SUBJECT: Stormwater Management Design Guidelines Update

TO: Environment, Infrastructure and Community Services Committee

FROM: Capital Works

Report Number: CW-14-20

Wards Affected: All

File Numbers:

Date to Committee: June 8, 2020

Date to Council: June 22, 2020

Recommendation:

Approve the updated Stormwater Management Design Guidelines for the City of Burlington, attached as Appendix A to capital works department report CW-14-20.

Purpose:

Vision to Focus Alignment:

- Support sustainable infrastructure and a resilient environment

The purpose of this report is to present the updated Stormwater Management Design Guidelines, which have been developed to align the City's stormwater management system with current best management practices, current regulatory requirements and to incorporate the latest technological advances into the City's stormwater management methodologies.

Background and Discussion:

The Storm Drainage Criteria Manual which is currently in use was prepared and adopted in 1977. By developing the drainage manual in 1977 the City of Burlington became one of the earliest municipalities in Southern Ontario to objectively define the stormwater management standards and targets. The 1977 document introduced drainage policies and stormwater management techniques that centered on the land use that existed at that time and were based on the available hydrologic data. Since 1977, numerous legislative and regulatory policies and guidelines have been produced

by the province and the local watershed management agencies. These additional documents have provided revisions and updates to our design guidelines. In addition, many master plans, watershed and sub-watershed studies have been completed, which reflect the significant increase and change in land-use within the City.

The updated stormwater management guidelines include the latest methodologies and tools to conform to the contemporary regulatory requirements. It is the City of Burlington's intent to be at the forefront of the stormwater management field and ensure that current best practices guidelines are provided to the practitioners and designers working within the City, specifically to guide future development and redevelopment as well as infrastructure renewal projects.

Numerous innovative technologies have emerged in the field of urban development in recent years which reduce the impact of development activity on the natural features. These development strategies, called Low Impact Development techniques, have increased in importance due to the greater demands in land use and intensification. The updated stormwater management guidelines have been developed to maximize the efficiency and effectiveness of stormwater management design and land-use planning. This document is intended to guide the City in managing, protecting and enhancing the urban and natural components of our watersheds.

Coordination with Partner Agencies

Capital Works has prepared the updated document in close coordination with the Region of Halton and Conservation Halton. Representatives from both agencies were part of the project Technical Advisory Committee (TAC) and provided their valuable input and feedback throughout the process by regularly attending the TAC meetings, reviewing the draft document and providing comments during each stage of its development. Preparation of the City's Stormwater Management Design Guidelines coincides with Conservation Halton's update of its Stormwater Management Submission Requirements document. Coincident timing facilitated harmonization of the two documents.

Multiple City departments were contacted and offered the opportunity to review the document and submit their feedback. The updated final document reflects the suggestions received from the City departments, as well as the input and feedback received from the Conservation Halton and the Region of Halton.

The updated guidelines document is in conformance with the Ministry of Environment and Climate Change's (MECP's) Stormwater Management Planning and Design Manual (2003). We have retained a degree of flexibility within the document to accommodate future guidance and design requirements originating from the province.

Strategy/process:

The City hired Wood Environment and Infrastructure Solutions in December 2017 to prepare new Stormwater Management Design Guidelines. A Technical Advisory Committee (TAC) comprising staff from the City, Conservation Halton and the Region of Halton was formed to oversee preparation of the document. The TAC reviewed the report contents and provided comments during every stage of its development. The final draft guidelines were shared with the development community, several consulting firms and other City departments. The feedback and comments that we received were considered in the final report.

The City staff would like to recognize Wood Environment and Infrastructure Solutions for their detailed background review and research, regular consultation with the TAC and for their remarkable efforts in preparing the Stormwater Management Design Guidelines.

The guidelines document is in the following format:

A – INTRODUCTION AND GENERAL INFORMATION

1. Introduction to Stormwater Management
2. Land Use Planning Framework
3. Stormwater Drainage System Policies
4. Analytical Methodology

B – STORMWATER DESIGN STANDARDS

5. Design Criteria – Conveyance Systems
6. Design Criteria – Stormwater Management
7. Erosion and Sediment Control (ESC) Design Criteria
8. Future Evolution of SWM Design Guidelines

Section A explains the City's current policies and methodologies, as well as the rationale for implementing the new guidelines.

