Lakehead Source Protection Plan

Approved Source Protection Plan - January 16, 2013

Prepared by the Lakehead Source Protection Committee

Under the Clean Water Act, 2006
(Ontario Regulation 287/07)

DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Lakehead Region Conservation Authority
Conserve Today... For A Better Tomorrow

LAKEHEAD Source Protection AREA

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Prepared by the Lakehead Source Protection Committee

Under the *Clean Water Act, 2006*
(Ontario Regulation 287/07)

The Minister has approved this plan. The effective date is October 1, 2013.

January 16, 2013

Lakehead Source Protection Area

Drinking Water Source Protection Program
Lakehead Region Conservation Authority
130 Conservation Road P.O Box 10427
Thunder Bay, Ontario P7B 6T8
Telephone: (807) 344-5857
Email: info@lakeheadca.com

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Executive Summary

The Ontario Government has created legislation, the *Clean Water Act, 2006*, in order to protect drinking water at the source as part of an overall commitment to human health and the environment and to ensure safe, clean drinking water for all Ontarians. This came after pathogens entered into the Municipal Drinking Water System for the Town of Walkerton, Ontario. Seven people died and thousands of others became ill from drinking the contaminated water. Protecting "source water" is the first step in a multi-barrier approach to ensure the quality and sustainability of Municipal Residential Drinking Water Supply. A key focus of *Ontario's Clean Water Act, 2006* is the production of locally developed, science-based Assessment Reports and Source Protection Plans.

Prior to the *Clean Water Act, 2006* being passed, the Ministry of the Environment (MOE) provided funding for Conservation Authorities to acquire the resources necessary to implement the proposed "protection of water at the source". These resources included the hiring of Staff such as Project Managers, Water Resources Engineers, GIS/Database Specialists, Communications Specialists and Administrative Assistants. It also included funding for infrastructure such as office space and associated related office equipment.

As per the *Clean Water Act, 2006*, the Minister of the Environment appointed Chairs for the Source Protection Committees on August 20, 2007. The initial appointment was for a term of four years with re-appointment in 2011 for an additional four year term. Subsequently, representatives from the watershed community (Municipalities, Conservation Authorities, stakeholders, water users and land owners) were appointed to the Source Protection Committees. Representation on the committees varies depending on local needs. The Lakehead Source Protection Committee (LSPC) involves combined representation from Municipalities, Industry and the Public.

The first step of the Source Protection Planning Process required each Source Protection Committee (SPC) to prepare a Terms of Reference. This document outlines all of the necessary steps to develop and implement a Source Protection Plan.

The approval of the Lakehead Region Terms of Reference on May 25, 2009, triggered the start date of a one-year timeline for the preparation of the Assessment Report. This enabled the start of technical studies such as the "Watershed Characterization Report - A Draft Report for the Consideration of the Lakehead Source Protection Committee" and the "Water Budget and Water Quantity Stress Assessment".

The SPC held monthly meetings, open to the public, to review existing technical studies used in the preparation of the Assessment Report. The Source Protection Staff continued to provide technical, communication and clerical support to the SPC. The technical study reports identified

vulnerable areas where contamination or shortages could be an issue for Municipal Drinking Water Sources. Technical studies helped to establish a list of threats that are located within the vulnerable areas. The Lakehead Source Protection Area Assessment Report was approved on June 21, 2011. The SPC was then able to proceed with preparation of the Source Protection Plan.

While most Conservation Authorities are based on a natural watershed or group of watersheds, the Lakehead Region Conservation Authority (LRCA) is an exception. The jurisdiction only covers the lower portions of virtually all of its watersheds. The boundary of the LRCA corresponds to the boundaries of its participating Municipalities, yet most of the watercourses and their watersheds extend beyond these Municipalities in unorganized territory. Territories that are not covered by a Conservation Authority in the Province of Ontario fall under the jurisdiction of the Ontario Ministry of Natural Resources.

There are only two Municipal drinking water sources within the LRCA jurisdiction; the Municipality of Oliver Paipoonge Rosslyn Village (groundwater intake) and the City of Thunder Bay (Lake Superior intake).

To date, 32 instances of Significant Drinking Water Threats, as defined by the *Clean Water Act*, have been identified in the Lakehead Source Protection Area. These threats are all located in the Rosslyn Village Wellhead Protection Area and consist of septic systems and threats related to agriculture. Since these threats are significant, policies have been created in order to protect the drinking water source.

No significant or moderate threats have been identified for the City of Thunder Bay or in the adjacent Municipality of Shuniah, which is in close proximity to the Bare Point Water Treatment Facility.

This Source Protection Plan is the culmination of the Lakehead SPC's efforts to draft policies to ensure that significant threats to the City of Thunder Bay and Rosslyn Village Subdivision drinking water sources cease to be or never become significant threats. The Committee, in consultation with the impacted parties, has reviewed relevant background information and has created the Plan.

The Source Protection Planning process was made up of six components: early engagement, policy development, pre-consultation, drafting the Source Protection Plan, Consultation, and submitting the Proposed Source Protection Plan.

Early Engagement began in January 2011 when notices were sent out to all of the Municipalities and stakeholders involved. The Chair and Staff made presentations to Municipal Councils in Oliver Paipoonge, the City of Thunder Bay and Shuniah.

In June 2011, Staff began the process of drafting policies for the significant drinking water threats within the Rosslyn Village Wellhead Protection Area (WHPA). Staff met with the Local Municipal Planning Working Group to discuss policy options and the direction of the SPC.

Six policies were developed and sent out for pre-consultation in September 2011. These included Land Use Planning, Specify Action and Education and Outreach Policies for the Rosslyn Village Municipal Drinking Water Supply, along with their corresponding monitoring policies.

The Land Use Planning Policy will prohibit the future significant threats of establishing a waste disposal site, sewage treatment facilities (not including those under 10,000 litres a day), organic solvents and fuel stored for non-residential use, and the storage of pure dense non-aqueous phase liquids (DNAPLs) except for incidental volumes for personal, domestic use.

The Specify Action Policy manages the existing significant threat of septic systems under 10,000 litres a day and future significant threats of application handling and storage of road salt, storage of snow and new septic systems under 10,000 litres a day.

The Education and Outreach Policy is designed to educate the residents of WHPA-A on existing and possible future threats on their property. This policy manages all existing agricultural threats and future agricultural threats that could take place on properties that are zoned "rural" and septic systems under 10,000 litres a day. It also advises residents of the harmful effects of DNAPLs to the groundwater resources.

In November 2011, the Strategic Policy for the City of Thunder Bay was delivered. This policy has been created after concerns were expressed about occasional shipping anchorage in proximity to the intake pipe at Bare Point. This policy encourages the City to develop or update a Spill Prevention and Contingency Plan and place a buoy at the anchorage line.

The Draft Source Protection Plan was delivered for Public Consultation in January 2012. The comments were received and considered from the consultation process and the Proposed Source Protection Plan was developed. After a second Public Consultation in the spring of 2012, the Proposed Source Protection Plan for the Lakehead Source Protection Area was submitted for approval. More information can be found on the Lakehead Region Conservation Authority Website www.lakeheadca.com.

An Explanatory Document containing the rationale for decisions made in policy development has also been prepared by the Lakehead Source Protection Committee. Included in this document is a summary of consultation comments and how they were considered by the Committee.

Acknowledgements

The Lakehead Source Protection Committee (SPC) acknowledges and thanks the Lakehead Source Protection Authority and Ministry of the Environment Staff for their guidance and support during the planning process and all former and current Source Water Protection Staff for preparing all of the previous documents and reports. Without this technical work, the Source Protection Plan would not be possible. The Lakehead SPC would also like to thank the following Lakehead Region Conservation Authority Staff for their dedication, hard work and perseverance in the preparation of this Source Protection Plan for the Lakehead Source Protection Area:

Julie Beach- Source Water Protection Manager
Mervi Henttonen- General Manager/ Secretary-Treasurer
Neal Zago- Source Water Protection Communications Officer
Vince Ponka - Source Water Protection Administrative Assistant
Roman Augustyn- GIS/Data Specialist
Tammy Cook- Watershed Manager

This project has received full funding support from the Government of Ontario.

Preface

In May 2000, water contaminated by *Escherichia coli* (*E. coli)* bacteria made its way into the Municipal Residential Drinking Water System of the Town of Walkerton, Ontario. Within days, seven people had died and thousands of others had become ill from drinking the contaminated water. As a result, the provincial government convened an inquiry led by Justice Dennis O'Connor of the Ontario Superior Court of Justice. In 2002 Justice O'Connor released two reports: the "Walkerton Report – Part One", which described the events that took place in the community and the series of human and system failures that led to the water becoming contaminated; and the "Walkerton Report – Part Two", which provided a more general look at water safety across the province and the steps needed to prevent a similar event from occurring elsewhere. This report contained 93 recommendations, including recommendations for practices related to source water protection and training procedures for those responsible for water treatment.

In response to the "Walkerton Report", and Justice O'Connor's recommendations, the Ontario government developed multiple pieces of legislation. The *Clean Water Act, 2006*, which implemented drinking water Source Protection Planning in every watershed in Ontario covered by a Conservation Authority, was one of the first pieces of legislation developed. Since the *Clean Water Act* received Royal Assent in October 2006 and then was enacted in July 2007, the provincial government has developed additional regulations and guidance documents that support the *Clean Water Act*.

The Lakehead Source Protection Committee's Source Protection Plan (SPP) has been developed for the Lakehead Source Protection Area (LSPA). It specifically applies to the Rosslyn Village Municipal Drinking Water sources in the Municipality of Oliver Paipoonge and the Bare Point Municipal Water Intake in the City of Thunder Bay. It does not apply to private wells.

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This Source Protection Plan has been prepared under the *Clean Water Act, 2006* and its associated Regulations and Technical Rules (TR). It focuses on the groundwater source for Rosslyn Village drinking water and the surface water source for the City of Thunder Bay.

1.1 - Drinking Water Source Protection & the *Clean Water Act, 2006*

After the Walkerton Inquiry, the Government of Ontario enacted the *Safe Drinking Water Act*, which created new requirements and rules for the treatment, distribution and testing of Municipal drinking water. The *Clean Water Act* and the *Safe Drinking Water Act*, along with their regulations, provide the legislative and regulatory framework to foster the multi-barrier approach to Municipal drinking water protection in the Province of Ontario.

The Ministry of the Environment's (MOE) *Clean Water Act, 2006* formally established the Drinking Water Source Protection (DWSP) Program in the Province of Ontario. The *Act* and associated Regulations created Source Protection Areas that are watershed based as per the O'Connor Inquiry Part 2 Recommendation # 1. The MOE has implemented this watershed based Source Protection via existing Conservation Authorities, as they were also established on a watershed basis.

The *Act* and Regulations instigated the formation of 19 Source Protection Committees covering the drinking water sources for approximately 90 percent of Ontario's population. These Source Protection Committees have been charged with preparing Source Protection Plans for their Municipal residential drinking water sources.

1.2 - Source Protection Planning Process

Pre-Legislation: Prior to the *Clean Water Act, 2006* being passed, the MOE provided funding to Conservation Authorities to acquire the resources necessary to implement the proposed "protection of water at the source". These resources included the hiring of Staff such as Project Managers, Water Resources Engineers, GIS/Database Specialists, Communications Specialists and Administrative Assistants. It also included funding for infrastructure such as office space and associated related office equipment.

This enabled the start of "technical studies" such as the "Watershed Characterization Report - A Draft Report for the Consideration of the Lakehead Source Protection Committee" and the "Water Budget and Water Quantity Stress Assessment". These Reports were prepared by the newly hired Source Water Protection (SWP) Staff, with assistance from Lakehead Region Conservation Authority (LRCA) Staff as needed. Consultants were hired to complete Studies such as the "Thunder Bay Aquifer Characterization Groundwater Management and Protection Study". Funding was also provided by the MOE to Municipalities in the form of Technical Study

Grants. Copies of these reports can be acquired at the Lakehead Region Conservation Authority Office.

Legislation Passed: The passing of the Legislation "officially" created Source Protection Areas and Source Protection Authorities out of the existing Conservation Authorities.

The enactment of the *Clean Water Act, 2006* saw the creation of Source Protection Authorities, based on existing Conservation Authority boards. This led to the appointment of the Chairs of the Source Protection Committees by the Minister of the Environment, based on recommendations from Source Protection Authorities. The Source Protection Authority (SPA) then appointed the Source Protection Committee Members, based on the various sectors. August 20, 2007, established the start date of a five-year process to complete a Source Protection Plan for each Municipal residential drinking water source located in Conservation Authority watersheds. Subsequently, the Source Protection Committee Members were appointed by the Source Protection Authorities in accordance with the *Act* and its Regulations.

The Source Protection Planning process can be broken down into three phases:

- Development of the Terms of Reference;
- Development of an Assessment Report;
- Preparation of the science based Source Protection Plan.

The first step of the Source Protection Planning Process required each Source Protection Committee (SPC) to prepare its Terms of Reference. This document outlines all of the necessary steps to develop and implement a Source Protection Plan. The approval of the Lakehead Region Terms of Reference on May 25, 2009, triggered the start date of a one-year timeline for the preparation of the Assessment Report.

While these activities were happening, work was continuing on the preparation of Technical Studies necessary for the completion of the Assessment Report. These studies include the "Water Budget and the Water Quantity Stress Assessment Report".

The second step in the process was the preparation of the Assessment Report. This document identifies vulnerable areas where contamination or shortages could be an issue for Municipal Drinking Water Sources. It also established a list of threats that are located within the vulnerable areas. This required the completion of technical studies by the Source Protection Staff and Consultants. It included the preparation of a Draft Assessment Report by the SPC, public consultation and submission to the Lakehead Source Protection Authority (SPA). Another public consultation period followed and ultimately the Proposed Assessment Report was submitted by the Lakehead SPA to the MOE for review and approval.

The SPC held monthly meetings, open to the public, to review existing technical studies used in the preparation of the Assessment Report. The Source Protection Staff continued to provide technical, communication and clerical support to the SPC.

The preparation and submission of the Assessment Report concluded the second phase of the Source Protection Planning process. The Lakehead Source Protection Area Assessment Report was approved on June 21, 2011, and can be found in the Appendix.

Next Steps: Through approval of the Assessment Report and the passing of the amendment to O. Reg. 287/07, the SPC was able to proceed with preparation of the Source Protection Plan.

The process involved the preparation of Draft Source Protection Plan by the SPC, including a public comment/review period. The SPC then submitted the Draft Source Protection Plan to the SPA, followed by another public comment period. After the Proposed Source Protection Plan had gone through all necessary review stages it was submitted to the Minister of the Environment for approval.

Once the Source Protection Plan is approved by the Minister, implementation will be required by the Municipalities, Lakehead Region Conservation Authority and Thunder Bay District Health Unit. At the time of Plan completion, the implementation process was still to be determined. There will also be on-going monitoring and reporting requirements, which need to be finalized.

1.3 - Participants in the Process

The Lakehead Source Protection Plan will cover the source water supply for the Municipal drinking water in Rosslyn Village (Municipality of Oliver Paipoonge) and Bare Point (City of Thunder Bay). Therefore, the main participants in the Source Protection Planning process are the Lakehead SPC, Lakehead SPA, the Municipality of Oliver-Paipoonge and the City of Thunder Bay. The major industrial partners are Forestry, Agriculture and Shipping. Public stakeholders include backgrounds in Tourism and Education. Three liaisons supported the SPC including employees from the Thunder Bay District Health Unit, the Ministry of the Environment and the Lakehead Region Conservation Authority.

1.4 – Objectives and Scope of the Source Protection Plan

The Source Protection Plan for the Lakehead Source Protection Area is a document that sets out the policies to protect sources of Municipal drinking water. This Plan determines how drinking water threats will be reduced, eliminated or monitored, who is responsible for taking action, timelines and how progress will be measured.

The scope of the Source Protection Plan is the Lakehead Source Protection Area. It specifically applies to Municipal residential drinking water sources (Wellhead Protection Areas and Intake Protection Zones). No threats have been listed in the Assessment Report for highly vulnerable

aquifers (HVAs) or significant groundwater recharge areas (SGRAs) within the Lakehead Source Protection Area, therefore no policies have been developed in these areas.

Section 22 of the Ontario Regulation 287/07 lists the following as objectives of the Source Protection Plan:

1. To protect existing and future drinking water sources in the Lakehead Source Protection Area.

2. To ensure that in all areas where a significant drinking water threat could exist, that:
    a. If the activity is occurring at the time the Source Protection Plan takes effect, the activity ceases to be a significant drinking water threat,
    b. The activity never becomes a significant drinking water threat.

1.5 – Priorities of the Source Protection Plan

The policies that are contained in the Source Protection Plan are focused on ensuring that activities that are or would be a significant threat to Municipal drinking water sources cease to exist or never become significant. Identified moderate and low threats to drinking water sources may be considered by the SPC and/or Municipalities in the future.

1.6 – Regulatory Requirement and Constraints

The *Clean Water Act* established the requirements governing the contents of the Source Protection Plan. Specific content is mandatory, while other content is optional as summarized in Table 1.

Table 1: Mandatory and Optional Content for Source Protection Plans.

Mandatory Content	Optional Content

• Approved Assessment Report
• Objectives
• Significant threat policies – activities: For areas where an activity is or would be a significant drinking water threat, policies intended to ensure the activity ceases to be or never becomes significant
• Monitoring policies:
  ○ monitoring activities/conditions in areas where they are / would be significant
  ○ monitoring of moderate / low drinking water threats where advisable to prevent the threat (activity or condition) from becoming significant
  ○ monitoring of a drinking water issue where advisable
• Summary of consultation activities
• Applicable legal provisions, person/body responsible and applicable area for each policy must be clearly identified
• Dates by which official plans, zoning by-laws and prescribed instruments, must conform with significant threat policies
	• Significant threat policies – conditions (contamination from previous activities): For areas where condition resulting from a past activity is a significant threat, policies intended to ensure condition ceases to be significant
	• Moderate and low threats policies –Policies to address activities and conditions identified as moderate and low threats
	• Policies governing:
	  ○ Incentive programs and education & outreach programs, including for drinking water sources not in the terms of reference
	  ○ Spills prevention, contingency or response plans along highways, railways or shipping lands in intake protection zones or wellhead protection areas
	  ○ Climate change data collection
	  ○ Transport pathways
	• Anything that will assist in understanding the source protection plan
	• Dates for policies to take effect

1.7 – How to Read This Plan

The Source Protection Plan for the Lakehead Source Protection Area is divided into seven chapters and includes applicable and required appendices. Also included with the Source Protection Plan is the Explanatory Document for the Lakehead Source Protection Area, which should be read in conjunction with the Plan.

The Introduction provides the background for the Source Protection Planning Process. This includes the creation of the *Clean Water Act, 2006*, the Terms of References, Assessment Report, Source Protection Plan, an explanation of who participated in the planning process and a description on how to read this Plan.

Chapter 2 discusses the geographical characteristics of the Lakehead Source Protection Area and the Municipalities that are affected by the Source Protection Plan. The vulnerability scores for

each Municipal drinking water source is displayed in this chapter as this provided the foundation for the policies that were written by the Committee.

