Kingston's Urban Forest Management Plan

A Plan for City-Owned Trees

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Prepared for: City of Kingston

July 19, 2011

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1.0 Introduction

1.1 Purpose of the Plan

To respond to the challenges of effectively managing an urban forest within a community growing in numbers of people and complexity, the City of Kingston has committed to preparation of an Urban Forest Management Plan to guide management of public trees within the City's urban area. The City of Kingston, Department of Public Works is responsible for maintenance and management of trees on City property. In looking to ensuring a sustainable future for this important community resource, the City of Kingston recognizes that:

- Maintaining abundant tree cover in urban areas will be a critical component in adapting to anticipated global changes in climate;
- Long term financial benefits of immediate and ongoing investment in green infrastructure outweigh the costs;
- Planning for investments in the urban forest now will ensure a healthy urban forest for the future; and
- Taking a leadership role will demonstrate the City's commitment to the importance of maintaining and enhancing a healthy urban forest.

To establish the guidance required to oversee a sustainable urban forest, Kingston's Urban Forest Management Plan will:

- **Articulate a vision** for sustaining Kingston's urban forest to 2035;
- **Establish strategic goals and objectives** regarding the management and sustainability of its urban forests;
- **Set the management activities required** to execute these responsibilities efficiently and effectively;
- **Identify tree management techniques and operational procedures** that will ensure long term community enjoyment of the forest;
- **List strategic actions and priorities** for the forest consistent with the established vision, goals, and objectives;
- **Make recommendations** that will ensure the long term sustainability of Kingston's urban forest.

This Plan follows current City strategic and policy initiatives that focus on community and environmental sustainability. For example, the completion of a Corporate Strategic Plan for 2009-2011 focused on community sustainability and has set the stage for the preparation of a Community Sustainability Plan that is currently in progress. In addition, the City's new Official Plan that came into effect on January 27, 2010 provides policy direction on a sustainability theme, based on solid recent comprehensive supporting studies that address natural heritage, growth and transportation challenges. These documents provide the direction and context for the preparation of an Urban Forest Management Strategy that is consistent with the theme of environmental sustainability embraced by Corporate administration and the community of Kingston.

This Plan will establish guidelines and actions for the City to follow for long term preservation and enhancement of its urban forest through sustainable practices. The ultimate outcomes desired through this plan are to maintain the City's existing urban forest cover and to support the expansion of the urban forest. Environmental, social, cultural and economic benefits are expected to be realized through effective management that will maintain and enhance the number, quality and diversity of trees within Kingston's urban community.

The overall Plan purpose is to provide management direction to the City so that the community and area flora and fauna can enjoy the

benefits of trees now and for future generations**. The focus for this plan is upon City-owned trees within the urban area.** It is acknowledged that the extent and strength of the City`s urban forest is comprised of City-owned trees along streets, in parks and in natural areas as well as trees on private property and on other public and institutional lands such as those of the Cataraqui Conservation Authority, Parks Canada and Queen`s University. The plan that follows provides strategic directions and proposed management actions to establish a comprehensive approach to City management of its public trees, as directed through the February 9, 2011 meeting of the Environment, Infrastructure and Transportation Policies Committee that approved this plan`s preparation. Some of the plan`s goals and management actions do relate to protection and enhancement of the City`s forest on private lands, in recognition that all trees within the City contribute to the overall urban forest. As implementation of this plan proceeds and advances occur in more proactive management of City-owned trees, the City will dedicate more attention to enhancement and maintenance of the full urban forest on private and public lands.

The plan components include strategic directions articulated through a vision for 2035, goals and objectives, presentation and analysis of the City's urban tree inventory, recommended management activities (for planting, pruning, tree health care, emergency response/risk management), public education and budget planning. In summary, the **main project deliverables** include:

1. **Background Review**: Review & Analyze available data, relevant existing strategic directions, policies and by-laws
2. Conduct urban forest management **best practices review** of targeted municipalities, including use of urban forest management software applications
3. Propose **Plan Vision, Goals, Objectives** options for internal and public input
4. **Establish urban Tree Advisory Board**
5. **Meet Tree Advisory Board** on draft strategic directions
6. **Public Meeting on draft strategic directions** for Plan
7. **Draft Urban Forestry Management Plan**
8. **Public Meeting on Draft Plan**
9. **Final Plan** Submitted and Presented to Council

The Urban Forest Management Plan for the City of Kingston will establish the City's commitment to preserving and enhancing the urban forest, and will provide a framework for monitoring progress towards established urban forest goals. It will:

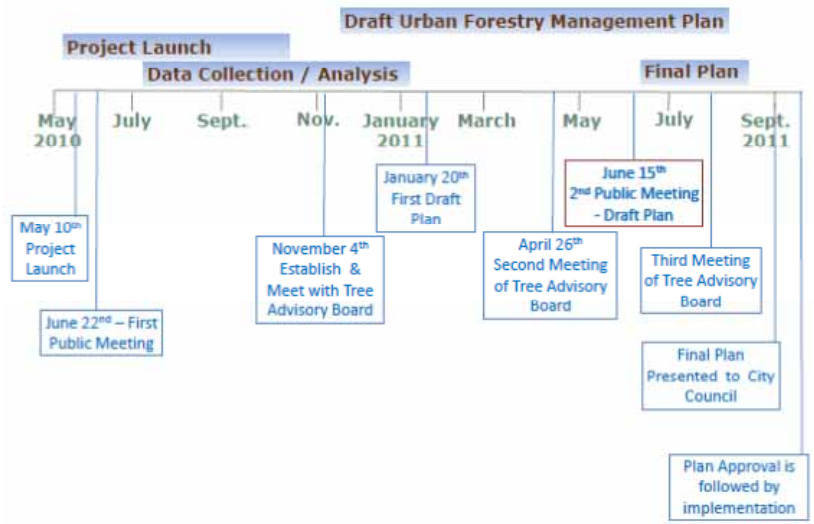
- Provide a better representation and understanding of the urban forest from which meaningful policy can be developed;
- Identify additional reliable, understandable, and meaningful sustainability indicators that can be compared to those of other municipalities for inclusion in updates to the ICSP and other strategic planning initiatives; and
- Monitor the success of the Tree By-law.

A number of policies exist in Council approved plans currently in effect that will guide the philosophy and therefore the preparation of Kingston's Urban Forest Management Strategy.

1.2 Plan Development Process

The refinement of content for this Plan was informed by a combination of discussion, review and analysis of the City's existing urban forest management practices, a detailed review of the practices and strategies employed by other comparable municipalities and community consultation. The following Figure 1 presents the study process.

Figure 1: Planning Process – Urban Forest Management Plan



1.3 Earning its Keep: The Working Forest

Trees have long been recognized for their aesthetic benefits to quality of life in urban centers. More recently, urban trees have been more fully acknowledged for their extensive contribution to urban infrastructure. Many of these benefits have recently been quantified.

The economic benefits associated with urban trees include increased property values and a positive impact on real estate, plus a decrease in energy costs thanks to reduced temperature in the shade (ISA, 2000; CMHC, 2001). Trees can protect against harsh winds and snow drifts and reduce or slow surface runoff (CMHC, 2001; University of Minnesota, 2010). Urban forests help to reduce the quantity of stormwater flows, soil erosion and stream sedimentation and improve the quality of runoff through absorption. They act above ground through interception, evaporation and absorption of precipitation, at ground surface through temporary storage, and below ground by assisting infiltration and permeation (ISA, 2000). Root growth leads to improved soil structure by helping to build micro and macro pores (Lawson, 2000).

In his book Up by the Roots (2008), James Urban defines the "functional tree" as a large-canopy tree. He states the following:

> "They must be large enough to shade houses, pavement, cars and people. Each tree should expect to live long enough with minimum maintenance so that its benefits are not outweighed by the cost of maintenance and replacement. There are many situations in which a small tree is appropriate, but small trees do not offer the environmental benefits large trees provide."

Table 1 presents an overview of the benefits of urban trees.

Tree Service	Benefit	Value
moderating the urban heat island effect	Cooler summer temperatures outside Building Energy savings	
shading buildings in the summer	Building energy savings	trees reduce air conditioning costs by up to 50%.
screening buildings from wind in the winter	Building energy savings	Trees planted as windbreaks can reduce heating costs by 10 to 25%.
cleaning and reducing storm water runoff	Reduced need for stormwater infrastructure; 100 Mature Trees catch 538,000 gallons of rainfall per year (McPherson et. al., 2002)	For every 5 % of tree cover area added to a community, storm water run-off is reduced by approximately 2%. In 50 years, one tree can recycle $35,000 of stormwater; *(www.toronto.ca/parks/taDDvalue trees htm)*
storing atmospheric carbon	Reduce community contributions to greenhouse gas emissions	*100 mature trees* remove 52 tons of $C0_2$ from the atmosphere per year

Tree Service	Benefit	Value
Habitat and food source for urban wildlife, migratory birds	Natural area aesthetics and ecosystem benefits for humans, plants and animals within the city	
temporary refuge for some types of wildlife moving between natural areas	Natural area aesthetics, refuge and habitat in the city	
collect and remove pollutants from the air,	Pollutants removed can include carbon monoxide, nitrogen oxides, and sulphur dioxide, filter dust, pollens and smoke Clean Air; 100 Mature Trees remove 430lbs. of particulate pollutants per year	In 50 years, one tree can eliminate pollutants that would otherwise cost $60,000 to remove from the air.* *Note that this figure only relates to pollutant removal, not the potential added health benefits and reduced costs for prevented health effects from air quality.
Provision of oxygen	Healthier air	In 50 years, one tree can generate $30,000 in oxygen,
Use of groundwater	reduce the capacity requirement of storm water conveyance systems such as storm sewers	
Roots provide bank stabilization along open watercourses	Reduced streambank erosion, reduced sedimentation to watercourses	
remove toxins from the ground water	Clean water, healthier ecosystem	
The leaves of trees impede and soften the impact of heavy rain on ground conditions	Reduce erosion, sedimentation	
strategic placement of trees as wind breaks	Reduced soil erosion and infrastructure damage; increased human comfort	
access to green space, calming effect of trees	improved sense of well being, sense of safety and physical calmness. Positive human mental health benefits identified from presence of trees	
Public Safety – Trees along transportation corridors provide a natural, physical barrier	narrow drivers' field of vision, reducing traffic speeds , provide a physical barrier, all of which increase pedestrian safety	
Road Safety – trees established along urban highways	decrease driver stress, resulting in fewer incidents of road rage,(City of Vancouver, 2007). Trees also screen headlight glare. *(Faulkner, 2004).*	
Social Interaction within Public spaces with trees	Trees encourage social interaction and increase a sense of community. Trees foster safer, more sociable neighbourhood environments.	
Trees as a symbol of Cultural Heritage	People associate many different events and memories with specific individual trees and stands of trees. Trees offer a link to past histories, providing insight to times and events	
Cultural: Sense of Place	The characteristics of neighbourhoods are determined by street, private and public open space. People feel an	

Tree Service	Benefit	Value
	immediate connection to the landscape fostering ongoing association with trees.	
Cultural: Sense of Place	Conservation of natural areas for the diversity of tree species and wildlife	
Economic	For Development: The presence of trees within a community provides an invitation to visitors, developers and investors thus enhancing the prosperity of a city. Mature trees on public and private property increase the value of these properties, in turn increasing municipal property tax.	"A mature tree can often have an appraised value of between $1,000 and $10,000 (*Council of Tree and Landscape Appraisers);* Under the City of Kingston's Tree By-Law, fines for unlawful injury or removal ranges from $1000 to 100,000, depending upon the offence specifics.
Engineering - acoustical control	. A screen of dense coniferous trees 30 meters wide can absorb 6-8 decibels.	
Engineering – infrastructure longevity	improve pavement performance. Research has documented that a twenty percent shade canopy improves pavement condition by 11%	Calculated as a 60% saving for resurfacing over a 30 year period *(McPherson et al. 1999)*

Analysis using the United States Forest Service's *i-Tree Streets* computer model estimates that each year, every street tree in Kingston provides over $67 in, net benefits by reducing building energy use, improving air quality, and storing carbon. This means that Kingston's estimated 28,000 street trees combined provide an **estimated $1.87 million in environmental benefits every year.**

2.0 Kingston's Urban Forest Today

This section describes the existing physical environmental, policy and community context for Kingston's urban forest. Descriptions of Kingston's current urban forest are also described below.

2.1 Urban Growth and the Urban Forest

The City of Kingston is located in Frontenac County, 200 kilometres west of Ottawa, about halfway between Toronto and Montreal. The city is found in Eastern Ontario where the St. Lawrence River flows out of Lake Ontario, close to the Thousand Islands (City of Kingston, 2010). The site where Kingston is today was first a First Nations settlement called Katarowki (Cataraqui). In 1674 Fort Frontenac was constructed at that site. In 1788 the fort and surrounding development was named the City of Kingston, which became home to Canada's first Parliament in 1841 until 1844. In 1998 the former City of Kingston, Kingston Township and Pittsburgh Township were amalgamated into the new City of Kingston (Kingston Historical Society, 2004), which covers 450.39 square kilometers and is home to 117, 210 residents according to the 2006 census, representing an increase of 2.6% or 3,000 people since 2001.

