DEVELOPMENT CHARGES AMENDMENT BACKGROUND STUDY: TRANSIT & WASTE MANAGEMENT SERVICES

Region of Waterloo

HEMSON Consulting Ltd

Staff Consolidation Report - February 3, 2017
Amended - May 15, 2017

HEMSON

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EXECUTIVE SUMMARY

The following summarizes the findings of the proposed amendment to the Region of Waterloo Development Charges (DC) By-law, By-law 14-046, to allow for the recovery of the development-related capital costs associated with Waste Management and Transit Services. The study includes revisions as necessary to reflect the terms of an Ontario Municipal Board settlement.

A. BACKGROUND AND OVERVIEW

- Hemson Consulting was retained by the Region of Waterloo to complete a new DC Background Study, specifically related to Waste Management and Transit Services, in order to amend the DCs calculated under the recently adopted 2014 DC Background Study and associated by-law.

- The Region's current DCs recover for the provision of library service (townships only), regional police, emergency medical services, airport, transit (conventional), general government, operations, transportation, water and wastewater.

B. STUDY CONSISTENT WITH DEVELOPMENT CHARGES LEGISLATION

- On December 3rd, 2015 the Province of Ontario passed Bill 73, Smart Growth for Our Communities Act, 2015, which amended the Development Charges Act, 1997 (DCA), its associated Ontario Regulation 82/98 (O. Reg. 82/98), as well as the Planning Act.

- This study calculates development charges for the Region of Waterloo in compliance with the recently amended provisions of the legislation.

- Under the *Development Charges Act, 1997 (DCA),* amendments to existing DC by-laws are permitted, but require a municipality to:

    - Produce a new background study which complies with the requirements under section 5(1) of the *DCA* and provides an examination of the long term capital and operating costs for the required infrastructure; and

- Requires that an amending by-law be passed by council.

C. DEVELOPMENT FORECAST

- A forecast of the amount, type and location of residential and non-residential development anticipated in the Region of Waterloo to 2025 is included in this report. It is consistent with the forecast in the 2014 DC Background Study.

- The development forecast for the ten-year planning period from 2016 to 2025 estimates that the Region's population will grow by approximately 103,300 people, 90,000 of which will be in the Cities and 13,300 in the Townships.

- The Region is forecast to add approximately 45,700 total dwelling units in the ten-year planning period from 2016 to 2025. The population residing in these new units is expected to grow by 108,800 across the Region – 91,800 in the Cities and 17,000 in the Townships.

- Employment in Waterloo is forecast to grow by approximately 38,800, which is expected to generate approximately 2,651,600 square metres of new non-residential building space by 2025. The majority of non-residential building space (2,312,300 sq.) is anticipated to be constructed in the Cities of Kitchener, Cambridge and Waterloo. The remaining 339,300 square metres will be constructed throughout the Region's Townships.

- The following is a summary of the projected development in the Region:

	Region of Waterloo		
	2015 Estimate	2016-2025 Growth	Forecast 2025
Residential			
Households	209,189	45,730	254,919
Population	556,707	103,295	660,002
Cities	*491,194*	*90,034*	*581,228*
Townships	*65,513*	*13,261*	*78,774*
Census plus students in new households		108,776	
Cities		*91,798*	
Townships		*16,977*	
Non-Residential			
Employment	300,720	38,830	339,550
Cities	*267,710*	*34,818*	*302,529*
Townships	*33,010*	*4,012*	*37,021*
New non-residential building space (m^2)		2,651,577	
Cities		*2,312,304*	
Townships		*339,273*	

D. FUNDING ENVELOPE BASED ON "NET" GROWTH

- In accordance with the *DCA*, development charges have been calculated at a level no higher than the average service level provided in the Region over the ten-year period immediately preceding the preparation of the background study, for Waste Management Services.

- The maximum permissible funding envelope is based on "net" population and employment growth.

- For Transit services, *DCA* requires that the estimate in the increase in the need for service delivery shall not exceed the planned level of service over the 10-year period immediately following the background study. For the purposes of this study, the planned level of service forecast period is 2016 to 2025.

E. TOTAL PROJECT COSTS AND FUNDING

- A development-related capital program, which sets out the projects required to service anticipated development for the ten-year period from 2016 to 2025 has been developed for both Transit and Waste Management Services, and is based on the Region's approved Capital Budget.

Waste Management Services

- The development-related capital program associated with Waste Management Services for the Region of Waterloo totals $30.4 million, of which $8.7 million is to be recovered from development charges over the planning period.

- Non-DC funding for replacement portions of the capital forecast and for portions of the capital projects that benefit existing development total $20.7 million. These shares will require funding from other sources.

- The *DCA* requires that development-related net capital costs for general services be reduced by ten per cent when calculating the applicable development charges. The ten per cent share of development-related net capital costs not included in the DC calculations must be funded from non-development charge sources. In total, about $970,600 is identified as the required ten per cent reduction.

- Details of the Waste Management capital program and development charges calculations can be found in Appendix B.

Transit Services

- The gross cost of the Region's development-related capital forecast for Transit Services amounts to $1,302.3 million and provides for a wide range of infrastructure expansions. Of the $1,302.3 million, approximately $152.7 million has been identified as eligible for recovery through development charges over the 2016-2025 planning period.

- Grants or alternative funding sources in the amount of $608.4 have been identified to fund a share of the development-related infrastructure projects.

- A share of the capital program, $439.6 million, will require funding from non-development charge sources and reflects the share of capital projects that replace existing infrastructure and benefit existing development.

- A share of the capital forecast is for portions of projects that relate to development in the post-2025 period and may be considered for recovery in future development charges studies, subject to service level considerations. In total, about $101.6 million is considered to be a post-2025 benefit.

- Details of the Transit Services capital program and development charges calculations can be found in Appendix C.

- The following is a summary of the development-related capital program:

Waste Management & Transit Services (2016-2025)		
Service	**Gross Cost ($000)**	**DC Eligible Cost ($000)**
Waste Management	$30,364.9	$8,735.5
Transit	$1,302,284.4	$152,660.3
Total All Services	**$1,332,649.3**	**$161,395.7**

F. CALCULATED DEVELOPMENT CHARGES

- The fully calculated residential charges are recommended to vary by unit type, reflecting the difference in occupancy patterns expected in various unit types and associated differences in demand placed on municipal services. Several rate structure options have been included in this analysis.

Calculated Residential Development Charges

	Residential Charge By Unit Type							
	Singles & Semis		Townhouses		Apartments		Lodging Units	
	Urban Area	Township	Urban Area	Township	Urban Area	Township	Urban Area	Township
TRANSIT (CITIES ONLY)	$3,365	$0	$2,526	$0	$1,832	$0	$1,035	$0
TRANSIT (REGION-WIDE)	$3,095	$3,095	$2,324	$2,324	$1,686	$1,686	$952	$952
TRANSIT (DIFFERENTIATED) - CITIES	$3,325		$2,497		$1,811		$1,023	
TRANSIT (DIFFERENTIATED) - TOWNSHIPS		$1,684		$1,264		$917		$518
WASTE MANAGEMENT	$255	$255	$192	$192	$139	$139	$79	$79

Calculated Non-Residential Development Charges

Service	Non-Residential Charge			
	Adjusted Charge			
	Urban Areas		Townships	
	per m^2	per ft^2	per m^2	per ft^2
TRANSIT (CITIES ONLY)	$19.72	$1.83	$0.00	$0.00
TRANSIT (REGION-WIDE)	$14.02	$1.30	$14.02	$1.30
TRANSIT (DIFFERENTIATED)	$15.52	$1.44	$6.09	$0.57
WASTE MANAGEMENT	$0.07	$0.01	$0.07	$0.01

G. LONG-TERM CAPITAL OPERATING AND ASSET MANAGEMENT COSTS

- By 2025, the annual asset management and operating cost provisions required for the development-related Transit capital program amount to $38.92 million.

- Of the $38.92 million, $26.90 million is for the LRT, which is being delivered through a Public-Private Partnership arrangement and has been incorporated into the Region's annual budgeting forecast. Of the $26.90 million $4.0 is for annual operating and $1.7 million for insurance. The balance of the costs, $21.2 million, are capital-related and include financing, maintenance, and lifecycle costs.

- The remaining $9.32 million is for conventional transit (GRT) projects, of which $8.70 million is for annual operating costs and the balance, $622,000, is related to asset management lifecycle costs.

- For Waste Management Services, it is estimated that net operating costs will increase by about $7.00 million by 2025 as new facilities and infrastructure are operated and maintained.

- Additionally, the annual asset management provision for Waste Management Services will amount to $813,500 by 2025 and will be required to properly fund the full life-cycle costs of the new assets supported under this Development Charges By-Law.

I INTRODUCTION

This Region of Waterloo Development Charges (DC) Background Study is presented as part of a process to lead to the amendment of Regional Development Charges By-law 14-046 that would amend the development charge rate imposed for the Transit service and introduce a development charge for eligible Waste Management services. This study in being prepared in compliance with the *Development Charges Act, 1997 (DCA)*, as amended in December 2015.

The *DCA* and *O. Reg. 82/98* now require that a development charge background study be prepared in which development charges are determined with reference to:

- A forecast of the amount, type and location of development anticipated in the Region;

- The average capital service levels provided in the Region over the ten-year period immediately preceding the preparation of the background study for services that are not prescribed under s. 5.2 (1) of the *DCA*;

- A review of future capital projects, including an analysis of gross expenditures, funding sources, and net expenditures incurred, or to be incurred, by the Region or its local boards to provide for the expected development, including the determination of the eligible and ineligible components of the capital projects;

- Consideration of the use of more than one development charge by-law to reflect different needs for services in different areas; and

- An examination of the long-term capital and operating costs for the capital infrastructure required for each service to which the development charges by-law would relate.

- An asset management plan that deals with all assets whose capital costs are proposed to be funded under the development charge by-law and that demonstrates that all such assets mentioned are financially sustainable over their full life cycle.

This study presents the results of the review that determines the development-related net capital costs that are attributable to development that is forecast to occur in the Region. These development-related net capital costs are apportioned among various types of development (residential and non-residential) in a manner that reflects the increase in the need for each service attributable to each type of development. The study arrives, therefore, at calculated development charges for various types of development.

The *DCA* provides for a period of public review and comment regarding the calculated development charges. Following completion of this process in accordance with the *DCA* and Council's review of this study and the comments it receives regarding this study or other information brought to its attention about the calculated charges, it is intended that Council will pass an amending development charges by-law for the Region.

The remainder of this study sets out the information and analysis upon which the calculated development charges are based.

Section II designates the services for which the development charges are calculated and the areas within the Region to which the development charges will apply. It also briefly reviews the methodology that has been used in this background study.

Section III presents a summary of the residential and non-residential development which is forecast to occur within the Region over the 2016–2025 period.

Section IV summarizes the historical ten-year average service levels that have been attained in the Region which form the basis for the development charge calculations for eligible Waste Management services.

In Section V, the Transit and Waste Management development-related capital programs that have been developed by various Region departments and approved by Regional Council through the 2016-2025 Regional Capital Plan are reviewed.

Section VI summarizes the calculation of applicable development charges and the resulting calculated development charges by land use and by unit type.

Section VII provides an examination of the long term capital and operating costs for each service included in the development charge calculation.

Section VIII highlights the findings of an asset management plan undertaken for all development-related components of the capital projects included in the forecasts.

II METHODOLOGY ALIGNS DEVELOPMENT-RELATED COSTS AND BENEFITS USING VARIOUS APPROACHES

Several key steps are required in calculating a development charge. However, specific circumstances arise in each municipality that must be reflected in the calculation. In this study, therefore, we have tailored our approach to the Region of Waterloo's unique circumstances. The approach to the calculated development charges is focused on providing a reasonable alignment of development-related costs with the development that necessitates them.

- For eligible Waste Management services, the study uses a Region-wide approach, consistent with most of the development charges imposed under the Region's current by-law.

- For Transit services, the study provides development charge calculations using three area-specific approaches.

Notwithstanding the various approaches presented in this study, the legislation allows the Region to exempt or reduce rates for specific geographic areas. However, the legislation prevents any revenue loss arising from exemptions or reductions from being made up through increased charges on development in other areas.

A. REGION-WIDE DEVELOPMENT CHARGES ARE CALCULATED FOR ELIGIBLE WASTE MANAGEMENT SERVICES

The Region provides a range of waste collection, diversion, landfill, and organics processing services to the community it serves and has a sizeable inventory of facilities, land, infrastructure, vehicles and equipment. *O. Reg. 82/98, s.2.1 (1)* prescribes "landfill sites and services" and "facilities and services for the incineration of waste" as services that are ineligible for development charge funding. Waste collection, diversion, and organics processing services are, however, eligible and are included in the definition of Waste Management services in the proposed by-law.

The *DCA* permits the Region to designate, in its by-laws, the areas within which the development charges shall be imposed. The charges may apply to all lands in the Region or to other designated development areas as specified in the by-laws.

For eligible Waste Management services that the Region provides, the full range of capital facilities, land, equipment and infrastructure is available throughout the Region. All residents therefore have access to all facilities. A widely accepted method for recovering the development-related capital costs for such services is to apportion them over all new development anticipated in the Region. This approach is consistent with the development charges imposed under the Region's current by-law for the following services:

- Waterloo Regional Police Service;
- Emergency Medical Services;
- Airport;
- General Government;
- Operations and Facilities;
- Transportation;
- Water; and
- Wastewater.

Region-wide development charges are area-rated for the Cities and Townships. DCs for Regional Library apply to Townships only, whereas Transit applies only in the Cities. For this reason, both services have been omitted from the above list.

The Region-wide approach forms a reasonable basis in which to plan and administer the development charges for eligible Waste Management services. The resulting development charges for this service would be imposed uniformly against all new development everywhere in the Region.

B. THREE APPROACHES ARE USED TO CALCULATE DEVELOPMENT CHARGES FOR TRANSIT

The Region currently provides conventional transit services (i.e. buses) to its urban areas (primarily Kitchener, Cambridge, Waterloo). Under the current by-law, development charges for Transit are imposed only on development in the urban areas, consistent with current property tax policy. The substantial commitments made by the Region to invest in Transit infrastructure will result in an expansion of the capacity and availability of Transit services. As such this study calculates Transit development charges using three different approaches:

- Under the first approach, Transit charges would be imposed only on development in the urban areas (the Cities of Waterloo, Cambridge, and Kitchener). This "Cities only" approach is consistent with the provisions of the current by-law relating to development charges for Transit services.

- Under the second approach, Transit charges would be imposed uniformly on all development in the Region. This "uniform Region-wide" approach is consistent with the provisions of the current by-law relating to development charges for all services, with the exception of Transit and Library.

- Under the third approach, the development charge would be imposed Region-wide but would be higher for development in the urban areas (or Cities) and lower for development in the Townships, based on the different demand for Transit in each of the two areas. This "Differentiated" approach would be new to the Region in respect of development charges.

Several key steps are required in calculating development charges for future development-related projects. These are summarized below.

C. KEY STEPS IN DETERMINING DEVELOPMENT CHARGES FOR FUTURE DEVELOPMENT-RELATED PROJECTS

Several key steps are required in calculating development charges for future development-related projects. These are summarized below.

1. Development Forecast

The first step in the methodology requires that a development forecast be prepared for the ten year study period, 2016 to 2025. The forecast of future residential and non-residential development used in this study was prepared in conjunction with the Region's planning staff.

For the residential portion of the forecast, a projection of both the net population growth as well as the population growth in new housing units is required. The net population growth is equivalent to the population in new housing units less the change in population in existing units. The net population growth determines the need for additional facilities and provides the foundation for the development-related capital program.

When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that will result from the addition of new housing units. This population in new units represents the population from which development charges will be collected.

The non-residential portion of the forecast estimates the amount of building space to be developed in the Region over the ten year period, 2016 to 2025. Factors for floor space per worker by employment category are used to convert the floorspace forecast into employment for the purposes of allocating development-related capital costs.

2. Service Categories and Service Levels

The *DCA* provides that the increase in the need for service attributable to anticipated development:

> ...must not include an increase that would result in the level of service exceeding the average level of that service provided in the Municipality over the 10-year period immediately preceding the preparation of the background study...(s. 5. (1) 4.)

Historical ten-year average service levels thus form the basis for development charges. A review of the Region's capital service levels for buildings, land, vehicles, and so on has therefore been prepared for eligible Waste Management services as a reference for the calculation so that the portion of future capital projects that may be included in the development charge can be determined. The historical service levels used in this study have been calculated based on the period 2006–2015.

The above provision does not apply in determining the estimate for the increase in the need for a prescribed service, of which all Transit services are currently the only services that are prescribed (see *O.Reg 82/98 6.1 (1)).* For Transit, the *DCA* requires that:

> …the estimate for the increase in the need for a prescribed service shall not exceed the planned level of service over the 10-year period immediately following the preparation of the background study… (s.5.2 (3))

O.Reg 82/98 6.1 (2) prescribes that the following method and criteria are to be used to estimate the planned level of service for Transit:

> 1. The service is a discrete service.
>
> 2. No portion of the service that is intended to benefit anticipated development after the 10-year period immediately following the preparation of the background study may be included in the estimate.
>
> 3. No portion of the service that is anticipated to exist as excess capacity at the end of the 10-year period immediately following the preparation of the background study may be included in the estimate.

For greater certainty, *O.Reg 82/98 6.1 (3)* states that paragraphs 2 and 3 of subsection (2) above:

> do not prevent the inclusion in any subsequent estimate of the portion of a service that is intended to benefit development over the 10-year period immediately following the preparation of the background study related to that subsequent estimate, even if that portion of the service was excluded from a previous estimate.

For the purposes of the development charge calculations for Transit the "planned level of service" is considered to be the Regional Council approved 10-year capital program (2016 capital budget and 2017-2025 capital forecast).

3. Development-Related Capital Program and Analysis of DC Eligible Costs to be Recovered Through Development Charges

The development-related capital program used in this study is sourced from the Council approved Regional Capital Plan 2016-2025. The program identifies development-related projects and their gross and net municipal costs, after allowing for capital grants, subsidies or other recoveries as required by the *Act* (*DCA*, s. 5. (2)). The capital program provides another cornerstone upon which development charges are based. The *DCA* requires that the increase in the need for service attributable to the anticipated development may include an increase:

> ... only if the council of the Municipality has indicated that it intends to ensure that such an increase in need will be met. (s. 5. (1) 3.)

In conjunction with *DCA*, s. 5. (1) 4. and s.5.2 (3) referenced above, these sections have the effect of requiring that the development charge be calculated on the lesser of the historical ten-year average service levels (for Waste Management) or the service levels embodied in future plans of the Region (for Transit). The development-related capital program used in this study ensures that development charges are only imposed to help pay for projects that have been or are intended to be purchased or built in order to accommodate future anticipated development. It is not sufficient in the calculation of development charges merely to have had the service in the past. There must also be a demonstrated commitment to continue to emplace facilities or infrastructure in the future. In this regard, *O. Reg. 82/98*, s. 3 states that:

> For the purposes of paragraph 3 of subsection 5 (1) of the *Act,* the council of a Municipality has indicated that it intends to ensure that an increase in the need for service will be met if the increase in service forms part of an official plan, capital forecast or similar expression of the intention of the council and the plan, forecast or similar expression of the intention of the council has been approved by the council.

For some projects in the development-related capital program, a portion of the project may confer benefits to existing residents. As required by the *DCA*, s. 5. (1) 6., these portions of projects and their associated net costs are the funding responsibility of the Region from non-development charges sources. The amount of municipal funding for

such non-DC-eligible shares of projects is also identified as part of the preparation of the development-related capital program.

There is also a requirement in the *DCA* to reduce the applicable development charge by the amount of any "uncommitted excess capacity" that is available for a service. Such capacity is available to partially meet the future servicing requirements. Adjustments are made in the analysis to meet this requirement of the *DCA*.

Finally, in calculating development charges, the development-related net municipal costs must be reduced by ten per cent for all municipal services except roads and related services, storm drainage and control services, water and wastewater supply, engineering studies, protective services and transit (*DCA*, s. 5. (1) 8.). Therefore, in this study the ten per cent discount is applied only to eligible Waste Management services and the resulting municipal funding responsibility from non-development charge sources is identified.

4. Attribution to Types of Development

The next step in the determination of development charges is the allocation of the development-related net capital costs between the residential and the non-residential sectors. For Transit, the allocation is based on the consideration of projected changes in population in new units and employment over the planning period. The estimated volume of waste processed from each sector is the basis of the allocation for eligible Waste Management services.

The residential component of the development charge is applied to different housing types based on average occupancy factors. The non-residential component is applied on the basis of gross building space in square feet for non-residential development.

5. Final Adjustment

The final determination of the development charge results from adjustments made to development-related DC eligible costs for each service and sector resulting from the application of any unallocated growth-related reserve fund balances that are available to finance the development-related capital costs in the capital program. A cash flow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are therefore accounted for in the calculation as allowed under the *DCA*.

III DEVELOPMENT FORECAST

The following section provides a summary of the development forecasts that have been used as inputs to the development charges calculation for the Region of Waterloo. A more detailed summary of the forecasts, including tables illustrating historic trends and forecast results, is provided in Appendix A.

Development charges for eligible Waste Management services are based on Region-wide forecasts. Charges for Transit under the three approaches described in the previous section are based on forecasts of development in the Region's urban area (the Cities of Kitchener, Cambridge and Waterloo) and Townships.

The *DCA* requires the Region to estimate "the anticipated amount, type and location of development" for which development charges may be imposed. The development forecast must cover both residential and non-residential development and be specific enough with regards to quantum, type, location and timing of development to allow the Region to prepare a reasonable development-related capital program. A ten year development forecast, from 2016 to 2025, has been used for all the development charge eligible services in the Region.

A. RESIDENTIAL GROWTH FORECAST

Development charges are levied on residential development as a charge per new unit. Therefore, for the residential forecast, a projection of both the population growth as well as the population in new housing units is required.

- The *population growth*[1] determines the need for additional facilities and provides the foundation for the development-related capital program.
- When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that occupy new housing units. This *population in new units* represents the population from which development charges will be collected.

The total ten-year population growth in new units is forecast at 108,780 for the Region; 91,800 for the Cities, and 16,980 for the Townships.

[1] Commonly referred to as "net population growth" in the context of development charges.

B. NON-RESIDENTIAL GROWTH FORECAST

Non-residential development charges are calculated on a unit of gross floor area (GFA) basis. Therefore, a forecast of new non-residential building space has been developed. As with the residential forecast, the floorspace forecast covers the ten-year period from 2016 to 2025 for both Waste Management and Transit services.

In order to estimate the number of employees in new floorspace, an assumed floorspace per worker (FSW) for each employment category is then applied to the new floorspace forecast. The following FSW assumptions have been used:

Industrial	80 m^2 per employee
Commercial	42 m^2 per employee
Institutional	50 m^2 per employee

The Region's net employment growth is estimated at 38,830 over the ten year period to 2025, 34,820 of which is forecast to occur in the Cities and 4,010 in the Townships. The total ten-year new GFA forecast is 2,651,580 m^2 for the Region; 2,312,300 m^2 for the Cities, and 339,270 m^2 for the Townships.

Table 1 summarizes the development charge development forecast for the Region.

TABLE 1

REGION OF WATERLOO
2016 DEVELOPMENT CHARGES BACKGROUND STUDY
RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT FORECAST

	Region of Waterloo		
	2015 Estimate	2016-2025 Growth	Forecast 2025
Residential			
Households	209,189	45,730	254,919
Population	556,707	103,295	660,002
Cities	*491,194*	*90,034*	*581,228*
Townships	*65,513*	*13,261*	*78,774*
Census plus students in new households		108,776	
Cities		*91,798*	
Townships		*16,977*	
Non-Residential			
Employment	300,720	38,830	339,550
Cities	*267,710*	*34,818*	*302,529*
Townships	*33,010*	*4,012*	*37,021*
New non-residential building space (m^2)		2,651,577	
Cities		*2,312,304*	
Townships		*339,273*	

IV SUMMARY OF CAPITAL SERVICE LEVELS

The *DCA* and *O. Reg. 82/98* require that, other than for prescribed services, the development charges be set at a level no higher than the average service level provided in the Region over the ten-year period immediately preceding the preparation of the background study, on a service by service basis.

A. HISTORICAL CAPITAL SERVICES LEVELS

For eligible Waste Management services the above legislative requirement is met by documenting historical service levels for the preceding ten years, in this case, for the period 2006 to 2015. The service levels are measured as a ratio of inputs per capita.

