CITY OF HAMILTON
2024 DEVELOPMENT CHARGES UPDATE

STORMWATER
BACKGROUND STUDY

November 2023

WSP (E&I) Canada Inc. and Scheckenberger & Associates Ltd.

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1. Introduction

This Background Study has been prepared to support the City of Hamilton 2024 Development Charges (D.C.) Update for the Stormwater component of the Background Study. This report documents changes and updates related to eligible projects, land use and costing for the stormwater component of the Development Charges that have occurred in the 2019-2023 period. This Update to the 2019 D.C. constitutes a more simplified review in comparison to previous editions of the D.C. Update with a focus on those project needs within the existing urban boundary and less emphasis on those in the previously designated Growth areas per GRIDS2, due to Provincial Planning changes and pending studies to support and identify the infrastructure needs for those areas in particular (e.g., City Master Plans and Community Secondary Plans). The changes and updates have been summarized as follows:

- Completed projects since the 2019 D.C. Update have been removed/zeroed out and new projects have been identified and added.
- The forecast is based on the target population numbers that were included in the prior D.C. study. The City is undertaking masterplan studies to assess the servicing needs of future growth as per Official Plan Amendment (O.P.A.) 167 however, as of the time of writing, this analysis is not complete. As the servicing information is not available for growth identified in O.P.A. 167, the former growth targets have been continued for this study.
- New stormwater-related studies, and associated project and costs estimates, have been updated or completed (either superseding older studies, or where no earlier studies existed).
- Projects have been updated / modified, based on new information from the City.
- Land requirement calculations for stormwater management facilities, where no studies exist, have been verified by the City, based on recent actual facility land requirements.
- Capital cost calculations for stormwater management facilities have been verified by the City, based on actual facility capital costs for those constructed in the 2019-2023 period.
- Contingencies have been verified against other projects across the GTA and the approach has been harmonized with the calculations associated with Water and Wastewater (where appropriate).
- The Local Service Policy has been updated. Refer to Section 1.4 and Appendix E of the overall Background Report for the full policies.
- Projects have been deleted from the planning timeframe as a result of the updates to the City's growth forecasts, specific to the GRIDS2 land budget.
- Non-residential stormwater facility growth costs excluded from the Development Charge; therefore having non-residential developers construct their stormwater management facilities directly, at their cost.
- In instances where both residential and non-residential growth lands are proposed to contribute to a stormwater management facility, the areally-estimated component shares have been separated for costing purposes. These have been maintained at the 2019 ratios where new information was not available.

In addition to the above, unit rates for land costs have increased and have been provided by the City's Real Estate Department, for 2023, as follows:

- $1,074,267 per acre, for Ancaster and Flamborough (Waterdown)

- $953,902 per acre, for Hamilton City, Dundas, Stoney Creek and Glanbrook (includes Binbrook)

Capital costs for construction of stormwater infrastructure have increased by 39.39%, in accordance with the Non-Residential Construction Index prescribed by the Development Charges Act (ref. Table G.4).

1.1 Study Area

For the 2024 Development Charges Update, development in the former member municipalities of the City of Hamilton has in accordance with previous renditions of the D.C. Update, been combined for financial purposes, however a column in the stormwater costing tables accompanying this report has been maintained for reference purposes (and to assist in locating the projects on the overall drawing). The geography of the City has been divided into seven (7) areas as follows:

- Ancaster,
- Binbrook/Mount Hope,
- Hamilton Mountain,
- Stoney Creek (Lower),
- Stoney Creek (Mountain),
- Waterdown,
- Other (Hamilton Downtown, Dundas, Greensville, Carlisle, Freelton, and other outlying areas).

1.2 Background and Purpose

This Stormwater Background study provides information for the portion of the Development Charges relating to stormwater infrastructure including:

- channel system improvements,
- off-site erosion control,
- stormwater management works,
- oversizing of stormwater related infrastructure, and
- culverts related to identified road projects.

Projects included in this study are future growth related to the service target, which include both planned and unplanned projects. Future growth-related information has been collected from the City and City-approved studies and, where no information was available, appropriate assumptions and calculations have been made.

This report applies a common approach as used in the 2019 D.C. Update in establishing stormwater-related Development Charges for both residential and non-residential development. The report consists of the following sections: Introduction, Municipal Stormwater Drainage Policies and Criteria, Methodology, Development Charges Summaries, and Conclusions.

1.3 Development Charges Act: Storm Services

According to the Development Charges Act (S.O. 1997, Chapter 27), the "council of a municipality may by by-law impose development charges against land to pay for increased capital costs required because of increased needs for services arising from development of the area to which the by-law applies".

The services referred to include stormwater drainage and control and others as described in Appendix E of the 2023 Development Charges Background Study prepared by Watson & Associates Economists Ltd.

The Development Charges for this Update are based on a projection of the costs to service new development to the service target.

All components of the identified drainage works, that have been considered to require development funding have been included. Storm drainage infrastructure has been classified into five categories:

- open watercourses (channel system improvements),
- off-site erosion control (not previously identified),
- stormwater management facilities (quality and quantity),
- storm sewer oversizing, and
- culverts/bridges (not previously identified and associated with new or widened roads).

1.4 City of Hamilton Development Charge – Local Service Policies

Within a Development Charge policy, certain works deemed "local services" remain the responsibility of the developing landowner. The Local Service Policy for Stormwater Drainage Systems can be found in Appendix E of the Development Charge Background Study.

The following summarizes the updates and new policies that have been added or modified as part of the City of Hamilton's Local Service Policy for Stormwater Drainage Systems, through this update to the Development Charge Bylaw. As part of the 2019 D.C. Update there were numerous updates to the Local Servicing Policies including guidelines and practices – these have been repeated herein for continuity. The 2024 Update (this report) has involved a discussion with City staff on the efficacy/use of the 2019 Updates and any emerging needs.

New Policies introduced For 2019 Update

- Stormwater management facilities in series
- Combined Residential / Non- Residential stormwater management facilities
- Oversizing of stormwater management facilities due to downstream constraints
- 100 Year Control in stormwater management facilities
- Criteria for stormwater management facilities in Airport Employment Growth District (A.E.G.D.)
- City Standard for total drainage area to stormwater management facilities
- City Standard for stormwater management facilities treating public roads / single applicants
- Definition of underground tanks for stormwater management facilities not Development Charge eligible
- Definition of stormwater management facilities servicing Mixed Use buildings
- Definition of stormwater management facilities servicing Commercial lands
- Tailwater impacts on land for stormwater management facilities
- Construction cost estimates for stormwater management facilities
- Bedrock impacts on stormwater management facilities cost estimates and actuals

- Frontage calculation for stormwater management facilities
- Definitions for culverts and bridges (as related to road infrastructure)
- Definition for culverts and bridges Development Charge eligible costs
- Watercourses definitions
- Watercourse enclosures not Development Charge eligible
- Combined sewer watershed peak flow control
- Combined sewer watershed provisional Development Charge eligible projects
- Combined sewer watershed provisional outlets
- Monitoring (holistic) of more than one development is Development Charge eligible

New Policies for 2024 D.C. Update

The information provided below on new policies should be confirmed with Appendix E of the 2023 D.C. Background Study (Watson, 2023) where reliance on such information is critical. The information may be condensed from the reference, to focus on stormwater, for the purposes this report. Other services may be mentioned for context.

There are several new considerations for projects based on whether they are within or outside of the Urban Boundary as set out in Official Plan Amendment (O.P.A.) 167, as adopted by Council on June 8, 2022, and without the Minister modifications approved on November 4, 2022 (Council-adopted Urban Boundary). For development within the Council-adopted Urban Boundary, the local service policy set out therein would apply. For development outside of the Council-adopted Urban Boundary, the following would be a direct developer responsibility:

- All costs required to service the development and/or to connect the development area with existing infrastructure including without limitation, all water, wastewater, **stormwater**, transit, transportation works (in accordance with the Complete Street definition), any utility relocation/conversion costs, and land acquisition costs to meet City standards will be a developer responsibility, unless otherwise provided in Appendix E of the 2023 D.C. Background Study.
- In conjunction with the above bullet, the scope to service the development and/or connect the development area would be identified within approval authority accepted studies to support development areas.
- Projects occurring within the Council-adopted Urban Boundary with an oversizing component that is required to service development outside of the Council-adopted Urban Boundary – the oversizing component is a direct developer responsibility.
- Downstream and/or upstream water and wastewater infrastructure located within the Council-adopted Urban Boundary required to support development outside the Council-adopted Urban Boundary would be a direct developer responsibility.

Based on the above, and to be clear, developments occurring outside of the Council-adopted Urban Boundary will be required to pay the City-wide D.C.'s for all services except for **stormwater**, water linear, and wastewater linear.

In the Local Service Policy for Stormwater Drainage Systems, in addition to the City's Major/Minor systems there are also a class of works related to source water management and use of natural systems. These have

been articulated in the City's Green Standards and Guidelines (GSG, 2023). The definitions of these practices per the GSG are as follows:

Low Impact Development (L.I.D.):

- Stormwater management approach that seeks to manage precipitation at source through better site design and use of L.I.D. practices.
- Typically includes a suite of site design strategies to mimic the area's natural hydrology through stormwater infiltration, evapotranspiration, rainwater harvesting, filtration, and detention.
- L.I.D. practices can include those such as bio-swales, permeable pavement, rain gardens, green roofs, and exfiltration systems, etc. L.I.D. practices often employ vegetation and soil in their design, however not always, and the specific form may vary considering local conditions and community character.

Green Infrastructure (G.I.):

- Natural and human-made elements that provide ecological and hydrological functions and processes. G.I. can include components such as natural heritage features and systems, parklands, stormwater management systems, street trees, urban forests, natural channels, permeable surfaces, and green roofs.

Natural Infrastructure / Assets:

- The term "natural infrastructure" refers to naturally occurring landscape features and/or nature-based solutions that promote, use, restore or emulate natural ecological processes.
- In summary, L.I.D. practices are man-made measures to off-set the impacts of development, while Natural infrastructure considers the water management services provided by natural features or nature-based solutions. Green Infrastructure considers both concepts and embodies these into a more holistic term.

For Stormwater Management Facilities, the following should be noted:

- L.I.D. practices and G.I. are not eligible for D.C. contributions.
- Where a centralized (communal) facility serves both residential and non-residential parcels, the cost is established based on the ratio of the areas served and factored by the respective runoff coefficients. Note that the non-residential area, if commercial, may also be required to provide lot-level quality controls, depending on location, however this component (L.I.D. and/or G.I.) would not be eligible for D.C. contributions.

1.5 Background Information Collected

City staff, through the Technical Committee noted in Section 1.6, has supplied the following background information:

- Applicable background reports
- Summary of stormwater management facility construction costs and land areas
- Digital topographic mapping
- Digital growth-related land use fabric
- Stormwater policy/philosophy related to Development Charges
- Reviews and comments on overall map of growth areas and identified projects
- Culvert and bridge, and subdivision-related storm sewer oversizing database.

- Draft - Green Standards and Guidelines

1.6 Administration

A City of Hamilton Team has assisted in collecting the background information for this study, as well as meeting with WSP and Scheckenberger & Associates Ltd. (S&A) to review the various stormwater projects, cost estimates, financially committed projects, and underlying philosophy and assumptions; these have included:

Tony Sergi, Director & Senior Advisor, Strategic Growth Initiatives

Gavin Norman, Manager of Infrastructure Planning

Mark Hartley, Senior Engineer Stormwater, Infrastructure Planning

Monir Moniruzzaman, Manager Development Engineering

Bhajan Sarker, Senior Project Manager

2. Municipal Stormwater Policy and Criteria

2.1 Overview

The financial requirements to provide stormwater servicing to the service target have been established in accordance with the Development Charges Act, and specifically relate to the level of service to be provided in the subject growth areas.

The City of Hamilton's Storm Drainage Criteria and level of service has been summarized in this Section. The City's standards have been developed to provide this level of service, and also recognize other Provincial and Federal criteria for management of flooding, erosion, stormwater quality, and fisheries habitat protection and enhancement.

2.2 Storm Sewer System

The storm sewer system provides for the drainage and conveyance of the runoff resulting from a design storm event having a 5-year return period. In the former municipalities of the City of Hamilton, the storm sewers were designed to have the capacity for storm events ranging between a 1 in 2-year event and approximately a 1 in 50-year event (ref. Table G.1):

TABLE G.1
COMPARISON OF FORMER AREA MUNICIPALITIES
STORM DRAINAGE SYSTEM CRITERIA AND POLICY

Former Municipality	Minor System Criteria	Foundation Drainage Requirements (2)	Combined Sewers	Roof Leader Policy	Major System Criteria
Hamilton	18 – 50 yr (1)	Gravity	Yes	Direct to Sewer	100 yr
Ancaster	2 yr	Sump Pumps	No	Surface	100 yr
Dundas	2 – 5 yr	N/A	No (3)	N/A	100 yr
Flamborough	2 – 5 yr	Gravity/ Sump Pumps	No	Surface	100 yr/Regional (4)
Glanbrook	5 yr	Sump Pumps	No	Surface	100 yr
Stoney Creek	5 yr	Gravity	No	Surface	100 yr

Notes:
(1) 1942 - 1992 (inclusive) used an 18-year storm event; post 1992 used 50 year. Both design storms used the Modified Rational Area Method
(2) Foundation drainage requirement exceptions are currently permitted upon receipt of a stormwater management report.
(3) The Pleasant Valley neighbourhood (Dundas) only has a combined sewer system permitted by By-Law.
(4) Regional Storm is Hurricane Hazel

New storm sewers will have to be designed to the new criteria, but new development must also reflect both the external upstream drainage and the existing storm sewer system (potentially none) downstream of the site.

The City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (September 2007) outline the criteria and assessment requirements for the new storm sewer system as follows:

- Approved Master Drainage Plans (M.D.P.'s), which have established storm sewer sizing criteria other than 1 in 5 year standard will govern. In the absence of approved M.D.P.'s, storm sewers shall be designed to a minimum 1 in 5 year, unsurcharged standard (i.e. 85% of pipe capacity). For any storm sewer to be assumed by the City the minimum allowable pipe diameter is 300 mm.
- Interfacing between new storm sewers designed to the minimum 1 in 5 year, unsurcharged standard and existing storm sewers of variable sizing standard shall require hydraulic analysis of the existing and proposed storm sewers. Flow capacity of the proposed storm sewer shall be determined based on the receiving existing sewer remaining unsurcharged. The proposed storm sewer flow capacity would either be the 1 in 5 year standard or designed to allow the existing storm sewer to remain unsurcharged. Should the proposed storm sewer flow capacity be required to be less than the 1 in 5 year standard, to prevent downstream surcharging, inlet capacity for the storm sewer should be designed accordingly. Should the existing downstream system already be surcharged, the proposed upstream storm sewer should not increase the level of surcharging downstream.

- Hydraulic analysis of the proposed and existing storm sewer system shall provide hydraulic grade lines for the inlet capacity and/or 1 in 5 year standard and 1 in 100 year standard. Hydraulic analysis should demonstrate that no negative impact on the receiving storm sewer system results from the proposed storm sewer. The extent of the downstream off-site analysis needs to be verified with City staff prior to initiation, to ensure that downstream conditions are adequately accounted for in the analysis. The City shall provide the developer's consultant with the 100-year hydraulic grade line for the existing storm infrastructure system when available. Should downstream storm sewer surcharging be a concern under existing conditions, the proponent may be required to restrict inlet capacity to ensure no negative impact on the receiving system. In addition, the proponent is to ensure that adequate overland flow capacity is available in the development and in the receiving major system, incorporating the influence of the restricted inlet capacity of the storm sewer system.

Storm Sewer Oversizing

In regards to Storm Sewers, the Development Charges are applicable primarily to oversizing of existing or new storm sewers, to allow for the conveyance of runoff from new development. Current City financial policy provides for financial relief for storm sewers over 1200 mm in diameter (ref. Comprehensive Development Guidelines and Financial Policies Manual, 2017). Oversizing is common when a development has a large upstream drainage area that has also been proposed to be developed. When stormwater peak flows from the area's ultimate land use need to be conveyed through a downstream development, the Development Charges provide a method for collecting funds for the net difference between the storm sewer system required solely for the subject development, and the oversized system required for the conveyance of runoff from multiple off-site developments.

In some areas, a storm sewer system may not be viable, and the major overland system may not be able to safely convey the runoff resulting from a 1 in 100 year design storm event. In this case a relief sewer or alternate conveyance mechanism may be required to provide the additional capacity and hence be funded through Development Charges.

2.3 Road Crossings

Waterway openings for culverts and bridge crossings shall be designed in accordance with the current and in-effect Ministry of Transportation Ontario (M.T.O.) policies and guidelines.

Notwithstanding the M.T.O.'s drainage policy and guidelines, it is a City of Hamilton requirement that new roadway culverts and bridges have sufficient conveyance capacity to safely pass the Regulatory flood (larger of Hurricane Hazel or 100 year event), in order to avoid adverse backwater effects (ref. M.T.O. Directive B-100). If, due to economics or other mitigating circumstances, this is not feasible, a backwater analysis must be undertaken to determine the limits of upstream flooding and provide necessary mitigating design modifications.

Arterial and collector roadways in new developments should be, where possible, the only road classifications permitted to cross a watercourse with a drainage area over 125 ha. The spacing and location of roadway crossings other than arterial or collector roads may be considered by the City when documented within the subject Stormwater Management Plan for the respective development.

Freeboard and clearance (as defined in the governing M.T.O. manuals and the Ontario Bridge Code) requirements for watercourse crossings should be based on current M.T.O. criteria.

Where a permit is required from a Conservation Authority, watercourse crossings will not be permitted to increase upstream flooding on private lands, unless appropriate waivers can be secured.

Culvert replacements may require a Class Environmental Assessment as outlined within the City's Storm Drainage Policy.

Allowable Regional Storm event (Hurricane Hazel) flooding depths on roadways should be determined based on the standards within the Ontario Ministry of Natural Resources Natural Hazards Technical Guides, latest revision.

2.4 Natural Watercourse Systems

The City of Hamilton Criteria and Guidelines for Stormwater Infrastructure Design (September 2007) outline the criteria for the open watercourses as follows:

Where watercourse alterations are proposed as part of a development, the design of such alterations shall incorporate and consider the following:

Design Approach and Principles

- Channel design is to be based on natural channel forming processes to achieve a dynamically stable system. The channel evaluation methodology and design approach are to be consistent with the most current Provincial guidelines (ref. Ontario Ministry of Natural Resources Natural Hazards Technical Guides, March 2003 and "Adaptive Management of Stream Corridors in Ontario", M.N.R., 2001 and subsequent updates).
- Alteration to a regulated watercourse will require a permit from the respective Conservation Authority (Development, Interference with Wetlands and Alterations to Shorelines and Watercourses) and potentially clearance/authorization from the Federal Department of Fisheries and Oceans (Fisheries Act) and Ontario Ministry of Natural Resources and Forestry (Lakes and Rivers Improvement Act).
- Remedial works shall incorporate fish habitat protection/mitigation or compensation in accordance with the requirements of the Federal Department of Fisheries and Oceans (DFO) and Ontario Ministry of Natural Resources and Forestry (M.N.R.F.), related to stream type and significance.
- Remedial works shall incorporate the requirements of the governing Official Plan and any Official Plan Amendment (O.P.A.) including Secondary Plans, as well as the requirements of provincial Ministries and other public agencies for protection of associated natural features such as:

Environmentally Significant Areas (E.S.A.)

- City of Hamilton
- Conservation Authorities

Niagara Escarpment

- Niagara Escarpment Commission (N.E.C.)

Heritage Sites

- Ontario Ministry of Tourism, Culture and Recreation

Setbacks

The City of Hamilton area Conservation Authorities have various watercourse setback policies for watercourse features to establish regulated development boundaries. The proponent should always verify that the most current Conservation Authority's setback policies are being applied. The four Conservation Authorities in the City of Hamilton, Hamilton Conservation Authority (H.C.A.), Niagara Peninsula Conservation Authority (N.P.C.A.), Grand River Conservation Authority (G.R.C.A.), and Conservation Halton (C.H.), require development to adhere to their specific setback policies. Each Conservation Authority has established Generic Regulations for development in or adjacent to hazardous lands and other regulated areas, i.e. "Development, Interference with Wetlands and Alteration to Shorelines and Watercourses".

The size of setbacks from the watercourse edge to developable lands is typically a function of the significance of the valley form, the sensitivity of the watercourse and the type of development (building or other).

The Conservation Authorities may establish setbacks using "Understanding Natural Hazards", M.N.R., 2001 to define the erosion hazard limit using stable slope allowances. Development Proponents should be aware that watercourse setbacks from regulated systems will typically be established in coordination with a Conservation Authority where flooding and/or erosion hazards are present.

Access/Maintenance

- Creek block dedications in new developments adjacent to private land shall be fenced to prevent human access and encroachment. Fencing shall be on public property, 150 mm from the property line. Private access gates to creek block areas are not allowed.
- Natural channel design shall consider channel and utility maintenance requirements by incorporating access routes. Access routes may be located within the appropriate top of bank setback limit or adjacent to the low flow area in appropriately designated areas.

2.5 Stormwater Management Facilities

The City of Hamilton Stormwater Policy (March 2004) outlines the criteria for stormwater management quality, quantity and erosion control as follows:

Quality Control

Urbanization typically increases the contaminant load (i.e. sediment, metals, nutrients, bacteria) to natural stream systems. To mitigate this effect, stormwater quality treatment is required for all new development and redevelopment (including reconstruction of roadways with additional lanes, widening and cross-section revisions as required by review on an individual case basis by the Ministry of Environment) within the City of Hamilton, except for areas draining directly to a combined sewer system.

Stormwater quality treatment should provide a comprehensive approach to both surface runoff and groundwater. Thus, as a general consideration, maintenance of the natural hydrologic cycle including infiltration is encouraged and the use of stormwater management practices (S.W.M.P.) which enhance or maintain infiltration should be considered for each development.