Kingston's urban forest is located on 21 per cent or 9,559 hectares of the City and consists of public trees located in municipal parks, along municipal streets and in the historic Downtown (City of Kingston, 2010). The management plan will be developed for protection and enhancement of public trees within the urban area of the City as illustrated through the Urban Boundary in the Official Plan (City of Kingston, 2010).

The City's current forest cover within the urban area of approximately 20% (28% forest cover for the entire City of Kingston, not counting street trees (City of Kingston Report to Planning Committee 10-064, 2010) is comparable to other urban areas in Canada. The challenge for

the future in Kingston, as in other communities, will be to ensure that this urban forest is managed so that the existing cover is maintained and continues to expand. The urban forest will allow Kingston's residents and visitors to take advantage of the services provided by trees including cooling effects, carbon sequestration and protection from wind, as well as to enjoy the intrinsic value of the urban forest. Expanding the urban forest will become increasingly difficult, and more important as the City of Kingston's population density continues to rise and as the city grows within its urban boundaries.

2.2 The Ecological Context of Kingston's Urban Forest

Kingston is located in the Manitoulin-Lake Simcoe Ecoregion of the Mixedwood Plains Ecozone. This ecozone stretches from the Lower Great Lakes to the St. Lawrence Valley and is characterized by warm summers; fertile agricultural soils and gentle topography that have allowed it to become one of Canada's most intensively used and highly populated areas (Natural Resources Canada, 2007).

The average summer temperature for this ecozone is 17^{o}C and the average winter temperature is -5^{o}C. The Mixedwood Plains see an average of 720-1000 mm of precipitation annually (Natural Resources Canada, 2007). This ecozone is the smallest, covering nine percent of Canada's land, however it is home to nearly half of the country's population. The topography of the Mixedwood Plains is characterized by plains and gently rolling hills, whose geology is characterized by carbonate-rich Paleozoic bedrock. The soils of this area are predominantly Luvisols which are excellent agricultural soils. Brunisols and podzols are found in the northern part of the ecozone, and thick moraine clay deposits are also characteristic of the area. Containing four of the Great Lakes as well as a portion of the St. Lawrence River and its tributaries, the Mixedwood plains contain abundant freshwater resources.

The remaining fragments of forest in this area boast Canada's highest tree species diversity. Although it is estimated that two hundred years ago the ecozone had a 90% forest cover, today only 17% remains, most of which is found in the remaining wetlands.

2.3 Policy and Regulatory Context

The City of Kingston currently has a number of existing policies that protect trees. The City's ***Official Plan*** maps and provides policies to protect residents from environmental hazards, as well as to protect existing natural features and functions from development impacts. Controls upon vegetation removal are provided through the City's Tree By-Law (2007-170) and Site Alteration By-law (2008-128). All of these policies work together to protect overall forest canopy cover and municipal trees and contribute to the preservation of the urban forest.

2.3.1 Corporate Strategic Directions

The *City's Corporate Strategic Plan 2009-2011* provides a roadmap and the framework for what the Corporation intends to accomplish in a particular timeframe. Kingston's Corporate Strategic Plan aligns available financial and staff resources to meet Council and community objectives, and contains a set of prioritized corporate objectives that can be monitored and measured that will elicit feedback on how the Corporation is meeting community goals and expectations.

Kingston's *Corporate Strategic Plan* also sets out the community vision for the City as *"Kingston – Canada's Most Sustainable City"*. In 2007, Council participated in planning sessions to determine its priorities for 2007-2011. In 2008, Council established a theme statement and a number of strategic directions under the umbrella of sustainability. Since then, City Council has adopted sustainability as the overall umbrella under which component the four pillars of the Strategic Plan - Economic, Social, Environmental, and Cultural –

operate. The following statement demonstrates the City's commitment to sustainability:

We are striving to be a progressive and dynamic city. We believe in sustainability – economic, environmental, social and cultural. This means having a social consciousness, while being environmentally friendly and promoting strong neighbourhoods and quality of life enhancing activities.

The specific commitment to environmental sustainability is articulated as follows:

Environmental Sustainability - The Corporation will conduct itself in a manner that values, protects and enhances our natural assets (air, land, water, and climate) so that future generations, locally and globally, may derive the same or greater benefits from them.

Strategic statements developed through the Corporate Strategic Plan are connected to the directions of the *Integrated Community Sustainability Plan (ICSP)*. Completed in 2010 by the FOCUS Kingston Steering Committee, this plan, called *Sustainable Kingston*, has been prepared with extensive community input and will be implemented in part through community partnerships. The Plan has been developed around the four sustainability pillars of Cultural Vitality, Economic Health, Environmental Responsibility, and Social Equity. Urban forest policy and tree canopy cover are identified as indicators of Environmental Responsibility in this plan. Over time, there is the potential for pilot projects of fruit-bearing trees to contribute to the Social Indicator for Food and Nutrition.

2.3.2 The Policy & Regulatory Environment

The Official Plan provides a number of policies to support a healthy urban forest. The **new Official Plan** for the City of Kingston came into effect on January 27, 2010. The Official Plan of the City of Kingston provides policy direction on all lands within the municipal boundary whether publicly or privately owned.

The following Figure 2 is a schedule from the Official Plan that illustrates the City Structure. The Urban Boundary, outlined in red, comprises the geographic area to which this Urban Forest Management Plan applies. The dark green areas represent open space and environmental areas of the City. The urban forest that is the subject of this plan is located within these areas and along the streetscapes throughout the urban portion of the City. Official Plan policies relevant to Kingston's urban forest are summarized in Table 2.

The City also has a **Tree By-law (2007-170)**, passed on September 4, 2007. This by-law supports the City's goal of increasing the urban forest and promotes practices that sustain healthy woodlands and the urban forest. Through this by-law, permits are required for injury or destruction of trees of specific species (such as endangered or at risk species), trees that are distinctive, trees of a size greater than or equal to 15 cm in diameter, trees on municipal property, within Environmental Protection Areas and Open Space designated lands within the City's Official Plan or trees identified for protection in a City approved *Tree Preservation & Protection Plan*. The By-Law does not apply to trees on private residential lots.

The City's **Site Alteration By-law (2008-128)** specifies that a site alteration permit is required prior to placement of fill, removal of topsoil or change to the grade or topography of lands within the City. Several purposes are stated for the control set through this by-law, including maintenance of existing drainage patterns and protection of significant cultural and natural heritage features .

Figure 2: Urban Boundary, Major Open Space & Environmental Areas

Table 2: Summary of Official Plan Policies relevant to Kingston's Urban Forest

Policy Section	Policy Summary
Section 2 Strategic Policy Direction 2.3.13 Natural Heritage System	*Significant* natural areas and functions comprising the *natural heritage system* will be protected utilizing an ecosystem approach.
2.3.14 Shoreline Protection	Shorelines of lakes and rivers are a valued visual, environmental, and *recreational* resource to be protected, and acquired, where feasible, to form a linked, public open space system.
2.8.1 Natural Heritage Area	The City recognizes that the *ecological functions* of the *natural heritage system* and the biodiversity of its components are inter-related and function together to contribute to sustaining human health and economic welfare, as well as providing habitat for plant and animal communities. The City, in consultation with the Cataraqui Region Conservation Authority, the Ministry of Natural Resources, and Fisheries and Oceans Canada, as appropriate, intends to protect *significant* elements of the *natural heritage system,* as more specifically discussed in Sections 3.10 and 6 of this Plan, and illustrated on Schedules 3, 7 and 8 and the secondary plans included in Section 10 of this Plan. It is the intent of the City to support and participate in stewardship programs in partnership with conservation organizations.
2.8.2 Minimum Forest Coverage	Kingston will take steps to achieve the Environment Canada guideline of 30 percent minimum forest coverage in the urban area and maintain the existing forest coverage outside the *Urban Boundary*."
2.8.4 Site Alteration By-Law	The City's Site Alteration By-law applies to lands not covered by the Cataraqui Region Conservation Authority's "Development, Interference with Wetlands and Alterations to Shorelines and Watercourses" under Ontario Regulation 148/06.
2.8.5 Water Quality and Quantity	In order to maintain the *quality and quantity of water*, the City will restrict *development* and *site alteration* near *sensitive surface* or *groundwater features* and in areas of medium to very high groundwater sensitivity
Section 3: Land Use Designations & Policy 3.8.7 Passive Lands	The Open Space designation also includes landscaped areas, *woodlands*, or conservation reserves primarily retained in a natural state or developed for such passive *uses* as are *compatible* with the primary intent of preserving the natural setting."
3.9.2 Ribbon of Life	"Increasingly, the benefits of shoreline protection and re-vegetation to protect all waterbodies are recognized. Public and private agencies, as well as residents, are encouraged to protect this "ribbon of life" along the waterfront. New *development* must be set back a minimum of 30 metres from all waterbodies, and this "ribbon of life" area must be maintained with non-disturbance of soils and vegetation. In some cases, the area may be re-vegetated in order to protect the quality of the waterbody. The cutting or removal of trees, shrubs or groundcover is not permitted within the "ribbon of life", except for the removal of dead or diseased trees, debris or noxious plants, where a narrow corridor is required for access between a dwelling and the shoreline, or for the provision of pathways and trails, as shown on Schedule 5 and in accordance with the policies of this Plan."

Policy Section	Policy Summary
3.10 Environmental Protection Areas	Areas designated as Environmental Protection on Schedules 3 and 10 of this Official Plan apply to all portions of the City. This designation recognizes lands that have inherent environmental sensitivity. Such locations coincide with flood prone locations which are hazardous to *development*, based on the probability of a 100-year storm event and *wave uprush* conditions. Environmental Protection Areas must be *maintained* in their natural, undisturbed state. Policies of this section of the Official Plan are primarily related to land use. More detailed policy related to environmental functions and features, such as *wetlands*, which form the traditional basis for this land use designation, are found in Section 6. Reference should also be made to Section 5 of the Plan which addresses Natural Hazard policies for the municipality. For *rivers, streams and small inland lake systems* where floodline mapping is not available, an Environmental Protection Area designation is shown as a 30 metre buffer from the respective shorelines to signify the *adjacent land* as referenced in Section 6.1.
3.10.1 Defined Areas	The Environmental Protection Area designation includes: • areas of natural and scientific interest (ANSIs); • significant aquatic or wildlife habitat areas; • provincially significant wetlands, coastal wetlands and locally significant wetlands; • habitat of endangered and threatened species; • habitat of species tracked by the Ministry of Natural Resources 'Natural Heritage Information Centre; and, • all land within the *regulatory floodplain*, which include areas subject to *wave uprush* and *erosion hazards* as set out in Section 5 of this Plan.
Section 4 Infrastructure & Transportation 4.6.6 Pedestrian Friendly Streetscapes	"The City supports the development of convenient and appealing streetscapes through such measures as providing wide sidewalks, street furniture, trees and amenities, including convenient transit stops."
4.6.27 Street Trees	"*Development* proponents may also be required to provide trees in the street boulevard, or in other locations as approved by the City, as a condition of *development* approval."
Section 6 Environment & Energy	This Section of the Official Plan provides policy guidance with respect to the protection of environmental quality within the City's *natural heritage system*, a vital network of diverse features which connects the urban and rural portions of the municipality across air, land and water. The protection of the *natural heritage system* across the *watersheds* is a fundamental requirement of ensuring how this City addresses climate change and still ensures its *sustainability*. This Section of the Plan also deals with principles of energy production and *energy conservation*. These policies are intended to assist the City in evaluating the rapidly evolving technologies for *renewable energy* systems.
6.1 Natural Heritage System	The *natural heritage system* is important for its natural features and their functions which contain animal and plant habitat areas, for the natural resources, such as water, which sustains animal and human health and activity, and for its

Policy Section	Policy Summary
	value as a *recreational* and tourist resource. These interrelated features and functions that support life and environmental health have been evaluated as a system, and consist of core areas linked by landforms and habitats. Provincial policy states "Natural features and areas shall be protected for the long term" (2.1.1). "The diversity and connectivity of natural features in an area, and the long-term *ecological function* and biodiversity of *natural heritage systems*, should be maintained, restored or, where possible, improved while others cannot, and *environmental impact assessments* are required to make this determination. A great variety of different ecological areas are included in the *natural heritage system* and, because it is a living system involving plants, animals and humans, and is continuously evolving. The ecological system consists of core areas, linkages, landforms and functions that allow for the movement of wildlife and the maintenance of natural functions across large areas. Most areas can accommodate some human presence and have *recreational* potential, but some are more sensitive, and cannot. Some areas can include non-intrusive built forms of *development*
6.1.21 Contributory Woodlands	The City encourages the preservation of both *significant* and *contributory woodlands* as shown on Schedule 8 of this Plan, and the consideration of all *woodlands* in the preparation of an *environmental impact assessment*, recognizing linkages between and among *natural heritage features and areas, surface water features* and *groundwater features"* (2.1.2).
Section 9 9.5.41 Tree By-Law	"The City will continue to enforce and monitor its by-law to prohibit or regulate the destruction or injury of trees within the municipality, in accordance with the provisions of the Municipal Act."
Schedule 8	Illustrates significant and contributory woodlands within the City.

