Development Charges Background Study

City of Hamilton

This report consolidates the March 13, 2019 Background Study, the May 15, 2019 Addendum 1 Report, and the June 10, 2019 Addendum 2 Report

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Table of Contents

Page

Executive Summary ..... **i**

1. Introduction **1-1**
- 1.1 Purpose of this Document 1-1
- 1.2 Summary of the Process 1-2
- 1.3 Changes to the D.C.A.: Bill 73 1-4
  - 1.3.1 Area Rating 1-4
  - 1.3.2 Asset Management Plan for New Infrastructure 1-5
  - 1.3.3 60-Day Circulation of D.C. Background Study 1-5
  - 1.3.4 Timing of Collection of D.C.s 1-5
  - 1.3.5 Transit 1-6
  - 1.3.6 Other Changes 1-6

2. Current City of Hamilton Policy **2-1**
- 2.1 Schedule of Charges 2-1
- 2.2 Services Covered 2-2
- 2.3 Timing of D.C. Calculation and Payment 2-3
- 2.4 Indexing 2-3
- 2.5 Redevelopment Allowance 2-3
- 2.6 Exemptions 2-4
- 2.7 Reductions 2-5

3. Anticipated Development in the City of Hamilton **3-1**
- 3.1 Requirements of the Act 3-1
- 3.2 Basis of Population, Household and Non-Residential Gross Floor Area Forecast 3-1
- 3.3 Summary of Growth Forecast 3-2

4. The Approach to the Calculation of the Charge **4-1**
- 4.1 Introduction 4-1
- 4.2 Services Potentially Involved 4-1
- 4.3 Increase in the Need for Service 4-1
- 4.4 Local Service Policy 4-6

Table of Contents (Cont'd)

Page

4.5 Capital Forecast 4-7
4.6 Treatment of Credits 4-8
4.7 Eligible Interest Costs 4-8
4.8 Existing Reserve Funds 4-9
4.9 Deductions 4-10
4.9.1 Reduction Required by Level of Service Ceiling 4-11
4.9.2 Reduction for Uncommitted Excess Capacity 4-11
4.9.3 Reduction for Benefit to Existing Development 4-12
4.9.4 Reduction for Anticipated Grants, Subsidies and Other Contributions 4-13
4.9.5 The 10% Reduction 4-13
4.10 Municipal-wide vs. Area Rating 4-14
4.11 Allocation of Development 4-14
4.12 Asset Management 4-14
4.13 Transit 4-14

5. D.C.-Eligible Cost Analysis by Service 5-1
5.1 Introduction 5-1
5.2 Service Levels and 10-Year Capital Costs for D.C. Calculation 5-1
5.2.1 Transit Services 5-1
5.2.2 Airport 5-6
5.2.3 Parking Services 5-8
5.2.4 Provincial Offences Administration (P.O.A.) 5-10
5.2.5 Parkland Development 5-12
5.2.6 Indoor Recreation Facilities 5-20
5.2.7 Library Services 5-23
5.2.8 Administrative Studies 5-28
5.2.9 Long Term Care 5-32
5.2.10 Health 5-34
5.2.11 Social and Child Services 5-36
5.2.12 Paramedics 5-38
5.2.13 Social Housing 5-41
5.2.14 Waste Diversion 5-43
5.3 Service Levels and 13-Year Capital Costs for Hamilton's D.C. Calculation 5-45
5.3.1 Services Related to a Highway 5-45
5.3.2 Public Works Facilities, Fleet & Equipment 5-56
5.3.3 Police Services 5-62
5.3.4 Fire Protection Services 5-66
5.3.5 Stormwater Drainage and Control Services 5-71
5.3.6 Water and Wastewater Services 5-78
5.4 Special Area Charges 5-86

Table of Contents (Cont'd)

Page

5.4.1 Dundas/Waterdown Special Area Charge 5-86
5.4.2 Binbrook Special Area Charge 5-88

6. D.C. Calculation 6-1

7. D.C. Policy Recommendations and D.C. By-law Rules 7-1
7.1 Introduction 7-1
7.2 D.C. By-law Structure 7-2
7.3 D.C. By-law Rules 7-2
7.3.1 Payment in any Particular Case 7-2
7.3.2 Determination of the Amount of the Charge 7-3
7.3.3 Application to Redevelopment of Land (Demolition and Conversion) 7-4
7.3.4 Exemptions (full or partial) 7-4
7.3.5 Phasing in 7-6
7.3.6 Timing of Collection 7-6
7.3.7 Indexing 7-6
7.3.8 The Applicable Areas 7-6
7.4 Other D.C. By-law Provisions 7-7
7.4.1 Categories of Services for Reserve Fund and Credit Purposes 7-7
7.4.2 By-law In-force Date 7-8
7.4.3 Minimum Interest Rate Paid on Refunds and Charged for Inter-Reserve Fund Borrowing 7-8
7.4.4 Area Rating 7-8
7.4.5 Other Recommendations 7-12

8. By-law Implementation 8-1
8.1 Public Consultation Process 8-1
8.1.1 Introduction 8-1
8.1.2 Public Meeting of Council 8-1
8.1.3 Other Consultation Activity 8-1
8.2 Anticipated Impact of the Charge on Development 8-2
8.3 Implementation Requirements 8-3
8.3.1 Introduction 8-3
8.3.2 Notice of Passage 8-3
8.3.3 By-law Pamphlet 8-3
8.3.4 Appeals 8-4
8.3.5 Complaints 8-4
8.3.6 Credits 8-5
8.3.7 Front-Ending Agreements 8-5
8.3.8 Severance and Subdivision Agreement Conditions 8-5

Table of Contents (Cont'd)

Page

Appendix A: Background Information on Residential and Non-Residential Growth Forecast A-1

Appendix B: Level of Service B-1

Appendix C: Long-Term Capital and Operating Cost Examination C-1

Appendix D: D.C. Reserve Fund Policy D-1

Appendix E: Local Service Policy E-1

Appendix F: Water and Wastewater Servicing Needs – GM BluePlan Engineering Consultants Ltd F-1

Appendix G: Stormwater Management Servicing Needs – Wood Environment & Infrastructure Solutions G-1

Appendix H: Services Related to a Highway Needs – Dillon Consulting Limited H-1

Appendix I: Transit Servicing Needs – Dillon Consulting Limited I-1

Appendix J: Asset Management Plan J-1

Appendix K: Proposed D.C. By-law K-1

List of Acronyms and Abbreviations

Acronym	Full Description of Acronym
A.E.G.D.	Airport Employment Growth District
A.M.P.	Asset Management Plan
A.N.S.I.	Areas of National and Scientific Interest
A.T.	Active Transportation
B.I.A.	Business Improvement Area
B.T.E.	Benefit to existing
CANSIM	Canadian Socio-Economic Information Management System (Statistics Canada)
C.H.	Conservation Halton
C.I.P.A.	Community Improvement Project Area
CSO	Combined Sewer Overflow
D.C.	Development Charge
D.C.A.	Development Charges Act, 1997, as amended
D.F.O.	Department of Fisheries and Oceans
E.A.	Environmental Assessments
E.R.A.S.E.	Environmental Remediation and Site Enhancement
E.S.A.	Environmentally Significant Area
F.I.R.	Financial Information Return
G.F.A.	Gross floor area
G.R.C.A.	Grand River Conservation Authority
G.R.I.D.S.	Growth Related Integrated Development Strategy
G.T.A.	Greater Toronto Area
ha	Hectare

List of Acronyms and Abbreviations (Cont'd)

I.S.D.	Investigative Services Division
H.C.A.	Hamilton Conservation Authority
H.O.V.	High Occupancy Vehicle
H.S.R.	Hamilton Street Railway
H.T.M.P.	Hamilton Transportation Master Plan
I.J.P.A.	Infrastructure for Jobs and Prosperity Act
kPa	Kilopascal
L.P.A.T.	Local Planning Appeal Tribunal
L.R.T.	Light rail transit
M.D.P.	Master Drainage Plan
M	Million
MLD	Millions of litres per day
mm	Milimeter
M.N.R.	Ministry of Natural Resources
M.N.R.F.	Ministry of Natural Resources and Forestry
M.O.E.	Ministry of the Environment
M.O.E.E.	Ministry of Energy and Environment
M.O.E.C.P.	Ministry of the Environment, Conservation and Parks
M.T.C.	Mountain Transit Centre
M.T.O.	Ministry of Transportation of Ontario
N.E.C.	Niagara Escarpment Commission
N.F.P.O.W.	No Fixed Place of Work
N.H.S.	Natural Heritage System
N.P.C.A.	Niagara Peninsula Conservation Authority
O.M.B.	Ontario Municipal Board
O.P.	Official Plan
O.P.A.	Official Plan Amendment
O.Reg.	Ontario Regulation
P.O.A.	Provincial Offences Administration
P.P.	Post period

List of Acronyms and Abbreviations (Cont'd)

P.P.U.	Persons per unit
psi	Pounds per square inch
P.T.I.F.	Public Transit Infrastructure Fund
R.O.W.	Right-of-way
R.R.O.	Revised Regulations of Ontario
R.S.A.	Rural Settlement Area
S.C.U.B.E.	Stoney Creek Urban Boundary Expansion
S.D.E.	Single detached equivalent
S.D.U.	Single detached unit
S.P.A.	Special Policy Area
S.W.M.	Stormwater management
S.W.M.F.	Stormwater management facilities
S.W.M.P.	Stormwater management practices
sq.ft.	square foot
sq.m.	square metre
T.D.M.	Travel Demand Management
V.P.Z.	Vegetation Protection Zone
W.W.T.P.	Wastewater Treatment Plant

Unique identifiers confined in Appendix F

W	Waterdown
A	Ancaster
B	Binbrook
MH	A.E.G.D./Mount Hope
HM	Hamilton Mountain
SCU	Stoney Creek Upper
SCL	Stoney Creek Lower
W-19	Water Projects
S-19	Wastewater Projects

Executive Summary

Executive Summary

1. The report provided herein represents the Development Charges (D.C.) Background Study for the City of Hamilton required by the Development Charges Act, 1997, as amended by Bill 73 (D.C.A.). This report has been prepared in accordance with the methodology required under the D.C.A. The contents include the following:

    - Chapter 1 – Overview of the legislative requirements of the Act;
    - Chapter 2 – Review of present D.C. policies of the City;
    - Chapter 3 – Summary of the residential and non-residential growth forecasts for the City;
    - Chapter 4 – Approach to calculating the D.C.;
    - Chapter 5 – Review of historic service standards and identification of future capital requirements to service growth and related deductions and allocations;
    - Chapter 6 – Calculation of the D.C.s;
    - Chapter 7 – D.C. policy recommendations and rules; and
    - Chapter 8 – By-law implementation.

2. D.C.s provide for the recovery of growth-related capital expenditures from new development. The D.C.A. is the statutory basis to recover these charges. The methodology is detailed in Chapter 4; a simplified summary is provided below:

    1) Identify amount, type and location of growth;

    2) Identify servicing needs to accommodate growth;

    3) Identify capital costs to provide services to meet the needs;

    4) Deduct:

        - Grants, subsidies and other contributions;
        - Benefit to existing development;
        - Statutory 10% deduction (soft services);
        - Amounts in excess of service standard calculations;
        - D.C. reserve funds (where applicable);

5) Net costs are then allocated between residential and non-residential benefit; and

6) Net costs divided by growth to provide the D.C. charge.

3. A number of changes to the D.C. process need to be addressed as a result of Bill 73. These changes have been incorporated throughout the report and in the updated draft by-law, as necessary. These items include:

    a. Area-rating: Council must consider the use of area-specific charges.

    b. Asset Management Plan for New Infrastructure: The D.C. background study must include an asset management plan that deals with all assets proposed to be funded, in whole or in part, by D.C.s. The asset management plan must show that the assets are financially sustainable over their full lifecycle.

    c. 60-day Circulation Period: The D.C. background study must be released to the public at least 60-days prior to passage of the D.C. by-law.

    d. Timing of Collection of Development Charges: The D.C.A. now requires D.C.s to be collected at the time of the first building permit.

4. The growth forecast (Chapter 3) on which the City-wide D.C. is based, projects the following population, housing and non-residential floor area for the 10-year (2019 to 2028) and 13-year (2019 to 2031) periods.

Measure	10-Year City-wide 2019-2028	13-Year City-wide 2019-2031	13-Year Urban Area 2019-2031	13-Year Combined Sewer System 2019-2031	13-Year Separated Sewer System 2019-2031
(Net) Population Increase	65,046	86,183	86,142	8,007	78,135
Residential Unit Increase	33,274	42,848	42,435	9,278	33,530
Non-Residential Gross Floor Area Increase (sq.ft.)	28,791,900	39,111,300	38,758,400	8,031,700	30,726,700

Source: Watson & Associates Economists Ltd. Forecast 2019

5. On June 25, 2014, the City of Hamilton passed By-law 14-153 under the D.C.A. The by-law imposes D.C.s on residential and non-residential uses. This by-law was amended on July 13, 2018 via By-law 18-196 and August 20, 2018 via by-law 18-228. This by-law, as amended, will expire on July 6, 2019. The City is

undertaking a D.C. public process and anticipates passing a new by-law in advance of the expiry date. The mandatory public meeting has been set for April 18, 2019 with adoption of the by-law on May 22, 2019. It is noted that the GO Transit By-law 11-174, as amended, has not been updated as part of this background study.

6. The City's D.C.s currently in effect (excluding GO Transit service and area-specific charges) are $38,318 for single detached dwelling units for full services and non-residential charges are $20.54 per square foot for full services. Note that water, wastewater and stormwater are applicable only in the urban areas. This report has undertaken a recalculation of the charge based on future identified needs (presented in Schedule ES-1 for residential and non-residential). Charges have been provided on a City-wide basis for all services except for stormwater. Historically, stormwater has been calculated on a City-wide basis, but as approved by Council (report FCS18034), direction has provided to utilize an area specific approach based on the combined and separated sewer systems for the Stormwater component for the 2019 D.C. background study. The corresponding single detached unit charge is $43,489 for the combined sewer system area and $50,003 for the separated sewer system area. The non-residential charge is $18.02 per square foot of building area for the combined system, and $20.18 for the separated system area per square foot of building area. These rates are submitted to Council for its consideration.

7. The City's area-specific D.C.s currently in effect in Binbrook for water and wastewater services are $3,211 for single detached dwelling equivalent units. There is no non-residential area-specific charge in Binbrook. Currently it is anticipated that all development will be complete prior to the 2019 by-law being passed and therefore, there will no longer be a Binbrook area specific D.C. included in the 2019 by-law. For Dundas and Waterdown, the area specific D.C.s, currently in effect for single detached dwelling units related to wastewater services is $1,588 and is $1.09 per square foot for non-residential development. This study has undertaken updates to the area-specific charge for Dundas and Waterdown and the resulting charge is $1,971 for single detached dwelling units and $1.04 per square foot for non-residential development.

8. The D.C.A. requires a summary be provided of the gross capital costs and the net costs to be recovered over the life of the by-law. This calculation is provided by service and is presented in Table 6-7. A summary of these costs is provided below:

Total gross expenditures planned over the next five years	$ 2,849,223,312
Less:	
Benefit to existing development	$ 946,283,371
Post planning period benefit	$ 162,098,114
Ineligible	$ 31,192,195
Mandatory 10% deduction for certain services	$ 21,566,486
Grants, subsidies and other contributions	$ 449,484,218
Net Costs to be recovered from development charges	**$ 1,238,598,926**

Hence, $1.610 billion (or an annual amount of $322 million) will need to be contributed from taxes and rates, or other sources. Of this amount, $162 million will be included in subsequent D.C. study updates to reflect the portion of capital that benefits growth in the post period D.C. forecasts.

Based on the above table, the City plans to spend $2.849 billion over the next five years, of which $1.238 billion (43%) is recoverable from D.C.s. Of this net amount, $821.88 million is recoverable from residential development and $416.72 million from non-residential development. It is noted also that any exemptions or reductions in the charges would reduce this recovery further.

9. Considerations by Council – The background study represents the service needs arising from residential and non-residential growth over the forecast periods.

The following services are calculated based on a 13-year City-wide forecast:

- Fire Protection Services;
- Police Services;
- Services Related to a Highway; and
- Public Works Facilities, Fleet & Equipment.

The following services are calculated based on a 13-year urban-wide forecast:

- Wastewater Services – Treatment;
- Wastewater Services – Linear; and

- Water Services.

The following service is based on a 13-year urban area-specific forecast for the separated sewer system and combined sewer system:

- Stormwater Drainage and Control Services.
  - Combined Sewer System; and
  - Separated Sewer System.

All other services are calculated based on a 10-year forecast. These include:

- Transit Services;
- Parking Services;
- Airport Services;
- Parkland Development;
- Indoor Recreation Services;
- Library Services;
- Administrative Studies – Engineering Services Studies;
- Administrative Studies – Community Based Studies;
- Long Term Care;
- Provincial Offences Act;
- Health Services;
- Social and Child Services;
- Paramedics;
- Social Housing; and
- Waste Diversion.

Dundas/Waterdown area-specific charges are based on the remaining single detached equivalent units and the non-residential charges are based on the remaining building area (sq.ft.) anticipated.

Council will consider the findings and recommendations provided in the report and, in conjunction with public input, approve such policies and rates it deems appropriate. These directions will refine the draft D.C. by-law which is appended in Appendix K. These decisions may include:

- Adopting the charges and policies recommended herein;
- Considering additional exemptions to the by-law; and
- Considering reductions in the charge by class of development (obtained by removing certain services on which the charge is based and/or by a general reduction in the charge).

Table ES-1
Schedule of Development Charges

Service	RESIDENTIAL					NON-RESIDENTIAL
	Single-Detached Dwelling & Semi-Detached Dwelling (per unit)	Townhouses & Other Multiple Unit Dwellings (per unit)	Apartments 2-Bedrooms+ (per unit)	Apartments Bachelor & 1-Bedroom (per unit)	Residential Facility Dwelling (per bedroom)	(per sq.ft. of Gross Floor Area)
City Wide Services:						
Services Related to a Highway	10,769	7,708	6,306	4,314	3,479	8.05
Public Works Facilities, Vehicles & Equipment	784	561	459	314	253	0.41
Police Services	524	375	307	210	169	0.26
Fire Protection Services	462	331	271	185	149	0.23
Transit Services	1,917	1,372	1,123	768	619	0.98
Parkland Development	2,352	1,683	1,377	942	760	0.11
Indoor Recreation Services	4,430	3,171	2,594	1,775	1,431	0.20
Library Services	1,045	748	612	419	338	0.05
Administrative Studies - Community Based Studies	330	236	193	132	107	0.17
Administrative Studies - Engineering Services Studies	166	119	97	66	54	0.08
Paramedics	137	98	80	55	44	0.03
Long Term Care	125	89	73	50	40	0.01
Health Services	1	1	1	-	-	0.00
Social & Child Services	15	11	9	6	5	0.00
Social Housing	648	464	379	260	209	0.00
Airport lands	419	300	245	168	135	0.21
Parking services	490	351	287	196	158	0.25
Provincial Offences Administration	40	29	23	16	13	0.02
Waste Diversion	657	470	385	263	212	0.13
Total City Wide Services	**25,311**	**18,117**	**14,821**	**10,139**	**8,175**	**11.18**
Urban Services						
Wastewater Facilities	4,048	2,897	2,371	1,622	1,308	1.95
Wastewater Linear Services	5,415	3,876	3,171	2,169	1,749	2.61
Water Services	4,767	3,412	2,792	1,910	1,540	2.29
Combined Sewer System						
Stormwater Drainage and Control Services	3,948	2,826	2,312	1,582	1,275	0.00
Separated Sewer System						
Stormwater Drainage and Control Services	10,462	7,488	6,127	4,191	3,380	2.16
GRAND TOTAL RURAL AREA	**25,311**	**18,117**	**14,821**	**10,139**	**8,175**	**11.18**
GRAND TOTAL URBAN AREA (COMBINED SEWER SYSTEM)	**43,489**	**31,128**	**25,467**	**17,422**	**14,047**	**18.02**
GRAND TOTAL URBAN AREA (SEPARATED SEWER SYSTEM)	**50,003**	**35,790**	**29,282**	**20,031**	**16,152**	**20.18**
Additional Special Area Charges						
Dundas/Waterdown	1,971	1,410	1,154	789	637	1.04

Report

Chapter 1
Introduction

1. Introduction

1.1 Purpose of this Document

This background study has been prepared pursuant to the requirements of the Development Charges Act (D.C.A.) (s. 10) and, accordingly, recommends new D.C.s and policies for the City of Hamilton.

The City retained Watson & Associates Economists Ltd. (Watson), to undertake the Development Charges (D.C.) study process throughout 2018 and 2019. Watson worked with City staff as well as engineering consultants (GM BluePlan Engineering Consultants Limited (GM BluePlan), Wood Environment & Infrastructure Solutions (Wood), and Dillon Consulting Limited (Dillon)) in preparing the D.C. analysis and policy recommendations.

This D.C. background study, containing the proposed D.C. by-law, will be distributed to members of the public in order to provide interested parties with sufficient background information on the legislation, the study's recommendations and an outline of the basis for these recommendations.

This report has been prepared, in the first instance, to meet the statutory requirements applicable to the City's D.C. background study, as summarized in Chapter 4. The requirement to address "rules" (contained in Chapter 7) and the proposed by-law to be made available as part of the approval process (included as Appendix K).

In addition, the report is designed to set out sufficient background on the legislation (Chapter 4), Hamilton's current D.C. policies (Chapter 2) and the policies underlying the proposed by-law, to make the exercise understandable to those who are involved.

Finally, it addresses post-adoption implementation requirements (Chapter 8) which are critical to the successful application of the new policy.

The Chapters in the report are supported by Appendices containing the data required to explain and substantiate the calculation of the charge. A full discussion of the statutory requirements for the preparation of a background study and calculation of a D.C. is provided herein.

1.2 Summary of the Process

The public meeting required under Section 12 of the D.C.A., has been scheduled for April 18, 2019. Its purpose is to present the findings of the study to the public and to solicit public input. The meeting is also being held to answer any questions regarding the study's purpose, methodology and the proposed modifications to the City's D.C.s.

In accordance with the legislation, the background study and proposed D.C. by-law will be available for public review on March 13, 2019.

The process to be followed in finalizing the report and recommendations includes:

- consideration of responses received prior to, at, or immediately following the Public Meeting; and
- finalization of the report and Council consideration of the by-law subsequent to the public meeting.

Figure 1-1 outlines the proposed schedule to be followed with respect to the D.C. by-law adoption process.

Figure 1-1
Schedule of Key D.C. Process Dates for the City of Hamilton

1. Data collection, staff review, engineering work, D.C. calculations and policy work	January 2018 to February 2019
2. Development Charges Stakeholders Sub-Committee Meetings	1. March 1, 2018 2. June 14, 2018 3. September 13, 2018 4. January 28, 2019 5. February 19, 2019 6. March 25, 2019
3. Public meeting advertisement placed in newspaper(s)	March 21 & 28, 2019 (Hamilton Community News) March 22 & 29, 2019 (Hamilton Spectator)
4. Background study and proposed by-law available to public	March 13, 2019
5. Public meeting at Audit, Finance & Administration Committee	April 18, 2019
6. Addendum report available to the public	May 15,2019
7. Audit, Finance & Administration Committee considers adoption of background study and by-law	June 6, 2019
8. Addendum report #2 available to the public	June 7, 2019
9. Council adoption of by-law	June 12, 2019
10. Newspaper notice given of by-law passage	By 20 days after passage
11. Last day for by-law appeal	40 days after passage
12. City makes pamphlet available (where by-law not appealed)	By 60 days after in force date

1.3 Changes to the D.C.A.: Bill 73

With the amendment of the D.C.A. (as a result of Bill 73 and O.Reg. 428/15), there are a number of areas that must be addressed to ensure that the City is in compliance with the D.C.A., as amended. The following provides an explanation of the changes to the Act that affect the City's Background Study and how they have been dealt with to ensure compliance with the amended legislation.

1.3.1 Area Rating

Bill 73 has introduced two new sections where Council must consider the use of area-specific charges:

1) Section 2 (9) of the Act now requires a municipality to implement area-specific D.C.s for either specific services which are prescribed and/or for specific municipalities which are to be regulated. (Note that at this time, no municipalities or services are prescribed by the Regulations.)

2) Section 10 (2) c.1 of the D.C.A. requires that, "the development charges background study shall include consideration of the use of more than one development charge by-law to reflect different needs for services in different areas."

In regard to the first item, there are no services or specific municipalities identified in the regulations which must be area-rated. The second item requires Council to consider the use of area rating.

City of Hamilton staff have discussed area rating with the D.C. Stakeholders Subcommittee during the March 1, 2018 meeting and prepared a subsequent staff report (FCS18034) to recommend the use of an area-specific approach (combined sewer system versus separated sewer system) for the Stormwater component for the 2019 D.C. Background Study. This recommendation was approved by Council on March 26, 2018.

1.3.2 Asset Management Plan for New Infrastructure

The new legislation now requires that a D.C. background study must include an Asset Management Plan (s.10 (2) c.2). The asset management plan must deal with all assets that are proposed to be funded, in whole or in part, by D.C.s. The current regulations provide very extensive and specific requirements for the asset management plan related to transit services; however, they are silent with respect to how the asset management plan is to be provided for all other services. As part of any asset management plan, the examination should be consistent with the municipality's existing assumptions, approaches and policies on asset management planning. This examination may include both qualitative and quantitative measures such as examining the annual future lifecycle contributions needs (discussed further in Appendix J of this report).

1.3.3 60-Day Circulation of D.C. Background Study

Previously the legislation required that a D.C. background study be made available to the public at least two weeks prior to the public meeting. The amended legislation now provides that the D.C. background study must be made available to the public (including posting on the municipal website) at least 60 days prior to passage of the D.C. by-law. No other changes were made to timing requirements for such things as notice of the public meeting and notice of by-law passage.

This D.C. study is being provided to the public on March 13, 2019 to ensure the new requirements for release of the study is met.

1.3.4 Timing of Collection of D.C.s

The D.C.A. has been refined by Bill 73 to require that D.C.s are collected at the time of the first building permit. For the majority of development, this will not impact the City's present process. There may be instances, however, where several building permits are to be issued and either the size of the development or the uses will not be definable at the time of the first building permit. In these instances, the City may enter into a delayed payment agreement in order to capture the full development.

1.3.5 Transit

As per O.Reg. 428/15 and O.Reg. 82/98, Transit services now require a revised form of calculation. The following changes and requirements are as follows:

- 10% mandatory deduction from the growth-related costs removed;
- Methodology for determining the "planned level of service" set out in the regulations; and
- Methodology requires ridership forecasts and ridership capacity for all modes of transit over the 10 years, identification of excess capacity which exists at the end of 10 years, identification of whether new ridership is from existing or planned development.

To this end, Watson has retained Dillon Consulting Ltd. to undertake the Transit forecast as per the requirements of O.Reg. 428/15. The findings of their work are in Appendix I to this study.

In addition to the revisions above, a detailed evaluation for Transit asset management is required and consist of the following:

- Identifying the state of local infrastructure for the existing assets;
- Definition of service levels through time frames and provides performance measures;
- Provides an asset management strategy and a financial strategy for existing and future assets;
- Assessment of options to achieve level of service;
- Review of procurement measures to achieve level of service; and
- Review of risks associated with strategies.

The asset management requirements are provided in Appendix J.

1.3.6 Other Changes

It is also noted that a number of other changes were made through Bill 73 and O.Reg. 428/15 including the changes to Waste Diversion and the ability for collection of additional levies. Due to these changes, growth-related waste diversion infrastructure is being included in this D.C. Further, the City's local service policy has been refined as presented in Appendix E.

Chapter 2
Current City of Hamilton Policy

2. Current City of Hamilton Policy

2.1 Schedule of Charges

On June 25, 2014, the City of Hamilton passed By-law 14-153 under the D.C.A. This by-law was amended on July 13, 2018 via By-law 18-196 and August 20, 2018 via By-law 18-228.

By-law 11-174 was passed on June 15, 2011, and amended by By-law 18-228 on August 20, 2018, and By-law 12-053 amended on February 15, 2012 which set out GO Transit D.C.s (this background study does not include any updates to the GO Transit D.C.s).

These by-laws impose D.C.s for residential and non-residential uses. The table below provides the rates currently in effect, as at July 6, 2018.

Table 2-1
City of Hamilton
Current D.C. Rates

Service	Residential					Non-Residential
	Single-Detached Dwelling & Semi-Detached Dwelling (per unit)	Townhouses & Other Multiple Unit Dwellings (per unit)	Apartments 2-Bedrooms+ (per unit)	Apartments Bachelor & 1-Bedroom (per unit)	Residential Facility Dwelling (per Bedroom)	per sq.ft.
City Wide Charges						
Services Related to a Highway	8,939	6,460	5,458	3,797	2,900	9.10
Public Works	333	241	204	141	108	0.19
Police Services	421	305	256	179	137	0.23
Fire Protection Services	371	268	227	158	120	0.21
Transit Services	544	393	332	231	176	0.34
Parkland Development	1,479	1,069	903	628	480	0.11
Indoor Recreation Services	2,271	1,641	1,387	965	737	0.16
Library Services	642	464	392	273	208	0.04
Administrative Studies	795	575	485	337	258	0.48
Paramedics	39	28	24	16	13	0.02
Long Term Care	257	186	157	110	83	0.04
Health Services	28	21	18	12	9	-
Social & Child Services	31	22	19	13	10	-
Social Housing	583	421	356	248	189	-
Airport Services	261	188	159	111	84	0.16
Parking Services	366	264	223	156	118	0.22
Provincial Offences Act	25	19	15	11	8	0.01
Hamilton Conservation Authority	24	18	14	10	8	0.02
Total City Wide Charges	**17,409**	**12,583**	**10,629**	**7,396**	**5,646**	**11.33**
Urban Area Charges						
Stormwater Drainage and Control Services	7,065	5,106	4,313	3,001	2,293	1.41
Wastewater Facilities	4,090	2,956	2,497	1,737	1,328	2.30
Wastewater Linear Services	5,151	3,723	3,146	2,188	1,671	2.90
Water Service	4,603	3,327	2,811	1,955	1,493	2.60
Total Urban Area Charges	**20,909**	**15,112**	**12,767**	**8,881**	**6,785**	**9.21**
Grand Total (Urban Area & Municipal Wide)	**38,318**	**27,695**	**23,396**	**16,277**	**12,431**	**20.54**
Additional Special Area Charges						
Binbrook	3,211	2,320	1,961	1,364	1,042	-
Dundas/Waterdown	1,588	1,147	970	674	515	1.09
GO Transit (City-Wide)	**252**	**180**	**156**	**104**	**82**	**-**

2.2 Services Covered

The following services are covered under By-laws 14-153 (as amended) and 11-174 (as amended):

By-law 14-153, as amended:

- Services Related to a Highway;
- Public Works;
- Police Services;
- Fire Protection Services;
- Transit Services;
- Parkland Development;
- Indoor Recreation Services;
- Library Services;
- Administrative Studies;
- Paramedics;
- Long Term Care;
- Health Services;
- Social and Child Services;
- Social Housing;
- Airport Services;
- Parking Services;
- Provincial Offenses Act;
- Hamilton Conservation Authority;
- Water Service;
- Wastewater Facilities;
- Wastewater Linear Services;
- Stormwater Drainage and Control Services; and
- Special Area Charges (i.e. Dundas/Waterdown).

By-law 11-174, as amended:

- GO Transit Service.

2.3 Timing of D.C. Calculation and Payment

D.C.s are payable at the time of building permit issuance and are collected by the City of Hamilton Building Department. Deferrals are available for non-residential developments, apartment developments, and residential facility developments for up to a maximum of 5 years. The deferral agreement is subject to interest charges and administration fees.

2.4 Indexing

Rates shall be indexed on the anniversary date of the D.C. by-laws (every July 6) by the percentage change recorded in the average annual Non-Residential Building Construction Price Index produced by Statistics Canada.

2.5 Redevelopment Allowance

As a result of the redevelopment of land, a building or structure existing on the same land within 5 years prior to the date of payment of building permit issuance in regard to such redevelopment was, or is to be demolished, in whole or in part, or converted from one principal use to another principal use on the same land, in order to facilitate the redevelopment, the D.C.s otherwise payable with respect to such redevelopment shall be reduced by the following amounts:

(a) in the case of a residential building or structure, or in the case of a mixed-use building or structure, the residential uses in the mixed-use building or structure, an amount calculated by multiplying the applicable D.C. under subsections 24(b) or 26 by the number, according to type, of dwelling units that have been or will be demolished or converted to another principal use; and

(b) in the case of a non-residential building or structure or, in the case of mixed-use building or structure, the non-residential uses in the mixed-use building or structure, an amount calculated by multiplying the applicable D.C.s under subsection 24(b) or 25 by the gross floor area that has been or will be demolished or converted to another principal use;

provided that such amounts shall not exceed, in total, the amount of the D.C.s otherwise payable with respect to the redevelopment.

2.6 Exemptions

The following discretionary exemptions are provided under By-laws 14-153, as amended, and 11-174, as amended:

- Residential:
  - Enlargement of existing dwelling unit and addition of one or two dwellings to a single detached dwelling or one additional dwelling to any other residential building is exempt;
  - Affordable Housing – Projects receiving federal or provincial funding or either City of Hamilton or CityHousing Hamilton Corporation funding (but not receiving funding to cover D.C.s) 100% exempted;
  - Farm Help Houses – Considered to be Agricultural Use – 100% exempt - but does not include single detached dwelling on agricultural land; and
  - Heritage Buildings – redevelopment 100% exempt within the existing building envelope.
- Non-Residential:
  - Expansion of existing Industrial Buildings – Expansion of up to 50% of existing G.F.A. exempted (attached or detached as long as on same property);
  - Parking Garage/Structure – 100% exempted;
  - Agricultural Use – 100% exempted for bona fide farming/agriculture uses;
  - Place of Worship – 100% exempted (must be exempt from property taxes);
  - Covered Sports Field – Playing surface and spectator viewing areas 100% exempted (does not include ancillary areas i.e. hallways, change rooms, concessions etc.);
  - Temporary Building or Structure – 100% exempted provided the temporary building or structure is on the land for less than one year;
  - Non-Industrial Expansion:
    - First 5,000 sq.ft. of G.F.A. for expansion exempt from D.C.s, can be attached or unattached as long as on same site (original development must exist as of by-law date); and

- Heritage Buildings – redevelopment 100% exempt within the existing building envelope.

Note that the mandatory exemptions required as per the D.C.A. are also included in the by-laws.

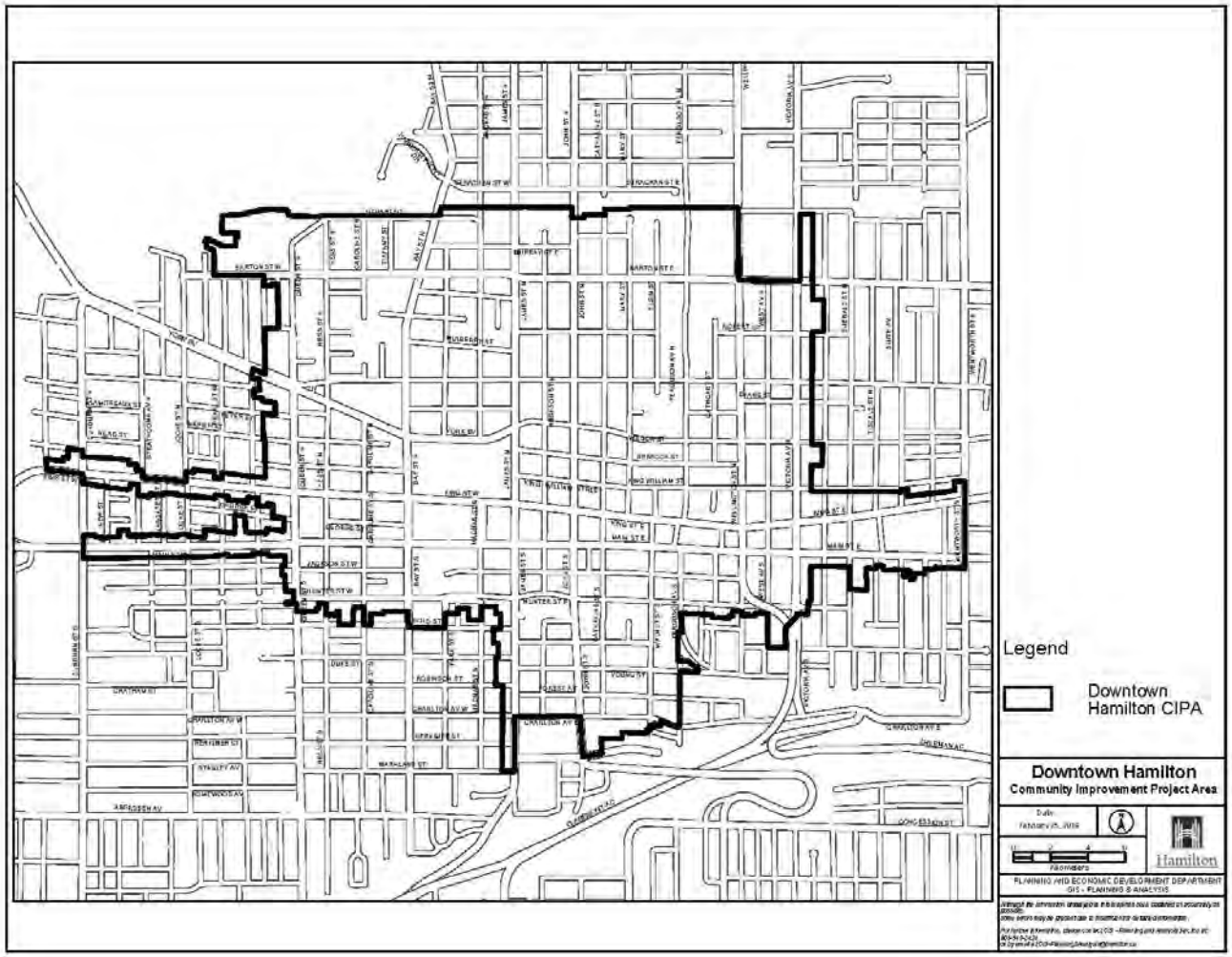
2.7 Reductions

- Residential:
  - Downtown Hamilton Community Improvement Project Area (C.I.P.A.) Exemption (Figure 2-1) – 70% exemption of D.C.s otherwise payable if within boundaries (to be applied after all other exemptions and credits are applied);
  - Student Residence – 50% exemption for student residence built by a University, College of applied arts and technology or other accredited post-secondary institution; and
  - Redevelopment of existing residential development – exempt from 50% of D.C.s generated within the existing building envelope (credit for 100% of previous use) (for example turning an S.D.U. into a rooming house).
- Non-Residential:
  - New Industrial:
    - 10,000 sq.ft. or less – pay $9.41 per sq.ft.
    - 10,000+ sq. ft. – pay $12.53 per sq.ft.
  - Non-Industrial (Commercial/Institutional) Stepped Rates:
    - First 5,000 sq.ft. of development $10.27/sq.ft. (50% of charge in effect)
    - Second 5,000 sq.ft. of development $15.41/sq.ft. (75% of charge in effect)
    - 10,000+ sq.ft. of development $20.54/sq.ft. (100% of charge in effect)
  - Academic/Teaching Space – exempt from all City D.C.s except for the Transit component if development is by a University, other post-secondary school offering a degree or diploma recognized by the Province, or a not-for-profit private elementary or secondary school operated in compliance with Section 16 of the *Education Act;*
  - Public Hospital – Exempt from 50% of the D.C.s otherwise payable;
  - ERASE/Brownfield – Exemption for the lesser of environmental remediation costs (approved through ERASE grant) or D.C.s otherwise payable; and

- Downtown Hamilton Community Improvement Project Area (C.I.P.A.) Exemption (Map in Figure 2-1 below) – 70% exemption of D.C.s otherwise payable if within boundaries (to be applied after all other exemptions and credits are applied).

These exemptions and reductions were recently subject to review by the City under separate cover and will be revised in the draft by-law as per section 7.3.4 of this report.

Figure 2-1
Downtown Hamilton Community Improvement Project Area



Chapter 3
Anticipated Development in the City of Hamilton

3. Anticipated Development in the City of Hamilton

3.1 Requirements of the Act

Chapter 4 provides the methodology for calculating a D.C. as per the D.C.A. Figure 4-1 presents this methodology graphically. It is noted in the first box of the schematic that in order to determine the D.C. that may be imposed, it is a requirement of section 5 (1) of the D.C.A. that "the anticipated amount, type and location of development, for which development charges can be imposed, must be estimated."

The growth forecast contained in this chapter (with supplemental tables in Appendix A) provides for the anticipated development for which the City of Hamilton will be required to provide services, over a 10-year (early 2019 to early 2029) and a longer term (early 2019 to mid-2031) time horizon.

3.2 Basis of Population, Household and Non-Residential Gross Floor Area Forecast

The D.C. growth forecast has been derived from the City of Hamilton, Growth Related Integrated Development Strategy: Growth Report, 2006, which is consistent with Schedule 3 of the Growth Plan for the Greater Golden Horseshoe, Ministry of Infrastructure, June 2013 and the identified 2031A growth projections. In compiling the growth forecast, the following specific information sources were consulted to help assess the residential and non-residential development potential for the City of Hamilton over the forecast period, including:

- The City of Hamilton Development Charge Background Study, Watson & Associates Economists Ltd., May 20, 2014;
- City of Hamilton Growth Related Integrated Development Strategy: Growth Report, May 2006;
- The Urban Hamilton Official Plan, December 2015;
- Rural Hamilton Official Plan, April 2014;
- Historical residential and non-residential building permit data over the 2011-2018 period;

- The City of Hamilton Growth Related Integrated Development Strategy Traffic Zone level population, housing and employment dataset;
- Residential supply (in the development process and other designated residential lands) along with residential intensification opportunities as provided by the City of Hamilton Planning and Economic Development Department;
- Non-residential supply opportunities as provided by the City of Hamilton Planning and Economic Development Department; and
- City of Hamilton Ward Boundary Review, 2017.

3.3 Summary of Growth Forecast

A detailed analysis of the residential and non-residential growth forecasts is provided in Appendix A and the methodology employed is illustrated in Figure 3-1. The discussion provided herein summarizes the anticipated growth for the City and describes the basis for the forecast. The results of the residential growth forecast analysis are summarized in Table 3-1 below, and *Schedule 1* in Appendix A.

As identified in Table 3-1 and Appendix A, *Schedule 1*, the City's population is anticipated to reach 614,943 by early 2029 and 636,080 by mid-2031, resulting in an increase of 65,046 and 86,183 persons, respectively, over the 10-year and longer term (2019 to 2031) forecast periods.[1]

[1] The population figures used in the calculation of the 2019 D.C. exclude the net Census undercount, which is estimated at approximately 3.7%.

Figure 3-1
Household Formation-based Population and Household Projection Model

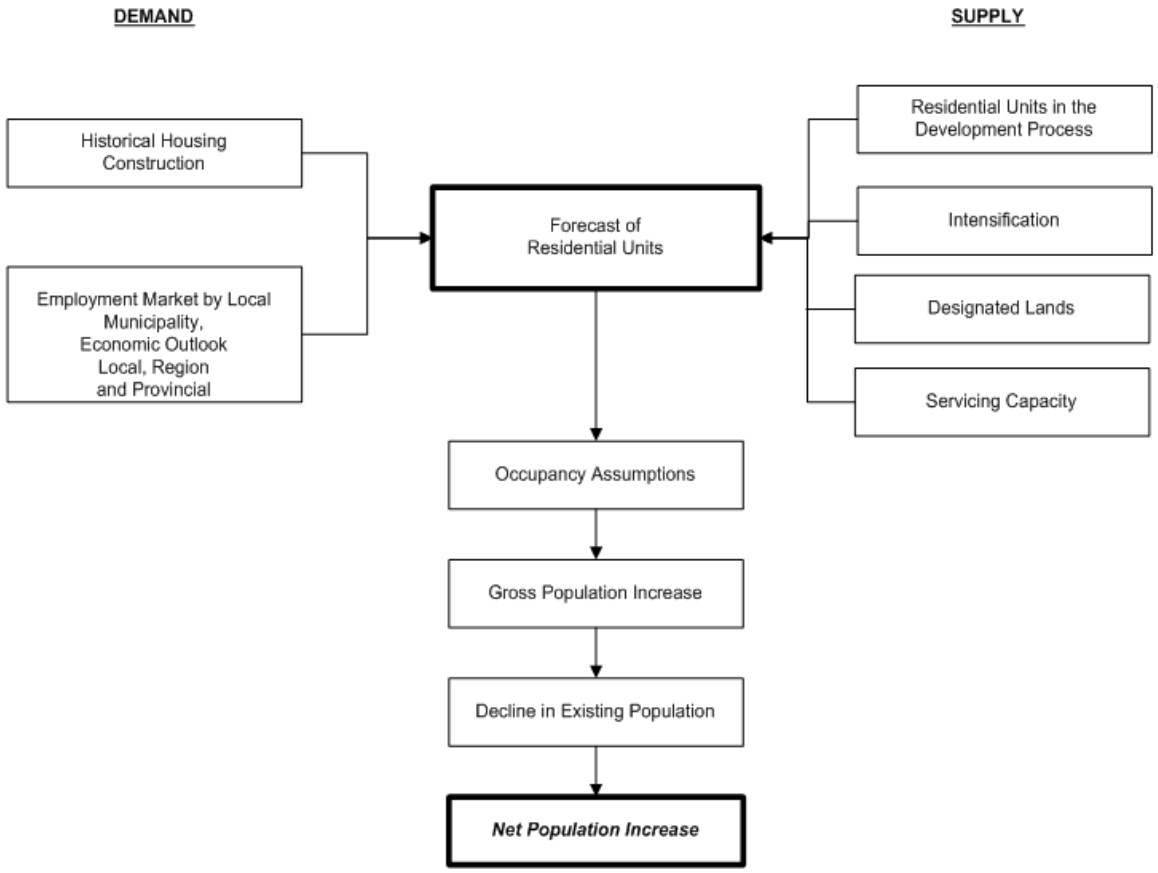


Table 3-1
City of Hamilton
Residential Growth Forecast Summary

	Year	Population (Including Census Undercount)[1]	Excluding Census Undercount			Housing Units						Person Per Unit (P.P.U.): Total Population/ Total Households	Persons in Private Households/ Total Households
			Population	Institutional Population	Population Excluding Institutional Population	Singles & Semi-Detached	Multiple Dwellings[2]	Apartments[3]	Other	Total Households	Equivalent Institutional Households		
Historical	*Mid-2006*	523,530	504,559	8,929	495,630	118,410	25,095	50,155	795	194,455	8,117	2.595	2.549
	Mid-2011	539,500	519,949	10,314	509,635	124,435	27,765	50,805	810	203,815	9,376	2.551	2.500
	Mid-2016	557,110	536,917	8,987	527,930	127,705	31,405	51,675	815	211,600	8,170	2.537	2.495
Forecast	*Early-2019*	570,570	549,897	9,058	540,839	129,668	33,693	53,605	815	217,781	8,235	2.525	2.483
	Early-2029	638,060	614,943	9,460	605,483	142,660	43,993	63,222	815	250,690	8,600	2.453	2.415
	Mid-2031	660,000	636,080	9,541	626,539	146,175	46,843	66,357	815	260,190	8,674	2.445	2.408
Incremental	**Mid-2006 to Mid-2011**	**15,970**	**15,390**	**1,385**	**14,005**	**6,025**	**2,670**	**650**	**15**	**9,360**	**1,259**		
	Mid-2011 to Mid-2016	**17,610**	**16,968**	**-1,327**	**18,295**	**3,270**	**3,640**	**870**	**5**	**7,785**	**-1,206**		
	Mid-2016 to Early-2019	**13,460**	**12,980**	**71**	**12,909**	**1,963**	**2,288**	**1,930**	**0**	**6,181**	**65**		
	Early-2019 to Early-2029	**67,490**	**65,046**	**402**	**64,644**	**12,992**	**10,300**	**9,617**	**0**	**32,909**	**365**		
	Early-2019 to Mid-2031	**89,430**	**86,183**	**483**	**85,700**	**16,507**	**13,150**	**12,752**	**0**	**42,409**	**439**		

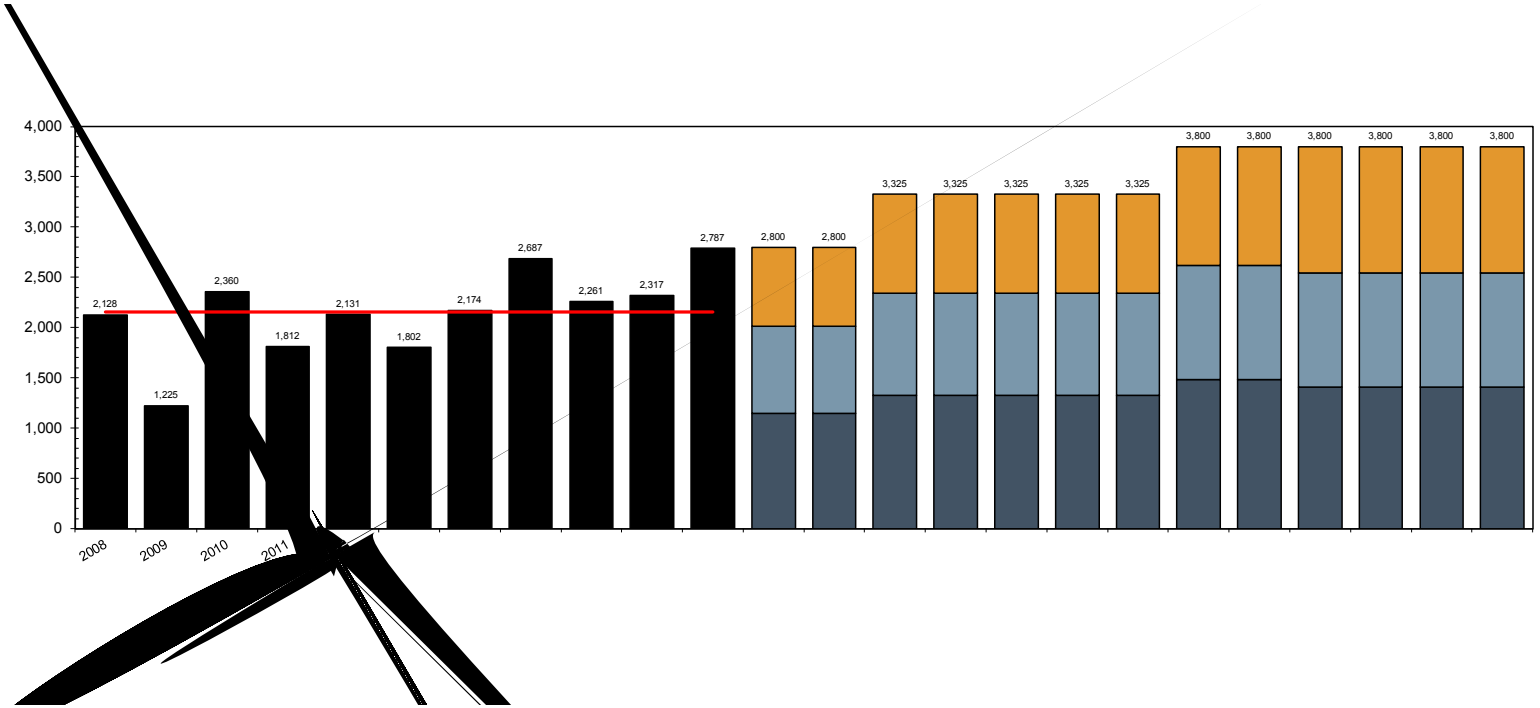
Source: Watson & Associates Economists Ltd., 2018.

[1] Census undercount estimated at approximately 3.7%. Note: Population including the undercount has been rounded.

[2] Includes townhouses and apartments in duplexes.

[3] Includes bachelor, 1 bedroom and 2 bedroom+ apartments.

Figure 3-2
City of Hamilton
Annual Housing Forecast



5.3.2 Public Works Facilities, Fleet & Equipment

The Public Works Department has a variety of vehicles and major equipment totalling approximately $105,179,620. The inventory provides for a per capita standard of $184. Over the forecast period, the D.C.-eligible amount for vehicles and equipment is $15,888,698.

Additional vehicle and equipment items have been identified for the forecast period, amounting to a gross cost of $14,695,337 of growth-related capital. Deductions to the gross amount include benefit to existing of $21,350, 10% mandatory deduction of $463,102 on vehicles & equipment related to soft services resulting in an amount of $14,210,885 which has been included in the D.C. calculation.

The City operates their Public Works service out of a number of facilities and shipping containers. The facilities provide 853,574 sq.ft. of building area, as well as 4.06 acres of land for the Old Rheem Property Snow Dump, providing for an average level of service of 1.67 sq.ft. per capita or $946 per capita. This level of service provides the City with a maximum D.C.-eligible amount for recovery over the 13-year forecast period of $81,505,849.

There have been twelve facility-related projects identified for inclusion from public works with the total cost of the projects identified as $43,765,500. The Parks Work Yards in Binbrook, the Confederation Park yard & field house, and the Public Works Depot will assist in servicing both services related to a highway and outdoor parks services therefore a mandatory 10% deduction has been made on these projects. As well, deductions in the amount of $12,911,900 to reflect benefit to existing development and $3,763,222 to reflect the reserve fund balance have been made to the gross capital cost. The net amount included in the D.C. is $26,461,649.

The residential/non-residential capital cost allocation for facilities and fleet is based on a 62%/38% split which is based on the incremental growth in population to employment for the 13-year forecast period.

