

QUINTE CONSERVATION
LOWER TRENT CONSERVATION
CATARAQUI REGION CONSERVATION AUTHORITY

**BAY OF QUINTE REMEDIAL ACTION PLAN
IMPLEMENTATION AREA
STORMWATER MANAGEMENT DESIGN GUIDELINES**

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1. INTRODUCTION

This document provides guidance on requirements for planning, design and approvals of new urban stormwater management systems in new urban development areas in the BQRAP Implementation Area (see Figure 1). It also provides guidance with respect to design and approvals of retrofit stormwater treatment facilities within existing built-up areas. This document is intended to assist development proponents and local municipalities by helping define approval requirements.

This document supercedes and replaces the previous BQRAP SWM guidelines document of May 1993.

2. STORMWATER MANAGEMENT IN THE MUNICIPAL CONTEXT

It is widely recognized that effective stormwater management involves a hierarchy of planning and management techniques.

The need for environmental protection, including water quality protection, is generally spelled out in a municipal Official Plan. To ensure proper planning of drainage infrastructure as part of land development planning, watershed plans or subwatershed plans are required for development areas. Watershed/subwatershed plans help support the development of secondary plans.

To identify the necessary stormwater control measures or works within a designated development area, a master drainage plan is required. This provides design guidelines and defines proposed locations and estimated costs for any centralized stormwater control facilities. In general, planning of drainage systems for new development areas should strive to minimize the number of separate stormwater facilities, since the proliferation of relatively small on-site facilities can significantly increase the costs to local municipalities for monitoring and maintenance.

Once a plan is in place, municipalities typically set up a "cash-in-lieu" fund to allow the municipality to accumulate the funds needed to build the required stormwater facilities as needed. A policy of allowing a percentage of the development area to proceed in advance of facility construction can be implemented by the municipality, provided that regulatory agencies such as the Ontario Ministry of Environment provide approval of such an arrangement.

Since the original BQRAP stormwater guidelines (1993) have been in effect, a number of issues related to stormwater planning have been identified. For example, not all Official Plans for Bay of Quinte municipalities contain the foregoing provisions, and the Master Drainage Plan/cash-in-lieu approach is not consistent. Most smaller municipalities are allowing development with small on-site facilities, and this may be creating unforeseen maintenance requirements and unforeseen costs. A consistent and comprehensive approach for stormwater management is needed for new development areas in the BQRAP area, and these guidelines reflect that need.

3. GENERAL STORMWATER DRAINAGE GUIDELINES

3.1 Role of the Local Municipality

1. Municipal Official Plans should recognize stormwater management in the hierarchy of planning and management techniques for new development and contain provisions for watershed plans, sub-watershed plans and master drainage plans as part of secondary plans.
2. Having identified strategies for accommodating new development via centralized stormwater facilities, municipalities should establish "cash-in-lieu" arrangements to support the construction of the required facilities when needed.

3.2 Development Design Requirements

1. Adhere to the guidelines provided in the most recent version of the Ontario Ministry of Environment's "Stormwater Management Planning and Design Manual" (current version dated March 2003).
2. New developments should be designed to incorporate all reasonable and practical means of minimizing direct surface runoff, including:
 - Minimize the amount of impervious area
 - Maximize the amount of existing vegetated area (treed areas, grassed areas) that is retained within the development design, to help maximize opportunity for infiltration (soak away) of surface water.
 - Roof drainage should be diverted on vegetated areas to give the water opportunity to soak into the ground.
3. Drainage systems for new development should be designed using the "minor and major system" approach. The minor system typically conveys all drainage flows generated by precipitation events up to the 5-year return period, and may include ditches, culverts, catchbasins and storm sewers. The major system conveys flows in excess of the capacity of the minor system in such a way as to minimize risk to life or property. The major system may include ditches, swales and other overland flow paths (including roadways).
4. Development proponents are responsible for ensuring that the design of the drainage system complies with current municipal design standards of the local municipality.
5. Small on-site facilities are discouraged and contribution to centralized works as identified in Watershed or Master Drainage Plans are encouraged.

4. STORMWATER QUALITY CONTROL

This section applies to all developments of an area equal to or greater than one hectare.