Generally, active infiltration measures, such as soakaway pits and rear yard ponding, will be most applicable in permeable soils areas and their use will require supporting soils property documentation. Passive measures such as disconnection of roof leaders have been historically applied in many areas and shall be implemented in all areas unless specific constraints (such as in the former City of Hamilton and Town of Dundas where zero lot line construction on narrow width lots is permitted, or in the older City of Hamilton downtown areas where there is insufficient pervious area) preclude these measures. In all cases, the potential for groundwater contamination shall be considered where infiltration of road runoff is contemplated. In areas where hydrogeologic concerns are identified, particularly in areas where groundwater is used for human consumption and/or critical linkages to fisheries habitat are present, additional study and analysis may be required to determine the appropriate level of mitigation.

Stormwater quality treatment measures shall adhere to the specific guidelines for stormwater management practices that have been developed by the Province (ref. Stormwater Management Planning and Design Manual, Ministry of Environment, March 2003, or subsequent updates).

The design of stormwater quality facilities shall conform to existing Provincial requirements (ref. Stormwater Management Planning and Design Manual, M.O.E., March 2003, Water Management Policies, Guidelines Provincial Water Quality Objectives (Blue Book), M.O.E.E., 1994), as well as current policies within the City of Hamilton (i.e. Hamilton Harbour Remedial Action Plan, Vision 2020), or subsequent updates of the foregoing.

All new development shall implement a stormwater quality management strategy, which considers surface runoff and groundwater in compliance with the existing provincial and municipal policies.

In areas of existing development where re-development is proposed, requirements for stormwater quality measures will be evaluated on a site-specific basis, with regard to the feasibility of implementation. Where on-site measures are considered infeasible, or in areas serviced by combined sewers, the City of Hamilton's Planning and Development Department may consider the potential for contributions to off-site improvements in the form of a cash-in-lieu policy, as in the current Provincial Stormwater Management Planning and Design Manual, March 2003, or subsequent updates. In order to appropriately direct these resources, a Master Storm Water Quality Plan (a regional assessment to identify retrofit locations and costs) is being contemplated by the City's Public Works Department. A 'pilot' study has been prepared for the former community of Stoney Creek.

Quantity Control and Flood Protection

Urbanization causes increases in runoff volumes and rates, due to an increase in impervious area and changes in conveyance systems. Without proper stormwater management, these increases may result in flooding and erosion.

The specified level of control for subject lands in the City of Hamilton is designated by a Watershed/Subwatershed or Master Drainage Plan where they exist. Such plans account for additional constraints (i.e. economic and physical limitations) which may limit the capacity of proposed stormwater management systems. Such plans may also demonstrate that the existing downstream capacities are sufficient to accommodate local increases in post-development peak flows (i.e. oversized sewers or watercourse reaches with adequate capacity and resistance to flow increases).

Local Conservation Authorities, through their mandate to control flooding and limit flood damage, have developed criteria for runoff control. Hence, application of these criteria through a co-ordinated approach to

drainage planning on a watershed and subwatershed basis is required to ensure effective runoff control and minimization of flood damages.

Several Municipal jurisdictions have implemented a ***"zero increase in peak runoff rate"*** *policy for controlling post-development runoff. While this type of policy provides simple and clear direction regarding stormwater management flood control, a uniform application of this type of policy does not consider the potentially negative effects on watercourses from extended periods of controlled peak discharge (i.e. increased erosion).*

In cases where no Master Drainage Plan (M.D.P.) or Watershed/Subwatershed Planning has been completed or development lands are considered as external drainage areas to a M.D.P., watershed/subwatershed planning areas, consultation with the City shall determine if runoff peak flows shall be controlled to pre-development levels or alternative stormwater management is required. Discussion with the City's Planning and Development Department shall be required to determine the scope of assessment based on the potential impact on the receiving storm system (ref. Conditions for Practice). Should the proponent establish, to the satisfaction of the City's Planning and Development Department, that the potential impact of the proposed development would be minimal, the City's Planning and Development Department could decide that detailed modelling and analysis may not be required, as per the Conditions of Practice within the Criteria and Guidelines for Stormwater Infrastructure Design Manual. Should the City's Planning and Development Department deem a more detailed assessment appropriate, the proponent would need to demonstrate through appropriate modelling and analysis, that uncontrolled flow will not cause detrimental impacts on downstream properties and watercourse systems as per the Criteria and Guidelines for Stormwater Infrastructure Design Manual. At the development application stage, before the City's Planning and Development Department will accept an increase in runoff rates, the proponent must also receive endorsement from the agencies having jurisdiction. Over-control of runoff (i.e. less than pre-development runoff), may also be required as it relates to downstream constraints.

The City of Hamilton is also introducing new "Green Standards and Guidelines" (GSG) which are expected to be in place for 2024. These GSG prescribe minimum capture requirements at-source to effectively treat water quality, along with a listing of acceptable Low Impact Development practices. The GSG aligns with Provincial (M.E.C.P.) guidance specific to the use of the 90th percentile event in designing a treatment train for stormwater management with the objective of water quality treatment and water balance.

2.6 Erosion Control

The rate that uncontrolled runoff, due to urbanization, can accelerate the natural evolutionary processes of a watercourse depends upon topography and soil conditions. When erosion and/or bank instability is probable (e.g. from outlets from future development areas), the proponent shall either provide effective on-site or system controls (e.g. end-of-pipe controls), stabilize the receiving watercourse by appropriate remedial measures, or contribute to a fund designated towards future watercourse improvements, typically identified in Watershed and Subwatershed Plans. Should on-site or system controls not adequately control flows below the receiving system's erosion threshold, either off-site watercourse remedial measures or contribution to a fund shall be required.

Requirements for erosion control will generally be determined through upper level studies such as Watershed/Subwatershed/Master Drainage Plans. In these cases, the proponent(s) will be required to provide mitigation in accordance with the Watershed or Subwatershed Plans or with the Master Drainage Plans, as well as policies of the local Conservation Authority.

In areas where no Watershed, Subwatershed Plan or Master Drainage Plan exists, it shall be the responsibility of the development proponent to mitigate potential erosion impacts in accordance with Provincial Guidelines, unless it can be demonstrated through appropriate modelling and/or analysis that erosion processes will not be adversely affected by the proposed development.

In areas where the downstream receiving watercourse is determined to be unstable, or where control/over control of flow rates is either not possible or not feasible, design of watercourse alterations would be considered subject to design in accordance with Natural Channel Design principles.

The City of Hamilton supports Natural Channel Design Principles, as specified by the Province in Natural Channel Systems, An Approach to Management and Design, M.N.R., 1994 (or most recent update) and "Adaptive Management of Stream Corridors in Ontario", M.N.R. 2002 (or most recent update) Implementation of Natural Channel Design principles on area watercourses shall follow the guidance within the Criteria and Guidelines for Stormwater Infrastructure Design Manual. Any watercourse alteration shall be designed to the future flow regime with stormwater management controls in-place.

Storm sewer outfalls in natural channels should be provided with proper protection against erosion, which includes appropriate bank scouring protection on either side of the outfall and creek. When storm sewer outfalls outlet to steep and/or deep valleys, drop structures shall be designed in such a manner as to ensure bank stability. Such local erosion protection measures shall be designed so as not to interfere with the natural channel forming processes of the receiving watercourse system. Natural channels shall be designed to accommodate various flow regimes resulting from phased stormwater management measures.

Although both swales and ditches only provide a flow conveyance function and not the natural channel form, swales and ditches should be designed with appropriate erosion protection. Erosion protection measures shall be provided at storm outfalls and for the swale/ditch according to erosion thresholds.

3. Methodology

3.1 Overview

All components of the eligible drainage works that have been considered to require development funding have been included in this assessment/calculation. As noted earlier, the eligible Storm drainage infrastructure may consist of:

- open watercourses,
- storm sewers (shared and outlet works), and
- stormwater management facilities.

For the purposes of this assessment, the charges have been separated into five categories of work as follows:

A. Open Watercourses: Channel System Improvements (identified projects)

- Erosion control and conveyance works, including channelization and major culverts, identified along watercourses to address the impacts of growth, such as increased peak flows, volumes, and durations of erosive flows, as identified in currently approved studies

B. Open Watercourses: Erosion Control – Anticipated Future Works

- Off-site (immediately downstream of new development) erosion control and conveyance works not yet identified in any approved studies along watercourses to mitigate impacts of growth (i.e. areas not covered in current Master Drainage Plans, Subwatershed Studies, etc.).

C. Stormwater Management (Quality and/or Quantity Facilities)

- Stormwater quantity and quality control infrastructure required to manage runoff from future growth areas, to mitigate impacts on downstream systems, including:
    - Retrofit facilities designed to manage runoff from future growth
    - End-of-pipe infrastructure such as wetlands, wet ponds, dry ponds
- Includes opportunity for certain qualifying source controls, such as Best Management Practices, and Low Impact Development (unidentified in the list)

D. Storm Sewers – Oversizing and Neighbourhood Outlet Works

D1 Oversizing of trunk storm sewers

- Oversizing of storm sewers to accommodate new growth, or where multiple new growth areas combine to generate sufficient additional runoff that a sewer more than 1200 mm in diameter is required; the cost of the oversizing would be considered a Development Charge. Local storm sewers to service new growth, equal to and less than the 1200 mm diameter threshold, are considered a local Developer Contribution, and are not included in the Development Charge.

D2 Storm sewer – neighbourhood outlet works (as recommended by studies)

- Storm sewers and outlet works, shared by multiple development growth parcels, required to accommodate new growth

E. Culverts and Bridges: Anticipated Future Works

- Future culverts/bridges (i.e. those not identified in previous studies as part of Category A) which require an upgrade (either in length or capacity) normally associated with new road construction to support growth.

A further two sub-categories (one for stormwater management facilities and one for watercourses) have been included, to specifically capture the infrastructure required for the identified growth areas:

- G.R.I.D.S. stormwater management facilities
- G.R.I.D.S. watercourses

G.R.I.D.S. is the City's Growth Related Integrated Development Strategy, which includes the areas identified as Potential New Business Park, in the existing Airport Business Park Special Policy Area, new employment lands adjacent to the Airport Special Policy Area (S.P.A.) lands, and a proposed urban boundary expansion/employment lands to the south and east of Highway 20 and Highway 53/Elfrida.

These growth areas include the lands which are the subject of the completed studies: Airport Employment Growth District – Phase 2, Dillon et al 2009, A.E.G.D. Subwatershed Study and Stormwater Master Plan

(S.W.M.P.) Implementation Document, Aquafor Beech Ltd., April 2017, and Elfrida Subwatershed Study, Phase 1 Report, Aquafor Beech Limited, May 2018.

It should be noted that projects related to Elfrida have had their time frame revised to be a post-period benefit whereas in 2019, they were indicated for the 2014-31 time period.

3.2 Future Development (Residential /Non-Residential growth areas)

Figures G1-G7 cover the City of Hamilton, along with the bounded development areas from previous Development Charge Background Studies.

It should be noted that for the purpose of calculating the stormwater component of the Development Charge, no distinction between the development time frame has been made. A column in the costing tables has been added for reference purposes only.

Figures G1-G7 show the forty (40) +/- subwatersheds that cover the City of Hamilton. These subwatersheds lie within the jurisdiction of the four Conservation Authorities, namely: Conservation Halton, Hamilton Conservation Authority, Grand River Conservation Authority, and the Niagara Peninsula Conservation Authority.

3.3 Costing Assumptions

The estimates of the construction and land costs have been based on the best available information for the future projects. A complete listing of all the projects is in Appendix G1. All assumptions used to derive the costs are listed in this section. Estimated land costs have also been included in the totals. Residential land costs have been tracked by the City, and currently have been set at $953,900/ac ($2,357,100/ha), except for Ancaster and Waterdown, which has been set at $1,074,300/ac. ($2,654,600/ha). The costs shown under the individual categories (A to E and G.R.I.D.S.) are based only on estimated construction costs. A 15 % allowance for engineering, design, legal, and survey has been added to the subtotals as shown in the Appendix G1 summary pages.

The costs have either been calculated using formulas based on:

- 2019-2023 construction prices from projects completed in the City, and neighbouring Municipalities in the GTA, where no cost estimates are available in the background reports, or
- where construction estimates were available, the unit rates used in those estimates were considered to be valid in 2024 (i.e. same rates as from current contract bids provided by the City of Hamilton).

Where a portion of the Development Charge (for the stormwater component cost of the project) benefits existing development, the amount attributable to new development has been adjusted by examining the percentage of existing development that would benefit from the proposed infrastructure.

3.3.1 Specific Costing Assumptions By Category

A complete summary listing of all projects is in Appendix G1, with the Residential listing first followed by the Non-Residential, sorted by geographic area, then category of project.

Costs for Category A **(Open Watercourses: Channel System Improvements, for projects identified in City studies)** have been established using the existing studies provided by the City (ref. list of references at the end of the report), . In instances where the studies identified watercourse and road crossings, but no specific costs (Waterdown East-West Corridor, Airport Employment Growth District), the City estimated the culvert crossing size and costing estimate using the method described below for Category E.

Costs for Category B **(Open Watercourses: Erosion Control – Estimated Future Works not identified in previous studies)** have been calculated as follows:

- for existing open watercourses downstream of new development, the information has been abstracted from the topographic mapping provided by the City.
- The applicable watercourse length assumed to require treatment for erosion protection has been defined based on the distance to a receiving water body (i.e. lake), or to a point downstream where erosion potential is deemed to no longer be predicted to occur as a result of the subject development. This point has been estimated as the point where the total tributary drainage area exceeds 2 times the area tributary to the development discharge point (i.e. immediately downstream of the new development). This approach is intended to reflect the diminished erosion impact potential of development discharge, as the size of the drainage area and flow in the watercourse increases downstream from the point of discharge from the subject development.
- The percentage of the total length of channel required for require erosion works has been established at between 5 and 20 %, depending on the relationship of total development area as a function of upstream drainage area. The greater the amount of developed area, tributary to the subject watercourse, the greater the percentage of watercourse assumed to require erosion control. The limit of up to 20 % of a receiving watercourse requiring treatment reflects the anticipated benefits from on-site stormwater management which would greatly reduce downstream erosion potential. However, since 100 % volume control is not considered practical in most parts of Hamilton, it is predicted that erosion potential would not be eliminated entirely with on-site controls in place.
- The cost per metre of work has been estimated to be either $2,090 or $3,485 depending on the general size or depth of the creek bankfull section, and potential valley slopes, which has been expressed as a function of the upstream drainage area. Subject watercourses having an upstream drainage area of under 500 ha have been costed at $2,090 /m, and drainage areas over 500 ha at $3,485 /m. The difference reflects the condition whereby the required protection may vary between simple regrading of banks and vegetative bioengineering, to structural measures such as armour-stone and major earth excavation. The unit rate of $2,090 /m involves site preparation, dewatering, earth excavation, bioengineering (live staking, timber cribs, brush mattresses, etc.), and site restoration. The unit rate of $3,485 /m differs in that more structural materials are employed for erosion control, such as riprap, and armour stone, which typically involve more excavation and items such as geotextiles, subdrains and backfill.
- The cost for land for an armoured watercourse to be brought into public control (I.e., through an easement) has been assumed to be the same as the cost of land for stormwater management facilities, i.e. assuming highest and best use for the land. The land required for an easement has been estimated as either 5 m or 10 m width depending on the size of the creek (i.e. drainage area under or over 500 ha), multiplied by the length of creek to be treated. This estimate does not allow for connections between easements on separate sections of the creek.

- The amount of the costs allocated to growth, or the new development percentage, is calculated by dividing the new development area (residential and non-residential) by the total of existing and future development area (residential and non-residential) within the contributing drainage area to the subject watercourse erosion project reach. The division of areas determined in 2019 was carried forward, as no new information was available for revisiting the calculations.

Costs for Category C **(Stormwater Management Facilities)** have either been based on available studies or, if no estimate was available, the cost has been based on a formula related to the drainage area, to estimate required volume, and the required land to accommodate the facility footprint. The cost of land has been set at either $953,900 per acre, or $1,074,300 per acre (Ancaster and Waterdown) in accordance with the City's calculated costs.

Target volumes for stormwater quality, erosion control and flood control vary widely, each specific to the location of development and the watershed's characteristics. For the purpose of this D.C. Update, Volumetric Ranges have been estimated to be between 100 and 200 m^3/impervious hectare for quality only; between 100 and 400 m^3/impervious hectare for extended detention erosion control, and between 300 to 500 m^3/impervious hectare for flood control. These values are based on recent experience in developing urban environments in Hamilton and the Greater Golden Horseshoe. The specific volumetric amounts are directly related to the type of receiving watercourse. For sizing quality control only, in the absence of available reporting, an average target volume of 475 m^3/impervious hectare has been used, with an approximate impervious fraction of 40 %, resulting in an average volume of 190 m^3/hectare for Development Charge calculation purposes. A volume of 720 m^3/hectare has been used for Development Charge calculation purposes for combined quantity/quality control facilities.

The erosion control and flood control volumes are typically stacked above the water quality control volumes, hence there can be economies in terms of land requirements when multiple functions are required at a facility. The construction costs have been based on the total volumes.

The land costs have been developed to take into account the required footprint of the facilities and have been based on the following rule:

- If the footprint has been established through a City-approved study, this area is to be used;
- If no study exists, a quality (only) facility or quantity (only) facility will require 4 % of the contributing drainage area; or
- If no study exists, a combined quality/quantity facility (and those combined facilities that include an erosion control volume) will require 6 % of the contributing drainage area

- The City has identified seven (7) facilities in the Fruitland-Winona Secondary Plan area, which will require 10 % of the contributing drainage area, due to grading constraints associated with flat local grades and comparatively high existing ditch outlets. The City has furthermore identified two (2) additional residential facilities for which similar grading constraints have been identified, and hence also applied the 10 % estimate to the area requirement: Ancaster facility ANC 14 at Meadowlands Phase 4, and Hamilton facility HAM 31 at Stonechurch and Wellington. (The City has identified one (1) non-residential facility for which grading constraints have been identified: Ancaster facility ANC 23 at Trustwood Industrial East).

A construction cost relationship for S.W.M.F. has been developed based on past estimates and actual construction costs of a range of stormwater management facilities constructed in Southern Ontario over the past five years. Capital costs assigned to the individual projects are based on $112/$m^3$ of total volume for the first 6,500 m^3, and $56/$m^3$ of total volume for the balance of storage volume.

The City has identified seven (7) facilities (number carried forward from 2019) which are known to be located in an area of shallow depth to bedrock. The City has estimated the volume of rock that will be encountered,

and increased the facility cost estimate for excavation accordingly, based on using the $112/m^3 unit rate, to account for the estimated rock volume in excess of the 6,500 m^3 cutoff under the standard cost estimate noted above. (Note that the City also has a contingency for additional facilities which may encounter more bedrock than estimated).

Comparison of Actual Costs for Two (2) Completed S.W.M. Facilities vs. 2019

The City provided actual costs for two (2) completed S.W.M. facilities and comparison ratios for each vs. 2019 estimates. The comparison is summarized in Table G.2. For Waterdown S.W.M.F. #4, the land cost and capital cost were 17% and 29% higher, respectively. For Waterdown S.W.M.F. #5, the land cost and capital cost were 13% and 17% lower, respectively. Although the cost increases are less than the indexed inflation value of 39.4%, they are still notably higher than estimated in 2019, for three of the four comparison ratios made.

TABLE G.2
COMPARISON OF ACTUAL COSTS FOR TWO (2) COMPLETED S.W.M. FACILITIES VS. 2019

Primary Dev. Area	S.W.M.F.#	Proj. Title	2019 Land Cost ($M)	2019 Est. Cap. Cost ($M)	Schedule of Fees Land ($M)	Schedule of Fees Capital ($M)	Land Cost Ratio: Actual / 2019	Cap. Cost Ratio: Actual / 2019
WAT	4	Mtview Heights	4.85	2.99	5.67	3.86	1.17	1.29
WAT	5	Mtview Heights	2.91	1.58	3.28	1.31	1.13	0.83

Unidentified Projects (Category C – Res. – Facility U1)

The City has included a placeholder item entry under Category C for stormwater management facilities that are not currently identified in the list of projects. The basis for this is that the City has had several occasions over the preceding years where development has occurred in such a manner as to require temporary or additional stormwater management works. These works may, in some cases, be determined by the City to provide a long-term benefit to the stormwater system, and hence the City has added these select works to its infrastructure. In these instances, the City may credit these works in part or in full, and hence has created this item as a form of a Credit Pool. The City will also review whether previously identified works in the area may need to be updated to reflect the new works. The City will develop a process for the auditing and accounting of these potential works to confirm the reasonableness of each cost estimate of the facility or portion of facility for which credit is being sought. An amount of $5,000,000 has been carried forward from 2019.

Low Impact Development Credit Policy (Category C – Res. – Facility U2)

The City of Hamilton is supportive of Low Impact Development measures and as such wishes to encourage these through a form of incentive program. To this end, the City, through this Development Charge, has

set up an initial Low Impact Development Credit Pool in the amount of $1,500,000 (carried forward from 2019). The City is developing a policy for the management of this credit, which will be refined as the policy evolves over time.

Facility Road Frontage Costs (Category C – Res. – Facility U3)

This constitutes an item entry under Category C for S.W.M. facility road frontage costs, to cover the portion of road cost that is fronted by a City S.W.M. facility block. The average frontage being applied in the calculation is 120 m, based on the average footprint and geometry of facilities, and verification of past frontages from the past. This amounts to 120 m * $2090/m/facility for the 38 residential facilities listed (retrofits excluded) or $9,530,000.

Facility Land Footprint Contingency (Category C – Res. – Facility U4)

This constitutes an entry under Category C for special instances where the land footprint required is more than either the City formula-based calculation or the detailed estimate. The basis for this contingency is that the City has had several occasions over the recent past where the footprint was between 6 and 10 % of the contributing drainage area, and hence the Development Charge for those facilities did not cover the full cost of the land. The City has proposed that, on average, 1 in 4 stormwater management facilities will require a larger footprint. Since there are 38 residential facilities on the list, this amounts to approximately 10 facilities. The average footprint for the 38 facilities has been used to calculate the land footprint contingency, using an average exceedance of the footprint by 25 %, amounting to approximately $6,100,000 of additional land. Note that for the 2024 D.C. Update Study, the City has identified eight (8) facilities (number of facilities carried forward from 2019) which may require a larger footprint, and they would not apply to this contingency. In identifying the eight (8) facilities, the likelihood of another ten (10) requiring a larger footprint is expected to be lowered.