Additional land use controls may be identified in the future Official Plan once priority protection areas are identified through source protection planning currently underway by the local Conservation Authority. The Cataraqui Region Conservation Authority released the Draft Assessment Report for the Cataraqui Source Protection Area on April 15, 2010. Land use regulation to protect drinking water sources will be part of implementation of the **Source Protection Plan** that will address the results of this assessment.

2.4 Community Input

A public open house in June 2010 drew close to 40 attendees. The purpose of this meeting was to introduce the urban forest management plan, to provide an overview of this City resource and to obtain preliminary input on plan components of the future urban forest, goals to achieve and community identified benefits of the urban forest. The open house feedback was supplemented by a paper and online survey. The summary of responses (36 total, 20 online) includes the following:

- The urban forest is important!
- "fair" rating in terms of health
- More trees are desired
- Concerns focus on visual – tree removal, impact by utilities, damage and decay;
- Suggested areas for more trees – new developments, public open spaces, replacement of removed trees, at parking lots.

As part of this plan's development, the City has established a Tree Advisory Board comprised of community experts to advise on plan components and to work in partnership with the City on the Plan's implementation, once approved. Appendix A provides a Terms of Reference for the Tree Advisory Board. Through three meetings with these community experts in November 2010, April and July 2011, this group offered feedback on the draft plan as follows:

- Take all possible efforts to establish the "right tree in the right place"
- Strongly agree with trees being treated as an important component of City infrastructure
- Consider extending the City's Tree By-Law to private property to help further strengthen Kingston's urban forest
- Invest in the education and promotion of the benefits of urban trees, encouraging community involvement and ownership in their care
- Explore a range of funding and resourcing opportunities to establish and care for Kingston's urban forest
- Establish clear guidelines for tree planting and management
- Apply a number of public education messages, initiatives and strategies to engage the community in sharing urban forest care.

A full draft plan was reviewed by the community in June 2011. For this second round of public consultation, the draft urban forest management plan was posted on the City website in advance of a public meeting. Approximately 40 residents attended the June 15, 2011 public meeting that featured an open house session of display boards, a presentation on the plan highlights and a question and answer period. Members of the public were invited to provide further feedback by e-mail or to an online survey on the City's website. Feedback provided through post-it notes, the question and answer session, 31 surveys and 61 e-mail submissions provided a diverse and thoughtful range of feedback on the draft plan. The main points raised include:

- Ensure integration of this plan with other tree-related City programs and policies
- Consider more attention to and protection of private trees
- Clearly state plan application, directions for the future
- Take advantage of partnerships with others, maximize community participation

- Encourage fruit-bearing trees
- Establish the City as a leader and
- Many specific suggestions for plan wording, forest management actions and offers of assistance for plan implementation.

Appendix B provides a more detailed summary of the public and Tree Advisory Board input throughout the plan preparation process. All of the feedback has been carefully considered in the preparation of this final plan, anticipated for Council review in the fall of 2011.

2.5 Experiences of Other Jurisdictions

Preparation of this plan involved a review of urban forest management by other municipalities comparable to Kingston. Appendix C presents a summary of the review results from the following municipalities:

- Peterborough
- Oakville
- Burlington
- Montreal
- Guelph
- Calgary/London

The main finding of the review of other jurisdictions is that all municipalities are facing very similar challenges to Kingston. Many municipalities are working to compile tree inventories. To date, urban forest management planning is becoming more important but there are not many Urban Forest Plans as yet. As in Kingston, the availability of limited resources for effective management of urban trees appears to be a significant challenge. Analysis by the Town of Oakville of the tree management budgets in Canada and the U.S. municipalities reveals that Kingston's budget is similar in per capita ($5.81) and per tree $ ($19.45), however, all Canadian municipalities tend to have smaller comparable budgets to many U.S. cities.

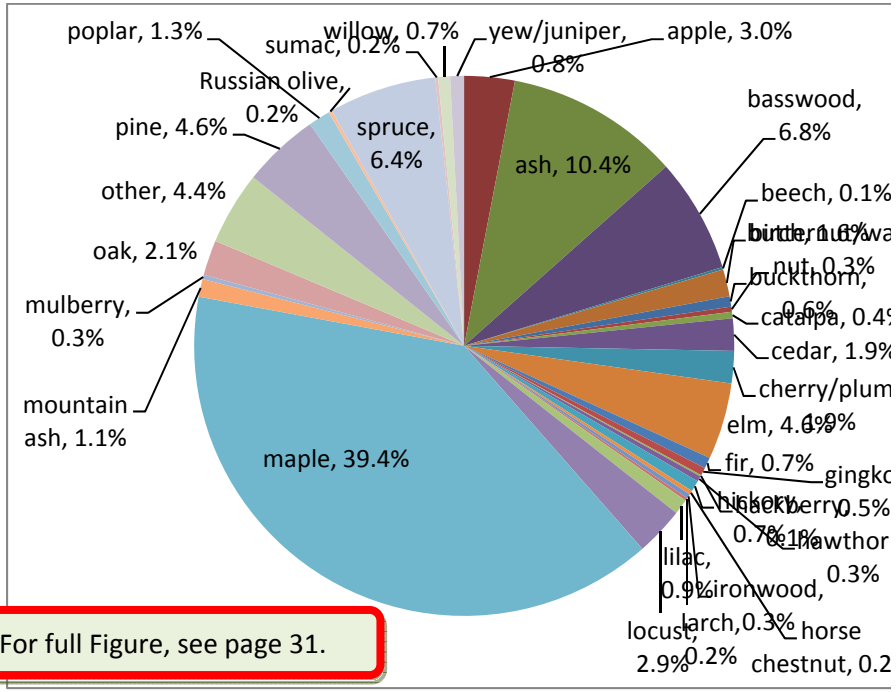
Coordination with other urban infrastructure is also a challenge, with trees often placed to a lower priority by default not design. Many municipalities are recognizing the value of planning adequately for healthy tree environments and are working towards recognition of trees as integral to City infrastructure as part of "green infrastructure". Community engagement in planning and caring for trees is common throughout the majority of municipalities reviewed.

2.6 Urban Forest Profile

The City completed a tree inventory of its urban forest through University of Toronto resources in 1999, after the 1998 ice storm damage. Analysis of this inventory provides very useful data to profile the distribution of tree species, size and health within Kingston's urban forest from that time. Update of this data in the future will be valuable for ongoing tree management in achieving a sustainable urban forest. The following charts, Figures 3 and 4, provide an overview profile of the urban forest.

Tree Species	Number	%
apple	748	3.0%
ash	2593	10.4%
basswood	1702	6.8%
beech	36	0.1%
birch	404	1.6%
buckthorn	153	0.6%
butternut/walnut	77	0.3%
catalpa	97	0.4%
cedar	479	1.9%
cherry/plum	480	1.9%
elm	1140	4.6%
fir	162	0.7%
gingko	119	0.5%
hackberry	22	0.1%
hawthorn	81	0.3%
hickory	165	0.7%
horse chestnut	61	0.2%
ironwood	64	0.3%
larch	43	0.2%
lilac	230	0.9%
locust	723	2.9%
maple	9788	39.4%
mountain ash	265	1.1%
mulberry	66	0.3%
oak	523	2.1%
other	1089	4.4%
pine	1143	4.6%
poplar	325	1.3%
Russian olive	51	0.2%
spruce	1601	6.4%
sumac	44	0.2%
willow	175	0.7%
yew/juniper	208	0.8%
Total	**24857**	

Figure 3: Tree Species Distribution in Kingston's Urban Forest



For full Figure, see page 31.

As illustrated above, maple trees comprise the greatest proportion of Kingston's urban forest, followed by ash, spruce, basswood (linden), elm and pine species. The forest is comprised of a significant proportion of smaller and younger trees (~33% are equal to or less than 10 cm or 4 inches in diameter). However, a similar proportion of the population (31%) is greater than 30 cm (or 1 foot) in diameter.

A review of some of the tree health parameters within the database indicates that the majority of trees were relatively healthy at the time of the inventory in 1999. For example:

- 15% (3812) of trees have 25-50% of their crown volume removed; 4% (1034) of trees have >50% of their crown removed;
- 6% (1571) of trees are lopsided or have an unbalanced crown where more than ¾ of the crown volume is on one side of the tree stem;
- <1% (239) of trees are leaning at an angle greater than 15° from vertical, with root mounding;
- 4% (1030) of trees have a cavity or area of rot greater than ¼ of the trunk diameter;
- 3% (737) of trees have a confined rooting space which precludes root development within an area greater than ¼ of the area within the tree's dripline;
- 11% (2855) of trees currently are within 0.5 m of wires and 3.8% of trees (952) will likely encounter a conflict within the next few years.

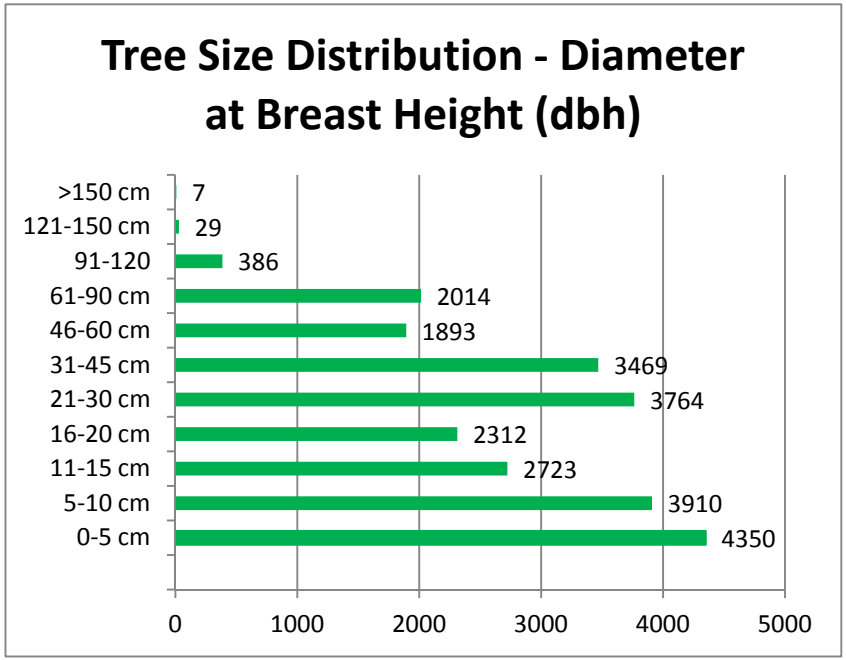


Figure 4: Urban Forest Tree Diameters

2.6 Current Conditions

2.6.1 Challenges

The **main challenges** associated with effective management of Kingston's urban forest, identified during this planning process include:

- **Older, mature tree**s;
- **Urban environment** – insufficient soil volume, compaction;
- **Limited City resources** & wide range of responsibilities.

The stresses trees face in an urban environment are significant and complicate the establishment and maintenance of these trees. These challenges are described further below.

Abiotic stresses related to soil conditions that urban trees face include soil compaction, salt pollution, drought, shading, and competition for water and nutrients. The ISA (2000) recommends that municipalities instigate coordinated policy education initiatives and implement effective monitoring in order to ensure a healthy urban forest. Policy, education and monitoring initiatives can all be used as tools to ensure that trees receive enough water, that developments are constructed to withstand and accommodate trees and that buildings sidewalks and roads experience as little damage as possible

The average street tree in an intensively developed urban area lives 10 to 25 years (Urban, 1989) and most urban tree survival problems are due to insufficient soil volumes. Water is lost as runoff over impervious paved areas, through drainage beyond the reach of the roots, and as evaporation from the surface of the soil (Goldstein et al, 1991). Trees planted close to hard surfaces often suffer root damage and girdling as a result of soil volume restriction, and sometimes cause pavement lifting in an effort to access air, water and nutrients (ISA, 2000). In order to avoid root damage to pavement, proper soil drainage must be ensured, encouraging roots to grow at a sufficient depth below the pavement. This, along with adequate soil and space for root-flare accommodation, will ensure the long-term integrity of the paver (Urban, 2008c).

Open spaces adjacent to trees (e.g. lawns) lead to trees that are healthier than those found in the middle of paved roads. Trees should be planted in open lawn areas rather than tree pits whenever possible. Trees respond positively to an increase in soil volume at their roots, as well as to an increase in the size of the rootball hole. A planting volume smaller than three cubic metres is too small to sustain a healthy tree. (Urban,1989). In 10 years or fewer, any differences in rooting areas will be reflected in differences in tree appearance, an example of which is shown in Figure 4 (Goldstein et al, 1991).