O. Reg. 82/98 requires that when determining historical service levels both quantity and quality of service be taken into consideration. In most cases, the service levels are initially established in quantitative terms. For example, service levels for buildings are presented in terms of square feet per capita. The qualitative aspect is introduced by the consideration of the monetary value of the facility or service. In the case of buildings, for example, the cost would be shown in terms of dollars per square foot to replace or construct a facility of the same quality. This approach helps to ensure that the cost of development-related capital infrastructure that is to be charged to new development reflect not only the quantity (number and size) but also the quality (value or replacement cost) of service provided historically by the Region. Both the quantitative and qualitative aspects of service levels used in the present analysis are based on information provided by Region staff based on historical records and their experience with costs to acquire or construct similar facilities, equipment and infrastructure.

Appendix B provides detailed historical inventory data upon which the calculation of service levels is based for eligible Waste Management Services.

B. PLANNED LEVEL OF SERVICE FOR TRANSIT

The above provision does not apply in determining the estimate for the increase in the need for a prescribed service, of which all Transit services are currently the only

services that are prescribed (see *O.Reg 82/98 6.1 (1)*). For Transit, the *DCA* requires that the estimate in the increase in the need shall not exceed the planned level of service over the 10-year period immediately following the background study. For the purposes of this study the 10-year period for the planned level of service is 2016 to 2025.

For the purposes of the development charge calculations for Transit the "planned level of service" is considered to be the Regional Council approved 10-year capital program (2016 capital budget and 2017-2025 capital forecast). Through its approval of the program Council has indicated that it intends to ensure that the increase in need for Transit service will be met.

V THE DEVELOPMENT-RELATED CAPITAL PROGRAM

The *DCA* requires the Council of a municipality to express its intent to provide future capital facilities at the level incorporated in the development charges calculation. As noted above in Section II, *O. Reg. 82/98*, s. 3 states that:

> For the purposes of paragraph 3 of subsection 5 (1) of the Act, the council of a Municipality has indicated that it intends to ensure that an increase in the need for service will be met if the increase in service forms part of an official plan, capital forecast or similar expression of the intention of the council and the plan, forecast or similar expression of the intention of the council has been approved by the council.

A. A DEVELOPMENT-RELATED CAPITAL PROGRAM IS PROVIDED FOR COUNCIL'S APPROVAL

Based on the development forecasts summarized in Section III and detailed in Appendix A, a development-related capital program setting out those projects that are required to service anticipated development has been established. For both the Waste Management and Transit services the capital program covers the ten-year period from 2016 to 2025.

It is assumed that future capital budgets and forecasts will continue to bring forward the development-related projects contained herein that are consistent with the development occurring in the Region. It is acknowledged that changes to the capital program presented here may occur through the Region's normal capital budget process.

B. DEVELOPMENT-RELATED CAPITAL PROGRAM FOR WASTE MANAGEMENT

A development-related capital program which sets out the projects required to service anticipated development for the ten-year period from 2016 to 2025 has been developed for eligible Waste Management services. The program is based on the Region's 2016-2025 Capital Budget that was approved by Regional Council and includes a number of facility and equipment expansions and upgrades that will enhance the capacity of the service to process a greater amount of waste. All facility expansion projects in the program are included in the Region's approved capital

budget and 9-year capital forecast. Provision is also made for the increased capital cost required to purchase additional vehicles through the waste collection contracts to maintain the historical average level of service to 2025. The gross cost of all projects amounts to $30.4 million. No grants or subsidies have been identified; the net cost of the capital program therefore remains $30.4 million.

To determine the share of the program that is eligible for recovery through development charges, the gross project costs are reduced by any anticipated grants or subsidies, "benefit to existing" shares, and the mandatory 10% reduction.

Not all of the net costs are to be recovered from new development by way of development charges (see Section VI for the method and determination of net municipal costs attributable to development). Portions of the capital program relate to shares of projects that benefit the existing community and must be removed from the development charge calculation. In addition to this reduction, the development-related costs must be reduced by 10 per cent as required by s. 5 (1) 8 of the *DCA*. Both the benefit to existing share and the 10 per cent reduction amount must be funded from non-development charge sources.

Further details on the capital program for eligible Waste Management services are provided in Appendix B.

C. DEVELOPMENT-RELATED CAPITAL PROGRAM FOR TRANSIT

The 2016-2025 development-related capital program for Transit services includes projects associated with the expansion of conventional Grand River Transit (GRT), the construction of a multi-modal transit hub, and the construction of new higher-order transit in the form of a combined light rail (ION LRT) and adapted bus rapid transit (aBRT) system. The gross cost of the program is $1,302.3 million.

To determine the share of the program that is eligible for recovery through development charges, the gross project costs are reduced by any anticipated grants or subsidies and benefit to existing shares. Grants in the amount of $608.4 million have been identified; the net cost of the capital program is therefore $693.8 million.

Details on the gross and net costs of individual components of the capital program are provided in Appendix C.

VI DEVELOPMENT CHARGES ARE CALCULATED IN ACCORDANCE WITH THE *DCA*

This section summarizes the calculation of development charges for each service category and the resulting total development charge by type of development. Furthermore, the calculation of the "unadjusted" per capita (residential) and per square foot (non-residential) charges is presented. Adjustments are made to these amounts resulting from a cash flow analysis that considers interest earnings and borrowing costs.

For residential development, the adjusted total per capita amount is then converted to a variable charge by housing unit type using unit occupancy factors. The calculated non-residential charge is based on gross floor area (GFA) of building space.

It is noted that the calculation of the development charges does not include any provision for exemptions required under the *DCA* such as the exemption for enlargements of up to 50 per cent on existing industrial buildings. Such legislated exemptions, or other exemptions or reductions which Council may choose to provide, will result in loss of development charge revenue for the affected types of development. Any such revenue loss may not be made up, however, by offsetting increases in other portions of the calculated charge.

A. UNADJUSTED DEVELOPMENT CHARGE CALCULATIONS

The capital program for eligible Waste Management services incorporates those projects identified to be related to development anticipated in the next ten years. However, not all of the capital costs are to be recovered from new development by way of development charges. A benefit to existing share of $20.7 million has been removed from the development charge calculation. Moreover, for eligible Waste Management services, the development-related net capital cost must be reduced by 10 per cent (DCA s.5.(1)8.). In total, $970,605 is identified as the required 10 per cent reduction. These portions of capital costs will be funded from property taxes, user fees or other non-development charge revenue sources.

The total costs eligible for recovery through development charges for eligible Waste Management services is $8.7 million. The development-related costs have been

allocated 98 per cent to residential development ($8.6 million) and 2 per cent to non-residential development ($174,709). This ratio is based on estimates provided by staff of the volume of waste processed from each sector. When the amount allocated to the residential sector is divided by the 10 year Regional population growth in new units (108,776), an unadjusted charge of $78.70 per capita is derived. The non-residential share of the Waste Management capital program is divided by the 10 year forecast of new non-residential space growth in the Region (2,651,577 m^2), which yields an unadjusted charge of $0.07 per m^2.

Further details of the calculation for eligible Waste Management services are available in Appendix B.

The capital program for Transit services also incorporates those projects identified to be related to development anticipated in the next ten years. A benefit to existing share, based on ridership growth, is calculated to be $439.6 million and has been removed from the development charge calculation. Under the amended DCA, Transit is now a service for which the 10 per cent reduction no longer applies.

For most of the Transit investments, a portion of the capital program will service development that will not occur until after 2025. This portion of the capital program is deemed to be "pre-built" service capacity to be considered as committed excess capacity to be recovered under future development. In total, $101.6 million is determined as a "post-period" benefitting share of the costs.

The total costs eligible for recovery through development charges for Transit services is $152.7 million. The development-related costs have been allocated based on shares of population in new units and employment in the Region, Cities, and Townships depending on which of the three Transit approaches used.

Further details of these allocations, including detailed calculations of the benefit to existing and post-period benefitting shares for Transit services, are available in Appendix C.

A summary of the "unadjusted" residential and non-residential development charges for eligible Waste Management and Transit services is presented in Table 2.

Table 2 – Unadjusted Development Charges						
Service & Approach	Residential			Non-Residential		
	Growth-Related Net Capital Costs (000,000)	Population in New Units	Charge per Capita	Growth-Related Net Capital Costs (000,000)	GFA in m^2	Charge per m^2
Waste Management	$8.6	108,776	$78.70	$0.2	2,651,577	$0.07
Transit (Cities only)	$103.4	91,798	$1,126.23	$49.3	2,312,304	$21.31
Transit (Uniform Region-wide)	$112.5	108,776	$1,034.24	$40.2	2,651,577	$15.15
Transit (Differentiated – Cities)	$102.2	91,798	$1,113.40	$38.8	2,312,304	$16.77
Transit (Differentiated – Townships)	$9.5	16,977	$556.70	$2.2	339,273	$6.58

B. ADJUSTED RESIDENTIAL AND NON-RESIDENTIAL DEVELOPMENT CHARGES

Final adjustments to the "unadjusted" development charge rates summarized above are made through a cash flow analysis. The analysis, details of which are included in the Appendices B and C, considers the cost associated with borrowing and interest earnings associated with the timing of expenditures and development charge receipts for each service.

Table 3 summarizes the results of the adjustment for the residential development charge rates. The adjusted per capita rate increases for Waste Management and Transit services under all approaches after the cash flow analysis. Residential development charges are proposed to vary by dwelling unit type to reflect their different occupancy factors and resulting demand for services.

TABLE 3

REGION OF WATERLOO
2016 DEVELOPMENT CHARGES BACKGROUND STUDY
RESIDENTIAL DEVELOPMENT CHARGES BY UNIT TYPE

	Unadjusted Charge Per Capita	Adjusted Charge Per Capita	Residential Charge By Unit Type							
			Singles & Semis		Townhouses		Apartments		Lodging Units	
			Urban Area	Township	Urban Area	Township	Urban Area	Township	Urban Area	Township
TRANSIT (CITIES ONLY)	$1,126	$1,035	$3,365	$0	$2,526	$0	$1,832	$0	$1,035	$0
TRANSIT (REGION-WIDE)	$1,034	$952	$3,095	$3,095	$2,324	$2,324	$1,686	$1,686	$952	$952
TRANSIT (DIFFERENTIATED) - CITIES	$1,113	$1,023	$3,325		$2,497		$1,811		$1,023	
TRANSIT (DIFFERENTIATED) - TOWNSHIPS	$557	$518		$1,684		$1,264		$917		$518
WASTE MANAGEMENT	$79	$79	$255	$255	$192	$192	$139	$139	$79	$79

(1) Based on Persons Per Unit Of:

Singles/Semis	*3.25*
Townhouses	*2.44*
Apartments	*1.77*
Lodging Units	*1.00*

As shown in Table 3, the calculated Waste Management residential charge ranges from $79 for a lodging house to $255 per single or semi-detached units throughout the Region.

For development in the Cities under the "Cities Only" approach, the Transit residential charge ranges from $1,035 for a lodging house to $3,365 per single or semi-detached residential unit. The calculated charges under this approach for townhouses and apartment units are $2,526 and $1,832 per unit, respectively.

Under the "Uniform Region-wide" approach, single and semi-detached units in both Cities and Townships will be charged $3,095 per unit. Townhouses will be charged at a rate of $2,324 per unit and apartments at $1,686 per unit. Lodging houses anywhere in the region under this approach would be subject to a charge of $952.

Finally, under the "Differentiated Approach", the development of singles and semi-detached units, townhouses, apartments and lodging houses in the Cities will be required to pay $3,325, $2,497, $1,811 or $1,023 per unit, respectively. Singles and semi-detached units in the Townships would be subject to a charge of $1,684, $1,264 per unit for Townhouses, $917 per apartment unit and $518 for lodging house units.

The calculated non-residential development charges rates are presented in Table 4. As with the residential charges, the calculated adjusted rate for new non-residential development is slightly higher than the unadjusted rates.

TABLE 4

REGION OF WATERLOO
2016 DEVELOPMENT CHARGES BACKGROUND STUDY
NON-RESIDENTIAL DEVELOPMENT CHARGES PER SQUARE METRE/SQUARE FOOT OF GFA

Service	Non-Residential Charge							
	Unadjusted Charge				Adjusted Charge			
	Urban Areas		Townships		Urban Areas		Townships	
	per m^2	per ft^2	per m^2	per ft^2	per m^2	per ft^2	per m^2	per ft^2
TRANSIT (CITIES ONLY)	$21.31	$1.98	$0.00	$0.00	$19.72	$1.83	$0.00	$0.00
TRANSIT (REGION-WIDE)	$15.15	$1.41	$15.15	$1.41	$14.02	$1.30	$14.02	$1.30
TRANSIT (DIFFERENTIATED)	$16.77	$1.56	$6.58	$0.61	$15.52	$1.44	$6.09	$0.57
WASTE MANAGEMENT	$0.07	$0.01	$0.07	$0.01	$0.07	$0.01	$0.07	$0.01

VII LONG-TERM CAPITAL AND OPERATING AND ASSET MANAGEMENT-RELATED COSTS

This section provides a brief examination of the long-term capital and operating costs as well as the asset management-related annual provisions for the capital facilities and infrastructure to be included in the development charges by-law. This examination is required as one of the features of the *DCA*.

A. TRANSIT SERVICES

By 2025, the annual asset management and operating cost provisions required for the maintenance of the development-related Transit capital program amount to $38.92 million. As shown in Table 5, this includes $29.60 million for Light Rapid Transit, which is being delivered through a Public-Private Partnership arrangement and has been incorporated into the Region's annual budgeting forecast.

Of the $26.90 million, $4.00 million relates to annual operating costs and $1.70 million for insurance. The balance of the costs are capital-related and include financing, maintenance and lifecycle costs. An additional $9.32 million is related to conventional transit (GRT) projects, of which $8.70 million is for annual operating costs and $622,000 relates to asset management lifecycle provisions.

Given that the Region has already accounted for the most significant share of this annual provision (LRT), dedicated property tax increases over the next seven years, and the increasing assessment base by 2025, it is determined that all assets included in this development charge study are financially sustainable over their full life cycle.

Additional details related to the operating impacts and asset management requirements for transit services are included in Appendix E.

Table 5 – Summary of Transit Services Maximum Annual Provision	
Capital Project Description	**Life Cycle AMP Annual Provision**
Light Rapid Transit	
Finance	$10,600,000
Maintenance	$4,500,000
Lifecycle	$8,800,000
Insurance	$1,700,000
Annual Operating Cost Impacts	$4,000,000
Subtotal Light Rapid Transit	*$29,600,000*
Conventional Transit	
Transit Garage, Plaza & Terminal	$256,000
Transit Fleet	$251,000
Technology Implementation	$115,000
Annual Operating Cost Impacts	$8,700,000
Subtotal Conventional Transit	*$9,322,000*
Total Annual Provision	**$38,922,000**

B. WASTE MANAGEMENT SERVICES

Table 6 summarizes the estimated increase in net operating costs that the Region will experience for additions associated with the planned capital program for Waste Management services. This estimate is based on a high-level analysis of operating cost impacts using the Region's 2016 budget. Currently, the cost per typical household for the provision of waste management services is estimated at $153 per household. As the Region is expecting an increase of 45,730 households over the next ten years, the net waste management operating costs are estimated to increase by nearly $7 million by 2025. It should be noted that a share of approximately 2 per cent of the total expenditures are related to contributions to reserves. Therefore, a share of the projected increases in annual operating expenditures may be related to asset life cycle costing and overlaps with the estimates included in the asset management plan analysis.

By 2025, the Region will need to fund an additional $1.51 million per annum in order to properly fund the full life-cycle costs of the new assets supported under this Development Charges By-Law. Annual life cycle provisions for the share of costs included in the development charge rate calculation total $813,000. The calculated life-cycle funding requirement equal of $813,000 equates to 1.57% of the Region's 2016 waste management total own source revenues of $51.8 million (tax levy of $38.2 million and user fees/charges of $13.6 million). The calculated annual funding

provision should be considered within the context of the Region's projected growth; over the next ten years (to 2025) the Region is projecting an increase of about 45,700 households, which represents an 18% increase over the existing base as well as approximately 39,000 new employees. This growth will have the effect of increasing the overall assessment base and additional user fee and charges revenues to offset the required capital asset provisions. As such, these calculated annual provisions are considered to be financially sustainable as it is expected that the increased capital asset management requirements can be absorbed by the tax and user base over the long-term. This analysis is shown on Table 7.

Additional details related to the operating impacts for waste management services are included in Appendix F.

TABLE 6

REGION OF WATERLOO
OPERATING COST ANALYSIS

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Waste Management Operating Costs	$576,111.8	$1,259,741.4	$1,958,180.4	$2,671,750.2	$3,400,778.9	$4,145,601.8	$4,838,411.0	$5,543,328.8	$6,262,154.4	**$6,996,692.2**
Total New HH Growth	*3,765*	*4,468*	*4,565*	*4,664*	*4,765*	*4,868*	*4,528*	*4,607*	*4,698*	*4,801*

Based on cost to average household of: $153.00

TABLE 7

REGION OF WATERLOO
SUMMARY OF CALCULATED ANNUAL PROVISIONS FOR FUTURE REPLACEMENT [(1)]
(in thousands of dollars)

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Curbside Seperated Organic Collection	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Scale Systems and Buildings	$0.0	$0.0	$0.8	$2.1	$3.7	$3.7	$3.7	$3.7	$3.7	$4.6
Materials Recycling Centre	$0.0	$1.5	$3.3	$4.1	$6.9	$9.1	$10.6	$11.0	$11.5	$12.0
Transfer Building Upgrade	$0.0	$0.1	$1.8	$5.8	$7.7	$9.7	$12.8	$15.9	$17.3	$17.3
Compost Pad Expansion	$0.0	$4.4	$4.4	$4.4	$8.7	$8.7	$8.7	$13.3	$13.3	$13.3
Scale Systems	$0.0	$0.0	$1.9	$2.3	$2.8	$4.3	$4.8	$5.2	$6.9	$10.3
Transfer Stations	$0.0	$4.6	$8.3	$15.5	$21.2	$33.1	$39.4	$39.4	$43.2	$43.2
New Vehicles	$0.0	$0.0	$58.7	$118.5	$228.9	$314.7	$461.3	$526.0	$645.5	$712.9
Total Annual Provision (in $000)	**$0.0**	**$10.7**	**$79.2**	**$152.9**	**$279.8**	**$383.4**	**$541.3**	**$614.6**	**$741.3**	**$813.5**

Notes:
(1) See Appendix F

APPENDIX A

DEVELOPMENT FORECAST

APPENDIX A

DEVELOPMENT FORECAST

This appendix provides details of the development forecast used to prepare the 2016 Transit and Waste Management Development Charges Background Study for the Region of Waterloo. The forecast method and key assumptions are discussed. The forecast results are presented in the following tables:

Table A Historical Development
- A.1 Population
- A.2 Households and Housing
- A.3 Employment and Non-Residential Floorspace

Table B Forecast Development
- B.1 Population, Households and Housing
- B.2 Employment and Non-Residential Floorspace

A. FORECAST APPROACH, KEY ASSUMPTIONS AND DEFINITIONS

The *Development Charges Act (DCA)* requires the Region to estimate "the anticipated amount, type and location of development" for which development charges may be imposed. The development forecast must cover both residential and non-residential development and be specific enough with regards to quantum, type, location and timing of development to allow the Region to prepare a reasonable development-related capital program. A ten-year development forecast, from 2016 to 2025, has been used for all the development charge eligible services in the Region.

The development forecast is based on similar forecasts prepared for the Region as part of its comprehensive *Development Charges Background Study, June 2014* (the 2014 RDC forecasts). Adjustments have been made to short-term growth prospects to account for slower than anticipated population and employment growth in recent years. Long term growth forecast targets are considered unaffected by these adjustments (see below).

The 2014 RDC forecasts are based on forecasts of development occurring within the Region's approved development areas. This is consistent with Provincial regulations

that require development charge forecasts be based on areas approved for development in a municipality's official plan.

The forecasts are premised on the Region achieving population and employment targets established by Table 1 of the Regional Official Plan (for 2031) which are consistent with population and employment forecasts for the Region under the Provincial *Growth Plan for the Greater Golden Horseshoe*.[1]

Development charges calculations in this study are based on master servicing plans and other capital development plans that are themselves based on the development forecasts shown here.

- For the waste management service, development charges are based on Region-wide forecasts.

- The Region-wide forecasts have been allocated to urban areas (collectively the Cities of Kitchener, Cambridge, and Waterloo) and rural areas (collectively the Townships of Wellesley, Wilmot, Woolwich and North Dumfries) for the purposes of calculating and considering area specific charges for transit.

The development forecasts are based on a range of data including Statistics Canada Census data, Canada Mortgage Housing Corporation (CMHC) housing market information, *Labour Force Survey* data, local municipal building permits and development application data. Studies of student populations were also used to establish a forecast of post secondary students and student housing.

While the forecasts are consistent with the Regional Official Plan and the *Growth Plan*, the definition of population used for the purposes of the development charges study incorporates:

- The population recorded in the Census ("Census population"). This definition does not include the Census net under-coverage (about 4% of the Census population) which represents those who were missed by the Census, and which is included in the definition of population used in the Regional Official Plan and the *Growth Plan*.

[1] 2031 population and employment targets of 729,000 and 366,000, respectively.

- An estimate of full-time post-secondary students who reside in off-campus housing but whose permanent residence is outside the Region. This student population is not counted by the Census. Full-time students are included in all population figures in this study because the need for municipal services is in part driven by development triggered by student growth.

Population figures shown in the development forecast represent mid-year estimates, with the exception of students which are based on fall term enrollment figures. Unit figures represent "occupied units", and are associated with the year in which they are anticipated to be occupied.

The "Total Census Employment" figures presented represent Statistics Canada place of work data. Place of work data record where people work rather than their place of residence. Employment is categorized as industrial, commercial, institutional, and other. The latter category includes work-at-home, no fixed workplace, and agriculture, and for the purposes of the development charge calculations, is considered not to require building floorspace for its activities.

B. HISTORICAL DEVELOPMENT IN THE REGION

Prior to 2009, the Region of Waterloo had experienced steady and sustained population, household and employment growth for many years. The growth was fuelled by a strong and diverse local economy and high levels of in-migration. Generally, employment growth and construction activity in the non-residential sector has been steady since 2001. *Labour Force Survey* data indicate that, as elsewhere in the Province, the 2008-2009 recession resulted in some job losses, particularly in the manufacturing sector.

1. Historical Residential Development

Historical population and housing figures presented in Tables A.1 and A.2 are derived from Statistics Canada Census data. For development charges purposes, a ten-year historical period of 2006 to 2015 is used for calculating service levels for the waste management service. Since 2011 was the year of the last available Census, figures for 2012 to 2015 are based on building permit activity and vacancy rate estimates. Statistics generated from the 2016 Census will not be available prior to 2017.

Table A.1 shows that population growth across the Region remained steady between 0.8% and 2.1% per annum over the historical period to 2008. Growth has slowed since 2009, with much of the slowdown occurring in the Cities, and has not yet rebounded to pre-recessionary levels.

The number of housing units in the Region has grown at a slightly higher rate than the population over the same period. As with the population, the rate of housing growth fell during the recessionary period but has started to recover (see Table A.2). The rate of growth in off-campus student housing, a substantial component of development in the Cities, has been higher than the overall rate of housing growth in recent years.

The overall market share of new single and semi-detached units has fallen in recent years, to a low of 24% of total construction in 2014. Growth in apartment housing has been particularly strong in recent years: in 2014 about 59% of all newly constructed units in the Region were apartments (see Table A.2).

2. Historical Non-Residential Development

Historical employment and non-residential building floorspace in the Region is presented in Table A.3. Drawing on Statistics Canada's *Labour Force Survey* information, Table A.3 shows that employment growth, which had been relatively steady prior to 2008, fell during the recession but has since risen. The net increase in employment in the ten-year period 2006 to 2015 is estimated at 47,900, with the majority of growth (34,420) occurring in the commercial sector and the industrial sector being the only sector exhibiting decline (-4,370).

The net increase in floorspace over the same ten-year period was 1.8 million m^2, with the majority of growth (926,150 m^2) being in commercial buildings. The net change in industrial floorspace (330,190 m^2) is in contrast to the decline in industrial employment over the period; a reflection of declining employment densities in existing buildings through vacancy, under-utilization, shift reductions, and capital-labour substitution.

C. FORECAST METHOD AND RESULTS

This section describes the method used to establish the ten-year development charges forecast for the period 2016 to 2025.

Development charges are levied on residential development as a charge per new unit. Therefore, for the residential forecast, a projection of both the *population growth*[2] as well as the *population in new housing units* is required.

- The *population growth* determines the need for additional facilities and provides the foundation for the development-related capital program.

[2] Commonly referred to as "net population growth" in the context of development charges.

- When calculating the development charge, however, the development-related net capital costs are spread over the total additional population that occupy new housing units. This *population in new units* represents the population from which development charges will be collected.