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4.1 New Urban or Rural Development

1. The development proponent is responsible for checking with the local municipality and with the conservation authority to ensure that the design of the drainage system is consistent with applicable Watershed Plans, Subwatershed Plans or Master Drainage Plans.
2. Plan and design the new development in accordance with the MOE SWM Manual, including the following steps:
 - Define and describe the type of development in terms of land use, total imperviousness, directly-connected imperviousness (i.e. how much of the total impervious area will drain directly into the minor system, versus the amount of impervious area that will drain onto vegetated area).
 - Define physical site constraints affecting drainage design and quality control options. These may include geotechnical properties of the local soil including permeability, depth to bedrock, and high water table levels.
 - To address stormwater quality concerns, follow the "treatment train" approach. Examine options for source control, conveyance control and, if necessary, end-of-pipe controls. The MOE SWM Manual provides considerable guidance on options to consider and how to evaluate them.
3. Where the development will include curbed roadways or paved parking areas drained by catchbasins and storm sewers, or otherwise includes collection of surface drainage in pipe systems, then end-of-pipe treatment of the storm sewer outflows will be needed.
4. Any required end-of-pipe stormwater treatment facilities must be designed as follows:
 - Examine options for end-of-pipe treatment using guidance provided in the MOE SWM Manual.
 - Design the end-of-pipe facility in accordance with the MOE SWM Manual. **End-of-pipe stormwater facilities must be designed to provide MOE "Enhanced" level of stormwater treatment (formerly referred to as "Level 1") as defined in the MOE SWM Manual (March 2003).**
 - If the end-of-pipe facility is to be a treatment pond, then it must be designed to allow routine clean-out of accumulated sediment and debris, including vehicle access to allow the clean-out operation and removal of sediments for off-site disposal. The pond should be designed such it can be hydraulically isolated to allow it to be pumped out if necessary to allow maintenance or clean-out.
 - As a general requirement in the BQRAP Implementation Area, end-of-pipe stormwater facilities do not need to include active effluent disinfection using UV technology or equivalent technology.
 - If the storm pipe outfall to local watercourse or waterbody can reasonably be expected to have a direct impact on water quality at a swimming beach, then active effluent disinfection may be required at the outfall. The development proponent is responsible for determining if disinfection is required through consultation with the conservation authority and the MOE Regional Office.

4.2 Retrofit Measures in Existing Built-Up Areas

1. In general, it is expected that local municipalities will be the proponents in any undertakings to implement retrofit stormwater treatment within existing built-up areas.
2. Planning and design of retrofit strategies should adhere to the same guidelines as listed above for new development situations, with the following exception:
 - Retrofit end-of-pipe treatment facilities should be designed to provide the MOE "Enhanced" (Level 1) treatment level if possible and practical. Designing to achieve the MOE "Normal" (Level 2) treatment level will generally be considered as an acceptable option. Lower levels of treatment may also be considered if the proposed location for retrofit installation poses specific site constraints or issues that make Level 1 or Level 2 treatment not feasible or practical to implement.
3. Retrofit strategies should be developed in close consultation with the conservation authority and the Ontario Ministry of Environment to ensure that final designs are acceptable from the regulatory standpoint.

5. STORMWATER QUANTITY CONTROL FOR NEW DEVELOPMENT

1. Stormwater quantity control is necessary to ensure that flows released from the development property do not have any adverse downstream impacts on flooding or watercourse erosion.
2. New developments must be designed to adhere to the requirements of the Provincial Policy Statement (March 1, 2005) under Section 3 of the Planning Act. The Policy Statement includes requirements for protecting public health and safety by restricting land development within areas affected by flood hazards, erosion hazards or dynamic beach hazards. Refer to the Policy Statement for specific definitions and requirements.
3. Unless there is in place a Watershed Plan, Subwatershed Plan or Master Drainage Plan that stipulates otherwise, peak flows released from the development property are not to exceed the "pre-development" peaks flows released from the site, for all return periods from 2 years to 100 years. The Regional Storm in the Quinte Conservation and Cataraqui Region Conservation Authority jurisdictions is the 100-year storm. Developments in the Lower Trent Conservation jurisdiction must also safely pass the Timmins Regional Storm.
4. If the development proponent believes that higher peak flows can be released from the site without any adverse upstream or downstream impacts on flood risk or watercourse erosion, then the development proponent will be responsible for conducting all necessary hydrologic and hydraulic studies to prove that this is so to the satisfaction of regulatory authorities including the local municipality and the conservation authority. Prior to making any such submission, the development proponent should consult with the conservation authority to determine the specific technical analyses that will be required to support higher site release flows.