Small volumes of compacted soil in tree pits are either poorly drained or are incapable of holding enough water to meet demand and the tree experiences periodic to prolonged drought (Urban 1991). Trees growing in restricted root zones typically have leaning trunks which indicates inadequate root system development (Urban, 1994). It must be noted that although trees are mechanically more stable when planted in open spaces, leaves can be threatened by excess light and over-heating due to light reflecting from of buildings during hot summers. This leads to an increased need for soil water to offset the higher rate of transpiration The heat island effect increases tree water requirements and the amount of water transpired by trees in urban areas almost always exceeds the quantity contributed by rainfall (CMHC, 2001).

2.6.2 Opportunities

In addition to the challenges, there are several strengths available that will assist in maintenance of a sustainable urban forest for Kingston, including:

- Range of species;

- Favourable climate;
- Strong base of knowledge to build upon;
- City commitment to proactive management;
- Interested public

2.6.3 Current City Operations

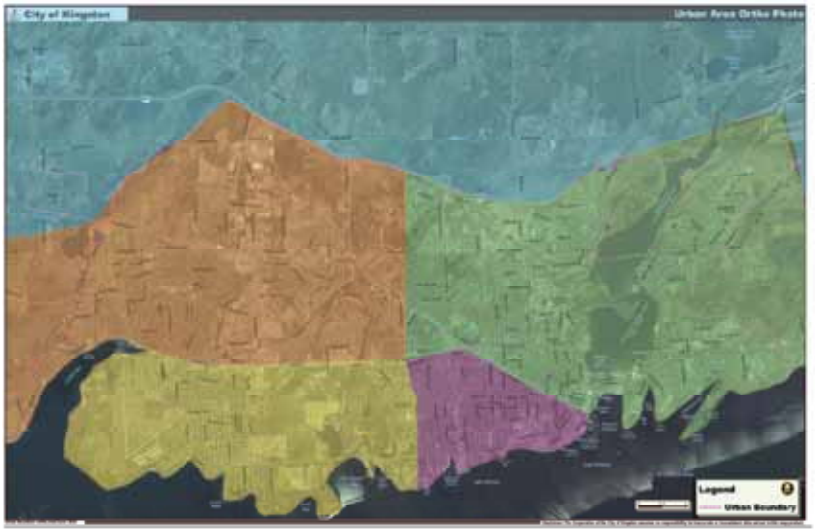
As noted above, the City has a completed tree inventory, however, it the data is currently in a form which is not as user friendly as desired for data retrieval, analysis, input and for use in tree maintenance work planning. With an updated data management system, this existing data could be downloaded and updated to integrate with the City's existing AGL Cartêgraph Graphic Information System (GIS) and Work Director (work order system). The City is also concerned that a significant amount of change has occurred to the urban forest since the 1999 inventory, such as new plantings, tree removals, tree health changes and pruning effects.

Despite data availability not meeting desired levels of City Forestry staff, regular and significant efforts are undertaken annually in the assessment and maintenance of urban trees. Staff are very interested to have data available to ensure timely direction of their efforts to maintain tree health on a priority basis.

Operationally, City forestry staff face work challenges due to the wide range of their responsibilities. In addition to tree maintenance and planning, this work group is also responsible for grass cutting, sportsfield maintenance and scheduling, natural areas management and management of the City golf course.

In the past, work order management for urban forestry has involved task allocation according to four City area zones that correspond to areas of relatively similar tree management issues. These four zones correspond to the downtown core, northeast sector that is north of downtown, southwest and northwest zones as illustrated in Figure 5.

Figure 5: Map of Former City Work Order Zones



The current tree inventory for the City is estimated to be approximately 28,000 trees, but likely higher. The 1999 inventory documents 24, 857 trees with additional trees planted annually since this time (450 in 2010, for example). As well, not all City trees within more naturalized areas have been documented, such as at Belle Island, within wetland systems and along stream corridors. Overall, management of the urban forest resource is a continually growing challenge as new trees are added, existing trees (particularly in the downtown) become older and tree health stresses continue such as drought, salt, air pollution, urban heat island effect, climate change, and invasive species.

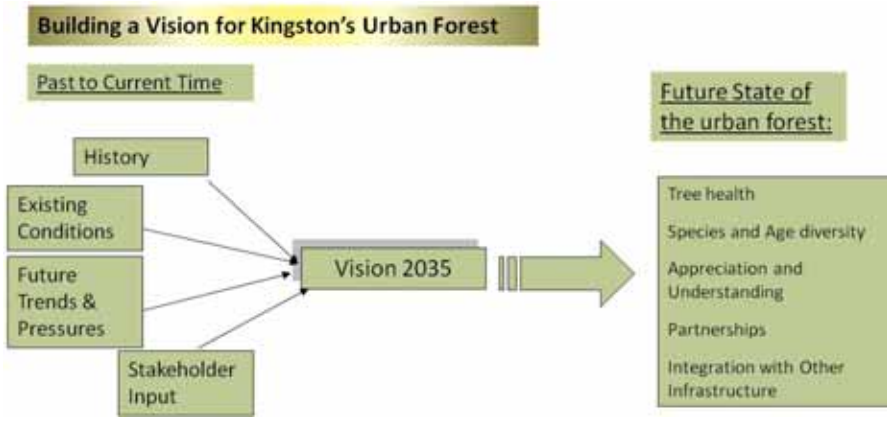
3.0 Kingston's Urban Forest in 2035

Within strategic planning, the vision statement for an organization is its long term view of what they wish the future to be. The statement that describes this future desired state should:

- inspire;
- be concise;
- describe the broader goal for being in existence;
- provide a clear picture and direction against which individuals can make appropriate management decisions over time that contribute to achieving the stated future;
- be memorable;
- remain valid for a long period of time, even decades;
- describe a bright future; and
- be aligned with organizational values and culture.

The following Figure 6 illustrates the factors considered in development of the vision statement.

Figure 6: Contributions to the 2035 Vision for Kingston's Urban Forest



For the Urban Forest Management Plan, the timeframe for the vision is 25 years, to 2035. Once a vision is articulated, it will be supported by:

- *goals* which represent action statements of strategic direction for implementing the vision and which demonstrate a commitment to broad intentions and aspirations; these statements begin with a verb;
- *outcomes* or products expressed as a statement of the end states to be achieved and that contribute to achieving part or all of a goal; and
- *management actions* which are the main task items that together will contribute to achieving the stated outcomes, goals and vision for 2035 .

Participants at a June 2010 public open house shared views on their future vision for Kingston's urban forest, as listed below:

- valued equally with other urban infrastructure
- healthy
- a thriving, community-shared forest praised by visitors for its beauty and vitality
- Shade
- More trees (boulevard trees and everywhere)
- Advise the public that trees are available for planting
- Budget dependent
- Would like private trees to be considered

The first point represents the statement preferred by a majority of participants.

Further input from the Tree Advisory Board, formed in November 2010, recommended refinement to the 2035 vision of Kingston's urban forest as follows:

- Preference for native species;
- Rooted firmly in the future;

- Bringing the forest to the City;
- Community ownership that well supports the City's effective management;
- A healthy and diverse forest; and
- Encourage stewardship by Kingston's young residents.

Considering the existing conditions, pressures and community feedback on the future urban forest, the **proposed Vision Statement** to direct goals and actions for managing this valuable resource over the next 25 years is:

In 2035, Kingston's urban forest will be healthy and diverse, working as a fully functioning green infrastructure that is recognized, celebrated and cared for by all residents as a necessary component of the City's urban area.

4.0 A 25 Year Management Plan for the Urban Forest

Building upon the desired vision for Kingston's urban forest in 2035, community and City staff input, assessment of the current City forest management practices and challenges along with the experiences of other municipalities led to the development of **seven main goals** for long term urban forest management. These goals are organized according to two main categories that are derived from the vision statement presented above:

Sustainable Urban Forest Management

1. **Maintain**, restore and enhance a sustainable urban forest;
2. **Strengthen** the City's role as a manager and steward of the urban forest;
3. **Recognize** and manage the urban forest as a critical element of the City's infrastructure;

Community Stewardship

4. **Maximize** the benefits of the urban forest for the well-being of the community
5. **Identify** and recognize significant valuable trees
6. **Increase** community awareness of the benefits of trees and engagement in a shared responsibility for management of Kingston's urban forest
7. **Encourage** planting and care of private trees and of trees on public property not owned by the City

The following Table 3 presents these goals and their associated outcomes and management actions required to achieve the goals and the overall vision for Kingston's sustainable urban forest. Each of the identified management actions proposes estimates of the required resources for completion. Timing of those actions will be determined based on available resources.

One of the main changes to the City's procedures for urban forest management that will occur upon implementation of this plan is the updating of the City's tree inventory to a geographically based data system. Once all of the information for the City's trees is updated to include geographic data and entry of new and removed trees since the 1999 tree inventory, all future maintenance activities will be tracked on an individual tree basis. Although this task to update data management system will involve significant effort initially, the geographically based tree inventory that will allow electronic field data entry will be efficient for work planning and sustainable forest management once in place. As well, reporting on the City's urban forest health and progress towards implementation of many aspects of this management plan will also be streamlined.

To assist with future urban forest management and reporting, it is recommended that the updated tree inventory and tracking system apply the City's neighbourhood areas, as illustrated in Figure 6. The

neighbourhood areas on this map are used by the City for monitoring and reporting on a number of characteristics of interest to residents such as population, household size and income and demographics. Use of these neighbourhoods for tracking and reporting on urban forest activities and health is expected to provide meaningful areas for public understanding and awareness that is an important component of this plan's success.

5.0 Conclusion

Preparation of this management plan for Kingston's urban forest has considered the experiences and best practices of other jurisdictions, reviewed the existing urban forest assets and management operations and sought the input of community experts and interested residents. The resulting set of goals, outcomes and management actions is believed to be a comprehensive and efficient strategy to achieving the 2035 vision of:

Kingston's urban forest will be healthy and diverse, working as a fully functioning green infrastructure that is recognized, celebrated and cared for by all residents as a necessary component of the City's urban area

as well as sustaining a long-term urban forest for future Kingston residents.

A preliminary progress report outline to consider for annual reporting on the implementation of this management plan could include the following:

- Introduction – description of general management plan priorities and focus for the year;
- Description of annual progress towards each of the tasks under the seven plan goals;
- Include reporting upon urban forest indicators, once developed;
- Presentation of annual workplan projects and priorities, with resource / budget requirements, projected over the next three years according to the City's budgeting process; and
- Identification of emerging trends and challenges that may impact upon management of the urban forest.

Considerable public comment on the draft version of this plan expressed a desire for more attention to management of the urban forest on private lands. Activities within this Urban Forest Management Plan focus upon strengthening the City's ability to effectively manage the publicly owned component of Kingston's urban forest for long term sustainability and to engage and direct the very interested community to share in its care. Placing the City's urban forest in order and demonstrating leadership is a wise shorter term use of available resources which at present are challenged to maintain the existing inventory of City trees.

A few of the proposed actions within this plan relate to management of the urban forest on private lands, building upon existing City policies, guidelines and regulations such as Official Plan policies, development guidelines and the Tree and Site Alteration By-Laws. Upcoming reviews of these documents will address strengthening of urban forest management on private lands. In addition, the Urban Forest Management Plan is recommended to undergo a review of its directions and actions every five years. Following anticipated approval of this plan in 2011, by the year 2016, many of the priority actions to strengthen the City's management role within this plan will be complete. A review of the UFMP at this time could then further address forest management on private lands, building upon the 2014-2015 review of the City's Official Plan.