Development charges are levied on non-residential development as a charge per unit of gross floor area (GFA). As with the residential forecast, the non-residential forecast requires both a projection of *employment growth* as well as a projection of the *employment growth associated with new floorspace* in the Region.

1. Residential Development Forecast

The residential development forecast incorporates forecasts of population, households, and housing units by type. The population forecast is Census based and is anchored on the 2031 population forecast of 729,000 for the Region, established by the *Growth Plan*. Population to be housed in 'collective' dwellings (e.g. nursing homes) is forecast separately as this population is expected to grow more rapidly over the forecast period than the population in households due to aging of the population. The population forecast also gives consideration to post-secondary students that are not counted by the Census. In effect, the development charge population forecast is the sum of three independent forecasts of: household population, population in collectives, and students.

Table B.1 summarizes the population and household forecast for the Region, Cities and Townships between 2016 and 2025. The Region is forecast to grow by 103,295 persons and 45,730 households over the period. The higher rate of household growth compared to population growth is predicated on a slight decline in occupancy levels in existing housing units and a continuing shift to multi-residential development that typically has lower persons per unit (ppu).

The residential development charges calculation is based on a forecast of population growth in new housing units. Projections of housing by type are consistent with the amount, type and location of development planned for under the Regional Official Plan for the period 2016 to 2025. In general, residential unit growth is forecast to shift towards higher density housing. This is in keeping with recent shifts in unit type preference in the Region and Regional Official Plan policies aimed at achieving *Growth Plan* intensification targets and increased densities in greenfields.

The housing unit forecast is also shown in Table B.1. Population growth in new units is estimated by applying the following ppu to the housing unit forecast: 3.25 for single and semi-detached units; 2.44 for rows and other multiples; 1.77 for apartments; and 3.95 for off-campus student accommodation. The ppu estimates are based upon the occupancy patterns of similar unit types constructed in the Region between 1986 and 2006 and are consistent with those used in the preparation of the Regional Official Plan.

The total ten-year population growth in new units is forecast at 108,776 for the Region, 91,798 for the Cities, and 16,977 for the Townships.

The difference between the forecast population growth in new units in the Region (108,776) and the population growth (103,295) represents the declining population in existing 2015 dwellings (-5,481) over the next ten years.

2. Non-Residential Development Forecast

The employment forecast is anchored on the 2031 employment forecast of 366,000 for the Region established by the *Growth Plan*. Table B.2 shows that total Census employment (or "net" employment) is forecast to grow by 38,830 over the ten-year forecast period with the majority of growth being in the commercial (13,460 or 35%) and institutional (12,250 or 32%) sectors. Industrial employment is anticipated to reverse its recent decline and grow by 3,730 over the period (10% of total employment).

Non-residential development charges are calculated on a unit of gross floor area (GFA) basis. Therefore, a forecast of new non-residential building space has been developed. As with the residential forecast, the floorspace forecast covers the ten-year period from 2016 to 2025 for both waste management and transit services.

The floorspace forecast for industrial, commercial and institutional uses is based on historical floorspace trends and averages. The forecast also accounts for known or expected developments in the near- to medium-term as well as the long-term outlook for employment envisioned by the Regional Official Plan and *Growth Plan*.

An assumed floorspace per worker (FSW) for each employment category is then applied to the new floorspace forecast in order to estimate the number of associated employees. The following FSW assumptions have been used:

Industrial	80 m^2 per employee
Commercial	42 m^2 per employee
Institutional	50 m^2 per employee

These factors are consistent with those used by the Cities of Kitchener and Waterloo in their most recent development charges background studies as well as the Region's 2009 and 2014 development charges background studies.

The floorspace forecasts are provided in Table B.2. The total floorspace growth is forecast at 2,651,577 m^2 over the ten-year period of which the largest component relates to commercial development (980,472 m^2 or 37%) followed by institutional development (870,165 m^2 or 33%) and industrial development (800,940 m^2 or 30%). A significant amount of new industrial floorspace is anticipated to be generated by the development of some of the East Side Lands within the ten-year period.

The proportion of employment and floorspace growth in the Townships and the Cities is determined based on information from a range of sources, including recent building permits, plans of subdivision, and land capacity estimates (see Table B.2).

It is noted that the decline in existing industrial floorspace through demolitions, obsolescence, less intensive use, and shift reductions is expected to continue to be substantial. When taken together with the declining trend in new industrial construction, the net increase in floorspace and employment in this sector is forecast to be very small.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE A.1
HISTORICAL POPULATION

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-2015
Region											
Total Population with Students	**497,081**	504,141	511,511	516,304	521,109	**531,854**	538,616	543,057	548,234	556,707	
- Census Population	**478,121**	484,825	491,840	496,435	500,450	**507,245**	513,573	517,469	522,074	529,638	
- Student Population	**18,960**	19,316	19,671	19,869	20,659	**24,609**	25,043	25,588	26,161	27,069	
Total Population With Students Growth	**8,611**	7,060	7,371	4,793	4,805	**10,745**	6,763	4,441	5,177	8,473	68,237
Total Population With Students Growth %		1.4%	1.5%	0.9%	0.9%	**2.1%**	1.3%	0.8%	1.0%	1.5%	
Cities											
Total Population with Students	**442,447**	448,420	454,520	457,890	461,532	**469,626**	475,044	478,604	483,311	491,194	
- Census Population	**423,487**	429,104	434,849	438,021	440,873	**445,017**	450,001	453,016	457,151	464,125	
- Student Population	**18,960**	19,316	19,671	19,869	20,659	**24,609**	25,043	25,588	26,161	27,069	
Total Population With Students Growth	**7,657**	5,973	6,101	3,370	3,642	**8,094**	5,419	3,560	4,707	7,883	56,404
Total Population With Students Growth %		1.3%	1.4%	0.7%	0.8%	**1.8%**	1.2%	0.7%	1.0%	1.6%	
Townships											
Total Population with Students	**54,634**	55,721	56,991	58,414	59,577	**62,228**	63,572	64,453	64,923	65,513	
- Census Population	**54,634**	55,721	56,991	58,414	59,577	**62,228**	63,572	64,453	64,923	65,513	
- Student Population	**0**	0	0	0	0	**0**	0	0	0	0	
Total Population With Students Growth	**954**	1,087	1,270	1,423	1,163	**2,651**	1,344	881	470	590	11,833
Total Population With Students Growth %		2.0%	2.3%	2.5%	2.0%	**4.4%**	2.2%	1.4%	0.7%	0.9%	

Source: Statistics Canada, 2006 and 2011 Census; Statistics Canada and local municipal building permit data (for 2012 to 2015)

Note: Census population does not include an estimate of Census undercount.

Note: Student populations estimated by Region of Waterloo based on data from 3 institutions and Census custom cross-tabulation. Student figures represent estimate of full-time students less those who live in the Region (counted in the Census) plus those who leave to study elsewhere.

Note: Figures for inter-censal years are estimated.

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TABLE A.2
HISTORICAL HOUSEHOLDS AND HOUSING

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-2015
Region											
All Housing Units	**182,920**	186,047	189,397	191,534	193,786	**197,873**	200,938	203,029	205,539	209,189	
Occupied Housing Units (Census)	**178,120**	181,157	184,417	186,504	188,556	**191,643**	194,598	196,551	198,916	202,336	
- Singles/Semis	**113,725**	115,741	117,470	119,131	120,487	**122,310**	123,610	124,417	124,977	125,937	
- Rowhouses	**18,045**	18,327	18,968	19,426	19,721	**20,288**	20,761	20,977	21,392	22,411	
- Apartments and others	**46,350**	47,089	47,979	47,947	48,348	**49,045**	50,226	51,157	52,547	53,988	
Off-Campus Student Housing (Non-Census)	**4,800**	4,890	4,980	5,030	5,230	**6,230**	6,340	6,478	6,623	6,853	
Housing Unit Growth	**3,718**	3,127	3,350	2,137	2,252	**4,087**	3,065	2,091	2,511	3,649	29,987
Occupied Housing Units (Census)	**3,318**	3,037	3,260	2,087	2,052	**3,087**	2,955	1,953	2,366	3,419	27,534
- Singles/Semis	**1,720**	2,016	1,729	1,661	1,356	**1,823**	1,300	806	560	960	13,932
- Rowhouses	**699**	282	641	458	295	**567**	473	216	415	1,019	5,065
- Apartments and others	**899**	739	890	-32	401	**697**	1,181	931	1,390	1,440	8,537
Off-Campus Student Housing (Non-Census)	**400**	90	90	50	200	**1,000**	110	138	145	230	2,453
Share of New Occupied Housing Units (Census)											
- Singles/Semis	**52%**	66%	53%	80%	66%	**59%**	44%	41%	24%	28%	51%
- Rowhouses	**21%**	9%	20%	22%	14%	**18%**	16%	11%	18%	30%	18%
- Apartments and others	**27%**	24%	27%	-2%	20%	**23%**	40%	48%	59%	42%	31%
Cities											
All Housing Units	**163,955**					**176,580**					
Occupied Housing Units (Census)	**159,155**					**170,350**					
Off-Campus Student Housing (Non-Census)	**4,800**					**6,230**					
Townships											
All Housing Units	**18,965**					**21,293**					
Occupied Housing Units (Census)	**18,965**					**21,293**					
Off-Campus Student Housing (Non-Census)	**0**					**0**					

Source: Occupied Households based on Statistics Canada, 2006 and 2011 Census. Inter- and post-Censal figures based on local municipal building permit data.

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TABLE A.3
HISTORICAL EMPLOYMENT AND NON-RESIDENTIAL FLOORSPACE

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-2015
Region											
Total Census Employment	**259,310**	263,890	266,430	257,110	268,490	**276,240**	286,630	291,440	295,890	300,720	
- Industrial	**90,500**	89,660	87,750	79,790	82,540	**83,980**	85,070	85,230	85,230	84,920	-4,370
- Commercial	**89,860**	94,350	97,600	96,100	102,410	**106,680**	112,570	115,200	117,490	120,290	34,420
- Institutional	**40,850**	41,330	42,150	42,950	44,290	**45,550**	47,750	48,990	50,260	51,710	11,020
- Other	**38,100**	38,550	38,930	38,270	39,250	**40,030**	41,240	42,020	42,910	43,800	6,830
Total Census Employment Growth	**6,490**	4,580	2,540	-9,320	11,380	**7,750**	10,390	4,810	4,450	4,830	47,900
Total Census Employment Growth (%)		1.8%	1.0%	-3.5%	4.4%	**2.9%**	3.8%	1.7%	1.5%	1.6%	
Total Occupied Floorspace (m^2)	**12,891,800**	13,168,400	13,389,400	13,651,000	13,831,300	**13,861,170**	14,112,570	14,225,370	14,338,560	14,484,360	
- Industrial	**6,827,400**	6,889,900	6,966,900	7,043,700	7,078,900	**6,998,390**	7,002,240	6,998,100	7,007,320	7,058,490	330,190
- Commercial	**3,827,900**	3,988,500	4,074,900	4,204,000	4,289,700	**4,358,010**	4,489,000	4,528,150	4,583,220	4,632,250	926,150
- Institutional	**2,236,500**	2,290,000	2,347,600	2,403,300	2,462,700	**2,504,770**	2,621,330	2,699,120	2,748,020	2,793,620	579,520
Total Occupied Floorspace Growth (m^2)	**243,300**	276,600	221,000	261,600	180,300	**29,870**	251,400	112,800	113,190	145,800	1,835,860
Total Occupied Floorspace Growth (%)		2.1%	1.7%	2.0%	1.3%	**0.2%**	1.8%	0.8%	0.8%	1.0%	
Cities											
Total Census Employment	**234,318**	237,720	239,415	230,872	240,349	**247,019**	255,883	259,832	263,497	267,710	38,679
Total Occupied Floorspace (m^2)	**11,324,684**	11,551,615	11,728,012	11,944,599	12,081,141	**12,102,074**	12,311,054	12,393,339	12,488,542	12,614,576	1,481,165
Townships											
Total Census Employment	**24,992**	26,170	27,015	26,238	28,141	**29,221**	30,747	31,608	32,393	33,010	9,221
Total Occupired Floorspace (m^2)	**1,567,116**	1,616,785	1,661,388	1,706,401	1,750,159	**1,759,096**	1,801,516	1,832,031	1,850,018	1,869,784	354,695

Source: Statistics Canada, 2006 Census; Labour Force Survey; local municipal non-residential building permit data.

Note. 'Other' employment category includes 'No Fixed Work Place' and 'Work at Home' employment.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE A.4.1
HOUSEHOLD SIZE BY UNIT TYPE BY PERIOD OF CONSTRUCTION
REGION OF WATERLOO

	Period of Construction											
	Pre 1946	1946-1960	1961-1970	1971-1980	1981-1985	1986-1990	1991-1995	1996-2001	2001-2006	Pre 1996	1986-2006	Total
Singles												
Household Population	39,125	35,215	34,250	42,110	19,575	34,050	20,545	32,520	46,295	224,870	133,410	303,685
Households	13,900	14,480	12,655	14,430	6,210	10,305	6,185	9,630	13,975	78,165	40,095	101,770
Household Size	2.81	2.43	2.71	2.92	3.15	3.30	3.32	3.38	3.31	2.88	3.33	2.98
Semis												
Household Population	3,070	1,810	3,955	9,140	2,975	3,385	4,515	3,295	3,250	28,850	14,445	35,395
Households	1,100	635	1,415	3,060	940	1,145	1,530	1,085	1,135	9,825	4,895	12,045
Household Size	2.79	2.85	2.80	2.99	3.16	2.96	2.95	3.04	2.86	2.94	2.95	2.94
Singles & Semis												
Household Population	42,195	37,025	38,205	51,250	22,550	37,435	25,060	35,815	49,545	253,720	147,855	339,080
Households	15,000	15,115	14,070	17,490	7,150	11,450	7,715	10,715	15,110	87,990	44,990	113,815
Household Size	2.81	2.45	2.72	2.93	3.15	3.27	3.25	3.34	3.28	2.88	3.29	2.98
Rows												
Household Population	710	1,570	4,930	10,240	4,645	6,695	6,240	4,985	6,915	35,030	24,835	46,930
Households	265	530	1,730	3,815	1,700	2,525	2,290	2,155	3,030	12,855	10,000	18,040
Household Size	2.68	2.96	2.85	2.68	2.73	2.65	2.72	2.31	2.28	2.73	2.48	2.60
Apartments												
Household Population	10,960	11,070	17,355	18,770	7,895	6,740	5,025	2,510	4,245	77,815	18,520	84,570
Households	6,060	6,110	9,545	10,200	4,200	3,790	2,740	1,355	2,240	42,645	10,125	46,240
Household Size	1.81	1.81	1.82	1.84	1.88	1.78	1.83	1.85	1.90	1.82	1.83	1.83
All Units												
Household Population	53,865	49,665	60,490	80,260	35,090	50,870	36,325	43,310	60,705	366,565	191,210	470,580
Households	21,325	21,755	25,345	31,505	13,050	17,765	12,745	14,225	20,380	143,490	65,115	178,095
Household Size	2.53	2.28	2.39	2.55	2.69	2.86	2.85	3.04	2.98	2.55	2.94	2.64

Source: Statistics Canada, 2006 Census Special Run

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE A.4.2

HOUSEHOLD SIZE BY UNIT TYPE BY PERIOD OF CONSTRUCTION

CITIES OF KITCHENER, CAMBRIDGE, WATERLOO

	Period of Construction											
	Pre 1946	1946-1960	1961-1970	1971-1980	1981-1985	1986-1990	1991-1995	1996-2001	2001-2006	Pre 1996	1996-2006	Total
Singles												
Household Population	27,200	31,215	29,315	36,110	17,605	29,860	17,220	28,505	40,275	188,525	115,860	257,305
Households	10,255	12,875	10,845	12,410	5,535	8,950	5,185	8,325	12,015	66,055	34,475	86,395
Household Size	2.65	2.42	2.70	2.91	3.18	3.34	3.32	3.42	3.35	2.85	3.36	2.98
Semis												
Household Population	1,850	1,515	3,615	8,125	2,645	3,100	3,925	3,035	2,615	24,775	12,675	30,425
Households	765	540	1,275	2,710	865	1,040	1,330	980	895	8,525	4,245	10,400
Household Size	2.42	2.81	2.84	3.00	3.06	2.98	2.95	3.10	2.92	2.91	2.99	2.93
Singles & Semis												
Singles	29,050	32,730	32,930	44,235	20,250	32,960	21,145	31,540	42,890	213,300	128,535	287,730
Household Population	11,020	13,415	12,120	15,120	6,400	9,990	6,515	9,305	12,910	74,580	38,720	96,795
Households	2.64	2.44	2.72	2.93	3.16	3.30	3.25	3.39	3.32	2.86	3.32	2.97
Rows												
Household Population	665	1,545	4,890	10,160	4,615	6,660	6,160	4,830	6,690	34,695	24,340	46,215
Households	250	515	1,710	3,770	1,675	2,505	2,255	2,075	2,925	12,680	9,760	17,680
Household Size	2.66	3.00	2.86	2.69	2.76	2.66	2.73	2.33	2.29	2.74	2.49	2.61
Apartments												
Household Population	10,200	10,670	17,015	18,260	7,735	6,585	4,935	2,390	4,170	75,400	18,080	81,960
Households	5,750	5,945	9,340	9,965	4,105	3,690	2,700	1,285	2,220	41,495	9,895	45,000
Household Size	1.77	1.79	1.82	1.83	1.88	1.78	1.83	1.86	1.88	1.82	1.83	1.82
All Units												
Household Population	39,915	44,945	54,835	72,655	32,600	46,205	32,240	38,760	53,750	323,395	170,955	415,905
Households	17,020	19,875	23,170	28,855	12,180	16,185	11,470	12,665	18,055	128,755	58,375	159,475
Household Size	2.35	2.26	2.37	2.52	2.68	2.85	2.81	3.06	2.98	2.51	2.93	2.61

Source: Statistics Canada, 2006 Census Special Run

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE A.4.3

HOUSEHOLD SIZE BY UNIT TYPE BY PERIOD OF CONSTRUCTION

TOWNSHIPS OF NORTH DUMFRIES, WILMOT, WELLESLEY, WOOLWICH

	Period of Construction											
	Pre 1946	1946-1960	1961-1970	1971-1980	1981-1985	1986-1990	1991-1995	1996-2001	2001-2006	Pre 1996	1996-2006	Total
Singles												
Household Population	12,280	3,995	4,935	5,995	1,965	4,190	3,325	4,010	6,005	36,685	17,530	46,700
Households	3,650	1,585	1,810	2,035	670	1,355	1,010	1,310	1,960	12,115	5,635	15,385
Household Size	3.36	2.52	2.73	2.95	2.93	3.09	3.29	3.06	3.06	3.03	3.11	3.04
Semis												
Household Population	1,210	190	315	1,000	290	240	585	170	625	3,830	1,620	4,625
Households	325	110	120	350	75	110	195	100	240	1,285	645	1,625
Household Size	3.72	1.73	2.63	2.86	3.87	2.18	3.00	1.70	2.60	2.98	2.51	2.85
Singles & Semis												
Singles	13,490	4,185	5,250	6,995	2,255	4,430	3,910	4,180	6,630	40,515	19,150	51,325
Household Population	3,975	1,695	1,930	2,385	745	1,465	1,205	1,410	2,200	13,400	6,280	17,010
Households	3.39	2.47	2.72	2.93	3.03	3.02	3.24	2.96	3.01	3.02	3.05	3.02
Rows												
Household Population	0	0	0	50	0	40	20	150	205	110	415	465
Households	15	30	15	35	20	15	25	80	100	155	220	335
Household Size	0.00	0.00	0.00	1.43	0.00	2.67	0.80	1.88	2.05	0.71	1.89	1.39
Apartments												
Household Population	560	280	225	370	110	90	0	50	0	1,635	140	1,685
Households	315	165	205	225	85	80	40	45	20	1,115	185	1,180
Household Size	1.78	1.70	1.10	1.64	1.29	1.13	0.00	1.11	0.00	1.47	0.76	1.43
All Units												
Household Population	14,050	4,465	5,475	7,415	2,365	4,560	3,930	4,380	6,835	42,260	19,705	53,475
Households	4,305	1,890	2,150	2,645	850	1,560	1,270	1,535	2,320	14,670	6,685	18,525
Household Size	3.26	2.36	2.55	2.80	2.78	2.92	3.09	2.85	2.95	2.88	2.95	2.89

Source: Statistics Canada, 2006 Census Special Run

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE B.1
POPULATION AND HOUSING FORECAST SUMMARY

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2016-2025
Region											
Total Population With Students	**565,338**	575,417	585,685	596,145	606,801	**617,656**	627,989	638,463	649,120	660,002	
Total Population With Students Growth	**8,630**	10,080	10,268	10,460	10,656	**10,855**	10,333	10,474	10,657	10,883	103,295
Total Population With Students Growth %	**1.6%**	1.8%	1.8%	1.8%	1.8%	**1.8%**	1.7%	1.7%	1.7%	1.7%	
Total Housing Units	**212,954**	217,422	221,987	226,651	231,416	**236,284**	240,812	245,420	250,118	254,919	45,730
Occupied Units (Census)	**205,704**	210,166	214,725	219,383	224,142	**229,004**	233,522	238,130	242,828	247,619	45,283
- Singles/Semis	**126,945**	128,294	129,686	131,121	132,601	**134,128**	135,536	136,960	138,402	139,860	13,923
- Rowhouses	**22,984**	23,758	24,563	25,400	26,270	**27,174**	28,014	28,871	29,745	30,636	8,225
- Apartments and others	**55,774**	58,114	60,477	62,863	65,271	**67,702**	69,972	72,298	74,681	77,122	23,135
Off-Campus Student Housing (Non-Census)	**7,250**	7,256	7,262	7,268	7,274	**7,280**	7,290	7,290	7,290	7,300	447
PPU in New Units											
- Singles/Semis	**3.25**	3.25	3.25	3.25	3.25	**3.25**	3.25	3.25	3.25	3.25	
- Rowhouses	**2.44**	2.44	2.44	2.44	2.44	**2.44**	2.44	2.44	2.44	2.44	
- Apartments and others	**1.77**	1.77	1.77	1.77	1.77	**1.77**	1.77	1.77	1.77	1.77	
Off-Campus Student Housing (Non-Census)	**3.95**	3.95	3.95	3.95	3.95	**3.95**	3.95	3.95	3.95	3.95	
Population Growth in New Units	**9,607**	10,648	10,854	11,064	11,277	**11,495**	10,683	10,837	11,035	11,275	108,776
- Singles/Semis	**3,643**	4,772	4,820	4,867	4,915	**4,962**	4,576	4,630	4,685	4,740	46,608
- Rowhouses	**1,521**	2,016	2,062	2,109	2,157	**2,207**	2,051	2,091	2,132	2,174	20,521
- Apartments and others	**2,875**	3,837	3,948	4,064	4,182	**4,303**	4,018	4,117	4,218	4,321	39,882
Off-Campus Student Housing (Non-Census)	**1,568**	24	24	24	24	**24**	40	0	0	40	1,766
Cities											
Total Population With Students	**499,512**	508,177	517,078	526,139	535,308	**544,688**	553,633	562,621	571,833	581,228	
Total Population With Students Growth	**8,317**	8,666	8,901	9,061	9,169	**9,380**	8,945	8,988	9,212	9,396	90,034
Total Population With Students Growth %	**1.7%**	1.7%	1.8%	1.8%	1.7%	**1.8%**	1.6%	1.6%	1.6%	1.6%	
Total Housing Unit Growth	**3,618**	3,876	3,929	4,023	4,115	**4,234**	3,922	4,002	4,094	4,173	39,987
Population Growth in New Units	**9,172**	8,898	8,974	9,169	9,356	**9,621**	8,892	9,049	9,249	9,418	91,798
Townships											
Total Population With Students	**65,826**	67,240	68,607	70,006	71,493	**72,968**	74,356	75,842	77,287	78,774	
Total Population With Students Growth	**313**	1,414	1,367	1,399	1,487	**1,475**	1,388	1,486	1,445	1,487	13,261
Total Population With Students Growth %	**0.5%**	2.1%	2.0%	2.0%	2.1%	**2.1%**	1.9%	2.0%	1.9%	1.9%	
Total Housing Unit Growth	**147**	592	636	641	650	**634**	606	605	604	628	5,743
Population Growth in New Units	**435**	1,750	1,880	1,895	1,922	**1,874**	1,791	1,789	1,786	1,856	16,977

Source: Region of Waterloo projections based on: Schedule 3, Growth Plan for the Greater Golden Horseshoe; Regional Official Plan (2010) and supporting documents; and building permits issued to 2015.

