



CITY OF HAMILTON
PUBLIC WORKS DEPARTMENT
Hamilton Water Division

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	November 18, 2019
SUBJECT/REPORT NO:	City of Hamilton Watermain Fire Flow Requirement Design Guidelines Policy (PW19096) (City Wide) (Outstanding Business List Item)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Bert Posedowski, (905) 546-2424 Ext. 3199
SUBMITTED BY:	Mark Bainbridge Director, Water & Wastewater Planning & Capital Public Works Department
SIGNATURE:	

RECOMMENDATION(S)

- (a) That the Watermain Fire Flow Requirement Design Guidelines Policy attached as Appendix A to Report PW19096 be approved;
- (b) That the appropriate staff be authorized and directed to revise and update the Comprehensive Development Guidelines and Financial Policies Manual as required, and to bring forward for Council's consideration any necessary amendments to the Adequate Services By-law or any other City of Hamilton By-laws;
- (c) That delegated authority be granted to the General Manager of Planning and Economic Development or a designate to make adjustments and changes as may be required to implement the Watermain Fire Flow Requirement Design Guidelines Policy, as described as a method of transition in this report, to any approved Draft Plan of Subdivision or Registered Plans of Subdivision; and
- (d) That item AAL - Correspondence from Suzanne Mammel, Hamilton-Halton Home Builders' Association, respecting the Implementation of the Proposed New Hamilton Fire Flow Policy be identified as completed and be removed from the Public Works Committee Outstanding Business List.

OUR Vision: To be the best place to raise a child and age successfully.

OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

OUR Culture: Collective Ownership, Steadfast Integrity, Courageous Change, Sensational Service, Engaged Empowered Employees.

EXECUTIVE SUMMARY

Several stakeholders in the development industry have expressed concern regarding the implementation of the City of Hamilton's (City's) current watermain fire flow requirement design guidelines approach that is based on the Fire Underwriters Survey (FUS) Insurance Underwriters Guidelines. In order to address these concerns, staff initiated a study to review the City's current guidelines for development application approvals and to provide recommendations for a revised approach.

After an extensive review and evaluation process that included collaboration with stakeholders; staff from Planning and Economic Development, Legal Services, Public Works, Hamilton Fire and members of the Hamilton Halton Home Builders Association (HHHBA), a preferred approach based on two levels of policy has been developed. It includes a Master Plan Approach based on the Ministry of the Environment, Conservation and Parks (MECP) guidelines; and a Development Application Approach approval process based on the Ontario Building Code (OBC) and a Target Available Fire Flow. The proposed City of Hamilton Watermain Fire Flow Requirement Design Guidelines Policy is attached as Appendix "A" to Report PW19096.

The proposed two-level approach will ensure that a robust and reliable trunk water distribution system is retained while also offering a reasonable level of service, at the local street level, by following an OBC and land-use targets strategy. The recommended policy will provide clarity for stakeholders and will assist staff in reviewing and processing applications. This aligns with the City's Open for Business mandate to create consistent, predictable, and customer-focused services that encourage investment.

Alternatives for Consideration - Not Applicable

FINANCIAL – STAFFING – LEGAL IMPLICATIONS

Financial: N/A.

Staffing: N/A

Legal: N/A

HISTORICAL BACKGROUND

In 2005, Council adopted Report No.(PW05050) that endorsed the City's Water and Wastewater Master Plan Policy Paper with policy statements and implementation strategies for the 2006 Master Plan. Policy No.W.06 of the policy paper stated that: "The City of Hamilton shall consider the Ministry of the Environment Guidelines and the Insurance Underwriters (FUS) Guidelines for establishing the acceptable level of fire flow".

In 2016, Council adopted the Comprehensive Development Guidelines and Financial Policies Manual (PED12165) that included watermain fire flow requirement design guidelines based on Policy No. W.06. The City's current guidelines require that the applicant calculate fire flow needs for their development based on FUS. The applicant may also be required to conduct hydrant tests to determine the available fire flow at their proposed development. If the identified FUS based fire flow needs exceed the system fire flows available at the hydrant, the applicant is required to either alter their development plan so that FUS based fire flow needs are met or undertake capacity upgrades to City infrastructure.

The City's development community and stakeholders have for some time expressed concern and raised a number of issues regarding the implementation of the current approach including:

- Long approvals times and delays resulting in the need to make multiple submissions which is time consuming and costly.
- Potential higher construction, maintenance and replacement costs resulting from building bigger pipes that are required to meet FUS fire flow needs.
- Lack of clarity and consistency when using the approach that often leads to interpretation conflicts (FUS guideline for required fire flow calculation can be confusing and open to differing interpretations).
- The FUS approach can be conservative leading to oversizing of local watermains that can potentially cause water quality issues.

