

1 Waste Disposal and Sewage Threats

1.1 *Establishment, Operation or Maintenance of a Waste Disposal Site within the Meaning Part V of the Environmental Protection Act*

1.1.1 Application of Untreated Septage

What is the Threat to Drinking Water

This paper provides background information for prescribed drinking water threat 1A – The establishment, operation or maintenance of a waste disposal site, sub threat: application of untreated septage to land. The primary consideration for reducing or eliminating drinking water threats related to the application of untreated septage to land is to make sure untreated septage does not enter surface water and/or groundwater. Untreated septage consists of the raw, untreated liquids and solids that are pumped out of septic tanks and holding tanks. These tanks can be found on residential, commercial and industrial properties. Untreated septage has not been treated to reduce pathogens, and is considered waste.

Untreated septage does not include septage after it has been composted, digested or otherwise treated. Treated septage is discussed in the Discussion Paper on Threats #6 and #7: Application of Non-Agriculture Source Material and Handling and Storage of Non-Agricultural Source Material.

Technical Background on the management and disposal of untreated septage

Subject to the appropriate approvals, septage can either be disposed as waste in landfill sites, dewatering trenches, waste stabilization lagoons or land applied. Alternatively, it can be treated and converted into biosolids as a source of nutrients.

With a Ministry of Environment (MOE) Certificate of Approval, untreated septage can be applied to land through direct surface application, or incorporation into soil through subsurface injection. Public perception can impact where untreated septage is applied to land so sites tend to be isolated from residential areas and major roads.

Capacity to treat untreated septage differs significantly between urban centers and rural communities. In many urban centers, the quantity of septage is relatively small compared to municipal sewage, so STPs can integrate septage with relative ease. However, in many rural communities, the capacities of STPs are small in comparison to the amount of septage that accrues.

The transportation of septage is a significant cost from a business perspective. To minimize the costs, many haulers collect and temporarily store septage in tanks or lagoons, linking the septage disposal process to other threat categories such as septic system holding tanks and the storage of sewage.

With the impending new re-inspection regulation (requiring mandatory inspections of septic systems), all septic systems will require pumping prior to inspection; thus, the quantity of septage can be expected to increase over the next few years.

A national field sampling program was completed that assessed “emerging substances” after treatment in sludge and biosolids in order to compare the quality of sludge treatment technologies. The removal efficiency for

pharmaceutical products, Polyaromatic Hydrocarbons (PAH), industrial contaminants, and fragrances was compared in 11 different biosolid treatment processes. Preliminary results indicate that aerobic composting is the most efficient in reducing the tested parameters. Anaerobic digestion has average efficiency and physical filtering was found to be the least effective. It should be noted that some chemicals are best removed anaerobically, while other contaminants cannot be removed via any treatment process. To obtain optimal results, a combination of anaerobic digestion and aerobic composting is suggested (CCME 2009).

Legal Significance

The application of untreated septage to land is banned in British Columbia, Quebec, Newfoundland and Labrador, and New Brunswick. While approximately 50% of untreated septage generated in Ontario is disposed of at municipal sewage treatment plants, land application is the predominant method of disposal for the remainder. The land application of untreated septage is regulated as a waste under Part V of the Environmental Protection Act. Certificates of approval from the MOE are required for the transportation, storage and land application of untreated septage. This will be further discussed in Section 4: Applicable legislation, policies and programs.

Currently, MOE is exploring policy options towards ending the land application of untreated septage. The MOE recommends the handling of this septage at municipal sewage treatment plants or other treatment facilities (e.g. composting, gasification, anaerobic digestion, dewatering, alkaline stabilization). However, the government is assessing the local capacity to treat septage and whether additional capacity must be created in order to successfully end land application of untreated septage.

Untreated septage that is treated may be applied to agricultural land as a nutrient in accordance with the requirements for the management of non-agricultural source materials (NASM) in O. Reg. 267 under the Nutrient Management Act. Information on land application of NASM is in the application, handling and storage of Non-Agricultural Source Material threat policy discussion paper. .

What Causes the Activity to be a Drinking Water Threat

The MOE Tables of Drinking Water Threats (Government of Ontario, 2009), identify two chemicals (nitrogen and total phosphorus) and pathogens as substances that could make their way into surface and groundwater as a result of the application of untreated septage to land (circumstances 96 to 101 and 1971). The primary source of nitrogen, total phosphorus and pathogens in untreated septage is from human waste as well as household and personal care products.

Heavy metals and pharmaceuticals in untreated septage are of public concern; however, they are currently outside the scope of the Clean Water Act because they are found at levels so low that they do not rate as being a significant threat to drinking water.

What is the Local Scale of the Drinking Water Threat

Untreated septage can be applied to land that meets specific requirements. In general, this activity can occur now and in the future on highly vulnerable aquifers, in significant groundwater recharge areas and in parts of intake protection zones and wellhead protection areas.

Depending on the location and the size of the application area, the land application of untreated septage can be classified as a significant, moderate or low drinking water threat. For the chemical threats nitrogen and total phosphorus, the risk rating increases with the size of the application area ($A < 1$ ha, $1 \text{ ha} \leq A \leq 10$ ha, > 10 ha) and can be significant at vulnerability 9-10. As a pathogen source, untreated septage is considered a threat within intake protection zones (IPZs 1-3), in surface water bodies that influence municipal wells (WHPA-E) and in areas

closest to the well (WHPA-A and WHPA-B). In HVA/SGRA, the risk level is no higher than a low for chemical threats.

Under the sub-threat of the application of untreated septage to the land, no significant threats have been identified within the Thames-Sydenham and Region Source Protection region.

Applicable Legislation, Policies and Programs

The following section provides a summary of the applicable legislation, policies and programs (federal, provincial and municipal) that address the drinking water threat of the application of untreated septage to the land.

Table 1-1 Applicable Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs
Provincial	Environmental Protection Act <ul style="list-style-type: none"> • O. Reg. 347 General-Waste Management • Guide to Applying for a Certificate of Approval to Spread Sewage and Other Biosolids on Agricultural Lands (Organic Soil Conditioning) Provincial Policy Statement 2005
Municipal	Land Use Planning and Other Municipal Tools Municipal Septage Business Plans and Management Plans

Federal

There are federal guidelines for the application of untreated septage and biosolids to federal lands. These guidelines generally defer to the provincial standard for the province in which the federal facility is located.

Provincial

Environmental Protection Act

The Environmental Protection Act (EPA) prohibits the discharge of contaminants into the natural environment. Prior to using, operating, establishing, altering, enlarging or extending a waste management system or waste disposal site for septage, S. 27 of the Environmental Protection Act requires that approval be obtained. A Certificate of Approval issued by the Ministry of the Environment (MOE) under Part V of the Environmental Protection Act is required in order to apply untreated septage to land (Government of Ontario, 1990). Sewage haulers can deposit untreated septage at any site in Ontario that has been approved by the Ministry of Environment.

Environmental Protection Act Ontario Regulation 347-General Waste Management

Ontario Regulation 347, made under the Environmental Protection Act, specifies the standards for the location, maintenance and operation of waste disposal sites for untreated septage (also called organic soil conditioning). Amendments in 2003 to Regulation 347 have prohibited the land application of untreated waste from chemical or portable toilets. Each hauler/spreader requires a Certificate of Approval (Untreated Septage Waste Management System). This approval contains conditions for the safe transport of the untreated septage and general requirements for land application. A site specific approval is required for each site where untreated septage is land applied. A site specific approval is required for each site where untreated septage is applied to the land. Approved sites can then be added to the schedule of a Waste Management System Certificate, which lists the sites approved for application. Once approved, the applicant is required to keep records of how the conditions of a Certificate of Approval are met (Government of Ontario, 1990). These records are not submitted to MOE unless specifically requested.

Guide to Applying for a Certificate of Approval to Spread Sewage and Other Biosolids on Agricultural Lands

The MOE has published a “Guide to Applying for a Certificate of Approval to Spread Sewage and Other Biosolids on Agricultural Lands (Organic Soil Conditioning)” (Ontario Ministry of the Environment, 1996) that outlines the extensive documentation required to support an application for a Certificate of Approval. The supporting information includes, but is not limited to:

- the source and type of material to be applied,
- waste analysis report,
- soil analysis report,
- terrain description,
- surface physiology and geology,
- depth to the water table,
- water wells,
- separation distances,
- application areas,
- crops,
- schedule of use,
- notification to adjacent landowners, and
- confirmation from the municipality.

The general land application requirements are listed in Table 1-2. Reductions to the requirements can be considered by MOE if there are acceptable technical reasons. Proposed sites for the application of untreated septage are assessed on a case-by-case basis.

Table 1-2 Minimum Setback Requirements for the Application of Untreated Septage to Land

Feature	Value
Minimum distance to wells	90 m
Minimum distance to public roadway	30 m
Minimum distance to individual residences	90 m ¹
Minimum distance to residential areas	450 m ²
Minimum distance to watercourses	60 m to 180 m ³
¹ May be reduced to 25 m if injected or incorporated within 24 hours ² May be reduced to 50m if injected or incorporated within 24 hours ³ The minimum distance to a watercourse is dependent on slope and soil permeability, which is determined through field observation.	

Provincial Policy Statement, 2005

The Provincial Policy Statement (PPS) is issued under Section 3 of the Planning Act, and provides direction on matters of provincial interest related to land use planning and development. Decisions affecting planning matters must be consistent with the PPS. In order to be consistent with the PPS, municipalities must review their official plans at least every five years. The PPS does not apply retroactively to existing development. The relevant portions of the PPS are described below.

The PPS indicates that municipal sewage services are the preferred form of servicing for new development. Where private communal or individual on-site sewage services (e.g. septic systems) are to be used for new development, lot creation is only to be permitted if there is confirmation of sufficient reserve sewage system capacity within municipal sewage services or private communal sewage services. This capacity relates to the ability to store and treat untreated septage. It is required because the Province discourages the application of untreated septage to land.

Reserve capacity for private communal and individual on-site sewage services is considered sufficient if the untreated septage from the development can be treated or disposed of at sites approved under the Environmental Protection Act or the Ontario Water Resources Act, but not by land-applying untreated septage.

Septage treatment capacity can be confirmed in a number of ways including the implementation of a municipal septage plan, and determining that there is an MOE approved facility with capacity to receive and treat septage that is accessible within the area of new development. The capacity could be provided by a municipal sewage treatment plant in the municipality, or through written agreement with another municipality or an approved private sector facility.

Municipal

Land Use Planning

Application of septage is an activity that occurs on the landscape, and is not considered a land use, and therefore application of septage is not generally regulated through land use planning. As noted above, however, when considering new development, municipalities must make decisions that are consistent with the PPS, which establishes a hierarchy of servicing considerations to ensure the new development can be appropriately serviced, and land application of septage as a means of sewage disposal is not a viable option.

A letter from the municipality where the site is located confirming that the proposed use of waste and site is consistent with its official plan and by-laws is only required in the Oak Ridges Moraine Municipal Septage Business Plans and Management Plans.

Municipal Septage Business Plans and Management Plans

A number of municipalities in Ontario have prepared septage business plans or septage management plans, and have received funding to build or increase the capacity of existing wastewater treatment plants in order to treat septage. Suggestions on the content of a municipal septage plan are listed in MOE's guidance document "Provincial Policy Statement, 2005: Reserve Sewage System Capacity for Hauled Sewage". They include background information on the service area and an inventory of available treatment and disposal options; information about the number of private systems and the type and volume of septage being produced; and a proposed strategy to treat septage. The strategy would outline existing treatment capacity versus future treatment capacity requirements, the method of treatment, the provider, and the financial implications (Ontario Ministry of the Environment, 2007).

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with the application of untreated septage to the land.

Table 1-3 Existing Gaps in the Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs	Gaps
Provincial	Environmental Protection Act	Applicant is required to keep records of how the conditions of a Certificate of Approval are met; not required to be submitted to MOE unless specifically stated in C of A however they must be available at the request of the MOE during a planned inspection

Policy Considerations

- REMINDER: The main consideration for reducing or eliminating drinking water threats related to the application of untreated septage to land is to make sure that septage does not enter surface water and/or groundwater.
- This activity is most likely to occur in HVAs and SGRAs (where it would be a low threat) in isolated locations away from residential areas and major roads due to public perception and odor.
- Clean Water Act Part IV tools interim risk management plans, risk management plans, prohibition, and restricted land uses cannot be used for waste disposal sites, which include the land application of untreated septage.
- All information provided during the application for a Certificate of Approval is provided by the hauler. Also, record keeping during operation remains the responsibility of the hauler. Prior to approval the MOE conducts site assessments to check the completeness and accuracy of information in an application for approval. In addition, the MOE conducts planned inspections of untreated septage land application sites to assess compliance with approval conditions. Quality assurance for this data and monitoring about operational practices remain the responsibility of MOE, with local agencies as implementing bodies. While general land application requirements are consistent throughout the Province, local differences in practice are acknowledged. It is the responsibility of the SPC to address these appropriately.
- Key point of clarification: There is a distinction between processed organic waste and untreated septage. Organic soil conditioning site approvals are not issued for untreated septage. Untreated septage site approvals are issued for the land application of untreated septage. As of now the land application of untreated septage is still permitted if a waste CoA issued under S. 39 of Part V of the EPA has been issued.
- The applicant is required to keep records of how the conditions of a certificate of approval are met. They are not required to be submitted to MOE unless specifically stated in the certificate of approval. However, they must be made available at the request of the MOE such as during planned inspection.

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to the subject threat in the Thames-Sydenham and Region. It is not an exhaustive list. Each policy tool is discussed separately in the table below.

Table 1-4 Policy Ideas for application of septage

Threat	The establishment, operation or maintenance of a waste disposal site
Sub-Threat	The Application of Untreated Septage to Land
Circumstances	Where the application of untreated septage would be a significant drinking water threat
Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Area-wide education and outreach programs targeted to haulers/spreaders and agricultural/rural landowners on the importance of respecting separation distance requirements and respecting the conditions of their C of A including the prohibition of application of untreated septage in areas where it would be a significant threat. • Promote widespread adoption of best management practices for haulers/spreaders (including. pre-treatment of septage, method of incorporation into soil, timing of application). • Area-wide education and outreach programs targeted at landowners with septic systems and holding tanks about the importance of maintaining their systems and reducing their use of phosphorus-containing products.
Incentive Programs	<ul style="list-style-type: none"> • Incentive programs were considered and determined to not be applicable to this threat.
Land Use	<ul style="list-style-type: none"> • Land use planning cannot be used to the regulation of an activity such as this

Planning	<ul style="list-style-type: none"> Official plans and bylaws should flag agricultural zoned lands as restricted to acknowledge that the prescribed instrument tool will not allow for the application of untreated septage in these areas and to make reference to municipal bylaws which municipalities will be encouraged to enact under their powers under the Municipal Act to prohibit application of untreated septage where it would be a significant threat.
Prescribed Instruments	<ul style="list-style-type: none"> Land application sites are legally considered waste disposal sites and require a Certificate of Approval under the Environmental Protection Act. C of As must be required to not allow application of untreated septage in areas where it would be seen as a significant threat (new or existing)
Other: Specify Action	<ul style="list-style-type: none"> Recommend MOE prioritize inspections of areas near vulnerable areas where the application of untreated septage is considered a significant threat, and report to the SPA with the number of inspections carried out, and the number of locations where corrective action was required and the nature of the corrective action. Encourage municipalities to ban the land application of untreated septage within their IPZs and WHPAs where it can be a significant drinking water threat, using their powers under the Municipal Act.
Municipal Operations/ Infrastructure	<ul style="list-style-type: none"> Encourage municipalities to install adequate sewage treatment capacity for the treatment/stabilization of septage produced within the municipality before applying it to land Encourage other treatment options (such as by haulers) where sewage treatment capacity is not feasible

Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	1.1-1
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant, Moderate and Low
Body Responsible for Implementing	Municipal Watershed partnership with Conservation Authority as lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing, Expanding and Future
Land Use	Agriculture (or any other land use which could be associated with the spreading of untreated septage)
Legal Effect	Conform for significant threats, have regard when related to moderate and low threats
Policy Tool	Education and Outreach
Policy Idea	<p>Protect the drinking water sources from the nutrient and pathogen risks associated with the application of untreated septage to land by promoting Best Management Practices. These practices may include:</p> <ul style="list-style-type: none"> Area-wide education and outreach programs targeted to haulers/spreaders and agricultural/rural landowners on the importance of respecting separation distance requirements and respecting the conditions of their C of A including the prohibition of application of untreated septage in areas where it would be a significant threat; Promotion of widespread adoption of best management practices for haulers/spreaders (including pre-treatment of septage, method of incorporation into soil, timing of application); and, Area-wide education and outreach programs targeted at landowners with septic systems and holding tanks about the importance of maintaining their systems and reducing their use of phosphorus-containing products. The implementation of this policy through the existing municipal partnership of

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Policy Number	1.1-1
	the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities can be involved in the program development and delivery depending on their individual needs; however the program(s) would be developed in a consistent manner across the region.
Implementation schedule	Within 2 years of the approval of the Source Protection Plan.
Monitoring Policy	The implementing body shall report to the SPA the number of educational packages offered as well as a description of the actions/measures they have taken to implement the education/outreach in the previous year. Measures of tracking the uptake by the target audience will also be included in this report.

Policy Number	1.1-2
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant
Body Responsible for Implementing	Conservation Authority, Municipality, MOE and others
Threat Status	Existing, Expanding, Future
Land Use	Agriculture (or any other land use which could be associated with the spreading of untreated septage)
Legal Effect	Strategic
Policy Tool	Incentive Programs
Policy Idea	Incentive programs were considered and determined to not be applicable to this threat.
Implementation schedule	N/A
Monitoring Policy	N/A

Policy Number	1.1-3
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	Agriculture (or any other land use which could be associated with the spreading of untreated septage)
Legal Effect	Strategic action
Policy Tool	Other – Specify Action (Municipal Act Powers)
Policy Idea	Municipalities shall be encouraged, through the powers granted under the Municipal Act, to ban the land application of untreated septage within areas where it can be a significant threat.
Implementation schedule	Effective date of SPP
Monitoring Policy	Municipalities will notify the CA if they proceed with a bylaw to prohibit the spreading of untreated septage where it would be a significant threat.

Policy Number	1.1-4
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing or Future
Land Use	Agriculture (or any other land use which could be associated with the spreading of untreated septage)
Legal Effect	Conform
Policy Tool	Prescribed instruments-Environmental Protection Act
Policy Idea	The MOE shall be required to issue C of As which prohibits the application of untreated septage in areas where it would be seen as a significant threat.

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Policy Number	1.1-4
Implementation schedule	Within 1 year of the approval of the Source Protection Plan.
Monitoring Policy	MOE shall report annually to the SPA with the number of C of As issued for the application of untreated septage which specified a prohibition in the areas where the application would be a significant threat and the number of C of As which were denied as the entire application area was within the areas where the application would be a significant threat.

Policy Number	1.1-5
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing, Expanding and Future
Land Use	Municipal Operations/Infrastructure; All
Legal Effect	Strategic
Policy Tool	Other-Specific Action (Municipal Operations/Infrastructure)
Policy Idea	It is recommended that municipalities work towards ensuring adequate sewage treatment capacity for the treatment/stabilization of septage before applying it to the land. Capacity should be in the municipality where the sewage is generated or provided through agreement by a nearby municipality. Municipalities develop programs to encourage other treatment options (such as by haulers) where sewage treatment capacity is not feasible.
Implementation schedule	N/A
Monitoring Policy	The municipality shall report to the CA if adequate sewage treatment capacity is installed. If alternative treatment options are instituted, the municipality shall also provide a report to the CA.

Policy Number	1.1-6
Vulnerable Area	WHPA-A, B with a vulnerability score of 10; IPZ-1 with vulnerability scores of 9 and 10
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing, and Future
Land Use	All
Legal Effect	Strategic
Policy Tool	Other- Specify Action
Policy Idea	The MOE shall prioritize inspections of areas near vulnerable areas where the application of untreated septage is considered a significant threat.
Implementation schedule	Within 1 year of the approval of the Source Protection Plan.
Monitoring Policy	MOE shall report to the SPA with the number of inspections carried out as well as the number of locations where corrective action was required and the nature of the corrective action.

Proposed Policies

Proposed Policies have been developed for the Thames-Sydenham and Region Source Protection Plan for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for a detailed version of the policies.

Table 1-5 Draft Policies for the Application of Untreated Septage to Land

TSR Policy Number	Provincial Policy Database Number	Policy Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.1.1.1	1631	Prohibition of the application of untreated septage to land through Environmental Compliance Approval	Significant	Existing and future	Prescribed Instruments	MOE
TS.1.1.2	1632	Prohibition of the application of untreated septage to land through Municipal Act	Significant	Existing and future	Specify Action	Municipality
TS.1.1.3	1633	Development of a prioritized inspection schedule for application of untreated septage to land	Significant	Existing and future	Specify Action	MOE
G.7.3	1690	Geo-referencing of prescribed instruments	Significant	Existing and future	Specify Action	MOE
G.3.1, G.3.3.1, G.3.4.1	1693	General land use planning policies	Significant	Future	Land use planning	Planning approval authority
G.1.1 to G.1.2	1696	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority MOE
G.1.3	1866	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	Signage policy as part of municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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1.1.2 Other Waste Disposal Sites

What is the Threat to Drinking Water

The focus of this discussion paper is on waste disposal sites, which is a sub threat of prescribed drinking water threat 1-the establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act (EPA). The main consideration for reducing or eliminating drinking water threats related to waste disposal sites is to make sure that any discharge from the sites does not result in a significant risk to drinking water through appropriate measures to mitigate the threat.

Waste disposal sites may be active, inactive (i.e., are no longer used, but did not follow a closure plan) or closed and are defined as any land, building, or structure in connection with the depositing, disposal, handling, storage, transfer, treatment or processing of waste. Operational activities associated with these sites are also included in the definition. Waste includes: ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and such other materials as are designated in the regulations under the Act.

