

**MANAGING  
INFRASTRUCTURE CAPACITY  
TO SUPPORT  
INTENSIFICATION AND INFILL  
A STRATEGIC APPROACH**

# TABLE OF CONTENTS

	<b>Page</b>
<b>EXECUTIVE SUMMARY WITH SUMMARY OF POLICIES.....</b>	<b>4</b>
<b>BACKGROUND INFORMATION.....</b>	<b>10</b>
<b>CAPACITY MANAGEMENT POLICIES AND IMPLEMENTATION</b>	
<b><i>ADDRESSING CAPACITY MANAGEMENT CHALLENGES AND OPPORTUNITIES</i></b>	
1.0 SPECIFY CONDITIONS UNDER WHICH INTENSIFICATION AND INFILL IS ENCOURAGED .....	11
2.0 INTENSIFICATION CONSTRAINT AREAS IDENTIFIED.....	12
3.0 PRIORITY INTENSIFICATION AREAS IDENTIFIED.....	13
4.0 MAKE COLLECTOR AND SPINE CAPACITY AVAILABLE FOR INTENSIFICATION AND INFILL .....	15
5.0 RESERVE LOCAL CAPACITY FOR INTENSIFICATION AND INFILL.....	16
6.0 ADD ‘GROWTH POTENTIAL’ TO REHABILITATION CRITERIA PRIORITIES.....	17
7.0 ASSESS IMPACTS OF CLIMATE CHANGE ON CAPACITY MANAGEMENT .....	18
<b><i>PUBLIC AND PRIVATE CAPACITY IMPROVEMENT PROJECTS</i></b>	
8.0 POTENTIAL EXTRANEIOUS FLOW REMOVAL PROJECTS .....	19
9.0 INITIATIVES TO PROTECT PRIVATE PROPERTY.....	20
10.0 ALTERNATIVE COMPENSATION PROJECTS .....	22
11.0 DISCOURAGE DESIGN FEATURES THAT INCREASE FLOODING.....	23
12.0 USE OF GREEN BUILDING TECHNOLOGY.....	24
<b><i>RELATED PUBLIC EDUCATION PROGRAMS</i></b>	
13.0 BENEFITS OF INTENSIFICATION FOR CAPACITY.....	26
<b><i>FUNDING CAPACITY WORKS</i></b>	
14.0 FRONT-ENDING: INFRASTRUCTURE REQUIRED BY INTENSIFICATION.....	27
15.0 PURSUING WATER EFFICIENCY AND FLOW REMOVAL SAVINGS.....	28
16.0 EXPLORING ALTERNATIVE FUNDING SOURCES.....	30

**MONITORING CAPACITY MANAGEMENT INITIATIVES**

17.0 MONITORING AND EVALUATING PROGRESS.....31

APPENDIX A - GLOSSARY OF TERMS .....33

APPENDIX B - GUIDELINES RE LANDOWNER EMPLACEMENT OF LOCAL SERVICES .....36  
UNDER DEVELOPMENT AGREEMENTS

## EXECUTIVE SUMMARY

Ottawa's Official Plan promotes growth through intensification and infill inside the Greenbelt. The environmental and economic benefits include: making use of existing transportation, infrastructure, recreation and other services and reducing the need to absorb large tracts of additional agricultural and general rural land. Ottawa cannot afford the capital costs associated with unchecked Greenfield development. It is not sustainable. This has been recognized for many years. The intensified use of land within the Greenbelt, however, does not come without its own challenges. The Capacity Management Strategy is intended to address the City's infrastructure challenges within the overall policy direction of the Official Plan and by supplementing other policies contained in the Infrastructure Master Plan.

Currently, the major concern related to the management of capacity for intensification and infill is primarily related to the performance of sewer and drainage systems during and following extreme wet weather events, when collectors serving these areas are at capacity. While services are in place to accommodate the development of land inside the Greenbelt, much of the infrastructure is due for renewal and/or may require capacity expansion to accommodate its future use – particularly when the land uses are intensified. In addition, the specter of continued extreme weather conditions as a result of climate change places an added 'wild card' in determining whether parts of the sewer system, that are at or near capacity, could continue to support growth without undertaking particular measures to alleviate capacity concerns. With regard to combined sewers, the City must also conform to Provincial procedure F5-5 regarding the capture and treatment of 90 % of combined sewer overflows.

Policy 2.2.3 of the Official Plan promotes managed growth within the urban area and generally identifies the Central Area, Mixed-Use Centres, Employment Areas, Developing Communities and Mainstreets as areas of significant intensification potential to which growth will be directed. It also identifies the type of development that is being promoted. Policy 2.3.2 of the Official Plan provides a more focused context for the relationship between water and sewage services and intensification and infill.

The City's Infrastructure Master Plan supports the thrust of the Official Plan. It provides greater direction concerning the relationship between future intensification, existing infrastructure and the means to accommodate growth in systems which may, in certain locations or under certain conditions, lack sufficient capacity and which may be in need of major rehabilitation due to physical deterioration. The current Infrastructure Master Plan outlines a number of policy directions which are primarily outlined in Section 5.6. The purpose of replacing this section with the Capacity Management Strategy policies is to provide more detailed guidance for intensification servicing. The Strategy also recognizes the changes that have occurred in recent years; anticipates the challenges related to the implementation of the policies and links the capacity management policies to other recent initiatives of the City.

A strategy for allocating capacity for growth inside the Greenbelt must recognize the interconnection between its objectives and the City's infrastructure rehabilitation programs (water and sewer), other municipal efforts (e.g. the Brownfields Redevelopment Strategy and the Stormwater Management Strategy), the adoption of an amalgamated development charges by-law in 2004 – as amended in March 2005 - and sewer system improvements intended to address historical basement flooding. All of these exercises, while separate efforts in themselves, are intertwined. Other key initiatives, which are particularly related to capacity management, are the City's flow management, water efficiency and water loss programs. Water efficiency measures reduce the flows that enter the sewer system and flow management will identify projects which will either remove flows from the sewer system or will better manage the flows so that additional

capacity can be freed up for future growth. Water loss measures improve the integrity of the water system.

While this Capacity Management Strategy is focused upon the provision of water and particularly sewer capacity for growth, it also recognizes that the issue of capacity is not one that can be solved in isolation from the broader context. Therefore, the Capacity Management policies will be reviewed when Ottawa's comprehensive Stormwater Management Strategy reaches a later stage of development.

The Capacity Management Strategy policies and implementation plans address the variety of issues that arise with allocating sufficient water and sewer capacity to service intensification and infill along with existing residential and non-residential uses. The City's basic servicing approach underlying the Capacity Management Strategy on the water side is to distribute, with adequate pressure, an uninterrupted reliable supply of safe potable water and fire flow to properties. On the sewer and drainage side, the approach is three-fold: remove extraneous flows (inflow and infiltration of stormwater into the sanitary system), improve conveyance (primarily related to collectors and spines) and provide protection for individual properties (from basement flooding). As the provision of water services is less problematic, the individual policies and implementation plans in the Capacity Management Strategy focus upon wet weather issues related to sewer and drainage systems. Some are focused on City initiatives while others address means by which individuals and developers can assist in solving issues related to intensification and infill.

The policies have been grouped within the context of:

- addressing capacity challenges and opportunities;
- public and private capacity improvement projects;
- related public education programs;
- funding capacity works; and
- monitoring capacity management initiatives.

The individual policies outline ways to provide infrastructure capacity to support growth and to work with the private sector and the public to promote intensification and infill inside the Greenbelt and then suggest the means to monitor the City's progress. Step-by-step implementation plans are provided with each policy.

Appendix A provides a glossary of terms used in the text. Appendix B contains the guidelines re: landowner emplacement of local services under development agreements for water, wastewater and storm drainage that are referenced in the text.

A summary of the policies contained in this report follow:

## ***SUMMARY OF CAPACITY MANAGEMENT POLICIES***

### **ADDRESSING CAPACITY MANAGEMENT CHALLENGES AND OPPORTUNITIES**

#### **POLICY 1.1**

**The City will promote intensification and infill where sufficient water and sewer capacity is, or can be made, available to support the magnitude of the resulting growth.**

**POLICY 2.1**

**The City will identify growth constraint areas where the risk of wet weather flow conditions could lead to greater occurrence of basement flooding.**

**POLICY 3.1**

**The City will fully integrate infrastructure assessment and system solutions with the development of Community Design Plans and other planning studies of areas inside the Greenbelt.**

**POLICY 3.2**

**The City will identify five or more top priority areas where pressure for intensification and infill is expected to occur over the next five-year period; consult with the development community to supplement the information; and give these areas priority for capacity assessment and solutions.**

**POLICY 4.1**

**The City will identify, by collector and spine, the capacity anticipated to be required for future intensification and/or infill projects. Where there is a capacity constraint related to a collector or spine, the City will endeavour through on-going infrastructure renewal and maintenance initiatives to ensure that capacity to support a spectrum of intensification and infill projects will be available.**

**POLICY 5.1**

**The City will identify specific levels of service for collector drainage areas serving properties within potential intensification and infill areas.**

**POLICY 5.2**

**Within the context of servicing levels identified for potential intensification and infill areas, the City will undertake works to provide capacity in the local water and sewer systems to accommodate growth as per its emplacement policy or identify the works that are required to provide capacity.**

**POLICY 5.3**

**When flow has been removed as a result of major intensification projects within a collector drainage area, the City will reserve this freed-up capacity to support future intensification and infill projects.**

**POLICY 6.1**

**The City will add 'growth potential' to its present list of criteria to assess priority for its rehabilitation program.**

**POLICY 7.1**

In its investigation of the potential impacts of climate change on sewer systems, the City will take into account the factors related to the accommodation of future intensification and infill in constrained systems.

**PUBLIC AND PRIVATE CAPACITY IMPROVEMENT PROJECTS**

**POLICY 8.1**

In the partially-separated sewer system, the City will give priority to extraneous flow removal projects that provide capacity for intensification and infill as well as benefit for existing properties.