Facility Volume Construction Contingency (Category C – Res. – Facility U5)

This constitutes an item entry under Category C for special instances where the storage volume required is more than either the City estimate or the detailed estimate. This may be for exceptional circumstances, including an increase in land use density at a specific facility and/or tributary drainage area. The basis for this contingency is that the City has had several occasions over the recent past where estimated volumes have been exceeded, and based on this experience has assumed that 1 in 10 facilities will exceed the design volume by 10 %, amounting to $4,391,000 in additional construction cost (primarily excavation). The ratio of facilities has been carried forward from 2019 while the cost has been indexed by inflation for 2019-2023.

Facility Rock Excavation Construction Contingency (Category C – Res. – Facility U6)

This constitutes an item entry under Category C for special instances where the volume of rock encountered is more than either the City estimate or the detailed estimate. The City has recorded the instances of extra rock encountered in the facility construction over a previous5 year period (2014-2019), and based on this experience has assumed that 1 in 10 facilities (3.8) will encounter 9,000 m^3 of rock, amounting to $3,813,700

(indexed to inflation for 2019-2023) (in extra construction cost for excavation. Note that for the 2024 D.C. Update Study, the City has identified seven (7) facilities (carried forward from 2019) which have been identified in bedrock, and they would not apply to this contingency. In identifying the seven (7) facilities, the likelihood of another 3.8 encountering bedrock is expected to be lowered.

Unidentified Facilities in Combined Sewer Area (Category C – Res. – Facility U7)

The City has included an item entry under Category C for stormwater management facilities in the combined sewershed area, which are currently not identified in the list of projects. These works may, in some cases, be determined by the City to provide a long-term benefit to the stormwater system, and hence the City proposes to add these select works to their infrastructure. The area is currently under study, and the City estimates that there will be three (3) projects that result in a facility, costing an estimated $2,787,800 each, for a total of $8,363,400.

S.W.M. Retrofits

The City, as part of its Stormwater Master Plan (2007), assessed the feasibility of retrofitting existing stormwater management facilities in order to provide stormwater quality control and erosion control measures. The objective for the City is to improve environmental conditions in the downstream receiving water bodies.

There are 29 identified retrofit opportunities (e.g. add a quality or erosion component to an area currently receiving only quantity or flood control) in the City. These have been separated into those 11 locations which serve only existing development (therefore not growth-related, and not currently considered), and those 18 which serve both existing and new development (the benefit to existing must be deducted).

For the 18 facilities that meet the criteria, the total area served is 759 ha and the growth-related fraction has been estimated at 54.45 %. Note that the City has confirmed that one of the facilities (Binbrook R54) has been superseded through the development process, and this one has been removed from the 2019 list of potential retrofits.

G.R.I.D.S.

G.R.I.D.S. is the City's Growth-Related Integrated Development Strategy, which includes the areas identified as Potential new Business Park, in the existing Airport Business Park Special Policy Area, and new employment lands adjacent to the Airport S.P.A. lands. Projects related to Elfrida are considered a post-period benefit in this study as Elfrida is located outside of the Council-adopted Urban Boundary. The growth areas identified in the G.R.I.D.S. study account for approximately 75 new projects, including an estimated 57 stormwater management facilities and 18 off-site erosion control projects, with the erosion projects lumped into 5 area erosion studies, based on the watersheds and distinct growth areas.

The City has completed the Draft Airport Employment Growth District study (December 2009), and the Airport Employment Growth District Subwatershed Study and Stormwater Master Plan (S.W.M.P) Implementation Document (April 2017), however the reports do not detail the siting of all future stormwater management facilities. There may be opportunities to further plan the areas, and reduce the infrastructure, however it is left at the conservative level for the charge calculation purposes. Once a Final Master Drainage

Plan is complete, an update may be required for the G.R.I.D.S. stormwater management facilities (number, location, and sizes).

The G.R.I.D.S. development areas are drained by the Welland River, Three Mile Creek, and Twenty Mile Creek, each of which are considered to be sensitive coldwater fish habitat. Based on the anticipated Enhanced level of protection to be applied to the tributaries, it is proposed that all watercourse tributaries will be required to remain open: this therefore increases the number of facilities required to service the area.

Similar to the 2004, 2009, 2011, 2014 and 2019 Development Charge Background Studies, there are off-site erosion control studies and potentially work proposed for each receiving tributary downstream of the growth area.

The Airport S.P.A. facilities have been preliminarily sized to have larger footprints on account of the condition that Transport Canada typically imposes on stormwater management facilities near airports. There cannot be open water facilities since these are considered to attract waterfowl, and pose a navigation hazard to aircraft. The facilities have therefore been sized as dry ponds. (ref. Storm Drainage System Local Service Policy number 18, Appendix E).

Costs for Category D (**Storm Sewers Oversizing and Neighbourhood Outlet Works)** are developed for two sub-categories: storm sewer oversizing, and storm sewers identified for neighbourhood outlet works.

Storm Sewers - Oversizing

The oversizing costs are based on the relative increase in cost for storm sewers over a threshold diameter of 1200 mm, as set by previous City Financial Policy. In 2019, a list of projects had been generated by the City Development Engineering Department. The list was based on two sources of information: Draft Approved Subdivision Plans and Approved Secondary Plans. The 2024 list does not contain any new projects, however complete projects have been removed and two Binbrook projects were moved from Part Two – Secondary Plans to Part One – Subdivisions. The current list is included in Appendix G1-D.

Storm Sewers – Neighbourhood Outlet Works

The neighbourhood outlet works cost estimates are based on City studies for four (4) proposed Neighbourhood storm outlet works (shared by multiple development growth parcels). One project (Swayze Nhd Storm Outlet) has been completed since the original list of five (5) from 2019 and has been removed from the list. A list of projects has been generated by the City Development Engineering Department, and is included in Appendix G1-D.

The City has included a provisional entry under Category D2 for storm sewer neighbourhood outlet works within the combined sewershed that are currently under study by the City and not identified in the list of projects. The City estimates a total of three (3) new Neighbourhood outlets to service growth, at an estimated cost of $1,393,900 each. The estimate of three (3) outlets has been carried over from 2019 while the cost has been indexed to inflation for 2019-2023.

Costs for Category E **(culvert and bridge upgrades not identified in previous studies)** have been estimated in the following manner:

- Based on the planned Development Charge eligible road projects (replacement and widening of existing) affected watercourse crossings, based on the topographic mapping, have been determined (current estimate = 32),

- The size of the new culvert cross-sectional area has been estimated as a function of the upstream drainage area,
- All "small" crossings where the culvert will likely have a diameter smaller than 1200 mm have been removed from the calculation, as those works would be assumed to be part of the road works,
- Also, any culverts previously identified in Category A (75) have not been included under this category,
- The remaining (79) culverts have been separated into three categories, based on: estimated flow conveyance area of 2 m^2, 4 m^2, and 8 m^2, (68, 6, and 5 respectively); for costing purposes unit rates of $117,500, $235,000 and $470,000 per culvert/bridge respectively have been used, assuming a 26 m road width for all culverts/bridges. This cost estimate is based on concrete box culverts and has been developed using 2019 unit rates and adjusted by the CPI factor for 2019-2023 of 39.39 %, installation estimated at double the supply cost, and allows for an average depth of cover on each culvert.

The costs are currently attributed to new development based on the benefit to growth percentage established in the roads study (ref. Appendix H).

3.4 Existing Agreements

As noted in Section 2, there are existing agreements (e.g. Special Policy Areas, Local Area Improvements, and Developer Agreements) in force that will need to be accounted for in the financial section of the Development Charges Update. Where it can be identified and verified by the City, existing developer contributions that have been made under existing agreements will be credited after the Development Charges are collected.

4. Summary of Stormwater Component of Development Charges

4.1 Overview

Table G.3 presents the stormwater development charges cost estimates, by Category A to E, plus G.R.I.D.S.. In each table, the costs have been split into Residential and Non-Residential, providing the gross costs and the Development Charge related costs.

Table G.3: Summary of Stormwater Development Charges Costs

Type of Work		Gross Estimated Cost	Development Charge Eligible Growth %	Development Charge Cost
A Channel System Improvements (Identified Projects)				
	Residential	$27,831,000	76.27	$21,227,000
	Non-Residential	$31,070,000	86.27	$26,800,000
Subtotal A		$58,900,000	81.54	$48,030,000
B Erosion Control – Estimated Downstream Future Works				
	Residential	$25,114,295	48.05	$12,068,251
	Non-Residential	$11,401,708	61.08	$6,963,747
Subtotal B		$36,516,003	52.12	$ 19,031,997
C Stormwater Management Quality/Quantity Facilities				
	Residential	$205,470,844	96.17	$197,610,973
	Non-Residential	$150,578,009	0.62	$940,084
Subtotal C		$356,048,853	55.77	$198,551,056

Table G.3: Summary of Stormwater Development Charges Costs

Type of Work		Gross Estimated Cost	Development Charge Eligible Growth %	Development Charge Cost
D Oversizing of trunk sewers and culverts				
	Residential	$22,455,523	87.75	$19,705,523
	Non-Residential	$1,901,280	100	$1,901,280
Subtotal D		$24,356,802	88.71	$21,606,802
E Culverts and Bridges (not in Category A)				
	Residential	$4,817,737	78.05	$3,760,185
	Non-Residential	$6,932,840	85.17	$5,904,665
Subtotal E		$11,750,577	82.25	$9,664,850
Categories A to E				
	Residential	$285,689,398	89.04	$254,371,931
	Non-Residential	$201,880,837	20.13	$42,510,575
Subtotal Categories A to E		**$487,570,235**	**60.89**	**$296,882,506**
15% Allowance				**$44,532,376**
Total Categories A to E				**$341,414,882**

Table G.3: Summary of Stormwater Development Charges Costs

Type of Work		Gross Estimated Cost	Development Charge Eligible Growth %	Development Charge Cost
G.R.I.D.S. Stormwater Management Quality/Quantity Facilities				
	Residential	$135,892,134	0.00	$0
	Non-Residential	$247,984,477	0.00	$0
Subtotal G.R.I.D.S. S.W.M.		$383,876,611	0.00	$0
G.R.I.D.S. Watercourses				
	Residential	$10,025,938	100	$10,025,938
	Non-Residential	$17,451,247	100	$17,451,247
Subtotal G.R.I.D.S. Watercourses		$27,477,185	100	$27,477,185
Residential		$431,607,470	61.26	$264,397,869
Non-Residential		$467,316,562	12.83	$59,961,822
SUBTOTAL		**$898,924,031**	**36.08**	**$324,359,691**
15% ALLOWANCE				**$48,653,954**
TOTAL				**$373,013,645**

All of the proposed projects in Categories A to E and G.R.I.D.S., which have been considered for the storm drainage Development Charge, can be attributed to distinct parcels of residential and/or non-residential growth lands. These linkages form the basis for the proposed split of the total charge. For categories D, and E, in the absence of information to support the establishment of a City share, the % attributable to the City has been set at zero.

4.2 Summary

The City of Hamilton has updated the 2019 Development Charges project listing. The City has prepared an overall report, including appendices for details related to Stormwater, Water, Wastewater, and Transportation.

The Stormwater appendix provides information for the portion of the Development Charges relating to stormwater works including: erosion control, channel improvements, stormwater management works, oversizing of existing stormwater related infrastructure and stormwater related studies. Projects included in this report are future growth related which includes both planned and unplanned projects. Future growth-related information has been collected from the City and other studies, and where no information was available appropriate assumptions have been made, as detailed herein. This appendix provides a summary of the approach used in establishing the Development Charges related costs and summarizing of the stormwater-related Development Charges for both residential and non-residential development.

For a final summary of the costs with G.R.I.D.S. excluded (Categories A to E), a gross total of $487,570,235, with the portion allocated to new development totaling $296,882,506 plus a 15% allowance for a total development charge cost of $341,414,882.

For a final summary of the costs with G.R.I.D.S. included (Categories A to E + G.R.I.D.S. S.W.M. + G.R.I.D.S. Watercourses), a gross total of $898,924,031, with the portion allocated to new development totaling $324,359,691 plus a 15% allowance for a total development charge cost of $373,013,645.

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Additional City Reference Studies

NAME	DATE	REVISIONS	AUTHOR
Ancaster Commercial Development (S.W.M. Report)		September-95	Cosburn Patterson Wardman Limited
Ancaster Community Center (S.W.M. Plan)	September-91		Sandwell Swan Wooster.
Ancaster Industrial Park (S.W.M. Report Update)	September-02	December-02	A.J. Clarke and Associates Ltd.
Ancaster Industrial Park Detention Pond No. 2 (S.W.M. Study Addendum)	November-98		A.J. Clarke and Associates Ltd.
Ancaster Master Drainage Plan (Final Draft)	January-87		Philips Planning and Engineering Limited
Ancaster Meadows Phase 1 (S.W.M. Updated)	November-09		Metropolitan Consulting Inc.
Ancaster Meadows Phase II (Storm Drainage & Final Detention Pond Design)	August-86		Upper Canada Consultants
Ancaster Village Townhomes (S.W.M. Report)	September-93	January-95	A.J. Clarke and Associates Ltd.
Ancaster Woodlands Subdivision (S.W.M. Report)	July-013	Jan 14	S. Llewellyn & Associates Limited
Anpropco Developments (S.W.M. Study)		December-80	Paul Theil Associates Limited
Binbrook Settlement Area (Master Drainage Plan Update Report)	December-08		Weslake Inc.
Binbrook Urban Settlement Area (S.W.M. Report)	June-00		A.J. Clarke and Associates Ltd.
Bogle Subdivision (Functional Servicing Design Report)	June-00		Stantec
Bridgeport Subdivision (Preliminary S.W.M. Report)	May-03		A.J. Clarke and Associates Ltd.
Bridgeport Watercourses (Hydrologic & Hydraulic Analysis)	May-05		A.J. Clarke and Associates Ltd.
Bridle Ridge Subdivision Phase 3 ((S.W.M. Report)	July-05		S. Llewellyn & Associates Limited
Canada Bread (S.W.M. NGIBP S.W.M. Facility HC3-FB)		Aug-010	AMEC Earth & Environmental
Chedoke Golf Course Channel Municipal Class EA (Schedule B) Final	July-08		McCormick Rankin Corporation
City of Stoney Creek (Implementation of Drainage Works Watercourse 5,6,7 & 9)	May-92		Philips Planning and Engineering Limited
Clappison's Corners Industrial Business Park Master Drainage Plan (Final Report)	May-89		Totten Sims Hubicki Associates Consultants
Clovervale Subdivision (S.W.M. Report)	September-04		Lamarre Consulting Group Inc.
Clovervale Subdivision (Retrofit Design-S.W.M. Facility & Associated Conveyance Improvements)	November-013		AMEC Environment & Infrastructure
D'Aminco Cimico (S.W.M. Report)	September-09		Kenneth Youngs Engineering Inc.
Dartnall Rd Extension Culvert/Bridge (Hydraulic Impacts Report) Final Report	March-012		Dillon Consulting

NAME	DATE	REVISIONS	AUTHOR
Delsey Creek (Storm Drainage Master Plan - Class EA Study Project File Report)	October-03		MTE Consultants Inc.
Duff's Corners Business Park (S.W.M. Report)	May-06	April-07	A.J. Clarke and Associates Ltd.
Dussin Property - Meadowlands Neighbourhood (S.W.M. Report)	May-013		Lamarre Consulting Group Inc.
Elizabeth Gardens - Binbrook Settlement Area (S.W.M. Report)	June-04		Lamarre Consulting Group Inc.
Enclave The (S.W.M. Report)	April-97	July-97	A.J. Clarke and Associates Ltd.
Falling Brook Estates (S.W.M. Assessment)	July-96		A.J. Clarke and Associates Ltd.
Fiddler's Green Estates (S.W.M. Report)	July-91		Aquafor Engineering Limited
Fifty Road Joint Venture Inc. (S.W.M. Implementation Report)	February-00		Rand Engineering Corporation
Fifty Point West Neighbourhood (Addendum to Preliminary S.W.M. Plan)	November-97		Hydro Comp Inc.
Flamborough Business Park - Highway 6 & Dundas Street (S.W.M. Report)	March-06		Lamarre Consulting Group Inc.
Fontana Gardens Phase 3 (S.W.M. Assessment Report)	December-07		A.J. Clarke and Associates Ltd.
Foothills of Winona Avatar International Realty Corporation (S.W.M. Report)	August-01		Planning & Engineering Initiatives Limited
Forest Ridge (S.W.M. Report)	December-04		A.J. Clarke and Associates Ltd.
Forty Mile Creek Flood Damage Reduction Study	August-95		Aquafor Beech Limited
Fruitland Centre (S.W.M. Report)	June-03		Serabill Designbuild Corporation Inc.
Fruitland Meadows (S.W.M. Report for Existing S.W.M. Facility Retrofit)	January-02	March-03	S. Llewellyn & Associates Limited
Garner Grove Subdivision (S.W.M. Report)	December-02	July-03	Ashenhurst Nouwens Limited
Garner Neighbourhood (Master Drainage Plan)	July-96		Philips Planning and Engineering Limited
Garth Trails (S.W.M. Addendum)	June-02		A.J. Clarke and Associates Ltd.
Gates of Ancaster II Limited (S.W.M. Report)	April-07		John Towle Associates Limited
Gatesbury Developments Phase IV (Functional Report)	November-94		F. J. Ternoway & Associates Limited
Greater Hamilton Airport Business Park Phase 1 (SW Drainage Report)		August-92	CC Parker Consultants Limited
Green Millen Shore Estates (S.W.M. Report)	February-011	September-11	AMEC Environment & Infrastructure
Greenforest Estates (S.W.M. Report)	September-08		Kenneth Youngs Engineering Inc.
Greenhill Avenue Area Storm Drainage Study	June-08		SNC Lavalin
Greenwood Estates Subdivision (S.W.M. Report)	May-88		Youngs Consultants
Greystones (S.W.M. Report)	December-08		A.J. Clarke and Associates Ltd.
Hamilton International Airport Apron Expansion Phase 2 (S.W.M. Report)	October-02		Giffels Associates Limited
Hannon Creek Subwatershed NGIBP (Master Drainage Plan) Draft Report	March-07		Totten Sims Hubicki Associates Consultants

NAME	DATE	REVISIONS	AUTHOR
Head of the Lake (Mount Hope Terrace) (S.W.M. Report)	October-90	July-91	Philips Planning and Engineering Limited
Heritage Green Community - (Functional Engineering Report)	April-91		Delcan
Highgrove Park Estates (S.W.M. & Floodplain Mapping Tributary of Ann St Creek)	April-86	July-86	G. M. Serns & Associates Ltd.
Highland Estates (S.W.M. Review)	November-92		C.C. Parker Consultants Limited
Jackson Heights Phase 3 (S.W.M. Report)	July-06		A.J. Clarke and Associates Ltd.
Kaleidoscope Phase 1 - 157 Parkside Drive (S.W.M. Report)			AMEC Environment & Infrastructure
Kopperfields West Residential Community (S.W.M. Report)	September-98		Paul Theil Associates Limited
Lake Vista Winona Subdivision (Mattamy Winona Limited)	June-06	November-06	David Schaeffer Engineering Ltd
Lewis Road Improvements Class EA from Barton Street to South Service Road (Drainage and S.W.M. Report	October-06	July-07	MacViro Consultants
Limberlost Estates (S.W.M. Report)	November-91		Town of Ancaster
Lime Kiln (S.W.M. Plan)	September-88		Philips Planning and Engineering Limited
Limestone Manor (S.W.M. Report)	September-12		Lamarre Consulting Group Inc.
Maple Leaf Foods - New Build (Site S.W.M. Design Report)	March-012		AECOM
Mattamy (Southcote) Limited (S.W.M. Implementation Report)	September-09		Rand Engineering Corporation
Mattamy on the Lake Subdivision (Mattamy (Winona) Limited) (S.W.M. Report)	April-07		David Schaeffer Engineering Ltd
Meadowbrook Manors (S.W.M. Report)	January-95		Weslake Inc.
Meadowlands Neighbourhoods 3, 4, 5 (Master Plan)	F-00		A.J. Clarke and Associates Ltd.
Meadowlands Neighbourhood 4 (Functional Servicing & S.W.M. Report)	March-04		Metropolitan Consulting Inc.
Meadowlands of Ancaster (Phase 6) (Proposed S.W.M. Facility)	October-01		A.J. Clarke and Associates Ltd.
Meadowlands of Ancaster (Phase 7) (S.W.M. Report)	March-03		A.J. Clarke and Associates Ltd.
Meadowlands Phase 10 (Proposed S.W.M. Plan)	January-08	May-08	Stantec Consulting Ltd.
Meadowlands Place (Functional Servicing & S.W.M. Assessment)	March-98	March-99	A.J. Clarke and Associates Ltd.
Meadowlands Place (S.W.M. Report)	September-98		A.J. Clarke and Associates Ltd.
Meadowlands The (Tiffany Watershed) (Detailed Master Drainage Plan)	March-88		Philips Planning and Engineering Limited
Millcreek Estates (S.W.M. Report)	September-92		Kenneth Youngs Engineering Inc.
Millers Pond Subdivision (S.W.M. Report)	July-01	July-02	S. Llewellyn & Associates Limited
Millrun Condominiums (S.W.M. Plan)	September-99		Phillips Planning and Engineering Limited
Montgomery Creek (S.W.M. Class EA)	August-97		Philips Planning and Engineering Limited
Morgan Firestone Arena Twinning (S.W.M. Report)	August-10		Their and Curran Architects Inc.