REGION OF WATERLOO DEVELOPMENT CHARGE STUDY - 2016

TABLE B.2
EMPLOYMENT AND NON-RESIDENTIAL FLOORSPACE FORECAST SUMMARY

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2016-2025
Region											
Total Census Employment	**304,470**	308,400	312,970	318,050	322,320	**325,470**	328,930	332,450	336,040	339,550	
- Industrial	**84,930**	85,110	85,540	86,390	87,080	**87,320**	87,600	87,900	88,250	88,650	3,730
- Commercial	**122,060**	123,710	125,590	127,480	128,870	**129,710**	130,750	131,790	132,820	133,750	13,460
- Institutional	**52,820**	54,040	55,330	56,640	57,860	**59,040**	60,260	61,490	62,740	63,960	12,250
- Other	**44,660**	45,540	46,510	47,540	48,510	**49,400**	50,320	51,270	52,230	53,190	9,390
Total Census Employment Growth	**3,750**	3,930	4,570	5,080	4,270	**3,150**	3,460	3,520	3,590	3,510	38,830
Total Census Employment Growth (%)	**1.2%**	1.3%	1.5%	1.6%	1.3%	**1.0%**	1.1%	1.1%	1.1%	1.0%	
Total Occupied Floorspace (m2)	**14,671,960**	14,867,085	15,076,715	15,292,242	15,515,701	**15,745,622**	15,979,534	16,219,769	16,466,082	16,718,636	
- Industrial	**7,140,480**	7,177,404	7,221,266	7,266,358	7,314,986	**7,367,181**	7,422,727	7,480,814	7,541,168	7,603,982	
- Commercial	**4,683,770**	4,765,201	4,850,493	4,940,285	5,033,427	**5,129,308**	5,227,360	5,327,263	5,428,995	5,532,440	
- Institutional	**2,847,710**	2,924,480	3,004,956	3,085,599	3,167,288	**3,249,133**	3,329,447	3,411,692	3,495,919	3,582,214	
- Other	**0**	0	0	0	0	**0**	0	0	0	0	
Additional Incremental Floorspace (m^2)	**231,190**	237,141	251,116	257,167	264,815	**271,036**	274,962	281,611	288,027	294,512	2,651,577
- Industrial	**108,725**	61,912	69,276	70,697	74,219	**77,616**	80,684	83,373	85,912	88,526	800,940
- Commercial	**60,172**	90,360	93,173	97,711	100,742	**103,515**	105,796	107,766	109,702	111,535	980,472
- Institutional	**62,293**	84,869	88,667	88,759	89,854	**89,905**	88,482	90,472	92,413	94,451	870,165
Floorspace per Employee (sq.m. of new construction)											
- Industrial	**85**	85	85	85	85	**85**	85	85	85	85	
- Commercial	**42**	42	42	42	42	**42**	42	42	42	42	
- Institutional	**50**	50	50	50	50	**50**	50	50	50	50	
Annual Employment Growth in New Construction	**3,958**	4,577	4,807	4,933	5,069	**5,176**	5,238	5,356	5,471	5,586	50,171
- Industrial	**1,279**	728	815	832	873	**913**	949	981	1,011	1,041	9,423
- Commercial	**1,433**	2,151	2,218	2,326	2,399	**2,465**	2,519	2,566	2,612	2,656	23,345
- Institutional	**1,246**	1,697	1,773	1,775	1,797	**1,798**	1,770	1,809	1,848	1,889	17,403
Cities											
Total Census Employment	**271,013**	274,520	278,615	283,179	286,964	**289,801**	292,893	296,056	299,335	302,529	34,818
Additional Incremental Floorspace (m^2)	**201,364**	206,563	218,807	224,166	230,877	**236,351**	239,841	245,723	251,419	257,193	2,312,304
Annual Employment Growth in New Construction	**3,447**	3,987	4,188	4,300	4,419	**4,514**	4,569	4,674	4,776	4,878	43,752
Townships											
Total Census Employment	**33,457**	33,880	34,355	34,871	35,356	**35,669**	36,037	36,394	36,705	37,021	4,012
Additional Incremental Floorspace (m^2)	**29,826**	30,578	32,309	33,001	33,938	**34,685**	35,121	35,888	36,608	37,319	339,273
Annual Employment Growth in New Construction	**511**	590	618	633	650	**662**	669	683	695	708	6,419

Source: Region of Waterloo projections based on: Schedule 3, Growth Plan for the Greater Golden Horseshoe; Regional Official Plan (2010) and supporting documents; and building permits issued to 2015.

APPENDIX B

WASTE MANAGEMENT TECHNICAL APPENDIX

APPENDIX B

WASTE MANAGEMENT TECHNICAL APPENDIX

This appendix provides the detailed analysis undertaken to establish the development charge rates for development charge-eligible Waste Management services in the Region of Waterloo. The appendix contains three tables. An overview of the content and purpose of each of the tables is given below.

TABLE 1 HISTORICAL SERVICE LEVELS 2006-2015

Table 1 presents the data used to determine the ten year historical service level. For all services other than transit, the *Development Charges Act* (*DCA*) and *Ontario Regulation 82/98* require that development charges be set at a level no higher than the average service level provided in the Region over the ten year period immediately preceding the preparation of the background study, on a service by service basis. For the purpose of the waste management development charge calculation, the historical inventory period has been defined as 2006 to 2015.

O. Reg. 82/98 requires that when defining and determining historical service levels both the quantity and quality of service be taken into consideration. In most cases, the service levels are initially established in quantitative terms. For example, service levels for buildings are presented in terms of square feet per unit. The qualitative aspect is introduced by considering the monetary value of the facility or service. In the case of buildings, for example, the cost would be shown in terms of dollars per square foot to replace or construct a facility of the same quality. This approach helps to ensure that the capital facilities that are to be charged to new development reflect not only the quantity (number and size) but also the quality (value or cost) of service provided by the Region in the past. Both the quantitative and qualitative aspects of service levels used in the current analysis are based on information provided by Regional staff. This information is generally based on historical records and experience with costs to acquire or construct similar facilities, equipment and infrastructure.

Table 1 (pages 1-2) displays the ten-year historical inventory for buildings, land, vehicles, and furniture and equipment for Waste Management collection, diversion (recycling), and organics processing services. Diversion services are provided at sites in Cambridge, whereas both diversion and landfill operations occur in Waterloo. Organics

processing is undertaken at a facility owned and operated by the City of Guelph, for which the Region pays the City an annual fee. The area of the facilities at these sites relating to Regional diversion and organics activities (i.e. removing landfill components) totals 115,263 ft^2 and has a current replacement value of $17.3 million. Land associated with these activities totals 30.1 hectares and is valued at $13.6 million. The 79 vehicles currently used for waste collection add another $18.5 million to the value of the inventory.[1] Finally, furniture and equipment located at the sites are valued at $7.9 million.

The final page of Table 1 shows the calculation of the "maximum allowable funding envelope", net of uncommitted excess capacity. The maximum allowable is defined as the ten year historical service level (expressed as $/capita) multiplied by the forecast increase in net population over the planning period. The resulting figure is the value of capital infrastructure that must be constructed for the Waste Management service so that the ten year historical service level is maintained.

The 2015 full replacement value of the inventory of capital assets for Regional Waste Management collection, diversion and organics is $57.2 million and the ten year historical average service level is $94.88 per capita (page 3). The historical service level, multiplied by the ten year forecast Regional net population growth, results in a ten year maximum allowable $9.8 million that can be considered for recovery from development charges.

There is also a requirement in the *DCA* to consider "excess capacity" within the Region's existing infrastructure that may be available to partially meet future servicing requirements. If Council has expressed its intent, before or at the time the capacity was created, to recoup the cost of providing the capacity from new development, it is considered "committed excess capacity" under the *DCA* and the associated capital is eligible for recovery. Should uncommitted excess capacity exist it will be determined whether or not this capacity will be available to service new development and, if so, appropriate adjustments will be made to the calculations.

[1] Waste collection is provided under contracts and, as of March 2017, will be provided by Enterra (7 years), Miller Waste (7 years), and External Hauling (5 years). Historical vehicle counts are based on current vehicle replacement costs, vehicle capacity (tonnage per truck), and historical tonnage collected.

In planning and approving the works in the development-related capital program, the Region has effectively accounted for any excess capacity that may be available to meet future servicing requirements. Moreover, the use of net population growth to determine the development-related benefits of project in the capital program ensures that development charge funds pay no more than an appropriate pro-rata share of future investment. No adjustment for uncommitted excess capacity has therefore been made to the maximum allowable funding envelope for eligible Waste Management services.

Finally, Waste Management capital costs must be reduced by ten per cent as per the *DCA*. The resulting net maximum allowable funding envelope brought forward to the development charges calculation is reduced to $8.8 million.

TABLE 2 2016 – 2025 DEVELOPMENT-RELATED CAPITAL PROGRAM & CALCULATION OF THE UNADJUSTED DEVELOPMENT CHARGE

The *DCA* requires that Council express its intent to provide future capital facilities to support future development. Based on the development forecasts presented in Appendix A, a development-related capital program which sets out the projects required to service anticipated development for the ten-year period from 2016 to 2025 has been developed and is consistent with the Region's 2016-2025 Capital Budget, as approved by Council. The program includes a number of facility and equipment expansions and upgrades at each site that will enhance the capacity of the service to process a greater amount of waste. The projects include; upgrades to the Materials Recycling Centre, Transfer Building and Waterloo Transfer Station, improvements to the scale systems, new vehicle acquisitions and the implementation of curbside separated organics collection.

All facility expansion projects in the program are included in the Region's approved capital budget and 9-year capital forecast. Provision is also made for the increased capital cost required to purchase additional vehicles through the collection contracts to maintain the historical average level of service to 2025. The gross cost of all projects amounts to $30.4 million.

To determine the share of the program that is eligible for recovery through development charges, several deductions must be made. No grants, subsidies or alternative funding sources have been identified and the net cost of the capital program remains $30.4 million.

A benefit to existing share represents that portion of a capital project that will benefit the existing community. The benefit to existing share of the capital program is not deemed to be development-related and is therefore removed from the development charge calculation. The capital cost for benefit to existing shares will require funding from non-development charge sources, typically property taxes or user fees.

Given the qualitative and system-wide benefits of the capital works, the benefits of the development-related capital program are considered to accrue to all residents in the Region—both existing and new—over the next ten years. A development-related share of costs (16 per cent) is determined using the ratio of net population growth over the ten year period (103,295) over the 2025 population base (660,002). The remaining costs are considered to be ineligible for development charge funding as a benefit to existing share. No benefit to existing shares have been calculated for vehicle purchases as these represent investments over the 2016-2025 planning period in order to maintain historical service levels (i.e. to meet the increased need for service arising from development only). Altogether, a benefit to existing share of $20.7 million has been removed from the development charge calculation.

When calculating development charges for Waste Management services, the development-related net capital cost must be reduced by 10% (*DCA* s.5.(1)8.). The remaining $9.7 million becomes subject to the ten per cent reduction. As with benefit to existing shares, the 10% mandatory reduction must be funded from non-development charge sources.

The discounted development-related net capital cost of $8.7 million, less than the maximum allowable funding envelope calculated on the final pages of Table 1, is eligible for development charge recovery.

Calculation of the Unadjusted Development Charge Rates

The section below the capital program (Table 2, page 2) displays the calculation of the "unadjusted" development charge rates. The term "unadjusted" development charge is used to distinguish the charge that is calculated prior to cash flow financing considerations. The cash flow analysis is shown in Table 3.

The first step when determining the unadjusted development charge rate is to allocate the development-related net capital cost between the residential and non-residential sectors. For all eligible Waste Management services the development-related costs have

been allocated 98 per cent residential ($8.6 million) and 2 per cent non-residential ($174,709). This ratio is based on estimates provided by staff of the volume of waste processed from each sector.[2]

The residential share of the 2016-2025 development charge eligible costs are then divided by the forecast population growth in new units. This gives the unadjusted residential development charge of $78.70 per capita. The non-residential development-related net capital costs are divided by the forecast increase in non-residential gross floor area (GFA). This yields a charge of $0.07 per m^2 of new non-residential GFA.

TABLE 3 CASH FLOW ANALYSIS

A cash flow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast, the analysis calculates the development charges rate that is required to finance the net development-related capital spending plan including provisions for any borrowing costs or interest earnings on the reserve funds. The cash flow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible.

Opening cash balances in the cash flow analysis reflect the reserve fund balances that are available to fund development-related capital works as at 31 December, 2015. In the case of eligible Waste Management services no such reserve funds exist.

In order to determine appropriate development charges rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An inflation rate of 2.0% is used for the funding requirements, and interest rates of 5.5% (negative balance) and 3.5% (positive balance) are used for borrowing/earnings on the funds. This yields effective real discount rates of 3.5% and 1.5% respectively.

Table 3 displays the results of the cash flow analysis and provides the adjusted or final per capita residential and per square foot (of GFA) non-residential development charges. After cash flow consideration, the residential calculated charge decreases

[2] Non-residential waste includes collection only from select Business Improvement Areas and some small scale retail development.

slightly to $78.50 per capita. The non-residential charge remains the same at $0.07 per m^2.

WASTE MANAGEMENT						
10-year Hist. Service Level	2016 - 2025 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
$/capita	Total	Net DC Recoverable	$/capita	$/$m^2$	**$/capita**	**$/$m^2$**
$94.88	$30,364,883	$8,735,448	$78.70	$0.07	**$78.50**	**$0.07**

APPENDIX B
TABLE 1 - PAGE 1

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
WASTE MANAGEMENT

	# of Square Feet										UNIT COST
BUILDINGS	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**($/sq.ft.)**
Site 1 Cambridge											
Compost and Organics Receiving	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	$13
Waste Transfer Station (30% diversion portion only)	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020	7,020	$105
Scales (30% diversion portion only)	7,200	7,200	11,400	11,400	11,400	11,400	11,400	11,400	11,400	11,400	$11
Site 2 - Waterloo											
Main Scales (36% diversion portion only)						165	165	165	165	165	$15
Administration Building (70% diversion portion only)	5,520	5,520	5,520	5,520	5,520	5,520	5,520	5,520	5,520	5,520	$178
Education Centre (50% diversion portion only)	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	$90
Materials Recycling Centre	38,000	38,000	38,000	53,000	53,000	53,000	53,000	53,000	53,000	53,000	$169
Small Vehicle Transfer Station/Gate 2 Scales (36% diversion portion	394	394	394	394	394	394	394	394	394	394	$170
Municipal Hazardous or Special Waste Building	1,216	1,216	1,216	1,216	1,216	1,216	1,216	1,216	1,216	1,216	$172
Green Bin Storage Bunkers								2,067	2,067	2,067	$128
Site 3 - Green Bin Facility (Guelph)											
Organics Processing - ROW capacity (of total of 100,000 sq.ft.)	2,107	2,107	5,633	16,673	25,827	31,737	30,190	29,973	29,077	31,457	$184
Site 4 - Niagara											
Total (sq.ft.)	**64,481**	**64,481**	**72,208**	**98,248**	**107,401**	**113,476**	**111,929**	**113,780**	**112,883**	**115,263**	
Total ($000)	**$9,040.6**	**$9,040.6**	**$9,735.4**	**$14,296.2**	**$15,980.4**	**$17,070.3**	**$16,785.7**	**$17,010.2**	**$16,845.2**	**$17,283.2**	

	# of Hectares										UNIT COST
LAND	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**($/ha)**
Site 1	17.5	17.5	17.6	17.6	17.6	17.6	17.6	17.6	17.6	17.6	$450,000
Site 2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	$450,000
Site 3	0.0	0.0	0.1	0.2	0.3	0.4	0.4	0.4	0.4	0.4	$450,000
Site 4											
Total (ha)	**29.8**	**29.8**	**29.8**	**30.0**	**30.1**	**30.1**	**30.1**	**30.1**	**30.1**	**30.1**	
Total ($000)	**$13,387.5**	**$13,387.5**	**$13,424.3**	**$13,484.3**	**$13,534.0**	**$13,566.1**	**$13,557.7**	**$13,556.6**	**$13,551.7**	**$13,564.62**	

APPENDIX B
TABLE 1 - PAGE 2

REGION OF WATERLOO
INVENTORY OF CAPITAL ASSETS
WASTE MANAGEMENT

VEHICLES	# of Vehicles										UNIT COST
Description	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	($/vehicle)
Trucks (Contract)	9	9	10	11	11	12	11	12	12	12	$361,600
Trucks (Contract)	45	45	49	52	54	56	55	57	57	58	$224,052
Highway Tractors (Contract)	4	4	4	5	5	5	5	5	5	5	$169,500
Cambridge (Loader # 3565,3563,3567, roll-off truck 3238)[1]	4	4	4	4	4	4	4	4	4	4	$0
Waterloo (Loader # 3548,3547, roll-off truck 3239)	1	1	1	1	1	1	1	1	1	1	$417,216
Total (#)	**62**	**62**	**68**	**73**	**75**	**78**	**76**	**79**	**79**	**79**	
Total ($000)	**$14,303.4**	**$14,303.4**	**$15,677.0**	**$16,819.2**	**$17,465.1**	**$18,040.0**	**$17,696.6**	**$18,375.8**	**$18,314.8**	**$18,456.3**	

1. Cambridge vehicles all have useful lives of 6 years or less.

FURNITURE & EQUIPMENT	# of Furniture & Equipment										UNIT COST
Description	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	($/unit)
Screener	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	$847,500
Grinder	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	$847,500
City of Guelph	0.02	0.02	0.06	0.17	0.26	0.32	0.30	0.30	0.29	0.31	$12,613,019
Materials Recycling Centre				1.00	1.00	1.00	1.00	1.00	1.00	1.00	$3,560,926
Total (#)	**0.44**	**0.44**	**0.47**	**1.58**	**1.67**	**1.73**	**1.72**	**1.72**	**1.71**	**1.73**	
Total ($000)	**$618.8**	**$618.8**	**$1,063.7**	**$6,017.1**	**$7,171.6**	**$7,917.0**	**$7,721.9**	**$7,694.6**	**$7,581.5**	**$7,881.7**	

APPENDIX B
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REGION OF WATERLOO
CALCULATION OF SERVICE LEVELS
WASTE MANAGEMENT

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Historical Population	497,081	504,141	511,511	516,304	521,109	531,854	538,616	543,057	548,234	556,707

INVENTORY SUMMARY ($000)

Buildings	$9,040.6	$9,040.6	$9,735.4	$14,296.2	$15,980.4	$17,070.3	$16,785.7	$17,010.2	$16,845.2	$17,283.2
Land	$13,387.5	$13,387.5	$13,424.3	$13,484.3	$13,534.0	$13,566.1	$13,557.7	$13,556.6	$13,551.7	$13,564.6
Vehicles	$14,303.4	$14,303.4	$15,677.0	$16,819.2	$17,465.1	$18,040.0	$17,696.6	$18,375.8	$18,314.8	$18,456.3
Furniture & Equipment	$618.8	$618.8	$1,063.7	$6,017.1	$7,171.6	$7,917.0	$7,721.9	$7,694.6	$7,581.5	$7,881.7
Total ($000)	**$37,350.4**	**$37,350.4**	**$39,900.4**	**$50,616.7**	**$54,151.1**	**$56,593.5**	**$55,762.0**	**$56,637.2**	**$56,293.2**	**$57,185.8**

SERVICE LEVELS ($/capita)

											10 Year Average Service Level
Buildings	$18.19	$17.93	$19.03	$27.69	$30.67	$32.10	$31.16	$31.32	$30.73	$31.05	$26.99
Land	$26.93	$26.56	$26.24	$26.12	$25.97	$25.51	$25.17	$24.96	$24.72	$24.37	$25.65
Vehicles	$28.77	$28.37	$30.65	$32.58	$33.52	$33.92	$32.86	$33.84	$33.41	$33.15	$32.11
Furniture & Equipment	$1.24	$1.23	$2.08	$11.65	$13.76	$14.89	$14.34	$14.17	$13.83	$14.16	$10.13
Total ($/capita)	**$75.14**	**$74.09**	**$78.00**	**$98.04**	**$103.92**	**$106.41**	**$103.53**	**$104.29**	**$102.68**	**$102.72**	**$94.88**
											(A)

REGION OF WATERLOO
CALCULATION OF MAXIMUM ALLOWABLE
WASTE MANAGEMENT

10-Year Funding Envelope Calculation		
10 Year Average Service Level 2006 - 2015	$94.88	(A)
Net Population Growth in Region 2016 - 2025	103,295	(B)
Maximum Allowable Funding Envelope	$9,800,794	(C) = (A) x (B)
Less: Uncommitted Excess Capacity	$0	(D)
Less: 10% Legislated Reduction	$980,079	(E) = 10% reduction
Discounted Maximum Allowable Funding Envelope	**$8,820,715**	(F) = (C) - (D) - (E)

APPENDIX B
TABLE 2 - PAGE 1

REGION OF WATERLOO
2016 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

				(C)	(D)	(E) = (C) - (D)	(F)	(G) = (E) - (F) * 10%	(H) = (E) - (F) - (G)	(I) = (H) up to sum of (B)	(J) = (I) - (H)	(K) = (I) + (J)
										Development-Related Costs		
Project #		Project Description	Timing	Total Project Cost	Less Grants/ Subsidies/ Recoveries	Net Cost	Replacement and Benefit to Existing Share	10% Reduction	Total Development-Related Costs	2016-2025	Post 2025 or Service Level Increase	Total
	1.00	**WASTE MANAGEMENT**										
01004	1.1	Curbside Separated Organics Collection										
			2016	$ 880,000	$ -	$ 880,000	$ 742,274	$ 13,773	$ 123,954	$ 123,954	$ -	$ 123,954
			2017	$ 300,000	$ -	$ 300,000	$ 253,048	$ 4,695	$ 42,257	$ 42,257	$ -	$ 42,257
			2018	$ 300,000	$ -	$ 300,000	$ 253,048	$ 4,695	$ 42,257	$ 42,257	$ -	$ 42,257
			2019	$ 835,000	$ -	$ 835,000	$ 704,317	$ 13,068	$ 117,615	$ 117,615	$ -	$ 117,615
01005	1.2	Scale System & Building										
			2017	$ 219,000	$ -	$ 219,000	$ 184,725	$ 3,428	$ 30,848	$ 30,848	$ -	$ 30,848
			2018	$ 364,000	$ -	$ 364,000	$ 307,031	$ 5,697	$ 51,272	$ 51,272	$ -	$ 51,272
			2019	$ 416,000	$ -	$ 416,000	$ 350,893	$ 6,511	$ 58,596	$ 58,596	$ -	$ 58,596
			2024	$ 219,000	$ -	$ 219,000	$ 184,725	$ 3,428	$ 30,848	$ 30,848	$ -	$ 30,848
01084	1.3	Materials Recycling Centre										
			2016	$ 554,000	$ -	$ 554,000	$ 467,295	$ 8,670	$ 78,034	$ 78,034	$ -	$ 78,034
			2017	$ 629,000	$ -	$ 629,000	$ 530,557	$ 9,844	$ 88,599	$ 88,599	$ -	$ 88,599
			2018	$ 255,000	$ -	$ 255,000	$ 215,091	$ 3,991	$ 35,918	$ 35,918	$ -	$ 35,918
			2019	$ 935,000	$ -	$ 935,000	$ 788,666	$ 14,633	$ 131,701	$ 131,701	$ -	$ 131,701
			2020	$ 724,000	$ -	$ 724,000	$ 610,689	$ 11,331	$ 101,980	$ 101,980	$ -	$ 101,980
			2021	$ 510,000	$ -	$ 510,000	$ 430,181	$ 7,982	$ 71,837	$ 71,837	$ -	$ 71,837
			2022	$ 122,000	$ -	$ 122,000	$ 102,906	$ 1,909	$ 17,184	$ 17,184	$ -	$ 17,184
			2023	$ 149,000	$ -	$ 149,000	$ 125,680	$ 2,332	$ 20,988	$ 20,988	$ -	$ 20,988
			2024	$ 153,000	$ -	$ 153,000	$ 129,054	$ 2,395	$ 21,551	$ 21,551	$ -	$ 21,551
			2025	$ 500,000	$ -	$ 500,000	$ 421,746	$ 7,825	$ 70,428	$ 70,428	$ -	$ 70,428
01104	1,4	Transfer Building Upgrade										
			2016	$ 48,000	$ -	$ 48,000	$ 40,488	$ 751	$ 6,761	$ 6,761	$ -	$ 6,761
			2017	$ 587,000	$ -	$ 587,000	$ 495,130	$ 9,187	$ 82,683	$ 82,683	$ -	$ 82,683
			2018	$ 1,380,000	$ -	$ 1,380,000	$ 1,164,020	$ 21,598	$ 194,382	$ 194,382	$ -	$ 194,382
			2019	$ 624,000	$ -	$ 624,000	$ 526,340	$ 9,766	$ 87,894	$ 87,894	$ -	$ 87,894
			2020	$ 684,000	$ -	$ 684,000	$ 576,949	$ 10,705	$ 96,346	$ 96,346	$ -	$ 96,346
			2021	$ 991,000	$ -	$ 991,000	$ 835,901	$ 15,510	$ 139,589	$ 139,589	$ -	$ 139,589
			2022	$ 991,000	$ -	$ 991,000	$ 835,901	$ 15,510	$ 139,589	$ 139,589	$ -	$ 139,589
			2023	$ 416,000	$ -	$ 416,000	$ 350,893	$ 6,511	$ 58,596	$ 58,596	$ -	$ 58,596
01106	1,5	Compost Pad Expansion										
			2016	$ 622,000	$ -	$ 622,000	$ 524,653	$ 9,735	$ 87,613	$ 87,613	$ -	$ 87,613
			2019	$ 564,000	$ -	$ 564,000	$ 475,730	$ 8,827	$ 79,443	$ 79,443	$ -	$ 79,443
			2022	$ 564,000	$ -	$ 564,000	$ 475,730	$ 8,827	$ 79,443	$ 79,443	$ -	$ 79,443
			2025	$ 564,000	$ -	$ 564,000	$ 475,730	$ 8,827	$ 79,443	$ 79,443	$ -	$ 79,443

