

1. *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,

NOTE TO THE READER

*This document is one of a series of threat policy discussion papers for the Thames- Sydenham and Region in support of Source Protection Plan development. Each discussion paper looks at the nature of one or more types of drinking water threats, describes the local occurrence of those threats, assesses existing policies/programs, and introduces related 'policy concepts' for source protection planning. **While every effort has been made to ensure the accuracy of the information in this document, it should not be construed as legal advice or relied on as a substitute for the legislation.***

*This version is considered to be a **working draft** because it will be revised as the policy development process progresses. This discussion paper represents the best information available to the SPC upon which they will base their policy decisions.*

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- 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.

2. *What Causes this 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 for a listing of chemicals and pathogens that could threaten the safety of drinking water sources.

Table 1: 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.

3. *What is the Local Scale of the Drinking Water Threat?*

Refer to Appendix A for the locations where these activities result in significant drinking water threats within the Thames-Sydenham and Region.

4. *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 2: 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

a) **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).

b) **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).

c) **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.

d) **Other**

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.

5. *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 3: 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

Level of Government	Applicable Legislation/Policies/Programs	Gaps
		<ul style="list-style-type: none"> Sewer use bylaws may vary from municipality to municipality

6. 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”).

7. 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.

Threat:	The establishment, operation or maintenance of a system that collects, stores, transmits, treats or disposes of sewage:
Sub- Threat	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharges • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstances	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ 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) • 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 • Require 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	<ul style="list-style-type: none"> • Give consideration to any enhanced construction of existing or new sewer systems into vulnerable areas

(Municipal Operations/ Infrastructure)	<ul style="list-style-type: none"> • Any expansion of sewer systems and WWTP's in vulnerable must conform to best practices standards which will mitigate significant threats (pipe joint wrapping and seals; engineered standards for operations in WWTP) • 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

8. Reference List

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Ontario Ministry of the Environment. March 1995. Procedure D-5-2: Application of Municipal Responsibility for Communal Water and Sewage Services.

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

Appendix A-Significant Threat Tables

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 septics and sanitary sewers)	B	10, 6
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 septics)	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.		5	A	10

Appendix B-Policy Examples

Appendix B will be added when the SPC gets to the appropriate stage in the policy discussions. The draft policies presented in appendix B are placeholder policies based on the policy ideas noted above. They are presented in this document to facilitate policy discussion at the upcoming SPC meeting. And subsequent review and comment by the Municipal Source Protection Policy Advisory committee.

Policy Number	2b-1
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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, 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 operators, elected officials and the general public; • 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
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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	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

Appendix B – Policy Examples

<p>Policy Idea</p>	<p>The province shall be encouraged to offer incentives to municipalities to examine and upgrade sewers, where needed, in vulnerable areas.</p> <p>Municipalities shall initiate 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 shall identify illegal connections to sewer networks and initiate incentive programs to provide remedial action.</p> <p>The province shall be encouraged to assist municipalities with providing incentive programs that would assist in disconnecting illegal connections to the sewer network (i.e. eavestroughs, sump pumps).</p>
<p>Implementation schedule</p>	<p>Within 2 years of the approval of the SPP.</p>
<p>Monitoring Policy</p>	<p>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.</p>

Policy Number	2b-3
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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

Appendix B – Policy Examples

<p>Policy Idea</p>	<p>Municipalities shall prohibit new or expanding sewage treatment plants in areas where they would be a significant drinking water threat.</p> <p>As part of the Municipal Class EA process, municipalities shall consider mitigating risk through enhanced construction standards.</p> <p>Through zoning by-laws and site plan control, municipalities shall require minimum setbacks between municipal wells and sanitary sewers.</p>
<p>Implementation schedule</p>	<p>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.</p>
<p>Monitoring Policy</p>	<p>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.</p>

Policy Number	2b-4
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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
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

Appendix B – Policy Examples

<p>Policy Idea</p>	<p>MOE shall continue to review Certificate of Approval applications for sewers and sewage treatment plants. Under these C of A applications conditions 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> <ul style="list-style-type: none"> • Prevent issuance of C of A's in vulnerable areas
<p>Implementation schedule</p>	<p>Within 1 year of the approval of the SPP for existing Certificate of Approvals and immediately for new C of As.</p>
<p>Monitoring Policy</p>	<p>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.</p>