As a matter of best practice, staff are dedicated to continuously reviewing current practices, processes and policies to identify improvements and ensure that the delivery of client services responds to the needs of the City's customers and stakeholders. Therefore, to address the City's customers and stakeholder's concerns, staff initiated a study that would review the City's current watermain fire flow requirement level of service and design guidelines approach for purposes of development application approvals. The study would further compare the City's approach with industry best practices.

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In July 2017, a consultant (GM BluePlan Engineering) was retained to carry out this study as part of the on-going City-Wide Water/Wastewater and Stormwater Master Plans update project. The study was summarized in a Technical Memo that will form part of the City-Wide Water/Wastewater and Stormwater Master Plans report.

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS

Policies and by-laws that may require updating as a result of the recommendations of this report include:

- City's Comprehensive Development Guidelines and Financial Policies, 2018
- City's Water and Wastewater Master Plan Policy, 2006
- City's Adequate Services By-Law

Legislation requirements to which the recommendations of this report align include:

- *Safe Drinking Water Act, 2002*
- *Ontario Building Code and Building Code Act, 1992*
- *Fire Protection and Prevention Act, 1997*

RELEVANT CONSULTATION

Staff conducted several meetings and workshops which included staff from Planning and Economic Development, Legal Services, Public Works, Hamilton Fire and representatives of HHHBA and the Development Industry Liaison Group (DILG). In addition, the consultant conducted a review of approaches for neighbouring municipalities.

ANALYSIS AND RATIONALE FOR RECOMMENDATION(S)

The study evaluated several fire flow requirement options with varying levels of service. The variations ranged from minimal fire flows based on OBC, to conservatively high fire flows based on FUS.

After an extensive review process that included collaboration with stakeholders including staff from Planning and Economic Development, Public Works, Hamilton Fire and members of the HHHBA, an intermediate fire flow service level was selected for the Development Application Approach. This approach utilizes fire flow requirements based on the greater of the required fire flow calculated using the OBC method and a City Target Available Fire Flow based on land use. Under this approach, developers shall be responsible for providing the system available fire flow appropriate for the

development being proposed. The requirement to provide system available fire flow is a departure from the FUS guideline where required fire flow for a building could be altered through changes in building construction and/or building separation (often referred to as changes to built form).

The change being proposed in this report primarily deals with a change to the Development Application Approach. The proposed approach is generally consistent with what other municipalities are using and will provide a level of service that is adequate and appropriate for the City. It is a reasonable approach that establishes land-use-based targets for the water distribution system and available fire flows to ensure that the water system is robust and reliable.

The approach may represent a reduction in watermain fire flow requirements from the current City guidelines which are based on FUS. It will not however, materially impact the City's insurance grading because that grading is not predominantly based on watermain fire flow design guidelines. As stated on the Fire Underwriters Survey (Canada) website, FUS grading criteria assesses the water supply system's ability to provide reliable water supplies along with an assessment of storage, pumping and duplication of various parts of the system. The City's water distribution system is well looped and is backed up with adequate storage and pumping capacity and will continue to provide reliability and redundancy as required by the FUS grading criteria.

A preliminary, high level review of the distribution system has identified that approximately 86% of commercial lands, 83% of institutional lands and 77% of residential lands have systems that currently meet the Target Available Fire Flow; 61% of industrial lands have systems that currently meet the Target Available Fire Flow. The City will continue to upgrade watermains to achieve Target Available Fire Flows, where practically feasible, through its ongoing state of good repair program.

The rationale for recommending this approach was based on satisfying the following key policy objectives:

1. Providing a safe, high quality and consistent supply of drinking water.
2. Building and maintaining a robust water distribution system that meets set targets of pressure, quality, reliability and fire flow.
3. Ensuring that adequate fire safety and building protection is provided.
4. Provide a consistent and transparent methodology for establishing fire flow requirements.

In addition to the foregoing analysis of fire flow requirements for Development Applications, the study reviewed fire flow requirement for the master Planning level

system-wide sizing of storage and trunk infrastructure. The City's current policy and design criteria for water storage and trunk watermains is as follows:

- Storage Volume - the system is to provide storage volume for each Pressure District of Max Day Pressure District Demand plus MECF Guidelines Fire Flow Storage. This calculation generates a storage volume that provides water for equalization, emergency and fire protection within the zone.
- Transmission - Trunk watermains are sized in order to convey Maximum Day Demands + MECF fire flow. The fire flow is based on service area population, typically delineated by Pressure District.

The study recommended that at a master plan level, the City continues to use the current policies.