The following types of waste disposal sites are indicated in the MOE Tables of Drinking Water Threats (2008, as amended in 2009):

- Land farming of petroleum refining waste- Landfarming is defined by O. Reg. 347 as the biodegradation of petroleum refining wastes by naturally occurring soil bacteria by means of controlled application of the wastes to land followed by periodic tilling.;
- Landfilling of hazardous waste- Landfilling is the process of the disposal of waste by deposit, under controlled conditions, on land or on land covered by water, and includes compaction of the waste into a cell and covering the waste with cover materials at regular intervals. Hazardous waste includes the following: hazardous industrial waste, acute hazardous waste chemical (includes commercial waste chemical), hazardous waste chemical, ignitable waste; corrosive waste; reactive waste (except radioisotope as per the Canadian Nuclear Safety Commission); pathological waste; leachate toxic waste or PCB waste;
- Landfilling of municipal waste- Municipal Waste is any waste, whether or not it is owned, controlled or managed by a municipality (except hazardous waste, liquid industrial was or gaseous waste) and solid fuel that is derived in whole or in part from waste.;
- Landfilling of solid, non-hazardous industrial or commercial waste- Non-Hazardous Industrial waste means industrial waste that is not liquid industrial, hazardous or asbestos waste. Commercial waste includes asbestos waste;
- Liquid industrial waste injection into a well- Liquid Industrial waste as defined by O. Reg. 347 is both liquid waste and industrial waste that has a slump of more than 150 millimeters using the Test Methods for the Determination of Liquid Waste (slump test) set out in Schedule 9 of the regulation.;
- PCB (Polychlorinated biphenyl) waste storage- PCB (monochlorinated or polychlorinated biphenyl) waste is defined by O. Reg 362 as means of PCB equipment, PCB liquid or PCB material excluding the outlined as exemptions.;
- Storage of hazardous waste at disposal sites- Storage of Hazardous Waste at disposal sites is defined in the Drinking Water threat tables as hazardous waste or liquid industrial waste stored at or below grade that has the potential to discharge waste into surface and groundwater.;
- Storage of certain hazardous wastes- Clauses (p), (q), (r), (s), (t), or (u) include small quantities of hazardous waste, the storage of empty hazardous waste containers, and the storage of residues or contaminated materials from the cleanup of a small spill, meaning they are also considered drinking water threats.

Waste disposal sites do not apply to the storage or disposal on a private property, unless the situation becomes a nuisance (Director's decision), or where the activity would fall under the Ontario Water Resources Act (e.g.

sewage disposal, water quality impacts). Future waste disposal sites must be located in an area which will not create a significant drinking water threat.

What Causes the Activity to be a Drinking Water Threat

There are thirty-five (35) chemicals (circumstances 1533 to 1943) listed in the MOE Tables of Drinking Water Threats and shown in Table 1-6 below (Ontario Ministry of the Environment, 2009). These chemicals have the potential to be introduced into surface and groundwater as a result of the storage and land disposal of a prescribed waste.

Table 1-6 Chemical Threats Associated with the Storage and Land Disposal of a Prescribed Waste

Threat Grouping	Chemical Parameter
Land Disposal of Municipal Waste (O. Reg. 347 s. 1 land disposal definition clauses (a) & (b))	Arsenic, Barium, BTEX, Cadmium, Dichlorobenzene-1,4, Lead, Mercury, Nitrogen, Selenium, Trichloroethylene (DNAPL), Uranium, Vinyl chloride (DNAPL)
Land Disposal of Industrial Waste or Commercial Waste (O. Reg. 347 s. 1 land disposal definition clause (c))	
Land Disposal of Municipal Waste (O. Reg. 347 s. 1 land disposal definition clauses (a) & (b))	Arsenic, Barium, BTEX, Cadmium, Dichlorobenzene-1,4, Lead, Mercury, Nitrogen, Selenium, Trichloroethylene (DNAPL), Uranium, Vinyl chloride (DNAPL)
Land Disposal of Petroleum Refining Waste (O. Reg. 347 s. 1 land disposal definition clause (d))	BTEX, PAHs, Petroleum Hydrocarbons (F1-F4)
Land Disposal of Hazardous Waste, Liquid Industrial Waste or Processed Liquid Industrial Waste (O. Reg. 347 s. 1 land disposal definition clauses (a) & (b))	Arsenic, Barium, Cadmium, Chromium VI, D-2,4, Lead, Mercury, PCBs, Selenium, Silver, 2,4,5-T, Uranium
A Site that is Not Approved to Accept, but Does Accept a Hazardous or Industrial Waste (O. Reg. 347 waste description clauses (p), (q), (r), (s), (t) or (u); hazardous waste definition clause (d))	Arsenic, Barium, Cadmium, Chromium VI, D-2,4, Lead, Mercury, Selenium, Silver, 2,4,5-T
Storage of Hazardous Waste at Disposal Sites (as defined in O. Reg. 347 (General – Waste Management), R.R.O. 1990)	
PCB Waste Storage at Disposal Sites (as described in O. Reg. 362 s.3 or in accordance with clause 8(a))	PCBs
Liquid Industrial Waste Injection into a Well (as defined in O. Reg. 347 (General – Waste Management), R.R.O. 1990)	Arsenic, Atrazine, Barium, Bis(2-ethylhexyl) phthalate, BTEX, Cadmium, Carbofuran, Chlorobenzene, Copper, Cyanide (CN-), Dichlorobenzene-1,2 (ortho), Dichlorobenzene 1,4 (para), Hexachlorobenzene, Hexachlorocyclopentadiene, Lead, Mercury, PCBs, Oxamyl, 1,2,4-T, Trichloroethane-1,1,1, Trichloroethylene (DNAPL), Vinyl Chloride (DNAPL), Zinc

What is the Local Scale of the Drinking Water Threat

Existing and historic waste disposal sites may be identified within intake protection zones (IPZ) and wellhead protection areas (WHPA). A number of sites are more likely to be present within the highly vulnerable aquifers

(HVAs) and significant groundwater recharge areas (SGRAs) as they generally cover a greater geographical area. It is unlikely that future waste disposal sites will be permitted in an IPZ or WHPA, although there is currently no legislation preventing their establishment.

Significant Threat

In most instances, any waste disposal site (particularly medium to large operations) located within a WHPA A or B or IPZ-1 could constitute a significant threat. Acceptance of hazardous waste or industrial waste in small quantities, if stored above, or partially above grade increases the potential for even small municipal operations to be identified as a significant drinking water threat.

Moderate/Low Threat

In WHPA C and D, there is considerable variability, although a waste disposal site will likely be classified as a moderate or low threat. The land disposal or storage of waste (at a waste disposal site) is generally classified as a low threat within Highly Vulnerable Aquifers (HVAs) and Significant Groundwater Recharge Areas (SGRAs) where the vulnerability score is 6. The presence of vinyl chloride, a DNAPL, could result in a moderate drinking water threat for large waste disposal sites. This activity cannot be or become a significant threat in these areas.

The table below provides the local scale of this threat within the Thames-Sydenham and Region.

Table 1-7 Local Scale of Waste Disposal Sites within Thames-Sydenham and Region

SPA	System	Threat	Type	# of Locations	WHPA	Vulnerability Score
UTR	Ingersoll	Establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act	Pathogen	3	A	10
UTR	Woodstock-urban	Establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act	Pathogen	2	A	10
UTR	St. Marys	Establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act	Pathogen	1		
UTR	Mt. Elgin	Establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the Environmental Protection Act	Pathogen	1	A	10

Applicable Legislation, Policies and Programs

The following section provides a summary of the applicable legislation, policies and programs (provincial, municipal and other) that address waste disposal.

Table 1-8 Applicable Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policy/Program
Federal	Canadian Environmental Protection Act (Government of Canada, 1999)
Provincial	Environmental Protection Act (Part V Waste Management) (Government of Ontario, 1990)

Level of Government	Applicable Legislation/Policy/Program
	<ul style="list-style-type: none"> • O. Reg. 347 General Waste Management • O. Reg.232/98 Landfilling Sites • O. Reg 102/94 Waste Audits and Waste Reduction Work Plan • O. Reg.103/94 Industrial, Commercial and Institutional (IC&I) Source Separation Programs
	Environmental Assessment Act (Government of Ontario, 1990)
	Waste Diversion Act 2002 (Government of Ontario, 2002)
	Ministry of Environment Guidelines and Procedures <ul style="list-style-type: none"> • B-7 reasonable use (MOE, 1994) • B-7-1 determination of contaminant limits and attenuation zone (MOE, 2008) • D-4 land use on or near landfills and dumps (MOE, 1994) • Procedure C-13-1 engineered facilities (MOE, 2008) • Guidelines for environmental protection measures at chemical and waste storage facilities (MOE, 2007)
	Landfill Inventory Management Ontario
Municipal	Land Use Planning
	Waste Management Practices
	Sewer Use Bylaw
Other	Ontario Tire Stewardship Used Tire Program
	Stewardship Ontario Orange Drop Program

Federal

Canadian Environmental Assessment Act (Government of Canada, 1999)

Under the Canadian Environmental Protection Act, there are regulations which establish a prohibition on the release, manufacture, processing, use, import, export, offer for sale and sale of PCBs and products that contain certain concentrations of PCBs. The regulations also provide exceptions to these prohibitions, set storage requirements for PCBs and products containing PCBs across Canada and labeling and reporting requirements (Lake Erie Source Protection Committee, 2011).

Provincial

Environmental Protection Act (Part V Waste Management) (Government of Ontario, 1990)

Other than where an exemption applies, prior to using, operating, establishing, altering, enlarging or extending a waste management system or a waste disposal site, a Certificate of Approval is required from the Ministry of the Environment under Part V of the Environmental Protection Act (s. 27). The Certificate of Approval (C of A) is a prescribed instrument under the Clean Water Act, and therefore may be used to implement policies in a Source Protection Plan. The term “waste disposal site” is broad, and includes facilities where waste is only temporarily handled, stored or processed as well as sites where waste is permanently deposited. Waste disposal site C of A are required for all of these types of activities. Private waste disposal sites may accept a variety of municipal, industrial and commercial waste but only in accordance with their Certificate of Approval. Some examples of the types of terms and conditions that may be associated with a C of A include:

- Restrictions on the type and/or quantity of waste that can be accepted at the site.

- Restrictions of the type and/or quantity of waste that can be transported (for waste haulers) or processed (for waste processors).
- Restrictions on where/how the waste can be stored/processed/disposed.
- Requirement for the posting of Financial Assurance (typically only required for privately owned waste facilities).
- Operational requirements
- Monitoring and reporting requirements

There are many exemptions to this approval requirement are set out in the EPA and a number of its associated regulations.

MOE field staff (i.e., “Environmental Officers”) from the ministry’s local District Offices typically undertake annual inspections at a subset of waste facilities located within their geographic area of responsibility. These inspections may include municipal and/or private disposal sites, waste processing sites, storage/transfer sites as well as waste haulers. MOE field staff may also carry out site visits/inspections of waste facilities in response to complaints or reports of noncompliance, spills or other environmental concerns. Where issues of non-compliance with regulatory requirements are identified, Environmental Officers have the authority to require the facility owner/operator to take action to bring the facility into compliance.

O. Reg. 347 General Waste Management

Section 11 of Ontario Regulation 347, made under the EPA, specifies the generic standards for waste disposal sites, definitions of waste, and designates, classifies and exempts waste sites. The standards that are relevant to drinking water source protection include: restricting access to authorized persons; treatment of runoff; separation distances; collection and treatment of leachate; mitigation measures and environmental monitoring; and inspection and maintenance of final and daily cover material over fill area.

O. Reg.232/98 Landfilling Sites

Ontario Regulation 232/98 applies to new or expanded landfill sites (as of August 1, 1998) that receive municipal waste (i.e. non-hazardous) and have a final capacity greater than 40,000 cubic metres. It details the requirements for design, operation, closure, post-closure care and financial assurance of new municipal landfill sites and the preparation of certificates of approval. Parts III and V outline specific design and construction specifications such as requiring a minimum 30 m buffer around a landfill, as well as operational standards for landfilling sites.

O. Reg 102/94 Waste Audits and Waste Reduction Work Plan and O. Reg.103/94 Industrial, Commercial and Institutional (IC&I) Source Separation Programs

Ontario Regulation 102/94 requires that industrial, commercial and institutional entities conduct waste audits and prepare, post and update waste reduction work plans. Ontario Regulation 103/94 requires that source separation programs are in place and sets out the types of waste to be separated from the waste stream for specified sectors.

Environmental Assessment Act (Government of Ontario, 1990)

Many landfill proposals, particularly larger sites, may require approval under the Environmental Assessment Act (EAA). Under the EAA, a broader view of the environment is taken and issues beyond the effects on the natural environment must be addressed. An Environmental Assessment is triggered by the proposed capacity of the landfill.

Waste Diversion Act 2002 (Government of Ontario, 2002)

The Waste Diversion Act was introduced in 2002 to promote the reduction, reuse and recycling of waste and to provide for the development, implementation and operation of waste diversion programs. Under this Act the Ministry of Environment designates waste materials for programs such as blue box waste, used tires, waste electrical and electronic equipment and municipal hazardous and special waste. Waste Diversion Ontario, a non-crown agency was established to develop, implement and operate waste diversion programs (CIELAP, 2008).

Ministry of Environment Guidelines and Procedures

Guidelines and procedures do not have the same legal status as requirements set out in acts and regulations. The only instance where they become legally binding is when they are imposed through reference in a certificate of approval.

Guideline B-7 reasonable use (MOE, 1994)

The overall objective of these guidelines is to ensure a waste disposal facility's impact on local groundwater is "reasonable" and will not result in unacceptable impairment to the groundwater quality of neighbouring properties. Guideline B-7 outlines situations and locations where the MOE may not support waste disposal facilities and Guideline B-7-1 sets out an approach to determine impact limits for the groundwater at the down gradient property boundary in an area referred to as a "contaminant attenuation zone".

Guideline B-7-1 determination of contaminant limits and attenuation zone (MOE, 2008)

Guideline B-7-1 sets out an approach to determine impact limits for the groundwater at the down gradient property boundary in an area referred to as a "contaminant attenuation zone". It essentially allows limited impairment of use of off-site properties. The level of impairment depends on the current use of groundwater. For example, where groundwater is used for drinking and the quality of the water is better than the Ontario Drinking Water Standards it is permitted to allow off-site migration of contaminants that would result in a reduction of water quality as follows:

- Up to 50% of the difference between background conditions and the ODWO for non-health-related parameters; and
- Up to 25% of the difference between background conditions and the ODWO for health-related parameters.

Guideline D-4 land use on or near landfills and dumps (MOE, 1994)

There are a number of guidelines identifying setback distances for the establishment of new waste disposal sites, including keeping these sites away from settlement areas. The Ontario Ministry of the Environment Guideline D-4: Land Use On or Near Landfills and Dumps provides guidelines on land uses (either existing or proposed) that are sensitive to landfills, such as permanent structures used in animal husbandry (i.e. a barn), agricultural land used for pasturing livestock, or residences. This guideline makes reference to 500 m setbacks to identify the study area in the evaluation of a new site to sensitive land uses but it is not a legal requirement.

Guidelines for environmental protection measures at chemical and waste storage facilities (MOE, 2007)

These guidelines identifies environmental protection measures for chemical and waste storage areas and protection measures for human health and is identified as a resource during the planning of upgrades to existing storage areas and for the design and operation of new facilities. MOE abatement staff, owners, operators and designers of chemical and waste storage facilities may utilize this document, which indicates best practices, and spill containment provisions.

Procedure C-13-1 engineered facilities (MOE, 2008)

In this procedure the MOE indicates that there are limitations for engineered waste disposal sites and that any site should be located in an area with a high degree of natural protection and where groundwater is not and would not be used.

Landfill Inventory Management Ontario

The MOE created Landfill Inventory Management Ontario (LIMO) to store key information on Ontario's largest landfills and the LIMO dataset was created to make landfill information available to the public. For larger landfills, information is available on landfill capacity, fill rates, estimated remaining capacity, engineering designs and reporting and monitoring details. For the smaller landfills, information is available on open/closed status, site owner, site location and Certificate of Approval number. Many landfills produce Annual Reports each year that outline how the landfill has been operating (Lake Erie Source Protection Committee, 2011).

Municipal

Land Use Planning

Many municipalities have policies regarding waste disposal sites in their official plans. In general, these policies recognize existing sites and indicate the need for an official plan and/or zoning bylaw amendment in order to establish a new site. Many official plans recognize that new sites may not be possible within their boundaries based on legislative requirements. Municipalities that have waste disposal site policies may also explicitly prohibit the storage or disposal of nuclear and toxic (hazardous) waste.

Waste Management Practices

The Government of Ontario gave waste managers in Ontario the goal of diverting 60% of waste from disposal by the end of 2008. This goal indirectly supports the drinking water source protection initiative through the implementation of policies and programs that increase the lifespan of the site (i.e. fewer new waste disposal sites are required), and keeping certain materials out of landfills, thereby improving the quality of runoff from the site that enters surface water and groundwater. Many municipalities have or are implementing programs and projects to reduce the amount of waste that requires disposal, such as recycling programs, green bin programs, and household hazardous waste collection days. Recently introduced programs under Stewardship Ontario offer municipalities a way to significantly recover costs.

Sewer Use Bylaw

For a landfill discharging to a sewer, the quality and quantity of the discharge is controlled by local sewer use bylaws, and the requirements or limitations of the receiving wastewater treatment plant.

Other

Ontario Tire Stewardship Used Tire Program

Ontario Tire Stewardship (OTS) is an industry funded organization that implements and operates the used tire program. This program was launched in 2009 as a province-wide initiative to divert scrap tires away from burning and landfill (Ontario Tire Stewardship, 2011). The OTS provides financial incentives for registered organizations that collect, transport or process used tires or manufacture recycled products. The program is

projected within 5 years to divert 90% of scrap on road tires and collect and recycle 50% of all scrap off road tires within 5 years (Ontario Tire Stewardship, 2011).

Stewardship Ontario Orange Drop Program

Stewardship Ontario, a private not-for-profit organization, has been developed to administer government-mandated stewardship such as the Orange Drop Program. The Orange Drop Program is a recycling program aimed at keeping household hazardous waste out of landfills (Ontario Stewardship, 2011). This program is free to residents being fully funded by manufacturers and importers of household hazardous or special waste material. In 2010 this program diverted 26 482 tonnes of waste (Ontario Stewardship, 2011).

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with waste disposal sites.

Table 1-9 Gaps in Existing Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs	Gaps
Provincial	Environmental Protection Act (Government of Ontario, 1990) and Certificates of Approval for Waste Disposal	<ul style="list-style-type: none"> • Many waste disposal sites are exempted from the C of A process under section 39 of the EPA. There is inconsistency in the regulations due to the many exemptions. • Since older C of As for waste disposal do not have an expiry date there are still some very old, inadequate C of As. • There is a lack of resources at the Ministry level to monitor and enforce EPA regulations and C of A requirements. • Certificates of approval are not generally required for PCB waste disposal sites
	Ontario Regulation 232/98 Landfilling Sites	<ul style="list-style-type: none"> • Landfills approved prior to August 1, 1998 did not require the same level of consideration for design and construction specifications or operational standards (i.e. Parts III and V of Ontario Regulation 232/98).
	Ontario Regulation 102/94: Waste Audits and Waste Reduction Work Plans (O.Reg. 102/94) and Ontario Regulation 103/94: Industrial, Commercial and Institutional (IC&I) Source Separation Programs	<ul style="list-style-type: none"> • These regulations require Institutional/Commercial/Industrial (ICI) sectors to do waste reduction plans and waste audits; however there is no enforcement to ensure these plans have been created or followed.
	Guideline D-4: Land Use On or Near Landfills and Dumps (Ontario Ministry of the Environment, 1994)	<ul style="list-style-type: none"> • It can be difficult to enforce these guidelines unless the property is municipally owned. • Developers may try to work around the guidelines or get the allowable land use changed.
	MOE Guidelines and Procedures (Guidelines B-7, B-7-1, D-4 and guidelines for environmental protection measures at chemical and waste storage facilities, Procedure C-13-1)	<ul style="list-style-type: none"> • Guidelines and procedures note specific considerations for water quality protection, they are not legally binding unless included in Certificate of Approval
Municipal	Land Use Planning	<ul style="list-style-type: none"> • Waste disposal sites are not explicitly prohibited within vulnerable areas in municipal official plans and zoning by-laws.

Level of Government	Applicable Legislation/Policies/Programs	Gaps
Other Regulatory Gaps		<ul style="list-style-type: none"> • There is very limited regulation for old, historic waste disposal sites and a lack of responsibility being taken for these sites. • Historic landfill locations are not necessarily recorded and monitored • The frequency of household hazardous waste collection opportunities (e.g. collection days) is not sufficient to accommodate the needs of the community; therefore, household hazardous wastes may still be illegally disposed with household garbage. • Exemptions in the definitions of “waste” and “waste disposal” may have an impact on authority of policies or applicability of prescribed instruments

Policy Considerations

- REMINDER: The main consideration for reducing or eliminating drinking water threats related to waste disposal sites is to make sure that any discharge from the sites does not result in a significant risk to drinking water through appropriate measures to mitigate the threat, such that discharge from the sites do not threaten the quality of surface or groundwater sources, or are adequately mitigated. This could be accomplished by:
 1. Complete or improved diversion of household hazardous waste, electronics, compost and recyclables for current and future use will reduce contamination from harmful waste and the overall footprint/area of impact
 2. Capture and treatment of surface water runoff and prevention of run-off by using proper operating techniques and enforcement of C of A conditions.
 3. Capture and treatment of leachate (to reduce impacts on groundwater). Prevention of leachate from entering groundwater/surface water by using proper design and/or rehabilitation
- Clean Water Act Part IV tools interim risk management plans, risk management plans, prohibition, and restricted land uses cannot be used for waste disposal sites.
- Prescribed Instruments may be used to address concerns for waste disposal sites, but identified risk management measures are only mandatory for significant drinking water threats. However, this does not prevent their voluntary incorporation.
- The source protection plan will need to address all “would be” situations related to waste disposal sites, even those instances where we believe they are unlikely to occur. Those situations can be covered by a high-level policy approach (“a catch-all policy”).

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to the subject threat in the Thames-Sydenham and Region. It is not an exhaustive list. Each policy tool is discussed separately in the table below.

