



Decorative Crosswalk Guideline



Trans Flag Decorative Crosswalk, Stirling Avenue

Decorative Crosswalk Guideline

1.0 Introduction

Crosswalks are an integral component of the transportation network that distinctly indicates safe roadway crossing locations for pedestrians by means of lines or other markings on the surface of the roadway. Vehicle traffic is controlled at crosswalks with stop signs, pedestrian crossovers (PXO's), and partial or full traffic signals. Crosswalks exist at intersections, between intersections (mid-block) and on all road classification types throughout the City of Hamilton.

The size and colour of crosswalk pavement markings is governed by the Ontario Traffic Manual (OTM). The transverse lines, which are lines that run perpendicular to the roadway and establish the boundaries of the crosswalk, must be white and extend the entire length of the crosswalk. Ladder (also referred to as zebra) markings are suggested for crosswalks where higher visibility is desired. The longitudinal lines (rungs of the ladder) are also normally white; however, the OTM does not specify that they must be white.

The Highway Traffic Act (HTA), specifically Ontario Regulation 402/15: Pedestrian Crossover Signs, requires that PXO's include ladder pavement markings and that the longitudinal lines (rungs) are to the width and spacing as specified. Like OTM, the colour of the rungs are not mandated to be white.

The OTM does state that textured or coloured crosswalks should be “applied to increase the conspicuity of a pedestrian crossings and increase driver’s awareness of potential conflicts”. It goes on to state that the “materials should be designed to maintain visibility at night”.

Decorative crosswalks are typically understood to be crosswalks that include elements (colour, design, imagery, texture and/or material) that are considered aesthetic enhancements above and beyond standard crosswalk treatments. In Hamilton, an example of a decorative crosswalk is the rainbow crosswalk located on Main Street West at Summers Lane in-front of City Hall, which was installed in 2018.

Crosswalks must always include two white transverse lines, and except for PXO's, the pavement marking treatment in between the transverse lines is not restricted. Therefore, decorative elements (artwork) can be legally applied to the road surface if they are ‘framed’ by the white transverse lines and the edge of the roadway (normally being curbs). However, it is implied that the design of the treatment would not negatively impact the safety of road users, visually or otherwise.

The Decorative Sidewalk Guideline is constructed to support and facilitate the installation of decorative crosswalks in the City of Hamilton. It directly aligns with the City of Hamilton Art in Public Places Policy which recognizes that “art in public places enriches the quality of life of its citizens adding cultural, social and economic value to our shared public spaces”.

2.0 Process

The desire to install decorative crosswalks can be driven by external and internal interests. Individuals, communities, organizations or agencies may express interest to install a decorative crosswalk on a City roadway. Additionally, decorative crosswalks may be incorporated into City projects, such as roadway reconstruction or other similar initiatives.

Parties with an expressed interest to install a decorative crosswalk shall consult with the Public Works Department, Transportation Operations & Maintenance Division. An agreement between the applicant and the City may be necessary to formalize installation and maintenance cost terms and responsibilities.

Enabling the installation of decorative crosswalks aligns with the City of Hamilton Art in Public Places Policy. This policy provides a framework “to guide the conception, planning and implementation of successful art in public places projects”. It includes five processes, specifically Publicly Commissioned Art, Donated Art, Community Art, Integrated Art and Temporary Art.

The Art in Public Places Policy is comprehensive and directly applicable to decorative crosswalks. Therefore, the Art in Public Places Policy shall be used to manage the application, selection and implementation of decorative crosswalks. Combined, the Art in Public Places Policy and the Decorative Crosswalk Guideline shall govern decorative crosswalks in the City of Hamilton.

3.0 Permitted Locations

Selecting a location for the installation of decorative crosswalks is important to ensure that they are appropriate, sustainable and safe. The primary consideration in approving a decorative crosswalk location is the safety of pedestrians, cyclists and motorists. Where safety may be negatively impacted, a decorative crosswalk will not be permitted to be installed.

Decorative crosswalks should be avoided, without special consideration and permission, across roadways that have high volumes of traffic and/or a high percentage of truck traffic, specifically, major and minor arterial roadways as classified by the Urban Hamilton Official Plan and the Rural Hamilton Official Plan. On arterial roadways,

maintenance is cost prohibitive given the amount of tire wear and marks from large trucks.

Decorative crosswalks can be installed on collector and local classified roadways. This includes collector and local roadways that intersect with, or immediately parallel to, major/minor arterial roadways permitting that the crosswalk is located on the secondary leg(s) of the intersection.

It is important that the roadways are in acceptable condition. The installation location surface must be free of potholes, fatigue cracking, loose debris or other similar degraded conditions which would inhibit the installation of surface treatments or perceivably shorten the operational life. Asphalt roadways are preferred, however concrete roads can be considered. Roadways that are constructed using unit pavers, stamped textures or comprised of mixed materials (such as adjoining asphalt and concrete surfaces) should be avoided. Roadways that are scheduled for reconstruction or re-surfacing within five (5) years or less from the time of decorative crosswalk installation must be avoided so that the treatments are not inadvertently removed earlier than intended or before their operational end-of-life.

4.0 Installation & Maintenance

Proper installation and maintenance of decorative crosswalk treatments protects their overall integrity and longevity. Therefore, they must be installed in a professional by forces that are sufficiently trained and skilled, using appropriate materials and methods, routinely monitored, repaired and maintained.

4.1 Decorative Crosswalk Specifications

- i. Artwork must be contained within the two white standard transverse lines of the crosswalk and the edge of the roadway. Treatment must be configured so that a pedestrian's first step is onto asphalt (the bare road surface), achieved by starting the artwork approximately 1.0 metre away from the curb/edge of road. It must not continue or extend onto median islands, curb gutters, curbs, sidewalks or other roadway features;
- ii. Artwork must not be applied to utility manhole covers, chamber lids, frames or other similar infrastructure;
- iii. Artwork should provide visual contrast and be reflective as per the requirements of the Ontario Traffic Manual;

- iv. Artwork that would be considered ladder (or zebra) markings, must dimensionally conform to the requirements of the HTA and Ontario Traffic Manual;
- v. Artwork shall respect community standards concerning appropriate subjects and imagery for display in public places. Further, commercial interests such as advertising and copyright protected content is not permitted without special consideration and explicit permission;
- vi. Artwork must not be comprised of any elements that road users, particularly pedestrians, would interact with such as hopscotch as an example;
- vii. Artwork must not directly or inadvertently mislead the general use or guidance of the crosswalk, especially users whom are visually impaired; and
- viii. Artwork shall comply with the City of Hamilton Art in Public Places Policy.

4.2 Material & Installation

- i. Durable skid resistant pavement markings, such as thermoplastic or cold plastic, must be used for artwork and as specified by the Public Works Department. The in-service operational life of durable pavement markings is approximately five (5) years, and dependent upon roadway surface conditions and traffic volumes.
- ii. Artwork must be reflective as per the requirements of the Ontario Traffic Manual;
- iii. Decorative crosswalks must be installed by the City of Hamilton, Public Works Department or by contractors as directed by the same;
- iv. Artwork designs shall be reasonable, easily reproduced and installed using the noted marking materials and their associated installation methods. Artwork must be acceptable and appropriate based upon the Art in Public Places policy process and requirements; and
- v. Installation shall be scheduled to occur seasonally in the late spring to early fall or as weather and conditions permit to ensure optimal adherence of materials to roadway surfaces.