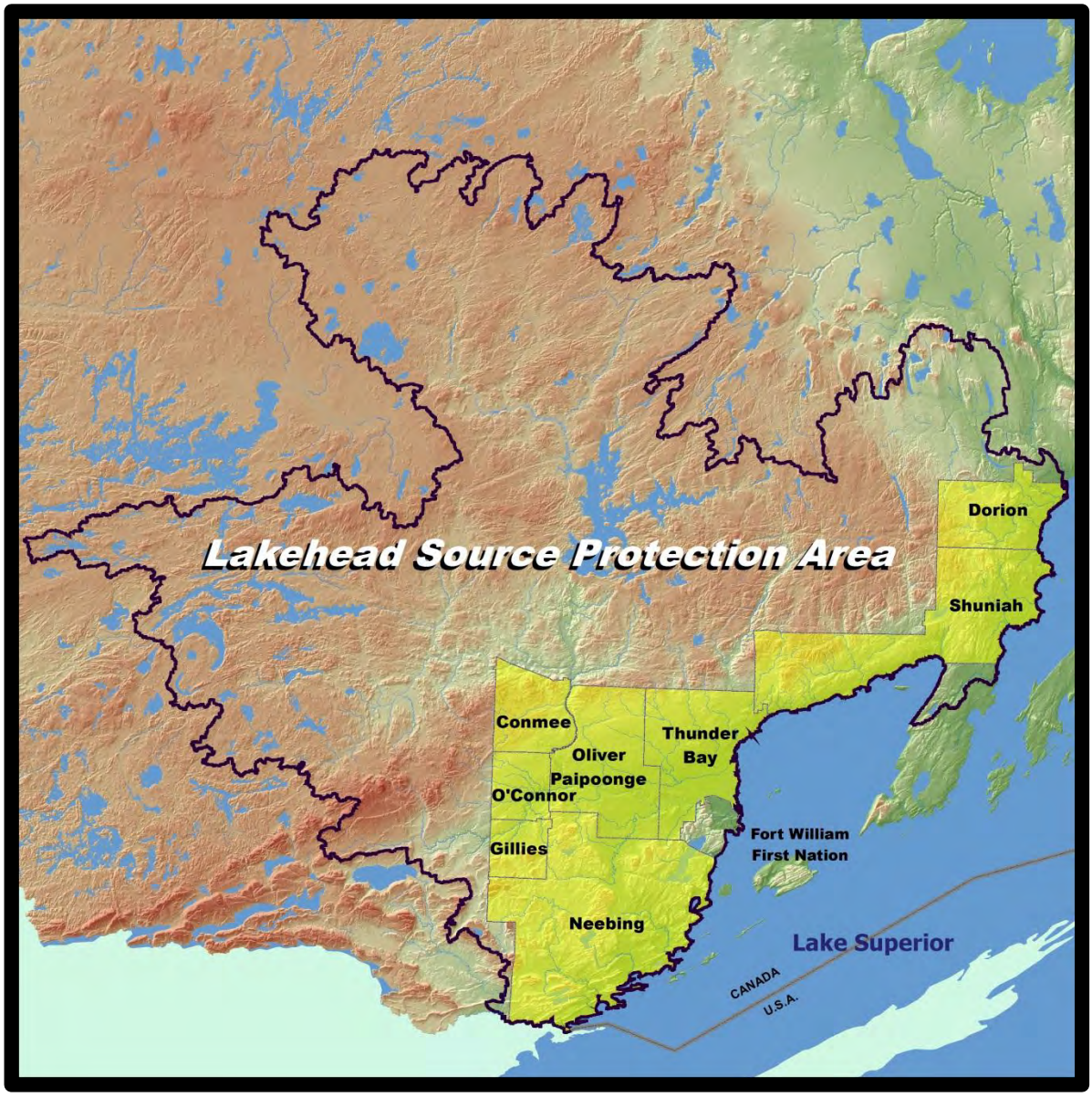
Chapter 3 explains the Source Protection Planning Process. Implementers and users are provided with background information on the 21 Prescribed Drinking Water Threats, the policy tools that were available for policy development and the legal effects of various policies. This section can be used as a reference by readers.

When writing the Source Protection Plan, the policy sections for the Rosslyn Village Municipal Residential Drinking Water System (Chapter 4) and the City of Thunder Bay (Bare Point) Municipal Drinking Water Systems (Chapter 5) were designed in order to be standalone from the Plan itself. Policies in the Source Protection Plan are grouped based on the policy approach that was used. Maps for the areas where the policies apply can be found within each chapter.

Included in the Appendix are the necessary lists in order to achieve compliance with subsection 34(1) to (4) of Ontario Regulation 287/07 (steps to make the Source Protection Plan legal), the approved Assessment Report, an acronym list and glossary.

Ontario Regulation 287/07, Section 40 requires that an Explanatory Document be prepared and submitted with each Source Protection Plan. While this document is not part of the Plan, it provides implementers, municipalities, stakeholders, the general public, Source Protection Authority and the Ministry of the Environment with information that influenced policy decisions. Through providing this rational, the Explanatory Document supports the transparent decision making process that is Source Protection Planning.

More information about this process can be found on the Lakehead Region Conservation Authority Website at www.lakeheadca.com.



Chapter 2 – Lakehead Source Protection Area

Chapter 2 - Lakehead Source Protection Area

2.1 - Geography of the Lakehead Source Protection Area

The Lakehead Source Protection Area (LSPA) covers a land base of 11,526 square kilometres. The Lakehead Region Conservation Authority (LRCA) jurisdiction is found within this area as indicated on Figure 1: Source Protection Plan Map #1: Lakehead Source Protection Area on page 13. The LRCA is comprised of the Townships of Gillies, Conmee, O'Connor and Dorion; the Municipalities of Neebing, Oliver Paipoonge and Shuniah; and the City of Thunder Bay. The majority of the land base in the LSPA has a low population density with a rural character.

The boundary of the LSPA was determined based on the flow of water contained within the portion of the secondary watershed that would eventually pass through the LRCA jurisdiction and reach Lake Superior.

The topography of the area is variable because of glacial activity, post-glacial meltwater lake levels and river outwash. The last glacial period took place between 10,000 and 12,000 years ago.

Climate in the LSPA is that of a mid-latitude location on a Great Lake. Warm, wet summers, cold dry winters and a short growing season are experienced regularly. The modified continental climate that exists in this region means that the temperature differences between summer and winter is at least 30 degrees Celsius.

There are two Municipal Drinking Water Sources within the LSPA. The first is located in Rosslyn Village in the Municipality of Oliver Paipoonge. The second is located in the City of Thunder Bay on the shore of Lake Superior. Other smaller communities in this area (Dorion, Kakabeka Falls, Murillo) rely on private wells for their drinking water.

2.1.1 - Municipality of Oliver Paipoonge

Oliver Paipoonge is a Municipality within the LSPA and located directly west of the City of Thunder Bay. The Municipality was formed on January 1, 1998, with the amalgamation of the former Townships of Oliver and Paipoonge. The Municipality is part of Thunder Bay's Census Metropolitan Area.

The geography of Oliver Paipoonge transitions from river valleys in the south, through flat open farmland and rolling hills in the central areas, to the rough Canadian Shield in the north. The most notable geographic feature is Kakabeka Falls, located on the western edge of the Municipality in Kakabeka Falls Provincial Park.

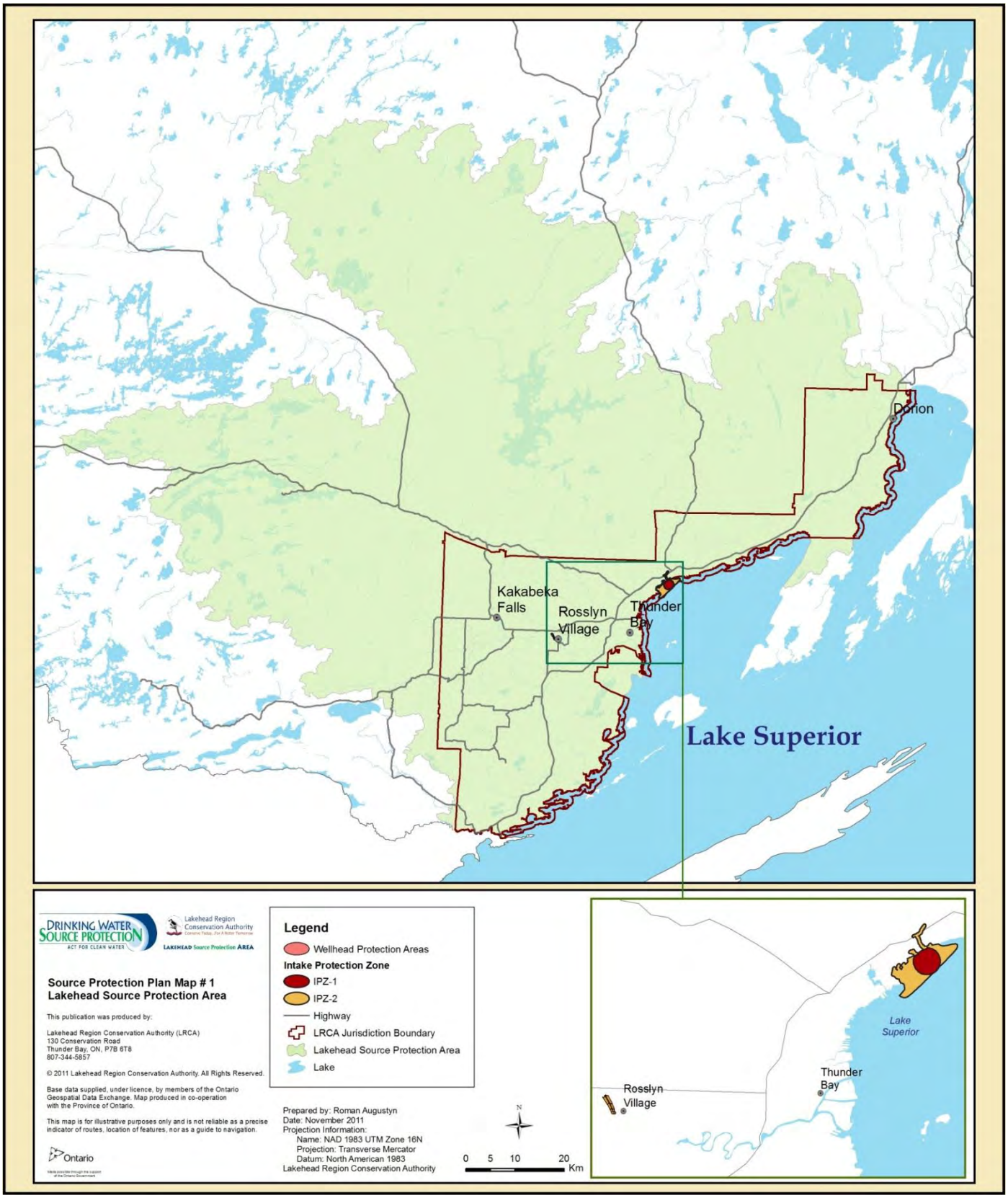


Figure 1: Source Protection Plan Map #1: Lakehead Source Protection Area

2.1.2 - City of Thunder Bay

The City of Thunder Bay is located near the geographical centre of Canada on the shore of Lake Superior - the western terminus of the St. Lawrence Seaway System. The city takes its name from the immense bay known as Thunder Bay at the head of Lake Superior, shown on 18th-century French maps as *Baie du Tonnerre* (Bay of Thunder). The city is often referred to as the "Lakehead" or "Canadian Lakehead" because of its location at the end of Great Lakes navigation system.

Thunder Bay is the 10th largest city in Ontario and the largest metropolitan centre in Northwestern Ontario. The population of metro Thunder Bay is approximately 125,000 and is made up of a diverse multi-cultural base.

The City has an area of 328.48 square kilometres, which includes the former cities of Fort William and Port Arthur, as well as the former Townships of Neebing and McIntyre. The former Fort William section occupies flat alluvial land along the Kaministiquia River. In the river delta are two large islands: Mission Island and McKellar Island. The former Port Arthur section is more typical of the Canadian Shield, with gently sloping hills and very thin soil lying on top of bedrock with many bare outcrops.

The City of Thunder Bay is a major transportation corridor as it is located near the centre of Canada and has access to the east and west, as well as to the United States and the global market. Land, air and water transportation are available for the movement of goods.

There are two primary highways that run through the area and numerous secondary highways. Both the Canadian National and the Canadian Pacific Railways pass through the region, with major stops in the Port of Thunder Bay.

The Thunder Bay International Airport is one of the busiest in the province, servicing both the movement of people and goods for the region. According to the Annual Report for the Thunder Bay International Airports Authority, over 600,000 travellers passed through the airport in 2010.

The Port of Thunder Bay is at the head of the Great Lakes/St. Lawrence Seaway system and 3,700 kilometres into North America from the Atlantic Ocean. It takes roughly five days to travel from the Eastern Seaboard, through the locks and reach the Port. The Thunder Bay Port Authority has storage facilities for various types of cargo, including grain, which is most common type of cargo.

2.2 - Assessment Report and Major Findings

The Assessment Report is the technical, science-based report generated by the Lakehead SPC to identify risks and threats to the sources of Municipal residential drinking water in the LSPA. Threats and risks were identified and assessed for the vulnerable areas defined in technical

studies for the Rosslyn Village Subdivision Well Supply in the Municipality of Oliver Paipoonge and the Bare Point Water Treatment Plant that serves the City of Thunder Bay. Once Wellhead Protection Areas (WHPAs) and Intake Protection Zones (IPZs) were identified and mapped, scientific calculations and professional expertise were used to determine how vulnerable each zone or area was to contamination. The Approved Assessment Report for the Lakehead Source Protection Area can be found in Appendix B.

The susceptibility to contamination is known as the vulnerability score. The score is a numbering system designed by the MOE that ranges between one and ten, with a higher number indicating a higher susceptibility to contamination. Areas closest to the well or intake are the most vulnerable.

The highest vulnerability score, as shown in Figure 2: Source Protection Plan Map #2: Vulnerability Scores for Rosslyn Village Wellhead Protection Area supply is 10. This score is located in WHPA-A.

For the City of Thunder Bay IPZ, the highest vulnerability score is five, which is in IPZ 1, as shown in Figure 3: Source Protection Plan Map #3: Vulnerability Scores for Thunder Bay (Bare Point) Water Treatment Plant.

The Assessment Report contains the technical and scientific information that the Lakehead Source Protection Committee required in order to develop the Source Protection Plan. The Watershed Characterization and Water Budget Reports also helped support decisions made to address water quality and quantity issues and threats.

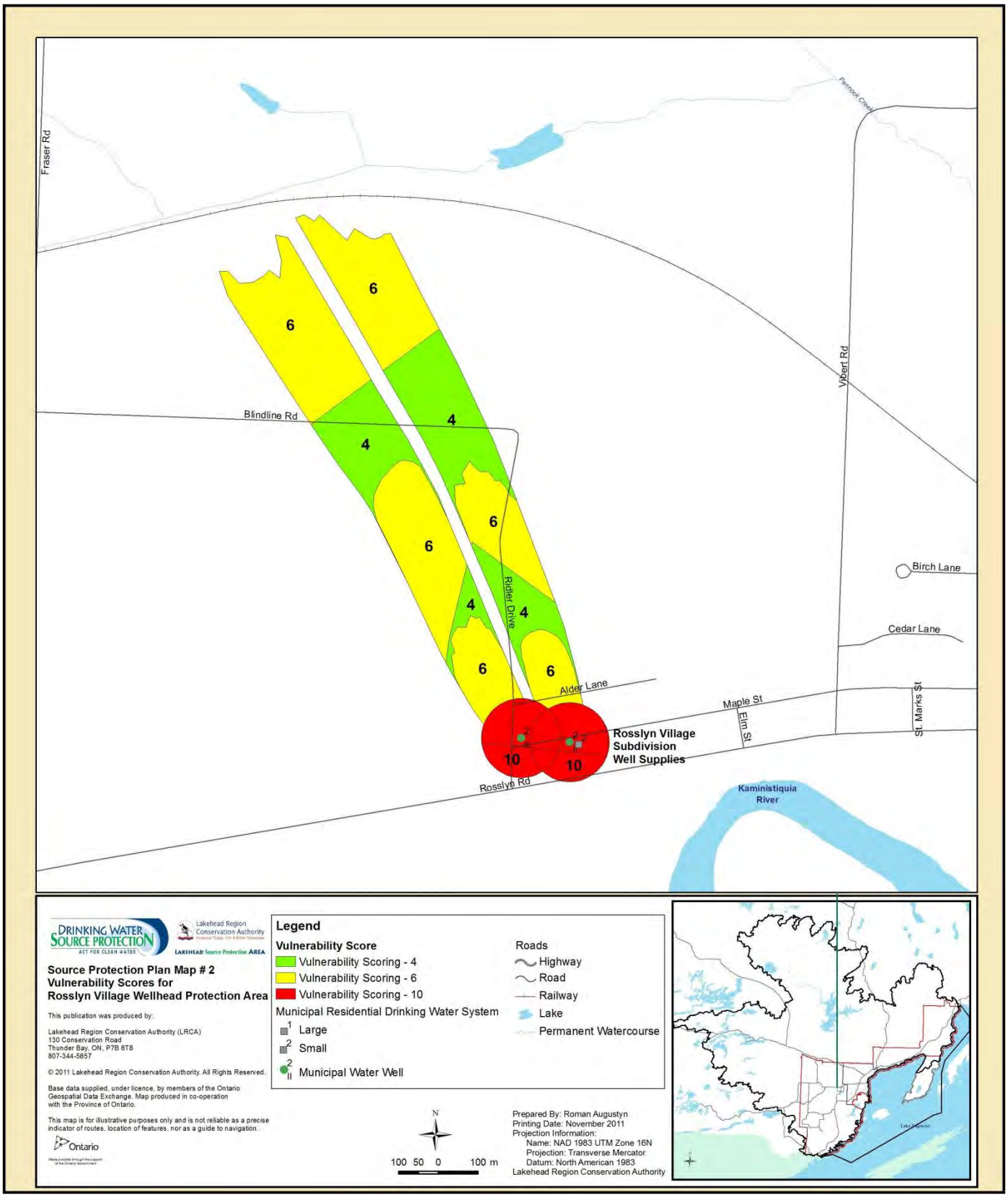


Figure 2: Source Protection Map #2: Vulnerability Scores for Rosslyn Village Wellhead Protection Area

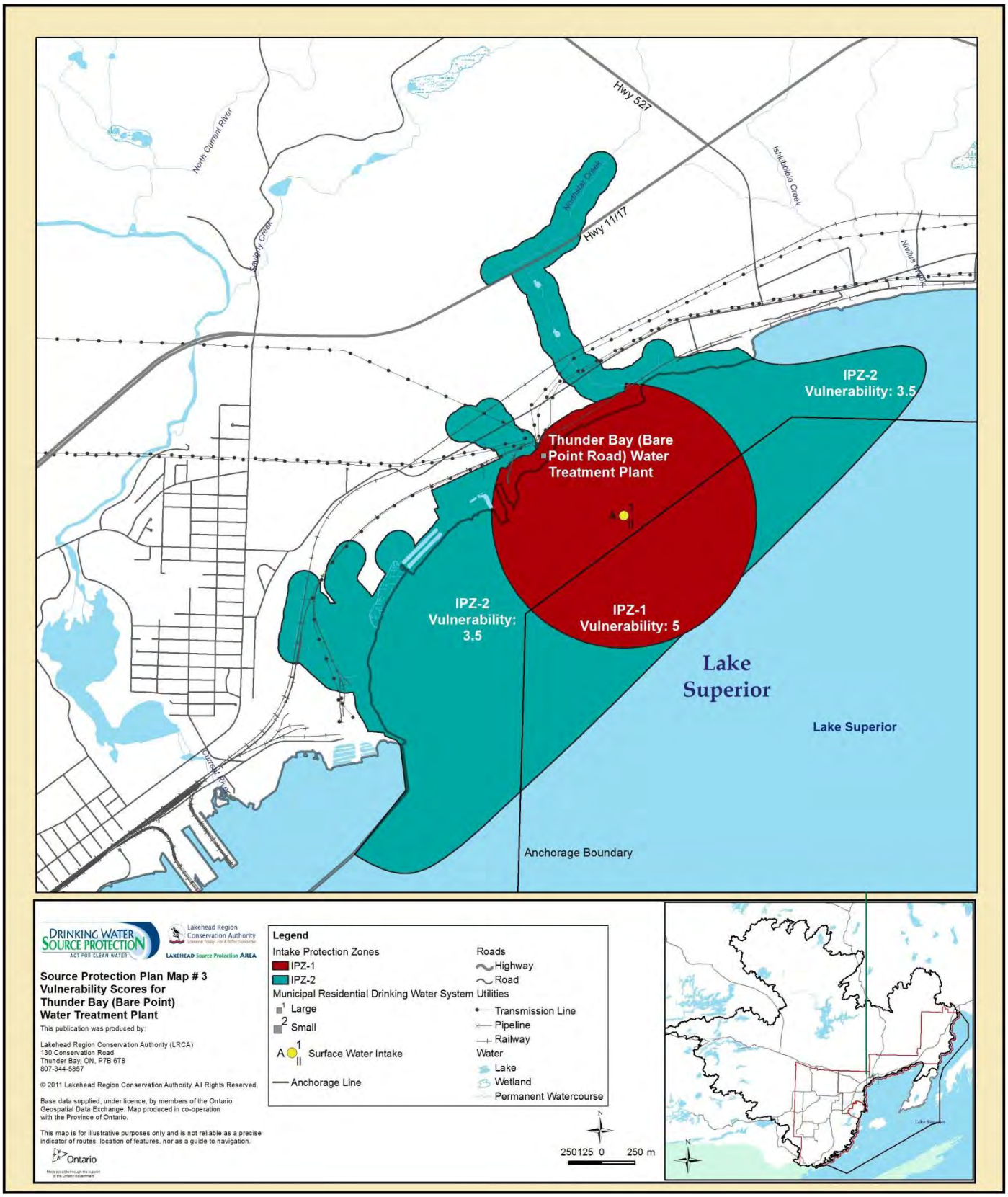


Figure 3: Source Protection Map #3: Vulnerability Scores for Thunder Bay (Bare Point) Water Treatment Plant

2.2.1 - Significant Groundwater Recharge Area

An aquifer is a volume of soil or rock underground that has the ability and space to store and release (discharge) a significant amount of water. Water that seeps into an aquifer is called recharge. The natural recharge of an aquifer comes from rain and melting snow. The land area where the rain or snow seeps down into the ground and flows to an aquifer is called a recharge area. These areas are where water from precipitation is transmitted downward to an aquifer. They also often have highly permeable soil, such as sand or gravel, which allows the water to seep easily into the ground. Areas of bedrock without much overburden having numerous fractures and cracks can also be recharge areas. In some areas where the soils are less permeable or more compact, it can be more difficult to determine where recharge areas are located. Areas which transmit the most precipitation are often referred to as significant recharge areas. For the purposes of the *Clean Water Act*, an area can only be classified as a Significant Groundwater Recharge Area (SGRAs) if the area has a hydrological connection to a surface water body or aquifer that is a source of drinking water for a Municipal or Private Drinking Water System.

