



Table of Contents

1.0	Introduction	1
1.1.	Purpose of this Document	2
1.2.	Responsibilities.....	2
1.3.	Updating	2
2.0	Policy Statement.....	3
3.0	Current Winter Maintenance Program	3
3.1.	Overview of Road Network.....	3
	Winter Event.....	4
3.2.	Salt and Sand.....	4
3.2.1.	Loading	4
3.2.2.	Application.....	4
3.2.3.	Application Rates.....	5
4.0	Level of Service	5
5.0	Equipment – Winter Maintenance Fleet	6
5.1	Automated Vehicle Location (AVL).....	7
5.2	Equipment Calibration	7
6.	Continuous Improvement Practices and Strategies	7
6.1.	Weather Monitoring	7
6.2.	Communications.....	7
6.3.	Training	8
6.4.	Record Keeping.....	8
6.5.	Equipment Washing	8
6.6.	Salt Ordering and Delivery	8
6.7.	Management of Salt Vulnerable Areas	9
7.0	Closing.....	9

1.0 Introduction

The Municipality of Brockton is responsible for winter maintenance on approximately 415 km of roads which includes approximately 185 km of gravel and 230 km of pavement. The Municipality is a mixed urban/rural community with approximately 9,461 residents (2016).

Our area receives an average annual snow fall of 405 cm. To provide safe driving conditions during the winter months, road salts must be used to help melt snow and ice on our roads. Solid salt particles are applied to the road in a mixture with sand. Salt particles are actuated by vehicle traffic crushing the particles, which in turn causes the snow to melt. Mixed sand and salt application rates and application locations are monitored by electronic spreader controllers and GPS location tracking of the winter maintenance fleet.

Environment Canada has been studying the effects of salts on plants, birds, animals, fish, groundwater, lake and stream ecosystems. Freshwater fish are especially intolerant of salt contamination. High salt concentrations can affect nutrient adsorption, reproduction and growth of vegetation. Salt also accelerates the corrosion of metal such as steel beams in bridges and steel bodies on vehicles. In spring, animals that are low in salt from the winter are attracted to the side of the road where they could be in danger. In 2001, an Environment Canada assessment report was released that recommended salt be classified as toxic under the *Canadian Environmental Protection Act (CEPA)*. Road salts are on the Priority Substance List of the CEPA Environment Registry. Health Canada has stated that “salt is not harmful to humans”. Road salts will not be banned but instead, users will be encouraged to develop a management strategy to reduce use and implement alternatives, especially in salt sensitive areas.

In response to concerns over the impacts of road salt on the environment, Environment Canada published in April 2004 the Code of Practice for the Environmental Management of Road Salts in the Canada Gazette stating that road salt is on the Priority Substance List compiled under the Canadian Environmental Protection Act, 1999. The Code of Practice was developed by Environment Canada through a multi-stakeholder consultation and includes practices relating to:

- Salt storage;
- Snow disposal; and
- Salt application with all environmental impacts considered.

This code applies to organizations which:

- Use more than 500 tonnes of road salt per year; and
- Have vulnerable areas that could be potentially impacted by road salts.

Any organization which meets the criteria listed in the Code is required to prepare a Salt Management Plan (SMP). The Municipality of Brockton meets the criteria listed in the Code of Practice for the Environmental Management of Road Salts.

1.1. Purpose of this Document

This SMP sets out a policy and procedural framework for ensuring that the Municipality of Brockton continuously improves on the effective delivery of winter maintenance services and the management of road salt use in winter maintenance operations, as outlined in *Environment Canada's Code of Practice for the Environmental Management of Road Salts*.

The SMP is meant to be a dynamic document to allow the municipality to evaluate and phase-in changes and new approaches and technologies for winter maintenance activities in a fiscally sound manner. At the same time, any modifications to municipal winter maintenance activities must ensure that roadway safety is not compromised.

As specified in the *Code of Practices for the Environmental Management of Road Salts*, the SMP is to be endorsed by the Municipality of Brockton's Council.