4.3 Maintenance & Operations

- i. Decorative crosswalks shall be maintained (repaired, cleaned, etc.) by the City of Hamilton, Public Works Department;
- ii. It is recognized that decorative crosswalks do not have an attributed level of service as defined by Ontario Regulation 239/02: Minimum Maintenance Standards for Municipal Highways. However, decorative crosswalks shall generally be inspected by the City of Hamilton, Public Works Department, once per calendar year, typically in the late spring;
- iii. Maintenance of decorative crosswalks shall be safety focused, but also to maintain the integrity and longevity of the artwork. Maintenance shall be generally conducted on an as-needed basis;
- iv. Decorative crosswalks do not have an infinite life and would need to be removed (and replaced if appropriate) when deemed necessary or as required by any terms and/or agreements of their installation;
- v. Requestors of decorative crosswalks shall be responsible for installation costs and share maintenance costs with the City of Hamilton as described in Section 5.0 of this guideline.

5.0 Attributed Costs

The cost of installing and maintaining decorative crosswalks will have an impact on capital and existing operational budgets. Because of this, the person or agency requesting decorative crosswalks shall share in all or part of the costs. Table 5.1 outlines installation cost sharing.

Table 5.1 – Decorative Crosswalk Cost Sharing

Installation Cost	City Share	Requestor’s Share
Existing non-ladder crosswalk	40% (Cost of white durable pavement markings)	60% (Cost difference between standard ladder markings and artwork)
Existing ladder crosswalk (< = 3 years old)	None	100%
Existing ladder crosswalk (> = 3 years old)	40% (Cost of white durable pavement markings)	60% (Cost difference between standard ladder markings and artwork)
All other locations	None	100%

The cost of installing a decorative crosswalk is be dependent upon the intricacy, width of the roadway, coverage of the artwork and location. It is estimated that installation costs would be between \$5,000 and \$15,000 depending on the length of the crossing.

The ongoing maintenance of the decorative crosswalks shall be shared between the City of Hamilton and the requestor based upon the cost difference between standard crosswalks and decorative crosswalks. Costs would also be dependent upon the same primary cost drivers noted as part of installation (above).

Maintenance costs shall be determined at the time of approval and based upon the design of the decorative crosswalks and perceived attributed maintenance cost pressures.

Installation and maintenance costs which are shared with the City of Hamilton by requestors should be formalized by establishment of a written agreement.

Decorative crosswalks that are not requested by external people or agencies, but rather internal to the City of Hamilton, installation costs shall be funded from an appropriate capital budget. Maintenance and operation costs shall be funded from an appropriate operating budget and annual budgets shall be reasonably adjusted as decorative crosswalks are added or removed.

6.0 Roles & Responsibilities

- i. The General Manager of Public Works, or their delegate, shall be responsible for administering and recommending updates to this guideline;
- ii. Decorative crosswalk artwork approval shall be the responsibility of the Public Works Department, Transportation Operations & Maintenance Division and in collaboration with the Planning & Economic Development Department, Tourism & Culture Division.
- iii. The Public Works Department, Transportation Operations and Maintenance Division shall be responsible for coordinating, planning, implementing and maintaining decorative crosswalks in the City of Hamilton; and
- iv. Requestors shall share in the ownership and responsibility of decorative crosswalks as governed by any formal agreements or terms as they apply.



City of Hamilton
Community Safety Zone Selection Guideline

Community Safety Zone Selection Guideline

1.0 Introduction

A Community Safety Zone (CSZ) is a designated stretch of roadway marked with community safety zone signs which are recognized under Provincial legislation and allows the doubling of fines associated with speeding within the CSZ. Further, the Province of Ontario passed Bill 65, the Safer School Zones Act, which amended the Highway Traffic Act to facilitate the municipal adoption of Automated Speed Enforcement (ASE) technology on roads with speed limits under 80 km/h in designated school zones and CSZ's.

It is recognized that CSZ's help to change driver behaviour, including reducing speeding, distracted driving, and improving safety on roads where public safety is of special concern. This approach is in alignment with Vision Zero principals and the City of Hamilton Mission, Vision, values and goals.

This guideline has been developed to assist with the selection of CSZ's and is intended to provide a consistent, repeatable, transparent and defined method for designation and aid in responding to requests from Council and the public.

Scored ranking criteria is used to take roadway characteristics into account such as daily traffic volume, vehicle operating speed, pedestrian volumes, collision history, and the presence (or lack of) multi-modal amenities to determine areas that would benefit from being designated as a CSZ. The ranking of locations that meet the guideline will ensure that roadways with a greater number of vulnerable road users and higher exposures to roadway safety risk factors will receive priority designation.

This document is based on Provincial guidelines for the implementation of ASE and is comparable to criteria that is used by other municipalities in Ontario.

2.0 Selection Criteria

The Community Safety Zone Selection Guideline includes three criteria categories which are a) Risk Exposure, b) Collision Activity and c) Built Environment. Combined, the total score attained from review of each category is used to rank outcomes of reviewed roadways and prioritizes the implementation of CSZ designations.

2.1 Risk Exposure

Candidate locations are generally roadways with measurable poor speed limit compliance. In order to affect the largest population of drivers and benefit the largest number of vulnerable road users, a risk exposure index component is included in the site selection ranking. Risk exposure includes vehicle volume, 85th percentile vehicle speed, length of CSZ/school zone, school population and after school hour outdoor use data elements. While ASE may only be used during school hours, the after-hour use of the candidate location is an important exposure factor and is therefore included. The following ratings and weights, shall be utilized to obtain a scoring rank for the risk exposure criteria:

Table 2.1 – Risk Exposure Criteria

Component	Range	Rating	Weight
Traffic Volume (AADT)	< 1,000 v.p.d	1	3.0
"	1,001 to 3,000 v.p.d	2	
"	3001 to 5,000 v.p.d	3	
"	> 5,000 v.p.d	4	
Travel Speed	85 th percent - posted < 10 km/h	1	4.0
"	85 th percent - posted = 11 to 20 km/h	2	
"	85 th percent - posted = 21 to 30 km/h	3	
"	85 th percent - posted > 31 km/h	4	
Length of Zone	< 100 m	1	1.0
"	101 - 200 m	2	
"	201 - 300 m	3	
"	> 301 m	4	
School Population	<400 students	1	2.0
"	401 - 900 students	2	
"	901 - 1200 students	3	
"	> 1201 students	4	
After Hour Use	no	0	1.0
	yes	1	
2.1 Risk Exposure Total Score:			

2.2 Collision Activity

Collision history of candidate locations is an important consideration, however not all collisions are considered to have been speed related. Pedestrian - motor vehicle collisions and cyclist - motor vehicle collisions are included in the ranking process.