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Services Related to a Highway - Vehicles and Equipment

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Subtotal	Less:	Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New		Other (e.g. 10% Statutory Deduction)	Total	Residential Share 62%	Non-Residential Share 38%
	Operations:												
1	Aluminum Sander Prewelded (1)	2019-2031	225,000	-		225,000	-		225,000		225,000	139,500	85,500
2	1 1/2 Ton Pickup (9)	2019-2031	233,000	-		233,000	-		233,000		233,000	144,460	88,540
3	Large Front End Loader (2)	2019-2031	404,667	-		404,667	-		404,667		404,667	250,893	153,773
4	Grader (1)	2019-2031	281,000	-		281,000	-		281,000		281,000	174,220	106,780
5	Large Mobile Sweeper (4)	2019-2031	1,304,000	-		1,304,000	-		1,304,000		1,304,000	808,480	495,520
6	Snow Blower Attachment (1)	2019-2031	202,000	-		202,000	-		202,000		202,000	125,240	76,760
7	Street Flusher (1)	2019-2031	225,000	-		225,000	-		225,000		225,000	139,500	85,500
8	Hotspot Transporter (2)	2019-2031	63,000	-		63,000	-		63,000		63,000	39,060	23,940
9	Tandem Trailer - 12 Ton(1)	2019-2031	22,500	-		22,500	-		22,500		22,500	13,950	8,550
10	Large Hopper/Spreader Attachment (1)	2019-2031	18,000	-		18,000	-		18,000		18,000	11,160	6,840
11	Aluminum Dump/Crew/Crane/Plow (1)	2019-2031	84,500	-		84,500	-		84,500		84,500	52,390	32,110
12	Aluminum Dump/Crew/Plow (1)	2019-2031	78,500	-		78,500	-		78,500		78,500	48,670	29,830
13	Arrow Boards (3)	2019-2031	30,900	-		30,900	-		30,900		30,900	19,158	11,742
14	Steel Dump/Crew/Crane/Plow (1)	2019-2031	59,600	-		59,600	-		59,600		59,600	36,952	22,648
15	Steel Dump/Crew (1)	2019-2031	56,200	-		56,200	-		56,200		56,200	34,844	21,356
16	Sander Radius Dump with 2 Way Front (1)	2019-2031	259,000	-		259,000	-		259,000		259,000	160,580	98,420
17	Sander Pre-Wel 2 Way with Wing (2)	2019-2031	562,000	-		562,000	-		562,000		562,000	348,440	213,560
18	Trackless (1)	2019-2031	235,000	-		235,000	-		235,000		235,000	145,700	89,300
19	Gradal (1)	2019-2031	362,000	-		362,000	-		362,000		362,000	224,440	137,560
20	Alum Sander Prew Front & Wing Plow (4)	2019-2031	876,800	-		876,800	-		876,800		876,800	543,616	333,184
21	Sander Tandem Prew Plow (1)	2019-2031	253,000	-		253,000	-		253,000		253,000	156,860	96,140
	Parks:												
22	1 1/2 Ton Pick-up Truck (3)	2019-2023	77,600	-		77,600	-		77,600	7,760	69,840	43,301	26,539
23	Small Tractor (2)	2019-2023	78,700	-		78,700	-		78,700	7,870	70,830	43,915	26,915
24	Medium Tractor (1)	2019-2023	50,600	-		50,600	-		50,600	5,060	45,540	28,235	17,305
25	Large Tractor (3)	2019-2023	186,000	-		186,000	-		186,000	18,600	167,400	103,788	63,612
26	Service Body - Utility (2)	2019-2023	101,000	-		101,000	-		101,000	10,100	90,900	56,358	34,542
27	1 Ton Pick-up with Plow (1)	2019-2023	56,200	-		56,200	-		56,200	5,620	50,580	31,360	19,220
28	Tow behind rotary mower (1)	2019-2023	2,900	-		2,900	-		2,900	290	2,610	1,618	992
29	Utility Turf Vehicle (3)	2019-2023	57,300	-		57,300	-		57,300	5,730	51,570	31,973	19,597
30	Mower Front Mount Riding (10)	2019-2023	211,500	-		211,500	-		211,500	21,150	190,350	118,017	72,333

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Services Related to a Highway - Vehicles and Equipment

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Subtotal	Less:	Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New		Other (e.g. 10% Statutory Deduction)	Total	Residential Share 62%	Non-Residential Share 38%
31	Tandem Axle Trailer (5)	2019-2023	42,700	-		42,700	-		42,700	4,270	38,430	23,827	14,603
32	Overseeder (1)	2019-2023	21,400	-		21,400	-		21,400	2,140	19,260	11,941	7,319
33	Top Dresser (1)	2019-2023	18,000	-		18,000	-		18,000	1,800	16,200	10,044	6,156
34	Small Aerifier (1)	2019-2023	10,400	-		10,400	-		10,400	1,040	9,360	5,803	3,557
35	Aerifier (1)	2019-2023	16,900	-		16,900	-		16,900	1,690	15,210	9,430	5,780
36	Drop in Sander (3)	2019-2023	30,400	-		30,400	-		30,400	3,040	27,360	16,963	10,397
37	Aluminum Dump/Crew (1)	2019-2023	73,100	-		73,100	-		73,100	7,310	65,790	40,790	25,000
38	Aluminum Dump/Crew & Plow (1)	2019-2023	78,500	-		78,500	-		78,500	7,850	70,650	43,803	26,847
39	Packer Truck (1)	2019-2023	187,000	-		187,000	-		187,000	18,700	168,300	104,346	63,954
40	Riding Mower (1)	2019-2023	73,100	-		73,100	-		73,100	7,310	65,790	40,790	25,000
41	Rotary Riding Mower (1)	2019-2023	337,000	-		337,000	-		337,000	33,700	303,300	188,046	115,254
42	Steel Dump Crew - 1 Ton	2019-2023	56,200	-		56,200	-		56,200	5,620	50,580	31,360	19,220
43	Aerifier (2)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
44	Ball Diamond Groomer (1)	2019-2028	10,200	-		10,200	-		10,200	1,020	9,180	5,692	3,488
45	Blower (1)	2019-2028	10,200	-		10,200	-		10,200	1,020	9,180	5,692	3,488
46	Miscellaneous (1)	2019-2028	10,200	-		10,200	-		10,200	1,020	9,180	5,692	3,488
47	Mower (1)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
48	Over Seeder (1)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
49	Top Dresser (1)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
50	Beach Rake (1)	2019-2028	93,600	-		93,600	-		93,600	9,360	84,240	52,229	32,011
51	Golf Cart (4)	2019-2028	10,200	-		10,200	-		10,200	1,020	9,180	5,692	3,488
52	Leaf Blower (1)	2019-2028	520	-		520	-		520	52	468	290	178
53	Pressure Washer (1)	2019-2028	10,400	-		10,400	-		10,400	1,040	9,360	5,803	3,557
54	Wood Chipper (1)	2019-2028	33,700	-		33,700	-		33,700	3,370	30,330	18,805	11,525
55	Mower Outfront (3)	2019-2028	25,500	-		25,500	-		25,500	2,550	22,950	14,229	8,721
56	Mower Riding (3)	2019-2028	140,000	-		140,000	-		140,000	14,000	126,000	78,120	47,880
57	Mower Walk Behind (1)	2019-2028	7,300	-		7,300	-		7,300	730	6,570	4,073	2,497
58	Pickup 1 ton Crew Cab (3)	2019-2028	134,000	-		134,000	-		134,000	13,400	120,600	74,772	45,828
59	Pickup 1 ton Snow Plow (1)	2019-2028	52,000	-		52,000	-		52,000	5,200	46,800	29,016	17,784
60	Refuse Rear Load Mini Packer (1)	2019-2028	169,300	-		169,300	-		169,300	16,930	152,370	94,469	57,901

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Services Related to a Highway - Vehicles and Equipment

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Subtotal	Less:	Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New		Other (e.g. 10% Statutory Deduction)	Total	Residential Share 62%	Non-Residential Share 38%
61	Refuse Side Loader (1)	2019-2028	169,300	-		169,300	-		169,300	16,930	152,370	94,469	57,901
62	Service Body Truck (3/4 ton) (3)	2019-2028	66,300	-		66,300	-		66,300	6,630	59,670	36,995	22,675
63	Sidewalk Sweeper (1)	2019-2028	59,200	-		59,200	-		59,200	5,920	53,280	33,034	20,246
64	Tractor Loader/Backhoe Small (97-182 HP 6.5 cu yards) (1)	2019-2028	114,200	-		114,200	-		114,200	11,420	102,780	63,724	39,056
65	Trailer Float (1)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
66	Utility Vehicle (5)	2019-2028	20,400	-		20,400	-		20,400	2,040	18,360	11,383	6,977
67	Utility Vehicle - Toolcat (2)	2019-2028	102,000	-		102,000	-		102,000	10,200	91,800	56,916	34,884
	Forestry (Roads & Parks):												
68	Pickup 3/4 Ton	2019-2031	42,700	-		42,700	21,350		21,350	2,135	19,215	11,913	7,302
69	Wood Chipper (2)	2019-2031	188,000	-		188,000	-		188,000	18,800	169,200	104,904	64,296
70	Aerial Truck (1)	2019-2031	291,000	-		291,000	-		291,000	29,100	261,900	162,378	99,522
71	Dump Truck Tandem Axle Chipper Body (1)	2019-2023	202,000	-		202,000	-		202,000	20,200	181,800	112,716	69,084
	Horticulture:												
72	Tandem Axle Trailer (1)	2019-2031	12,500	-		12,500	-		12,500	1,250	11,250	6,975	4,275
73	Aluminum Dump/Crew (2)	2019-2023	145,600	-		145,600	-		145,600	14,560	131,040	81,245	49,795
	Traffic												
74	Signal Bucket Trucks (2)	2019-2023	573,000	-		573,000	-		573,000		573,000	355,260	217,740
75	Signal Tech Van	2019-2024	80,700	-		80,700	-		80,700		80,700	50,034	30,666
76	Foreman's Pickup Truck	2019-2026	54,600	-		54,600	-		54,600		54,600	33,852	20,748
77	Investigator Pickup Truck	2019-2027	57,300	-		57,300	-		57,300		57,300	35,526	21,774
78	Aerial Truck (2)	2019-2031	630,000	-		630,000	-		630,000		630,000	390,600	239,400
79	Line Painter - Walk Behind (2)	2019-2031	10,200	-		10,200	-		10,200		10,200	6,324	3,876
80	Sign Trucks (2)	2019-2031	1,275,000	-		1,275,000	-		1,275,000		1,275,000	790,500	484,500
	Recreation												
81	Ice Resurfacer (2)	2024-2028	191,000	-		191,000	-		191,000	19,100	171,900	106,578	65,322
82	Compact Car (3)	2024-2028	84,300	-		84,300	-		84,300	8,430	75,870	47,039	28,831
	Building & By-law Enforcement												
83	Hybrid Vehicles (6)	2019-2023	239,000	-		239,000	-		239,000	23,900	215,100	133,362	81,738
84	Compact Pick-up (1)	2019-2023	25,850	-		25,850	-		25,850	2,585	23,265	14,424	8,841
	Parks & Roads:												
85	Refuse Rear Load (11)	2019-2028	246,800	-		246,800	-		246,800	12,340	234,460	145,365	89,095

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Services Related to a Highway - Vehicles and Equipment

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Subtotal	Less:	Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New		Other (e.g. 10% Statutory Deduction)	Total	Residential Share 62%	Non-Residential Share 38%
	Roads:												
86	SUV 2 Wheel Drive (15)	2019-2031	468,000	-		468,000	-		468,000		468,000	290,160	177,840
87	SUV 4 Wheel Drive (5)	2019-2031	208,000	-		208,000	-		208,000		208,000	128,960	79,040
88	Pickup 1/2 ton (5)	2019-2031	146,000	-		146,000	-		146,000		146,000	90,520	55,480
89	SUV 4 Wheel Drive (11)	2019-2031	458,000	-		458,000	-		458,000		458,000	283,960	174,040
90	SUV 2 Wheel Drive (3)	2019-2031	94,000	-		94,000	-		94,000		94,000	58,280	35,720
91	Pickup 1/2 ton (1)	2019-2031	29,100	-		29,100	-		29,100		29,100	18,042	11,058
	Total		**14,695,337**	**-**	**-**	**14,695,337**	**21,350**	**-**	**14,673,987**	**463,102**	**14,210,885**	**8,810,748**	**5,400,136**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Public Works - Facilities

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Subtotal	Less:	Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development		Other (e.g. 10% Statutory Deduction)	Total	Residential Share 62%	Non-Residential Share 38%
1	Dundas Expansion	2019-2031	1,650,000	-		1,650,000	-		1,650,000		1,650,000	1,023,000	627,000
2	Lower Stoney Creek Expansion	2019-2031	1,960,000	-		1,960,000	-		1,960,000		1,960,000	1,215,200	744,800
3	North District Expansion	2019-2031	1,020,000	-		1,020,000	-		1,020,000		1,020,000	632,400	387,600
4	South Mountain Expansion	2019-2031	2,860,000	-		2,860,000	-		2,860,000		2,860,000	1,773,200	1,086,800
5	Upper Stoney Creek/Binbrook Expansion	2019-2031	1,640,000	-		1,640,000	-		1,640,000		1,640,000	1,016,800	623,200
6	Waterdown/Carlisle Expansion	2019-2031	1,780,000	-		1,780,000	-		1,780,000		1,780,000	1,103,600	676,400
7	Provision for Expansion of Parks Works Yards - Binbrook*	2019-2031	573,500	-		573,500	-		573,500	57,350	516,150	320,013	196,137
8	Streetlighting Facility Expansion (Storage)	2019-2023	1,200,000	-		1,200,000	318,200		881,800		881,800	546,716	335,084
9	Additional Snow Dump (Land)	2025-2028	5,750,000	-		5,750,000	-		5,750,000		5,750,000	3,565,000	2,185,000
10	Water & Wastewater Office/Storage Expansion	2019-2024	17,250,000	-		17,250,000	10,225,500		7,024,500		7,024,500	4,355,190	2,669,310
11	Confederation Park - Sports Park Development - Phase 2 (Maintenance Yard & Field House)*	2020	4,182,000	-		4,182,000	418,200		3,763,800	376,380	3,387,420	2,100,200	1,287,220
12	Public Works Depot - Bayfront Park (Design & Construction)*	2019	3,900,000	-		3,900,000	1,950,000		1,950,000	195,000	1,755,000	1,088,100	666,900
13	Reserve Fund Adjustment					-	3,763,222		(3,763,222)		(3,763,222)	(2,333,197)	(1,430,024)
	Total		**43,765,500**	**-**	**-**	**43,765,500**	**16,675,122**	**-**	**27,090,379**	**628,730**	**26,461,649**	**16,406,222**	**10,055,426**

*Related to Parks Department therefore a 10% mandatory deduction has been attributed

5.3.3 Police Services

The Hamilton Police Service operates from several facilities, some of which are owned while others are leased. These facilities combined provide 327,302 sq.ft. of building area, providing for an average level of service of 0.58 sq.ft. per capita or $262 per capita. This level of service provides the City with a maximum D.C.-eligible amount for recovery over the 13-year forecast period of $22,554,091.

The police service has a fleet of 219 vehicles with a useful life of more than six years currently in use. The average level of service for the 10-year period is $16 per capita, providing for a D.C.-eligible amount over the forecast period of $1,404,783.

The police service currently has 1,001 members that are outfitted, including 807 sworn officers; 18 senior officers; 88 special constables; 76 auxiliary officers; and 12 cadets. The police service provides equipment and gear for these members, along with equipment for vehicles which are changed out when vehicles are replaced and therefore, often have a life longer than the vehicles themselves. This equipment and gear provide a calculated average level of service for the historic 10-year period of $22 per capita, providing for a D.C.-eligible amount over the forecast period of $1,870,171.

The total D.C.-eligible amount over the 13-year forecast period for Police services is $25,829,045.

To service growth over the 13-year forecast period, a number of projects have been identified for inclusion in the D.C.; they include an Investigative Services Division (I.S.D.) forensics facility, the replacement and expansion of the marine facility, an additional station, as well as additional space for communications, and a backup data/disaster recovery facility. These projects have a gross capital cost of $57,654,900. Existing Debt for the Divisional 30 Headquarters including principal and interest (discounted) of $310,378 and existing debt for the Shared Training Facility of $2,950,561 (including discounted principal and interest) have been included in the D.C. calculations for recovery. The City has identified the need for debenture financing on the I.S.D. Forensics Headquarters which has been estimated using a 15-year term and 5% interest rate, resulting in the inclusion of $469,698 of (discounted) interest in the D.C. calculation. A deduction of $22,223,200 has been made to reflect the benefit to growth beyond the 2019 to 2031 period for these facilities as well as a benefit to existing

development deduction of $15,981,800. A D.C.-eligible amount of $23,180,536 has been included with respect to Police facilities.

In addition to these facility-related projects, additional vehicles and equipment have been identified to service growth. The total capital cost of these projects has been identified as $5,852,300. A deduction of $435,300 has been made to recognize benefit to growth beyond the 13-year forecast, as well as an attribution of $275,600 to recognize the benefit to existing. This results in a D.C.-eligible amount of $5,141,000 to be included in the calculation for vehicles and equipment.

A deduction of $1,146,703 in order to recognize the reserve fund balance has been made resulting in a total D.C.-eligible amount of $27,175,233 for Police services including $1,365,647 of debt interest (discounted) which is in addition to the service standard.

The costs for the Hamilton Police Service are shared 62%/38% between residential and non-residential based on the population to employment ratio over the 13-year forecast period.

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Police Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 62%	Non-Residential Share 38%
	Facilities										
1	Marine Facility Expansion & Replacement	2019	5,148,000	-		5,148,000	2,059,200		3,088,800	1,915,056	1,173,744
2	Additional Police Facility Requirements - Station 40	2025	25,500,000	21,981,000		3,519,000	-		3,519,000	2,181,780	1,337,220
3	Investigative Services Division (I.S.D.) Forensics Headquarters	2019	25,824,000	-		25,824,000	13,471,600		12,352,400	7,658,488	4,693,912
4	Growth Related Component of I.S.D. Forensics Headquarters Debt Interest (Discounted)	2019-2033	469,698	-		469,698	-		469,698	291,213	178,485
5	Backup Data Centre/Disaster Recovery Facility Space Expansion	2020	281,000	242,200		38,800	-		38,800	24,056	14,744
6	Debt Principal on Divisional 30 Headquarters	2019	302,808	-		302,808	-		302,808	187,741	115,067
7	Debt Interest (Discounted) on Divisional 30 Headquarters	2019	7,570	-		7,570	-		7,570	4,694	2,877
8	Debt Principal (Discounted) - Shared Training Facility	2019-2027	2,062,182	-		2,062,182	-		2,062,182	1,278,553	783,629
9	Debt Interest (Discounted) - Shared Training Facility	2019-2027	888,379	-		888,379	-		888,379	550,795	337,584
10	Communication/9-1-1 Centre Expansion	2020	500,000	-		500,000	250,000		250,000	155,000	95,000
11	Communications Centre Facility Expansion	2019	401,900	-		401,900	201,000		200,900	124,558	76,342
	Vehicles & Equipment										
12	Station 40 Equipment	2025	213,000	183,600		29,400	-		29,400	18,228	11,172
13	Command Van	2020	750,000	-		750,000	275,600		474,400	294,128	180,272
14	Marine Vessal (Hike)	2019	800,000	-		800,000	-		800,000	496,000	304,000
15	Ice Rescue	2020	82,000	-		82,000	-		82,000	50,840	31,160
16	Additional Cruisers (46)	2019-2031	1,490,400	-		1,490,400	-		1,490,400	924,048	566,352
17	Equipment for Officers (200)	2019-2031	680,000	68,000		612,000	-		612,000	379,440	232,560
18	Equipment for Senior Officers (2)	2019-2031	7,200	700		6,500	-		6,500	4,030	2,470

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Police Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 62%	Non-Residential Share 38%
19	Equipment for Special Constables (21)	2019-2031	46,200	4,600		41,600	-		41,600	25,792	15,808
20	Equipment for Cadets (2)	2019-2031	5,400	500		4,900	-		4,900	3,038	1,862
21	Equipment for Auxiliary Officers (12)	2019-2031	30,600	3,100		27,500	-		27,500	17,050	10,450
22	Portable Radios (200)	2019-2031	1,177,100	117,700		1,059,400	-		1,059,400	656,828	402,572
23	Vehicle Equipment (46)	2019-2031	142,600	14,300		128,300	-		128,300	79,546	48,754
24	In-Car Mobile Radios / Electronics (46)	2019-2031	427,800	42,800		385,000	-		385,000	238,700	146,300
25	Reserve Fund Adjustment						1,146,703		(1,146,703)	(710,956)	(435,747)
	Total		**67,237,836**	**22,658,500**	**-**	**44,579,336**	**17,404,103**	**-**	**27,175,233**	**16,848,644**	**10,326,588**

5.3.4 Fire Protection Services

Hamilton currently operates its fire services from 255,838 sq.ft. of facility space, providing for a per capita average level of service of 0.48 sq.ft. per capita or $195 per capita. This level of service provides the City with a maximum D.C.-eligible amount for recovery over the 13-year forecast period of $16,766,041.

The fire department has a current inventory of 118 vehicles. The total D.C.-eligible amount calculated for fire vehicles over the forecast period is $10,525,530, based on a standard of $122 per capita.

The fire department provides 5,206 items of equipment and gear for the use in fire services. This results in a calculated average level of service for the historic 10-year period of $37 per capita, providing for a D.C.-eligible amount over the forecast period of $3,224,968 for small equipment and gear.

The total D.C.-eligible amount over the 13-year forecast period for Fire Protection services is $30,516,538.

Four facilities related projects have been identified to service growth over the forecast period at a cost of $30,547,000. A deduction of $5,565,100 has been made to recognize the benefit to growth beyond the 13-year forecast period, in addition to a deduction of $5,633,900 to reflect the benefit to existing development. Further, outstanding discounted debt, related to Station 20 and the Shared Training Facility, in the amount of $4,620,316 (including $140,135 of discounted interest payments) has been included in the D.C. As mentioned in section 4.7, the City has identified the need for growth-related financing for the new Waterdown station. This debenture has been assumed to have a 15-year term at a rate of 5%, resulting in the inclusion of $838,420 (discounted) interest in the D.C. calculation.

Additional vehicles and equipment have also been identified at a gross capital cost of $4,105,000. The recovery of outstanding debt (principal and discounted interest) related to a Station 20 vehicle has been included in the D.C. calculation at an amount of $88,079. Deductions were then made of $785,000 attributable to growth in the post 2031 period and $66,900 is attributable to existing benefit. These deductions result in a net D.C.-eligible cost of $3,341,179 to be included in the calculation for Fire vehicles and equipment.

In order to reflect the existing reserve fund balance, a deduction to recognize the surplus of $4,217,369 has been made. Therefore, the net amount to be included in the D.C. for the 13-year forecast period for all Fire Services related capital costs is $23,930,547

These costs are shared between residential and non-residential based on the population to employment ratio over the forecast period, resulting in 62% being allocated to residential development and 38% being allocated to non-residential development.

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Fire Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 62%	Non-Residential Share 38%
	Fire Facilities										
1	New Station Waterdown Growth Area	2019-2021	7,500,000	-		7,500,000	-		7,500,000	4,650,000	2,850,000
2	Growth Related Debt Interest (Discounted) - New Station Waterdown Growth Area	2022-2037	838,420	-		838,420	-		838,420	519,820	318,600
3	New Station Elfrida/Upper Stoney Creek Growth Area	2025-2027	8,432,000	5,565,100		2,866,900	-		2,866,900	1,777,478	1,089,422
4	Provision for Station Expansion/Renovation - Upper Stoney Creek	2027-2028	2,473,000	-		2,473,000	1,237,000		1,236,000	766,320	469,680
5	Mechanical/Stores Relocation/Expansion	2021-2024	12,142,000	-		12,142,000	4,396,900		7,745,100	4,801,962	2,943,138
6	Outstanding Debt - Station 20 - Principal	2019-2023	859,624	-		859,624	-		859,624	532,967	326,657
7	Outstanding Debt - Station 20 - Interest (Discounted)	2019-2023	71,725	-		71,725	-		71,725	44,470	27,256
8	Outstanding Debt- Shared Training Facility - Principal	2019-2027	3,620,557	-		3,620,557	-		3,620,557	2,244,745	1,375,812
9	Outstanding Debt- Shared Training Facility - Interest (Discounted)	2019-2027	68,410	-		68,410	-		68,410	42,414	25,996
	Fire Vehicles			-			-				
10	Rural Pumper for Elfrida Growth Area (New Station)	2026-2027	755,000	-		755,000	-		755,000	468,100	286,900
11	Engine for Elfrida Growth Area (New Station)	2026-2027	814,000	537,200		276,800	-		276,800	171,616	105,184
12	Rural Tanker for Waterdown Growth Area - New Station	2021-2022	705,000	-		705,000	-		705,000	437,100	267,900
13	Urban Pumper for Waterdown Growth Area - New Station	2021-2022	814,000	-		814,000	-		814,000	504,680	309,320

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Fire Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 62%	Non-Residential Share 38%
14	Outstanding Debt on Stn 20 Vehicle - Principal	2019-2023	81,295	-		81,295	-		81,295	50,403	30,892
15	Outstanding Debt on Stn 20 Vehicle - Interest (Discounted)	2019-2023	6,783	-		6,783	-		6,783	4,206	2,578
	Fire Equipment			-			-				
	Station #31 Waterdown			-			-				
16	Air compressor	2020-2021	3,000	-		3,000	-		3,000	1,860	1,140
17	Washer Extractor	2020-2021	17,000	-		17,000	-		17,000	10,540	6,460
18	Portable Radios, Chargers & Batteries	2020-2021	25,000	-		25,000	-		25,000	15,500	9,500
19	S.C.B.A.'s	2020-2021	31,000	-		31,000	-		31,000	19,220	11,780
20	Portable Pumps	2020-2021	18,000	-		18,000	-		18,000	11,160	6,840
21	Multi Gas Detectors	2020-2021	6,000	-		6,000	-		6,000	3,720	2,280
22	Defibrillators	2020-2021	6,000	-		6,000	-		6,000	3,720	2,280
23	Thermal Imaging Camera	2020-2021	13,000	-		13,000	-		13,000	8,060	4,940
24	Auto Extrication Equipment	2020-2021	57,000	-		57,000	-		57,000	35,340	21,660
25	Air Bags	2020-2021	11,000	-		11,000	-		11,000	6,820	4,180
26	Fire Hose	2020-2021	43,000	-		43,000	-		43,000	26,660	16,340
27	Bunker Gear	2020-2021	41,000	-		41,000	-		41,000	25,420	15,580
28	Station Exhaust System	2020-2021	56,000	-		56,000	-		56,000	34,720	21,280
29	Protective Gear & Uniform Clothing	2020-2021	48,000	-		48,000	-		48,000	29,760	18,240
	New Station Elfrida Growth Area		-	-			-				
30	Air Compressor	2026-2027	3,000	2,000		1,000	-		1,000	620	380
31	Washer Extractor	2026-2027	17,000	11,200		5,800	-		5,800	3,596	2,204
32	Portable Radios, Chargers & Batteries	2026-2027	25,000	16,500		8,500	-		8,500	5,270	3,230
33	S.C.B.A.'s	2026-2027	31,000	20,500		10,500	-		10,500	6,510	3,990

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Fire Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 62%	Non-Residential Share 38%
34	Portable Pumps	2026-2027	18,000	11,900		6,100	-		6,100	3,782	2,318
35	Multi Gas Detectors	2026-2027	6,000	4,000		2,000	-		2,000	1,240	760
36	Defibrillators	2026-2027	6,000	4,000		2,000	-		2,000	1,240	760
37	Thermal Imaging Camera	2026-2027	13,000	8,600		4,400	-		4,400	2,728	1,672
38	Auto Extrication Equipment	2026-2027	57,000	37,600		19,400	-		19,400	12,028	7,372
39	Air Bags	2026-2027	11,000	7,300		3,700	-		3,700	2,294	1,406
40	Fire Hose	2026-2027	43,000	28,400		14,600	-		14,600	9,052	5,548
41	Bunker Gear	2026-2027	41,000	27,100		13,900	-		13,900	8,618	5,282
42	Station Exhaust System	2026-2027	56,000	37,000		19,000	-		19,000	11,780	7,220
43	Protective Gear & Uniform Clothing	2026-2027	48,000	31,700		16,300	-		16,300	10,106	6,194
	Glanbrook Growth Area Station Expansion/Renovation										
44	Additional Firefighting Equipment at Glanbrook Growth Area	2021-2022	89,000	-		89,000	22,300		66,700	41,354	25,346
	Winona Growth Area										
45	Additional Firefighting Equipment at Winona Growth Area	2021-2022	89,000	-		89,000	22,300		66,700	41,354	25,346
	Upper Stoney Creek Growth Area										
46	Additional Firefighting Equipment at Upper Stoney Creek Station	2026-2027	89,000	-		89,000	22,300		66,700	41,354	25,346
47	Reserve Fund Adjustment			-		-	4,217,369		(4,217,369)	(2,614,769)	(1,602,600)
	Total		**40,198,816**	**6,350,100**	**-**	**33,848,716**	**9,918,169**	**-**	**23,930,547**	**14,836,939**	**9,093,608**

5.3.5 Stormwater Drainage and Control Services

Wood Environment & Infrastructure Solutions (Wood) undertook an assessment of the needs for stormwater management within the serviced areas of the City. Appendix G provides the detailed assessment and allocation of works between existing benefit and growth. Historically, the Stormwater D.C. calculation has been undertaken on a City-wide basis, but under Bill 73, Council is required to consider the use of area-specific charges when completing a D.C. background study. Based on staff recommendations, Council has directed as per report FCS18034, the use of an area-specific D.C. calculation for Stormwater services on the basis of the combined sewer system versus the separated sewer system for the 2019 D.C. background study. It was identified that some of the stormwater works, including channels, drainage and studies, benefit both the combined and the separated systems. These works were proportioned between the combined and separated systems based on the anticipated growth in population and employment in each. Other works, such as on-site controls, are required in the combined system, as the development of stormwater management ponds is not possible; whereas, ponds are required for development in the separated system. As such, Wood has identified the works required in each system and costs have been allocated to these respective areas.

Within the separated sewer system Wood has identified $681,578,067 in works required. In addition, the City has identified $26,713,318 in stormwater studies, provisions for Best Efforts Agreements in the amount of $952,693 and outstanding stormwater credits in the amount of $18,626,355 to be included in the calculations. Outstanding debt owed to the Ontario Land Corporation is included in the D.C. at an amount of $1,404,656 (apportioned between the combined and separated sewer systems). An amount of $6,211,845 has been included in the D.C. calculation to recognize the reserve fund deficit, as well as $274,463 of existing debt. The resulting gross cost in the separated sewer system is $735,761,398. Of this amount, $26,629,917 has been identified as benefiting existing development and $134,109,622 is a benefit to growth beyond the 13-year forecast period. A further deduction of $226,174,652 has been made to recognize the non-residential portion of the residential ponds. These deductions result in a net amount of $348,847,708 attributable to growth over the 13-year forecast period.

Within the combined sewer system area, Wood has identified $9,000,000 in future capital works. Staff have also identified $7,876,682 of stormwater studies within the combined sewer system area. $1,902,094 of debt owed to the Ontario Land Corporation has also been identified in the D.C. recoverable costs. $114,198 has been included in the D.C. calculation in order to reflect the reserve fund deficit, resulting in a gross cost of $18,892,974. A deduction of $107,336 has been made to reflect the benefit to existing in addition to $79,264, which reflects the benefit to growth beyond the 13-year forecast period. This results in a D.C. eligible amount of $18,706,374 for the combined sewer system area.

The existing reserve fund deficit has been allocated amongst the separated versus combined systems based on the proportion of D.C. eligible costs identified in each respective system in the 2014 D.C. background study. As discussed in section 7.4.1, it is recommended that the City split out the reserve fund to reflect the area-specific charges.

Although the D.C. charge will be lower in the combined sewer system for the stormwater component, landowners are required to pay for additional on-site works, and the relative reduction would assist in providing a more equitable cost for development in this area.

The following is a summary of the gross and net recoverable costs for the separated versus combined system based on Wood's assessment and all other adjustments:

Separated Sewer System	Gross Cost	Net D.C. Recoverable Cost
Future Capital Works	$681,578,067	$295,607,777
Stormwater Studies	$26,713,318	$25,769,918
Reserve Fund Adjustment	$6,211,845	$6,211,845
Provision for Stormwater Credits	$18,626,355	$18,626,355
Provision for Best Efforts Agreements	$952,693	$952,693
Outstanding Debt to Ontario Land Corp.	$1,404,656	$1,404,656
Existing Debt	$274,463	$274,463
Total	**$735,761,398**	**$348,847,708**

Combined Sewer System	Gross Cost	Net D.C. Recoverable Cost
Future Capital Works	$9,000,000	$9,000,000
Stormwater Studies	$7,876,682	$7,690,082
Outstanding Debt to Ontario Land Corp.	$1,902,094	$1,902,094
Reserve Fund Adjustment	$114,198	$114,198
Total	**$18,892,974**	**$18,706,374**

The costs for all stormwater services except facilities are shared 44%/56% between residential and non-residential based on the benefiting lands associated with the stormwater management works over the 13-year forecast period.

For stormwater facilities within the separated system, the costs identified are attributable 100% to residential development. Non-residential development is required to provide facilities as part of the local service policy.

The costs for stormwater in the combined system are attributable 100% to residential.

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Stormwater Works & Studies (excluding Facilities) - Within Separated Sewer System

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 44%	Non-Residential Share 56%
1	Open Watercourses - Channel System Improvements - Residential (Category A)	2019-2023	2,913,000	-		2,913,000	-		2,913,000	1,281,720	1,631,280
2	Open Watercourses - Channel System Improvements - Residential (Category A)	2024-2028	1,410,000	-		1,410,000	-		1,410,000	620,400	789,600
3	Open Watercourses - Channel System Improvements - Residential (Category A)	2029-2031	16,600,000	3,793,333		12,806,667	-		12,806,667	5,634,933	7,171,734
4	Open Watercourses - Channel System Improvements - Non-Residential (Category A)	2019-2023	1,590,000	-		1,590,000	795,000		795,000	349,800	445,200
5	Open Watercourses - Channel System Improvements - Non-Residential (Category A)	2029-2031	21,497,000	-		21,497,000	2,667,500		18,829,500	8,284,980	10,544,520
6	Off Site Erosion Works (Category B)	2019-2031	25,804,837	-		25,804,837	12,339,935		13,464,902	5,924,557	7,540,345
7	Oversizing of trunk sewers and culverts (Category D)	2019-2023	14,118,070	-		14,118,070	-		14,118,070	6,211,951	7,906,119
8	Oversizing of trunk sewers and culverts (Category D)	2024-2028	2,784,639	-		2,784,639	-		2,784,639	1,225,241	1,559,398
8	Culverts and Bridges not previously identified (Category E)	2019-2023	2,529,000	-		2,529,000	337,200		2,191,800	964,392	1,227,408
9	Culverts and Bridges not previously identified (Category E)	2024-2031	6,912,600	334,390		6,578,210	1,331,940		5,246,270	2,308,359	2,937,911
10	GRIDS Related Open Watercourses	2019-2031	19,497,638	4,716,709		14,780,929	-		14,780,929	6,503,609	8,277,320
11	Existing Debt on Growth Related Projects - Principal (Discounted)	2019-2031	212,923	-		212,923	-		212,923	93,686	119,237
12	Existing Debt on Growth Related Projects - Interest (Discounted)	2019-2031	61,539	-		61,539	-		61,539	27,077	34,462
13	Outstanding Debt to Ontario Land Corporation	2019-2031	1,404,656	-		1,404,656	-		1,404,656	618,049	786,607
14	Reserve Fund Adjustment		1,845,614			1,845,614	-		1,845,614	812,070	1,033,544
	Stormwater Studies:					-	-		-	-	-
15	Stormwater Management Monitoring (Separated System)	2019-2031	8,000,000	-		8,000,000	-		8,000,000	3,520,000	4,480,000

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Stormwater Works & Studies (excluding Facilities) - Within Separated Sewer System

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 44%	Non-Residential Share 56%
16	Specific Area Water Shed Master Plans for Separated System Area	2019-2031	3,750,000	-		3,750,000	-		3,750,000	1,650,000	2,100,000
17	Airport Block Servicing Studies (Separated System)	2019-2028	6,000,000	-		6,000,000	-		6,000,000	2,640,000	3,360,000
18	Cherry Beach EA & Preliminary Design Study (Lower Stoney Creek) (Separated System)	2022	500,000	-		500,000	-		500,000	220,000	280,000
19	Falkirk East Storm Drainage Study (Separated System)	2025	500,000	-		500,000	-		500,000	220,000	280,000
20	Stoney Creek Watercourse 6 Drainage Improvements Hwy. 8 to Lake Ontario (Separated System)	2019	1,500,000	-		1,500,000	-		1,500,000	660,000	840,000
21	Stoney Creek Watercourse 7 Drainage Improvements Upstream of Barton to Hwy. 8 (Separated System)	2020	750,000	-		750,000	-		750,000	330,000	420,000
22	Watercourse 10 - S.C.U.B.E. Drainage Improvement Study (Separated System)	2020	500,000	-		500,000	-		500,000	220,000	280,000
23	Stormwater Master Plan Update - City Wide (Proportion for Separated Sewer System)	2019	208,717	-		208,717	41,743		166,973	73,468	93,505
24	Stormwater Master Plan Update - City Wide (Proportion for Separated Sewer System)	2024	1,252,301	-		1,252,301	250,460		1,001,840	440,810	561,031
25	Stormwater Master Plan Update - City Wide (Proportion for Separated Sewer System)	2029	1,252,301	400,736		851,564	250,460		601,104	264,486	336,618
26	Unidentified Studies (Separated System)	2019-2031	2,500,000	-		2,500,000	-		2,500,000	1,100,000	1,400,000
	Total		**145,894,835**	**9,245,168**	**-**	**136,649,667**	**18,014,239**	**-**	**118,635,428**	**52,199,588**	**66,435,840**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Stormwater Facilities - Within Separated Sewer System

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 100%	Non-Residential Share 0%
1	Stormwater Management Quality/Quantity Facilities - Residential	2019-2023	89,997,369	-		89,997,369	-		89,997,000	89,997,000	-
2	Stormwater Management Quality/Quantity Facilities - Residential	2024-2031	89,686,075	-		89,686,075	5,922,300		83,764,000	83,764,000	-
3	Provision for Non-Residential Portion of Residential Ponds	2019-2031	(1,022,108)	-		(1,022,108)	-		(1,022,000)	(1,022,000)	-
4	Stormwater Management Quality/Quantity Facilities - Non-Residential	2019-2023	4,122,067	-		4,122,067	2,018,178	2,103,889	-	-	-
5	Stormwater Management Quality/Quantity Facilities - Non-Residential	2024-2031	103,879,110	-		103,879,110	675,200	103,203,910	-	-	-
6	Provision for Residential Portion of Non-Residential Ponds	2024-2031	651,896	-		651,896	-		652,000	652,000	-
7	GRIDS Related SWM Projects - Residential Portion	2019-2031	98,626,698	65,751,132		32,875,566	-		32,876,000	32,876,000	-
8	GRIDS Related SWM Projects - Non-Residential Portion	2019-2031	179,980,176	59,113,322		120,866,854	-	120,866,853	-	-	-
9	Provision for Stormwater Credits	2019-2031	18,626,355	-		18,626,355	-		18,626,355	18,626,355	-
10	Provision for Best Efforts Agreements	2019-2031	952,693	-		952,693	-		952,693	952,693	-
11	Reserve Fund Adjustment		4,366,231	-		4,366,231	-		4,366,231	4,366,231	-
	Total		**589,866,563**	**124,864,454**	**-**	**465,002,109**	**8,615,678**	**226,174,652**	**230,212,280**	**230,212,280**	**-**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Stormwater Facilities - Within Combined Sewer System

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 100%	Non-Residential Share 0%
1	Stormwater Management Quality/Quantity Facilities (Combined)	2024-2031	6,000,000	-		6,000,000	-		6,000,000	6,000,000	-
2	Oversizing of trunk sewers and culverts (Category D)	2019-2023	2,000,000	-		2,000,000	-		2,000,000	2,000,000	-
3	Oversizing of trunk sewers and culverts (Category D)	2024-2031	1,000,000	-		1,000,000	-		1,000,000	1,000,000	-
4	Outstanding Debt to Ontario Land Corporation	2019-2031	1,902,094	-		1,902,094	-		1,902,094	1,902,094	-
	Stormwater Studies:										
5	Specific Area Water Shed Master Plans for Combined Sewer Area	2019-2031	3,750,000	-		3,750,000	-		3,750,000	3,750,000	-
6	Ainslie Wood Westdale Stormwater Drainage Master Plan (Combined System)	2019	750,000	-		750,000	-		750,000	750,000	-
7	Ainsliewood/Westdale Neighbourhoods Class EA (Combined System)	2023	340,000	-		340,000	-		340,000	340,000	-
8	Unidentified Studies (Combined System)	2019-2031	2,500,000	-		2,500,000	-		2,500,000	2,500,000	-
9	Stormwater Master Plan Update - City Wide (Proportion for Combined Sewer System)	2019	41,283	-		41,283	8,257		33,027	33,027	-
10	Stormwater Master Plan Update - City Wide (Proportion for Combined Sewer System)	2024	247,699	-		247,699	49,540		198,160	198,160	-
11	Stormwater Master Plan Update - City Wide (Proportion for Combined Sewer System)	2029	247,699	79,264		168,436	49,540		118,896	118,896	-
12	Reserve Fund Adjustment		114,198	-		114,198	-		114,198	114,198	-
	Total		**18,892,974**	**79,264**	**-**	**18,813,711**	**107,336**	**-**	**18,706,374**	**18,706,374**	**-**

5.3.6 Water and Wastewater Services

GM BluePlan undertook a detailed review of the water and wastewater linear services required to service growth over the forecast period to 2031, details of their work is provided in Appendix F. Table 5-A provides a high-level summary of GM BluePlan's assessment by area throughout the City. In addition to the capital costs they provided, debt obligations and the balance in the City's D.C. reserve funds for water and wastewater services have been included in the summary.

For water services, a total gross cost of $353,669,700 has been identified for capital projects. Existing debt (discounted) on growth-related projects has been included in the D.C. calculation at an amount of $106,836. A provision of $626,489 for Best Efforts has also been included in the D.C. calculation. Future financing requirements have been identified by the City and is based on projects anticipated to be completed within the five-year period of the by-law at a term of 15 years and a rate of 5%. This results in the inclusion of $32,135,051 in the D.C. for discounted interest. Deductions to the gross cost include a post period benefit of $78,772,420, a benefit to existing development of $31,590,500 and $9,870,000 has been identified as costs that are the direct responsibility of developers as per the City's local service policy. The surplus in the water D.C. reserve fund of $26,181,280 has also been deducted from the D.C. calculations. The result of these deductions is a net growth-related cost of $240,123,876 eligible for D.C. funding.

The total program for linear wastewater services, provides for a gross capital cost of $266,383,000. An additional $400,431 has been included to reflect the existing debt on growth related wastewater projects. Similar to water services, the need for future financing has been identified at an amount of $36,844,849 for projects that are anticipated to be completed within the five-year period of the by-law, at an interest rate of 5% and a 15-year term. A Best Efforts provision of $332,308 has also been included in the D.C. calculation. From the gross amount, deductions have been made to recognize works that will benefit growth in the post 2031 period at an amount of $40,170,200, works that provide a benefit to existing totaling $26,169,750 and direct developer contributions totalling $9,466,000. With a deduction to recognize the D.C. reserve fund deficit of $44,582,713, the net growth-related costs for inclusion in the D.C. calculations is $272,737,351.

The upgrades and expansion to the Woodward Wastewater Treatment Plant include works related to water quality, a plant expansion and a Biosolids management facility (summarized in Table 5-B). The cost of these works totals $927,653,374. The City has been successful in receiving $274,326,078 of grant funding from both the Provincial and Federal governments. The water quality and Biosolids Management facility will also benefit existing development and therefore, a deduction of $295,267,624 has been made. Updated projections based on recent flow measurement at the W.W.T.P. identified there would be some post period benefit beyond the 2031 forecast period. A 25% post period benefit was applied to these projects resulting in a $89,514,918 deduction. The City's wastewater treatment D.C. reserve fund, of $64,665,961 has also been deducted from the gross cost of the projects. The net growth-related costs for inclusion in the D.C. calculations is therefore $203,878,794.

The growth-related costs have been allocated between residential and non-residential development based on flow requirements which results in a 63% allocation to residential and a 37% allocation to non-residential.

Table 5-A

Linear Water and Wastewater Programs	Gross Estimated Cost	Post Period Benefit	Existing Benefit	Direct Developer Contribution	Reserve Fund Balance	Net Growth Related Cost
Water:						-
Ancaster Water Distribution System	31,804,000	672,500	7,402,000	-		23,729,500
Waterdown Water Distribution System	20,414,000	811,000	3,554,000	408,000		15,641,000
Binbrook Water Distribution System	11,465,000	-	-	729,000		10,736,000
A.E.G.D./Mount Hope Water Distribution System	15,941,000	-	-	3,636,000		12,305,000
Hamilton Mountain Water Distribution System	50,778,700	6,636,970	-	1,492,000		42,649,730
Stoney Creek Upper Water Distribution System	102,855,000	30,015,250	5,217,500	3,605,000		64,017,250
Stoney Creek Lower Water Distribution System	8,670,000	-	-	-		8,670,000
City Wide Water Distribution System	111,742,000	5,636,700	15,417,000	-		90,688,300
Existing Debt (Discounted)	106,836	-	-	-		106,836
New Growth Related Financing (Discounted)	32,135,051	-	-	-		32,135,051
Best Efforts Provision	626,489	-	-	-		626,489
Provisional Post Period Benefit Deduction	-	35,000,000	-	-		(35,000,000)
Reserve Fund Balance					26,181,280	(26,181,280)
Total Water	**386,538,076**	**78,772,420**	**31,590,500**	**9,870,000**	**26,181,280**	**240,123,876**
Wastewater:						-
Ancaster Sanitary Sewage System	3,090,000	741,000	-	838,000		1,511,000
Waterdown Sanitary Sewage System	11,719,000	300,800	7,322,000	714,000		3,382,200
Binbrook Sanitary Sewage System	2,406,000	-	-	619,000		1,787,000
A.E.G.D./Mount Hope Sanitary Sewage System	31,659,000	-	-	3,294,000		28,365,000
Hamilton Mountain Sanitary Sewage System	90,365,000	8,840,000	-	532,000		80,993,000
Stoney Creek Upper Sanitary Sewage System	30,084,000	18,279,000	-	3,107,000		8,698,000
Stoney Creek Lower Sanitary Sewage System	27,298,000	2,009,400	184,000	362,000		24,742,600
City Wide Sanitary Sewage System	69,762,000	-	18,663,750	-		51,098,250
Existing Debt (Discounted)	400,431	-	-	-		400,431
New Growth Related Financing (Discounted)	36,844,849	-	-	-		36,844,849
Best Efforts Provision	332,308	-	-	-		332,308
Provisional Post Period Benefit Deduction	-	10,000,000	-	-		(10,000,000)
Reserve Fund Balance					(44,582,713)	44,582,713
Total Wastewater	**303,960,588**	**40,170,200**	**26,169,750**	**9,466,000**	**(44,582,713)**	**272,737,351**
Total Water & Wastewater	**690,498,664**	**118,942,620**	**57,760,250**	**19,336,000**	**(18,401,433)**	**512,861,227**

Table 5-B

Wastewater Facilities	Gross Capital Cost	Grants	Post Period Benefit	Existing Benefit	Reserve Fund Balance	Net Growth Related Cost
Water Quaility	531,839,374	260,026,078	11,411,201	226,168,493		34,233,602
Plant Expansion	296,374,000	-	74,093,500	-		222,280,500
Biosolids Management Facility	99,440,000	14,300,000	4,010,217	69,099,130		12,030,652
Reserve Fund Balance					64,665,961	(64,665,961)
Total Capital Costs	**927,653,374**	**274,326,078**	**89,514,918**	**295,267,624**	**64,665,961**	**203,878,794**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Water Services

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 63%	Non-Residential Share 37%
1	Ancaster Water Distribution System	2019-2023	31,804,000	672,500		31,131,500	7,402,000		23,729,500	14,949,585	8,779,915
2	Waterdown Water Distribution System	2019-2023	20,414,000	811,000		19,603,000	3,554,000	408,000	15,641,000	9,853,830	5,787,170
3	Binbrook Water Distribution System	2019-2023	11,465,000	-		11,465,000	-	729,000	10,736,000	6,763,680	3,972,320
4	AEGD/Mount Hope Water Distribution System	2019-2023	761,000	-		761,000	-		761,000	479,430	281,570
5	AEGD/Mount Hope Water Distribution System	2024-2031	15,180,000	-		15,180,000	-	3,636,000	11,544,000	7,272,720	4,271,280
6	Hamilton Mountain Water Distribution System	2019-2023	48,495,700	6,636,970		41,858,730	-	1,277,000	40,581,730	25,566,490	15,015,240
7	Hamilton Mountain Water Distribution System	2024-2031	2,283,000	-		2,283,000	-	215,000	2,068,000	1,302,840	765,160
8	Stoney Creek Upper Water Distribution System	2019-2023	39,036,000	2,705,250		36,330,750	5,217,500	498,000	30,615,250	19,287,608	11,327,643
9	Stoney Creek Upper Water Distribution System	2024-2031	63,819,000	27,310,000		36,509,000	-	3,107,000	33,402,000	21,043,260	12,358,740
10	Stoney Creek Lower Water Distribution System	2019-2023	1,353,000	-		1,353,000	-		1,353,000	852,390	500,610
11	Stoney Creek Lower Water Distribution System	2024-2031	7,317,000	-		7,317,000	-		7,317,000	4,609,710	2,707,290
12	City Wide Water Distribution System	2019-2023	92,448,000	5,636,700		86,811,300	7,917,000		78,894,300	49,703,409	29,190,891
13	City Wide Water Distribution System	2024-2031	19,294,000	-		19,294,000	7,500,000		11,794,000	7,430,220	4,363,780
14	Existing Debt Principal (Discounted)	2019-2023	98,608	-		98,608	-		98,608	62,123	36,485
15	Existing Debt Interest (Discounted)	2019-2023	8,228	-		8,228	-		8,228	5,183	3,044
16	Growth Related Financing Costs (Discounted)	2019-2034	32,135,051	-		32,135,051	-		32,135,051	20,245,082	11,889,969
17	Best Effort Provision	2019-2031	626,489	-		626,489	-		626,489	394,688	231,801
18	Provisional Post Period Benefit Deduction	2019-2031		35,000,000		(35,000,000)	-		(35,000,000)	(22,050,000)	(12,950,000)
19	Reserve Fund Adjustment		-	-		-	26,181,280		(26,181,280)	(16,494,206)	(9,687,073)
	Total		**386,538,076**	**78,772,420**	**-**	**307,765,656**	**57,771,780**	**9,870,000**	**240,123,876**	**151,278,042**	**88,845,834**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Wastewater - Sewers

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 63%	Non-Residential Share 37%
1	Ancaster Sanitary Sewage System	2019-2023	3,090,000	741,000		2,349,000	-	838,000	1,511,000	951,930	559,070
2	Waterdown Sanitary Sewage System	2019-2023	11,719,000	300,800		11,418,200	7,322,000	714,000	3,382,200	2,130,786	1,251,414
3	Binbrook Sanitary Sewage System	2019-2023	2,406,000	-		2,406,000	-	619,000	1,787,000	1,125,810	661,190
4	AEGD/Mount Hope Sanitary Sewage System	2019-2023	18,910,000	-		18,910,000	-		18,910,000	11,913,300	6,996,700
5	AEGD/Mount Hope Sanitary Sewage System	2024-2031	12,749,000	-		12,749,000	-	3,294,000	9,455,000	5,956,650	3,498,350
6	Hamilton Mountain Sanitary Sewage System	2019-2023	90,297,000	8,840,000		81,457,000	-	532,000	80,925,000	50,982,750	29,942,250
7	Hamilton Mountain Sanitary Sewage System	2024-2031	68,000	-		68,000	-		68,000	42,840	25,160
8	Stoney Creek Upper Sanitary Sewage System	2019-2023	2,389,000	-		2,389,000	-		2,389,000	1,505,070	883,930
9	Stoney Creek Upper Sanitary Sewage System	2024-2031	27,695,000	18,279,000		9,416,000	-	3,107,000	6,309,000	3,974,670	2,334,330
10	Stoney Creek Lower Sanitary Sewage System	2019-2023	27,298,000	2,009,400		25,288,600	184,000	362,000	24,742,600	15,587,838	9,154,762
11	City Wide Sanitary System	2019-2023	47,106,000	-		47,106,000	11,163,750	-	35,942,250	22,643,618	13,298,633
12	City Wide Sanitary System	2024-2031	22,656,000	-		22,656,000	7,500,000	-	15,156,000	9,548,280	5,607,720
13	Existing Debt Principal	2019-2023	369,593	-		369,593	-		369,593	232,844	136,749
14	Existing Debt Interest (Discounted)	2019-2023	30,838	-		30,838	-		30,838	19,428	11,410
15	Financing (Linear) (Interest Discounted)	2019-2034	36,844,849	-		36,844,849	-		36,844,849	23,212,255	13,632,594
16	Best Effort Provision	2019-2031	332,308	-		332,308	-		332,308	209,354	122,954
17	Provisional Post Period Benefit Deduction	2019-2031		10,000,000		(10,000,000)	-		(10,000,000)	(6,300,000)	(3,700,000)
18	Reserve Fund Adjustment		44,582,713			44,582,713	-		44,582,713	28,087,109	16,495,604
	Total		**348,543,301**	**40,170,200**	**-**	**308,373,101**	**26,169,750**	**9,466,000**	**272,737,351**	**171,824,531**	**100,912,820**

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Wastewater Facilities

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 63%	Non-Residential Share 37%
	Water Quality:										
1	Wastewater Pumping Station	2019-2021	95,974,275	1,836,314		94,137,961	31,641,096	56,987,925	5,508,941	3,470,633	2,038,308
2a	Primary Clarifier - Primary Treatment (Phase 1 - CEPT) - Engineering Included	2019-2021	16,255,669	520,971		15,734,698	8,976,738	5,195,046	1,562,914	984,636	578,278
2b	Primary Clarifier - Primary Treatment (Phase 2 - Tanks) - Engineering Included	2019-2021	52,246,549	820,296		51,426,253	14,134,332	34,831,033	2,460,888	1,550,360	910,529
2c	Primary Clarifier - Other Costs (includes New/Expanded Laboratory/Admin Building)	2019-2021	11,857,782	1,568,785		10,288,997	5,582,644		4,706,354	2,965,003	1,741,351
4a	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 1)	2019-2021	134,908,478	1,375,990		133,532,488	52,072,583	77,331,936	4,127,969	2,600,621	1,527,349
5b	Chlorine Contact Tank and Outfall - Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	2019-2021	43,246,869	997,717		42,249,152	16,081,115	23,174,887	2,993,150	1,885,684	1,107,465
8a	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	2019-2021	24,810,804	913,658		23,897,146	21,156,173		2,740,974	1,726,813	1,014,160
8b	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 2	2019-2021	25,573,521	941,745		24,631,776	21,806,541		2,825,235	1,779,898	1,045,337
8d	Plant Expansion - Engineering - Other Costs (includes WWE Modular Office Building)	2019-2021	8,428,089	310,364		8,117,725	7,186,631		931,093	586,589	344,504
11a	Biogas Digester - Biogas Upgrades	2019-2021	45,005,784	805,742		44,200,042	21,782,816	20,000,000	2,417,226	1,522,852	894,374
13a	Electrical System Upgrades - New Electrical and power systems - Phase 1	2019-2021	63,202,719	1,319,620		61,883,099	22,202,990	35,721,251	3,958,859	2,494,081	1,464,778
14	Collection System Upgrades	2019-2021	10,328,835	-		10,328,835	3,544,835	6,784,000	-	-	-

Infrastructure Costs Covered in the D.C. Calculation

City of Hamilton
Service: Wastewater Facilities

Project Number	Increased Service Needs Attributable to Anticipated Development 2019-2031	Timing (year)	Gross Capital Cost Estimate (2019$)	Post Period Benefit	Other Deductions	Net Capital Cost	Less:		Potential D.C. Recoverable Cost		
							Benefit to Existing Development	Grants, Subsidies and Other Contributions Attributable to New Development	Total	Residential Share 63%	Non-Residential Share 37%
	Plant Expansion:		-	-							
4b	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 2)	2025-2031	224,800,000	56,200,000		168,600,000	-		168,600,000	106,218,000	62,382,000
8c	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 3	2025-2031	28,300,000	7,075,000		21,225,000	-		21,225,000	13,371,750	7,853,250
11b	Biogas Digester - Digesters Upgrades	2025-2031	8,430,000	2,107,500		6,322,500	-		6,322,500	3,983,175	2,339,325
13b	Electrical System Upgrades - New Electrical and power systems - Phase 2	2025-2031	34,844,000	8,711,000		26,133,000	-		26,133,000	16,463,790	9,669,210
	Biosolids Management Facility:										
12	Biosolids Management Facility - Biosolids Thermal Reduction Disposal Facility	2019-2021	99,440,000	4,010,217		95,429,783	69,099,130	14,300,000	12,030,652	7,579,311	4,451,341
	Reserve Fund Adjustment		-	-		-	64,665,961		(64,665,961)	(40,739,555)	(23,926,405)
	Total		**927,653,374**	**89,514,918**	**-**	**838,138,456**	**359,933,584**	**274,326,078**	**203,878,794**	**128,443,640**	**75,435,154**

5.4 Special Area Charges

At present, there are two special area charges in effect which provide for the specific recovery of works which were built by the landowners and would require recovery from development within those areas. Both of these agreements provide for interest to be calculated and recovered in conjunction with the original principal amount. The provisions of these agreements, along with the recalculation of the charges are provided herein.

5.4.1 Dundas/Waterdown Special Area Charge

A financial agreement was entered into with landowners for the construction of wastewater services (Equalization Tank, diversion forcemain and sanitary sewers) which would benefit both Waterdown and Dundas (map of area is provided in Figure 5-1). The total recoverable cost of the work was $8,150,147. The interest rate calculation as provided for in the agreement was based on prime commercial plus one percent (7.65% at the time of signing). The term on which the calculation was based was a fifteen-year term. In 2018, the City paid off the outstanding balance and has been cash-flowing this amount internally at a rate of 4%. It is anticipated the developments related to this charge will not be fully complete until 2031. As such, the calculations have been updated to include the outstanding balance and interest anticipated over the five-year term of this by-law.

Figure 5-1
Dundas/Waterdown Special Area Charge Map

The original calculation split the total recoverable cost of the work between residential and non-residential development on a 64/36 basis. The residential/non-residential split remains the same for the 2019 D.C. study.

The original calculation was based on 6,100 single detached equivalent (S.D.E.) units, of which 3,245.91 S.D.E. have been collected on. Therefore, the remaining balance to be recovered will be spread over the remaining 2,854.09 S.D.E. units. Further, the non-

residential portion will be spread over the same basis as the original charge, based on the projected non-residential growth in square feet remaining of 3,049,992.

Based on information and calculations provided by City staff, the recalculated interest owing is $1,145,747. Based on these current figures the special area charge is as follows:

Current Outstanding Balance	$7,642,871
Interest over the 13 year term	$1,145,747
Total	$8,788,618
Residential Share (64%)	$5,624,716
Remaining SDE	2,854.09
Residential Special Area Charge (as of 2019)	**$1,971**
Non-Residential Share (36%)	$3,163,903
Non-Residential sq.ft. Growth Projection (Remaining)	3,049,992
Special Area Charge per sq.ft. (as of 2019)	**$1.04**

As the residential charge is based on a single detached unit, the following charges for all unit types are provided based upon the person per unit relationship discussed in Appendix A:

	Single Detached Equivalent based on P.P.U.	D.C.
Single/Semi-detached units	1.00	$1,971
Apartments - 2 bedrooms or more	0.59	$1,154
Apartments - less than 2 bedrooms	0.40	$789
Other Multiples	0.72	$1,410
Residential Facility Dwelling Units	0.32	$637

5.4.2 Binbrook Special Area Charge

The Binbrook special area charge provided for the recovery of water and wastewater projects, but as all of the anticipated development in this area has occurred, this charge will no longer be calculated and included in the D.C.

Chapter 6
D.C. Calculation

6. D.C. Calculation

Table 6-1 calculates the proposed area specific D.C.s to be imposed for stormwater within the combined sewer system area, and Table 6-2 calculates the area specific stormwater charge within the separated sewer system area, both based on an urban 13-year horizon. Table 6-3 calculates the proposed D.C. to be imposed for infrastructure services based upon an urban 13-year horizon (wastewater and water). Table 6-4 calculates the proposed uniform D.C. to be imposed on anticipated development in the City for City-wide services over a 13-year planning horizon. Table 6-5 calculates the proposed uniform D.C. to be imposed on anticipated development in the City for City-wide services over a 10-year planning horizon

The calculation for residential development is generated on a per capita basis and is based upon five forms of housing types (single and semi-detached, apartments 2-bedrooms+, apartments bachelor and 1-bedroom, residential facilities and all other multiples). The non-residential D.C. has been calculated on a per sq.ft. of gross floor area basis for all types of non-residential development (industrial, commercial and institutional).

The D.C.-eligible costs for each service component were developed in Chapter 5 for all City services, based on their proposed capital programs.

For the residential calculations, the total cost is divided by the "gross" (new resident) population to determine the per capita amount. The eligible D.C. cost calculations set out in Chapter 5 are based on the net anticipated population increase (the forecast new unit population less the anticipated decline in existing units). The cost per capita is then multiplied by the average occupancy of the new units (Appendix A, Schedule 5) to calculate the charge in Tables 6-1 through 6-5.

With respect to non-residential development, the total costs in the uniform charge allocated to non-residential development (based on need for service) have been divided by the anticipated development over the planning period to calculate a cost per sq.ft. of gross floor area.

Table 6-6 summarizes the total D.C. that is applicable for all municipal services and Table 6-7 summarizes the gross capital expenditures and sources of revenue for works to be undertaken during the 5-year life of the by-law.

The area specific D.C. calculations for Waterdown/Dundas have been provided for in Chapter 5, section 5.4.1.