Table 1-10 Proposed Policy Ideas

Threat:	The establishment, operation or maintenance of a waste disposal site within the meaning of Part V of the <i>Environmental Protection Act</i> .
Sub- Threat	<ul style="list-style-type: none"> • Land farming of petroleum refining waste

Circumstances	<ul style="list-style-type: none"> • Landfilling of hazardous waste • Landfilling of municipal waste • Landfilling of solid, non-hazardous industrial or commercial waste • Liquid industrial waste injection into a well • PCB (Polychlorinated biphenyl) waste storage • Storage of hazardous waste at disposal sites • Storage of certain hazardous wastes • Land farming of petroleum refining waste <ul style="list-style-type: none"> ○ Application area >10 ha • Landfilling of hazardous waste, municipal waste, solid, non-hazardous industrial or commercial waste <ul style="list-style-type: none"> ○ <1 ha ○ 1-10 ha ○ >10 ha • Liquid industrial waste injection into a well <ul style="list-style-type: none"> ○ 380 to 3800 m³ ○ 3800 to 38000 m³ ○ 38000 to 380 000 m³ ○ 380 000 to 3 800 000 m³ ○ 3 800 000 to 38 000 000 m³ ○ >38 000 000 m³ • PCB (Polychlorinated biphenyl) waste storage <ul style="list-style-type: none"> ○ Stored in an underground pit or engineered cell ○ Stored in tanks completely below grade ○ Stored in tanks partially below grade ○ Stored in uncontained piles • Storage of hazardous waste at disposal sites, certain hazardous waste <ul style="list-style-type: none"> ○ At or above grade ○ Completely below grade ○ Partially below grade
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Table 1-11 Gaps in Existing Legislation, Policies and Programs

Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Provide education materials and information sessions about proper disposal of waste materials prescribed under the Clean Water Act and what can be done to reduce the volume of waste • Encourage waste diversion approaches to complement household special waste (HSW) and SP goals and mandates • Promote backyard composters. • Ensure HSW is included in garbage schedule (calendar)
Incentive Programs	<ul style="list-style-type: none"> • Provincial funding for municipalities to increase household hazardous waste collection opportunities. • Province may waive MOE application fees for existing C of A amendments to include SWP generated policies • Coordinate cross municipal HSW programs to increase accessibility (amend C of A's as needed)
Land Use Planning	<ul style="list-style-type: none"> • Prohibit new waste disposal sites in areas where they would be a significant drinking water threat.
Prescribed Instruments	<ul style="list-style-type: none"> • Do not issue waste site C of A's where the site activity is a significant threat unless term and conditions adequately manage the threat. • Require MOE to review and amend current C of A's in locations where the site activity is a significant threat to ensure that term and conditions adequately manage the threat.
S.26 p.1 Other-	<ul style="list-style-type: none"> • Encourage municipalities to develop complimentary programs that would achieve

Policy Tool	Policy ideas
Specify Action (Municipal Operations/ Infrastructure)	waste reduction goals to minimize liquid and hazardous waste materials from entering landfill as follows: <ul style="list-style-type: none"> • “Pay as you throw” program to encourage waste diversion (fee per bag of garbage, bag limits, bi-weekly pickup), along with other waste diversion strategies. • Require the use of clear garbage bags to help identify household hazardous waste or other materials that should be diverted from a landfill. • Random garbage bag audits. This can help target future diversion initiatives, including household hazardous waste and electronics. • Electronics recycling collection – Stewardship Ontario has initiated programs to assist municipalities and business to divert electronics from the waste stream. • Ontario Tire Stewardship – Although tires are banned from landfills, they have been historically been illegally dumped/stored. Programs have been put into place to reduce this behaviour.

Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	1.3-1
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant, Moderate and Low
Body Responsible for Implementing	Municipal Watershed partnership with Conservation Authority as lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing and Future
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Conform (significant), strategic (moderate and low)
Policy Tool	Education and Outreach
Policy Idea	Enhance existing education and outreach programs where applicable, or if they do not exist, develop new programs to promote Best Management Practices to protect drinking water sources from the chemical risks associated with the disposal of waste including: <ul style="list-style-type: none"> • Providing education materials and information sessions about proper disposal of CWA prescribed waste materials and what can be done to reduce the volume of waste • Encouraging waste diversion approaches to complement household hazardous waste programs • Promoting the use of backyard composters in order to reduce municipal waste • Providing material within the waste schedule calendar that promotes awareness of household hazardous waste • The implementation of this policy through the existing municipal partnership of the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities can be involved in the program development and delivery depending on their individual needs; however the program(s) would be developed in a consistent manner across the region.
Implementation schedule	Within 2 years of the approval of the Source Protection Plan.
Monitoring Policy	The implementing body shall report to the SPA the number of educational packages offered as well as a description of the actions/measures they have taken to implement the education/outreach in the previous year. Measures of tracking the uptake by the target

Waste Disposal and Sewage Threats

Policy Number	1.3-1
	audience will also be included in this report.

Policy Number	1.3-2
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing and Future
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Strategic (MOE)
Policy Tool	Incentive Programs
Policy Idea	<p>The province shall be encouraged to develop and implement new incentive programs to assist with the costs of risk mitigation practices. These programs could provide funding for municipalities that would allow opportunities such as increasing household hazardous waste collection to occur.</p> <p>The province shall be encouraged to waive application fees where C of As would need to be amended based on source water protection policies.</p>
Implementation schedule	This policy shall be implemented within 1 year of the effective date of the first approved source protection plan.
Monitoring Policy	The implementing bodies shall report to the CA annually on the implementation of this policy. The report shall include the funding available, the uptake of the incentives, the areas where the incentives were used and a description of the efforts to promote the incentives. The report shall report on each type of incentive separately.

Policy Number	1.3-3
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	Municipalities shall prohibit new waste disposal sites and transfer stations in areas where they would be a significant drinking water threat.
Implementation schedule	From the date of the Source Protection Plan approval, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plan within 6 months of the Source Protection Plan approval with the goal to be completed within 2 years of the SPP approval date. Zoning by-laws shall be updated with the goal to be completed within 3 years of the SPP approval date.
Monitoring Policy	Municipalities shall report to the CA on new policies incorporated in Official Plans and any new by-laws relevant to source water protection. All municipalities must report even if it is to indicate that no changes were required. Where no changes were required, the report is to describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	1.3-4
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing and Future

Waste Disposal and Sewage Threats

Policy Number	1.3-4
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Conform
Policy Tool	Prescribed Instrument-Environmental Protection Act
Policy Idea	MOE shall prohibit the issuance of future waste site C of A where the site activity is a significant threat. MOE shall review and amend current C of A where the site activity is a significant threat to ensure that terms and conditions adequately manage the threat.
Implementation schedule	For existing C of A, the implementation of this policy shall be within 1 year of the approval of the SPP. For future C of As, this policy shall be implemented immediately following the approval of the SPP.
Monitoring Policy	MOE shall report to the CA the number of C of A applications that have been reviewed and amended including the instrument number as well as the number of C of A applications that have been prohibited within vulnerable areas where the threat is considered significant.

Policy Number	1.3-5
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Conform
Policy Tool	S.26 Other-Establish Stewardship
Policy Idea	Municipalities shall be encouraged to develop and implement complementary stewardship programs that would minimize liquid and hazardous waste materials from entering landfills where the threat would be significant. These programs would encourage a change in behaviour and could include: <ul style="list-style-type: none"> ○ “pay as you throw” program to encourage waste diversion (fee per bag of garbage, bag limits, bi-weekly pickup) along with other waste diversion strategies ○ Require the use of clear garbage bags to help identify household hazardous waste or other materials that should be diverted from a landfill ○ Random garbage bag audits. This can help target future diversion initiative, including household hazardous waste and electronics ○ Electronics recycling collection-stewardship Ontario has initiated programs to assist municipalities and business to divert electronics from waste stream ○ Ontario tire stewardship-although tires are banned from landfills, they have been historically illegally dumped/stored.
Implementation schedule	The development of stewardship programs shall be initiated immediately following the approval of the source protection plan.
Monitoring Policy	Municipalities shall report annually to the CA the number of stewardship programs developed as well as a description of the actions/measures they have taken to implement these programs.

Policy Number	1.3-6
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A,B with vulnerability score of 10 • IPZ-1
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use which could be associated with waste disposal.
Legal Effect	Conform

Policy Number	1.3-6
Policy Tool	S.26 Other-Specify Action
Policy Idea	Municipalities shall consider collaborating with each other to increase accessibility to cross municipal household hazardous waste programs to ensure that the activity ceases to be a significant drinking water threat.
Implementation schedule	Within 1 year of the effective date of the Source Protection Plan.
Monitoring Policy	Municipalities shall submit a report to the CA which would detail if cross municipal partnerships have occurred.

Draft Policies

Draft policies have been developed for the Thames-Sydenham and Region Source Protection Plan for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for a detailed version of the policies.

Table 1-12 Draft Policies for Waste Disposal Sites

TSR Policy Number	Provincial Policy Database Number	Sub-Threat	Policy Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.1.3.1	1636	All waste sub-threats except those pertaining to PCB storage	Management of existing waste disposal sites through the Environmental Protection Act	Significant	Existing	Prescribed Instrument	MOE
TS.1.3.1	1637	All waste sub-threats except those pertaining to PCB storage	Prohibit future waste disposal sites through Environmental Protection Act	Significant	Future	Prescribed Instrument	MOE
TS.1.3.5	1638	All waste sub-threats	Waiving of Environmental Compliance Approval fees for existing waste disposal sites	Significant	Existing	Incentives	MOE
G.7.3	1690	All waste sub-threats except PCB storage	Geo-referencing of prescribed instruments	Significant	Existing and future	Specify Action	MOE
G.2.1.2	1691	All sub-threats except	Continued funding for Ontario Drinking Water Stewardship Program	Significant	Existing	Incentives	MOE
G.3.1; 3.3.1; 3.4.1	1693	All sub-threats	General land use planning policies	Significant	Future	Land use planning	Planning approval authority
G.5.1 to G.5.5	1694	PCB storage	Section 58 of the Clean Water Act general risk	Significant	Existing and future	Section 58	Risk Management Official

TSR Policy Number	Provincial Policy Database Number	Sub-Threat	Policy Description	Risk Category	Threat Status	Policy Approach	Implementer
			management policies				
G.1.1 to G.1.2	1696	All sub-threats	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority Province
G.2.1.1	1724	All sub-threats	Existing incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.2.2.1	1728	All sub-threats	New incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
TS.1.3.4	1805	Landfilling solid non-hazardous waste and PCB storage	Prohibition of future waste disposal sites not subject to Environmental Compliance Approvals through Section 57 of the Clean Water Act	Significant	Future	Section 57	Municipality Risk Management Official
G.1.3	1866	All sub-threats	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	All sub-threats	Signage policy as part of municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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1.2 Establishment, operation or maintenance of a system that collect, stores, transmits, treats or disposes of sewage

1.2.1 Stormwater Management

What is the Threat to Drinking Water

This discussion paper focuses on the activities related to stormwater management facilities, which are listed as a subthreat of prescribed drinking water threat 2- the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage. Stormwater refers to rainwater runoff, water runoff from roofs, snowmelt and surface runoff. Stormwater can be managed by a hierarchical approach - at the source, through conveyance and finally end-of-pipe collection systems for quality and quantity – often under a stormwater management plan.

Stormwater management can occur in a variety of ways:

- A stormwater management facility is defined as a facility for the treatment, retention, infiltration or control of stormwater. The word “facility” is not defined in the Ministry of the Environment (MOE) threat tables; it is assumed that “facility” applies to the system of managing stormwater, including stormwater pipes that discharge directly into streams or water bodies.
- Stormwater management ponds (SWM ponds) are facilities designed to collect runoff from the local storm-sewer system and overland flow following either a rainfall or snowmelt event, or from activities such as washing cars. There are two types of SWM ponds - retention (“wet”) and detention (“dry”) - to manage both stormwater quality and quantity, respectively.
- “Wet” ponds are built to hold stormwater indefinitely for settling and removing of pollutants and then slowly release it back to natural waterways or infiltrate into the ground. Most SWM ponds with a quality control component have fore bays, which are not designed to infiltrate, that slow down the flow of water and collect contaminated sediments so that they can be removed through regular maintenance before the water moves to an infiltration pond. Maintenance dredging, proper disposal of the contaminated dredge soil are key parts of SWM management.
- “Dry” ponds are designed as quantity-control mechanisms in that they temporarily hold water while slowly release it to surface water. They are not designed to manage the quality of the water, nor are they designed to infiltrate to groundwater. Overflows, designed or accidental, would pose a risk of stormwater moving into receiving areas. Overflows could occur in “wet” and “dry” ponds.

Under the Clean Water Act the threat to drinking water is limited to stormwater management facilities. Activities relating to stormwater management facilities designed to discharge stormwater to groundwater (through infiltration) or surface water are listed as a subthreat of prescribed drinking water threat 2-the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.

The goal of management is to produce cleaner effluent from stormwater management systems, thus reducing impacts on both surface and groundwater through the reduction of contaminants on the landscape, reduction of non-essential water use (e.g. driveway washing, lawn-watering), and improved stormwater management measures. One way to manage stormwater is through Low impact development (LID). LID is a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible (US EPA, 2007).

Table 1-13 Low Impact Development Practices

Low Impact Development Practice	Description
Rainwater harvesting	The process of intercepting, conveying and storing rainfall for future use. The capture of rainwater can significantly reduce stormwater runoff volume and pollutant load
Green roofs	Consist of a thin layer of vegetation and growing medium installed on top of a conventional flat or sloped roof. Green roofs reduce total annual runoff volumes
Roof downspout disconnection	Involves directing flow from roof downspouts to a pervious area that drain away from the building. This prevents stormwater from directly entering the storm sewer system or flowing across a “connected” impervious surface such as a driveway that drains to a storm sewer;
Soakaways, infiltration trenches and chambers	Facility design options that receive runoff and allow it to infiltrate into the native soil. These design options service individual lots and receive roof and walkway runoff
Bioretention	Stormwater filter and infiltration practice that temporarily stores, treats and infiltrates runoff
Vegetated filter strips	Gently sloping, densely vegetated areas that treat runoff as sheet flow from adjacent impervious areas. They function by slowing runoff velocity and filtering out suspended sediment and associated pollutants;
Permeable pavement	Allows stormwater to drain through them and into a stone reservoir where it is infiltrated into the underlying native soil;
Enhanced grass swales	Vegetated open channels designed to convey, treat and attenuate stormwater runoff;
Dry swales	an enhanced grass swale that incorporates an engineered soil (i.e. filter media or growing media) bed and optional perforated pipe underdrain or a bioretention cell;
Perforated pipe systems	underground stormwater conveyance systems designed to attenuate runoff volume and reduce contaminant loads to receiving waters

(CVC and TRCA, 2010).

Other management techniques include oil and grit separators which are containment units designed to remove coarse sediment and oils from stormwater before it enters the storm-drain network, the ground or other treatment. Stream restoration is also a part of stormwater management, because stream quality, as measured by bank stability, water quality and available habitat, deteriorates when impervious cover increases in a watershed.

What Causes the Activity to be a Drinking Water Threat

There are twenty chemicals and pathogens included in the MOE Tables of Drinking Water Threats (Ontario Ministry of the Environment, 2009) for stormwater management facilities. Any of these contaminants can make their way into surface water and groundwater and threaten the safety of a drinking water source. It should be noted that the circumstances included in the MOE Tables of Drinking Water Threats (2008, as amended in 2009) are for stormwater management facilities only and do not include run off from properties where there is no management facility such as a farm field.

Table 1-14 Pathogens and Chemicals Associated with Stormwater Management Facilities

<ul style="list-style-type: none"> • Pathogens • Aluminum • Arsenic 	<ul style="list-style-type: none"> • Copper • Glyphosate • Lead 	<ul style="list-style-type: none"> • Nitrogen • Polycyclicaromatic hydrocarbons • Petroleum hydrocarbons F1 to F4
------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------

<ul style="list-style-type: none"> • Cadmium • Chloride • Chromium VI 	<ul style="list-style-type: none"> • Mecoprop • Mercury • Nickel 	<ul style="list-style-type: none"> • Total Phosphorus • Zinc
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Significant Threat

Stormwater management systems can be a significant chemical and pathogen sewage threat for rural, urban (high density residential) or industrial/commercial, depending on the size of the drainage area and which chemical. To be a significant threat, the stormwater management facility must discharge into a WHPA with a vulnerability score of 10 or an IPZ or WHPA-E with a vulnerability score equal to or greater than 9.

What is the Local Scale of the Drinking Water Threat

Stormwater management is a sub-threat of the establishment, operation or maintenance of systems that collects, stores, transmits, treats or disposes of sewage. Through the investigations completed for the Thames-Sydenham and Region Assessment Report, this threat was not broken into its component sub-threats and it is not known if this sub-threat is significant within the Region.

Applicable Legislation, Policies and Programs

The following section provides a summary of applicable legislation, policies and programs (provincial, municipal and other) that address stormwater management.

Table 1-15 Applicable Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs
Federal	Fisheries Act 1985
Provincial	Ontario Water Resources Act 1990 (Government of Ontario, 1990)
	Pesticides Act 1990 (Government of Ontario, 1990) <ul style="list-style-type: none"> • O. Reg. 63/09 Cosmetic Pesticide Ban
	Water Opportunities Act
	Ontario Environmental Assessment Act (Government of Ontario, 1990)
	Planning Act 1990 (Government of Ontario, 1990)
	Stormwater Management Planning and Design Manual (Ministry of Environment, 2003)
Municipal	Land Use Planning
Other	Conservation Authority Planning Policy
	Trout Unlimited Yellow Fish Road Program

Federal

Fisheries Act (Government of Canada, 1985)

Section 36 (3) of the Fisheries Act prohibits “the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance may enter any such water” (Government of Canada, 1985). Any substance with potentially harmful chemicals, or a physical (e.g. temperature) or biological effect on fish or fish habitat is considered deleterious. This Act would apply to stormwater runoff.

Provincial

Ontario Water Resources Act (Government of Ontario, 1990)

Stormwater management facilities require a certificate of approval (C of A) issued by the Ministry of Environment (MOE) under the Ontario Water Resources Act (OWRA). The MOE “Guide for Applying for Approval of Municipal and Private Water and Sewage Works” (August 2000) is used by applicants to ensure that their proposals meet the legislative requirements for a C of A. The terms and conditions of the C of A generally address:

- criteria for operation and performance of the stormwater management facility,
- requirements for monitoring and recording of specific indicators of the environmental impact of the works (water quality, not quantity),
- reporting on incidents, and
- Provision of contingencies to prevent and deal with accidental spills.

The C of A may also deal with issues such as: time limited approval, timing for upgrades, financial assurance, or requirements to obtain some other approvals before commencement of the construction of the conditionally approved facility or its part. It is noted that there has been some innovation in the C of A process, towards a more comprehensive, natural systems approach to stormwater management over the past several decades (Lake Erie Source Protection Committee, 2011).

Environmental Assessment Act (Government of Ontario, 1990)

Environmental assessments determine the ecological, cultural, economic and social impact of a project. The Environmental Assessment Act (EAA) contains requirements for undertaking environmental assessments for any major public sector activity in Ontario that has the potential for significant environmental effects. Municipal Class Environmental Assessment (Class EA), which is approved under the EAA, is a process that municipalities follow when planning sewer, water including stormwater management facilities, road and transit projects. This process allows for the evaluation of the environmental effects of the proposed alternatives to a project and includes the mandatory requirements for public input, while expediting the environmental assessment of smaller recurring projects (MEA, 2011).

Pesticides Act (Government of Ontario, 1990)

The Pesticides Act, 1990 regulates the sale, use, transportation, storage and disposal of pesticides. The MOE Tables of Drinking Water Threats identify two pesticide ingredients (glyphosate and mecoprop) that can be found in stormwater discharge and result in a drinking water threat.

Ontario Regulation 63/09 Ontario's Cosmetic Pesticides Ban

Ontario Regulation 63/09 of the Pesticides Act was amended in 2009 to incorporate the Cosmetic Pesticides Ban Act, 2008 (Government of Ontario, 2009). Ontario’s cosmetic pesticide ban prohibits the application of pesticides for cosmetic purposes on lawns, vegetable and ornamental gardens, patios, driveways, cemeteries, and in parks and school yards. Exceptions to the ban are made for: public health and safety, natural resources, golf courses, sports fields, specialty turf, agriculture, forestry and public works. This ban has an effect on reducing the amount of pesticides in stormwater since it applies to the majority of pesticides, including glyphosate and mecoprop.

The Water Opportunities Act (Government of Ontario, 2010)

The Water Opportunities Act, 2010 seeks to foster innovative, water, waste water and stormwater technologies, services and practices in both the public and private sector as well as conserve and sustain water resources for

present and future generations. This Act enables the authority to require municipalities and other water service providers to prepare municipal water sustainability plans. The MOE may develop targets or performance standards for the use of green infrastructure to manage stormwater, as a component of these plans. Key to delivering these outcomes is the creation of the Water Technology Acceleration Partnership (WaterTAP), which will support research and development as well as the commercialization of new technologies and innovations in Ontario's water sector.

Planning Act 1990 (Government of Ontario, 1990)

The Planning Act sets out the framework for land use planning in Ontario. Within the Planning Act there are a variety of tools that can be used to regulate the use of land. The following table provides an overview of some of these tools that could be used in stormwater management.

Table 1-16 Planning Act Tools

Planning Act Tool	Description
S.37 height and Density Bonusing	This enables municipalities to enter into agreements with developers where they will provide facilities or services in exchange for increased building height and density. Provisions could be used by municipalities to require developers to construct green infrastructure that would assist in low impact development.
S.41 (4) Site Plan Control	Enables municipality to require certain external design elements in project plans. This could be used to secure various types of on-site green infrastructure.
S.42 (6.2) Parkland Dedication	In situations where parklands cannot be created on site, this enables municipalities to allow a reduction in cash-in-lieu requirements in exchange for design structures such as green roofs or permeable surfaces.
S. 51 Plan of Subdivision	Under this section, municipalities have review and approval powers that provide an opportunity to assess proposed plans of subdivision.
S.70.2 Development Permit System	Development permit system combines zoning, site plan control and minor variance approvals. Measures to ensure the protection of water could be considered in the development permit system by specifying conditions or by expanding on matters addressed through the site plan control process.

(Binstock, 2011)

Stormwater Management Planning and Design Manual

The MOE “Stormwater Management Planning and Design Manual” (March 2003) provides practical information on how to design stormwater management facilities in Ontario. It focuses on quantity and quality control and it is the main reference document for urban stormwater management within many Source Protection Areas. Although this manual mentions the need to consider bacteria near recreational/swimming areas and temperature for coldwater streams, the focus is on sediment control. There are three different levels of quality treatment relating to sediment control:

- Enhanced – removes 80% of suspended solids and is used in areas with highly permeable soils, sensitive spawning habitat, high baseflow, clear waters and low erosion;
- Normal – removes 70% of suspended solids and is used in areas with some sediment loading and less sensitive spawning habitat; and,
- Basic – removes 60% of suspended solids and is used in areas with high sediment loading and significantly altered stream system with little opportunity to rehabilitate.

Municipal

Land Use Planning

Municipalities, under the authority of the Planning Act, make local planning decisions that determine the future of communities within their jurisdiction. Through Official Plan policies and zoning by-laws, municipalities have varying levels of policies regarding stormwater management. Some of the tools used by municipalities in developing policies related to stormwater management include:

- Stormwater Management - All municipalities require stormwater management (SWM) plans to accompany subdivision applications. Most of them also require SWM plans for commercial and industrial development.
- Vegetative Buffers - Development setbacks from water bodies have generally increased from 15 m to 30 m. The intent of the water setback is to provide a buffer of undisturbed soil and vegetation along the shoreline, which will help to filter runoff, prevent soil erosion, and provide wildlife habitat. A number of municipalities require or encourage the maintenance of natural vegetation cover (trees, shrubs, vines, groundcovers) within at least 15 m of the shoreline.

Other

Conservation Authority Planning Policy

Flood control, maintaining baseflow in watercourses, water temperature, erosion and sediment control, limiting nutrient and bacteria loading, maintaining fish habitat, and groundwater recharge and contamination may be of interest in a particular watershed or subwatershed. Ontario Conservation Authorities (CAs) are commenting agencies under the Planning Act. One of their roles is to review stormwater management plans for new development and to provide comments to their member municipalities. The following aspects are considered through this review:

- maintenance of the hydrologic cycle,
- recognition of riparian water rights, and
- retention and improvement of ecosystem health.