Collision data verification is required to determine which historical collisions occurred within the candidate location and which occurred beyond the zone. Rating only pedestrian – motorist and cyclist – motorist collisions equalizes local, collector and arterial roadways to some degree as arterial roadways tend to have higher numbers of collisions and more collision types than the lesser roadway classifications. The following ratings and weights, shall be used to obtain a scoring rank for the collision activity criteria:

Table 2.2 – Collision Activity Criteria

Component	Range	Rating	Weight
Prior 3 years Pedestrian - Motorist Collisions Only	0	0	4
"	1	2	
"	2	3	
"	3	4	
"	> 3	5	
Prior 3 years Cyclist - Motorist Collisions Only	0	0	4
"	1	2	
"	2	3	
"	3	4	
"	> 3	5	
2.2 Collision Activity Total Score:			

2.3 Built Environment

The absence of sidewalks, the presence of on-street bike lanes, the presence of on-street parking (whether permitted or prohibited), proximity to parks, the curvature of the roadway within and immediately adjacent to the candidate location and the presence of a speed limit transition within one kilometer of the candidate location are all factors which impact the comfort and safety of vulnerable road users. The applied scored criteria ensure that the environment of the candidate zone is reflected in the selection process. The following ratings and weights, shall be utilized to obtain a scoring rank for the built environment criteria:

Table 2.3 – Built Environment Criteria

Component	Range	Rating	Weight
Sidewalks	Both Sides	0	2.0
"	One Side Only	1	
"	None	2	
Bike Lanes	Both Sides	0	2.0
"	One Side Only	1	
"	None	2	
On Street Parking	None	1	1.0
	Present Although Prohibited	2	
	Present and Permitted	3	
Adjacent to Park	No	0	1.0
	Yes	3	
Roadway Curvature	None	0	2.0
	Present	1	
Speed Transition	None	0	2.0
	Present	1	
2.3 Built Environment Total Score:			

3.0 Application

Each of the three criteria categories (Risk Exposure, Collision Activity and Built Environment) shall be examined and total scores for each calculated, all three scores shall be combined to attain the total score for the candidate location.

Table 3.0 – Candidate Location Score

Criteria Category	Score
2.1 Risk Exposure Total Score:	
2.2 Collision Activity Total Score:	
2.3 Built Environment Total Score:	
Candidate Location Total Score:	

3.1 Minimum Score

A candidate location must achieve a minimum of 25 points in order to be considered for the designation of a CSZ.

3.2 Additional Influential Considerations

Other location specific considerations should be examined in addition to the scored criteria to determine if they should influence the priority ranking of the candidate location. These considerations include other vulnerable road users, types of schools, whether children or other vulnerable road users cross the road, percentage of students being driven to school versus walking, police and public input and whether schools have programs to actively encourage walking. Additional influential considerations shall be well documented and when viewed as elevating the priority of the candidate location, a validated explanation documented and provided.

3.3 Physical Feasibility Review

Prior to finalizing a candidate location's score and prioritization listing, a site audit must be conducted to ensure there are no physical impediments that may prevent or restrict the designation of a CSZ, including the full functionality of ASE equipment.

At a minimum, the following criteria should be reviewed at all candidate locations:

- There are no physical obstructions to signage or ASE equipment including on-street parking;
- If the location involves a change in the posted speed limit, the ability to accommodate a sufficient buffer;
- There is adequate boulevard space to accommodate ASE equipment; and
- There are no sharp curves in the road or extreme grading that may affect the operation of ASE equipment.

4.0 Ranking & Prioritization

Transportation Operations & Maintenance Division, Transportation Operations Section will maintain a master database of candidate location rankings, which shall be directly based upon the three criteria categories contained in the Community Safety Zone Selection Guideline. The database will contain the scored results for each candidate location and the total score attained. The ranking shall be sorted by highest scoring first and lowest scoring candidate locations last, additionally, a pass/fail indicator will be clearly established.

Additional influential considerations shall be included, and supplemental descriptions and documentation retained. A priority increase in ranking in the database shall be by approval by the Director after an assessment of information provided. Candidate locations that are given different ranking prioritization beyond the base criteria score must include a clear indicator on the master database.

5.0 Implementation

Implementation, meaning the formal designation of a CSZ via inclusion in the Traffic By-law and posting of signage, shall be incorporated into the Vision Zero Action Plan annual activities or as deemed necessary by the routine review of roadway safety.

The ASE pilot project, and/or future permanent establishment of an ASE program, will be coordinated with the implementation of CSZ's as required to support the pilot/program.

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Tables

NOTE: BOLD text represents the new and updated policies.