Table 6-1
Development Charge Calculation
Area-Specific Services – Combined Sewer System
2019 to 2031

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
1. Stormwater Drainage and Control Services				
1.1 Stormwater Facilities	18,706,374	-	3,948	-
	18,706,374	-	3,948	-
TOTAL	**$18,706,374**	**$0**	**$3,948**	**$0.00**
D.C.-Eligible Capital Cost	$18,706,374	$0		
Urban (13 Year) Gross Population/GFA Growth (sq.ft,)	16,132	8,031,700		
Cost Per Capita/Non-Residential GFA (sq.ft.)	**$1,159.58**	**$0.00**		
By Residential Unit Type **P.P.U.**				
Single and Semi-Detached Dwelling 3.41	$3,948			
Apartments - 2 Bedrooms + 1.99	$2,312			
Apartments - Bachelor and 1 Bedroom 1.36	$1,582			
Other Multiples 2.44	$2,826			
Residential Facility 1.10	$1,276			

Table 6-2
Development Charge Calculation
Area Specific Services – Separated Sewer System (Other Built Boundary & Greenfield)
2019 to 2031

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
1. Stormwater Drainage and Control Services				
1.1 Channels, drainage and studies	52,199,588	66,435,840	1,934	2.16
1.2 Residential Ponds	230,212,280	-	8,528	-
	282,411,868	66,435,840	10,462	2.16
TOTAL	**282,411,868**	**$66,435,840**	**10,462**	**2.16**
D.C.-Eligible Capital Cost	282,411,868	$66,435,840		
Urban (13 Year) Gross Population/GFA Growth (sq.ft,)	91,917	30,726,700		
Cost Per Capita/Non-Residential GFA (sq.ft.)	**$3,072.47**	**$2.16**		
By Residential Unit Type **P.P.U.**				
Single and Semi-Detached Dwelling 3.41	$10,462			
Apartments - 2 Bedrooms + 1.99	$6,126			
Apartments - Bachelor and 1 Bedroom 1.36	$4,191			
Other Multiples 2.44	$7,488			
Residential Facility 1.10	$3,380			

Table 6-3
Development Charge Calculation
Area-Specific Services – Water & Wastewater Services (Urban)
2019 to 2031

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
2. Wastewater Services				
2.1 Wastewater Facilities	128,443,640	75,435,154	4,048	1.95
2.2 Wastewater Linear Services	171,824,531	100,912,820	5,415	2.60
	300,268,171	176,347,974	9,463	4.55
3. Water Services				
3.1 Facilities, Storage and Distribution systems	151,278,042	88,845,834	4,767	2.29
	151,278,042	88,845,834	4,767	2.29
TOTAL	**451,546,213**	**265,193,808**	**$14,230**	**6.84**
D.C.-Eligible Capital Cost	$451,546,213	$265,193,808		
Urban (13 Year) Gross Population/GFA Growth (sq.ft,)	108,049	38,758,400		
Cost Per Capita/Non-Residential GFA (sq.ft.)	**$4,179.09**	**$6.84**		

By Residential Unit Type	P.P.U.	
Single and Semi-Detached Dwelling	3.41	$14,230
Apartments - 2 Bedrooms +	1.99	$8,333
Apartments - Bachelor and 1 Bedroom	1.36	$5,700
Other Multiples	2.44	$10,184
Residential Facility	1.10	$4,597

Table 6-4
Development Charge Calculation
City-Wide Services
2019 to 2031

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
4. Services Related to a Highway				
4.1 Services Related to a Highway	346,183,949	314,715,092	10,769	8.05
5. Public Works Facilities, Vehicles & Equipment				
5.1 Facilities	16,406,222	10,055,426	510	0.26
5.2 Vehicles & Equipment	8,810,748	5,400,136	274	0.15
	25,216,971	15,455,563	784	0.41
6. Fire Protection Services				
6.1 Fire facilities, vehicles & equipment	14,836,939	9,093,608	462	0.23
	14,836,939	9,093,608	462	0.23
7. Police Services				
7.1 Police facilities, vehicles & equipment	16,848,644	10,326,588	524	0.26
	16,848,644	10,326,588	524	0.26
TOTAL	**$403,086,503**	**$349,590,851**	**$12,539**	**$8.95**
D.C.-Eligible Capital Cost	$403,086,503	$349,590,851		
13-Year Gross Population/GFA Growth (sq,ft,)	109,455	39,111,300		
Cost Per Capita/Non-Residential GFA (sq.ft.)	**$3,682.67**	**$8.94**		

By Residential Unit Type	**P.P.U.**	
Single and Semi-Detached Dwelling	3.41	$12,539
Apartments - 2 Bedrooms +	1.99	$7,343
Apartments - Bachelor and 1 Bedroom	1.36	$5,023
Other Multiples	2.44	$8,975
Residential Facility	1.10	$4,051

Table 6-5
Development Charge Calculation
City-Wide Services
2019 to 2028

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
8. Transit Services				
8.1 Transit facilities, vehicles and other infrastructure	48,046,855	28,217,994	1,917	0.98
	48,046,855	28,217,994	1,917	0.98
9. Other Transportation Services				
9.1 Parking services	12,290,688	7,218,340	490	0.25
9.2 Airport lands	10,494,005	6,163,146	419	0.21
	22,784,693	13,381,486	909	0.46
10. Parkland Development				
10.1 Parkland development, amenities, trails, vehicles & equipment	58,944,902	3,102,363	2,352	0.11
	58,944,902	3,102,363	2,352	0.11
11. Indoor Recreation Services				
11.1 Recreation facilities, vehicles & equipment	111,007,307	5,842,490	4,430	0.20
	111,007,307	5,842,490	4,430	0.20
12. Library Services				
12.1 Library facilities and vehicles	23,415,983	1,232,420	934	0.04
12.2 Library materials	2,784,436	146,549	111	0.01
	26,200,419	1,378,969	1,045	0.05
13. Administrative Studies				
13.1 Administrative Studies - Community Based Studies	8,278,710	4,862,100	330	0.17
13.2 Administrative Studies - Engineering Services Studies	4,153,402	2,439,299	166	0.08
	12,432,112	7,301,399	496	0.25
14. Long Term Care				
14.1 Long Term Care Facilities	3,126,267	347,363	125	0.01
	3,126,267	347,363	125	0.01
15. Social & Child Services				
15.1 Social and Child Services Facilities	373,841	41,538	15	-
	373,841	41,538	15	-
16. Health Services				
16.1 Health department space	21,868	2,430	1	-
17. Provincial Offences Administration				
17.1 P.O.A. facilities	1,003,680	589,463	40	0.02
18. Social Housing				
18.1 Social housing facilities	16,239,109	-	648	-
19. Paramedics				
19.1 Paramedics facilities	1,974,810	219,423	79	0.02
19.2 Vehicles & Equipment	1,453,626	161,514	58	0.01
	3,428,436	380,937	137	0.03

Table 6-5 Continued
Development Charge Calculation
City-Wide Services
2019 to 2028

SERVICE	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
20. Waste Diversion				
20.1 Waste diversion facilites, vehicles, equipment and other	16,475,018	3,374,401	657	0.13
	16,475,018	3,374,401	657	0.13
TOTAL	**320,084,505**	**63,960,834**	**$12,772**	**$2.23**
D.C.-Eligible Capital Cost	$320,084,505	$63,960,834		
10-Year Gross Population/GFA Growth (sq,ft,)	85,329	28,791,900		
Cost Per Capita/Non-Residential GFA (sq.ft.)	**$3,751.18**	**$2.23**		
By Residential Unit Type P.P.U.				
Single and Semi-Detached Dwelling 3.41	$12,772			
Apartments - 2 Bedrooms + 1.99	$7,480			
Apartments - Bachelor and 1 Bedroom 1.36	$5,117			
Other Multiples 2.44	$9,142			
Residential Facility 1.10	$4,126			

Table 6-6
Development Charge Calculation
Total Cost for All Services

	2019$ D.C.-Eligible Cost		2019$ D.C.-Eligible Cost	
	Residential	Non-Residential	SDU	per ft²
	$	$	$	$
Urban-wide Services 13 Year (Within Combined Sewer System)	470,252,587	265,193,808	18,178	$6.85
Urban-wide Services 13 Year (Within Separated Sewer System)	733,958,081	331,629,648	24,692	9.01
City-Wide Services 13 Year	403,086,503	349,590,851	12,539	8.95
City-wide Services 10 Year	320,084,505	63,960,834	12,772	2.23
TOTAL COMBINED SEWER SYSTEM	**$1,193,423,596**	**$678,745,492**	**$43,489**	**$18.02**
TOTAL SEPARATED SEWER SYSTEM	**$1,457,129,089**	**$745,181,332**	**$50,003**	**20.18**

Table 6-7
Cost to be Incurred Over the Life of the D.C. By-law

Service	Total Gross Cost	Sources of Financing						
		Tax Base or Other Non-D.C. Source				Post D.C. Period Benefit	D.C. Reserve Fund	
		Other Deductions	Benefit to Existing	Other Funding	Legislated Reduction		Residential	Non-Residential
1. Stormwater Drainage and Control Services (Combined Sewer System)								
1.1 Stormwater Facilities	5,535,129	0	8,257	0	0	0	5,526,873	0
1. Stormwater Drainage and Control Services (Separated Sewer System)								
1.1 Channels, drainage and studies	50,513,585	0	5,920,072	0	0	1,814,119	18,822,933	23,956,460
1.2 Residential Ponds	201,275,926	0	2,018,178	48,591,140	0	48,024,790	102,641,615	0
2. Wastewater Services								
2.1 Wastewater Facilities	631,279,374	0	295,267,624	274,326,078	0	15,421,418	29,146,480	17,117,774
2.2 Wastewater Linear Services	203,215,000	0	18,669,750	3,065,000	0	11,891,200	106,841,102	62,747,949
3. Water Services								
3.1 Facilities, Storage and Distribution systems	245,776,700	0	24,090,500	2,912,000	0	16,462,420	127,456,421	74,855,359
4. Services Related to a Highway								
4.1 Services Related to a Highway	466,160,359	0	73,493,504	0	0	21,585,530	195,428,662	175,652,662
5. Public Works Facilities, Vehicles & Equipment								
5.1 Facilities	27,498,731	0	10,866,800	0	593,438	0	9,943,866	6,094,627
5.2 Vehicles & Equipment	7,430,738	0	8,212	0	313,925	0	4,407,333	2,701,269
6. Fire Protection Services								
6.1 Fire facilities, vehicles & equipment	18,678,500	0	3,342,275	0	0	0	9,508,460	5,827,766
7. Police Services								
7.1 Police facilities, vehicles & equipment	35,328,169	0	16,257,400	0	0	339,008	11,613,692	7,118,069
8. Transit Services								
8.1 Transit facilities, vehicles and other infrastructure	380,013,550	22,270,000	183,095,900	108,800,000	0	12,225,050	33,782,238	19,840,362
9. Other Transportation Services								
9.1 Parking services	6,475,000	0	883,500	0	559,150	0	3,170,381	1,861,970
9.2 Airport lands	14,000,000	0	0	0	1,400,000	0	7,938,000	4,662,000
10. Parkland Development								
10.1 Parkland development, amenities, trails, vehicles & equipment	97,856,033	0	31,144,600	0	5,051,135	16,200,080	43,187,207	2,273,011
11. Indoor Recreation Services								
11.1 Recreation facilities, vehicles & equipment	64,781,667	0	4,420,000	0	6,036,167	0	51,609,225	2,716,275
12. Library Services								
12.1 Library facilities and vehicles	19,224,000	0	7,893,100	1,250,000	1,008,090	0	8,619,170	453,641
12.2 Library materials	1,915,400	0	0	0	191,540	0	1,637,667	86,193
13. Administrative Studies								
13.1 Administrative Studies - Community Based Studies	14,629,667	0	3,734,900	0	1,089,477	0	6,177,333	3,627,957
13.2 Administrative Studies - Engineering Services Studies	5,594,833	0	250,100	0	371,010	0	3,133,446	1,840,278

Table 6-7
Cost to be Incurred Over the Life of the D.C. By-law

Service	Total Gross Cost	Sources of Financing						
		Tax Base or Other Non-D.C. Source				Post D.C. Period Benefit	D.C. Reserve Fund	
		Other Deductions	Benefit to Existing	Other Funding	Legislated Reduction		Residential	Non-Residential
14. Long Term Care								
14.1 Long Term Care Facilities	11,850,000	0	6,140,000	2,640,000	307,000	0	2,486,700	276,300
15. Social and Child Services								
15.1 Social and Child Services Facilities	2,000,000	0	0	2,000,000	0	0	0	0
16. Health Services								
16.1 Health department space	0	0	0	0	0	0	0	0
17. Provincial Offences Administration								
17.1 P.O.A. facilities	0	0	0	0	0	0	0	0
18. Social Housing								
18.1 Social housing facilities	282,848,000	0	237,607,200	5,900,000	2,577,830	13,562,500	23,200,470	0
19. Paramedics								
19.1 Paramedics facilities	2,200,000	0	0	0	68,000	1,520,000	550,800	61,200
19.2 Vehicles & Equipment	1,715,000	0	0	0	171,500	0	1,389,150	154,350
20. Waste Diversion								
20.1 Waste diversion facilites, vehicles, equipment and other	51,427,950	8,922,195	21,171,500	0	1,828,226	3,052,000	13,656,844	2,797,185
Total Expenditures & Revenues	**$2,849,223,312**	**$31,192,195**	**$946,283,371**	**$449,484,218**	**$21,566,486**	**$162,098,114**	**$821,876,068**	**$416,722,656**

Chapter 7
D.C. Policy Recommendations and D.C. By-law Rules

7. D.C. Policy Recommendations and D.C. By-law Rules

7.1 Introduction

Subsection 5 (1) 9 states that rules must be developed:

> "...to determine if a development charge is payable in any particular case and to determine the amount of the charge, subject to the limitations set out in subsection 6."

Paragraph 10 of the section goes on to state that the rules may provide for exemptions, phasing in and/or indexing of D.C.s.

Subsection 5 (6) establishes the following restrictions on the rules:

- the total of all D.C.s that would be imposed on anticipated development must not exceed the capital costs determined under 5(1) 2-8 for all services involved;
- if the rules expressly identify a type of development, they must not provide for it to pay D.C.s that exceed the capital costs that arise from the increase in the need for service for that type of development; however, this requirement does not relate to any particular development; and
- if the rules provide for a type of development to have a lower D.C. than is allowed, the rules for determining D.C.s may not provide for any resulting shortfall to be made up via other development.

With respect to "the rules," Section 6 states that a D.C. by-law must expressly address the matters referred to above re s. 5 (1) paragraphs 9 and 10, as well as how the rules apply to the redevelopment of land.

The rules provided are based on the City's existing policies; however, there are items under consideration at this time and these may be refined prior to adoption of the by-law.

7.2 D.C. By-law Structure

It is recommended that:

- the City uses a uniform City-wide D.C. calculation for all Municipal services except water, wastewater and stormwater services and the works included in the Dundas/Waterdown area-specific charges;
- water and wastewater services, be imposed on the urban service areas of the City;
- stormwater services be imposed on an area-specific basis for the combined sewer system versus the separated sewer system area;
- Dundas/Waterdown area-specific D.C.s continue; and
- one Municipal D.C. by-law be used for all services, except GO Transit;

7.3 D.C. By-law Rules

The following subsections set out the recommended rules governing the calculation, payment and collection of D.C.s in accordance with Section 6 of the D.C.A.

It is recommended that the following sections provide the basis for the D.C.s:

7.3.1 Payment in any Particular Case

In accordance with the D.C.A., s.2(2), a D.C. be calculated, payable and collected where the development requires one or more of the following:

a) the passing of a zoning by-law or of an amendment to a zoning by-law under section 34 of the Planning Act;

b) the approval of a minor variance under section 45 of the Planning Act;

c) a conveyance of land to which a by-law passed under section 50(7) of the Planning Act applies;

d) the approval of a plan of subdivision under section 51 of the Planning Act;

e) a consent under section 53 of the Planning Act;

f) the approval of a description under section 50 of the Condominium Act; or

g) the issuing of a building permit under the Building Code Act in relation to a building or structure.

7.3.2 Determination of the Amount of the Charge

The following conventions be adopted:

1) Costs allocated to residential uses will be assigned to different types of residential units based on the average occupancy for each housing type constructed during the previous decade. Costs allocated to non-residential uses will be assigned based on the amount of square feet of gross floor area constructed for eligible uses (i.e. industrial, commercial and institutional).

2) Costs allocated to residential and non-residential uses are based upon a number of conventions, as may be suited to each municipal circumstance, e.g.

    - for Administrative Studies – Engineering Services Studies, Administrative Studies – Community Based Studies, Transit, Parking, Airport, P.O.A., the costs have been based on a population vs. employment growth ratio (63%/37%) for residential and non-residential, respectively) over the 10-year forecast period;
    - for Fire, Police and Public Works facilities, fleet and equipment the costs have been based on a population vs. employment growth ratio (62%/38%) for residential and non-residential, respectively) over the 13-year forecast period;
    - for Indoor Recreation, Parkland Development and Library services, a 5% non-residential attribution has been made to recognize use by the non-residential sector;
    - for Health, Social & Child Services, and Paramedics a 10% non-residential attribution has been made to recognize use by the non-residential sector;
    - for Social Housing, a 100% residential attribution has been made to recognize use by the residential sector only;
    - for Services Related to a Highway, a 50% residential/50% non-residential attribution has been made based on the use of the origins and destinations derived from trips for the a.m. peak hour;

- for Waste Diversion an 83% residential/17% non-residential attribution has been made based on the allocation of residential versus non-residential properties collected from;
- for Stormwater within the separated sewer system a 44% residential/56% non-residential allocation has been made based on benefiting lands associated with the stormwater management works over the 13-year forecast period;
- for Stormwater Facilities within the Separated and Combined Sewer Systems the costs identified are attributable 100% to residential development since non-residential development is required to provide facilities as part of the local service policy; and
- for Water, Wastewater Linear and W.W.T.P. services a 63% residential/37% non-residential allocation has been made based on population vs. employment growth over the 13-forecast period.

7.3.3 Application to Redevelopment of Land (Demolition and Conversion)

If a development involves the demolition of and replacement of a building or structure on the same site, or the conversion from one principal use to another, the developer shall be allowed a credit equivalent to:

1) the number of dwelling units demolished/converted multiplied by the applicable residential D.C. in place at the time the D.C. is payable; and/or

2) the gross floor area of the building demolished/converted multiplied by the current non-residential D.C. in place at the time the D.C. is payable.

7.3.4 Exemptions (full or partial)

A full review of the City's exemption policies was undertaken under a separate cover (FCS18062(b)). On February 19, 2019, the D.C. Stakeholders Sub-Committee directed the following exemptions to be included in this D.C. by-law.

a) Statutory exemptions

- industrial building additions of up to and including 50% of the existing gross floor area (defined in O.Reg. 82/98, s.1) of the building; for industrial

building additions which exceed 50% of the existing gross floor area, only the portion of the addition in excess of 50% is subject to D.C.s (s.4(3)) of the D.C.A.;

- buildings or structures owned by and used for the purposes of any municipality, local board or Board of Education (s.3); and
- residential development that results only in the enlargement of an existing dwelling unit, or that results only in the creation of up to two additional dwelling units (based on prescribed limits set out in s.2 of O.Reg. 82/98).

b) Non-statutory exemptions

- A building, or part thereof, used for parking but excluding a building or part thereof used for commercial parking;
- An agricultural use;
- A place of worship;
- A laneway house; and
- A temporary building or structure.

c) Partial non-statutory exemptions

- Class A Office development within the Downtown C.I.P.A. shall be 70% exempted from D.C.s otherwise payable;
- All development other than Class A office development within Downtown Hamilton C.I.P.A. will be subject to reductions based on the following amounts dependent on the date applicable D.C.s are payable:

Date	Percentage of Exemption (%)	Percentage of development charge payable (%)
July 6, 2019 to July 5, 2020	60	40
July 6, 2020 to July 5, 20201	50	50
July 6, 2021 to July 5, 2022	40	60
July 6, 2022 to July 5, 2023	40	60
July 6, 2023 to July 6, 2024	40	60

- ¢ Non-industrial development within a C.I.P.A. or B.I.A. will be partially exempt from D.C.s as follows:
  - ¢ Fifty percent (50%) reduction on the first 5,000 sq.ft.
  - ¢ Seventy-five percent (75%) on development between 5,001 – 10,000 sq.ft.
  - ¢ One hundred percent (100%) on the amount of development exceeding 10,000 sq.ft.;
- o A student residence developed by a university, college of applied arts and technology or other accredited post-secondary institution is exempt from 50% of the applicable D.C. This partial reduction will only be applicable until June 30, 2020;
- o Redevelopment of an existing residential development for the purpose of creating more residential facilities within the existing building envelope is exempt from 50% of the D.C. otherwise payable; and
- o Adaptive Reuse of Protected Heritage Properties is exempted from D.C.s but excludes any sections of the existing building that are not covered by the Heritage designation.

7.3.5 Phasing in

No provisions for phased in the D.C. are provided in the D.C. by-law.

7.3.6 Timing of Collection

D.C.s are payable at the time a building permit is issued with respect to a development.

7.3.7 Indexing

Indexing of the D.C.s shall be implemented on a mandatory basis annually commencing on the first anniversary date of this by-law and each anniversary date thereafter, in accordance with the Statistics Canada Quarterly, Non-Residential Building Construction Price Index (Table 18-10-0135-01)[1] for the most recent year-over-year period.

[1] O.Reg. 82/98 referenced "The Statistics Canada Quarterly, Construction Price Statistics, catalogue number 62-007" as the index source. Since implementation, Statistics Canada has modified this index twice and the above-noted index is the most current. The draft by-law provided herein refers to O.Reg. 82/98 to ensure traceability should this index continue to be modified over time.

7.3.8 The Applicable Areas

The charges developed herein provide for varying charges within the City, as follows:

- All Municipal-wide Services – the full residential and non-residential charge will be imposed on all lands within the City; and
- Water and Wastewater – the full residential and non-residential charge will be imposed on the urban service areas of the City.
- Stormwater – Urban area specific charges will be imposed based on the combined sewer system and the separated sewer system.
- Dundas/Waterdown – area specific charges are applicable in addition to City-wide and urban services.

7.4 Other D.C. By-law Provisions

It is recommended that:

7.4.1 Categories of Services for Reserve Fund and Credit Purposes

The City's D.C. collections are currently allocated to the following reserve funds:

- Services Related to a Highway;
- Public Works Facilities, Fleet & Equipment;
- Transit Services;
- Parking Services;
- Airport Land;
- Fire Protection Services;
- Police Services;
- Parkland Development;
- Indoor Recreation Services;
- Library Services;
- Administrative Studies;
- Long Term Care;
- Social & Child Services;
- Provincial Offences Administration;
- Health Services;

- Social Housing;
- Paramedics;
- Stormwater Drainage and Control Services;
- Water;
- Wastewater Treatment Plant;
- Wastewater Linear;
- Dundas/Waterdown Special Area Charge; and
- Binbrook Special Area Charge.

It is recommended that the City create a reserve fund for waste diversion as it will commence collection for this previously ineligible service. It is also recommended to rename the Administrative Studies reserve fund to Administrative Studies – Engineering Services Studies and add a new reserve fund for Administrative Studies – Community Based Studies. Further, the stormwater reserve fund should now be split out into combined and separated system reserves to reflect the area specific charge.

Further, it is recommended that the existing balance in the stormwater development charge reserve fund be split between the two new reserve funds based on the adjustments identified in Chapter 4, section 4.8.

Appendix D outlines the reserve fund policies that the City is required to follow as per the D.C.A.

7.4.2 By-law In-force Date

A by-law under the D.C.A. comes into force on the day after which the by-law is passed by Council, or a later date as specified in the by-law. The recommended date is July 6, 2019 to align with the expiration of the existing City D.C. by-law.

7.4.3 Minimum Interest Rate Paid on Refunds and Charged for Inter-Reserve Fund Borrowing

The minimum interest rate is the Bank of Canada rate on the day on which the by-law comes into force (as per s. 11 of O.Reg. 82/98).

7.4.4 Area Rating

As noted earlier, Bill 73 has introduced two new sections where Council must consider the use of area specific charges:

1. Section 2 (9) of the Act now requires a municipality to implement area-specific D.C.s for either specific services which are prescribed and/or for specific municipalities which are to be regulated (note that at this time, no municipalities or services are prescribed by the Regulations).

2. Section 10 (2) c. 1 of the D.C.A. requires that "the development charges background study shall include consideration of the use of more than one development charge by-law to reflect different needs for services in different areas."

In regard to the first item, there are no services or specific municipalities identified in the regulations which must be area-rated. The second item requires Council to consider the use of area-rating.

At present, the City's by-law does provide for water, wastewater and stormwater services on an urban-wide basis. All other services are provided on a City-wide basis. In regards to non-water/wastewater/stormwater services there have been several reasons why these rates have not been imposed on an area specific basis:

1. All City services, with the exception of water, wastewater and stormwater, require that the average 10-year service standard be calculated. This average service standard multiplied by growth in the City, establishes an upper ceiling on the amount of funds which can be collected from all developing landowners. Section 4(4) of O. Reg. 82/98 provides that "…if a development charge by-law applies to a part of the municipality, the level of service and average level of service cannot exceed that which would be determined if the by-law applied to the whole municipality." Put in layman terms, the average service standard multiplied by the growth within the specific area, would establish an area specific ceiling which would significantly reduce the total revenue recoverable for the City hence potentially resulting in D.C. revenue shortfalls and impacts on property taxes.

2. Extending on item 1, attempting to impose an area charge potentially causes equity issues in transitioning from a City-wide approach to an area specific approach. For example, if all services were now built (and funded) within area A (which is 75% built out) and this was funded with some revenues from areas B and C, moving to an area rating approach would see Area A contribute no funds to the costs of services in Areas B & C. The development charges would be lower in Area A (as all services are now funded) and higher in B and C. As well, funding shortfalls may then potentially encourage the municipality to provide less services to B and C due to reduced revenue.

3. Many services which are provided (roads, parks, recreation facilities, library) are not restricted to one specific area and are often used by all residents. For example, arenas located in different parts of the City will be used by residents from all areas depending on the programing of the facility (i.e. a public skate is available each night, but at a different arena; hence usage of any one facility at any given time is based on programing availability).

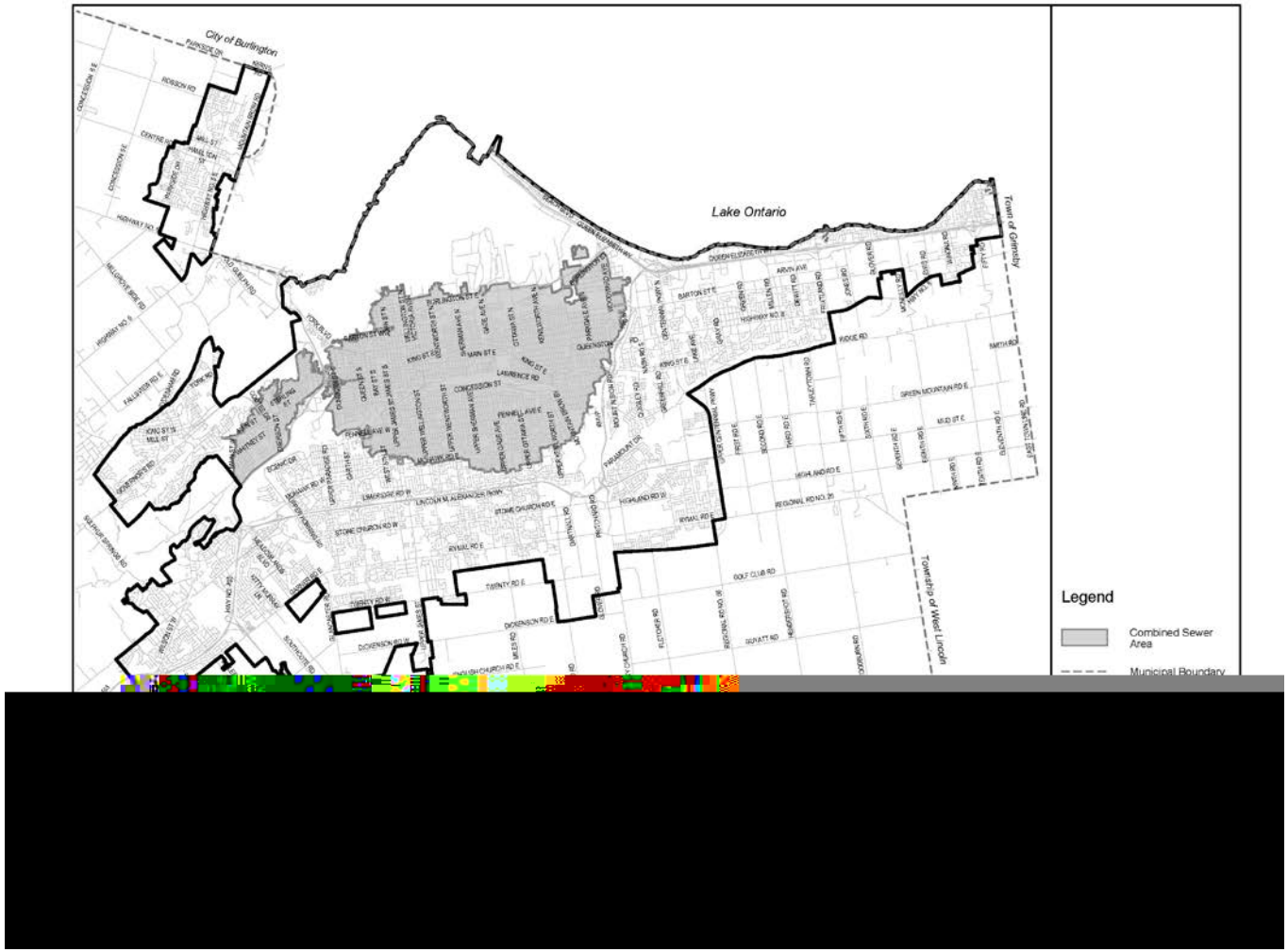
4. It is noted that both water and wastewater services are provided on systems that deliver a consistent level of service across the City, and many projects, including linear projects, have the potential to provide benefits to both the greenfield and built boundary areas. This makes it difficult to calculate proportionate shares of many projects.

For the reasons noted above, it is recommended that the City continue the current D.C. approach to calculate the charges on a uniform City-wide basis for non- stormwater services.

On the other hand, it is recommended that Stormwater services be applied on an area-specific basis between the combined sewer system and the separated sewer system. The combined sewer system area is delineated in Figure 7-1. All other areas within the urban area boundary are part of the separated sewer system. Stormwater services have a strong connection between capital works and those who benefit from the capital works, a clear service boundary, a different level of service between the boundaries and an ability to support the infrastructure costs/debt charges without pooling of funds. Given that Stormwater services within the City meet these requirements, area-specific calculations have been set out in this report for this service.

It is recommended that the City continue the special area charge for the Dundas/Waterdown area that has been in effect since amalgamation. The Binbrook area specific charge is no longer required as all growth-related revenues have been recovered for the works that were originally identified.

Figure 7-1
Map of Combined Sewer System Area and Urban Boundary Area
City of Hamilton



3. Sidewalks, trails, pathways, multi-use trails, cycle tracks and bike lanes, inclusive of all required land and infrastructure, including related temporary works and grade separations that are located within or linking to non-arterial road corridors internal to development are considered part of the complete street and are a direct developer responsibility under s. 59 of the D.C.A. (local service component) per *Financial Policies for Development* and the *Comprehensive Development Guidelines and Financial Policies Manual, 2017, or* as may be amended from time to time.

4. Other sidewalks, trails, pathways, multi-use trails, cycle tracks and bike lanes, inclusive of all required land and infrastructure, including related temporary works and grade separations, that are located within non-arterial road corridors external to development and needed to support a specific development or required to link with the area to which the plan relates are a direct developer responsibility under s. 59 of the D.C.A. (local service component) per *Financial Policies for Development* and the *Comprehensive Development Guidelines and Financial Policies Manual, 2017, or* as may be amended from time to time.

5. Multi-use trails (not associated with a road), inclusive of all land and required infrastructure and including related temporary works and grade separations, that go beyond the function of a (parkland) recreational trail and form part of the City's active transportation network for cycling and/or walking are included in D.C. calculation as permitted under a. 5(1) of the D.C.A.

E.5.3.6 Sustainable Modes Programs including Transportation Demand Management

1. Bike share expansions within existing service areas and in new service areas; cycling amenities including bike racks, lockers, shelters and fix-it stations; pedestrian amenities (e.g. benches); and sustainable mobility programs (e.g. Smart Commute, T.D.M. for higher density developments) are considered part of the complete street and included as part of highway costing funded through D.C. net of direct developer responsibility (local service component) per *Financial Policies for Development* and the *Comprehensive Development Guidelines and Financial Policies Manual, 2017, or* as may be amended from time to time.

E.5.3.7 Noise Abatement Measures

1. Noise abatement measures external and internal to development where it is related to, or a requirement of a specific development are a direct developer responsibility under s. 59 of the D.C.A. (local service component).

2. Noise abatement measures on new arterial roads and arterial road Improvements abutting an existing community and unrelated to a specific development are included in D.C. calculation as permitted under a. 5(1) of the D.C.A.

E.5.3.8 Transit Nodes, Terminals, Lanes and Bus Stop Infrastructure

1. Transit node, transit priority measures (e.g. queue jump lanes, transit signal priority) and bus stop infrastructure and amenities (including bus pads and shelters) located within arterial road corridors, and including transit stations or terminals located on lands to serve these road corridors are considered part of the complete street and included in D.C. calculation as permitted under a. 5(1) of the D.C.A. net of direct developer responsibility under s. 59 of the D.C.A. (local service component) per *Financial Policies for Development* and the *Comprehensive Development Guidelines and Financial Policies Manual, 2017, or* as may be amended from time to time.

2. Transit node, transit priority measures (e.g. queue jump lanes, transit signal priority) and bus stop infrastructure and amenities located within non-arterial road corridors internal to development are considered part of the complete street and direct developer responsibility under s. 59 of the D.C.A. (local service component).

3. Transit node, transit priority measures (e.g. queue jump lanes, transit signal priority) and bus stop infrastructure and amenities located within non-arterial road corridors external to development and needed to support a specific development or required to link with the area to which the plan relates are a direct developer responsibility under s. 59 of the D.C.A. (local service component).

E.5.3.9 Infrastructure Assets Constructed by Developers

1. All infrastructure assets constructed by developers must be designed in accordance with the City's engineering standards and policies.

2. All infrastructure assets shall be conveyed in accordance with the City's engineering standards and policies.

Appendix F: Water and Wastewater Servicing Needs – GM BluePlan Engineering Consultants Ltd.

Prepared By:

CITY OF HAMILTON

2019 CITY OF HAMILTON DEVELOPMENT CHARGES BY-LAW STUDY
APPENDIX F - WATER AND WASTEWATER

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TABLE OF CONTENTS

1. Introduction 1
2. Development Areas 2
3. Development Charges Calculations & Policies 3
3.1 Local Service Policy 3
3.1.1 Funding for Municipal Extensions 4
3.1.2 Capacity Allocation 4
3.1.3 Co-ordinated Projects with Transportation Requirements 4
3.2 Benefit to Existing 5
3.3 Post Period Oversizing 7
3.3.1 Provisional Post Period Benefit 8
3.4 City-Wide Projects 8
3.5 Residential/Non-Residential Cost Share 8
3.6 Costing Criteria 8
3.7 Wastewater Runoff Controls 9
4. Service Standards 10
4.1 Water Distribution System 10
4.2 Sanitary Sewer System 10
4.2.1 Sanitary Sewers 10
4.2.2 Sewage Pumping Stations 11
4.2.3 Treatment Facilities 11
5. Project Descriptions 12
5.1 Water Distribution System 12
5.1.1 Waterdown 12
5.1.2 Ancaster 12
5.1.3 Binbrook 13
5.1.4 A.E.G.D./Mount Hope 13
5.1.5 Hamilton Mountain 13
5.1.6 Stoney Creek Upper 13
5.1.7 Stoney Creek Lower 13
5.2 Wastewater System 14
5.2.1 Waterdown 14

5.2.2 Ancaster 14
5.2.3 Binbrook 14
5.2.4 A.E.G.D./Mount Hope 14
5.2.5 Hamilton Mountain 14
5.2.6 Stoney Creek Upper 15
5.2.7 Stoney Creek Lower 15
5.3 City Wide Water and Wastewater Projects 15
5.4 Intensification Allowance 15
5.5 Program Changes from 2019 D.C. Study 16
5.6 Woodward Avenue W.W.T.P. 17
5.6.1 Project Scope 17
5.6.2 Key Considerations 17
5.6.3 Project Cost Analysis 17
6. Summary of Development Charges Projects 19

1. INTRODUCTION

This water and wastewater technical report is prepared as a background document ŦƧℕ ΰĶŜ /ƛΰè ƧŦ I l·Y˙ƛfΰƨyΩă нлмф Development Charges (D.C.) By-law. The 2019 D.C. Background Study is an update to the Consolidated Development Charges Background Report, dated October, 2014, prepared by Watson & Associates Limited. This water and wastewater technical report provides engineering input on growth related costs of water and wastewater infrasΰℕdzŎΰdzℕŜ dzLJƎℕl·ŘŜă l·yŘ ǿƛff ōŜ dzăŜŘ ΰƧ dzLJŘl·ΰŜ ΰĶŜ /ƛΰèΩă D.C. By-Law in 2019 for growth to 2031.

The objectives of this study are:

LŘŜyΰƛŦè ΰĶŜ ŘŜY˙l·yŘ ΰĶl·ΰ ǿƛff ōŜ LJfl·ŎŜŘ Ƨy˙ΰĶŜ Ŏ2Y˙Y˙dzyƛΰèΩă Y˙dzyƛŎƛLJl·f ǿl·ΰŜℕ l·yŘ ǿl·ăΰŜǿl·ΰŜℕ ăèăΰŜY˙ l·ă l· ℕŜădzfΰ ƧŦ approved population and employment growth within the urban boundary to the year 2031, consistent with Places to Grow.

Recommend water and wastewater infrastructure required to service the expected growth needs in the two planning horizons 0 to 5 year and 6 year to urban boundary build-out (U.B.B.O.).

Provide growth related project cost estimates for water and wastewater infrastructure eligible for D.C. funding.

Section 5 describes the works required that are development related for each urban area. Figures are organized with the digit and decimal (e.g. 2.2). The digit identifies the type of infrastructure and the decimal identifies the urban area as follows (e.g. 2.2 Wastewater System, Ancaster).

Digit ς Infrastructure

1 - Water Distribution System

2 - Wastewater System

Decimal ς Area

.1 - Waterdown

.2 - Ancaster

.3 - A.E.G.D./Mount Hope

.4 - Binbrook

.5 - Hamilton Mountain

.6 - Stoney Creek Upper

.7 - Stoney Creek Lower

The time periods for the projects are listed on tables identified as:

a ς 0 to 5 year period ς Includes growth from 2019 to 2023, inclusive

b ς 6 year to Urban Boundary Build-Out (U.B.B.O.) ς Includes growth from 2024 to 2031, inclusive

Within the tables and figure, the projects are further identified with unique identifiers as follows

W Waterdown

A Ancaster

B Binbrook
MH A.E.G.D./Mount Hope
HM Hamilton Mountain
SCU Stoney Creek Upper
SCL Stoney Creek Lower
W-19 Water Projects
S-19 Wastewater Projects

Example: W# - W ç 19 represents water project # in Waterdown
SCU# - S ç 19 represents wastewater project # in Stoney Creek Upper

This report also includes a table for City-ø¼ŘŜ LJN2?ŜŎúă øKλŎK fŁăúă LJN2LJ2ăŜŘ ŎI·LJ¼úI·f LJN2?ŜŎúă úKI·ú I·ŦŦŜŎú úKŜ /¼úè¤ă overall systems and are typically located outside the previously identified urban areas. General projects such as studies are also included; however, the majority of City Wide projects are being driven by and are benefitting growth.

The Woodward Wastewater Treatment Plant has been added to the charge as a separate item and is not listed in the City-Wide projects.

2. DEVELOPMENT AREAS

¢KN2dzƎK úKŜ ŘŜØŜf2LJYŜyű 2Ŧ úKŜ /¼úè 2Ŧ I I·Yλtű2y¤ă DN2øúK wŜfI·úŜŘ LyűŜƎNI·úŜŘ 5ŜØŜf2LJYŜyű {űdzŘè óD.R.I.D.S.) and úKŜ нллс /¼úè 2Ŧ I I·Yλtű2y² I·úŜN I·yŘ øI·úŜN a I·ăúŜN tfI·y£ úKŜ /¼úè¤ă tfI·yŷλyƎ 5ŜLJI·NúYŜyű ŘŜØŜf2LJŜŘ ŜÈLJŜŎúŜŘ LJ2LJdzfI·ú¼2y I·yŘ ŜYLJf2èYŜyű úI·NƎŜűă ű2 NŜI·ŎK úKŜ tN2Ø¼yŎŜ¤ă tfI·ŎŜă ű2 DN2ø NŜIjdzNNŜYŜyúă ű2 úKŜ ¦NōI·y . 2dzyŘI·Nè Buildout (U.B.B.O.) in 2031. This growth was focused in the following areas:

- Waterdown,
- Ancaster,
- Binbrook,
- Airport Employment Growth District (A.E.G.D.) / Mount Hope,
- Hamilton Mountain,
- Stoney Creek Lower, and
- Stoney Creek Upper.

All areas capable of being developed in the urban boundary are assumed to have densities and land uses in I·ŎŎ2NŘI·yŎŜ ø¼úK úKŜ /¼úè¤ă hŦŦλŎ¼I·f tfI·y¶

Subsequent to the G.R.I.D.S. and Master Planning processes, additional study was undertaken for the Airport Employment Growth District (A.E.G.D.). A stand-alone servicing master plan for the A.E.G.D. was developed and identified detailed servicing requirements. These recommendations have been incorporated into the D.C. Background Study infrastructure requirements.

3. DEVELOPMENT CHARGES CALCULATIONS & POLICIES

3.1 Local Service Policy

¦ûλfλÎλyƎ ûKŜ /λûèℚă ŘŜØŜf2LJYŜyű I·ăădzYLJûλ2yãΣ ûKŜ ø I·ûŜℕ I·yŘ ø I·ăűŜø I·ûŜℕ λyŦℕI·ăűℕdzÕûdzℕŜ required to service these areas was identified. To determine if a project is a Development Charges (D.C.) related project, the following two categories were considered:

Category 1 - Projects External to Proposed Development Lands (i.e. on existing road allowance and servicing more than one development)

The following project descriptions fall into Category 1 and will be fully or partially allocated to Development Charges:

- New infrastructure or upgrades to existing City infrastructure required to service more than one potential proposed development and/or development property, whether in a Greenfield area or Intensification area. This includes upgrades to infrastructure that is upstream (water) or downstream (wastewater) of multiple developments.
  - If an upgrade is triggered by growth (single or multiple potential development) and that planned growth is less than or equal to the approved Traffic Survey Zone growth, the upgrade will be all or partially allocated to Development Charges
  - In the case that a development plans to have more growth than is planned for (by approved Traffic Survey Zones and system capacity) and if the infrastructure upgrade is as a result of growth over and above what is approved, that additional oversizing shall be the responsibility of the Developer (Direct Developer)
- This may include watermains for transmission, distribution and looping

New projects that physically lie outside of a proposed development, but only service a single development can be considered to be part of Category 2. e.g. New sewer on existing road right of way (external to development) to service a new building on land not already serviced, with no additional developments potentially draining to the new sewer

Local cost recoveries will be made on a site specific basis based on frontage and/or drainage area

Category 2 - Projects Within Proposed Development Lands - The following project descriptions fall into Category 2:

- Water and sewer infrastructure that is required to directly service the proposed development lands.
- Water and sewer infrastructure that is required to directly service the proposed development lands *and* LJ2ûŜyűλI·ftè ά2ØŜℕăλÎŜŘέ λyŎ2yãλŘŜℕI·ûλ2Y (capacity, looping or fire protection) of additional proposed developable lands that are normally serviced via proposed development property.

In regard to Category 2 projects, the developer is required to pay for the full cost of the installation of sanitary sewers and watermain up to and including the sizes listed below. This is described as the Direct 5ŜØŜf2LJŜℕă /2yűℕλõdzûλ2y₱ ¢KŜ YλyλYdzY ăλÎŜă I·ℕŜ LJℕ2ØλŘŜŘ Ŧℕ2Y ûKŜ /λûèℚă 5ŜØŜf2LJYŜyű t2fλÕλŜăY

Sanitary Sewer	450 mm diameter
Watermain	300 mm diameter

Facilities (Water Pumping Station, Water Reservoir or Elevated Tank, Wastewater Pumping Station)

- No minimum size / capacity
- Facilities to service single proposed development lands will be Direct Developer Contribution.
- Facilities servicing multiple developments /service areas will be allocated to Development Charges Categories only (D.C., Benefit to Existing and Post Period Benefit).

Water Treatment / Wastewater Treatment ς Treatment upgrades to be included in Development Charges Categories only (D.C., Benefit to Existing and Post Period Benefit).

Should the size of the local infrastructure be required to be greater than the minimum local servicing sizes (i.e. to support external development), Development Charges contributions shall be made. The City shall contribute, through the Development Charges Fund, towards the cost to install tKŜ ƛyŦNIꞏăúNdzŎűdzNŜ 2yˊIꞏ áCfIꞏű wIꞏűŜε ōIꞏăƛăφ áCfIꞏű wIꞏűŜε ƛă ŘŜŦƛyŜŘ IꞏăűKŜ Ŏ2ăű ŘƛŦŦŜNŜyŎŜ ōŜűøŜŜyˊűKŜ ăƛÎŜ NŜIjdzNŜŘ Ŧ2N ŜÈúŜNyƖꞏf ŘŜØŜf2LJYˊŜyű IꞏyŘ űKŜ YˊƛyƛYˊdzY ăƛÎŜΣ y2űŜŘ IꞏōzØŜ ƛyˊűKŜ /ƛűèQă 5ŜØŜf2LJYˊŜyű t2fƛŎƛŜăφ

Projects identified are sized based on the CiűèQă ŜyƎƛySŜNƛyƎ ƎdzƛŘŜfƛySă Ŧ2N ŘŜăƛƎyˊIꞏyŘ to accommodate the future population and employment demand/flow within the proposed drainage/service areas.

The Development Charges Capital Program demonstrates the calculated cost splits on a project by project basis.

3.1.1 Funding for Municipal Extensions

In cases where a new watermain or sewer is installed by a developer that benefits and enables a new connection to by an existing, unserviced property, a flat rate contribution is made back to the developer. Additional details of this ŦdzyŘƛyƎ YˊŜűK2Ř2f2Ǝè NŜfIꞏűŜŘ ű2 5ƛNŜŎű 5ŜØŜf2LJŜN ó2N á5ŜØŜf2LJŜN LyˊƛűƛIꞏűŜŘéú LJN2?ŜŎűă ƛyŎfdzŘƛyƎ LJN2?ŜŎűă ŜÈúŜNyƖꞏf ű2 űKŜ development lands are found in the 2007 City Report: *TOE02005b/FCS02026b/PED07248 - Funding Methodology for Municipal Infrastructure Extensions Review and Update*

3.1.2 Capacity Allocation

As growth and re-development progresses over time, The City requires a means to determine the amount of spare capacity within the water distribution and wastewater collection systems that are to be allocated to any potential development application. Additionally, the City must also determine a reasonable period of time in which this allocated capacity is to be made available prior to development.

The capacity will be allocated to projects in the order in which the Construction Plans are approved. In the event that multiple projects are approved at the same time, the identification, selection and prioritization of the project given in űKŜ /ƛűèQă LyŦNIꞏăúNdzŎűdzNŜ {űIꞏƎƛyƎ 2Ŧ 5ŜØŜf2LJYˊŜyű tN2ƎNIꞏYˊ will prevail.

This policy is intended to be used as a guide for conveyance only (not treatment) and are subject to review and update by the City moving forward.

3.1.3 Co-ordinated Projects with Transportation Requirements

Water and wastewater projects external to proposed development lands (i.e. on existing road allowances and/or existing roads) that fall into Category 1 and that are initiated as a result of identified transportation requirements and are eligible for inclusion in the D.C. at the same D.C. eligible percentage as the associated road.

Service connections (water and/or wastewater connections ς public portion) will be constructed to each land parcel, when an existing dwelling unit exists. Property owners that require more than one service connection will be required to pay for the cost of the additional service connections prior to construction. Benefitting property owners ăKI·ff Ŏ2yúNλōdzúŜ ű2ø I·NŘă űKŜ Ŏ2ăű ű2 λyãűI·ff űKŜ λyŦNI·ăűNdzŎűdzNŜ 2y I· ά₮fI·ú NI·úŜε ōI·ăλă¢ ¢KŜ ά₮fI·ú NI·úŜε øλff ōŜ ŜăűI·ōfλăKŜŘ by the City at the beginning of each year.

3.2 Benefit to Existing

The non-growth component has been identified for certain projects which benefit the existing service area. These components are typically associated with upgrades to the existing systems or facilities necessary to continue to provide service to the existing residential and non-residential users. These projects may also involve upgrades or expansions which provide additional capacity to meet growth in the service area. As such, for each of these projects, the growth related and non growth related needs and corresponding capacity and costs have been separately identified.

Given that the servicing program is designed to service growth to 2031 and the infrastructure is primarily located in new growth areas, there are limited benefit to existing (non-growth) components in the capital program.

For projects that may have a benefit to existing, a methodology was developed to estimate the B.T.E. split. If reasonable and appropriate data are available to support the accurate calculation of Benefit to Existing (B.T.E.), B.T.E.1, a calculation-based approach will be used to arrive at a project-specific B.T.E. percentage. Otherwise, the cost allocation shall reference a structured approximation policy assigning B.T.E. under categories B.T.E.2 through B.T.E.5, as outlined in the table below:

Table 1 ς Benefit to Existing Approach

Category	B.T.E. %	Description
B.T.E.1	Calculated ς if possible	Calculated based on best available data. Example calculation basis: ∉ Cost for existing needs vs cost for growth ∉ Existing measurable capacity deficiency that is addressed through new project that supports growth EXAMPLE: ∉ Existing watermain/sewer is to be replaced within intensification area based on condition and State of Good Repair (S.O.G.R.ú yŜŜŘă¢ wŜLJfI·ÔŜYŜyű λă λŘŜyűλ₮λŜŘ λy˝űKŜ /λűë℡ă 2yƎ2ƗyƎ {.O.G.R. program, not based on growth ∉ There is potential growth (within D.C. Period and identified in planning estimates) that is serviced by watermain / sewer ∉ In order to service existing service area plus growth, increase in diameter is required ∉ B.T.E. % is calculated as: Cost for Replacement only Project ÷ Cost for Upsized Project ∉ Remaining cost is applicable to D.C.
B.T.E.2	10% B.T.E.	These projects are driven by growth but are likely to address some minor existing deficiencies potentially related to level of service, security of supply, age, operational flexibility, condition or performance. EXAMPLE: ∉ A watermain replacement and upsizing is required to support growth in a new greenfield area

		¢ Adjacent existing serviced area is currently serviced by a watermain that is ~25 years old and may have slightly decreased capacity due to condition ¢ Replacement watermain provides new service to new users and a replacement of the existing watermain ¢ *Minor condition/age deficiency is addressed by construction of new watermain, therefore, 10% B.T.E. is applied*
B.T.E.3	25% B.T.E.	These projects are driven by growth but will address some known existing deficiencies potentially related to operational issues or significant level of service, security of supply, age, operational flexibility, condition or performance. EXAMPLE: ¢ A new development within an intensification area is to be serviced by an existing sewer which has known capacity deficiencies and modelled surcharging ¢ A larger sewer is required to address the existing capacity constraint as well as to service growth ¢ *Level of service / capacity deficiency is addressed by construction of new watermain, therefore 25% B.T.E. is applied*
B.T.E.4	50% B.T.E.	These projects equally provide additional capacity for growth as well as enhanced level of service in existing service areas. These projects address known existing deficiencies but also improve servicing conditions including security of supply/service. EXAMPLE: ¢ A new development within an intensification area is to be serviced by an existing sewer which has significant known condition issues and significant capacity constraints including *modelled* surcharging and occasional *observed* surcharging and capacity constraints ¢ A larger, new sewer is required to address the existing deficiencies as well as to service growth ¢ *Level of service, capacity and condition/age deficiencies are addressed by construction of new sewer, therefore 50% B.T.E. is applied*
B.T.E.5	Other	These projects to not fall within B.T.E.1-B.T.E.5 categories and may require a unique split based on project specific factors. EXAMPLE: ¢ An existing sewage pumping station is deficient in pumping capacity, wet well storage capacity and standby power. Additionally, pumps and other mechanical equipment require replacement due to condition ¢ Modifications to the station are recommended to address all issues, including pump replacement ¢ The new pumps will be re-sized to accommodate both the increase in required existing flow as well as an additional marginal increase in capacity to accommodate small potential intensification developments ¢ *Major capacity and level of service and condition constraints trigger the need for S.P.S. upgrade; only marginal increase in capacity is required, therefore an estimated 90% B.T.E. is applied to the project cost*

NOTE: The intensification allowance for water and wastewater within the City-Wide category is currently assumed to have a 50% Benefit to Existing 50% D.C. split based on assumed overall age, condition and level of service within intensification areas. The B.T.E. split that is applied will be reviewed and confirmed on a project by project basis as detailed intensification projects are initiated.

3.3 Post Period Oversizing

Project costs would be identified for any oversizing of infrastructure to service growth beyond the D.C. by-law planning period, in this case 2031.

Under this D.C. program, most of the local development area servicing is sized to service the specific development areas within the approved urban boundary. There is no post-period oversizing for these projects. There are some service areas that have made allowance for servicing lands outside the current urban boundary. These projects have some post period oversizing costs identified.

The trunk infrastructure is based on the City of Hamilton Master Plan. The Master Plan infrastructure and sizing was based on the growth plan projections and urban boundary established under G.R.I.D.S. This baseline data from G.R.I.D.S. forecasted to the 2031 planning horizon. In general, there is no post-period oversizing for the trunk infrastructure.

If reasonable and appropriate data are available to support the calculation of Post Period Benefit, P.P.1, a calculation-based approach will be used to arrive at a project-specific Post Period percentage. Otherwise, the cost allocation shall reference a structured approximation policy assigning Post Period splits under categories P.P.2 through P.P.5, as outlined in the table below:

Table 2 – Post Period Oversizing Approach

Category	Post Period %	Description
P.P.1	Calculated – if possible	Calculated based on best available data. Example calculation basis: – Cost for 2031 project vs cost of oversized needs Typical P.P. calculation is for greenfield linear works and consists of: P.P. = Cost for oversized pipe – Cost for pipe required for in-period growth only – Capacity for 2031 needs vs Capacity for post-period growth EXAMPLE: – A new sewer is required to service a greenfield growth area up to the edge of the urban boundary. The urban boundary is anticipated to be built out within the year 2031 (in-period) – Beyond the urban boundary lies a potential growth area that is likely to require servicing after 2031 – The sewer is strategically oversized by one pipe size to accommodate the growth area outside of the urban boundary – *Post Period Benefit is calculated as: P.P. = Cost for oversized pipe – Cost for pipe required for in-period growth only*
P.P.1 is applicable in most cases of projects with Post Period Benefit. P.P.2, P.P.3, P.P.4 and P.P.5 are intended to be applied to unique projects where the calculations of capacities and costs applicable to in period growth and post period growth are complex and not easily defined.		
P.P.2	10% P.P.	These projects are driven by growth within the By-law planning period but are oversized to provide some marginal additional capacity to support additional growth beyond the By-law planning period.
P.P.3	25% P.P.	These projects are driven by growth within the By-law planning period but are oversized to provide additional capacity to support growth beyond the By-law planning period. These projects are predominantly located in and/or support areas with likely future growth potential.

P.P.4	50% P.P.	These projects are strategically sized for significant additional future capacity. These projects are located in areas with constraints for additional capacity. These projects may also provide cost effective additional capacity.
P.P.5	Other	These projects do not fall within P.P.1-P.P.4 categories and may require a unique split based on project specific factors.

3.3.1 Provisional Post Period Benefit

Project specific post period benefit has been allocated based on growth triggers and assumptions stated in the table above. However, due to the uncertainty surrounding the 2031 to 2041 population and employment growth locations and densities as well as the uncertainty around the subsequent 2031 to 2041 water and wastewater servicing needs, it is anticipated that there will be additional post period benefit within a portion of the program. As such, a $45M Provisional Post Period Benefit has been allocated proportionally to both the water ($35M) and wastewater ($10M) programs.

3.4 City-Wide Projects

The City has identified specific monitoring and programs that must be undertaken to evaluate the existing and future infrastructure requirements to service the City. For the most part, these are required for future development; however, the existing infrastructure will have to be evaluated. An allowance has been made for City-Wide costs for these items.

Development related projects are listed in the tables identified by infrastructure (water and sewage) and by urban area. A City-wide project table is included with projects that do not lie within the listed urban areas or that provide City-wide benefit, such as studies.

3.5 Residential/Non-Residential Cost Share

The general intent of the cost share for water and wastewater infrastructure is based on proportion of growth attributed to residential and non-residential use.

The Residential and Non-Residential growth split is determined based on growth from 2019 to 2031. This split excludes Work from Home and No Fixed Place of Work uses. The cost share based on this growth is 63% Residential and 37% non-residential.

3.6 Costing Criteria

In addition to updating the water and wastewater project scopes and descriptions, the overall project costs have also been revised from the 2014 D.C. Study. The linear unit costs for projects from the 2014 D.C. Study, which were represented in 2014 dollars, have been inflated based on indexing from 2014 to 2019 (12.4%) to represent current (2019) dollars.

Unit costs calculation was completed on a $/m basis, with additional 25% added to account for engineering and contingency

Two types of unit cost were used:

- Greenfield - The greenfield unit rate assumes infrastructure is installed in new greenfield growth areas and will require less additional costs such as restoration, traffic control, utility re-locates, etc. It is also anticipated that Greenfield projects will be coordinated with adjacent watermain construction, storm sewer construction and potential road widening. As such, it is expected that some cost efficiencies may be achieved for Greenfield projects and the unit rate reflects this assumption
- Urban ç the urban unit rate assumes a higher unit cost than Greenfield due to anticipated additional project specific costs. Typically, an Urban type project is a stand-alone linear water or wastewater project within an already built up area which may not have efficiencies of other coordinated construction works. The Urban unit rate reflects these assumptions

Where more up to date cost information was available, such as tender prices, detailed Environmental Assessment (E.A.) project cost eăúλY˙I·úŜă 2ℕ ₹ℕ2Y˝ ůKŜ /λúëℓ̊ă Budget, these costs were used instead of the typical unit cost calculation.

For the Woodward Avenue Wastewater Treatment Plant (W.W.T.P.), the overall project implementation and costing has been reviewed and updated since the 2014 D.C. Study. Costing for the W.W.T.P. is based on actual incurred costs, or actual tender costs received, or preliminary design estimates, or conceptual estimates where appropriate. The Woodward Avenue W.W.T.P. information is addressed separately in this report.

3.7 Wastewater Runoff Controls

In order to mitigate the impact of runoff into the combined sewer network, a policy has been developed that applies to properties that are undergoing re-development within the combined sewer catchment area.

At the development stage, the owner will be required to submit a detailed Storm Water Management Report, to the satisfaction of the Manager of Engineering Design and Construction, addressing the fact that in the absence of an overland flow route, the release rate of a 100 year post development flow will be controlled to the release rate of a 2 year pre development flow.

It has been assumed that the old 18 year storm criteria are very much equivalent to current 2 year storm using Mount Hope Intensity-Duration-Frequency curves.

4. SERVICE STANDARDS

The following standards are the minimum acceptable level of service for each category of service. The City Standards will be used for the design and construction of all roads and municipal services required for all new development. These standards set the level of service for the community, both for new and existing development (i.e. replacement of existing infrastructure).

4.1 Water Distribution System

The water distribution system shall be designed to deliver all required water supply demands and fire flows (protection) based on the Ministry of the Environment, Conservation and Parks (M.E.C.P.) and Regional guidelines with due consideration to the Fire Underwriters Survey. The minimum watermain size for new construction shall be 150 mm diameter for residential areas and 300 mm for Commercial/ Institutional/ Industrial areas.

The City standards require that the minimum distribution system fire flow pressure be not less than 140 kpa (20 psi), distribution system maximum hour pressure does not fall below 275 kpa (40 psi) and distribution system static pressure does not exceed 700 kpa (100 psi). The water system shall be "looped" where possible to minimize water quality problems.

4.2 Sanitary Sewer System

The sewer system shall be designed to carry flows from the drainage area as specified by the City, which may include the Developer's lands, as well as lands beyond the Developer's properties including existing developed lands (external lands) and future developable lands within the urban boundary.

The minimum sewer size for residential development is 250 mm diameter with a minimum velocity of 0.75 m/s. The design shall conform to Ontario Provincial Standards Specifications. For industrial / commercial / institutional development, the minimum sewer size is 375 mm.

The development projections for new developments were provided by the City of Hamilton Planning Department and are the basis for analysis of the sanitary sewer system. The analysis of sewer systems was completed on the basis of the following criteria:

4.2.1 Sanitary Sewers

To determine sewer capacity, the sewers affected by new development were reviewed to determine their capacity. As-recorded information from the City was used to obtain pipe sizes and grades.

The following criteria are ₸₪2Y ůKŜ /ʎúëℚå /2YLJ₪ŜKŜyãƛØŜ 5ŜØŜf2LJYŜyű DʤzʎŘŜfʎyŜå l·yŘ Financial Policies Manual (2017) and are used to estimate the sewage flows from a new residential and/or employment development:

Per Capita Flow	=	360 L/capita/day
Peaking Factor (Babbitt Formula)	=	$M = 5/P^{0.2}$ 5 (max.), 2.0 (min.)
Infiltration	=	0.4 L/s/ha ς 0.6 L/s/ha (depending on anticipated storm sewer and dwelling weeping tile configuration)

The sewers are designed to flow at a maximum of 75% full.

LY I·ŘŘλűλ2Y ű2 dzăλyƎ űKŜ /λűè 2Ŧ I I·Yλfű2yŒă ŘŜăλƎY ÖNŴλűŜNŴλI· Ŧ2NŴ ăλÎλyƎ ăŜøŜNŴă λY yŜø ŘŜØŜf2LJY ŜyŰ I·NŴŜI·ăΣ űKŜ нллс ² I·úŜNŴ and Wastewater Master Plan Class E.A. Report identified major trunk sewer projects and upgrades using calibrated wastewater modelling software. A skeletonized model of the existing City of Hamilton wastewater system using 5 I ŁŒă Mike Urban software was developed and calibrated by AWS Engineers and Planners Corp. This model was ran under future peak wet weather conditions and a 5 year storm event in order to identify major upgrades to the system under the Master Plan. The model results identified trunk projects that would be required to service new growth to 2031.

Construction of the 2006 Master Plan recommended sewer network has been refined through various detailed studies and analyses over the past 12 years. Constructed projects and modifications to the Master Plan program are reflected in the 2019 D.C. Study.

4.2.2 Sewage Pumping Stations

Existing sewage pumping stations affected by the new development were assessed to determine their available capacities and if upgrades would be required. For lands where gravity flow is not possible, new pumping stations were sized and identified. New pump stations were identified based on topography and availability of grade to connect into an existing or proposed trunk sanitary sewer system. Previous studies as well as the 2006 Water and Wastewater Master Plan Class E.A. Report identified many of the proposed pumping stations and upgrades.

4.2.3 Treatment Facilities

Based on growth projections, the flows draining to the respective treatment facilities were evaluated. The wastewater treatment strategy was based on the Water and Wastewater Master Plan.

The Woodward Avenue W.W.T.P. will require significant upgrades to support the growth related flows and address water quality requirements. The approach, level of capacity of each phase of the upgrade and cost estimates have been further defined through staff reports and project team documents. Additional information on the Woodward Avenue W.W.T.P. upgrade is further detailed in this report.