**POLICY 9.1**

For intensification and infill projects, the City will continue to:

- Require, where deemed advisable, applicants to undertake measures that would protect structures from future flooding (e.g. sump pumps, back flow valves, slab on grade construction); and
- Require new development and redevelopment to undertake means of stormwater management and/or other compensation projects (e.g. roof gardens, rain barrels, permeable surfaces, parking lot retention, etc.)

**POLICY 9.2**

For intensification and infill projects, where extraneous flow removal is restricted, the City will explore other opportunities for flow removal through such means as cash-in-lieu and/or alternative off-site compensation projects.

**POLICY 10.1**

The City will explore opportunities for contributing to alternative compensation projects that could help to reduce and/or delay the construction of future infrastructure capital works. Such a program will incorporate the following features:

- Identification of compensation works for existing properties (type of project, location, drainage area affected, amount of flow removed, benefit to the system due to location, developer credited, completion date)
- Identification of the intensification or infill project to which the flow credit would apply (project details such as size, type, location, drainage area affected, impact on the system due to location, developer to be debited, completion date)

**POLICY 11.1**

The City will resolve any situations in which its requirements lead to design features and/or lot configurations that contribute to flooding in intensification and infill areas.

**POLICY 12.1**

The City will encourage all intensification and infill projects to use green building technology so that any additional demands on existing infrastructure systems can be minimized.

**POLICY 12.2**

The City will explore the use of green technology in relation to its infrastructure construction and reconstruction projects so that the demand on existing infrastructure systems can be minimized. Exploration will include the municipal role in such options as green infrastructure, facilitating potential reuse of grey water or reuse of heat generated from private property.

**RELATED PUBLIC EDUCATION PROGRAMS**

**POLICY 13.1**

Within the partially-separated areas, the City will continue to encourage moderate growth through intensification and infill when disconnection requirements are met. The City will provide information to the public to better inform citizens of the benefits of these projects for improving system capacity.

A well-developed public education campaign will include the following features:

- In easily understood terms, apprise citizens of the potential benefits of intensification and infill on underground infrastructure when disconnect measures are taken;
- Provide examples and illustrations of positive moderately-sized growth projects;
- Inform citizens within partially-separated and other constraint areas of ways to protect their own properties from flooding;
- Inform citizens of the mechanics of flood-protection devices, identify properties at risk of flooding, explain the principles of flow management; and
- Distribute timely information to people and locations that will best ensure that the public is well-informed about measures specific to individual properties.

**FUNDING CAPACITY WORKS**

**POLICY 14.1**

The City will use its front-ending policy and/or negotiated agreements to accommodate the special needs of intensification and infill projects within the following guidelines:

- provide for individual front-ending agreements and/or negotiated agreements between the City and developers whose intensification or infill projects will require additional major infrastructure and/or require the advancement of major rehabilitation work;
- if intensification and infill projects require the advancement of major new or rehabilitation works, permit the developer to fund these works with reimbursement scheduled in the year the works are planned for construction;
- encourage developers to undertake local works to accommodate their developments where such works are not of sufficient size to be included as development charge projects;



- where projects will benefit more than one development, make use of the Front-ending Agreement provisions of the Development Charges Act.

#### **POLICY 15.1**

In recognition of the potential lower-cost opportunities to provide capacity for growth afforded by Water Efficiency, Water Loss, Green Infrastructure and Flow Removal measures inside the Greenbelt, the City will explore the use of development charges or an alternative source of growth funding to help support these programs.

#### **POLICY 16.1**

The City will give priority to the use of Development Charges funding and the exploration of other feasible funding opportunities to support capacity management projects in areas in which intensification and infill are encouraged. Such opportunities will include but not be limited to:

- Use of DC funding for the growth portion of projects completed within the City's rehabilitation programs (e.g. enlargement of pipes, new sections, enlargement of pumping stations, etc.)
- Appeal to the Federal and Provincial governments to financially support projects (e.g. the Provincial government in light of the PPS, Federal programs through FCM such as the Green Funds);
- Exploration of DC changes such as: elimination of discretionary exemptions and exemption areas, recognition of growth capacity allowances in rehabilitation projects, improved accuracy in estimates;
- Coordination of DC and Water Rate funding to support capacity management

#### **MONITORING CAPACITY MANAGEMENT INITIATIVES**

#### **POLICY 17.1**

The City will monitor system changes on an on-going basis to identify the current and expected future status of the system's capacity as intensification and system improvements proceed.

#### **POLICY 17.2**

The City will monitor and evaluate its progress with regard to allocating sufficient capacity in existing systems to support intensification and infill and adjust strategies and implementation plans as required.

## BACKGROUND INFORMATION

The City of Ottawa has inherited water and sewer systems that have been built over a period of about 150 years. With complex systems that have been expanded and rehabilitated over so many years, accommodating changing building forms and densities, periods of exceptional growth and periods of stagnation, changes and advancements in system and pipe technology; and the amalgamation of former municipal and regional systems, it is not surprising that there would be some challenges related to providing capacity to support intensification and infill projects in built-up areas.

While the existing water system experiences strains due to the age of some pipes, it is the sewer system that creates greater concern in terms of intensification and infill. In the core of the city, there are still some sewers that are more than 100 years old. Areas of anticipated intensification and infill include those serviced by a variety of sewage and drainage systems: combined sewers, partially-separated sewers, fully-separated sanitary and storm sewers and sanitary sewers with ditches and/or culverts, all of which operate in different ways. Therefore, determining whether there is capacity in the existing sewer systems to meet the needs of intensification becomes a more complex matter than may be commonly recognized. This is due to the impact of wet weather flows and the way in which the various systems respond to and handle these flows. Added to this is the fact that each sewer system reacts differently to the particular storm conditions (e.g. long duration intense rainfalls, short duration intense rainfalls, snow melt, etc.)

Previous to amalgamation, the former City of Ottawa maintained an annual Sanitary Sewer Disconnect Program in its partially-separated areas. Through this program, most of the less complicated and more cost-effective measures were taken such as replacement of manhole covers and disconnection of weeping tile and roof drainage on individual properties and a third-pipe solution on some streets. Approximately \$2 million annually was budgeted for this program from the mid-1980's to the time of amalgamation. The former City of Vanier also maintained a program to encourage flow removal in the partially-separated sewer areas inside its boundaries. Vanier's program focussed upon a low-lying area of flat-roofed small apartment buildings which provided the city with the highest cost-benefit return.

In the late 1990's, the Region of Ottawa-Carleton considered methods to address capacity issues in the Rideau River and the West Nepean Collectors generated by the partially-separated sewer areas tributary to these collectors. The solution contemplated during the draft stage of the Region's Official Plan was to require developers to remove 1.25 times the sanitary flow contributed from the 'Capacity for Growth Trunk Sanitary Sewers Collection Areas'. Upon review by the municipalities, this was not found to be an acceptable solution as it was considered by some to pose a strong deterrent to further intensification and infill development. The requirement, although included in the draft Regional OP, was removed from the final document.

After amalgamation, development within the partially-separated and combined sewer areas continued to place pressure on sewer systems that remained prone to surcharging during periods of extreme wet weather conditions. As the former Cities of Ottawa and Vanier had not passed development charges by-laws in 1999, the new amalgamated city did not have a means to address the problems of growth-related sanitary flows being added to constrained local systems within the partially-separated sewer areas. Therefore, the new city used a cash-in-lieu arrangement to raise funds to allow it to offset the additional sanitary flows contributed to the system by growth in these areas. The rate was set as a dollar amount times the added sanitary flow.

Since 2000, the operation of the wastewater collection system has been improved to divert flows when particular collectors are at capacity. This has been effective in resolving some of the

causes of the surcharging of the West Nepean Collector. However, in extreme events (e.g. a 100 year storm), flooding can result, as it is not economically feasible to build a system that can handle the extreme storms that we have occasionally experienced in Ottawa.

The disconnect programs pursued by the former municipalities alleviated some concerns in the local partially-separated sewer systems. As well, annual rehabilitation programs in the combined sewer area have addressed many streets in the downtown and central areas. The cash-in-lieu fees provide a minor reserve of monies to address a few additional projects. However, challenges still remain.

With such a vast and varied system as Ottawa has, addressing the impact of intensification and/or infill development on the City's existing sewer system is not easy and, in most cases, detailed analysis is required to pinpoint the particular demands that new development and redevelopment will place on different parts of the system. In some situations, the local street sewers are the origin of surcharging. Mainly, surcharging is a result of collector sewers that are at capacity. As a result of major flooding in 2004, the City undertook a detailed analysis of the 'pinch points' in the sewer system – to determine if in any one location, the 'pinch point' is a local, spine or collector pipe. A report with the results of this analysis was forwarded to Council in November 2005. The report identifies long and short-term improvements to the system and flooding areas requiring more in-depth study. Until these and other specific capital improvements and studies are completed, the Capacity Management Strategy provides a means of supporting intensification and infill with a less than perfect, aging and diverse sewer system.

## ***ADDRESSING CAPACITY MANAGEMENT CHALLENGES AND OPPORTUNITIES***

### **1.0 SPECIFY CONDITIONS UNDER WHICH INTENSIFICATION AND INFILL IS PROMOTED**

While the Official Plan promotes intensification and infill through a series of policies, it does not clearly link it to specific urban locations where sufficient water and sewer capacity either are, or can be made, available to support this growth. In addition, a contribution from growth-related funding such as development charges has not been provided to support infrastructure rehabilitation programs. This has resulted from insufficient recognition that rehabilitation works, such as the replacement of deteriorated pipes and structures, increase the ability of the system to accommodate growth. As a result, the number of projects completed through the annual infrastructure rehabilitation programs is less than could have been undertaken with a growth-related contribution. Therefore, it is necessary for the development community to understand that, while intensification and infill are promoted, specific larger-scale developments cannot always be accommodated unless related changes to underground systems are made prior to completion of the development project. This has been a controversial issue related to a few proposed larger developments. Therefore, one or more additional Official Plan policies (see below) could be helpful in alerting developers to this constraint regarding the general direction of the Plan.