GENERAL				
Policy No.	NEW Policy No.	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
G.01	G.01	Planning and Servicing Policies	<i>"The City of Hamilton shall harmonize planning and servicing policies and processes within the City of Hamilton Planning and Public Works Departments"</i>	<ul style="list-style-type: none"> - The City will comply with the development and servicing requirements of the Greenbelt Protection Act and the Places to Grow Act. - Planning decisions should be made with recognition of the infrastructure requirements.
G.02	G.02	Planning and Servicing Policies	<i>"The City of Hamilton shall harmonize planning and servicing policies and strategies with provincial and regional policies and strategies"</i>	<ul style="list-style-type: none"> - The City should evaluate servicing strategies and requirements of neighbouring municipalities to determine potential impact to the City's servicing strategies - Where applicable, the City should consider harmonizing servicing strategies - Water and wastewater servicing strategies and needs in neighbouring municipalities could impact timing of the City's implementation program
G.03	G.03	New Development	<i>"The City of Hamilton shall not permit partial servicing for new development"</i>	<ul style="list-style-type: none"> - Consider guidelines established by the Ministry of Environment, Climate and Parks (MECP) and Ministry of Municipal Affairs and Housing (MMAH) as well as the Provincial Policy Statement - Municipal water and wastewater services best support sustainability and management of land uses
G.04	G.04	Servicing Strategy - Municipal Servicing	<i>"Provision of municipal water and wastewater servicing shall be considered a priority for growth areas within the City of Hamilton"</i>	<ul style="list-style-type: none"> - Consider economic and technical servicing viability of supporting growth with local rural supply or with extension of lake-based supply. - Phasing of the extension of municipal services shall be evaluated in conjunction with phasing of growth as identified in the Official Plan - Provide servicing to support urban intensification. - Avoid potential issues related to breakdown of private systems. - Servicing with new well-based supply will require evaluation of hydrogeological conditions to ensure long term viability of source.
G.05	G.05	Planning Horizon	<i>"The City of Hamilton shall ensure that the design of water and wastewater infrastructure recognizes the potential for growth beyond the time horizon of the Official Plan"</i>	<ul style="list-style-type: none"> - Recognize that the service life of infrastructure may be 30 years or more. - Consider, where appropriate, potential for growth beyond the time horizon of the Official Plan for the planning and sizing of infrastructure - Evaluate the value of oversizing versus future twinning of services. - Consider: <ul style="list-style-type: none"> - Potential ultimate site requirements - Potential for phasing implementation and construction - Potential need for infrastructure oversizing - Overall project life cycle cost
G.06	G.06	Existing Infrastructure	<i>"The City of Hamilton shall maximize the use of existing capacity, prior to the upgrading or expansion of infrastructure"</i>	<ul style="list-style-type: none"> - Planning and design of servicing strategies should utilize capacity of existing infrastructure where available.
G.07	G.07	Reserve Capacity	<i>"The City of Hamilton shall maintain sufficient reserve capacity in its water and wastewater infrastructure and facilities to provide operational flexibility and meet potential changes in servicing conditions"</i>	<ul style="list-style-type: none"> - Recognize the time frame required to implement expansion of the infrastructure and facilities and initiate planning, the EA process, design and construction for expansion with consideration of the in-service date. - Consider timing expansions to withstand impacts from: <ul style="list-style-type: none"> - Extreme conditions (such as power failures); - Equipment shutdowns (planned or unplanned); - Fluctuation in growth rates; - Fluctuating demand criteria; and, - Decreasing system and equipment performance - Day to day operation and maintenance of infrastructure and facilities requires flexibility for operating conditions, fluctuating flows, equipment shutdowns, maintenance, emergency operations and other unforeseen conditions - Inability to maintain adequate operating capacity may trigger future expansions or upgrades of the infrastructure - Additional capacity for infrastructure and facilities will consider full rated capacity and appropriate reserve capacity defined through design criteria
G.08	G.08	Standards and By-Laws	<i>"The City of Hamilton shall adopt city-wide development standards, design standards, and by-laws"</i>	<ul style="list-style-type: none"> - Ensure consistency with Best Practices. - Ensure consistency of processes and equipment within facilities. - Incorporate feedback from Operations and Maintenance.
G.09	G.09	Efficiency and Optimization	<i>"The City of Hamilton shall implement best practices and standards to ensure system efficiency and optimization through infrastructure planning, design, operation, and maintenance"</i>	<ul style="list-style-type: none"> - All aspects of planning, design, operation and maintenance should consider efficiency and optimization. - Where applicable, implementation of energy-efficient components and/or practices and their impact on the full life-cycle costing should be evaluated. - Maintenance management systems should be developed to ensure that equipment is properly maintained and operating efficiently. - Facilities will be planned and designed with consideration to minimize overall lifecycle costs, including capital and operating/maintenance costs - Attention to energy use will provide significant opportunity to optimize lifecycle costs - Alternative infrastructure strategies should be considered to minimize energy (ie: water storage vs pumping)
G.10	G.10	Communication	<i>"The City of Hamilton shall ensure open communications between the public, review agencies, and City Departments,"</i>	<ul style="list-style-type: none"> - Master Plan will follow open communication process; points of contact will include, but not limited to: <ul style="list-style-type: none"> - Points of public contact; - Points of contact with regulatory agencies; or - Points of contact with internal staff and other departments. - Communication aligns with existing policies such as the Hamilton Public Engagement Charter - https://www.hamilton.ca/city-initiatives/priority-projects/hamilton-public-engagement
G.11	G.11	Services and Facility Location	<i>"The City of Hamilton shall endeavour to locate all of its services and facilities on public property or on municipally-owned easements"</i>	<ul style="list-style-type: none"> - The City should ensure that any new and existing infrastructure be located within road right-of-ways, or on City-owned property (including designated lots and easements). - Adequate property size should be maintained to facilitate all day-to-day activities and emergency response. - Where feasible, property is to be sized to allow for future expansion and/or end-of-life replacement while maintaining customer service with original asset.
G.12	G.12	Monitoring	<i>"The City of Hamilton shall continue to monitor water and wastewater system conditions and water production/wastewater collection flow information"</i>	<ul style="list-style-type: none"> - Monitor water production, water consumption, pumping station and reservoir data, billing records and data for residential and non-residential land uses. - Monitor wastewater flows to the plant, pumping station data, infiltration, and data for residential and non-residential land uses. - Use the data to gauge changes in trends in water use that might impact capital programs or billings. - Use the data to complete ongoing updates and calibration to hydraulic modelling tools

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Tables

GENERAL				
Policy No.	NEW Policy No.	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
NEW	G.13	Environmental Protection	<i>"The City of Hamilton shall consider, protect and endeavour to minimize impact to the natural, built and cultural environment and heritage of the community"</i>	<ul style="list-style-type: none"> - Servicing studies shall consider the City's Official Plan's Environmental and Heritage Policies - Services will be planned through the appropriate Environmental Assessment process to ensure full regard for the natural and cultural heritage
NEW	G.14	System Reliability and Security	<i>"City of Hamilton shall endeavor to provide operational flexibility, reliability, redundancy and security in its water and wastewater systems, prioritizing high risk and critical areas."</i>	<ul style="list-style-type: none"> - Recognize that all systems are susceptible to some level of failure or breakdown, or need to be taken out of service for regular maintenance. It is reasonable to provide a level of reliability to ensure an acceptable level of service is maintained - System reliability will be further defined through design criteria
NEW	G.15	Climate Change	<i>"The City of Hamilton shall consider the potential impact of climate change and ensure that it helps guide the planning and sizing of infrastructure, in line with the City's Climate Change Task Force Report."</i>	<ul style="list-style-type: none"> - Water and wastewater infrastructure and facilities will be designed with consideration to the potential impacts of climate change - The City's Drinking Water Quality Management Standard (DWQMS) must consider climate change during the review and risk assessment of infrastructure; - The Ministry of the Environment, Conservation and Parks' "Climate Ready: Adaptation Strategy and Action Plan" will provide direction to the City's climate change initiatives - Hamilton Water recognizes that Council has declared a Climate Emergency, and will consider/acknowledge this in Master Planning process and strategies - Collaboration with the City's Climate Change Task Force will be undertaken
NEW	G.16	Level of Service	<i>"The City of Hamilton shall outline the Level of Service Objectives through the Master Plan and endeavor to meet or exceed the minimum requirements as outlined in the objectives."</i>	<ul style="list-style-type: none"> - The City will review and evaluate strategies developed through the Master Plan based on their ability to meet requirements outlined in the Level of Service Objectives
NEW	G.17	Program Costing	<i>"The City of Hamilton shall utilize a transparent, traceable and consistent costing methodology to establish Master Plan level capital project costs"</i>	<ul style="list-style-type: none"> - Methodology for cost estimates will be documented as part of the Master Plan, which will be a process that can be used for subsequent analyses - City will periodically review the costing methodology and unit costs to ensure cost estimates are appropriate and as accurate as possible - City will consider life cycle cost analysis in Master Plan decision making process
NEW	G.18	Strategic Plan	<i>"The City of Hamilton will recommend Water and Wastewater Servicing Strategies that align with the City's 2016-2025 Strategic Plan"</i>	<ul style="list-style-type: none"> - Provide high quality, cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner
NEW	G.19	Operations	<i>"The City of Hamilton will consider City operating procedures when recommending Master Plan servicing strategies, location and sizing of infrastructure"</i>	<ul style="list-style-type: none"> - Servicing strategies will take into consideration operating protocols in place to reduce operating costs, maintain water quality and service pressure standards. Maintain adequate fire storage columns and maintain system redundancy necessary to facilitate maintenance or emergency operations. - System designs shall consider diurnal and seasonal fluctuations in demand to function efficiently within the full range of low to high demand
NEW	G.20	Coordination	<i>"The City of Hamilton shall maintain current and update as needed the Water, Wastewater and Storm Water Master Plan to align with and inform the Development Charges Background Study updates"</i>	<ul style="list-style-type: none"> - Endeavour to complete timely updates - Ensure coordination with the Finance Department schedule for updates - Maintain tracking of implementation of DC projects to facilitate DC updates - Ensure DC funds are utilized through the State of Good Repair Program (CPMS)