The Dundas W.W.T.P. will continue to operate. The Waterdown W.W.T.P. has been decommissioned and converted ű2 I· ăŜøI·ƎŜ LJdzYLJλyƎ ăűI·ű2yΣ øKλŎK LJdzYLJă Ŧf2ø űKN2dzƎK I· yŜø Ŧ2NŎŜY I·λyΣ ŘλăŎKI·NƎλyƎ ű2 úKŜ ŜÈλăűλyƎ .2NŴŜŴă /NŴŜŜ] Trunk Sewer.

The Woodward Avenue W.T.P. will continue to be the water supply source for all existing and future development areas in Hamilton.

5. PROJECT DESCRIPTIONS

Provided in Attachments A, B and C are tables listing the projects for each of the growth areas identified in Section 1. The corresponding figures identify the location of the projects listed in the tables. The tables and figures are located as follows:

Attachment A: Water Projects

Attachment B: Water City Wide Projects

Attachment C: Wastewater Projects

Attachment D: Wastewater City Wide Projects

Attachment E: Woodward Avenue W.W.T.P. Projects

The project list was devised through an extensive review of background information, including the previous Development Charges Background Studies (2004, 2009, 2011 and 2014), the 2006 Water and Wastewater Master Plan Class E.A. Report ayŘ ŭKŜ /ʎŭëℚă /I·LJʎύI·f ² 2ℕ℩ă tℕ2ƎℕI·Y˘ă ø a ŜŜűʎyƎă øʎűK ℩Ŝè /ʎűë ăύI·₸₸ ʎŘŜyΰʎ₸ʎŜŘ I·ŘŘʎűʎ2yI·f projects and refined the project lists.

In this section, we have provided some further input on some of the larger projects and servicing strategy within each development area.

5.1 Water Distribution System

5.1.1 Waterdown

The majority of the water projects in Waterdown are required to service the UpCountry Estates, North Waterdown and South Waterdown lands. The majority of the water infrastructure to service North Waterdown has been built. A 400 mm watermain will extend west to east along a new road alignment north of Parkside Drive, connecting the existing local network and supplying new growth in the north. A 600 mm trunk feedermain and HD016 Booster Station upgrades are planned which will support growth and provide security of supply. The Feedermain and Station upgrades have been refined through detailed studies since the previous D.C. Study.

Refer to Table F-1, as well as Figure 1-1 for location, size and cost of the projects for this area.

5.1.2 Ancaster

A new 500 mm to 600 mm trunk watermain is required on Garner Road from Southcote Road to Wilson Street West in order to provide trunk water transmission capacity to the Ancaster Industrial Park area. This area also has several proposed internal watermain projects, most of which are planned to be Direct Developer Contribution sized, and are required to service the development within the Park. A 300 mm crossing of Highway 403 along Shaver Road is planned to provide looping within the system and support the growth in the Ancaster Industrial Park. A recently completed study identified the proposed location for the new PD18 Elevated Tank, on Jerseyville Road.

Refer to Table F-1, as well as Figure 1-2 for location, size and cost of the projects for this area.

5.1.3 Binbrook

A new 400 mm trunk Feedermain along Fletcher Road and Cemetery Road, will be required to service the development needs of Binbrook. Additionally, new 400 mm watermain projects in west Binbrook will service the new growth areas.

Refer to Table F-1, as well as Figure 1-3 for location, size and cost of the projects for this area.

5.1.4 A.E.G.D./Mount Hope

Modifications to the A.E.G.D. service areas have resulted in minor updates to the proposed water network. However, the majority of the local 300 mm and 400 mm Pressure Districts 6 and 18 watermain network remains unchanged and follows the proposed road network throughout the A.E.G.D.

Refer to Table F-1, as well as Figure 1-3 for location, size and cost of the projects for this area.

5.1.5 Hamilton Mountain

Several 300 mm to 400 mm watermains are required to service the North Glanbrook Industrial Business Park (N.G.I.B.P.) in the southeast corner of the Hamilton Mountain Growth Area. Also required is a 1200 mm to 1050 mm trunk feedermain delivering water from Greenhill Pumping Station HD05A (see Stoney Creek Upper) through the Nash Neighbourhood to Mud Street and along Mud Street and Stone Church Road to Pumping Station HD06B. Other sections of 400 mm to 600 mm watermains will be required in the growth area of Upper Sherman Avenue and Rymal Road East and a new 400 mm watermain will be required along an easement from Twenty Road to Rymal Road. Recent analysis has determined that the Pressure District 7 elevated tank is to be located at the southwest corner of Trinity Church Road and Twenty Road.

Refer to Table F-1, as well as Figure 1-4 for location, size and cost of the projects for this area.

5.1.6 Stoney Creek Upper

This strategy will include capacity upgrades to Pumping Station HD05A and a new 1200 mm to 1050 mm feedermain from HD05A through the Nash Neighbourhood to Mud Street and along Mud Street and Stone Church Road to HD06B, both of which will also benefit growth within Pressure Districts 5 and 6. The Feedermain alignment has been further refined through recent detailed study. A new 600 mm Feedermain on Upper Centennial Parkway and new PD7 Pumping Station at Rymal Road and Upper Centennial Parkway are also recommended.

Refer to Table F-1, as well as Figure 1-5 for location, size and cost of the projects for this area.

5.1.7 Stoney Creek Lower

Several 300 mm and 400 mm watermains are required to provide looping and to service new employment growth areas within Lower Stoney Creek. The majority of these are employment growth areas that lie adjacent to the railway and Q.E.W.

Refer to Table F-1, as well as Figure 1-6 for location, size and cost of the projects for this area.

5.2 Wastewater System

5.2.1 Waterdown

Sewer extensions within growth areas in Waterdown will be required to service growth. In addition, a capacity upgrade at DC014 will be required to service south Waterdown development

Servicing of Waterdown North is partially complete and will only require short sewer extensions to complete servicing.

Refer to Table F-3, as well as Figure 2-1 for location, size and cost of the projects for this area

5.2.2 Ancaster

Most of the growth related D.C. wastewater projects within Ancaster have been completed. The remaining wastewater projects to service growth consist of short sections of gravity sewers ranging from 250 mm to 1050 mm within the Ancaster Business Park as well as Calvin Street S.P.S. upgrade and sewer extension east of Silver Maple Drive.

Refer to Table F-3, as well as Figure 2-2 for location, size and cost of the projects for this area.

5.2.3 Binbrook

In order to service the growth in Binbrook, pumping Station HC058 will require a capacity upgrade. A 600 mm internal sewer extending west along Windwood Drive is also required to service growth

Refer to Table F-3, as well as Figure 2-3 for location, size and cost of the projects for this area.

5.2.4 A.E.G.D./Mount Hope

Modifications to the A.E.G.D. service areas have resulted in minor updates to the proposed sewer network. However, the overall servicing strategy remains unchanged since the 2014 D.C. Study. The first anticipated phase of growth will be in the northeast corner of the A.E.G.D. and will be serviced through connections to existing trunk sewers and the Twenty Road S.P.S. The central portion of the A.E.G.D. will convey flow to the new Dickenson Road sewer within the A.E.G.D. which flows east and will connect with the new Dickenson / Centennial Trunk sewer east of Upper James Street.

Refer to Table F-3, as well as Figure 2-3 for location, size and cost of the projects for this area.

5.2.5 Hamilton Mountain

The main projects required for servicing the Hamilton Mountain growth area are the gravity sewers that service the N.G.I.B.P. This area will require gravity sewers ranging from 375 mm to 525 mm, which will flow to the north to the existing network. The Upper Centennial/Dickenson Trunk Sewer Project crosses the southern limit of the Hamilton Mountain service area, however, this infrastructure will service the A.E.G.D. and Upper Stoney Creek. The required projects have been modified since the previous D.C. They now consist of a deep trunk sewer (1,200 mm to 1,350 mm) tunnel from Upper James to Upper Centennial (Regional Road 56).

Refer to Table F-3, as well as Figure 2-4 for location, size and cost of the projects for this area.

5.2.6 Stoney Creek Upper

The majority of the Hamilton Mountain wastewater projects have been constructed. The remaining project is a 450 mm sewer on Rymal Road, west of Upper Centennial Parkway to service the Regional Official Plan Amendment (R.O.P.A.) 9 area.

Refer to Table F-3, as well as Figure 2-4 for location, size and cost of the projects for this area.

5.2.7 Stoney Creek Lower

A new sewage pumping station, forcemain and gravity sewer will be required to service the areas surrounding Fifty Road South of the Q.E.W. and growth at the north end of Millen Road will require gravity sewer upgrades and connection to the Eastern Sanitary Interceptor (E.S.I.). Additionally, the northern section of the Centennial Parkway Trunk Sewer twinning (1,500 mm) is required to service growth on the Hamilton Mountain

Refer to Table F-3, as well as Figure 2-6 for location, size and cost of the projects for this area.

5.3 City Wide Water and Wastewater Projects

City-Wide water and wastewater projects cover traditional water and wastewater infrastructure capital works (pumping stations, watermains, sewers, etc.) throughout the City, most of which are required to support growth, however, do not lie within the geographical areas of the other systems mentioned above. Also covered in City-Wide projects are items such as studies, flow monitoring and intensification upgrades.

The costs associated with intensification have been reviewed and updated for the 2019 D.C. to reflect an increased level of density and associated cost escalation within the City core. These costs are further described in Section 5.4.

In addition to projects being identified for servicing new developments, several major projects from the 2006 Water and Wastewater Master Plan Class E.A. Report were carried forward into the D.C. By-Law Study. These are large, trunk infrastructure projects and are required to service new growth areas.

Projects in this section relate to City-wide programs identified to increase available capacity in the system. This will allow development to continue in the City while maintaining water quality targets. Without these improvements, development freezes could take effect.

Refer to Table F-2 and F-4 for location, size and cost of the projects.

5.4 Intensification Allowance

Previous Development Charges By-Law studies have included a lump sum dollar amount for both water and wastewater intensification servicing. With the City undertaking detailed studies for specific intensification areas such as the Weăű I I·ŃōƨdzŃ {ŜŎƨyŘI·Ńè tfI·y˝óá{ŜűűλyƎ {I·λfɛó, Light Rapid Transit (L.R.T.) Corridor as well as the requirement by the province for further increases to the minimum levels of intensification growth, there will continue to be a need to further refine the servicing requirements for these areas.

As part of this D.C. By-Law Study, additional intensification allowance costs have been allocated to the D.C. program. The 2019 D.C. has recommended an increase to the water and wastewater allowance to bring the totals to $30M for water and $30M for wastewater over the remaining By-Law period.

5.5 Program Changes from 2019 D.C. Study

With respect to the linear program in the 2019 D.C. Study, the key program changes from 2014 include but are not limited to the following:

Water	Wastewater
Waterdown: ¢ New alignment for the PD016 Feedermain ¢ South Waterdown tower has been constructed ¢ Revised alignment for growth related watermains	Waterdown: ¢ Several sanitary sewer projects completed/removed
Ancaster ¢ Ancaster PD018 elevated tank relocated to north of Jerseyville Road	Ancaster ¢ Several sanitary sewer projects completed/removed
A.E.G.D. / Mount Hope ¢ A.E.G.D. service area boundary has been modified, resulting in removal of certain watermain projects ¢ No major project changes	A.E.G.D. / Mount Hope ¢ A.E.G.D. service area boundary has been modified, resulting in removal of certain sanitary sewer projects
Binbrook ¢ Binbrook pumping station upgrades are complete	Binbrook ¢ New Forcemain completed
Hamilton Mountain ¢ Realignment of the Stone Church Road Feedermain and distribution main on Dartnall Road	Hamilton Mountain ¢ Dickenson Road trunk sewer updated to reflect new deep tunneled sewer strategy; S.P.S./Forcemain removed from program
Stoney Creek Upper ¢ Several watermain and facility projects completed/removed	Stoney Creek Upper ¢ Several gravity sewer projects completed/removed ¢ Partial completion of Centennial Trunk
Stoney Creek Lower ¢ Several watermain and projects completed/removed	Stoney Creek Lower ¢ No major changes to strategy ¢ Additional sewer upgrades added
City Wide ¢ Increased intensification upgrades to $30M Total ¢ Several projects complete/removed	City Wide ¢ Increased intensification upgrades to $30M Total ¢ Several projects complete/removed

5.6 Woodward Avenue W.W.T.P.

5.6.1 Project Scope

As part of the 2019 City of Hamilton Development Charge Study and review of the water and wastewater capital program, it is recognized that the Woodward Avenue W.W.T.P. Upgrade is a significant and major capital project required to meet the future growth to 2031.

The scope of the Woodward Avenue W.W.T.P. expansion has evolved from the project developed under the 2006 Master Plan and carried in previous D.C. updates. The project has undergone review through the original Master Plan, subsequent Class E.A. study, and most significantly through the conceptual / preliminary design phases as part of the project implementation.

Over the last few years, the City of Hamilton proactively and continually reviewed the wastewater treatment capacity trends that were declining. Concurrently, additional discussions were taking place regarding the conditions and expectations for receiving federal and provincial grants and funding for the project. Based on this new information, it was determined that the optimal approach for the Woodward Avenue W.W.T.P. Upgrades would be to complete the water quality upgrades first and defer most of the capacity upgrades out in the future until such time as the current rated capacity of the plant would be constrained.

This approach results in a cost-effective implementation program for the Woodward Avenue W.W.T.P. Upgrades as well as meets the funding/grant requirements with respect to scope and timing in order to secure the funds.

5.6.2 Key Considerations

With respect to the wastewater flow projections, the analysis undertaken by the City team indicated observed lower than anticipated flows at the plant and decreasing trends in recent years. It is estimated that due to several factors, including reduced water demands and reduction in large scale employment, the wastewater flows are approximately 34 MLD lower than projected. While recent actual flows are below projections, caution should be taken before allocating this capacity to new development. It was determined that there is potential for these uses to return and that the City should safeguard this capacity for the already approved lands. On this basis, it has been determined that 50% of the available capacity will be made available to new development, while 50% will be maintained for the existing servicing areas. As such, 50% of the 34 MLD which equates to 17 MLD, within the current rated capacity of 409 MLD, of the Woodward Avenue W.W.T.P. can be utilized by new development.

Notwithstanding recent trends, it was also determined that the capacity for the future expansion of the Woodward Avenue W.W.T.P. would remain at 500 MLD to satisfy the capacity requirements of the Places To Grow 2031 population and employment projections. Updated projections based on recent flow measurement at the W.W.T.P. identified that there would be some Post Period benefit beyond the 2031 boundary. As such, a 25% Post Period Benefit was applied to the Woodward W.W.T.P. projects.

5.6.3 Project Cost Analysis

Given that the Woodward Avenue W.W.T.P. Upgrades have undergone a significant scope change, a new cost estimate for the total facility upgrades has been completed. Table F-5 provides the overall summary table of the project components that comprise the full upgrades. Attachment D also provides additional detail regarding available cost estimate breakdowns as well as the rationale for the D.C. eligible calculation.

The updated 2019 Cost Estimate for the Woodward Avenue W.W.T.P. Upgrades is summarized in the following table and further detailed in Table F-5.

Project ID	Description	Capital Cost Estimate ($2019)
1	Wastewater Pumping Station	$ 94,537,613
2a	Primary Clarifier - Primary Treatment (Phase 1- C.E.P.T.) - Engineering Included	$ 16,255,669
2b	Primary Clarifier - Primary Treatment (Phase 2 - Tanks) - Engineering Included	$ 52,246,549
2c	Primary Clarifier - Other Costs (includes New/Expanded Laboratory/Admin Building)	$ 11,857,782
3	Tertiary Upgrades - North and South Secondary Treatment Plant Upgrades	$ -
4a	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 1)	$ 132,889,001
4b	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 2)	*$ 224,800,000*
5a	Chlorine Contact Tank and Outfall - Railway Re-Alignment	$ -
5b	Chlorine Contact Tank and Outfall - Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	$ 42,599,496
7	Chlorine Contact Tank and Outfall - New Outfall (included in 5b project)	$ -
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	$ 24,810,804
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 2	$ 25,573,521
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 3	*$ 28,300,000*
8	Plant Expansion - Engineering - Other Costs (includes WWE Modular Office Building)	$ 5,623,839
6	Biogas Digester - New W.A.S. Thickening Facility (forms part of the Digester Upgrades)	$ -
9	Biogas Digester - Additional Dewatering Capacity	$ -
10	Biogas Digester - Refurbishment of Digesters to Increase Capacity	$ -
11a	Biogas Digester - Biogas Upgrades	$ 45,005,784
11b	Biogas Digester - Digesters Upgrades	*$ 8,430,000*
12	Biosolids Management Facility - Biosolids Thermal Reduction Dispossal Facility	$ 99,440,000
13a	Electrical System Upgrades - New Electrical and power systems - Phase 1	$ 62,256,622
13b	Electrical System Upgrades - New Electrical and power systems - Phase 2	*$ 34,844,000*
14	Collection System Upgrades	$ 10,176,000
	Total	$ 919,646,680

6. SUMMARY OF DEVELOPMENT CHARGES PROJECTS

The following tables summarize total project costs for the D.C. projects (not including Woodward W.W.T.P.). The detailed calculations are provided in Attachments A through E.

Total Costs

Area	Water	Sanitary	Total
Ancaster	$ 31,804,000	$ 6,590,000	$ 38,394,000
Waterdown	$ 20,414,000	$ 11,719,000	$ 32,133,000
Binbrook	$ 11,465,000	$ 2,406,000	$ 13,871,000
A.E.G.D./Mt. Hope	$ 15,941,000	$ 31,659,000	$ 47,600,000
Hamilton Mountain	$ 50,778,700	$ 90,365,000	$ 141,143,700
Stoney Creek Upper	$ 102,855,000	$ 30,084,000	$ 132,939,000
Stoney Creek Lower	$ 8,670,000	$ 27,298,000	$ 35,968,000
City Wide Projects	$ 111,742,000	$ 69,762,000	$ 181,504,000
Total ($2019)	**$ 353,669,700**	**$ 269,883,000**	**$ 623,552,700**

Non-Growth Related Costs (City Costs)

Area	Water	Sanitary	Total
Ancaster	$ 7,402,000	$ 1,750,000	$ 9,152,000
Waterdown	$ 3,554,000	$ 7,322,000	$ 10,876,000
Binbrook	$ -	$ -	$ -
A.E.G.D./Mt. Hope	$ -	$ -	$ -
Hamilton Mountain	$ -	$ -	$ -
Stoney Creek Upper	$ 5,217,500	$ -	$ 5,217,500
Stoney Creek Lower	$ -	$ 184,000	$ 184,000
City Wide Projects	$ 15,417,000	$ 18,663,750	$ 34,080,750
Total ($2019)	**$ 31,590,500**	**$ 27,919,750**	**$ 59,510,250**

Growth Related Costs - Development Charges

Area	Water	Sanitary	Total
Ancaster	$ 23,729,500	$ 3,261,000	$ 26,990,500
Waterdown	$ 15,641,000	$ 3,382,200	$ 19,023,200
Binbrook	$ 10,736,000	$ 1,787,000	$ 12,523,000
A.E.G.D./Mt. Hope	$ 12,305,000	$ 28,365,000	$ 40,670,000
Hamilton Mountain	$ 42,649,730	$ 80,993,000	$ 123,642,730
Stoney Creek Upper	$ 64,017,250	$ 8,698,000	$ 72,715,250
Stoney Creek Lower	$ 8,670,000	$ 24,742,600	$ 33,412,600
City Wide Projects	$ 90,688,300	$ 51,098,250	$ 141,786,550
Total ($2019)	**$ 268,436,780**	**$ 202,327,050**	**$ 470,763,830**

Direct Developer's Costs

Area	Water	Sanitary	Total
Ancaster	$ -	$ 838,000	$ 838,000
Waterdown	$ 408,000	$ 714,000	$ 1,122,000
Binbrook	$ 729,000	$ 619,000	$ 1,348,000
A.E.G.D./Mt. Hope	$ 3,636,000	$ 3,294,000	$ 6,930,000
Hamilton Mountain	$ 1,492,000	$ 532,000	$ 2,024,000
Stoney Creek Upper	$ 3,605,000	$ 3,107,000	$ 6,712,000
Stoney Creek Lower	$ -	$ 362,000	$ 362,000
City Wide Projects	$ -	$ -	$ -
Total ($2019)	**$ 9,870,000**	**$ 9,466,000**	**$ 19,336,000**

Post Period Benefit Costs

Area	Water	Sanitary	Total
Ancaster	$ 672,500	$ 741,000	$ 1,413,500
Waterdown	$ 811,000	$ 300,800	$ 1,111,800
Binbrook	$ -	$ -	$ -
A.E.G.D./Mt. Hope	$ -	$ -	$ -
Hamilton Mountain	$ 6,636,970	$ 8,840,000	$ 15,476,970
Stoney Creek Upper	$ 30,015,250	$ 18,279,000	$ 48,294,250
Stoney Creek Lower	$ -	$ 2,009,400	$ 2,009,400
City Wide Projects	$ 5,636,700	$ -	$ 5,636,700
Total ($2019)	**$ 43,772,420**	**$ 30,170,200**	**$ 73,942,620**

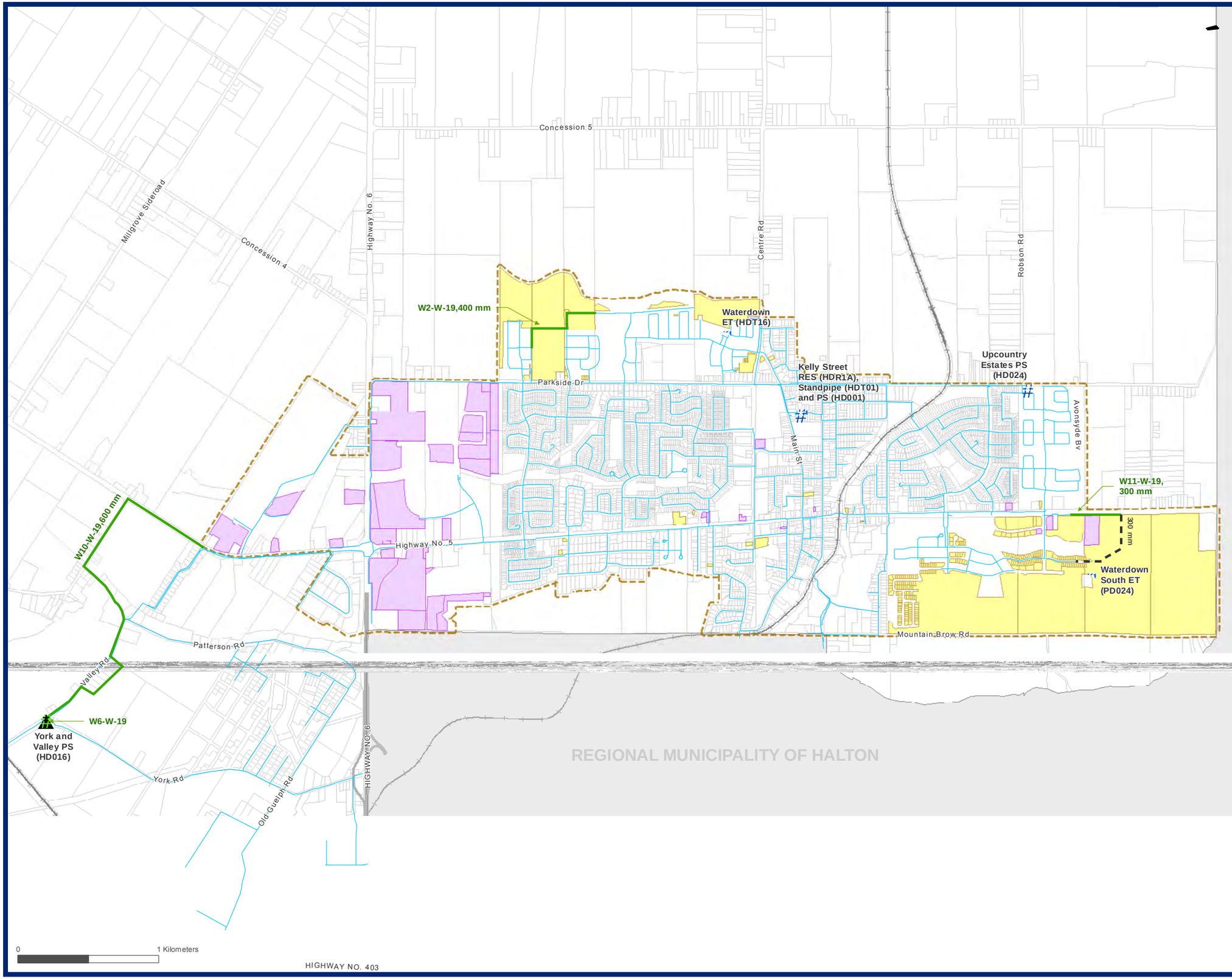
Attachment A ς Water Projects

TABLE F-1 - WATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2019)	Direct Developer Contribution ($2019)	Benefit to Existing	Benefit to Existing ($2019)	Post Period Benefit (%)	Post Period Benefit ($2019)	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
WATERDOWN																				
Waterdown	0 to 5 years	W2-W-19	New Road	Sadielou Blvd	Mosaic Dr	700	400	**$ 680,000**	$ 408,000	0%	$ -	0%	$ -	**$ 272,000**		X	X	X		Updated length and alignment, updated unit cost (inflation)
Waterdown	0 to 5 years	W6-W-19	HD016 Booster Station Upgrade, Back Up Power and Building Expansion	208 L/s	309 L/s		4 x 103 L/s	**$ 8,510,000**	$ -	10%	$ 851,000	0%	$ -	**$ 7,659,000**		X				Updated cost based on City Capital Budget
Waterdown	0 to 5 years	W10-W-19	PD16 Feedermain - Valley Rd and Rock Chapel Rd	PS HD016	Dundas St/Algonquin Ave	2900	600	**$ 10,813,000**	$ -	25%	$ 2,703,000	10%	$ 811,000	**$ 7,299,000**		X		X		Updated cost - inflation only; slight alignment update
Waterdown	0 to 5 years	W11-W-19	Up Country Estates - Dundas St	575 m west of Evans Ave	210 m west of Evans Ave	365	300	**$ 411,000**	$ -	0%	$ -	0%	$ -	**$ 411,000**		X	X	X		Updated length, updated unit cost (inflation)
Sub-Total Waterdown								**$ 20,414,000**	**$ 408,000**		**$ 3,554,000**		**$ 811,000**	**$ 15,641,000**						
ANCASTER																				
Ancaster	0 to 5 years	A1-W-19	Garner Rd	Southcote Rd	Fiddlers Green Rd	2060	600	**$ 9,936,000**	$ -	0%	$ -	0%	$ -	**$ 9,936,000**		X				Updated cost - inflation only
Ancaster	0 to 5 years	A2-W-19	Shaver Rd	Westview Ave	Katsura Pl	800	300	**$ 902,000**	$ -	75%	$ 677,000	0%	$ -	**$ 225,000**	X	X	X			Updated extents, updated unit cost (inflation)
Ancaster	0 to 5 years	A4-W-19	Ancaster Industrial Park - South Connection	McClure Rd Extension WM	Cormorant Dr (via Hydro Easement)	900	300	**$ 525,000**	$ -	0%	$ -	0%	$ -	**$ 525,000**		X		X		Updated length, updated unit cost (inflation)
Ancaster	0 to 5 years	A16-W-19	Garner Rd	Fiddlers Green Rd	Hamilton Dr	1680	600	**$ 3,755,000**	$ -	0%	$ -	0%	$ -	**$ 3,755,000**		X		X		Diameter updated from 500mm to 600mm; unit cost updated (inflation)
Ancaster	0 to 5 years	A17-W-19	Garner Rd	Hamilton Dr	Wilson St W	1800	500	**$ 3,236,000**	$ -	0%	$ -	0%	$ -	**$ 3,236,000**		X				Updated unit cost - inflation only
Ancaster	0 to 5 years	A18-W-19	Reservoir W-H 18 (additional elevated storage) AEGD Proj B-20	North of Jerseyville Road - Final location to be determined			9.9 ML	**$ 13,450,000**	$ -	50%	$ 6,725,000	10%	$ 672,500	**$ 6,052,500**	X	X	X			Updated capcity, location. Cost updated based on City Design Sheet
Sub-Total Ancaster								**$ 31,804,000**	**$ -**		**$ 7,402,000**		**$ 672,500**	**$ 23,729,500**						
AEGD/MT. HOPE																				
AEGD/Mt. Hope	0 to 5 years	MH5-W-19	PD 18 Watermain on Southcote Rd	Garner Rd	383 m South	383	400	**$ 372,000**	$ -	0%	$ -	0%	$ -	**$ 372,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH12-W-19	PD 18 Watermain on Garner Rd and Glancaster Rd	HD018	New Road	400	400	**$ 389,000**	$ -	0%	$ -	0%	$ -	**$ 389,000**		X	X	X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH1-W-19	PD 18 Watermain on Smith Rd	Garner Rd	389 m south	389	300	**$ 227,000**	$ -	0%	$ -	0%	$ -	**$ 227,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH2-W-19	PD 18 Watermain on new road	Southcote Rd	Smith Rd	417	400	**$ 405,000**	$ 243,000	0%	$ -	0%	$ -	**$ 162,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH3-W-19	PD 18 Watermain on Southcote Rd	New road	Hydro Corridor	700	400	**$ 680,000**	$ -	0%	$ -	0%	$ -	**$ 680,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH7-W-19	PD 6 Watermain on Book Rd	372 m east of Smith Rd	Smith Rd	372	400	**$ 361,000**	$ -	0%	$ -	0%	$ -	**$ 361,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH8-W-19	PD 18 Watermain on Southcote Rd	Book Rd	590 m north	590	300	**$ 344,000**	$ -	0%	$ -	0%	$ -	**$ 344,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH9-W-19	PD 18 Watermain on Smith Rd	Book Rd	603 m north	603	300	**$ 352,000**	$ -	0%	$ -	0%	$ -	**$ 352,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH10-W-19	PD 18 Watermain on new road	Smith Rd	421 m east	421	400	**$ 409,000**	$ 245,000	0%	$ -	0%	$ -	**$ 164,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH11-W-14	PD 6 Watermain on Glancaster Rd	Rymal Rd	Twenty Rd	1325	400	**$ 2,124,000**	$ -	0%	$ -	0%	$ -	**$ 2,124,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH13-W-19	PD 18 Watermain on new road	Raymond Rd Extension	863 m west	863	400	**$ 839,000**	$ 503,000	0%	$ -	0%	$ -	**$ 336,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH14-W-19	PD 18 Watermain on new road	Raymond Rd Extension	552 m east	552	400	**$ 536,000**	$ 322,000	0%	$ -	0%	$ -	**$ 214,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH15-W-19	PD 6 Watermain on Dickenson Rd	Garth St Extension	953 m west	953	300	**$ 556,000**	$ -	0%	$ -	0%	$ -	**$ 556,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH16-W-19	PD 18 Watermain on Southcote Rd	Hydro Corridor	293 m south	293	400	**$ 285,000**	$ -	0%	$ -	0%	$ -	**$ 285,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH17-W-19	PD 6 Watermain on Smith Rd	Book Rd	259 m south	259	400	**$ 252,000**	$ -	0%	$ -	0%	$ -	**$ 252,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH18-W-19	PD 18 Watermain on Smith Rd	Hydro Corridor	627 m north	627	300	**$ 366,000**	$ -	0%	$ -	0%	$ -	**$ 366,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH19-W-19	PD 18 Watermain on Smith Rd	Hydro Corridor	350 m south	350	300	**$ 204,000**	$ -	0%	$ -	0%	$ -	**$ 204,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH22-W-19	PD 6 Watermain on Book Rd	Glancaster Rd	595 m west	595	400	**$ 578,000**	$ -	0%	$ -	0%	$ -	**$ 578,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH23-W-19	PD 6 Watermain on Dickenson Rd	Glancaster Rd	598 m east	598	300	**$ 349,000**	$ -	0%	$ -	0%	$ -	**$ 349,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH24-W-19	PD 6 Watermain on new Garth St Extension	Dickenson Rd	837 m north	837	400	**$ 813,000**	$ 488,000	0%	$ -	0%	$ -	**$ 325,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH25-W-19	PD 6 Watermain on Dickenson Rd	Garth St	870 m east	870	300	**$ 507,000**	$ -	0%	$ -	0%	$ -	**$ 507,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH26-W-19	PD 6 Watermain on new Garth St Extension	Glancaster Rd	1365 m east	1365	400	**$ 1,326,000**	$ 796,000	0%	$ -	0%	$ -	**$ 530,000**		X	X			Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH27-W-19	PD 6 Watermain on new Garth St Extension	Dickenson Rd	MH26-W-19	600	400	**$ 583,000**	$ 350,000	0%	$ -	0%	$ -	**$ 233,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH28-W-19	PD 6 Watermain on Smith Rd	265 m south of Book Rd	625 m south of Book Rd	322	400	**$ 313,000**	$ -	0%	$ -	0%	$ -	**$ 313,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH29-W-19	PD 6 Watermain on new Garth St Extension	Twenty Rd	662 m south	662	400	**$ 643,000**	$ 386,000	0%	$ -	0%	$ -	**$ 257,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH30-W-19	PD 6 Watermain on Book Rd	Smith Rd	Southcote Rd	397	400	**$ 386,000**	$ -	0%	$ -	0%	$ -	**$ 386,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH44-W-19	PD 6 Watermain on new Garth St extension	Glancaster Rd	Smith Rd	520	400	**$ 505,000**	$ 303,000	0%	$ -	0%	$ -	**$ 202,000**		X		X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH45-W-19	PD 6 Watermain on Southcote Rd	Book Rd	590 m south	500	300	**$ 292,000**	$ -	0%	$ -	0%	$ -	**$ 292,000**					X	New
AEGD/Mt. Hope	6 years to UBBO	MH46-W-19	PD 6 Watermain on Book Rd	Southcote Rd	420 m west	420	300	**$ 245,000**	$ -	0%	$ -	0%	$ -	**$ 245,000**					X	New
AEGD/Mt. Hope	6 years to UBBO	MH47-W-19	PD 18 Watermain on Book Rd	West of Southcote Rd	East of Smith Rd	1200	300	**$ 700,000**	$ -	0%	$ -	0%	$ -	**$ 700,000**					X	New
Sub-Total AEGD/Mt. Hope								**$ 15,941,000**	**$ 3,636,000**		**$ -**		**$ -**	**$ 12,305,000**						

TABLE F-1 - WATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2019)	Direct Developer Contribution ($2019)	Benefit to Existing	Benefit to Existing ($2019)	Post Period Benefit (%)	Post Period Benefit ($2019)	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
BINBROOK																				
Binbrook	0 to 5 years	B2-W-19	HD 019 Pumping Station Expansion	Regional Rd 56				**$ 1,650,000**	$ -	0%	$ -	0%	$ -	**$ 1,650,000**	X	X				Updated cost based on City Capital Budget
Binbrook	0 to 5 years	B4-W-19	Pumpkin Pass	West end of Cutts Cres and Pumpkin Pass	Fletcher Rd	400	400	**$ 389,000**	$ 233,000	0%	$ -	0%	$ -	**$ 156,000**		X	X	X		Updated length, updated unit cost (inflation)
Binbrook	0 to 5 years	B5-W-19	Fletcher Rd	Binbrook Rd	Pumpkin Pass	400	400	**$ 389,000**	$ -	0%	$ -	0%	$ -	**$ 389,000**		X				Updated unit cost - inflation only
Binbrook	0 to 5 years	B6-W-19	Binbrook Rd	West of Royal Winter Blvd	Fletcher Rd	850	400	**$ 826,000**	$ -	0%	$ -	0%	$ -	**$ 826,000**		X	X	X		Updated length, updated unit cost (inflation)
Binbrook	0 to 5 years	B7-W-19	Binbrook Trunk Feedermain - Fletcher's Rd and Cemetery Rd	Hydro Corridor	HD019	6950	400	**$ 6,753,000**	$ -	0%	$ -	0%	$ -	**$ 6,753,000**		X	X			Updated unit cost - inflation only
Binbrook	0 to 5 years	B8-W-19	Fletcher Rd	Binbrook Rd	Binhaven Boulevard Extension	650	400	**$ 632,000**	$ -	0%	$ -	0%	$ -	**$ 632,000**		X	X			Updated unit cost - inflation only
Binbrook	0 to 5 years	B9-W-19	Binhaven Boulevard Extension	Brigham Ave	Fletcher Rd	850	400	**$ 826,000**	$ 496,000	0%	$ -	0%	$ -	**$ 330,000**		X	X	X		Updated length, updated unit cost (inflation)
Sub-Total Binbrook								**$ 11,465,000**	**$ 729,000**		**$ -**		**$ -**	**$ 10,736,000**						
HAMILTON MOUNTAIN																				
Hamilton Mountain	0 to 5 years	HM2-W-19	Terni Blvd extension	140m West of Upper Gage Ave	Miles Rd	430	400	**$ 418,000**	$ 251,000	0%	$ -	0%	$ -	**$ 167,000**		X	X	X		Updated length, updated unit cost (inflation)
Hamilton Mountain	0 to 5 years	HM3-W-19	Terni Blvd extension	Miles Rd	300m west	300	400	**$ 292,000**	$ 175,000	0%	$ -	0%	$ -	**$ 117,000**	X	X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM4-W-19	Miles Rd	West extension of Terni Blvd	East extension of Terni Blvd	50	400	**$ 80,000**	$ -	0%	$ -	0%	$ -	**$ 80,000**	X	X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM5-W-19	Vineberg Dr	140m east of Upper Wentworth St	570m east of Upper Wentworth St	430	400	**$ 418,000**	$ 251,000	0%	$ -	0%	$ -	**$ 167,000**		X		X		Updated length, updated unit cost (inflation)
Hamilton Mountain	0 to 5 years	HM8-W-19	Twenty Rd Extension	Glover Rd	Trinity Church Rd	580	400	**$ 564,000**	$ 338,000	0%	$ -	0%	$ -	**$ 226,000**		X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM12-W-19	Nebo Rd	Dickenson Rd	Hydro Corridor	350	300	**$ 395,000**	$ -	0%	$ -	0%	$ -	**$ 395,000**		X	X	X		Updated length, updated unit cost (inflation)
Hamilton Mountain	0 to 5 years	HM13-W-19	Dickenson Rd	Nebo Rd	800m east of Nebo Rd.	800	300	**$ 902,000**	$ -	0%	$ -	0%	$ -	**$ 902,000**	X	X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM15-W-19	Dartnall Rd and new road alignment	Twenty Rd	Dickenson Rd	1475	300	**$ 860,000**	$ -	0%	$ -	0%	$ -	**$ 860,000**		X	X	X		Updated length, updated unit cost (inflation)
Hamilton Mountain	0 to 5 years	HM18-W-19	Extension of Terni Blvd	590m east of Upper Wentworth St	300m west of Miles Rd	450	400	**$ 437,000**	$ 262,000	0%	$ -	0%	$ -	**$ 175,000**	X	X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM20-W-19	Stone Church Trunk Feedermain	First Rd W	HD06B	5420	1050	**$ 28,269,700**	$ -	0%	$ -	10%	$ 2,826,970	**$ 25,442,730**	X	X	X	X		Updated alignment; cost update from City
Hamilton Mountain	0 to 5 years	HM26-W-19	Rymal Rd E	Nebo Rd	Dartnall Rd	550	300	**$ 620,000**	$ -	0%	$ -	0%	$ -	**$ 620,000**		X		X		Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM28-W-19	PD7 Elevated Tank	Trinity Church Rd/ Twenty Rd (Exact location to be determined)			9.9 ML	**$ 15,240,000**	$ -	0%	$ -	25%	$ 3,810,000	**$ 11,430,000**		X	X	X		Updated capcity, location. Cost updated based on City Project Sheet
Hamilton Mountain	6 years to UBBO	HM1-W-19	Crerar Dr	160m North of Stone Church Rd	Stone Church Rd	160	400	**$ 155,000**	$ 93,000	0%	$ -	0%	$ -	**$ 62,000**		X				Updated unit cost - inflation only
Hamilton Mountain	6 years to UBBO	HM21-W-19	New East-West alignment	Upper Sherman Ave	Acadia Dr	210	400	**$ 204,000**	$ 122,000	0%	$ -	0%	$ -	**$ 82,000**		X	X	X		Updated length, updated unit cost (inflation)
Hamilton Mountain	6 years to UBBO	HM27-W-19	Upper Wentworth / Turner Park / Twenty Rd	South Limit at Hydro Corridor	Springside Dr	1980	400	**$ 1,924,000**	$ -	0%	$ -	0%	$ -	**$ 1,924,000**	X	X				Updated unit cost - inflation only
Sub-Total Hamilton Mountain								**$ 50,778,700**	**$ 1,492,000**		**$ -**		**$ 6,636,970**	**$ 42,649,730**						
STONEY CREEK UPPER																				
Stoney Creek Upper	0 to 5 years	SCU6-W-19	First Rd W	Green Mountain Rd	Glover Mountain Rd	855	400	**$ 831,000**	$ 498,000	0%	$ -	0%	$ -	**$ 333,000**		X	X	X		Updated length, updated unit cost (inflation)
Stoney Creek Upper	0 to 5 years	SCU12-W-19	PD5 Trunk Feedermain - Valve Chamber to Mud St	Valve Chamber 3B	Mud St W	2500	1200	**$ 11,400,000**	$ -	0%	$ -	10%	$ 1,140,000	**$ 10,260,000**		X	X	X		Updated length and alignment, updated cost from City
Stoney Creek Upper	0 to 5 years	SCU16-W-19	Upper Mount Albion Rd	235 m south of Highland Rd W	Highland Rd W	235	300	**$ 265,000**	$ -	0%	$ -	0%	$ -	**$ 265,000**		X	X			Updated unit cost - inflation only
Stoney Creek Upper	0 to 5 years	SCU18-W-19	PS W-H5A Upgrades					**$ 20,870,000**	$ -	25%	$ 5,217,500	10%	$ 1,565,250	**$ 14,087,250**		X				Updated cost from City Detail Sheet
Stoney Creek Upper	0 to 5 years	SCU23-W-19	PD5 Trunk Feedermain - HD05A to Valve Chamber	HD05A	Valve Chamber 3B	240	1200	**$ 5,670,000**		0%		0%		**$ 5,670,000**					X	New
Stoney Creek Upper	6 years to UBBO	SCU7-W-19	Highland Reservoir HDR07 (additional storage)				5.5 ML	**$ 12,420,000**	$ -	0%	$ -	25%	$ 3,105,000	**$ 9,315,000**		X				Cost based on City Project Sheet
Stoney Creek Upper	6 years to UBBO	SCU17-W-19	Elfrida Distribution Network					**$ 27,695,000**	$ 3,107,000	0%	$ -	66%	$ 18,279,000	**$ 6,309,000**		X				Updated cost - inflation only
Stoney Creek Upper	6 years to UBBO	SCU21-W-19	New Zone 7 Booster Pumping Station	Upper Centennial Pkwy and Rymal Rd E			55 MLD	**$ 19,480,000**	$ -	0%	$ -	25%	$ 4,870,000	**$ 14,610,000**		X				Updated capcity. Cost updated based on City Project Sheet
Stoney Creek Upper	6 years to UBBO	SCU22-W-19	Upper Centennial Pkwy	Mud St	New PD 7 Booster Station	1890	600	**$ 4,224,000**	$ -	0%	$ -	25%	$ 1,056,000	**$ 3,168,000**		X	X	X		Updated length, updated unit cost (inflation)
Sub-Total Stoney Creek Upper								**$ 102,855,000**	**$ 3,605,000**		**$ 5,217,500**		**$ 30,015,250**	**$ 64,017,250**						
STONEY CREEK LOWER																				
Stoney Creek Lower	0 to 5 years	SCL4-W-19	Replacement on Lewis Rd	Hwy 8	Barton St	500	300	**$ 564,000**	$ -	0%	$ -	0%	$ -	**$ 564,000**	X	X				Updated cost - inflation only
Stoney Creek Lower	0 to 5 years	SCL6-W-19	Glover Rd	Barton St	Service Rd Extension	700	300	**$ 789,000**	$ -	0%	$ -	0%	$ -	**$ 789,000**		X				Updated cost - inflation only
Stoney Creek Lower	6 years to UBBO	SCL7-W-19	Millen Rd	South Service Rd	Arvin Ave	670	400	**$ 1,074,000**	$ -	0%	$ -	0%	$ -	**$ 1,074,000**		X		X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	6 years to UBBO	SCL8-W-19	South Service Rd	Fruitland Rd	Jones Rd	950	400	**$ 1,523,000**	$ -	0%	$ -	0%	$ -	**$ 1,523,000**		X		X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	6 years to UBBO	SCL9-W-19	South Service Rd	Millen Rd	Seaman St	1600	400	**$ 2,565,000**	$ -	0%	$ -	0%	$ -	**$ 2,565,000**		X				Updated cost - inflation only
Stoney Creek Lower	6 years to UBBO	SCL10-W-19	Dewitt Rd	CNR Tracks	Barton St	610	300	**$ 688,000**	$ -	0%	$ -	0%	$ -	**$ 688,000**		X				Updated cost - inflation only
Stoney Creek Lower	6 years to UBBO	SCL11-W-19	Jones Rd	South Service Rd	Barton St	915	400	**$ 1,467,000**	$ -	0%	$ -	0%	$ -	**$ 1,467,000**		X				Updated cost - inflation only
Sub-Total Stoney Creek Lower								**$ 8,670,000**	**$ -**		**$ -**		**$ -**	**$ 8,670,000**						
Total Water								**$ 241,927,700**	**$ 9,870,000**		**$ 16,173,500**		**$ 38,135,720**	**$ 177,748,480**						



Integrated Water / Wastewater and Stormwater Master Plans

General Features

- Highways
- Railways
- Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Water Infrastructure

- Water Treatment Plant
- Pumping Station
- Reservoir
- Water Tower
- Watermains

Future Water Infrastructure

- Pumping Stations 0 - 5 Years
- Water Tower 0 - 5 Years
- Watermains 0 - 5 Years
- Pumping Stations 6 Plus Years
- Reservoir 6 Plus Years
- Watermains 6 Plus Years
- Watermains - 100% Direct Development Contribution

Figure 1-1

Waterdown Watermain

Development Charges Background Study

November, 2018
717010-W-01616A
NAD 1983 UTM Zone 17N

Rymal and Glancaster RES (HDR18) and PS (HD018)

MH12-W-19, 400 mm
MH14-W-19, 400 mm
MH11-W-19, 400 mm
MH13-W-19, 400 mm
MH1-W-19, 300 mm
MH10-W-19, 400 mm
MH15-W-19, 400 mm
MH2-W-19, 400 mm
MH18-W-19, 300 mm
MH3-W-19, 400 mm
MH19-W-19, 300 mm
MH16-W-19, 400 mm
MH9-W-19, 300 mm
MH8-W-19, 300 mm
MH47-W-19, 300 mm
MH22-W-19, 400 mm
MH7-W-19, 400 mm
MH17-W-19, 400 mm
MH30-W-19, 400 mm
MH28-W-19, 400 mm
MH46-W-19, 300 mm
MH44-W-19, 400 mm
MH45-W-19, 300 mm
MH29-W-19, 400 mm
MH24-W-19, 400 mm
MH23-W-19, 300 mm
MH15-W-19, 300 mm
MH25-W-19, 300 mm
MH26-W-19, 400 mm
MH27-W-19, 400 mm
300 mm

Rymal Rd
Garth St
Twenty Rd
Glancaster Rd
Upper James St
Dickenson Rd
English Church Rd
Book Rd
Fiddler's Green Rd
Airport Rd
Homestead Dr
Butter Rd
White Church Rd
HIGHWAY NO 403
HIGHWAY NO 6
Stonehenge Dr
Kitty Murray Ln
John Frederick Dr
Southcote Rd
Garner Rd

0 1 Kilometers

Integrated Water / Wastewater and Stormwater Master Plans

General Features

- Highways
- Railways
- Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Water Infrastructure

- Water Treatment Plant
- Pumping Station
- Reservoir
- Water Tower
- Watermains

Future Water Infrastructure

- Pumping Stations 0 - 5 Years
- Water Tower 0 - 5 Years
- Watermains 0 - 5 Years
- Pumping Stations 6 Plus Years
- Reservoir 6 Plus Years
- Watermains 6 Plus Years
- Watermains - 100% Direct Development Contribution

Figure 1-3

AEGD/Mount Hope Watermain

Development Charges Background Study

November, 2018
717010-W-016C
NAD 1983 UTM Zone 17N

Integrated Water / Wastewater and Stormwater Master Plans

General Features

- Highways
- Railways
- Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Water Infrastructure

- Water Treatment Plant
- Pumping Station
- Reservoir
- Water Tower
- Watermains

Future Water Infrastructure

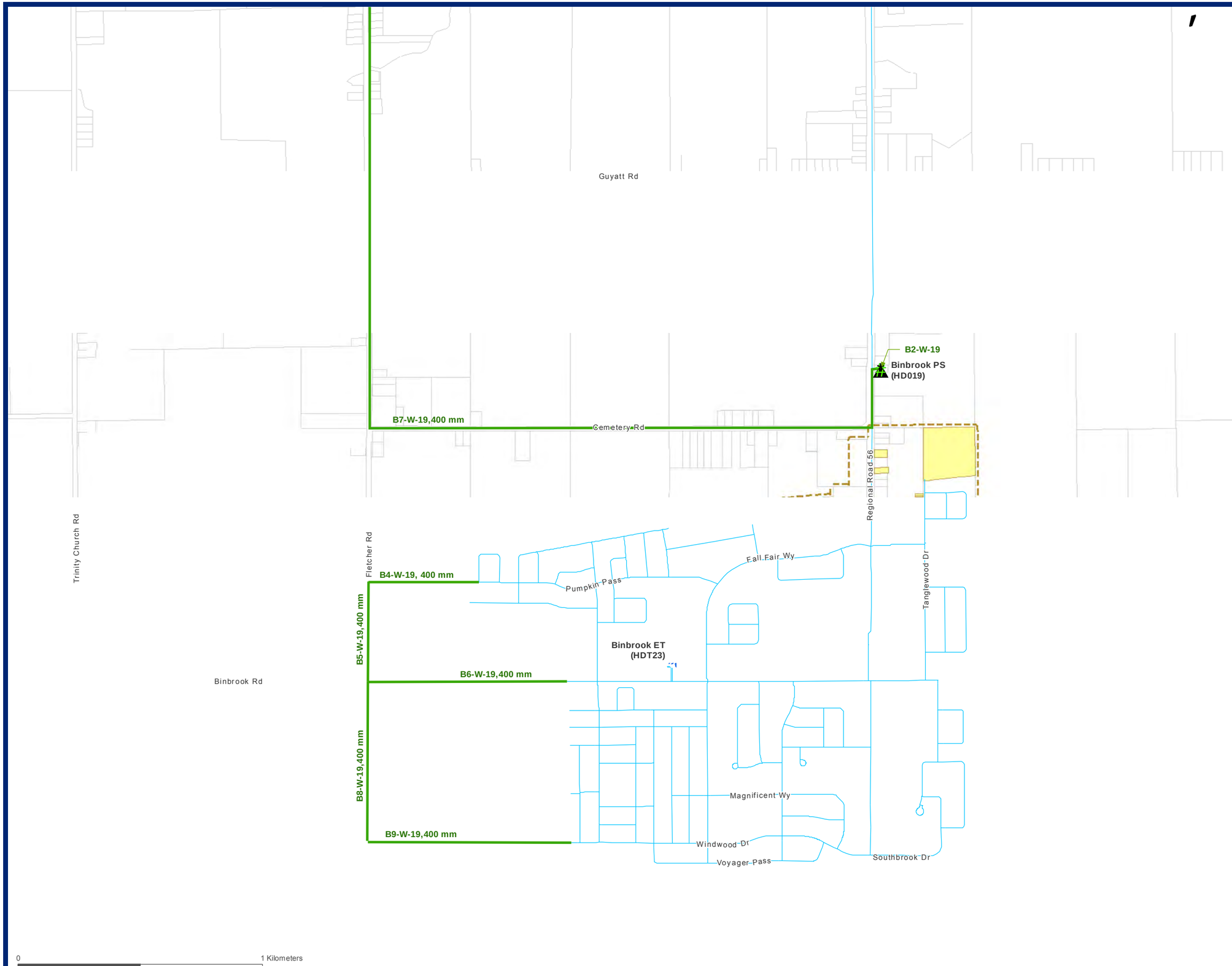
- Pumping Stations 0 - 5 Years
- Water Tower 0 - 5 Years
- Watermains 0 - 5 Years
- Pumping Stations 6 Plus Years
- Reservoir 6 Plus Years
- Watermains 6 Plus Years
- Watermains - 100% Direct Development Contribution

Figure 1-4

Binbrook Watermain

Development Charges Background Study

November, 2018
717010-W-01616D
NAD 1983 UTM Zone 17N



Attachment B ς Water City Wide Projects

TABLE F-2 - WATER CAPITAL PROGRAM - CITYWIDE

Area	Planning Period	Project ID	Project	Description	Estimated Total Cost	Direct Developer Contribution	City Cost Share	Post Period Benefit	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
City Wide Projects	0 to 5 years	CW1-W-19	Oversizing of Infrastructure-Watermains	Oversizing of servicing infrastructure within subdivisions	$ 306,000	$ -	$ -	$ -	$ 306,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW2-W-19	Regional Subdivider's Share for Local Improvements		$ 1,161,000	$ -	$ -	$ -	$ 1,161,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW3-W-19	Intensification Infrastructure Upgrades - Water (0-5 years)	Upgrades to existing infrastructure to accommodate intensification	$ 15,000,000	$ -	$ 7,500,000	$ -	$ 7,500,000		X		X		Updated cost; increased to account for additional anticipated intensification costs
City Wide Projects	0 to 5 years	CW5-W-19	HD12A Governor's Rd Pumping Station Upgrades	Additional pumping capacity new pump and new standby power (3ML/d)	$ 3,518,000	$ -	$ -	$ -	$ 3,518,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW6-W-19	Governor's Rd PD 11 Watermain Extension	Twin Watermain feeding HD12A (220 m 400mm)	$ 1,560,000	$ -	$ -	$ -	$ 1,560,000		X				Updated Cost - City Estimate
City Wide Projects	0 to 5 years	CW7-W-19	Governor's Rd PD 22 Watermain Extension	New watermain from HD12A to PD22 on Governor's Rd and Moss Blvd (1000m 300 mm)	$ 1,340,000	$ -	$ -	$ -	$ 1,340,000		X				Updated Cost - City Estimate
City Wide Projects	0 to 5 years	CW12-W-19	Woodward WTP	Sedimentation Tank and Pre-Chlorination Upgrades (MP W-17 & W-18)	$ 56,367,000	$ -	$ -	$ 5,636,700	$ 50,730,300		X				Updated Cost - City Estimate
City Wide Projects	0 to 5 years	CW14-W-19	Oversizing of Infrastructure-Watermains	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	$ 7,261,000	$ -	$ -	$ -	$ 7,261,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW15-W-19	Large diameter and cut-in valves on existing watermains		$ 1,405,000	$ -	$ -	$ -	$ 1,405,000		X		X		Updated cost and combined with previous project CW13
City Wide Projects	0 to 5 years	CW23-W-19	Master Plan and additional studies		$ 1,000,000				$ 1,000,000					X	New
City Wide Projects	0 to 5 years	CW24-W-19	Freelton Well (FDF01) Capacity Increase	Increase the capacity of the Freelton municipal well in order to meet the ultimate water demand of the Freelton Rural Settlement Area	$ 3,530,000	$ -	$ 417,000	$ -	$ 3,113,000					X	New
City Wide Projects	6 years to UBBO	CW4-W-19	Intensification Infrastructure Upgrades - Water	Upgrades to existing infrastructure to accommodate intensification	$ 15,000,000	$ -	$ 7,500,000	$ -	$ 7,500,000		X		X		Updated cost; increased to account for additional anticipated intensification costs
City Wide Projects	6 years to UBBO	CW11-W-19	Locke St Watermain	Locke St from Barton St to Main St (1500 m; 500 mm)	$ 4,294,000	$ -	$ -	$ -	$ 4,294,000		X		X		
Total Water CityWide					**$ 111,742,000**	**$ -**	**$ 15,417,000**	**$ 5,636,700**	**$ 90,688,300**						