To ensure consistency in their approach to stormwater management, many CA's have various guidelines for stormwater management that form part of their planning policies. For example, the Upper Thames River Conservation Authority (UTRCA) within the Thames-Sydenham and Region Source Protection Region reviews all plans of subdivision within its jurisdiction due to the potential for large scale impacts on the natural environment (UTRCA, 2006).

Yellow Fish Road Program

Trout Unlimited Canada, a non-profit organization dedicated to ensuring that present and future generations have the opportunity to enjoy Canada's fresh water resources, developed the Yellow fish Road Program (Trout Unlimited, 2011). This program was initiated in 1991 and is an environmental education campaign that raises awareness about pollution entering local water bodies through storm drains. The educational components of this campaign are painting yellow fish near storm drains and handing out 'fish hanger' brochures to inform residents of why yellow fish are found in their neighbourhood (Trout Unlimited, 2011).

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with stormwater management.

Table 1-17 Gaps in Existing Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies and Programs	Gaps
Federal	Fisheries Act	<ul style="list-style-type: none"> • Legislation is reactive
Provincial	Ontario Water Resources Act (Government of Ontario, 1990)	<ul style="list-style-type: none"> • There is a perception that there is a lack of monitoring and enforcement of C of A requirements • C of As do not have an expiry date; the requirements for some stormwater management facilities may be out of date and do not meet current environmental standards • The level of review for C of A applications may be inconsistent among the various MOE district offices • Most existing C of A do not have requirements for ongoing management or review
	Stormwater Management Planning and Design Manual	<ul style="list-style-type: none"> • Currently the design manual focuses largely on sediment. There are no design guidelines for pathogens, chlorides or other dissolved contaminants. • There are no temperature requirements in the manual. • There are no guidelines for lining ponds or building permanent pools in the water table. • Provides design criteria for “conventional” end of pipe stormwater management practices such as wet ponds and constructed wetlands but provides only limited information about lot level and conveyance controls.
Other		<ul style="list-style-type: none"> • There is no regulation that requires retrofitting of older systems and there are limited resources available for replacement of outdated stormwater management facilities or infrastructure.

Policy Considerations

- Clean Water Act Part IV tools interim risk management plans, risk management plans, prohibition, and restricted land uses cannot be used for sewage systems, which include industrial sewage works.
- The Certificate of Approval under the OWRA is a provincial instrument to which the SPC can ask MOE to include conditions

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to the subject threat in the Thames-Sydenham and Region. It is not an exhaustive list. Each policy tool is discussed separately in the table below.

Table 1-18 Policy Ideas

Threat:	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage
Sub- Threat	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstances	<ul style="list-style-type: none"> • Drainage area >100 ha <ul style="list-style-type: none"> ○ Predominant land use is rural, agricultural low density residential ○ Predominant land use is industrial/commercial • Drainage area 10-100 ha where predominant land use is industrial/commercial
Policy Tool	Policy ideas

Education and Outreach	<ul style="list-style-type: none"> Promote programs such as Yellow Fish Road, hazardous product management information and awareness at residential and industrial level Create signage to identify vulnerable areas Additional methods of identification relating to vulnerable areas
Incentive Programs	<ul style="list-style-type: none"> Consider incentives for alternate approaches when retrofitting SWP Municipalities to consider various incentives (e.g. density trading, setback relaxation, reduction of parkland requirements) for implementing low impact development Province to continue to fund Ontario Drinking Water Stewardship Program for private and municipal projects
Land Use Planning	<ul style="list-style-type: none"> Encourage low development in vulnerable areas Consider coordination of stormwater management and natural channel design Prohibit SWM in areas where they might be a significant threat
Prescribed Instruments	<ul style="list-style-type: none"> Prohibit issuance of ne C of A where significant threats may occur Require MOE to review existing C of A where significant threats may occur to include conditions that mitigate the threat (e.g. minimum standards for maintenance and monitoring, 5 year review cycle)
S.26 p. Other-Specify Action	<ul style="list-style-type: none"> Use enhanced construction standards in vulnerable areas Municipal design standards include catch basin fish grates, catch basin with sumps to provide primary settlement Municipalities to ensure emergency responders take additional steps for mitigation in all vulnerable areas Require storm sewer use bylaws to be in place for vulnerable areas Require BMP during maintenance process in vulnerable areas Municipalities shall be required to ensure that existing storm water management facilities are brought into compliance with current standards.

Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	2.1-1
Vulnerable Area	<ul style="list-style-type: none"> WHPA-A, B vulnerability score of 10 IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant, Moderate and Low
Body Responsible for Implementing	Municipal Watershed partnership with Conservation Authority as lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform (significant), strategic (moderate and low)
Policy Tool	Education and Outreach
Policy Idea	<p>Enhance existing education and outreach programs, or if they do not exist, develop new programs to promote Best Management Practices to protect drinking water sources from the chemical risks associated with stormwater management including:</p> <ul style="list-style-type: none"> Promoting programs such as Yellow Fish Road, hazardous product management Creating signage to identify vulnerable areas Additional methods of identification relating to vulnerable areas The implementation of this policy through the existing municipal partnership of the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities can

Waste Disposal and Sewage Threats

Policy Number	2.1-1
	be involved in the program development and delivery depending on their individual needs; however the program(s) would be developed in a consistent manner across the region.
Implementation schedule	Within 2 years of the approval of the Source Protection Plan.
Monitoring Policy	The implementing body shall report to the SPA the number of educational packages offered as well as a description of the actions/measures they have taken to implement the education/outreach in the previous year. Measures of tracking the uptake by the target audience will also be included in this report.

Policy Number	2.1-2
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	Province
Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform (Municipality); Strategic (Province)
Policy Tool	Incentive Programs
Policy Idea	The province shall consider developing incentive programs for providing alternate approaches to retrofitting Stormwater Management Ponds. The province, through the Ontario Drinking Water Stewardship Program, shall be encouraged to continue to adequately fund risk mitigation practices for significant drinking water threats.
Implementation schedule	Ongoing implementation for existing programs or within 2 years of the approval of the SPP for new programs.
Monitoring Policy	The implementing bodies shall report to the CA annually on the implementation of this policy. The report shall include the funding available, the uptake of the incentives, the area where the incentives were used and a description of the efforts to promote the incentives. Each incentive program shall be reported on separately.

Policy Number	2.1-3
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	Municipalities shall encourage developers to use a stormwater management strategy, such as low impact development, to manage runoff as close to the source as possible. Low impact development practices could include rainwater harvesting, green roofs, roof downspout disconnection, soakaway and infiltration trenches and enhanced grassed swales. Municipalities shall prohibit stormwater management facilities in areas where they would be a significant threat. When stormwater management facilities are proposed, municipalities shall encourage the consideration of coordination of stormwater management and natural channel design.
Implementation schedule	From the date of the Source Protection Plan approval, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plan within 6 months of the Source Protection Plan approval with the goal to be completed within 2 years of the SPP approval date. Zoning by-laws shall be updated with the goal to be completed within 3 years of the SPP approval date.
Monitoring Policy	Municipalities shall report to the CA on new policies incorporated in Official Plans and any

Policy Number	2.1-3
	new by-laws relevant to source water protection. All municipalities must report even if it is to indicate that no changes were required. Where no changes were required, the report is to describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	2.1-4
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform
Policy Tool	Prescribed Instruments-Ontario Water Resources Act
Policy Idea	MOE shall prohibit the issuance of new C of As for stormwater management ponds where they would be a significant drinking water threat. MOE shall review existing C of As for stormwater management ponds and include any new conditions deemed necessary to mitigate the threat. Conditions could include requirements for using minimum maintenance standards, requirements for monitoring and mandatory inspection every 5 years.
Implementation schedule	For existing C of As, the implementation of this policy shall be within 1 year of the approval of the SPP. For future C of As, this policy shall be implemented immediately following the approval of the SPP.
Monitoring Policy	MOE shall report to the CA the number of C of A applications that have been reviewed and amended including the instrument number as well as the number of C of A applications that have been prohibited within vulnerable areas where the threat is considered significant.

Policy Number	2.1-5a
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	In vulnerable areas, municipalities shall consider requiring design standards that mitigate the risk. Municipalities shall be required to use Best Management Practices during Stormwater Management Pond maintenance in vulnerable areas where the threat would be significant. Municipalities shall be required to ensure that existing stormwater management facilities are brought into compliance with current standards.
Implementation schedule	Implementation shall occur immediately after the Source Protection Plan comes into effect.
Monitoring Policy	The Municipality shall submit an annual report to the CA detailing what design standards have been used, what best management practices have been used, how many stormwater management facilities need to be retrofitted and how many retrofits have been completed.

Policy Number	2.1-5b
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	Municipality

Waste Disposal and Sewage Threats

Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	Municipalities shall enact and enforce storm sewer use by-laws for vulnerable areas where the threat is significant. These by-laws shall be reviewed periodically to reflect current engineering standards.
Implementation schedule	Implementation shall occur immediately after the Source Protection Plan comes into effect.
Monitoring Policy	The Municipality shall submit an annual report to the CA detailing if storm sewer by-laws have been developed as well as when they will be reviewed.

Policy Number	2.1-5c
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B vulnerability score of 10 • IPZ or WHPA-E with a vulnerability score of 9
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use which could be associated with stormwater management
Legal Effect	Conform
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	Municipalities shall take additional steps for risk mitigation in vulnerable areas where the threat is significant.
Implementation schedule	Implementation shall occur immediately after the Source Protection Plan comes into effect.
Monitoring Policy	The Municipality shall submit an annual report to the CA detailing whether emergency responders have developed policies and procedures to take additional steps to mitigate risks in vulnerable areas where the threat is significant.

Draft Policies

Draft policies have been developed for the Thames-Sydenham and Region for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for detailed versions of policies.

Table 1-19 Draft Policies for the Discharge of Untreated Stormwater from a Stormwater Retention Pond

TSR Policy Number	Policy Database Number	Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.2.1.1	1640	Management of existing discharge of untreated stormwater from a stormwater retention pond through Ontario Water Resources Act	Significant	Existing	Prescribed Instrument	MOE
TS.2.1.2	1641	Prohibit future discharge of untreated stormwater from a stormwater retention pond through Ontario Water Resources Act	Significant	Future	Prescribed Instrument	MOE
G.7.3	1690	Geo-referencing prescribed instruments	Significant	Existing and future	Specify Action	MOE
G.2.1.2	1691	Continued funding of Ontario Drinking Water Stewardship Program	Significant	Existing	Incentives	MOE
G.3.1, G.3.3.1, G.3.4.1	1693	General land use planning policies	Significant	Future	Land Use Planning	Planning Approval Authority
G.1.1 and G.1.2	1696	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority Province
G.2.1.1	1724	Existing incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.2.2.1	1728	New incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.1.3	1866	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	Signage policy as part of municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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1.2.2 Sewage Treatment Plants, Sewage Storage and Sanitary Sewers and Related Pipes

What is the Threat to Drinking Water

The Ontario Water Resources Act defines sewage as drainage, stormwater, commercial wastes and industrial wastes. The Ministry of the Environment (MOE) has prescribed the establishment, operation, or maintenance of a system that collects, stores, transmits, treats or disposes of sewage as a threat to drinking water sources. This discussion paper provides background information for prescribed drinking water threat 2B-sewage treatment plants and sewer networks.

MOE has designated the following sewage systems as ones that may pose a significant threat to drinking water sources. These include:

- Sanitary sewers and related pipes: these pipes collect sanitary waste from all the serviced buildings in the area and direct the wastewater to a treatment plant where the water is treated before being discharged into surface waters. Leaks in sewer lines from as a result of tree roots, soil slippage, sewage backup, improperly constructed pipelines, age of system are a threat to drinking water because it may cause the mixing of raw sewage with other waste products;
- Combined sewer discharge from a stormwater outlet to surface water-some older systems combine the collection of sanitary wastes and stormwater together in one pipe. During periods of high rainfall and snow melt, water flows may rise above the capacity of the combined sewer system and some flow may be released to waterbodies. Pathogens and toxic chemicals could be released during these overflows (Halton-Hamilton Source Protection Committee, 2011);
- Sewage treatment plant effluent discharges (including lagoons): Sewage treatment plants treat the collected sewage from households, commercial establishments, industries and institutions. Treatment may be primary, secondary or tertiary with each level improving the quality of the plant effluent. The effluent can be directly released to a watercourse or waterbody or its release from a lagoon can be scheduled;
- Sewage treatment plant by-pass discharge to surface water: Sometimes the capacity at a sewage treatment plant is overwhelmed and partially treated or untreated sanitary waste is released into the receiving water body. This is generally as a result of an extreme wet weather event (i.e. significant rainfall or snow melt) where the sanitary sewer network is not completely isolated from stormwater. Bypasses can be of untreated or partially treated wastewater. Combined sewers or sewer networks with inflow/infiltration issues are the root cause of bypasses; and,
- Storage of sewage (treatment plant tanks): Many sewage treatment plants have underground and/or above ground tanks used in the treatment process or to store sewage prior to or after treatment. These storage tanks may leak or spills may occur potentially contaminating the groundwater or surface water.

The main consideration for reducing or eliminating drinking water threats related to sewage treatment plants and sewer systems is to make sure that any discharge from these sites does not result in a significant risk to drinking water through appropriate mitigation measures. Future sewage treatment plants and sewer networks must not create a significant drinking water threat.

What Causes the Activity to be a Drinking Water Threat

The Ministry of Environment (MOE) Tables of Drinking Water Threats (MOE, 2009) indicate that there are 318 chemical and pathogen circumstances (circumstances 631-694 and 1958, 719-783 and 1948, 784-903 and 1959 and 904-1097 and 1960-1961, 212-276 and 1947) associated with sewage systems and sewage works that could

affect surface and groundwater as a result of discharge. The main groups of contaminants are pesticides, metals, synthetic chemicals and pathogens. Refer to Table 1-20 for a listing of chemicals and pathogens that could threaten the safety of drinking water sources.

Table 1-20 Chemicals and Pathogens that could Threaten the Safety of Drinking Water Sources

Antimony	Dichlorobenzidine-3,3	Phosphorus (total)
Arsenic	Dichlorophenol-2,4	Polychlorinated Biphenyls (PCBs)
Barium	Ethylene Glycol	Polycyclic Aromatic Hydrocarbons (PAHs)
BTEX	Hexachlorobenzene	Silver
Cadmium	Lead	Trichloroethylene
Chlorophenol-2	MCPA (2-methyl-4-chlorophenoxyacetic acid)	Vinyl chloride
Chromium VI	Mercury	Zinc
Copper	Nickel	Pathogens
Cyanide (CN-)	Nitrogen	
Dibutyl phthalate	Nitrosodimethylamine-N (NDMA)	
Dichlorobenzene-1,2 (ortho)	Pentachlorophenol	
Dichlorobenzene-1,4 (para)	phenol	

Depending on the location, type of facility and designed discharge rate, a sewage treatment facility or sewer network can be classified as a significant, moderate or low drinking water threat.

The following summarizes where a significant drinking water threat may occur:

- Sanitary sewers network– Sewage discharge from sanitary sewers (e.g. leaks) is generally a threat to groundwater quality. Any sanitary sewer or related pipe can be significant for pathogens in wellhead protection areas (WHPA-A,B) with a vulnerability score of 10;
- Combined sewers – combined sewers can only be significant drinking water threats for surface water (IPZ/WHPA-E) where the vulnerability score is at least 8 (for PCBs) or 9 for the balance of contaminants. Generally speaking the average daily rate of the sewage treatment plant must be at least 2,500 m³ before there are any significant drinking water threats. However, any capacity system can be significant in a vulnerable area of at least 8 for pathogens;
- Sewage treatment plants effluent discharges- these could be significant drinking water threats in IPZ/WHPA-E with a vulnerability score of 9 and WHPA with a vulnerability score of 10;
- Sewage treatment plants with designed bypasses- these could be significant drinking water threats in IPZ/WHPA-E that have vulnerability score of 9 depending on the presence of chemicals and the average daily rate of discharge. This activity is a significant drinking water threat for pathogens for IPZs and WHPA-A, with vulnerability scores of 8.1 and 10 respectively; and,
- Sewage storage tanks-sewage storage tanks could be a significant drinking water threat in IPZ/WHPA-E when the vulnerability is greater or equal to 9 and in a WHPA with a vulnerability greater than or equal to 8 (WHPA-B,C) depending on the presence of chemicals and the average daily rate of discharge. This is a significant threat for pathogens in WHPA-A or B when the vulnerability is 10.

What is the Local Scale of the Drinking Water Threat

The table below provides where these activities result in significant drinking water threats within the Thames-Sydenham and Region.

Table 1-21 Local Scale of Sewage Treatment Plant, Sewage Storage and Sanitary Sewers and Related Pipes

SPA	System	Threat	Type	Number of Locations	WHPA	Vulnerability Score
UTR	Dorchester	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	54 (includes septic and sanitary sewers)	B	6, 10
UTR	City of London-Hyde Park	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1 (sanitary sewer)	A	10
UTR	City of London-Hyde Park	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1 (sanitary sewer)	B	10
UTR	Beachville	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	6	A	10
UTR	Embro	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	19	A	10
UTR	Hickson	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	9	A	10
UTR	Ingersoll	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	11 (includes 4 sanitary sewers and 7 on-site septic)	A, B	6, 8, 10
UTR	Lakeside	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	5	A	10
UTR	Tavistock	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1	A	10
UTR	Thamesford	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	3 (includes 1 septic and 2 sanitary sewers)	A, B	6, 8, 10
LTV	Ridgetown	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.	Pathogen	5	A	10

Applicable Legislation, Policies and Programs

The following section provides a summary of the applicable legislation, policies and programs (federal, provincial, municipal and other) that addresses the drinking water threats of sewers and sewage treatment.

Table 1-22 Outline of Applicable Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs
Federal	Fisheries Act 1985
	National Pollutant Release Inventory
Provincial	Ontario Water Resources Act 1990 <ul style="list-style-type: none"> • O. Reg. 129/04 Licensing of Sewage Works Operators • Procedure F-5-1: Determining of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Water • Procedure D-5-2: Application of Municipal Responsibility for Communal Water and Sewage Services
	Ontario Environmental Protection Act
	Ontario Environmental Assessment Act
Municipal	Land Use Planning
	Municipal Act 2001 <ul style="list-style-type: none"> • Sewage Use Bylaws
	City of London WIPE (Washing Initiative to Protect our Environment) Program
	Thames River Clear Water Revival
Other	Other Jurisdictional Programs <ul style="list-style-type: none"> • Grand River Water Managers Working Group • Grand River Watershed Wide Wastewater Optimization Pilot Project

Federal

Fisheries Act 1985

Under S.36 (3) of the Fisheries Act, no person is to deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or where the substance could enter the water. Discharges from sewage treatment plants are considered deleterious substances and would be in contravention of this Act. There is also a proposed Regulatory Framework for Wastewater under the Fisheries Act that would involve the development of wastewater effluent regulations and administrative mechanisms, additional risk management actions for wastewater systems under federal government operations and risk management actions for sources of pollutants in wastewater (Lake Erie Source Protection Region, 2011).

National Pollutant Release Inventory

Under the Canadian Environmental Protection Act, 1999, the National Pollutant Release Inventory (NPRI) was developed to track pollutant release, disposals and transfers for recycling. Municipal wastewater facilities that produce an annual average discharge of 10,000 m³ or more per day into surface water must report releases of designated substances to the NPRI (Lake Erie Source Protection Region, 2011).

Provincial

Ontario Water Resources Act 1990

The Ontario Water Resources Act (OWRA) contains general prohibitions against discharging pollutants to surface or groundwater (Government of Ontario, 1990). Certificates of Approval (C of A) are required under the OWRA for sewage systems and other sewage works. The MOE is the regulatory body for C of As, which are prescribed instruments under the Clean Water Act. The terms and conditions of the C of A generally address:

- the criteria for operation and performance of the sewage treatment plant;
- the requirements for monitoring and recording of specific indicators of the environmental impact of the works (e.g. effluent standards);

- reporting on incidents; and,
- provision of contingencies to prevent and deal with accidental spills.

The MOE “Guide for Applying for Approval of Municipal and Private Water and Sewage Works” (August, 2000) is used by applicants to ensure that their proposals meet the legislative requirements for a C of A.

O. Reg. 129/04 Licensing of Sewage Works Operators

Ontario Regulation 129/04 made under the OWRA, requires that all operators at a sewage treatment plant must be licensed technicians.

Procedure F-5-1: Determining of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Water

Procedure F-5-1 Determining Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Water, developed under the authority of the OWRA, provides guidance on sewage treatment bypasses. This document is not enforceable but states that bypasses are only permitted in emergency situations and must be reported to the relevant authority (Lake Erie Source Protection, 2011).

Procedure D-5-2: Application of Municipal Responsibility for Communal Water and Sewage Services

Procedure D-5-2 Application of Municipal Responsibility for Communal Water and Sewage Services also developed under the authority of the OWRA indicates that the MOE “requires municipal ownership and responsibility for operation and maintenance of proposed new communal water and sewage works, as well as the existing privately owned communal water and sewage works when they are proposed for expansion. Communal water and sewage works serve more than five (5) units of full-time or seasonal residential or industrial/commercial occupancy or other occupancy as determined by MOE staff. Where municipal ownership of communal works cannot be achieved, this issue must be addressed in pre-application consultation with the local District Office of the Ministry and resolved prior to submitting an application for approval of the works.” In general, communal water and sewage systems are not supported because of the financial implications to the municipality.

Ontario Environmental Protection Act 1990

Part X of the Environmental Protection Act outlines the required reporting and clean up of spills. Wastewater treatment plant bypasses may be considered a spill under this Act. If a bypass or spill occurs, the Ministry of Environment’s Spills Action Centre must be notified. The Spills Action Centre has procedures for contacting downstream users such as drinking water treatment plants and other relevant agencies (Lake Erie Source Protection Region, 2011).

Ontario Environmental Assessment Act

The purpose of the Ontario Environmental Assessment Act, R.S.O 1990, is to provide for the protection, conservation and wise management of the environment for the betterment of the people of Ontario. Projects that commonly re-occur, similar in nature and present a limited scale of predictable ranges of environmental effects are undertaken under Municipal Class Environmental Assessment (Class EA). This program provides a phase planning approach and is a principal tool used by municipalities for assessing infrastructure projects including roads and water and wastewater projects (Fisheries and Oceans Canada, 2005).

Municipal

Land Use Planning

Municipalities, through land use planning, have the ability to develop Official Plan policies, which are implemented through provisions of zoning by-laws. New developments within serviced areas must connect to existing water and sanitary sewage systems since development that would require unplanned expansions to these systems is not permitted.

Municipal Act 2001

Under the Municipal Act, 2001, municipalities have broad authorities to pass by-laws about the economic, social, and environmental well-being of the municipality and its people. Municipalities can supplement provincial regulatory schemes, provided that the by-law does not conflict with the provincial legislation.