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6. APPROVAL SUBMISSIONS AND PROCESS

1. Application for approval of proposed drainage systems for new land developments must be made to the local municipality as part of the overall development approval process administered by the municipality.
2. The conservation authority will assist the municipality by reviewing proposed development plans with respect to drainage and stormwater management requirements set out in these guidelines.
3. Additional approvals may be required depending on the specific design and type of drainage system being proposed. See below.
4. Submissions to the municipality with respect to the proposed development's drainage system must include the following information:
 - a) Design and location of the "minor" drainage system and the "major" drainage system. Plans and drawings showing the engineering design, location and elevation or elevation profile of all system components including ditches, culverts, catchbasins, pipes, manholes and other structures, in accordance with the local municipalities design standards. The development proponent is responsible for obtaining and understanding the local municipal design standards.
 - b) Plan showing all contributing drainage areas and showing drainage direction for all impervious areas, including all paved surfaces, roofs and other impervious surfaces. Indicate where roof drains will discharge. Indicate surface drainage direction along roadways and within commercial/industrial parking areas.
 - c) In the case of the major drainage system, provide details including: Location of all overland flow routes including locations of outlet to storage facilities or outlets to local watercourses or waterbodies; information on estimated flow depth and flow velocity at peak flow in the 25-year, 100-year and Regional Storm events, at critical locations within the major system including road intersections or other critical locations within the development area.
 - d) Clear description of how pre-development peak flows were determined or calculated.
 - e) A plan or plans showing any and all proposed facilities for controlling site release flows to the pre-development level, including location and size of any runoff storage facilities. Provide information on maximum water storage volume and water levels in such facilities at each of the design return periods including the Regional Storm event.
5. For proposed facilities for end-of-pipe stormwater treatment, the following requirements apply:
 - a) Generally, ownership and operation end-of-pipe stormwater facilities will be assumed by the local municipality once the facility has been completed to the municipality's satisfaction and all necessary approvals for operation of the facility have been acquired. The development proponent must confirm specific requirements with the local municipality.
 - b) The development proponent is responsible for obtaining any and all necessary approvals on behalf of the local municipality as the eventual owner/operator. These approvals will include but are not necessarily limited to Ontario Ministry of Environment approval (Section 53 approval under Ontario Water Resources

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- Act). The development proponent is responsible for determining approval requirements through discussion with the conservation authority, the local municipality, and the Ontario Ministry of Environment.
- c) The MOE s.53 OWRA approval will result in MOE issuing a Certificate of Approval to the municipality for the proposed facility. Generally, the MOE C. of A. will define specific monitoring and reporting requirements. Prior to making application to MOE for this approval, the development proponent is responsible for "pre-consultation" with the MOE Regional office to determine the likely C. of A. conditions. Prior to making the C. of A. application, the development proponent must advise the local municipality of the outcome of the MOE pre-consultation and obtain the local municipality's authorization to proceed with the C. of A. application.
 - d) The development proponent is responsible for completing any necessary environmental assessment (EA) that may be required under the Ontario Environmental Assessment Act or the Canadian Environmental Assessment Act. The development proponent is responsible for determining what EA requirements apply to the project.
 - e) Prior to final acceptance of the facility by the municipality, the development proponent must submit to the municipality an Operations & Maintenance Manual for the facility. This manual must clearly describe all operational and maintenance requirements, including all procedures needed to maintain compliance with the MOE C. of A. The manual should include details of any required sampling or testing of facility effluent or facility performance as may be required by the C. of A., and provide standard forms for recording and reporting necessary information. As well, the O&M Manual must include any and all relevant user manuals for any equipment necessary for operation and maintenance of the SWM facility.

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Figure 1: Bay of Quinte Stormwater Management Implementation Area