APPENDIX B
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REGION OF WATERLOO
2016 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

				(C)	(D)	(E) = (C) - (D)	(F)	(G) = (E) - (F) * 10%	(H) = (E) - (F) - (G)	(I) = (H) up to sum of (B)	(J) = (I) - (H)	(K) = (I) + (J)
										Development-Related Costs		
Project #	Project Description		Timing	Total Project Cost	Less Grants/ Subsidies/ Recoveries	Net Cost	Replacement and Benefit to Existing Share	10% Reduction	Total Development-Related Costs	2016-2025	Post 2025 or Service Level Increase	Total
	1.00 WASTE MANAGEMENT											
01186	1.6	Waterloo Scale Systems										
			2017	$ 521,000	$ -	$ 521,000	$ 439,460	$ 8,154	$ 73,386	$ 73,386	$ -	$ 73,386
			2018	$ 116,000	$ -	$ 116,000	$ 97,845	$ 1,815	$ 16,339	$ 16,339	$ -	$ 16,339
			2019	$ 116,000	$ -	$ 116,000	$ 97,845	$ 1,815	$ 16,339	$ 16,339	$ -	$ 16,339
			2020	$ 405,000	$ -	$ 405,000	$ 341,615	$ 6,339	$ 57,047	$ 57,047	$ -	$ 57,047
			2021	$ 116,000	$ -	$ 116,000	$ 97,845	$ 1,815	$ 16,339	$ 16,339	$ -	$ 16,339
			2022	$ 116,000	$ -	$ 116,000	$ 97,845	$ 1,815	$ 16,339	$ 16,339	$ -	$ 16,339
			2023	$ 405,000	$ -	$ 405,000	$ 341,615	$ 6,339	$ 57,047	$ 57,047	$ -	$ 57,047
			2024	$ 809,000	$ -	$ 809,000	$ 682,386	$ 12,661	$ 113,953	$ 113,953	$ -	$ 113,953
			2025	$ 116,000	$ -	$ 116,000	$ 97,845	$ 1,815	$ 16,339	$ 16,339	$ -	$ 16,339
01192	1.7	Waterloo Transfer Station Upgrade										
			2016	$ 645,000	$ -	$ 645,000	$ 544,053	$ 10,095	$ 90,852	$ 90,852	$ -	$ 90,852
			2017	$ 500,000	$ -	$ 500,000	$ 421,746	$ 7,825	$ 70,428	$ 70,428	$ -	$ 70,428
			2018	$ 977,000	$ -	$ 977,000	$ 824,093	$ 15,291	$ 137,617	$ 137,617	$ -	$ 137,617
			2019	$ 747,000	$ -	$ 747,000	$ 630,089	$ 11,691	$ 105,220	$ 105,220	$ -	$ 105,220
			2020	$ 1,540,000	$ -	$ 1,540,000	$ 1,298,979	$ 24,102	$ 216,919	$ 216,919	$ -	$ 216,919
			2021	$ 800,000	$ -	$ 800,000	$ 674,794	$ 12,521	$ 112,685	$ 112,685	$ -	$ 112,685
			2023	$ 464,000	$ -	$ 464,000	$ 391,381	$ 7,262	$ 65,357	$ 65,357	$ -	$ 65,357
	1.8	New Vehicles (Based on Historical Service Levels)										
			2016	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
			2017	$ 448,103	$ -	$ 448,103	$ -	$ 44,810	$ 403,293	$ 403,293	$ -	$ 403,293
			2018	$ 448,103	$ -	$ 448,103	$ -	$ 44,810	$ 403,293	$ 403,293	$ -	$ 403,293
			2019	$ 809,703	$ -	$ 809,703	$ -	$ 80,970	$ 728,733	$ 728,733	$ -	$ 728,733
			2020	$ 617,603	$ -	$ 617,603	$ -	$ 61,760	$ 555,843	$ 555,843	$ -	$ 555,843
			2021	$ 1,033,755	$ -	$ 1,033,755	$ -	$ 103,376	$ 930,380	$ 930,380	$ -	$ 930,380
			2022	$ 448,103	$ -	$ 448,103	$ -	$ 44,810	$ 403,293	$ 403,293	$ -	$ 403,293
			2023	$ 809,703	$ -	$ 809,703	$ -	$ 80,970	$ 728,733	$ 728,733	$ -	$ 728,733
			2024	$ 448,103	$ -	$ 448,103	$ -	$ 44,810	$ 403,293	$ 403,293	$ -	$ 403,293
			2025	$ 809,703	$ -	$ 809,703	$ -	$ 80,970	$ 728,733	$ 728,733	$ -	$ 728,733
		Sub-total WASTE MANAGEMENT		$ 30,364,883	$ -	$ 30,364,883	$ 20,658,829	$ 970,605	$ 8,735,448	$ 8,735,448	$ -	$ 8,735,448
	TOTAL WASTE MANAGEMENT			**$ 30,364,883**	**$ -**	**$ 30,364,883**	**$ 20,658,829**	**$ 970,605**	**$ 8,735,448**	**$ 8,735,448** Lesser of (B) or (H)	**$ -**	**$ 8,735,448**

Residential Development Charge Calculation		
Residential Share of 2016-2025 Discounted Development-Related Capital Program	98%	$ 8,560,740
10 Year Growth in Population in New Units		108,776
Unadjusted Development Charge Per Capita		**$ 78.70**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2016-2025 Discounted Development-Related Capital Program	2%	$ 174,709
10 Year Growth in Square Meters		2,651,577
Unadjusted Development Charge Per m^2		**$ 0.07**

(A) 2016 - 2025 Discounted Funding Envelope = (J) on previous page	$ 8,820,715
Reserve Fund Balance as at Dec 31, 2015	$ -
(B) Adjusted 2016 - 2025 Funding Envelope	$ 8,820,715

APPENDIX B
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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WASTE MANAGEMENT
RESIDENTIAL DEVELOPMENT CHARGE

WASTE MANAGEMENT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$0			**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE ($000)				$0.0	$381.2	$457.0	$460.9	$36.3	($98.4)	($493.0)	($295.7)	($384.4)	($2.4)	
2016-2025 RESIDENTIAL FUNDING REQUIREMENTS														
- WASTE MANAGEMENT - current ($000) (1)				$379.5	$791.2	$898.3	$1,378.5	$1,090.6	$1,375.0	$723.8	$1,047.7	$618.7	$1,048.1	**$9,351.5**
REVENUE - current ($000)	Rate for 2016													
- Dev. Charge Receipts (2)	$78.50	Inflation:	2.0%	$754.1	$852.6	$886.5	$921.7	$958.3	$996.3	$944.4	$977.2	$1,014.9	$1,057.7	**$9,363.7**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$0.0	$13.3	$16.0	$16.1	$1.3	($5.4)	($27.1)	($16.3)	($21.1)	($0.1)	**($23.3)**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	$6.6	$1.1	($0.3)	$16.1	($3.6)	($10.4)	$3.9	($1.9)	$6.9	$0.2	**$18.4**
						$0.0	$0.0							
TOTAL REVENUE ($000)				$760.7	$867.0	$902.2	$954.0	$955.9	$980.5	$921.1	$959.0	$1,000.7	$1,057.7	**$9,358.8**
CLOSING CASH BALANCE ($000)				$381.2	$457.0	$460.9	$36.3	($98.4)	($493.0)	($295.7)	($384.4)	($2.4)	$7.2	
WASTE MANAGEMENT PER CAPITA CHARGE	**$78.50**													
(1) Based on residential funding requirements in constant $000 of				*$379.5*	*$775.7*	*$863.5*	*$1,299.0*	*$1,007.6*	*$1,245.4*	*$642.7*	*$912.1*	*$528.0*	*$877.0*	***$8,530.5***
(2) Based on population growth in new units of				*9,607*	*10,648*	*10,854*	*11,064*	*11,277*	*11,495*	*10,683*	*10,837*	*11,035*	*11,275*	***108,776***

APPENDIX B
TABLE 3 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
WASTE MANAGEMENT
NON-RESIDENTIAL DEVELOPMENT CHARGE

WASTE MANAGEMENT

OPENING CASH BALANCE FROM APPLICABLE RESERVES	$0			**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE ($000)				$0.0	$8.6	$9.7	$10.0	$1.0	($1.1)	($8.6)	($2.0)	($0.9)	$10.3	
2016-2025 NON-RESIDENTIAL FUNDING REQUIREMENTS														
- WASTE MANAGEMENT - current ($000) (1)				$7.7	$16.1	$18.3	$28.1	$22.3	$28.1	$14.8	$21.4	$12.6	$21.4	**$190.8**
REVENUE - current ($000)	Rate for 2016													
- Dev. Charge Receipts (2)	$0.07	Inflation:	2.0%	$16.2	$16.9	$18.3	$19.1	$20.1	$20.9	$21.7	$22.6	$23.6	$24.6	**$204.0**
	Balance:	Positive	Negative											
- Interest on Opening Balance	Rate:	3.5%	5.5%	$0.0	$0.3	$0.3	$0.3	$0.0	($0.1)	($0.5)	($0.1)	($0.0)	$0.4	**$0.7**
- Interest on In-year Transactions (excl.int.)	Rate:	3.5%	5.5%	$0.1	$0.0	($0.0)	($0.2)	($0.1)	($0.2)	$0.1	$0.0	$0.2	$0.1	**$0.0**
TOTAL REVENUE ($000)				$16.3	$17.2	$18.6	$19.2	$20.1	$20.6	$21.4	$22.5	$23.7	$25.0	**$204.7**
CLOSING CASH BALANCE ($000)				$8.6	$9.7	$10.0	$1.0	($1.1)	($8.6)	($2.0)	($0.9)	$10.3	$13.9	
WASTE MANAGEMENT CHARGE PER M^2	**$0.07**													
(1) Based on non-residential funding requirements in constant $000 of				*$7.7*	*$15.8*	*$17.6*	*$26.5*	*$20.6*	*$25.4*	*$13.1*	*$18.6*	*$10.8*	*$17.9*	***$174.1***
(2) Based on non-residential GFA growth in square metres of				*231,190*	*237,141*	*251,116*	*257,167*	*264,815*	*271,036*	*274,962*	*281,611*	*288,027*	*294,512*	***2,651,577***

APPENDIX C

TRANSIT TECHNICAL APPENDIX

APPENDIX C

TRANSIT TECHNICAL APPENDIX

This appendix provides the detailed analysis undertaken to establish the development charge rates for Transit in the Region of Waterloo. The appendix contains a series of tables. An overview of the content and purpose of each of the tables is given below.

Three separate development charge rates for Transit services are provided, based on:

- The approach in the current RDC by-law, whereby the Transit charge would be imposed only on development in the urban areas (the Cities of Waterloo, Cambridge, and Kitchener), referred to as the "Cities only" approach.

- An approach whereby the development charge would be imposed uniformly on all development in the Region, referred to as the "uniform Region-wide" approach.

- An approach whereby the development charge would be imposed on all development in the Region but would be higher for development in the Cities and lower for development in the Townships based on the different demand for Transit in each of the two areas. This is referred to as the "differentiated" approach.

TABLE 1 DEVELOPMENT-RELATED CAPITAL PROGRAM 2016-2025 & CALCULATION OF THE UNADJUSTED DEVELOPMENT CHARGE

The *DCA* (s.5.2 (3)) requires that in estimating the increase in need for Transit services attributable to the anticipated development the increased need "shall not exceed the planned level of service over the 10-year period immediately following the preparation of the background study". For the purposes of the development charge calculations, the "planned level of service" is considered to be the Regional Council approved 10-year capital program (2016 capital budget and 2017-2025 capital forecast). Through its approval of the program, Council has indicated that it intends to ensure that the increase in need in Transit service will be met.

There is a requirement in the *DCA* to consider "excess capacity" within the Region's existing infrastructure that may be available to partially meet future servicing requirements (s.5. (1) 5.). Given Council's recent investment in transit, and its commitment to continue to increase transit service levels (including, in part, through

providing services that do not yet currently exist), it is assumed that no uncommitted excess capacity exists in the Transit service.

The 2016-2025 development-related capital program includes projects associated with the expansion of conventional Grand River Transit (GRT), the construction of a multi-modal transit hub, and the construction of new higher-order transit in the form of a combined light rail (ION LRT) and adapted bus rapid transit (aBRT) system. The gross cost of the program is $1,302.3 million.

To determine the share of the program that is eligible for recovery through development charges, the gross project costs are reduced by any anticipated grants or subsidies and "benefit to existing" shares. Grants in the amount of $608.4 million have been identified; the net cost of the capital program is therefore $693.8 million.

Details on the gross and net costs of individual components of the capital program are provided below.

GRT Capital

The gross cost of the GRT portion of the capital program is $160.7 million. Grants in the amount of $11.2 million have been applied against these projects. Grant funding was provided by the Federal and Provincial Governments through the Public Transit Infrastructure Fund – Phase One, which provides transit funding to municipalities[1]. The net cost of this portion of the program is therefore reduced to $149.4 million. The GRT program includes:

- a new garage at Northfield Drive between 2016 and 2018 at a total cost of $105.1 million (including $8.2 million in principal and interest on debt associated with the recent acquisition of land for the site);[2]
- $18.6 million in bus station expansion and upgrades;
- the addition of new conventional buses at a total cost of $23.0 million; and
- $14.0 million worth of other GRT capital, including Intelligent Transportation System (ITS) investments in automatic vehicle location control (AVL),

1 Details of the grant allocations and benefitting projects are outlined in Staff Report COR-FSD-16-24 dated October 4, 2016.

2 Northfield Debenture CDS14-82.

automatic passenger count (APC), and card fare payment technology. It is noted that ITS costs that are required to implement transit priority measures within road rights of way are included in the development charge currently imposed for the Transportation service.

Financing costs associated with long-term debt to be issued by the Region for the new Northfield Drive Garage, in the amount of $31.5 million (at an interest rate of 4.25% and a 20 year term), have been included in the GRT part of the capital program (and are included in the $105.1 million costs for the garage on Northfield Drive).

Transit Hub

The multi-modal transportation hub (Transit Hub) is planned to be the focal point for higher order transit service in the Region, connecting passengers through the co-location of ION LRT, GO Transit (rail and bus service), VIA Rail service, intercity bus and GRT. The Transit Hub is also expected to generate ION ridership by serving as an anchor development along the Central Transit Corridor with transit station functions integrated with a mixed-use destination. Total costs of the Transit Hub planned to be incurred between 2016 and 2021 amount to $47.1 million, including $14.9 million in principal and interest on debt associated with the acquisition of land for the site.[3]

On June 14, 2016, the Provincial Government announced funding in the amount of $43 million for the Transit Hub project. It is assumed that all 2016-2025 costs associated with the Hub will be eligible for this funding, with the exception of the $14.9 million debenture payments associated with the land acquisition. Only the $14.9 million is therefore brought forward to the development charge calculation.

Rapid Transit

A significant portion of the anticipated development set out in Appendix A is planned to be accommodated through the redevelopment and intensification of existing built up areas in the Region. A key target area for this redevelopment and intensification is along the Central Transit Corridor that extends from the City of Waterloo's downtown to the City of Cambridge. Providing rapid transit along this corridor is critical to achieving the Region's redevelopment and intensification objectives.

[3] Transit Hub Debenture CDS13-77. It is noted that Hub costs planned to be incurred beyond 2025 are not shown in this study.

Following a lengthy Environmental Assessment process that identified Bus Rapid Transit (BRT) and Light Rail Transit (LRT) as the rapid transit systems most suited to the Region, Regional Council approved an RT implementation plan in June 2009. In 2010, funding commitments for the plan were secured from the Federal and Provincial governments. As part of the plan, Regional staff reviewed eleven rapid transit implementation options for Council's consideration.[4]

All of the implementation options involved the construction of a rapid transit system that extended along the spine of the central transit corridor from downtown Waterloo south-west to the Ainslie Street Terminal in Cambridge. Eight options involved a combined system of LRT and aBRT. Of the other three options, one involved a full LRT system, one a full BRT system, and the third a base case option in which rapid transit did not proceed.

On June 15, 2011, Council approved LRT as the preferred technology for the rapid transit system from Northfield Drive in the City of Waterloo to the Ainslie Street Terminal in the City of Cambridge. Of the eleven options reviewed, option L3 was selected as the preferred option. The L3 option includes implementation of a combined RT system, with LRT from Northfield Drive in Waterloo to Fairway Road in Kitchener and an aBRT from Fairway Road to the Ainslie Street Terminal. Among other matters, Council directed staff to pursue a Regional development charge legislative amendment in order to assist with funding the rapid transit project.

Capital costs included in this Background Study are based on the L3 option—the option planned for by Council through its approved 10 year capital program as the expression of its intent to meet future servicing needs (including the increase in need arising from development). As shown in Table 1, page 2, the gross capital cost for rapid transit is $1,092.7 million, including $818.0 million in construction costs, $273.7 million in financing costs, and $1.0 million in environmental assessment studies for future (post-2025) expansion. A portion of the financing costs, $79.9 million, is to be paid for as interest on long-term debt issued by the Region;[5] the remaining $193.8 million

[4] The options were presented to Regional Council for information on February 15, 2011 (see Regional staff report E-11-021).

[5] The Region has recently issued three debentures—two for $50.0 million each and one for $4.5 million—for rapid transit construction and vehicle acquisition.

represents the Region's financing costs associated with its public-private partnership agreement for light rail transit.

In 2010, the Provincial government agreed to provide $300.0 million in funding for rapid transit. The Federal government subsequently agreed to fund one third of eligible project costs to a maximum of $265.0 million. The *DCA* (s.5. (2)) requires that the capital forecast be reduced to adjust for capital grants, subsidies or other contributions. Together, alternative funding sources for the LRT and aBRT projects total $565.0 million. The resulting net capital cost for rapid transit is $527.7 million.

Benefit to Existing Calculations

The *DCA* prohibits municipalities from using development charges to pay for capital costs that benefit existing development (s.5. (1) 6.). A "benefit to existing" cost share has therefore been determined for the transit service as a whole and has been removed from the development charge calculation.

Technical Appendix D contains the details of the analysis undertaken by Dillon Consulting Limited to determine the benefit to existing shares of the capital program based on ridership figures. The total benefit to existing share of the capital program is calculated to be $439.6 million. The capital cost for the benefit to existing share will require funding from non-development charge sources.

The benefit to existing share of the GRT capital investment in technology is calculated differently from other investments given a significant portion of the technology cost represents an increase in the level of service provided on existing buses. This benefit to existing share calculation is shown in Table 1 below:

Table 1 – Calculation of Benefit to Existing for Transit Technology

A	# of current (2015 year-end) fleet (including MobilityPlus)	283
B	# of new buses 2016-2025	28
C = B/A	% of new technology relating to new buses	9%

Post-Period Benefits Calculations

Although deemed development-related, not all of the net development-related capital program may be recoverable from development charges in the period from 2016 to 2025. For most of the Transit investments, a portion of the capital program will service development that will not occur until after 2025. This portion of the capital program is deemed to be "pre-built" service capacity to be considered as committed excess capacity to be recovered under future development charge studies.

Given the rapid transit investment set out in Table 1 has been planned to meet only the ridership demand generated at PM peak hour in 2031, the development charges analysis identifies no benefit of the development-related Transit capital costs beyond 2031. An exception is made for the new GRT Northfield Garage and vehicle additions. The Northfield Garage will be built for operation and maintenance of 237 Standard Bus Equivalents (SBEs) by 2035. The first year of use is 2021 and the number of SBEs projected for the facility at the end of 2025 is 124. The post-period benefit share totals $24.7 million, which is calculated based on the 113 SBEs to be accommodated in the facility between 2026 and 2035. A share of the DC eligible costs associated with the garage expansion has been allocated fully to the post-period benefit. It is expected that the allocation of costs for this particular item will be re-examined during the Region's next update to the DC study and a greater share of costs will be included within the planning period.

The post-period (2025-2031) benefits of the remaining transit works in the capital program total $76.9 million. The allocation of development-related costs to in-period and post-planning periods were determined by Dillon Consulting Limited and are also detailed in Technical Appendix D.

Future DC Background Studies Will Review Benefit to Existing and Post-Period Allocations

The benefit to existing allocation for the bulk of the transit costs is based on estimates of increases in ridership from "existing" residents and employees, or more accurately the ridership generated by existing built-form (houses and non-residential buildings) and the ridership that will be generated from new development over the planning periods. Likewise, the post-period allocation is also based on the ridership estimates, including 2031 transit mode share targets.

The analysis is based on existing data and a series of assumptions, including transit mode share targets, as discussed in Appendix D. The Region will be tracking ridership data, and the transit mode share, moving forward, especially as the LRT becomes operational, and will assess the reasonableness and appropriateness of the assumptions used. It is anticipated that the actual ridership data may differ from the assumptions used in this Background Study and as such, subsequent Region of Waterloo transit DC calculations will include a review of the cost allocations between benefit to existing, in-period DC recovery and post-period.

Calculation of the Unadjusted Development Charge Rates

The section below the capital program (Table 2, page 2) displays the calculation of the "unadjusted" development charge rates for each of the three area-specific development charge approaches. The term "unadjusted" development charge is used to distinguish the charge that is calculated prior to the consideration of costs associated with internal borrowing required to finance the capital program.[6] The cash flow analysis used to calculate the costs of internal borrowing is shown in Table 2.

The first step when determining the unadjusted development charge rate is to allocate the development-related net capital cost between the residential and non-residential sectors.

- Under the "Cities only" approach, the development-related costs have been allocated 68 per cent residential ($103.4 million) and 32 per cent non-residential ($49.3 million). This ratio is based on forecast changes in population in new housing units and employment in new non-residential floor space over the planning period in the Cities.

- Under the "Uniform Region-Wide" approach, the development-related costs have been allocated 74 per cent residential ($112.5 million) and 26 per cent non-residential ($40.2 million). This ratio is based on forecast changes in population in new housing units and employment in new non-residential floor space over the planning period in the entire Region.

- Under the "Differentiated" approach, the development-related costs have been allocated 92 per cent to the Cities ($141.0 million) and 8 per cent to the Townships ($11.7 million). This ratio is based on forecast changes in

[6] Financing costs associated with external borrowing (long-term debt for the Northfield Garage and rapid transit as well as rapid transit P3 financing costs) are included as line items in the capital program and are excluded from the cash flow analysis.

population in new housing units and employment in new non-residential floor space over the planning period in the Region as a whole, with the Township growth weighted at 50 per cent. The weighting is intended to reflect the lower demand for Transit arising from development in the Townships between 2016 and 2025. Costs are then further allocated to residential and non-residential development within the Cities and Townships based on forecast changes in population in new housing units and employment in new non-residential floor space in each area (see Table 2).

Table 2 - Allocation of Transit DC Costs Under Differentiated Approach

	2016-2025	Total Costs	Residential	Non-Res.
Cities: Pop. + Empl. Growth	126,617	92.3%	72.5%	27.5%
Population in New Units	*91,798*			
Employment in New Space	*34,818*			
Townships: Pop. + Emp. Growth (weighted	10,495	7.7%	80.9%	19.1%
Population in New Units	*16,977*			
Employment in New Space	*4,012*			
Regional Total Pop. and Emp. Growth	137,111			
		^ Used to allocate transit DC costs between Cities and Townships	^ Used to allocate Cities costs between residential & non-residential and Township costs between residential & non-residential ^ Then do City and Twp res. & non-res. Cash flows using full Cities and Twp growth	

The residential share of the 2016-2025 development charge eligible costs are then divided by the forecast population growth in new units for each area. This gives unadjusted residential development charges of:

- $1,126.23 per capita under the Cities only approach;
- $1,034.24 per capita under the uniform Region-wide approach; and
- Under the Differentiated approach, $1,113.40 per capita for development in the Cities and $556.70 per capita for development in the Townships.