The classification and delineation of the SGRAs within the LSPA was based on available datasets and completed according to Rule 44.(1) in "Directors Technical Rules, *Clean Water Act, 2006*". This method states the following: "44. Subject to rule 45, an area is a significant groundwater recharge area if, (1) the area annually recharges water to the underlying aquifer at a rate that is greater than the rate of recharge across the whole of the related groundwater recharge area by a factor of 1.15 or more". A copy of the "Directors Technical Rules" can be obtained from the Lakehead Region Conservation Authority.

Rule 45 of the "Directors Technical Rules, *Clean Water Act, 2006*" states that only those areas of high recharge that have a hydrological connection to a surface water body or aquifer that is a source of drinking water for a drinking water system are identified as a SGRAs.

There are no known issues or pre-existing conditions found in SGRAs within the LSPA. Assessment Report Map #27: Significant Groundwater Recharge Areas, depicts the SGRAs within the LSPA. This map can be found in the Assessment Report.

2.2.2 - Highly Vulnerable Aquifers

The potential vulnerability of an aquifer to groundwater contamination is a function of the susceptibility of the recharge area to infiltration. A vulnerable aquifer can be defined by the tendency or likelihood of contamination reaching a specified position in the groundwater system and accessing the aquifer. Aquifer vulnerability is not an absolute property but a relative indication of areas where contamination is likely to occur. The "Ground Water Study" identified areas of susceptibility to contamination using the Intrinsic Susceptibility Index (ISI) method. As the ISI method was one of the methods referenced by the "Directors Technical Rules, *Clean Water Act, 2006*", it was used by the Lakehead SPC to assess groundwater vulnerability. This

method uses a combination of soil depth and permeability to determine an intrinsic susceptibility to contamination.

Due to a significant lack of data, aquifer vulnerability was not assessed outside the study area, which was identified in the "Ground Water Study". There are no known issues or pre-existing conditions in the highly vulnerable aquifers (HVAs) within the LSPA. Assessment Report Map #25 Vulnerability Scores for Highly Vulnerable Aquifers depicts the HVAs in the LSPA.

2.2.3 - Existing Significant Drinking Water Threats for the Lakehead Source Protection Area

There are four existing significant drinking water threats located within WHPA-A in the Rosslyn Village Subdivision with 32 total instances identified in the Assessment Report. The Source Protection Plan includes policies for the four significant threats identified. These threats include:

1. the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage;
2. the application of agricultural source material (ASM) to land;
3. storage of ASM and;
4. the use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm animal land.

The Assessment Report identified no significant or moderate drinking water threats within IPZ-1 at the Bare Point Water Treatment Plant. There are no drinking water threats listed for IPZ 2. This is based on the low vulnerability score which is defined within the Director's Technical Rules. Concerns have been raised about occasional ship anchorage in the IPZ 1, but could not be identified as a potential threat because of regulatory limitations.

2.3 - Summary

The LSPA is an 11,526 square kilometre land area located within Northwestern Ontario. The LRCA jurisdiction can be found within this area. The LRCA is comprised of the Townships of Gillies, Conmee, O'Connor and Dorion; the Municipalities of Neebing, Oliver Paipoonge and Shuniah; and the City of Thunder Bay. There are two municipal drinking water sources within the LSPA; Rosslyn Village, located in the Municipality of Oliver Paipoonge; and the City of Thunder Bay, along the Lake Superior shore.

The Assessment Report is the technical, science based report completed by the SPC identifying the vulnerable areas, risks and threats to Municipal drinking water. It also outlines the SGRA's and HVAs within the LSPA.

Four significant and existing threats were listed for the Rosslyn Village drinking water source. These threats include: the establishment, operation or maintenance of a system that collects,

stores, transmits, treats or disposes of sewage; the application of agricultural source material (ASM) to land; storage of ASM; and the use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm animal land.

There are no significant or moderate threats for the City of Thunder Bay.

Chapter 3 –
Source Protection Planning Process

Chapter 3 - Source Protection Planning Process

3.1 - Process

The Source Protection Plan (SPP) process was made up of six components: early engagement, policy development, pre-consultation, drafting the Source Protection Plan, consultation and completion of Proposed Source Protection Plan.

Early Engagement began in January 2011 when notices were sent out to all of the Municipalities and stakeholders involved (see Chapter 7 for details). The Chair and Staff made presentations to Municipal Councils in the Municipality of Oliver Paipoonge, the City of Thunder Bay and the Municipality of Shuniah.

In June 2011, Staff began the process of drafting policies for the significant drinking water threats within the Rosslyn Village Wellhead Protection Area (WHPA). Staff met with the Local Municipal Planning Working Group to discuss policy options and the direction of the SPC. The Local Municipal Planning Working Group consists of planners from affected Municipalities, the Ministry of Municipal Affairs and Housing (MMAH), planners from the Ministry of the Environment (MOE), Source Water and LRCA Staff. The group was formed for the purpose of plan development.

Six policies were developed and sent out for pre-consultation in September 2011. These included the Land Use Planning, Specify Action and Education and Outreach Policies for the Rosslyn Village Municipal Residential Drinking Water Supply, along with their corresponding monitoring policies. Delivered in November 2011 was the Strategic Action Policy for the City of Thunder Bay. The elected officials and stakeholder groups that received draft policies included the Municipality of Oliver Paipoonge, the City of Thunder Bay, the Thunder Bay District Health Unit, the Ministry of Municipal Affairs and Housing, and the Ontario Ministry of Agriculture, Food and Rural Affairs.

The Draft Source Protection Plan was developed in the fall of 2011 by the Source Protection Committee (SPC). It included all mandatory components under the *Clean Water Act*.

The Draft Source Protection Plan was delivered for Public Consultation in January 2012. The comments were received from the consultation process and considered in the development of the Proposed Source Protection Plan (See Explanatory Document produced by the Lakehead Source Protection Committee in conjunction with the Source Protection Plan).

After a second Public Consultation in the spring of 2012, the Proposed Source Protection Plan for the Lakehead Source Protection Area was submitted for approval.

The Source Protection Plan builds on information that was collected in the Assessment Report and establishes policies to protect the sources of Municipal Drinking Water in the Lakehead Source Protection Area. The *Clean Water Act, 2006* dictates that policies must address significant threats to drinking water quality and quantity. At this time, the Lakehead Source Protection Committee does not have to address threats regarding quantity, as there are no quantity concerns. This was determined through the Lakehead Source Protection Area Water Budget and Water Quality Stress Assessment studies that were completed in 2008. The quantity of water used is minimal compared to the amount of available water.

Low and moderate threat policies are not a mandatory component of the Source Protection Plan. The policies that have been included will work to reduce or eliminate a drinking water threat, or prevent it from becoming an existing threat.

3.2 - Participants

The Lakehead Source Protection Plan covers the source water supply for Municipal drinking water at Rosslyn Village (Municipality of Oliver Paipoonge) and Bare Point (City of Thunder Bay). The main participants in the Source Protection Planning process are the Lakehead Source Protection Committee, as listed in Table 1, the Lakehead Source Protection Authority, as listed in Table 2, the Municipalities of Oliver Paipoonge and Shuniah and the City of Thunder Bay. The SPC is made up of representatives from Municipal and Industrial sectors and stakeholders in Forestry, Agriculture and Shipping; Public stakeholders represent Tourism, Education and the general Public.

The Source Protection Committee has also been supported by Liaisons of various capacities, representing the Thunder Bay District Health Unit (THBDHU), Ministry of the Environment (MOE) and the Lakehead Source Protection Authority (SPA). During the Source Protection Planning Process invitations were delivered with the goal of obtaining a First Nations Liaison, but this seat remains vacant.

The Lakehead Region SPC consisted of the following representation at the time of the Source Protection Plan completion:

Table 2: Lakehead Source Protection Committee Representation

Lakehead Source Protection Committee Representation	
Chair- Appointed by the Minister of the Environment	Bob Hartley
Municipal (Three Members)	Ken McWhirter – Vice-Chair, City of Thunder Bay
	James Vukmanich, City of Thunder Bay
	Veikko Long (2007-2012) Eric Collingwood (2012- Present), Municipality of Oliver Paipoonge
Industrial (Three Members)	Guy Jarvis, Thunder Bay Port Authority
	Hartley Multamaki, Forest Industry
	Bernie Kamphof, Agriculture
Others (Three Members)	Ross Chuchman, Public Member
	Paul McAlister, Tourism
	Rob Stewart, Education
Liaison Members	
Thunder Bay District Health Unit	Christopher Beveridge
Ministry of the Environment	Mary Wooding
Lakehead Source Protection Authority	Mervi Henttonen
First Nations Liaison	Vacant
Planning Consultant	Menic Planning Services (Syl Menic)

Table 3: Lakehead Source Protection Authority Representation

Lakehead Source Protection Authority Representation	
City of Thunder Bay	Bill Bartley (Chair)
	Ken Boshcoff
	Gary Murchison
	Linda Rydholm
Municipality of Oliver Paipoonge	Jim Byers
Municipality of Neebing	Ziggy Polkowski
Municipality of Shuniah	Donna Blunt
Township of Conmee	Grant Arnold
Township of Dorion	Ed Chambers
Township of Gillies	Rick Kieri
Township of O'Connor	Jim Vezina

3.3 - Drinking Water Threats

3.3.1 - Existing and Future Drinking Water Threat Activities

A future threat is considered to be an activity that takes place at a location in a vulnerable area after the Source Protection Plan takes effect, where that activity has never taken place before, or is not an existing activity.

An existing threat is an activity that started or has been engaged in at a location in a vulnerable area before the Source Protection Plan takes effect.

3.3.2 - Existing and Future Uses

An existing use is a land use that is currently taking place or permitted within Municipal planning documents at the time of the approval of the Source Protection Plan. This includes growth or development that would not require additional planning permission.

A future use is defined as the development of a use which is not in existence or permitted at the time of approval of the Source Protection Plan.

3.3.3 - Prescribed Drinking Water Threats

The *Clean Water Act, 2006* defines a drinking water threat as an activity or condition that adversely affects or has the potential to affect the quality or quantity of a drinking water source, and includes an activity that is prescribed by the regulations as a drinking water threat. Currently drinking water threats have been identified using the threats approach only. This involves consideration of a list of activities provided by the MOE in combination with the vulnerability scores of a particular WHPA or IPZ. Significant threats can occur in a WHPA with a vulnerability score of eight or higher with the exception of the handling, storage or transportation of dense non-aqueous phase liquids (DNAPLs), where a vulnerability score of two or higher can produce a significant threat.

The Source Protection Plan must include policies to address significant drinking water threats. The significant threat policies must address existing activities and those that "would be" significant if they were to occur in the future.

3.3.3.1 - 21 Prescribed Drinking Water Threats

The following is a list of the 21 activities that are prescribed drinking water threats in subsection 2(1) of the *Clean Water Act, 2006*.

1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act*.
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.
11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid.
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

3.4 - Threat Definitions

The *Clean Water Act* designated 21 Prescribed Drinking Water Threats for the purposes of Source Protection Planning. These threats fall into five categories: waste and sewage disposal, agriculture, salt and snow, industrial and water quantity. Of these 21, only 19 are applicable to the Lakehead Source Protection Area as there are no water quantity issues.

3.4.1 - Waste Disposal Sites (Threat 1)

The following types of waste disposal sites are indicated in the MOE Tables of Drinking Water Threats and are considered threats to sources of drinking water:

- the application of:
    - hauled sewage,
- the land disposal of:
    - petroleum refinement waste,
    - hazardous waste, liquid industrial waste or processed liquid industrial waste,
    - municipal waste (e.g. landfill, incinerator, and waste transfer and processing facilities where material is accepted from other municipalities),
    - industrial waste or commercial waste,
    - liquid industrial waste (discharged into a geological formation by means of a well),
- the storage of:
    - tailings from mining operations,
    - PCB waste,
    - hazardous waste or liquid industrial waste.

Exemptions are given for domestic waste generation.

3.4.2 - Onsite Sewage System (Threat 2)

The main consideration for reducing or eliminating drinking water threats related to failing on-site sewage systems is to prevent unacceptable impact on the water resource from chemical and pathogen parameters.

This drinking water threat includes systems that store and/or treat human waste on-site, but do not include sewage treatment plants. These systems come in a variety of forms including earth pit privies, privy vaults, greywater systems, cesspools, leaching bed systems and associated treatment units and holding tanks. Leaching bed systems with septic tanks (or holding tanks) are the systems authorized for use in the Lakehead Source Protection Area.

There are two categories of systems: small and large. Small systems (those with a design flow less than or equal to 10,000 L/day) are subject to approval under the *Ontario Building Code Act* which are administered by the Thunder Bay District Health Unit in the LSPA. Large systems (those with a design flow greater than 10,000 L/day) are subject to approval by the MOE under the *Ontario Water Resources Act*. Schools, campgrounds, larger businesses and Municipal systems are examples of facilities that may require a large system.

3.4.3 - The Application, Storage and Management of Agricultural Source Material (Threats 3, 4 and 5)

According to Ontario Regulation 267/03 (General) under the *Nutrient Management Act*, agricultural source materials (ASM) include the following materials that may be produced on a farm:

- manure produced by farm animals, including bedding materials,
- runoff from farm-animal yards and manure storages,
- wash water that has not been mixed with human body waste (e.g. from the milking centre),
- organic materials produced by intermediate operations that process the above materials (e.g. mushroom compost),
- anaerobic digestion output that does not include sewage biosolids or human body waste (anaerobic digestion is a process used to decompose organic matter by bacteria in an oxygen-limited environment),
- regulated compost (which contains dead farm animals).

ASM can be stored in a permanent nutrient storage facility or on a temporary field nutrient storage site.

The primary consideration for reducing or eliminating the threat to drinking water in the application and storage of ASM is to ensure nitrogen, phosphorus and pathogens do not enter surface water and/or groundwater.

3.4.4 - The Application, Handling and Storage of Non-Agricultural Source Material (Threats 6 and 7)

Nutrients are materials that can be applied to land for the purpose of improving the growth of agricultural crops and for soil conditioning. They are essential components of plant growth.

According to Ontario Regulation 267/03 (General) under the *Nutrient Management Act*, non-agricultural source materials (NASM) include the following materials that are intended to be applied to land as nutrients, but that are not produced on a farm:

- pulp and paper biosolids,
- sewage biosolids,
- anaerobic digestion output where less than 50% of the total material is on-farm anaerobic digestion materials (anaerobic digestion is a process used to decompose organic matter by bacteria in an oxygen-limited environment),

- any other material that is not from an agricultural source and that is capable of being applied to land as a nutrient (such as materials from dairy product or animal food manufacturing).

NASM that will be applied to fields on a farm can be stored in a permanent nutrient storage facility, or on a temporary field nutrient storage site. There are restrictions about what types of NASM can be stored on a farm and for how long.

3.4.5 - The Application, Handling and Storage of Commercial Fertilizer (Threats 8 and 9)

The main consideration for reducing or eliminating drinking water threats related to the storage and land application of commercial fertilizer is to make sure it does not enter surface water and/or groundwater sources. Nitrogen and total phosphorus are substances that could make their way into drinking water sources as a result of the application of commercial fertilizer to land. These nutrients could threaten the safety of drinking water sources in certain situations due to runoff or spills.

3.4.6 - The Application, Handling, and Storage of Pesticides (Threats 10 and 11)

In Ontario, the *Pesticides Act* defines "pesticide" as any organism or substance that is manufactured, represented, sold or used as a means of directly or indirectly controlling, preventing, destroying, mitigating, attracting or repelling any pest or altering the growth, development or characteristics of any plant life that is not a pest. It also includes any organism, substance or thing registered under the federal *Pest Control Products Act*. Pesticides are typically chemicals, but could be organisms that are used to control undesirable pests, such as weeds, insects and fungi. All of the pesticides considered through the drinking water source protection initiative are chemicals used to control weeds or fungi.

Since 2009, there has been a cosmetic pesticide ban in effect in Ontario. This ban prohibits the application of pesticides for cosmetic purposes on lawns, vegetable and ornamental gardens, patios, driveways, cemeteries, and in parks and schoolyards in an effort to reduce the amount of pesticides that make its way into sources of drinking water.

The application of pesticides to land, as well as the handling and storage of pesticides, is most commonly associated with agricultural, recreational, public works and retail land uses.

3.4.7 - The Application, Handling and Storage of Road Salt (Threats 12 and 13)

Road salt is a drinking water threat when any product used to maintain roads and pedestrian areas contains sodium and/or chloride. The majority of road salt is used as a de-icer or an ice

prevention agent, but limited use for dust suppression does occur. The most commonly used products are sodium chloride and calcium chloride because they are effective and inexpensive.

Winter road salt application works by breaking the bond formed between the pavement and the ice/compacted snow. As snow accumulates on the road and is compacted by traffic, it forms a bond with the pavement, making it difficult to remove with plows. In these situations, salt is advantageous to break through the snow to prevent this bond from forming. The salt reacts with moisture to create a layer of salty water called brine between the snow or ice layer and the road. This brine layer has a freezing point below zero degrees Celsius and breaks the bond, thereby permitting the snow and ice to be plowed from the road.

3.4.8 - The Storage of Snow (Threat 14)

Snow removed from roads and parking lots can be contaminated with salt, oil, grease and heavy metals from vehicles, litter and airborne pollutants. Large snow banks along roads and in parking areas can create traffic hazards and can result in localized flooding when the snow melts, especially on major roadways in urban areas. In these situations the excess snow must be melted on-site or transported to a location where it is either melted or stockpiled and allowed to melt. The disposal of snow in one location concentrates the potential contaminants; however, they are diluted by the larger volume of snow. Since the snow is contaminated, it must be handled and stored in ways that protect water sources.

This drinking water threat includes:

- snow that is pushed into large piles on a property (e.g. stored in parking lots),
- snow transported to a central site from other locations (e.g. snow disposal sites),
- large snow banks along roads that are close to municipal wellheads or surface water intakes.

The snow storage drinking water threat is closely linked to the application of road salt. Reducing the amount of salt applied to roads and parking areas could reduce the amount of road salt in stockpiled snow.

3.4.9 - The Handling and Storage of Fuel (Threat 15)

The main consideration relating to the handling and storage of fuel is to prevent fuel spills that could enter surface water or groundwater. A primary objective is to eliminate or manage significant drinking water threats so that they cease to be significant.

This category of drinking water threats includes the handling of liquid fuel in relation to its storage and the storage of liquid fuel. The types of storage facilities to be considered are defined in Ontario Regulation 213/01 (Fuel Oil) or Ontario Regulation 217/01 (Liquid Fuels). Both regulations are made under the *Technical Standards and Safety Act*, *2000*. Although not part of

the Technical Standards and Safety Authority (TSSA) Regulations, facilities where fuel is manufactured or refined are also to be considered. The types of fuel storage facilities include:

- bulk plants or facilities where it is manufactured or refined,
- permanent or mobile retail outlets,
- marinas,
- cardlocks/keylocks,
- private outlets (e.g. public works yard, contractor yard),
- farms,
- furnace oil tanks for home and business heating purposes.

The types of fuels considered include diesel, used oil when used as a fuel, kerosene and hydrocarbon fuel (e.g. gasoline).