1.2. Responsibilities

Everyone within the Municipality of Brockton's Operations Department connected to winter road maintenance has some degree of responsibility for developing, implementing and reviewing the success of the SMP and its associated activities. It is through a cooperative effort that the municipality will reduce the environmental effects of road salt while maintaining a safe transportation network.

1.3. Updating

The SMP is reviewed annually and updated as needed, as well as when practices are added or changed.

2.0 Policy Statement

The minimum standards for winter maintenance are mandated under provincial legislation. The standards set within The Municipality of Brockton are currently at the same level or higher than the Minimum Maintenance Standards (MMS) specified in the *Ontario Regulation 239/02* and amendment *Ontario Regulation 47/13*.

The Municipality of Brockton will work within its capabilities to provide efficient and effective winter maintenance to ensure the safety of users of the municipal road network in keeping with applicable provincial legislation and accepted standards while striving to minimize adverse impacts to the environment. These commitments will be met by:

- Monitoring on an annual basis, the present conditions of the winter maintenance program, as well as the effectiveness of the SMP;
- Committing to ongoing winter maintenance staff training and education;
- Adhering to the procedures contained within the SMP; and
- Reviewing and upgrading the SMP on an annual basis to incorporate new technologies and new developments.

3.0 Current Winter Maintenance Program

3.1. Overview of Road Network

The major activities related to winter maintenance are:

- Snow plowing;
- Salt/sand spreading;
- Salt and sand storage;
- Snow removal;
- Snow storage; and
- Sidewalk plowing and de-icing.

The Municipality of Brockton is responsible for winter maintenance of 415 km of roads:

Type	Length
Paved	230 km
Unpaved (Gravel) Roads	185 km

Winter Event

Winter weather includes various combinations of precipitation, humidity, air and pavement temperatures, wind, and visibility. A successful winter operation employs numerous practices based on the weather conditions.

The objective of applying a sand and salt mix on the road surface is to prevent the formation of ice rather than to melt and stop accumulation. Therefore, salting, whether prior to or during a storm, must be timed appropriately. The exact effective range of salt varies, being dependent on many factors. During a storm where plowing is continuous, further salt applications after each pass of the plow will prevent ice formation. Salt and sand mix applied in the early morning immediately after plowing will have the advantage of any morning sunshine and increased traffic volume to aid the melting process. Speed and safety with a controlled distribution of sand and salt mix are the important factors in efficient salting.

3.2. Salt and Sand

3.2.1. Loading

Equipment is loaded outside of the storage structure with a sand and salt mix. Care is taken to minimize spillage on the loading pad. Deliveries are placed within the covered storage facility as soon as possible and care is taken when loading spreaders to prevent sand and salt mix loss.

3.2.2. Application

The Municipality of Brockton uses electronic spreader controls in all municipal equipment. The electronic spreader units allow for accurate placement of sand and salt, so that the right amount of material is applied. The application rates are based on the current and forecasted weather conditions, the road classifications, and other factors including but not limited to slope, speed limits, and bus or emergency routes. The electronic spreader controls also allow for downloading of activity information for verification. These units are calibrated annually to ensure accuracy.

3.2.3. Application Rates

Solids	kg per two (2) lane km
Highway Class	Sand (max) with 10% salt mixture
Class 3	300
Class 4	300
Class 5	300
Class 6	300

4.0 Level of Service

The Level of Service policy for the Municipality of Brockton currently meets or exceeds the Minimum Maintenance Standards (MMS) specified in the *O. Reg. 239/02, Municipal Act, 2001*, for snow accumulation and icy roads. Roads that are classified as a Class 6 road are maintained to the standards of a Class 5 road as per *O. Reg. 239/02*. The Municipality provides winter maintenance services to sidewalks based on the priority of servicing. Typically, the winter maintenance season commences around November 15 and is completed by April 15 of the following year.

During the winter season, snow plowing may vary. Regular staff hours are between 7:00 am to 3:30 pm at a full crew. Roads are classified as critical, primary or secondary and plowed in decreasing order of priority. Secondary roads are plowed at least once prior to the conclusion of the shift. At that time, if it is required to continue, the primary roads are plowed again. Depending on snow accumulation, the crew may be notified that the shift will start any time prior to 7:00 am. Upon call out, the response time is within 30 minutes, however depending on the snow accumulation and the time of the call, the snow plowing operation may only be with a partial crew concentrating on the call out area and the critical roads.