The non-residential development-related net capital costs are divided by the forecast increase in non-residential gross floor area (GFA). This yields unadjusted non-residential development charges of:

- $21.31 per m^2 under the Cities only approach;
- $15.15 per m^2 under the uniform Region-wide approach; and
- Under the Differentiated approach, $16.77 per m^2 for development in the Cities and $6.58 per m^2 for development in the Townships.

TABLE 2 CASH FLOW ANALYSIS

A cash flow analysis is also undertaken to account for the timing of projects and receipt of development charges. Interest earnings or borrowing costs (associated with internal borrowing only—see above) are, therefore, accounted for in the calculation as allowed under the *DCA*. Based on the development forecast, the analysis calculates the development charges rate that is required to finance the net development-related capital spending plan including provisions for any internal borrowing costs or interest earnings on the reserve funds. The cash flow analysis is designed so that the closing cash balance at the end of the planning period is as close to nil as possible.

Opening cash balances in the cash flow analysis reflect the reserve fund balances that are available to fund development-related capital works as at 31 December, 2015. In the case of the Transit service the reserve fund was in a deficit of $1.8 million as of that date.

In order to determine appropriate development charges rates reflecting borrowing and earnings necessary to support the net development-related funding requirement, assumptions are used for the inflation rate and interest rate. An inflation rate of 2.0% is used for the funding requirements, and interest rates of 5.5% (negative balance) and 3.5% (positive balance) are used for borrowing/earnings on the funds. This yields effective real discount rates of 3.5% and 1.5% respectively.

Table 2 displays the results of the cash flow analysis and provides the adjusted or final per capita residential and per square foot (of GFA) non-residential development charges. After cash flow considerations, the calculated residential and non-residential charges increase under all approaches—details are provided in the summary table below.

TRANSIT					
2016 - 2025 Development Related Capital Program		Unadjusted Development Charge		**Adjusted Development Charge**	
Total	Net DC Recoverable	$/capita	$/m^2	**$/capita**	**$/m^2**
$1,302,284,406	$152,660,283				
			CITIES ONLY		
		$1,126.23	$21.31	**$1,035.23**	**$19.72**
			UNIFORM REGION-WIDE		
		$1,034.24	$15.15	**$952.29**	**$14.02**
			DIFFERENTIATED (CITIES)		
		$1,113.40	$16.77	**$1,023.21**	**$15.52**
			DIFFERENTIATED (TOWNSHIPS)		
		$556.70	$6.58	**$518.10**	**$6.09**

APPENDIX C
TABLE 1 - PAGE 1

REGION OF WATERLOO
2016 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 0% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs: Available DC Reserves	(J) = (I) - (H) Development-Related Costs: 2016-2025	Development-Related Costs: Post 2025 or Service Level Increase	(K) = (I) + (J) Development-Related Costs: Total
	2.00 TRANSIT											
	2.1 Conventional Transit (GRT) Facilities											
	Projects That have been or will be debt financed											
66079	2.1.1 Northfield Drive Garage Expansion - Debt for Land		$ 8,237,192	$ -	$ 8,237,192	$ 5,189,431	$ -	$ 3,047,761	$ -	$ 1,453,152	$ 1,594,609	$ 3,047,761
66079	Northfield Drive Garage Expansion	2016	$ 1,550,000	$ 600,000	$ 950,000	$ 598,500	$ -	$ 351,500	$ -	$ 167,593	$ 183,907	$ 351,500
66079	Northfield Drive Garage Expansion - design & engineering	2017	$ 4,400,000	$ 2,200,000	$ 2,200,000	$ 1,386,000	$ -	$ 814,000	$ -	$ 388,110	$ 425,890	$ 814,000
66079	Northfield Drive Garage Expansion - construction	2018	$ 6,997,000	$ -	$ 6,997,000	$ 4,408,110	$ -	$ 2,588,890	$ -	$ 1,234,365	$ 1,354,525	$ 2,588,890
66079	Northfield Drive Garage Expansion - construction[1]	2019	$ 27,875,000	$ -	$ 27,875,000	$ 17,561,250	$ -	$ 10,313,750	$ -	$ -	$ 10,313,750	$ 10,313,750
66079	Northfield Drive Garage Expansion - construction		$ 24,478,000	$ -	$ 24,478,000	$ 15,421,140	$ -	$ 9,056,860	$ -	$ 4,318,250	$ 4,738,610	$ 9,056,860
	Northfield Drive Garage Expansion - financing		$ 31,524,794	$ -	$ 31,524,794	$ 19,860,620	$ -	$ 11,664,174	$ -	$ 5,561,399	$ 6,102,774	$ 11,664,174
	Projects with no debt financing (fully cashflowed)											
66088	2.1.2 Cambridge Centre Terminal	2016	$ 4,000,000	$ -	$ 4,000,000	$ 2,520,000	$ -	$ 1,480,000	$ -	$ 1,000,000	$ 480,000	$ 1,480,000
66090	2.1.3 UW Transit Plaza	2016	$ 562,000	$ 281,000	$ 281,000	$ 177,030	$ -	$ 103,970	$ -	$ 70,250	$ 33,720	$ 103,970
66090	UW Transit Plaza	2017	$ 3,200,000	$ 1,600,000	$ 1,600,000	$ 1,008,000	$ -	$ 592,000	$ -	$ 400,000	$ 192,000	$ 592,000
66071	2.1.4 RT Station Integration	2016	$ 539,000	$ -	$ 539,000	$ 339,570	$ -	$ 199,430	$ -	$ 134,750	$ 64,680	$ 199,430
66071	RT Station Integration	2017	$ 539,000	$ -	$ 539,000	$ 339,570	$ -	$ 199,430	$ -	$ 134,750	$ 64,680	$ 199,430
66092	2.1.5 Fairview Mall Terminal	2016	$ 500,000	$ -	$ 500,000	$ 315,000	$ -	$ 185,000	$ -	$ 125,000	$ 60,000	$ 185,000
66092	Fairview Mall Terminal	2017	$ 5,170,000	$ 1,000,000	$ 4,170,000	$ 2,627,100	$ -	$ 1,542,900	$ -	$ 1,042,500	$ 500,400	$ 1,542,900
66093	2.1.6 Blockline Station	2017	$ 1,000,000	$ -	$ 1,000,000	$ 630,000	$ -	$ 370,000	$ -	$ 250,000	$ 120,000	$ 370,000
66029	2.1.7 iXpress Station Development	2016	$ 952,000	$ -	$ 952,000	$ 599,760	$ -	$ 352,240	$ -	$ 238,000	$ 114,240	$ 352,240
66029	iXpress Station Development	2017	$ 2,118,000	$ 1,059,000	$ 1,059,000	$ 667,170	$ -	$ 391,830	$ -	$ 264,750	$ 127,080	$ 391,830
	Sub-Total Facilities		$ 123,641,986	$ 6,740,000	$ 116,901,986	$ 73,648,251	$ -	$ 43,253,735	$ -	$ 16,782,869	$ 26,470,866	$ 43,253,735
	2.2 Conventional Transit (GRT) Fleet											
66008	2.2.1 Vehicle Additions Conventional	2017	$ 9,000,000	$ 4,500,000	$ 4,500,000	$ 2,835,000	$ -	$ 1,665,000	$ -	$ 793,861	$ 871,139	$ 1,665,000
66008	Vehicle Additions Conventional	2019	$ 4,500,000	$ -	$ 4,500,000	$ 2,835,000	$ -	$ 1,665,000	$ -	$ 793,861	$ 871,139	$ 1,665,000
66008	Vehicle Additions Conventional	2020	$ 5,000,000	$ -	$ 5,000,000	$ 3,150,000	$ -	$ 1,850,000	$ -	$ 882,068	$ 967,932	$ 1,850,000
66008	Vehicle Additions Conventional	2021	$ 4,500,000	$ -	$ 4,500,000	$ 2,835,000	$ -	$ 1,665,000	$ -	$ 793,861	$ 871,139	$ 1,665,000
	Sub-Total Fleet		$ 23,000,000	$ 4,500,000	$ 18,500,000	$ 11,655,000	$ -	$ 6,845,000	$ -	$ 3,263,650	$ 3,581,350	$ 6,845,000
	2.3 Other Conventional Transit (GRT) Capital											
66071	2.3.1 AVL APC Technology Implementation	2016	$ 4,406,000	$ -	$ 4,406,000	$ 4,009,318	$ -	$ 396,682	$ -	$ 396,682	$ -	$ 396,682
66071	AVL APC Technology Implementation	2017	$ 860,000	$ -	$ 860,000	$ 782,572	$ -	$ 77,428	$ -	$ 77,428	$ -	$ 77,428
66071	AVL APC Technology Implementation	2018	$ 525,000	$ -	$ 525,000	$ 525,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2019	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2020	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2021	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2022	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2023	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2024	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66071	AVL APC Technology Implementation	2025	$ 475,000	$ -	$ 475,000	$ 475,000	$ -	$ -	$ -	$ -	$ -	$ -
66059	2.3.2 Card Fare Payment Technology	2016	$ 4,911,000	$ -	$ 4,911,000	$ 4,468,852	$ -	$ 442,148	$ -	$ 442,148	$ -	$ 442,148
	Sub-Total Other Capital		$ 14,027,000	$ -	$ 14,027,000	$ 13,110,743	$ -	$ 916,257	$ -	$ 916,257	$ -	$ 916,257
	SUB-TOTAL TRANSIT (GRT)		**$ 160,668,986**	**$ 11,240,000**	**$ 149,428,986**	**$ 98,413,994**	**$ -**	**$ 51,014,992**	**$ -**	**$ 20,962,776**	**$ 30,052,216**	**$ 51,014,992**

APPENDIX C
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REGION OF WATERLOO
2016 DEVELOPMENT CHARGES STUDY
DEVELOPMENT-RELATED CAPITAL PROGRAM

Project #	Project Description	Timing	(C) Total Project Cost	(D) Less Grants/ Subsidies/ Recoveries	(E) = (C) - (D) Net Cost	(F) Replacement and Benefit to Existing Share	(G) = (E) - (F) * 10% 0% Reduction	(H) = (E) - (F) - (G) Total Development-Related Costs	(I) = (H) up to sum of (B) Development-Related Costs: Available DC Reserves	Development-Related Costs: 2016-2025	(J) = (I) - (H) Development-Related Costs: Post 2025 or Service Level Increase	(K) = (I) + (J) Development-Related Costs: Total
	2.00 TRANSIT											
	2.4 Multi-Modal Transit Hub											
	2.4.1 Mullti-Modal Transit Hub - Debt for Land		$ 14,853,889	$ -	$ 14,853,889	$ 9,357,950	$ -	$ 5,495,939	$ -	$ 3,713,472	$ 1,782,467	$ 5,495,939
	Mullti-Modal Transit Hub	2016	$ 599,000	$ 599,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Mullti-Modal Transit Hub	2017	$ 340,000	$ 340,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Mullti-Modal Transit Hub	2019	$ 7,446,000	$ 7,446,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Mullti-Modal Transit Hub	2020	$ 14,892,000	$ 14,892,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Mullti-Modal Transit Hub	2021	$ 7,446,000	$ 7,446,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Mullti-Modal Transit Hub	2021	$ 1,479,000	$ 1,479,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Sub-Total Multi-Modal Transit Hub		$ 47,055,889	$ 32,202,000	$ 14,853,889	$ 9,357,950	$ -	$ 5,495,939	$ -	$ 3,713,472	$ 1,782,467	$ 5,495,939
	2.5 Rapid Transit - LRT and aBRT											
	2.5.1 Stage 1 - LRT and aBRT - Principal Costs		$ 272,666,667	$ 188,333,333	$ 84,333,333	$ 53,130,000	$ -	$ 31,203,333	$ -	$ 21,083,333	$ 10,120,000	$ 31,203,333
	Stage 1 - LRT and aBRT - Principal Costs		$ 272,666,667	$ 188,333,333	$ 84,333,333	$ 53,130,000	$ -	$ 31,203,333	$ -	$ 21,083,333	$ 10,120,000	$ 31,203,333
	Stage 1 - LRT and aBRT - Principal Costs		$ 272,666,667	$ 188,333,333	$ 84,333,333	$ 53,130,000	$ -	$ 31,203,333	$ -	$ 19,163,862	$ 12,039,471	$ 31,203,333
	Stage 1 - LRT and aBRT - Financing Costs		$ 273,722,490	$ -	$ 273,722,490	$ 172,445,168	$ -	$ 101,277,321	$ -	$ 64,816,465	$ 36,460,856	$ 101,277,321
	Stage 2 Environmental Assessment	2016	$ 500,000	$ -	$ 500,000	$ -	$ -	$ 500,000	$ -	$ -	$ 500,000	$ 500,000
	Stage 2 Environmental Assessment	2017	$ 500,000	$ -	$ 500,000	$ -	$ -	$ 500,000	$ -	$ -	$ 500,000	$ 500,000
	Cambridge Supportive Strategy		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Sub-Total Rapid Transit - LRT and aBRT		$ 1,092,722,490	$ 565,000,000	$ 527,722,490	$ 331,835,168	$ -	$ 195,887,321	$ -	$ 126,146,993	$ 69,740,328	$ 195,887,321
	2.6 Recovery of Negative DC Reserve Fund Balance											
	2.6.1 Recovery of Transit DC Reserve Fund Balance	2016	$ 1,837,042	$ -	$ 1,837,042	$ -	$ -	$ 1,837,042	$ -	$ 1,837,042	$ -	$ 1,837,042
	TOTAL TRANSIT (GRT, TRANSIT HUB, AND RAPID TRANSIT)		**$ 1,302,284,406**	**$ 608,442,000**	**$ 693,842,406**	**$ 439,607,112**	**$ -**	**$ 254,235,294**	**$ -**	**$ 152,660,283**	**$ 101,575,011**	**$ 254,235,294**
	Sub-Total Projects with Debt Financing		**$ 1,211,638,364**	**$ 567,800,000**	**$ 643,838,364**	**$ 405,618,169**	**$ -**	**$ 238,220,195**	**$ -**	**$ 142,983,334**	**$ 95,236,860**	**$ 238,220,195**
	Sub-Total Projects with No Debt Financing (full CF)		**$ 90,646,042**	**$ 40,642,000**	**$ 50,004,042**	**$ 33,988,943**	**$ -**	**$ 16,015,099**	**$ -**	**$ 9,676,949**	**$ 6,338,150**	**$ 16,015,099**
	check		**$ -**	**$ -**	**$ (0)**	**$ -**	**$ -**	**$ -**	**$ -**	**$ (0)** Lesser of (B) or (H)	**$ 0**	**$ -**

Note 1: All DC eligible costs have been allocated to the post-2025 period. It is expected that the allocation of costs will be re-examined during the Region's next update to the DC study and a greater share of costs will be included within the planning period.

COST ALLOCATION - CITIES ONLY

Residential Development Charge Calculation		
Residential Share of 2016-2025 Development-Related Capital Program	68%	
Internal Borrowing		$ 6,553,510
External Borrowing		$ 96,832,459
10 Year Growth in Population in New Units (Cities)		91,798
Unadjusted Development Charge Per Capita		**$ 1,126.23**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2016-2025 Development-Related Capital Program	32%	
Internal Borrowing		$ 3,123,439
External Borrowing		$ 46,150,876
10 Year Growth in Square Meters (Cities)		2,312,304
Unadjusted Development Charge Per m^2		**$ 21.31**

COST ALLOCATION - REGION-WIDE

Residential Development Charge Calculation		
Residential Share of 2016-2025 Development-Related Capital Program	74%	
Internal Borrowing		$ 7,131,278
External Borrowing		$ 105,369,365
10 Year Growth in Population in New Units (Region)		108,776
Unadjusted Development Charge Per Capita		**$ 1,034.24**
Non-Residential Development Charge Calculation		
Non-Residential Share of 2016-2025 Development-Related Capital Program	26%	
Internal Borrowing		$ 2,545,671
External Borrowing		$ 37,613,969
10 Year Growth in Square Meters (Region)		2,651,577
Unadjusted Development Charge Per m^2		**$ 15.15**

COST ALLOCATION - DIFFERENTIATED

City Share	92%	$ 140,975,483
Township Share	8%	$ 11,684,801
Residential Development Charge Calculation		
Cities		
Residential Share of 2016-2025 Development-Related Capital Program	73%	
Internal Borrowing		$ 6,478,891
External Borrowing		$ 95,729,906
10 Year Growth in Population in New Units (Cities)		91,798
Unadjusted Development Charge Per Capita		**$ 1,113.40**
Townships		
Residential Share of 2016-2025 Development-Related Capital Program	81%	
Internal Borrowing		$ 599,112
External Borrowing		$ 8,852,278
10 Year Growth in Population in New Units (Townships)		16,977
Unadjusted Development Charge Per Capita		**$ 556.70**
Non-Residential Development Charge Calculation		
Cities		
Non-Residential Share of 2016-2025 Development-Related Capital Program	27%	
Internal Borrowing		$ 2,457,373
External Borrowing		$ 36,309,313
10 Year Growth in Square Meters (Cities)		2,312,304
Unadjusted Development Charge Per m^2		**$ 16.77**
Townships		
Non-Residential Share of 2016-2025 Development-Related Capital Program	19%	
Internal Borrowing		$ 141,573
External Borrowing		$ 2,091,837
10 Year Growth in Square Meters (Townships)		339,273
Unadjusted Development Charge Per m^2		**$ 6.58**

APPENDIX C
TABLE 2 - PAGE 1

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - UNIFORM REGION-WIDE

PUBLIC TRANSIT	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE	$0.0	($1,769.7)	($4,930.6)	($5,554.6)	($6,412.3)	($6,946.1)	($6,979.4)	($6,997.1)	($6,290.7)	($3,486.3)	
2016-2025 RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$6,415.7	$2,183.7	$0.0	$585.0	$650.0	$585.0	$0.0	$0.0	$0.0	$0.0	**$10,419.6**
- Public Transit Services: Inflated (1)	$6,415.7	$2,227.4	$0.0	$620.8	$703.6	$645.9	$0.0	$0.0	$0.0	$0.0	**$10,613.5**
- Public Transit Infrastructure: Debenture Finance (1)	$4,455.2	$11,097.3	$11,097.3	$11,097.3	$11,097.3	$11,097.3	$11,097.3	$10,782.4	$9,215.8	$9,215.8	**$100,253.2**
- Public Transit (Inflated + Debenture Financed)	$10,870.9	$13,324.7	$11,097.3	$11,718.2	$11,800.9	$11,743.2	$11,097.3	$10,782.4	$9,215.8	$9,215.8	**$110,866.7**
NEW RESIDENTIAL DEVELOPMENT											
- Population Growth in New Units	9,607	10,648	10,854	11,064	11,277	11,495	10,683	10,837	11,035	11,275	**108,776**
REVENUE											
- DC Receipts: Inflated	$9,148.6	$10,343.2	$10,753.9	$11,180.8	$11,624.6	$12,086.0	$11,457.2	$11,854.9	$12,312.0	$12,831.6	**$113,592.8**
INTEREST											
- Interest on Opening Balance	$0.0	($97.3)	($271.2)	($305.5)	($352.7)	($382.0)	($383.9)	($384.8)	($346.0)	($191.7)	**($2,715.2)**
- Interest on In-year Transactions	($47.4)	($82.0)	($9.4)	($14.8)	($4.8)	$6.0	$6.3	$18.8	$54.2	$63.3	**($9.9)**
TOTAL REVENUE	$9,101.2	$10,163.9	$10,473.3	$10,860.5	$11,267.1	$11,710.0	$11,079.6	$11,488.8	$12,020.2	$12,703.1	**$110,867.7**
CLOSING CASH BALANCE	($1,769.7)	($4,930.6)	($5,554.6)	($6,412.3)	($6,946.1)	($6,979.4)	($6,997.1)	($6,290.7)	($3,486.3)	$1.0	

2016 Adjusted Charge Per Capita	**$952.29**

Allocation of Capital Program	
Residential Sector	73.7%
Non-Residential	26.3%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

APPENDIX C
TABLE 2 - PAGE 2

REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - CITIES ONLY

PUBLIC TRANSIT	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE	$0.0	($508.3)	($3,463.7)	($4,201.6)	($5,147.8)	($5,801.8)	($5,912.6)	($6,066.6)	($5,533.6)	($3,040.5)	
2016-2025 RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$5,895.9	$2,006.8	$0.0	$537.6	$597.4	$537.6	$0.0	$0.0	$0.0	$0.0	**$9,575.4**
- Public Transit Services: Inflated (1)	$5,895.9	$2,047.0	$0.0	$570.5	$646.6	$593.6	$0.0	$0.0	$0.0	$0.0	**$9,753.6**
- Public Transit Infrastructure: Debenture Finance (1)	$4,094.3	$10,198.2	$10,198.2	$10,198.2	$10,198.2	$10,198.2	$10,198.2	$9,908.8	$8,469.2	$8,469.2	**$92,130.8**
- Public Transit (Inflated + Debenture Financed)	$9,990.2	$12,245.2	$10,198.2	$10,768.8	$10,844.8	$10,791.8	$10,198.2	$9,908.8	$8,469.2	$8,469.2	**$101,884.4**
NEW RESIDENTIAL DEVELOPMENT											
- Population Growth in New Units	9,172	8,898	8,974	9,169	9,356	9,621	8,892	9,049	9,249	9,418	**91,798**
REVENUE											
- DC Receipts: Inflated	$9,495.5	$9,396.1	$9,665.5	$10,072.8	$10,483.9	$10,996.5	$10,366.5	$10,760.6	$11,218.5	$11,652.3	**$104,108.2**
INTEREST											
- Interest on Opening Balance	$0.0	($28.0)	($190.5)	($231.1)	($283.1)	($319.1)	($325.2)	($333.7)	($304.3)	($167.2)	**($2,182.2)**
- Interest on In-year Transactions	($13.6)	($78.4)	($14.7)	($19.1)	($9.9)	$3.6	$2.9	$14.9	$48.1	$55.7	**($10.4)**
TOTAL REVENUE	$9,481.9	$9,289.8	$9,460.3	$9,822.6	$10,190.8	$10,681.0	$10,044.3	$10,441.8	$10,962.3	$11,540.8	**$101,915.6**
CLOSING CASH BALANCE	($508.3)	($3,463.7)	($4,201.6)	($5,147.8)	($5,801.8)	($5,912.6)	($6,066.6)	($5,533.6)	($3,040.5)	$31.2	

2016 Adjusted Charge Per Capita	**$1,035.23**

Allocation of Capital Program	
Residential Sector	67.7%
Non-Residential	32.3%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

APPENDIX C
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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - DIFFERENTIATED (CITIES)

PUBLIC TRANSIT	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE	$0.0	($504.8)	($3,428.8)	($4,160.8)	($5,098.9)	($5,748.5)	($5,861.3)	($6,016.8)	($5,493.4)	($3,032.4)	
2016-2025 RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$5,828.8	$1,984.0	$0.0	$531.5	$590.6	$531.5	$0.0	$0.0	$0.0	$0.0	**$9,466.4**
- Public Transit Services: Inflated (1)	$5,828.8	$2,023.7	$0.0	$564.0	$639.2	$586.8	$0.0	$0.0	$0.0	$0.0	**$9,642.6**
- Public Transit Infrastructure: Debenture Finance (1)	$4,047.6	$10,082.1	$10,082.1	$10,082.1	$10,082.1	$10,082.1	$10,082.1	$9,796.0	$8,372.7	$8,372.7	**$91,081.8**
- Public Transit (Inflated + Debenture Financed)	$9,876.4	$12,105.8	$10,082.1	$10,646.1	$10,721.4	$10,668.9	$10,082.1	$9,796.0	$8,372.7	$8,372.7	**$100,724.3**
NEW RESIDENTIAL DEVELOPMENT											
- Population Growth in New Units	9,172	8,898	8,974	9,169	9,356	9,621	8,892	9,049	9,249	9,418	**91,798**
REVENUE											
- DC Receipts: Inflated	$9,385.2	$9,287.0	$9,553.2	$9,955.9	$10,362.1	$10,868.8	$10,246.1	$10,635.7	$11,088.3	$11,517.0	**$102,899.3**
INTEREST											
- Interest on Opening Balance	$0.0	($27.8)	($188.6)	($228.8)	($280.4)	($316.2)	($322.4)	($330.9)	($302.1)	($166.8)	**($2,164.0)**
- Interest on In-year Transactions	($13.5)	($77.5)	($14.5)	($19.0)	($9.9)	$3.5	$2.9	$14.7	$47.5	$55.0	**($10.8)**
TOTAL REVENUE	$9,371.7	$9,181.7	$9,350.1	$9,708.1	$10,071.8	$10,556.1	$9,926.6	$10,319.5	$10,833.7	$11,405.2	**$100,724.5**
CLOSING CASH BALANCE	($504.8)	($3,428.8)	($4,160.8)	($5,098.9)	($5,748.5)	($5,861.3)	($6,016.8)	($5,493.4)	($3,032.4)	$0.1	