NAME	DATE	REVISIONS	AUTHOR
Mount Hope Secondary Plan (S.W.M. Report)	No date		Youngs Consultants
Mount Hope Urban Settlement Area (Master S.W.M. Plan)		December-94	Kenneth Youngs Engineering Inc.
Orchard Park Subdivision (S.W.M. Report)	May-13	Aug13;Oct13	S. Llewellyn & Associates Limited
Orkney Acres Rural Estate Subdivision (S.W.M. Report)	June-04		Lamarre Consulting Group Inc.
Orlick Aeropark (Design Brief)	February-08	April-09	Odan/Detech Group Inc.
Paradise Gardens (S.W.M. Report)	May-03		A.J. Clarke and Associates Ltd.
Paramount Estates (S.W.M. Report)	October-013		Lamarre Consulting Group Inc.
Parkside Hills Phase 1 (S.W.M. Design Brief)	May-07		Metropolitan Consulting Inc.
Pleasant Valley Development (S.W.M. Report)		July-07	Planning & Engineering Initiatives Limited
QEW Drainage Report (Pinelands Ave to Fifty Road)	No date		UMA Engineering Ltd.
Redeemer University College (S.W.M. Report)	November-04	Dec04;Apr05	Van der Woerd & Associates Ltd.
Ridgeview Subdivision (S.W.M. Report)	September-011		Lamarre Consulting Group Inc.
Riocan Power Centre (S.W.M. Report)	March-06		A.J. Clarke and Associates Ltd.
Rockcliffe Gardens (Storm Drainage Study)	February-77		William L. Sears and Associates Limited
Rockview Summit (S.W.M. Report)	Septemer-93	August-94	A.J. Clarke and Associates Ltd.
Rothsay Avenue Flood Remediation (Class EA) DRAFT	February-012		AMEC Environment & Infrastructure
Scenic Wood (Ancaster) (S.W.M. Study)	No date		Stantec
Seabreeze (S.W.M. Report)	July-06	April-07	A.J. Clarke and Associates Ltd.
Shaver Estates (S.W.M. Report)	January-04	June-04	A.J. Clarke and Associates Ltd.
Shaver Neighbourhood (East) (S.W.M. Plan)	November-96		Philips Planning and Engineering Limited
Shaver Neighbourhood (Master Drainage Plan - Addendum) (Final)	April-97		Weslake Inc.
Silverwood Homes (Functional Servicing & S.W.M. Report)	July-08		Metropolitan Consulting Inc.
Southampton Estates (S.W.M. Report)	April-03		Lamarre Consulting Group Inc.
Southcote Woodlands Plan of Subdivision (Design Brief for Phase II)	January-86	Jan;Jun;Jul07	Odan/Detech Group Inc.
Spencer Creek Estates (Preliminary S.W.M. Report)	October-98	January-99	Philips Planning and Engineering Limited
Spencer Creek Estates (S.W.M. Report)	April-98		CVE Engineering Ltd.
Spencer Creek Estates Phase 2 (S.W.M. Report)	May-12		EXP
Spencer Creek Village (S.W.M. Report)	June-99	October-99	Planning & Engineering Initiatives Limited
Springbrook Meadows - Phase 1 (S.W.M. Report)	February-92		Philips Planning and Engineering Limited

NAME	DATE	REVISIONS	AUTHOR
Spring Valley West, Shaver and Garner (S.W.M. Study Expanded Urban Area)	February-92		Philips Planning and Engineering Limited
Spring Valley West, Shaver and Garner (M.D.P. - Proposed Amendment)	November-96		Weslake Inc.
Stone Church Centre (S.W.M. Report)	March-04		A.J. Clarke and Associates Ltd.
Stoney Creek Master Drainage Plan Industrial Corridor Area No's 5-7(Addndm 1)	January-91		Philps Planning and Engineering Limited
Summerlea West Residential Subdivision (S.W.M. Report)	February-011	January-12	MTE Consultants Inc.
Sundusk Estates Subdivision (S.W.M. Report)	August-94		Kenneth Youngs Engineering Inc.
Sunnymeade Property (Storm Drainage Report)	February-88		Upper Canada Consultants
Sunset Ridge (S.W.M. Report)	July-98		Planning Initiatives Ltd.
Tech Park (S.W.M. Report)	February-94		Philips Planning and Engineering Limited
Tiffany (S.W.M. Report)	June-93	Oct-93 Jun 97	A.J. Clarke and Associates Ltd.
Trillium Estates Subdivision (S.W.M. Report)	August-03		S. Llewellyn & Associates Limited
Town of Ancaster (Master Drainage Plan)	August-99		C.N. Watson and Associates Ltd.
Twenty Road (Regional Stormwater Facility Design Report)	August-012		AECOM
Twin Gable Estates - Shaver Neighbourd (East) (S.W.M. Plan)	July-97		Philips Planning and Engineering Limited
Upcountry Estates Limited - Proposed Residential Subdivision (Functional)	May-09		Condeland Engineering Ltd.
Van Every Gardens (S.W.M. Report)	March-96		Kenneth Youngs Engineering Inc.
Venetor Crane Ltd. (S.W.M. Report)	May-06		S. Llewellyn & Associates Limited
Village Grove in Carlisle Subdivision (Final S.W.M. Report)	November-00		Stantec
Ward Estates (S.W.M. Report)	August-00		A.J. Clarke and Associates Ltd.
Waterdown Bay (Functional S.W.M. Plan Final Report)	May-05		McCormick Rankin Corporation
Watercourse 5.0 & 6.0 (Hydraulic Assessment)	January-011		Dillon Consulting
Waterdown North (Master Drainage Plan Addendum)	February-012		AMEC Environment & Infrastructure
Waterdown Woods (Functional Report)	January-91		Kenneth Youngs Engineering Inc.
Webster Estates (S.W.M. Report)	June-02	September-02	S. Llewellyn & Associates Limited
Wellington Meadows (Preliminary S.W.M. Plan)	July-97	September-97	Hydro Comp Inc.
West Bloom Estates (S.W.M. Update Report)	April-12		Metropolitan Consulting Inc.
West Central Mountain Drainage Assessment Supplemental Capacity Analysis & S.W.M. Sizing	October-11		AMEC Environment & Infrastructure
Westover Winds (Servicing/S.W.M. Report)	July-06		Weslake Inc.
Westview Estates (S.W.M. Plan)	November-96	May-97	Hydro Comp Inc.

NAME	DATE	REVISIONS	AUTHOR
Wilson Woods Condominium (S.W.M. Report)	August-94	November-94	A.J. Clarke and Associates Ltd.
Winona Crossing (Functional Servicing Report & S.W.M. Report)	January-013	November-013	A.J. Clarke and Associates Ltd.
Winona Meadows (S.W.M. Assessment)	July-95		A.J. Clarke and Associates Ltd.
Winona Park Estates (S.W.M. Study)	April-90		Environmental Hydraulics Group
Winona Urban Area (Master Drainage Plan Implementation)	May-90		Philips Planning and Engineering Limited
Winona Urban Boundary Expansion (Preliminary Engineering Servicing Study)	August-92		Philips Planning and Engineering Limited
Woodland Manor (Functional Servicing Report)	May-08		Stantec Consultant Ltd.

TABLE G.4: INFLATION INDEX 2019-2023

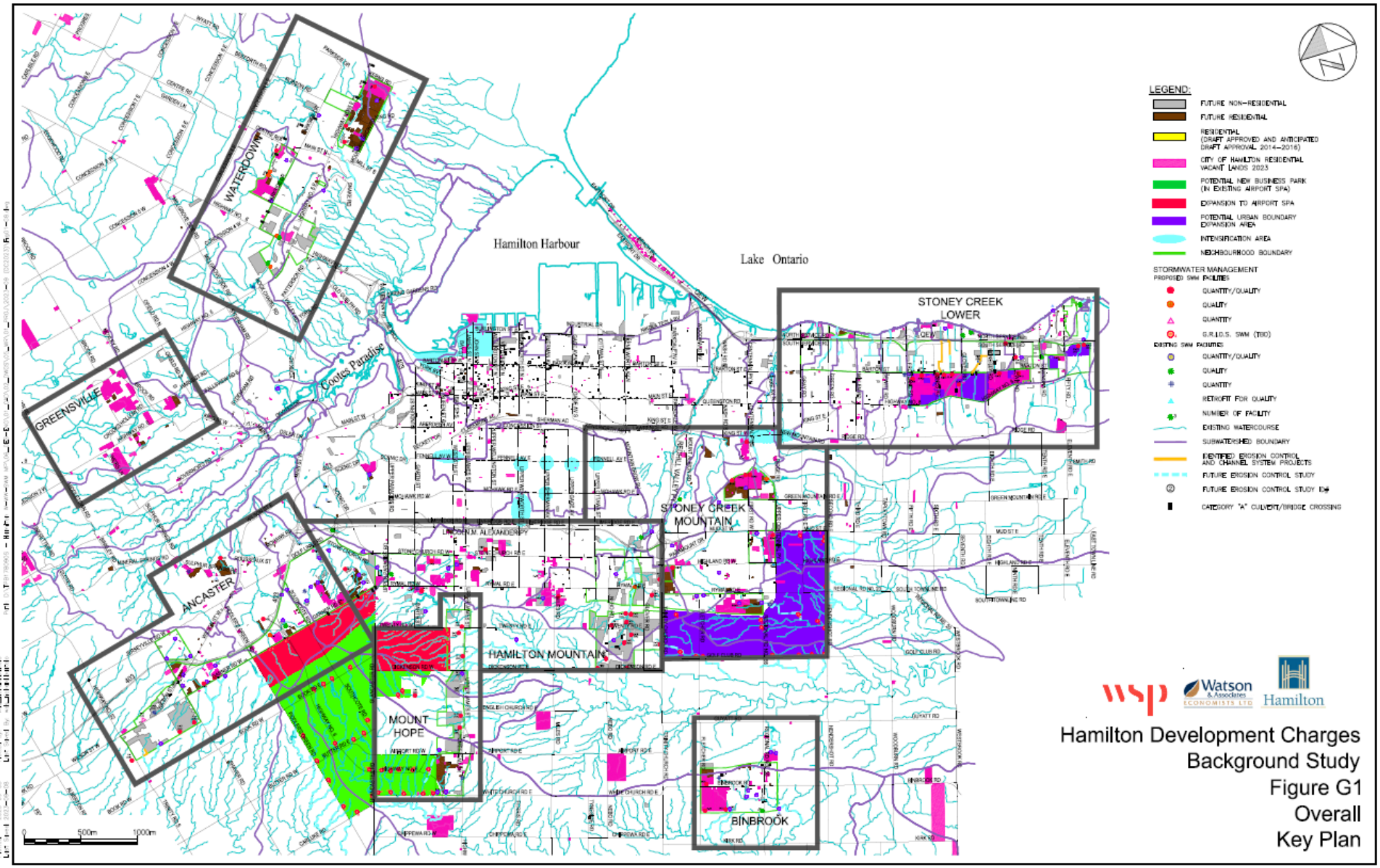
As of July 31, 2023

Toronto Series

2017 BASE YEAR	2019		2020		2021		2022		2023	
	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR	INDEX	YR/YR
QUARTER		% CHNG		% CHNG		% CHNG		% CHNG		% CHNG
I	107.4	5.2%	110.6	3.0%	114.2	3.3%	134.2	17.5%	150.6	12.2%
II	108.3	4.0%	111.1	2.6%	119.9	7.9%	140.9	17.5%	152.3	8.1%
III	109.2	3.3%	111.9	2.5%	125.0	11.7%	144.5	15.6%		
IV	109.7	2.9%	112.1	2.2%	129.3	15.3%	148.1	14.5%		
Ann. Avg.	108.7	3.8%	111.4	2.6%	122.1	9.6%	141.9	16.2%	151.5	6.7%

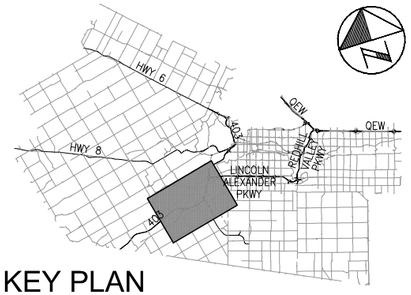
Source: Statistics Canada. Table 18-10-0276-02 Building construction price indexes, by type of building

2019 to 2023	39.39%



Hamilton Development Charges
Background Study
Figure G1
Overall
Key Plan

KEY PLAN



LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- FUTURE EROSION CONTROL STUDY ID#
- CATEGORY "A" CULVERT/BRIDGE CROSSING

SCALE VALID ONLY FOR 11"x17" VERSION

0 500m 1000m

SCALE 1:30000

Hamilton Development Charges
Background Study
Figure G2
Ancaster
Stormwater Infrastructure

Path: D:\TPB178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PRO\2023-09 (DC2023)\Fig01-G8.dwg
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Plotted: 2023-09-08
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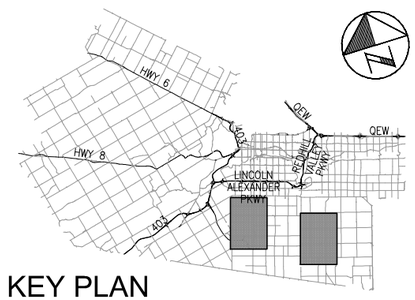

KEY PLAN

GUYATT RD
REGIONAL RD NO. 56
FLETCHER RD
THREE MILE CREEK
BINBROOK RD
BINBROOK AREA
WELLAND RIVER
TRINITY CHURCH RD
KIRK RD
B-23
B-24
B-20
B-21
B-7
R-75
12
11
9

SCALE VALID ONLY FOR 11"x17" VERSION
0 500m 1000m
SCALE 1:30000

BINBROOK

GLANCASTER RD
GARTH ST
CARTH TRA LS
TWENTY RD W
UPPER JAMES ST
TWENTY RD E
GLANBROOK HILLS
B-11 (NR)
B-12 (NR)
B-13 (NR)
TWENTY MILE CREEK
DICKENSON RD W
DICKENSON RD E
B-14 (NR)
AIRPORT BUSINESS PARK
R-53 (NR)
HIGHWAY NO. 6
B-9 (NR)
THREE MILE CREEK
ENGLISH CHURCH RD E
AIRPORT
B-15 (NR)
B-16 (NR)
HOMESTEAD DR
AIRPORT RD W
AIRPORT RD E
HIGHWAY No.6
MOUNT HOPE URBAN BOUNDARY EXPANSION
WELLAND RIVER
WHITE CHURCH RD E
B-10
20
17
19
16
5
21
14
13

MOUNT HOPE

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD) 4

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY 3
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- FUTURE EROSION CONTROL STUDY ID# 2
- CATEGORY "A" CULVERT/BRIDGE CROSSING

wsp Watson & Associates ECONOMISTS LTD. Hamilton

Hamilton Development Charges Background Study
Figure G3
Binbrook / Mount Hope Stormwater Infrastructure

Path: D:\TPB178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PRO\2023-09 (DC2023)\Fig01-G8.dwg
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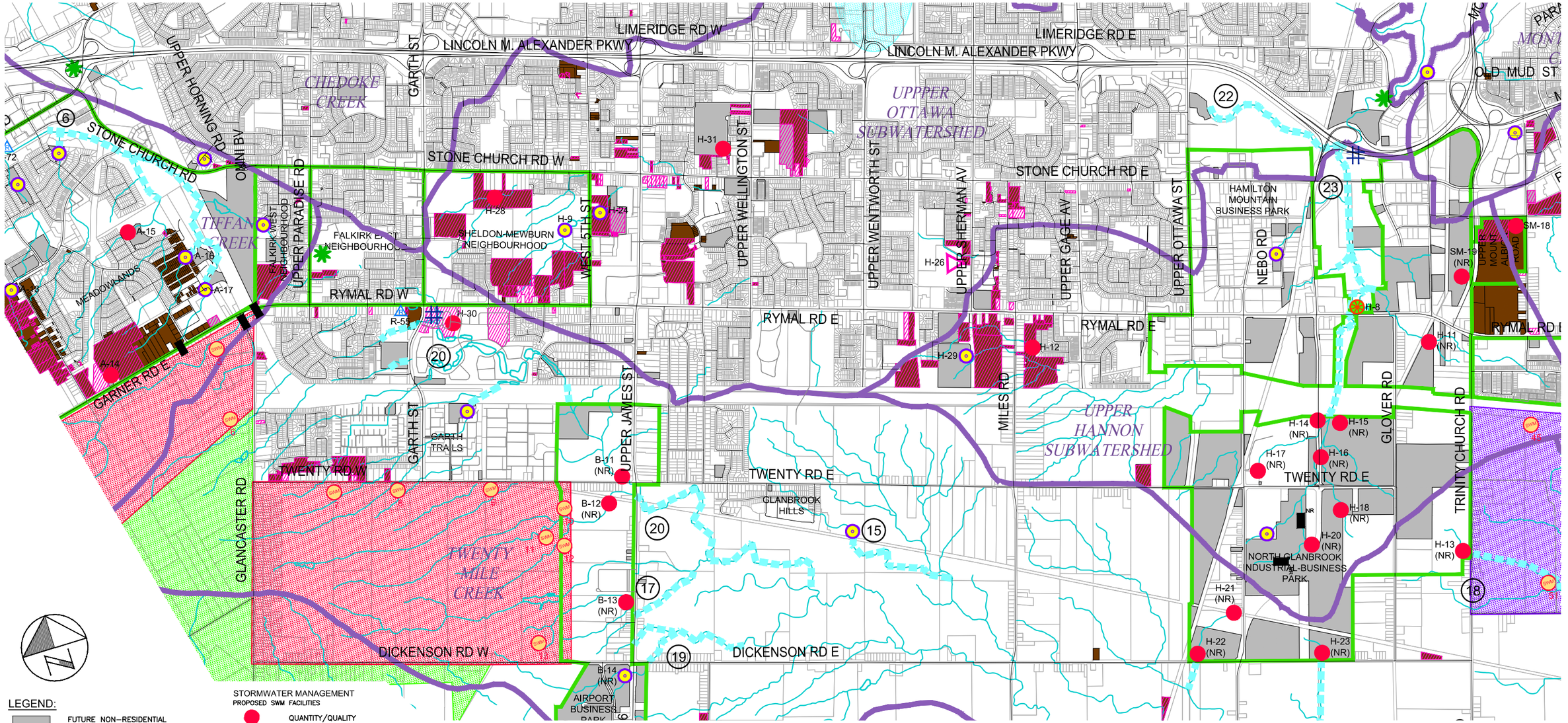
Last Saved By: wds_richard.bartolo
Plotted: 2023-09-08
Last Saved: 2023-09-08



LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

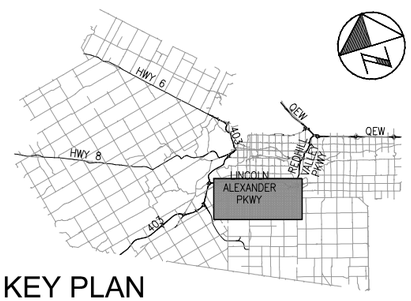
EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- FUTURE EROSION CONTROL STUDY ID#
- CATEGORY "A" CULVERT/BRIDGE CROSSING

SCALE VALID ONLY FOR 11"x17" VERSION

0 500m 1000m

SCALE 1:30000



KEY PLAN

Hamilton Development Charges Background Study
Figure G4
Hamilton Mountain Stormwater Infrastructure

Path: D:\TPB178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PRO\2023-09 (DC2023)\Fig01-G8.dwg
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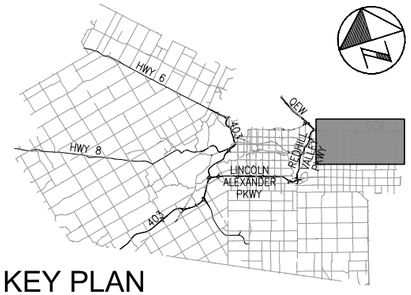
Plotted: 2023-09-08
Last Saved: 2023-09-08

KEY PLAN



LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD) 4

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- 3 NUMBER OF FACILITY
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- 2 FUTURE EROSION CONTROL STUDY ID#
- CATEGORY "A" CULVERT/BRIDGE CROSSING

Lake Ontario
CHERRY BEACH
NORTH SERVICE RD
SOUTH SERVICE RD
QEW
BARTON ST
HIGHWAY NO. 8
KING ST E
RIDGE RD
NEW MOUNTAIN RD
CENTENNIAL PKY N
CENTENNIAL PKY S
LAKE AV N
GRAY RD
GREEN RD
MILLEN RD
DEWITT RD
FRUITLAND RD
STONEY CREEK BUSINESS PARK
JONES RD
GLOVER RD
MCNEILLY RD
LEWIS RD
WINONA RD
FIFTY RD
FIFTY POINT JOINT VENTURE
FIFTY POINT INDUSTRIAL PARK
S.C.U.B.E.
STONEY CREEK URBAN BOUNDARY EXPANSION
FIRST RD E
SECOND RD E
THIRD RD E
TAPLEYTOWN RD
FIFTH RD E
EIGHTH RD E
ASH
HARDS
WC 0
WC 1
WC 2
WC 3
WC 4
WC 5
WC 6
WC 7
WC 9
WC 10
WC 12
SL-10 (NR)
SL-11 (NR)
SL-12
SL-13
SL-17 (NR)
SL-18
SL-19
SL-20
SL-21
SL-23 (NR)
SL-24
SL-29
SL-30
SL-31
SL-2
SL-3
SL-4
R-82 (NR)
SM-6
SM-21
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36
37

SCALE VALID ONLY FOR 11"x17" VERSION

0 500m 1000m

SCALE 1:30000

Hamilton Development Charges
Background Study
Figure G5
Stoney Creek Lower
Stormwater Infrastructure