Depending on the time, the temperature and the snow accumulation, the municipality's procedure for icy road conditions may vary. Sanding operations vary given temperature and snow accumulation. This allows for the main areas to be sanded prior to the increase in traffic volume. Following the critical and primary

roads, concentration is on school zones and then subdivision areas. Due to the severity of the ice conditions, special attention is scheduled for stop sign areas, intersections, hills, shaded sections of roadways and primary residential areas.

Unpaved roads are maintained by ice blading with the motor graders. Very little, if any, salt and sand are ever applied to unpaved roads. This is to maintain the structural integrity of the road base and surface.

Note: The municipality does not maintain any Class 1 and 2 highways.

5.0 Equipment – Winter Maintenance Fleet

Unit Number	Make/Model	Material Spread Controller
<i>Walkerton Patrol Shop 136 Wallace St</i>		
<ul style="list-style-type: none"> • 13 • 14 	Single Axle Plow Truck	Dickey-John
<ul style="list-style-type: none"> • 17 	Tandem Plow Truck	Dickey-John
<ul style="list-style-type: none"> • 28 • 29 	Trackless Sidewalk Machine	
<i>Brant Patrol Shop 603 Bruce Road 19</i>		
<ul style="list-style-type: none"> • 02 • 03 	Grader	
<ul style="list-style-type: none"> • 10 • 11 • 16 	Tandem Plow Truck	Dickey-John
<i>Greenock Patrol Shop 248 Conc 10</i>		
<ul style="list-style-type: none"> • 01 • 04 	Grader	
<ul style="list-style-type: none"> • 18 • 19 	Tandem Plow Truck	Dickey-John

5.1 Automated Vehicle Location (AVL)

The Municipality of Brockton has an Automated Vehicle Location (AVL) system that includes tracking equipment installed in all winter maintenance vehicles. The use of AVL allows staff to ensure that all roads have been covered. It provides vehicle tracking and monitoring, twenty-four hours a day, seven days a week, over the internet for as many vehicles as required.

The AVL allows for the recording and analysis of the following:

- Truck speed;
- Vehicle location;
- Start and finish times;

5.2 Equipment Calibration

Properly calibrated equipment is one of the keys to the effective placement of sand and salt mix material on municipal roads. Prior to the winter season and each year thereafter, all spreaders will have their calibration verified and will be calibrated as needed.

6. Continuous Improvement Practices and Strategies

6.1. Weather Monitoring

The Municipality of Brockton supplements road patrol weather data with observations from municipal staff, communications with staff of adjacent municipalities and the Environment Canada weather broadcast / Weather Network radio, websites, and radar. Staff also monitor pavement temperatures by means of vehicle mounted, infrared thermometer located on the patrol truck.

6.2. Communications

All winter maintenance vehicles are equipped with two-way communications (radios, cells, etc.), and municipal staff/supervisors are responsible for reporting changing

winter weather and/or road conditions. External communication with the public ranges from media press releases to information posted on the Municipality of Brockton's website regarding winter maintenance services and salt management practices, to responses to individual inquires.

6.3. Training

The Municipality of Brockton currently provides training for winter maintenance personnel. Prior to the winter season, staff meet to discuss the strategy for winter maintenance, to go over spreading/plow responsibilities and review safety issues. In the spring following the winter season, staff typically meet to discuss the successes and failures of the past winter maintenance campaign and to provide input and suggestions for improvement.

6.4. Record Keeping

All municipal staff involved in winter maintenance activities, including supervisors, lead hands, patrollers, equipment operators, and contracted staff are required to record all activities, including material usage and location. This information is used to calculate and keep track of salt and sand mix usage and distribution across the municipality.

6.5. Equipment Washing

The Municipality of Brockton shops have oil and grit separators within their depots. These separators reduce the harmful effects of oil, grease and salt from entering the environment. Equipment washing generally occurs inside the depots to minimize salt impacts on the environment.