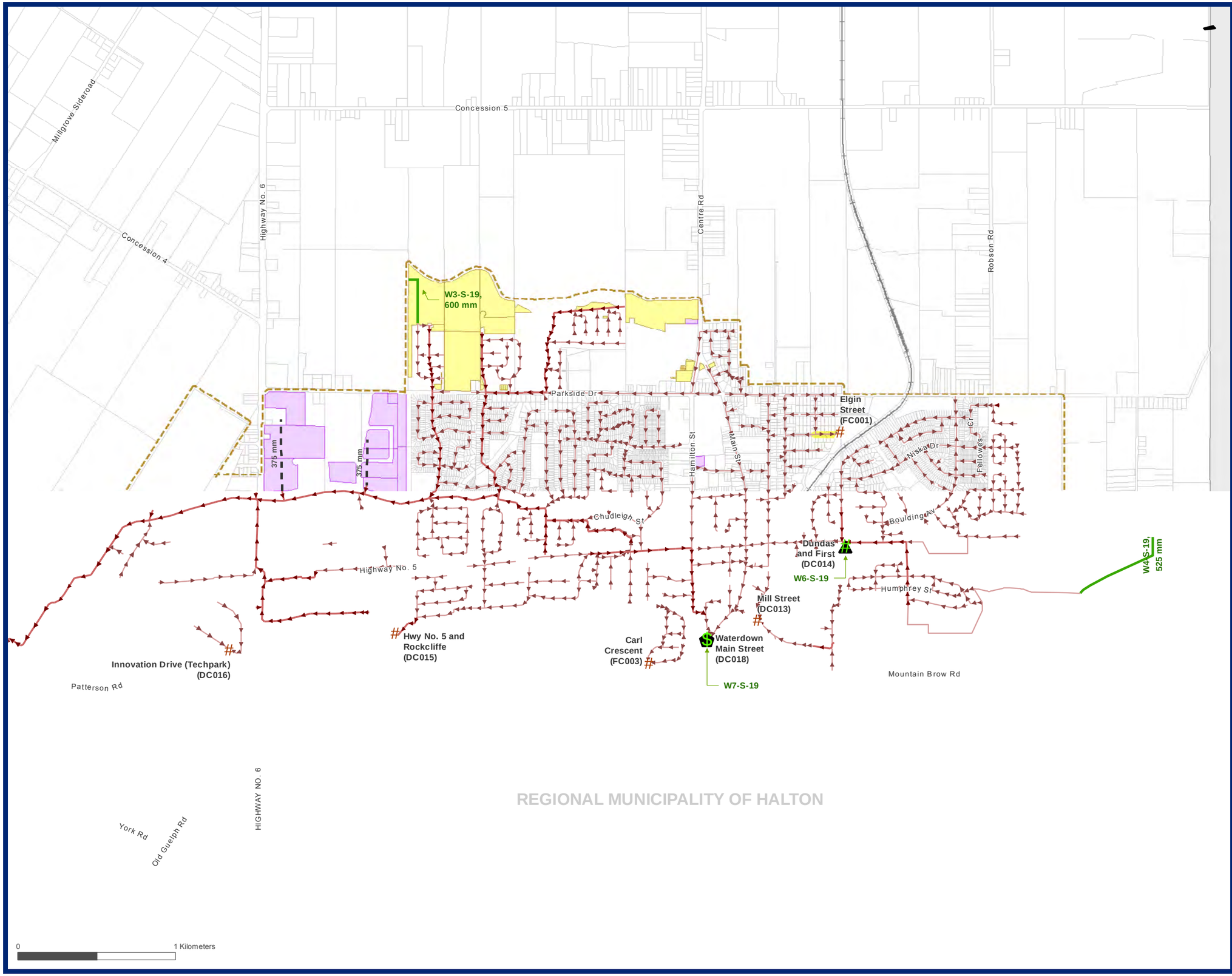
Attachment C ς Wastewater Projects

TABLE F-3 - WASTEWATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2019)	Direct Developer Contribution ($2019)	Benefit to Existing (%)	Benefit to Existing ($2019)	Post Period Benefit (%)	Post Period Benefit ($2019)	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
WATERDOWN																				
Waterdown	0 to 5 years	W3-S-19	Waterdown North Area	McCurdy Ave	Northerly	340	600	**$ 291,000**	$ 248,000	0%	$ -	0%	$ -	**$ 43,000**		X		X		Updated length, updated unit cost (inflation)
Waterdown	0 to 5 years	W4-S-19	Waterdown South Sewer	Dundas St and Evans Ave	300 m south and 300 m west of Dundas St and Evans Ave	640	525	**$ 498,000**	$ 466,000	0%	$ -	0%	$ -	**$ 32,000**		X	X	X		Updated length and alignment. Updated unit cost (inflation)
Waterdown	0 to 5 years	W6-S-19	DC014- Existing Pump Capacity & Wet Well upgrade at 1st St./ Hwy 5	Increase capacity from 283 L/s (measured) to 456 L/s with 3 replacement pumps			456 L/s	**$ 4,930,000**	$ -	39%	$ 1,922,000	10%	$ 300,800	**$ 2,707,200**	X	X		X		Updated cost based on City Capital Budget
Waterdown	0 to 5 years	W7-S-19	Waterdown WWTP Decommissioning					**$ 6,000,000**	$ -	90%	$ 5,400,000	0%	$ -	**$ 600,000**		X				Updated cost based on City Capital Budget
Sub-Total Waterdown								**$ 11,719,000**	**$ 714,000**		**$ 7,322,000**		**$ 300,800**	**$ 3,382,200**						
ANCASTER																				
Ancaster	0 to 5 years	A13-S-19	Ancaster Industrial Park Area- Hydro Corridor	Shaver Rd	New road	820	450	**$ 863,000**	$ -	0%	$ -	0%		**$ 863,000**		X	X	X		Updated length and alignment. Updated unit cost (inflation)
Ancaster	0 to 5 years	A15-S-14	HC011-Calvin St SPS Upgrades	Capacity Expansion to 118 L/s			118 L/s	**$ 3,500,000**	$ -	50%	$ 1,750,000	0%	$ -	**$ 1,750,000**		X		X		Updated Cost based on City Estimates
Ancaster	0 to 5 years	A17-S-19	Area north of Garner Rd E / between Silver Maple Dr and Hwy 6	Garner Rd	30 m east of Silver Maple Dr	410	600	**$ 351,000**	$ 299,000	0%	$ -	0%	$ -	**$ 52,000**	X	X	X	X		Updated length, updated unit cost (inflation)
Ancaster	0 to 5 years	A20-S-19	Cormorant Rd extension	Tradewind Dr	Trinity Rd	740	1050	**$ 1,280,000**	$ 539,000	0%	$ -	58%	$ 741,000	**$ -**		X	X	X		Updated length, updated unit cost (inflation)
Ancaster	0 to 5 years	A21-S-19	Shaver Rd	Osprey Dr	Hydro Corridor	840	375	**$ 596,000**	$ -	0%	$ -	0%	$ -	**$ 596,000**					X	New
Sub-Total Ancaster								**$ 6,590,000**	**$ 838,000**		**$ 1,750,000**		**$ 741,000**	**$ 3,261,000**						
AEGD/MT. HOPE																				
AEGD/Mt. Hope	0 to 5 years	MH1-S-19	Twenty Rd	Silverbirch Blvd	Upper James St	2000	450	**$ 2,896,000**	$ -	0%	$ -	0%	$ -	**$ 2,896,000**		X				Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	0 to 5 years	MH2-S-19	Southcote Rd	Hydro Corridor	Garner Rd	875	375	**$ 621,000**	$ -	0%	$ -	0%	$ -	**$ 621,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH3-S-19	Garner Rd	Hwy 6	Kitty Murray Ln	1150	375	**$ 1,553,000**	$ -	0%	$ -	0%	$ -	**$ 1,553,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH4-S-19	Garner Rd	Kitty Murray Ln	Springbrook Ave	630	450	**$ 912,000**	$ -	0%	$ -	0%	$ -	**$ 912,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH5-S-19	Smith Rd	Hydro Corridor	Garner Rd	700	375	**$ 497,000**	$ -	0%	$ -	0%	$ -	**$ 497,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH6-S-19	Garner Rd	Springbrook Rd	Raymond Rd	880	600	**$ 1,531,000**	$ -	0%	$ -	0%	$ -	**$ 1,531,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	0 to 5 years	MH22-S-19	HC019 and HC018 Upgrade Strategy					**$ 10,900,000**	$ -	0%	$ -	0%	$ -	**$ 10,900,000**					X	New
AEGD/Mt. Hope	6 years to UBBO	MH10-S-19	Dickenson Rd Trunk Sewer	Garth St Extension	Upper James St	1200	750	**$ 2,670,000**	$ -	0%	$ -	0%	$ -	**$ 2,670,000**		X	X	X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH11-S-19	Book Rd Trunk Sewer	400 m west of Southcote	Smith Rd	830	600	**$ 710,000**	$ -	0%	$ -	0%	$ -	**$ 710,000**		X	X	X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH12-S-19	Smith Rd	Hydro Corridor	Book Rd	950	375	**$ 674,000**	$ -	0%	$ -	0%	$ -	**$ 674,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH13-S-19	Garth St Extension	Smith Rd	Dickenson Rd	2275	525	**$ 3,625,000**	$ 3,294,000	0%	$ -	0%	$ -	**$ 331,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH14-S-19	Glancaster Rd	Airport	Garth St extension	450	375	**$ 319,000**	$ -	0%	$ -	0%	$ -	**$ 319,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH15-S-19	Glancaster Rd	Dickenson Rd	Garth St extension	375	375	**$ 266,000**	$ -	0%	$ -	0%	$ -	**$ 266,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH16-S-19	Glancaster Rd	Book Rd	Dickenson Rd	380	375	**$ 270,000**	$ -	0%	$ -	0%	$ -	**$ 270,000**		X		X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH17-S-19	Dickenson Rd	Garth St Extension	Smith Rd	2420	600	**$ 2,069,000**	$ -	0%	$ -	0%	$ -	**$ 2,069,000**		X	X	X		Updated length, diameter and unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH18-S-19	Book Rd	Glancaster Rd	Smith Rd	950	375	**$ 674,000**	$ -	0%	$ -	0%	$ -	**$ 674,000**		X		X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH19-S-19	Southcote Rd	Hydro Corridor	Book Rd	875	375	**$ 621,000**	$ -	0%	$ -	0%	$ -	**$ 621,000**		X				Updated unit cost - inflation only
AEGD/Mt. Hope	6 years to UBBO	MH20-S-19	Smith Rd	Book Rd	Garth St extension	675	375	**$ 479,000**	$ -	0%	$ -	0%	$ -	**$ 479,000**		X		X		Updated length, updated unit cost (inflation)
AEGD/Mt. Hope	6 years to UBBO	MH21-S-19	Southcote Rd	Book Rd	Garth St extension	525	375	**$ 372,000**	$ -	0%	$ -	0%	$ -	**$ 372,000**		X		X	X	New - MH21 now gravity sewe - SPS project remvoed
Sub-Total AEGD/Mt. Hope								**$ 31,659,000**	**$ 3,294,000**		**$ -**		**$ -**	**$ 28,365,000**						
BINBROOK																				
Binbrook	0 to 5 years	B2-S-19	PS HC058 Upgrade - Regional Rd. 56 at Southbrook Dr.	Electrical, mechanical upgrades to SPS and replacement of 3 pumps			340 L/s	**$ 1,076,000**	$ -	0%	$ -	0%	$ -	**$ 1,076,000**		X				Updated cost - inflation only
Binbrook	0 to 5 years	B10-S-19	Windwood Dr Extension	Fletcher Rd	Brigham Ave	850	600	**$ 727,000**	$ 619,000	0%	$ -	0%	$ -	**$ 108,000**		X	X	X		Updated length, updated unit cost (inflation)
Binbrook	0 to 5 years	B11-S-19	Binbrook Rd	Fletcher Rd	Brigham Ave	850	375	**$ 603,000**	$ -	0%	$ -	0%	$ -	**$ 603,000**					X	Updated alignment, updated unit cost (inflation)
Sub-Total Binbrook								**$ 2,406,000**	**$ 619,000**		**$ -**		**$ -**	**$ 1,787,000**						

TABLE F-3 - WASTEWATER CAPITAL PROGRAM

Area	Planning Period	Project ID	Project/Street	From	To	Length (m)	Size (mm)	Estimated Total Cost ($2019)	Direct Developer Contribution ($2019)	Benefit to Existing (%)	Benefit to Existing ($2019)	Post Period Benefit (%)	Post Period Benefit ($2019)	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
HAMILTON MOUNTAIN																				
Hamilton Mountain	0 to 5 years	HM6-S-19	Dartnall Rd extension	Twenty Rd	730 m south	730	525	**$ 567,000**	$ 532,000	0%	$ -	0%	$ -	**$ 35,000**		X	X	X		Updated length, updated unit cost (inflation)
Hamilton Mountain	0 to 5 years	HM9-S-19	Nebo Rd	250 m north of Twenty Rd East	480 m south of Rymal Rd	630	375	**$ 851,000**	$ -	0%	$ -	0%	$ -	**$ 851,000**		X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM10-S-19	Upper Ottawa St	275 m north of Twenty Rd East	350 m south of Rymal Rd	675	375	**$ 479,000**	$ -	0%	$ -	0%	$ -	**$ 479,000**		X				Updated unit cost - inflation only
Hamilton Mountain	0 to 5 years	HM20-S-19	Dickenson Rd Trunk Sewer	Upper James St	Miles Rd	2900	1200	**$ 44,200,000**	$ -	0%	$ -	10%	$ 4,420,000	**$ 39,780,000**	X	X	X	X		Updated scope, length, alignment, cost from City Project Detail Sheet
Hamilton Mountain	0 to 5 years	HM26-S-19	Dickenson Rd Trunk Sewer	Miles Rd	RR 56	6800	1350	**$ 44,200,000**	$ -	0%	$ -	10%	$ 4,420,000	**$ 39,780,000**	X	X	X	X		Updated scope, length, alignment, cost from City Project Detail Sheet
Hamilton Mountain	6 years to UBBO	HM3-S-19	Miles Rd	Connection of sewers east and west of Miles Rd		50	375	**$ 68,000**	$ -	0%	$ -	0%	$ -	**$ 68,000**		X	X	X		Updated length, updated unit cost (inflation)
Sub-Total Hamilton Mountain								**$ 90,365,000**	**$ 532,000**		**$ -**		**$ 8,840,000**	**$ 80,993,000**						
STONEY CREEK UPPER																				
Stoney Creek Upper	0 to 5 years	SCU5-S-19	Rymal Rd	Upper Centennial	2nd Rd West	1650	450	**$ 2,389,000**	$ -	0%	$ -	0%	$ -	**$ 2,389,000**		X		X		Updated diameter, updated unit cost (inflation)
Stoney Creek Upper	6 years to UBBO	SCU11-S-14	Elfrida Collection Network					**$ 27,695,000**	$ 3,107,000	0%	$ -	66%	$ 18,279,000	**$ 6,309,000**		X				Updated cost - inflation only
Sub-Total Stoney Creek Upper								**$ 30,084,000**	**$ 3,107,000**		**$ -**		**$ 18,279,000**	**$ 8,698,000**						
STONEY CREEK LOWER																				
Stoney Creek Lower	0 to 5 years	SCL1-S-19	South Service Rd	50 m east of Fifty Road	200 m east of Winona Rd	590	600	**$ 1,910,000**	$ -	0%	$ -	0%	$ -	**$ 1,910,000**		X	X	X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	0 to 5 years	SCL2-S-19	Forcemain- South Service Rd	New SPS	30 m west	30	150	**$ 17,000**	$ -	0%	$ -	0%	$ -	**$ 17,000**		X	X	X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	0 to 5 years	SCL3-S-19	New Sewage Pumping Station at South Service Rd, east of Fifty Rd					**$ 352,000**	$ -	0%	$ -	0%	$ -	**$ 352,000**		X				Updated cost - inflation only
Stoney Creek Lower	0 to 5 years	SCL11-S-19	Centennial Trunk Sewer	King St	ESI at Kenora Ave	3510	1500	**$ 17,324,000**	$ -	0%	$ -	10%	$ 1,732,400	**$ 15,591,600**		X				Updated cost - inflation only
Stoney Creek Lower	0 to 5 years	SCL14-S-19	South Service Rd	50 m east of Fifty Road	500 m east	500	450	**$ 724,000**	$ 362,000	0%	$ -	0%	$ -	**$ 362,000**		X	X	X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	0 to 5 years	SCL17-S-19	Fifty Rd	South Service Rd	475 m south	475	675	**$ 1,387,000**	$ -	0%	$ -	20%	$ 277,000	**$ 1,110,000**		X	X	X		Updated length, updated unit cost (inflation)
Stoney Creek Lower	0 to 5 years	SCL18-S-19	Barton St	Jones Rd	470 m east toward Glover	470	450	**$ 680,000**	$ -	0%	$ -	0%	$ -	**$ 680,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL19-S-19	Glover Rd	Hwy 8	500 m north, past Watercourse 7	500	450	**$ 724,000**	$ -	10%	$ 72,000	0%	$ -	**$ 652,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL20-S-19	Barton St	McNeilly Rd	200 m east of McNeilly Rd	200	375	**$ 270,000**	$ -	0%	$ -	0%	$ -	**$ 270,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL21-S-19	Barton St	200 m east of McNeilly Rd	Lewis Rd	600	450	**$ 869,000**	$ -	0%	$ -	0%	$ -	**$ 869,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL22-S-19	Barton St	Lewis Rd	350 m east of Lewis Rd	350	450	**$ 507,000**	$ -	10%	$ 51,000	0%	$ -	**$ 456,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL24-S-19	Barton St	350 m east of Fruitland Rd	200 m east	200	525	**$ 319,000**	$ -	10%	$ 32,000	0%	$ -	**$ 287,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL25-S-19	Jones St	350 south of Barton St	200 m south	200	450	**$ 290,000**	$ -	10%	$ 29,000	0%	$ -	**$ 261,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL26-S-19	Vortex Flow Insert Units for Centennial Trunk Sewer					**$ 800,000**	$ -	0%	$ -	0%	$ -	**$ 800,000**					X	New
Stoney Creek Lower	0 to 5 years	SCL16-S-19	Millen Rd and easement (QEW Crossing)	South Service Rd	North Service Rd	120	450	**$ 1,125,000**	$ -	0%	$ -	0%	$ -	**$ 1,125,000**					X	New
Sub-Total Stoney Creek Lower								**$ 27,298,000**	**$ 362,000**		**$ 184,000**		**$ 2,009,400**	**$ 24,742,600**						
Total Water								**$ 200,121,000**	**$ 9,466,000**		**$ 9,256,000**		**$ 30,170,200**	**$ 151,228,800**						



Integrated Water / Wastewater and Stormwater Master Plans

General Features

- Highways
- Railways
- Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Wastewater Infrastructure

- Wastewater Treatment Plant
- Pumping Station
- Sanitary Trunk
- Sanitary Sewer
- Combined Trunk
- Combined Sewer
- Forcemain

Future Wastewater Infrastructure

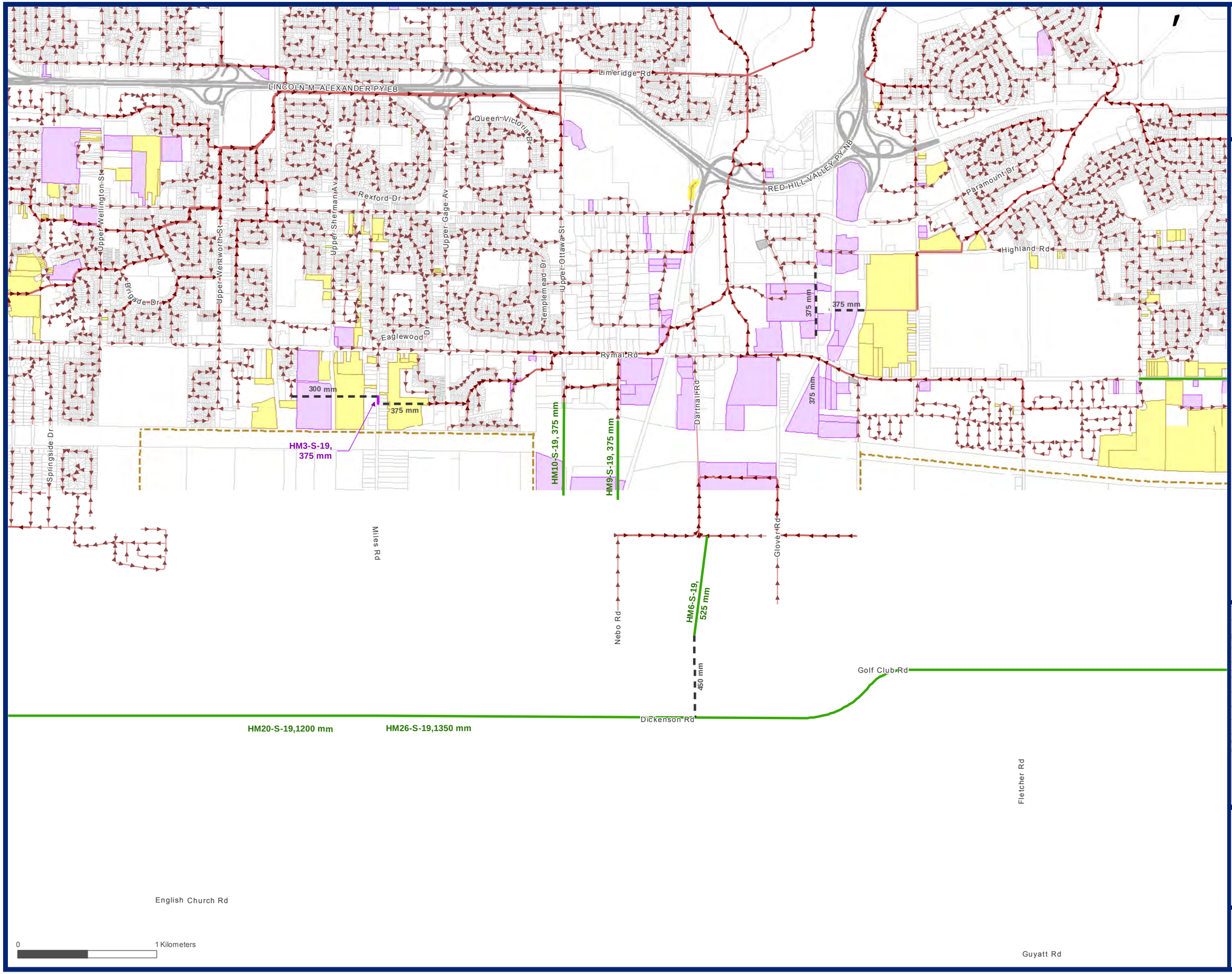
- Pumping Stations 0 - 5 Years
- Wastewater Treatment Plant 0 - 5 Years
- Sanitary Sewers 0 - 5 Years
- Forcemains 0 - 5 Years
- Pumping Stations 6 Plus Years
- Sanitary Sewers 6 Plus Years
- Forcemains 6 Plus Years
- Sanitary Sewers - 100% Direct Development Contribution

Figure 2-1

Waterdown Wastewater

Development Charges Background Study

July, 2018
717010-WW-019A
NAD 1983 UTM Zone 17N



Integrated Water / Wastewater and Stormwater Master Plans

General Features

- Highways
- Railways
- Urban Boundary
- Other Municipalities
- Parking Lot
- Vacant Non-Residential
- Vacant Residential

Existing Wastewater Infrastructure

- Wastewater Treatment Plant
- Pumping Station
- Sanitary Trunk
- Sanitary Sewer
- Combined Trunk
- Combined Sewer
- Forcemain

Future Wastewater Infrastructure

- Pumping Stations 0 - 5 Years
- Wastewater Treatment Plant 0 - 5 Years
- Sanitary Sewers 0 - 5 Years
- Forcemains 0 - 5 Years
- Pumping Stations 6 Plus Years
- Sanitary Sewers 6 Plus Years
- Forcemains 6 Plus Years
- Sanitary Sewers - 100% Direct Development Contribution

Figure 2-5

Hamilton Mountain Wastewater

Development Charges Background Study

November, 2018
717010-WW-019E
NAD 1983 UTM Zone 17N

Attachment D ς Wastewater City Wide Projects

TABLE F-4 - WASTEWATER CAPITAL WASTEWATER CAPITAL PROGRAM-CITYWIDE

Area	Planning Period	Project ID	Project	Description	Estimated Total Cost	Direct Developer Contribution	City Cost Share	Post Period Benefit	Development Charges ($2019)	Updated Timing	Updated Cost	Scope Change: Location	Scope Change: Length and/or Size	Project Added	2014-2019 Change Details
City Wide Projects	0 to 5 years	CW1-S-19	Flow Monitoring	Total cost over a period of 2 - 2.5 years. Study being undertaken to know various flow characteristics to calibrate the Sanitary Sewer Model to assist the Master Planning Study	$ 2,448,000	$ -	$ 1,224,000	$ -	$ 1,224,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW2-S-19	I/I Reduction Program	Program to free up extra capacity within the existing sewers - costs over five years	$ 1,574,000	$ -	$ 787,000	$ -	$ 787,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW3-S-19	Annual Operational Improvements Outstations, 5160067052	Operational improvements to wastewater outstations to increase capacities.	$ 611,000	$ -	$ 152,750	$ -	$ 458,250		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW4-S-19	Oversizing of Infrastructure-Sanitary	Oversizing of servicing infrastructure within subdivisions	$ 611,000	$ -	$ -	$ -	$ 611,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW5-S-19	Land requirement for new sewage pumping stations and easements	Areas for SPS footprints and easements- 5 Ha	$ 611,000	$ -	$ -	$ -	$ 611,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW6-S-19	Intensification Infrastructure Upgrades - Wastewater (0-5 years)	Upgrades to existing infrastructure to accommodate intensification	$ 15,000,000	$ -	$ 7,500,000	$ -	$ 7,500,000		X		X		Updated cost; increased to account for additional anticipated intensification costs
City Wide Projects	0 to 5 years	CW15-S-19	Hwy 403 Trunk sewer twinning - Phase 1	MIP to Main-King	$ 8,823,000	$ -	$ -	$ -	$ 8,823,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW18-S-19	Oversizing of Infrastructure-Sanitary	Oversizing of servicing infrastructure for subdivisions not identified on draft plans	$ 1,171,000	$ -	$ -	$ -	$ 1,171,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW19-S-19	Regional Subdivider's Share for Local Improvements		$ 257,000	$ -	$ -	$ -	$ 257,000		X				Updated cost - inflation only
City Wide Projects	0 to 5 years	CW20-S-19	West Harbour Sanitary Pumping Station and Forcemain	New SPS at north end of Pier 7/8, storage tank and twin forcemain discharging to Ferguson/Burlington	$ 15,000,000	$ -	$ 1,500,000	$ -	$ 13,500,000		X				Updated cost - City Estimate
City Wide Projects	0 to 5 years	CW22-S-19	Master Plan and additional studies		$ 1,000,000	$ -	$ -	$ -	$ 1,000,000					X	New
City Wide Projects	6 years to UBBO	CW7-S-19	Intensification Infrastructure Upgrades - Wastewater	Upgrades to existing infrastructure to accommodate intensification	$ 15,000,000	$ -	$ 7,500,000	$ -	$ 7,500,000		X		X		Updated cost; increased to account for additional anticipated intensification costs
City Wide Projects	6 years to UBBO	CW16-S-19	Hwy 403 Trunk sewer twinning - Phase 2	Royal CSO to MIP	$ 7,656,000	$ -	$ -	$ -	$ 7,656,000		X				Updated cost - inflation only
Total					**$ 69,762,000**	**$ -**	**$ 18,663,750**	**$ -**	**$ 51,098,250**						

Attachment E ς Woodward W.W.T.P.

TABLE F-5 - WOODWARD WWTP CAPITAL PROGRAM

		CAPITAL COST					DEVELOPMENT CHARGES						
Project ID	Description	Capital Cost Estimate ($2019)	Internal Staffing Cost Allocation (Not Eligible for Funding)	Capital Cost w Internal Staffing ($)	Grants, Subsidies and Other Contributions Attributable to New Development	Project Cost Less Grants, Subsidies, etc ($)	Growth (%)	Non-Growth (%)	Benefit to Existing ($)	Growth Related Cost ($)	Post Period (%)	Growth - Post Period ($)	Growth - In Period DC APPLICABLE COST ($)
1	Wastewater Pumping Station	$ 94,537,613	$ 1,436,662	$ 95,974,275	$ 56,987,925	$ 38,986,350	18.84%	81.16%	$ 31,641,095	$ 7,345,254	25.00%	$ 1,836,314	$ 5,508,941
2a	Primary Clarifier - Primary Treatment (Phase 1 - C.E.P.T.) - Engineering Included	$ 16,255,669	$ -	$ 16,255,669	$ 5,195,046	$ 11,060,623	18.84%	81.16%	$ 8,976,738	$ 2,083,885	25.00%	$ 520,971	$ 1,562,914
2b	Primary Clarifier - Primary Treatment (Phase 2 - Tanks) - Engineering Included	$ 52,246,549	$ -	$ 52,246,549	$ 34,831,033	$ 17,415,516	18.84%	81.16%	$ 14,134,332	$ 3,281,184	25.00%	$ 820,296	$ 2,460,888
2c	Primary Clarifier - Other Costs (includes New/Expanded Laboratory/Admin Building)	$ 11,857,782	$ -	$ 11,857,782	$ -	$ 11,857,782	52.92%	47.08%	$ 5,582,644	$ 6,275,138	25.00%	$ 1,568,785	$ 4,706,354
3	Tertiary Upgrades - North and South Secondary Treatment Plant Upgrades	$ -	$ -	$ -	$ -	$ -	0.00%	100.00%	$ -	$ -	0.00%	$ -	$ -
4a	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 1)	$ 132,889,001	$ 2,019,477	$ 134,908,478	$ 77,331,936	$ 57,576,542	9.56%	90.44%	$ 52,072,582	$ 5,503,959	25.00%	$ 1,375,990	$ 4,127,969
4b	Tertiary Upgrades - New Secondary/Tertiary Treatment Plant (Phase 2)	*$ 224,800,000*	$ -	$ 224,800,000	$ -	$ 224,800,000	100.00%	0.00%	$ -	$ 224,800,000	25.00%	$ 56,200,000	$ 168,600,000
5a	Chlorine Contact Tank and Outfall - Railway Re-Alignment	$ -	$ -	$ -	$ -	$ -	19.88%	80.12%	$ -	$ -	25.00%	$ -	$ -
5b	Chlorine Contact Tank and Outfall - Secondary/Tertiary Chlorine contact Tank, Outfall and Red Hill Creek Upgrades	$ 42,599,496	$ 647,373	$ 43,246,869	$ 23,174,887	$ 20,071,982	19.88%	80.12%	$ 16,081,115	$ 3,990,867	25.00%	$ 997,717	$ 2,993,150
7	Chlorine Contact Tank and Outfall - New Outfall (included in 5b project)	$ -	$ -	$ -	$ -	$ -	0.00%	100.00%	$ -	$ -	25.00%	$ -	$ -
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 1	$ 24,810,804	$ -	$ 24,810,804	$ -	$ 24,810,804	14.73%	85.27%	$ 21,156,173	$ 3,654,631	25.00%	$ 913,658	$ 2,740,974
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 2	$ 25,573,521	$ -	$ 25,573,521	$ -	$ 25,573,521	14.73%	85.27%	$ 21,806,541	$ 3,766,980	25.00%	$ 941,745	$ 2,825,235
8	Plant Expansion - Engineering (Projects 1, 4a, 4b, 5, 13) Phase 3	*$ 28,300,000*	$ -	$ 28,300,000	$ -	$ 28,300,000	100.00%	0.00%	$ -	$ 28,300,000	25.00%	$ 7,075,000	$ 21,225,000
8	Plant Expansion - Engineering - Other Costs (includes W.W.E. Modular Office Building)	$ 5,623,839	$ 2,804,250	$ 8,428,089	$ -	$ 8,428,089	14.73%	85.27%	$ 7,186,631	$ 1,241,457	25.00%	$ 310,364	$ 931,093
6	Biogas Digester - New W.A.S. Thickening Facility (forms part of the Digester Upgrades)	$ -	$ -	$ -		$ -		100.00%	$ -	$ -	0.00%	$ -	$ -
9	Biogas Digester - Additional Dewatering Capacity	$ -	$ -	$ -		$ -		100.00%	$ -	$ -	0.00%	$ -	$ -
10	Biogas Digester - Refurbishment of Digesters to Increase Capacity	$ -	$ -	$ -		$ -		100.00%	$ -	$ -	0.00%	$ -	$ -
11a	Biogas Digester - Biogas Upgrades	$ 45,005,784	$ -	$ 45,005,784	$ 20,000,000	$ 25,005,784	12.89%	87.11%	$ 21,782,816	$ 3,222,968	25.00%	$ 805,742	$ 2,417,226
11b	Biogas Digester - Digesters Upgrades	*$ 8,430,000*	$ -	$ 8,430,000	$ -	$ 8,430,000	100.00%	0.00%	$ -	$ 8,430,000	25.00%	$ 2,107,500	$ 6,322,500
12	Biosolids Management Facility - Biosolids Thermal Reduction Dispossal Facility	$ 99,440,000	$ -	$ 99,440,000	$ 14,300,000	$ 85,140,000	18.84%	81.16%	$ 69,099,130	$ 16,040,870	25.00%	$ 4,010,217	$ 12,030,652
13a	Electrical System Upgrades - New Electrical and power systems - Phase 1	$ 62,256,622	$ 946,097	$ 63,202,719	$ 35,721,251	$ 27,481,468	19.21%	80.79%	$ 22,202,989	$ 5,278,478	25.00%	$ 1,319,620	$ 3,958,859
13b	Electrical System Upgrades - New Electrical and power systems - Phase 2	*$ 34,844,000*	$ -	$ 34,844,000	$ -	$ 34,844,000	100.00%	0.00%	$ -	$ 34,844,000	25.00%	$ 8,711,000	$ 26,133,000
14	Collection System Upgrades	$ 10,176,000	$ 154,642	$ 10,330,642	$ 6,784,000	$ 3,546,642	0.00%	100.00%	$ 3,546,642	$ -	0.00%	$ -	$ -
	Total	$ 919,646,680	$ 8,008,501	$ 927,655,181	$ 274,326,079	$ 653,329,102			$ 295,269,430	$ 358,059,672		$ 89,514,918	$ 268,544,754

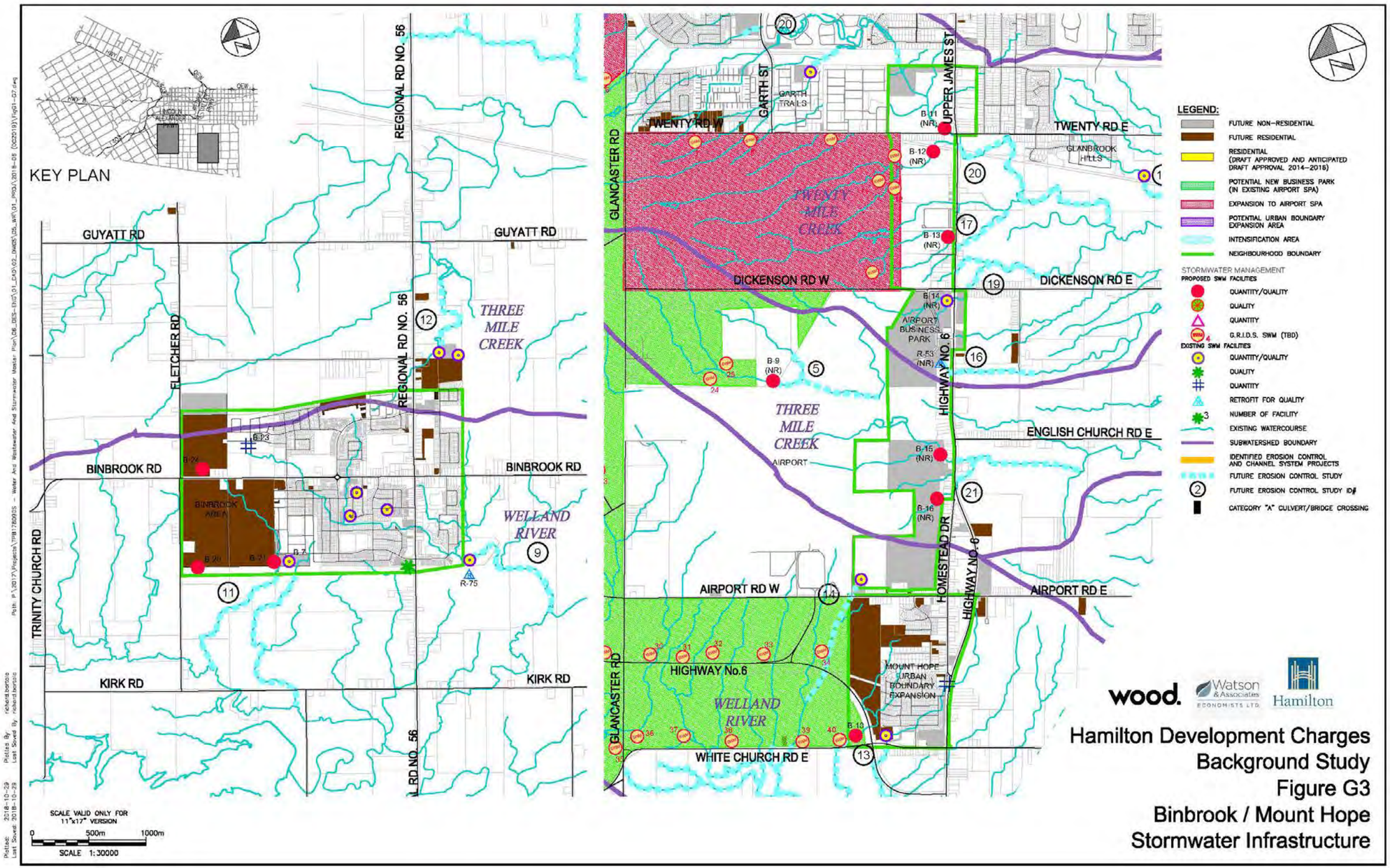
Appendix G: Stormwater Management Servicing Needs – Wood Environment & Infrastructure Solutions

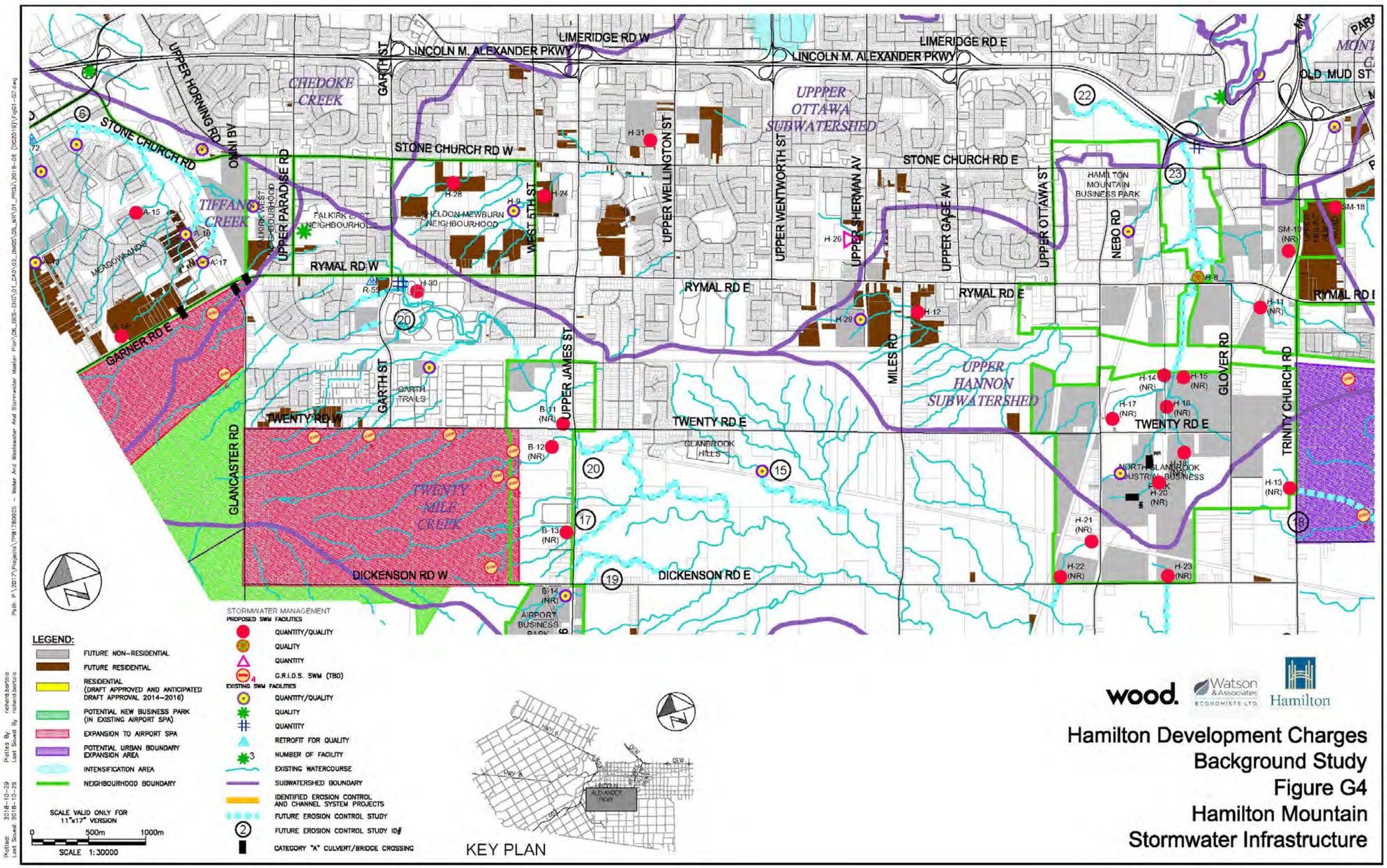
CITY OF HAMILTON
2019 DEVELOPMENT CHARGES UPDATE

STORMWATER
BACKGROUND STUDY

May 14, 2019

Wood Environment & Infrastructure Solutions
Wood Canada Limited


KEY PLAN
GUYATT RD
REGIONAL RD NO. 56
FLETCHER RD
THREE MILE CREEK
BINBROOK RD
TRINITY CHURCH RD
WELLAND RIVER
KIRK RD
GLANCASTER RD
TWENTY RD W
GARTH ST
GARTH TRAILS
UPPER JAMES ST
TWENTY RD E
GLANBROOK HILLS
TWENTY MILE CREEK
DICKENSON RD W
DICKENSON RD E
AIRPORT BUSINESS PARK
HIGHWAY NO. 6
ENGLISH CHURCH RD E
AIRPORT
HOMESTEAD DR
AIRPORT RD W
AIRPORT RD E
HIGHWAY No.6
MOUNT HOPE URBAN BOUNDARY EXPANSION
WHITE CHURCH RD E
LEGEND:
FUTURE NON-RESIDENTIAL
FUTURE RESIDENTIAL
RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2018)
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
wood.
Watson & Associates ECONOMISTS LTD.
Hamilton
Hamilton Development Charges Background Study
Figure G3
Binbrook / Mount Hope Stormwater Infrastructure


LIMERIDGE RD W
LINCOLN M. ALEXANDER PKWY
LIMERIDGE RD E
LINCOLN M. ALEXANDER PKWY
STONE CHURCH RD
STONE CHURCH RD W
STONE CHURCH RD E
RYMAL RD W
RYMAL RD E
RYMAL RD E
TWENTY RD W
TWENTY RD E
DICKENSON RD W
DICKENSON RD E
GARNER RD E
OLD MUD ST
UPPER HORNING RD
UPPER PARADISE RD
GARTH ST
UPPER WELLINGTON ST
UPPER WENTWORTH ST
UPPER SHERMAN AV
UPPER GAGE AV
UPPER OTTAWA ST
NEBO RD
MILES RD
GLOVER RD
TRINITY CHURCH RD
WEST 5TH ST
UPPER JAMES ST
GLANCASTER RD
CHEDOKE CREEK
TIFFANY CREEK
TWENTY MILE CREEK
UPPPER OTTAWA SUBWATERSHED
UPPER HANNON SUBWATERSHED
FALKIRK WEST NEIGHBOURHOOD
FALKIRK EAST NEIGHBOURHOOD
SHELDON-MEWBURN NEIGHBOURHOOD
MEADOWLANDS
GLANBROOK HILLS
NORTH GLANBROOK INDUSTRIAL BUSINESS PARK
AIRPORT BUSINESS PARK
HAMILTON MOUNTAIN BUSINESS PARK
EARTH TRAILS
H-31
H-28
H-9
H-24
H-30
H-26
H-29
H-12
H-8
H-11 (NR)
H-14 (NR)
H-15 (NR)
H-17 (NR)
H-16 (NR)
H-20 (NR)
H-13 (NR)
H-21 (NR)
H-22 (NR)
H-23 (NR)
SM-18
SM-19 (NR)
A-15
A-18
A-17
A-14
B-11 (NR)
B-12 (NR)
B-13 (NR)
B-14 (NR)
R-55
LEGEND:
FUTURE NON-RESIDENTIAL
FUTURE RESIDENTIAL
RESIDENTIAL (DRAFT APPROVED AND ANTICIPATED DRAFT APPROVAL 2014-2016)
POTENTIAL NEW BUSINESS PARK (IN EXISTING AIRPORT SPA)
EXPANSION TO AIRPORT SPA
POTENTIAL URBAN BOUNDARY EXPANSION AREA
INTENSIFICATION AREA
NEIGHBOURHOOD BOUNDARY
SCALE VALID ONLY FOR 11"x17" VERSION
0 500m 1000m
SCALE 1:30000
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
KEY PLAN
HWY 6
QEW
LINCOLN M. ALEXANDER PKWY
wood.
Watson & Associates ECONOMISTS LTD.
Hamilton
Hamilton Development Charges Background Study
Figure G4
Hamilton Mountain Stormwater Infrastructure

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	Study Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work							Estimated Total Cost (Rounded)($)	Growth Related %	Net Growth Related Cost ($)	Growth Related Post Period Cost ($)	Net Total Cost ($)	Remarks	Other Changes From 2014 Study
Primary Dev. Areas	Build Out (yr)	Secondary					Type of Work	Location of Work	Type	Description	Length (m)	2014 Estimated Capital Cost ($)	2019 Estimated Capital Cost ($)							
ANC	6+	A	Garner Road EA	2013			5 structures	Garner Rd Hwy 6 to Glancaster				1,250,000	1,405,000	1,410,000	100	1,410,000		1,410,000		Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1989		Erosion Control and Channel System Improvements	Lower culvert by 0.4 m - South Service Rd. under w/c #6					163,182	183,417	180,000	100	180,000		180,000	will be updated when WC5,6 ,studied	Inflation applied
SCL	11+	A	SCUBE - Barton Street	2013		road crossings at existing watercourses	7 structures (3@$400k, 4@$750k)	Fruitland to Fifty				4,200,000	4,720,800	4,720,000	100	4,720,000		4,720,000		Inflation applied
SCL	0-5	A	SCUBE Block 1	2017		road crossings at existing watercourses	1 structure	Fruitland to N/S Collector				750,000	843,000	843,000	100	843,000		843,000	location set with Block plan - study underway	Inflation applied
SCL	0-5		SCUBE Block 2	2017		road crossings at existing watercourses	2 structures	Jones to Glover				1,500,000	1,686,000	1,690,000	100	1,690,000		1,690,000	location set with Block plan - study underway	Inflation applied
SCM	11+	A	ELFRIDA Secondary Plan major roads xngs	2017		road crossings at existing watercourses	20 culverts (6 small, 6 med, 8 large)	ELFRIDA SP				4,215,000	4,737,660	4,740,000	100	4,740,000	3,160,000	1,580,000	2/3 Post-Period	Inflation applied
SCM	11+	A	ELFRIDA Secondary Plan upgrade ex Hwy 56 xngs	2017		ex road crossings at existing watercourses	3 culverts (1 med, 2 large)	ELFRIDA SP				843,000	947,532	950,000	100	950,000	633,333	316,667	2/3 Post-Period	Inflation applied
WAT	11+	A	East West Corridor - North Waterdown Drive	2012		road crossings at existing watercourses	6 culverts (med)	EW2,3,4,7,8,EW9					1,011,600	1,010,000	100	1,010,000		1,010,000	NEW	NEW
WAT	11+	A	East West Corridor - North Waterdown Drive	2012		road crossings at existing watercourses	1 structure	EW5					5,000,000	5,000,000	100	5,000,000		5,000,000	NEW	NEW
WAT	0-5	A	Parkside Drive EA	2013			2 culverts (med)	Parkside Dr Hwy 6 to Hollybush				337,200	379,013	380,000	100	380,000		380,000		Inflation applied
Total Residential												**13,258,382**	**20,914,022**	**20,923,000**	**100**	**20,923,000**	**3,793,333**	**17,129,667**		

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	Study Year	Drainage Area (ha)	Purpose	SWMF/ Drainage Work					2014 Estimated Capital Cost ($)	2019 Estimated Capital Cost ($)	Estimated Total Cost (Rounded)($)	Growth Related %	Net Growth Related Cost ($)	Growth Related Post Period Cost ($)	Net Total Cost ($)	Remarks	Other Changes From 2014 Study
Primary Dev. Areas	Build Out (yr)	Secondary					Type of Work	Location of Work	Type	Description	Length (m)									
ANC	0-5	A	Ancaster Industrial Park - Cormorant Midblock	2013			culvert	Trinity to Tradewind					400,000	400,000	50	200,000		200,000	City updated estimate ref. AJC study and tender	city updated estimate ref. AJC study and tender
ANC	0-5	A	Ancaster Industrial Park - Cormorant Midblock	2013			channel improvements	Trinity to Tradewind					400,000	400,000	50	200,000		200,000	city updated estimate ref. AJC study and tender	city updated estimate ref. AJC study and tender
BMH	11+	A	AEGD major roads crossings	2017		road crossings at existing watercourses	40 culverts (12 small, 12 med, 16 large)	AEGD				8,430,000	9,475,320	9,480,000	100	9,480,000		9,480,000	Ciity updated estimate	Inflation applied
HAM	11+	A	Red Hill Business Park - Dartnall Road	2017			2 culverts (small)	Twenty to Dickenson					400,000	400,000	100	400,000		400,000	Upper Hannon Creek MDP Oct 2017	NEW
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Triple-Culvert replacement - QEW Corridor at w/c #5					1,405,493	1,579,774	1,580,000	100	1,580,000		1,580,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			New culvert - North Service Rd. at w/c #5					233,434	262,380	260,000	100	260,000		260,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Creek System Improvement W/C 7	2003			Lower culvert by 0.4 m - South Service Rd. under w/c #6					117,145	131,670	130,000	50	65,000		65,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - QEW Corridor on w/c #6.2					518,783	583,112	580,000	100	580,000		580,000		Inflation applied
SCL	11+	A	Water Course 5- Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990	582		channel improvements			Length of channel improvement work	1015	2,305,703	2,591,610	2,590,000	100	2,590,000		2,590,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Lower culvert by 1.6 m - Arvin Ave. on w/c #5					62,477	70,224	70,000	20	14,000		14,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Culvert replacement - CNR line on w/c #5					163,556	183,837	180,000	20	36,000		36,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Water Course 6 - Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990	67		channel improvements			Length of channel improvement work	1077	2,469,333	2,775,530	2,780,000	50	1,390,000		1,390,000	to be updated when WC 5/6 studies completed	Inflation applied
SCL	11+	A	Master Drainage Plan Area No. 5, 6, 7. City of Stoney Creek	1990			Lower culvert by 1.84 m - South Service Rd. under w/c #5					117,145	131,670	130,000	100	130,000		130,000		Inflation applied
SCL	0-5	A	SCUBE - Barton Street	2017			WC9 channel/enclosure	west property limit of school to 140 m east				700,000	786,800	790,000	50	395,000		395,000	new configuration	Inflation applied
SCL	11+	A	SCUBE - NSR	2013			culvert	Green easterly to City limits				750,000	843,000	843,000	100	843,000		843,000		Inflation applied
WAT	11+	A	Hwy 5/6 Interchange				2 or 3 culverts	Hwy 5/6 and ramp				1,200,000	1,348,800	1,350,000	25	337,500		337,500	per City agreement with MTO	Inflation applied
WAT	11+	A	Highway 6				culvert	Borer's Ck				1,000,000	1,124,000	1,124,000	100	1,124,000		1,124,000		Inflation applied
Total Non-Residential												**19,473,068**	**23,087,728**	**23,087,000**	**85**	**19,624,500**	**0**	**19,624,500**		
Grand Total												**32,731,450**	**44,001,750**	**44,010,000**	**92**	**40,547,500**	**3,793,333**	**36,754,167**		

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	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 2014 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		
							Res.	Non-Res.	Res.	Non-Res.											
						(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)		
2	ANC	Non-Res	Big Creek (Outlet #1 & #2 Industrial Park)	Big Creek		271		11.6	5.32	136.83	56.73	0.15	4,988	748	$1,122,300	$697,738	$1,820,038	0.925	$1,682,721	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	South of Shaver Neighbourhood	43	35		5.5		94.19	0.20	600	120	$180,000	$111,907	$291,907	0.136	$39,642	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		100	70.92		21.48	0.29	92.69	0.20	1,500	300	$450,000	$279,767	$729,767	0.235	$171,399	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	Part of Airport Business Park and Airport	165		20		24.48	26.96	0.10	1,500	150	$225,000	$139,883	$364,883	0.550	$200,817	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	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	$750,000	$466,278	$1,216,278	0.839	$1,020,369	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	Falkirk West and Bayview Glen Estates	110			11.5	1.76	12.05	0.05	450	23	$33,750	$20,982	$54,732	1.000	$54,732	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		1794			15.98		0.89	0.05	500	25	$62,500	$46,628	$109,128	1.000	$109,128	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	Binbrook Urban area of 200 ha Draining at Node 'B'	300	191.27		100.12	0.5	97.30	0.20	4,500	900	$1,350,000	$725,881	$2,075,881	0.345	$715,595	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	Three tributaries B7-a,b,c	133			100.26		75.38	0.20	4,100	820	$1,230,000	$661,358	$1,891,358	1.000	$1,891,358	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)	Jackson Heights etc	25	15		9.14		96.56	0.20	750	150	$225,000	$120,980	$345,980	0.379	$130,997	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	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	$450,000	$241,960	$691,960	0.260	$179,826	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		30				20	66.67	0.15	1,200	180	$270,000	$145,176	$415,176	1.000	$415,176	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)	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	$270,000	$145,176	$415,176	0.452	$187,495	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated

[1]To point immediately d/s of future development (start of off-site erosion assessment)

[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%

Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

[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 (Column A). Note that the end point may also be set by Hamilton Harbour or La

[4]$2500/m for Watershed Area > 500 ha
$1500/m for Watershed Area < 500 ha

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	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 2014 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		
							Res.	Non-Res.	Res.	Non-Res.											
						(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)		
16	BMH	Non-Res	Node Downstream of SWMF # R53	Twenty Mile Creek (Three Mile, Sinkhole Creek)		40				36.81	92.03	0.20	850	170	$255,000	$137,111	$392,111	1.000	$392,111	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)		32				19.67	61.47	0.15	600	90	$135,000	$72,588	$207,588	1.000	$207,588	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)		181				63.3	34.97	0.10	2,000	200	$300,000	$161,307	$461,307	1.000	$461,307	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)		58				5.71	9.84	0.05	1,100	55	$82,500	$44,359	$126,859	1.000	$126,859	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)		700	282.29		26.2	48.63	51.02	0.15	3,000	450	$1,125,000	$725,881	$1,850,881	0.210	$387,829	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)		179	100			54.41	86.26	0.20	1,400	280	$420,000	$225,830	$645,830	0.352	$227,573	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	Erosion works downstream identified in previous studies	1356	766	308.9	136.28	0.86	89.38	0.20	1,100	220	$550,000	$354,875	$904,875	0.113	$102,385	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		1070	115.2	357.7	75.95	292.53	78.63	0.20	2,000	400	$1,000,000	$645,228	$1,645,228	0.438	$720,523	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)	Nash	300			62.09	1.92	21.34	0.05	1,250	63	$93,750	$50,408	$144,158	1.000	$144,158	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)	WC 0	321	112.9	149.7	1.12	2.98	83.08	0.20	50	10	$15,000	$8,065	$23,065	0.015	$355	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)	WC 1	330	157.5	61	13.09	2.87	71.05	0.15	1,900	285	$427,500	$229,862	$657,362	0.068	$44,748	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)	assumed Fruitland-Winona SP land use	20				16.56	82.80	0.20	600	120	$180,000	$96,784	$276,784	1.000	$276,784	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)

ID #	Primary Development Area	Res/Non-Res	Subwatershed	Watershed	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 2014 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		
							Res.	Non-Res.	Res.	Non-Res.											
						(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)		
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	$90,000	$48,392	$138,392	0.041	$5,642	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	$168,750	$108,882	$277,632	0.217	$60,199	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	$330,000	$177,438	$507,438	0.010	$5,029	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	$270,000	$145,176	$415,176	0.045	$18,479	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	$180,000	$96,784	$276,784	0.067	$18,558	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	$1,350,000	$871,057	$2,221,057	0.350	$776,683	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	$390,000	$209,699	$599,699	0.626	$375,281	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	$150,000	$80,653	$230,653	0.368	$84,975	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	$300,000	$193,568	$493,568	0.341	$168,222	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	$360,000	$193,568	$553,568	0.613	$339,575	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated

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Hamilton Harbour (Red Hill Creek, Central Business Park)

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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	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 2014 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		
							Res.	Non-Res.	Res.	Non-Res.											
						(ha)	(ha)	(ha)	(ha)	(ha)	(%)		(m)	(m)	($)	($)	($)		($)		
42	WAT	Res	Falcon Creek	Grindstone Creek/ North Shore Watershed	OPA 28 South	48			48		100.00	0.20	1,200	240	$360,000	$223,813	$583,813	1.000	$583,813	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	$270,000	$167,860	$437,860	1.000	$437,860	new development fraction recalculated as fraction of existing and future development, not drainage area	land values updated
44	WAT	Res	Grindstone Creek	Grindstone	OPA 28 South and Uncounty Estates	1011	254.8		108.81		35.97	0.10	2,000	200	$500,000	$373,022	$873,022	0.299	$261,251	new development fraction recalculated as fraction of	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	$135,000	$83,930	$218,930	1.000	$218,930	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	$135,000	$83,930	$218,930	1.000	$218,930	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**	**$16,191,050**	**$9,613,787**	**$25,804,837**	**52.18**	**$13,464,902**		

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Coote's Paradise (Borer's Creek, Spencer Creek, Sulphur Creek, Ancaster Creek, Chedoke Creek, Others)
Hamilton Harbour (Red Hill Creek, Central Business Park)

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[4]$2500/m for Watershed Area > 500 ha
$1500/m for Watershed Area < 500 ha

Total Residential	**$17,745,811**	**48.10**	**$8,535,252**
Total Non-Residential	**$8,059,025**	**61.17**	**$4,929,650**