#### **1.1 Sufficient Capacity**

##### **The City will**

Promote intensification and infill where sufficient water and sewer capacity is, or can be made, available to support the magnitude of the resulting growth.

## **IMPLEMENTATION**

### **1.1.1**

Provide additional policies for the Official Plan and Infrastructure Master Plan Updates to clarify the conditions under which intensification and infill will be promoted and to address level of service issues inside the Greenbelt.

### **1.1.2**

On an interim basis, continue current review procedures for small- and moderate-scale development applications on a property basis to assess whether or not each application can be serviced (e.g. with precautionary measures such as disconnection where required and without resulting in detrimental negative downstream implications for the system). An example of 'small scale' would be individual single or semi-detached or small-scale apartment units. A 'moderate scale' might be a townhouse development.

### **1.1.3**

For larger-scale intensification projects (e.g. the redevelopment of Federal sites, vacant surplus NCC property or redevelopment of former commercial and/or industrial sites), identify any system solutions required prior to approval of the application

### **1.1.4**

Where works are required to address capacity constraints, issue a building permit only upon notification that: the works have been completed by Public Works & Services, the developer or a front-ending agreement for the required works has been signed with the developer.

### **1.1.5**

When a development application has been approved and a building permit issued, keep a record that capacity to service the development has been set aside.

### **1.1.6**

When capacity is recorded in the model, it will remain at least for the duration of the site plan or subdivision agreement. If the development does not proceed as planned, then the information will be removed or the amount revised according to new information.

## **2.0 INTENSIFICATION CONSTRAINT AREAS IDENTIFIED**

Over the years, the City has collected information with respect to wet weather flooding and has used this information to pinpoint areas in which the sewer system is in need of attention. The information is helpful as a basis upon which to predict if intensification in certain locations will further tax systems and increase the potential for flooding in wet weather. Within these constraint areas, the City considers it important to take timely steps to address surcharging to protect existing residents as well as prior to entertaining any larger-scale intensification and infill projects.

### **2.1 Identify Growth Constraint Areas**

#### **The City will**

Identify growth constraint areas where the risk of wet weather flow conditions could lead to greater occurrence of basement flooding.

## **IMPLEMENTATION**

### **2.1.1**

Continue to collect and maintain flooding information as a means to address pockets of historical flooding and to determine solutions.

### **2.1.2**

Continue major studies such as Wet Weather Flow Management and capacity studies for identified constrained sewer areas (e.g. Preston, O'Connor) and to implement solutions.

### **2.1.3**

Develop a list of infrastructure projects to address constraint areas that overlap with anticipated growth areas and add the projects to the City's priorities for funding and implementation.

### **2.1.4**

Consider the impact of intensification planning priorities as outlined in its Brownfields Strategy, its Community Design Plans (e.g. Richmond Road/Westboro, Old Ottawa East, Wellington Street, Carling/Bayview, Rockcliffe Air Base, Pinecrest/Queensway, Beechwood) when putting forward solutions for constraint areas for funding and implementation.

## **3.0 PRIORITY INTENSIFICATION AREAS IDENTIFIED**

The 2003 Official Plan has identified expected employment and population/ housing unit densities and type and also potential intensification areas (e.g. lands within 600 metres of rapid-transit stations, under-utilized lands, Brownfield sites, and parking lots or storage areas). These areas are generally along arterials where some infrastructure capacity could be available to support more intense development.

The City also undertakes Community Design Plans and other studies for more specific areas. Particularly for intensification areas inside the Greenbelt, growth opportunities are a strong element of the Plans. These plans address urban form to a greater extent and more detailed management of housing and non-residential development.

In both of these cases, the City is attempting to better pinpoint areas where development potential exists and to encourage certain forms of development and the public services required to support growth. However, in terms of determining infrastructure capacity and engineering solutions to meet the needs of intensification areas or major infill development, further efforts are required to bridge the gap. These include some adjustments in the development of CDPs, plans and studies and further steps to identify some anticipated priority infill areas through internal consultation and consultation with the development community. These efforts would help to increase the likelihood that there is a good fit between potential infill areas identified and the level of the infrastructure's capacity to service the particular locations. In turn, the development community could be made aware of the locations where current levels of servicing can better support growth.

The City will take a proactive stance so that growth can be accommodated with no significant servicing impacts on the existing community. As part of the initiative to match potential intensification and major infill areas with the infrastructure changes that will facilitate the growth, the City will consult internally and with the development community and citizen representatives. Such consultation will include industry associations such as OCHBA and BOMA and inner-city developers who can identify, from their perspective, the trends that they see emerging regarding future development patterns. This information will be used to supplement available information from the Official Plan, the Community Design Plans and trends identified from internal consultations.

### 3.1 Integration of Servicing and Community Design Plans

#### The City will:

Fully integrate infrastructure assessment and system solutions with the development of Community Design Plans and other planning studies for areas inside the Greenbelt.

#### IMPLEMENTATION

##### 3.1.1

With the development of Community Design Plans (e.g. Richmond Road/Westboro, Old Ottawa East, Wellington Street, Carling/Bayview, Beechwood), other plans (e.g. Rockcliffe Air Base), strategies (e.g. the Brownfields Strategy) and planning studies,

- integrate, in an iterative manner, a review of current water and sewer servicing, servicing constraint information and the identification of capacity solutions; and
- ensure that servicing solutions for the area have been assessed with regard to their impact on the operation of the overall system.

### 3.2 High Pressure Growth Areas

#### The City will

Identify five or more top priority areas where pressure for intensification and infill is expected to occur over the next five-year period; consult with the development community to supplement the information and give these areas priority for capacity assessment and solutions.

#### IMPLEMENTATION

##### 3.2.1

Initial internal consultation has resulted in the following intensification and infill areas being identified most frequently:

- Westboro especially on either side of Richmond Road,
- Around LRT locations on Preston Street, Bayview and Carling,
- East side of Downtown (east side of the canal) including Rideau Street and the market
- West side of Downtown including Bay/Gloucester area
- Major intersections along Bank at Heron and Walkley
- The City Centre area

These are areas where current trends would indicate priority for servicing.

##### 3.2.2

Identify through flow monitoring, infrastructure studies, and other means, the level of intensification, which the infrastructure in each of these areas could support.

##### 3.2.3

Convene a meeting with OCHBA, BOMA and FCA representatives and inner-city developers to discuss the current intensification and infill trends emerging inside the Greenbelt –priority areas, types of development, larger development sites, trends in built form, etc. in order to supplement the direction set out in the Official Plan and the areas identified through internal consultation. At such a meeting, provide information regarding proposed infrastructure projects that might support priority intensification areas.

##### 3.2.4

Take the results of this consultation into account in determining the infrastructure rehabilitation projects that would benefit high pressure intensification and infill areas (see 6.0).

## **4.0 MAKE COLLECTOR AND SPINE CAPACITY AVAILABLE FOR INTENSIFICATION AND INFILL**

Given that the Official Plan encourages intensification and infill projects to make use of existing infrastructure services, water and sewer capacity in the City's collectors and spines must be made available to accommodate these future projects. Competition for this collector capacity may come from both existing properties inside the Greenbelt and occasionally from new projects in 'greenfield' locations. To support its objectives, it will be necessary for the City to ensure that all of these situations can be accommodated without detriment to the other. In an aging system with some collector and spines determined to be 'at capacity', this remains a key issue.

In areas in which combined sewers are still in place, intensification continues to present a challenge to already taxed systems. The City has been looking at its ability to address this operationally. Within this area, studies to address the Sandy Hill, O'Connor and Preston Street sewers are already underway and solutions have been determined. Even in partially-separated areas that were built in the period from 1951 to 1961, there are instances in which the system can surcharge due to wet weather flows and the City continues to identify major solutions.

Both water and sewer systems must be assessed in terms of present ability to service developments as well as future ability under a variety of intensification conditions. As capacity is available for dry weather flows, the challenge is to determine the capacity of a varied and aging system under a variety of potential future wet weather flows and then to address these issues through a number of means such as flow removal, increased conveyance, and local flood protection.

To determine when and how potential capacity issues could occur, more in-depth analysis of the impact of future growth on both the collectors and spines is being completed and solutions for these issues are being determined. While the process of addressing any weaknesses in the capacity of this vast system of sewer pipes, pumping stations, force mains, etc. continues, the City of Ottawa is also committed to supporting the growth of the general community in an economical and efficient manner. It is critical, therefore, to ensure that sufficient capacity to service future intensification and infill projects is facilitated in key parts of the water, sewer and drainage systems. In some particular cases, ensuring this capacity for intensification and infill is available may need to be addressed prior to meeting all of the requirements of specific Greenfield developments that rely on these same pipes and/or pumping stations, etc.

### **4.1 Collector and Spine Capacity**

#### **The City will**

Identify, by collector and spine, the capacity anticipated to be required for future intensification and/or infill projects. Where there is a capacity constraint related to a collector or spine, the City will endeavour through on-going infrastructure renewal and maintenance initiatives to ensure that capacity to support a spectrum of intensification and infill projects will be available.

## **IMPLEMENTATION**

### **4.1.1**

Continue to monitor and measure the existing capacity of collectors and spines that service areas inside the Greenbelt. Give special attention to collectors such as the West Nepean and Ottawa Outfall-Interceptor System that serve combined sewer areas and are subject to MOE Procedure F5-5.

The monitoring of collectors, which includes an analysis of historical flooding, is underway. Assessment of capacity will include both current available capacity and potential capacity under conditions in which improvements to the local street systems are made to accommodate infill and intensification (this could result in reduced capacity in collectors and spines).

**4.1.2**

Continue to identify the trends regarding future intensification and infill projects on an annual or semi-annual basis, continue to supplement this information by consulting with the industry and community representatives and take this information into consideration for rehabilitation programs.