Table 3: Kingston Urban Forest Management Plan

Goal	Outcome	Activities	Resourcing*
Sustainable Urban Forest Management			
1. Maintain, restore and enhance a sustainable urban forest	- resilient to stress - diverse species, age, heights - right tree in the right place - the urban forest is healthy and sustaining - risks are managed - the health status of the forest is known - proactive management	1. **Update the existing tree maintenance plan** for the City's Urban Forest to proactively maintain urban trees for long-term health and demonstrate leadership in forest management, including: a. Establish maintenance of the existing tree resources as the priority for the City responsibility in urban forest management; b. Increase inspection resources to ensure new tree plantings are installed in accordance with standardized specifications and that they survive following installation; c. Support tools for the long-term tree maintenance plan include use of the existing tree inventory data, application of a GIS based data management and work order system, as described below, and tracked according to City neighbourhoods (see Figure 6), or possible grouping of City neighbourhoods. d. Develop a budget for tree maintenance that provides for timely health assessment and maintenance of Kingston's urban trees 2. **Develop an overall tree planting strategy** and annual workplan that balances planting of trees in new areas or as replacement for old, damaged or diseased trees with City and community resources available for maintenance of all of Kingston's Urban Forest. Consider the following: a. plant "the right tree in the right place" assessing factors that might impact/harm the tree and planting appropriate species of appropriate size in each spot • use city's tree inventory as a resource to determine which trees have done well under which conditions; link tree types to City soil type distribution • Use various tree sizes for planting – street trees should be >60mm while seedlings are appropriate for parks and other open spaces b. implement a formal program to plant in public spaces dominated by mature trees (so that regeneration is started before the mature trees must be removed). c. Establish an adequate budget for tree planting and maintenance, mainly as City or contracted staff while integrating the use of community resources as feasible; d. Explore establishing long-term tree-growing contracts to ensure availability of high-quality native planting stock for city projects. e. For those developer-supplied trees that residents do not wish on their property, plant them on suitable public spaces such as. city parks f. partner with universities, high schools & colleges to conduct research and update the inventory g. focus on one or two key public sites for planting each year h. when possible, uproot, burlap and save trees before development and replant them afterwards, either in the same place or in areas that will most benefit from the immediate introduction of mature trees i. use mulch where appropriate to reduce compaction and increase nutrient and water availability and absorption	Staff resources to prepare strategy – 0.2 FTE City or contracted staff or community stakeholders (support from Tree Advisory Board) to conduct annual planting plans and initial tree care City staff – 0.2 FTE ~$20,000 for TREEpaQ module (year 1); $5,000 per year (year 2+); perhaps +$5,000 for additional Work Director license (work orders) Forestry/Horticultural Student resources to update tree data, including entry of UTM coordinates (2 4-month

Goal	Outcome	Activities	Resourcing*
		j. develop site management requirements that favour care and retention of native soils that are as undisturbed as possible or are returned to a state representative of the natural profiles (topsoil on top, uncompacted); 3. **Integrate the existing tree inventory with the City's existing AGL (applied GeoLogics Inc.) Georgraphic Information System**, through use of the AGL TREEpaQ module a. Update the tree inventory data for work conducted (trees planted and removed) in the past 11 years, since completion of the inventory and enter UTM coordinates for all trees through use of the existing street addresses and/or field measurement as trees are visited through the regular maintenance program b. Design the TREEpaQ module to modify the tree inventory as work is completed through its work order system c. Consider use of the UFORE (free shareware) or i-Tree (also free public domain resource) resources for management planning, forest health and / or value assessment 4. **Document and update the City's existing tree planting and care guidelines** to develop a comprehensive city-wide Treescape Guidelines for tree protection and replacement with consideration for existing materials from various departments. Key areas to be addressed include minimum soil depths and volumes, recommended species, specifications for different settings and requirements for inspections and to provide more favourable growth environments for urban trees, including considerations such as: a. Providing for adequate soil volumes for new trees; b. Establishment of tree soil boxes or silvicells under sidewalks when rehabilitating downtown infrastructure and under boulevards generally; these structures can provide more soil volume for tree growth; c. Use of permeable pavement, permeable rubber sidewalks when replacing existing infrastructure, particularly in the City core, so as to provide more water for trees; d. Initiatives to encourage more rainfall (i.e. roof drains) towards urban trees e. Planting of trees so as not to be physically or aesthetically impacted by other infrastructure (overhead lines, underground infrastructure maintenance) or other City operations (snow removal, salt, road maintenance) f. The Town of Markham Tree Guideline document can serve as a model 5. **Develop and implement an Emergency Response Plan**, such as the preliminary version within Appendix D	terms = ~$20,000-$25,000) City staff work and oversight – 0.75 FTE Consider a budget of at least the current $5.81 / capita/year (comparable to other cities) – this value is suggested for increase to achieve a sustainable forest City staff – 0.25 FTE City staff (0.2 FTE) & stakeholders
2. Strengthen the City's role as a manager and steward of the urban forest	- priorities are clear - sufficient resources are available - investments made in the urban forest over the next few years will serve to help sustain	6. **Develop a Risk Management Program** that: a. Formalizes the city's process for evaluating trees, monitoring for invasive species and identifying those requiring removal or risk mitigation. b. Develops a web-based Tree Service or inspection request system and an effective implementation strategy so that responses can be prioritized and documented in a consistent and effective manner. c. Modifies the Level of Service to ensure that newly planted trees are pruned within	City staff – 0.5 FTE Adequate budget for tree planting and maintenance – at least current budget

Goal	Outcome	Activities	Resourcing*
	the forest over time	the first two years of planting and twice more within the first ten years of planting. d. Undertakes a benefit/cost analysis of implementing a five year pruning and inspection cycle Level of Service. e. Formalizes programs for and integrates the city's following current practices to be consistent with best practices: • Emergency Response • Consultation & Stakeholder input • Opportunities Assessment 7. **Amend the Site Plan Application Guidelines and guidelines for larger scale developments** to: a. include wording from the *Planning Act* (1990) that supports tree planting as a condition of Site Plan approval (where preservation is not feasible); b. (once a definition for "significant trees" has been developed) replace the requirement that trees serving a "deemed purpose" must be replaced with the requirement that "significant trees" be replaced; c. Building upon tree inventory and preservation study and tree compensation requirements for site plan applications, explore other options for increasing tree cover in new developments, such as requiring dedicated naturalized areas within new subdivisions, possibly encouraged through incentives, and other street re-design options (e.g. one way streets, specification of the desired long-term visual aesthetic, such as one that models the older areas of the City); 8. **Develop a standard methodology for valuing trees** being protected or removed through the development process that provides the basis for securities, tree replacement, required compensation. 9. **Develop an internal communications plan**, modelled on the draft approach outlined in Appendix D, that notes respective responsibilities for urban forest management, education initiatives for relevant City staff and Councillors, regular reporting (annual, aligned with the budgeting process) on the progress of this plan's implementation, on key urban forest health indicators, success of management efforts and planning decisions and on the value of the urban forest; annual report cards will help maintain this Plan as a priority 10. The **annual urban forest workplan will follow the directions of this Plan**, including establishment of an adequate budget for staff, equipment, materials and contracted resources	level City staff – 0.2 FTE Input from Tree Advisory Board City staff – 0.1 FTE City Planning Staff Tree Advisory Board support City staff – 0.1 FTE City staff Tree Advisory Board
3. Recognize and manage the urban forest as a critical element of the City's infrastructure	- trees are valued by other infrastructure managers - a GIS-connected work order system with field data entry capability is in place	11. **Amend the City's Official Plan** to include policies that: a. Emphasize the role of the urban forest as a crucial part of the City's infrastructure; b. Support development of natural heritage assessments and management plans for City-owned woodlots and other wooded natural areas in line with existing Environmental Impact Statement requirements; prepare these assessments and plans, including provisions to maintain corridors of mature trees as ecological	City staff – 0.1 FTE + City Planning Staff Tree Advisory Board (TAB) $25,000 preliminary for consulting advice on natural heritage (up to $100,000)

Goal	Outcome	Activities	Resourcing*
		linkages across the City and identify areas for restoration of canopy cover and ecological function in areas of degraded public spaces; 12. **Include trees on infrastructure maps and city plans** (e.g. Toronto) – facilitate an exchange information between infrastructure managers and Tree Advisory Board to help all fully understand the challenges of locating trees and infrastructure within urban environments 13. **Update site plan and subdivision guidelines/processes to reinforce that trees will be included at the beginning of planning processes** in areas of development/redevelopment to maintain more of the existing trees, establish sufficient areas for trees and to reduce conflicts with infrastructure; this is the least cost and most effective way to ensure a healthy urban forest 14. **Establish urban forest indicators based upon the services that trees provide** (for example the City of Oakville has an urban forest that filters more air pollution than their industry produces) **and on the health and extent of the overall urban forest and its components**; the actions in this plan will contribute to the Official Plan 30% tree cover target with more specific area or component forest cover targets to be developed over time. 15. **Consider enhancement of the City's existing Official Plan policies and Tree By-Law to encourage maintenance and enhancement of the urban forest on private property,** in such areas as significant woodlands, contributory woodlands, significant trees overall natural heritage system.	City staff – 0.3 FTE / Tree Advisory Board City staff – 0.2 FTE +City Planning Staff Tree Advisory Board City staff – 0.1 FTE Tree Advisory Board City staff – 0.75 FTE City Planning staff Tree Advisory Board
4. Maximize the benefits of the urban forest for the well-being of the community	- residents are proud of their urban forest - Kingston's urban forest is noticed by visitors	16. **Continue to increase the diversity of Kingston's urban forest** through such measures as: a. Planting of a diversity of tree species matched to the proposed habitat, favouring native species but also considering non-native hardy species that are well suited to urban environment conditions, such as potentially limited soil volumes, lower available moisture, air pollution, urban heat effect and salt; the species list in Appendix F offers a comprehensive of tree species options rated as to their suitability to different urban environment types; b. Include a description of urban forest diversity in public communication materials and encourage community adoption of varied tree species, focusing upon the "right tree in the right place"; c. consider planting shrubs, wildflowers or ornamental grasses on road medians to further enhance vegetation diversity; including a low wall (angled inwards) to protect plants from salt, garbage etc. (pilot project on one or two medians to see if innovative median designs will work) d. Active control of invasive species on City lands; e. Encourage planting of fruit trees on private property, including encouragement of a pilot project on private lands that features fruit and nut-bearing trees to provide food products in a lower income neighbourhood(s), to add to the species and floral diversity of Kingston's urban forest and contribute to the food security aspect of a sustainable Kingston.	City staff – 0.2 FTE Tree Advisory Board City staff (as part of communications strategy) Tree Advisory Board

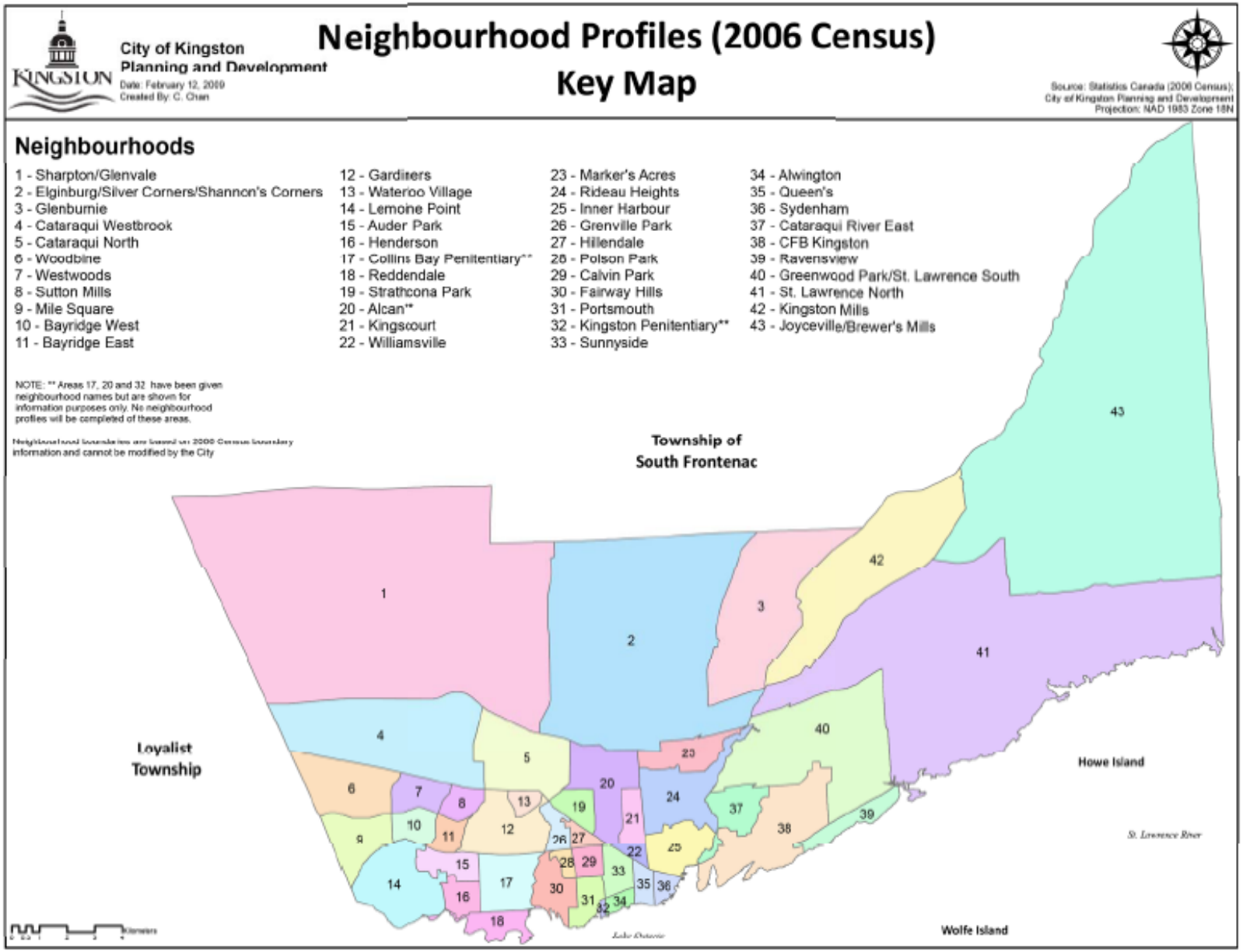
Goal	Outcome	Activities	Resourcing*
		17. **Include descriptions of the full value of Kingston's urban forest in promotional materials** as part of the communications strategy. Reference values such as economic, social, cultural and ecological values of trees as well as aesthetic values quoted in studies such as the finding that consumers are willing to pay 9-12% more for equivalent products and services in business districts that have an urban forest (encourage joint city and business funding for greening of Kingston streets).	
5. Identify and recognize significant valuable trees	- significant trees are protected, where feasible	18. **Establish a program for recognition of significant trees**, through such initiatives as: a. annual heritage tree hunt (e.g. Oakville, other cities) where communities compete to identify the nicest trees in their neighbourhood based on different characteristics every year – best entry wins a prize; competition category examples from Oakville include: favourite healthy mature tree, tallest tree, best story, neighbourhood landmark, best photo of a full tree, photo of wildlife in trees, most kid-friendly tree, best photo journal b. Heritage tree program administered through the Kingston Tree Advisory Board; and c. Develop a policy-based definition of "significant trees", building upon the definition proposed in this plan, to guide tree protection during the planning process, and include in the Official Plan and subsequently the Site Plan Application guidelines. This definition should capture, at a minimum, mature native trees as well as tree Species at Risk that have specific protection under federal and provincial species at risk legislation.	City Staff – 0.25 FTE Tree Advisory Board
6. Increase community awareness of the benefits of trees and engagement in a shared responsibility for management of Kingston's urban forest	- residents/ stakeholders understand the benefits of the urban forest - residents are active in urban forest management - efforts are coordinated	19. **Explore potential to engage funding for urban tree management** through other agencies, programs and community resources through initiatives such as: a) Develop memorial tree programs for tree planting and to create "endowment" funds for individual trees that will pay for tree maintenance and eventual replacement; Consider requirement for developers to create similar funds for trees planted in new communities; b) "adopt a park/street tree" program encouraging businesses to create similar endowment funds for existing city trees in exchange for a sign or plaque acknowledging their contribution; c) innovative fund-raising and cost-reduction programs such as use of watering bags (with advertizing) for newly-planted trees ; d) use contests and races to raise money for the urban forest e.g. relay race or marathon through the city for schools, corporations, individuals etc. all registered teams must donate at least x amount, those that donate over y amount get special recognition; e) co-op or other students could be hired for a couple of months per year to help identify and apply for grants to supplement public funding for urban forest management; and f) access tree research grant programs. 20. **Develop a community communications plan**, building upon the preliminary approach in Appendix D, that notes respective responsibilities for urban forest management,	City staff – 0.2 FTE Student resources Tree Advisory Board City staff City Planning staff Contract development of full strategy and development/modification of some education materials (estimate $15,000) Tree Advisory Board