Path: D:\TPB\178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\2023-09 (DC2023)\Fig01-G8.dwg
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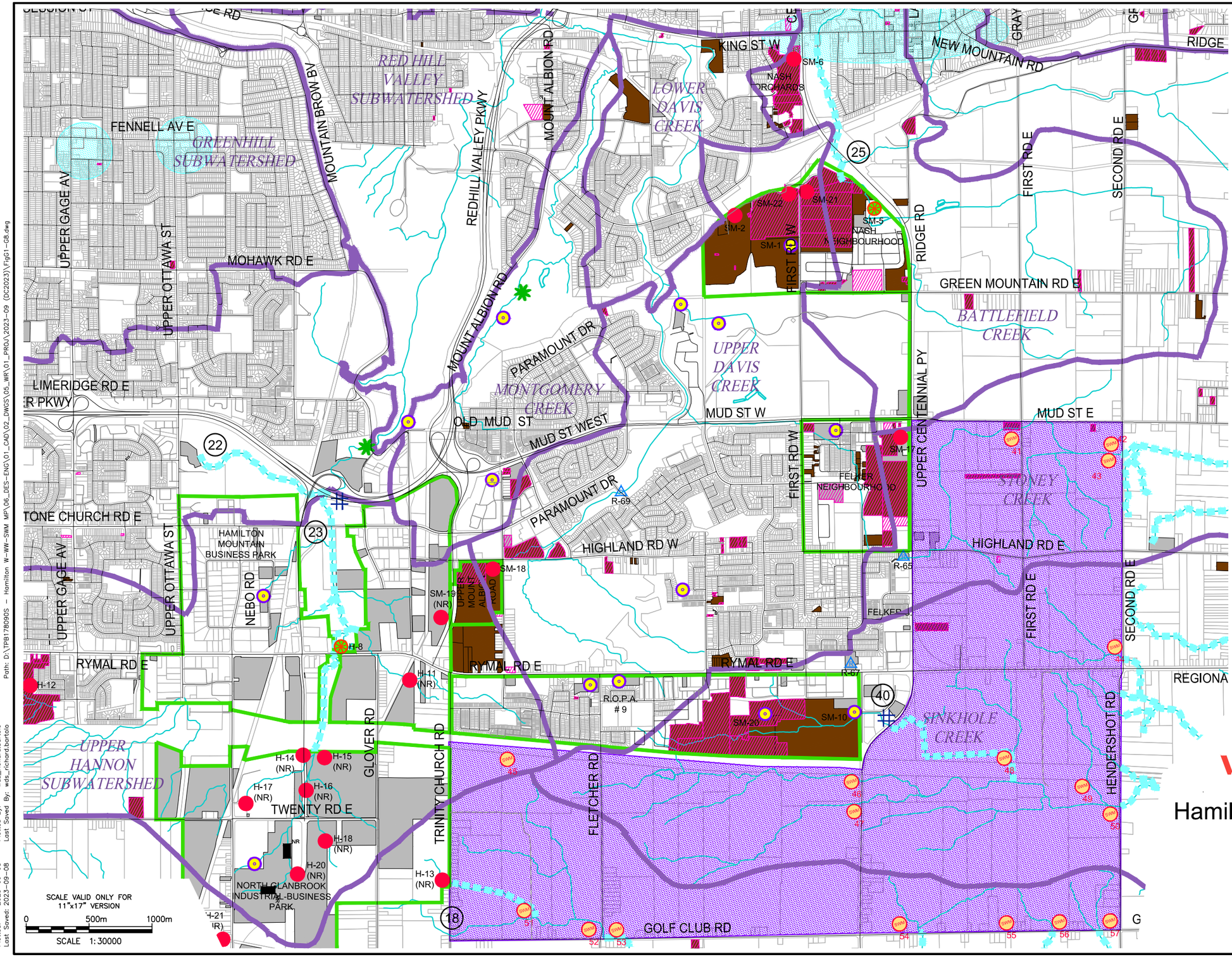
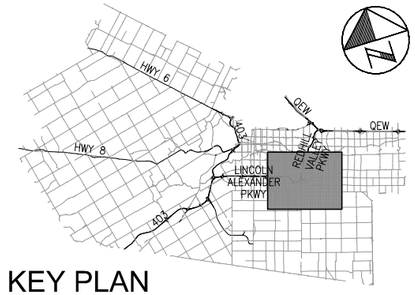
Plotted: 2023-09-08
Last Saved: 2023-09-08





KEY PLAN

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- NUMBER OF FACILITY
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- FUTURE EROSION CONTROL STUDY ID#
- CATEGORY "A" CULVERT/BRIDGE CROSSING

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Hamilton Development Charges Background Study
Figure G6
Stoney Creek Mountain Stormwater Infrastructure

Path: D:\TPB178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PRO\2023-09 (DC2023)\Fig01-G8.dwg
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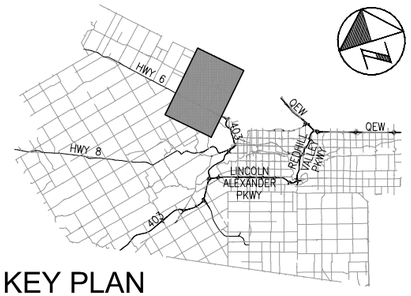
Plotted: 2023-09-08
Last Saved: 2023-09-08

KEY PLAN



CONCESSION 6 E
CONCESSION 5 E
CONCESSION 4 W
MILLGROVE SIDE RD
HIGHWAY NO. 6
CENTRE RD
BEEFORTH RD
ROBSON RD
PARKSIDE DR
LOGIES CREEK
BORER'S CREEK
GRINDSTONE CREEK
FALCON CREEK
WATERDOWN NORTH (OPA 28)
WATERDOWN SOUTH (OPA 28)
CLAPPISON INDUSTRIAL PARK
UPCOUNTRY ESTATES
PARKSIDE DR
MAIN ST N
HIGHWAY NO. 5 E
HOWARD BLVD
THOMSON DR
MILL ST S
SNAKE RD
MOUNTAIN BROW RD
KERNS RD
KING RD
SYDENHAM
ROCK CHAPEL RD
PATTERSON RD
VALLEY RD
YORK RD
HIGHWAY NO. 6
R-35 (NR)
EW1
EW2
EW3
EW4
EW5
EW7
EW8
EW9
W1
W2
W3
W4
W5
W6
W19
42
43
44
45
46

LEGEND:

- FUTURE NON-RESIDENTIAL
- FUTURE RESIDENTIAL
- RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
- CITY OF HAMILTON RESIDENTIAL VACANT LANDS 2023
- POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
- EXPANSION TO AIRPORT SPA
- POTENTIAL URBAN BOUNDARY EXPANSION AREA
- INTENSIFICATION AREA
- NEIGHBOURHOOD BOUNDARY

STORMWATER MANAGEMENT

PROPOSED SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- SWM 4 G.R.I.D.S. SWM (TBD)

EXISTING SWM FACILITIES

- QUANTITY/QUALITY
- QUALITY
- QUANTITY
- RETROFIT FOR QUALITY
- 3 NUMBER OF FACILITY
- EXISTING WATERCOURSE
- SUBWATERSHED BOUNDARY
- IDENTIFIED EROSION CONTROL AND CHANNEL SYSTEM PROJECTS
- FUTURE EROSION CONTROL STUDY
- (2) FUTURE EROSION CONTROL STUDY ID#
- CATEGORY "A" CULVERT/BRIDGE CROSSING

SCALE VALID ONLY FOR 11"x17" VERSION

0 500m 1000m

SCALE 1:30000

Hamilton Development Charges Background Study
Figure G7
Waterdown Stormwater Infrastructure

Plotted: 2023-09-08
Last Saved: 2023-09-08
Plotted By:
Last Saved By: wds_richard.bartolo
Path: D:\TPB178090S - Hamilton W-WW-SWM MP\06_DES-ENG\01_CAD\02_DWGS\05_WR\01_PROJ\2023-09 (DC2023)\Fig01-G8.dwg

Appendix G-1

Cost Summary Sheets – Detailed By Category

APPENDIX G-1: CATEGORY A - OPEN WATERCOURSES: CHANNEL SYSTEM IMPROVEMENTS (IDENTIFIED PROJECTS) RESIDENTIAL

Category		Project Title	Status?	Study Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work					2019 Estimated Capital Cost ($)	2023 Estimated Capital Cost ($)	Estimated Total Cost (Rounded)($)	Growth Related %	Net Total Cost ($)	Remarks	Other Changes From 2019 Study
Primary Dev. Areas	Secondary						Type of Work	Location of Work	Type	Description	Length (m)							
ANC	A	Garner Road EA	Not Complete	2013			5 structures	Garner Rd Hwy 6 to Glancaster				1,405,000	1,958,430	1,958,000	100	1,958,000		Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1989		Erosion Control and Channel System Improvements	Lower culvert by 0.4 m - South Service Rd. under w/c #6					183,417	255,665	256,000	100	256,000	will be updated when WC5,6 ,studied	Inflation applied
SCL	A	SCUBE - Barton Street	Not Complete	2013		road crossings at existing watercourses	7 structures (3@$400k, 4@$750k)	Fruitland to Fifty				4,720,800	6,580,323	6,580,000	100	6,580,000		Inflation applied
SCL	A	SCUBE Block 1	Not Complete	2017		road crossings at existing watercourses	1 structure	Fruitland to N/S Collector				843,000	1,175,058	1,175,000	100	1,175,000	location set with Block plan - study underway	Inflation applied
SCL		SCUBE Block 2	Not Complete	2017		road crossings at existing watercourses	2 structures	Jones to Glover				1,686,000	2,350,115	2,350,000	100	2,350,000	location set with Block plan - study underway	Inflation applied
SCM	A	ELFRIDA Secondary Plan major roads xngs	Not Complete	2017		road crossings at existing watercourses	20 culverts (6 small, 6 med, 8 large)	ELFRIDA SP				4,737,660	6,603,824	6,604,000	0	0	Included as Post Period Benefit. Estimated total cost is maintained in this list while Growth Related % set to 0, for current period.	Inflation applied
WAT	A	East West Corridor - North Waterdown Drive	Not Complete	2012		road crossings at existing watercourses	6 culverts (med)	EW2,3,4,7,8,EW9				1,011,600	1,410,069	1,410,000	100	1,410,000	NEW	Inflation applied
WAT	A	East West Corridor - North Waterdown Drive	Not Complete	2012		road crossings at existing watercourses	1 structure	EW5				5,000,000	6,969,500	6,970,000	100	6,970,000	NEW	Inflation applied
WAT	A	Parkside Drive EA	Not Complete	2013			2 culverts (med)	Parkside Dr Hwy 6 to Hollybush				379,013	528,306	528,000	100	528,000		Inflation applied
Total Residential												**19,966,490**	**27,831,290**	**27,831,000**	**76.27**	**21,227,000**		

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX G-1: CATEGORY A - OPEN WATERCOURSES: CHANNEL SYSTEM IMPROVEMENTS (IDENTIFIED PROJECTS) NON-RESIDENTIAL

Category		Project Title	Status	Study Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work					2019 Estimated Capital Cost ($)	2023 Estimated Capital Cost ($)	Estimated Total Cost (Rounded)($)	Growth Related %	Net Total Cost ($)	Remarks	Other Changes From 2019 Study
Primary Dev. Areas	Secondary						Type of Work	Location of Work	Type	Description	Length (m)							
BMH	A	AEGD major roads crossings	Not Complete	2017		road crossings at existing watercourses	40 culverts (12 small, 12 med, 16 large)	AEGD				9,475,320	13,207,649	13,208,000	100	13,208,000	Ciity updated estimate	Inflation applied
HAM	A	Red Hill Business Park - Dartnall Road	Not Complete	2017			2 culverts (small)	Twenty to Dickenson				400,000	557,560	558,000	100	558,000	Upper Hannon Creek MDP Oct 2017	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			Triple-Culvert replacement - QEW Corridor at w/c #5					1,579,774	2,202,047	2,202,000	100	2,202,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			New culvert - North Service Rd. at w/c #5					262,380	365,731	366,000	100	366,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Creek System Improvement W/C 7	Not Complete	2003			Lower culvert by 0.4 m - South Service Rd. under w/c #6					131,670	183,535	184,000	50	92,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			Culvert replacement - QEW Corridor on w/c #6.2					583,112	812,800	813,000	100	813,000		Inflation applied
SCL	A	Water Course 5- Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990	582		channel improvements			Length of channel improvement work	1015	2,591,610	3,612,445	3,612,000	100	3,612,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			Lower culvert by 1.6 m - Arvin Ave. on w/c #5					70,224	97,886	98,000	20	19,600	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			Culvert replacement - CNR line on w/c #5					183,837	256,251	256,000	20	51,200	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Water Course 6 - Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990	67		channel improvements			Length of channel improvement work	1077	2,775,530	3,868,812	3,869,000	50	1,934,500	to be updated when WC 5/6 studies completed	Inflation applied
SCL	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	Not Complete	1990			Lower culvert by 1.84 m - South Service Rd. under w/c #5					131,670	183,535	184,000	100	184,000		Inflation applied
SCL	A	SCUBE - Barton Street	Not Complete	2017			WC9 channel/enclosure	west property limit of school to 140 m east				786,800	1,096,721	1,097,000	50	548,500	new configuration	Inflation applied
SCL	A	SCUBE - NSR	Not Complete	2013			culvert	Green easterly to City limits				843,000	1,175,058	1,175,000	100	1,175,000		Inflation applied
WAT	A	Hwy 5/6 Interchange	Not Complete				2 or 3 culverts	Hwy 5/6 and ramp				1,348,800	1,880,092	1,880,000	25	470,000	per City agreement with MTO	Inflation applied
WAT	A	Highway 6	Not Complete				culvert	Borer's Ck				1,124,000	1,566,744	1,567,000	100	1,567,000		Inflation applied
Total Non-Residential												**22,287,728**	**31,066,864**	**31,067,000**	**86.27**	**26,800,800**		
Grand Total												**42,254,218**	**58,898,154**	**58,898,000**	**81.54**	**48,027,800**		

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX G-1 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

ID #	Primary Development Area	Res/Non-Res	Subwatershed	Watershed	Status	Remarks	Watershed Area[1]	Existing Development Area (ha)		Future Development Area (ha)		Development Fraction	Fraction of Watercourse Assumed to Require Erosion Control[2]	Total Length of Downstream Watercourse to Assumed End-Point[3]	Length of Erosion Control Works	Cost[4]	Land Cost	Total Cost	New Development Fraction	Development Related Cost	Remarks	Other Changes from 2019 Study
							A	B	C	D	E	F = 100 X (B+C+D+E) / A	G	H	I = G X H	J	K	L=J+K	M = (D+E) / (B+C+D+E)	L X M		
							(ha)	Res. (ha)	Non-Res. (ha)	Res. (ha)	Non-Res. (ha)	(%)		(m)	(m)	($)	($)	($)		($)		
2	ANC	Non-Res	Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek	Not complete		271		11.6	5.32	136.83	56.73	0.15	4,988	748	$1,564,486	$993,054	$2,557,540	0.925	$2,364,581	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
3	ANC	Res	Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	Not complete	South of Shaver Neighbourhood	43	35		5.5		94.19	0.20	600	120	$250,920	$159,271	$410,191	0.136	$55,705	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
4	ANC	Res	Big Creek (Spring Valley West and Shaver Neighbourhood)	Big Creek	Not complete		100	70.92		21.48	0.29	92.69	0.20	1,500	300	$627,300	$398,177	$1,025,477	0.235	$240,853	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
5	BMH	Non-Res	Three Mile Creek	Twenty Mile Creek	Not complete	Part of Airport Business Park and Airport	165		20		24.48	26.96	0.10	1,500	150	$313,650	$199,089	$512,739	0.550	$282,191	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
6	ANC	Res	Tiffany Creek	Coote's Paradise	Not complete	Meadowlands, Garner, Ancaster. A portion of the w/c is lined in a SWMF	165	25		129.84	0.37	94.07	0.20	2,500	500	$1,045,500	$663,628	$1,709,128	0.839	$1,433,836	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
7	ANC	Res	Tiffany Creek	Coote's Paradise	Not complete	Falkirk West and Bayview Glen Estates	110			11.5	1.76	12.05	0.05	450	23	$47,048	$29,863	$76,911	1.000	$76,911	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
8	ANC	Res	Sulphur Creek	Coote's Paradise	Not complete		1794			15.98		0.89	0.05	500	25	$87,125	$66,363	$153,488	1.000	$153,488	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
9	BMH	Res	Binbrook Node B	Welland River	Not complete	Binbrook Urban area of 200 ha Draining at Node 'B'	300	191.27		100.12	0.5	97.30	0.20	4,500	900	$1,881,900	$1,060,691	$2,942,591	0.345	$1,014,367	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
11	BMH	Res	Binbrook Node D	Welland River	Not complete	Three tributaries B7-a,b,c	133			100.26		75.38	0.20	4,100	820	$1,714,620	$966,408	$2,681,028	1.000	$2,681,028	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
12	BMH	Res	Binbrook Node G	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete	Jackson Heights etc	25	15		9.14		96.56	0.20	750	150	$313,650	$176,782	$490,432	0.379	$185,690	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
13	BMH	Res	Node of Welland River south of Mount Hope Urban Boundary SWMF # B-10	Welland River	Not complete	Mount Hope & adjacent areas (including Airport Business Area)-two outlet	220	128.52	20	47.39	4.76	91.21	0.20	1,500	300	$627,300	$353,564	$980,864	0.260	$254,906	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
14	BMH	Non-Res	Node of Welland River north of Mount Hope Urban Boundary	Welland River	Not complete		30				20	66.67	0.15	1,200	180	$376,380	$212,138	$588,518	1.000	$588,518	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
15	HAM	Res	Node Downstream of Glanbrook Hills	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete?	Garth Trail, North Glenbrook Industrial Park, Airport Industrial Business Park, part of Binbrook and others	40	20		16.47		91.18	0.20	900	180	$376,380	$212,138	$588,518	0.452	$265,777	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated

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$2091/m for Watershed Area < 500 ha (increase of 39.39% from 2019: $1500/m for Watershed Area < 500 ha)

APPENDIX G-1 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

16	BMH	Non-Res	Node Downstream of SWMF # R53	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		40				36.81	92.03	0.20	850	170	$355,470	$200,353	$555,823	1.000	$555,823	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
17	HAM	Non-Res	Node Downstream of SWMF #B 13	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		32				19.67	61.47	0.15	600	90	$188,190	$106,069	$294,259	1.000	$294,259	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
18	HAM	Non-Res	Node Downstream of SWMF # H 13	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		181				63.3	34.97	0.10	2,000	200	$418,200	$235,709	$653,909	1.000	$653,909	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
19	HAM	Non-Res	Node Downstream of SWMF # B 14	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		58				5.71	9.84	0.05	1,100	55	$115,005	$64,820	$179,825	1.000	$179,825	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
20	HAM	Non-Res	Node Downstream of SWMF # B 11 & B 12	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		700	282.29		26.2	48.63	51.02	0.15	3,000	450	$1,568,250	$1,060,691	$2,628,941	0.210	$550,862	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
21	BMH	Non-Res	Node Downstream of SWMF # B 15 & 16	Twenty Mile Creek (Three Mile, Sinkhole Creek)	Not complete		179	100			54.41	86.26	0.20	1,400	280	$585,480	$329,993	$915,473	0.352	$322,588	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
22	HAM	Res	Upper Ottawa subwatershed	Hamilton Harbour	Not complete	Erosion works downstream identified in previous studies	1356	766	308.9	136.28	0.86	89.38	0.20	1,100	220	$766,700	$518,560	$1,285,260	0.113	$145,425	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
23	HAM	Res	Hannon Creek subwatershed	Hamilton Harbour	Not complete		1070	115.2	357.7	75.95	292.53	78.63	0.20	2,000	400	$1,394,000	$942,837	$2,336,837	0.438	$1,023,411	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
25	SCL	Res	Battlefield Creek	Lake Ontario (Battlefield Creek, SC, WC 0-12)	Not complete	Nash	300			62.09	1.92	21.34	0.05	1,250	63	$130,688	$73,659	$204,347	1.000	$204,347	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
26	SCL	Res	Water Course 0	Lake Ontario (Battlefield Creek, SC, WC 0-12)	Not complete	WC 0	321	112.9	149.7	1.12	2.98	83.08	0.20	50	10	$20,910	$11,785	$32,695	0.015	$503	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
27	SCL	Res	Water Course 1	Lake Ontario (Battlefield Creek, SC, WC 0-12)	Not complete	WC 1	330	157.5	61	13.09	2.87	71.05	0.15	1,900	285	$595,935	$335,886	$931,821	0.068	$63,430	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
28	Water Course 10/12	Non-Res	Fifty Point Industrial Park	Lake Ontario (Battlefield Creek, SC, WC 0-12)	Not complete	assumed Fruitland-Winona SP land use	20				16.56	82.80	0.20	600	120	$250,920	$141,426	$392,346	1.000	$392,346	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated

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$2091/m for Watershed Area < 500 ha (increase of 39.39% from 2019: $1500/m for Watershed Area < 500 ha)

