

## Stormwater Management Study

### What is the purpose of this?



A *stormwater management* [SWM] *study* is an evaluation of the proposed development on the natural environment, municipal storm and sewer infrastructure and neighbouring properties. The study provides mitigative measures to reduce the impacts of increased sedimentation erosion, higher and faster peak flows and contaminant loads on the stormwater network. SWM reports should also speak to measures that aim to reduce the cumulative impacts of development to maintain overall watershed health. This study may also be combined with a grading or drainage report, or such grading and drainage reports may follow a stormwater management study.

### Who should prepare this?



A *stormwater management study* is to be prepared by a qualified professional engineer with experience in water resources. The study may be a stand-alone document or combined with a *functional servicing* study or grading/drainage reports.

### When is this required?



This study is required for, but not limited to, any large-scale land development proposal (i.e. subdivision). Another situation that may require the completion of a SWM report includes where there is reasonable probability that proposed development will impact site specific or cumulative stormwater systems. This should be completed prior to submitting a development application with the local Municipality and County. For subdivision and condominium applications, a preliminary SWM study is required prior to the County issuing draft approval. A detailed SWM will be required as a condition of draft approval. Applications where the County is the approval authority that may require a *stormwater management study* include, but are not limited to:

- Official Plan Amendment
- Plan of Subdivision / Condominium

Other municipal/provincial level applications that may require a *stormwater management study* include:

- Official Plan Amendment (local)
- Zoning By-law Amendment
- Consent
- Site Plan Control
- Development Permits (Niagara Escarpment Commission Development Permits are a Provincial requirement. Study requirements must be scoped to adhere to the policies of the Niagara Escarpment Plan (NEP) (2017) and any applicable guideline which may be more restrictive than municipal standards).

### Why do we need this?



The *stormwater management study* is required to:

- assess infrastructure needs to accommodate stormwater runoff

- integrate proposed water management for the subject site with local watershed management planning, typically informed by the local conservation authorities and municipal engineering standards

**How should  
this be  
prepared?**



*A stormwater management study should include the following:*

- a map of existing contours and pre-development catchments including external contributing areas
- identification of flood plain limits of all watercourses
- the Regulatory floodline associated with all watercourses on a scalable drawing using surveyed data points
- a plan with post-development catchments including area and runoff coefficients
- a plan of the sewer system, SWM facilities and overland flow routes
- a description of methodology and existing watershed criteria
- a summary of the municipality's applicable criteria to be met
- detail input parameters to the hydrologic and/or hydraulic modelling plus computer output/input printouts (computer files)
- a comparison table/chart showing pre versus post development release rates
- demonstration how SWM facilities meet quality, quantity, erosion, water balance (post to pre-development), phosphorus (achieving or exceeding pre-development loading rates)
- a stage/storage/discharge table for the proposed SWM pond
- summary of computer output results in a simplified tabular format
- comparison of storm sewer sized by Rational Method to hydrologic output
- identification of revised pipes and proposed catch basin inlet controls
- verification that major overland flow routes do not impact properties and that road gutter flows are within municipal parameters
- calculations demonstrating safe conveyance of the Regulatory Storm (or the uncontrolled 100 year for sites smaller than 5Ha with no floodplain) through the site to a sufficient outlet
- identified IDF curve value suitable for the subject lands – recommend referencing the MTO IDF Curve Lookup Tool at:  
[http://www.mto.gov.on.ca/IDF\\_Curves/map\\_acquisition.shtml](http://www.mto.gov.on.ca/IDF_Curves/map_acquisition.shtml)
- indicate the surface run-off for all adjacent and proposed lots using arrows to show the direction of flow and swale locations, length and slope percentage
- indicate the location, length and percent slope of proposed driveways
- 1:100 year hydraulic grade lines to be calculated for all pipes and basement elevations evaluated for surcharge potential
- indicate grading details in relation to the adjacent road(s)
- summary of how all County, municipal and Watershed SWM criteria has been satisfied
- outline of the maintenance and monitoring program for the SWM facilities, including Oil Grit Separators (OGS)
- SWM studies may be required to meet quality, quantity, or thermal regime standards as per provincial, municipal or conservation authority requirements

- efforts to implement Low Impact Development (LID) standards
- reference to available and previously approved Background Reports, if available
- a stand-alone Operation and Maintenance Manual for all Municipal owned SWM pond, LID measures, and/or Oil and Grit Separators

Typically, a full-scale Erosion and Sediment Control Plan(s), an engineering drawing, and a Geotechnical report must accompany the SWM report. The list may be modified in pre-submission consultation with the review agencies. A Stormwater Management Study should not be completed in isolation from other technical development studies/reports. Efforts should be made by the qualified professional(s) to integrate and interpret key findings and mitigation measures from other supporting studies/reports related to the proposed development with the Stormwater Management Study.