In a two tier system, each tier may have exclusive jurisdiction over a matter, for example, lower tiers may enact zoning by-laws whereas upper tiers may be responsible for public health. As a result, the upper tier municipality cannot use its broad authorities to pass a by-law which is specifically within the jurisdiction of the lower tier.

Sewer Use By-Law

Municipalities often have sewer use by-laws that regulate connections to the sanitary sewer systems, as well as the types and concentrations of waste that can enter the systems. Industrial, commercial, institutional or multi-residential building developments may be required to pre-treat, monitor and report on sewage or stormwater discharge. Dilution of waste to meet concentration requirements is prohibited. Special agreements may be required to all special exceptions to these rules. Sewer use by-laws can set out limits on temperature, pH as well as rules for specific pollutants.

With the Thames-Sydenham and Region, an example of a sewer use by-law can be found within the City of London. The discharge of the following materials is prohibited in sanitary sewers:

- solid materials large enough to block sewer flow;
- sewage with pH less than 6 or greater than 10.5;
- sewage with more than 100 mg/L of grease or oil;
- sewage in which the biological oxygen demand (BOD) is more than 300 mg/L; and,
- sewage containing more than 350 mg/L of suspended solids (City of London, 2011).

City of London W.I.P.E Program

Within the City of London, approximately 40% of sewer main blockages are caused by improper disposal of fats, oils and grease (FOG). The City of London has developed the W.I.P.E Program (Washing Initiative to Protect Our Environment) to help restaurants and food preparation locations reduce FOG from entering the sanitary sewer system (City of London, 2010). This program is an education and outreach program that includes initiatives such

as removing food waste prior to dishwashing and the use of grease interceptors to protect the drainage system (City of London, 2010).

Thames River Clear Water Revival

Wet weather overflows can cause direct discharges of untreated wastewater to the river or bypasses at wastewater treatment plants (City of London, 2008). In 2000, the Thames River, including the entire watershed, was designated as a Canadian National Heritage River. Current watershed decisions have been made based on recommendations and ideas put forth in the Thames River Water Management Study, which has become outdated (the last revisions were completed in 1975). The City of London has initiated an innovative and creative regional watershed project, the Thames River Clear Water Revival, to lessen the impact on the environment from wet weather overflows on the quality of water (City of London, 2008). This project is a multi-year initiative that is designed to assist all communities along the Thames River to make large capital improvements to regional wastewater infrastructure.

Other Jurisdictional Programs

Grand River Water Managers Working Group

To reduce the risk of existing wastewater treatment plants, procedures must be in place to properly characterize and communicate the occurrence of spills and wastewater treatment plant bypasses to downstream drinking water intakes in a timely manner (Lake Erie Source Protection Region, 2011).

The Grand River Water Managers Working Group, comprised of senior water and wastewater systems managers, has developed a series of Best Management Practices to reduce the frequency and severity of spills and bypasses from wastewater treatment plants. These include:

- Aggressive inflow and infiltration programs;
- Implementation of back-up power at all pump stations and wastewater treatment plants;
- Prioritize infrastructure upgrades to for wastewater; and,
- Wastewater treatment plant optimization to improve process control for improved effluent quality and reduce bypasses (Lake Erie Source Protection Region, 2011).

Grand River Watershed Wide Wastewater Optimization Pilot Project

The Grand River Watershed-Wide Wastewater Optimization Pilot Project was carried out in 2010 and 2011 to educate and inform watershed wastewater professionals on the goals and benefits of optimization using the Composite Correction Program (CCP) (Lake Erie Source Protection Region, 2011). CCP was developed by the United States Environmental Protection Agency in response to findings that a significant number of municipal wastewater treatment plants in the U.S were exceeding discharge permits (Chapman and Anderson, 2011). CCP is a two-step approach which identifies and resolves factors that contribute to poor performance.

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with sewers and sewage treatment.

Table 1-23 Existing Gaps in the Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs	Gaps
Federal	Fisheries Act 1985	<ul style="list-style-type: none"> • Legislation is reactive
Provincial	Ontario Water Resources Act 1990	<ul style="list-style-type: none"> • C of A is a fairly inflexible mechanism • C of A are inconsistent; some older plants have higher limits and have not upgraded capacity and may not be required to monitor or report • No requirement of a C of A if the facility discharges to a municipal sewer as the discharge is regulated under applicable sewer use bylaws • C of As only address individual pipes and not the entire collection system or vulnerable area.
	Ontario Environmental Protection Act	<ul style="list-style-type: none"> • Legislation requires operators report bypasses to MOE however this does not prevent spills from occurring • Some sewer system leaks are considered spills under the EPA and must be reported to the Spills Action Centre. This is a reactive approach and does not prevent the spills from occurring.
	Procedure F-5-1: Determining of Treatment Requirements for Municipal and Private Sewage Treatment Works Discharging to Surface Water	<ul style="list-style-type: none"> • Procedure is not enforceable
Municipal	Municipal Sewer Use By-law	<ul style="list-style-type: none"> • Created by municipality on voluntary basis and no minimum standards • Sewer use by-laws may not address all source water protection concerns relating to the contaminants identified in the MOE Tables of Drinking Water Threats • Sewer use bylaws may vary from municipality to municipality

Policy Considerations

- REMINDER: The main consideration for reducing or eliminating drinking water threats related to sewage systems and sewage works is to produce cleaner effluent. It appears that the legislative framework makes great strides toward this objective and that education and enforcement of the rules and regulations could also be effective;
- Clean Water Act Part IV tools: interim risk management plans, risk management plans, prohibition, and restricted land uses, cannot be used for sewage systems or sewage works;
- Policies related to the preferential location of new facilities with separation between drinking water intakes, and with consideration of flows during extreme events should be considered during discussion related to specific vulnerable areas;
- An industrial vs. residential approach to the application of policies should be considered due to the varied nature of threats and management requirements; and,
- In certain instances the “would be” drinking water threats are disregarded since they are unlikely to occur. However, the source protection plan will still need to address those situations through a high-level policy approach (“a catch-all policy”).

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to the subject threat in the Thames-Sydenham and Region. It is not an exhaustive list. Each policy tool is discussed separately in the table below.

Table 1-24 Policy Ideas for sewer systems

- Threat:** The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage:
- Sub- Threat**
- Sanitary sewer network
 - Combined sewers
 - Sewage treatment plants effluent discharges
 - Sewer treatment plants with designed bypasses
 - Storage of sewage
- Circumstances**
- Sanitary sewer network-
 - >10 000 to 100 000 m³/d
 - > 100 000 m³/d
 - Combined sewers
 - >17 500 to < 50 000 m³/d
 - > 50 000 m³/d
 - Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses
 - >2500 to <17 500 m³/d
 - >17 500 to < 50 000 m³/d
 - > 50 000 m³/d
 - Storage of sewage
 - STP holding tank installed completely below grade except for access points
 - >2500 to 17 500 m³/d (completely below or partially below grade)
 - 17 500 to 50 000 m³/d (completely below or partially below grade)
 - >50 000 m³/d (completely below, partially below, at or above grade)

Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Area-wide education and outreach programs targeted at sanitary sewer users about what can and cannot be poured down the drain, what other disposal options are available, how incorrectly disposed of substances/materials negatively affect the treatment system and the quality of the effluent leaving the treatment facility • Develop information brochures, handouts, operational guides for a varied range of users i.e. W.I.P.E Program (“Healthy sewer is a happy sewer”) • Improve the knowledge of operators, general public and elected officials regarding performance and operation of WWTPs • Inform residents about alternatives to using chemical products and proper disposal of products and proper disposal (not into sewers) • Education programs and municipal strategies for the correct disposal of products and highest possible maintenance standards • BMP for industrial customers for disposal of wastewater • “Clearwater Revival Program” to update standards for river as an entire watershed system
Incentive Programs	<ul style="list-style-type: none"> • Assist with disconnecting illegal connections to the sewer network (eavestroughs, sump pumps) • Initiate combined sewer review to reduce flow from weeping tiles and direct connects (pre 1980 development)

Waste Disposal and Sewage Threats

	<ul style="list-style-type: none"> Identify illegal connections to sewer network and remedial action Offer incentives to municipalities to examine and upgrade sewers where needed in vulnerable areas
Land Use Planning	<ul style="list-style-type: none"> Prohibit new sewage treatment plants in areas where they would be a significant drinking water threat As part of the EA process consideration should be given to mitigating risk through engineering solutions Shall consider minimum setbacks between municipal wells and sanitary sewers under zoning and site plan
Prescribed Instruments	<ul style="list-style-type: none"> Ensure that spills action protocols include municipalities and risk management officials should they occur in a vulnerable area Use directors orders rather than opening C of As Require province to require enhanced construction standards in vulnerable areas Prevent issuance of C of A's in vulnerable areas
S.26 p.1 Other-Specify Action (Municipal Operations/ Infrastructure)	<ul style="list-style-type: none"> Give consideration to any enhanced construction of existing or new sewer systems into vulnerable areas Any expansion of sewer systems and WWTP's in vulnerable must conform to best practices standards which will mitigate significant threats. Consider alternatives to effluent discharge or bypasses in vulnerable areas Inflow/infiltration reduction programs Upgrade sewage treatment plants Continue to upgrade sewage treatment plants Enact and enforce sewer use by-laws for all users regardless of scale; communicate to residents the requirements and need for compliance including the impact on infrastructure and environment Video inspection, sewer lining programs for old sewers (BMP) in vulnerable areas Improving sewer pipe connections using appropriate design standards in vulnerable areas Mandatory inspection programs should include audits more frequently in vulnerable areas Continue to improve WWTP and sewer system operations through BMPs Require municipalities to review sewer use bylaws to reflect current engineering standards Provide ability to share expertise between large and small municipalities with regards to engineering standards and practice
S. 57 Prohibition	<ul style="list-style-type: none"> Not applicable
S. 58 Risk Management Plans	<ul style="list-style-type: none"> Not applicable
S. 59 Restricted Land Use	<ul style="list-style-type: none"> Not applicable

Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	2b-1
Vulnerable Area	<ul style="list-style-type: none"> WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> Sanitary sewers and related pipes (pathogens) Sewage treatment plant effluent discharges (chemical, pathogens) Storage of sewage (treatment plant tanks) (pathogens) WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> Storage of sewage (treatment plant tanks) (chemicals) IPZ/WHPA-E with a vulnerability score of 9

Waste Disposal and Sewage Threats

Policy Number	2b-1
	<ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical) ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant, Moderate and Low
Body Responsible for Implementing	Municipal Watershed partnership with Conservation Authority to lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing and Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Conform (Significant), Strategic (Moderate, Low)
Policy Tool	Education and Outreach
Policy Idea	<p>Enhance existing education and outreach programs, or if they do not exist, develop new programs to promote Best Management Practices to protect drinking water sources from the chemical and pathogen risks associated with sewers and sewage treatment:</p> <ul style="list-style-type: none"> • Promotion of area-wide education and outreach programs to communicate to residents their impact on infrastructure and the environment. This education program would include information on: <ul style="list-style-type: none"> ▪ What can and cannot be poured down the drain ▪ What other disposal options are available ▪ How incorrectly disposed of materials negatively affect the treatment system ▪ Need for compliance • Promotion and further development of the W.I.P.E Program to include residential sector; • The development of information brochures, hand outs, operational guides (similar to those created for the W.I.P.E Program) targeting both industrial and residential sectors; • The promotion of awareness programs associated with the performance and operation of WWTPs. These programs would target elected officials and the general public; • The training of municipal operators shall include information on source water protection; • The promotion of the use of BMP for the disposal of wastewater. This would be targeted at industrial customers; • Promotion and further development of the Clear Water Revival Program to update wastewater infrastructure standards across an entire watershed; • The implementation of this policy through the existing municipal partnership of the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities can be involved in the program development and delivery depending on their individual needs; however the program(s) would be developed in a consistent manner across the region.
Implementation schedule	Within 2 years of the approval of the Source Protection Plan
Monitoring Policy	The implementing body shall report to the SPA the number of educational packages offered as well as a description of the actions/measures they have taken to implement the education/outreach in the previous year. Measures of tracking of the uptake by the target audience will also be included in this report.

Policy Number	2b-2
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> ▪ Sanitary sewers and related pipes (pathogens) ▪ Sewage treatment plant effluent discharges (chemical, pathogens) ▪ Storage of sewage (treatment plant tanks) (pathogens) • WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemicals) • IPZ/WHPA-E with a vulnerability score of 9 <ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical)

Policy Number	2b-2
	<ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant
Body Responsible for Implementing	Conservation Authority, Municipality, province
Threat Status	Existing and Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Significant (Conservation Authority, Municipality), Strategic (province)
Policy Tool	Incentives
Policy Idea	<p>The province shall be encouraged to offer incentives to municipalities to examine and upgrade sewers, where needed, in vulnerable areas.</p> <p>Municipalities should consider incentive programs to conduct a review of sewers to reduce flow from weeping tiles and direct connects as a result of pre-1980 development.</p> <p>Municipalities should have by-laws in place to identify and address illegal connections to sewer networks</p> <p>The province shall be encouraged to assist municipalities with providing incentive programs that would assist in disconnecting connections to the sewer network (i.e. eavestroughs, sump pumps).</p>
Implementation schedule	Within 2 years of the approval of the SPP.
Monitoring Policy	The implementing body shall report to the CA (or in the case of the CA, the SPA), the types of incentive packages offered, whether they were new or existing initiatives and the measures taken to track the effectiveness of these programs.

Policy Number	2b-3
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> ▪ Sanitary sewers and related pipes (pathogens) ▪ Sewage treatment plant effluent discharges (chemical, pathogens) ▪ Storage of sewage (treatment plant tanks) (pathogens) • WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemicals) • IPZ/WHPA-E with a vulnerability score of 9 <ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical) ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	<p>Municipalities shall prohibit new sewage treatment plants in areas where they would be a significant drinking water threat.</p> <p>As part of the Municipal Class EA process for sanitary sewer networks, municipalities shall consider mitigating risk through enhanced construction standards.</p> <p>Through zoning by-laws and site plan control, municipalities shall consider minimum setbacks between municipal wells and sanitary sewers.</p>
Implementation schedule	From the date of the Source Protection Plan approval, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plan within 6 months of the Source Protection Plan approval with the goal to be completed within 2 years of the SPP approval date. Zoning by-laws shall be updated with the goal to be completed within 3 years of the SPP approval date.
Monitoring Policy	Municipalities shall report to the CA on new policies incorporated in Official Plans and any new by-laws relevant to source water protection. All municipalities must report even if it is to indicate that no changes were required. Where no changes were required, the report is to

Policy Number	2b-3
	describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	2b-4
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> ▪ Sanitary sewers and related pipes (pathogens) ▪ Sewage treatment plant effluent discharges (chemical, pathogens) ▪ Storage of sewage (treatment plant tanks) (pathogens) • WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemicals) • IPZ/WHPA-E with a vulnerability score of 9 <ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical) ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant
Body Responsible for Implementing	MOE, Municipality (municipalities delegated authority for approving certain aspects of C of As for sewers)
Threat Status	Existing and Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Conform
Policy Tool	Prescribed Instruments-Environmental Protection Act
Policy Idea	<p>MOE or designated authority shall continue to review Certificate of Approval applications for sewers and sewage treatment plants. Under these C of A's, application conditions are to require enhanced construction standards, if these facilities are located within vulnerable areas, shall be included. Conditions referencing spills action protocols should also be included.</p> <p>Director's orders under s.53 (1) of the Environmental Protection Act (no person shall establish, alter, extend or replace new or existing sewage works except in accordance with an approval from a Director) shall be used to determine the location of sewers and sewage treatment plants.</p> <p>Consideration should be given to the cost benefit of enhancing or relocation impact on existing facilities in vulnerable areas. The goal is to focus on mitigating significant risk for existing those locations.</p> <p>MOE shall prohibit the issuance of new C of As for sewage treatment plants where the activity is a significant threat.</p>
Implementation schedule	Within 1 year of the approval of the SPP for existing Certificate of Approvals and immediately for new C of As.
Monitoring Policy	MOE shall report to the CA the number of Certificate of Approval applications that they have reviewed, the number located within vulnerable areas and the types of conditions applied to those C of As.

Policy Number	2b-5
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> ▪ Sanitary sewers and related pipes (pathogens) ▪ Sewage treatment plant effluent discharges (chemical, pathogens) ▪ Storage of sewage (treatment plant tanks) (pathogens) • WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemicals) • IPZ/WHPA-E with a vulnerability score of 9 <ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical) ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant
Body Responsible for	Municipality

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Policy Number	2b-5
Implementing	
Threat Status	Existing and Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Conform
Policy Tool	S. 26 p.1 Other-Specify Action (Municipal Operations and Infrastructure)
Policy Idea	<p>Municipalities shall consider best practice standards, which will mitigate significant threats when expansion or construction of new sewer systems and WWTPs occurs in vulnerable areas.</p> <p>Municipalities shall consider alternatives to effluent discharge or bypasses in vulnerable areas.</p> <p>Municipalities shall consider using best management practices (i.e. video inspection, sewer lining programs) for old sewers that are located within vulnerable areas.</p> <p>Municipalities shall continue to upgrade sewage treatment plants when required.</p> <p>Municipalities shall include more frequent audits where sewers or WWTP are located within vulnerable areas.</p> <p>In vulnerable areas, municipalities shall improve sewer pipe connections using appropriate design standards.</p> <p>Municipalities shall be encouraged to develop inflow/infiltration reduction programs.</p>
Implementation schedule	Within 1 year of the approval of the SPP.
Monitoring Policy	<p>The municipality shall submit an annual report to the CA that would include:</p> <ul style="list-style-type: none"> • The number of expansions or new construction of sewer systems and WWTPs in vulnerable areas and whether best practices standards have been used; • the number of audits completed of sewer systems and WWTP in vulnerable areas; • the number of sewer pipe connections that have been improved; • the number of inflow/infiltration reduction programs that have been developed.

Policy Number	2b-6
Vulnerable Area	<ul style="list-style-type: none"> • WHPA-A, B with a vulnerability score of 10 <ul style="list-style-type: none"> ▪ Sanitary sewers and related pipes (pathogens) ▪ Sewage treatment plant effluent discharges (chemical, pathogens) ▪ Storage of sewage (treatment plant tanks) (pathogens) • WHPA-B,C with a vulnerability score of 8 <ul style="list-style-type: none"> ▪ Storage of sewage (treatment plant tanks) (chemicals) • IPZ/WHPA-E with a vulnerability score of 9 <ul style="list-style-type: none"> ▪ Combined sewers (8 for PCBs) ▪ Sewage treatment plant bypass (chemical) ▪ Sewage treatment plant effluent discharges (chemical) ▪ Storage of sewage (treatment plant tanks) (chemical)
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use that could be associated with sewers and sewage treatment.
Legal Effect	Conform
Policy Tool	S. 26 p.1 Other-Specify Action
Policy Idea	<p>Municipalities should be encouraged to enact sewer use by-laws to improve the quality of sewage effluent.</p> <p>Municipalities shall be encouraged to network with each other to provide expertise with regards to engineering standards and practice.</p>
Implementation schedule	Within 1 year of the approval of the SPP.
Monitoring Policy	The municipality shall submit an annual report to the CA that would indicate whether a sewer by-law has been enacted, the number of infractions of this by-law and when the by-law has been reviewed.

Draft Policies

Draft Policies have been developed for the Thames-Sydenham and Region for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for detailed versions of these policies.

Table 1-25 Draft Policies for Sewage Treatment Plants, Sewage Storage and Sanitary Sewers and Related Pipes

TSR Policy Number	Policy Database Number	Sub-threat	Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.2.2.1	1642	Sanitary sewers and related pipes	Management of sanitary sewers and related pipes through Ontario Water Resources Act	Significant	Existing and future	Prescribed Instruments	MOE
TS.2.2.2	1737	Sanitary sewers and related pipes	Enacting and enforcing sewer use bylaws through the Municipal Act	Significant	Existing and future	Specify Action	Municipality
TS.2.3.1	1643	Sewage treatment plants (effluent and bypass)	Management of existing sewage treatment plant effluent discharge through Environmental Protection Act	Significant	Existing	Prescribed Instruments	MOE
TS.2.3.2	1745	Sewage treatment plants (effluent and bypass)	Prohibition of future sewage treatment plant effluent discharge through Environmental Protection Act	Significant	Future	Prescribed Instruments	MOE
TS.2.4.1	1644	Sewage storage	Management of existing sewage storage through Environmental Protection Act	Significant	Existing	Prescribed Instruments	MOE
TS.2.4.2	1746	Sewage storage	Prohibition of future sewage storage through Environmental Protection Act	Significant	Future	Prescribed Instruments	MOE
G.7.3	1690	All sub-threats	Geo-referencing of prescribed instruments	Significant	Existing and future	Specify Action	MOE
G.2.1.2	1691	All sub-threats	Continued funding of Ontario Drinking Water Stewardship Program	Significant	Existing	Incentives	MOE
G.3.1, G.3.3.1,	1693	All sub-threats	General land use planning policies	Significant	Future	Land Use Planning	Planning Approval

TSR Policy Number	Policy Database Number	Sub-threat	Description	Risk Category	Threat Status	Policy Approach	Implementer
G.3.4.1							Authority
G.1.1 and G.1.2	1696	All sub-threats	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority Province
G.2.1.1	1724	All sub-threats	Existing incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.2.2.1	1728	All sub-threats	New incentives programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.1.3	1866	All sub-threats	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	All-sub-threats	Signage policy as part of Municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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Services. http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079311.pdf

1.2.3 On-Site Septic Systems and Holding Tanks

What is the Threat to Drinking Water

This drinking water threat includes systems that store and/or treat human waste on-site, but does 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 most commonly used in the Thames-Sydenham 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 may be administered by municipalities, conservation authorities or local health units. Small systems most frequently service individual residences in rural areas including hamlets and small villages that do not have municipal or communal sewage services.

Large systems (those with a design flow greater than 10,000 L/day) are subject to approval by the Ministry of the Environment (MOE) under the *Ontario Water Resources Act*. Also, any system, no matter its size, which cannot be located within the confines of a single property are subject to approval by the Ministry of the Environment (MOE) under the *Ontario Water Resources Act*. Schools, campgrounds, larger businesses and communal systems are examples of facilities that may require a large system. The requirements are described in more detail below.

What Causes the Activity to be a Drinking Water Threat

The MOE Tables of Drinking Water Threats (2008, as amended in 2009) identify a number of chemicals and pathogens that could make their way from on-site sewage storage and treatment systems into the groundwater and/or surface water under certain conditions (circumstances 831 to 854 and 1955, 1956). The following chemicals and pathogens could threaten the safety of these sources of drinking water in certain situations.

- Pathogens
- Acetone
- Chloride
- Dichlorobenzene-1,4 (para)
- Nitrogen
- Total phosphorus
- sodium

The chemicals listed above are a concern for both surface and groundwater, with the exception of total phosphorous which is only considered a threat to surface water because excessive inputs results in eutrophication and can cause toxic algae blooms.