**4.1.3**

Review and determine the means and cost of providing capacity in the related collectors and spines to accommodate the targets, use, locations and phasing of future intensification and infill that is anticipated within the time frame of the Official Plan and consider identified priority intensification areas in operational (e.g. real-time control) and capital plans and programs.

**4.1.4**

As an interim measure, record capacity information in the GIS data base system for future retrieval to enter capacity-related information into appropriate models.

**5.0 RESERVE LOCAL CAPACITY FOR INTENSIFICATION AND INFILL**

If the City is to accommodate growth, where the infrastructure systems (roads, sewers, water, schools, recreation services, etc.) are in place, then it must take steps to also support future development wherever local system constraints exist. Therefore, wherever possible, sufficient capacity to meet both the needs of existing properties and growth will be reserved in existing local infrastructure systems. The City will not jeopardize identified servicing levels for existing properties but, after addressing critical needs, resources will be focused upon projects that can provide both capacity for intensification areas and infill and the maintenance of acceptable service levels for existing properties.

**5.1 Specific Levels of Service Identified**

**The City will**

Identify specific levels of service for collector drainage areas serving properties within potential intensification and major infill areas.

**IMPLEMENTATION**

**5.1.1**

Determine appropriate levels of service for collector drainage areas related to high priority intensification areas identified.

**5.2 Provide Capacity as per DC Emplacement Policy**

**The City will**

Within the context of servicing levels identified for potential intensification and infill areas, undertake works to provide capacity in the local water and sewer systems to accommodate growth as per its emplacement policy (Appendix B of 2004 DC Background Report) or identify the works that are required to provide capacity.



**IMPLEMENTATION**

**5.2.1**

Update area population, employment and housing projections for use in determining changes in water and sewer demand.

**5.2.2**

On a regular basis (semi-annual or quarterly), analyze current information to determine, within levels of service, available capacity to service specific anticipated major intensification and infill projects through more detailed capacity allocation and management plan.

**5.2.3**

Consult internally about capacity allocation and management plans to so that they can be used to assist with future development plans.

**5.2.4**

Allocate additional resources to the work of issue-based analysis and modeling of the local sewer system’s capacity as outlined by 17.1 Monitor Changes to Identify Status of System

**5.3 Reserve Capacity for Future Intensification and Infill**

**The City will**

When flow has been removed as a result of major intensification projects within a collector drainage area, reserve this freed-up capacity to support future intensification and infill projects.

**IMPLEMENTATION**

**5.3.1**

Develop a centralized and coordinated information system with respect to sewer system capacity in relation to intensification and infill areas.

Information will be available for the collector drainage area. Ownership and maintenance of the information system related to collectors to reside with Public Works & Services. Ownership and maintenance of the information system related to flow changes resulting from growth on the local system to reside with Planning, Transit and the Environment. Information will be coordinated and used by both groups.

**5.3.2**

On a semi-annual basis, consult about the needs of growth and the capacity freed for growth as a result of compensation projects and other flow removal works (See Policies under Public and Private Capacity Improvement Projects).

**6.0 ADD ‘GROWTH POTENTIAL’ TO REHABILITATION CRITERIA PRIORITIES**

The City has identified potential general locations for future development and redevelopment in the Official Plan. While there are many opportunities to meet the Official Plan’s future growth targets, some of the potential locations for intensification can only be provided through redevelopment. Most of the sites may have sufficient servicing capacity to handle additional mixed-use development. Where this is not the case, the City can ensure that projects in its rehabilitation programs accommodate both future growth and existing properties in identified areas and that these projects are given more priority. This can be accomplished by including an additional criteria or weighted value related to ‘growth potential’ as part of the determination of the City’s priorities for rehabilitation work.

## **6.1 Add 'Growth Potential' to List of Rehabilitation Program Criteria**

### **The City will**

Add 'growth potential' to its present list of criteria to assess priority for its rehabilitation programs.

## **IMPLEMENTATION**

### **6.1.1**

In relation to its water and sewer rehabilitation programs, add an evaluation criterion or value for projects that have the ability to service identified intensification and infill areas and projects, particularly ones targeted as priority for the next 5 years.

### **6.1.2**

After addressing critical risks to private property and the environment (e.g. a broken pipe, a collapsed sewer, repetitive flooding situations), review rehabilitation project lists and other major projects in light of growth pressures and give additional priority to projects that can both service these intensification/infill areas and maintain the defined level of service for existing properties within the sewer shed.

## **7.0 ASSESS IMPACTS OF CLIMATE CHANGE ON CAPACITY MANAGEMENT**

Although the City has an abundant supply of water, available information on climate change suggests that climate change could negatively affect current capacities of the City's sewer systems. Climate change impacts are anticipated to include an increase in extreme wet weather events although generally conditions may be drier for the latitude that includes Ottawa.

At a seminar organized by a local consultant several years ago, it was suggested that about 25 percent of pipes in the sewer system would surcharge if total annual rainfall volume increased by more than 15 percent. And, as it is anticipated that Ottawa's future total rainfall volume could increase by 20 percent as a result of climate change (through extreme events), it is possible that 25 to 35 percent of the City's sewer pipes could surcharge if measures were not taken to address this. Climate change impacts are very difficult to predict and many organizations are pursuing answers including the Federal government, other municipalities and Engineers Canada. Consultation with western municipalities suggests that if green infrastructure measures, such as swales or permeable parking lots, are not vigorously pursued, sewer design standards may need to be changed and sewer systems rebuilt over time to handle the a greater intensity of rainfall expected from climate change. As intensification and infill can burden systems that are at capacity, the City could consider actively pursuing green infrastructure or the option of enlarging new pipes. Other options include building storage into the system to accommodate the impacts of climate change. Growth should pay a portion of these system replacement projects.

## **7.1 Take Intensification into Account When Considering Impacts of Climate Change**

### **The City will:**

In its investigation of the potential impacts of climate change on its sewer systems, take into account the factors related to the accommodation of future intensification and infill in constrained systems.

## **IMPLEMENTATION**

### **7.1.1**

Research and investigate the literature available on the anticipated impacts of climate change on sewer systems in similar climatic areas to that of Ottawa and ensure that the complexity of factors related to constrained sewer systems and growth pressures is thoroughly assessed in relation to any system changes resulting from this investigation.

### **7.1.2**

Where specific measures are pursued to mitigate the impacts of climate change on the sewer systems, give greater consideration to the construction of green infrastructure measures and to corrective and rehabilitative measures where existing systems are most constrained and intensification and infill is anticipated.

## **PUBLIC AND PRIVATE CAPACITY IMPROVEMENT PROJECTS**

### **8.0 POTENTIAL EXTRANEEOUS FLOW REMOVAL PROJECTS**

The partially-separated system presents a particular challenge in supporting intensification and infill due to its performance during intense wet weather events. Under the Disconnect Programs of the former municipalities, many of the smaller, less-costly projects have been completed and the larger, more complex projects remain. The City should continue to encourage individuals to disconnect their downspouts and weeping tile to avoid flooding under intense wet weather conditions. However, this alone may be insufficient where future growth is anticipated. To encourage intensification and infill, priority will be given to completion of major projects in the locations expected to be of primary interest to developers. A list of the 'disconnect' infrastructure projects has been developed over the years and additions to the list will be made as solutions for local flooding continue to be identified.

#### **8.1 Give Priority to Extraneous Flow Removal Projects in Partially-Separated Areas**

##### **The City will**

In the partially-separated sewer system, give priority to extraneous flow removal projects that provide capacity for intensification and infill as well as benefit for existing properties.

## **IMPLEMENTATION**

### **8.1.1**

Develop a list of priority extraneous flow removal projects from previous lists from the former cities of Ottawa, Vanier, Nepean, and Gloucester and more recent additions as they relate to historical flooding situations

### **8.1.2**

Consult regarding priorities for the completion of a suite of flow removal and green infrastructure projects in relation to priority intensification and infill areas and projects.

### **8.1.3**

Make revisions to priorities when the maintenance of designated service levels for existing properties will not be jeopardized.

## 9.0 INITIATIVES TO PROTECT PRIVATE PROPERTY

The original core of the City contains combined sewers (the original sewers built before 1951 and newer combined sewers that were replaced after 1995), a few partially-separated sewers and fully-separated sewers (built after 1961). Surrounding this original combined sewer area like a half-donut is the predominantly partially-separated system built approximately between 1951 and 1961. These years were a time of major expansion for Ottawa, when population growth far exceeded expectations and the City doubled its infrastructure to both accommodate this increase in households and support the development of the original suburbs.

With combined sewers, both sanitary and storm flows enter the system and are conveyed to the treatment plant. Older residential properties in the combined sewer area rarely have weeping tile. During rainfall events, drainage from rooftops and downspouts as well as lot drainage can enter the combined system through street grates unless drainage is retained on the lot. In combined sewer areas, wet weather flows can exceed system capacity particularly when there are high intensity storms. When this occurs, overflows in the sewer system are conveyed to the river, which is not desirable from an environmental standpoint and could be in contravention to MOE procedure F5-5.

With partially-separated sewers, although the road drainage is conveyed through separate storm sewers, much of the property drainage (e.g. rooftop drainage, through eaves troughs and downspouts, and roof and some lot drainage, through weeping tile) remains connected to the sanitary sewers. The partially-separated system is particularly sensitive to wet weather flows through these connections. In extreme storm events, the additional water from rooftops and foundation drains floods sanitary sewers that were not designed to take this volume of flows. After 1961, a new by-law prohibited connections of weeping tile and roof drainage to the sanitary sewers

The City is interested in exploring all feasible options to support growth through intensification and infill while protecting existing properties. The concern for existing properties is particularly strong within the combined and partially-separated sewer system areas. Most new development projects should be able to incorporate adequate flood protection devices to ensure that individual basements will be protected. This includes: back flow valves in the combined sewer area; back flow valves on the sanitary sewer and a sump pump in the partially-separated area and a back flow valve on both of the sanitary sewer and storm sewer and a sump pump in the partially-separated area when the hydraulic grade line indicates this additional need.