6.6. Salt Ordering and Delivery

In the fall season, salt and sand is delivered and stockpiled on the loading pad. Within 24 hours winter sand is mixed with salt and all material conveyed to indoor storage.

Staff should ensure the following:

- ensure proper records are kept that include weigh tickets for each delivery;
- ensure all deliveries of sand and salt are covered while in transport, on the ground, and schedule deliveries in good weather; and
- ensure all loading pads are swept cleaned following the transfer of the material to indoor storage.

6.7. Management of Salt Vulnerable Areas

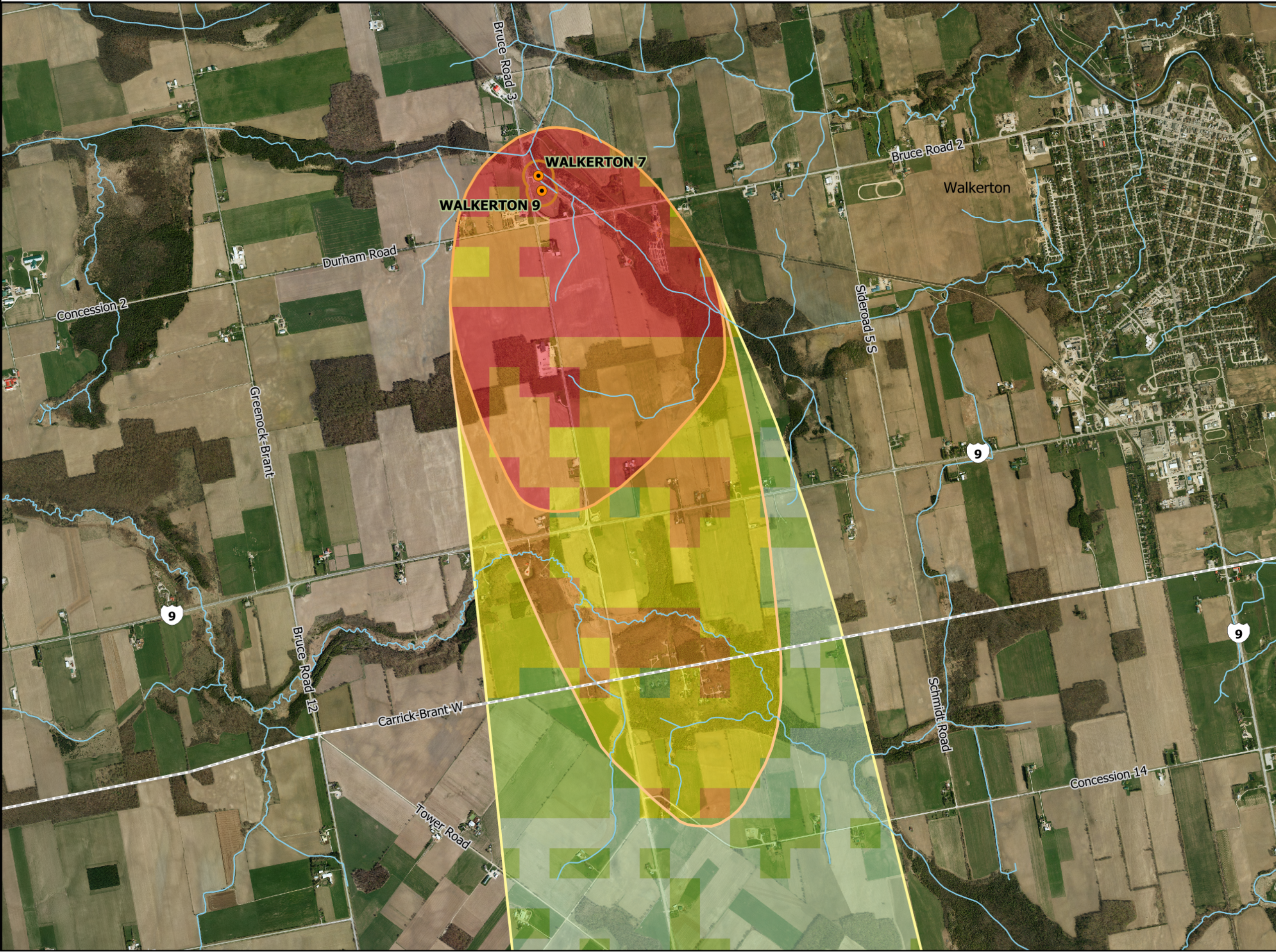
The Municipality of Brockton monitors Environment Canada's approach to addressing vulnerable areas, including portions of the Wellhead Protection Areas for the Municipal Drinking Water Systems in Walkerton, Chepstow and Lake Rosalind/Marl Lake as designated by the Saugeen, Grey Sauble, Northern Bruce Peninsula Source Protection Plan maps which are reviewed with winter maintenance personnel (REFERENCE ATTACHED MAPS HERE). Within these vulnerable areas, efforts will be made to reduce salt application rates, and the removal of plowed snow will be prioritized to minimize contaminated runoff. Alternative de-icing technologies are continuously being reviewed for effective and safe use in identified vulnerable areas.