2016 Adjusted Charge Per Capita	**$1,023.21**

Allocation of Capital Program	
Residential Sector	72.5%
Non-Residential	27.5%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - DIFFERENTIATED (TOWNSHIPS)

PUBLIC TRANSIT	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
OPENING CASH BALANCE	$0.0	($707.1)	($946.0)	($915.4)	($907.3)	($869.5)	($830.3)	($761.0)	($641.6)	($361.8)	
2016-2025 RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$539.0	$183.5	$0.0	$49.1	$54.6	$49.1	$0.0	$0.0	$0.0	$0.0	**$875.4**
- Public Transit Services: Inflated (1)	$539.0	$187.1	$0.0	$52.2	$59.1	$54.3	$0.0	$0.0	$0.0	$0.0	**$891.7**
- Public Transit Infrastructure: Debenture Finance (1)	$374.3	$932.3	$932.3	$932.3	$932.3	$932.3	$932.3	$905.9	$774.2	$774.2	**$8,422.5**
- Public Transit (Inflated + Debenture Financed)	$913.3	$1,119.4	$932.3	$984.5	$991.4	$986.6	$932.3	$905.9	$774.2	$774.2	**$9,314.1**
NEW RESIDENTIAL DEVELOPMENT											
- Population Growth in New Units	435	1,750	1,880	1,895	1,922	1,874	1,791	1,789	1,786	1,856	**16,977**
REVENUE											
- DC Receipts: Inflated	$225.1	$924.8	$1,013.5	$1,041.9	$1,077.6	$1,072.1	$1,045.3	$1,064.4	$1,083.9	$1,149.5	**$9,698.1**
INTEREST											
- Interest on Opening Balance	$0.0	($38.9)	($52.0)	($50.3)	($49.9)	($47.8)	($45.7)	($41.9)	($35.3)	($19.9)	**($381.7)**
- Interest on In-year Transactions	($18.9)	($5.4)	$1.4	$1.0	$1.5	$1.5	$2.0	$2.8	$5.4	$6.6	**($2.1)**
TOTAL REVENUE	$206.2	$880.6	$962.9	$992.6	$1,029.2	$1,025.8	$1,001.6	$1,025.3	$1,054.0	$1,136.2	**$9,314.3**
CLOSING CASH BALANCE	($707.1)	($946.0)	($915.4)	($907.3)	($869.5)	($830.3)	($761.0)	($641.6)	($361.8)	$0.2	

2016 Adjusted Charge Per Capita	**$518.10**

Allocation of Capital Program	
Residential Sector	80.9%
Non-Residential	19.1%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
NON-RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - UNIFORM REGION-WIDE

PUBLIC TRANSIT	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE	$0.0	($656.9)	($2,096.0)	($2,518.0)	($3,023.1)	($3,388.6)	($3,571.5)	($3,381.4)	($2,869.2)	($1,560.3)	
2016-2025 NON-RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$2,290.2	$779.5	$0.0	$208.8	$232.0	$208.8	$0.0	$0.0	$0.0	$0.0	**$3,719.5**
- Public Transit Services: Inflated (1)	$2,290.2	$795.1	$0.0	$221.6	$251.2	$230.6	$0.0	$0.0	$0.0	$0.0	**$3,788.7**
- Public Transit Infrastructure: Debenture Finance (1)	$1,590.4	$3,961.4	$3,961.4	$3,961.4	$3,961.4	$3,961.4	$3,961.4	$3,849.0	$3,289.8	$3,289.8	**$35,787.6**
- Public Transit (Inflated + Debenture Financed)	$3,880.6	$4,756.6	$3,961.4	$4,183.1	$4,212.6	$4,192.0	$3,961.4	$3,849.0	$3,289.8	$3,289.8	**$39,576.4**
NEW NON-RESIDENTIAL DEVELOPMENT											
- New Non-Residential Gross Floor Area (Sq.M)	231,190	237,141	251,116	257,167	264,815	271,036	274,962	281,611	288,027	294,512	**2,651,577**
REVENUE											
- DC Receipts: Inflated	$3,241.3	$3,391.2	$3,662.9	$3,826.2	$4,018.8	$4,195.4	$4,341.3	$4,535.2	$4,731.3	$4,934.6	**$40,878.2**
INTEREST											
- Interest on Opening Balance	$0.0	($36.1)	($115.3)	($138.5)	($166.3)	($186.4)	($196.4)	($186.0)	($157.8)	($85.8)	**($1,268.6)**
- Interest on In-year Transactions	($17.6)	($37.5)	($8.2)	($9.8)	($5.3)	$0.1	$6.6	$12.0	$25.2	$28.8	**($5.8)**
TOTAL REVENUE	$3,223.7	$3,317.5	$3,539.4	$3,677.9	$3,847.2	$4,009.1	$4,151.5	$4,361.2	$4,598.7	$4,877.6	**$39,603.9**
CLOSING CASH BALANCE	($656.9)	($2,096.0)	($2,518.0)	($3,023.1)	($3,388.6)	($3,571.5)	($3,381.4)	($2,869.2)	($1,560.3)	$27.5	

2016 Adjusted Charge Per Square Metre	**$14.02**

Allocation of Capital Program	
Residential Sector	73.7%
Non-Residential	26.3%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
NON-RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - CITIES ONLY

PUBLIC TRANSIT	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**TOTAL**
OPENING CASH BALANCE	$0.0	($812.2)	($2,584.4)	($3,108.0)	($3,732.5)	($4,184.9)	($4,412.5)	($4,181.2)	($3,552.9)	($1,944.7)	
2016-2025 NON-RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$2,810.0	$956.5	$0.0	$256.2	$284.7	$256.2	$0.0	$0.0	$0.0	$0.0	**$4,563.7**
- Public Transit Services: Inflated (1)	$2,810.0	$975.6	$0.0	$271.9	$308.2	$282.9	$0.0	$0.0	$0.0	$0.0	**$4,648.6**
- Public Transit Infrastructure: Debenture Finance (1)	$1,951.3	$4,860.5	$4,860.5	$4,860.5	$4,860.5	$4,860.5	$4,860.5	$4,722.6	$4,036.4	$4,036.4	**$43,910.0**
- Public Transit (Inflated + Debenture Financed)	$4,761.4	$5,836.1	$4,860.5	$5,132.5	$5,168.7	$5,143.4	$4,860.5	$4,722.6	$4,036.4	$4,036.4	**$48,558.7**
NEW NON-RESIDENTIAL DEVELOPMENT											
- New Non-Residential Gross Floor Area (Sq.M)	201,364	206,563	218,807	224,166	230,877	236,351	239,841	245,723	251,419	257,193	**2,312,304**
REVENUE											
- DC Receipts: Inflated	$3,970.9	$4,154.9	$4,489.2	$4,691.1	$4,928.2	$5,145.9	$5,326.4	$5,566.1	$5,809.1	$6,061.3	**$50,143.1**
INTEREST											
- Interest on Opening Balance	$0.0	($44.7)	($142.1)	($170.9)	($205.3)	($230.2)	($242.7)	($230.0)	($195.4)	($107.0)	**($1,568.2)**
- Interest on In-year Transactions	($21.7)	($46.2)	($10.2)	($12.1)	($6.6)	$0.0	$8.2	$14.8	$31.0	$35.4	**($7.5)**
TOTAL REVENUE	$3,949.2	$4,064.0	$4,336.8	$4,508.0	$4,716.3	$4,915.8	$5,091.9	$5,350.9	$5,644.7	$5,989.8	**$48,567.4**
CLOSING CASH BALANCE	($812.2)	($2,584.4)	($3,108.0)	($3,732.5)	($4,184.9)	($4,412.5)	($4,181.2)	($3,552.9)	($1,944.7)	$8.7	

2016 Adjusted Charge Per Square Metre	**$19.72**

Allocation of Capital Program	
Residential Sector	67.7%
Non-Residential	32.3%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
NON-RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - DIFFERENTIATED (CITIES)

PUBLIC TRANSIT	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
OPENING CASH BALANCE	$0.0	($637.9)	($2,030.9)	($2,441.6)	($2,931.3)	($3,285.6)	($3,462.9)	($3,278.9)	($2,782.4)	($1,514.9)	
2016-2025 NON-RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$2,210.8	$752.5	$0.0	$201.6	$224.0	$201.6	$0.0	$0.0	$0.0	$0.0	**$3,590.5**
- Public Transit Services: Inflated (1)	$2,210.8	$767.6	$0.0	$213.9	$242.5	$222.6	$0.0	$0.0	$0.0	$0.0	**$3,657.3**
- Public Transit Infrastructure: Debenture Finance (1)	$1,535.2	$3,824.0	$3,824.0	$3,824.0	$3,824.0	$3,824.0	$3,824.0	$3,715.5	$3,175.7	$3,175.7	**$34,546.3**
- Public Transit (Inflated + Debenture Financed)	$3,746.0	$4,591.6	$3,824.0	$4,038.0	$4,066.5	$4,046.6	$3,824.0	$3,715.5	$3,175.7	$3,175.7	**$38,203.7**
NEW NON-RESIDENTIAL DEVELOPMENT											
- New Non-Residential Gross Floor Area (Sq.M)	201,364	206,563	218,807	224,166	230,877	236,351	239,841	245,723	251,419	257,193	**2,312,304**
REVENUE											
- DC Receipts: Inflated	$3,125.2	$3,270.0	$3,533.1	$3,692.0	$3,878.6	$4,050.0	$4,192.0	$4,380.7	$4,571.8	$4,770.4	**$39,463.8**
INTEREST											
- Interest on Opening Balance	$0.0	($35.1)	($111.7)	($134.3)	($161.2)	($180.7)	($190.5)	($180.3)	($153.0)	($83.3)	**($1,230.2)**
- Interest on In-year Transactions	($17.1)	($36.3)	($8.0)	($9.5)	($5.2)	$0.1	$6.4	$11.6	$24.4	$27.9	**($5.6)**
TOTAL REVENUE	$3,108.1	$3,198.6	$3,413.4	$3,548.2	$3,712.2	$3,869.4	$4,008.0	$4,212.0	$4,443.2	$4,715.0	**$38,228.0**
CLOSING CASH BALANCE	($637.9)	($2,030.9)	($2,441.6)	($2,931.3)	($3,285.6)	($3,462.9)	($3,278.9)	($2,782.4)	($1,514.9)	$24.4	

2016 Adjusted Charge Per Square Metre	**$15.52**

Allocation of Capital Program	
Residential Sector	72.5%
Non-Residential	27.5%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

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REGION OF WATERLOO
CASHFLOW AND DETERMINATION OF DEVELOPMENT CHARGE
TRANSIT
NON-RESIDENTIAL DEVELOPMENT CHARGE
(in $000)

TRANSIT - DIFFERENTIATED (TOWNSHIPS)

PUBLIC TRANSIT	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL
OPENING CASH BALANCE	$0.0	($35.2)	($113.8)	($136.1)	($163.4)	($183.3)	($193.3)	($183.0)	($155.3)	($84.3)	
2016-2025 NON-RESIDENTIAL FUNDING REQUIREMENTS											
- Public Transit Services: Non Inflated	$127.4	$43.4	$0.0	$11.6	$12.9	$11.6	$0.0	$0.0	$0.0	$0.0	**$206.9**
- Public Transit Services: Inflated (1)	$127.4	$44.2	$0.0	$12.3	$14.0	$12.8	$0.0	$0.0	$0.0	$0.0	**$210.7**
- Public Transit Infrastructure: Debenture Finance (1)	$88.4	$220.3	$220.3	$220.3	$220.3	$220.3	$220.3	$214.1	$183.0	$183.0	**$1,990.3**
- Public Transit (Inflated + Debenture Financed)	$215.8	$264.5	$220.3	$232.6	$234.3	$233.1	$220.3	$214.1	$183.0	$183.0	**$2,201.0**
NEW NON-RESIDENTIAL DEVELOPMENT											
- New Non-Residential Gross Floor Area (Sq.M)	29,826	30,578	32,309	33,001	33,938	34,685	35,121	35,888	36,608	37,319	**339,273**
REVENUE											
- DC Receipts: Inflated	$181.6	$189.9	$204.7	$213.3	$223.7	$233.2	$240.9	$251.1	$261.2	$271.6	**$2,271.2**
INTEREST											
- Interest on Opening Balance	$0.0	($1.9)	($6.3)	($7.5)	($9.0)	($10.1)	($10.6)	($10.1)	($8.5)	($4.6)	**($68.6)**
- Interest on In-year Transactions	($0.9)	($2.1)	($0.4)	($0.5)	($0.3)	$0.0	$0.4	$0.6	$1.4	$1.6	**($0.3)**
TOTAL REVENUE	$180.7	$185.9	$198.0	$205.3	$214.4	$223.1	$230.6	$241.7	$254.0	$268.5	**$2,202.3**
CLOSING CASH BALANCE	($35.2)	($113.8)	($136.1)	($163.4)	($183.3)	($193.3)	($183.0)	($155.3)	($84.3)	$1.3	

2016 Adjusted Charge Per Square Metre	**$6.09**

Allocation of Capital Program	
Residential Sector	80.9%
Non-Residential	19.1%
Rates for 2016	
Inflation Rate	2.0%
Interest Rate on Positive Balances	3.5%
Interest Rate on Negative Balances	5.5%

Region of Waterloo Transit DC

Technical Appendix

To be incorporated into the
Region's Development Charge
Background Study

Dillon Consulting Limited

July 2016

Region of Waterloo

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1. INTRODUCTION

The Region of Waterloo (the "Region") will continue to experience rapid growth in both population and employment over the next ten years, supported by a shift to increase investment in sustainable transportation infrastructure and services. Through the application of Development Charges ("DCs"), this growth must contribute an appropriate share of infrastructure capital costs for necessary transit improvements over the ten-year planning period. DCs are a tool for municipalities to ensure that "growth pays for growth". The *Development Charges Act* ("DCA") regulates when and how municipalities may collect DCs.

The provincial government recently enacted changes to the Development Charges Act, 1997 (the DCA) with direct implications for how the Region and other municipalities plan and fund future transit services. Historically, transit services could only be funded through DCs in the following manner:

- Service costs could only be recovered at up to 90% of total capital cost due to a DCA 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. Although the Region is endeavouring to adjust travel behaviours and mode shares to prioritize transit and active transportation modes, this resulted in very limited development charge recovery of the Region's transit services required to accommodate future growth.

The Transportation and Transit DC Study that Dillon undertook in 2014 as an input into the DC Background Study looked at a variety of methods to recover growth-related transit infrastructure within the Region. Since the 2014 Transportation and Transit DC Study, two major changes in the DCA came into effect in January 2016 that directly impact the Region'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 transit services to be 100% recoverable through development charges.
- 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 development charge calculations and apportion them to growth accordingly. It also

included new highly prescriptive reporting requirements associated with the background reporting for development charges.

The purpose of this memo is to provide an update to the Region of Waterloo 2014 Transportation and Transit DC Study related to the transit expenditures that can be funded through development charges and to inform the Region's 2016 Development Charges Background Study for Transit and Waste Management prepared by Hemson Consulting.

2. BACKGROUND

With a population of just over half a million, the Region of Waterloo is currently the fourth largest urban area in Ontario. It is also one of the fastest growing communities. Historically, the Region of Waterloo has experienced significant growth and is expected to continue to grow to approximately 729,000 people and 366,000 jobs by 2031[1]. The Regional Official Plan guides development and growth within the Region for the next 20 years. It has planned for the majority of the population and employment growth to be within the Urban Area designation within the municipalities of Cambridge, Kitchener and Waterloo. The Urban Areas are well serviced by the existing Regional transit system, which is intended to be further enhanced through the introduction of rapid transit. The majority of growth is planned to occur through transit oriented development built-forms within the Urban Growth Centres, Major Transit Station Areas, Reurbanization Corridors, Major Local Nodes and Urban Designated Greenfield Areas. This development is intended to facilitate walking and transit use for everyday activities by providing a greater mix of medium to high density land uses within an easy walk of Major Transit Station Areas or a higher frequency transit stop.

The 2010 Regional Transportation Master Plan (RTMP), which demonstrates Council's approved policies and practices to guide transportation decision-making for the next 20 years, establishes a multi-modal system of integrated transportation infrastructure needed to support the vision of growth for the Region to 2031. The preferred rapid transit corridor (LRT and aBRT) recommended in the Rapid Transit Environmental Assessment[2] formed part of the '2031 base case scenario'. The 2010 RTMP assessment identified that 210 lane kilometres of the existing major road network in the urban municipalities are at or over capacity during the afternoon peak hour. If the Region did nothing, this would result in 500 km of the major road network being at or over capacity by 2031.

To address these future deficiencies, a transit-oriented plan with strategic road improvements was carried forward as the basis for developing the 2010 RTMP. The network improvements needed to achieve the approved transit-oriented plan was identified through the RTMP, GRT Business Plans and carried forward into the Region's Transit Capital Plan for implementation.

[1] Based on the Region of Waterloo Official Plan 2031, as approved with modifications by the Ontario Municipal Board on June 18, 2015
[2] Phase 2 Summary Report, 2009 ("RT EA")

3. APPROACH

The Region's Transit Capital Plan, which builds on the transportation program identified from the RTMP, GRT Business Plan and other Regional planning document, demonstrates the planned transit level of service for the Region.

The Development Charges Act (DCA) indicates that transit must be a discrete service (which precludes treating transportation services (roads and transit) together), that no portion of the service that is intended to benefit anticipated development after the ten-year period may be included in the estimate and that no portion of service that is anticipated to exist as excess capacity at the end of the ten-year period may be included in the estimate. The DCA also requires a reduction in the eligible capital expenditures based on the extent to which an increase in service benefits existing development.

The 2010 RTMP PM peak hour ridership was used as the source for all assessment of benefits, as it presents the council approved forecast that was used to determine the planned transit program. Exhibit 5-7 and 7-2 from the 2010 RTMP, as presented in **Table 3-1** and **3-2** below, were used to determine the allocation of benefit. The base year 2016 total trips and the interim year 2025 transit and total trips used in the DC calculations were extrapolated.

Table 3.1: PM Peak Hour Transit Ridership (Exhibit 5-7 from the 2010 RTMP)

Exhibit 5-7. Characteristics of Alternative Transit Oriented Networks (PM peak hour)

Alternative	Transit Concepts	Horizon Year					
		2016		2021		2031	
		Trips	Transit Share*	Trips	Transit Share*	Trips	Transit Share*
A	High Frequency, High Transfer	9,200	6%	11,600	6.5%	13,100	8.3%
B	Medium Frequency, Low Transfer	9,200	6%	12,400	6.9%	21,900	13.8%
C	High Frequency, Low Transfer	9,200	6%	20,000	13.0%	27,100	17.3%

*Transit Share refers to the share of motorized trips

Please Note: Alternative C was the preferred transportation program from the 2010 RTMP.

Table 3.2: Regional Mode Share Targets (Exhibit 7-2 from the 2010 RTMP)

Exhibit 7-2. Regional Mode Share Targets[1]

Mode	2006 PM Peak Hour		2031 PM Peak Hour	
	Person Trips	Share	Target	Person Trips
Auto Driver	85,038	69.6%	58.0%	106,422
Auto Passenger	19,098	15.6%	12.0%	22,073
Local Transit	4,651	3.8%	14.8%[2]	27,101
School Bus	3,294	2.7%	2.7%	4,954
Cycle	841	0.7%	3.0%	5,505
Walk	8,719	7.1%	9.0%	16,514
Other	514	0.4%	0.5%	917
Total	122,154	100.0%	100.0%	183,487

1: Across entire Region, some corridors will have higher targets
2: Transit mode share target as a percentage of total person trips. The 17.3% transit target used in Section 5 of the report refers to the share of motorized trips only.

The base year for this DC calculation is 2016. As the need and justification for the transit program is based on a planning horizon of 2031 (and associated ridership forecasts), post-period capacity is assessed based on infrastructure associated with growth between the end of this DC period (2025) and the end of the planning horizon (2031).

The benefit to existing deduction was calculated based on the relative change in ridership among the existing base and new population and employment growth. To determine the benefit to existing, transit trips as a portion of all trips (known as transit mode share) was considered. The Region is planning for an increase in transit mode share (during the PM peak hour, the Region-wide transit mode share is planned to increase from 3.8% of all trips in 2006 to 14.8% of all trips in 2031). To achieve this increase and recognizing that the propensity to use transit varies based on built form, density and access to higher-order transit, the RTMP allocated planned transit mode share targets by traffic zone. The transit mode share by traffic zone was assessed, along with other available information to determine the appropriate transit mode share targets for existing base and new growth. Based on this assessment, existing base was assumed to achieve 95% of the Region-wide transit mode share target, with the remaining increase in transit usage coming from new growth. The transit mode share targets for existing base and new growth are presented in **Table 4-1**.

4. RESULTS

Table 4-1 presents the information used to determine the benefit to existing and post period deductions. The following subsections present the calculations used. **Figure 4.1** presents a summary of the results.

The benefit to existing base for the 2016-2025 DC period is 51%. The DC eligible growth related benefit for the 2016-2025 DC period is 25%. The post planning period benefit for existing base and new growth, to be considered for future DC studies (2025-2031) is 24%.

