

1. *What is the Threat to Drinking Water?*

Stormwater, which is the focus of this discussion paper, 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

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 threat, 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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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: 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	is a stormwater filter and infiltration practice that temporarily stores, treats and infiltrates runoff
Vegetated filter strips	gently sloping, densely vegetated areas that 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.

2. *What causes this 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 2: Pathogens and Chemicals Associated with Stormwater Management Facilities

• Pathogens	• Copper	• Nitrogen
• Aluminum	• Glyphosate	• Polycyclicaromatic hydrocarbons
• Arsenic	• Lead	• Petroleum hydrocarbons F1 to F4
• Cadmium	• Mecoprop	• Total Phosphorus
• Chloride	• Mercury	• Zinc
• Chromium VI	• Nickel	

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.

3. *What is the local scale of the drinking water threat?*

Appendix A displays where these threat activities in this SPA are or would be drinking water threats according to the MOE Tables of Drinking Water Threats (2008, as amended in 2009).

4. *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 3: 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

a) **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.

b) 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 glyphoaste and mecroprop.

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 4: 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.

c) **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.

d) **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).

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 stormwater management.

Table 5: 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 exciting 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

Level of Government	Applicable Legislation/Policies and Programs	Gaps
Other		<p>controls.</p> <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.

6. 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

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** Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
- Circumstances**
- Drainage area >100 ha
 - 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

8. Reference List

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Appendix A – Significant Threat Table

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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.

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Policy Number	2.1-1
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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 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
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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, 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	<p>The province shall consider developing incentive programs for providing alternate approaches to retrofitting Stormwater Management Ponds.</p> <p>Municipalities shall consider providing incentives (i.e. density trading, setback relaxation, reduction of parkland requirements) to developers for implementing stormwater management strategies such as low impact development.</p> <p>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.</p>
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
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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	<p>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.</p> <p>Municipalities shall prohibit stormwater management facilities in areas where they would be a significant threat.</p> <p>When stormwater management facilities are proposed, municipalities shall encourage the consideration of coordination of stormwater management and natural channel design.</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 describe how the existing OP and bylaws meet the requirements of this policy.

Policy Number	2.1.-4
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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	<p>MOE shall prohibit the issuance of new C of As for stormwater management ponds where they would be a significant drinking water threat.</p> <p>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.</p>
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
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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	<p>In vulnerable areas, municipalities shall use appropriate design standards. These standards could include enhanced construction standards, catch basin fish grates and catch basins with sumps to provide primary settlement.</p> <p>Municipalities shall be required to use Best Management Practices during Stormwater Management Pond maintenance in vulnerable areas where the threat would be significant.</p> <p>Municipalities shall be required to ensure that poor stormwater management facilities are brought into compliance with current standards.</p>
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.

Appendix B – Policy Examples

Policy Number	2.1-5b
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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 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
Sub- Threat(s)	Stormwater management facility designed to discharge stormwater to groundwater (through infiltration) or surface water
Circumstance	<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
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 encourage emergency responders to 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.

Appendix C-Definitions

Conveyance is the movement or transfer of stormwater via gutters, sewer pipes, culverts and ditches. Storm sewers collect runoff along roads, and are separate from sanitary sewers that collect wastewater from homes or business.

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).

End of pipe collection systems provide quantity and quality control. There are many types of these “end of pipe” management systems. One of the most prevalent is stormwater management ponds which help capture excess runoff and hold it until it can be absorbed back into the natural watercourses.

Groundwater: Water related features in the earth’s subsurface including recharge (discharge areas, water tables, aquifers and unsaturated zones) that can be defined by surface and subsurface hydrogeologic investigations (Provincial Policy Statement, 2005).

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.

Pathogens – Pathogens can be associated with animal waste and combined sewers.

Petroleum Hydrocarbons – The sources of petroleum hydrocarbons include the disposal of used oil and other fluids on the ground or into storm drains, spills of gasoline or oil, and leaks of oil and other fluids from vehicles, hydraulic oil is at industrial sites, runoff from residential car washing.

Polycyclic Aromatic Hydrocarbons (PAHs) – These chemicals can be found in vehicle exhaust, coal tar-based sealants used on paved roads and parking lots, and creosote treated wood.

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)

Surface Water: Features on the earth’s surface including headwaters, rivers, stream channels, inland lakes, seepage areas, recharge/discharge areas, springs, wetlands and associated riparian lands that can be defined by soil moisture, soil type, vegetation or topographic characteristics.

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

Vulnerable Area: Significant groundwater recharge area, a highly vulnerable aquifer, a surface water intake protection zone or a wellhead protection area.

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;

Appendix C– Definitions

- 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.

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)