Acetone is the active ingredient in common household products like nail polish remover, paint thinner and household cleaner. It is also used in industrial products and applications such as pesticides, cleaning (e.g. printing), solvents (e.g. rubber manufacturing), and dilution and extraction (e.g. laboratories). Water softeners (water used and backwash), laundry detergents, bar soaps, foods and cleaning products may contain chloride, sodium and phosphorus. 1,4 Dichlorobenzene (para) is used as a disinfectant, pesticide (e.g. mothballs, general agricultural insecticide), a deodorant (e.g. urinal cakes), for resin manufacturing and in the pharmaceutical industry. The primary source of nitrogen and pathogens in on-site systems and holding tanks is from human waste. Bacteria, viruses and protozoans are the main categories of pathogens.

What is the Local Scale of the Drinking Water Threat

Depending on the location and size of the systems, and the type of contaminant, discharge from a septic system or a spill from a holding tank can be classified as a significant, moderate or low drinking water threat. The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage, for sub-threats *sewage systems or sewage works –septic systems and septic system holding tanks* are considered a significant threat for the above mentioned chemicals for a large system subject to the OWRA in a WHPA with a vulnerability score of 10, and for holding tanks subject to the Ontario Building Code. The large OWRA systems, holding tanks and small septic system subject to the *Ontario Building Code* are significant for pathogen contamination in areas with a vulnerability score of 10.

Onsite sewage systems, particularly leaching bed systems, are prevalent throughout the Thames-Sydenham Source Protection Area in areas that are not serviced by municipal or communal wastewater treatment systems. They can be found now and in the future in all or part of the intake protection zones (IPZ), wellhead protection areas (WHPA), highly vulnerable aquifers (HVA), and significant groundwater recharge areas (SGRA). The table below summarizes the areas in the Thames-Sydenham Region where significant drinking water threats have been enumerated which may be the result of septic systems. As discussed in the Assessment Reports for the region, this enumeration is based on best available information which is included to characterize the distribution of this type of drinking water threat, but is not expected to be completely accurate. It should be noted that in sensitive areas holding tanks are sometimes used to protect the area since a properly functioning holding tank does not leach, thereby eliminating sewage from impacting the area. Irrespective of whether threats have been enumerated, the Source Protection Plan will need to have policies which deal with both existing and future drinking water threats of this type.

Table 1-26 Local Scale of the Establishment, Operation or Maintenance of a System that Collects, Stores, Transmits, Treats or Disposes of Sewage

System	Threat	Type	# of Significant Threat Locations	WHPA	Vulnerability Score
Birr	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	11	A	10
Dorchester	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1	A	10
Dorchester	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	54	B	10
City of London-Fanshawe	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	2	A	10
City of London-Hyde Park	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1	A	10
City of London-Hyde Park	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1	B	10
Melrose	The establishment, operation or maintenance of a system that collects,	Pathogen	13	A	10

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System	Threat	Type	# of Significant Threat Locations	WHPA	Vulnerability Score
	stores, transmits, treats or disposes of sewage				
Melrose	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	8	B	10
Thorndale	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	5	A	10
Beachville	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	6	A	10
Embro	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	19	A	10
Hickson	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	9	A	10
Ingersoll	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	11	A,B	10
Ingersoll	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	3	A	
Lakeside	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	5	A	10
Mt. Elgin	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	12	A	10
Tavistock	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	1	A	10
Thamesford	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	3	A,B	10
Woodstock-urban	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	2	A	
Woodstock-rural	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	186	A,B	10

System	Threat	Type	# of Significant Threat Locations	WHPA	Vulnerability Score
St. Mary's	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage	Pathogen	5		
Highgate	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage		25	A	10
Ridgetown	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage		5	A	10
	Totals		388		

Applicable Legislation, Policies and Programs

The following section provides a summary of the applicable legislation, policies and programs (provincial or municipal) that addresses the drinking water threat of on-site sewage storage and treatment systems.

Table 1-27 Applicable Legislation, Policies and Programs

Level of Government	Legislation/Policies/Programs
Provincial	Ontario Building Code Act 1992 (Government of Ontario, 2006) <ul style="list-style-type: none"> O. Reg. 315/10 Ontario Building Code Septic System Re-inspection Program
	Ministry of Environment Procedure D-5-4 Technical Guideline for Individual On-Site Sewage Systems Water Quality Impact Risk Assessments (MOE, 1996)
	Ontario Water Resources Act 1990 (Government of Ontario, 1990) <ul style="list-style-type: none"> MOE Guide for Applying for Approval of municipal and Private Water and Sewage Works (Government of Ontario, 2000) Guideline B-7: Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities
	Provincial Policy Statement, 2005 (Government of Ontario, 2005)
	Conservation Authorities Act 1990 (Government of Ontario, 1990)
	Ontario Clean Water Act 2006 <ul style="list-style-type: none"> Ontario Drinking Water Stewardship Program
Municipal	Land Use Planning
Other	Canada-Ontario Environmental Farm Plan (Ontario Soil and Crop Improvement Association, 1993)
	Clean Water Program
	Report of the Great Lakes Science Advisory Board to the International Joint Commission: Groundwater in the Great Lakes Basin (February 2010)
	Programs in United States

Provincial

Ontario Building Code Act 1992, O. Reg. 350/06 (Government of Ontario, 2006)

As previously mentioned, **Small systems** (those with a design flow less than or equal to 10,000 L/day) are regulated under the Building Code Act, 1992, O.Reg. 350/06. Part 8 of the Building Code refers specifically to sewage systems. Under S.8.1.2.1 of the Building Code, there are five classes of sewage systems identified:

- Class 1 -Outhouse: chemical or composting toilet, incinerating toilet or vault privy (s.8.3)
- Class 2 - Leaching pit for grey water disposal only (s.8.4)
- Class 3 -Cesspool for disposal of outhouse waste (s.8.5)
- **Class 4 – Septic tank and leaching bed includes a filter bed, conventional leaching bed and chamber systems, tertiary systems (new technologies) (s.8.6)**
- Class 5 – Holding tanks (minimum 9,000 liters) (s.8.8)

Class 4 systems are the most common in the Thames-Sydenham Region and include the following components: a septic tank with filter (required as of January 1, 2007), a leaching bed or filter bed, and a mantle. These systems are generally installed on a **property by property basis** conforming to minimum separation distances in the *Ontario Building Code* as displayed on Figure 1.



Figure 1-1 Minimum Separation Distances for Leaching or Filter Beds

Notes: If a leaching or filter bed is raised the separation distances are increased by twice the difference between the finished and existing grade. For instance, if the finished grade is 1.5 m higher than the existing, then 1.5 m is multiplied by 2 to equal 3 m. Three metres is then added to all the distances noted above. Municipalities can impose greater setbacks from waterbodies through their official plans and zoning by-laws.

Advanced treatment units (ATU) (also referred to as tertiary treatment systems) are generally implemented in situations where the size of the lot or site conditions do not permit the installation of a conventional septic tank and associated leaching bed or when enhanced effluent quality is sought. The main difference between these systems and conventional ones are that more treatment occurs in the tank as a result of introduction of aeration and/or filter media. Common brands include EcoFlow and Waterloo Biofilter. ATUs must be approved through the Building Materials Evaluation Committee which is under the Ministry of Municipal Affairs and Housing before they can be permitted under the Ontario Building Code. Biological Oxygen Demand (BOD) is a measure of the organic material in water or wastewater. Effluent targets for tertiary units are Biological Oxygen Demand (5 day) (BOD5) 15 mg/L, Carbonaceous Biological Oxygen Demand (5 day) (CBOD5) 10 mg/L, and suspended solids 10 mg/L (Code and Guide for Sewage Systems – 1997 Ontario Building Code).

Septic Re-inspection

Septic system re-inspection programs can be used to locate faulty and failed septic systems, and to require their repair or replacement in order to improve effluent quality. The *Ontario Building Code Act* O. Reg. 350/06 has been amended (O. Reg. 315/10), effective January 2011, to require municipalities to develop and implement mandatory septic system re-inspection programs for significant threats (i.e. areas with a vulnerability score of 10) and voluntary programs elsewhere.

Mandatory onsite sewage maintenance inspections

- Mandatory maintenance inspection program will be required where on-site sewage systems subject to the Building Code Act have been identified as a significant drinking water threat in vulnerable areas identified in the most recent Assessment Report under the Clean Water Act.
- Inspections of on-site sewage systems are to be conducted no later than:
 - 5 years after the date on which the notice of approval of the assessment report is published on the Environmental Bill of Rights Registry
 - Every 5 years after the most recent inspection of the sewage system.
- If an inspection indicates that a septic system is not functioning as designed, the Building Code provides the authority for inspectors to issue an order for maintenance, replacement or upgrading where necessary, to ensure they continue to protect drinking water sources.
- The regulation also authorizes principal authorities (municipalities, health units, or conservation authorities) to accept certificates from property owners as an alternative to conducting inspections under mandatory or discretionary on-site sewage system maintenance inspection programs. These certificates must be in a form approved by the Minister of Municipal Affairs and Housing and be signed by a qualified person as set out in the regulation.
- Both the mandatory and discretionary programs would be enforced by principal authorities under the Building Code. The enforcement of the maintenance inspections programs will be fully funded by the principle authority responsible for the designated areas. Under the Building Code, enforcement bodies may charge fees to recover costs of the inspection programs.

Discretionary inspection program

- “Discretionary” – pertains to the discretion of the principal authority to include additional areas under their maintenance inspection program. It does not mean that the landowner can choose whether to complete the re-inspection.
- MMAH has made the “discretionary” program flexible – it is up to the principal authority to decide where it applies and to establish timeframes for re-inspection.
 - Principal authorities have the discretion to include additional areas (beyond what is included in the mandatory requirements) within an inspection program.
 - Timeframes for re-inspection of on-site sewage system that fall under the discretionary program are flexible and do not have to follow the same timelines as the mandatory program. It is at the discretion of the principal authority to set these timeframes.

Ministry of Environment Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessments (MOE, 1996)

The MOE “Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessments” provides technical guidance for hydrogeologists to locate septic systems in rural subdivisions with five or more units. Approval under the Ontario Building Code is required for each system that would be installed in the subdivision. This guideline includes a groundwater impact assessment to address the ability of the development lands to treat septic effluent to acceptable limits. Such an assessment should be considered in conjunction with the Technical Guideline for Private Wells: Water Supply Assessment.

Ontario Water Resources Act 1990 (Government of Ontario, 1990)

The review and approval of applications for **large systems** (those with a design flow greater than 10,000 L/day) as well as small systems that cross property boundaries, rests with the MOE under the *Ontario Water Resources Act* (OWRA).

The MOE “Guide for Applying for Approval of Municipal and Private Water and Sewage Works” (August 2000) is used for a number of sewage-related facilities including large on-site sewage systems that require approval under the OWRA. The most important environmental aspect to consider as part of the approval process is the impact of the sewage works on the receiving waterbody or aquifer (groundwater). The following information is generally needed in support of an application for a large on-site sewage system:

- Expected rate of contaminants discharge to the groundwater;
- Background levels of contaminants in the groundwater;
- Estimated allowable amount of degradation based on the current and potential future uses of the groundwater in accordance with “Guideline B-7: Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities”;
- Proposed measures to be taken to reduce or prevent groundwater contamination; and,
- Proposed monitoring program to assess the effectiveness of the proposed groundwater aquifer contamination control measures.

Guideline B-7 states that there are four situations where a sewage disposal system would be unsuitable:

- Where no appreciable attenuation can be provided (e.g. very short time of travel to surface water),
- Natural attenuation capacity is weak (e.g. fractured rocks),
- The subsurface is suited for better use (e.g. an esker that could be used as a water supply), and
- The consequences of failure are unacceptable (e.g. affect the only water supply for a community).

Provincial Policy Statement, 2005

The Provincial Policy Statement (PPS) is issued under Section 3 of the Planning Act, and provides direction on matters of provincial interest related to land use planning and development. Decisions affecting planning matters must be consistent with the PPS.

The PPS indicates that municipal sewage services are the preferred form of servicing for new development. Where private communal or individual on-site sewage services (e.g. septic systems) are to be used for new development, lot creation is only to be permitted if there is confirmation of sufficient reserve sewage system capacity within municipal sewage services or private communal sewage services. This capacity relates to the ability to store and treat hauled sewage.

Reserve capacity for private communal and individual on-site sewage services is considered sufficient if the hauled sewage from the development can be treated or disposed of at sites approved under the Environmental Protection Act or the Ontario Water Resources Act. Septage treatment capacity can be confirmed in a number of ways including the implementation of a municipal septage plan, and determining that there is an MOE approved facility with capacity to receive and treat septage that is accessible within the area of new development. The capacity could be provided by a municipal sewage treatment plant in the municipality, or through written agreement with another municipality or an approved private sector facility.

Conservation Authorities Act 1990

Conservation Authorities have the ability to restrict and regulate areas in and under their jurisdiction under Section 28 of the Conservation Authorities Act. Restriction or regulation of activities could include the installation of septic systems within setbacks of existing rivers, creeks, streams, watercourses and wetlands.

Ontario Clean Water Act 2006 Ontario Drinking Water Stewardship

Landowners with property near municipal wells and surface water intakes can help protect those sources of drinking water supplies. Under S.97 of the Clean Water Act, 2006 the provincial government has created the Ontario Drinking Water Stewardship Program in order to help landowners take action. It provides grants to help pay for a variety of projects that protect municipal water supplies from contamination. Grants have been available to help maintain or upgrade septic systems in the Thames-Sydenham Region through the Early Actions Program. This program was focused on eligible activities (including septic system upgrades) in eligible areas (WHPA-A, IPZ-1 and 2 year time of travel areas or preliminary WHPA-B as endorsed by councils). Although this program is nearing its completion the Conservation Authorities in the region have applied for funding through the Early Response Program. This program, if applications are successful, would target significant threats as identified in the Assessment Reports.

Municipal

Land Use Planning

Municipalities have the ability to develop Official Plan policies related to certain aspects of septic systems and implementation of policies through provisions of Zoning By-Laws. Through these planning documents, municipalities can also impose greater setbacks from water bodies than what is required in the Ontario Building Code.

A majority of the municipalities require a minimum 30 m setback from waterbodies for development (including septic systems). The intent of this setback is to provide a buffer of undisturbed soil and vegetation along the shoreline, which will help to filter runoff, prevent soil erosion, and provide wildlife habitat.

Oxford County has existing Official Plan policies relating to the protection of groundwater and specifically, policies pertaining to septic systems. The policies of the Oxford County Official Plan state that policies related to source protection will remain in place until such time as the Official Plan is amended to incorporate approved Source Protection Plans. These policies include the prohibition of certain activities within certain vulnerable areas identified in the Official Plan. An example of this type of policy is found in S.3.2.7.2.3.1 Municipal Wellhead Protection Area Policies where “New development utilizing a private septic system and or private well within the 100-metre (328 feet) radius or the 0 – 2 year time-of –travel zone, excluding farm severances in accordance with Section 3.1.4.4 provided that the zoning by-law or other development controls prohibit the establishment of buildings or structures within this area” (County of Oxford, 2009).

Other

Canada-Ontario Environmental Farm Plan

The Environmental Farm Plan (EFP) is a program that is delivered locally through the Ontario Soil and Crop Improvement Association with expertise provided by the Ontario Ministry of Agriculture and Food. It is a voluntary educational program for farmers delivered through local workshops. Participants are provided instruction on how to progress through the risk assessment and action plan development contained in the EFP workbook. Limited funds (either a 50/50 or 30/70 cost share depending on project) are available to help address areas identified in the plan as needing improvement.

The risk assessment gives the farmer the opportunity to rate the current level of environmental concern in up to 23 different worksheets/ topic areas on the farm. The worksheet relevant to this drinking water source protection initiative is the *treatment of household waste*.

Clean Water Program

The Clean Water Program (CWP) is a rural water quality initiative that provides technical assistance and financial incentives to improve and protect water quality on private property. Local municipalities offer cost-sharing grants to qualified landowners for best management practices that improve ground and surface water quality. The grant rate for all projects is 50% and range from a maximum of \$500 - \$5,000, depending on the project type. Septic systems are covered at a cost-share rate of 50% to a maximum of \$4,000. Within the Thames-Sydenham Region participants include Oxford, Middlesex and Perth Counties. Perth County contributes to the funding of erosion control, well upgrades and well decommissioning but not septic related upgrades with the exception of the Upper Avon watershed. Septic funding is available under this program in Oxford, Middlesex, City of London and upstream of Stratford (Upper Avon watershed). St. Mary's has participated in this program in the past, however, in 2010 did not contribute.

Report of the Great Lakes Science Advisory Board to the International Joint Commission: Groundwater in the Great Lakes Basin (February 2010)

The following recommendations were made in this IJC report that may be applicable to onsite sewage systems:

- Tracking of and communication with homeowners: Increase homeowner awareness through dissemination of information regarding the effects of septic failure (e.g., groundwater contamination) and regulatory expectations. Ideally, septic systems should be inspected as a condition for the transfer of a deed.
- Permitting alternative technologies to be better integrated into the process.
- Requirement for and tracking of maintenance contracts:
- Funding and support from local governments and homeowners: Regulatory codes should be backed by appropriate department budgets

Programs in the United States

In Pinellas County, Florida a portion of the County's potable water supply comes from groundwater sources. In 1985 Growth Management legislation required all counties and municipalities in the State of Florida to protect well fields (Pinellas County, 1990). Pinellas County, in 1990, adopted a wellhead protection ordinance to protect and safeguard the health, safety and welfare of residents in the county by regulating certain substances that may impair the present and future water supply (Pinellas County, 1990). As part of this ordinance, all new non-residential discharges, new non-residential activities, and installations are prohibited subject to conditions in the zone of protection (the total area contributing water to a well under a given set of circumstances). New single-family residential septic tanks are exempt from this article, provided they meet the minimum criteria of one unit per two acres. Prohibited Uses include land divisions resulting in high density (>1 unit/acre) septic systems within Zone 1, the 6- month time-of-travel zone. (NOTE: this is typically within about 1000 feet of the public water supply well unless granted a special exception).

In Lane County Oregon, the Eugene Water and Electric Board established a Source Water Protection program to evaluate and mitigate water quality uses. The concept of the program was to balance watershed health and human use over time and implement actions that maintain water quality. Surface water drinking protection zones (DWP) were identified prohibiting storage, use or production of hazardous materials (County Planning, 2009). Existing businesses and new developments within the DWP are required to prepare and submit a Safe Drinking Water Plan (SDWP) (County Planning, 2009). Owners of septic systems within the SDWP area are required to have their septic system inspected within one year of the ordinances effective date and every five years thereafter. Water protection strategies were also identified for restricting development in the floodplain. One strategy was to prohibit the construction of new conventional septic systems in the regulated floodplain. As a result, aerobic septic systems, which pose a lesser threat to water quality, are required for new developments in the floodplain as part of public health protection standards.

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with on-site sewage storage and treatment systems.

Table 1-28 Existing Gaps in the Legislation, Policies and Programs

Level of Government	Legislation/Policies/Programs	Gaps
Provincial	Ontario Building Code Act 1992: O. Reg. 315/10 Ontario Building Code	<ul style="list-style-type: none"> Ontario Building Code does not have requirements for bacteria, nitrate and phosphorus control (other parameters are used as indicators). It is focused on oxygen demand and suspended solids. Nitrate and phosphorus both have implications for enriching our surface water bodies, causing eutrophication. Eutrophic waters have more algae blooms which could produce toxins, interfere with drinking water treatment processes, and cause taste and odour issues. Nitrate is a direct drinking water concern in both surface water and groundwater as well. The Ontario Building Code re-inspection program is mandatory for septics identified as significant threats only.
	MOE Procedure D-5-4: Technical Guidance for Individual On-Site Sewage System: Water Quality Impact Risk Assessments (MOE, 1996)	<ul style="list-style-type: none"> This procedure does not account for pathogens Nitrogen is used as an indicator for the transportation of pathogens
	Ontario Water Resources Act 1990 (Government of Ontario, 1990)	<ul style="list-style-type: none"> Although large systems require a Certificate of Approval, in most cases monitoring results are not required to be reported to the MOE on a regular basis Data collected from monitoring remains onsite until inspections occur.
Municipal	Land Use Planning	<ul style="list-style-type: none"> Few programs in Ontario are in place to ensure ongoing maintenance and proper function of septic systems
Other		<ul style="list-style-type: none"> There is no technical solution to manage or remove pathogens as a drinking water threat This has been identified by MOE and they are working to address this through their programs The other chemicals of concern related to septic systems are not treated by the systems in any way and if remain suspended or dissolved in the water would be discharged into the septic bed.

Policy Considerations

- Clean Water Act* Part IV tools which include interim risk management plans, risk management plans, prohibition, and restricted land uses cannot be used for sewage systems, which include onsite sewage treatment and storage systems. The *Ontario Water Resources Act* or the *Building Code Act* provides the authority for source protection plan policies to address both existing and future threats. In addition, a policy could rely on land use planning for future occurrences.
- It is the “discharge from the system” that poses a risk to drinking water (as set out in the tables of Drinking Water Threats, which are part of the Director’s Technical Rules: Assessment Report.) The septic system itself is a risk management measure, because when it is functioning properly, it reduces or

eliminates pathogens in the discharge from septic systems. Therefore, an inspection to find out if a septic system is functioning may be all that is needed to determine whether it “ceases to be” a significant drinking water threat. The standards for the design, installation and proper maintenance of a septic system are set out in Ontario’s Building Code. (MOE bulletin, Jan. 2011)

- The density of septic systems is not a factor as prescribed by MOE in source water protection drinking water threats. In an identified drinking water issue, density could be a consideration in source protection policies. However, the Thames-Sydenham Region has not identified any issues contributing areas in the Assessment Report for the first round of policy development. Evolving and changing environmental planning standards take density into account to varying degrees.
- The Planning Act has evolved and new standards are in place. With new development a holding tank is generally the last option.
- The Oxford Public Health Department feels that generally ‘new’ properly functioning systems are not of concern; it is the old septic systems that are of concern. It sees the septic system maintenance program as being instrumental in implementation of the SPPs and wishes to see emphasis placed on this.
- From Oxford County’s experience, there are concerns associated with tertiary systems as they tend to fail more frequently. The advantage of the tertiary system is that they require less space, however, where possible, traditional systems are the preferred option, as tertiary systems are high maintenance. They require a service agreement which means there is an annual cost associated with the system. Also the peat in these systems must be changed regularly which is an additional cost. Some people are inclined to avoid proper maintenance because of the cost.
- For large septic systems, the OWRA considers impact on receiving water body or groundwater assessed as part of approval process. Certificate of Approvals are issued with conditions under Section 53 of OWRA. If prohibited in Source Protection Plan, applications are not processed by MOE.
- If the SPC drafts a policy relating to a septic system covered under OWRA (large system), the policy can only address matters which would be within the legal limitation of that Certificate of Approval (C of A)/prescribed instrument. As C of A's do not set out inspection timelines, or have the legal ability to do so, the SPC cannot require that the C of A include provisions surrounding inspection frequency. However, the ministry has an internal program policy to enforce compliance. MOE field staff (i.e., "Environmental Officers") from the Ministry's local District Offices typically undertake annual inspections at a subset of sewage facilities located within their geographic area of responsibility. These inspections would cover a range of sewage facilities; including smaller holding tanks and septic systems with a capacity greater than 10,000 L/day (less than 10,000 L/day are covered by the Building Code). MOE field staff may also carry out site visits/inspections of sewage facilities in response to complaints or reports of non-compliance, spills or other environmental concerns. Where issues of non-compliance with regulatory requirements (OWRA and associated regulations and any requirements associated with the terms and conditions of the site's C of A) are identified, Environmental Officers have the authority to require the facility owner/operator to take action to bring the facility into compliance. (personal communication, MOE liaison, Jan, 2011)

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to on-site sewage treatment and storage systems. It is not an exhaustive list. The examples are categorized by the size of septic systems and types of policy tools that can be used to meet the source protection plan objectives.