Goal	Outcome	Activities	Resourcing*
		promotional, education, engagement initiatives and materials for community stakeholders; Capitalize upon the strong community interest to help care for the urban forest by facilitating community programs such as: a. volunteer-based education in the schools that connects to school curriculum; b. public education (delivery of pamphlets explaining services provided by trees and $ value of the tree; raise awareness of location of street trees, their importance and protection; public education campaigns such as posting of $ values to trees, public workshops etc.); materials should use language that promotes the sharing of trees as community resources ("our tree); c. use of prompts to encourage community tree care, such as large fridge magnets detailing how to care for your street tree and why; d. organization of community groups for peer education of community members and participation in urban forest stewardship initiatives, caring for street trees; e. addition of Kingston urban forest statistics, tree values and care on the City website (consider potential to link to davey tree: http://www.davey.com/ask-the-expert/tree-calculator/national-tree-benefit-calculator.aspx, interactive site which calculates tree $ value with entry of tree type, size); f. hire young Kingstonians (paid university co-op students, volunteer high school co-op students, summer students, interns etc.) for tree maintenance, databasing, technological and administrative work as they are less-expensive labour and many grants are available to help supplement their pay, plus the City would be doing them a service in helping them gain valuable work experience; students are often experienced in new technologies/software and could help the City make the transition from their old data collection system to a new one; g. Establish a system that provides for citizen complaints/reports about tree risks, damage etc. to be entered into the tree inventory; h. Encourage residents to help with ongoing assessment of tree health through a system to report sick or damaged specimens to further keep tree inventory up to date.	
7. Encourage planting and care of private trees or trees on public property not owned by the city	- the city's urban forest will benefit from initiatives to increase overall green-cover in Kingston - people involved in planting trees will care more for both their own and city-owned trees	21. Through the communications plan, develop an approach that raises awareness and engages residents, businesses and community groups to **maintain and expand the urban forest on private lands and other public lands**. Possible supporting initiatives include: a. Use city tree give-away for planting on private property – resident is responsible for upkeep, one-time cost to city and will help to increase overall forest cover (consider UFORE to measure) b. sell trees to companies, individuals etc.; direct proceeds to maintenance of the urban forest c. stage a competition for corporations/businesses to green their properties, storefronts etc., perhaps charge an entry fee that will go to public urban forest (prize: plaque and/or artist rendering of their business); d. partner with Evergreen, school boards, other organizations to encourage	City staff – 0.5 FTE City Planning Staff Tree Advisory Board Student Resources, Queen's University

Goal	Outcome	Activities	Resourcing*
		schoolyard greening, outdoor classrooms e. work with potential partner agencies and institutions to maintain and enhance trees and the urban forest on public and institutional lands within the City according to the directions and initiatives of this plan. A number of organizations could increase their partnerships with the City, such as the Cataraqui Conservation Authority, federal institutions (Corrections, Parks Canada, Department of National Defense), Lemoine Point Nursery, Kingston Horticultural Society, Kingston Field Naturalists, Society for Conservation Biology, Urban Agriculture Kingston, Katarokwi Native Friendship Centre, Ferguson Forest Centre in Kemptville, schools, TD Friends of the Environment, provincial ministries, and others.	

*Resourcing estimates for time from City staff to complete management actions are for staff within the Forestry section of Public Works. For those actions that require input from other City departments, they are named specifically in the above table. For example, some of the management actions will require input and time from Planning staff; these are noted where appropriate.

Figure 6: City of Kingston Neighbourhood Map



6.0 References

1. American Public Works Association. 200_. Urban Forestry Best Management Practices for Public Works Managers.
2. Council of Tree and Landscape Appraisers, www.arbordav.org/trees/benefits/cfm)
3. City of Burlington. 2010. Urban Forest Management Plan – 2011-2030.
4. City of Guelph. 2007. Framework for the Strategic Urban Forest Management Plan for the City of Guelph: 2008-2028. Final Report.
5. City of Kingston. 2009. Corporate Strategic Plan 2009-2011.
6. City of Kingston. 2010. Official Plan.
7. City of Kingston. 2008. Site Alteration By-Law, By-Law No. 2008-128.
8. City of Kingston. 2010. *Sustainable Kingston*.
9. City of Kingston. 2007. Tree By-Law, By-Law No. 2007-170.
10. City of Peterborough. 2009. Urban Forest Strategic Plan.
11. City of Montreal. 2005. Tree Policy of Montréal.
12. City of Vancouver . 2007. Urban Forest Management Plan,
13. Kingston Historical Society. 2004. Chronology of the History of Kingston. http://www.kingstonhistoricalsociety.ca/chrono.html
14. McPherson.E.G., S.E, Maco, J.R. Simpson, P.J.Pepper, Q. Xiao, A M. VanDerZanden, N. Bell, 2002, Western Washington & Oregon Community Tree Guide: Benefits, Costs and Strategic Planning, Centre for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service.
15. Natural Resources Canada. 2007. Forest Ecosystems of Canada. http://ecosys.cfl.scf.rncan.gc.ca/classification/classif02-eng.asp
16. Queen's Printers for Ontario, 1995. Sustainable Forests in Urban Ontario: A Report of the Urban Forest Working Group,
17. School of Urban and Regional Planning. 2008. *Moving Kingston Forward Towards Sustainable Residential Development.* Prepared for the City of Kingston. http://www.cityofkingston.ca/pdf/cityhall/sustainability/SustainableResidentialDevelopment.pdf
18. Statistics Canada. 2007. Community Profiles. http://www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/details/Page.cfm?Lang=E&Geo1=CMA&Code1=521__&Geo2=PR&Code2=35&Data=Count&SearchText=Kingston&SearchType=Begins&SearchPR
19. Sullivan, W.C. and Kuo, E.E. 1996, "Do Trees Strengthen Urban Communities, Reduce Domestic Violence?" Arborist News.
20. Town of Markham. 2009. Trees for Tomorrow – Streetscape Manual.
21. Town of Oakville. 2008. Urban Forest Strategic Management Plan – Town of Oakville: 2008-2027.
22. Urban, James. 2008. Up by the roots. ISA. Print.

7.0 Glossary

Canopy cover – The proportion of land area occupied by tree crown (leaf) area when viewed from above. This measure consists of the two-dimensional area extent of the combined canopies of all trees within a specified land area.

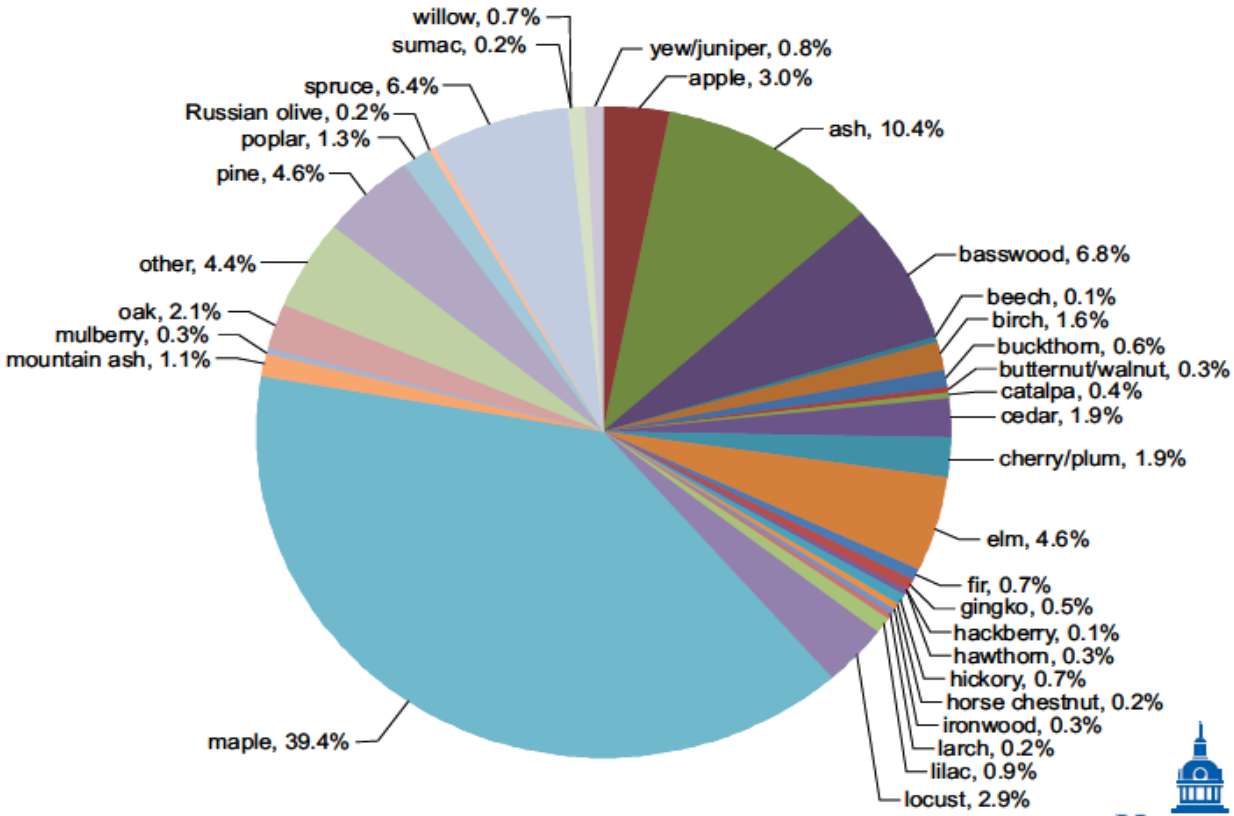
DBH – tree diameter at breast height, at a level approximately 1.3 metres above ground level.

Significant Trees – consist of “distinctive trees” as defined in the City’s Tree By-Law (No. 2007-170) and specimen native tree species which are unique in their size, form, age or cultural contribution to their neighbourhood

Urban Forest – individual trees, groups of trees or forests, greenspace and related abiotic, biological and cultural components within the City of Kingston Urban Boundary as defined in the 2010 Official Plan.