In addition to this, compensation projects must be undertaken in conjunction with new development whenever feasible as it is important that intensification not reduce the designated level of service for existing properties. For the additional compensation works (flow removal projects that result in no net increase in surcharging of a system due to new development or redevelopment), offering a choice of cash-in-lieu or completion of compensation projects within the same collector drainage area could present developers with less-expensive options with equally-effective results as a project that the City would need to undertake. Provision could also be made for developers to share credits in cases in which one developer could undertake a compensation project with more benefit than another within the same collector drainage area (see 10.1 Alternative Compensation Projects below). The City's overall concern would be that sufficient compensating flows be removed within the collector drainage area to justify a credit towards the development project.

For the cash-in-lieu option, the City would determine priorities for projects ahead of time and apply the funds according to its priorities. Cash-in-lieu would always be applied to municipal capital works.

This policy will require a well-designed implementation plan to accompany it.

### **9.1 Protective Measures for Development**

For intensification and infill projects, **The City will** continue to:

- Require, where deemed advisable, applicants to undertake measures that would protect structures from future flooding (e.g. sump pumps, back flow valves, slab on grade construction); and
- Require new development and redevelopment to undertake stormwater management, green infrastructure and/or other compensation projects (e.g. roof gardens, rain barrels, permeable surfaces, parking lot retention, etc.)

### **IMPLEMENTATION**

#### **9.1.1**

Discuss required private property protection measures with all clients seeking planning and /or building approval and enforce these requirements.

#### **9.1.2**

Prepare a list of publicly-built works and potential compensation works (flow removal) in collector drainage areas that are at capacity under wet weather conditions.

#### **9.1.3**

Discuss compensation works at the time of building permit application.

#### **9.1.4**

Discuss the importance of retention of stormwater on-site with all clients seeking planning and /or building approval for properties within the combined sewer area.

#### **9.1.5**

Produce information regarding on-site storage and post the information on its web site and at Client Service Centres.

### **9.2 Explore Other Opportunities for Flow Removal**

#### **The City will**

For intensification and infill projects, where extraneous flow removal is restricted, explore other opportunities for flow removal through such means as cash-in-lieu and/or alternative off-site compensation projects.

### **IMPLEMENTATION**

#### **9.2.1**

Explore with inner-city developers where there may be opportunities to remove flows from their own properties or other properties within the same collector drainage area – or in other constraint areas.

#### **9.2.2**

Where on-site compensation is not possible, explore development of a program where developers can provide cash-in-lieu of on-site compensation work so that the City can undertake larger works

that will maintain and/or improve sewer system capacity or offer other off-site compensation works undertaken within the same drainage area.

**9.2.3**

Where any innovative measures require a new by-law or program to facilitate them, bring a report forward for Council approval.

**10.0 ALTERNATIVE COMPENSATION PROJECTS**

Some of the larger developers in the city both build and manage properties (this includes private developers, government and public agencies). There may be instances related to existing properties, in which opportunities are available to remove flows from the sewer system through disconnection of flat rooves, construction of roof gardens, parking lot retention, on-site storage, etc. Through the Ottawa-Carleton Home Builders Association (OCHBA) and the Building Owners and Managers Association (BOMA), the City will undertake the exploration of these opportunities and work with private property developers to encourage these types of projects. For those developers who participate, the City will provide credits towards requirements for compensation projects and/or facilitate the exchange of credits among these developers. The goal would be to facilitate improvements to the system with the least cost. These works will be voluntary and through individual agreement with the City. The amount of the credit would be determined by the flow removed through a compensation project and the benefit for the system (e.g. flow removed upstream in the system would have more benefit than the same flow removed downstream in the system.) Arrangements between developers would be left to the individual developers but the City would oversee and inspect the privately-completed works.

Both the City and other government and public agencies are also major managers of properties in Ottawa. Therefore, the City will not only work with private developers on this initiative but also lead by example by reviewing its own opportunities to remove flow whenever developing properties and it will approach other government levels as well.

**10.1 Alternative Compensation Projects**

**The City will**

Explore opportunities for contributing to alternative compensation projects that could help to reduce and/or delay the construction of future infrastructure capital works.

Such a program will incorporate the following features:

- Identification of compensation works for existing properties (type of project, location, drainage area affected, amount of flow removed, benefit to the system due to location, developer credited, completion date)
- Identification of the intensification or infill project to which the flow credit would apply (project details such as size, type, location, drainage area affected, impact on the system due to location, developer to be debited, completion date)

**IMPLEMENTATION**

**10.1.1**

Meet with major property developers (who build and manage buildings) to determine if such a program has merit and if there are opportunities to remove flows from existing properties.

**10.1.2**

Depending upon the conclusions, establish, with the development community, a voluntary program to allow for a credit system with respect to removal of flows from existing properties to off-set flow restrictions for infill and intensification projects

**10.1.3**

Review compensation proposals to receive flow credits against flow debits and to determine, through modeling, system benefits due to location of the works.

**10.1.4**

Provide through the program, credits to the developer for flow removed.

Flow credits can be used by the developer to offset compensation requirements within the same collector drainage area or can be exchanged with another developer who is building within the same collector drainage area. For example, an owner might be able to remove X litres per second as a result of developing a roof garden and disconnecting the downspout on a flat-roofed apartment building and remove another X litres per second through a combination of on-site storage measures at another location. Depending upon the location of the projects along the pipe, with these credits, he may be able to develop on a new site where development otherwise would be restricted without a third-pipe solution or construction of a new sewer or give the credits to another developer with a proposal in the area in exchange for credits he/she may have related to another collector drainage area of interest.

**10.1.5**

Sign an agreement with the developer(s) involved in the program.

**10.1.6**

Register the agreement on the title of the property and add a map, situating the property.

The map will provide for easier reference in the future.

**10.1.7**

Track the actual removal and uptake of flows through the agreements.

**11.0 DISCOURAGE DESIGN FEATURES THAT INCREASE FLOODING**

Occasionally, City requirements intended to address other issues could result in a conflict with the municipality's desire to reduce flooding on private property. For example, both the City's private approach by-law and its zoning by-law contain slope requirements. The one is intended for private property and the other for public property. With depressed driveways, the requirements of the two by-laws needed to be harmonized. The private approach by-law is intended to protect private property from flooding so it has a requirement that there be a positive slope of 2 to 6% from the road's centre line to the lot line. The zoning by-law permits an 8% slope between the top and the bottom of the driveway. By harmonizing the requirements of these by-laws at the lot line, both concerns can be satisfied with a minimum of design adjustment.

For esthetic, planning and logistical reasons, depressed driveways are a positive design feature for some narrow infill sites and yet, in combined sewer areas, they increase flows into the sewers and require corrective measures and potentially a warning of the implications for the homeowner. Therefore, depressed driveways should be strictly limited.

Whenever these types of situations come to light, the City will take steps to reconcile any of its design, placement, etc. requirements that do not support its objective to reduce private property flooding.

### **11.1 Reconcile City Requirements That Might Contribute to Flooding**

#### **The City will**

Resolve any situations in which its requirements lead to design features and/or lot configurations that contribute to flooding in intensification and infill areas.

#### **IMPLEMENTATION**

##### **11.1.1**

Be sensitive to and identify design features and/or lot configurations that could contribute to flooding of private property along with any new design features or solutions (e.g. green buildings) that would alleviate flooding

##### **11.1.2**

Review planning and building processes and municipal engineering requirements for both private development and public facilities to determine potential conflicts and to jointly recommend solutions (e.g. require a grading plan review and corrective measures such as back flow valves and sump pumps for depressed driveways as a condition of their approval)

##### **11.1.3**

Where useful, such as in the case of depressed driveways, develop information for the public to inform citizens of the implications of such designs for its sewer system and the homeowner's property.

### **12.0 USE OF GREEN BUILDING TECHNOLOGY**

The benefits of green building technology are gaining recognition in North America, particularly in the western provinces such as British Columbia and Alberta. While many of the features related to green building technology focus on building materials, insulation and house construction/reconstruction techniques, there are both housing and lot measures that can be considered 'green' and that contribute to the reduction of water use and stormwater leaving the lot. Many people would be willing to undertake these measures to benefit the environment but they require information on what to do, how to do it, firms and/or agencies that can assist them to do it, the benefits of doing it, etc. The City can both provide local information specific to the Ottawa situation and provide web sites and hard copy documents that would be of benefit to residents generally.

#### **12.1 Green Building Technology**

##### **The City will**

Encourage all intensification and infill projects to use green building technology so that any additional demands on existing infrastructure systems can be minimized.



## **IMPLEMENTATION**

### **12.1.1**

Prepare information on green building technology for distribution to the development community when it applies for building and planning approvals, at Client Service Centres and through OCHBA, BOMA and the Ottawa Construction Association (OCA) and to encourage the Ottawa Housing Corporation to model new technologies.

### **12.1.2**

Conduct or facilitate seminars encouraging uses of green building technology in new development and redevelopment projects, focusing on projects and retrofitting that would minimize demands on water, sewer and drainage systems.

### **12.1.3**

Investigate the use of the Green Municipal Investment Fund and/or the Green Municipal Enabling Fund to further the public's knowledge of means to construct and/or retrofit homes in ways that reduce demand on underground infrastructure systems.

## **12.2 Green Methods for Public Infrastructure Construction Projects**

### **The City will**

Explore the use of green technology in relation to its infrastructure construction and reconstruction projects so that the demand on existing infrastructure systems can be minimized. Exploration will include the municipal role in facilitating such options as green infrastructure, potential reuse of grey water or reuse of heat generated from private property.

## **IMPLEMENTATION**

### **12.2.1**

Research and consult about potential green infrastructure projects that could positively impact water, sewer and drainage systems.

### **12.2.2**

Prepare a report to make recommendations to Council about green technology that could be used to maximize the reuse of such resources as water and heat

### **12.2.3**

With Ottawa Housing Corporation implement the results of this exercise in City infrastructure projects wherever possible where there will be positive impacts on water, sewer and drainage systems.