Policy Number	2b-5
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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 (Municipal Operations and Infrastructure)

Appendix B – Policy Examples

<p>Policy Idea</p>	<p>Municipalities shall require that the expansion or construction of new sewer systems and WWTPs in vulnerable areas must conform to best practices standards which will mitigate significant threats (i.e. pipe joint wrapping and seals; engineered standards for operations in WWTP).</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, through mandatory inspection programs, 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>
<p>Implementation schedule</p>	<p>Within 1year of the approval of the SPP.</p>
<p>Monitoring Policy</p>	<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 if sewer pipe connections that have been improved; • the number of inflow/infiltration reduction programs that have been developed.

Policy Number	2b-6
Sub- Threat(s)	<ul style="list-style-type: none"> • Sanitary sewer network • Combined sewers • Sewage treatment plants effluent discharge • Sewer treatment plants with designed bypasses • Storage of sewage
Circumstance	<ul style="list-style-type: none"> • Sanitary sewer network- <ul style="list-style-type: none"> ▪ >10 000 to 100 000 m³/d ▪ > 100 000 m³/d • Combined sewers <ul style="list-style-type: none"> ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Sewer treatment plants effluent discharge and sewer treatment plants with designed bypasses <ul style="list-style-type: none"> ▪ >2500 to <17 500 m³/d ▪ >17 500 to < 50 000 m³/d ▪ > 50 000 m³/d • Storage of sewage <ul style="list-style-type: none"> ▪ STP holding tank installed completely below grade except for access points <ul style="list-style-type: none"> ▪ >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)
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

Appendix B – Policy Examples

Policy Tool	S. 26 p.1 Other-Specify Action
Policy Idea	<p>Municipalities shall enact and enforce sewer use by-laws for all users regardless of scale. These by-laws shall be reviewed periodically to reflect current engineering standards.</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 1year 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. This report will also include if networks have been created between different municipalities.

Appendix C-Definitions

Combined Sewer: A sewer intended to function simultaneously as a storm sewer and a sanitary sewer.

Drinking Water Threat: An activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water and includes an activity or condition that is prescribed by the regulation as a drinking water threat (Clean Water Act, 2006₁).

Intake Protection Zone (IPZ): Refers to a surface water intake protection zone, which is an area related to a surface water intake and within which it is desirable to regulate or monitor drinking water threats (General Regulation 287/07₂). Intake Protection Zones are further delineated as:

- Intake Protection Zone 1 (IPZ-1), which is the immediate zone of 1 kilometer radius for a Great Lakes intake, drawn around the intake, until it touches the shore where it extends to a certain setback into the land;
- Intake Protection Zone 2 (IPZ-2), is delineated based on a 2 hour travel time to the intake under tributaries and creeks that drain into the lake within a 2 hour time of travel to the intake.

Moderate and Low Drinking Water Threats: Generally refer to prescribed activities deemed moderate or low drinking water threats based on the risk score.

Sanitary Sewer: A sewer for collection and transmission of domestic, commercial, institutional and industrial sewage or any combination.

Significant Threat: A significant drinking water threat means a drinking water threat that according to a risk assessment, poses or has the potential to pose a significant risk (Clean Water Act, 2006₁)

Threat: Refers to an activity (land use) that poses a threat to drinking water quality or quantity.

Vulnerability Score: A score assigned to a vulnerable area with a higher score indicating a higher vulnerability.

Wellhead Protection Area (WHPA): Refers to an area that is related to a wellhead and within which it is desirable to regulate or monitor drinking water threats (General Regulation 297/07₂). Wellhead Protection Zones can be further delineated into:

- WHPA-A: 100 m fixed radius around each well;
- WHPA-B: 2 year time of travel to the well, excluding the area of WHPA-A
- WHPA-C: 2 to 5 year time of travel to the well;
- WHPA-D: 5 to 25 year time of travel to the well;
- WHPA-E: delineated if it is shown that a surface water system influence effectively bypass the aquifer's protection; and,
- WHPA-F: delineated if the well is subject to issues, which originate from outside the other parts of the Wellhead Protection Area.

Wet Weather Flow: Wet weather flow is runoff generated when it rains or snows.

¹Clean Water Act, 2006 (http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_06c22_e.htm)

²Clean Water Act Ontario Regulation 287/07-General (http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_070287_e.htm)