Profile of the City of Kingston's Urban Forest

Tree Species	Number	%
apple	748	3.0%
ash	2593	10.4%
basswood	1702	6.8%
beech	36	0.1%
birch	404	1.6%
buckthorn	153	0.6%
butternut/walnut	77	0.3%
catalpa	97	0.4%
cedar	479	1.9%
cherry/plum	480	1.9%
elm	1140	4.6%
fir	162	0.7%
gingko	119	0.5%
hackberry	22	0.1%
hawthorn	81	0.3%
hickory	165	0.7%
horse chestnut	61	0.2%
ironwood	64	0.3%
larch	43	0.2%
lilac	230	0.9%
locust	723	2.9%
maple	9788	39.4%
mountain ash	265	1.1%
mulberry	66	0.3%
oak	523	2.1%
other	1089	4.4%
pine	1143	4.6%
poplar	325	1.3%
Russian olive	51	0.2%
spruce	1601	6.4%
sumac	44	0.2%
willow	175	0.7%
yew/juniper	208	0.8%
Total	**24857**	



Appendices

Appendix A: Terms of Reference for Tree Advisory Board

Tree Advisory Board – City of Kingston

Terms of Reference

DRAFT

Updated July 19, 2011

Mandate

To work with the City of Kingston Public Works Department to provide input and feedback to assist the City in development and initial implementation of the Urban Forest Management Plan (UFMP) for the City. The term of this group will extend for a two-year period from November 2010 until December 31, 2012.

Membership

Tree Advisory Board membership was sought in mid-2010 through contact of stakeholder organizations within the City that have an interest in and expert knowledge of Kingston's urban forest. In addition, surveys distributed through the project initiation public meeting in June 2010 requested respondents to indicate their potential interest in participating in an advisory board to City staff. The composition of the advisory board aims to be representative of the main community areas of interest – residents, horticulturalists, arborists, landscape architects and land managers of some of Kingston's other (non-City) large greenspace areas. The list of Tree Advisory Board members, including City staff members, is attached as Table 1 below.

Responsibilities

Information will be exchanged amongst the group, including a draft and final plan document for Advisory Board review and experiences and best practices from members, as applicable. The current membership is set at 14 members (see Table 1).

The role of Tree Advisory Board members includes:

- Sharing of information and expertise;;
- Providing input to plan development in such areas as the existing conditions of Kingston's urban forest, the public consultation process, setting of a future 25 year vision, reviewing and commenting upon the draft plan, identifying opportunities for application of best management practices and community involvement;
- Collecting and distributing information to their organization or community;
- Advising on and contributing to urban forest management plan implementation in such areas as public education, coordination of stewardship initiatives, raising of community awareness and encouraging community stewardship.

Administration

The City of Kingston Public Works representative will be responsible for setting meetings, meeting notification, agendas, distribution of materials, facilitation of meetings and meeting notes. During the plan development phase, meeting organization will be coordinated by representatives of SENES Consultants Limited, the contractor working with the City to prepare the urban forest management plan.

Proposed Workplan Schedule

During plan development, Tree Advisory Board meetings will be scheduled prior to and following draft plan development, in November 2010 and February 2011, respectively. Following plan approval by Council, expected in late summer or fall of 2011, the Tree Advisory Board will likely meet once more in 2011 and 3-4 times during 2012 to collaborate with the City on community education and engagement. In addition to in-person meetings, information will be exchanged via e-mail, as the work proceeds. Meeting timing and subjects are proposed as follows:

November 2010 - Initial Meeting – input to draft UFMP

- Introduction of plan development process, preliminary findings of existing conditions, input to draft vision statement and recommended strategic directions, possible management actions.

April 2011 - Meeting – Review of Draft UFMP

- Update on plan
- Verification of plan directions and management actions

July 2011 – Review Public Input to Draft Plan

- Verify and refine plan to reflect public feedback

~ Fall 2011, Winter, Summer & Fall 2012 – Begin and Assess Initial Plan implementation

- Input to communications strategy
- Identification of community led initiatives for 2011
- Input to Plan progress update in early 2012 (for budget)
- Identification of community led initiatives for 2012

Table 1: City of Kingston Tree Advisory Board Membership

Name	Affiliation
Darrin Richmond	City of Kingston Public Works
Damon Wells	City of Kingston Public Works
David Swinton	Queen's University, Operations
Jack Nielissen	Cataraqui Cemetery
Rick Knapton	Friends of Lemoine Point/Cataraqui Conservation Authority
Jane Murphy	Kingston Horticultural Society
Warren Mabee Neall Scott	Queen's University, Geography Department
Mary Beth Lynch	Parks Canada, St. Lawrence Islands
Jay Gazeley	Cataraqui Golf and Country Club
Kathy Cotton	Resident
Bardi Vorster	Landscape Architect
Paul Vanden Engel	ISA Certified Arborist
Terry Nichols	Horticulturalist
Sean Rivoire	Geography Student, Queen's University

Appendix B: Public Consultation Summary

1. June 2010 Public Meeting and Survey Highlights:

In June of 2010, the City conducted a survey to determine residents' opinion on Kingston's urban forest. The respondents felt that the urban forest is important. Their visions for the city over the next 25 years include capitalizing on the ability of trees to provide green infrastructure, considering the urban forest to be an essential community asset, having more than 35% canopy cover within the city, and maintaining an urban forest that is adaptive to climate change pests and pathogens. A number of respondents also believe that the urban forest should provide a continuous link to natural areas. The biggest challenges to overcome in order to fulfill these visions include insufficient funding and insufficient planting of trees. Overall, the current state of the urban forest was rated as "fair" on a four point scale ranging from poor to excellent. The urban forest could be improved by replacing sick and old specimens, as well as planting trees in more areas of the city. The respondents would be interested in planting trees in parks and other public spaces, watering municipal trees in front of their homes and educating community members and neighbours.

Concerns:

The survey respondents expressed a number of concerns. The most common concern had to do with trees being planted under low overhead wires. When they grow to the height of the wires, they tend to need awkward pruning, and on occasion are cut down. Another common concern was that trees are damaged or cut down for road widening, and for development. In the case of the traffic island at Place D'Armes, residents have an issue with the fact that trees were removed prematurely for possible traffic reconfiguration which never ended up taking place. It is recommended that public consultations be had before healthy trees are removed. One respondent suggested that despite being exempt from the 2007 tree by-law, the city do more to comply with its terms. Better maintenance and pruning is suggested for old, damaged and sick trees, and those that are deemed unsafe should be removed promptly. Along the lines of safety, it has also been expressed that horse chestnuts not be planted since their fruit is hard, heavy and spiny and presents a hazard to people who have difficulty walking. One resident is concerned that new trees on the road rights-of-way will shade out her vegetable garden. Respondents recommend more staff funding for tree planting and maintenance as well as adequate funding for by-law enforcement. One specific problem that is impacting municipal trees is the inappropriate use of weed whackers at the bases of trees which damages the bark and can lead to the death of the tree.

Areas Requiring More Trees:

The survey respondents would like to see more trees planted in new developments, in Ashton Park around the jogging trail, in parking lots, in the inner core of the city to replace ageing trees, along the waterfront walking paths, on lower Princess Street and in Market Square. In terms of new developments, one respondent suggested that site plan agreements should make more trees in new developments a requirement. Trees that are removed should be replaced promptly. It would be nice to see trees planted on either side of the sidewalk forming a canopy for pedestrians and giving real meaning to the term "urban forest". One respondent suggested planting trees with edible fruit, or some kind of community orchard.

Other Comments:

Respondents requested a higher diversity of tree species and more green space in new neighbourhoods. With respect to parking lots, it was suggested that industry be obligated to plant more trees. On a positive note, the city was commended for planting more trees around downtown, Queen's University West Campus and at the Memorial Centre, where there tree species diversity is especially good. One respondent would like to see tree canopies undamaged by utility corridors. Another suggested that developers should be prohibited from razing all trees in a

new development area, and instead maintain as many older trees as possible so that once the new development is built, it has an already established and effective urban forest. Finally, several respondents were interested in seeing the city plant as many trees as possible in order to take advantage of their aesthetic beauty, their shade, their ability to improve air quality and moderate climate, and the facts that they prevent soil erosion and provide wildlife habitat. The residents of Kingston value the city for reasons that go beyond its built environment. To them, trees offer tranquility and inspiration on top of recognized health advantages.

2. Input from Tree Advisory Board – November 2010

A tree advisory board for plan development and implementation was struck in early November, 2010. The first meeting of this Board was held at City Public Works offices on November 4, 2010. Much valuable discussion and input resulted through this initiation meeting with keen interest expressed by all members for continued involvement in plan development and subsequent delivery. The summary of input provided through the new Tree Advisory Board is presented below.

In considering the **desired state for Kingston's forest in 2035**, Advisory Board members suggested:

- urban native forest – native to seed zone and to the area
- Diversity is key
- Bringing the forest to the City
- Roots firmly planted for the future
- Kingston's Rain Forest of the North – lots of diversity
- Healthy + diverse and native
- Aim to establish well balanced species; Try to diversity populations along street
- The Plan for 2035 should target young children (grades 1 & 2); they will be at this table (Advisory Board) in 25 years; teaching children encourages them tell their parents what to do (like recycling)

Members also offered a number of suggestions to assist the City in ongoing urban forest management, including:

- Increase the urban forest cover by **encouraging people to plant more trees on their own property**. **Public education** to encourage tree planting can help encourage establishment of more trees and give people a choice of tree types.
  - The public education materials should also **promote the value of trees**.
  - Another way to raise public awareness of their tree population and value is a tool such as a website to enter tree data and get $ value of the specified tree or to post the $ values on trees (full value – economic, social and ecological.
  - through education, detailed instructions and engagement, could encourage nearby landowners to care for street trees – put info on a fridge magnet, for example; information to people on what they have, type of tree, how big it gets, care needed would be great
  - **Could use space at Sustainability Centre** (Princess and Montreal Streets) **for public education,** displays, workshops; take advantage of Arbour Week for promotional activities
- Education Education Education
- **Apply community and volunteer resources to assist in urban forest management**. Possible areas to assist include voluntary committees to evaluate trees, care for trees in long term. Forest should be a community asset, not just a City responsibility but a shared one.
  - Suggest encouraging residents to run their sumps, laundry water to trees
  - Once the plan is in place, the advisory board can assist with the education
  - see City as primarily responsible for care of trees away from streets (in parks, natural areas);

- Many members expressed a **preference for use of native tree species**. The argument was offered that some non-native species could be helpful to increase biodiversity (and hence urban forest resilience), if species are used that are known to be hardy for the climate and an urban environment (salt and drought tolerant).
  - Guidelines for development, emphasizing native species were suggested.
  - Some discussion occurred related to what to do with **ash trees**. A suggestion was offered to not remove ash trees from the recommended species planting list because these trees contribute to the urban forest. A solution or a developed resistance to emerald ash borer could evolve..
  - It was noted that **sourcing native stock is difficult**. The City could work with other partners to contract with nurseries to grow stock from locally sourced seeds. The CA and Horticultural Society grow their own stock from local seed.
  - Some noted their experience that **native species outperform others**. Some people do not like native species because they are felt to not provide enough of a manicured look. Unruly native species can be a conversation maker!
  - Greenspace should be native whereas other spaces such as streetscapes can entertain other species; for example Norway spruce can handle salt better.
- **Right tree in the right place** should be a goal. For example, bare root stock works in greenspaces but not on street scapes. Use different tree sizes to match the planting location (street trees should be larger because they have more stress after planting than a park/open space/natural area tree. Public Works has ~ a 90% survival rate; a survival rate that is very good.
- .Suggestions offered for effective management included:
  - The City requires 1 tree per new house lot. Should there be unwanted trees, these could be saved for mass plantings in parks, parking lot areas;
  - **Operational plans should outline key sites for priority action each year** (i.e. Lake Ontario Park); note that Operating plans will cover the details for annual works; Identification of problem areas = action could include in the UFMP
  - Explore options to enhance the soil for trees in downtown
  - Implement other soil/moisture improvement practices for trees such as permeable pavement
  - Tree cells could be established under driveways, sidewalks (done in Oakville)
  - **Tree rescue program for areas about to be developed** could be a way of sourcing trees (difficult to remove trees with a mechanical spade in rocky area); CA had good experience saving trees – received $ for them
  - **Maintenance of existing population is key and should be the City priority** – need for sufficient resources; City has $680K for maintenance. The budget stays the same or decreases yet the number of trees to manage increases each year, the City planted about 425 trees this year
  - Recommend replacement tree program
  - **Fall planting preferred**; more successful; use education to decrease public wish for spring planting
  - Geography Department at **Queen's** is pushing for a student project for trees on campus that could provide a **GIS based database**
  - Note Kitchener uses **tree water bags** – drip irrigation system; advertising and education messaging could be placed on bags
  - PW has an **asset management program** for other infrastructure; once have the UFMP in place, could implement an asset management system for urban trees as well
  - City could **concentrate on cleaning up some key areas**; would encourage residents to follow
- To encourage appreciation of the urban forest as a critical component of urban infrastructure consider actions such as:
  - Applying Toronto's practice of identifying trees on infrastructure map

    - Perhaps could recognize trees as integral part of infrastructure within the City's Official Plan
- Plan for trees in advance, with other infrastructure;
- **Safety issues impact upon some aspects of trees**, shrubs, naturalization (dead trees for habitat)
    - Note that shrubs also catch garbage, leaves
- **Map green areas** as opportunities; studies have demonstrated that trees are good for business
- **A tree maintenance system tied to GIS would be very helpful**; once have details on trees, could be very helpful to obtain City funding
    - City would like to know the **maintenance cost per tree**; City has the data but would take some time to compile this information;
    - integrated work order system could provide this information
- Funding
    - Recommend to explore **alternative funding sources** for maintaining Kingston's urban trees; perhaps a dedicated resource to research / prepare funding proposals for range of City programs
    - Note that Queen's requests an **endowment for long term maintenance** (100 years) when trees are donated to the university
    - Suggest **build in maintenance $ into donations**; also have developers contribute $ for long-term tree maintenance; maintaining a mature tree population does not happen for free
    - Likely good to look for public and private program funding
    - **Advisory Board could conduct the research**, look through grants book and provide list of options to City for proposal preparation

3. June 2010 Survey Results

The following table provides a summary of responses to the administered survey.