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

Category			SWMF #	Project Title	Year	Drainage Area (ha)	Purpose	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 2014 Study
Primary Dev. Areas	Build Out (yr)	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	11+	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	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	775,886	72,800	848,686	100	848,686	-	-	-	848,686		land values updated
ANC	0-5	C	14	Meadowlands Phase IV		6			Springbrook at Garner	Quality / Quantity	Storage Capacity =	2,110		0.36	0.60	0.60	1,119,066	168,797	1,287,863	100	1,287,863	-	-	-	1,287,863	Increase land to 10% due to known grade constraint	land values updated
ANC	11+	C	22	Woodland Manor Preliminary SWM Report	Jul-08	15.3	SWM Plan for proposed urban development	SWMF	Sulpher Springs Road and Mansfield Drive	Quality / Quantity	Storage Volume =	13,289		0.92		0.92	1,712,172	791,576	2,503,748	100	2,503,748	-	-	-	2,503,748		land values updated
ANC	11+	C	24	Miller's pond expansion		5		SWMF	Shaver Road and Garner Road	Quality		3,600	0.20			0.20	373,022	288,000	661,022	100	661,022	-	-	-	661,022		land values updated
ANC	11+	C	25	Golf Stream Manor		36				Quality / Quantity		25,920	1.44			1.44	2,685,760	1,296,800	3,982,560	100	3,982,560	-	-	-	3,982,560		land values updated
ANC	11+	R	3	N/A	N/A	31.34	Flood Control	Future Retrofit	Galley Crt & Speers Rd	Quality						0.00	-	443,100	443,100	30	132,930	310,170	-	-	132,930		
ANC	11+	R	22	N/A	N/A	2.19	Flood Control	Future Retrofit	Harrington Place and Lover's Lane	Quality						0.00	-	422,000	422,000	50	211,000	211,000	-	-	211,000		
ANC	11+	R	70	Drainage Report - The Meadowlands	N/A	296.9		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	11+	R	71	Drainage Report - The Meadowlands	N/A	42.51		Future Retrofit	Golf Links Rd and Meadowlands Blvd	Quality						0.00	-	601,350	601,350	40	240,540	360,810	-	-	240,540		
ANC	11+	R	72	Drainage Report - The Meadowlands	N/A	18.03		Future Retrofit	Golf Links Rd. and Meadowlands Blvd.	Quality						0.00	-	422,000	422,000	40	168,800	253,200	-	-	168,800		
BMH	11+	C	24	Ceterini	2013	15		SWMF	Binbrook Rd west of Woodland	Quality / Quantity	Storage Capacity =	9,400		0.90		0.90	1,451,762	635,996	2,087,758	100	2,087,758	-	-	-	2,087,758		land values updated
BMH	0-5	C	10	Mountaingate Functional Servicing Report	Oct. 2007	100.66	SWM Plan for proposed urban development	SWMF	South west of new Hwy - 6	Quality / Quantity	Storage Volume =	34,698		6.04	5.15	5.15	8,307,304	1,647,904	9,955,208	100	9,955,208	-	-	-	9,955,208		land values updated
BMH	11+	C	21	Master Drainage Plan Update Report : Binbrook Settlement Area	Oct. 2006	31	additional facility adjacent to the watercourse	SWMF		Quality / Quantity	Storage Capacity =	19,376		1.86		1.86	3,000,308	1,035,058	4,035,366	100	4,035,366	-	-	-	4,035,366		land values updated
BMH	11+	C	20	Binbrook Settlement Area	2013	22.72	MacNeilly facilty	SWMF	Area draining to the south west near Fletcher Road	Quality / Quantity	Storage Capacity =	19,201		1.36	1.80	1.80	2,903,524	1,028,029	3,931,552	100	3,931,552	-	-	-	3,931,552		land values updated
HAM	11+	C	12	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Nov. 2008	10		SWMF	Upper Gage/Terni in tandem with HAM29	Quality / Quantity	Storage volume =	8,817		0.40		0.40	645,228	1,252,664	1,897,892	100	1,897,892	-	-	-	1,897,892	per City comments; estimated 8,000 m3 in rock	land values updated
HAM	0-5	C	24	Mewburn and Sheldon Neighbourhoods Master Servicing Plan	2011	15.9	SWM Plan for proposed urban development	SWMF	West 5thand Stonechurch Road	Quality / Quantity	Storage Capacity =	12,650		0.95	1.25	1.25	2,016,336	1,246,000	3,262,336	100	3,262,336	-	-	-	3,262,336	New pond to help H-9; estimated 6000 m3 rock	land values updated
HAM	11+	C	28	305 Stone Church Road West	2011	33.29	SWM Plan for proposed urban development	SWMF	NE limit of development	Quality / Quantity	Storage volume =	20,382		2.00		2.00	3,221,944	1,955,266.46	5,177,210	100	5,177,210	-	-	-	5,177,210	estimated 11,000 m3 rock	land values updated
HAM	11+	C	29	Miles	2011	42	SWM Plan for proposed urban development	SWMF	NE limit of development	Quality / Quantity	Storage volume =	37,000		2.52		2.52	4,064,933	3,420,000	7,484,933	100	7,484,933	-	-	-	7,484,933	per City comments; estimated 21,000 m3 in rock	land values updated
HAM	11+	C	30	St Elizabeth expansion	2013	50	SWM facility expansion	SWMF	expand for new development	Quality / Quantity	Storage volume =	38,000				0.00	-	1,780,000	1,780,000	100	1,780,000	-	-	-	1,780,000		
HAM	0-5	C	31	Upper Wellington and Stonechurch		14		SWMF	SW corner of Upper Wellington and Stonechurch Rd	Quantity / Quality	Extended Detention Pond	11,263		0.84	1.40	1.40	2,258,296	1,270,529.60	3,528,826	100	3,528,826	-	-	-	3,528,826	Increase land to 10% due to known grade constraint; estimated 7000 m3 in rock	land values updated
HAM	11+	R	55	Villages of Glancaster	Jul. 1990	77.63	Flood Control	Future Retrofit	Twenty Rd and Garth St	Quality		-	3.11			3.11	5,008,901	1,086,650	6,095,551	80	4,876,441	1,219,110	-	-	4,876,441		land values updated
SCL	0-5	C	2	SCUBE Subwatershed Study (Phase 3)	May-13	26.4	Stormwater management strategy	SWMF	WC6 south of Barton SCUBE West	Quantity / Quality	wet pond #3	13,216		1.58	2.64	2.64	4,258,502	788,640	5,047,142	100	5,047,142	-	-	-	5,047,142	Increase land to 10% due to known grade constraint	land values updated
SCL	0-5	C	3	SCUBE Subwatershed Study (Phase 3 - Block2)	Sep-18	16.4	Stormwater management strategy	SWMF	WC6.1 south of Barton SCUBE West	Quantity / Quality	wet pond for 6.0	10,331		0.98	1.64	1.64	2,645,433	673,240	3,318,673	100	3,318,673	-	-	-	3,318,673	Increase land to 10% due to known grade constraint	land values updated
SCL	0-5	C	31	SCUBE Subwatershed Study (Phase 3 - Block 2)	Sep-18	27.6	Stormwater management strategy	SWMF	WC6.1 south of Barton SCUBE West	Quantity / Quality	wet pond for 6.1	18,115		1.66	2.76	2.76	4,452,070	984,600	5,436,670	100	5,436,670	-	-	-	5,436,670	Increase land to 10% due to known grade constraint	land values updated
SCL	0-5	C	12	SCUBE Subwatershed Study (Phase 3)	May-13	54	Stormwater management strategy	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-2	34,060		3.24	5.40	5.40	8,710,572	1,622,400	10,332,972	100	10,332,972	-	-	-	10,332,972	Increase land to 10% due to known grade constraint	land values updated
SCL	0-5	C	13	SCUBE Subwatershed Study (Phase 3)	May-13	23.1	Stormwater management strategy	SWMF	SCUBE Central	Quantity / Quality	wet pond #9-3	14,592		1.39	2.31	2.31	3,726,189	843,680	4,569,869	100	4,569,869	-	-	-	4,569,869	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 #	Project Title	Year	Drainage Area (ha)	Purpose	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 2014 Study
Primary Dev. Areas	Build Out (yr)	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							
SCL	0-5	C	29	SCUBE Subwatershed Study (Phase 3)	May-13	39.8	Stormwater management strategy	SWMF	WC5 south of Barton SCUBE West	Quantity / Quality	wet pond #1	19,417		2.39	3.98	3.98	6,420,014	1,036,680	7,456,694	100	7,456,694	-	-	-	7,456,694	Increase land to 10% due to known grade constraint	land values updated
SCL	0-5	C	30	SCUBE Subwatershed Study (Phase 3)	May-13	24.5	Stormwater management strategy	SWMF	WC5.2 south of Barton SCUBE West	Quantity / Quality	wet pond #2	12,773		1.47	2.45	2.45	3,952,019	770,920	4,722,939	100	4,722,939	-	-	-	4,722,939	Increase land to 10% due to known grade constraint	land values updated
SCL	11+	R	16	Lake Vista			Stormwater quality and associated resource management	Storm outfall retrofit	Lake Vista	Quality	OGS					0.00	-	50,000	50,000	100	50,000	-	-	-	50,000		
SCL	11+	R	18	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	27.2	Stormwater quality and associated resource management	Storm outfall retrofit	BFC. Little League Park, Queenston Rd.	Quality	Wetland	2,413				0.00	-	193,040	193,040	100	193,040	-	-	-	193,040		
SCL	11+	R	19	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	33	Stormwater quality and associated resource management	Storm outfall retrofit	BFC, Lake Ave. Park, Huckleberry Dr.	Quality	Wetland	2,582				0.00	-	206,560	206,560	100	206,560	-	-	-	206,560		
SCL	11+	R	20	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	77	Stormwater quality and associated resource management	Storm outfall retrofit	North of Barton St.	Quality	Wetland	6,724				0.00	-	528,960	528,960	100	528,960	-	-	-	528,960		
SCL	11+	R	21	Stormwater Quality Management Strategy Stoney Creek Master Plan	2004	20.5	Stormwater quality and associated resource management	Storm outfall retrofit	Lake Avenue, Warrington St.	Quality	Wetland	1,923				0.00	-	153,840	153,840	100	153,840	-	-	-	153,840		
SCM	0-5	C	10	Summit Park - ROPA 9		83.9	MDP addressing drainage related issues for future development	Proposed wetland/wetpond #3	West side of Swayze Road	Quantity / Quality		52,577				0.00	-		3,320,000	100	3,320,000	-	-	-	3,320,000	per development schedules May 2018	
SCM	0-5	C	18	Future Planned Residential Development		42	easterly portion	SWMF		Quality / Quantity		29,890				0.00	-		3,630,000	100	3,630,000	-	-	-	3,630,000	per development schedules May 2019	
SCM	11+	C	21	Davis Ck SWS - Nash Nhd		24.5		SWMF	North limit of First Road W. at east side	Quantity / Quality	Extended Detention Pond	17,615		1.47		1.47	2,371,211	2,373,800	4,745,011	100	4,745,011	-	-	-	4,745,011	per City comments; estimated 17,615 m3 in rock	land values updated
SCM	0-5	C	22	Davis Ck SWS - Nash Nhd		15		SWMF	North limit of First Road W. at west side	Quantity / Quality	Extended Detention Pond	11,425		0.90		0.90	1,451,762	1,516,996	2,968,758	100	2,968,758	-	-	-	2,968,758	per City comments; estimated 10,000 m3 in rock	land values updated
SCM	11+	C	2	Davis Ck SWS - Nash Nhd		22.85		Wet pond	Northwest portion, east of historical lands	Quantity / Quality	Extended Detention Pond	22,394			1.66	1.66	2,677,694	1,795,757	4,473,451	100	4,473,451	-	-	-	4,473,451	per City comments June 17, 2011; estimated 8,000 m3 in rock	land values updated
SCM	11+	C	6	Montgomery Creek Nash Orchards		22.49				Quality		17,436	0.90		1.35	1.35	2,177,643	957,429	3,135,072	100	3,135,072	-	-	-	3,135,072		land values updated
SCM	0-5	C	17	Fletcher Estates - Fletcher Community Functional SWM	Nov. 2008	30	Functional Service Plan for proposed urban development	SWMF	SW corner Mud St. and Upper Centennial PKWY.	Quality / Quantity	Storage volume =	20,300		1.80	1.87	1.87	3,016,439	1,071,992	4,088,431	100	4,088,431	-	-	1,022,108	3,066,323		land values updated
SCM	11+	R	65	N/A	N/A	15.2		Future Retrofit	Hwy 20 and Highland Rd	Quality						0.00	-	422,000	422,000	30	126,600	295,400	-	-	126,600		
SCM	11+	R	67	Deerfield Estate Phase 1	Apr. 1991	19.8		Future Retrofit	Rymal Rd E and Whitedeer Rd.	Quality						0.00	-	422,000	422,000	50	211,000	211,000	-	-	211,000		
SCM	11+	R	69	Heritage Green Valley Park Stage II	Sept. 1990	83.9		Future Retrofit	Winter Drive and Paramount Drive	Quality						0.00	-	1,160,500	1,160,500	50	580,250	580,250	-	-	580,250		
WAT	0-5	C	1	Mtview Heights/Waterdown Bay Phase 2	Jul-13	12.43	To guide future development and management of the South Waterdown lands	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	0-5	C	3	Mtview Heights/Waterdown Bay Phase 2	Jul-13	8.89	To guide future development and management of the South Waterdown lands	SWMF	Grindstone Creek - East Tributary (north west) 5D	Quantity / Quality	Storage Capacity =	10,037				0.00	-		4,000,000	100	4,000,000	-	-	-	4,000,000	cost estimate including land, from developer, 2018	
WAT	0-5	C	4	Mtview Heights	Jul-13	41.06	To guide future development and management of the South Waterdown lands	SWMF	Grindstone Creek - South west Tributary 2	Quantity / Quality	Storage Capacity =	53,288		2.46	2.98	2.60	4,849,288	3,591,510	8,440,798	100	8,440,798	-	-	-	8,440,798	footprint per draft plan; estimated 15,000 m3 rock	land values updated
WAT	11+	C	5	Mtview Heights	Jul-13	12.71	To guide future development and management of the South Waterdown lands	SWMF	East side of Waterdown Bay property	Quantity / Quality	Storage Capacity =	28,055		0.76	1.56	1.56	2,909,573	1,782,187.94	4,691,761	100	4,691,761	-	-	-	4,691,761	footprint per draft plan; estimated 5,000 m3 rock	land values updated
WAT	11+	C	6	Mtview Heights	Jul-13	5.66	To guide future development and management of the South Waterdown lands	SWMF	Salem Property	Quantity / Quality	Storage Capacity =	16,754		0.34		0.34	633,392	930,160	1,563,551	100	1,563,551	-	-	-	1,563,551		land values updated
WAT	0-5	C	19	Waterdown North Master Drainage Plan	Feb. 2007	9.7	Assess proposed expansion for the urban settlement area of Waterdown	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	756,744	473,448	1,230,192	100	1,230,192	-	-	-	1,230,192	footprint estimated June 1, 2011 by Metropolitain/City agreed hazard land impacts price $175,000 acre	land values updated
U	11+	C	U1	Unidentified			provisional item for unidentified SWM works		open	Quantity / Quality							-	5,000,000	5,000,000	100	5,000,000	-	-	-	5,000,000		
U	11+	C	U2		Infills		to include provision for LID infrastructure cost recovery		open	Quality							-	1,500,000	1,500,000	100	1,500,000	-	-	-	1,500,000		
U	11+	C	U3	Frontage Costs			estimate of road frontage costs for 38 residential SWM facilities (Retrofits and Unidentified facilities excluded)		open	Quantity / Quality	120m * $1500/m per facility						-	6,840,000	6,840,000	100	6,840,000	-	-	-	6,840,000		
U	11+	C	U4	Land Footprint Contingency			estimate that 10 facilities will exceed the estimated land footprint by 20%		open	Quantity / Quality							3,500,000		3,500,000	100	3,500,000	-	-	-	3,500,000		
U	11+	C	U5	Facility Unidentified Volume Contingency			estimate that 1/10 facilities will exceed the estimated volume by 10%		open	Quantity / Quality								3,150,000	3,150,000	100	3,150,000	-	-	-	3,150,000		
U	11+	C	U6	Facility Unidentified Rock Volume Contingency			estimate that two (2) facilities will encounter unanticipated 9000 m3 rock		open	Quantity / Quality								1,440,000	1,440,000	100	1,440,000	-	-	-	1,440,000	per development engineering	
U	11+	C	U7	Unidentified - Within Combined Sewershed			under study - estimate 3 projects will result in SWM facilities @ $2M each		combined sewershed	Quantity / Quality								6,000,000	6,000,000	100	6,000,000	-	-	-	6,000,000	per development engineering	
Total Residential												**691,959**					**98,052,984**	**73,280,460**	**185,683,445**	**96.81**	**179,761,145**	**5,922,300**	**0**	**1,022,108**	**178,739,037**		

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	SWMF/ Drainage 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 Associated Cost ($)	Existing Benefit	Direct Developer Contribution ($)	Residential Area Fraction Cost ($)	Net Total Associated Cost ($)	Remarks	Remarks
Primary Dev. Areas	Build Out (yr)	Secondary						Type of Work	Location of Work																	
ANC	11+	C	11	Ancaster Industrial Park, Stormwater Detention Facilities Area No. 1,3 and 4	July. 1990	8.2			Detention Pond #A	Quantity		2,187	0.33			0.33	611,756	174,929	786,685	0	-	-	786,685	-	-		
ANC	11+	C	23	Trustwood Industrial Park east facility	Dec-07	30	Functional Servicing Report industrial	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	21,600		1.80	3.00	3.00	5,595,332	1,124,000	6,719,332	0	-	-	6,719,332	-	-	Increase land to 10% due to known grade constraint	Increase land to 10% due to known grade constraint
ANC	11+	C	27	Trustwood Industrial Park west facility		19	Functional Servicing Report industrial	SWMF	west of Shaver	Quality / Quantity	final drainage area to be determined	5,185		1.14		1.14	2,126,226	414,763	2,540,990	0	-	-	2,540,990	-	-		
BMH	11+	C	9	Future Planned Non-Residential Development		25		SWMF		Quality / Quantity	Storage Capacity =	6,667		1.50		1.50	2,419,603	526,660	2,946,263	0	-	-	2,946,263	-	-		
BMH	11+	C	11	Future Planned Non-Residential Development		36		SWMF		Quality / Quantity	Storage Capacity =	9,600		2.16		2.16	3,484,229	643,990	4,128,219	0	-	-	4,128,219	-	-		
BMH	11+	C	12	Future Planned Non-Residential Development		20		SWMF		Quality / Quantity	Storage Capacity =	5,333		1.20		1.20	1,935,683	426,656	2,362,339	0	-	-	2,362,339	-	-		
BMH	11+	C	13	Future Planned Non-Residential Development		26		SWMF		Quality / Quantity	Storage Capacity =	6,933		1.56		1.56	2,516,387	537,326	3,053,714	0	-	-	3,053,714	-	-		
BMH	11+	C	15	Future Planned Non-Residential Development		40		dry pond		Quantity	Storage Capacity =	10,666	1.60			1.60	2,580,910	686,656	3,267,566	0	-	-	3,267,566	-	-		
BMH	11+	C	16	Future Planned Non-Residential Development		15		dry pond		Quantity	Storage Capacity =	4,000	0.60			0.60	967,841	319,992	1,287,833	0	-	-	1,287,833	-	-		
BMH	11+	R	53	Greater Hamilton Airport Business Park	Oct. 1991	11.65	Quality control facility		Hwy 6 & Dickenson Rd W	Quality						0.00	-	422,000	422,000	0	-	-	422,000	-	-		
HAM	11+	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	SWMF	HC3	Quality / Quantity	Flood Control Volume =	59,291		6.52	4.10	4.10	6,613,582	2,631,658	9,245,240	0	-	-	9,245,240	651,896	(651,896)		
HAM	11+	C	13	Hannon Creek SWS – North Glanbrook Industrial Business Park MDP	Mar-09	36	Develop a Master Drainage Plan for the Hannon Creek Subwatershed	SWMF	TM3	Quality / Quantity	Flood Control Volume =	19,357		2.16	1.85	1.85	2,984,177	1,034,270	4,018,448	0	-	-	4,018,448	-	-		
HAM	11+	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	SWMF	HC6	Quality / Quantity	Flood Control Volume =	23,889		2.78	2.09	2.09	3,371,314	1,215,554	4,586,868	0	-	-	4,586,868	-	-		
HAM	11+	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	SWMF	HC7	Quality / Quantity	Flood Control Volume =	40,430		4.28	3.11	3.11	5,016,644	1,877,214	6,893,858	0	-	-	6,893,858	-	-		
HAM	11+	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	SWMF	HC8	Quality / Quantity	Flood Control Volume =	18,647		1.30	2.00	2.00	3,226,138	1,005,874	4,232,012	0	-	-	4,232,012	-	-		
HAM	11+	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	SWMF	HC9	Quality / Quantity	Flood Control Volume =	12,503		0.85	1.54	1.54	2,484,126	760,136	3,244,262	0	-	-	3,244,262	-	-		
HAM	11+	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	SWMF	HC12	Quality / Quantity	Flood Control Volume =	12,775		1.15	1.60	1.60	2,580,910	770,995	3,351,905	0	-	-	3,351,905	-	-		
HAM	11+	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	SWMF	HC14	Quality / Quantity	Flood Control Volume =	30,739		2.44	2.72	2.72	4,387,547	1,489,542	5,877,090	0	-	-	5,877,090	-	-		
HAM	11+	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	SWMF	TM1a	Quality / Quantity	Flood Control Volume =	7,586		1.00	0.75	0.75	1,209,802	563,422	1,773,224	0	-	-	1,773,224	-	-		
HAM	11+	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	SWMF	TM1b	Quality / Quantity	Flood Control Volume =	7,586		1.00	0.75	0.75	1,209,802	563,422	1,773,224	0	-	-	1,773,224	-	-		
HAM	11+	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	SWMF	TM2	Quality / Quantity	Flood Control Volume =	18,508		2.13	1.78	1.78	2,871,262	1,000,317	3,871,580	0	-	-	3,871,580	-	-		
SCL	11+	C	10	Stormwater Quality Management Strategy. City of Stoney Creek - Master Plan	2004	63	Stormwater quality and associated resource management	Proposed SWMFQuality	Area F/G: S.W of Lewis & S. service Rd.	Quality / Quantity	Wetland	17,897		3.78		3.78	6,097,400	975,863	7,073,263	0	-	-	7,073,263	-	-		
SCL	11+	C	17	SCUBE Subwatershed Study (Phase 3)	May-13	11.8	Stormwater management strategy	SWMF	Fifty Creek east SCUBE East	Quantity / Quality	wet pond #12-1	8,969		0.71		0.71	1,142,053	618,760	1,760,813	0	-	-	1,760,813	-	-		
SCL	0-5	C	23	SCUBE Subwatershed Study (Phase 3)	May-13	14.5	Stormwater management strategy	SWMF	Fifty Creek west SCUBE East	Quantity / Quality	wet pond #12-2	11,013		0.87		0.87	1,403,370	700,520	2,103,890	0	-	-	2,103,890	-	-		
SCL	11+	R	82	Glover Industrial Park Phase 2B	Jan. 1989	2.05	Flood Control	Future Retrofit	Anin Av. / Glover Rd	Quality						0.00	-	422,000	422,000	0	-	-	337,600	84,400	-		
SCM	0-5	C	19	Future Planned Industrial Development		14	westerly portion			Quality / Quantity		10,080		0.84		0.84	1,354,978	663,200	2,018,178	0	-	2,018,178	-	-	-		
WAT	11+	C	12	Clappison Industrial Park		60	Quality only	SWMF	to be determined	Quality / Quantity	Storage Capacity =	21,100		3.60		3.60	6,714,399	1,103,984	7,818,383	0	-	-	7,818,383	-	-		
WAT	11+	R	35	Tech Park	Feb. 1994	15.66	Quality and Flood Control	Future Retrofit	Hwy 6 & Hwy 5	Quality						0.00	-	422,000	422,000	0	-	-	337,600	84,400	-		
U	11+	C	UNR	Unidentified			provisional item for unidentified non-res SWM works with residential component		open	Quantity / Quality						0.00	-	10,000,000	10,000,000	0	-	-	-	-	-		
																									-		
Total Non-Residential												**392,538**					**74,905,471**	**33,095,706**	**108,001,177**	**0.00**	**0**	**2,693,378**	**105,307,800**	**651,896**	**(651,896)**		
Grand Total												**1,084,497**				**TOTAL =**	**172,958,455**	**106,376,167**	**293,684,622**	**61.21**	**179,761,145**	**8,615,678**	**105,307,800**	**1,674,003**	**178,087,141**		

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	Application Number	Pipe Length	Oversize Pipe Cost	Number MH	Oversize MH Cost	Total Over-Size Cost 0-5 Years	Total Over-Size Cost 5-10 Years	Notes
Storm Sewer	1350 mm Diam.	25T201305 - Sheldon's Gate	200	$82,982.56	3	$0.00	$82,982.56		Rymal Road West to Storm Pond
		25T201801 - 78 and 80 Marion Str	200	$82,982.56	0	$0.00	$82,982.56		through part of Lot 11 and Street A to Street B throug h Block 126
		25T-88031 - Sandrina Gardens	135	$56,013.23	0	$0.00	$56,013.23		Street "G" From west limit of Plan to Street "B" and Street "B" From Street "G" To Street "C"
		25T-95002 - Miles Estates	283	$117,420.32	9	$0.00	$117,420.32		Through Block 132 to Upper Sherman Avenue
	1500 mm Diam.	25T200723 - Mountaingate	200	$184,258.40	4	$0.00	$184,258.40		West leg of Provident Way and south along Rosebury Way to Block 307
		25T201003 - Parkside Hills Phase 2	300	$276,387.60	3	$0.00	$276,387.60		Cole Street to Pond SWMF WAT#19
		25T201209 1125 West Fifth	200	$184,258.40	3	$0.00	$184,258.40		Possible Street 'A' from West 5th to existing 1500mm in easement to east
		25T201301 - Red Hill - Phase 2	200	$184,258.40	3	$0.00	$184,258.40		
		25T201503 - 165 Upper Centennial Parkway	200	$184,258.40	3	$0.00	$184,258.40		Dancy Street and Street D
		25T201611 - Nash Neighbourhood - Phase 2	300	$276,387.60	3	$0.00	$276,387.60		
		25T201612 - Nash Neighbourhood - Phase 3	300	$276,387.60	3	$0.00	$276,387.60		
		25T201706 - Jackson Heights Extension	300	$276,387.60	3	$0.00	$276,387.60		
		25T-88031 - Sandrina Gardens	135	$124,374.42	0	$0.00	$124,374.42		Street "C" From Street "B" To Court "E"
		25T-95002 - Miles Estates	152	$140,036.38	4	$0.00	$140,036.38		Street "G" From Miles Road To Street "F" and Street "F" From Street "G" To Block 132
	1650 mm Diam.	25T00610 - Caterini	200	$294,283.20	3	$18,440.42	$312,723.62		
		25T200723 - Mountaingate	200	$294,283.20	3	$18,440.42	$312,723.62		Mountaingate Drive
		25T200908 - Paletta - Felker Nhd	200	$294,283.20	0		$294,283.20		Drancy Road frin SWM headwall to Drancy Rd
		25T-88031 - Sandrina Gardens	80	$117,713.28	2	$12,293.61	$130,006.89		Street "C" from Terni Blvd. To Court "E"
		25T - 3105 Fletcher Road	400	$588,566.40	5	$30,734.04	$619,300.44		
	1800 mm Diam.								
	2100 mm Diam.								
Subtotals			**4185**	**$4,035,522.75**	**54**	**$79,908.49**			
Total by Period							**$4,115,431.24**	**$0.00**	

Draft Approved Subdivision Sub-total							**$4,115,431.24**	

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

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1650 mm	300	1110	333000	439560	$ 219,780.00	$ 219,780.00
Storm Sewer Over-Sizing 1800 mm	400	1630	652000	860640	$ 430,320.00	$ 430,320.00
				1300200		

Fruitland - Winona
Collector Roads D, E, and F

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1500 mm	400	695	278000	366960	$ 183,480.00	$ 183,480.00
Storm Sewer Over-Sizing 1650 mm	1000	1110	1110000	1465200	$ 732,600.00	$ 732,600.00
Storm Sewer Over-Sizing 1800 mm	300	1630	489000	645480	$ 322,740.00	$ 322,740.00
				2477640		

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

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1500 mm	200	695	139000	183480	$ 91,740.00	$ 91,740.00

Mewburn
1500 Diam. To Pond HAM#24

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1500 mm	350	695	243250	321090	$ 160,545.00	$ 160,545.00

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

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1650 mm	150	1110	166500	219780	$ 109,890.00	$ 109,890.00
Storm Sewer Over-Sizing 1800 mm	200	1630	326000	430320	$ 215,160.00	$ 215,160.00
				650100		

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

Description	Length in (m) or Quantity	Rate	City Contribution	City Contribution Incl Overhead	0-5 Years	5-10 Years
Storm Sewer Over-Sizing 1350 mm	300	313	93900	123948	$ 61,974.00	$ 61,974.00
Storm Sewer Over-Sizing 1650 mm	350	1110	388500	512820	$ 256,410.00	$ 256,410.00
				636768		

Total by Period					**$2,784,639.00**	**$2,784,639.00**	
Secondary Plan Anticipated Oversizing Sub-total						**$5,569,278.00**	

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

Description		City Capital Cost Estimate	City Contribution			
Nebo Rd: Twenty to 400 m s of Rymal (NON-RES)	1	1800000	1800000	$ 1,800,000.00		preliminary estimate by City - study not completed
Parkside Dr storm sewer project (NON-RES)	1	500000	500000	$ 500,000.00		preliminary estimate by City - study not completed
Roxborough Nhd Storm Outlet (RES)	1	950000	950000	$ 950,000.00		preliminary estimate by City - study not completed
Airport Road Marion to Mountaingate (RES/NON-RES)	1	1368000	1368000	$ 1,368,000.00		preliminary estimate by City - study not completed
Swayze Nhd Storm Outlet (RES)	1	2600000	2600000	$ 2,600,000.00		based on cost chedule in subdivision agreement
3 Unidentified Projects in Combined Watershed (RES)	3	1000000	3000000	$ 2,000,000.00	$ 1,000,000.00	preliminary estimate by City - study not completed

Total by Period					**$9,218,000.00**	**$1,000,000.00**	
Neighbourhood Storm Outlet Sub-total						**$10,218,000.00**	
STORM SEWERS - Oversizing and Outlets - Total						**$19,902,709.24**	

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

Ref: Hamilton Development Charges -Transportation

Item Number	Road Project Description	From	To	Improvement	Length km	Benefit to Growth % (Roads)		Number of Culverts/Bridges > 1m² end area	Replacement /Widening/ New	Identified in Category "A"	Small @$84,300 1-4m²	Meduim @$168,600 4-8m²	Large @$337,200 >8m²	Cost (2019$)	Benefit to Growth % (SWM)	Growth Related Cost	Growth Related Post Period Cost	Net Growth Related Cost	Notes	Other Changes From 2014 Study
	AEGD Projects																			
1	Airport Road	Upper James Street	Glancaster Road	2r-4u	2.84	60		3	Widening		3			$252,900	60	$151,740		$151,740	non-res	inflation applied to benchmark costs
2	Airport Road	Butter Road	Glancaster Road	2r-4u	0.86	85		0	Widening		0			$0	85	$0		$0		
3	Airport Service Road	Glancaster	Airport Road	4u	1.93	100		0	New		0			$0	100	$0		$0		
4	Book Road	Fiddler's Green Road	Highway 6	2r-4u	0.99	85		1	Widening		1			$84,300	85	$71,655		$71,655	non-res	inflation applied to benchmark costs
5	Book Road	Highway 6	Southcote Road	2r-4u	1.11	85		1	Widening		1			$84,300	85	$71,655		$71,655	non-res	inflation applied to benchmark costs
6	Book Road	Highway 6	Southcote Road	4u-6u	1.11	85		0	Widening		0			$0	85	$0		$0	do under 4 lane	
7	Book Road E	Collector 2W	Glancaster Road	2r-2u	0.59	85		0	Widening		0			$0	85	$0		$0		
8	Butter Road	Fiddler's Green Road	Glancaster Road	2r-4u	3.39	85		0	Widening		0			$0	85	$0		$0	non-res	
9	Carluke Road East	Fiddler's Green Road	Glancaster Road	2r-4u	1.05	85		0	Widening		0			$0	85	$0		$0	non-res	
10	Collector Road 10N	Garner Road	Smith Road	2u	0.83	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
11	Collector Road 10N	Smith Road	Collector Road 2W	2u	0.65	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
12	Collector Road 1E	Collector 6N	Dickenson Road	2u	0.76	100		5	New (Cat A)	5				$0	100	$0		$0	non-res	inflation applied to benchmark costs
13	Collector Road 1N	Southcote Road	Collector Road 2E	2u	2.06	100		5	New (Cat A)	5				$0	100	$0		$0	non-res	inflation applied to benchmark costs
14	Collector Road 2E	Collector Road 1N	Airport Boundary	2u	0.47	100		0	New (Cat A)	0				$0	100	$0		$0		
15	Collector Road 2W	Garner Road	Collector Road 10N	2u	0.27	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
16	Collector Road 2W	Collector Road 10N	Dickenson Road extension	2u	1.35	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
17	Collector Road 6E	Collector 6N	Dickenson Road	4u	0.71	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
18	Collector Road 6N	Glancaster Road	Collector Road 6E	4u	1.93	100		3	New (Cat A)	3				$0	100	$0		$0	non-res	inflation applied to benchmark costs
19	Collector Road 6N	Collector Road 6E	Collecror Road 7E	4u	2.56	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
20	Collector Road 7E	Dickenson Road	Collector 6N	2u	0.49	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
21	Collector Road 7E	Collector 6N	Upper James Street	4u	0.58	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
22	Collector Road 7N	Book Road	Southcote Road	2u	0.91	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
23	Collector Road 7N	Southcote Road	Collector Road 2W	2u	0.89	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
24	Collector Road 12S	Collector 4E	Collector 5E	2u	0.35	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
25	Collector Road 12S	Collector 3E	Collector 4E	2u	0.35	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
26	Collector Road 1S	Fiddler's Green Road	Collector Road 9W	2u	0.41	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
27	Collector Road 2N	Collector Road 7N	Smith Road	2u	0.64	100		0	New (Cat A)	0				$0	100	$0		$0		
28	Collector Road 2S	Fiddler's Green Road	Collector Road 9W	2u	0.41	100		0	New (Cat A)	0				$0	100	$0		$0		
29	Collector Road 3E	Collector 12S	White Church Road	2u	0.2	100		0	New (Cat A)	0				$0	100	$0		$0		
30	Collector Road 3S	Collector 6W	Southcote Road	2u	0.52	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
31	Collector Road 4E	Collector 12S	White Church Road	2u	0.18	100		0	New (Cat A)	0				$0	100	$0		$0		
32	Collector Road 5E	Collector 12S	White Church Road	2u	0.18	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
33	Collector Road 5N	Fiddler's Green Road	Collector Road 8W	2u	0.84	100		0	New (Cat A)	0				$0	100	$0		$0		
34	Collector Road 6S	Glancaster Road (north)	Airport Road	2u	0.92	100		0	New (Cat A)	0				$0	100	$0		$0		
35	Collector Road 6S	Airport Road	Glancaster Road (south)	2u	0.4	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
36	Collector Road 6W	Collector 3S	Butter Road	2u	0.52	100		0	New (Cat A)	0				$0	100	$0		$0		
37	Collector Road 7S	Fiddler's Green Road	Collector 9W	2u	0.4	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
38	Collector Road 8S	Fiddler's Green Road	Collector 9W	2u	0.41	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
39	Collector Road 8W	Garner Road	Collector 5N	2u	1.36	100		0	New (Cat A)	0				$0	100	$0		$0		
40	Collector Road 9W	Garner Road	Carluke Road	2u	5.9	100		4	New (Cat A)	4				$0	100	$0		$0	non-res	inflation applied to benchmark costs
41	Dickenson Road	Glancaster Road	Upper James Street	2r-4u	2.9	85		8	Widening		7		1	$927,300	85	$788,205		$788,205	non-res	inflation applied to benchmark costs
42	Dickenson Road extension	Southcote Road	Smith Road	4u	0.42	100		1	New		1			$84,300	100	$84,300		$84,300	non-res	inflation applied to benchmark costs
43	Dickenson Road	Southcote Road	Smith Road	2r-4u	0.42	100		0	Widening					$0	100	$0		$0		
44	Dickenson Road extension	Smith Road	Glancaster Road	4u	0.8	100		0	New					$0	100	$0		$0	non-res	
45	Dickenson Road East	Upper James Street	w/o Nebo Road	2r-2u	4.6	60		0	Widening		0			$0	60	$0		$0		
46	Garner Road	w/o Southcote	e/o Glancaster	2r-5u	2.98	85		2	Widening		2			$168,600	85	$143,310		$143,310		inflation applied to benchmark costs
47	Garner Road	e/o Fiddler's Green Road	w/o Southcote Road	2r-4u	2.02	85		1	Widening		1			$84,300	85	$71,655		$71,655		inflation applied to benchmark costs
48	Garth Street extension	Twenty Road	Dickenson Road	5u	1.5	100		2	New		2			$168,600	100	$168,600		$168,600	non-res	inflation applied to benchmark costs
49	Garth Street extension	Dickenson Road	Collector 2E	5u	0.62	100		1	New		1			$84,300	100	$84,300		$84,300	non-res	inflation applied to benchmark costs

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

Ref: Hamilton Development Charges -Transportation

Item Number	Road Project Description	From	To	Improvement	Length km	Benefit to Growth % (Roads)		Number of Culverts/Bridges > 1m² end area	Replacement /Widening/ New	Identified in Category "A"	Small @$84,300 1-4m²	Meduim @$168,600 4-8m²	Large @$337,200 >8m²	Cost (2019$)	Benefit to Growth % (SWM)	Growth Related Cost	Growth Related Post Period Cost	Net Growth Related Cost	Notes	Other Changes From 2014 Study
	AEGD Projects																			
50	Glancaster Road	Collector 1N	Airport Boundary	2r-2u	0.49	85		0	Widening		0			$0	85	$0		$0		
51	Glancaster Road	Dickenson Road extension	Collector 1N	2r-4u	0.37	85		0	Widening		0			$0	85	$0		$0		
52	Glancaster Road	Garner Road	Dickenson Road	2r-4u	2.46	85		4	Widening		4			$337,200	85	$286,620		$286,620	non-res	inflation applied to benchmark costs
53	Smith Road	Dickenson Road extension	Collector 1N	2r-4u	0.65	85		0	Widening					$0	85	$0		$0		
54	Smith Road	Garner Road	Dickenson Road extension	2u	1.57	100		1	New		1			$84,300	100	$84,300		$84,300		inflation applied to benchmark costs
55	Smith Road	Collector 1N	Airport Boundary	2r-2u	0.35	100		0	Widening					$0	100	$0		$0	non-res	
56	Smith Road extension	Hydro corridor north crossing		2u	0.26	100		0	New					$0	100	$0		$0		
57	Southcote Road	Garner	Twenty Road extension	2r-4u	0.97	85		0	Widening					$0	85	$0		$0		
58	Southcote Road	Twenty Road extension	Book Road	2r-4u	0.97	85		0	Widening					$0	85	$0		$0		
59	Twenty Road	Glancaster Road	Aldercrest Avenue	2r-4u	3.08	85		9	Widening		9			$758,700	85	$644,895		$644,895	non-res	inflation applied to benchmark costs
60	Twenty Road extension	Southcote Road	Glancaster Road	4u	1.86	100		2	New		2			$168,600	100	$168,600		$168,600	non-res	inflation applied to benchmark costs
61	Fiddler's Green Road	Garner Road	Carluke Road	2r-4u	6.07	85		7	Widening		7			$590,100	85	$501,585		$501,585	non-res	inflation applied to benchmark costs
62	Glancaster Road	Butter Road	White Church Road	2r-4u	2.31	85		2	Widening		2			$168,600	85	$143,310		$143,310	non-res	inflation applied to benchmark costs
63	Southcote Road	Book Road	Collector 1N	2r-4u	0.65	85		0	Widening		0			$0	85	$0		$0		
64	Southcote Road	Airport Boundary	Butter Road	2u	0.81	100		0	Replacement		0			$0	100	$0		$0	non-res	
65	Upper James Street	Ardelea Avenue	Homestead Drive	4u-6u	4.69	85		6	Widening		5	1		$590,100	85	$501,585		$501,585	non-res	inflation applied to benchmark costs
66	White Church Road	Glancaster Road	Highway 6	2r-4u	2.31	85		1	Widening		1			$84,300	85	$71,655		$71,655	non-res	inflation applied to benchmark costs
67	Upper James Street	Malton	Highway 6	4r-5u_NBR	7	85		0	Widening					$0	85	$0		$0		
	SMATS Projects																			
68	West 5th Street	Rymal Road	Stone Church Road	2r-3u	1	60		0	New					$0	60	$0		$0		
69	Garth Street	Rymal Road	Stone Church Road	2r-4u	1	85		0	Widening					$0	85	$0		$0		
70	Rymal Road	Glancaster Road	Garth Street	2r-5u	1.3	85		1	Widening				1	$337,200	85	$286,620		$286,620		inflation applied to benchmark costs
71	Rymal Road	Fletcher Road	Upper Centenial	2r-5u	2.49	85		1	Replacement				1	$337,200	85	$286,620		$286,620		inflation applied to benchmark costs
72	Rymal Road	Upper Wentworth	West of Dartnall	3r-3u	3.29	85		0	Widening					$0	85	$0		$0		
73	Rymal Road	Upper James Street	Upper Wellington Street	2r-5u	0.87	85		0	Widening					$0	85	$0		$0		
74	Rymal Road	Upper Wellington Street	Upper Wentworth Street	2r-5u	0.86	85		0	Widening					$0	85	$0		$0		
75	Upper Wellington Street	Rymal Road	Stone Church Road	2u-4u	1	60		0	Widening					$0	60	$0		$0		
	SCUBE Projects																			
76	Arvin Avenue	McNeilly	Lewis Road	2u	0.8	100		0	New					$0	100	$0		$0		
77	Arvin Avenue	Jones Road	existing east end	2u	0.5	100		0	New					$0	100	$0		$0		
78	Arvin Avenue	McNeilly	existing west end	2u	0.4	100		1	New (Cat A)	1				$0	100	$0		$0		
79	SCUBE Central (east-west collector)	McNeilly Road	eastern boundary collector	2u	1.47	100		0	New					$0	100	$0		$0		
80	SCUBE Central (north-south collector)	Highway 8	Arvin Road extension	2u	0.48	100		0	New					$0	100	$0		$0		
81	SCUBE Central (north-south collector)	Barton Street	Highway 8	2u	0.66	100		0	New					$0	100	$0		$0		
82	SCUBE West (Block 1) (east-west	Fruitland Road	north-south collector	2u	1.36	100		1	New (Cat A)	1				$0	100	$0		$0		
83	SCUBE West (Block 1) (north-	Barton Street	Highway 8	2u	0.76	100		0	New					$0	100	$0		$0		
	Ancaster Industrial Park and TMP Projects																			
84	Ancaster New E/W Road (Trinity@Wilson	Tradewind/ Cormorant	Trinity Road	2u	0.81	100		1	New (Cat A)	1				$0	100	$0		$0	non-res	inflation applied to benchmark costs
85	Garner Road / Wilson St / Hwy 2	Fiddler's Green Road	Hwy 2	2r-4r	3.5	85		0	Widening					$0	85	$0		$0		
86	Golf Links Rd intersection improvements (Martindale			Int	--	85		0	Widening					$0	85	$0		$0		
87	Golf Links Road	McNiven Road	Kitty Murray Lane	2r-3u	0.8	85		0	Widening					$0	85	$0		$0		
88	Jerseyville Road	Shaver Road	Wilson Street	2r-3u	3.10	60		0	Widening					$0	60	$0		$0		
89	Springbrook Avenue	Regan Drive	Garner Road	2r-2u	0.69	85		0	Widening					$0	85	$0		$0		
90	Trinity Road	1km S. of Wilson	Hwy 403	2r-4u	2.2	85		2	Widening				2	$674,400	85	$573,240		$573,240		inflation applied to benchmark costs
91	Shaver Road	Trustwood	Garner Road	2r-2u	1.00	85		0	Widening					$0	85	$0		$0		
92	Southcote Road	Calder Street	Garner Road	2r-3u	1.26	60		0	Widening					$0	60	$0		$0		
93	McNiven Road	Rousseaux Street	Golf Links Road	2r-3u	0.63	20		0	Widening					$0	20	$0		$0		
94	Mohawk Road	McNiven Road	Highway 403	2r-3u	1.3	60		0	Widening					$0	60	$0		$0		
95	Stone Church Road	Harrogate Drive	Stonehenge Drive	2r-4u	0.34	85		0	Widening					$0	85	$0		$0		

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

Ref: Hamilton Development Charges -Transportation

Item Number	Road Project Description	From	To	Improvement	Length km	Benefit to Growth % (Roads)		Number of Culverts/Bridges > 1m² end area	Replacement /Widening/ New	Identified in Category "A"	Small @$84,300 1-4m²	Meduim @$168,600 4-8m²	Large @$337,200 >8m²	Cost (2019$)	Benefit to Growth % (SWM)	Growth Related Cost	Growth Related Post Period Cost	Net Growth Related Cost	Notes	Other Changes From 2014 Study
	RHBPS Projects																			
96	Dartnall Road Extension	Twenty Road	Dickenson Road	4u	1.65	100		2	New (Cat A)	2				$0	100	$0		$0	non-res	inflation applied to benchmark costs
97	Dickenson Road	w/o Nebo	w/o Glover	2r-2u	1.1	60		3	Widening		3			$252,900	60	$151,740		$151,740		inflation applied to benchmark costs
98	Nebo Road	Rymal Road	Twenty Road	2r-2u	1.3	85		1	Replacement		1			$84,300	85	$71,655		$71,655	non-res	inflation applied to benchmark costs
99	Nebo Road	800m South of Twenty Road	Dickenson Road	2r-2u	0.6	85			Widening					$0	85	$0		$0	non-res	
100	Regional Road 56	Rymal Road	ROPA 9 Boundary	2r-5u	1.2	85		3	Widening		3			$252,900	85	$214,965		$214,965		inflation applied to benchmark costs
101	Regional Road 56	Cemetery Road	South Limits of ROPA 9	various/ESR	0	85		0	Widening					$0	85	$0		$0		
102	Twenty Road extension	Glover Road	Upper Red Hill Valley Parkway	3u	0.6	100		2	New		2			$168,600	100	$168,600		$168,600		inflation applied to benchmark costs
103	Glover Road	Twenty Road	Rymal Road	2r-2u	2.6	85		0	Widening					$0	85	$0		$0		
104	Upper Red Hill Valley Parkway (previously	Rymal Road	Dartnall Road extension	5u	2.5	100		1	New		1			$84,300	100	$84,300		$84,300	non-res	inflation applied to benchmark costs
	Waterdown Projects																			
105	Burke Street	Dundas Street	Mountain Brow	4u	0.85	95		0	New					$0	95	$0		$0		
106	Parkside Drive	Highway 6	Main Street	2r-4u	2.92	60		2	New Cat A	2				$0	60	$0		$0		
107	Parkside Drive	Main Street	Churchill (500 m east)	2r-4u	0.61.52	60		0	Widening					$0	60	$0		$0		
108	East-West Road Corridor (Waterdown By-Pass)	Kerns Road	Highway 6	4u	6.34	95		8	New Cat A	8				$0	95	$0		$0		
109	Waterdown Road (Burlington portion)	Mountain Brow Road	Craven Avenue	2r-4u	1.9	100		0	Widening					$0	100	$0		$0		
110	Mountain Brow Road	Waterdown Road	New north-south link	2r-4u	0.91	85		2	Widening			2		$337,200	85	$286,620		$286,620		inflation applied to benchmark costs
111	Dundas Street	New north-south link	Hamilton Boundary	4u-6u	0.87	85		0	New (Cat A)					$0	85	$0		$0		
112	Centre Road	Northlawn	Parkside Drive	2r-3u	0.4	60		0	New (Cat A)					$0	60	$0		$0		
	Fruitland Winona Projects																			
113	Barton Street	Fruitland Road	Fifty Road	2r-3u	5	60		5	Widening (Cat A)	5				$0	60	$0		$0		inflation applied to benchmark costs
114	Fifty Road	South Service Road	Barton Street	2r-4u	1	85		0	Widening					$0	85	$0		$0	non-res	
115	Fifty Road Escarpment Access	QEW	Highway 8	2r-2u	0.8	85		0	Widening					$0	85	$0		$0	non-res	
116	Fruitland Road By-pass	Barton Street	Highway 8	4u	1.1	85		1	New (Cat A)	1				$0	85	$0		$0		inflation applied to benchmark costs
117	Fruitland Road	Arvin Avenue	Barton Street	2u-4u	0.3	85		0	Widening					$0	85	$0		$0		
118	Highway 8 (Stoney Creek)	Dewitt Road	Fruitland Road	2r-5u	0.8	60		0	Widening					$0	60	$0		$0		
119	Highway 8 (Stoney Creek)	Fruitland Road	East City Limit	2r-4r_NBR	3.3	60		4	Widening		3	1		$421,500	60	$252,900		$252,900		inflation applied to benchmark costs
	Elfrida Boundary Expansion Projects (NOTE: 2/3 Post-Period)																			
120	First Road East	Highway 20	Mud Street	2r-3u	2.1	85		1	Widening		1			$84,300	85	$71,655	$47,770	$23,885	2/3 Post-Period	inflation applied to benchmark costs
121	Fletcher Road	500m South of Rymal	Golf Club Road	2r-3u	1.6	85		1	Widening		1			$84,300	85	$71,655	$47,770	$23,885	2/3 Post-Period	inflation applied to benchmark costs
122	Golf Club Road	Trinity Church Road	Hendershot Road	2r-2u	7.00	85		1	Widening		1			$84,300	85	$71,655	$47,770	$23,885	2/3 Post-Period	inflation applied to benchmark costs
123	Hendershot Road	Highway 20	Golf Club Road	2r-3u	2.10	85		1	Widening		1			$84,300	85	$71,655	$47,770	$23,885	2/3 Post-Period	inflation applied to benchmark costs
124	Highland Road	Upper Centennial Parkway	Second Road East	2r-3u	2.00	85		0	Widening					$0	85	$0	$0	$0	2/3 Post-Period	
125	Mud Street	Upper Centennial Parkway	Second Road East	2r-2u	2.00	85		1	Widening		1			$84,300	85	$71,655	$47,770	$23,885	2/3 Post-Period	inflation applied to benchmark costs
126	Second Road East	Highway 20	Mud Street	2r-3u	3.00	85		1	Widening			1		$168,600	85	$143,310	$95,540	$47,770	2/3 Post-Period	inflation applied to benchmark costs
127	Trinity Church Road	Hydro corridor	Golf Club Road	2r-2u	2.00	85		0	Widening					$0	85	$0	$0	$0	2/3 Post-Period	
128	Upper Centennial Parkway	Green Mountain Road	Highway 20	4r-5u	2.90	85		0	Widening					$0	85	$0	$0	$0	2/3 Post-Period	
129	Hwy 56	Hydro Corridor	Golf Club Road	4r-5u	TBD	85		3	New (Cat A)	3				$0	85	$0	$0	$0	2/3 Post-Period	
	Other Road Projects																			
130	Binbrook Road	Royal Winter Drive/Binhaven Road	Fletcher Road	2r-3u	0.7	85		0	Widening					$0	85	$0		$0		
131	Highway 8 (Dundas)	Bond Street	Dundas Limits	2r-3u	0.4	60		0	Widening					$0	60	$0		$0		
132	Highway 8 (Dundas)	Hillcrest	Park Ave	2r-3u	0.6	60		1	Widening		1			$84,300	60	$50,580		$50,580		inflation applied to benchmark costs
133	Jones Road	Barton Street	South Service Road	2r-2u	0.90	50		1	Widening		1			$84,300	50	$42,150		$42,150	non-res	inflation applied to benchmark costs
134	Lewis Road	Barton Street	South Service Road	2r-2u	0.80	50		1	New (Cat A)	1				$0	50	$0		$0	non-res	inflation applied to benchmark costs
135	Longwood Road	Aberdeen Avenue	Main Street	various/ESR	0.65	50		0	Widening					$0	50	$0		$0		
136	Miles Road	Rymal Road	Hydro Corridor	2r-3u	2.00	85		1	Widening		1			$84,300	85	$71,655		$71,655		inflation applied to benchmark costs
137	Millen Road	Barton Street	South Service Road	2r-3u	1.00	60		0	Widening					$0	60	$0		$0	non-res	
138	Fletcher Road	Binbrook Road	Golf Club Road	2r-2u	4.20	60		3	Widening		3			$252,900	60	$151,740		$151,740		inflation applied to benchmark costs
139	South Service Road	Millen Road	Gray	2r-2u	1.70	85		0	Widening					$0	85	$0		$0	non-res	
140	Trinity Church Road	Binbrook Road	Golf Club Road	2r-2u	5.20	60		1	Widening				1	$337,200	60	$202,320		$202,320		inflation applied to benchmark costs

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

Ref: Hamilton Development Charges -Transportation

Item Number	Road Project Description	From	To	Improvement	Length km	Benefit to Growth % (Roads)		Number of Culverts/Bridges > 1m² end area	Replacement /Widening/ New	Identified in Category "A"	Small @$84,300 1-4m²	Meduim @$168,600 4-8m²	Large @$337,200 >8m²	Cost (2019$)	Benefit to Growth % (SWM)	Growth Related Cost	Growth Related Post Period Cost	Net Growth Related Cost	Notes	Other Changes From 2014 Study
141	Nebo Road	800m South of Twenty Road	Dickenson Road	2r-2u	0.6	85		0	Widening					$0	85	$0		$0		
142	Twenty Road	Aldercrest Avenue	600m west of Nebo Road	2r-2u	4.1	60		0	Widening					$0	60	$0		$0		
143	Upper Gage Street	Mohawk Road	Thorley	4u-5u	0.6	50		0	Widening					$0	50	$0		$0		
144	Upper Sherman Avenue	Stone Church Road	LINC	2r-3u	0.90	60		0	Widening					$0	60	$0		$0		
145	Upper Sherman Avenue	Stone Church Road	Rymal Road	2r-3u	1.00	60		0	Widening					$0	60	$0		$0		
146	Upper Wellington Street	Limeridge Street	Stone Church Road	2r-5u	1.20	60		0	Widening					$0	60	$0		$0		
147	West 5th Street	Limeridge Street	Stone Church Road	2r-3u	1.20	60		0	Widening					$0	60	$0		$0		
148	Shaver Road	Hwy 403	Wilson Road		1.50	100		1	Widening			1		$168,600	100	$168,600		$168,600		inflation applied to benchmark costs
149	Scenic Drive	Old City Limits	Lavender S Leg		1.40	100		1	Widening			1		$168,600	100	$168,600		$168,600		inflation applied to benchmark costs
150	North Service Road	Green Road	East City Limits		8.30	100		1	New (Cat A)	1				$0	100	$0		$0		inflation applied to benchmark costs
151	Victoria Avenue	Ferrie Street	Burlington Street	Two-way conversion	0.46	85		0	Widening					$0	85	$0		$0		
152	Highway 5/6 municipal roads			Service Roads		100		1	New (Cat A)	1				$0	100	$0		$0		inflation applied to benchmark costs
																$0		$0		
Grand Total								**154**		**67**	**74**	**7**	**6**	**$9,441,600**		**$7,772,460**	**$334,390**	**$7,438,070**		
Growth %																**82%**				
Total Growth																**$7,772,460**	**$334,390**	**$7,438,070**		

Total Residential	**$4,467,900**	**Res**	**$3,536,385**	**$334,390**	**$3,201,995**
Total Non-Residential	**$4,973,700**	**Non-Res**	**$4,236,075**	**$0**	**$4,236,075**

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 2014 Study
Expansion to Airport SPA	1	2	77	17,325	3.08	4,968,252	1,096,673	6,064,924	100	6,064,924	6,064,924	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	2	2	33	7,425	1.32	2,129,251	470,003	2,599,253	100	2,599,253	2,599,253	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	3	2	38.5	8,663	1.54	2,484,126	548,336	3,032,462	100	3,032,462	3,032,462	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	4	2	88	19,800	3.52	5,678,002	1,253,340	6,931,342	100	6,931,342	6,931,342	-	100	-	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	5	1	160	36,000	6.40	10,323,640	2,278,800	12,602,440	100	12,602,440	-	12,602,440	100	12,602,440	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	6	1	63	14,175	2.52	4,064,933	897,278	4,962,211	100	4,962,211	-	4,962,211	100	4,962,211	-	In Ancaster, south of Garner Road	land value updated, benchmark costs verified unchanged
	10	1	33	7,425	1.32	2,129,251	470,003	2,599,253	100	2,599,253	-	2,599,253	100	2,599,253	-	North of Airport	land value updated, benchmark costs verified unchanged
	11	1	28	6,300	1.12	1,806,637	398,790	2,205,427	100	2,205,427	-	2,205,427	100	2,205,427	-	North of Airport	land value updated, benchmark costs verified unchanged
	12	1	17.88	4,023	0.72	1,153,667	254,656	1,408,323	100	1,408,323	-	1,408,323	100	1,408,323	-	North of Airport	land value updated, benchmark costs verified unchanged
	13	1	108	24,300	4.32	6,968,457	1,538,190	8,506,647	100	8,506,647	-	8,506,647	100	8,506,647	-	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	2,742,217	605,306	3,347,523	100	3,347,523	-	3,347,523	100	3,347,523	-		land value updated, benchmark costs verified unchanged
	15	1	25.5	5,738	1.02	1,645,330	363,184	2,008,514	100	2,008,514	-	2,008,514	100	2,008,514	-		land value updated, benchmark costs verified unchanged
	16	1	34	7,650	1.36	2,193,774	484,245	2,678,019	100	2,678,019	-	2,678,019	100	2,678,019	-		land value updated, benchmark costs verified unchanged
	17	1	41	9,225	1.64	2,645,433	583,943	3,229,375	100	3,229,375	-	3,229,375	100	3,229,375	-		land value updated, benchmark costs verified unchanged
	18	1	124.88	28,098	5.00	8,057,601	1,778,603	9,836,205	100	9,836,205	-	9,836,205	100	9,836,205	-		land value updated, benchmark costs verified unchanged
	19	1	100	22,500	4.00	6,452,275	1,424,250	7,876,525	100	7,876,525	-	7,876,525	100	7,876,525	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	20	1	230.5	51,863	9.22	14,872,494	3,282,896	18,155,391	100	18,155,391	-	18,155,391	100	18,155,391	-		land value updated, benchmark costs verified unchanged
	21	1	15	3,375	0.60	967,841	213,638	1,181,479	100	1,181,479	-	1,181,479	100	1,181,479	-		land value updated, benchmark costs verified unchanged
	22	1	34	7,650	1.36	2,193,774	484,245	2,678,019	100	2,678,019	-	2,678,019	100	2,678,019	-		land value updated, benchmark costs verified unchanged
	23	1	140.88	31,698	5.64	9,089,965	2,006,483	11,096,449	100	11,096,449	-	11,096,449	100	11,096,449	-		land value updated, benchmark costs verified unchanged
	24	1	50.5	11,363	2.02	3,258,399	719,246	3,977,645	100	3,977,645	-	3,977,645	100	3,977,645	-		land value updated, benchmark costs verified unchanged
	25	1	97	21,825	3.88	6,258,707	1,381,523	7,640,229	100	7,640,229	-	7,640,229	100	7,640,229	-		land value updated, benchmark costs verified unchanged
	26	2	45	10,125	1.80	2,903,524	640,913	3,544,436	100	3,544,436	3,544,436	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	27	2	42.75	9,619	1.71	2,758,348	608,867	3,367,215	100	3,367,215	3,367,215	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	28	2	18	4,050	0.72	1,161,410	256,365	1,417,775	100	1,417,775	1,417,775	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	29	2	196.75	44,269	7.87	12,694,851	2,802,212	15,497,063	100	15,497,063	15,497,063	-	100	-	-		land value updated, benchmark costs verified unchanged
	30	2	24.75	5,569	0.99	1,596,938	352,502	1,949,440	100	1,949,440	1,949,440	-	100	-	-		land value updated, benchmark costs verified unchanged
	31	2	16.25	3,656	0.65	1,048,495	231,441	1,279,935	100	1,279,935	1,279,935	-	100	-	-		land value updated, benchmark costs verified unchanged
	32	2	15	3,375	0.60	967,841	213,638	1,181,479	100	1,181,479	1,181,479	-	100	-	-		land value updated, benchmark costs verified unchanged
	33	2	30.25	6,806	1.21	1,951,813	430,836	2,382,649	100	2,382,649	2,382,649	-	100	-	-		land value updated, benchmark costs verified unchanged
	34	1	24.75	5,569	0.99	1,596,938	352,502	1,949,440	100	1,949,440	-	1,949,440	100	1,949,440	-		land value updated, benchmark costs verified unchanged
	35	2	12.75	2,869	0.51	822,665	181,592	1,004,257	100	1,004,257	1,004,257	-	100	-	-		land value updated, benchmark costs verified unchanged
	36	2	22.5	5,063	0.90	1,451,762	320,456	1,772,218	100	1,772,218	1,772,218	-	100	-	-		land value updated, benchmark costs verified unchanged
	37	2	33.75	7,594	1.35	2,177,643	480,684	2,658,327	100	2,658,327	2,658,327	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	38	2	56.25	12,656	2.25	3,629,405	801,141	4,430,545	100	4,430,545	4,430,545	-	100	-	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
	39	1	37.5	8,438	1.50	2,419,603	534,094	2,953,697	100	2,953,697	-	2,953,697	100	2,953,697	-	Involves off-site stream work	land value updated, benchmark costs verified unchanged
Potential Urban Boundary Expansion Area	7	1	20	4,500	0.80	1,290,455	284,850	1,575,305	100	1,575,305	-	1,575,305	100	1,575,305	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	8	1	37.25	8,381	1.49	2,403,473	530,533	2,934,006	100	2,934,006	-	2,934,006	100	2,934,006	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	9	1	58.13	13,079	2.33	3,750,708	827,917	4,578,624	100	4,578,624	-	4,578,624	100	4,578,624	-	South of Twenty Road West, north of Airport	land value updated, benchmark costs verified unchanged
	40	1	11.25	2,531	0.45	725,881	160,228	886,109	100	886,109	-	886,109	100	886,109	-	potential to combine with B10	land value updated, benchmark costs verified unchanged
	41	Elfrida (Res)	126	28,350	5.04	8,129,867	1,794,555	9,924,422	100	9,924,422	6,616,281	3,308,141	0	-	3,308,141	First Rd E and Mud	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	42	Elfrida (Res)	21.25	4,781	0.85	1,371,108	302,653	1,673,762	100	1,673,762	1,115,841	557,921	0	-	557,921	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	43	Elfrida (Res)	60	13,500	2.40	3,871,365	854,550	4,725,915	100	4,725,915	3,150,610	1,575,305	0	-	1,575,305	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	44	Elfrida (Res)	71.25	16,031	2.85	4,597,246	1,014,778	5,612,024	100	5,612,024	3,741,349	1,870,675	0	-	1,870,675	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	45	Elfrida (Res)	22	4,950	0.88	1,419,501	313,335	1,732,836	100	1,732,836	1,155,224	577,612	0	-	577,612	NW corner, Trinity Church at Hydro ROW	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	46	Elfrida (Res)	147	33,075	5.88	9,484,845	2,093,648	11,578,492	100	11,578,492	7,718,995	3,859,497	0	-	3,859,497	HWY 56	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	47	Elfrida (Res)	168.75	37,969	6.75	10,888,214	2,403,422	13,291,636	100	13,291,636	8,861,091	4,430,545	0	-	4,430,545	HWY 56	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	48	Elfrida (Res)	140	31,500	5.60	9,033,185	1,993,950	11,027,135	100	11,027,135	7,351,424	3,675,712	0	-	3,675,712	First Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	49	Elfrida (Res)	66	14,850	2.64	4,258,502	940,005	5,198,507	100	5,198,507	3,465,671	1,732,836	0	-	1,732,836	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	50	Elfrida (Res)	130.75	29,419	5.23	8,436,350	1,862,207	10,298,557	100	10,298,557	6,865,704	3,432,852	0	-	3,432,852	Second Rd E, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	51	Elfrida (Res)	38.5	8,663	1.54	2,484,126	548,336	3,032,462	100	3,032,462	2,021,641	1,010,821	0	-	1,010,821	u/s confluence u/s Fletcher	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	52	Elfrida (Res)	102.25	23,006	4.09	6,597,451	1,456,296	8,053,747	100	8,053,747	5,369,165	2,684,582	0	-	2,684,582	Fletcher at Golf Club	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	53	Elfrida (Res)	25.16	5,661	1.01	1,623,392	358,341	1,981,734	100	1,981,734	1,321,156	660,578	0	-	660,578	Fletcher at Golf Club ,Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	54	Elfrida (Res)	29.25	6,581	1.17	1,887,290	416,593	2,303,884	100	2,303,884	1,535,922	767,961	0	-	767,961	Golf Club E of 56, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	55	Elfrida (Res)	48.75	10,969	1.95	3,145,484	694,322	3,839,806	100	3,839,806	2,559,871	1,279,935	0	-	1,279,935	Golf Club btwn 56 and Hendershott	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	56	Elfrida (Res)	29.25	6,581	1.17	1,887,290	416,593	2,303,884	100	2,303,884	1,535,922	767,961	0	-	767,961	Golf Club W of Hendershott, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
	57	Elfrida (Res)	26	5,850	1.04	1,677,592	370,305	2,047,897	100	2,047,897	1,365,264	682,632	0	-	682,632	Gol Club at Hendershott, Involves off-site stream work	land value updated, benchmark costs verified unchanged; 2/3 Post Period
Total								**278,606,874**	**100**	**278,606,874**	**124,864,454**	**153,742,420**		**120,866,854**	**32,875,566**		

Total Residential								**98,626,698**	**100**	**98,626,698**	**65,751,132**	**32,875,566**		**-**	**32,875,566**		
Total Non-Residential								**179,980,176**	**100**	**179,980,176**	**59,113,322**	**120,866,854**		**120,866,854**	**-**		

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 Growth Related Cost ($)	Growth Related Post Period Cost ($)	Net Total Assiciated Growth Related Cost ($)	Remarks	Other Changes From 2014 Study
Expansion to Airport SPA	Ancaster	1,303	0.2	260.6	390,900	243,024	633,924	100	633,924		633,924		land values updated (City benchmark unit costs unchanged)
	North of Airport	-	0.2	-	-	-	-	100	-		-		land values updated (City benchmark unit costs unchanged)
Potential New Busniess Park (In Existing Airport Spa)	West of Airport	24,231	0.2	4,846.2	7,269,300	4,519,350	11,788,650	100	11,788,650		11,788,650		land values updated (City benchmark unit costs unchanged)
Potential Urban Boundary Expansion Area	South of Twenty Road West, north of Airport	-	0.2	-	-	-	-	100	-		-		land values updated (City benchmark unit costs unchanged)
	Northwest of Golf Club Road and Hendershott	15,337	0.2	3,067.4	4,601,100	2,473,964	7,075,064	100	7,075,064	4,716,709	2,358,355	Residential	land values updated (City benchmark unit costs unchanged); 2/3 Post-period
Grand Total							**19,497,638**	**100**	**19,497,638**	**4,716,709**	**14,780,929**		
Total Residential							**7,075,064**	**100**	**7,075,064**	**4,716,709**	**2,358,355**		
Total Non-Residential							**12,422,574**	**100**	**12,422,574**	**-**	**12,422,574**		

[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]$2500/m for Watershed Area > 500 ha
$1500/m for Watershed Area < 500 ha

Appendix H: Services Related to a Highway Needs – Dillon Consulting Limited

DILLON CONSULTING

CITY OF HAMILTON

Draft 2019 Development Charge - Background Study

Appendix H – Services Related to Highway Needs

February 28, 2019 – 16-4540

Table of Contents

1.0 Introduction 1
2.0 Level of Service 1
2.1 Overview 1
3.0 Local Service Policy 3
4.0 Benefit to Existing Community 3
4.1 Overview 3
4.2 Approach to Benefit to Existing Community 5
5.0 Post Period Benefit 11
6.0 Project Costing 12
6.1 Overview 12
6.2 Unit Costs 12
6.3 Typical Project Costs 14
7.0 Development Charge Eligible Capital Projects 15

Tables

Table 1: Benefit to Existing Community 6
Table 2: Unit Costs for Capital Project Construction Line Items 12
Table 3: Typical Cross Section Improvement Costs for Road Projects 14
Table 4: Highway Projects 2019-2031 17

1.0 Introduction

The following report is a technical appendix to Hamilton's 2019 Development Charges (D.C.) Background Study. The purpose of the report is to provide an overview of the changes to Hamilton's public highways (road) network within the D.C. study period (2019 to 2028), identify the capital costs associated with improvements and apportion the capital expenditures to existing and growth populations within the same study period.