The Thunder Bay (Bare Point Road) Water Treatment Plant has a significant quantity of diesel fuel present on site required for emergency operation of the Water Treatment Plant. In addition, adjacent to the Water Treatment Plant is a Hydro One Transformer Station Plant that has the potential to have fuels and organic solvents on site.

3.4.10 - The Handling and Storage of Dense Non-Aqueous Phase Liquid (DNAPL's) (Threat 16)

A DNAPL is a liquid that is denser than water and tends to be sparingly soluble in water. This means that the immiscible liquid sinks to the bottom of groundwater aquifers and surface water bodies as a separate phase liquid. Once entrained in the groundwater column, the liquids will sparingly dissolve into the passing groundwater at a rate which is very much higher than potable drinking water standards creating a "contaminant plume". The slow solubilization of the contaminant mass suggests that the contaminating source can be present in the subsurface aquifer for decades or centuries before being depleted.

DNAPLs, particularly those listed in the MOE Tables of Drinking Water Threats, have been readily used in large quantities for decades in industrial and commercial applications such as dry cleaning, cleaning/degreasing solvents, electronics, aerosols, plastics, pesticides, pharmaceutics, wood preservation, asphalt operations, varnishes and the repair of motor vehicles and equipment. These chemicals can also be found in small quantities in common household products (e.g. adhesives and cleaners).

3.4.11 - The Handling and Storage of Organic Solvents (Threat 17)

The primary consideration for reducing or eliminating drinking water threats related to the handling and storage of an organic solvent is to make sure it does not enter surface water and/or groundwater.

Organic solvents are a chemical class of compounds that are used routinely in commercial industries and industrial sites. These chemicals could threaten the safety of drinking water sources in certain situations.

3.4.12 - The Management of Runoff that Contains Chemicals Used in the De-icing of Aircrafts (Threat 18)

Aircrafts that have frost, ice or snow on any of its critical structures (e.g. wings) are not permitted to attempt take-off under the Canadian Aviation Regulations. During weather conditions that would result in frost, ice or snow, aircraft may be sprayed with de-icing and/or anti-icing fluids prior to take-off.

Ethylene glycol or propylene glycol is the active ingredient in aircraft de-icing fluids. While other formulations have been considered, glycol continues to be the major chemical used in this application. The runoff of large volumes of de-icing fluids into surface water bodies over a short period of time can lead to oxygen depletion which results in poor water quality and toxicity to aquatic life and mammals. The toxicity associated with the de-icing chemical can originate from both the glycol formulations, as well as the additives mixed into these formulations.

3.4.13 - Water Quantity (Threats 19 and 20)

An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body and an activity that reduces the recharge of an aquifer are considered significant drinking water threats. In the Lakehead Source Protection Area these threats are not a concern.

3.4.14 - The Use of Land as Livestock Grazing or Pasturing Land, an Outdoor Confinement Area or a Farm-Animal Yard (Threat 21)

An outdoor confinement area is a yard, facility or enclosure with a very high animal concentration, typically in excess of 15 animals per acre, often for extended periods of time. Ontario Regulation 267/03 made pursuant to the *Nutrient Management Act* defines outdoor confinement areas as follows:

- It has no roof, except as described in bullet # 3 below,
- It is composed of fences, pens, corrals or similar structures,
- It may contain a shelter to protect the animals from the wind or another shelter with a roof of an area of less than 20 square metres,
- It has permanent or portable feeding or watering equipment,
- The animals are fed or watered at the enclosure,

- The animals may or may not have access to other buildings or structures for shelter, feeding or watering and,
- Grazing and foraging provides less than 50 per cent of dry matter intake.

Farm animal yards are outdoor livestock areas lined with concrete other than those meeting the definition of an outdoor confinement area. Food and water are not provided in farm-animal yards. They are generally used as outdoor exercise areas or holding areas for when barns are being cleaned out, usually in association with a barn/covered structure.

Grazing is crop production where the animals do the harvesting. Ontario grazing systems involve a concentration of up to 2-3 animals per acre during the grazing season, often on a rotational basis.

Although grazing/pasturing farm animal yards and outdoor confinement areas are different, many sections of this background report apply to all. In this report when all types of outdoor livestock areas are referred to collectively, the term "outdoor livestock areas" is used for brevity.

3.5 - Policy Tools

The Source Protection Committee had numerous policy tool options available to address drinking water threats. Policy tools can be grouped into two different categories: those that result in legal restrictions being placed on activities, and those that generally rely on non-regulatory policy tools.

3.5.1 - Regulatory Policy Tools

3.5.1.1 - Section 57 Prohibition

Under the *Clean Water Act*, Section 57 Prohibition means that an activity is no longer allowed to occur in an area where it would be a significant threat. The prohibition of activities is a very strong approach. Prohibiting existing threats to reduce risks to source water can be challenging. Stopping activities that are already taking place can be very costly and have a serious impact on the business and/or property owner affected. Whenever possible, it is preferable to use other available tools to adequately reduce the risk created by an existing threat. Choosing to manage rather than prohibit a threat can help ensure that existing activities and businesses are not penalized unfairly, due to their historic existence.

Choosing prohibition as a policy approach for future threats may provide advantages. If activities that would be significant drinking water threats are not already established, prohibition can be a very effective and efficient tool to prevent them from establishing and becoming significant risks to local drinking water sources. Prohibition of specific future activities in highly vulnerable areas would mean that hazardous activities get located in less vulnerable areas in the watershed.

3.5.1.2 - Section 58 Risk Management Plans

The *Clean Water Act* (under Part IV) established new tools to regulate significant drinking water threats. One of these new tools is "risk management plans" under Section 58. The Act permits Source Protection Committees to use Section 58 as a means to address significant drinking water threats, where such activities are located within intake protection zones or wellhead protection areas. This also provides Municipalities with the necessary authority to support the regulation of identified significant drinking water threats in those areas.

Section 58 risk management plans are site-specific documents that are negotiated after the approval of the Source Protection Plan. A risk management plan will outline the actions required to address an identified significant drinking water threat and should include and account for risk management measures that are already in place.

Section 57 Prohibition and Section 58 Risk Management Policies are facilitated by a Risk Management Official and Risk Management Inspector. The hiring, training and employment of these positions would be the responsibility of the Municipality.

3.5.1.3 - Section 59 Restricted Land Use

Where Source Protection Plan policies rely on a Section 58 Risk Management Plan tool or a Section 57 Prohibition tool under the *Act*, it is recommended that a complementary policy using Section 59 Restricted Land Use tool under the *Act* be included in the Plan. This is needed to effectively prevent future activities from being established that would be a significant threat and allow development to proceed that does not pose a significant threat to drinking water. This restriction would apply to activities that are associated with specifically named land uses where the activity would be a significant drinking water threat if established or expanded in the future. Land uses not specifically named would be exempt from the application of Section 59 policies.

3.5.1.4 - Land Use Planning

The *Clean Water Act* recognizes the authority of the *Planning Act* and *Condominium Act* to regulate land uses and provides for the implementation of certain Source Protection Plan policies through Ontario's existing land use planning framework. The *Planning Act* in Ontario provides tools with which municipalities can regulate development as they plan their communities, such as allocating land for agricultural, residential, commercial or mixed uses. However, land use planning does not always regulate the specific activities associated with land use. Many of the threats to drinking water identified under the *Clean Water Act* are activities such as the spreading of manure or the application of pesticides.

Transition policies are necessary if relief from new rules is desirable. They allow applications which require many approvals to continue. Based on the current development in Rosslyn Village, transition policies are not necessary in the Lakehead Source Protection Plan.

3.5.1.5 - Prescribed Instruments

A Prescribed Instrument is a document of legal effect, that includes a permit, licences, approval authorization, direction or order that is created under a piece of Ontario legislation. An instrument sets out additional requirements that are specific or customized to the activity being carried out at one site and in some cases multiple sites operated by one company or person. Instruments manage these site specific requirements by containing terms and conditions that direct specific ways in which certain activities may be undertaken at the site. These terms and conditions are often designed to protect the environment and/or human health. The following is a list of Prescribed Instruments that could be used for the purposes of Source Protection Planning:

- Environmental Compliance Approvals (sewage and waste),
- Renewable Energy Approval,
- Pesticide Permits,
- Municipal Drinking Water Licence and Drinking Water Works Permit,
- *Aggregate Resources Act* Instruments,
- *Nutrient Management Act* Instruments,
- Permits to Take Water.

3.5.2 - Non-Regulatory Policy Tools

3.5.2.1 - Specify Actions

Specify Actions can be taken to implement a plan or achieve the plan's objectives, including addressing drinking water threats when the Committee's desired action is not within the scope of authority provided by the spectrum of other policy tools.

Municipalities have authorities to enact by-laws for specific matters within their jurisdiction and these authorities are available under the *Municipal Act*. Municipalities have broad authorities to pass by-laws about the economic, social and environmental well-being of the Municipality, and about the health, safety and well-being of people. This policy option is not intended to be directed to individual owners or operators, rather it must specify the public body or other organization that is responsible for implementing this policy.

3.5.2.2 - Stewardship Programs

Stewardship programs often include financial and hands-on technical assistance to the community/landowners/businesses to complete a variety of environmental projects.

Stewardship programs can include:

- developing technical tools to monitor and assess the state of the watershed,
- providing advice and technical assistance in completing on-the-ground projects,
- promoting community involvement in projects,
- building partnerships with all levels of government, environmental groups, businesses, residents and landowners,
- creating educational resources.

3.5.2.3 - Incentive Programs

Incentive programs are intended to promote or encourage Specific Actions or behaviours. They often include financial incentives or cost share programs, but could also include community recognition programs/awards.

3.5.2.4 - Education and Outreach

Education and outreach programs are intended to increase awareness of the benefits of drinking water source protection, improve landowner acceptance of Source Protection Plan policies and encourage positive changes in behaviour.

An education and outreach program could include:

- written materials,
- community outreach,
- special activities,
- media releases,
- public open houses.

3.5.2.5 - Best Management Practices

Best management practices are measures taken to mitigate or prevent negative impacts to water quality or quantity. Often, with activities like agriculture or construction, there are also sector established best management practices that promote the safest or most efficient way of doing something. Information on typical best management practices can be obtained from professional organizations, industry associations as well as people who operate in that sector.

3.5.2.6 - Pilot Projects and Research Programs

Pilot projects and research programs may be implemented when a Committee feels that further research is necessary to develop new methods or new technologies for addressing certain threats. In some cases, additional research may either refine the issues in a contributing area or demonstrate that remedial actions within specific portions of the area would have the greatest effect. In these situations, the Committee may recommend that a specified body be responsible

for undertaking additional research and the policy could identify the purpose of the research and any other partners in the undertaking.

3.6 - Policy Template

The policy template was designed to be both easy to read and to contain as much information as possible for the readers. The template displays the policy number, legal effect, implementing body, implementation date and the policy text.

The policies are grouped together based on the policy tool used to manage the present or future significant drinking water threat. Below is a skeleton of the policy template:

Implementing Body:	Municipality or group responsible for the implementation of the policy.
Policy Tool:	The Source Protection Committee had numerous policy tool options available to address drinking water threats and achieve desired outcomes.
Implementation Date:	Date by which the policy needs to be implemented by the listed Municipality or group.
Legal Effect:	There are three types of legal effects in Source Protection Plan policies. These include "must conform/comply with" policies, "have regard to" policies, and "non-legally binding" policies.
Policy:	Policy text. The policies were grouped together based on threats and tool used to manage or prohibit future and significant threats.

The reasoning behind each policy can be found in the Explanatory Document for the Lakehead Source Protection Plan.

The policy numbers contain an abundance of information regarding the policy. Below is the policy numbers identifier:

Example Policy Number: XX.#.LE-PT

XX= Municipal Drinking Water System

- RV=Rosslyn Village
- TB= Bare Point (City of Thunder Bay)

#= Sequential Policy Number

LE= Legal Effect

- CW= Comply with/Conform with
- HR= Have Regard to
- NLB = Non-legally binding

PT= Policy Tool

- PA= *Planning Act* (Land Use Planning)
- PIV= Part IV powers under the CWA
- PI= Prescribed Instrument
- EO= Education and Outreach
- SP= Specify Action

3.7 - Legal Effect of Source Protection Plan Policies

There are three types of legal effects in Source Protection Plan policies. These include "must conform/comply with" policies, "have regard to" policies, and "non-legally binding" policies. Appendix A of the Source Protection Plan for the Lakehead Source Protection Plan for the Lakehead Source Protection Area contains lists of policies and the designated legal effect as outlined in the *Clean Water Act*.

3.7.1 - Must Conform With

- Municipalities, local boards or Source Protection Authorities are required to comply with any policies to address significant drinking water threats or conditions, regardless of the tool or approach used in the policy (See Appendix A, List E).
- The *Clean Water Act* requires that decisions under the *Planning Act and Condominium Act, 1998* to conform with significant threat or condition policies (See Appendix A, List A).
- Decisions related to Prescribed Instruments are required to conform with significant threats or condition policies under the *Clean Water Act* (Appendix A, List C).
- Under the *Clean Water Act*, persons participating in significant threat activities must conform with policies that use Part IV powers.
- A public body must be designated in the Source Protection Plan to administer monitoring which is required by the *Clean Water Act*. Obligations stipulated in the monitoring policies have a must conform with legal effect for the public bodies (Appendix A, List F).

3.7.2 - Have Regard To

- Moderate and low threat and condition policies carry a have regard to legal effect for decisions under the *Planning Act and Condominium* Act, 1988 (Appendix A, List B).

- The *Clean Water Act* requires that all policies for moderate and low threats and conditions related to Prescribed Instruments have a legal effect of have regard to (Appendix A, List D).

3.7.3 - Non-legally Binding

The Source Protection Plan may also include other policy types that are not legally binding under the *Clean Water Act*, but are determined to be important by the Committee. These include:

- Significant, moderate and low threat or condition policies that list bodies not including Municipalities, local boards or Source Protection Authorities as implementers and do not use Part IV, Prescribed Instruments or *Planning Act* Tools.
- Other permitted policies governing:
    - Incentive programs and education and outreach programs including systems that were not included in the Terms of Reference.
    - The update of spill prevention, contingency or response plans along highways, railways or shipping lanes.
    - Climate conditions data collection.
    - Transport pathways in WHPA or IPZ.
- Optional monitoring policies that list bodies other than Municipalities, local boards or Source Protection Authorities as implementers.

3.8 – Effective Dates

The Source Protection Plan takes effect on the date of the posting of the Notice of Approval on the MOE's Environmental Registry (www.ebr.gov.on.ca).

3.9 – Implementation

Implementation of the Source Protection Plan (SPP) requires the cooperation of various participants in the Source Protection Planning Process. The Municipality of Oliver Paipoonge, the City of Thunder Bay and the Thunder Bay District Health Unit are the main implementing bodies of the Source Protection Plan. The involvement and cooperation of landowners in the affected areas will be beneficial during the implementation process. The key roles and responsibilities of various bodies during the implementation stage are listed below.

3.9.1 - Source Protection Committee (SPC)

The SPC will continue to have input on additional studies to be included in future Assessment Reports. The SPC will also continue to be consulted by the SPA in regards to proposed amendments to the SPP.

3.9.2 - Source Protection Authority (SPA)

The SPA will continue to support the SPC, particularly when making amendments to the SPP at the time of review. The SPA will have an important role in monitoring and reporting on the progress of the Source Protection Plan implementation. They will continue their role as liaison with the MOE and the Member Municipalities.

3.9.3 - Province

The Minister of the Environment (MOE) is responsible for approving the Source Protection Plan. The MOE conducts research and sets water quality standards under other legislation to achieve water protection across all of Ontario.

Other Ministries such as the Ministry of Municipal Affairs and Housing (MMAH), Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), and the Ministry of Natural Resources (MNR) may be involved where provincial instruments are used in policies to manage drinking water threats (Appendix A, Table 1).

3.9.4 - Municipalities

Municipalities have an important role in implementing Source Protection Plans. Currently, municipalities are responsible for the delivery of municipal drinking water and land use planning. Many of the SPP policies will build on these roles, meaning implementation of the SPP policies will for the most part be incorporated into existing municipal planning processes and/or water and wastewater operations.

Municipalities will be responsible for bringing their Official Plans and Zoning By-laws into conformity with the significant threat policies contained in the SPP. They will be required to ensure that any future undertaking does not conflict with the SPP.

As mandated by the CWA, municipalities will be required to take on new roles and responsibilities, including the monitoring of threats and reporting on progress of implementing the Source Protection Plan.

Inspection and enforcement of the aspects of the SPP that pertain to its Official Plan, Zoning By-laws, subdivision plans, condominium plans and other planning approvals are the responsibility of the Municipality.

3.9.5 - Landowners and Business Owners

Individual property owners and local businesses must take action on the policies for significant drinking water threats located within their intake protection areas. Voluntary co-operation is promoted and expected but mandatory action will be enforced when needed.

3.9.6 - Thunder Bay District Health Unit

The Thunder Bay District Health Unit will be responsible for the septic re-inspection program and all necessary reporting requirements that will take place in the Rosslyn Village WHPA-A.

3.9.7 - Conservation Authority

The main role of the Lakehead Region Conservation Authority (LRCA) in the implementation of the SPP is to provide technical and planning advice to their municipal partners. As they do now, the LRCA will also protect environmental areas and promote stewardship and best management practices.

3.10 - Annual Review Process

The *Clean Water Act* requires that the Source Protection Authority prepare an Annual Progress Report describing the measures taken to address existing and future significant drinking water threats, the results of monitoring, the progress that has been achieved in meeting the Source Protection Plan's objectives, and other information prescribed in the regulations. The information required in the Annual Report can be found in Ontario Regulation 287/07 Section 52.

The Annual Reports will provide the basis to evaluate the effectiveness of the Plan and whether additional policies or approaches are necessary. It will therefore serve to inform future SPP amendments and will serve as important information in the ongoing assessment of progress towards source water protection.

3.11 – Financing

Municipalities, residents and persons engaged in significant drinking water threats share the responsibility for safe drinking water and are responsible for financing the implementation of the Source Protection Plan.

3.12 - Summary

The Source Protection Planning Process is a series of six stages, as discussed in Chapter 3, that involve notifying municipalities of the start of the planning process through to the final submission of the Source Protection Plan.

Various participants were involved in the planning process. These participants included the Municipality of Oliver Paipoonge, the City of Thunder Bay, the Lakehead Source Protection Committee, the Lakehead Source Protection Authority and the Local Municipal Planning Working Group. The Source Protection Committee is comprised of members from various stakeholder groups impacted by Source Water Protection. This includes Municipal representatives, representatives from various sectors including Forestry, Agriculture and Shipping and public members with backgrounds in Tourism and Education.

Various tools were available to address the 21 significant drinking water threats. These tools are both regulatory and non-regulatory in nature.

The implementation of the Source Protection Plan will fall mainly to the Municipalities who are responsible for the policies that have been created. In some cases, local boards, such as the Thunder Bay District Health Unit, will be responsible for implementation. Involvement and cooperation from residents will be valuable in the process.

Implementing bodies will be responsible for providing an Annual Report to the Lakehead Source Protection Authority. In turn, an Annual Report will be produced by the SPA as part of the review process. This will describe the actions that have been taken to address threats in the vulnerable areas.

Financing for Source Protection Plan implementation is the responsibility of the Municipalities, residents and persons who are engaged in the significant threat activities.

Chapter 4 - Rosslyn Village Municipal Residential Drinking Water System

Chapter 4 - Rosslyn Village Municipal Residential Drinking Water System

4.1 - Description of System

The Hamlet of Rosslyn Village is located about 17 kilometres west of the City of Thunder Bay and approximately 400 metres north of the Kaministiquia River. The Rosslyn Village Municipal Residential Drinking Water wells were drilled in 1974 and are currently servicing (as of January 2010) 29 residences. Water is supplied from one of two Municipal wells which are operated alternately to a single water treatment plant. These wells are in a basal sand and gravel aquifer that is located immediately above the bedrock and is about five meters thick. Average water use is 35,000 litres per day, although a maximum use of approximately 50,000 litres per day has been recorded. This water is treated at a single water treatment plant where chlorine is added.

The Rosslyn Village Municipal Drinking Water System is operated by Water Quality Service.

Wellhead protection areas (WHPAs) have been delineated around the Rosslyn Village wells. The shape of the WHPAs, as shown in Figure 4: Source Protection Plan Map #4: Rosslyn Village Wellhead Protection Area on page 52, is based on the groundwater flow direction, water velocities, gradient, and hydraulic properties of the soil and rock. The protection area size and shape are determined by the speed at which a contaminant could reach the wells from that area, taking into account any pipes or drains that could carry them.