Table 4-1: Summary of Data Used in DC Calculations

	2016	**2025**	**2031**	***Growth (2016-2025)***	***Growth (2016-2031)***
PM peak hour transit ridership	9,200	22,840	27,101	*13,640*	*17,901*
PM peak hour all trips	146,687	173,004	183,486	*26,317*	*36,779*
Existing Base Transit Mode Share	6.3%	12.5%	14.0%		
New Growth Transit Mode Share	N/A	16.9%	17.7%		
Region-wide Transit Mode Share	6.3%	13.2%	14.8%		

Benefit to Existing Calculation

***Please Note**: Values in the table have been rounded. Due to rounding, the mathematical equations below do not necessarily sum exactly to the totals shown.*

Increase in PM peak hour transit trips for existing base (2016-2025) = (146,687 x 12.5%) – 9,200 = 9,198
Increase in PM peak hour transit trips for new growth (2016-2025) = (13,640 - 9,198) = 4,443

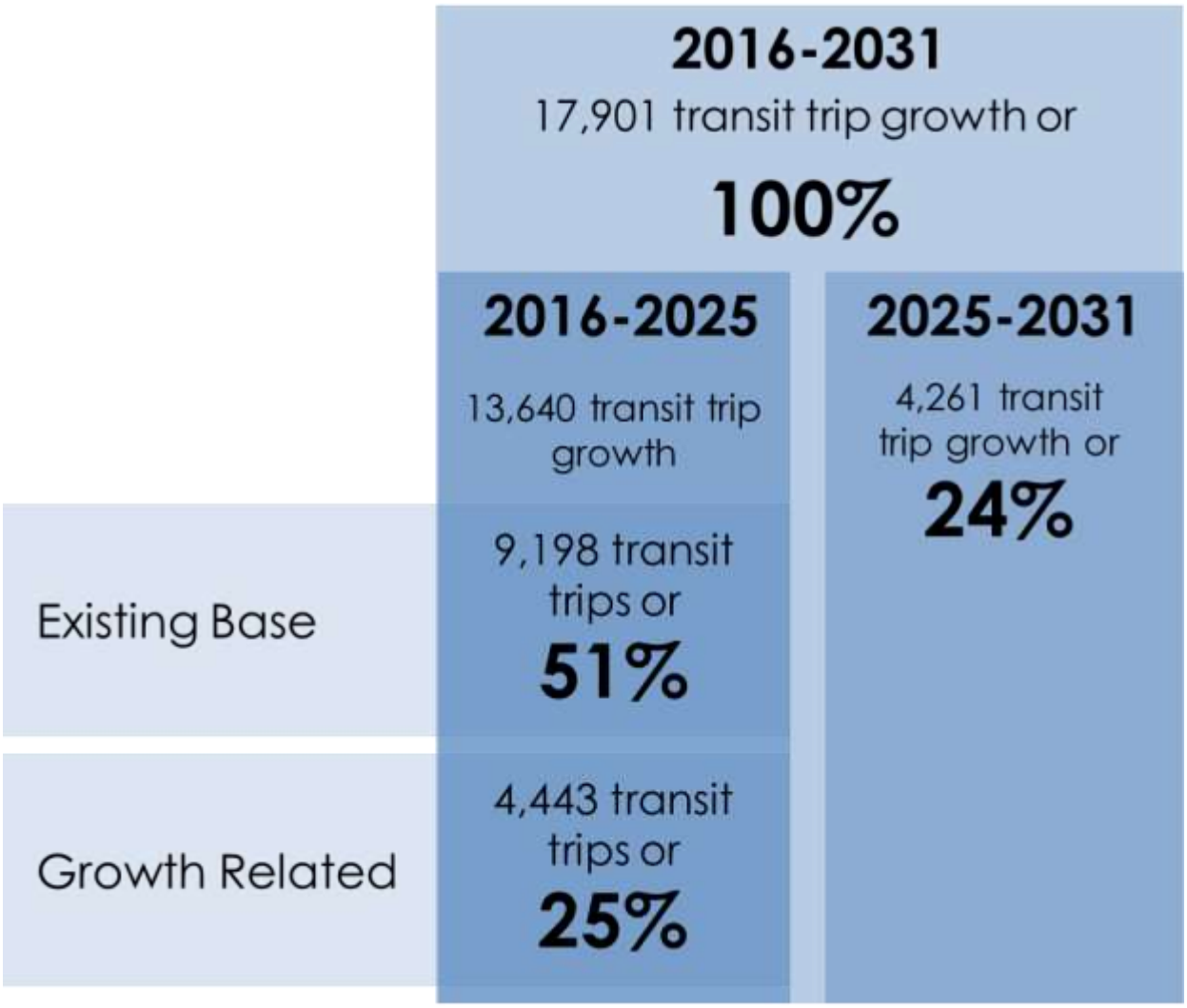
Benefit to existing (2016-2025) = (9,197/17,901) = **51.4%**
DC eligible growth related benefit (2016-2025) = (4,443 / 17,901) = **24.8%**

Post-Planning Period Benefit

Increase in PM peak hour transit trips (2025-2031) = (17,901 – 13,640) = 4,261 (existing base and new growth)

Post planning period benefit (existing base and new growth) = (4,261 / 17,901) = **23.8%**

Figure 4-1: Summary of BTE and Post-Planning Period Benefit



***Please Note**: Values in the figure have been rounded. Due to rounding, the percentages do not necessarily sum exactly to the totals shown.*

APPENDIX E

TRANSIT SERVICES:

ASSET MANAGEMENT PLAN & LONG TERM CAPITAL AND OPERATING COST EXAMINATION

APPENDIX E

TRANSIT SERVICES ~ ASSET MANAGEMENT PLAN & LONG TERM CAPITAL AND OPERATING IMPACT EXAMINATION

A. ASSET MANAGEMENT PLAN

Section 10 of the *Development Charges Act* identifies what must be included in a Development Charges Background Study, this appendix deals with two of those requirements for Transit Services, namely:

> s.10 (2) The development charge background study shall include,
>
> (c) an examination, for each service to which the development charge by-law would relate, of the long term capital and operating costs for capital infrastructure required for the service;
>
> (c.2) an asset management plan prepared in accordance with subsection (3);
>
> Asset management plan
>
> (3) The asset management plan shall,
>
> (a) deal with all assets whose capital costs are proposed to be funded under the development charge by-law;
>
> (b) demonstrate that all the assets mentioned in clause (a) are financially sustainable over their full life cycle;
>
> (c) contain any other information that is prescribed; and

The requirement to include an asset management plan was part of the DCA amendments that came into effect on January 1st 2016. A key function of the Asset Management Plan is to demonstrate that all assets proposed to be funded under the development charges by-law are financially sustainable over their full life cycle.

This appendix addresses both requirements for the transit infrastructure to be funded by the calculated transit DC rates included in this Background Study. The analysis will address two type of transit works separately:

1. Rapid Transit and Related Infrastructure
2. Conventional Buses and Other Transit Infrastructure

1. Light Rapid Transit Project

The Light Rapid Transit (LRT) project and related infrastructure represents the greatest share, over 80%, of the transit capital costs considered under this Development Charges Study and proposed to funded from DCs. Stage 1 of the LRT project is currently under construction and prior to approving and initiating the project the Region undertook a significant amount of background work and analysis. A central part of the background analysis was a comprehensive business case and financial analysis.

The following provides links to some of the key documents and staff report that address the financial components of the LRT project:

- **Business Case Region of Waterloo Rapid Transit Project, March 2009**

  http://rapidtransit.regionofwaterloo.ca/en/projectinformation/resources/Draft2009RapidTransitBusinessCase.pdf

- **ION Update, March 2014**

  http://rapidtransit.regionofwaterloo.ca/en/multimedialibrary/resources/MarchIONUpdate.pdf

- **Region of Waterloo Staff Report F-14-062, Finance Department, Stage 1 Light Rail Transit Project: Commercial and Financial Close with GrandLinq GP May 27, 2014**

  http://rapidtransit.regionofwaterloo.ca/en/multimedialibrary/resources/F-14-062Stage1LRTProjectCommercialFinancialCloseGrandLinq.pdf

The Business Case provides an excellent overview of the project and includes a consideration of many of the requirements set out in the amended O.Reg. 82/98. The introduction to the Business Case establishes the rationale for undertaking the project:

> *Growth management is critical as the Region continues to plan for significant population and employment growth over the next two decades. The Provincial Growth Plan for the Greater Golden Horseshoe projects that the Region's population will increase by 45 per cent to 729,000 people by 2031, and that employment will increase by 44 per cent to 366,000 by 2031. A rapid transit system has the potential to encourage a more compact urban form, helping to prevent sprawl and protecting sensitive environmental landscapes and farmlands from urban encroachment. The rapid transit system that the Region is considering has the dual goals of 1) providing transportation choice and meeting future transportation needs and 2) building a viable, vibrant and sustainable community.*

The Business Case and the subsequent Staff Report and ION Updates provide a thorough examination of:

- Planned actions to achieve the Council approved project, level of service, in a sustainable way;
- Ongoing financial analysis that considers life cycle costs, direct and indirect costs and benefits, and risk assessment and mitigation; and
- The various studies examined non-infrastructure solutions, maintenance activities, renewal and rehabilitation activities, disposal, and future expansion.

As the LRT will be a new service for the Region of Waterloo there is no historical expenditure data to provide.

Regional Council has approved the capital budget for the LRT and the Region undertook a comprehensive procurement and tendering process. The Background section of the May 27, 2014 provides a summary of the Council approval and procurement process:

> *Background*
>
> *In June 2011, Regional Council approved Light Rail Transit (LRT) from Waterloo to Cambridge as the preferred rapid transit solution for the Region. Council also approved constructing LRT in stages, to best match technology with projected ridership and development, and to ensure the project could be built affordably. Stage 1 includes LRT from north Waterloo to south Kitchener, and adapted Bus Rapid Transit from south Kitchener to downtown Cambridge (Galt). Also in 2011, Council approved a capital budget of $818 million for the project, and a funding strategy (based on net property tax increases of 0.7% per year for 7 years) to fund the operating, maintenance and financing costs of the system.*
>
> *In February 2012, Regional Council approved developing the project through a Design Build-Finance-Operate-Maintain (DBFOM) approach with a private-sector partner. This approach was selected because it provided the best balance of Regional control and ownership, while transferring appropriate risks to the private sector, and taking advantage of private sector innovation. It also provided the greatest assurance of completing the project on time and within budget.*
>
> *In March 2013, the Region identified a short-list of 3 DBFOM teams, and issued a request for proposals (RFP) to these 3 teams. In December 2013, the Region received proposals from the 3 short-listed teams.*

In March 2014, the Region approved entering into a contract with GrandLinq GP for the construction of Stage 1 of the Light Rail Project, together with financing, operations, maintenance and lifecycle rehabilitation for a term of up to 30 years.

The DBFOM agreement provides for the full funding of the LRT system including: capital, operations, maintenance, lifecycle and insurance. The Commercial Close, execution of the finalized Project Agreement and ancillary agreement occurred on May 6, 2014 and the Financial Close occurred three business days later on May 9, 2014. The May 27, 2014 Staff Report includes a table that summarizes the Program Agreement Costs. Table 1 from the Staff Report is included on the following page for reference purposes.

As is shown on Table 1, the Region has determined and planned for the full capital, operating and lifecycle costs of the LRT project. The Region's approved budgets include these costs and funding, including the property tax increase of 1.5% for 7 years.

The Region has fully satisfied the Asset Management Plan requirements of s.10(3) and shown that the LRT assets are financial sustainable over their full life cycle.

Table 1 ($ in millions)

Project Agreement Costs During the 30 Year Operations and Maintenance Term

Project Agreement Component	Annual cost	Total cost (30 years)	Payment details	Subject to inflation (yes/no)
Finance (note 1)	$10.6 (previously $11.0)	$318.9 (previously $330.4)	Paid monthly for 30 years (mid 2017-mid 2047). This includes the $130.7m in withheld capital described above plus the costs of GrandLinq's financing and other corporate costs such as audit, legal, agency rating fees, etc.	No (note 1)
Operations	$4.0	$121.1	Paid monthly for 30 years (360 payments) from mid-2017 to mid-2047	Yes (note 2)
Maintenance	$4.5	$135.9	Paid monthly for 30 years (360 payments) from mid-2017 to mid-2047	Yes (note 2)
Lifecycle	$8.8	$263.1	Paid monthly for 30 years (360 payments) from mid-2017 to mid-2047 – payments vary by year	Yes (note 2)
Insurance	$1.7	$51.0	Paid monthly for 30 years (360 payments) from mid-2017 to mid-2047	Yes (note 2)
Total	$29.6 (previously $30.0)	$890.0 (previously $901.5)	Payments vary by year for lifecycle costs.	

Notes:

1. The cost of financing in GrandLinq's bid was based on long term Government of Canada bond yields in effect as of December 13, 2013 (one business day prior to the date the bids were submitted). The final cost of long term financing was set on the date of Commercial Close (May 6, 2014) and Financial Close occurred on May 9, 2014. These costs are now fixed for the 30-year term and not subject to inflation or refinancing risk.

2. The Operations, Maintenance, Lifecycle and Insurance costs shown above reflect the base service level only, and are unchanged from the amounts presented to Committee on March 4, 2014.

2. Conventional Transit (GRT) Assets

A summary of the future municipal-owned assets and estimated useful life assumptions considered under this Development Charges Study is outlined in Table 2 for the GRT conventional transit facilities and vehicles. Although all capital assets considered in the study have been identified, not all assets necessitate future replacement or ongoing maintenance activities. Some exceptions apply and the justification is as follows:

Some of the works identified may represent one-time expenditures and may be temporary in nature. Therefore, the assets would not be required to be replaced and no ongoing operation and maintenance costs exist. Such assets are identified as "not a long-term asset" in the table.

Some projects do not relate to the emplacement of a tangible capital asset– some examples include the acquisition of land or the undertaking of development-related studies. These projects/costs do not necessarily require future replacement or ongoing maintenance. Such projects are identified as "not infrastructure" in the table.

It should be noted that the capital cost estimates prepared for each of the projects' identified in this study include grouped costs of various individual elements, which, as a stand-alone item, may have its own useful life (ex. New buildings include: HVAC, structural elements, roof, etc.). Accordingly, the average useful life assumptions noted below are applicable to all project components.

Table 2 – Summary of Conventional Assets Considered	
Capital Project Description	**Estimated Useful Life**
Land	not infrastructure
Transit Garage, Plaza and Terminal	40 years
Transit Fleet – Type of Buses to be Acquired	14 years
Technology Implementation	8 years

Summary of Capital Program

Table 3 provides a summary of the conventional transit capital program by the major asset type. The capital costs and 2016-2025 DC recoverable shares are drawn from Appendix C Table 1.

Table 3 – Summary of Development-Related Capital Program[1]			
Capital Project Description	**Estimated Useful Life**	**Gross Cost**	**2016-2025 DC Recoverable**
Land	not infrastructure	$8,237,192	$1,453,152
Transit Garage, Plaza and Terminal	40 years	$83,880,000	$9,768,318
Transit Fleet	14 years	$23,000,000	$3,263,650
Technology Implementation	8 years	$14,027,000	$916,257

1) Note: capital costs exclude the financing costs associated with the Northfield Drive Garage expansion.

Annual Provision

When assets require rehabilitation or are due for replacement, the source of funds is limited to reserves or contributions from operating. The Region also issues debt to cover costs association with rehabilitation. Capital expenditures to carry out the rehabilitation and replacement of aging infrastructure are not growth-related, and therefore, are not eligible for funding through development charge revenues or other developer contributions.

Based on the information obtained through discussions with Region staff regarding useful life assumptions and the capital cost of acquiring and/or emplacing each asset, a provision for infrastructure replacement has been calculated. Provisions for infrastructure replacement are initially calculated for each asset based on their useful life and the anticipated cost of replacement. The aggregate of all individual provisions form the required annual capital provision. In calculating the annual provisions, a number of assumptions are made to account for inflation (2.0%) and interest (3.5%). Consistent with the requirements of the Development Charge Act, only the assets that are proposed to be funded under the development charges by-law have been included in the analysis. As a result, the total calculated annual provision has been netted down to consider the replacement of existing infrastructure or benefit-to-existing development.

Table 4 illustrates that, by 2025, the Region will need to fund an additional $5.71 million per annum in order to properly fund the full life-cycle costs of the new assets supported under this Development Charges By-Law. Annual life cycle provisions for the share of costs included in the development charge rate calculations total $622,000.

Table 4 – Calculation of Maximum Annual Provision – DC Funded Conventional Transit

Capital Project Description	Estimated Useful Life	2016-2025 DC Recoverable	Non-DC Funded	Non-DC Related Life Cycle AMP Annual Provision	DC Related Life Cycle AMP Annual Provision
Transit Garage, Plaza and Terminal	40 years	$9,768,318	$74,111,682	$1,957,000	$256,000
Transit Fleet	14 years	$3,263,650	$19,736,350	$1,504,000	$251,000
Technology Implementation	8 years	$916,257	$13,110,743	$1,626,000	$115,000
Total Annual Provision				**$5,087,000**	**$622,000**

Over 40% of the $622,000 calculated annual provision is for transit fleet. The Region utilizes a comprehensive transit vehicle replacement program that is fully funded through the current budget by way of reserve contributions/withdrawals and debt funding. A June 14, 2016 Regional Staff Report, COR-FSD-16-15 dealing with capital financing principles, includes the following:

> *Vehicle and equipment replacement and asset renewal/lifecycle projects should be financed through reserves and current year revenues from property tax and user rate sources, and not through long term borrowing. The use of debentures to finance such capital investments will be phased out, subject to annual budget approval and available funding. Implementing the Building Lifecycle provision in 2014 is one way in which Council is making progress towards this goal. This approach provides a source of financing for renewal projects at Regional facilities and Housing units in lieu of debenture financing. In addition, repurposing Transit debt servicing cost savings as a transfer to the*

Bus Replacement Reserve has been a good step toward the goal of financing 100% of bus replacements from reserves in lieu of debenture financing. The Region is currently at approximately 50% of this goal.

The same Staff Report includes the following:

The purpose and benefits of adopting capital funding and financing principles are to:

- *Promote long term corporate financial sustainability;*
- *Identify appropriate sources of funding and financing for capital works.*

These principles are being applied to the capital works being funded through this Development Charges Background Study and are aimed, in part, to ensure the full life cycle financial viability of the assets receiving DC funding.

The Region's 2016-2025 Capital Budget and Forecast, upon which the DC Background Study is based, includes significant reserve fund contributions for the long-term maintenance and replacement of transit assets. The following is an overview of the main transit reserves:

3980065 Facility Lifecycle

3982250 GRT Service Vehicle Reserve

3982260 GRT Bus Reserve

3982280 GRT Mobility Plus North Vehicle Reserve

3982290 GRT Mobility Plus Rural Vehicle Reserve

3982300 GRT Transmission Rebuild Reserve

3984010 Transit Capital RF

B. OPERATING COST IMPLICATIONS

This section provides a brief examination of the long-term operating costs for the capital facilities and infrastructure to be included in the Development Charges By-law for Conventional (GRT) Transit. This examination is required as one of the features of the *Development Charges Act, 1997.* Operating cost implications associated with the LRT have already been calculated by the Region and are summarized in Section A of this appendix.

The Region's 2016 Budget identifies a net transit (excluding LRT) expenditure of $53.4 million to be funded from property taxes. The net transit levy is funded from property taxes in the urban service area. The net transit levy equates to an expenditure of approximately $70/population + employment (based on the 2016 estimate population of 499,512 and employment of 271,013 in the cities). It is important to note that a share, approximately 15%, of the expenditures are capital in nature

The 2016-2025 forecast of population and employment growth in the cities is 124,852 (90,034 and 34,818 respectively) which would yield an increase in net levy expenditures of $8.7 million by 2025, based on the 2016 budget. As noted above, a share of the projected increase in annual tax levy is related to capital needs, including asset life cycle costing, and therefore overlaps with the estimates shown above under the asset management plan.

C. SUMMARY

In total, the annual asset management and operating cost provisions required for the maintenance of the development-related Transit capital program amount to $38.92 million by 2025. As shown in Table 5, this includes $29.60 million for Light Rapid Transit, which the Region has already incorporated into annual budgeting, and an additional $9.32 million, which has been calculated as part of this study for conventional transit based on life-cycle assumptions and budgeted operating costs per household.

Given that the Region has already accounted for the most significant share of this annual provision (LRT), dedicated property tax increases over the next seven years, and the increasing assessment base by 2025, it is determined that all assets included in this development charge study are financially sustainable over their full life cycle.

Table 5 – Summary of Transit Services Maximum Annual Provision	
Capital Project Description	**DC –Related Life Cycle AMP Annual Provision**
Light Rapid Transit	
Finance	$10,600,000
Maintenance	$4,500,000
Lifecycle	$8,800,000
Insurance	$1,700,000
Annual Operating Cost Impacts	$4,000,000
Subtotal Light Rapid Transit	*$29,600,000*
Conventional Transit	
Transit Garage, Plaza & Terminal	$256,000
Transit Fleet	$251,000
Technology Implementation	$115,000
Annual Operating Cost Impacts	$8,700,000
Subtotal Conventional Transit	*$9,322,000*
Total Annual Provision	**$38,922,000**

APPENDIX F

WASTE MANAGEMENT SERVICES:

ASSET MANAGEMENT PLAN & LONG TERM CAPITAL AND OPERATING COST EXAMINATION

APPENDIX F

ASSET MANAGEMENT PLAN

A. ASSET MANAGEMENT PLAN

The *Development Charges Act* was amended in late 2015 and, effective January 1st 2016, municipalities are required to complete an Asset Management Plan before the passing of a development charges by-law. A key function of the Asset Management Plan is to demonstrate that all assets proposed to be funded under the development charges by-law are financially sustainable over their full life cycle.

1. Asset Types

A summary of the future municipal-owned assets and estimated useful life assumptions considered for Waste Management Services under this Development Charges Study is outlined in Table 1. Although all capital assets considered in the study have been identified, not all assets necessitate future replacement or ongoing maintenance activities. The one exception and the justification is as follows:

- The curbside separated organic collection project does not relate to the emplacement of a tangible capital asset, and therefore, this project/cost does not necessarily require future replacement. This project is identified as "not infrastructure" in the table.

It should be noted that the capital cost estimates prepared for each of the projects' identified in this section include grouped costs of various individual elements, which, as a stand-alone item, may have its own useful life (ex. New buildings include: HVAC, structural elements, roof, etc.). Accordingly, the average useful life assumptions noted below are applicable to all project components.

Table 1 – Summary of General Services Assets Considered

Capital Project Description	Estimated Useful Life
Scale System and Buildings	40 Years
Materials Recycling Centre	50 Years
Transfer Building Upgrade	50 Years
Compost Pad Expansion	20 Years
Waterloo Scale Systems	40 Years
Waterloo Transfer Station Upgrade	20 Years
New Vehicles	7 Years
Curbside Separated Organic Collection	Not Infrastructure

2. Annual Provision

When assets require rehabilitation or are due for replacement, the source of funds is limited to reserves, contributions from operating, or the issuance of debt. Capital expenditures to carry out the rehabilitation and replacement of aging infrastructure are not growth-related, and therefore, are not eligible for funding through development charge revenues or other developer contributions.

Based on the information obtained through discussions with Region staff regarding useful life assumptions and the capital cost of acquiring and/or emplacing each asset, a provision for infrastructure replacement has been calculated. Provisions for infrastructure replacement are initially calculated for each asset based on their useful life and the anticipated cost of replacement. The aggregate of all individual provisions form the required annual capital provision. In calculating the annual provisions, a number of assumptions are made to account for inflation (2.0%) and interest (3.5%). Consistent with the requirements of the Development Charge Act, only the assets that are proposed to be funded under the development charges by-law have been included in the analysis. As a result, the total calculated annual provision has been netted down to consider the replacement of existing infrastructure or benefit-to-existing development.

Table 2 illustrates that, by 2025, the Region will need to fund an additional $1.51 million per annum in order to properly fund the full life-cycle costs of the new assets supported under this Development Charges By-Law. Annual life cycle provisions for the share of costs included in the development charge rate calculation total $813,000. The calculated life-cycle funding requirement equal of $813,000 equates to 1.57% of the Region's 2016 waste management total own source revenues of $51.8 million (tax levy of $38.2 million and user fees/charges of $13.6 million). The calculated annual funding provision should be considered within the context of the Region's projected growth; over the next ten years (to 2025) the Region is projecting an increase of about 45,700 households, which represents an 18% increase over the existing base as well as approximately 39,000 new employees. This growth will have the effect of increasing the overall assessment base and additional user fee and charges revenues to offset the capital asset provisions required to replace the infrastructure proposed to be funded under the development charges by-law. The collection of these funds is intended to be allocated to reserves for the future replacement of these assets.

The calculated annual provisions identified in Table 2 are considered to be financially sustainable as it is expected that the increased capital asset management requirements can be absorbed by the tax and user base over the long-term.

Table 2 - Calculation of Maximum Annual Provision – DC Funded Waste Management				
Capital Project Description	**2016-2025 DC Recoverable**	**Non-DC Funded**	**Non-DC Related Life Cycle AMP Annual Provision**	**DC Related Life Cycle AMP Annual Provision**
Curbside Separated Organics Collection	$326,100	$1,988,900	N/A	N/A
Scale Systems and Buildings	$171,600	$1,046,400	$28,000	$5,000
Materials Recycling Centre	$638,200	$3,892,800	$73,000	$12,000
Transfer Building Upgrade	$805,800	4,915,200	$105,000	$17,000
Compost Pad Expansion	$325,900	$1,988,100	$81,000	$13,000
Waterloo Scale Systems	$383,100	$2,336,900	$63,000	$10,000
Transfer Station	$799,100	$4,873,900	$264,000	$43,000
New Vehicles	$5,285,600	$587,300	$79,000	$713,000
Total Annual Provision			**$693,000**	**$813,000**

B. OPERATING COST IMPLICATIONS

This section provides a brief examination of the long-term operating costs for the capital facilities and infrastructure to be included in the Development Charges By-law for Waste Management Services. This examination is required as one of the features of the *Development Charges Act, 1997.*

Table 3 summarizes the estimated increase in net operating costs that the Region will experience for additions associated with the planned capital program. This estimate is based on a high-level analysis of operating cost impacts using the Region's 2016 budget. As identified in the Region's 2016 budget, the cost for waste management per typical household is estimated to be $153. As the Region is expecting an increase of 45,730 households over the next ten-years, by 2025, the Region's net waste management operating costs are estimated to increase by nearly $7 million. It should be noted that a share, approximately 2%, of the total expenditures are related to contributions to reserves. Therefore, a share of the projected increases in annual operating expenditures may be related to asset life cycle costing and overlaps with the estimates shown above under the asset management plan.

Table 3 – Summary of Operating Cost Impact		
Year	**Household Growth**	**Cumulative Operating Cost Impact**
2016	3,765	$576,100
2017	4,468	$1,259,700
2018	4,565	$1,958,200
2019	4,664	2,671,800
2020	4,765	3,400,800
2021	4,868	4,145,600
2022	4,528	4,838,400
2023	4,607	$5,543,300
2024	4,698	$6,262,200
2025	4,801	$6,996,700

APPENDIX G

AMENDED DEVELOPMENT CHARGES BY-LAW
AVAILABLE UNDER SEPARATE COVER

APPENDIX H

ADDITIONAL CORRESPONDENCE
AVAILABLE UNDER SEPARATE COVER