Table 1-29 Policy Ideas for large septic systems

Threat:	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
Sub- Threat	Sewage System or sewage works- septic system
Circumstance	<ul style="list-style-type: none"> • Septic system is subject to the OWRA (enforced by MOE) for new or existing sewage works over 10,000 L/day.

- Septic systems with less than 10,000 L/day where the components of the system are not all located on the same parcel of land are also subject to the OWRA.
- Septic system with holding tank subject to OWRA.
- In a WHPA with a vulnerability score of 10, where the release of Acetone, Chloride, Dichlorobenzene, Nitrogen and Sodium, or Pathogens from the septic systems represent a significant threat.

Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Education programs for large systems users on the Best Management Practices for on-site sewage maintenance, and impacts of system on drinking water. • 2 target audiences to include both system owners and system users • Focus on significant threats and look into possibilities of distributing as part of Certificate of Approvals package (may not get to all users this way). • Include other information within package not identified as significant threats (i.e. keeping pharmaceutical inputs out of septic) • Co-ordinate drinking water message with existing septic information as distributed by health units, municipalities and MOE. Address moderate and low threats with area-wide messaging.
Incentive Programs	<ul style="list-style-type: none"> • Should cost-share programs cover large septic systems?
Land Use Planning	<ul style="list-style-type: none"> • Land use restrictions for future occurrences • Review minimum lot size requirements in vulnerable areas through zoning. Direct municipalities to require a larger minimum lot size for all new development on private servicing. • OP policies addressing new severances in vulnerable areas. • Direct municipality(ies) to require that all new development must be on municipal services.
Prescribed Instruments	<ul style="list-style-type: none"> • Prohibit new large systems in areas with a vulnerability score of 10, and applications for Certificate of Approval will not be processed by MOE under the OWRA. • Require an amendment to an existing Certificate of Approval with either policy details about how the activity should be managed or outcomes to be achieved such as: <ul style="list-style-type: none"> • Separation distances • Operation and Maintenance standards • Reduction in effluent concentrations • Information management (local municipal data base) • Monitoring and Sampling • Advancing technologies • Development of System Management Plan • Groundwater investigation • Reed bed, Constructed or engineered wetlands • Proper waste disposal following leak or spill • Restrict to certain site conditions: lot size, soil depth and type, proximity to surface • (Consult MOE prior to using this tool) • More general statement that measures must be taken to ensure activity ceases to be a significant drinking water threat. • Require approval agency to compare records with vulnerable area mapping. • Require spills protocol for holding tanks.
S. 26 p.1 Other-Specify Action (Municipal Operations/ Infrastructure)	<ul style="list-style-type: none"> • Municipalities should consider extension of sewers in areas with a vulnerability score of 10 as first priority. • Support the implement an area-wide septic re-inspection program that targets specific locations, with the option of expansion to the entire area, to ensure on-going maintenance and proper function of systems. • Include an on-site wastewater treatment system inspection in annual municipal infrastructure inspections • Direct the municipality(ies) to establish a by-law to require hooking up to municipal

	services, where feasible.
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Table 1-30 Policy Ideas for small septic systems

- Threat:** The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.
- Sub- Threat Circumstance** Sewage System or sewage works- septic system
- Septic system is regulated under the Ontario Building Code for new or existing sewage works less than 10,000 L/day.
 - Septic system with holding tank regulated under the Ontario Building Code
 - In a WHPA with a vulnerability score of 10 where the release of pathogens from the septic systems represents a significant threat.

Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Education programs for septic landowners on the Best Management Practices for on-site sewage maintenance, and impacts of systems on drinking water. • Focus on significant threats and tie in with septic re-inspection program as one-on-one education. • Can include other information within package not identified as significant threats (i.e. keeping chemical and pharmaceutical inputs out of septic) • Co-ordinate drinking water message with existing septic information as distributed by health units, and/or municipalities. Address moderate and low threats with broader vulnerable area-wide messaging.
Incentive Programs	<ul style="list-style-type: none"> • Existing cost-share program for landowners to upgrade or replace failing septic systems are supported and encouraged to continue. • Encourage all municipalities where significant threats may occur to support Clean Water Program or other incentive programs. • Encourage province to continue with Ontario Drinking Water Stewardship Program septic funding for problems identified under re-inspection program. Limitations may be set for time frames (e.g. five years) or for first inspections. • Suggest cost-share programs also fund connecting into existing sewer infrastructure and decommissioning septic.
Land Use Planning	<ul style="list-style-type: none"> • Where septic systems exist in an area with a vulnerability score of 10 and where there is municipal sewage service available to the property, the municipality should pass a bylaw requiring the decommissioning of the septic system and require hookup to the municipal service. (Perhaps better included under other tools?) • Recommend OP policies addressing severances in vulnerable areas. Review minimum lot size requirements and update in accordance with provincial guidance. Or consider a more specific requirement that in WHPAs and IPZ with a vulnerability score of 10, the municipality shall not allow the creation of new unserviced lots under the size of 1 acre. • In areas with a vulnerability score of 10 and an existing lot of record exists the approval agency for septic systems should consider options including advanced treatment systems. A geo-technical study could be asked for to ensure that the proposed design option, lot size etc. is appropriate.
Prescribed Instruments	<ul style="list-style-type: none"> • Require mandatory re-inspection program for significant threats similar to that which is required through Ontario Building Code. Encourage re-inspection programs in moderate and low threat areas. • Suggest a targeting of areas where septic failures within vulnerable areas where septic systems are a significant threat and where there are known septic failures. Further emphasis on re-inspection should be placed on areas where older systems are more prevalent. • Inspection programs should be aware that while a septic system may have been in compliance with separation distances when built, encroachment may result in the system being out of compliance when inspected. These situations will need to be rectified so that systems which may be significant threats are in compliance with applicable standards.

S. 26 p.1 Other-Specify Action (Municipal Operations/ Infrastructure)	<ul style="list-style-type: none"> Municipalities should consider extension of sewers in areas with a vulnerability score of 10 as first priority. This would be best included as a strategic action policy. It is intended that these areas should be identified as priorities and that this additional priority should be considered by senior levels of government in providing infrastructure grants.
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Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	2-1
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i> and systems over 10, 000 L/day and holding tanks subject to the OWRA
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant, moderate and low
Body Responsible for Implementing	Municipal Watershed partnership with Conservation Authorities to lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing, Expanding and Future
Land Use	All
Legal Effect	Conform (Significant) ,Strategic (Moderate/Low)
Policy Tool	Education and Outreach
Policy Idea	<p>Enhance existing education and outreach programs, or if they do not exist, develop new programs to promote Best Management Practices to protect drinking water sources from the risks of on-site sewage storage and treatment systems including:</p> <ul style="list-style-type: none"> An education package shall be produced providing best management practices for septic system and holding tank maintenance that considers threats to drinking water sources. This information shall be distributed to all septic systems identified as being a significant threat through the re-inspection program for small septic systems and through the Certificate of Approvals process for septic systems subject to the OWRA. Co-ordination with existing area-wide septic awareness outreach programs to include source water protection messaging. Consideration of extending education to include information regarding drinking water threats not prescribed under the CWA (e.g. pharmaceuticals). Efforts to be coordinated with other agencies with existing education programs related to septic systems. The implementation of this policy through the existing municipal partnership of the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities will be encouraged to be involved in the program development and delivery depending on their individual needs; however the program (s) should be developed in a consistent manner across the region.
Implementation schedule	Initiate upon approval of SPP for the significant threats and initiate for moderate and low threats within 2 years of SPP approval date. (Within 2 years of the approval of the Source Protection Plan)
Monitoring Policy	The implementing body shall report to the SPA the number of educational programs offered, the number of educational packages distributed through the re-inspection of small systems and Certificate of Approval process for large systems as well as a description of the actions/measures they have taken to implement education/outreach in the previous year.

Policy Number	2-1
	Measures of tracking the uptake of the target audience will also be included in this report.

Policy Number	2-2
Sub- Threat(s)	sewage system or sewage works – septic system
Circumstance	Septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i> and systems over 10, 000 L/day and holding tanks subject to the OWRA
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Municipality, Conservation Authority, MOE
Threat Status	Existing and Future
Land Use	All
Legal Effect	Conform (Municipality, CA); Strategic (MOE)
Policy Tool	Incentives
Policy Idea	<p>Municipalities, where septic systems present significant threats to drinking water sources, shall be required to support the Clean Water Program or similar incentive programs to subsidize the cost to septic owners where upgrades have been identified as mandatory to reduce significant threats.</p> <p>Existing cost-share programs for septic owners (i.e. Clean Water Program, Ontario Drinking Water Stewardship Program, and Environmental Farm Plan), shall be supported and encouraged to continue.</p> <p>Funding shall be encouraged to be available for faulty septic systems identified through Phase 1 of re-inspection programs.</p> <p>Programs shall be encouraged to give priority to actions proposed in vulnerable areas and which will manage significant drinking water threats</p> <p>The Ontario Drinking Water Stewardship program shall be encouraged to share the funding of the incentive programs equally with the municipalities.</p> <p>Incentive funding shall be required until the time when all significant threat septic system Phase 1 inspections have occurred.</p>
Implementation schedule	Upon the effective date of the Source Protection Plan and for a period of 5 years following or until all significant threats identified in the Assessment Report have undergone a septic re-inspection. To be included in municipal budgets in the first calendar following the approval of the Source Protection Plan.
Monitoring Policy	Completed annual reports sent to either the CA (by municipalities and MOE) or SPA (Conservation Authorities) will include reporting on the number of septic grant applications within vulnerable areas, the number of eligible grant applications and the number of grants distributed.

Policy Number	2-3a
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i>
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	Official Plan policies and bylaws shall address new severances in vulnerable areas to ensure septic systems and holding tanks do not become a significant threat. Minimum lot size requirements shall be updated in accordance with accepted standards.
Implementation schedule	From the effective date of the Source Protection Plan, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plans within 6 months of Source

Waste Disposal and Sewage Threats

Policy Number	2-3a
	Protection Plan approval with the goal to be completed within 2 years of the Source Protection Plan approval date. Zoning bylaws shall be updated with the goal to be completed within 3 years of the Source Protection Plan approval date.
Monitoring Policy	Municipalities shall report to CA on new policies incorporated in Official Plans and any new by-laws relevant to source water protection. All municipalities must report even if it is to indicate that no changes were required. Where no changes were required, the report is to describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	2-3b
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	Septic system under 10,000 L/day regulated by <i>Ontario Building Code</i> and septic system over 10,000 L/day subject to OWRA; including holding tanks.
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	OP policies shall discourage the installation of new septic systems and holding tanks within areas with a vulnerability score of 10. They shall do this through minimum lot sizes, and permitted land uses.
Implementation schedule	From the effective date of the Source Protection Plan, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plans within 6 months of Source Protection Plan approval with the goal to be completed within 2 years of the Source Protection Plan approval date. Zoning bylaws shall be updated with the goal to be completed within 3 years of the Source Protection Plan approval date.
Monitoring Policy	Municipality shall report to the CA on the changes in OP implemented or planned regarding septic systems and holding tanks. Municipalities shall also report annually on the number of permits issued for new septic systems within vulnerable areas.

Policy Number	2-4
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system over 10,000 L/day subject to OWRA and septic system with holding tank subject to OWRA
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	MOE – through OWRA
Threat Status	Existing, Expanding and Future
Land Use	All
Legal Effect	Conform
Policy Tool	Prescribed instrument – Ontario Water Resources Act
Policy Idea	All Certificate of Approvals issued shall include management details to ensure the activity never becomes a significant threat. Certificate of Approvals for septic systems shall be discouraged for proposed septic systems within WHPA–A or B with a vulnerability score of 10.
Implementation schedule	Immediately upon approval of the SPP
Monitoring Policy	MOE to report to CA in a manner acceptable to the SPA. The report shall include: <ul style="list-style-type: none"> • The number of existing septic C of As within vulnerable areas which are significant drinking water threats; • Amendments that were made to existing C of As to reduce risk presented by these

Policy Number	2-4
	<p>significant threats</p> <ul style="list-style-type: none"> • The number of existing C of As that have been identified through re-inspection as being properly functioning and those required to make upgrades • The number inspected and those followed up on an annual basis • The frequency of inspections <p>This report shall be submitted in 2 years from the approval of the Source Protection Plan and annually from then on.</p>

Policy Number	2-5
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i>
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Issuer of approval of septic systems under the building code (generally Municipality or Health Unit)
Threat Status	Existing
Land Use	All
Legal Effect	Conform
Policy Tool	S. 26 p.1 Other-Specify Action
Policy Idea	<p>The <i>Ontario Building Code</i> requires onsite septic inspections every five years for existing systems that are identified as significant threats. The first round of inspections will be phased in over a 5 year period. Priority shall be given to inspect the oldest systems and those closest to the well head first with a priority on areas where failures are most suspected.</p> <p>Where the re-inspection program locates faulty and failed septic systems, the inspector shall require the maintenance, repair or replacement of the system to ensure that it functions as designed and meets applicable design standards thus ensure that the threat ceases to be significant.</p>
Implementation schedule	As per OBC (within 5 years)
Monitoring Policy	<p>Municipalities shall provide an annual report to the CA on the results of the septic system inspection program. This report will include:</p> <ul style="list-style-type: none"> • The number of inspections • The number of failures and remediation notices • The number of system pump-outs and compliance orders issued <p>The report shall be in a format acceptable to the SPA. The first report to be submitted within 2 years of approval of the Source Protection Plan and annually thereafter.</p>

Policy Number	2-6
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i>
Vulnerable Area	WHPAs with a vulnerability score of 6-8, IPZs with a vulnerability score of 5.6 -9.0
Risk	Moderate and Low
Body Responsible for Implementing	Municipality, Health Unit
Threat Status	Existing
Land Use	All land uses
Legal Effect	Strategic
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	Discretionary septic re-inspection programs as outlined in the <i>Ontario Building Code</i> are encouraged to include moderate and low threat septic systems. However, inspection of significant threats should remain the first priority. Discretionary re-inspection programs shall be encouraged to give priority to low and moderate threats within WHPA and IPZ and then HVA. Priority shall also be encouraged in those areas where septic failures are known

Waste Disposal and Sewage Threats

Policy Number	2-6
	to occur and where older septic systems are more predominant.
Implementation schedule	As soon as possible following the implementation of the mandatory re-inspection program (as determined by the local approval agency). Where mandatory re-inspection is not required the municipality encouraged to initiate the program within 5 years of the approval of the Source Protection Plan. It is anticipated that this policy would be given more weight in subsequent Source Protection Plan with legal affect increased to having regard for.
Monitoring Policy	Where discretionary inspection programs are implemented, an annual report is to be submitted to the CA identifying the results of the septic system inspection program, including the number of inspections, the number of failures and remediation notices, the number of system pump-outs and compliance orders issued. The report could be combined with that which is required for mandatory inspection programs. Municipalities not initiating a discretionary inspection program shall report to the CA on their intent and considerations related to the program.

Policy Number	2-7
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	Septic system under 10,000 L/ and septic system holding tanks day regulated by <i>Ontario Building Code</i>
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All
Legal Effect	Conform
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	Where municipal sewage services exist in areas with a vulnerability score of 10, the development of municipal by-laws shall be considered to decommission existing septic systems or holding tanks and require mandatory hook-up to the municipal service.
Implementation schedule	N/A
Monitoring Policy	The municipality shall report to the CA annually on the number of septic systems which could be hooked up and the number which have been hooked up.

Policy Number	2-8
Sub- Threat(s)	sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	Septic system under 10,000 L/day and holding tanks regulated by <i>Ontario Building Code</i> and systems over 10, 000 L/day and holding tanks subject to the OWRA
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All
Legal Effect	Conform
Policy Tool	S.26 p.1 Other-Specify Action
Policy Idea	When planning extension of sewer services, municipalities shall consider areas with a vulnerability score of 10 as first priority. Where the costs are beyond the capabilities of the municipality and landowner the senior levels of government should be encouraged to provide funding to offset the cost to the rate payer through an infrastructure funding programs.
Implementation schedule	Immediately upon effective date of SPP
Monitoring Policy	Municipalities to report annually to the CA any new sewer lines installed or planned within the vulnerable areas.

Policy Number	2-9
Sub- Threat(s)	Sewage system or sewage works – septic system sewage system or sewage works – septic system with holding tank
Circumstance	septic system over 10,000 L/day and septic system with holding tank subject to OWRA
Vulnerable Area	WHPA-A and B with a vulnerability score of 10
Risk	Significant
Body Responsible for Implementing	MOE – through OWRA
Threat Status	Existing, Expanding, Future
Land Use	All
Legal Effect	Strategic
Policy Tool	S.26 p.1 Other – specify action
Policy Idea	In order to ensure that large systems are adequately managed the MOE shall consider implementing a review of the Certificate of Approval within the areas where these systems may be significant drinking water threats. The development of a re-inspection program for the inspection of these systems shall also be considered. The re-inspection program should determine that the systems function as designed, they meet applicable design standards and that the systems are being properly maintained. MOE shall consider as a first priority the re-inspection of septic systems within areas with a vulnerability score of 10 and areas where known septic failures have been identified. Areas where older systems which have not recently been inspected shall also be considered as priorities within the re-inspection program. Systems found to be deficient shall be encouraged to undertake improvements to be in compliance. New or expanding systems shall be considered the subject of re-inspection every 5 years from the issuance of the C of A.
Implementation schedule	The re-inspection program shall be established within a 2 year period from the approval of the source protection plan with a completion of the inspection of systems in these areas within 5 years of the initiation of the re-inspection program.
Monitoring Policy	MOE to report to CA in a manner acceptable to the SPA. The report shall include: <ul style="list-style-type: none"> • The number of existing septic C of As within vulnerable areas which are significant drinking water threats • Amendments made to existing C of A to reduce risk presented by significant threat • Number of existing C of As that have been identified through re-inspection as being properly functioning and those required to make upgrades • The number inspected and those followed up on an annual basis • The frequency of inspections This report shall be submitted in 2 years from the approval of the Source Protection Plan and annually from then on.

Draft Policies

Draft policies have been developed for the Thames-Sydenham and Region for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for detailed versions of policies.

Table 1-31 Draft Policies for On-Site Septics

TSR Policy Number	Policy Database Number	Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.2.5.1	1645	Discretionary monitoring for septic systems that pose a low or moderate threat to municipal drinking water sources	Moderate Low	Existing	Specify Action	Health Unit Municipality

TSR Policy Number	Policy Database Number	Description	Risk Category	Threat Status	Policy Approach	Implementer
TS.2.5.3	1646	Management of existing septic systems through Ontario Water Resources Act	Significant	Existing	Prescribed Instrument	MOE
TS.2.5.4	1647	Prohibition of future septic systems through land use planning	Significant	Future	Land Use Planning	Planning Approval Authority
TS.2.5.5	1648	Management of septic systems through the Municipal Act	Significant	Existing and future	Specify Action	Municipality
TS.2.5.6	1649	Mandatory inspection programs for septic systems	Significant	Existing	Specify Action	Health Unit Municipality
G.7.3	1690	Geo-referencing of prescribed instruments	Significant	Existing and future	Specify Action	MOE
G.2.1.2	1691	Continued funding of Ontario Drinking Water Stewardship Program	Significant	Existing	Incentives	MOE
G.3.1, G.3.3.1, G.3.4.1	1693	General land use planning policies	Significant	Future	Land Use Planning	Planning Approval Authority
G.1.1 and G.1.2	1696	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority Province
G.2.1.1	1724	Existing incentives program general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.2.2.1	1728	New incentives program general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
TS.2.5.2	1747	Incentives for existing septic systems identified through phase 1 re-inspection	Significant	Existing	Incentives	Municipality
TS.2.5.7	1748	Compliance monitoring for septic systems subject to Ontario Water Resources Act	Significant	Existing	Specify Action	MOE
G.1.3	1866	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	Signage policy as part of Municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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1.2.4 Industrial Effluent

What is the Threat to Drinking Water

This paper provides background information for the activities relating to industrial effluent discharges. Industrial effluent discharges are a sub threat of prescribed drinking water threat 2-the establishment, operation, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage.

Industrial sewage works are any works for the collection, transmission, treatment or disposal of effluent generated from industrial operations. These works include, but are not limited to:

- process and cooling water streams, including discharges from heat pump systems;
- industrial sewage lagoons and biological treatment plants;
- wastewater treatment systems for sectors such as pulp and paper and meat processing facilities;
- quarry and mine dewatering systems and wash plants;
- landfill leachate treatment systems;
- groundwater remediation treatment systems, including mobile units; and
- river/harbour dredging projects with treatment facilities on-shore.

Industrial effluent discharges also include wastewater from sewage and stormwater treatment however these topics are addressed in other discussion papers.

What Causes the Activity to be a Drinking Water Threat

Ministry of the Environment (MOE) Tables of Drinking Water Threats (2009) has listed 131 circumstances that identify sewage works for industrial effluent discharges as a drinking water threat. The threat circumstances recognize that the effluent discharges could result in the presence of chemicals in surface and groundwater (WHPA-E).

Fifty-six (56) chemicals associated with this drinking water threat are identified within the table below. These substances could be by-products, impurities, reactants or manufacturing aids resulting from manufacturing or processing methods.