Section B outlines the specific new stormwater management design criteria related to creeks, development sites (quantity and quality control), low impact development concepts as well as erosion and sediment control. It also describes the necessity for

ongoing review and updating of the guidelines to reflect current design standards, updated regulations and legislation, guidance from partner agencies and other levels of government and new technologies.

Section B also commits the City to reviewing the intensity-duration-frequency (IDF) data every 5 years, to ensure that this criterion continues to be appropriate, including the potential impacts of climate change.

Noteworthy updates:

Some of the noteworthy guidelines are noted below:

1. The updated guidelines present a more integrated approach to manage stormwater by acknowledging environmental planning studies such as the watershed/sub-watershed studies, stormwater functional servicing plans and masterplans completed for certain areas within the City. The new document also recognizes the roles played by partner agencies such as Conservation Halton in managing the City's watersheds.

2. The updated guidelines document will be a constantly growing document which will accept new and evolving technologies and adapt to reflect future guidance from the province.

3. The updated guidelines, guided by the accepted regulatory standards across the province and as required by Conservation Halton, establish the greater of the 100-year event or the Regional Storm event as a more effective design standard for flood control infrastructure in the City of Burlington.

4. The stormwater runoff analysis included in the 1977 design guide was based on only 14-years of rainfall data from the Royal Botanical Garden gauging station. A total of 54 years of processed rainfall data is now available from the same meteorological station.

5. Stormwater infrastructure designs are primarily based on the rainfall intensity-duration-frequency (IDF) relationships. The 1977 manual provided IDF relationships that were based on a limited rainfall record. Those IDF relationships were revised in 1999 when a longer period of rainfall data became available. Our new guidelines propose a further update to the IDF relationships which are now based on the 54-year rainfall record, and which incorporate adjustments made to reflect projected climate change impacts.

6. The new guidelines will be used in the design of new development / redevelopment sites as well as Capital projects.

7. Low Impact Development will continue to be a focus to aid in stormwater management.

8. Enhanced stormwater quality and quantity control is proposed to protect our creeks and Lake Ontario from environmental degradation.

Climate Change Impact:

Climate change is an increasingly critical issue both at the local and global level. The changing climate has caused a significant shift in the weather patterns resulting in more frequent and higher intensity storm events. There is an undeniable trend of individual storm events within Southern Ontario surpassing the magnitude of 100-year design storm. Recent events in the City of Burlington including the ice-storm of 2013 and the rain event of August 2014 have highlighted the need to adapt to the new realities and to be prepared for the ongoing challenges. Updating the City's Stormwater Management Design Guidelines is a step towards this goal.

Financial Matters:

Source of Funding

Consulting fees for Wood Environment & Infrastructure Solutions are being funded from capital order SM0002 Climate Change & Design - Manual Update. A purchase order was approved for $40,510. Current fees paid amount to $29,342. The remaining balance is anticipated to be invoiced over the next 2 months, for services recently completed and services required to finalize the project.

Public Engagement Matters:

The City's development community was invited to participate in the development of this document. A draft was circulated to the Hamilton Halton Home Builders' Association and to civil engineering consulting firms who have frequently submitted designs in support of the developments. Comments and feedback received from these stakeholders were reviewed, considered and incorporated into the guidelines as appropriate.

Conclusion:

The updated guidelines document will bring the City's Stormwater Management policies to the current best practices standards in Southern Ontario. Stormwater infrastructure designed under these new standards will make Burlington more resilient to the increasing risks of climate change and severe rainfall/flooding events.

Respectfully submitted,

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Appendices:

Appendix A –Stormwater Management Design Guidelines, City of Burlington, dated May 2020

Notifications:

Barbara Veale – Conservation Halton

Jim Harnum – Halton Region

Report Approval:

All reports are reviewed and/or approved by Department Director, Director of Finance and Director of Legal. Final approval is by the City Manager.