7.0 Closing

The Municipality of Brockton's Salt Management Plan provides a positive step towards reducing our salt usage, while maintaining the same level of service the public has come to expect. The Operations Department will continue to measure and evaluate these benefits for operational improvement, cost savings, and environmental benefits on a yearly basis or as need dictates.

MAP 5.1.B.W.1 WALKERTON DRINKING WATER SYSTEM WHPA

Approved Source Protection Plan



- Municipal Well
- Watercourse
- Municipal Boundary

Wellhead Protection Area

- WHPA-A (100 m Radius)
- WHPA-B (2 Year Time-of-Travel Capture Zone)
- WHPA-C (5 Year Time-of-Travel Capture Zone)
- WHPA-D (25 Year Time-of-Travel Capture Zone)

Wellhead Vulnerability Score

- 10
- 8
- 6
- 4
- 2



1 : 25,000

Projection:
UTM NAD 83 Zone 17



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Wellhead Protection Areas delineated by Waterloo Numerical Modelling Corporation and DWSP Staff.
Vulnerability Scores delineated by DWSP Staff.

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MAP 5.1.B.C.1 CHEPSTOW DRINKING WATER SYSTEM WHPA

Approved Source Protection Plan



- Municipal Well
- Watercourse
- Lake

Wellhead Protection Area

- WHPA-A (100 m Radius)
- WHPA-B (2 Year Time-of-Travel Capture Zone)
- WHPA-C (5 Year Time-of-Travel Capture Zone)
- WHPA-D (25 Year Time-of-Travel Capture Zone)