Development Charges are a tool for municipalities to ensure that "growth pays for growth" – meaning that developments that grow the municipality cover the costs associated with extending municipal services for the new growth caused by these developments. Through the application of D.C., the development community contributes an appropriate share of infrastructure and capital costs (including those for public highways) for necessary growth-related improvements over the ten-year planning period. The Development Charges Act (D.C.A.), 1997, as amended regulates when and how municipalities may collect D.C.

2.0 Level of Service

2.1 Overview

Level of Service is a useful measure to understand how quantitatively and qualitatively the infrastructure of a municipality is performing and the value of City assets per capita. For transportation infrastructure in the City of Hamilton, level of service is measured in five distinct categories:

- Roads;
- Bridges, culverts, and roundabouts;
- Traffic signals;
- Terminals; and,
- Shelters.

The quality measure for road level of service is calculated as lane kilometers per capita for all road infrastructure (for automobiles, cyclists and pedestrians) in the City. Over the ten years prior to this study, lane kilometers per capita of road infrastructure has been steadily declining as the City has set policy directions in their Official Plan and Transportation Master Plan to prioritize more active transportation infrastructure and transit investments. This trend is expected to continue as mobility for new population growth will be increasingly accommodated

through non-automobile modes and therefore require a smaller proportional increase in lane kilometers.

Level of service for bridges, culverts, roundabouts, and traffic signals are calculated on an item per capita basis while terminals are calculated by square ft. of terminal space and shelters are calculated by lane km of roadway. These four measures have remained relatively stable throughout the previous ten years indicating that growth has been on pace with the provision of this infrastructure.

The level of service for the ten year Development Charge period is based on a historical average and projected population that determines the amount of infrastructure investment that is eligible to be recovered through development charges. The Benefit to Existing section in this appendix sets out the ratio of benefit to existing residents and benefit to new growth, which is the financial responsibility of the development community that is attributable to various infrastructure improvements. The level of service for roads; bridges, culverts, and roundabouts; and traffic signals; terminals; and shelters are presented in **Appendix B.**

3.0 Local Service Policy

Appendix E sets out the municipality's General Policy Guidelines on Development Charges (D.C.) and local service funding for Services Related to a Highway. The guidelines outline in general terms, the size and nature of the engineered infrastructure that is included in the study as a development charge project, versus infrastructure that is considered as a local service, to be emplaced separately by landowners, pursuant to a development agreement.

4.0 Benefit to Existing Community

4.1 Overview

The Hamilton Official Plan and the Hamilton Transportation Master Plan puts heavy emphasis on designing corridors, streets and paths with full consideration given to transit, cyclists and pedestrians. Consequently the design elements of a highway as well as its role and function must change to embrace the needs of all categories of transportation system users to provide a *Complete Street*. Complete streets is a concept that defines a highway as a transportation facility that provides safe and comfortable travel for a wide variety of users, regardless of mode, level of ability and age. Complete streets allow safe travel for:

- Pedestrians of all ages and ability levels;
- Cyclists;
- Automobiles;
- Transit vehicles; and,
- Delivery vehicles.

The main premise of complete streets is the recognition that the function of street (or a highway) goes beyond simply moving vehicles. Rather, streets play an important role in moving people, connecting the community, accommodating pedestrians and cyclists, enabling goods movement, providing a space for public interaction and civic engagement and providing access for local stores and businesses. A complete street concept has been fully embraced by the City of Hamilton and is the fundamental assumption for the key planning documents mentioned earlier. It also translates to the planned capital projects and therefore the development charges process.

Under this premise a street design is approached with the objective of optimizing the right-of-way (R.O.W.) by balancing mobility needs and enhancing connectivity for all users. Traffic

Management are a range of measures to help accomplish that (e.g. traffic signals, roundabouts). Travel Demand Management (T.D.M.) on the other hand refers to strategies that attempt to reduce or more efficiently manage the demand for travel within the existing transportation network and reduce capital expenditure for further expanding the supply network. Examples of TDM strategies with impact on highway design, role and function include:

- Carpooling to increase the occupancy of vehicles. High occupancy vehicle lanes (H.O.V.) provided within the road platform are needed to promote better utilization of existing assets by increased auto occupancy;
- Active transportation (walking or cycling) to reduce demand for vehicle travel by shifting commuter travel demand to cycling and walking. This measure is supported by on-road and off-road cycling trails and multi-use pathways; and,
- Park and ride facilities at transit stations are designed to "capture" auto users at some critical gateway points and divert them to transit.

The Hamilton Transportation Master Plan includes the identification of rapid transit initiatives and the implementation of LRT corridors which will have effects on the design of the transportation corridors, main LRT highways and the so called feeder routes. Several transit priority measures will be required to "prepare" a highway for serving transit effectively. These features will include but will not be limited to:

- H.O.V. or shared lanes for the exclusive or semi-exclusive use of transit vehicles and private automobiles with more than one occupant. They allow high-occupancy vehicles to have faster travel times than general purpose lanes, encouraging transit use and carpooling. Lanes may be designated as shared lanes only during peak periods;
- Provision of dedicated transit lanes along transit priority routes;
- Transit signal and transit priority signal uses real-time information to either extend a green light or shorten a red light when a bus is approaching to help the bus cross through the intersection without stopping. It provides priority to transit vehicles at intersections;
- Queue jump lanes with signal priority allow buses to bypass queues at intersections. Transit vehicles have an advanced green, and can enter the intersection before other vehicles; and,
- Architecturally distinctive passenger amenities, bus bays and shelters located within the road allowance and provided to improve safety and comfort for transit users.

The concept of services related to a highway is evolving and expanding to fully embrace the transportation of people and goods via many different modes including, but not limited to passenger cars, commercial vehicles, transit vehicles, bicycles and pedestrians and their related amenities and programs. The highway therefore consists of all land and associated infrastructure built to support (or service) this movement of people and goods regardless of the mode of transportation employed, thereby meeting their primary role and function of providing transportation "space" and opportunity for all users.

The associated infrastructure to achieve this concept shall include, but is not limited to:

- Highway Reconstruction with no Widening;
- New Highways;
- Highway Widenings;
- Highway Reconstruction and Urbanization;
- Traffic Management;
- Major Structures and Grade Separations;
- Active Transportation; and,
- Studies.

It is with this context that the transportation capital projects for the City of Hamilton were identified and included in the *Services Related to a Highway* portion of the development charge.

4.2 Approach to Benefit to Existing Community

The D.C.A. has a "benefit to existing (B.T.E.)" community provision that allows for a portion of growth-related capital costs identified in D.C. background studies to be deemed to benefit the existing community. These costs are discounted from the eligible D.C. capital costs and are essentially paid for by the existing residents and business (the community) through municipal property taxes and/or user fees.

The portion of the capital cost that is attributable to B.T.E. community typically varies by project type or grouping of projects depending on the extent of benefit. Said another way, to what extent is the project needed to support growth, bearing in mind the principle that "growth pays growth".

Out of the highway related infrastructure needs identified for the City, certain improvements will benefit current residents and would comprise the non-growth component of the D.C. The improvements required to accommodate higher volumes of traffic and increased demand on

the existing infrastructure directly attributable to new developments are eligible for funding through Development Charges. All road reconstruction projects where the is no widening and the works are done due to the deterioration of the road and not to add capacity the cost is borne 100% by the existing community. All new road projects have been determined to be 100% growth related; required to meet the needs of new development. Certain portions of future reconstruction, widening and urbanization projects have recognized a benefit to existing (B.T.E.) community component.

Table 1 outlines the percentage allocation and the rationale behind attributing all or a portion of an improvement as B.T.E. community for various project types. In some cases projects types were renamed and redefined from the previous D.C. Background Study to better align with the range of project types included in the capital plan and with the multi-modal integrated approach to transportation, including complete streets. For the most part, the B.T.E. community discount adopted for this D.C. Background Study is the same as the previous 2014 D.C. By-Law. The exception being those projects associated with active transportation (previously referred to as Community Trails and Bicycle Facilities). The rationale for the change is described in the table below.

Table 1: Benefit to Existing Community

Project Type	Rationale	Benefit to Existing (%)
Highway Reconstruction with no Widening	Where a road is reconstructed due to deterioration and there is no road widening or other infrastructure to support the growth in new development, 100% of the cost is B.T.E. community. These projects are excluded from the project list.	100%
New Highways	No deduction for B.T.E. community as new road links are built to increase capacity needed to serve growth. With the level of service in the overall road network deteriorating, even with construction of the 2019 – 2031 capital program, all of the cost of new road construction were allocated to growth.	0%
Highway Widening	Highways (roads) are widened to increase capacity to help accommodate growth. In cases where a road is widened, but not reconstructed, the existing lanes are resurfaced, intersections are improved and traffic signals and other right-of-way features may be upgraded as part of the widening. Typically a 15% deduction was applied to cover the estimated	5% - 50%

Project Type	Rationale	Benefit to Existing (%)
	rehabilitation cost of the existing asset. The deduction essentially relates to the net extension of the functional life of the roadway in conjunction with the widening. Higher deduction (40% to 50%) were applied for projects located in mature neighborhoods subject to increased travel demand generated by new growth located elsewhere but impacting the facility: ¢ 5% B.T.E. – Applied to projects to support O.P.A. 28 (Waterdown) ¢ 15% B.T.E. – Applied to most projects to reflect cost to rehabilitate road net of any growth ¢ 40-50% B.T.E. – Applied to projects in long established and /or developed corridors, typically when the existing road is reconstructed and widened.	
Highway Reconstruction & Urbanization	Highway reconstruction and urbanization projects typically serve to improve safety, operation, bring roadway section to urban cross-section and increase the roads capacity (e.g. the addition of a centre left-turn lane). Capacity gains result from improvements in alignment, lane reconfiguration, pavement structure improvements, and in some cases, road damage caused by heavy construction traffic. The project allocation is location specific and ranges from 15% to 50%: ¢ 15% B.T.E. – Applied to most projects to reflect cost to rehabilitate road net of any growth ¢ 40-50% B.T.E. – Applied to projects in long established and/or developed corridors and those rural corridors linking urban centres, typically when the existing road is reconstructed or widened. **80% B.T.E. and 0% B.T.E applied to one project in Ancaster in*	15% to 50%*

Project Type	Rationale	Benefit to Existing (%)
	a highly developed corridor and a Waterdown project respectively.	
Traffic Management	Traffic management includes projects that are required as a result of increased traffic due to growth. This could include new or modified traffic signals; intersections turn lanes; intersection improvements; roundabouts, traffic calming features, street lighting, and any related land acquisition. The introduction of traffic management projects is typically to address a bottleneck or a problem caused by growth (e.g. traffic infiltration) and on balance can reduce travel speeds or increase conflict potential, as such the benefit to the existing community is very low. Typically a 5% deduction was applied to reflect that for some projects there are geometric improvements or updated traffic signal technology that benefits the existing community. The remainder of the cost is allocated to growth understanding that the need for improvements is required to help accommodate growth. Land acquisition was 100% attributable to growth. Some projects due to their wider applicability to the existing community were deemed to have a higher B.T.E.	5% -85%
Major Structures and Grade Separations	These projects include grade separations (structures) for rail, pedestrians, and wildlife and are designed to address capacity deficiencies, safety concerns, and provide opportunities for other users in the road network resulting from growth in traffic. When a structure is driven by growth (i.e. Highway 5/6 Interchange) benefit to existing is 0% For rail, where there is an existing level crossing there is a benefit in the form of improved safety and elimination of delays due to train movements; a maximum 25% deduction has been made in order to address these considerations. For the Mohawk Road Highway 403 on-ramp, this was judged	0% - 50%

Project Type	Rationale	Benefit to Existing (%)
	to be 50% benefit to existing.	
Active Transportation	Active transportation includes sidewalks, on-road bicycle lanes, off-road trails, multi-use pathways, bike parking facilities, and crosswalks as well as other amenities and related programs; largely within the shared ROW. They play a complementary role with public transit, traffic management and transportation demand management infrastructure, amenities and programs aimed at decreasing single-occupant vehicle use. For this reason it is critical to helping to manage growth in travel demand due to new development and central to direction the city has adopted in their Official Plan and Hamilton Transportation Master Plan (H.T.M.P.) and as part of the complete streets approach to managing transportation. Collectively, active transportation looks to reduce the number of vehicles on City roads, particularly single occupant vehicles, thereby reducing the road infrastructure that would need to be added to accommodate the same demand. The H.T.M.P. targets an increase in active transportation mode split from 5% in 2016 to 15% by 2031. This reduces the capital infrastructure costs for such things as road widenings, but requires the installation of other infrastructure, amenities and programs. While there is some benefit to existing community, typically a 15% deduction was applied; the principle reason for implementing this approach is to help accommodate growth. Where the active transportation facility is constructed as part of a roadway project the B.T.E. is that of the underlying road project.	15%
Studies	This includes, but is not limited to, transportation studies, including Transportation Master Plans, and other transportation planning studies, programs and initiatives required to support planned growth.	0% - 5%

Project Type	Rationale	Benefit to Existing (%)
	When a study is about future planning it is 0% benefit to existing. Some programs (e.g. cordon counts program) are mostly about future orientation but has some value to existing residents. This has been assigned a benefit to existing of 5% Where the study is an Environmental Assessment for an individual road project, the cost is included in the road project cost and the B.T.E. is the same as the underlying road project.	

5.0 Post Period Benefit

The capital project list identified through this process included projects to support development that may not occur until beyond the 2031 horizon year, that may not be built until after 2031 or that may be built late in the period where some of the benefit for the project extends to development built post 2031. For these projects a post period benefit was identified and applied as a deduction before the B.T.E. was calculated. Below is a description of the five categories of projects where a post period benefit was applied and the rationale for including the post period benefit:

- *A.E.G.D. Phase 3 lands* – Certain lands in the Airport Employment Growth District (A.E.G.D.) are expected to develop post 2031. Roads identified as required to support these development lands have a 100% post period benefit applied.
- *Elfrida Boundary Expansion* – These lands are expected to occur later in the 2019 to 2031 period and extend to post 2031. A 66% post period benefit was applied to these projects.
- *Major Structures* – Two major structure projects were identified where the expectation is that they will occur later in the 2019 to 2031 period and where the project benefit will extend to development built post 2031. A 50% post period benefit was applied to these projects.
- *Active Transportation* – A 30% post period benefit was applied to all active transportation projects to reflect that some of these projects will be built late in the 2019 to 2031 period or post 2031 and the benefit will extend to development built post 2031. There are a few exceptions to this where there was an expectation that the post period benefit should be higher; 50% in the case of four projects and 100% in the case of three projects.
- *Post Period Benefit Deduction* – Beyond the a Beyond the adjustments noted above, there is an acknowledgement that if all of the development and/or capital program is built by 2031, there will be excess capacity available for future growth in some projects.

6.0 Project Costing

6.1 Overview

This background study will serve as an input to the update to the 2019 Development Charges By-law for the City of Hamilton as required by the Development Charges Act. This section details the methodology, assumptions, and final recommendations of capital projects for services related to a highway that are necessary to support population and employment growth in the City of Hamilton.

Costs were drawn from a number of sources including previous studies where costs were determined for infrastructure (e.g., A.E.G.D. projects), the previous costs used in the 2014 Development Charges By-law, previous capital budget or capital forecast, estimates of costs as determined by City staff from experience with similar projects and the development of project costs derived from unit costs of the component pieces. Determining the final cost of capital projects required developing construction unit costs and costs for typical highway projects. The methodology for the unit cost approach is presented below. All costs are presented as 2019 dollars using construction cost escalations.

6.2 Unit Costs

Construction unit costs for each project are based on 2017 costs provided by the City of Hamilton where available and escalated to 2019 dollars. In the event that there was insufficient information on certain costs, an average of recent construction bid costs for road projects was calculated to produce a unit cost. **Table 2** shows the unit costs used to determine a price for recommended capital projects.

Table 2: Unit Costs for Capital Project Construction Line Items

ITEM	ITEM	AVERAGE UNIT PRICE ($2019)
Clearing and Grubbing (Area)	m^2	3.93
Excavation	m^3	14.84
Remove Concrete Sidewalk/Driveway	m^2	16.86
Remove Culverts (Including headwalls/sewers)	m	32.07
Remove Catchbasin (single)	each	427.71

ITEM	ITEM	AVERAGE UNIT PRICE ($2019)
Remove Concrete Curb and Gutter	m	10.43
Remove Manholes (full depth)	each	555.71
Remove Manholes (partial depth)	each	668.58
Remove Concrete Curb Outlets	each	10.43
Remove Catchbasin (double)	each	778.66
Cold plane exist. Asphalt	m^2	9.41
Full Depth Asphalt Removal	m^2	3.93
20mm CRLS (Crusher Run Limestone)	tonne	28.11
50mm CRLS (Crusher Run Limestone)	tonne	28.55
Granular A- Roadway	m^3	54.73
Granular B - Roadway	m^3	48.59
Tack Coat	m^2	0.61
Hot Mix HL3 (40mm)	tonne	133.79
Hot Mix HL3 (50mm)	tonne	110.67
Hot Mix HL8 (80mm)	tonne	100.09
Hot Mix HL8 (100mm)	tonne	111.99
Hot Mix HL8 (120mm)	tonne	146.15
150mm DIA non perforated sub drain	m	27.27
Concrete Sidewalk (not including granular or excavation)	m^2	60.70
Concrete Sidewalk (including granular base)	m^2	85.68
Install Concrete Curb & Gutter (OPSD600.040)	m	105.56
Topsoil and Sod (300mm)	m^2	20.41
Adjust Double Catchbasin	each	664.55
Adjust Single Catchbasin	each	664.55
Adjust MH	each	728.06
Adjust Catchbasin MH	each	490.04
Adjust Water Valve Boxes	each	675.12
Supply and Install Storm, Sewer Pipes (300mm min.)	m	350.26
Supply and Install Catchbasin Leads including	m	373.20

ITEM	ITEM	AVERAGE UNIT PRICE ($2019)
appropriate fittings, Class 'B' bedding and Granular Backfill (single, 250mm DIA)		
Supply and Install Catchbasin (single, OPSD 705.010)	each	3,180.28
Supply and Install Catchbasin (double, OPSD 705.020)	each	3,979.94
Supply and Install Manhole, Maintenance Holes (OPSD701.01)	each	6,426.00
Pavement Markings	m	3.21
Fire Hydrant	each	6,588.73

6.3 Typical Project Costs

Typical project costing assumed that the quantities of materials used in each type of highway project remains unchanged from previous D.C. Background Studies. The typical costing relies on the updated unit costs from **Table 2** to produce a final cost of the project per kilometre as summarized in **Table 3.**

Table 3: Typical Cross Section Improvement Costs for Road Projects

IMPROVEMENT TYPE	CODE	COST PER KILOMETRE ($2019)
New Construction		
Industrial Collector 2 Lanes	2i	$3,627,132
Industrial Collector 3 Lanes	3i	$3,878,569
Collector Rural Residential	2r	$2,241,620
Rural 3 Lanes	3r	$2,344,853
Rural 4 Lanes	4r	$3,681,788
Collector Urban Residential	2u	$3,615,428
Urban 3 Lanes Arterial/Collector	3u	$3,929,403
Urban 4 Lanes Arterial	4u	$5,177,191
Urban 5 Lanes Arterial	5u	$6,040,438
Urban 6 Lanes Arterial	6u	$6,417,038
Reconstruction		

IMPROVEMENT TYPE	CODE	COST PER KILOMETRE ($2019)
Collector Rural Residential to Industrial Collector 2 Lanes	2r-2i	$3,556,562
Collector Rural Residential to Collector Urban Residential	2r-2u	$3,825,719
Collector Rural Residential to 3 Lanes Rural Arterial/Collector	2r-3u	$4,208,903
Collector Rural Residential to 3 Lanes Rural Arterial with bike facilities	2r-3u+bikes	$4,333,720
Collector Rural Residential to 4 Lanes Rural Arterial	2r-4r	$3,252,048
Collector Rural Residential to 4 Lanes Rural Arterial with no base removal	2r-4r_NBR	$3,041,904
Collector Rural Residential to 4 Lanes Urban Arterial	2r-4u	$4,702,224
Collector Rural Residential to 5 Lanes Urban Arterial	2r-5u	$5,591,273
Collector Urban Residential to 4 Lanes Urban Arterial	2u-4u	$4,984,283
3 Lanes Rural to 3 Lanes Urban	3r-3u	$4,080,044
4 Lanes Rural to 5 Lanes Urban	4r-5u	$5,895,207
4 Lanes Rural to 5 Lanes Urban with no base removal	4r-5u_NBR	$5,597,568
4 Lanes Urban to 5 Lanes Urban	4u-5u	$6,276,960
4 Lanes Urban to 6 Lanes Urban	4u-6u	$6,653,559
Other		
Environmental Assessment	EA	Project Specific
Structure	Structure	Project Specific

7.0 Development Charge Eligible Capital Projects

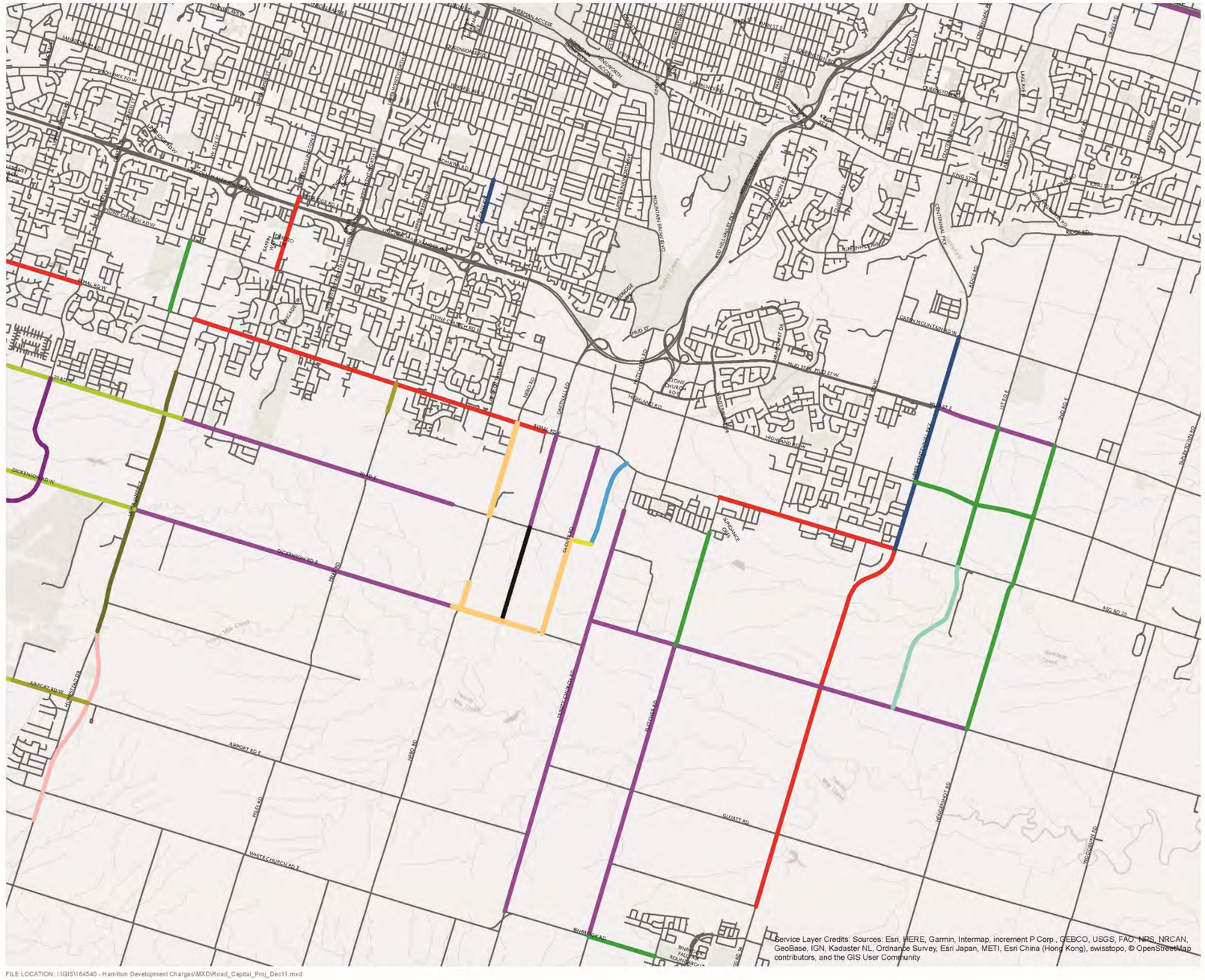
In order to produce a recommended project list, a review was completed of the City's Transportation Master Plan, 2019-28 Capital Budget, the 2019 to 2043 Capital Forecast, Recreational Trails Master Plan, Airport Employment Growth District Transportation Master

Plan Implementation Update, and 2014 Development Charge Background Study. The identified improvements comply with the City's Local Servicing Policy (see **Appendix E**). This review generated a project list that was refined based on discussions with City Staff to remove projects that have been completed, were outside the time horizon of the D.C. study (post-period; beyond 2031) or were not attributable to new growth and development. Capital costs for each project were sourced first from an E.A. or other study that has been completed in the last five years. Where none existed, project costs were calculated from the typical road section cost per kilometre and multiplied by the length of the project. A 10% allowance for engineering, 10% allowance for project contingencies and 10% internal project management cost have been included in the costs.

A list of the recommended projects and associated costs is presented in **Table 4** and **Exhibits 1-7.**

Table 4: Highway Projects 2019-2031

Item #	Project Name	From	To	Estimated Timing	Improvement Type	Length	Gross Capital Cost Including E.A. (2019$)	Post Period Benefit	Developer Responsibility	Net Capital Estimate After Deduction (2019$)	Benefit to Existing (%)	Benefit to Existing ($)	Benefit to Growth (%)	Benefit to Growth ($)
	Airport Employemnt Growth District Projects													
1	Airport Road	Upper James Street	East Cargo Road	2019-2022	2r-3i	1.07	$4,437,000	0%	0%	$4,437,000	40	$1,775,000	60	$2,662,000
2	Airport Road	East Cargo Road	Terminal Access Road	2019-2022	2r-4u	0.32	$2,423,000	0%	0%	$2,423,000	40	$969,000	60	$1,454,000
3	Airport Road	Terminal Access Road	Glancaster Road	2023-2031	2r-3i	1.68	$7,325,000	0%	0%	$7,325,000	40	$2,930,000	60	$4,395,000
4	Airport Road*	Butter Road	Glancaster Road	2032-2041	2r-4u	0.86	$7,470,000	100%	0%	$0	15	$0	85	$0
5	Book Road	Fiddler's Green Road	Highway 6	2032-2041	2r-4u	0.99	$6,340,000	100%	0%	$0	15	$0	85	$0
6	Book Road*	Highway 6	Southcote Road	2032-2041	2r-4u	1.11	$6,158,000	100%	0%	$0	15	$0	85	$0
7	Book Road	Highway 6	Southcote Road	2032-2041	4u-6u	1.11	$6,421,000	100%	0%	$0	15	$0	85	$0
8	Book Road	Collector 2W	Glancaster Road	2032-2041	2r-2u	0.59	$1,984,000	100%	0%	$0	15	$0	85	$0
9	Butter Road East*	Airport Road	Glancaster Road	2023-2031	2r-2u	0.97	$3,961,000	0%	0%	$3,961,000	15	$594,000	85	$3,367,000
10	Butter Road East	Highway 6	Airport Road	2023-2031	2r-4u	0.37	$3,428,000	100%	0%	$0	15	$0	85	$0
11	Butter Road East	Fiddlers Green Road	Highway 6	2032-2041	2r-4u	0.94	$8,708,000	100%	0%	$0	15	$0	85	$0
12	Carluke Road East	Fiddler's Green Road	Glancaster Road	2032-2041	2r-4u	1.05	$6,291,000	100%	0%	$0	15	$0	85	$0
13	Collector Road 6N (oversizing)	Glancaster Road	Collector Road 6E	2032-2041	4u	1.93	$2,896,000	100%	0%	$0	0	$0	100	$0
14	Collector Road 6N (oversizing)	Collector Road 6E	Collecror Road 7E	2032-2041	4u	2.56	$3,635,000	100%	0%	$0	0	$0	100	$0
15	Collector Road 7E (oversizing)	Collector 6N	Upper James Street	2032-2041	4u	0.58	$1,312,000	100%	0%	$0	0	$0	100	$0
16	Dickenson Road	Glancaster Road	Upper James Street	2025	2r-4u	2.90	$14,282,000	0%	0%	$14,282,000	15	$2,142,000	85	$12,140,000
17	Dickenson Road Extension	Southcote Road	Smith Road	2019-2022	4u	0.42	$3,195,000	0%	0%	$3,195,000	0	$0	100	$3,195,000
18	Dickenson Road Extension	Southcote Road	Smith Road	2032-2041	4u-6u	0.42	$2,435,000	100%	0%	$0	15	$0	85	$0
19	Dickenson Road Extension	Smith Road	Glancaster Road	2023-2031	4u	0.80	$6,149,000	0%	0%	$6,149,000	0	$0	100	$6,149,000
20	Garner Road*	Fiddler's Green Road	Glancaster Road	2023-2031	2r-4u	4.44	$19,920,000	0%	0%	$19,920,000	15	$2,988,000	85	$16,932,000
21	Garth Street extension (oversizing)	Twenty Road	Dickenson Road	2023-2031	5u	1.50	$2,391,000	0%	0%	$2,391,000	0	$0	100	$2,391,000
22	Garth Street extension (oversizing)	Dickenson Road	Collector 2E	2023-2031	5u	0.62	$1,359,000	0%	0%	$1,359,000	0	$0	100	$1,359,000
23	Glancaster Road	Collector 1N	Airport Boundary	2032-2041	2r-2u	0.49	$2,019,000	100%	0%	$0	15	$0	85	$0
24	Glancaster Road	Dickenson Road Extension	Collector 1N	2032-2041	2r-4u	0.37	$2,426,000	100%	0%	$0	15	$0	85	$0
25	Glancaster Road	Garner Road	Dickenson Road	2023-2031	2r-4u	2.46	$16,844,000	0%	0%	$16,844,000	15	$2,527,000	85	$14,317,000
26	Smith Road*	Dickenson Road extension	Collector 1N	2032-2041	2r-4u	0.65	$4,055,000	100%	0%	$0	15	$0	85	$0
27	Smith Road (except Hydro Corridor)	Garner Road	Dickenson Road extension	2032-2041	2u	1.57	$9,919,000	100%	0%	$0	0	$0	100	$0
28	Smith Road	Collector 1N	Airport Boundary	2032-2041	2r-2u	0.35	$1,919,000	100%	0%	$0	15	$0	85	$0
29	Smith Road extension	Hydro corridor north crossing		2032-2041	2u	0.26	$1,037,000	100%	0%	$0	0	$0	100	$0
30	Southcote Road*	Garner	Twenty Road extension	2019-2022	2r-4u	0.97	$9,306,000	0%	0%	$9,306,000	15	$1,396,000	85	$7,910,000
31	Southcote Road	Twenty Road extension	Book Road	2023-2031	2r-4u	0.97	$8,541,000	0%	0%	$8,541,000	15	$1,281,000	85	$7,260,000
32	Twenty Road	Glancaster Road	Aldercrest Avenue	2023-2031	2r-4u	3.08	$17,826,000	0%	0%	$17,826,000	15	$2,674,000	85	$15,152,000
33	Twenty Road extension	Southcote Road	Glancaster Road	2023-2031	4u	1.86	$14,296,000	0%	0%	$14,296,000	0	$0	100	$14,296,000
34	Fiddler's Green Road	Garner Road	Carluke Road	2032-2041	2r-4u	6.07	$38,881,000	100%	0%	$0	15	$0	85	$0
35	Glancaster Road*	Butter Road	Highway 6	2032-2041	2r-4u	1.40	$13,210,000	100%	0%	$0	15	$0	85	$0
36	Glancaster Road	Highway 6	White Church Road	2032-2041	2r-4u	0.89	$7,911,000	100%	0%	$0	15	$0	85	$0
37	Southcote Road	Book Road	Collector 1N	2023-2031	2r-4u	0.65	$4,210,000	100%	0%	$0	15	$0	85	$0
38	Southcote Road	Airport Boundary	Butter Road	2032-2041	2r-2u	0.81	$3,855,000	100%	0%	$0	15	$0	85	$0
39	Upper James Street	Alderlea Avenue	Homestead Drive	2023-2031	4u-6u	3.67	$30,929,000	0%	0%	$30,929,000	15	$4,639,000	85	$26,290,000
40	White Church Road	Glancaster Road	Highway 6	2032-2041	2r-4u	2.31	$19,651,000	100%	0%	$0	15	$0	85	$0
41	Upper James Street*	Homestead	Highway 6	2023-2031	4r-5u_NBR	2.78	$12,395,000	0%	0%	$12,395,000	15	$1,859,000	85	$10,536,000
	South Mountain Area Transportation Study Projects													
42	West 5th Street	Rymal Road	Stone Church Road	2025	2r-3u	1.00	$3,096,000	0%	0%	$3,096,000	40	$1,238,000	60	$1,858,000
43	Rymal Road	Glancaster Road	Garth Street	2019-2022	2r-5u	1.30	$7,993,000	0%	0%	$7,993,000	15	$1,199,000	85	$6,794,000
44	Rymal Road	Fletcher Road	Upper Centenial	2020	2r-5u	2.49	$15,717,000	0%	0%	$15,717,000	15	$2,358,000	85	$13,359,000
45	Rymal Road*	Upper Wentworth	West of Dartnall	2019-2022	2r-5u	3.29	$22,520,000	0%	0%	$22,520,000	15	$3,378,000	85	$19,142,000
46	Rymal Road	Upper James Street	Upper Wellington Street	2026	2r-5u	0.87	$4,624,000	0%	0%	$4,624,000	15	$694,000	85	$3,930,000
47	Rymal Road	Upper Wellington Street	Upper Wentworth Street	2030	2r-5u	0.86	$4,664,000	0%	0%	$4,664,000	15	$700,000	85	$3,964,000
	Stoney Creek Urban Boundary Expansion Projects													
48	Arvin Avenue	McNeilly	Lewis Road	2023-2031	2i	0.80	$3,652,000	0%	0%	$3,652,000	0	$0	100	$3,652,000
49	Arvin Avenue	Jones Road	Existing east end	2023-2031	2i	0.50	$2,564,000	0%	0%	$2,564,000	0	$0	100	$2,564,000
50	Arvin Avenue	McNeilly	Existing west end	2019-2022	2i	0.40	$2,201,000	0%	0%	$2,201,000	0	$0	100	$2,201,000
51	Fruitland Road	Highway 8	Barton Street	2023-2031	2r-4u	1.05	$8,207,000	0%	0%	$8,207,000	15	$1,231,000	85	$6,976,000
52	McNeilly Road*	Highway 8	Barton Street	2023-2031	2r-4u	0.89	$6,797,000	0%	0%	$6,797,000	15	$1,020,000	85	$5,777,000
53	Lewis Road*	Highway 8	Barton Street	2023-2031	2r-4u	0.52	$4,290,000	0%	0%	$4,290,000	15	$644,000	85	$3,646,000
54	Glover Road*	Highway 8	Barton Street	2023-2031	2r-4u	0.82	$6,323,000	0%	0%	$6,323,000	15	$948,000	85	$5,375,000
55	Jones Road*	Highway 8	Barton Street	2023-2031	2r-4u	0.93	$7,068,000	0%	0%	$7,068,000	15	$1,060,000	85	$6,008,000
	Ancaster Industrial Park and Transportation Master Plan Projects													
56	Garner Road	Fiddler's Green Road	Highway 2/Wilson Street	2019-2022	2r-4u	3.50	$20,208,000	0%	0%	$20,208,000	15	$3,031,000	85	$17,177,000
57	Golf Links Road	McNiven Road	Kitty Murray Lane	2023-2031	2r-3u	0.80	$4,646,000	0%	0%	$4,646,000	15	$697,000	85	$3,949,000
58	Jerseyville Road	Shaver Road	Wilson Street	2023-2031	2r-3u	3.10	$16,438,000	0%	0%	$16,438,000	40	$6,575,000	60	$9,863,000
59	Springbrook Avenue	Regan Drive	Garner Road	2020	2r-2u	0.69	$3,096,000	0%	0%	$3,096,000	15	$464,000	85	$2,632,000
60	Trinity Road	1km south of Wilson	Highway 403	2019-2022	2r-4u	2.20	$12,985,000	0%	0%	$12,985,000	15	$1,948,000	85	$11,037,000
61	Shaver Road	Trustwood	Garner Road	2023-2031	2r-2i	1.00	$4,840,000	0%	0%	$4,840,000	15	$726,000	85	$4,114,000
62	Shaver Road	Highway 403	Wilson Street	2019-2022	2r-2u	1.50	$6,189,000	0%	0%	$6,189,000	15	$928,000	85	$5,261,000
63	Southcote Road	Calder Street	Garner Road	2022	2r-3u	1.26	$5,871,000	0%	0%	$5,871,000	40	$2,348,000	60	$3,523,000
64	McNiven Road	Rousseaux Street	Golf Links Road	2028	2r-3u	0.63	$3,218,000	0%	0%	$3,218,000	80	$2,574,000	20	$644,000
65	Mohawk Road	McNiven Road	Highway 403	2019-2022	2r-3u	1.30	$7,656,000	0%	0%	$7,656,000	40	$3,062,000	60	$4,594,000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DICKENSON RD
GLANCASTER
ANCASTER
GREENHILL AVE
GREEN MOUNTAIN RD
HIGHLAND RD
GLOVER
FRUITLAND RD
STONEY CREEK
Stoney Creek
Hamilton Harbour
Lake Ontario
Hamilton Airport
Ancaster
Dundas
Flamborough
Glanbrook
Stoney Creek
Hamilton
AIRPORT RD W
AIRPORT RD E
WHITE CHURCH RD E
GLOVER RD
GLOVER-SALTFLEET RD
GLOVER-FRUITLAND RD
GLOVER-STONE CHURCH RD
GLOVER-HWY 8
GLOVER-HWY 20
GLOVER-RYMAL RD
GLOVER-GREENHILL AVE
GLOVER-HIGHLAND RD
GLOVER-GREEN MOUNTAIN RD
GLOVER-UPPER JAMES
GLOVER-UPPER WENTWORTH
GLOVER-DICKENSON RD
GLOVER-GLANCASTER
GLOVER-ANCASTER
GLOVER-MOHAWK RD
GLOVER-BARTON ST
GLOVER-KING ST
GLOVER-MAIN ST
GLOVER-STONE CHURCH RD

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HAMILTON DEVELOPMENT CHARGES STUDY

ROADS CAPITAL PROJECTS

Exhibit 5 of 7

- 2i
- 2r-2u
- 3i
- 2r-3u
- 2u
- 2r-4u
- 3u
- 2r-5u
- 4u
- 4r-5u
- 5u
- 4u-5u
- 2r-2i
- 4u-6u
- 2r-3i

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0 410 820 1,640 Metres

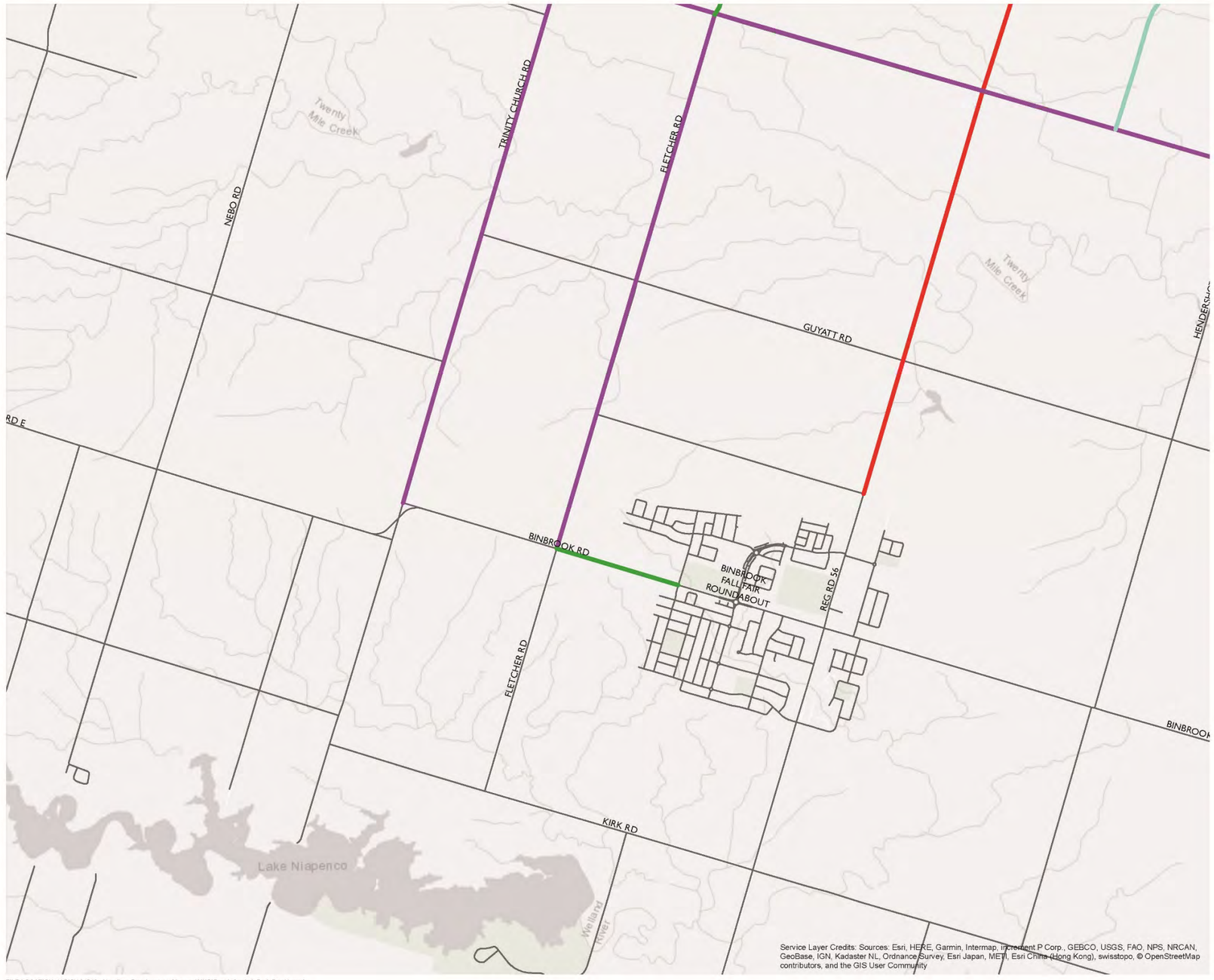
N W E S

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNRF

MAP CREATED BY: LK
MAP CHECKED BY: GP
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 16-4540
STATUS: DRAFT
DATE: 2019-02-27



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HAMILTON DEVELOPMENT CHARGES STUDY
ROADS CAPITAL PROJECTS

Exhibit 6 of 7

- 2i
- 3i
- 2u
- 3u
- 4u
- 5u
- 2r-2i
- 2r-3i
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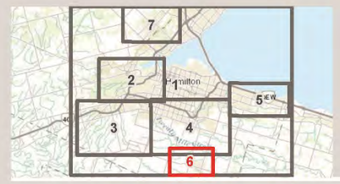

SCALE 1:27,260

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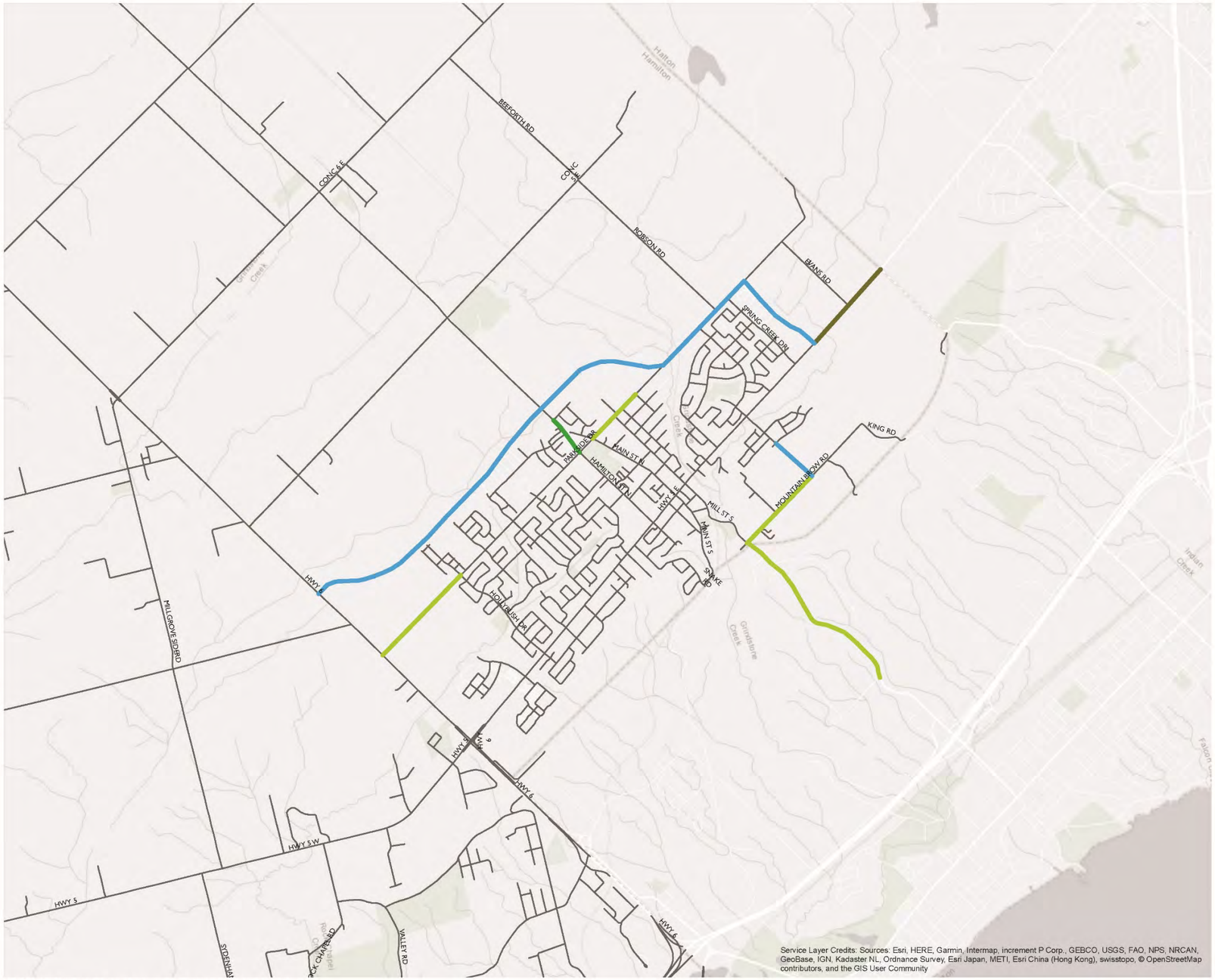
MAP DRAWING INFORMATION:
DATA PROVIDED BY: MNRF

MAP CREATED BY: LK
MAP CHECKED BY: GP
MAP PROJECTION: NAD 1983 UTM Zone 17N

DILLON CONSULTING

PROJECT: 16-4540
STATUS: DRAFT
DATE: 2019-02-27


Halton Hamilton
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REBECCA ST
REBECCA ST

Appendix I: Transit Servicing Needs – Dillon Consulting Limited

DILLON CONSULTING

CITY OF HAMILTON 2019 D.C. BACKGROUND REPORT

Appendix I - Transit

Final Report

March 2019 – 16-4540

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Table of Contents

1.0	**Introduction**	**1**
2.0	**Growth Forecasts**	**3**
3.0	**Transit Network**	**4**
3.1	Existing (2018)	4
3.2	Planned Transit Improvements to 2028	6
3.2.1	Ten Year Local Transit Strategy	6
3.2.2	Capital Plan – 2015 – 2024	8
3.2.3	Maintenance and Storage Facility (2023)	8
4.0	**Ten-Year Conventional Transit Ridership and Mode Share Forecast**	**10**
4.1	Total Person-Trips Forecast	10
4.2	2016 Transit Mode Share	10
4.3	2031 Transit Mode Share Target	11
4.4	Transit Ridership and Mode Share Forecasts	14
4.4.1	Capital Plan Period (2019 – 2024)	14
4.4.2	Separation of H.S.R. and L.R.T. Ridership and Mode Shares (2025 – 2031)	15
4.4.3	Summary of Modes Share and Ridership	15
5.0	**Ten-Year Capital Plan for D.C. Application**	**17**
5.1	New Conventional Transit Vehicles	17
5.1.1	2019 – 2025 – Capital Plan	18
5.1.2	2026-2031 – First Principles Approach	19
5.1.3	Capital Cost for Conventional Transit	24
5.2	Specialized Transit	26
5.2.1	Background	26
5.2.2	Ridership Forecast	27
5.2.3	Capital Costs for Specialized Transit	32
5.3	Support Vehicles (Operations, Administration and Facility Vehicles)	33
5.3.1	Facility Vehicles	33
5.3.2	Administration Vehicles	34
5.3.3	Operations Vehicles	34
6.0	**Apportioning Benefit**	**36**
6.1	In-Period Growth and Existing	36

6.1.1 Conventional Transit Vehicles 36
6.1.2 Specialized Vehicles 37
6.1.3 Support Vehicles 41
6.2 In-Period and Post-Period 41
6.2.1 Conventional Vehicles 41
6.2.2 Specialized Vehicles 45
6.2.3 Support Vehicles 45

7.0 **Summary of Key Values** **47**

Figures

Figure 1: H.S.R. Transit Network 5
Figure 2: Proposed B.L.A.S.T. Network 7
Figure 3: Planned B-Line L.R.T. Project Map 8
Figure 4: Transit Trips by D.C. Period 43

Tables

Table 1: Population and Employment Historical Records and Forecasts (2011-2031) 3
Table 2: 2031 A.M. Peak Period Transit Mode Share based on 2016 T.T.S. and Hamilton Emme Model 12
Table 3: Summary of Projected Local H.S.R. Transit Ridership and Mode Share 16
Table 4: 40-foot Bus Capacity Equivalency Factors 17
Table 5: Planned Expansion Buses Identified in the Capital Plan 18
Table 6: Peer Review (with values from C.U.T.A. 2016 Fact Book) 20
Table 7: 2019 to 2031 Expansion Bus Forecast 23
Table 8: Total Costs (2019 $) by Bus Type 25
Table 9: Conventional Transit Bus Requirements by 2028 and 2031 26
Table 10: Population by Age Cohort 28
Table 11: Potential Persons with Disabilities by Age Group[1] 28
Table 12: Specialized Service Registrant and Ridership Forecast 31
Table 13: Specialized Vehicle Requirement Forecast 33
Table 14: Additional Support Vehicle Requirements 35
Table 15: Summary of Population with Disability Growth Allocated to New and Existing Population 38

Table 16: Key Values for Transit D.C. Calculations (2018, 2028, 2031)..... 47
Table 17: Apportionment of Capital Costs (10-Year D.C. Period)..... 48

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1.0 Introduction

The following report is a technical appendix to Hamilton's 2019 Development Charges (D.C.) Background Study. The purpose of the report is to provide an overview of the changes to Hamilton's public transit network within the D.C. study period (2019 to 2028), identify the capital costs associated with improvements and apportion the capital expenditures to existing and growth populations within the same study period.

Development Charges are a tool for municipalities to ensure that "growth pays for growth" – meaning that developments that grow the municipality cover the costs associated with extending municipal services for the new growth caused by these developments. Through the application of D.C., the development community contributes an appropriate share of infrastructure and capital costs (including those for transit) for necessary growth-related improvements over the ten-year planning period. The *Development Charges Act* (D.C.A.), 1997, as amended regulates when and how municipalities may collect D.C.

The provincial government recently enacted changes to the D.C.A. with direct implications for how the City plans and funds future transit services. Historically, transit services could only be funded through D.C. in the following manner:

- Service costs could only be recovered at up to 90% of total capital cost due to a D.C.A. mandatory 10% reduction of eligible growth related capital cost applied to transit services; and
- Growth-related capital expenditures for transit infrastructure were limited to expenditures that supported maintaining historic service levels. This was calculated based on the average level of service over the prior ten years.

Changes in the D.C.A., which came into effect in January 2016, have resulted in alterations to the City's growth-related transit funding mechanisms. These changes are summarized as follows:

- The mandatory 10% reduction of eligible growth-related capital costs has been removed for transit services, allowing growth related transit services to be 100% recoverable through D.C.
- The introduction of planned levels of services for transit, with the prescribed method and criteria to establish the service level (outlined in O.Reg. 428/15). This allows municipalities to be forward-looking in estimating future level of service for transit D.C. calculations and apportion them to growth accordingly. It also included new highly prescriptive reporting requirements associated with the background reporting for D.C.

The new reporting requirements that need to be outlined in the D.C. background study related to transit include:

- The calculations that were used to prepare the estimate for the planned level of service for transit services;
- An identification of the portion of the total estimated capital costs related to the transit service that would benefit the anticipated development over the ten-year D.C. period and after the ten-year D.C. period;
- An identification of the anticipated excess capacity that would exist at the end of the ten-year D.C. period;
- An assessment of ridership forecasts for all modes of transit services proposed to be funded, including whether the ridership will be from existing or planned development; and
- An assessment of the ridership capacity for all modes of transit services proposed to be funded by the D.C.

The City of Hamilton's current D.C. By-law will expire on July 6, 2019 and the City is currently in the process of preparing a new by-law. The purpose of this technical appendix is to identify the conventional and specialized transit expenditures that can be funded through D.C. in the City's 2019 D.C. Background Study for transit prepared by Watson & Associates Economists Ltd (Watson).

2.0 Growth Forecasts

Table 1 presents the population and employment growth anticipated in Hamilton. Population and employment data for mid-2011, mid-2016, early-2019, early-2029, and mid-2031 were provided by Watson. Population and employment was assumed to grow linearly between these horizon years.

Table 1: Population and Employment Historical Records and Forecasts (2011-2031)

	Mid-2011	Mid-2016	Early-2019	2028	Early-2029	Mid-2031
Population[2]	519,949	536,917	549,897	608,438	614,943	636,080
Employment[3]	178,786	187,551	192,704	227,573	231,447	244,839

[1] *Population and employment for mid-2011, mid-2016, early-2019, early-2029, and mid-2031 were provided by Watson & Associates Economists Ltd., 2018. The population and employment for year's in-between were interpolated linearly using the known values.*
[2] *Population count includes institutional population, but excludes census undercount.*
[3] *Employment count excludes no-fixed-place-of-work and work at home.*

3.0 Transit Network

The following section describes the Hamilton Street Railway (H.S.R.) transit network in 2018, leading up to the start of the D.C. Study period, and the planned changes to the network within the study period (2019 to 2028).

3.1 Existing (2018)

H.S.R. currently operates 35 bus routes servicing Hamilton. **Figure 1** shows the H.S.R. network map. In addition to this, H.S.R. also operates a number of school extra services, special event buses, a TransCab service and a specialized transit service for registered clients with disabilities that cannot use the conventional service.

Within Hamilton, Burlington Transit and Metrolinx also provide inter-municipal opportunities to connect Hamilton to the rest of the Greater Toronto Area. Two combined GO Train and GO Bus stations are located in Hamilton, along with 22 GO Bus-only stations and stops.