- WHPA ‘A’ is the area closest to the well and is of highest concern since contaminants entering this area could potentially directly affect the well. It represents an area 100 metres in radius surrounding each well.
- WHPA ‘B’ is a secondary protection area. It is based on a two-year time of travel or less for contaminants to enter the water supply.
- WHPA ‘C’ is based on a two to five-year time of travel for contaminants to reach the wells.
- WHPA ‘D’ is based on an approximate 5 to 25-year time of travel for contaminants to reach the wells.

Vulnerability scores were assigned to each of the specific WHPAs in Rosslyn Village. Vulnerability scores help to show how susceptible the drinking water source is to contamination. An area with a higher vulnerability is more likely to allow contaminants from that area to reach the well. AMEC Earth and Environmental (2007) used the Intrinsic Susceptibility Index (ISI) to assign vulnerability scoring for the Rosslyn Village WHPAs.

Using the results of the vulnerability mapping, the vulnerability scores were calculated for WHPA ‘A’, ‘B’, ‘C’, and ‘D’ in accordance with the Technical Rules: Assessment Report (MOE, 2009). The vulnerability scores calculated for the Rosslyn Village Wellhead range from

four to ten, in the WHPA (AMEC Earth and Environmental, 2007), with the highest score (ten) located within the 100 metre radius of the wellhead and the two year time of travel and the lowest score (four) in WHPA 'D' where there is more natural protection for the underlying aquifer. See Figure 2: Source Protection Map #2: Vulnerability Scores for Rosslyn Village Wellhead Protection Area for Vulnerability Designations on page 16.

4.2 - Drinking Water Issues

The Rosslyn Village Subdivision Well Supply of drinking water has been regularly tested and monitored for drinking water quality since 2001, as noted in the Assessment Report for the Lakehead Source Protection Area. This data includes testing results for organics, inorganics, iron, manganese, hardness, chloride, sodium, nitrates, nitrites and fluoride. The Report entitled "Groundwater Vulnerability Analysis Issues Evaluation Threats, Inventory and Water Quality Risk Assessment for Hamlet of Rosslyn Village Wellhead Protection Area Municipality of Oliver Paipoonge, Ontario", (AMEC Earth and Environmental, December 2008) stated that the water quality for the Rosslyn Village Municipal Water Supply appeared to be stable with no apparent trends or impacts from surficial or near surface activities.

A number of Rosslyn Village subdivision residents have constructed their own wells and discontinued delivery of Municipal Residential Drinking Water to their homes. Drilling many wells in close proximity to private septic systems and other supply wells has the potential to compromise the confining layer and open up preferential pathways for surficial or shallow soil contamination. Development of a dense distribution of private wells in the Rosslyn Village subdivision area could be potentially detrimental to water quality if these wells are not constructed properly.

Several years of water quality sampling was available for the Rosslyn Village Municipal Water Supply. These raw water samples were compared to Ontario Drinking Water Quality Standard and Provincial Water Quality Objective and analyzed for potential trending. From the available data the following was noted:

- Two incidences of a parameter exceeding the Ontario Drinking Water Quality Standard – Maximum Allowable Concentration (fluoride).
- Zero incidence of a parameter measuring above Ontario Drinking Water Quality Standard – Interim Maximum Allowable Concentration.
- Zero incidence of a parameter measuring above the Ontario Drinking Water Quality Standard – ½ Maximum Allowable Concentration.
- Zero incidences of a parameter measuring above Ontario Drinking Water Quality Standard – Operating Guidelines.
- Two incidences of parameters measuring above Ontario Drinking Water Quality Standard – Aesthetic Objective (sodium, turbidity).

- Zero incidences of parameters measuring above Provincial Water Quality Objective and Method Detection Limits.
- Zero incidences increasing over the reporting period towards an Ontario Drinking Water Quality Standards or Provincial Water Quality Objective benchmark.

In order for these concerns to be elevated into drinking water issues, they need to be present at a concentration that may result in the deterioration of the quality of water or have a trend of increasing concentrations where a continuation of that trend would result in the deterioration of the quality of the Municipal Residential Drinking Water source. The fluoride is naturally occurring in this water source. Sodium and turbidity are considered aesthetic attributes, and therefore are not a drinking water threat. As a result of the data collected, there are no known issues identified within the Rosslyn Village Subdivision Well Supply Wellhead Protection Areas.

4.3 - Drinking Water Threats

Drinking water threats are activities in the area surrounding the municipal wells that may affect the quality of the water. The latest available information from the Approved Assessment Report for the Lakehead Source Protection Area has identified drinking water threats through a combined consideration of a list of activities provided by the Ministry of the Environment and vulnerability scores.

Table 4 and 5 are lists of identified existing significant drinking water threats for Rosslyn Village Wellhead Protection Area A, and the number of occurrences. The reference numbers and circumstances in these tables come from the Ministry of the Environment "Tables of Drinking Water Threats". More information about these tables can be found at www.lakeheadca.com.

Table 4: Significant Chemical Threats within the Wellhead Protection Area.

Reference Number	Threat	Circumstance	Chemical	Number of Occurrences
1215	The storage of agricultural source material.	1. A portion, but not all, of the agricultural material is stored above grade in or on a permanent nutrient storage facility. 2. The weight or volume of manure stored annually on a farm unit is sufficient to annually land apply agricultural source material at a rate that is more than 0.5, but not more than 1.0 nutrient unit per acre of the farm units.	Nitrogen	1

Table 5: Significant Pathogen Threats within the Wellhead Protection Area

Reference Number	Threat	Circumstance	Number of Occurrences
1944	The application of agricultural source material to land	1. Agricultural source material is applied to land in any quantity. 2. The application may result in the presence of one or more pathogens in groundwater or surface water.	1
1945	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.	1. The use of land as livestock grazing or pasturing land for one or more animals. 2. The land use may result in the presence of one or more pathogens in groundwater or surface water.	1
1946	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.	1. The use of land as an outdoor confinement area or a farm-animal yard for one or more animals. 2. The land use may result in the presence of one or more pathogens in groundwater or surface water.	1
1956	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	1. The system is an earth pit privy, privy vault, cesspool, or a leaching bed system and its associated treatment unit and is a sewage system as defined in Section 1 of Ontario Regulation 350/06 (Building Code) made under the "Building Code Act, 1992" or a sewage works as defined in Section 1 of the "Ontario Water Resources Act". 2. A discharge from the system may result in the presence of one or more pathogens in groundwater or surface water	26
1962	The storage of agricultural source material	1. Any portion of the agricultural source material is stored at or above grade in or on a permanent nutrient storage facility. 2. A spill of the material or runoff from an area where the material is stored may result in the presence of one or more pathogens in groundwater or surface water.	1
1964	The storage of agricultural source material	1. The agricultural source material is stored at a temporary field nutrient storage site. 2. A spill of the material or runoff from an area where the material is stored may result in the presence of one or more pathogens in groundwater or surface water.	1

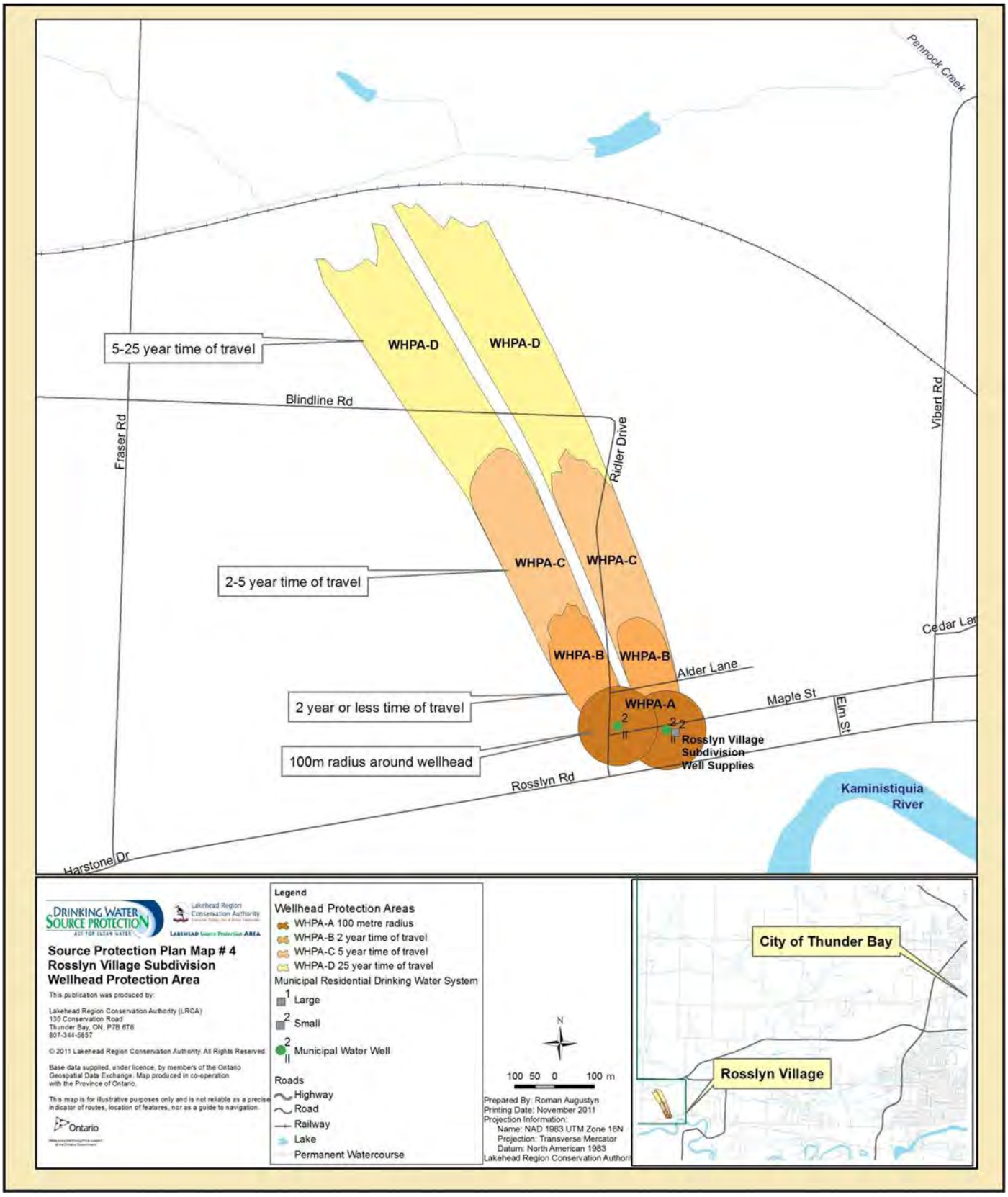


Figure 4: Map of Rosslyn Village Wellhead Protection Area

4.4 - Policies

The *Clean Water Act, 2006* dictates that all Source Protection Plans must include a policy for every area where an activity is or would be a significant drinking water threat, as defined in the Assessment Report. For an explanation of policy numbers see section 3.6. Policies created must ensure that the threat is managed in a way that it is no longer or does not become an existing threat. This does not mean that the activities must stop. All policies that have been created are effective in WHPA-A, as vulnerability scoring determined that this is the area where threats would be significant. As noted in Tables 4 and 5 on pages 50 and 51, there are four existing significant threats in WHPA-A. Table 6 lists the significant and monitoring threat policies that are applicable to 19 of the 21 Prescribed Drinking Water Threats.

Table 6: Significant Threat and Monitoring Policies

Threat		Education and Outreach	Land Use Planning	Specify Action	Monitoring
1	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act.*		RV.1.CW-PA		RV.2.M-PA
2	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage				
	- combined sewer discharge		RV.1.CW-PA		RV.2.M-PA
	- combined sewer discharge		RV.1.CW-PA		RV.2.M-PA
	- untreated stormwater discharges		RV.1.CW-PA		RV.2.M-PA
	- industrial effluent discharges		RV.1.CW-PA		RV.2.M-PA
	- sanitary sewers and pipes		RV.1.CW-PA		RV.2.M-PA
	- septic systems under *Ontario Water Resources Act*		RV.1.CW-PA		RV.2.M-PA
	- sewage treatment plant effluent discharges		RV.1.CW-PA		RV.2.M-PA
	- septic systems under Ontario Building Code	RV.5.CW-EO		RV.3.CW-SP	RV.4.M-SP RV.6M-EO
	- sewage treatment plant by-passes		RV.1.CW-PA		RV.2.M-PA
	- storage of sewage		RV.1.CW-PA		RV.2.M-PA

Threat		Education and Outreach	Land Use Planning	Specify Action	Monitoring
3/4	The application or storage of agricultural source material	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
6/ 7	The application or handling and storage of non-agricultural source material	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
8/ 9	The application or handling and storage of commercial fertilizer	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
10 / 11	The application or handling and storage of pesticide	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
12 / 13	The application or handling and storage of road salt			RV.3.CW-SP	RV.4.M-SP
14	The storage of snow			RV.3.CW-SP	RV.4.M-SP
15	The handling and storage of fuel		RV.1.CW-PA		RV.2M-PA
16	The handling and storage of dense non-aqueous phase liquid	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
17	The handling and storage of an organic solvent		RV.1.CW-PA		RV.2.M-PA
18	The management of runoff that contains chemicals used in the de-icing of aircraft	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO
21	The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard	RV.5.CW-EO	RV.1.CW-PA		RV.2.M-PA RV.6M-EO

4.4.1 - Land Use Planning Policy for Rosslyn Village

Policy: RV.1.CW-PA

Policy RV.1.CW-PA will prohibit the following future significant threats of establishing a waste disposal site, sewage treatment facilities (not including those under 10,000 litres a day), storage of organic solvents, storage of fuel, the storage of pure dense non-aqueous liquids (DNAPLs) and agricultural uses.

Policy Number:	RV.1.CW-PA
Implementing Body:	The Municipality of Oliver Paipoonge
Policy Tool:	Land Use Planning
Implementation Date:	Decisions must conform to the threat policies immediately when the Source Protection Plan takes effect
Legal Effect:	Must conform with
Policy:	The following land uses are prohibited in WHPA-A: 1) Land uses that normally require waste disposal sites approvals including: • Application of hauled sewage to land; • Mine tailings stored in a pit or in impoundment structures where the National Pollutant Release Inventory (NPRI) notice requires a person to report; • Landfarming of petroleum refining waste (more than ten hectares); • Landfilling of hazardous waste (less than one hectare); • Landfilling of municipal waste (less than one hectare); • Land disposal of commercial or industrial waste (less than one hectare); • Land disposal of liquid industrial waste • Storage of PCBs; and • A waste disposal site that is not approved to accept hazardous waste or liquid industrial waste but accepts small volumes that are exempt from Ontario Regulation 347. 2) Sewage treatment facilities, not including septic systems under 10,000 litres per day.

	3) Non-residential uses where organic solvents occur including, but not limited to, dry cleaning operations, vehicle service centres, paint and hardware stores, retail or wholesale pharmaceutical storage and distribution centres. 4) Uses where fuel is stored including but not limited to, non-residential fuel storage, retail fuel outlets, uses where backup generators are required (with the exception of the backup generator at the Rosslyn Village Water Treatment Plant), industrial operations and any other uses involving the bulk handling and storage of fuel. 5) Uses which include the storage of DNAPLs except for incidental volumes for personal domestic use. 6) Future Agricultural uses. 7) The Official Plan and Zoning By-law shall be brought into conformity with provisions 1 to 6 in accordance with Section 26 of the *Planning Act.*

4.4.2 - Land Use Planning Monitoring Policy for Rosslyn Village

Policy: RV.2.M-PA

Policy RV.2.M-PA is used to monitor the implementation of RV.1.CW-PA under the Source Protection Plan. Through the monitoring, the Lakehead Source Protection Authority can monitor changes to the Official Plan and necessary Zoning By-laws. This will help to facilitate the monitoring process and advise the SPC of any issues related to the Land Use Planning Policy.

Policy Number:	RV.2.M-PA
Implementing Body:	The Municipality of Oliver Paipoonge
Policy Tool:	Land Use Planning – Monitoring
Implementation Date:	On February 1 of each year after the Source Protection Plan takes effect.
Legal Effect:	Must conform with
Policy:	In relation to policy RV.1.CW-PA, the Municipality of Oliver Paipoonge shall provide an Annual Report to the Lakehead Source Protection Authority by February 1 of each year on the steps it has taken in the previous calendar year to implement the policies that are set out in the Source Protection Plan and apply to its decisions under the *Planning Act* and the *Condominium Act*. The Source Protection Authority, in conjunction with the Municipality, shall evaluate the effectiveness of the significant threat policies in the Source Protection Plan that affect *Planning Act* and *Condominium Act* decisions.

4.4.3 - Specify Action Policy for Rosslyn Village

Policy: RV.3.CW-SP

Policy RV.3.CW.SP manages the existing significant threat of septic systems under 10,000 litres a day, new septic systems under 10,000 liters a day, and future significant threats of application handling and storage of road salt, and storage of snow. These policies specify actions to be taken by various public bodies to implement this Plan.

Policy Number:	RV.3.CW-SP
Implementing Body:	Thunder Bay District Health Unit The Municipality of Oliver Paipoonge
Policy Tool:	Specify Action (S. 26 p.1 of O. Reg. 287/07
Implementation Date:	As noted in the policy text.
Legal Effect:	Must comply with
Policy:	1) To address the handling and storage of road salt (existing and future) and storage of snow (existing and future) the Municipality of Oliver Paipoonge shall prepare a Salt Management Plan to address the sensitivity of the Rosslyn Village WHPA-A within one year of the Source Protection Plan taking effect. Specific actions that should be included in the plan to address the risk of road salt effects on source water include: a) Locating salt and snow storage areas outside of the WHPA-A b) Minimizing application of road salt within WHPA-A 2) The Thunder Bay District Health Unit shall ensure that on-site sewage maintenance inspections are conducted on all existing and future septic systems within WHPA-A, under the authority of the Building Code. This process will begin within 5 years of the approval of the Assessment Report for the Lakehead Source Protection Area (June 21, 2011). 3) Copies of any Official Plan and Zoning By-law amendment applications in WHPA-A shall also be provided by the

	Municipality of Oliver Paipoonge to the Lakehead Source Protection Authority once they have been received for review and comment and shall provide copies of these amendments once they have been adopted. This procedure must be established within one (1) year of the Source Protection Plan taking effect.

4.4.4 - Specify Action Monitoring Policy for Rosslyn Village

Policy: RV.4.M-SP

Policy RV.4.M.SP is the monitoring policy that has been put in place in order to monitor the actions and measures of policy RV.3.CW.SP.

Policy Number:	RV.4.M-SP
Implementing Body:	Thunder Bay District Health Unit The Municipality of Oliver Paipoonge
Policy Tool:	Specify Action – Monitoring
Implementation Date:	As noted in policy text below.
Legal Effect:	Must comply with
Policy:	1) By February 1 of each year after the Source Protection Plan takes effect, the Municipality of Oliver Paipoonge shall provide an Annual Report to the Lakehead Source Protection Authority with a description of the actions/measures they have taken to implement policy RV.3.CW-SP during the previous calendar year. The report shall also include a description of what steps are being taken to determine the extent to which the specified action has achieved its objectives and any information on the results of those steps. The Municipality of Oliver Paipoonge shall provide the Lakehead Source Protection Authority with a copy of the Salt Management Plan once it is adopted. 2) By February 1 of each year after the Source Protection Plan takes effect, the Thunder Bay District Health Unit shall provide an Annual Report to the Lakehead Source Protection Authority with a description of the actions/measures they have taken to implement policy RV.3.CW-SP during the previous calendar year. The report shall also include a description of what steps are being taken to determine the extent to which the specified action has achieved its objectives and any information on the results of those steps.

	The Thunder Bay District Health Unit shall also provide the Lakehead Source Protection Authority with the following information: a) Results of mandatory sewage system maintenance inspections. b) A summary compliance report outlining any corrective action found to be necessary as a result of the Sewage Systems Maintenance Program.

4.4.5 - Education and Outreach Policy for Rosslyn Village

Policy: RV.5.CW-EO

Policy RV.5.CW-EO is designed to educate the residents of WHPA-A on existing and possible future threats on their property. This policy manages all existing agricultural threats and future agricultural threats that could take place on properties that are zoned "Rural". This policy also manages threats that could take place on properties with septic systems under 10,000 liters a day and incidental volumes of DNAPLs used for personal domestic use.