## **RELATED PUBLIC EDUCATION PROGRAMS**

## **13.0 BENEFITS OF INTENSIFICATION FOR CAPACITY**

Sometimes the public has difficulty welcoming development in established areas due to a misconception that it further taxes areas that are already experiencing flooding and, therefore, would result in an increase in flooding. Intensification and infill in partially-separated areas (e.g. under severance conditions, minor variance, redevelopment of properties, etc.) can actually be beneficial for sanitary system capacity when new development or redevelopment does not greatly increase the population being serviced and developers undertake disconnection measures

required for development approval. Few in the public would readily believe that often infill projects could improve the situation unless the dynamics related to the functioning of partially-separated systems are explained. Therefore, the City will prepare information in easily-understood layperson terms to explain the potential benefits of intensification and infill and widely distribute the information to the public.

It should be noted that development on vacant properties or a change in use (e.g. school site changed to high-density housing) that results in a doubling or more of the population may not provide these benefits for the system unless they are accompanied by further system improvements. As well, greater levels of intensification can tax partially-separated storm pipes during wet weather. These and any other qualifications will be acknowledged in education materials.

### **13.1 Public Information on Potential Benefits of Intensification and Infill for Infrastructure**

Within the partially-separated areas, **The City will**

Continue to encourage moderate growth through intensification and infill when disconnection requirements are met. The City will provide information to the public to better inform citizens of the benefits of these projects for improving system capacity.

A well-developed public education campaign will include the following features:

- In easily understood terms, apprise citizens of the potential benefits of intensification and infill on underground infrastructure when disconnect measures are taken;
- Provide examples and illustrations of positive moderately-sized growth projects;
- Inform citizens within partially-separated and other constraint areas of ways to protect their own properties from flooding;
- Inform citizens of the mechanics of flood-protection devices, identify properties at risk of flooding, explain the principles of flow management; and
- Distribute timely information to people and locations that will best ensure that the public is well informed about measures specific to individual properties.

## **IMPLEMENTATION**

### **13.1.1**

Continue to provide engineering approval of intensification and infill projects within partially-separated areas where required disconnection measures are carried out

### **13.1.2**

Publish information for public distribution highlighting the potential benefits of intensification and infill projects to the partially-separated system where disconnection measures have been taken. Such information will be available on the City's web site, Ottawa.ca, distributed with the water bills for ratepayers and be available at Client Service Centres.

### **13.1.3**

Distribute information to new home buyers through real estate agencies, OCHBA, BOMA, and developers' offices

### **13.1.4**

Prepare information for community newspaper articles.

**13.1.5**

Include comments in staff reports that bring attention to any potential benefits so that these can continue to be in front of the public's attention.

**FUNDING CAPACITY WORKS****14.0 FRONT-ENDING: INFRASTRUCTURE REQUIRED BY INTENSIFICATION**

The City has a front-ending policy to accommodate the needs of development when works are required prior to their anticipated municipal construction date. This policy may require amendment to accommodate intensification situations. In addition, projects, which support intensification and infill, may need to be added to the development charges project lists by amendment or for the by-law's 5-year review in 2009. Where front-ending 'pay-back' from the City is anticipated, it will be tied to the year in which the works have been programmed in the City's Capital Budget.

For most required projects, the developer will be responsible for the specific works to accommodate his/her development. The City's mechanism for 'pay-back', development charges, is related primarily to larger infrastructure. If there is a question of responsibility for the works, the 'Guidelines re: Landowner Emplacement of Local Services under Development Agreements' should be consulted. This is included in Appendix B of the City of Ottawa 2004 Development Charge Background Study and the portion related to underground infrastructure is appended to this report in Appendix B. It should be noted that many of the infrastructure projects required to accommodate intensification and infill will be the responsibility of the developer. In instances in which additional infrastructure works will be required to accommodate more than one intensification project, the City can make use of the front-ending agreement provisions contained in Part III of the Development Charges Act.

**14.1 Front-ending Agreements and Intensification****The City will**

Use its front-ending policy and/or negotiated agreements to accommodate the special needs of intensification and infill projects within the following guidelines:

- provide for individual front-ending agreements and/or negotiated agreements between the City and developers whose intensification or infill projects will require additional major infrastructure and/or require the advancement of major rehabilitation work and/or require enlargement/ change of planned infrastructure;
- if intensification and infill projects require the advancement of major new or rehabilitation works, permit the developer to fund these works with reimbursement scheduled in the year the works are planned for construction;
- encourage developers to undertake local works to accommodate their developments where such works are not of sufficient size to be included as development charge projects;
- if projects will benefit more than one development, make use of the Front-ending Agreement provisions of the Development Charges Act.

**IMPLEMENTATION****14.1.1**

Review its front-ending policy to ensure that larger municipal works required for intensification and infill projects are eligible.

**14.1.2**

Prepare a 3-year rehabilitation program (which will be updated annually)

**14.1.3**

Negotiate the front-ending agreements with developers where applicable

**14.1.4**

Verify that the front-ending provisions of Part III of the Development Charges Act can be used in cases in which local infrastructure works must be funded by a developer to permit construction of his intensification and/or infill project and such works benefit more than one developer.

**14.1.5**

Prepare the background for and draft, agreements when required.

There will be corporate implications related to front-ending agreements between a developer and the City and these will need to be carefully considered in light of the City's Long Range Financial Plan. With respect to each individual front-ending agreement with the City, the project(s) and expected construction date(s) must first be included in the Capital Budget.

Otherwise, required infrastructure projects to support intensification and/or infill projects are to be funded by the developer. Where the City is involved in the administration of private front-ending agreements among developers, staff costs would be offset as per the provisions of Part III of the DC Act.

## **15.0 PURSUING WATER EFFICIENCY, WATER LOSS, GREEN INFRASTRUCTURE AND FLOW REMOVAL SAVINGS**

The City approved its current Development Charges By-law in July 2004. However, during further consultation with the development community in the fall of 2004, any development charges contribution towards the growth component of City infrastructure rehabilitation projects was removed. The rationale for this change was that any rehabilitation projects would be completed regardless of whether growth occurred. While this argument has merit in some instances, the existing sewer system inside the Greenbelt does require upgrading, and rehabilitation projects often reduce inflow and infiltration, thus providing capacity for future growth. In addition to the City's rehabilitation programs, the Flow Removal, Water Loss and the Water Efficiency Programs are effective programs that contribute to increased water and sewer system capacity. Examples of projects that could be undertaken by citizens and/or developers include: disconnection of flat rooves, roof storage, local underground storage, parking lot storage, infiltration swales, curbside stormwater retention areas, rain barrel systems, alternate day watering, etc.

Under the current rules of the Development Charges Act, only the growth portion of capital projects can be charged to a Development Charges By-law. While Flow Removal and Water Efficiency Programs do result in the reduction of flows entering the sewer system and, thus, allow future room for flows generated by growth, they are often not specifically growth-related capital projects. The DC Act, in effect, encourages the City to build new larger pipes rather than pursuing measures (operating and capital) that would result in similar benefits at a much lower cost. This is an issue that merits further discussion with the development community. Once projects under the Water Efficiency, Water Loss, green infrastructure and Flow Removal Programs are ready to be put forth for approval, they should be the subject of consultation with representative developers so that the financial benefits of these works in place of more costly proposed capital projects can be fully understood. These works can be of financial benefit to both

the City and the development community. If this is fully explained and illustrated, developers may be amenable to the voluntary pursuit of this option.

At the same time, the City will pursue this issue with the Province as part of its review of the DC Act. It will be added to a list of changes to be forwarded to the Province.

Depending upon the reception of the Province, developers and the public, the City could alternatively include these program works in the 2009 Development Charges By-law, amend the current by-law or pursue another funding mechanism that would fairly provide program funds from both existing ratepayers and new residents.

## **15.1 Exploring Ways to Pursue Less Costly Alternatives**

### **The City will**

In recognition of the potential lower-cost opportunities to provide capacity for growth afforded by Water Efficiency, Water Loss, Green Infrastructure and Flow Removal measures, explore the use of development charges or an alternative source of growth funding to help support these programs.

## **IMPLEMENTATION**

### **15.1.1**

Further develop the Water Efficiency, Water Loss, Green Infrastructure and Flow Removal Programs and list projects to be completed within the next 5-year period with the cost estimates for these projects. Priority will be given to intensification and infill areas identified by staff, indicated in the OP, the Brownfield Redevelopment Strategy, Community Design Plans, Community Improvement Plans and/or through discussions with the private sector.

### **15.1.2**

Explain these programs to representatives of the development community, including the financial benefits of pursuing this option. The representatives will be given three alternatives:

- To jointly voluntarily fund Water Efficiency, Water Loss, Green Infrastructure and Flow Removal Projects through Development Charges by endorsing the City's use of DCs for these programs (based upon funds equivalent to the major capital projects or percent of major capital projects that they would replace);
- Reject the use of Development Charges for these programs and continue to pay towards the more costly major capital works; or
- Adopt a Voluntary Program under which individual developers can opt to fund Water Efficiency, Water Loss, Green Infrastructure and/or Flow Removal Works within a collector drainage area that are equivalent to the cost of the water and sewer portions of their DCs and be exempted from paying that portion of the DC charge.

### **15.1.3**

If there is agreement to funding a portion of these programs in the future under Development Charges, that amount will be added to the list of 2009 Development Charges projects or added upon amendment of the existing by-law.

### **15.1.4**

If there is no agreement, Development Charges will continue to reflect the cost of major capital projects required without the benefit of Water Efficiency, Water Loss, Green Infrastructure and Flow Removal works.

**15.1.5**

Once a funding source has been determined and secured for the programs, develop a public information strategy to inform the public about the details of the Water Efficiency, Water Loss, Green Infrastructure and Flow Removal Programs and to encourage the support of the public in assisting the City to attain the objectives of these programs.