APPENDIX G-1 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

29	SCL	Res	Fifty Point Joint Venture	Lake Ontario (Battlefield Creek, SC, WC 0-12)			45	32		1.17	0.19	74.13	0.20	300	60	$125,460	$70,713	$196,173	0.041	$7,997	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
30	SCL	Non-Res	Water Course 12	Lake Ontario (Battlefield Creek, SC, WC 0-12)		assumed Fruitland-Winona SP land use	642	75.8	14.1	0.89	24	17.88	0.05	1,350	68	$235,238	$159,104	$394,341	0.217	$85,505	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
31	SCL	Res	Water Course 2	Lake Ontario (Battlefield Creek, SC, WC 0-12)		WC 2	283	148	76.8	1.69	0.56	80.23	0.20	1,100	220	$460,020	$259,280	$719,300	0.010	$7,128	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
32	SCL	Res	Water Course 3	Lake Ontario (Battlefield Creek, SC, WC 0-12)		WC 3	190	74.4	73.3	4.44	2.44	81.36	0.20	900	180	$376,380	$212,138	$588,518	0.045	$26,194	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
33	SCL	Non-Res	Water Course 4	Lake Ontario (Battlefield Creek, SC, WC 0-12)		WC 4	376	133.9	60.9		14	55.53	0.15	800	120	$250,920	$141,426	$392,346	0.067	$26,307	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
34	SCL	Res	Water Course 5	Lake Ontario (Battlefield Creek, SC, WC 0-12)		w/c 5.1-1100m, w/c 5.0 2500; assumed FWSP land use	636	121.4	112.9	118.35	7.64	56.65	0.15	3,600	540	$1,881,900	$1,272,830	$3,154,730	0.350	$1,103,179	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
35	SCL	Res	Water Course 6	Lake Ontario (Battlefield Creek, SC, WC 0-12)		assumed Fruitland-Winona SP land use	100	19	18.1	50.39	11.65	99.14	0.20	1,300	260	$543,660	$306,422	$850,082	0.626	$531,966	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
36	SCL	Non-Res	Water Course 7	Lake Ontario (Battlefield Creek, SC, WC 0-12)		assumed Fruitland-Winona SP land use	421	77.2	28.2	25.28	36.2	39.64	0.10	1,000	100	$209,100	$117,855	$326,955	0.368	$120,453	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
37	SCL	Non-Res	Water Course 9	Lake Ontario (Battlefield Creek, SC, WC 0-12)		assumed Fruitland-Winona SP land use	579	148.76	51.2	86.41	16.98	52.39	0.15	800	120	$418,200	$282,851	$701,051	0.341	$238,937	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
40	SCM	Res	Sinkhole Creek	Twenty Mile Creek (Three Mile, Sinkhole Creek)		Felkirk South and ROPA #9 (Rymal Rd.)	140	63.1		100.13		116.59	0.20	1,200	240	$501,840	$282,851	$784,691	0.613	$481,352	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated

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APPENDIX G-1 CATEGORY B: OFF SITE EROSION WORKS NOT IDENTIFIED IN PREVIOUS STUDIES (RESIDENTIAL & NON RESIDENTIAL)

42	WAT	Res	Falcon Creek	Grindstone Creek/ North Shore Watershed		OPA 28 South	48			48		100.00	0.20	1,200	240	$501,840	$318,542	$820,382	1.000	$820,382	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
43	WAT	Res	Grindstone Creek SWMF # W7	Grindstone Creek/ North Shore Watershed			45			45		100.00	0.20	900	180	$376,380	$238,906	$615,286	1.000	$615,286	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
44	WAT	Res	Grindstone Creek SWMF # W1 to SWMF # W8	Grindstone Creek/ North Shore Watershed		OPA 28 South and Upcountry Estates, Gatesbury, etc.	1011	254.8		108.81		35.97	0.10	2,000	200	$697,000	$530,903	$1,227,903	0.299	$367,449	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
45	WAT	Non-Res	Flamborough Industrial Park SWMF # W14	Grindstone Creek/ North Shore Watershed			45				15	33.33	0.10	900	90	$188,190	$119,453	$307,643	1.000	$307,643	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
46	WAT	Res	Indian Creek	Grindstone Creek/ North Shore Watershed		OPA 28 South	14			10.91		77.93	0.20	450	90	$188,190	$119,453	$307,643	1.000	$307,643	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
48	OTH	Res	Central Business Subwatershed	Hamilton Harbour		Not in growth area	2400					0.00	0.00		0	$0	$0	$0	0.000	$0		
49	OTH	Res	Chedoke Creek	Hamilton Harbour		Not in growth area	2706					0.00	0.00		0	$0	$0	$0	0.000	$0		
50	OTH	Res	Green Hill subwatershed	Hamilton Harbour		Not in growth area	1225	1102.5				90.00	0.20	0	0	$0	$0	$0	0.000	$0		
51	OTH	Res	Logies Creek	Coote's Paradise		Not in growth area	1217					0.00	0.00		0	$0	$0	$0	0.000	$0		
52	OTH	Res	Lower Spencer Creek	Coote's Paradise		Not in growth area	277					0.00	0.00		0	$0	$0	$0	0.000	$0		
53	OTH	Res	Mid Spencer Creek	Coote's Paradise		Not in growth area	5513					0.00	0.00		0	$0	$0	$0	0.000	$0		
54	OTH	Res	Spring Creek	Coote's Paradise		Not in growth area	1305					0.00	0.00		0	$0	$0	$0	0.000	$0		
55	OTH	Res	Sydenham Creek	Coote's Paradise		Not in growth area	442					0.00	0.00		0	$0	$0	$0	0.000	$0		
			Grand Total				**27,643.0**	**4,270.5**	**1,364.4**	**1,379.2**	**863.9**	**28.50**		**58,638**	**9446**	**$22,570,324**	**$13,945,679**	**$36,516,003**	**52.12**	**$19,031,997**		

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Total Residential	**$25,114,295**	**48.05**	**$12,068,251**
Total Non-Residential	**$11,401,708**	**61.08**	**$6,963,747**

APPENDIX G-1: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES RESIDENTIAL

Category		SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	Status	SWMF/ Drainage Work											Growth Related %	Net GrowthTotal Associated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Non-Res Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks	Other Changes From 2019 Study
Primary Dev. Areas	Secondary							Type of Work	Location of Work	Type	Description	Total Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Footprint (ha)	Land Cost	Estimated Capital Cost ($)	Estimated Total Cost Including Land							
ANC	C	7	Garner Neighbourhood Master Drainage Plan. Ancaster	July. 1996 Rev. Nov. 2003	10.4	MDP addressing drainage related issues for existing and future development	Not complete	Proposed Quality Facility #1: Extended detention wetland	Between proposed Highway 6 (new) interchange corridor and the existing development	Quality	Storage Capacity =	910	0.42			0.42	1,104,278	101,476	1,205,754	100	1,205,754	-	-	-	1,205,754		land values updated
ANC	C	14	Meadowlands Phase IV		6		Not complete		Springbrook at Garner	Quality / Quantity	Storage Capacity =	2,110		0.36	0.60	0.60	1,592,708	235,286	1,827,994	100	1,827,994	-	-	-	1,827,994	Increase land to 10% due to known grade constraint	land values updated
ANC	C	22	Woodland Manor Preliminary SWM Report	Jul-08	15.3	SWM Plan for proposed urban development	Not complete	SWMF	Sulpher Springs Road and Mansfield Drive	Quality / Quantity	Storage Volume =	13,289		0.92		0.92	2,436,844	1,103,378	3,540,221	100	3,540,221	-	-	-	3,540,221		land values updated
ANC	C	24	Miller's pond expansion		5		Not complete	SWMF	Shaver Road and Garner Road	Quality		3,600	0.20			0.20	530,903	401,443	932,346	100	932,346	-	-	-	932,346		land values updated
ANC	C	25	Golf Stream Manor		36		Not complete			Quality / Quantity		25,920	1.44			1.44	3,822,500	1,807,610	5,630,109	100	5,630,109	-	-	-	5,630,109		land values updated
ANC	R	3	N/A	N/A	31.34	Flood Control	Not complete	Future Retrofit	Galley Crt & Speers Rd	Quality						0.00	-	443,100	443,100	30	132,930	310,170	-	-	132,930		
ANC	R	22	N/A	N/A	2.19	Flood Control	Not complete	Future Retrofit	Harrington Place and Lover's Lane	Quality						0.00	-	422,000	422,000	50	211,000	211,000	-	-	211,000		
ANC	R	70	Drainage Report - The Meadowlands	N/A	296.9		Not complete	Future Retrofit	Hwy 403 and Golf Links Rd	Quality						0.00	-	4,135,600	4,135,600	40	1,654,240	2,481,360	-	-	1,654,240		
ANC	R	71	Drainage Report - The Meadowlands	N/A	42.51		Not complete	Future Retrofit	Golf Links Rd and Meadowlands Blvd	Quality						0.00	-	601,350	601,350	40	240,540	360,810	-	-	240,540		
ANC	R	72	Drainage Report - The Meadowlands	N/A	18.03		Not complete	Future Retrofit	Golf Links Rd, and Meadowlands Blvd.	Quality						0.00	-	422,000	422,000	40	168,800	253,200	-	-	168,800		
BMH	C	24	Ceterini	2013	15		Not complete	SWMF	Binbrook Rd west of Woodland	Quality / Quantity	Storage Capacity =	9,400		0.90		0.90	2,121,383	886,515	3,007,897	100	3,007,897	-	-	-	3,007,897		land values updated
BMH	C	21	Master Drainage Plan Update Report : Binbrook Settlement Area	Oct. 2006	31	additional facility adjacent to the watercourse	Not complete	SWMF		Quality / Quantity	Storage Capacity =	19,376		1.86		1.86	4,384,191	1,442,768	5,826,959	100	5,826,959	-	-	-	5,826,959		land values updated
BMH	C	20	Binbrook Settlement Area	2013	22.72	MacNeilly facilty	Not complete	SWMF	Area draining to the south west near Fletcher Road	Quality / Quantity	Storage Capacity =	19,201		1.36	1.80	1.80	4,242,765	1,432,969	5,675,734	100	5,675,734	-	-	-	5,675,734		land values updated
HAM	C	12	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Nov. 2008	10		Not complete	SWMF	Upper Gage/Temi in tandem with HAM29	Quality / Quantity	Storage volume =	8,817		0.40		0.40	942,837	853,992	1,796,829	100	1,796,829	-	-	-	1,796,829		land values updated
HAM	C	28	305 Stone Church Road West	2011	33.29	SWM Plan for proposed urban development	Not complete	SWMF	NE limit of development	Quality / Quantity	Storage volume =	20,382		2.00		2.00	4,708,055	2,056,374	6,764,429	100	6,764,429	-	-	-	6,764,429	estimated 10,000 m3 rock	land values updated
HAM	C	29	Miles	2011	42	SWM Plan for proposed urban development	Not complete	SWMF	NE limit of development	Quality / Quantity	Storage volume =	30,240		2.52		2.52	5,939,871	2,745,425	8,685,297	100	8,685,297	-	-	-	8,685,297	estimated 12500 m3 rock	land values updated
HAM	C	30	St Elizabeth expansion	2013	50	SWM facility expansion	Not complete	SWMF	expand for new development	Quality / Quantity	Storage volume =	38,000				0.00	-	2,481,142	2,481,142	100	2,481,142	-	-	-	2,481,142		
HAM	C	31	Upper Wellington and Stonechurch		14		Not complete	SWMF	SW corner of Upper Wellington and Stonechurch Rd	Quantity / Quality	Extended Detention Pond	11,263		0.84	1.40	1.40	3,299,929	1,255,986	4,555,915	100	4,555,915	-	-	-	4,555,915	Increase land to 10% due to known grade constraint; estimated 7000 m3 in rock	land values updated
HAM	R	55	Villages of Glancaster	Jul. 1990	77.63	Flood Control	Not complete	Future Retrofit	Twenty Rd and Garth St	Quality		-	3.11			3.11	7,319,242	1,086,650	8,405,892	80	6,724,713	1,681,178	-	-	6,724,713		land values updated
SCL	C	2	SCUBE Subwatershed Study (Phase 3)	May-13	26.4	Stormwater management strategy	Not complete	SWMF	WC6 south of Barton SCUBE West	Quantity / Quality	wet pond #3	13,216		1.58	2.64	2.64	6,222,722	1,099,285	7,322,008	100	7,322,008	-	-	-	7,322,008	Increase land to 10% due to known grade constraint	land values updated
SCL	C	3	SCUBE Subwatershed Study (Phase 3 - Block2)	Sep-18	16.4	Stormwater management strategy	Not complete	SWMF	WC6.1 south of Barton SCUBE West	Quantity / Quality	wet pond for 6.0	10,331		0.98	1.64	1.64	3,865,631	938,429	4,804,060	100	4,804,060	-	-	-	4,804,060	Increase land to 10% due to known grade constraint	land values updated
SCL	C	31	SCUBE Subwatershed Study (Phase 3 - Block 2)	Sep-18	27.6	Stormwater management strategy	Not complete	SWMF	WC6.1 south of Barton SCUBE West	Quantity / Quality	wet pond for 6.1	18,115		1.66	2.76	2.76	6,505,573	1,372,434	7,878,007	100	7,878,007	-	-	-	7,878,007	Increase land to 10% due to known grade constraint	land values updated
SCL	C	12	SCUBE Subwatershed Study (Phase 3)	May-13	54	Stormwater management strategy	Not complete	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-2	34,060		3.24	5.40	5.40	12,728,296	2,261,463	14,989,759	100	14,989,759	-	-	-	14,989,759	Increase land to 10% due to known grade constraint	land values updated
SCL	C	13	SCUBE Subwatershed Study (Phase 3)	May-13	23.1	Stormwater management strategy	Not complete	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-3	14,592		1.39	2.31	2.31	5,444,882	1,176,006	6,620,888	100	6,620,888	-	-	-	6,620,888	Increase land to 10% due to known grade constraint	land values updated

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX G-1: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES RESIDENTIAL

Category								SWMF/ Drainage Work																		
Primary Dev. Areas	Secondary	SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	Status	Type of Work	Location of Work	Type	Description	Total Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Footprint (ha)	Land Cost	Estimated Capital Cost ($)	Estimated Total Cost Including Land	Growth Related %	Net GrowthTotal Assiciated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Non-Res Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks	Other Changes From 2019 Study
SCL	C	29	SCUBE Subwatershed Study (Phase 3)	May-13	39.8	Stormwater management strategy	Not complete	SWMF	WC5 south of Barton SCUBE West	Quantity / Quality	wet pond #1	19,417		2.39	3.98	3.98	9,381,226	1,445,028	10,826,254	100	10,826,254	-	-	-	10,826,254	Increase land to 10% due to known grade constraint	land values updated
SCL	C	30	SCUBE Subwatershed Study (Phase 3)	May-13	24.5	Stormwater management strategy	Not complete	SWMF	WC5.2 south of Barton SCUBE West	Quantity / Quality	wet pond #2	12,773		1.47	2.45	2.45	5,774,875	1,074,585	6,849,460	100	6,849,460	-	-	-	6,849,460	Increase land to 10% due to known grade constraint	land values updated
SCL	R	16	Lake Vista			Stormwater quality and associated resource management	Not complete	Storm outfall retrofit	Lake Vista	Quality	OGS					0.00	-	50,000	50,000	100	50,000	-	-	-	50,000		
SCL	R	18	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	27.2	Stormwater quality and associated resource management	Not complete	Storm outfall retrofit	BFC. Little League Park, Queenston Rd.	Quality	Wetland	2,413				0.00	-	269,078	269,078	100	269,078	-	-	-	269,078		
SCL	R	19	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	33	Stormwater quality and associated resource management	Not complete	Storm outfall retrofit	BFC, Lake Ave. Park, Huckleberry Dr.	Quality	Wetland	2,582				0.00	-	287,924	287,924	100	287,924	-	-	-	287,924		
SCL	R	20	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	77	Stormwater quality and associated resource management	Not complete	Storm outfall retrofit	North of Barton St.	Quality	Wetland	6,724				0.00	-	737,317	737,317	100	737,317	-	-	-	737,317		
SCL	R	21	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	20.5	Stormwater quality and associated resource management	Not complete	Storm outfall retrofit	Lake Avenue, Warrington St.	Quality	Wetland	1,923				0.00	-	214,438	214,438	100	214,438	-	-	-	214,438		
SCM	C	18	Future Planned Residential Development		42	easterly portion	Not complete	SWMF		Quality / Quantity		29,890				0.00	-		3,630,000	100	3,630,000	-	-	-	3,630,000	per development schedules May 2019	
SCM	C	21	Davis Ck SWS - Nash Nhd		21		Not complete	SWMF	North limit of First Road W. at west side CH lands	Quantity / Quality	Extended Detention Pond	15,395		1.26		1.26	2,969,936	1,220,770	4,190,706	100	4,190,706	-	-	-	4,190,706		land values updated
SCM	C	22	Davis Ck SWS - Nash Nhd		15		Not complete	SWMF	North limit of First Road W. at east side	Quantity / Quality	Extended Detention Pond	11,425		0.90		0.90	2,121,383	999,421	3,120,803	100	3,120,803	-	-	-	3,120,803		land values updated
SCM	C	2	Davis Ck SWS - Nash Nhd		22.85		Not complete	Wet pond	Northwest portion, east of historical lands	Quantity / Quality	Extended Detention Pond	22,394			1.66	1.66	3,912,772	2,001,302	5,914,074	100	5,914,074	-	-	-	5,914,074	per City comments June 17, 2011; estimated 8,000 m3 in rock	land values updated
SCM	C	6	Montgomery Creek Nash Orchards		22.49		Not complete			Quality		17,436	0.90		1.35	1.35	3,182,074	1,334,561	4,516,635	100	4,516,635	-	-	-	4,516,635		land values updated
SCM	C	17	Flamborough Estates - Parke Community Functional SWM	Nov. 2008	30	Functional Service Plan for proposed urban development	Not complete	SWMF	SW corner Mud St. and Upper Centennial PKWY.	Quality / Quantity	Storage volume =	20,300		1.80	1.87	1.87	4,407,762	1,494,250	5,902,011	100	5,902,011	-	-	1,475,503	4,426,509		land values updated
SCM	R	65	N/A	N/A	15.2		Not complete	Future Retrofit	Hwy 20 and Highland Rd	Quality						0.00	-	422,000	422,000	30	126,600	295,400	-	-	126,600		
SCM	R	67	Deerfield Estate Phase 1	Apr. 1991	19.8		Complete?	Future Retrofit	Rymal Rd E and Whitedeer Rd.	Quality						0.00	-	422,000	422,000	50	211,000	211,000	-	-	211,000		
SCM	R	69	Heritage Green Valley Park Stage II	Sept. 1990	83.9		Not complete	Future Retrofit	Winter Drive and Paramount Drive	Quality						0.00	-	1,160,500	1,160,500	50	580,250	580,250	-	-	580,250		
WAT	C	1	Mtview Heights/Waterdown Bay Phase 2	Jul-13	12.43	To guide future development and management of the South Waterdown lands	Not complete	SWMF	Grindstone Creek - East Tributary 58 (Northwest)	Quantity / Quality	Storage Capacity =	13,509				0.00	-		3,400,000	100	3,400,000	-	-	-	3,400,000	cost estimate including land, from developer, 2018	
WAT	C	6	Mtview Heights	Jul-13	5.66	To guide future development and management of the South Waterdown lands	Not complete	SWMF	Salem Property	Quantity / Quality	Storage Capacity =	16,754		0.34		0.34	800,468	1,296,550	2,097,018	100	2,097,018	-	-	-	2,097,018		land values updated
WAT	C	19	Waterdown North Master Drainage Plan	Feb. 2007	9.7	Assess proposed expansion for the urban settlement area of Waterdown	Not complete	SWMF for quality and erosion control	Along Borer's Creek, NW of Centre Road and Parkside Road intersection	Quality/Erosion	Storage Capacity =	5,918			1.75	1.75	4,124,911	659,939	4,784,850	100	4,784,850	-	-	-	4,784,850	footprint estimated June 1, 2011 by Metropolitain/City agreed hazard land impacts price $175,000 acre	land values updated
U	C	U1	Unidentified			provisional item for unidentified SWM works	Not complete		open	Quantity / Quality							-	5,000,000	5,000,000	100	5,000,000	-	-	-	5,000,000		
U	C	U2		Infills		to include provision for LID infrastructure cost recovery	Not complete		open	Quality							-	1,500,000	1,500,000	100	1,500,000	-	-	-	1,500,000		
U	C	U3	Frontage Costs			estimate of road frontage costs for 38 residential SWM facilities (Retrofits and Unidentified facilities excluded)	Not complete		open	Quantity / Quality	120m * $2091/m per facility ($1500 increased by 39.39%)						-	9,534,276	9,534,276	100	9,534,276	-	-	-	9,534,276		
U	C	U4	Land Footprint Contingency			estimate that 10 facilities will exceed the estimated land footprint by 20%	Not complete		open	Quantity / Quality	Land Cost increased by 25/20 to account for 25% larger footprint instead of 20% and also increased by 39.39% from 2019.						6,098,313		6,098,313	100	6,098,313	-	-	-	6,098,313		
U	C	U5	Facility Unidentified Volume Contingency			estimate that 1/10 facilities will exceed the estimated volume by 10%	Not complete		open	Quantity / Quality	Estimated Capital Cost increased by 39.39% from 2019.							4,390,785	4,390,785	100	4,390,785	-	-	-	4,390,785		
U	C	U6	Facility Unidentified Volume Contingency			estimate that 1/10 facilities will encounter unanticipated 9000 m3 rock	Not complete		open	Quantity / Quality	Estimated Capital Cost increased by 39.39% from 2019.							3,813,710	3,813,710	100	3,813,710	-	-	-	3,813,710	per development engineering	
U	C	U7	Unidentified - Within Combined Sewershed			under study - estimate 3 projects will result in SWM facilities @ $2M each	Not complete		combined sewershed	Quantity / Quality								8,363,400	8,363,400	100	8,363,400	-	-	-	8,363,400	per development engineering	
Total Residential												**491,674**					**119,986,328**	**78,454,516**	**205,470,844**	**96.89**	**199,086,476**	**6,384,368**	**0**	**1,475,503**	**197,610,973**		

APPENDIX G-1: CATEGORY C - STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY FACILITIES) NON-RESIDENTIAL - NOTE: FOR INFORMATION ONLY - NON-RES FACILITIES NOT INCLUDED IN DC CHARGE