Policy Number:	RV.5.CW-EO
Implementing Body:	Thunder Bay District Health Unit Municipality of Oliver Paipoonge
Policy Tool:	Education and Outreach
Implementation Date:	As noted in policy text below.
Legal Effect:	Must Comply with
Policy:	1) To address septic systems under 10,000 litres a day (existing and future) the Thunder Bay District Health Unit shall provide within two years of the source protection plan taking effect, information to landowners whose properties are serviced by an on-site sewage system within WHPA- A. The information shall be made available for a minimum of two years and will include: a) The reasons for the required inspection program. b) Maintenance of systems. c) Various types of allowed systems. d) Best management practices for using a system 2) The Municipality of Oliver Paipoonge shall develop an education program regarding the potential harmful effects of plane de-icer within the WHPA-A. This material will be required in the event of an airport being proposed. 3) To address all agricultural related drinking water threats (existing and future – Agricultural Source Material, Non-

	Agricultural Source Material, commercial fertilizer, pesticide and livestock grazing or pasturing of land, an outdoor confinement area or farm animal yard) the Municipality of Oliver Paipoonge shall develop an education and awareness program to advise the landowner in WHPA-A whose property currently contains existing agricultural threats. The Municipality shall prepare a package that will include information for best management practices and to raise awareness of and reduce drinking water threats. This information shall be developed and distributed within 2 years of the Source Protection Plan taking effect. 4) The Municipality shall prepare a package that will include information for best management practices and to raise awareness of and reduce drinking water threats related to the harmful effects of DNAPLs impacting groundwater resources.

4.5.6 - Education and Outreach Monitoring Policy for Rosslyn Village

Policy RV.6.M-EO

Policy RV.6.M-EO has been put forth to monitor policy RV.5.CW-EO, allowing the Lakehead Source Protection Authority to ensure the actions and measures being carried out by the Municipality of Oliver Paipoonge are in compliance with the Source Protection Plan.

Policy Number:	RV.6.M-EO
Implementing Body:	The Thunder Bay District Health Unit and The Municipality of Oliver Paipoonge
Policy Tool:	Education and Outreach – Monitoring
Implementation Date:	On February 1 of each year after the Source Protection Plan takes effect.
Legal Effect:	Must comply with
Policy:	1) By February 1 of each year, the Thunder Bay District Health Unit shall provide an Annual Report to the Lakehead Source Protection Authority with a description of the actions/measures they have taken to implement the education and outreach program (Policy RV.5.CW-EO) in the Source Protection Plan in the previous calendar year. The report shall also include a description of what steps are being taken to determine the extent of which the program has achieved its objectives and any information on the results of those steps. Enclosed with the Thunder Bay District Health Unit Annual Report shall be copies of any materials produced and the number of landowners/operators/persons engaged in significant drinking water threats reached by the program. 2) By February 1 of each year, the Municipality of Oliver Paipoonge shall provide an Annual Report to the Lakehead Source Protection Authority with a description of the actions/measures they have taken to implement the education and outreach program in the Source Protection Plan in the previous calendar year. The report shall also include a description of what steps are being taken to determine the

	extent to which the program has achieved its objectives and any information on the results of those steps. The Municipality of Oliver Paipoonge shall also provide a copy of any materials produced and the number of residents or reached by the education and outreach materials.

4.5 – Summary

The Rosslyn Village Municipal Residential Drinking Water Supply is located in the Municipality of Oliver Paipoonge and serves 29 residences as of January 2010. There are two municipal wells that operate alternately. The WHPA-A land for these two wells overlap.

The policies that were created for Rosslyn Village include only the geographic area that is WHPA-A and apply to the significant existing and future threats. The implementing bodies for these policies include: the Municipality of Oliver Paipoonge and Thunder Bay District Health Unit. Land Use Planning, Specified Action and Education and Outreach are the policy tools used to manage significant threats and ensure that they cease to be significant or never become existing threats.

Chapter 5 – City of Thunder Bay (Bare Point) Municipal Drinking Water System

Chapter 5 - Thunder Bay (Bare Point) Municipal Drinking Water System

5.1 - Description of the System

The Bare Point (Thunder Bay) Water Treatment Plant is owned and operated by the City of Thunder Bay. It was originally built in 1903 and expanded in 1978. In 2007, major upgrades took place and it is now the sole supply of drinking water for the City of Thunder Bay. The intakes for the water treatment plant are located in Lake Superior, as shown on Figure 5: Source Protection Plan Map #5: Thunder Bay (Bare Point) Intake Protection Zones on page 70. The intakes are approximately 840 metres into Lake Superior, at a depth of 10.2 metres. The rated capacity of the system is 113.5 million litres (2007), servicing a population of 102,500 (2007). It should be noted that the Thunder Bay (Bare Point) Water Treatment Plant also supplies treated drinking water to the following areas: the Fort William First Nation, located south of the City of Thunder Bay and Whitewater Subdivision which is located in the Municipality of Oliver Paipoonge.

Adjacent to the Intake Protection Zone (IPZ) is the Thunder Bay Area of Concern (AOC). An AOC is a term used to identify a hotspot where the environment has been harmed to the point where it affects use and enjoyment of that area of the lake or may be affecting the health of the lake. Environmental concerns in the Thunder Bay AOC have focused on the water quality impacts of industrial and urban development along the Thunder Bay waterfront and adjoining tributaries. In recent years, progress has been made within the AOC to work towards the restoration of beneficial uses and eventual delisting of the Area of Concern. The City of Thunder Bay has made upgrades to their water pollution control plant. Secondary sewage treatment started in 2006 and recently the new ultraviolet lights system replaced chlorine previously used for disinfecting the effluent water that is released into Lake Superior. This is beneficial to the health of Lake Superior. The Northern Wood Preservers Alternative Remediation Concept (NOWPARC) project saw the removal, isolation and thermal destruction of DNAPL contaminants and the creation of five hectares of fish habitat. Currently, work has been started to review management options for the contaminated sediment within the Thunder Bay north harbour.

During the preparation of the Assessment Report, data and reports were made available to the Committee through the Thunder Bay Remedial Action Plan (RAP). After a review of the information, the Committee concluded that the AOC does not have any known impacts on the water quality within IPZs 1 and 2 for Bare Point.

5.1.1 - Water Quality Intake Protection Zone (IPZ)

A water quality Intake Protection Zone (IPZ) is the protected area around a surface water intake. In most locations, this area includes both the land and water body that surrounds the intake. If the

intake protection zone is located far from shore, or within a Great Lake, the end shape may be a circle that never touches land. Only IPZ 1 and 2 were studied in the Assessment Report for the Lakehead Source Protection Area.

One element of the Director's Technical Rules concerning zone delineation relates to where the arc of the 1 km IPZ-1 intersects land. The extent of the zone inland is limited to the Generic Regulation (O. Reg 180/06) Regulated Limit or 120 metres, whichever is greater. In the case of the Lakehead Source Protection Area's IPZ-1, the 120 metres is greater than the Conservation Authority Generic Regulation Limit.

The IPZ-1 for the Bare Point Water Treatment Plant is a 1 kilometre radius circle around the intake. The intake is located 840 meters offshore. There are three intakes, two of which are 24 inches in diameter and one that is 54 inches. IPZ-1 intersects the shoreline and extends inland for a distance of 120 metres along the shoreline where the arc of the zone radius intersects the shore.

The area of water and land within an Intake Protection Zone is determined by various factors. This includes the time of travel, which is the amount of time it would take any contaminant spilled in or near a river to flow to the water intake. The *Clean Water Act* required that several Intake Protection Zones be identified. The second is the Intake Protection Zone 2, which is outside the Intake Protection Zone 1, but the area in which a spill may reach the treatment plant within a two hour time of travel.

5.1.2 - Intake Protection Zone 1

The majority of Intake Protection Zone 1 (IPZ 1) consists of Lake Superior. On the mainland, IPZ 1 consists mainly of undeveloped shoreline and also includes the Bare Point Water Treatment Plant. It represents a one kilometre radius around the intake pipes and is the most immediate and vulnerable area.

5.1.3 - Intake Protection Zone 2

Intake Protection Zone 2 (IPZ 2) encompasses a portion of the Municipality of Shuniah and the City of Thunder Bay, including residential properties, a former paper recycling facility, a hydro transformer station and a railway track. Much of IPZ 2 currently consists of undeveloped land.

The IPZ 2 is determined by the area in which a contaminant could be released and reach the IPZ 1 within two hours. Therefore the time of travel in the IPZ 2 is two hours.

IPZ 2 includes 2.6 kilometres of the lower watershed of Northstar Creek which confluences with Lake Superior. The portion of the creek determined to be within IPZ 2 was calculated based on stream velocity and a 30 minute residual time of travel.

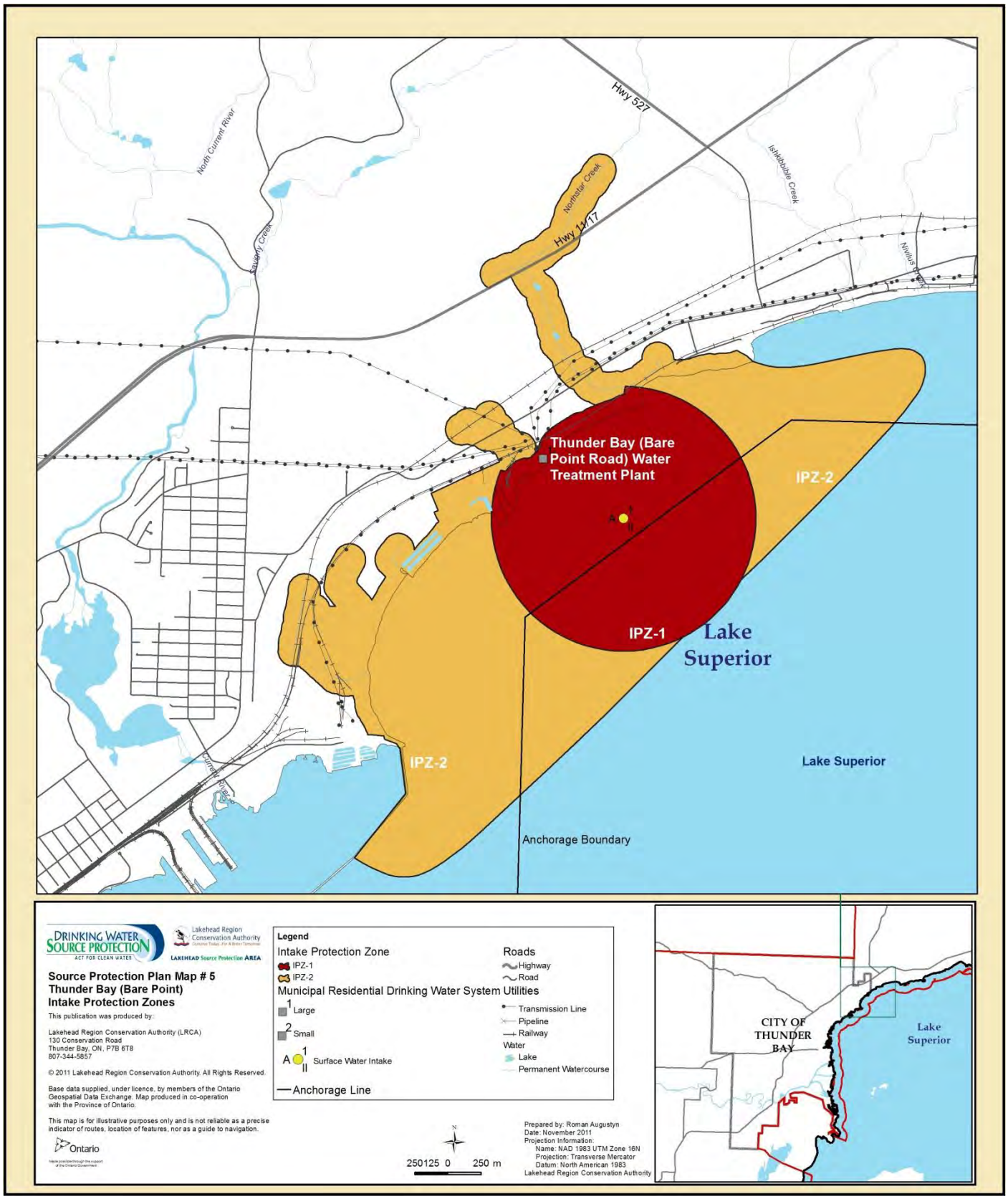


Figure 5: Source Protection Plan Map #5: Thunder Bay (Bare Point) Intake Protection Zones

5.2 - Drinking Water Issues

There were no drinking water issues listed for the Bare Point IPZ in the Amended Proposed Assessment Report (March 2011) for which further study would be required.

5.3 - Drinking Water Threats

There were no significant or moderate drinking water threats listed for the Bare Point IPZ 1 in the Amended Proposed Assessment Report (March 2011). For IPZ 2 there were no listed drinking water threats. This is based on the vulnerability scores for the drinking water supply.

5.4 - Policies

5.4.1 - Specify Action Policy for the City of Thunder Bay

Policy: TB.1.NLB-SP

Policy TB.1.NLB-SP has been put forth to protect the intake pipe and IPZ 1 from the potential impacts of ship anchorage. Ships occasionally anchor during spring and fall storms and this policy will help to avoid anchorage within proximity of the intake pipe and IPZ 1. A monitoring policy (TB.2.M-SP) is also included.

Spills in Lake Superior are currently dealt with by the Regional Environmental Emergencies Team (REET). This team is comprised of multiple agencies and members that specialize in emergencies impacting the environment. If a spill or emergency were to take place, the REET for Western Lake Superior would provide comprehensive advice to those requiring assistance.

Policy Number:	TB.1.NLB-SP
Implementing Body:	City of Thunder Bay
Policy Tool:	Specify Action (s. 26(6) of O. Reg. 287/07)
Implementation Date:	When the Source Protection Plan takes effect
Legal Effect:	Non-legally binding
Policy:	The City of Thunder Bay should update a Spill Prevention and Contingency Plan which may include, at minimum placing a buoy at the anchorage boundary that is within proximity to the Intake, as per Figure 5: Source Protection Plan Map #5: Thunder Bay (Bare Point) Intake Protection Zones.

5.4.2 - Specify Action Monitoring Policy for the City of Thunder Bay

Policy: TB.2.M-SP

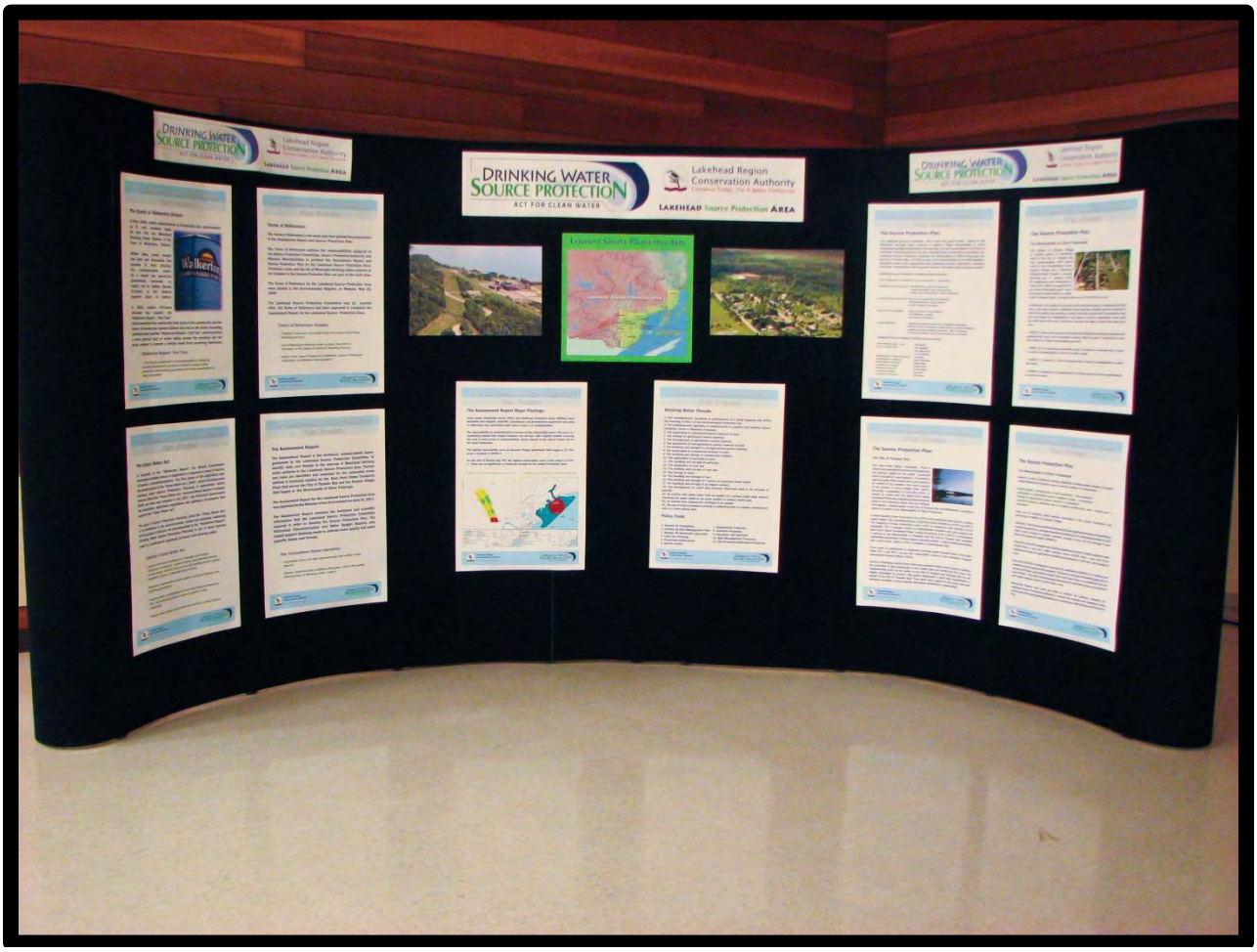
Policy TB.2.M-SP was created in order to monitor the implementation of TB.1.NLB-SP in the Source Protection Plan. Through monitoring, the Lakehead Source Protection Authority will be able to track how implementation is done by the City of Thunder Bay.

Policy Number:	TB.2.M-SP
Implementing Body:	City of Thunder Bay
Policy Tool:	Specify Action
Implementation Date:	When the Source Protection Plan takes effect.
Legal Effect:	Non-legally binding
Policy:	The City of Thunder Bay shall provide the Lakehead Source Protection Authority with a copy of any updates to the Spill Prevention and Contingency Plan that is created, and any actions that are taken under this Plan to protect the Bare Point Intakes.

5.5 Summary

The Bare Point (Thunder Bay) Water Treatment Plant is owned and operated by the City of Thunder Bay with its intakes located in Lake Superior. The Bare Point Water Treatment Plant also supplies treated drinking water to the following areas outside the City of Thunder Bay limits: the Fort William First Nation located south of the City of Thunder Bay and the Whitewater Subdivision, located in the Municipality of Oliver Paipoonge.

The Strategic Action Policy was created to address the proximity of ship anchorage to the intake pipes within the IPZ 1 area. The implementing body for the policy is the City of Thunder Bay although they are not legally mandated to comply. This policy represents a good faith commitment on behalf of the City of Thunder Bay. They must have regard for this policy and should consider it when making decisions pertaining to its applicability.



Chapter 6 – Summary of Consultations

Chapter 6 - Summary of Consultation

Source Protection Planning is a locally driven process that involves collaboration among many different industries, partners, municipalities and the general public. Under this process, all affected and interested parties have the ability to contribute and consult each step of the way until the Plan is submitted for approval. Consultation has taken place for the Terms of Reference, Assessment Report and preparation of the Source Protection Plan. More Consultation information can be found at www.lakeheadca.com.