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Tables

WATER				
Policy No.	NEW Policy No.	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
W.01	W.01	Raw Water Sources	<i>"The City of Hamilton shall endeavour to protect its raw water sources"</i>	<ul style="list-style-type: none"> - Applies to both lake-based and groundwater-based supplies. - Discharge a high quality effluent from Hamilton's wastewater treatment plants and comply with Hamilton Harbour RAP, Niagara River RAP, Welland River Watershed Strategy and F-5-5 targets, and/or new regulations as applicable. - Interact with the stormwater and water resources policies. - Monitor water quality of the lake and if necessary, evaluate and optimize the water treatment plant intake location. - Continue participation in the International Joint Commission on the Great Lakes and address water quality issues for Lake Ontario. - Continue coordination with the Halton-Hamilton Source Protection Region's (SPR) Source Protection Plan as mandated by the Clean Water Act
W.02	W.02	Water Supply and Distribution System - Water Quality	<i>"The City of Hamilton shall meet or exceed legislated water quality criteria throughout the distribution system"</i>	<ul style="list-style-type: none"> - Water quality should meet or exceed all legislated criteria - Water quality objectives should meet or exceed historical performance. - Maximize the potential capacity and performance of the facilities and equipment to achieve the best water quality on an on-going basis. - Review the economics, reliability and water quality impacts of implementing new technology. - Implement best practices to ensure sustainability of Operations and Maintenance, Maintenance Management, Systems, Training, Manuals, other monitoring/trending data is maintained - Objectives can be achieved through implementing best practices including the following: <ul style="list-style-type: none"> - Looping of watermain; - Regular and unidirectional flushing of the watermain; - Re-chlorination where necessary to maintain residual criteria; - Optimizing operational practices for storage facilities and booster pumping stations; - Examine use of back flow preventers (industrial vs other areas); - Replacement of cast iron watermain; and, - Monitoring of facilities for malfunction and for intrusion.
	W.03	Drinking Water Quality Management System	<i>"The City of Hamilton owns, maintains and operates various drinking water systems and is committed to: Safe, high quality, consistent supply of drinking water; Always improving the Drinking Water Quality Management System; Following and complying with applicable legislation; Effective and open communication with the community concerning matters of drinking water quality"</i>	<ul style="list-style-type: none"> - Objectives can be achieved through implementing best practices including the following: <ul style="list-style-type: none"> - Looping of watermain - Regular and unidirectional flushing of the watermain - Re-chlorination where necessary to maintain residual criteria; - Optimizing operational practices for storage facilities and booster pumping stations; - Examine use of back flow preventers (industrial vs other areas); - Replacement of cast iron watermain; and - Monitoring of facilities for malfunction and for intrusion.
W.03	W.04	Distribution Requirements	<i>"The City of Hamilton shall provide potable water at adequate pressure and flow to its customers"</i>	<ul style="list-style-type: none"> - Provide pressures and flows which meet current design criteria and standards. - MECP Guidelines identify a typical recommended operating range of 275-700 kPa (40-100 psi). - Evaluate impacts of tightening operating pressure range. - Where possible design systems with the lowest reliable pressure to minimize Non-revenue Water Loss
W.04	W.05	Water Supply and Distribution System - Reliability and Security	<i>"The City of Hamilton shall plan, design, construct, operate and maintain the water system to balance level of service and security of supply to the customers"</i>	<ul style="list-style-type: none"> - The City shall continue to implement standards, criteria, and standard operating procedures for the water system - Objectives can be achieved through implementing best practices including the following: <ul style="list-style-type: none"> - Multiple supply points to service areas and pressure districts; - Twinning major feeder mains; - Looping of watermain; - Providing stand-by power; - Providing sufficient valves to ensure that critical watermain can be isolated for maintenance or repair; - Regular maintenance; - Repair and replacement programs; and, - Staff training. - Provide redundant network design and assets that allow prolonged outage for maintenance and rehabilitation of critical assets
W.06	W.06	Fire Flow	<i>"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"</i>	<ul style="list-style-type: none"> - Provide pressures and flows which meet current design criteria and standards. - Consider establishing separate minimum criteria and standards for both urban and rural servicing - Dialogue with fire department, industry leaders and insurance industry.
W.08	W.07	Emergency Conditions	<i>"The City of Hamilton shall have an adequate combination of reservoir capacity, pumping capacity, and stand-by power to meet the desired level of service under emergency conditions"</i>	<ul style="list-style-type: none"> - Determine the level of service to be provided under emergency conditions including the following criteria: <ul style="list-style-type: none"> - Water demand conditions to be met (i.e. average day vs. max day); - Acceptable pressures and flows; and - Duration to be met. - Adjust operating procedures that recognize seasonal variations in demands that ensure readiness for emergency (e.g. extend reservoir filling beyond off-peak hydro periods as needed to ensure adequate volume in the summer)