Category		SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	Status	SWMF/ Drainage Work				Total Volume (m3)	Estimated Footprint 4% (ha)	Estimated Footprint 6% (ha)	Study/Draft Plan Footprint (ha)	Footprint (ha)	Land Cost ($)	Estimated Capital Cost ($)	Estimated Total Cost Including Land	Growth Related %	Net GrowthTotal Associated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Residential Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks	Remarks
Primary Dev. Areas	Secondary							Type of Work	Location of Work	Type	Description															
ANC	C	11	Ancaster Industrial Park, Stormwater Detention Facilities Area No. 1,3 and 4	July. 1990	8.2		Not complete		Detention Pond #A	Quantity		2,187	0.33			0.33	870,681	243,833	1,114,514	0	-	-	1,114,514	-	-		
ANC	C	23	Trustwood Industrial Park east facility	Dec-07	30	Functional Servicing Report industrial	Not complete	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	21,600		1.80	3.00	3.00	7,963,541	1,566,744	9,530,285	0	-	-	9,530,285	-	-	Increase land to 10% due to known grade constraint	Increase land to 10% due to known grade constraint
ANC	C	27	Trustwood Industrial Park west facility		19	Functional Servicing Report industrial	Not complete	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	5,185		1.14		1.14	3,026,146	578,138	3,604,284	0	-	-	3,604,284	-	-		
BMH	C	9	Future Planned Non-Residential Development		25		Not complete	SWMF		Quality / Quantity	Storage Capacity =	6,667		1.50		1.50	3,535,638	734,111	4,269,749	0	-	-	4,269,749	-	-		
BMH	C	11	Future Planned Non-Residential Development		36		Not complete	SWMF		Quality / Quantity	Storage Capacity =	9,600		2.16		2.16	5,091,318	897,658	5,988,977	0	-	-	5,988,977	-	-		
BMH	C	12	Future Planned Non-Residential Development		20		Not complete	SWMF		Quality / Quantity	Storage Capacity =	5,333		1.20		1.20	2,828,510	594,716	3,423,226	0	-	-	3,423,226	-	-		
BMH	C	13	Future Planned Non-Residential Development		26		Not complete	SWMF		Quality / Quantity	Storage Capacity =	6,933		1.56		1.56	3,677,063	748,979	4,426,043	0	-	-	4,426,043	-	-		
BMH	C	15	Future Planned Non-Residential Development		40		Not complete	dry pond		Quantity	Storage Capacity =	10,666	1.60			1.60	3,771,347	957,130	4,728,477	0	-	-	4,728,477	-	-		
BMH	C	16	Future Planned Non-Residential Development		15		Not complete	dry pond		Quantity	Storage Capacity =	4,000	0.60			0.60	1,414,255	446,037	1,860,292	0	-	-	1,860,292	-	-		
BMH	R	53	Greater Hamilton Airport Business Park	Oct. 1991	11.65	Quality control facility	Not complete		Hwy 6 & Dickenson Rd W	Quality						0.00	-	422,000	422,000	0	-	-	422,000	-	-		
HAM	C	11	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	108.7	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC3	Quality / Quantity	Flood Control Volume =	59,291		6.52	4.10	4.10	9,664,077	3,668,268	13,332,344	0	-	-	13,332,344	940,084	940,084		
HAM	C	13	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	36	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	TM3	Quality / Quantity	Flood Control Volume =	19,357		2.16	1.85	1.85	4,360,620	1,441,670	5,802,289	0	-	-	5,802,289	-	-		
HAM	C	14	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	46.3	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC6	Quality / Quantity	Flood Control Volume =	23,889		2.78	2.09	2.09	4,926,322	1,694,361	6,620,683	0	-	-	6,620,683	-	-		
HAM	C	15	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	71.3	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC7	Quality / Quantity	Flood Control Volume =	40,430		4.28	3.11	3.11	7,330,556	2,616,649	9,947,205	0	-	-	9,947,205	-	-		
HAM	C	16	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	21.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC8	Quality / Quantity	Flood Control Volume =	18,647		1.30	2.00	2.00	4,714,184	1,402,088	6,116,272	0	-	-	6,116,272	-	-		
HAM	C	17	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	14.1	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC9	Quality / Quantity	Flood Control Volume =	12,503		0.85	1.54	1.54	3,629,921	1,059,554	4,689,475	0	-	-	4,689,475	-	-		
HAM	C	18	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	19.2	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC12	Quality / Quantity	Flood Control Volume =	12,775		1.15	1.60	1.60	3,771,347	1,074,690	4,846,037	0	-	-	4,846,037	-	-		
HAM	C	20	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	40.7	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	HC14	Quality / Quantity	Flood Control Volume =	30,739		2.44	2.72	2.72	6,411,290	2,076,273	8,487,563	0	-	-	8,487,563	-	-		
HAM	C	21	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	16.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	TM1a	Quality / Quantity	Flood Control Volume =	7,586		1.00	0.75	0.75	1,767,819	785,354	2,553,173	0	-	-	2,553,173	-	-		
HAM	C	22	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	16.6	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	TM1b	Quality / Quantity	Flood Control Volume =	7,586		1.00	0.75	0.75	1,767,819	785,354	2,553,173	0	-	-	2,553,173	-	-		
HAM	C	23	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	35.5	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	Not complete	SWMF	TM2	Quality / Quantity	Flood Control Volume =	18,508		2.13	1.78	1.78	4,195,623	1,394,342	5,589,966	0	-	-	5,589,966	-	-		
SCL	C	10	Stormwater Quality Management Strategy, City of Stoney Creek - Master Plan	2004	63	Stormwater quality and associated resource management	Not complete	Proposed SWMFQuality	Area F/G: S.W of Lewis & S. service Rd.	Quality / Quantity	Wetland	17,897		3.78		3.78	8,909,807	1,360,256	10,270,063	0	-	-	10,270,063	-	-		
SCL	C	17	SCUBE Subwatershed Study (Phase 3)	May-13	11.8	Stormwater management strategy	Not complete	SWMF	Fifty Creek east SCUBE East	Quantity / Quality	wet pond #12-1	8,969		0.71		0.71	1,668,821	862,490	2,531,311	0	-	-	2,531,311	-	-		
SCL	C	23	SCUBE Subwatershed Study (Phase 3)	May-13	14.5	Stormwater management strategy	Not complete	SWMF	Fifty Creek west SCUBE East	Quantity / Quality	wet pond #12-2	11,013		0.87		0.87	2,050,670	976,455	3,027,125	0	-	-	3,027,125	-	-		
SCL	R	82	Glover Industrial Park Phase 2B	Jan. 1989	2.05	Flood Control	Not complete	Future Retrofit	Arvin Av. / Glover Rd	Quality						0.00	-	422,000	422,000	0	-	337,600	84,400	-	-		
SCM	C	19	Future Planned Industrial Development		14	westerly portion	Not complete			Quality / Quantity		10,080		0.84		0.84	1,979,957	924,434	2,904,392	0	-	2,904,392	-	-	-		
WAT	C	12	Clappison Industrial Park		60	Quality only	Not complete	SWMF	to be determined	Quality / Quantity	Storage Capacity =	21,100		3.60		3.60	9,556,250	1,538,843	11,095,093	0	-	-	11,095,093	-	-		
WAT	R	35	Tech Park	Feb. 1994	15.66	Quality and Flood Control	Not complete	Future Retrofit	Hwy 6 & Hwy 5	Quality						0.00	-	422,000	422,000	0	-	337,600	84,400	-	-		
U	C	UNR	Unidentified			provisional item for unidentified non-res SWM works with residential component	Not complete		open	Quantity / Quality						0.00	-	10,000,000	10,000,000	0	-	-	10,000,000	-	-		
																								-	-		
Total Non-Residential												**392,538**					**108,883,581**	**41,694,428**	**150,578,009**	**0.00**	**0**	**3,579,592**	**146,998,417**	**940,084**	**940,084**		
Grand Total												**884,213**				**TOTAL =**	**228,869,909**	**120,148,944**	**356,048,853**	**55.92**	**199,086,476**	**9,963,960**	**146,998,417**	**2,415,586**	**198,551,056**		

ANC: Ancaster
BMH: Binbrook / Mount Hope
HAM: Hamilton Mountain
SCL: Stoney Creek - Lower
SCM: Stoney Creek - Mountain
WAT: Waterdown

APPENDIX G-1: CATEGORY D1 - STORM SEWERS - OVERSIZING - DRAFT APPROVED SUBDIVISIONS & SECONDARY PLANS

PART ONE - SUBDIVISIONS

Subdivision and Road-Related Oversizing (where draft plans indicate storm sewers over 1200 mm diameter)

TYPE	Pipe Size	Status	Application Number		Pipe Length	Oversize Pipe Cost 2019	Oversize Pipe Cost 2023	Number MH	Oversize MH Cost 2019	Oversize MH Cost 2023	Total Over-Size Cost 2019 0-5 Years	Total Over-Size Cost 2019 5-10 Years	Total Over-Size Cost 2023 0-5 Years	Total Over-Size Cost 2023 5-10 Years	Notes
Storm Sewer	1350 mm Diam.	Not Complete	25T-201305 - Sheldon's Gate		200	$82,982.56	$115,669.39	3	$0.00	$0.00	$82,982.56		$115,669.39		Rymal Road West to Storm Pond
		Not Complete	25T-88031 - Sandrina Gardens		135	$56,013.23	$78,076.84	0	$0.00	$0.00	$56,013.23		$78,076.84		Street "G" From west limit of Plan to Street "B" and Street "B" From Street "G" To Street "C"
		Not Complete	25T-95002 - Miles Estates		283	$117,420.32	$163,672.18	9	$0.00	$0.00	$117,420.32		$163,672.18		Through Block 132 to Upper Sherman Avenue
													$0.00		
	1500 mm Diam.	Not Complete	25T-201209 1125 West Fifth		200	$184,258.40	$256,837.78	3	$0.00	$0.00	$184,258.40		$256,837.78		Possible Street 'A' from West 5th to existing 1500mm in easement to east
		Not Complete	25T-201503 - 165 Upper Centennial Parkway		200	$184,258.40	$256,837.78	3	$0.00	$0.00	$184,258.40		$256,837.78		Dancy Street and Street D
		Not Complete	25T-201611 - Nash Neighbourhood - Phase 2		300	$276,387.60	$385,256.68	3	$0.00	$0.00	$276,387.60		$385,256.68		
		Not Complete	25T-201612 - Nash Neighbourhood - Phase 3		300	$276,387.60	$385,256.68	3	$0.00	$0.00	$276,387.60		$385,256.68		
		Not Complete	25T-201706 - Jackson Heights Extension		300	$276,387.60	$385,256.68	3	$0.00	$0.00	$276,387.60		$385,256.68		
		Not Complete	25T-88031 - Sandrina Gardens		135	$124,374.42	$173,365.50	0	$0.00	$0.00	$124,374.42		$173,365.50		Street "C" From Street "B" To Court "E"
		Not Complete	25T-95002 - Miles Estates		152	$140,036.38	$195,196.71	4	$0.00	$0.00	$140,036.38		$195,196.71		Street "G" From Miles Road To Street "F" and Street "F" From Street "G" To Block 132
													$0.00		
	1650 mm Diam.	Not Complete	25T-00610 - Caterini		200	$294,283.20	$410,201.35	3	$18,440.42	$25,704.10	$312,723.62		$435,905.45		
		Not Complete	25T-200908 - Paletta - Felker Nhd		200	$294,283.20	$410,201.35	0			$294,283.20		$410,201.35		Drancy Road frin SWM headwall to Drancy Rd
		Not Complete	25T-88031 - Sandrina Gardens		80	$117,713.28	$164,080.54	2	$12,293.61	$17,136.06	$130,006.89		$181,216.60		Street "C" from Terni Blvd. To Court "E"
		Not Complete	25T-3105 Fletcher Road		400	$588,566.40	$820,402.70	5	$30,734.04	$42,840.18	$619,300.44		$863,242.88		
		Not Complete	Binbrook - Westerly extension of Windwood Drive to Fletcher Road		300	$333,000.00	$464,168.70	3	$18,440.42	$25,704.10	$351,440.42		$489,872.80		
	1800 mm Diam.	Not Complete	Binbrook - Westerly extension of Windwood Drive to Fletcher Road		400	$652,000.00	$908,822.80	5	$30,734.04	$42,840.18	$682,734.04		$951,662.98		
	2100 mm Diam.														
Subtotals					**3785**	**$3,998,352.59**	**$5,573,303.68**	**49**	**$110,642.53**	**$154,224.62**					
Total by Period											**$4,108,995.12**	**$0.00**	**$5,727,528.30**	**$0.00**	
Draft Approved Subdivision Sub-total												**$4,108,995.12**		**$5,727,528.30**	

PART TWO - SECONDARY PLANS

Anticipated City Cost Sharing in Secondary Plans
Not Identified Under Subdivision Draft Plans
To be Funded From Development Charges

Secondary Plan Calculations

Add Overhead = 32.00%
Adjustment 2013 to 2018 1.0965

Binbrook
Westerly extention of Windwood Drive to Fletcher Road

3479 Binbrook?? Catrini Phase 2 | 262 McNeely 860 Barton | 289 Louis Rd

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	
Storm Sewer Over-Sizing 1650 mm (RELOCATED TO PT1)	300	Not Complete	1110	1550	Relocate to Part 1 - RELOCATED
Storm Sewer Over-Sizing 1800 mm (RELOCATED TO PT1)	400	Not Complete	1630	2270	

Fruitland - Winona
Collector Roads D, E, and F

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	City Contribution 2019	City Contribution Incl Overhead 2019	City Contribution 2023	City Contribution Incl Overhead 2023	2019 0-5 Years	2019 5-10 Years	2023 0-5 Years	2023 5-10 Years
Storm Sewer Over-Sizing 1500 mm	400	Not Complete	695	969	278000	366960	387600	511632	$ 183,480.00	$ 183,480.00	$ 255,816.00	$ 255,816.00
Storm Sewer Over-Sizing 1650 mm	1000	Not Complete	1110	1547	1110000	1465200	1547000	2042040	$ 732,600.00	$ 732,600.00	$ 1,021,020.00	$ 1,021,020.00
Storm Sewer Over-Sizing 1800 mm	300	Not Complete	1630	2272	489000	645480	681600	899712	$ 322,740.00	$ 322,740.00	$ 449,856.00	$ 449,856.00
						2477640		3453384				

Jerome
Storm sewer servicing into storm water management pond H-31

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	City Contribution 2019	City Contribution Incl Overhead 2019	City Contribution 2023	City Contribution Incl Overhead 2023	2019 0-5 Years	2019 5-10 Years	2023 0-5 Years	2023 5-10 Years
Storm Sewer Over-Sizing 1500 mm	200	Not Complete	695	969	139000	183480	193800	255816	$ 91,740.00	$ 91,740.00	$ 127,908.00	$ 127,908.00

Mewburn
1500 Diam. To Pond HAM#24

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	City Contribution 2019	City Contribution Incl Overhead 2019	City Contribution 2023	City Contribution Incl Overhead 2023	2019 0-5 Years	2019 5-10 Years	2023 0-5 Years	2023 5-10 Years
Storm Sewer Over-Sizing 1500 mm	350	Not Complete	695	969	243250	321090	339150	447678	$ 160,545.00	$ 160,545.00	$ 223,839.00	$ 223,839.00

Nash Neighbourhood
North/South, East/West Street abutting Neighbourhood Park

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	City Contribution 2019	City Contribution Incl Overhead 2019	City Contribution 2023	City Contribution Incl Overhead 2023	2019 0-5 Years	2019 5-10 Years	2023 0-5 Years	2023 5-10 Years
Storm Sewer Over-Sizing 1650 mm	150	Not Complete	1110	1547	166500	219780	232050	306306	$ 109,890.00	$ 109,890.00	$ 153,153.00	$ 153,153.00
Storm Sewer Over-Sizing 1800 mm	200	Not Complete	1630	2272	326000	430320	454400	599808	$ 215,160.00	$ 215,160.00	$ 299,904.00	$ 299,904.00
						650100		906114				

Sheldon
North/South mid-block collector road oppposite Matthew Street to Stone Church Road

Description	Length in (m) or Quantity	Status	Rate 2019	Rate 2023	City Contribution 2019	City Contribution Incl Overhead 2019	City Contribution 2023	City Contribution Incl Overhead 2023	2019 0-5 Years	2019 5-10 Years	2023 0-5 Years	2023 5-10 Years
Storm Sewer Over-Sizing 1350 mm	300	Not Complete	313	436	93900	123948	130800	172656	$ 61,974.00	$ 61,974.00	$ 86,328.00	$ 86,328.00
Storm Sewer Over-Sizing 1650 mm	350	Not Complete	1110	1547	388500	512820	541450	714714	$ 256,410.00	$ 256,410.00	$ 357,357.00	$ 357,357.00
						636768		887370				

Total by Period										$2,134,539.00	$2,134,539.00	$2,975,181.00	$2,975,181.00
Secondary Plan Anticipated Oversizing Sub-total											$4,269,078.00		$5,950,362.00

APPENDIX G-1: CATEGORY D2 -STORM SEWERS- NEIGHBOURHOD STORM OUTLETS (AS PER APPROVED STUDIES)

Description		Status	City Capital Cost Estimate 2019	City Capital Cost Estimate 2023		City Contribution 2019	City Contribution 2023	City Contrib. 2023 (%)					
Nebo Rd: Twenty to 400 m s of Rymal (NON-RES)	1	Not Complete	180,000	250902		180000	250902	100%	$ 180,000.00		$ 250,902.00		preliminary estimate by City - study not completed
Parkside Dr storm sewer project (**NON-RES**)	1	Not Complete	500,000	696950		500000	696950	100%	$ 500,000.00		$ 696,950.00		preliminary estimate by City - study not completed
Roxborough Nhd Storm Outlet (RES)	1	Not Complete	950,000	1324205		950000	1324205	100%	$ 950,000.00		$ 1,324,205.00		preliminary estimate by City - study not completed
Airport Road Marion to Mountaingate (RES/NON-RES)	1	Not Complete	1,368,000	1906855.2		1368000	1906855.2	100%	$ 1,368,000.00		$ 1,906,855.20		preliminary estimate by City - study not completed
3 Unidentified Projects in Combined Watershed (RES)	3	Not Complete	1,000,000	4181700		3000000	4181700	100%	$ 2,000,000.00	$ 1,000,000.00	$ 2,000,000.00	$ 1,000,000.00	preliminary estimate by City - study not completed
New Project: Lewis Road Storm Outlet (RES) (50% DC funded)	1	Not Complete	N/A	5500000		N/A	2750000	50%	N/A	N/A	$ 2,750,000.00		ref. estimate by City of Hamilton and Urbantech, 2023-12-04
				13860612.2			11110612.2	80%					

Total by Period										$4,998,000.00	$1,000,000.00	$8,928,912.20	$1,000,000.00
Neighbourhood Storm Outlet Sub-total											$5,998,000.00		$9,928,912.20
STORM SEWERS - Oversizing and Outlets - Total											$14,376,073.12		$21,606,802.50

SUBTOTAL	NON-RES	$ 1,364,000.00	$ -	$ 1,901,279.60	$ -
	TOTAL NON-RES		$ 1,364,000.00		$ 1,901,279.60
	TOTAL RES		$ 13,012,073.12		$ 19,705,522.90

NOTE: New Project, Lewis Road Storm Outlet (RES) is 50% DC Funded. With 100% Cost of this Project, Gross Estimated Cost, STORM SEWERS - Oversizing and Outlets - Total = $ 24,356,802.50
Then TOTAL RES = $ 22,455,522.90
Development Charge Eligible Growth %, Residential = 87.75%
Development Charge Eligible Growth %, Total = 88.71%

