat	Oil Pipelines			

Note: This table provides a summary of the activities listed in the Clean Water Act (2006) that apply as Prescribed Drinking Water Threats (PDWT) within the Non-GUDI Wellhead Protection Zones shown on this map. For details refer to the text of the Source Protection Plan and the Ministry of the Environment Drinking Water Threats Tables.
*Application of Commercial Fertilizer, Non-Agricultural Source Material, and Road Salt may not be a significant drinking water threat in some areas due to the % managed land, livestock density, and/or % impervious surface calculations for these areas. See the text of the plan for further details.

- Well
- Road
- Minor River
- Lake / Main River

Wellhead Protection Zones:
- WHPA-A
- WHPA-B
- WHPA-C

Ontario

Grand River Conservation Authority

1. Updated July 20, 2018
2. Larger scale mapping of some map layers, including roads and vulnerability scores, is available at www.sourcewater.ca.
3. This map is for illustrative purposes only. Information contained hereon is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

APPENDIX “D”

DIRECT LIQUID APPLICATION ROUTE MAP

Hamilton