The recommended Watermain Fire Flow Requirement Design Guidelines Policy will be based on two policy levels:

1. Master Plan Approach

“The City of Hamilton will establish acceptable trunk infrastructure levels of service for fire flow and storage through consideration of land use and the Ministry of Environment, Conservation and Parks Design Guidelines.”

2. Development Application Approach

“The City of Hamilton endeavours, through this policy, to provide a local water distribution network with a system Available Fire Flow (AFF – water available for fighting a fire) that meets the greater of the Required Fire Flow calculated using the Ontario Building Code water supply flow rate method or the City's Target Available Fire Flow based on land use. Developers shall be responsible for providing the system AFF appropriate for the development being proposed.”

The recommended policy provides the overall guiding principles for Watermain Fire Flow Design Guideline Policy. Key policy principles include:

1. Developers are required to meet OBC standards for building construction. No credits will be considered for reducing required fire flow outside of any provisions contained within the *Ontario Building Code Act* or regulations under the *Act*.
2. OBC required fire flow calculations will be required as part of any development application submission. The required fire flow will be determined using the OBC water supply flow rate method (OBC section A-3.2.5.7). This methodology will be

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applied to all buildings falling under Part 3 and Part 9 of the Building Code (OBC sections 1.1.2.2 and 1.1.2.4).

3. System available fire flow calculations will be required as part of a development application submission and will be based on field testing and/or hydraulic modelling (as directed by the City). System available fire flow shall meet or exceed the greater of OBC required fire flow or the target available fire flow for the land use being proposed. For mixed use developments the target available fire flow will be based on the proposed land-use with the highest target available fire flow. The target available fire flow will be as defined in Table 1.

Table 1: Target Available Fire Flow

Land Use	Target AFF (L/s)
Commercial	150
Small ICI (<1,800 m ³) ¹	100
Industrial	250
Institutional	150
Residential Multi (greater than 3 units)	150
Residential Medium (3 or less units)	125
Residential Single	75
Residential Single (Dead End)	50

¹ 1800m³ represents a maximum building volume that qualifies as “Small ICI”

4. System upgrades required to achieve the greater of the OBC required fire flow or the target available fire flow (Table 1) will be the responsibility of the developer subject to local servicing policy and subject to the City’s state of good repair program.
5. The City’s Master Plan process will continue to establish system level of service for fire flow (trunk system and facilities).
6. The City’s Master Plan process, which will be based on Growth Related Integrated Development Strategy (GRIDS2) and the City’s Official Plan, will proactively develop intensification programs that will identify development related upgrades that can address both growth and fire flow deficiencies.
7. The City will be setting minimum available fire flow targets based on the recommendations of this study. The City will upgrade watermains to achieve target available fire flows, where practically feasible, through its ongoing state of good repair program.

Method of Transition

A transition plan has been developed through consultation with the Planning and Economic Development Department to address the treatment of development files at various stages of approval.

Based on where the application is in the review process, one of the following options will be applied:

- A. Change to Municipal Infrastructure Pipe Size (Form 1) where Engineering Approvals have been granted and watermain infrastructure has not been constructed.
 - Submit revised hydraulic assessment (indicating the greater of OBC fire flow method or Target Available Fire Flow (Table 1). A change in pipe size after the approval of engineering design drawings and Form 1 will require a resubmission of engineering design drawings and Form 1 submission, along with the applicable fees.
- B. Change to Municipal Infrastructure Pipe Size (Form 1) where Engineering Approvals has not been granted and watermain infrastructure has not been constructed.
 - Submit hydraulic assessment (indicating the greater of OBC Fire Flow method or Target Available Fire Flow (Table 1) and Form 1 along with the applicable fees.
- C. Change to the Approved Method of Construction (for the purpose of this transition policy, reference to the term “method of construction” relates to building material (i.e. brick finish vs siding) or additional firewalls or sprinkler systems etc. that were required to reduce the calculative area and exposure impacts to meet the existing FUS guidelines) and the watermain infrastructure is in place and building permit not issued.
 - Complete required fire flow calculations using the OBC method and confirm AFF from existing infrastructure meets or exceeds the required fire flows based on OBC method. Submit calculations along with the applicable fees.
- D. Change in Pipe Size where Site Servicing Approval has been granted and private water infrastructure has not been constructed
 - Will require submission of a revised Site Servicing Plan along with applicable fees.

ALTERNATIVES FOR CONSIDERATION

Not Applicable

ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN

Community Engagement and Participation

Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.

Economic Prosperity and Growth

Hamilton has a prosperous and diverse local economy where people have opportunities to grow and develop.

Healthy and Safe Communities

Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

Our People and Performance

Hamiltonians have a high level of trust and confidence in their City government.

APPENDICES AND SCHEDULES ATTACHED

Appendix A - Watermain Fire Flow Requirement Design Guidelines Policy Summary Table