Table 1-32 Chemicals Associated with Industrial Effluent Discharges

Acrylonitrile	Dichloroethane-1,2	Polycyclic Aromatic Hydrocarbons (PAHs)
Aluminum	Ethylene glycol	Pentachlorobenzene
Arsenic or arsenic compound	Formaldehyde	Petroleum Hydrocarbons F1 to F4
Biphenyl-1,1'	Hexachlorobenzene	Phenol
Bis(2-ethylhexyl) phthalate	Hexachloroethane	Total phosphorus
Boron	Hydrazine or hydrazine salt	Selenium or selenium compound
Bromomethane	Hydroquinone	Silver or silver compound
BTEX	Iron	Sodium fluoride
Butoxyethanol-2	Lead or lead compound	Styrene
Butyl-n alcohol	Manganese or manganese compound	Hydrogen sulphide
Butyl-tert alcohol	Mercury or mercury compound	Tetrachlorobenzene-1,2,4,5
Cadmium or cadmium compound	Methanol	Tetrachloroethylene
Carbon tetrachloride	Methyl ethyl ketone	Trichlorobenzene-1,2,4
Chloride	Methylene chloride (Dichloromethane)	Trichloroethylene or DNAPL that degrades to TCE
Chloroform	Molybdenum	Tritium
Chromium VI	Naphthalene	Vanadium
Cobalt or cobalt compound	Nickel or nickel compound	
	Nitrogen	

Copper or copper compound Cyanide Dichlorobenzene-1,2 Dichlorobenzene-1,4	Nitrosodimethylamine-N (NDMA) Adsorbable Organic Halides	Vinyl chloride or DNAPL that degrades to VC Zinc
------------------------------------------------------------------------------------	-------------------------------------------------------------	-----------------------------------------------------

The chemical circumstances can be divided into two broad categories:

- Industrial sewage systems that are associated with a facility for which National Pollution Release Inventory (NPRI) reporting is required; and,
- Those facilities for which NPRI reporting is not required.

The National Pollutant Release Inventory is Canada’s legislated inventory of pollutant releases to air, water and land, disposals, and transfers for recycling. Environment Canada manages the inventory, which tracks over 300 substances or groups of substances. Owners or operators of facilities that meet the reporting requirements must calculate the quantities of specified substances manufactured, processed or otherwise used and report these quantities on an annual basis. The threat circumstances also recognize that the effluent discharges could result in the presence pathogens in surface water. The Tables of Drinking Water Threats identify five classes of industrial operations as drinking water threats based solely on the release of pathogens. These operations include meat plants, seafood processing operations, dairy producers or dairy product manufacturing operations, animal food manufacturing operations that manufacture food from animal sources, and pulp and paper mills. Only meat plants are significant drinking water threats.

What is the Local Scale of the Drinking Water Threat

As mentioned, sewage systems or works associated with industrial effluent discharges can only be a drinking water threat in an intake protection zone or a wellhead protection area E, where groundwater is under the direct influence of surface water. Thus, it is these areas where threats may exist and where threats could exist if the activity was to be undertaken in the future.

Significant threats are possible only in these areas with vulnerability scores of 10, 9 to 10, or 8 to 10, depending on the circumstance. NPRI reporting is always required at facilities where threats can be significant. A circumstance that results in a low threat when associated with a system that does not require NPRI reporting, may be a moderate threat at an NPRI reporting facility.

In the Thames Sydenham Source Protection Region the only areas where this type of threat could be significant are:

Surface Water Intakes

- LAWSS IPZ-1 with a vulnerability score of 8
- Wallaceburg IPZ-1 with a vulnerability of 9

WHPA E (Ground water under direct influence)

- There are no locations with vulnerabilities within the range (>=8)

Industrial effluent discharge is a sub-threat of the establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage. The inventories completed for the Thames-Sydenham and Region Assessment Reports did not separate this threat into its sub-threat components and it unknown if industrial effluent discharge is a significant threat.

Applicable Legislation, Policies and Programs

The following section provides a summary of the applicable legislation, policies and programs (provincial, municipal and other) that address industrial effluent discharges.

Table 1-33 Applicable Legislation, Policies and Programs

Level of Government	Applicable Legislation, Policies and Programs
Federal	Canada Environmental Protection Act (Government of Canada, 1998)
	National Pollutant Release Inventory (Environment Canada, 1992)
Provincial	Ontario Water Resources Act (Government of Ontario, 1990)
	Municipal Industrial Strategy for Abatement (MISA)
	Procedure B-1-5: Deriving Receiving Requirements for Ontario Water (Ministry of Environment and Energy, 1994)
	Guideline D-6: Compatibility between Industrial Facilities and Sensitive Land Uses (Ministry of Environment, 1995)
Municipal	Land Use Planning
	Municipal Act 2001

Federal

Canadian Environmental Protection Act (Government of Canada, 1998)

Under the Canadian Environmental Protection Act (CEPA), substances that are determined to be toxic were placed on the Toxic Substances List. The Toxic Substances Management Policy addresses how substances on the list are to be managed. Many of the chemicals listed in the MOE Tables of Drinking Water Threats for Industrial Effluent Discharge are on the Toxic Substances List. There are two tracks of substances. The toxic substances of interest in source water protection are Track 2 substances, meaning they require full life cycle management (i.e., development to disposal) to prevent or minimize their release into the environment.

A number of risk management tools have been developed by Environment Canada for specific substances including:

- Sector regulations;
- Notices requiring the preparation and implementation of pollution prevention plans;
- Environmental performance agreements used to achieve specified environmental results, such as reducing the use and emission of substances on the CEPA Toxic Substances List;
- Codes of practice that identify and describe best management practices and can be used by specific industries; and,
- Recommendations on the design and operation of facilities.

National Pollutant Release Inventory (NPRI)

The National Pollutant Release Inventory (NPRI) is legislated under the *Canadian Environmental Protection Act, 1999* as a way to track pollutant releases, disposals, and transfers for recycling. The information is used to identify pollution prevention priorities, to support the assessment and risk management of chemicals, to assist with the development of targeted regulations for the reduction of the release of toxic substances, to encourage actions to reduce the release of pollutants, and to improve public understanding. The data reported are available for public review in annual summary reports and datasets released by Environment Canada.

Owners or operators of facilities that meet the following specified criteria are required to report to the NPRI:

- The facility has 10 or more full-time employees (or the equivalent of 20 000 worker-hours per year)
- The facility manufactured, processed or otherwise used 10 tonnes or more of a NPRI substance during the calendar year;
- The NPRI substance was manufactured, processed or otherwise used at a concentration of 1 % or more by

weight (Lake Erie Source Protection Committee, 2011).

Companies which fail to report, fail to report on time, or knowingly submit false or misleading information, face penalties as listed under s.272 and s.273 of CEPA 1999.

Examples of facilities that report to NPRI for land and water discharges include petroleum refineries, mines, pulp and paper operations, steel mills, and automobile manufacturers.

Provincial

Ontario Water Resources Act, R.S.O. 1990

A Certificate of Approval (C of A) is required from the Ministry of the Environment under section 53 of the *Ontario Water Resources Act*, R.S.O. 1990 for industrial sewage systems that discharge pollutants to ground and surface water (Government of Ontario, 1990). It should be noted that there is no requirement for a certificate of approval if the facility discharges to a municipal sewer, as the discharge is regulated under the applicable sewer use by-law. Also, facilities captured by the Municipal Industrial Strategy for Abatement (MISA) program may not have a C of A granted under this Act.

According to the MOE Guide for Applying for Approval of Industrial Sewage Works there are numerous supporting information requirements for an application. These include: (1) site plans, (2) sewage quantity and quality characteristics, (3) sewage works design report, (4) engineering drawings and specifications, and (5) environmental impact analysis (Ontario Ministry of the Environment, 1999).

The documents provided with the application are then considered and the subsequent details are included in the text of the certificate. However, proprietary information would not be included in the certificate or made available to the public. C of A applications are typically circulated by the MOE to agencies that may have an interest for notification, their review and comment.

Municipal Industrial Strategy for Abatement (MISA)

The Province committed to the management of persistent toxic substances in response to the Canada/Ontario Agreement Respecting the Great Lakes Basin Ecosystem. The Municipal Industrial Strategy for Abatement (MISA) program was the provincial response for addressing levels of persistent toxic substances that are discharged directly by industry into Ontario's waterways. The program focuses on nine industrial sectors that are the major toxic polluters: petroleum, pulp and paper, metal mining, industrial minerals, metal casting, organic chemical manufacturing, inorganic chemical, iron and steel, and electric power generation.

A regulation (Effluent Monitoring and Effluent Limits) exists under the *Environmental Protection Act*, R.S.O. 1990 for each industrial sector. These regulations specify sampling points, calculations required, effluent quality and flow monitoring, notification requirements, record keeping, and reporting requirements. There are also protocols for sampling and analysis associated with the regulations.

Sewage works that are covered by MISA regulations may not have a certificate of approval granted under Section 53 of the OWRA. The intent of the MISA regulations was to regulate the facilities through regulation rather than through approval because the regulations deal with classes of facilities rather than site specific situations. The MISA regulation is typically the key document even if a certificate of approval exists.

Procedure B-1-5: Deriving receiving-water based, point-source effluent requirements for Ontario waters (Ontario Ministry of Environment and Energy, 1994)

Procedure B-1-5: Deriving receiving-water based point source effluent requirements for Ontario waters is used by the MOE to establish receiving-water based effluent requirements for point source discharges to surface waterbodies. The procedures are based on the policies and water quality criteria contained in *Water Management*

– *Policies, Guidelines and Provincial, Water Quality Objectives (PWQO; MOE, 1994)*. The effluent requirements are used for certificates of approval or other legal documents.

Guideline D-6: Compatibility between Industrial Facilities and Sensitive Land Uses (Ontario Ministry of the Environment, 1995)

Guideline D-6: Compatibility between Industrial Facilities and Sensitive Land Uses MOE document is intended to be used as a land use planning tool to prevent or minimize future land use problems due to the encroachment of sensitive land uses and industrial land uses on one another. It assists the user with determining compatible mixed land uses and compatible intensification of land uses. The guideline encourages informed decision-making by provincial staff, municipalities and consultants.

The Guideline defines the term *sensitive land uses* to include recreational uses deemed to be sensitive, and buildings or associated amenity areas where people or the natural environment could be adversely affected by emissions generated by the operation of a nearby industrial facility. These land uses include residences, retirement homes, schools, daycares, hospitals, churches, campgrounds, etc.

Municipal

Land Use Planning

Land use planning, implemented locally through municipal official plans, zoning by-laws and other tools, can ensure that threat activities associated with specific land uses are located away from the sources of municipal drinking water. This may be achieved by designating industrial areas away from sensitive land uses and natural features, and establishing separations and minimum distance requirements between threat activities and drinking water sources.

Municipal Act Powers

The Municipal Act, 2001 gives municipalities the authority to enact sewer use by-laws to regulate the quality and quantity of substances that are discharged to sewer systems. Sewer use by-laws may set limits on basic parameters (i.e. temperature, pH) or set rules for a long list of pollutants and require sewer users to think about pollution prevention. Fees and penalties can be prescribed in these by-laws (Lake Erie Source Protection, 2011).

Gaps in Existing Legislation, Policies and Programs

The following table provides the gaps that exist in the legislation, policies and programs that are currently associated with industrial effluent discharges.

Table 1-34 Gaps in Existing Legislation, Policies and Programs

Level of Government	Applicable Legislation/Policies/Programs	Gaps
Provincial	Ontario Water Resources Act	<ul style="list-style-type: none"> • C of A is fairly inflexible mechanism • C of A are inconsistent; some older plants have higher discharge limits and have not upgraded capacity • C of A only address individual pipes and not entire collection system or vulnerable area • C of As are not consolidated • There is no requirement for a C of A if the facility discharges to municipal sewers as

Level of Government	Applicable Legislation/Policies/Programs	Gaps
		discharge is regulated under applicable sewer use by-laws
	Municipal Industrial Strategy for Abatement (MISA)	<ul style="list-style-type: none"> • Not all industries are covered by MISA regulations • Some MISA regulations may be out of date • There may be lack of compliance in some of the represented sectors
Municipal	Municipal Act 2011	<ul style="list-style-type: none"> • Sewer use by-laws are not mandatory for municipalities to enact • There are no minimum standards for what must be included in sewer use by-laws

Policy Considerations

- The federal and provincial legislative requirements for sewage works for industrial effluent discharges are comprehensive.
- Clean Water Act, 2006 Part IV tools - risk management plans, prohibition, and restricted land uses cannot be used for sewage systems, which include industrial sewage works.
- Regardless of the current planning context, policies are required to be included within the Source Protection Plan to ensure that this activity does not become a significant threat to the municipal drinking water supply.

Proposed Policy Ideas

For discussion purposes, this section of the report provides examples of policy ideas that could be applicable to the subject threat in the Thames-Sydenham and Region. It is not an exhaustive list. Each policy tool is discussed separately in the table below.

Table 1-35 Policy Ideas for Industrial Effluent

Threat: The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage

Sub-Threat: Sewage System or Sewage Works – Industrial Effluent Discharges

Circumstance:

- Discharger is a facility required to report through Environment Canada’s National Pollutant Inventory for the parameter (chemical)
- Discharger is not a facility required to report through Environment Canada’s National Pollutant Inventory for the parameter (chemical)
- System discharges to surface water and its primary functions include conveying sewage from a meat plant (pathogen)

Discharge may result in the presence of one or more pathogens in surface water (pathogen)

Policy Tool	Policy ideas
Education and Outreach	<ul style="list-style-type: none"> • Develop and enhance education and outreach programs to protect drinking water sources • Demonstrate the economic feasibility of best management practices and corporate environmental responsibility
Incentive Programs	<ul style="list-style-type: none"> • Not an appropriate tool in managing threats since regulation should define/obligate compliance
Land Use Planning	<ul style="list-style-type: none"> • The use of this tool is less effective and focus should be on the use of Prescribed Instruments to control threats. C of A’s would by definition effectively restrict and control activities provided that vulnerable areas are identified <p>However some consideration could be given to:</p>

	<ul style="list-style-type: none"> Require municipalities to include an Official Plan policy that ensures minimum separation distances between sewer outfall and the intake protection zone. Within IPZ/, by Official Plan and zoning bylaw, prohibit any industrial effluent discharges (or permit subject to provision and approval of an equivalent to risk management plan).
Prescribed Instruments	<ul style="list-style-type: none"> Require the Ministry of the Environment to review existing Certificates of Approval and include necessary additions to ensure the protection of municipal drinking water sources includes monitoring, training and other specific parameters of concern to drinking water. Require the Province to consider the protection of drinking water sources in their review of proposed Certificates of Approval for sewage systems that discharge industrial effluent within significant threat areas and ensure that CofA's contain requirements for monitoring, training and a high level of effluent treatment. Require the Province to prohibit the issuance of new C of A's could be considered but not preferable, in areas where they might cause a significant threat
Municipal Operations/ Infrastructure	<ul style="list-style-type: none"> Emphasis should be on the use of Prescribed Instruments since most industrial legislation is enforced at the provincial or federal level
S. 57 Prohibition (Part IV Tool)	<ul style="list-style-type: none"> Not applicable
S. 58 Risk Management Plans (Part IV Tool)	<ul style="list-style-type: none"> Require a risk management plan in significant threat areas where a sewage system may result in bypass discharges to surface water that is exempted from the Certificate of Approval process under Ontario Regulation 525/98, (Approval Exemptions).
S. 59 Restricted Land Use (Part IV Tool)	<ul style="list-style-type: none"> Not applicable
S.26 p.1 Other/Specify Action	<ul style="list-style-type: none"> Municipalities shall be encouraged to update their emergency response plans to include requirements for contacting water treatment plant operators if overflow/bypass occur. MOE shall be encouraged to geo-reference the Certificates of Approval associated with industrial effluent in vulnerable areas as part of a prioritization schedule. MOE shall be encouraged to review and update the Spills Action Centre Operations Procedures Cards to include contacting upstream water operators when a spill has occurred.

Policy Examples

Policy examples presented within this section are based on the policy ideas noted above. These policy examples were presented to the SPC to facilitate discussion and have been further reviewed by the Source Protection Municipal Policy Advisory Committee.

Policy Number	2D-1
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant, Moderate, Low
Body Responsible for Implementing	Municipal Watershed Partnership with Conservation Authority to lead. The implementation of this policy in this manner builds on the strengths and efficiencies of the Conservation Authorities as a partnership of the municipalities in the watershed.
Threat Status	Existing and Future
Land Use	All land use that could be associated with industrial effluent discharge.
Legal Effect	Conform (significant), Strategic (moderate, low)
Policy Tool	Education and Outreach

Waste Disposal and Sewage Threats

Policy Idea	Enhance existing education and outreach programs to promote Best Management Practices to protect drinking water sources associated with industrial sewage effluent. The implementation of this policy through the existing municipal partnership of the Conservation Authority will allow these programs to be built on existing watershed education and outreach in an efficient manner. The municipalities can be involved in the program development and delivery depending on their individual needs; however the program (s) would be developed in a consistent manner across the region.
Implementation schedule	Within 2 years of the approval of the Source Protection Plan
Monitoring Policy	The implementing body shall be encouraged to report to the SPA the number of educational packages offered as well as a description of the actions/measures they have taken to implement the education/outreach in the previous year. Measures of the uptake of these programs by the target audience will also be included in this report.

Policy Number	2D-2
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant
Body Responsible for Implementing	N/A
Threat Status	N/A
Land Use	N/A
Legal Effect	N/A
Policy Tool	Incentives
Policy Idea	The committee feels that this tool is not appropriate for this sub-threat.
Implementation schedule	N/A
Monitoring Policy	N/A

Policy Number	2D-3
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Future
Land Use	All land use that could be associated with industrial effluent discharge.
Legal Effect	Conform
Policy Tool	Land Use Planning
Policy Idea	Municipalities shall be required to include minimum separation distances between sewer outfall and IPZ within Official Plan and zoning bylaws. Municipalities shall prohibit within Official Plan and zoning bylaws any industrial effluent discharge within IPZ/WHPA-E. Committee feels that Land Use Planning is a less effective tool for this sub threat
Implementation schedule	From the date of the Source Protection Plan approval, all planning decisions shall be in conformity. Updates shall be initiated in all Official Plan within 6 months of the Source Protection Plan approval with the goal to be completed within 2 years of the SPP approval date. Zoning by-laws shall be updated with the goal to be completed within 3 years of the SPP approval date.
Monitoring Policy	Municipalities shall report to the CA on new policies incorporated in Official Plans and any new by-laws relevant to source water protection. All municipalities must report even if it is to indicate that no changes were required. Where no changes were required, the report is to describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	2D-4
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant
Body Responsible for Implementing	MOE

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Policy Number	2D-4
Threat Status	Existing and Future
Land Use	All land use that could be associated with industrial effluent discharge.
Legal Effect	Conform
Policy Tool	Prescribed Instruments-Ontario Water Resources Act
Policy Idea	MOE shall review and amend existing Certificates of Approval where industrial effluent discharge is a significant threat. Amendments to C of A shall include conditions such as adequately managing bypass and discharges, monitoring and training as well as other specific parameters to ensure the protection of municipal drinking water sources.
Implementation schedule	Implementation for this policy would take effect within 1 year of the effective date of the SPP for existing C of A and immediately for new C of A.
Monitoring Policy	MOE shall report to the CA the number of Certificates of Approval applications that have been reviewed; the number that has been amended as well as the number of new C of A that has been issued.

Policy Number	2D-5
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant
Body Responsible for Implementing	Municipality
Threat Status	Existing and Future
Land Use	All land use that could be associated with industrial effluent discharge.
Legal Effect	Conform
Policy Tool	S. 26 p. 1 Other-Specify Action
Policy Idea	Municipalities shall be encouraged to update their emergency response plans to include requirements for contacting water treatment plant operators if overflow/bypass occur.
Implementation schedule	For existing plans, the implementation of this policy shall be within 1 year of the approval of the SPP. For future plans, this policy shall be implemented immediately following the approval of the SPP.
Monitoring Policy	Municipalities shall submit an annual report to the CA indicating when they reviewed their emergency response plans and what changes, if any, they made to these plans in order to consider them up to date.

Policy Number	2D-6
Vulnerable Area	IPZ and WHPA-E with a vulnerability score between 8 and 10
Risk	Significant
Body Responsible for Implementing	MOE
Threat Status	Existing and Future
Land Use	All land use that could be associated with industrial effluent discharge.
Legal Effect	Strategic
Policy Tool	S. 26 p.1 Other-Specify Action
Policy Idea	MOE shall be encouraged to geo-reference the Certificates of Approval associated with industrial effluent in vulnerable areas as part of a prioritization schedule. MOE shall be encouraged to review and update the Spills Action Centre Operations Procedures Cards to include contacting upstream water operators when a spill has occurred.
Implementation schedule	Immediately after the Source Protection Plan comes into effect.
Monitoring Policy	The MOE shall submit a report to the CA detailing what efforts they have undertaken regarding the geo-referencing of Certificates of Approval as well as at the Spills Action Centre to ensure that the protection of municipal drinking water, especially in vulnerable areas, has been addressed.

Draft Policies

Draft policies have been developed for the Thames-Sydenham and Region for this threat. The table below provides a brief description of these policies. Refer to the Source Protection Plan for a detailed version of these policies.

Table 1-36 Draft Policies for Industrial Effluent

TSR Policy Number	Policy Database Number	Description	Risk Category	Threat Status	Policy Approach	Implementer
G.7.3	1690	Geo-referencing prescribed instruments	Significant	Existing and future	Specify Action	MOE
TS.2.1.1	1691	Continued funding of Ontario Drinking Water Stewardship Program	Significant	Existing	Incentives	MOE
G.3.1, G.3.3.1, G.3.4.1	1693	General land use planning policies	Significant	Future	Land Use Planning	Planning Approval Authority
G.1.1 and G.1.2	1696	General education and outreach policies	Significant Moderate Low	Existing and future	Education and Outreach	Municipality Conservation Authority Province
G.2.1.1	1724	Existing incentives programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.2.2.1	1728	New incentive programs general policy	Significant	Existing	Incentives	Municipality Conservation Authority Province
G.1.3	1866	Provincial signage to locate WHPA and IPZ	Significant	Existing and future	Education and Outreach	MOE MTO
G.1.4	1867	Signage policy as part of Municipal education policy	Significant	Existing and future	Education and Outreach	Municipality

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Government of Canada. 1998. Canadian Environmental Protection Act.

Government of Ontario. 1990. Ontario Water Resources Act. www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90o40_e.htm

Lake Erie Source Protection Committee. 2011. Lake Erie Source Protection Region Discussion Paper-The Establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage: Subthreat Industrial Effluent Discharges. http://www.sourcewater.ca/plandevlopment/2d_IndustrialEffluent_DiscussionPaper_Final.pdf

Ministry of the Environment. Municipal Industrial Strategy for Abatement (MISA) program.

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Ontario Ministry of the Environment. 2009. Tables of Drinking Water Threats: Clean Water Act 2006. http://www.ene.gov.on.ca/stdprodconsume/groups/lr/@ene/@resources/documents/resource/std01_079851.pdf

Ontario Ministry of the Environment. 1999. Guide for Applying for Approval of Industrial Sewage Works.

www.ene.gov.on.ca/environment/en/resources/STD01_076041.html

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Ontario Ministry of the Environment 1995. Guideline D-6: Compatibility between Industrial Facilities and Sensitive Land Uses. www.ene.gov.on.ca/environment/en/resources/STD01_076071.html

Ontario Ministry of Environment and Energy. 1994. Procedure B-1-5: Deriving receiving-water based, point-source effluent requirements for Ontario waters. www.ene.gov.on.ca/environment/en/resources/STD01_078855.html