### What else should we know?



The general philosophy behind SWM planning is that post-development stormwater flows should not exceed pre-development flows. Stormwater is to be dealt with on-site, except where development has permission to convey water off-site (e.g. into a regional SWM treatment pond, municipal storm sewer, or direct access to a waterbody).

A *stormwater management study* supports the intent of the watershed and/or subwatershed study recommendations (where they exist) and provides staff with a basis on which to assess the environmental implications of the proposed development. It also provides staff with a basis on which to assess the increased demands on municipal infrastructure posed by the development, and the need for future study requirements, such as detailed designs. The study recommends improvements to municipal infrastructure and mitigative measures to reduce erosion, risk of flooding, and maintain water balance and water quality in receiving stormwater systems. Stormwater management can impact thermal regimes within watercourses. This can ultimately impact aquatic life that rely on specific environmental conditions, including threatened and endangered species and their habitats (e.g. cold-water streams).

When a development is located adjacent (or in proximity) to a County road, or a County owned forest or trail property, the *stormwater management study* must also address the impact of storm drainage on these assets and drainage systems.

Emerging SWM treatment technologies such as Low Impact Development (LID) standards will be supported where proven feasible. Where stormwater ponds are required, consideration shall be given to landscaping and/or fencing which is functional yet attractive to neighbouring land uses, versus large chain-link fences.

Further details can be found under section 8.9.2 of the County Official Plan and section 1.6.6 of the Provincial Policy Statement (2020).

Pre-submission consultation is strongly encouraged with the applicable conservation authority and municipality as it pertains to SWM. Where such works are anticipated within a Regulated Area, a permit may first be required for site grading, filling, and/or outlet works prior to commencing any on-site works.

Where grading would require any tree removal please be aware of municipal or county tree-cutting or forest management by-laws. Prior to any tree removal on-site there may be a need for municipal or county permits. Works within the Niagara Escarpment development control area would require the issuance of a Development Permit prior to starting any site alteration.

**What other resources are available?**



Credit Valley Conservation Authority – LID Stormwater Management Planning and Design Guide - <https://cvc.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/low-impact-development-stormwater-management-planning-and-design-guide/>

Grey County Forest Management By-law - <https://www.grey.ca/forests-trails>

Grey Sauble Conservation Authority - <https://www.greysauble.on.ca/planning-regulations/plan-inputreview-regulations/>

Grand River Conservation Authority Water Management Plan - <https://www.grandriver.ca/en/our-watershed/Water-management-plan.aspx>

Ministry of Environment, Conservation and Parks Stormwater Management – Introduction to Stormwater Management Planning & Design - <https://www.ontario.ca/page/understanding-stormwater-management-introduction-stormwater-management-planning-and-design>

Ministry of Transportation – Drainage Management - <http://www.mto.gov.on.ca/english/publications/drainage-management.shtml>

Natural Heritage Information Centre - <https://www.ontario.ca/page/natural-heritage-information-centre>

Niagara Escarpment Commission - <https://escarpment.org/home>

Nottawasaga Valley Conservation Authority – Stormwater Technical Guide (2013) - [https://www.nvca.on.ca/Shared%20Documents/NVCA%20Stormwater%20Technical%20Guide%20\(Dec.%202013\).pdf](https://www.nvca.on.ca/Shared%20Documents/NVCA%20Stormwater%20Technical%20Guide%20(Dec.%202013).pdf)

Saugeen Valley Conservation Authority - <http://www.saugeenconservation.com/page.php?page=environmentalplanning>

Species at Risk in Ontario - <https://www.ontario.ca/page/species-risk-ontario>

\*This document is intended to be used for guideline purposes only. It will not be applied as a means of approving or rejecting development proposals, but rather it will be used to provide technical direction throughout the planning and development process.