Wellhead Vulnerability Score

- 10
- 8
- 6
- 4
- 2



1 : 8,000

Projection:
UTM NAD 83 Zone 17



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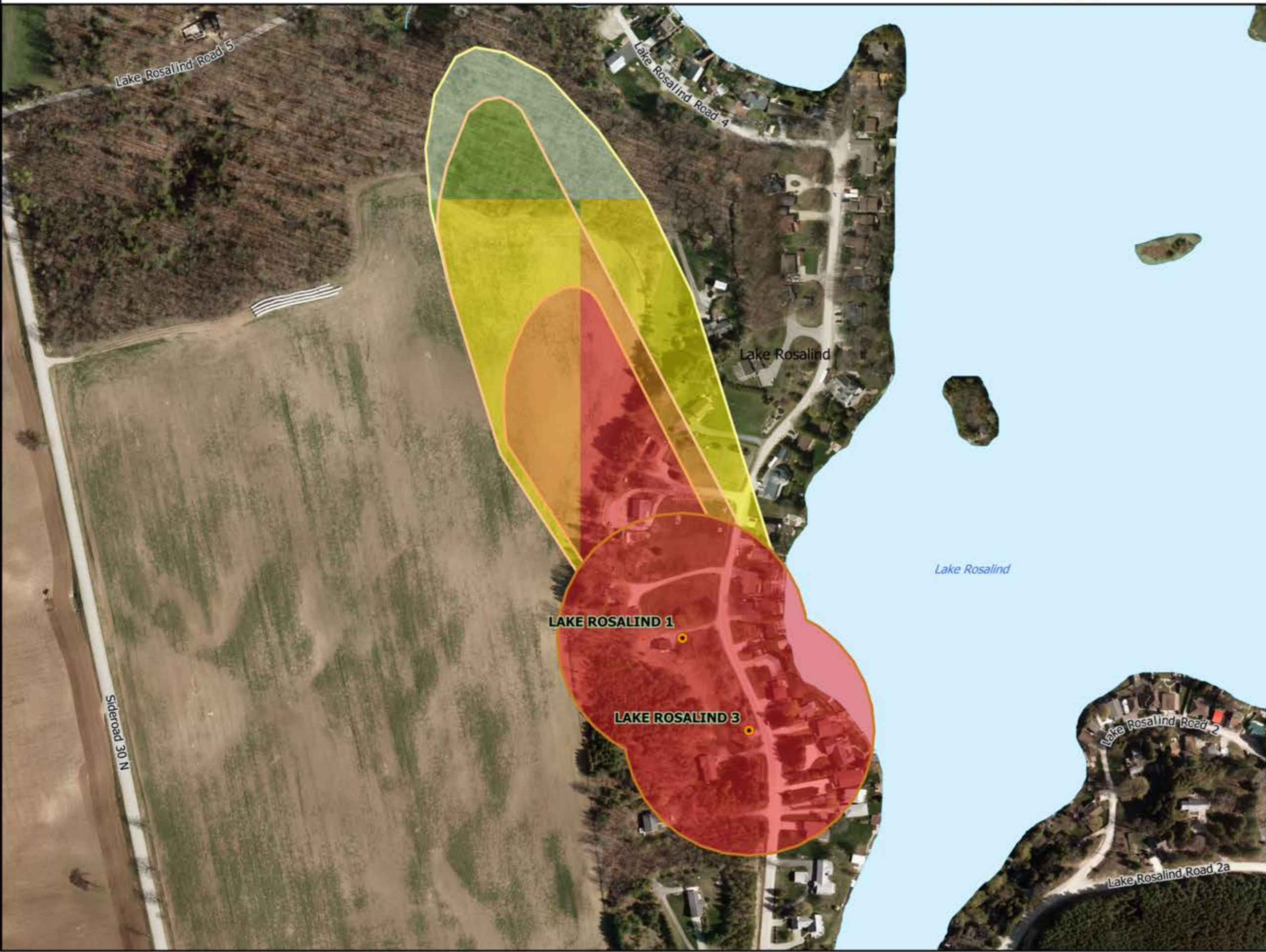
Wellhead Protection Areas delineated by Schlumberger Canada Limited and DWSP Staff.
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MAP 5.1.B.LR.1 LAKE ROSALIND DRINKING WATER SYSTEM WHPA

Approved Source Protection Plan



- Municipal Well
- Watercourse
- Lake
- Wellhead Protection Area**
 - WHPA-A (100 m Radius)
 - WHPA-B (2 Year Time-of-Travel Capture Zone)
 - WHPA-C (5 Year Time-of-Travel Capture Zone)
 - WHPA-D (25 Year Time-of-Travel Capture Zone)
- Wellhead Vulnerability Score**
 - 10
 - 8
 - 6
 - 4
 - 2