**15.1.6**

Concurrent to discussions with the development community, add this argument to its list of desired changes for the DC Act, which will be forwarded to the Province for the DC Act Review.

**16.0 EXPLORING ALTERNATIVE FUNDING SOURCES**

Given the variety of demands on existing municipal funds these days, it will be necessary for the City to give priority to the consideration of all potential sources of funding for infrastructure initiatives that would provide capacity for intensification and infill development. Other municipalities in Ontario use similar sources as the City of Ottawa (e.g. development charges, sewer charges). Additional means are recommended in this report. There are also some interesting approaches used in municipalities in the United States and Europe to fund stormwater management projects that might be worth pursuing here. Potential sources of funding include: a revolving fund, linked deposit programs, loans, water rights exchange, resource reductions and a foundation. Funds raised to support stormwater management might also be used to fund works that reduce stormwater infiltration in sanitary and combined pipes.

There are also means of raising funds that are pertinent to sewer systems that are at capacity. One such method used in the United States is to measure the percentage of each pipe being allocated to storm infiltration (this could be based on the run-off from a specific lot). Then ERUs (Equivalent Runoff Units) can be used to compare run-off from different properties to determine if the standard is appropriate and to adjust it if it isn't. Flow allocated to individual units would then be based upon dry weather flow and this set amount of infiltration. Growth would pay through DCs or other funding source for a portion of the pipe flow accordingly (with the costs determined and distributed based upon anticipated dwelling units within the time span of the Official Plan). Current users would pay through the sewer rates. The funds paid from growth projects could then be used to fund projects that would increase the capacity of the systems (e.g. storage, pipe bursting, etc.)

The objective of the research would be to find new, appropriate and equitable sources of funding so that growth can both be encouraged and supported without it placing an undue burden on the tax base for existing properties.

**16.1 Explore Funding Opportunities for Capacity Management Projects****The City will**

Give priority to the use of Development Charges funding and the exploration of other feasible funding opportunities to support capacity management projects in areas in which intensification and infill are encouraged. Such opportunities will include but not be limited to:

- Use of DC funding for the growth portion of projects completed within the City's rehabilitation programs (e.g. enlargement of pipes, new sections, enlargement of pumping stations, etc.)
- Appeal to the Federal and Provincial governments to financially support projects (e.g. the Provincial government in light of the PPS, Federal programs through FCM such as the Green Funds);

- Exploration of DC changes such as: elimination of discretionary exemptions and exemption areas, recognition of growth capacity allowances in rehabilitation projects, improved accuracy in estimates;
- Coordination of DC and Water Rate funding to support capacity management projects.

## **IMPLEMENTATION**

### **16.1.1**

Further research alternative funding sources used in other municipalities to support stormwater management or systems at capacity and the use of these sources to support the strategies contained in this document.

### **16.1.2**

Where found applicable, make recommendations for use of these alternative sources

### **16.1.3**

If pursuing Development Charges to support the Water Efficiency, Water Loss, Green Infrastructure and Flow Removal Programs is not accepted by the development community, explore a special levy for new properties inside the Greenbelt to finance these Programs. This would be combined with a future reduction in major capital works projects that would no longer be required under Development Charges.

### **16.1.4**

Investigate the use of the Green Municipal Investment Fund and/or the Green Municipal Enabling Fund to address partially-separated capacity issues in conjunction with other work.

### **16.1.5**

Pursue other alternative funding mechanisms that appear promising from research it has completed.

## **MONITORING CAPACITY MANAGEMENT INITIATIVES**

### **17.0 MONITORING AND EVALUATING PROGRESS**

The City will place greater priority on monitoring its infrastructure systems that service property inside the Greenbelt to ensure that it can identify opportunities for intensification and those properties that would benefit from underground system improvements. This will require increasing staff resources to advance the collection and analysis of information on identified parts of the local system as well as for the collectors and spines. Many of the mixed-use and Brownfield areas intended for intensification are adjacent to residential areas of known historical flooding. Additional local sewer information will be required in these areas. Where intensification and infill is indicated by the Official Plan, the Brownfield Redevelopment Strategy, Community Design Plans, Community Improvement Plans and/or as a result of consultation with the private sector, information on both the local system and the collectors and spines will be generated – regarding their current capacity and estimated capacity in light of anticipated growth.

#### **17.1 Monitor Changes to Identify Status of System Capacity**

##### **The City will**

Monitor system changes on an on-going basis to identify the current and expected future status of the system's capacity as intensification and system improvements proceed.

## **IMPLEMENTATION**

### **17.1.1**

Continue to both model the sewer system and to monitor the capacity of the collectors and spines and to record the information so that it can be accessed in relation to intensification projects

### **17.1.2**

For areas of future larger-scale intensification identified by the Official Plan, Community Design Plans, Community Improvement Plans, put more resources towards the modeling and detailed analysis of the local infrastructure system with regard to capacity constraints and opportunities

### **17.1.3**

Record the information in a model so it can be accessed in relation to intensification projects

### **17.1.4**

On a quarterly basis, record the information regarding removal of and uptake of flows on a project basis when compensation works take place.

## **17.2 Monitor Progress of the Strategy**

### **The City will**

Monitor and evaluate its progress with regard to allocating sufficient capacity in existing systems to support intensification and infill and adjust strategies and implementation plans as required.

## **IMPLEMENTATION**

### **17.2.1**

Convene a meeting once a year with key staff to monitor the policies and implementation plans contained in this strategy and, where there is a need to make adjustments in implementation, to recommend this.

### **17.2.2**

Where change in strategic direction or other policy adjustments are required, prepare a report to propose changes

### **17.2.3**

Ensure that its capacity management strategy policies remain appropriate to implement and enhance the direction of the IMP Update.



## **APPENDIX A**

### **Glossary of Terms**

#### **Backflow Valve**

A check valve designed for use in a gravity storm sewer system. The valve is normally closed.

#### **Brownfields**

Abandoned, idle or underused properties where expansion or redevelopment is complicated by real or perceived environmental contamination. This impediment is often exacerbated by building deterioration/obsolescence and/or inadequate infrastructure.

#### **Capacity Allocation**

Setting aside for use, the quantity that can be contained or the rate of flow that can be conveyed within or by a conduit or structure without adverse effects.

#### **Collector Sewer**

The component of the combined, sanitary or storm minor system that conveys the flow from the spines to the discharge point. For the sanitary sewer system, it is the component that conveys flows equal to or greater than 170 l/s to the discharge point.

#### **Combined Sewer**

A sewer intended to receive both wastewater and stormwater flows in a common pipe.

#### **Community Improvement Plan**

A provision of the Planning Act which permits municipalities to prepare plans for designated community improvement project areas that require community improvement as a result of age, dilapidation, overcrowding, faulty arrangement, unsuitability of buildings, or for any other environmental, social or community economic development reason.

#### **Compensation Project**

A flow removal project that results in no net increase in surcharging of a system at capacity due to new development or redevelopment.

#### **Constraint Areas**

Areas in which basement flooding has been experienced and further development and/or redevelopment could lead to future wet weather flooding unless changes to the wastewater system and/or individual building property infrastructure systems have been undertaken.

#### **Development Charges**

Fees levied on residential and non-residential properties that help finance a portion of the cost associated with new infrastructure and municipal service expansion to support growth.

**Dry Weather Flows**

Flow in a combined, partially-separated or separated sewer which is not significantly affected by stormwater but along with wastewater flows includes a certain amount of groundwater infiltration related to the level of the groundwater table.

Since the groundwater table fluctuates seasonally, a dry weather flow period is classified as a period of flow where groundwater conditions are relatively stable and there is no direct influence from precipitation or snowmelt. Spring groundwater infiltration levels are usually the most critical as the watertable is usually at its highest level during this period.

**Flow Management**

The management by several processes of the quantity or rate of movement of a fluid discharge or the total quantity carried by a conduit or channel. This could include flow attenuation (the process of reducing the peak flow rate by redistributing the same volume over a longer period of time), flow control (the process by which sewer flows or a portion of those flows are blocked, detained, or diverted within a certain portion of the collection system) and flow reduction (the process of decreasing flows into a sewer system or removing a proportion of the flow that is already in the sewer system or eliminating flow sources).

**Green Infrastructure**

Projects that keep stormwater from entering the sewer system. Such projects are intended to make sewer systems more resilient and provide capacity in sewer systems. These are particularly helpful in areas serviced by combined sewers. Such projects include: rain barrels, roof gardens, permeable parking lots, swales, stormwater planters, storm curb extensions, etc.

**Greenfields**

Lands that have not been built upon. These lands have not been divided and no infrastructure services have yet been provided.

**Intensification**

Further development and redevelopment in mature areas that are already considered developed or built up.

**Local System**

The street pipes for water distribution and wastewater collection systems that connect with individual private or public systems.

**Partially-separated Sewer**

A separated sewer system in which household foundation drains and roof drains contribute a direct source of stormwater and groundwater inflow to the sanitary sewer.

**Protective Plumbing Program**

A City of Ottawa program that provides subsidy for home owners who wish to protect their properties from future flooding during extreme wet weather events. Greater subsidy is provided to homeowners who have directly experienced basement flooding from sewers and a lower subsidy is available for homeowners who reside in an area of flooding. Information about the program is available on the City of Ottawa web site.

**Rehabilitation**

All aspects of upgrading the performance of existing sewer systems. Structural rehabilitation includes repair, renovation and renewal. Hydraulic rehabilitation covers replacement, lining, flow reduction or attenuation as well as structural rehabilitation.

**Separated Sewer**

A sewer system in which wastewater flows and storm flows are collected by separate pipe systems.

**Spine**

A component of the combined, sanitary or storm minor system which connects the collector or trunk pipes with the local sewers.

**Sump Pump**

A mechanism used for removing water or wastewater from a sump or wet well. It may be energized by air, water, steam or electric motor. Ejectors and submerged centrifugal pumps either float or manually controlled are often used for this purpose.

**Trunk Sewer**

A trunk sewer is considered to be the same as a collector sewer.