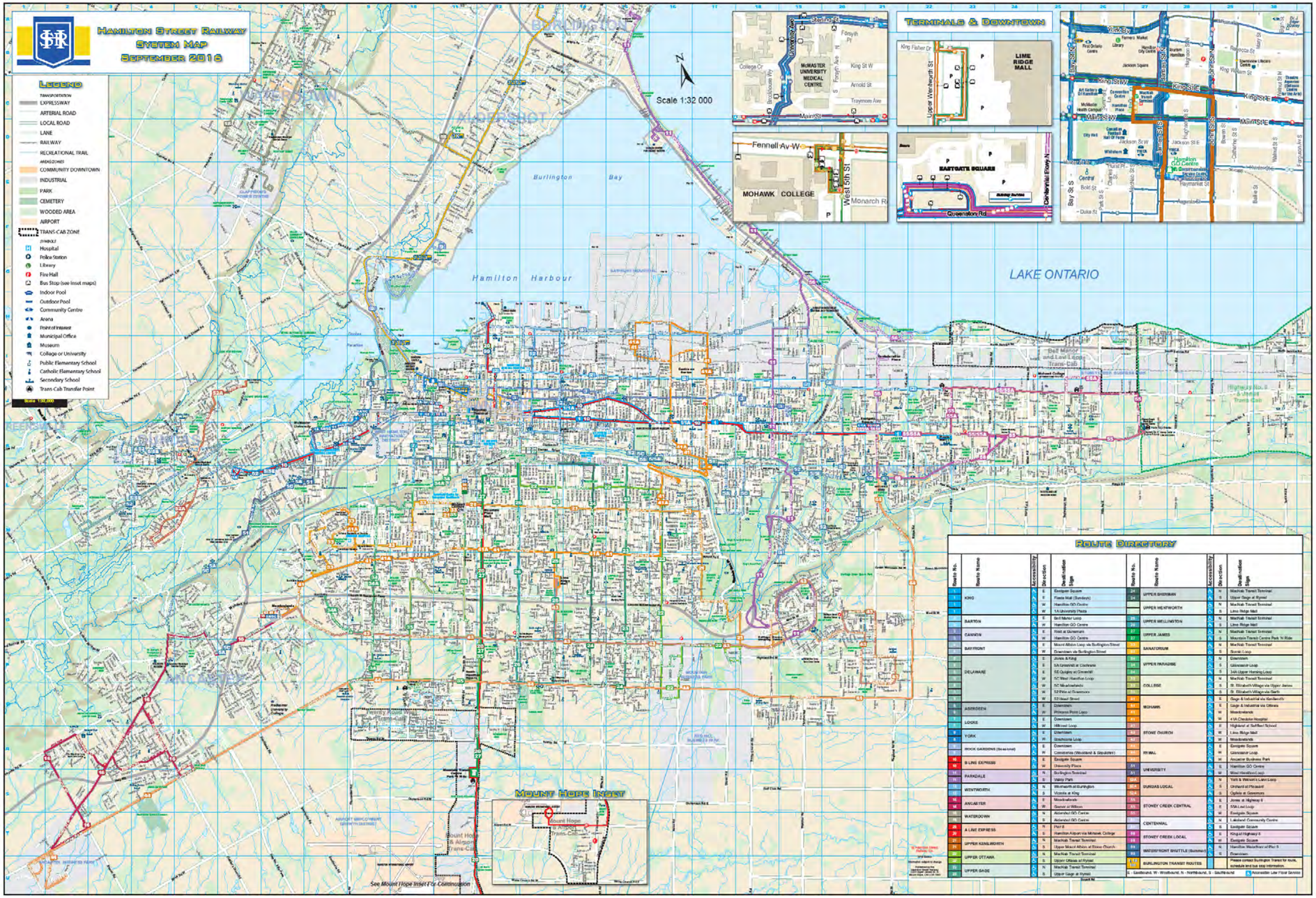


Figure 1: H.S.R. Transit Network

3.2 Planned Transit Improvements to 2028

The following sections discuss the planned changes to the H.S.R. transit network up to the end of the D.C. period (2028).

3.2.1 Ten Year Local Transit Strategy

H.S.R. is in currently midway through their Ten Year Local Transit Strategy for the 2015 to 2024 period. This strategy seeks to:

- Address identified deficiencies in the services (such as system reliability and capacity);
- Implement updated Council approved service standards to address any gaps in the standards;
- Increase transit service in pace with Hamilton's growth; and
- Increase the transit modal share in accordance with the targets identified in Hamilton's Transportation Master Plan (T.M.P.).

Several initiatives feed into the Ten Year Strategy, including the 2017 T.M.P. update, the development of the Growth Related Integrated Development Strategy II (G.R.I.D.S. 2031 – 2041), and the continued development of the Hamilton Long Term Rapid Transit System ("B.L.A.S.T.").

3.2.1.1 B.L.A.S.T. Network

B.L.A.S.T. is the name of H.S.R's long-term planned network of five BRT lines and two L.R.T. lines through Hamilton. These lines will be fed by existing local bus service. The lines (each named after one of the five letters of the B.L.A.S.T. acronym) are expected to come into service within different horizon terms – some within 15 years, others within 25 years, and others still in the future beyond 25 years. **Figure 2** shows the extent of the currently proposed B.L.A.S.T. network. Only the B-Line L.R.T. project falls within this ten year D.C. period.

Figure 2: Proposed B.L.A.S.T. Network

3.2.1.2 Introduction of the B-Line L.R.T. (2025)

The B-Line L.R.T. project, part of the B-Line component of the B.L.A.S.T. network, is scheduled for completion in 2024. The L.R.T. line will service 17 stops along Main Street and King Street, with terminals at McMaster University in the west and Eastgate Square in the east. A map of the planned L.R.T. project is shown in **Figure 3**. The capital costs associated with the B-Line project are covered fully by Metrolinx, as indicated in the Memorandum of Agreement (M.O.A.) between Metrolinx and the City of Hamilton. For this reason, the B-Line project is not eligible for funding through D.C.

Since the L.R.T. is planned for completion in 2024, it is expected to be in operation during the last years of this D.C. study period. Therefore, for the purposes of this study, the proportion of the overall transit mode share that is specific to the L.R.T. is separated from the proportion allocated to H.S.R. conventional bus service. Within the study, it was assumed that the L.R.T. will be

operational starting in 2025 so an independent mode share for the L.R.T. is calculated starting from that year in a following section.

Figure 3: Planned B-Line L.R.T. Project Map

The L.R.T. will also result in a re-routing of six existing H.S.R. routes along the Main/King corridor. This is projected to result in 18 40-foot buses being retired from service in 2025.

Once the L.R.T. corridor is in place, 18 new 40-foot buses will be required to connect to the L.R.T. corridor in 2025.

3.2.2 Capital Plan – 2015 – 2024

A capital plan was developed by H.S.R. and approved by Council for the period between 2015 and 2024. The capital plan notes both expansion buses to address growth and to address mode share targets identified in the T.M.P. The use of this capital plan in determining bus requirements in the ten-year D.C. period is described in **Section 5.1** below.

3.2.3 Maintenance and Storage Facility (2023)

A new Maintenance and Storage Facility (M.S.F.) for H.S.R. is anticipated to be completed in 2023. The facility will contain administrative, corporate, and operational departments, including a 205,231 square foot Bus Storage Garage. The new garage is designed to house 304 40-foot

equivalent buses and will contain one tow mobile, one lift truck, and two garage equipment repair vehicles.

4.0 Ten-Year Conventional Transit Ridership and Mode Share Forecast

This section outlines the detailed calculations that were used to forecast transit ridership over the ten-year D.C. period (2019 to 2028) and over the post-period (2029 to 2031).

Transit ridership forecasts were based on achieving a transit mode share target for the 2031 period and determining the associated transit ridership required to achieve the target for each year during the ten-year D.C. period and the post-period. The number of peak vehicles required to accommodate the growing ridership was then estimated (see **Section 5.0**).

4.1 Total Person-Trips Forecast

The total A.M. peak period person-trips reflecting all modes for trips with an origin and/or destination in Hamilton were derived from Hamilton's demand forecasting model for the year's 2011 and 2031. From this model, two total person-trip values were pulled for the A.M. peak period:

- 253,124 person-trips in 2011; and
- 320,352 person-trips in 2031.

Using linear interpolation, the number of person-trips for each year between 2011 and 2031 were calculated. These values were combined with the transit existing (2016) and targeted 2031 transit mode share used to forecast transit ridership.

4.2 2016 Transit Mode Share

The existing transit mode share was derived from the City's demand forecasting model which was used to develop the 2017 Hamilton Transportation Master Plan (T.M.P.). The T.M.P. identifies an existing (2016) local transit mode share for of 6.73% (rounded to 7% in the documentation). The forecasting model for transit trips is based on the A.M. peak period. A.M. peak period ridership was determined by applying this transit mode share to A.M. period total person-trips.

4.3 2031 Transit Mode Share Target

The City of Hamilton 2017 T.M.P. is an integral piece of transportation policy meant to identify future transportation system policy direction, targets and needs as well as identify the City's strategies to achieve these objectives.

The 2017 T.M.P. update utilizes a "2031 Base Case" scenario that includes only previously approved infrastructure improvements from sub-area plans, Council approved initiatives, the capital budget, and the 2014 D.C. By-law. Within this scenario, a 12% total transit mode share target for the 2031 is identified. To achieve this mode share target, development of the B.L.A.S.T. network (discussed in a previous section) and GO Transit rail expansion to the West Harbour and Confederation Stations (all-day service) will need to take place. An increase in H.S.R. service levels to support rapid transit investment are also required.

The 12% total mode share target for 2031 represents both local H.S.R. transit and GO Transit trips to and/or from Hamilton. For H.S.R. trips, this includes transit trips projected to occur on the planned L.R.T. service (funded by Metrolinx) as well as H.S.R. bus trips. It is therefore necessary to isolate H.S.R. bus-only trips from the total transit mode share forecast by removing trips taken on GO Transit and the planned B-Line L.R.T. corridor. This will result in a modified H.S.R. bus-only 2031 transit mode share forecast.

To calculate the portion of the 12% transit mode share for GO Transit trips, transit ridership for the A.M. peak period (including GO Transit trips) for Hamilton was obtained from the 2016 Transportation Tomorrow Survey (T.T.S.). **Table 2** summarizes the existing A.M. peak period transit ridership derived from the 2016 T.T.S.[1].

[1] Note: Local transit ridership from the 2016 T.T.S. does not align with the transit ridership from the City of Hamilton demand forecasting model due to differences in data sources. The data used in this table is only used to obtain a ratio of local transit trip to GO Transit trips in the City of Hamilton. This was used to project the proportion of the 2031 mode share that is for GO Transit trips.

SCHEDULE H TO BY-LAW 19-XXX

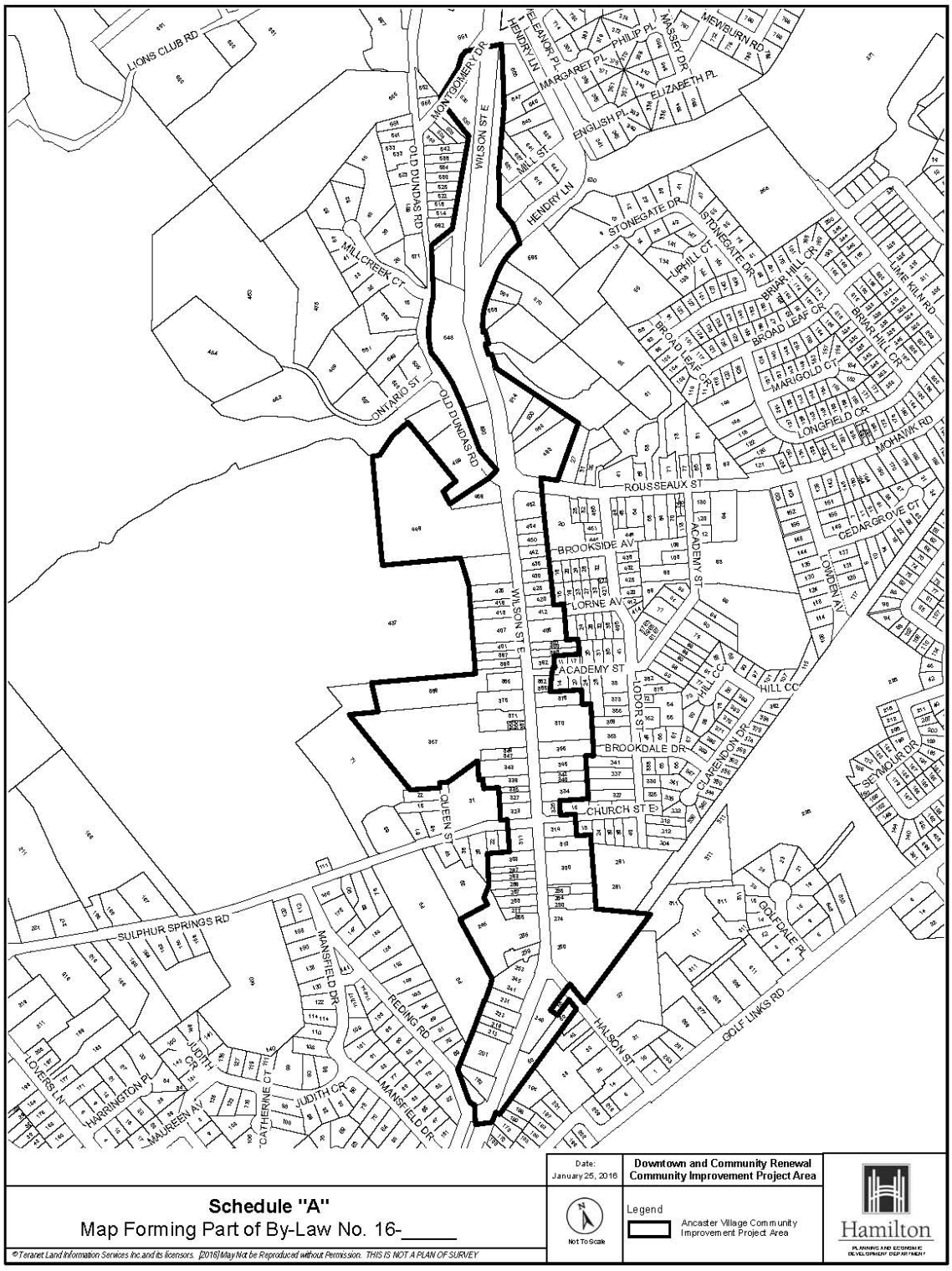
COMMUNITY IMPROVEMENT PROJECT AREAS (C.I.P.A.S) & BUSINESS IMPROVEMENT AREAS (B.I.A.S)

MAPS FOR COMMUNITY IMPROVEMENT PROJECT AREAS (C.I.P.A.s) & BUSINESS IMPROVEMENT AREAS (B.I.A.s)

INDEX

Ancaster Village C.I.P.A. 3
Barton Village C.I.P.A. 4
Binbrook C.I.P.A. 5
Commercial Corridors C.I.P.A. 6-10
Concession Street C.I.P.A. 11
Downtown Hamilton C.I.P.A. 12
Dundas C.I.P.A. 13
Locke Street C.I.P.A. 14
Mount Hope Airport Gateway C.I.P.A. 15
Ottawa Street C.I.P.A. 16
Stoney Creek C.I.P.A. 17
Waterdown C.I.P.A. 18
Westdale C.I.P.A. 19
Ancaster B.I.A. 20
Barton Village B.I.A. 21-22
Concession Street B.I.A. 23-24
Downtown Hamilton B.I.A. 25
Dundas B.I.A. 26
International Village B.I.A. 27
King West B.I.A. 28
Locke Street B.I.A. 29
Main West B.I.A. 30
Ottawa Street B.I.A. 31
Stoney Creek B.I.A. 32
Waterdown B.I.A. 33
Westdale B.I.A. 34

Ancaster Village C.I.P.A.



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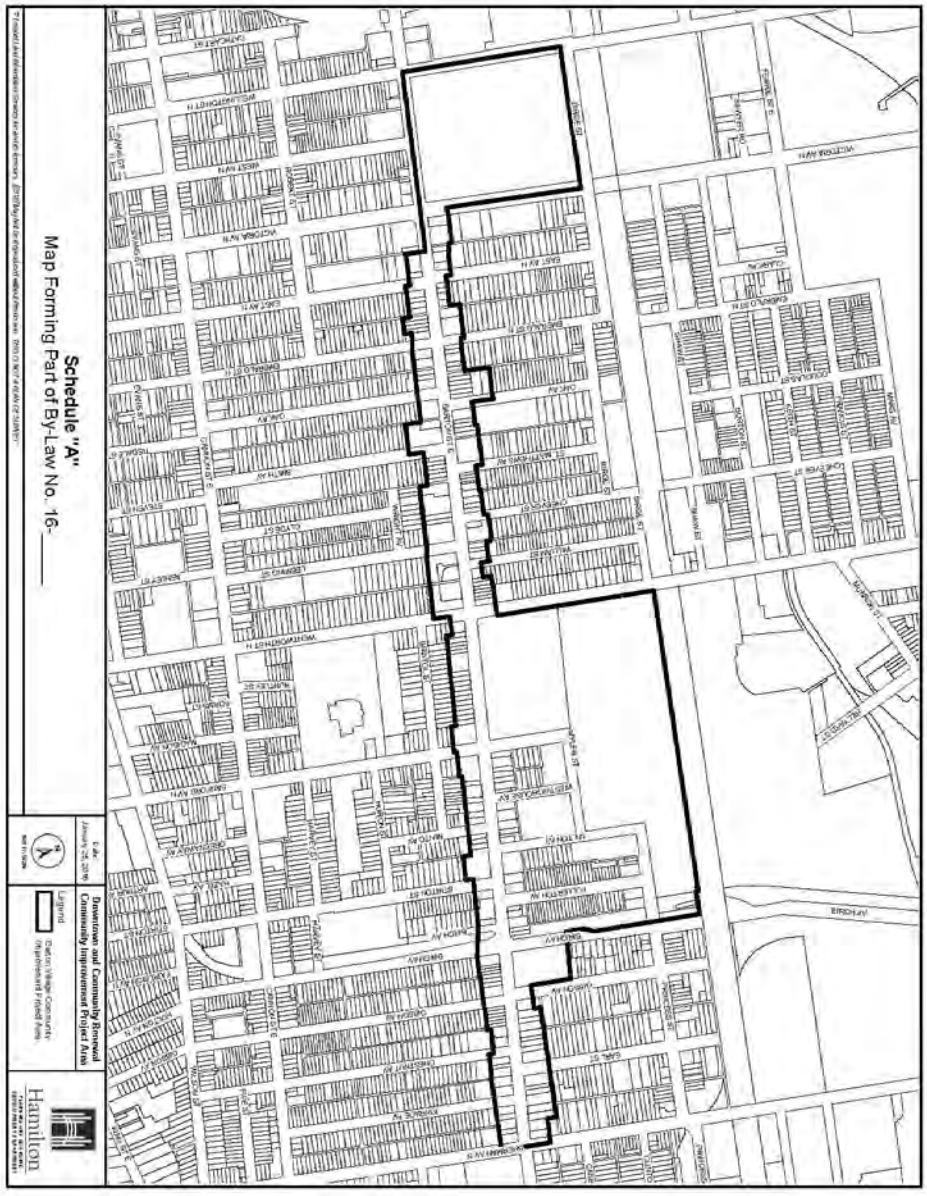
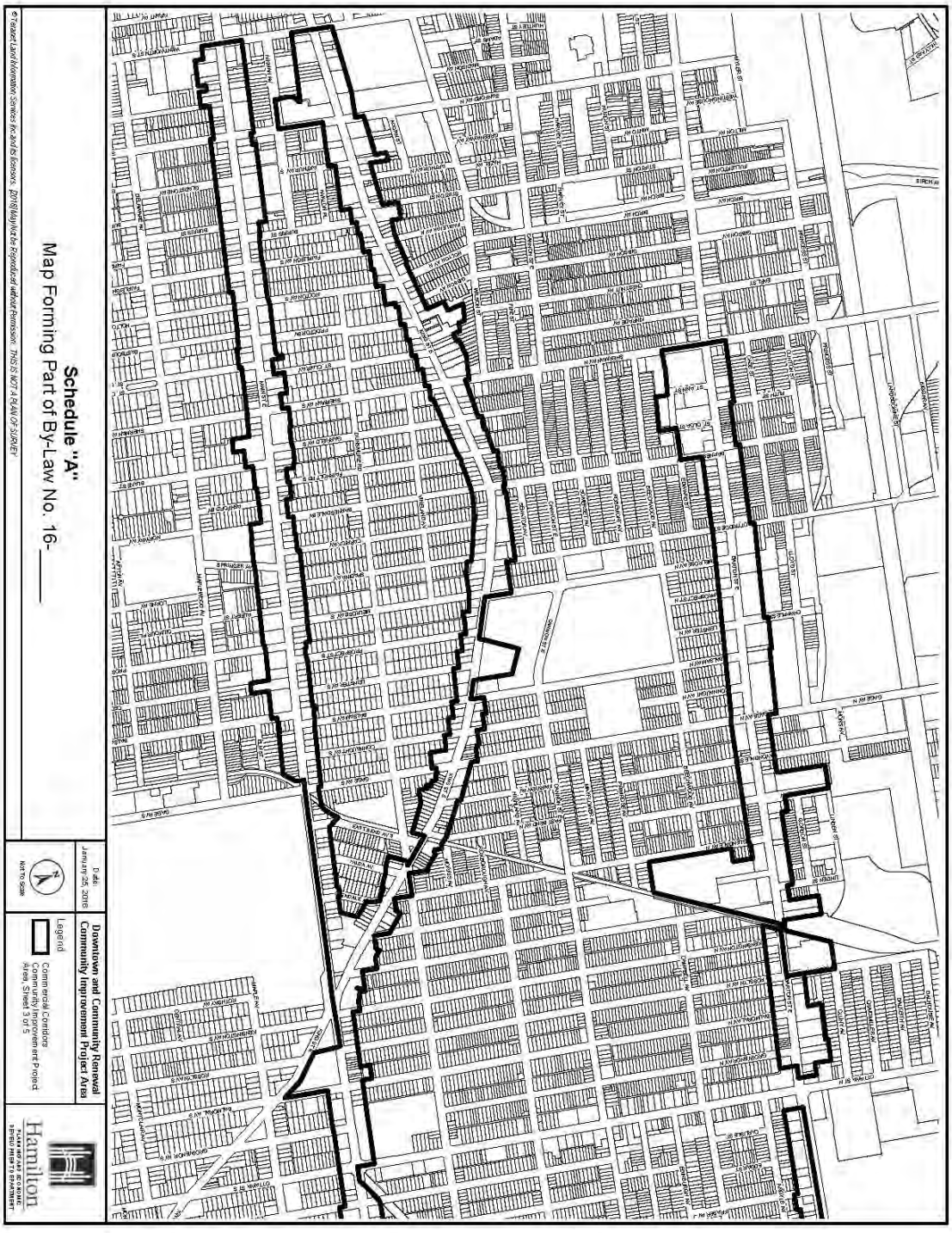


Binbrook C.I.P.A.

Commercial Corridors C.I.P.A. (2 of 5)

Commercial Corridors C.I.P.A. (3 of 5)



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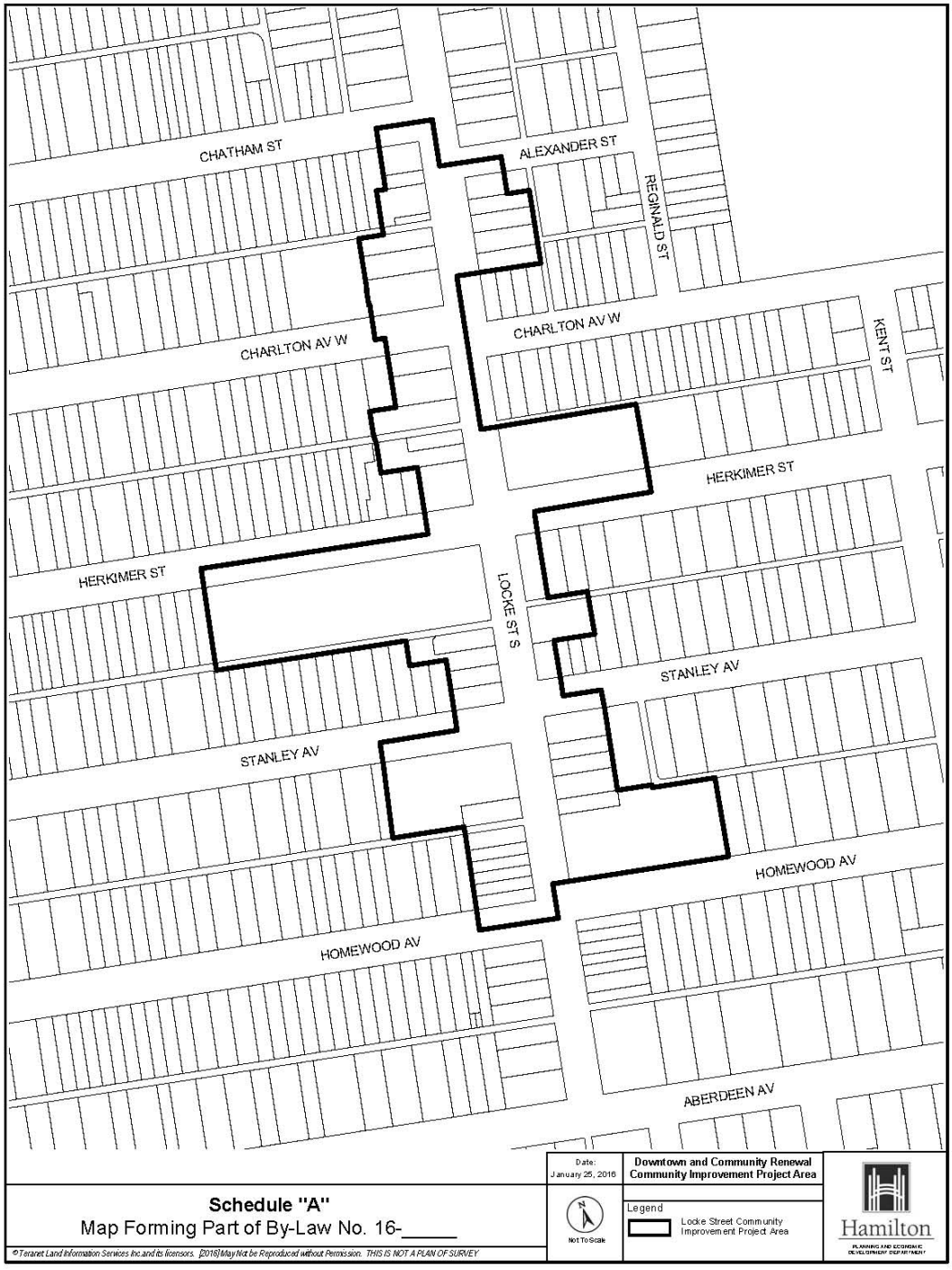

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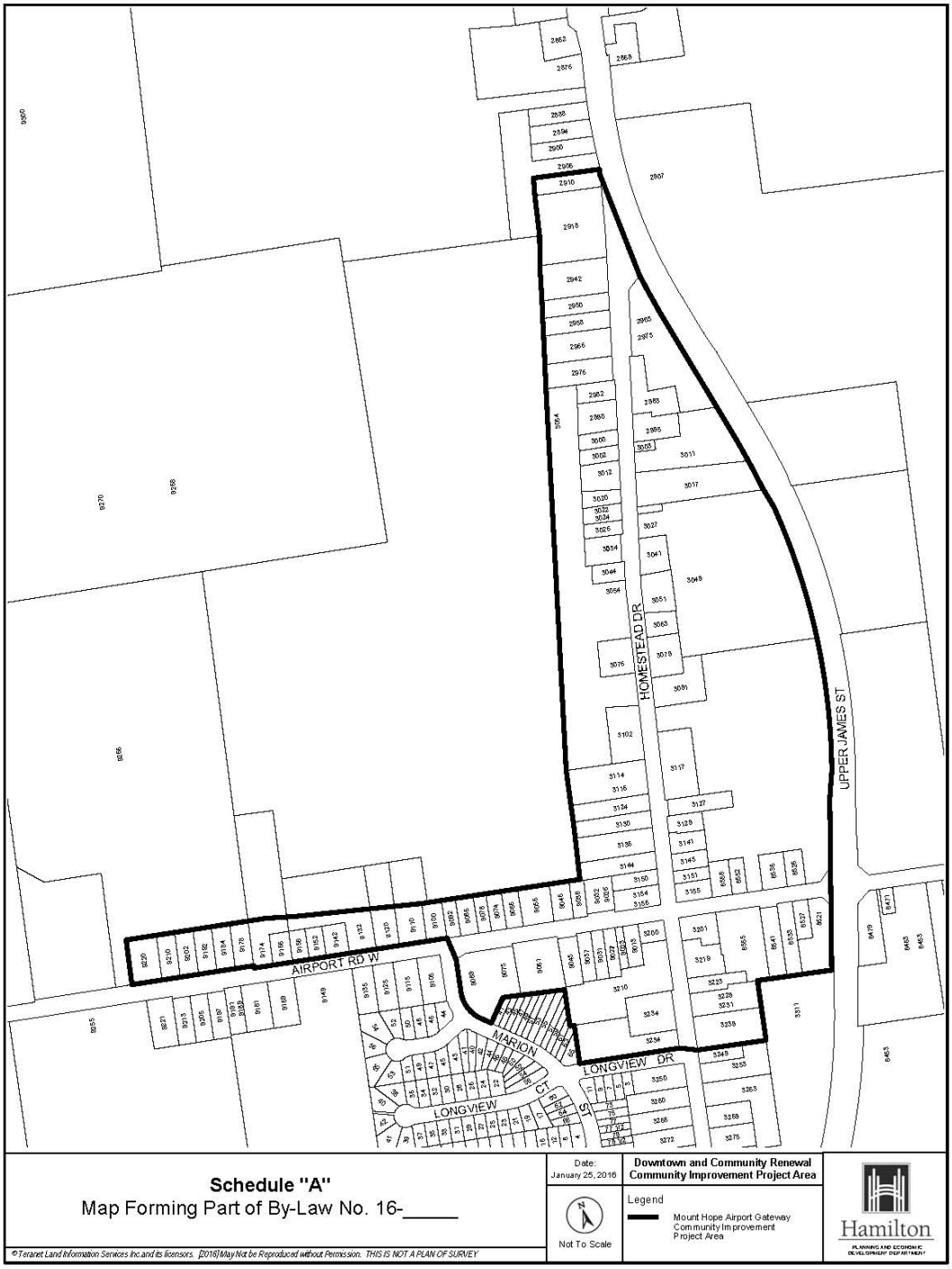

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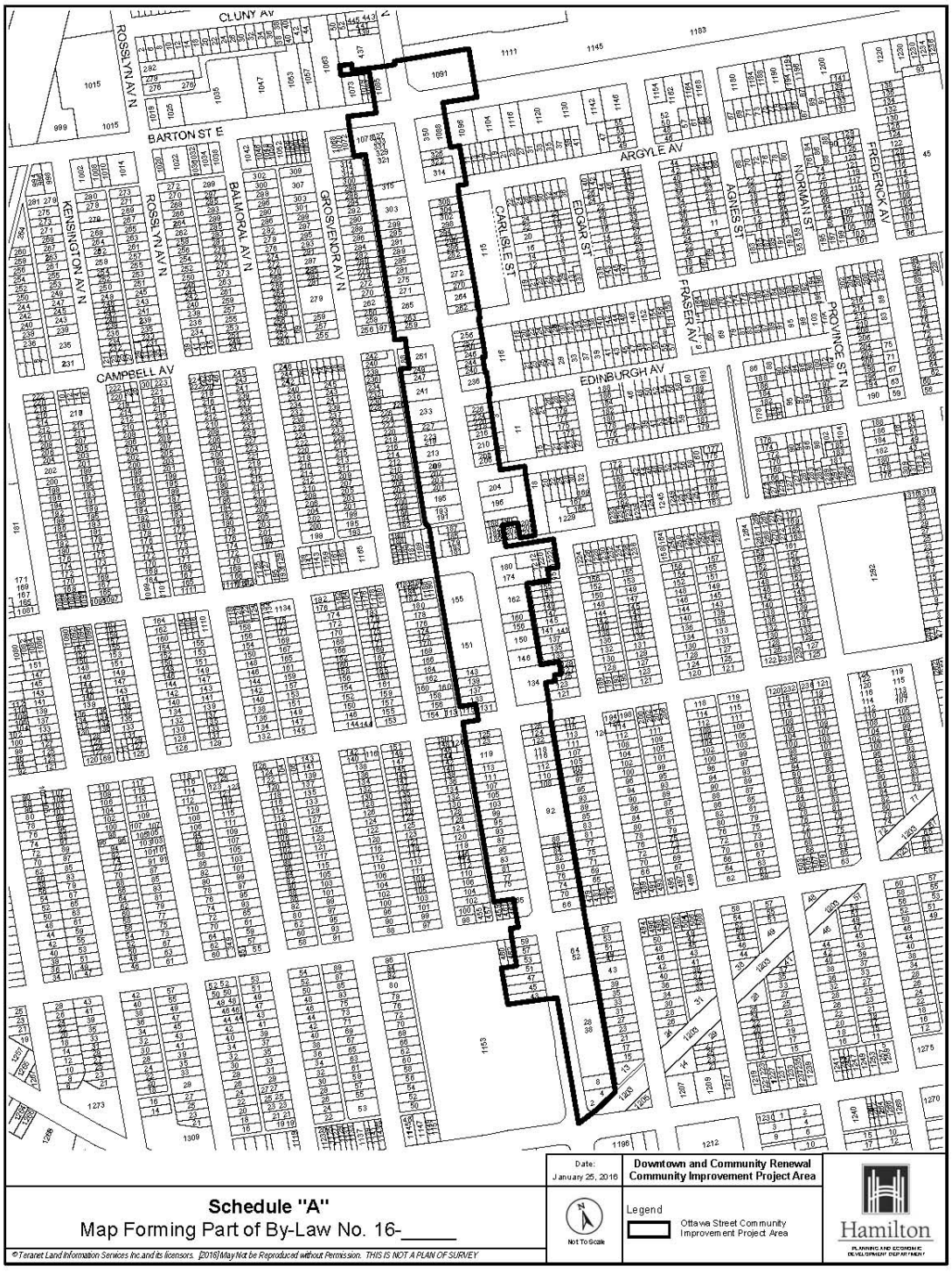

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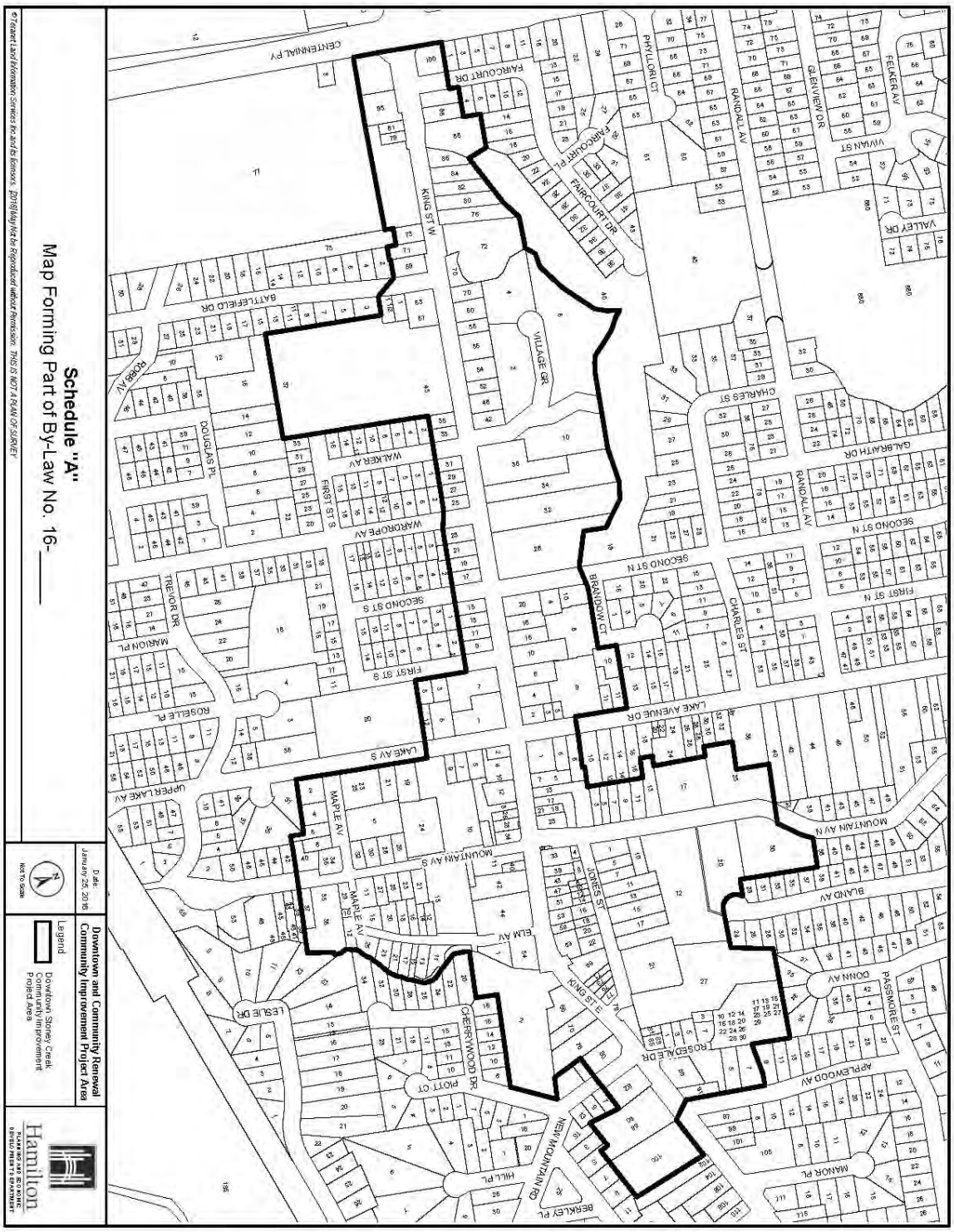

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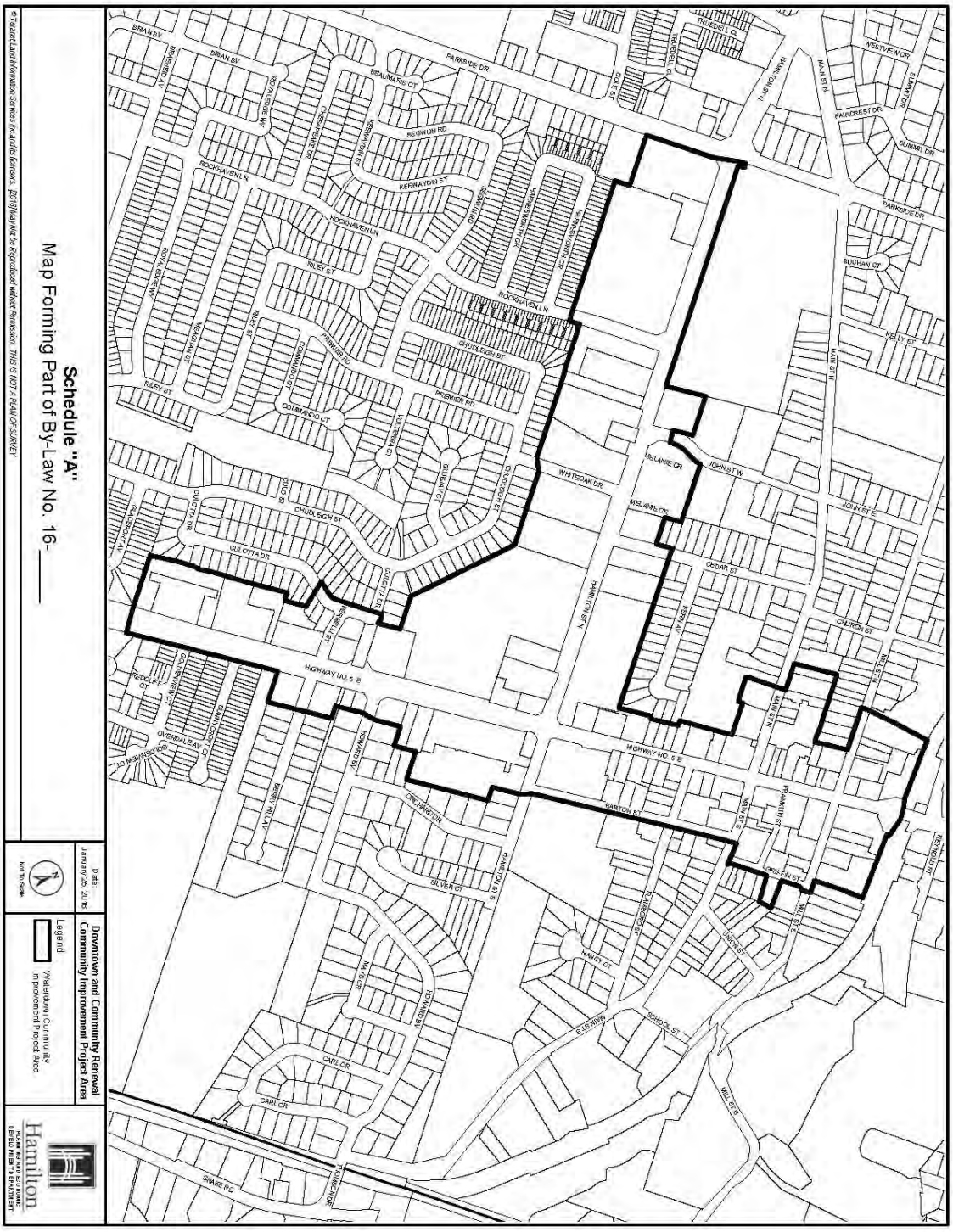

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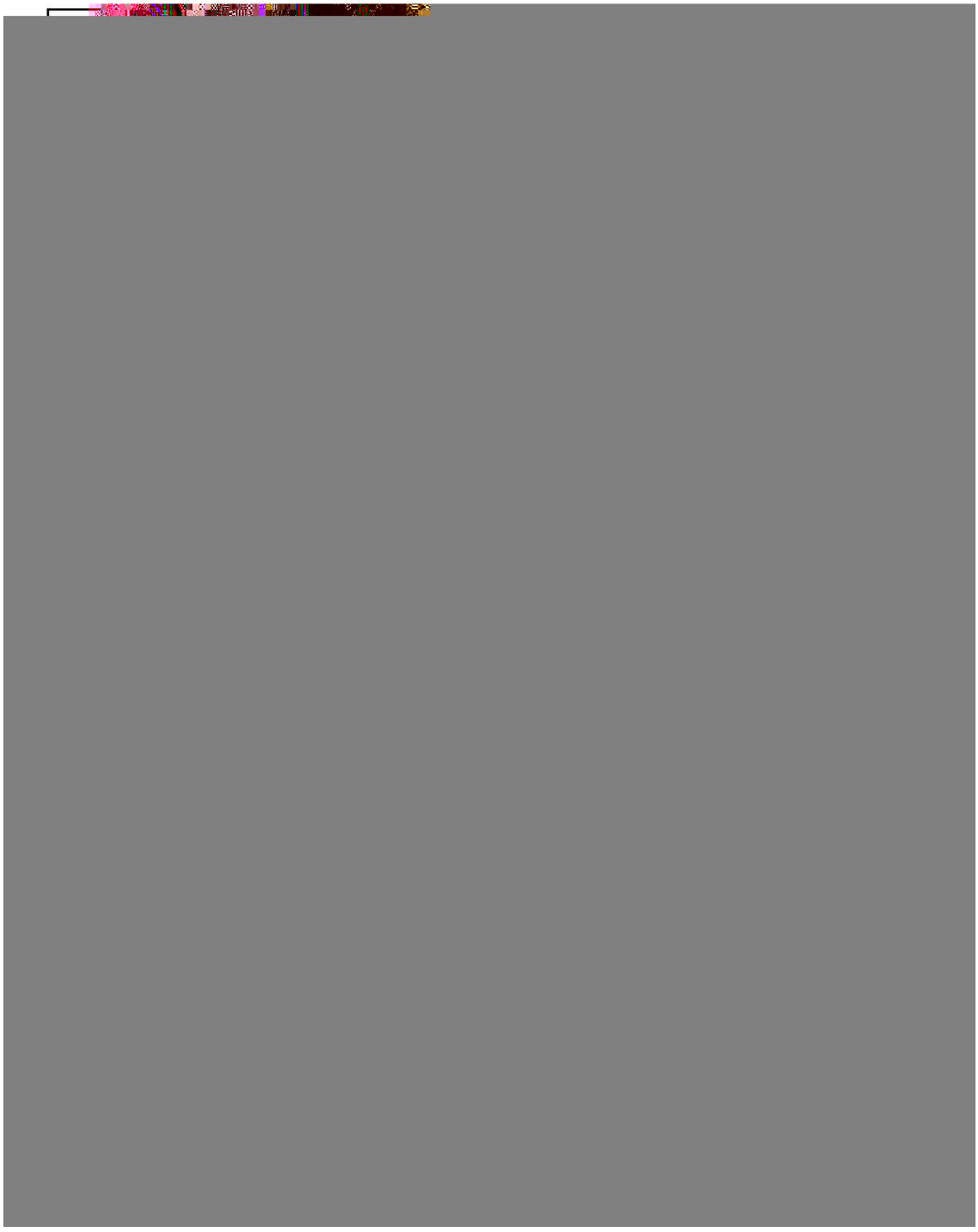
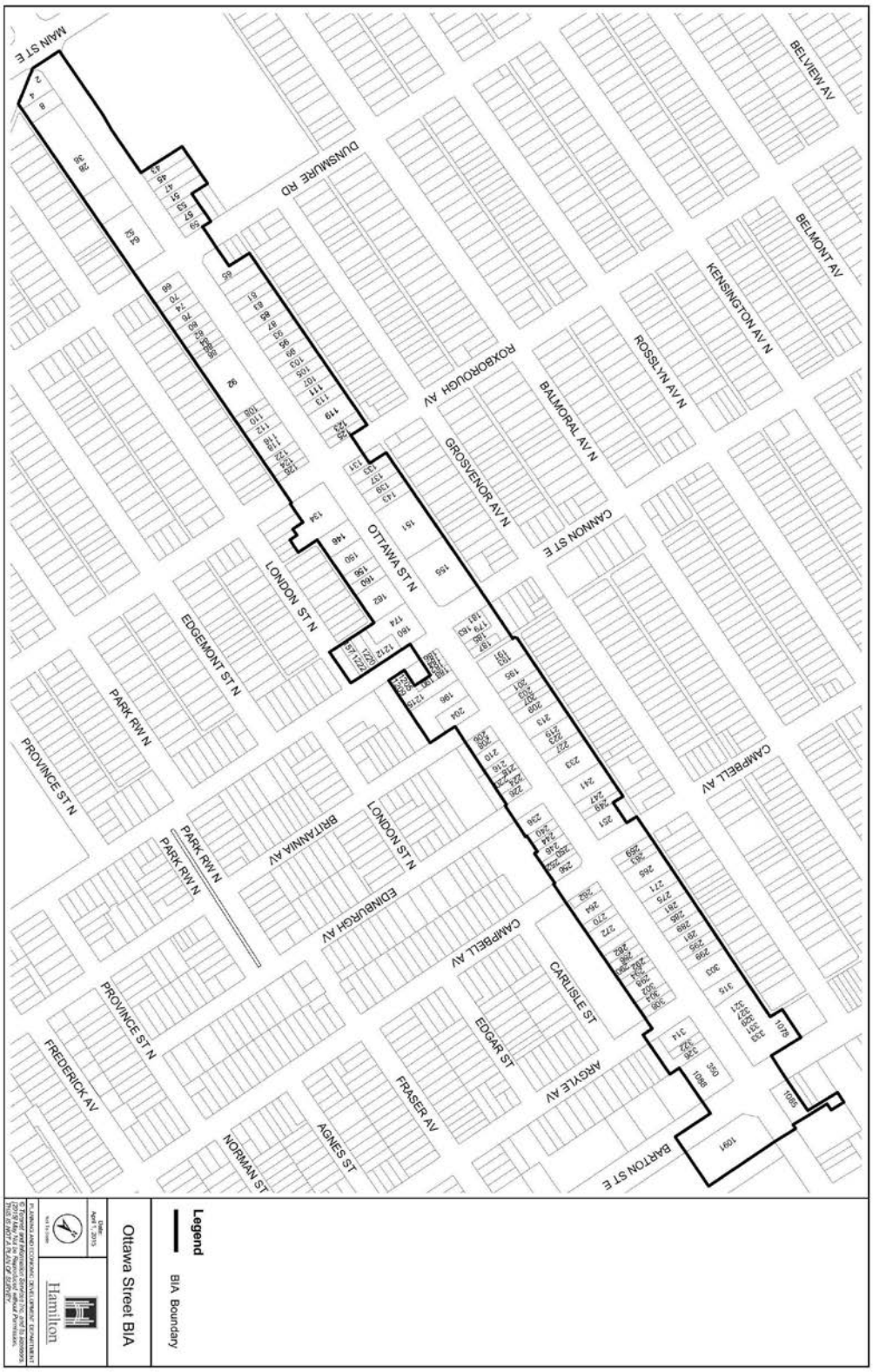


Main West B.I.A.

Ottawa Street B.I.A.



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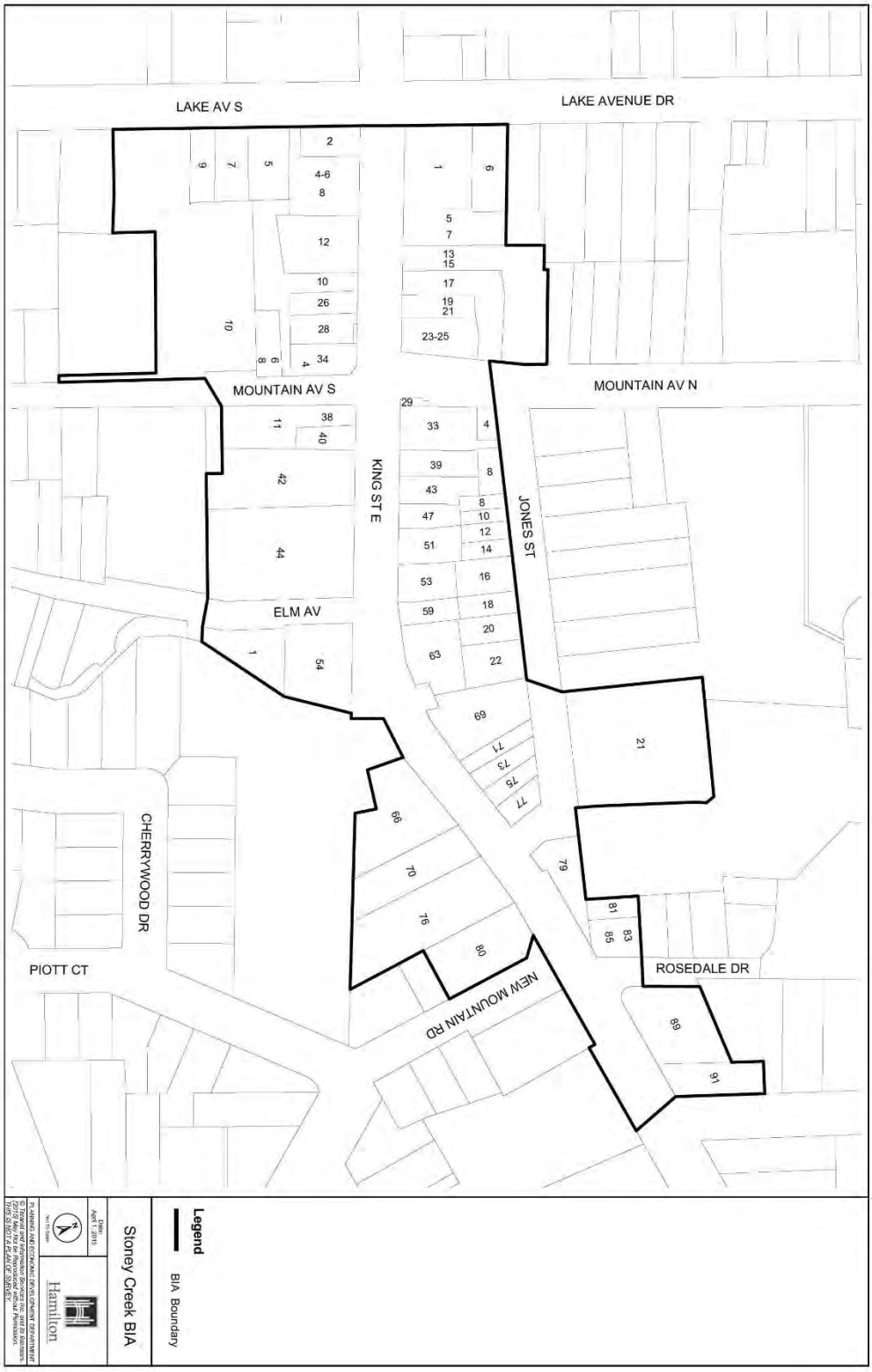

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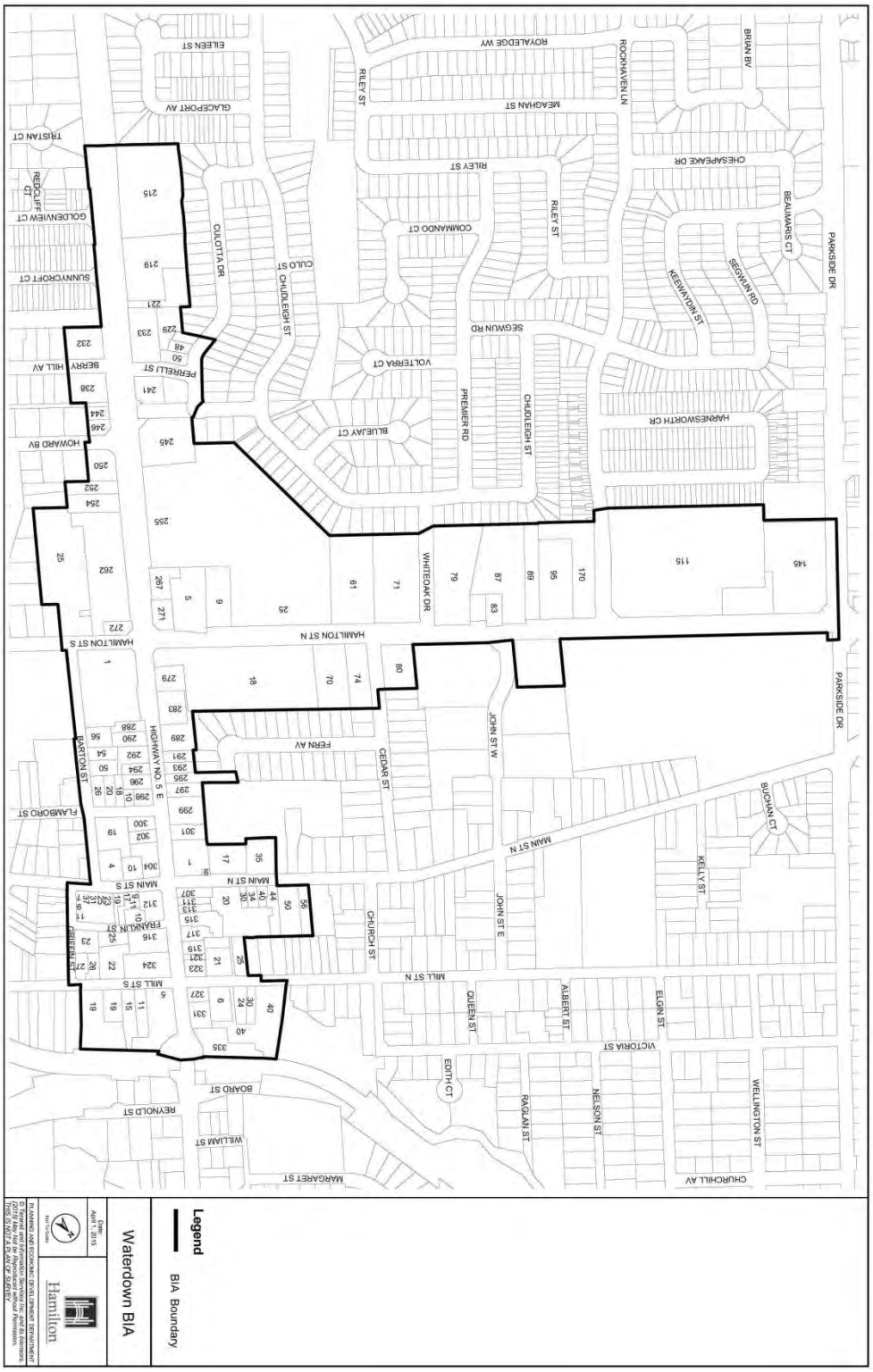

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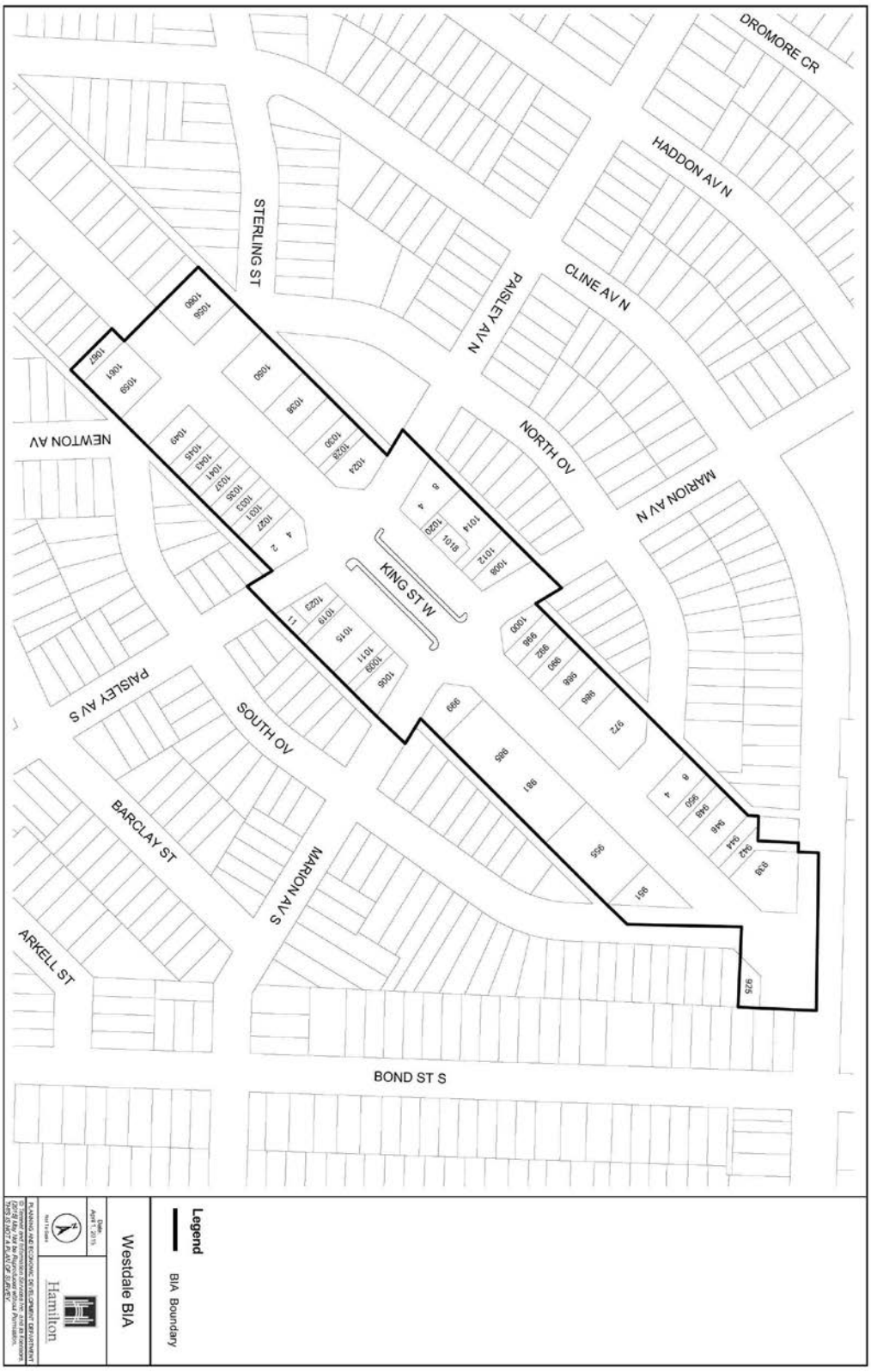

Addendum #1 to the March 13, 2019 Development Charges Background Study

City of Hamilton

May 15, 2019

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