1 : 3,000

Projection:
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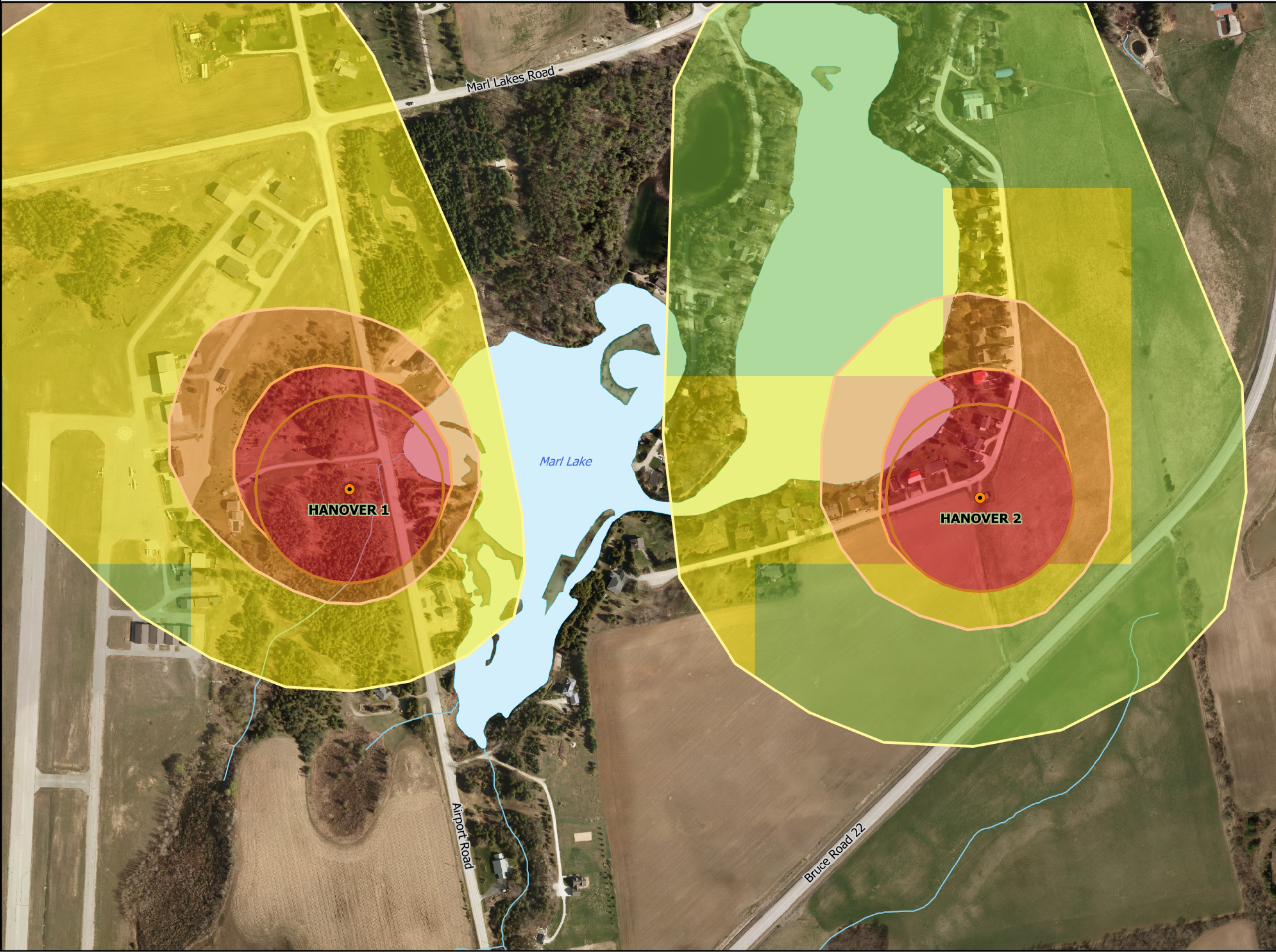
Wellhead Protection Areas delineated by Schlumberger Canada Limited and DWSP Staff.
Vulnerability Scores delineated by DWSP Staff.

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MAP 5.1.H.H.1 HANOVER WATER TREATMENT PLANT WHPA

Approved Source Protection Plan



- Municipal Well
- Watercourse
- Lake
- Wellhead Protection Area**
 - WHPA-A (100 m Radius)
 - WHPA-B (2 Year Time-of-Travel Capture Zone)
 - WHPA-C (5 Year Time-of-Travel Capture Zone)
 - WHPA-D (25 Year Time-of-Travel Capture Zone)
- Wellhead Vulnerability Score**
 - 10
 - 8
 - 6
 - 4



1 : 4,000

Projection:
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