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Tables

WATER				
Policy No.	NEW Policy No.	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
W.09	W.08	Water Conservation, Efficiency and Consumption Trends	<i>"The City of Hamilton shall encourage and promote water conservation with an awareness of the impacts of efficiency and conservation on the water network"</i>	<p>Continue to assess water demand conditions and determine reasonableness of trends (potential lower water use and consumption)</p> <p>Utilize water efficiency studies where available</p> <p>Apply where appropriate demand trends (efficiency) into future design criteria and growth forecasts</p> <p>Consider the potential impact to design criteria, demand projections, servicing strategies and scheduling of future infrastructure</p> <p>Objectives can be achieved through implementing best practices including but not limited to the following:</p> <ul style="list-style-type: none"> Restricted lawn watering by-law; Public education; Plumbing code requirements for new construction including low-flow aerators, shower heads and toilets; Use of rain barrels; Encouraging low-maintenance landscaping and native species; and, Implementing an increasing blockwater rate structure.
NEW	W.09	Health & Safety	<i>"The City of Hamilton will promote health, productivity and safety of the community through design, construction and maintenance of the City's potable water infrastructure"</i>	<ul style="list-style-type: none"> - The City will prepare a comprehensive strategy to manage existing and future water servicing needs - Ensure that planning and implementation of the potable water systems are consistent with legislative policies and guidelines - Municipal servicing will be implemented under typical standards (MECP Guidelines, City's criteria and standards)
NEW	W.10	Water Demand Projections	<i>"The City of Hamilton shall utilize a water demand projection methodology that uses City design criteria and recognizes recent water supply data and current consumption trends"</i>	<p>Forward-looking water demand projections in the Master Plan must reasonably estimate future water needs to ensure appropriate recommendations for infrastructure capacity and timing</p> <p>The City will utilize a methodology which accounts for recent historical water demands and usage to estimate a starting point from which to project growth demand</p> <p>The City will utilize current water design criteria for new growth demand</p> <p>All infrastructure to be designed in accordance with the City's Design Standards and Guidelines</p> <p>Where a conflict between projected in-service date for upgrades or new assets derived from A) PPS/GRIDS2 rate of development, versus B) actual rate of development, Hamilton Water will adjust in-service date (delay/accelerate) timing considering actual rate of development. A Capacity Accounting database will inform decisions on in-service timing</p>
NEW	W.11	Water Storage	<i>"The City of Hamilton shall adopt the MECP Guidelines as the minimum acceptable level/volume of water storage"</i>	<ul style="list-style-type: none"> - Provide adequate level/volume of storage which meets current design criteria and standards - Consider level of storage required under floating versus pumped conditions to meet equalization, fire and emergency storage as well as to meet operational flexibility requirements - Consider establishing separate minimum criteria and standards for both urban and rural servicing - Consider division of storage reservoirs into smaller cells to create operational flexibility satisfying water quality issues and LOS requirements at the same time
NEW	W.12	Operational Flexibility and Energy Management	<i>"City of Hamilton shall consider levels of storage beyond MECP Guidelines where appropriate in order to provide operational flexibility, energy management and system security"</i>	<ul style="list-style-type: none"> - Consideration should be given to optimizing lifecycle costs for the water system as storage can minimize pumping energy costs - Water storage can provide opportunities for optimization of pumping strategies - Water storage can provide additional level of service and security under emergency conditions, particularly for any areas across the Region with limited redundancy - The City's operating strategies will consider the City's Corporate Energy Policy and will ensure that there is no conflict between energy savings, service delivery (water quality), and minimum operational storage requirement - Consider division of storage reservoirs into smaller cells to create operational flexibility satisfying water quality issues and LOS requirements at the same time

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Tables

WASTEWATER				
Policy No.	NEW Policy No.	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
WW.01	WW.01	New Growth Areas - Separated System	"Provision of separate sanitary and storm sewer systems shall be considered a priority for all new growth areas"	Infilling within existing combined sewer service areas could proceed without having to provide separated sewers. Significant redevelopment may provide opportunities for sewer separation Separate sanitary and storm sewer to be provided within greenfield growth areas
WW.02	WW.02	Sewer Use Criteria	"City of Hamilton shall maintain a sewer use program that sets the appropriate limits and procedures to control discharge and maintains a suitable effluent and biosolids quality"	The City should adopt a monitoring program to detect sources of high strength or hazardous wastes. Where applicable, the City should stipulate pre-treatment to acceptable standards for discharge into municipal sewers based on the bylaw. Review and maintain a sewer use by-law, which is supported by Council The City shall consider over-strength discharge and surcharge permits to manage plant capacities
WW.03	WW.03	Wastewater Collection and Pumping Systems - Reliability and Security	"The City of Hamilton shall provide adequate reliability and security in wastewater pumping and collection systems"	Forcemain twinning should be examined to provide adequate velocities during different phases of development and also to provide security in operation The City should have adequate security in the pumping systems and will consider installation standby power. Adequate retention capacity should be provided in the sewer system. City shall endeavour to provide sewer capacity to agreed level of service as outlined in design criteria
WW.04	WW.04	Combined Sewer Overflow	"The City of Hamilton shall endeavour to meet or exceed the MECP Procedure F-5- 5 and HH- RAP for CSO control"	Best practices and criteria were developed through Wet Weather Control Policy Workshops and strategies will be further developed/refined through recommendations of the future Pollution Prevention Control Plan (PPCP) and future Flooding and Drainage Master Servicing Study (FDMSS)
WW.05	WW.05	Hamilton Harbour Loading	"The City of Hamilton shall meet the Hamilton Harbour Remedial Action Plan (RAP) initial loading objectives and work towards the refinement and achievement of the final stage loading objectives"	Best practices and criteria were developed through Wet Weather Control Policy Workshops and strategies will be further developed/refined through recommendations of the future Pollution Prevention Control Plan (PPCP) and future Flooding and Drainage Master Servicing Study (FDMSS)
WW.06	WW.06	Wastewater Treatment	"The City of Hamilton shall meet or exceed the requirements of the ECA and the appropriate legislated treatment criteria"	- The City should evaluate how the Hamilton Harbour Remedial Action Plan loading objectives impact the rated capacity of the plant and ascertain the need for technology upgrades
WW.08	WW.07	Biosolids Management	"The City of Hamilton shall ensure that there is a Biosolids Management Strategy that addresses the needs of all residents within the City boundary"	- The City should ensure that there is sufficient biosolids management capacity to address the lake-based system needs, as well as the private system needs for all residents within the development boundary - The City is currently in a long term contract for biosolids management and will ensure that it remains in compliance with the contract
NEW	WW.08	Health & Safety	"City of Hamilton will promote health, productivity and safety of the community through design, construction and maintenance of the City's wastewater infrastructure"	- The City will prepare, maintain and update comprehensive strategies to manage existing and future wastewater servicing needs - Ensure that planning and implementation of the wastewater systems are consistent with legislative policies and guidelines - Municipal servicing will be implemented under typical standards (MECP Guidelines, City's criteria and standards)
NEW	WW.09	Wastewater Flow Projections	"City of Hamilton shall utilize a wastewater flow projection methodology that uses City design criteria and recognizes recent wastewater flow and treatment data and current consumption trends"	- Forward-looking wastewater flow projections in the Master Plan must appropriately identify future wastewater needs to ensure the best estimate for infrastructure capacity and timing - The City will utilize a methodology which accounts for recent historical water demands and usage to estimate a starting point from which to project growth demand - The City will utilize current wastewater design criteria for projecting new growth flow - All infrastructure to be designed in accordance with the City's Design Standards and Guidelines
NEW	WW.10	Environmental Compliance	"City of Hamilton shall meet as a minimum the requirements of the Environmental Compliance Approvals set out by governing bodies and the appropriate legislated treatment and collection criteria."	- Wastewater quality (air and effluent) will meet as a minimum all legislated criteria. - Manage wet weather conditions (inflow / infiltration) through asset management programs to minimize extraneous flows and maximize efficient use of available wastewater infrastructure - Implement industry best practices to ensure effluent quality is maintained - Review the economics, reliability and effluent quality impacts of implementing new technology
NEW	WW.11	Wet Weather Flow Criteria	"City of Hamilton shall utilize current wet weather flow criteria to determine peak wet weather flows and size wastewater infrastructure"	- Existing systems across the City have a range of existing performance and levels of service under wet weather flow conditions. Notwithstanding existing conditions, City of Hamilton shall consider planning for new growth consistently across all systems - The desired level of service under wet weather conditions will be established through the Master Plan design criteria in conjunction with other related studies - Consideration to environmental, social and financial factors as well as the feasibility for implementation should be given when determining the wet weather criteria
NEW	WW.12	Wet Weather Strategies	"City of Hamilton shall review a combination of servicing strategies including infrastructure and non-infrastructure (e.g. VI reduction) solutions to meet wet weather level of service and provide sufficient wastewater capacity."	- The City's Master Plan will develop and evaluate a comprehensive list of alternatives against multiple-bottom-line criteria including lifecycle costs - The most cost-effective and beneficial strategy may include not providing additional infrastructure but creating additional capacity through flow reduction methods such as inflow/infiltration control
NEW	WW.13	Capacity Allocation	"City of Hamilton shall review opportunities to allocate capacity gained through implementation of wet weather strategies and system optimization for growth and non-growth benefit"	- Provision of additional capacity within the wastewater system will need to consider the desired benefit - Additional capacity may be required to meet regulatory requirements or to improve level of service in the system