APPENDIX G-1 - CATEGORY E - CULVERTS AND BRIDGES NOT PREVIOUSLY IDENTIFIED IN CATEGORY A

Ref: Hamilton Development Charges -Transportation

AEGD Projects 0 45 1 1
SMATS Projects
SCUBE Projects

Item Number	Road Project Description	From	To	Status	Improvem	Length km	Benefit to Growth % (Roads)	Number of Culverts/Bridges > 1m² end area	Replacement /Widening/ New	Identified in Category "A"	Small @$117,500 1-4m²	Meduim @$235,000 4-8m²	Large @$470,000 >8m²	Cost (2019$)	Cost (2023$)	Benefit to Growth % (SWM)	Cost	Cost (2023)	Notes	Other Changes From 2019 Study
	AEGD Projects																			
1	Airport Road	Upper James Street	Glancaster Road	Not Complete	2r-4u	2.84	60	3	Widening		3			$252,900	$352,517	60	$151,740	$211,510	non-res	inflation applied to benchmark costs
4	Book Road	Fiddler's Green Road	Highway 6	Not Complete	2r-4u	0.99	85	1	Widening		1			$84,300	$117,506	85	$71,655	$99,880	non-res	inflation applied to benchmark costs
5	Book Road	Highway 6	Southcote Road	Not Complete	2r-4u	1.11	85	1	Widening		1			$84,300	$117,506	85	$71,655	$99,880	non-res	inflation applied to benchmark costs
41	Dickenson Road	Glancaster Road	Upper James Street	Not Complete	2r-4u	2.9	85	8	Widening		7		1	$927,300	$1,292,563	85	$788,205	$1,098,679	non-res	inflation applied to benchmark costs
42	Dickenson Road extension	Southcote Road	Smith Road	Not Complete	4u	0.42	100	1	New		1			$84,300	$117,506	100	$84,300	$117,506	non-res	inflation applied to benchmark costs
46	Garner Road	w/o Southcote	e/o Glancaster	Not Complete	2r-5u	2.98	85	2	Widening		2			$168,600	$235,012	85	$143,310	$199,760		inflation applied to benchmark costs
47	Garner Road	e/o Fiddler's Green Road	w/o Southcote Road	Not Complete	2r-4u	2.02	85	1	Widening		1			$84,300	$117,506	85	$71,655	$99,880		inflation applied to benchmark costs
48	Garth Street extension	Twenty Road	Dickenson Road	Not Complete	5u	1.5	100	2	New		2			$168,600	$235,012	100	$168,600	$235,012	non-res	inflation applied to benchmark costs
49	Garth Street extension	Dickenson Road	Collector 2E	Not Complete	5u	0.62	100	1	New		1			$84,300	$117,506	100	$84,300	$117,506	non-res	inflation applied to benchmark costs
52	Glancaster Road	Garner Road	Dickenson Road	Not Complete	2r-4u	2.46	85	4	Widening		4			$337,200	$470,023	85	$286,620	$399,520	non-res	inflation applied to benchmark costs
54	Smith Road	Garner Road	Dickenson Road extension	Not Complete	2u	1.57	100	1	New		1			$84,300	$117,506	100	$84,300	$117,506		inflation applied to benchmark costs
59	Twenty Road	Glancaster Road	Aldercrest Avenue	Not Complete	2r-4u	3.08	85	9	Widening		9			$758,700	$1,057,552	85	$644,895	$898,919	non-res	inflation applied to benchmark costs
60	Twenty Road extension	Southcote Road	Glancaster Road	Not Complete	4u	1.86	100	2	New		2			$168,600	$235,012	100	$168,600	$235,012	non-res	inflation applied to benchmark costs
61	Fiddler's Green Road	Garner Road	Carluke Road	Not Complete	2r-4u	6.07	85	7	Widening		7			$590,100	$822,540	85	$501,585	$699,159	non-res	inflation applied to benchmark costs
62	Glancaster Road	Butter Road	White Church Road	Not Complete	2r-4u	2.31	85	2	Widening		2			$168,600	$235,012	85	$143,310	$199,760	non-res	inflation applied to benchmark costs
65	Upper James Street	Ardelea Avenue	Homestead Drive	Not Complete	4u-6u	4.69	85	6	Widening		5	1		$590,100	$822,540	85	$501,585	$699,159	non-res	inflation applied to benchmark costs
66	White Church Road	Glancaster Road	Highway 6	Not Complete	2r-4u	2.31	85	1	Widening		1			$84,300	$117,506	85	$71,655	$99,880	non-res	inflation applied to benchmark costs
	SMATS Projects																			
70	Rymal Road	Glancaster Road	Garth Street	Not Complete	2r-5u	1.3	85	1	Widening				1	$337,200	$470,023	85	$286,620	$399,520		inflation applied to benchmark costs
	SCUBE Projects																			
	Ancaster Industrial Park and TMP Projects																			
90	Trinity Road	1km S. of Wilson	Hwy 403	Not Complete	2r-4u	2.2	85	2	Widening				2	$674,400	$940,046	85	$573,240	$799,039		inflation applied to benchmark costs
	RHBPS Projects																			
97	Dickenson Road	w/o Nebo	w/o Glover	Not Complete	2r-2u	1.1	60	3	Widening		3			$252,900	$352,517	60	$151,740	$211,510		inflation applied to benchmark costs
98	Nebo Road	Rymal Road	Twenty Road	Not Complete	2r-2u	1.3	85	1	Replacement		1			$84,300	$117,506	85	$71,655	$99,880	non-res	inflation applied to benchmark costs
100	Regional Road 56	Rymal Road	ROPA 9 Boundary	Complete	2r-5u	1.2	85	3	Widening		3			$252,900	$352,517	85	$214,965	$299,640		inflation applied to benchmark costs
102	Twenty Road extension	Glover Road	Upper Red Hill Valley Parkway	Not Complete	3u	0.6	100	2	New		2			$168,600	$235,012	100	$168,600	$235,012		inflation applied to benchmark costs
104	Upper Red Hill Valley Parkway (previously Trinity Church Road)	Rymal Road	Dartnall Road extension (change to 20 Rd Extn	Not Complete	5u	2.5	100	1	New		1			$84,300	$117,506	100	$84,300	$117,506	non-res	inflation applied to benchmark costs
	Waterdown Projects																			
110	Mountain Brow Road	Waterdown Road	New north-southlink	Not Complete	2r-4u	0.91	85	2	Widening			2		$337,200	$470,023	85	$286,620	$399,520		inflation applied to benchmark costs
	Fruitland Winona Projects																			
119	Highway 8 (Stoney Creek)	Fruitland Road	East City Limit	Not Complete	2r-4r_NBR	3.3	60	4	Widening		3	1		$421,500	$587,529	60	$252,900	$352,517		inflation applied to benchmark costs
	Other Road Projects																			
132	Jones Road	Barton Street	South Service Road	Not Complete	2r-2u	0.90	50	1	Widening		1			$84,300	$117,506	50	$42,150	$58,753	non-res	inflation applied to benchmark costs
135	Miles Road	Rymal Road	Hydro Corridor	Not Complete	2r-3u	2.00	85	1	Widening		1			$84,300	$117,506	85	$71,655	$99,880		inflation applied to benchmark costs
137	Fletcher Road	Binbrook Road	Golf Club Road	Complete? (check with MM)	2r-2u	4.20	60	3	Widening		3			$252,900	$352,517	60	$151,740	$211,510		inflation applied to benchmark costs
139	Trinity Church Road	Binbrook Road	Golf Club Road	Not Complete	2r-2u	5.20	60	1	Widening				1	$337,200	$470,023	60	$202,320	$282,014		inflation applied to benchmark costs
147	Shaver Road	Hwy 403	Wilson Road	Not Complete		1.50	100	1	Widening			1		$168,600	$235,012	100	$168,600	$235,012		inflation applied to benchmark costs
148	Scenic Drive	Old City Limits	Lavender S Leg	Not Complete		1.40	100	1	Widening			1		$168,600	$235,012	100	$168,600	$235,012		inflation applied to benchmark costs
Grand Total								**79**		**0**	**68**	**6**	**5**	**$8,430,000**	**$11,750,577**		**$6,933,675**	**$9,664,850**		
Growth %																	**82%**	**82.25%**		
Total Growth																	**$6,933,675**	**$9,664,850**		

Total Residential	**$3,456,300**	**$4,817,737**	**Res**	**$2,697,600**	**$3,760,185**	0.780487805
Total Non-Residential	**$4,973,700**	**$6,932,840**	**Non-Res**	**$4,236,075**	**$5,904,665**	0.851694915

City of Hamilton
APPENDIX G.1: Summary of Stormwater Service Costs
(GRIDS excluded)

Total Residential and Non-Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	58,898,000	81.54	48,027,800
B Off-Site Erosion	36,516,003	52.12	19,031,997
C SWM	356,048,853	55.77	198,551,056
D Sewer Oversizing/Outlets	24,356,802	88.71	21,606,802
E Culverts/Bridges	11,750,577	82.25	9,664,850
Sub-Total	**487,570,235**	**60.89**	**296,882,506**
15% Allowance[1]			**44,532,376**
Total			**341,414,882**

Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	27,831,000	76.27	21,227,000
B Off-Site Erosion	25,114,295	48.05	12,068,251
C SWM	205,470,844	96.17	197,610,973
D Sewer Oversizing/Outlets	22,455,523	87.75	19,705,523
E Culverts/Bridges	4,817,737	78.05	3,760,185
Sub-Total	**285,689,398**	**89.04**	**254,371,931**
15% Allowance[1]			**38,155,790**
Total			**292,527,721**

Non-Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	31,067,000	86.27	26,800,800
B Off-Site Erosion	11,401,708	61.08	6,963,747
C SWM	150,578,009	0.62	940,084
D Sewer Oversizing/Outlets	1,901,280	100.00	1,901,280
E Culverts/Bridges	6,932,840	85.17	5,904,665
Sub-Total	**201,880,837**	**21.06**	**42,510,575**
15% Allowance[1]			**6,376,586**
Total			**48,887,161**

[1] 15 % allowance for engineering, design, legal, and survey

APPENDIX G-1 - GRIDS-RELATED STORMWATER MANAGEMENT (QUALITY AND OR QUANTITY) FACILITIES

Primary Dev. Areas	SWMF #	AEGD Stage #	Drainage Area (ha)	Volume (m3)	Estimated Footprint 4% (ha)	Land Cost 4%	Estimated Capital Cost ($)	Estimated Cost ($)	Growth Related %	Total Growth Assiciated Cost ($)	Post Period Cost ($)	Net Total Assiciated Cost 2014-2031 ($)	Direct Developer Contribution (%)	Direct Developer Contribution ($)	Net Total Assiciated Cost ($)	Remarks	Other Changes From 2019 Study
Expansion to Airport SPA	1	2	77	17,325	3.08	7,259,843	1,096,673	8,356,515	100	8,356,515	8,356,515	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	2	2	33	7,425	1.32	3,111,361	470,003	3,581,364	100	3,581,364	3,581,364	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	3	2	38.5	8,663	1.54	3,629,921	548,336	4,178,258	100	4,178,258	4,178,258	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	4	2	88	19,800	3.52	8,296,963	1,253,340	9,550,303	100	9,550,303	9,550,303	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	5	1	160	36,000	6.40	15,085,388	2,278,800	17,364,188	100	17,364,188	-	17,364,188	100	17,364,188	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	6	1	63	14,175	2.52	5,939,871	897,278	6,837,149	100	6,837,149	-	6,837,149	100	6,837,149	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	10	1	33	7,425	1.32	3,111,361	470,003	3,581,364	100	3,581,364	-	3,581,364	100	3,581,364	-	North of Airport	land value updated, benchmark costs verified unchanged
	11	1	28	6,300	1.12	2,639,943	398,790	3,038,733	100	3,038,733	-	3,038,733	100	3,038,733	-	North of Airport	land value updated, benchmark costs verified unchanged
	12	1	17.88	4,023	0.72	1,685,792	254,656	1,940,448	100	1,940,448	-	1,940,448	100	1,940,448	-	North of Airport	land value updated, benchmark costs verified unchanged
	13	1	108	24,300	4.32	10,182,637	1,538,190	11,720,827	100	11,720,827	-	11,720,827	100	11,720,827	-	North of Airport	land value updated, benchmark costs verified unchanged
Potential New Busniess Park (In existing Airport Spa)	14	1	42.5	9,563	1.70	4,007,056	605,306	4,612,362	100	4,612,362	-	4,612,362	100	4,612,362	-		land value updated, benchmark costs verified unchanged
	15	1	25.5	5,738	1.02	2,404,234	363,184	2,767,417	100	2,767,417	-	2,767,417	100	2,767,417	-		land value updated, benchmark costs verified unchanged
	16	1	34	7,650	1.36	3,205,645	484,245	3,689,890	100	3,689,890	-	3,689,890	100	3,689,890	-		land value updated, benchmark costs verified unchanged
	17	1	41	9,225	1.64	3,865,631	583,943	4,449,573	100	4,449,573	-	4,449,573	100	4,449,573	-		land value updated, benchmark costs verified unchanged
	18	1	124.88	28,098	5.00	11,774,145	1,778,603	13,552,749	100	13,552,749	-	13,552,749	100	13,552,749	-		land value updated, benchmark costs verified unchanged
	19	1	100	22,500	4.00	9,428,367	1,424,250	10,852,617	100	10,852,617	-	10,852,617	100	10,852,617	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	20	1	230.5	51,863	9.22	21,732,387	3,282,896	25,015,283	100	25,015,283	-	25,015,283	100	25,015,283	-		land value updated, benchmark costs verified unchanged
	21	1	15	3,375	0.60	1,414,255	213,638	1,627,893	100	1,627,893	-	1,627,893	100	1,627,893	-		land value updated, benchmark costs verified unchanged
	22	1	34	7,650	1.36	3,205,645	484,245	3,689,890	100	3,689,890	-	3,689,890	100	3,689,890	-		land value updated, benchmark costs verified unchanged
	23	1	140.88	31,698	5.64	13,282,684	2,006,483	15,289,167	100	15,289,167	-	15,289,167	100	15,289,167	-		land value updated, benchmark costs verified unchanged
	24	1	50.5	11,363	2.02	4,761,326	719,246	5,480,572	100	5,480,572	-	5,480,572	100	5,480,572	-		land value updated, benchmark costs verified unchanged
	25	1	97	21,825	3.88	9,145,516	1,381,523	10,527,039	100	10,527,039	-	10,527,039	100	10,527,039	-		land value updated, benchmark costs verified unchanged
	26	2	45	10,125	1.80	4,242,765	640,913	4,883,678	100	4,883,678	4,883,678	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	27	2	42.75	9,619	1.71	4,030,627	608,867	4,639,494	100	4,639,494	4,639,494	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	28	2	18	4,050	0.72	1,697,106	256,365	1,953,471	100	1,953,471	1,953,471	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	29	2	196.75	44,269	7.87	18,550,313	2,802,212	21,352,525	100	21,352,525	21,352,525	-	100	-	-		land value updated, benchmark costs verified unchanged
	30	2	24.75	5,569	0.99	2,333,521	352,502	2,686,023	100	2,686,023	2,686,023	-	100	-	-		land value updated, benchmark costs verified unchanged
	31	2	16.25	3,656	0.65	1,532,110	231,441	1,763,550	100	1,763,550	1,763,550	-	100	-	-		land value updated, benchmark costs verified unchanged
	32	2	15	3,375	0.60	1,414,255	213,638	1,627,893	100	1,627,893	1,627,893	-	100	-	-		land value updated, benchmark costs verified unchanged
	33	2	30.25	6,806	1.21	2,852,081	430,836	3,282,917	100	3,282,917	3,282,917	-	100	-	-		land value updated, benchmark costs verified unchanged
	34	1	24.75	5,569	0.99	2,333,521	352,502	2,686,023	100	2,686,023	-	2,686,023	100	2,686,023	-		land value updated, benchmark costs verified unchanged
	35	2	12.75	2,869	0.51	1,202,117	181,592	1,383,709	100	1,383,709	1,383,709	-	100	-	-		land value updated, benchmark costs verified unchanged
	36	2	22.5	5,063	0.90	2,121,383	320,456	2,441,839	100	2,441,839	2,441,839	-	100	-	-		land value updated, benchmark costs verified unchanged
	37	2	33.75	7,594	1.35	3,182,074	480,684	3,662,758	100	3,662,758	3,662,758	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	38	2	56.25	12,656	2.25	5,303,457	801,141	6,104,597	100	6,104,597	6,104,597	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	39	1	37.5	8,438	1.50	3,535,638	534,094	4,069,732	100	4,069,732	-	4,069,732	100	4,069,732	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
Potential Urban Boundary Expansion Area	7	1	20	4,500	0.80	1,885,673	284,850	2,170,523	100	2,170,523	-	2,170,523	100	2,170,523	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	8	1	37.25	8,381	1.49	3,512,067	530,533	4,042,600	100	4,042,600	-	4,042,600	100	4,042,600	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	9	1	58.13	13,079	2.33	5,480,710	827,917	6,308,626	100	6,308,626	-	6,308,626	100	6,308,626	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	40	1	11.25	2,531	0.45	1,060,691	160,228	1,220,919	100	1,220,919	-	1,220,919	100	1,220,919	-	potential to combine with B10	land value updated, benchmark costs verified unchanged
	41	Elfrida (Res)	126	28,350	5.04	11,879,743	1,794,555	13,674,298	100	13,674,298	13,674,298	-	0	-	-	First Rd E and Mud	land value updated, benchmark costs verified unchanged
	42	Elfrida (Res)	21.25	4,781	0.85	2,003,528	302,653	2,306,181	100	2,306,181	2,306,181	-	0	-	-	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	43	Elfrida (Res)	60	13,500	2.40	5,657,020	854,550	6,511,570	100	6,511,570	6,511,570	-	0	-	-	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	44	Elfrida (Res)	71.25	16,031	2.85	6,717,712	1,014,778	7,732,490	100	7,732,490	7,732,490	-	0	-	-	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	45	Elfrida (Res)	22	4,950	0.88	2,074,241	313,335	2,387,576	100	2,387,576	2,387,576	-	0	-	-	NW corner, Trinity Church at Hydro ROW	land value updated, benchmark costs verified unchanged
	46	Elfrida (Res)	147	33,075	5.88	13,859,700	2,093,648	15,953,348	100	15,953,348	15,953,348	-	0	-	-	HWY 56	land value updated, benchmark costs verified unchanged
	47	Elfrida (Res)	168.75	37,969	6.75	15,910,370	2,403,422	18,313,792	100	18,313,792	18,313,792	-	0	-	-	HWY 56	land value updated, benchmark costs verified unchanged
	48	Elfrida (Res)	140	31,500	5.60	13,199,714	1,993,950	15,193,664	100	15,193,664	15,193,664	-	0	-	-	First Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	49	Elfrida (Res)	66	14,850	2.64	6,222,722	940,005	7,162,727	100	7,162,727	7,162,727	-	0	-	-	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	50	Elfrida (Res)	130.75	29,419	5.23	12,327,590	1,862,207	14,189,797	100	14,189,797	14,189,797	-	0	-	-	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	51	Elfrida (Res)	38.5	8,663	1.54	3,629,921	548,336	4,178,258	100	4,178,258	4,178,258	-	0	-	-	u/s confluence u/s Fletcher	land value updated, benchmark costs verified unchanged
	52	Elfrida (Res)	102.25	23,006	4.09	9,640,506	1,456,296	11,096,801	100	11,096,801	11,096,801	-	0	-	-	Fletcher at Golf Club	land value updated, benchmark costs verified unchanged
	53	Elfrida (Res)	25.16	5,661	1.01	2,372,177	358,341	2,730,519	100	2,730,519	2,730,519	-	0	-	-	Fletcher at Golf Club ,Involves off-site stream work	land value updated, benchmark costs verified unchanged
	54	Elfrida (Res)	29.25	6,581	1.17	2,757,797	416,593	3,174,391	100	3,174,391	3,174,391	-	0	-	-	Golf Club E of 56, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	55	Elfrida (Res)	48.75	10,969	1.95	4,596,329	694,322	5,290,651	100	5,290,651	5,290,651	-	0	-	-	Golf Club btwn 56 and Hendershott	land value updated, benchmark costs verified unchanged
	56	Elfrida (Res)	29.25	6,581	1.17	2,757,797	416,593	3,174,391	100	3,174,391	3,174,391	-	0	-	-	Golf Club W of Hendershott, Involves off-site stream work	land value updated, benchmark costs verified unchanged
	57	Elfrida (Res)	26	5,850	1.04	2,451,376	370,305	2,821,681	100	2,821,681	2,821,681	-	0	-	-	Gol Club at Hendershott, Involves off-site stream work	land value updated, benchmark costs verified unchanged
Total								**383,876,611**	**100**	**383,876,611**	**217,341,027**	**166,535,584**		**166,535,584**	**-**		

Total Residential								**135,892,134**	**100**	**135,892,134**	**135,892,134**	**-**		**-**	**-**		
Total Non-Residential								**247,984,477**	**100**	**247,984,477**	**81,448,893**	**166,535,584**		**166,535,584**	**-**		

APPENDIX G-1 - GRIDS-RELATED OPEN WATERCOURSES: EROSION CONTROL AND CHANNEL SYSTEM IMPROVEMENTS

Primary Dev. Areas	Location	Total Length of Downstream Watercourse to Assumed End-Point[3]	Fraction of Watercourse Assumed to Required Erosion Control[2]	Length of Erosion Control Works	Estimated Cost ($)	Land Cost	Estimated Total Cost ($)	Growth Related %	Net Total Assiciated Cost ($)	Remarks	Other Changes From 2019 Study
Expansion to Airport SPA	Ancaster	1,303	0.2	260.6	544,654	345,883	890,537	100	890,537		land values updated, unit costs for watershed idea indexed to inflation
	North of Airport	-	0.2	-	-	-	-	100	-		land values updated, unit costs for watershed idea indexed to inflation
Potential New Busniess Park (In Existing Airport Spa)	West of Airport	24,231	0.2	4,846.2	10,128,558	6,432,152	16,560,710	100	16,560,710		land values updated, unit costs for watershed idea indexed to inflation
Potential Urban Boundary Expansion Area	South of Twenty Road West, north of Airport	-	0.2	-	-	-	-	100	-		land values updated, unit costs for watershed idea indexed to inflation
	Northwest of Golf Club Road and Second Road East	15,337	0.2	3,067.4	6,410,866	3,615,072	10,025,938	100	10,025,938	Residential	land values updated, unit costs for watershed idea indexed to inflation
Grand Total							**27,477,185**	**100**	**27,477,185**		
Total Residential							**10,025,938**	**100**	**10,025,938**		
Total Non-Residential							**17,451,247**	**100**	**17,451,247**		

[2]-0.05 - Where Development Fraction is 0 - 25%
0.10 - Where Development Fraction is 26 - 49%
0.15 - Where Development Fraction is 50 - 74%
0.20 - Where Development Fraction is 75 - 100%

[3]Location where d/s of this point no erosion is deemed to occur from subject development; total drainage area to this point estimated as a maximum of 2X the study watershed area.

[4]$3485/m for Watershed Area > 500 ha (Was in 2019: $2500/m for Watershed Area > 500 ha)
$2090/m for Watershed Area < 500 ha (Was in 2019: $1500/m for Watershed Area < 500 ha)

City of Hamilton
APPENDIX G.1: Summary of Stormwater Service Costs
(GRIDS included)

Total Residential and Non-Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	58,898,000	81.54	48,027,800
B Off-Site Erosion	36,516,003	52.12	19,031,997
C SWM	356,048,853	55.77	198,551,056
D Sewer Oversizing/Outlets	24,356,802	88.71	21,606,802
E Culverts/Bridges	11,750,577	82.25	9,664,850
GRIDS SWM	383,876,611	-	-
GRIDS Watercourses	27,477,185	100.00	27,477,185
Sub-Total	**898,924,031**	**36.08**	**324,359,691**
15% Allowance[1]			**48,653,954**
Total			**373,013,645**

Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	27,831,000	76.27	21,227,000
B Off-Site Erosion	25,114,295	48.05	12,068,251
C SWM	205,470,844	96.17	197,610,973
D Sewer Oversizing/Outlets	22,455,523	87.75	19,705,523
E Culverts/Bridges	4,817,737	78.05	3,760,185
GRIDS SWM	135,892,134	-	-
GRIDS Watercourses	10,025,938	100.00	10,025,938
Sub-Total	**431,607,470**	**61.26**	**264,397,869**
15% Allowance[1]			**39,659,680**
Total			**304,057,549**

Non-Residential

Category	Gross Estimated Cost	DC Eligible Growth (%)	DC Eligible Growth Cost
A Watercourses	31,067,000	86.27	26,800,800
B Off-Site Erosion	11,401,708	61.08	6,963,747
C SWM	150,578,009	0.62	940,084
D Sewer Oversizing/Outlets	1,901,280	100.00	1,901,280
E Culverts/Bridges	6,932,840	85.17	5,904,665
GRIDS SWM	247,984,477	-	-
GRIDS Watercourses	17,451,247	100.00	17,451,247
Sub-Total	**467,316,562**	**12.83**	**59,961,822**
15% Allowance[1]			**8,994,273**
Total			**68,956,095**

[1] 15 % allowance for engineering, design, legal, and survey


Hamilton


S&A