6.1 - Terms of Reference

The Terms of Reference is a work plan outlining the development of an Assessment Report and Source Protection Plan for the Lakehead Source Protection Area. Listed below is the consultation process that took place for the Terms of Reference:

Date	Consultation Activity	Location
June 14, 2008	Radio Commercials regarding the Terms of Reference	
June 20, 2008	Thunder Bay Source Ad informing of the Terms of Reference Open House Announcement	Thunder Bay Source
June 20, 2008	Letters to announce Draft Proposed Terms of Reference	
June 25, 2008	Terms of Reference Open House invitations	
July 12, 2008	Terms of Reference Open House	Thunder Bay Chronicle Journal Ad
July 14, 2008	Questionnaire for Property Owners regarding Terms of Reference	
July 15, 2008	Terms of Reference Open House	LRCA Boardroom
July 17, 2008	Terms of Reference Open House	Rosslyn Village Community Centre
August 20, 2008	Letters to announce Proposed Terms of Reference	
August 21, 2008	Proposed Terms of Reference Public Notice	Thunder Bay Chronicle Journal
August 22, 2008	Proposed Terms of Reference Public Notice	Thunder Bay Source Ad

6.2 - Assessment Report

The Assessment Report is a technical, science-based report to identify potential and existing risks and threats to the sources of Municipal Residential Drinking Water in the Lakehead Source Protection Area. Listed below is the consultation process that took place for the Assessment Report:

Date	Consultation Activity	Details
February 11, 2009	Mandatory Letter to Bare Point Landowners	Threats letters
February 11, 2009	Mandatory Letter to Rosslyn Village Landowners	Threats letters
February 13, 2009	Memo to Municipal Clerks	Assessment Report Open House details
February 16, 2009	Radio Advertising	Assessment Report Open House
February 25, 2009	Assessment Report Open House	Held at Rosslyn Village Community Centre
February 26, 2009	Assessment Report Open House	Held at Oliver Road Community Centre
February 11, 2010	Draft Proposed Assessment Report Open House Notice	Thunder Bay Source
February 11, 2010	Draft Proposed Assessment Report Open House Notice	Thunder Bay Chronicle Journal
February 11, 2010	Draft Proposed Assessment Report Notice	Source Water Protection Website
February 15, 2010	Radio Advertising for the Draft Assessment Report Open House	
February 18, 2010	Draft Proposed Assessment Report Open House	Rosslyn Village Community Centre
February 25, 2010	Draft Proposed Assessment Report Open House	Current River Community Centre
February 2010	Municipal Newsletters about Draft Assessment Report	
March 10, 2010	Draft Proposed Assessment Report Open House	LRCA Boardroom
May 20, 2010	Public Comment Period Notice	Thunder Bay Chronicle Journal
May 20, 2010	Public Comment Period Notice	Thunder Bay Source

6.3 - Preparation of Source Protection Plan

The Source Protection Plan is a strategic document that outlines policies and procedures to prevent or reduce significant threats and manage potential risks to the sources of Municipal Residential Drinking Water in the Lakehead Source Protection Area.

The Source Protection Planning process is transparent and open to public participation. The *Clean Water Act, 2006* and the *General Regulations* (O.Reg 287/07) identified four consultation periods that are intended to engage those that are likely to be impacted by the Plan. Consultation opportunities for the Source Protection Plan for the Lakehead Source Protection Authority are listed below.

Consultation Opportunity	Description
Notice of Plan Preparation	Source Protection Committees are required by Section 19 of the *General Regulation* to formally give notice in their Source Protection Area when they begin preparing their Source Protection Plans. Notice was sent to Municipalities, landowners identified as engaging in significant drinking water threat activities, the Chief of all First nations Bands, and the Secretary-Treasurer of all planning boards.
Pre-Consultation	Refers to the legislated requirement detailed in Sections 35 to 39 of the *General Regulation* to send notices to persons or bodies responsible for implementing policies and to government ministries that have obligations under the *Clean Water Act, 2006*.
Formal Consultation (Draft Proposed Source Protection Plan)	The Committee must publish a draft of the Plan on the internet and make it available for the inspection by the public for a minimum period of 35 days (Section 41 of the General Regulation). Further, the Committee must hold at least one public meeting at a location in the Source Protection Area at least 21 days after making the Plan available to the public.
Formal Consultation (Proposed Source Protection Plan)	The Committee must publish the Proposed Source Protection Plan on the internet for inspection by the public for a minimum period of 30 days. Any Comments received during this second public consultation period will be forwarded with the Proposed Plan to the Ministry of Environment for their consideration.

Listed below is the consultation process that took place for the Source Protection Plan:

Date	Consultation Activity	Details
December 23, 2010	Notice to Municipalities on the commencement of the Source Protection Plan	
January 4, 2011	Notice to Property Owners on the Commencement of the Source Protection Plan	
January 10, 2011	Presentation to Council	Municipality of Oliver Paipoonge
January 24, 2011	Presentation to Council	Municipality of Shuniah
February 7, 2011	Presentation to Council	City of Thunder Bay
June 10, 2011	Early Engagement	Meeting with Rudy Buitenhuis, OMAFRA Rep.
June 15, 2011	Early Engagement	Meeting with the CAO/ Clerk of Oliver Paipoonge, Jamie Cressman
July 20, 2011	Early Engagement	Meeting with Local Municipal Planning Working Group
September 19, 2011	Pre-Consultation Draft Policy Notice	Thunder Bay District Health Unit
September 19, 2011	Pre-Consultation Draft Policy Notice	Oliver Paipoonge Municipal Council and Mayor
September 19, 2011	Pre-Consultation Draft Policy Notice	Oliver Paipoonge CAO/Clerk, Jamie Cressman
September 19, 2011	Pre-Consultation Draft Policy Notice	Audrey Anderson, MMAH
September 19, 2011	Pre-Consultation Draft Policy Notice	Hugh Simpson, OMAFRA
October 12, 2011	Presentation to Oliver Paipoonge Municipal Council regarding Draft Policies	Oliver Paipoonge Municipal Office
November 8, 2011	Pre-Consultation Draft Policy Notice	City of Thunder Bay Clerk, John Hannam
January 14, 2012	Public Consultation Begins for Draft Source Protection Plan	
January 14, 2012	Newspaper Ads regarding the posting of the Draft Source Protection Plan for Public Consultation in the Thunder Bay Chronicle Journal and Thunder Bay Source.	Geographic area for distribution includes the City of Thunder Bay and surrounding Municipalities, including Oliver Paipoonge.

January 17, 2012	Notices delivered on Draft Source Protection Plan.	Notices delivered to Residents engaged in significant threats, Implementing bodies and Stakeholder groups.
February 6, 2012	Open House for Draft Source Protection Plan	Current River Community Centre
February 7, 2012	Open House for Draft Source Protection Plan	Rosslyn Village Community Centre
February 17, 2012	Public Consultation on Draft Source Protection Plan ends	
April 12- May11, 2012	Consultation for Proposed Source Protection Plan	
April 12, 2012	Newspaper ad in Thunder Bay Chronicle Journal regarding the posting of the Proposed Source Protection Plan for Public Consultation	Geographic area for distribution includes the City of Thunder Bay and surrounding Municipalities, including Oliver Paipoonge
April 13, 2012	Newspaper ad in Thunder Bay Source regarding the posting of the Proposed Source Protection Plan for Public Consultation	Geographic area for distribution includes the City of Thunder Bay and surrounding Municipalities, including Oliver Paipoonge
April 17, 2012	Notices of Proposed Plan delivered to Municipalities, Stakeholders, Implementing bodies, and Residents.	
May 11, 2012	Public Consultation on Proposed Source Protection Plan ends	

6.4 - Summary

The Source Protection Planning Process was open and transparent, allowing affected stakeholders, partners and the public to become involved and consult at every stage of the process. Through public notices, radio announcements, pre-consultation and open houses those with varied interests in the Source Protection Plan have been able to comment on the work that has been done.

Chapter 7 - Conclusion

Chapter 7 – Conclusion

The *Clean Water Act* was created by the Ontario Government to ensure that communities are able to protect their residential drinking water supplies. The *Act* requires the development and implementation of local Source Protection Plans. The Source Protection Plan for the Lakehead Source Protection Area will have the effect of reducing or eliminating human and natural impacts on the quality and supply of drinking water, thereby safe guarding human health and protecting our water for both current and future generations.

Source water is the untreated water in lakes, rivers and underground aquifers that is used to supply water systems. It is in a community's interest to protect the amount and quality of the source water before it is treated, tested and distributed through the Municipality. Source Protection complements the valuable work of water treatment plant and distribution system operators to deliver safe and potable drinking water.

In the Lakehead Source Protection Area there are two municipal Drinking Water Sources; one located in Rosslyn Village within the Municipality of Oliver Paipoonge and the second located at Bare Point, servicing the City of Thunder Bay.

Through the writing of the Assessment Report and other various studies, vulnerability scores for the Wellhead Protection Areas and Intake Protections Zones were determined, along with existing and future threats that could take place in these areas. The Assessment Report was to determine which policies needed to be drafted and used to develop the Source Protection Plan.

The Lakehead Source Protection Plan prescribes the strategy for reducing or eliminating drinking water threats in the vulnerable areas. It is mandated by legislation that policies for all existing and future significant threats, policies for monitoring drinking water threats, policies to achieve great lakes targets (if directed by the Minister of the Environment), and any other policies prescribed by regulation are included.

The Plan includes policies for both the Rosslyn Village and the Thunder Bay (Bare Point) Municipal Drinking Water sources. These policies utilize various tools, including Land Use Planning, Specify Actions, Education and Outreach and Strategic Actions, which include a range of legal effects. Policies related to Great Lakes targets did not have to be included at the time of submission of the Lakehead Source Protection Plan.

The Land Use Planning Policy for the Rosslyn Village Wellhead Protection Area will prohibit the future and significant threats of establishing a waste disposal site, sewage treatment facilities (not including those under 10,000 litres a day), organic solvent and storage of fuel stored and handled for non-residential use, future agricultural threats, and the storage of pure dense non-aqueous phase liquids (DNAPLs) except for incidental volumes for personal domestic use. As

per the legislation, a monitoring policy has been developed for this policy that requires the Municipality of Oliver Paipoonge to provide the Lakehead Source Protection Authority with all zoning amendment applications for comment and a copy of the Official Plan and Zoning By-laws when they have been approved.

The Specify Action Policy for the Municipality of Oliver Paipoonge Policy manages the existing significant threat of septic systems under 10,000 litres a day, new septic systems under 10,000 liters a day, and future significant threats of application, handling and storage of road salt and storage of snow.

A monitoring policy has been put in place in order to monitor the actions and measures in regards to this policy.

An Education and Outreach Policy has been developed to educate the residents of WHPA-A on existing and possible future threats on their property. This policy manages all existing agricultural threats and future agricultural threats that could take place on properties that are zoned "Rural", including the use of incidental volumes of DNAPLs, fuel storage and handling and the impacts of runoff from airplane de-icer. This policy also manages threats that could take place on properties with septic systems under 10,000 liters a day. A monitoring policy has also been created to complement this Education and Outreach Policy.

A Specify Action Policy for the City of Thunder Bay has been put forth to protect the intake pipe and IPZ 1 from the potential impacts of ship anchorage. Ships occasionally anchor during spring and fall storms and this policy will help to avoid anchorage within proximity of the intake pipe and IPZ 1. A monitoring policy is also included. There are no significant or moderate threats for the City of Thunder Bay. Concerns about ship anchorage have been brought to the attention of the SPC by City of Thunder Bay employees and Councillors.

The impacts of Source Protection Planning on individual landowners will vary across the watershed, depending on where they live, the various activities they engage in and land uses in proximity to drinking water sources. As the process was open and transparent, the public had the opportunity to become involved in each step of Source Protection Planning. Drinking Water Source Protection will work to ensure that clean and safe drinking water is available for the health of humans, ecosystems and economies for future generations. Our actions today affect the quantity and quality of water available for future uses and protecting sources of water is essential to ensuring human health.

The Lakehead SPC would like to thank the Municipality of Oliver Paipoonge, the City of Thunder Bay and the Lakehead Source Protection Authority for their continued cooperation and assistance in the Source Protection Planning Process.

Appendix – A: Compliance with subsection 34(1) to (4) of Regulation 287/07

Appendix – A: Compliance with subsection 34(1) to (4) of Regulation 287/07

List A

Significant threat Policies that affect decisions under the *Planning Act* and *Condominium Act, 1998*

"Clause 39(1)(a), subsections 39 (2), (4) and (6) and sections 40 and 42 of the *Clean Water Act, 2006* apply to the following policies:"

- RV.1.CW-PA - Land Use Planning Policy for Rosslyn Village

List B

Moderate and low threat policies that affect decisions under the *Planning Act* and *Condominium Act, 1988*

"Subsection 39 (1) (b) of the *Clean Water Act, 2006* applies to the following policies:"

- No Applicable Policies

List C

Significant threat policies that affect prescribed instrument decisions

"Subsection 39 (6), clause 39 (7) (a), section 43 and subsection 44 (1) of the *Clean Water Act, 2006* apply to the following policies:"

- No Applicable Policies

List D

Moderate and Low Threat Policies that affect prescribed instrument decisions

"Clause 39 (7) (b) of the *Clean Water Act, 2006* applies to the following policies:"

- No Applicable Policies

List E

Significant threat policies that impose obligations on municipalities, Source Protection Authorities and Local Boards

"Section 38 and subsection 39 (6) of the *Clean Water Act, 2006* applies to the following policies:"

- RV. 3.CW-SP – Specify Action Policy for Rosslyn Village
- RV.5.CW-EO – Education and Outreach Policy for Rosslyn Village

List F

Monitoring policies referred to in subsection 22 (2) of the *Clean Water Act, 2006*

"Section 45 of the *Clean Water Act, 2006* applies to the following policies:"

- RV.2.M-PA – Land Use Planning Monitoring Policy for Rosslyn Village
- RV.4.M-SP – Specify Action Monitoring Policy for Rosslyn Village
- RV.6.M-EO – Education and Outreach Monitoring Policy for Rosslyn Village
- TB.2.M-SP – Specify Action Monitoring Policy for the City of Thunder Bay

List G

Policies related to section 57 of the *Clean Water Act, 2006*

"The following policies relate to section 57 (prohibition) of the *Clean Water Act*."

- No Applicable Policies.

List H

Policies related to Section 58 of the *Clean Water Act, 2006*

"The following policies relate to Section 58 (Risk management Plans) of the *Clean Water Act*:"

- No Applicable Policies.

List I

Policies related to Section 59 of the *Clean Water Act, 2006*

"The following policies relate to Section 59 (Restricted Land Use) of the *Clean Water Act*:"

- No Applicable Policies.

List J

Strategic Action Policies

For the purposes of section 33 of Ontario Regulation 287/07, the following policies are identified as strategic action policies:

- TB.1.NLB-SP – Specify Action Policy for the City of the City of Thunder Bay

Table 1: Prescribed Instruments which apply to source protection Plan policies in Lists C and D above (ss 34(4)) of O. Reg. 287/07

Policy #	Legal Effect (Conform with, have regard to)	Aggregate Resources Act	Environmental Protection Act – Waste sites and systems	Environmental Protection Act - Renewable energy approvals	*Nutrient Management Act* – nutrient management strategies	*Nutrient Management Act* – nutrient management plans	*Nutrient Management Act* – NASM plans	Ontario Water Resources Act – permits to take water	Ontario Water Resources Act – Sewage works	Pesticides Act- Permits	*Safe Drinking Water Act*- permits, licences

Table 2: Policy Summary Matrix

Policy #	Legal Effect (conform with, have regard to, non-binding)	Policy Decisions under the *Planning Act* and *Condominium Act, 1998* (Lists A and B)	Policy affects Prescribed Instrument Decisions (Lists C and D)	Significant Threat Policies that impose obligations on municipalities, Source Protection Authorities and local boards (List E)	Monitoring policies referred to in ss 22(2) of the CWA (List F)	Part IV Policies - Significant threat policies that are designated in the plan as requiring a risk management plan, are prohibited under s.57, or to which s. 59 of the CWA applies (Lists G, H, and I)	Strategic Action Policies (List J)	Significant threat policies which designate a body other than a Municipality, source protection authority or local board as responsibly for implementing the policy *(not listed in Appendix lists)*
RV.1.CW-PA	Conform with	X						
RV.2.M.PA	Conform with				X			
RV.3.CW-SP	Conform with			X				
RV.4.M-SP	Conform with				X			
RV.5.CW-EO	Conform with			X				
RV.6.M-EO	Conform with				X			
TB.1.NLB-SP	Non-binding						X	
TB.2.M-SP	Non-binding				X			

Appendix B - Approved Assessment Report

Appendix B - Approved Assessment Report

As per requirements under the *Clean Water Act, 2006*, the Approved Assessment Report for the Lakehead Source Protection Area along with all corresponding maps can be found on the CD located in the back of this package. It can also be found electronically at http://www.sourceprotection.net/images/Approved%20Assessment%20Report%20May%202011%20FINAL.pdf.

Appendix C – Acronyms

Appendix C - Acronyms

ASM	Agricultural Source Material
DNAPLS	Dense Non - Aqueous Phase Liquids
DWSP	Drinking Water Stewardship Program
IPZ	Intake Protection Zone
ISI	Intrinsic Susceptibility Index
LRCA	Lakehead Region Conservation Authority
LSPA	Lakehead Source Protection Area
MMAH	Ministry of Municipal Affairs and Housing
MOE	Ministry of the Environment
NASM	Non – Agricultural Source Material
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
NOWPARC	Northern Wood Preservers Alternative Remediation Concept
NPRI	National Pollutant Release Inventory
PCBs	Polychlorinated biphenyls
RAP	Remedial Action Plan
SPA	Source Protection Authority
SPC	Source Protection Committee
SPP	Source Protection Plan
SWP	Source Water Protection
TR	Technical Rules
WHPA	Wellhead Protection Area

Appendix D – References

Appendix D - References

AMEC Earth and Environmental, 2008. “Groundwater vulnerability analysis issues evaluation threats, inventory and water quality risk assessment for the hamlet of Rosslyn Village wellhead protection area, Municipality of Oliver Paipoonge, Ontario”. December 2008. 23pp. + Maps and Appendices.

Gartner Lee Limited, 2008. Lakehead source protection area water budget and water quantity stress assessment – a draft report for consideration of the Lakehead Source Protection Committee. 76 pp.

Lakehead Region Conservation Authority (LRCA), 2008: “Watershed characterization report – a draft report for consideration of the Lakehead Source Protection Committee”.

Lakehead Source Protection Committee (SPC), 2011: “Approved Assessment Report for the Lakehead Source Protection Area".

Ontario Ministry of the Environment (MOE), 2006. “*Clean Water Act*” – an act to protect existing and future sources of drinking water and to make complementary and other amendments to other acts. Royal Assent October 2006. 83pp.

Stantec Consulting Limited, January 2009. “City of Thunder Bay source protection technical study – Bare Point water treatment plant, final phase 1 report”. January 2009. 51 pp. + Appendices.

Stantec Consulting Limited, February 2009. “City of Thunder Bay source protection technical study – Bare Point water treatment plant, final phase 2 report”. February 2009. 54 pp. + Appendices.

Appendix E - Glossary

Appendix E – Glossary

The following definitions have been gathered from multiple sources and are provided for local information purposes to assist the reader to understand the Source Protection Plan for the Lakehead Source Protection Area. Where pertinent, the legal definitions as per the "*Clean Water Act, 2006*" and associated Regulations and Director's Technical Rules have been used.

A

Agricultural Source Material - has the same meaning as in Section 1 of Ontario Regulation 276/03 (General) made under the "*Nutrient Management Act, 2002*".

Anthropogenic – influenced by human activity or human origin.

Aquifer - a water-bearing layer (or several layers) of rock or sediment capable of yielding supplies of water; typically consists of unconsolidated deposits of sandstone, limestone or granite, and can be classified as confined, unconfined or perched. The water in an aquifer is called groundwater.

Assessment Report - an Assessment Report is a science-based report generated locally for each Source Protection Area to comply with the *Clean Water Act, 2006*. The Assessment Report will identify the watersheds and the vulnerable areas within the Source Protection Area. Threats to the vulnerable areas will be assessed and determined whether they pose a significant threat to municipal residential drinking water supplies. The report identifies the local watersheds in the Source Protection Area, the vulnerable areas within the Source Protection Area, and assesses potential drinking water threats in each vulnerable area in order to determine which threats constitute significant drinking water threats. An Assessment Report looks at an entire watershed and the factors influencing the quality and amount of water (quantity) found there. Assessment Reports are a key requirement of the *Clean Water Act, 2006*. They include information such as the physical characteristics of the land, land uses, where drinking water supplies are located, how much water is being used and how much is available for future uses, where vulnerable water supply areas are located, what issues already compromise drinking water sources and what threatens drinking water sources from overuse and contamination. Assessment Reports provide Source Protection Committees with information that will help determine how best to protect the quality and quantity of their local water supply. They are the basis for developing Source Protection Plans and making local policy decisions for protecting drinking water. An Assessment Report is a technical document that is prepared by a Source Protection Committee under Section 15 of the *Clean Water Act, 2006* Source Protection Area and to rank risks to drinking water within that area. Each Assessment Report is approved by the Ontario Minister of the Environment.