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Table

STORMWATER				
Policy Ref. No.	Policy Document Reference	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
SW.01	SDP (3.1)	Quantity Control	Level of quantity control (flood and erosion control) for subject lands is governed by Watershed/Subwatershed Study or Master Drainage Plan, where they exist.	<ul style="list-style-type: none"> - Review available studies to confirm whether one is applicable to subject lands - Include Stormwater Master Plan criteria (watershed-based) - Where no such study is available, consult with City staff - City to provide a clear and organized list or inventory of applicable higher-level studies and their applicability to specific areas to provide clear guidance to practitioners
SW.02	CDG (G.5.3.1)	Quantity and Erosion Control	Runoff peak flows under post-development conditions are to be controlled to estimated pre-development levels or less (for the 2 through 100 year return periods at a minimum), unless the proponent can demonstrate through appropriate modelling and analysis that uncontrolled flows will not cause detrimental impacts on downstream properties. City may require peak flow control for the Regional Storm (Hurricane Hazel) in certain cases with higher downstream risks.	<ul style="list-style-type: none"> - Applies for the 2 through 100 year return periods - Default approach to quantity control in the absence of higher level studies - Should also consider erosion control requirements - Typically based on an event based analysis approach - Practitioner to assess changes in flows under existing and proposed conditions for the Regional Storm (Hurricane Hazel) and confirm significance of changes - Reference is made to TRCA Study (2016) on Approaches to Regional Flow Controls
SW.03	CDG (G.5.3.2)	Quantity and Erosion Control	Where no subwatershed plan exists, provide adequate erosion protection in accordance with Provincial Guidelines, unless it can be demonstrated through appropriate modelling and/or analysis that stream stability will not be adversely affected by the proposed development	<ul style="list-style-type: none"> - Undertake assessment of the downstream watercourse receiver to assess erosion susceptibility and critical flow values (event based or continuous simulation based) - In the absence of higher level guidance, provide extended detention of the 25 mm storm event as per the Ministry of the Environment's Stormwater planning and Design Manual (2003) - Ensure 25 mm storm event is retained for 24-48 hours, potentially 12 hours in constrained conditions to minimize downstream impacts - City and Conservation Authority to provide a clear scope of work to undertake an erosion assessment of the downstream watercourse receiver, or available information on previously completed assessments
SW.04	CDG (F.1.1)	Quantity and Erosion Control	Where the outlet is a combined sewer, the Consulting Engineer shall contact City Staff during the preliminary Engineering stage to determine specific constraints, if any, that may limit discharge. The City of Hamilton's typical requirements for combined sewer areas is control of the 100-year post development peak flow to the 2-year pre-development peak flow, or the capacity of the receiving sewer, whichever is less.	<ul style="list-style-type: none"> - Contact City staff to confirm constraints on discharge - Include an assessment of capacity of downstream receiver
SW.05	CDG (G.2.1.1)	Conveyance System	In the absence of senior study guidance, storm sewers shall be designed to a minimum one in five year unsurcharged standard (85% of pipe capacity), with a minimum pipe diameter of 300 mm. A more stringent design standard may be required at the discretion of the City of Hamilton in areas where a higher design standard has previously been applied, or areas with constrained major system (overland flow) capacity.	<ul style="list-style-type: none"> - Use City specified current IDF and approved methodologies to determine flow - Use storm sewer design sheet and/or hydraulic modelling to confirm pipe capacity

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Table

STORMWATER				
Policy Ref. No.	Policy Document Reference	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
SW.06	CDG (G2.1.1)	Conveyance System	Hydraulic analysis of the proposed and existing storm sewer system shall provide hydraulic grade lines based on the actual and proposed inlet capacity and/or one in 5 year standard and one in 100 year standard.	<ul style="list-style-type: none"> - HGL analysis would be expected to require hydraulic modelling, generally dual drainage modelling - May require consideration of inlet control devices, consult City staff - Inlet capacity analysis shall consider dynamic inlet capacity associated with different type of inlets and locations - Mandatory for any areas with directly connected foundation drains
SW.07	SDP (3.1.3)	Conveyance System	Basement floor elevations shall be constructed above the maximum 100-year hydraulic grade line, with a minimum freeboard of 0.30 m.	<ul style="list-style-type: none"> - HGL analysis would be expected to require hydraulic modelling, generally dual drainage modelling - May require consideration of inlet control devices, consult City staff - In the case of an already surcharged storm sewer, no increase in surcharge should result - Inlet capacity analysis shall consider dynamic inlet capacity associated with different type of inlets and locations - Mandatory for any areas with directly connected foundation drains
SW.08	CDG (G2.1.1)	Conveyance System	100 year HGL in the storm sewer system is to remain below the surface to ensure that there is no interference with the overland system	<ul style="list-style-type: none"> - HGL analysis would be expected to require hydraulic modelling, generally dual drainage modelling - May require consideration of inlet control devices consult City staff - In the case of a constrained system (shallow sewer), need to ensure the protection of private property and public safety - Inlet capacity analysis shall consider dynamic inlet capacity associated with different type of inlets and locations - Mandatory for any areas with directly connected foundation drains
SW.09	SDP (3.1.3)	Conveyance System	The City of Hamilton supports the policies of the local Conservation Authorities which generally require that no new building be subject to flood damages from the Regulatory Flood (greater of the Regional Storm or 100 year flood).	<ul style="list-style-type: none"> - Consult with appropriate Conservation Authority for most current floodplain mapping and guidance - 2-Dimensional hydraulic modelling may be appropriate in some cases, contact City staff
SW.10	SDP (3.1.3) and CDG (G.2.3..1)	Conveyance System	The roadway network in subdivisions, along with primary designated swales must be able to convey the 100 year flood without flooding private property , and without exceeding flooding depths above the roadway crown (0 mm for arterial and emergency routes, 150 mm for all other road classifications)	<ul style="list-style-type: none"> - Likely requires an HGL analysis with hydraulic modelling, specifically dual drainage modelling - More simplified analytical approaches may be possible however need to sufficiently consider inlet capacity as outlined in previous policies on HGL analyses - City may, in its sole discretion, require consideration of debris blockage of inlets in critical locations, including sag points - City may require 2-Dimensional hydraulic modelling in flat or poorly defined areas