**Wastewater System**

Flows in a combined, partially-separated or separated sewer system including waste flows and extraneous flows.

**Water Conservation**

Measures taken by individual home and building owners and the municipality to reduce the amount of water required by individual property owners. Such measures could include: roof gardens, use of rain barrels, perforated parking lots, reduced watering of lawns, etc.

**Water System**

Flows in a central water piped system which includes local watermains and trunks.

**Wet Weather Flows**

Flow in a combined, partially-separated or separated sewer that is influenced by meteorological conditions such as rainfall and snowmelt. The wet weather flow is comprised of the dry weather flow as well as event derived infiltration/inflow.

**APPENDIX B**

**Guidelines re: Landowner Emplacement of Local Services under Development Agreements**

**Introduction**

The policy guidelines are general principles by which staff will be guided in considering development applications. However, each application will be considered on its own merits regarding, among other factors: the nature, type, and location of the development and any existing and proposed development in the surrounding area; these policy guidelines; the location and type of services required and their relationship to the proposed development and existing development in the area; and the *Development Charges Act*, 1997.

The following guidelines set out the size and nature of engineered infrastructure included in the study as development charge projects. All other engineered infrastructure will be considered as a local service to be emplaced as part of the development.

**Water**

Subject to the criteria noted below, water works that are identified in an approved master plan or serviceability plan qualify as development charges projects. The detailed engineering requirements of the items below are governed by the detailed engineering standards for the City of Ottawa.

**1. Watermains**

Local watermains are typically 406 mm and smaller and support direct service connections. Feeder mains are typically 610mm and larger, feed/service areas beyond local development and do not support local service connections. Watermains, having a nominal diameter equal to or greater than 610 mm, are considered to be development charges projects and watermains of 405 mm or less are considered a developer’s responsibility, subject to the criteria below.

Feeder mains are typically located on Arterial or Major collector roads or easements where lot frontage is not normally permitted. Since a watermain of any size located within this right of way has no direct servicing benefit but is required by the developer for local services:

- i. The contribution towards “oversizing” through development charges for pipes greater than 610 mm will be the cost in excess of the cost of a 405 mm watermain and will increase as the pipe size increases, as follows:

Watermain Size	Charged to DCs
405 mm	NIL
610 mm	(cost of 610mm less cost of 405mm)
750 mm	(cost of 750mm less cost of 405mm)
900 mm	(cost of 900mm less cost of 405mm)
1050 mm	(cost of 1050mm less cost of 405mm)
1200 mm	(cost of 1200mm less cost of 405mm)

- ii. Where identified in an approved serviceability study, off-site feeder mains of any size required to provide network integrity or reliability to the distribution network, or to correct health-related water supply concerns having a growth-related component, are considered development charges projects.
- iii. All other watermains are considered a direct developer responsibility; including all required looping to service the development lands.
- iv. One price per nominal pipe diameter will apply to all over-sizing costs as set out in the corresponding table in the DC by-law.

**2. *Booster Pumping Stations and Reservoirs***

- i. Upgrades to, or construction of, temporary water booster pumping stations and reservoir projects are considered to be the developer’s responsibility.
- ii. Upgrades to, or construction of, permanent water booster pumping stations and reservoir projects are considered to be development charges projects.

**Wastewater**

Subject to the criteria noted below, wastewater works that are identified in an approved master plan or serviceability plan, qualify as development charges projects. The detailed engineering requirements of the items below are governed by the detailed engineering standards for the City of Ottawa.

The City may enter into a front ending agreement with a developer for infrastructure not qualifying as a development charges project. The front ending agreement may be used to assist in recovering costs from other benefiting owners.

**1. *Sanitary Sewers***

The development charge benchmark for pipe size and flow is based on a 40 ha (i.e.100acre) town house development (i.e. a town house development is judged a blended average between low and high density housing and is consistent with the current OP). Flow is then estimated in accordance with the latest City design guidelines.

- i. Only over-sizing costs for trunk sanitary sewers meeting the combined criteria of having a nominal diameter being equal to or greater than 450 mm and having a flow greater than 80 l/s are considered to be development charges projects. The contribution towards ‘over-sizing’ through development charges for pipes equal to or greater than 450 mm and having a flow greater than 80 l/s will be the cost in excess of the cost of a 375 mm sanitary sewer and will increase as the pipe size increases, as follows:

Size of Sanitary Sewer	Charged to DCs
375 mm	NIL
450mm @ 80l/s	(cost of 450mm less cost of 375mm)
525 mm	(cost of 525mm less cost of 375mm)
600 mm	(cost of 600mm less cost of 375mm)
675 mm	(cost of 675mm less cost of 375mm)
750 mm	(cost of 750mm less cost of 375mm)

900 mm	(cost of 900mm less cost of 375mm)
Larger pipe sizes	(cost of larger pipe less cost of 375mm)

- ii. Where identified in an approved serviceability study, off-site sanitary sewers of any combined size and flow factor are considered development charges projects. This would also apply to conditions where they are required for system integrity or as a system improvement to accommodate growth or to correct a health-related and/or environmental concern with a growth-related component.
- iii. All other sanitary sewers are considered to be the developer's responsibility.
- iv. One price per nominal pipe diameter will apply to all over-sizing costs as set out in the corresponding table of the DC by-law.
- v. Over-depth for upstream lands and rock excavation will be considered on an individual project basis, up to a maximum allowance of 15% of the over-sizing costs.

**2. Pumping Stations**

- i. Upgrades to, or construction of, temporary sanitary pumping stations are considered to be the developer's responsibility.
- ii. Upgrades to, or construction of, permanent pumping stations that are required as a result of an approved serviceability study, service more than one developer, and have a tributary flow greater than 80 l/s are considered to be development charges projects.
- iii. New or expanded pumping stations that do not qualify as development charges projects are the developer's responsibility.

**Land Acquisition for Water and Wastewater Works**

**1. Booster Stations and Reservoirs**

- i. Where the booster stations and reservoirs are not development charges projects, the land acquisition, to the size required by the design of the facility, is to be provided by the developer/landowner as part of the development approval process.
- ii. When booster stations and reservoirs are considered development charges projects, the market value of the land is considered to be part of the capital cost of the development charge project.

**2. Pumping Stations**

- i. Where pump stations are not development charges projects, the land acquisition, to the size required by the design of the facility, is to be provided by the developer/landowner as part of the development approval process.
- ii. When pumping stations are considered development charges projects, the market value of the land is considered to be part of the capital cost of the development charges project.

**Storm Water Management Works**

Subject to the criteria noted below, storm water management works that are identified in an approved master drainage plan or serviceability plan, qualify as development charges projects. The detailed engineering requirements of the following items are governed by the Stormwater Management Planning and Design Manual (MOE, 2003) and the detailed engineering standards of the City of Ottawa.

**1. Storm Sewers**

As with sanitary sewers, the development charge benchmark for pipe size and flow is based on a 40 ha (i.e.100acre) town house development (i.e. a town house development is judged a blended average between low and high density housing and is consistent with the current OP). Flow is estimated in accordance with the latest City design guidelines.

i. Only over-sizing costs for trunk storm sewers meeting the combined criteria of having a nominal pipe diameter being equal to or greater than 1800 mm and having a flow greater than 3600 l/s are considered to be development charges projects. The contribution towards ‘over-sizing’ through development charges for pipes equal to or greater than 1800 mm and having a flow greater than 3600 l/s will be the cost in excess of the cost of a 1650 mm storm sewer and will increase as the pipe size increases as follows:

ii.

<b>Size of Storm Sewer</b>	<b>Charged to DCs</b>
1650 mm	NIL
1800 mm	(cost of 1800mm less cost of 1650mm)
1950 mm	(cost of 1950mm less cost of 1650mm)
2100 mm	(cost of 2100mm less cost of 1650mm)
2250 mm	(cost of 2250mm less cost of 1650mm)
Larger pipe sizes	(cost of larger pipe less cost of 1650mm)

ii. Where identified in an approved serviceability study or master drainage plan, any over-sizing required to service off-site lands and required for system integrity, or as a system improvement to accommodate growth, is considered a development charge project.

iii. Where conditions of a particular development require on-site over-sizing, the on-site over-sizing will be the developer's responsibility.

iv. Unless identified as a development charges project, all storm sewers are considered to be the developer's responsibility.

v. One price per nominal pipe diameter will apply to all over-sizing costs as set out in the corresponding table of the DC by-law. Over-depth for upstream lands and rock

excavation will be considered on an individual project basis, up to a maximum allowance of 15% of the over-sizing costs.

- vi. Where identified in an approved serviceability study or master drainage plan, upgrades or expansions to existing natural channels qualify as part of a large-area development charge, and storm sewers as identified in points i and ii above qualify as part of a small benefit area charge based on the tributary watershed.

**2. Storm Water Management Facilities**

- i. Where the City deems, through an approved study, that it is preferable to provide centralized facilities to serve growth-related projects controlled by multiple owners, they are considered development charges projects.
- ii. Quality and quantity works may be considered development charges projects where they have been identified through an approved study and they benefit a broader area of development growth. In some of these cases, the quality and quantity works are to be developed by a single owner, with the works commonly oversized for other benefiting lands. In such cases, the owner on whose lands the works are located will be responsible for their proportionate share of the work and the project is considered to be a development charges project.
- iii. All other stormwater quality and quantity works are a direct developer responsibility.
- iv. Storm water management facilities, as identified in point ii, qualify as part of a small benefit area/specific area charge. The benefit area is the tributary area to the SWM facility.
- v. Storm water management facilities costs will include costs for developable land needed for the Storm Water Management Facility.

**3. Erosion Control Measures**

- i. Downstream erosion works and fish compensation works required to mitigate the impact of development and that have been identified through an approved study are development charges projects. In all other cases, a separate city-wide planning level study is required to assess existing stream stability and future impacts of development in order to maintain existing stream conditions and to apportion costs appropriately. The study costs will be considered a development charges project.