B

Bedrock - solid or fractured rock usually underlying unconsolidated geologic materials; bedrock may be exposed at the land surface.

C

"*Clean Water Act*" - the *Clean Water Act, 2006* was passed as Bill 43 to protect drinking water at the source. The Act requires the development of a watershed based Source Protection Plan. A key focus of the legislation is the preparation of locally developed, terms of reference, science based assessment reports and source protection plans. While it is not possible to completely remove all risks to our drinking water, the *Clean Water Act, 2006* will help reduce risks by addressing threats to drinking water quantity and quality. The Act is designed to promote voluntary initiatives but requires mandatory action where needed.

Commercial Fertilizer - has the same meaning as in Ontario Regulation 267/03 (General) made under the "*Nutrient Management Act, 2002*".

Conceptual Water Budget - a written description of the overall system flow dynamics for each watershed in the Source Protection Area, taking into consideration surface water and groundwater features, land cover (e.g. proportion of urban vs. rural uses), man-made structures (e.g. dams, channel diversions, water crossings) and water takings.

Condition - the presence of a substance in a vulnerable area that results from a past activity and that also constitutes a drinking water threat.

Conservation Authorities - local watershed management agencies that deliver services and programs that protect and manage water and other natural resources in partnership with government, landowners and other organizations.

Contaminant (pollutant) - an undesirable substance that makes water unfit for a given use when found in sufficient concentration.

D

Dense Non-Aqueous Phase Liquid (DNAPL) - an organic chemical in concentrations greater than its aqueous solubility and more dense than water. Such a chemical will sink in groundwater and accumulate in aquifer depressions.

Drilled Well - a well usually 10 inches or less in diameter, drilled with a drilling rig and cased with steel or plastic pipe. Drilled wells can be of varying depth.

Drinking Water – a) Water intended for human consumption.
b) Water that is required by an Act, regulation, order, municipal by-law or other document issued under the authority of an Act, (i) to be potable, or (ii) to meet or exceed the requirements of the prescribed drinking water quality standards.

Drinking Water Issue - a substantiated condition relating to the quality or quantity of water that interferes or is anticipated to soon interfere with the use of a drinking water source by a Municipality. As defined in the *Clean Water Act* Director's Technical Rule 114, regarding the quality of water in a vulnerable area: 1) The presence of a parameter in water at a surface water intake or well, at a concentration that may result in deterioration of the water quality or where there is a trend of increasing concentrations of a parameter. 2) The presence of a pathogen at a concentration that may result in deterioration of the water quality or there is a trend of increasing concentrations of the pathogen.

Drinking Water Source Protection - Protecting surface water sources such as lakes, rivers and streams, and groundwater sources from contamination or overuse, particularly through the planning process under the *Clean Water Act, 2006*. It is the first step in the multi-barrier approach to protecting drinking water. Other barriers include water testing and monitoring, reliable water treatment and distribution systems and training of water managers and staff. At this time, the emphasis of the project is to identify and address existing or potential threats to Municipal Residential Drinking Water Supplies by concentrating on zones immediately surrounding Municipal wellheads and surface water intakes.

Drinking Water System - a system of works, excluding plumbing, that is established for the purpose of providing users of the system with drinking water and that includes, (a) anything used for the collection, production, treatment, storage, supply or distribution of water, (b) anything related to the management of residue from the treatment process or the management of the discharge of a substance into the natural environment from the treatment system, and (c) a well or intake that serves as the source or entry point of raw water supply for the system.

Drinking Water Threat - has the same meaning as in the "*Clean Water Act, 2006*". An existing activity, possible future activity or existing condition that results from a past activity, (a) that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water, or (b) that results in or has the potential to result in the raw water supply of an existing or planned drinking-water system failing to meet any standards prescribed by the regulations respecting the quality or quantity of water, and includes an activity or condition that is prescribed by the Regulations as a drinking water threat.

E

Evaporation - the process by which water or other liquids change from liquid to vapour; evaporation can return infiltrated water to the atmosphere from upper soil layers before it reaches groundwater or surface water, and occur from leaf surfaces (interception), water bodies (lakes, streams, wetlands, oceans), and small puddled depressions in the landscape.

Evapotranspiration - the combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants.

Existing Threat - is an activity that started or has been engaged in at a location in a vulnerable area before the Source Protection Plan takes effect.

F

Fresh Water - water that contains less than 1,000 milligrams per litre of dissolved solids; generally more than 500 milligrams per litre is undesirable for drinking and many industrial uses.

Future Threat - is considered to be an activity that takes place at a location in a vulnerable area after the Source Protection Plan takes effect, where that activity has never taken place before, or is not an existing activity.

G

Geology - the study of science dealing with the origin, history, materials and structure of the earth, together with the forces and processes operating to produce change within and on the earth.

Great Lakes - the Great Lakes are the five large lakes located in Canada and United States: Lake Ontario, Lake Superior, Lake Huron, Lake Michigan and Lake Erie.

Groundwater - the water below the water table contained in void spaces (pore spaces between rock and soil particles, or bedrock fractures). Water occurring in the zone of saturation in an aquifer or soil.

Groundwater Recharge Area - the area where an aquifer is replenished from: (a) natural processes, such as the infiltration of rainfall and snowmelt and the seepage of surface water from lakes, streams and wetlands, (b) from human interventions, such as the use of storm water management systems, and; (c) whose recharge rate exceeds a specified threshold.

Groundwater Vulnerability - the probability of contaminants propagating to a specified region in the groundwater system after introduction at some location above the uppermost aquifer.

H

Highly Vulnerable Aquifer - an aquifer on which external sources have or are likely to have a significant adverse effect, and includes the land above the aquifer.

I

Intake Protection Zone (IPZ) - is one of four types of vulnerable areas identified in the Ontario *Clean Water Act, 2006*. Intake Protection Zone (IPZ) means the area of land and water that contributes source water to a drinking water system intake within a specified distance, period of flow time (for example, two hours), and/or watershed area. River and lake intakes can be contaminated when dangerous materials are spilled into the water or on nearby land and make their way to the intake. Intake protection zones are areas where dangerous materials may get to an intake so quickly the operators of the municipal water treatment plant may not have enough time to shut down the intake before the pollutant reaches it.

IPZ-1: For a lake intake, a one-kilometre circle around the intake except where it meets shore – at which point it is drawn 120 metres from shore or the extent of the regulation limit, whichever is greater.
IPZ-2: The area where water can reach the intake in a specified time, usually two to six hours.
IPZ-3: Areas where there are activities further away from the intake which could have an impact on water quality.

Intrinsic - innate, inherent, inseparable from the thing itself, essential; comprising, being part of a whole.

Intrinsic Susceptibility - a measure of the natural protection of an aquifer from overlying layers with low permeability.

Intrinsic Susceptibility Index (ISI) - is a calculated value that estimates the susceptibility of a given groundwater aquifer to contamination by activity or water on the surface at a given point. It is a numerical indicator of an aquifer's intrinsic susceptibility to contamination expressed as a function of the thickness and permeability of overlying layers.

Intrinsic Vulnerability - the potential for the movement of a contaminant(s) through the subsurface based on the properties of natural geological materials. How quickly does water move vertically from the surface down to the aquifer? - This is called 'intrinsic vulnerability.

J

K

L

Land Use - a particular use of space at or near the earth's surface with associated activities, substances and events related to the particular land use designation.

M

Municipal Residential Drinking Water System – a drinking water system or part of a drinking water system;
a) That is owned by a Municipality or by a municipal service board established under the Municipal Act, 2001 or a city board established under the City of Toronto Act, 2006,
b) That is owned by a corporation established under sections 9, 10 and 11 of the Municipal Act 2001, in accordance with section 203 of that Act or under sections 7 and 8 of the City of Toronto Act, 2006 in accordance with sections 148 and 154 of that Act,
c) From which a Municipality obtains or will obtain water under the terms of a contract between the Municipality and the owner of the system, or
d) That is in a prescribed class.

Municipal Well – a Municipality owned pumping well that provides drinking water to five or more residences.

N

Non-Agricultural Source Materials - used to apply to land as nutrients that do not originate from agricultural activities. Includes pulp and paper biosolids, sewage biosolids, non-agricultural compost and any other material capable of being applied to land as a nutrient that is not from an agricultural source (see "*Nutrient Management Act, 2002*" for legal description).

O

Official Plan (OP) - is a policy document prepared by a Municipality, which states in broad terms the Municipality's strategic vision for community development and land use. The primary

role of the Official Plan is to establish a series of Municipal policies to manage physical change and the effects on the social, economic and natural environment within the Municipality.

Ontario Ministry of the Environment (MOE) - is the provincial Ministry that is spearheading Drinking Water Source Protection in the Province of Ontario. The *Clean Water Act, 2006* legislated in July 2007, ensures that communities are able to identify potential risks to their supply of drinking water and take action to reduce or eliminate these risks.

Outdoor Confinement Area - has the same meaning as in Ontario Regulation 267/03 (General) made under the "*Nutrient Management Act, 2002*".

P

Pathogen - an organism capable of producing disease.

Permit to Take Water - any person that takes more than 50,000 litres of water per day from any source requires a permit issued by the Ministry of the Environment Director under the Ontario Water Resources Act, unless they meet the criteria for certain exempted water takings.
Pesticides - chemicals including insecticides, fungicides, and herbicides that are used to kill living organisms.

Policy - a statement of intention. A policy may be designed to guide current and future actions and decisions, and to achieve a desired goal or outcome. A policy may refer to the policy approaches or the measures that will be used to achieve it.

Prescribed Drinking Water Threats - The following activities are prescribed as drinking water threats for the purpose of the definition of "drinking water threat" in subsection 2 (1) of the *Clean Water Act*:
1. The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the "Environmental Protection Act".
2. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
3. The application of agricultural source material to land.
4. The storage of agricultural source material.
5. The management of agricultural source material.
6. The application of non-agricultural source material to land.
7. The handling and storage of non-agricultural source material.
8. The application of commercial fertilizer to land.
9. The handling and storage of commercial fertilizer.
10. The application of pesticide to land.

11. The handling and storage of pesticide.
12. The application of road salt.
13. The handling and storage of road salt.
14. The storage of snow.
15. The handling and storage of fuel.
16. The handling and storage of a dense non-aqueous phase liquid.
17. The handling and storage of an organic solvent.
18. The management of runoff that contains chemicals used in the de-icing of aircraft.
19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.
20. An activity that reduces the recharge of an aquifer.
21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard. Ontario Regulation 385/08, Section 3.

Q

R

Raw Water - water in its natural state, prior to any treatment; not the same as 'pure' water which does not exist in nature. Raw water is water that is in a drinking-water system or in plumbing that has not been treated in accordance with: (a) the prescribed standards and requirements that apply to the system, or (b) such additional treatment requirements that are imposed by the license or approval for the system.

Raw Water Supply - water outside a drinking water system that is a source of water for the system.

Recharge Area - an area in which water infiltrates and moves downward into the zone of saturation of an aquifer; area that replenishes groundwater.

Runoff - the portion of precipitation which is not absorbed by the ground surface and finds its way into surface stream channels and becomes the flow of water from the land to oceans or interior basins by overland flow and stream channels.

S

"*Safe Drinking Water Act, 2002*" - provides for the protection of human health and prevention of drinking water health hazards through the control and regulation of drinking water systems and drinking water testing.

Septic System (Conventional) - used to treat household sewage and wastewater by allowing solids to decompose and settle in a tank, then flow by gravity or pump/siphon to a drainage or tile field for soil absorption.

Sewage - has the same meaning as in the "Ontario Water Resources Act".

Significant Groundwater Recharge Area - an area within which it is desirable to regulate or monitor drinking water threats that may affect the recharge of an aquifer.

Significant Threat Policy - (a) a policy set out in a source protection plan that, for an area identified in the assessment report as an area where an activity is or would be a significant drinking water threat, is intended to achieve an objective referred to in paragraph 2 of subsection 22 (2), or (b) a policy set out in a source protection plan that, for an area identified in the assessment report as an area where a condition that results from a past activity is a significant drinking water threat, is intended to achieve the objective of ensuring that the condition ceases to be a significant drinking water threat.

Source Protection - a program of education, stewardship, planning, infrastructure, and regulation activities that together serve to help prevent the contamination or overuse of source water.

Source Protection Area - areas are based on the existing 36 Conservation Authority boundaries (however there are exceptions). For administrative efficiency, some Source Protection Areas (SPAs) have been grouped together to form Source Protection Regions. Source Protection Areas and Regions have been defined in Ontario Regulation 284/07. Source Protection Area means those lands and waters that have been defined under Ontario Regulation 284/07 as the 'study area' for an Assessment Report and Source Protection Plan under the *Clean Water Act, 2006*.

Source Protection Authority - a Conservation Authority or other person or body that is required to exercise powers and duties under the *Clean Water Act, 2006*. Source Protection Authority refers to the role that Conservation Authorities play in Drinking Water Source Protection. Generally, where a Conservation Authority exists it becomes the Source Protection Authority for the area, but they have additional roles and responsibilities as laid out in the *Clean Water Act, 2006*. Ontario Regulation 284/07 establishes Source Protection Authorities across Ontario.

Source Protection Committee - a group of individuals who have been appointed under the *Clean Water Act* by a Source Protection Authority to coordinate Source Protection Planning activities for a Source Protection Area. The Lakehead Source Protection Committee is composed of a provincially appointed Chair plus nine other members who were appointed from within the watershed by the Lakehead Source Protection Authority. At the time the Source Protection Plan

was completed the nine members of the Committee represent the watershed as the following: three municipal representatives - the City of Thunder Bay (2) and Municipality of Oliver Paipoonge (1); three economic/industry sector representatives - Thunder Bay Port Authority (1), forest industry (1) and agriculture industry (1); and three public members who represent education (1), tourism (1) and the general public (1). The Lakehead Source Protection Committee also includes one non-voting liaison representative from each of the following: the Lakehead Source Protection Authority, the Thunder Bay District Health Unit and the Ontario Ministry of the Environment. A First Nations Representative seat for an individual from Fort William First Nation remains vacant to date.

Source Protection Plan - the Source Protection Plan for each Source Protection Area (watershed) must set out policies intended to ensure that all significant drinking water threats cease to be significant and that potential threats are managed in such a way that they will never become significant drinking water threats. The Source Protection Committee must consult with Municipalities/public and make the Source Protection Plans available to the public. The Source Protection Committee will create a plan in 2012 for their Source Protection Area. In general, a Source Protection Plan builds on the information collected in the Assessment Report to establish policies to protect drinking water supplies. The *Clean Water Act, 2006* states that the Plans must address significant threats to drinking water. There are various tools and approaches that may be included in a Source Protection Plan. Many of these are already available to people who manage land uses and activities, such as Municipalities, for the protection of drinking water. Some of these will be familiar to people, such as land-use planning (by-laws and zoning), Regulations (e.g., you may need a Nutrient Management Plan to apply animal waste), and stewardship (e.g., education and Best Management Practices). Others may be less familiar, such as monitoring water quality to make sure an activity is not impacting the local area in a way that would negatively impact the drinking water supply. Each Plan is approved by the Ontario Ministry of the Environment. The Plan will outline policies and programs to eliminate significant threats to the water supply as well as reduce the opportunity for low and moderate threats to become significant. The Plan will be a document which specifies the actions required to protect and enhance drinking water sources in the Source Protection Area (watershed). The Source Protection Committee will establish criteria for policy development, priority areas based on the Assessment Report, along with monitoring and implementation requirements. Source Protection Plans will outline the steps that must be taken in a watershed to reduce the risk posed by significant threats. They could propose a variety of approaches such as incentive programs, monitoring activities, Risk Management Plans, changes to Municipal land use policies and others.

Source Protection Region - two or more Source Protection Areas that have been grouped together under Ontario Regulation 284/07.

Source Water - untreated water in streams, rivers, lakes or underground aquifers which is used for the supply of raw water for drinking water systems.

Source Water Protection - action taken to prevent the pollution and overuse of municipal drinking water sources, including groundwater, lakes, rivers and streams. Source water protection involves developing and implementing a plan to manage land uses and potential contaminants.

Surface Runoff (overland flow) - precipitation that cannot be absorbed by the soil because the soil is already saturated with water (soil capacity); precipitation that exceeds infiltration; the portion of rain, snow melt, irrigation water, or other water that moves across the land surface and enters a wetland, stream, or other body of water (overland flow). Overland flow usually occurs in urban settings (pavement, roofs, etc.) or where the soils are very fine textured or heavily compacted.

Surface Water - all water above the surface of the ground including, but not limited to lakes, ponds, reservoirs, artificial impoundments, streams, rivers, springs, seeps and wetlands.

Surface Water Intake Protection Zone (IPZ) - A surface water intake protection zone is an area that is related to a surface water intake and within which it is desirable to regulate or monitor drinking water threats. Intake protection zones were drawn around the intakes and assigned vulnerability scores on a 10-point scale:

The contiguous area of land and water immediately surrounding a surface water intake, which includes: the distance from the intake; a minimum travel time of the water associated with the intake of a municipal residential system or other designated systems, based on the minimum response time for the water treatment plant operator to respond to adverse conditions or an emergency; the remaining watershed area upstream of the minimum travel time area (also referred to as the Total Water Contributing Area) applicable to inland water courses and inland lakes only.

T

Table of Drinking Water Threats - a document released by the MOE that contains a listing of all potential threat activities and circumstances under which these activities may be considered to be significant, moderate or low risks to water supply sources in the province of Ontario.

Terms of Reference - the work plan and budget, as approved by the Minister of Environment, for the preparation of Assessment Report and Source Protection Plan, as defined by the "*Clean Water Act*". The Terms of Reference outlines the responsibilities assigned to the Source

Protection Committee, Source Protection Authority, Conservation Authority and Member Municipalities in each Source Protection Area, in order to produce the Assessment Report and Source Protection Plan.

Threat Policies - policies in a source protection plan that address a drinking water threat of any risk level (significant, moderate or low), including policies that address activities and conditions.

Tier One, Two and Three Water Budgets - numerical analysis at the watershed (Tier One), subwatershed (Tier Two) or local (Tier Three) level considering existing and anticipated amounts of water taken from the watershed, as well as quantitative flow between components such as recharge/discharge areas and rates.

Time of Travel - (a) in respect of groundwater, the length of time that is required for groundwater to travel a specified horizontal distance in the saturated zone; and (b) in respect of surface water, the length of time that is required for surface water to travel a specified distance within a surface water body.

Transport Pathway (formerly referred to as a Preferential Pathway) - any structure of land alteration or condition resulting from a naturally occurring process or human activity which would increase the probability of a contaminant reaching a drinking water source.

U

V

Vulnerable Area - areas related to a water supply source that are susceptible to contamination and for which it is desirable to regulate or monitor drinking water threats that may affect the water supply source. Vulnerable areas are (a) a significant groundwater recharge area, (b) a highly vulnerable aquifer, (c) a surface water intake protection zone, or (d) a wellhead protection area.

Vulnerability - describes how easily a well or intake can become polluted with a dangerous material. Researchers have studied each municipal well and intake to determine how vulnerable they are.

W

Waste Disposal Site - any land upon, into, in or through which, or building or structure in which waste is deposited, disposed of, handled, stored, transferred, treated or processed, and any operation carried out or machinery or equipment used in connection with the depositing, disposal, handling, storage, transfer, treatment or processing of the waste ("Environmental Protection Act", R.S.O. 1990).

Water Budget - a description and analysis of the overall movement of water within each watershed in the Source Protection Area, taking into consideration surface water and groundwater features, land cover (e.g. proportion of urban versus rural uses), human-made structures (e.g. dams, channel diversions, water crossings), and water takings.

Water Supply - any quantity of available water.

Water Quality - a term used to describe the chemical, physical and biological characteristics of water, usually in respect to its suitability for a particular purpose, such as drinking.

Watershed Characterization - a characterization of the physical geography and human geography of the watershed and the characterization of the interactions between the physical geography and human geography.

Well - a vertical bore hole in which a pipe-like structure is inserted into the ground in order to discharge (pump) water from an aquifer.

Wellhead - the structure built above a well.

Wellhead Protection Area (WHPA) - means an area that is related to a wellhead and within which it is desirable to regulate or monitor drinking water threats (Ontario Regulation 287/07).

X

Y

Z

Zoning – The partition of a city, county, township, or other governmental unit or area by ordinance into sections reserved for different purposes, such as residential, business, manufacturing, or agricultural.