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Table

STORMWATER				
Policy Ref. No.	Policy Document Reference	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
SW.11	NA	Climate Change	The City of Hamilton has recently adopted a Climate Change Task Force Report, which includes measures such as advocating to the Ministry of the Environment, Conservation and Parks for updated standards/guidance and pending Low Impact Development Guidelines. Direction is still pending on any potential modifications to the overall design of SWM features to reflect the expected impacts of Climate Change. In the absence of any formal direction or study, consult with City staff to determine the preferred approach to address the influence on stormwater system planning and associated resiliency requirements.	<ul style="list-style-type: none"> - Direction to be provided from future City Study - Interim direction also to be considered, including "stress test" approach/sensitivity analysis, or formal adjustments to approved IDF curves (direct inclusion in design) - Direction required on tools to be used or adjustment to be made - Periodic review of IDF curves in the interim (review in 2015 determined no update required) - Consideration of Regional IDF updates (multiple gauge sources) - City to advocate to Ministry of the Environment, Conservation and Parks for updated standards/guidance - Consideration of pending Low Impact Development Guidelines
SW.12	CDG (G.5.1.1)	Analytical Methods	The City of Hamilton will have to approve the selected temporal distribution (i.e. design storm) used by proponents for stormwater management analysis and design, based on a sensitivity analysis. For the design of any stormwater storage (quantity control) features, the design shall be based on a design storm with a duration of 24 hours, unless a shorter-duration storm event is shown to be the critical event with respect to required storage volume.	<ul style="list-style-type: none"> - Assess the various design storm distributions (AES, SCS, Chicago) for various durations (6, 12, 24 hour) to determine which yields the highest peak flow - Different storms may govern for pre-development and post-development conditions, should consider which yields the greatest SWM requirements
SW.13	CDG (G.2.1.5)	Drainage Connections	All roof leaders shall be discharged to surface, unless there is insufficient available space to infiltrate safely at source, using Low Impact Development (LID) design features if feasible. If connection to storm sewer is the only feasible alternative, LID design features (such as a "clean water collector" or exfiltration pipe systems) must be incorporated to reduce impacts where feasible, and storm sewer designs must include the impacts of direct flow contribution from roof leaders, including for more formative storm events.	<ul style="list-style-type: none"> - Intended to promote at source infiltration and reduced surface runoff - For Low Impact Development (LID) measures, roof water typically considered "clean" and preferred for infiltration (rear-yard soakaways) - Need to consider maintenance requirements and locations for soakaways (as per Table G.1 - "Discouraged in residential land use due to maintenance and impacts on use of rear yards") - Where roof leader connection is more logical, encourage sub-surface LID BMPs (clean water collector or exfiltration pipes), or where not feasible, over-sized storm sewers for sufficient conveyance - Reference to pending Low Impact Development Guidelines
SW.14	CDG (G.2.2)	Drainage Connections	Lowest building opening elevation (i.e. basement window sill) shall always be above the maximum ponding level above the rear yard catchbasin at which point there would be safe overland relief. Where it is demonstrated that it is not feasible to limit ponding to 0.33 m it shall be demonstrated that full capture of runoff from the 100-year event or a safe overland flow route can be achieved. These requirements shall be confirmed through a hydraulic gradeline (HGL) analysis.	<ul style="list-style-type: none"> - Need to ensure a fulsome HGL analysis of storm sewer system and surface grading/storage to assess potential implications - RYCBs should ideally be above roadway CBs; impacts to flooding to be considered as part of a fulsome HGL analysis

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Table

STORMWATER				
Policy Ref. No.	Policy Document Reference	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
SW.15	CDG (G.2.5.3)	SWM Controls Systems Design	Oil/grit separators are most appropriate for commercial/industrial land use and shall not be used as a stand-alone SWMP, but rather as part of a "treatment train" approach to achieve the required quality treatment. The "treatment train" approach (incorporation of two or more quality control measures in series) shall be required for all stormwater quality control measures, not only oil/grit separators.	<ul style="list-style-type: none"> - Ensure at least one other SWM quality control measure is implemented to ensure that treatment quality rate is achieved - Reference to pending Low Impact Development Guidelines
SW.16	CDG (G.2.5.3)	SWM Controls Systems Design	The City of Hamilton is prepared to accept the Canadian Environmental Testing Verification (CA-ETV) Program, that stand-alone oil-grit separator devices can achieve a TSS removal efficiency of between 50 and 60% based on the application of the CA-ETV particle size distribution (PSD). The City will credit the verified TSS removal rate determined from the CA-ETV program, to a maximum of 60% TSS removal. Only OGS units certified through the CA-ETV program are acceptable to the City.	<ul style="list-style-type: none"> - Reference is made to the CA-ETV website (etvcanada.ca)
SW.17	CDG (G.2.5.3)	SWM Controls System Design	The City of Hamilton supports the application of Low Impact Development Best Management Practices (LID BMPs) and Green Infrastructure (GI) subject to the completion of required site analyses to ensure long-term functionality. The City of Hamilton supports the retention and infiltration of the first 5 mm of rainfall (or other target as established by an available higher level study) for Industrial/Commercial/Institutional (ICI) lands, unless it can be clearly demonstrated why this is not technically feasible. The City may support this approach for other land uses on a case by case basis.	<ul style="list-style-type: none"> - Place onus on practitioner to demonstrate why infiltration is not feasible, rather than why it is feasible - Provide quantity control credit for proposed infiltration measures (erosion control and water budget only - not flood control) - City to update Tables G.1 and G.2 in CDG to reflect proposed approach - Reference to pending Low Impact Development Design Guidelines - Requires site plan agreement and bylaw to enforce operations and maintenance requirements for privately owned SWM infrastructure
SW.18	CDG (G.2.5.3)	SWM Controls System Design	The City of Hamilton supports the application of new and innovative technologies and techniques for stormwater management, where sufficient testing and information is available to support their application. Consult with City staff to review the most current information related to currently approved technologies and techniques, and the process for approval of new technologies and techniques.	<ul style="list-style-type: none"> - City to maintain a separate list of approved technologies under different categories (source control measures, water quality control measures, etcetera) - City to generate a separate defined procedure For the review and approval of potential new technologies and approaches

City of Hamilton Water, Wastewater and Stormwater Master Plans Policy Summary Table

STORMWATER				
Policy Ref. No.	Policy Document Reference	Policy Area	Policy Statement	Best Practices, Criteria and Potential Servicing Implications
SW.19	CDG (G.2.5.3)	SWM Controls Systems Design	The City of Hamilton supports the application of sub-surface storage chambers for the provision of site-level quantity control, provided that requirements for long-term functionality operation and maintenance are addressed to the City's satisfaction.	<ul style="list-style-type: none"> - City to maintain a separate list of approved technologies under different categories (source control measures, water quality control measures, etc.) - City to generate a separate defined procedure for the review and approval of potential new technologies and approaches

SDP City of Hamilton Storm Drainage Policy (Philips Engineering Ltd, May 2004)
SMP City of Hamilton Stormwater Master Plan (Aquafor Beech Limited, May 2007)
CGID City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (Philips Engineering Ltd, September 2007)
CDG City of Hamilton Comprehensive Development Guidelines and Financial Policies Manual (2019)