Appendix B: Public Consultation Results

		Public Meeting	Total*
Question 1			
How important is the urban forest to you?			
18	Very Important	16	**34**
2	Somewhat Important	0	**2**
0	Not important	0	**0**
0	No Opinion	0	**0**
20		16	**36**
Question 3			
Imagine our community twenty-five years from now, in the year 2035. Which of the following characteristics best describe your vision for the urban forest? Please choose up to 5.			
1	Exists relatively unchanged	0	**1**
5	A continuing source of community pride	5	**10**
12	Capitalizes on the ability of trees to provide green infrastructure	15	**27**
2	More individual trees than treed areas	4	**6**
2	More treed areas than individual trees	1	**3**
0	Less than 30% canopy cover	0	**0**
12	More than 30% canopy cover	10	**22**
4	Continuous canopy cover	1	**5**
10	Provides a continuous link to natural areas	5	**15**
8	Adaptive to climate change, pests, and pathogens	11	**19**
1	Economically viable	6	**7**
3	Shared responsibility for stewardship of the urban forest	1	**4**
5	Robust, vibrant and vital overall	6	**11**
6	Well managed and maintained	4	**10**
13	Considered an essential community asset	10	**23**
0	No Opinion	9	**9**
Question 4			
What do you think is the biggest challenge to overcome to fulfill your vision for Kingston's urban forest?			
1	Low maintenance and management	3	**4**
5	Insufficient funding for maintenance and management	9	**14**
2	Uneven age distribution	1	**3**
1	Poor forest health	1	**2**
0	Air quality	0	**0**
0	Lack of water	6	**6**
0	Global warming	0	**0**
6	Not enough planting of trees	8	**14**
4	Need for more tree replacement	3	**7**
0	Invasive species	0	**0**
1	No opinion	2	**3**
20			
Question 5			
Please complete the following sentence. The condition of the Urban Forest within the City of Kingston is:			
0	Excellent	0	**0**
3	Good	5	**8**
16	Fair	10	**26**
1	Poor	0	**1**
0	No Opinion	1	**1**
20			
Question 6			
How could the condition of the Urban Forest be improved?			
1	More frequent pruning	4	**5**
4	More replacement planting of sick/old specimens	11	**15**
1	More effort to retain heritage trees	5	**6**
0	Better species mix	3	**3**
13	Plant in more areas	12	**25**
0	Remove more trees	1	**1**
1	No Opinion	0	**1**
20			
Question 7			
Which of the following activities that would you be interested in? (Check all that apply)			
15	Planting trees in parks and other public places	13	**28**
12	Educating community members/neighbours	7	**19**
7	Adopting treed areas to manage in cooperation with City Public Works staff	6	**13**
15	Watering municipal street trees in front of your home	6	**21**
7	Providing expertise on committees and working groups that provide advice and input to City Public Works staff	2	**9**
	No Opinion	2	**2**

Kingston Urban Forest Management Plan

June 2011 Public Consultation Feedback

This document provides a summary of the public consultation session held on June 15, 2011, 6:30 to 8:30 p.m. at the Cataraqui Arena in Kingston as well as a summary of the subsequent written feedback provided by e-mail and through the on-line survey.

June 15th Public Meeting

The format for the public meeting included a preliminary open house component with poster boards of key plan information and request for community comments. Attendees were then invited to listen to a presentation to highlight the key components of the proposed urban forest management plan, followed by a question and answer session. The opportunity to view the poster boards, provide comments on the boards or through the paper survey and to speak to study team members followed the close of the question and answer session.

A total of approximately 40 residents attended the public meeting. Participants provided written comments posted on the open house poster boards, spoken comments and questions raised following an overview presentation of the proposed draft urban forest management plan and written responses to the paper surveys completed at the session (6 respondents). An additional 25 surveys were completed online through the City of Kingston website.

A total of sixty-one (61) written submissions with detailed comments on the draft Urban Forest Management Plan were received following the June 15th public meeting. Within the comments received, several submissions were from individuals and fifty (50) of the submissions consisted of support for a comprehensive set of comments developed and circulated to community members. This set of comments closely reflected the range of points raised through the posted comments, completed surveys and question and answer discussion at the June 15th public meeting.

The objective of this consultation session was to verify the content and comprehensiveness of the draft urban forest management plan and to obtain community input to refine plan content, as appropriate.

Survey results

The following summary of survey responses consists of 6 surveys submitted at the open house and 25 responses received through the online survey. Responses to the open-ended questions and requests for suggestions are provided in Appendix 1 to this document:

Q1: *Do you feel that the draft plan addresses all major tree-related issues within Kingston's urban area?*

Yes (6) No (22) Don't Know (3)

Q2: *Do you think that the 7 goals are comprehensive enough to meet the 2035 vision?*

Agree (9) Neutral (8) Disagree (13) Don't know (0)

Q3a: *Please identify the actions you see as the most important priorities to start now.*

Goal 1

- Update the City's tree maintenance plan (4)
- Develop an overall tree planting plan (11)
- Update tree inventory to a map-based system (6)
- Update Tree Planting and Care Guidelines (2)
- Develop an emergency response plan (0)

Goal 2

- Develop a risk management program (1)
- Amend Development Guidelines re: trees (5)
- Develop a standard approach to value trees (5)
- Develop an internal communications plan (1)
- Develop an annual urban forest workplan (8)

Goal 3*

- Amend City Official Plan to signify urban forest (5)
- Include trees on city infrastructure maps and plans (2)

- Trees are noted at beginning of development plan (3)
- Establish indicators that reflect tree services
- Expand Tree-By-Law to trees on private property (1)

Goal 4
- Increase diversity of Kingston's urban forest (14)
- Promote the full value of the urban forest (8)

Goal 5
- Establish a tree recognition program (6)

Goal 6
- Explore ways to fund tree management (7)
- Develop a community communications plan (5)

Goal 7
- Promote expansion of the urban forest by all (14)

*Please note that Goal 3 reflects paper survey responses only. This goal was inadvertently missed on the online survey.

Q4: *Identify all activities in which you or your community group would be willing to help.*

1 Annual tree planting (13)
2 Caring for newly planted trees (6)
3 Help educate others (1)
4 Help produce community brochures, etc. (0)
5 Organize an annual heritage tree hunt (0)
6 Join an annual heritage tree hunt (0)
7 Help create & deliver an education program in schools (1)
8 Assist the City in updating the tree inventory (1)
9 Monitor the health of trees in my neighbourhood (2)
10 Plant a tree on my property (3)
11 Purchase a tree from the City (2)
12 Get involved in tree planting initiatives in my child's schoolyard (1)
13 Help organize a competition for business to green their properties (5)

Q5: *Please note if you are currently a student at any of the following:*

High school University (1) College Other Not at this time (4)

Recommendations for Management Plan as a result of consultation feedback

1. Add reference to encouraging fruit and nut bearing trees as part of the actions related to promoting overall tree diversity and community sustainability
2. Note the additional social benefits of an urban forest
3. Provide clear direction on how the urban forest will be managed over the long term; include provision of regular plan review, for example
4. Expand on and be clear on how % tree cover will be considered
5. Expand on the strong community participation interest that has been expressed
6. Propose further definition for heritage trees, highlight their importance
7. Note underway complementary community initiatives
8. Address private vs. public trees and ensure that how they are addressed in this plan is clearly stated
9. Note community interest in preserving greenspace and how this plan links to other City policies/programs
10. Ensure clarity in overall plan management directions
11. Specific Plan wording and management suggestions.

The following table provides a summarized listing of all the public feedback submitted on the urban forest management plan. The comments are organized according to the main categories identified in the above Recommendations section

Summary of Public Input to the draft Urban Forest Management Plan – June 2011

Category	Comment	Recommended Response (for discussion)
Balance/Integrate Plan requirements with other City policies and programs	• Concern with potential for increased costs and additional requirements and processes that the UFMP directions might impose upon the development review process. The UFMP is supported but please balance its implementation with the goals of community affordable housing and economic growth. • Ensure that UFMP initiatives do not conflict or cancel out existing City requirements of developers. For example, please verify that actions #13, 14, 15 and 21 are relevant. • Ensure that the UFMP is aligned with other City policies and programs, such as the OP, Tree By-Law, Site Alteration By-Law, Natural Areas and Parkland Acquisition Policy, considering urban forest related recommendations for their improvement, where appropriate. • Concerns expressed that the UFMP could supersede or undermine existing policies and programs. • The UFMP is recommended as a catalyst for improvement of our municipal woodland protection, natural heritage policies.	• Development-related tree management activities in the plan will reference integration with existing development approval processes and guidelines. • Specific wording and actions for inclusion were discussed with Planning. The Plan will briefly describe the policies and by-laws listed here plus additional relevant Official Plan policies in Table 2 (for example "ribbon of life" (3.9.2), passive lands (3.8.7), pedestrian friendly streetscapes (4.6.6), street trees (4.6.27), Tree By-law (9.5.41), requirements for tree inventory and preservation study (9.12.3), schedules 7 and 8 (natural heritage system, significant woodlands, contributory woodlands)).
Address Private Trees within the UFMP	• Suggestion to emphasize responsibility rather than ownership –"we are all responsible" • The UFMP should manage all of our urban forest by including woodlands on private property; note that private trees comprise the majority of our "remaining" forest cover. • Concern expressed that plan only addresses Urban Forest within the OP urban boundary. Some participants expressed support for controls to prevent loss of private trees and woods in both the urban and rural area. An example provided by several residents was the desire for long-term protection of Mile Square. • Note in the plan that development applications should be restricted in "Significant Woodlands" and surrounding buffer (increase to 120m from the current 50m). Recommend that the protection for these areas be improved within the OP and Zoning By-Law. Natural areas and features should be protected for the long term, as mandated by the PPS and OP. We cannot afford to risk losing any more of these shared ecologically important and rare community resources. • Enhance the definition of Significant Woodlands within the OP to include the requirement for field assessment; some sites might need field verification to determine whether any of the criteria for significant woodlands apply (beyond the 5 applied – age, interior habitat, proximity to other significant natural features, hydrologic values or age). The current definition used to establish significant woodlands through aerial photography was noted to be limiting and not consistent with the PPS definition. • Enhance the protection of Contributory Woodlands within the OP, such as through requirement for an Environmental Impact Assessment when development is proposed in these areas. It is possible that not all Significant Woodlands have been identified yet, therefore a precautionary approach is recommended for those woodlands that have not been evaluated in the field. Adopt London's approach for placing unevaluated woodlands into an 'Environmental Review' category. • Consider encouraging the planting of more trees in private parking lots to shade cars	• Consider consolidated section within the Plan that references how private trees are now managed within Kingston and current Plan directions for enhancement, if any – refer to existing OP policies, updated in 2010 to meet 2005 PPS, PPS now under review (new in 2012?) and next OP review date. Suggest brief explanation of the development review process requirements regarding trees, note any opportunities for enhancement in the short term and areas to review for the next OP, if possible. • Focus of this plan is municipal trees, as per Council direction; contribution of private trees to urban forest will be briefly described and long-term intent to address will be noted; focus now will be to place municipal tree management in order • Discussed with Planning – will reference updates to OP policies as part of 5 year review in 2014-2015, and updates to development guidelines documents, Tree By-Law. • Update of the Natural Heritage System is planned with Conservation Authority for next OP review; this update will consider the expanded buffers that are referenced within the new Natural Heritage Manual • Plan scope will remain as the geographic area within the City's Urban Boundary. Consider acknowledgement at plan beginning of the importance of the forest within the rural area – not part of this plan but managed through other methods that are….

Category	Comment	Recommended Response (for discussion)
	and reduce urban heat island effect.	• The planting of more trees, such as for shade and aesthetics in parking lots, is now encouraged during review of landscaping plans
Development Related requirements	• Many contributors expressed opposition to the proposed action to use cash-in-lieu payments for tree establishment/maintenance (action #7d). These funds should be kept for their intended use to provide community parks. • Have a "tree observer" at Planning Committee • Implement measures to prevent developers from sending in bulldozers and apologizing afterwards. Consider application of a large fine to discourage acceptance of a fine as a cost of doing business.	• Action 7d will be removed. • A community member could report to Tree Advisory Board, review items presented to Planning Committee, or be part of circulation list for development applications with tree inventories and preservation plans (mainly applies to private lands). The Tree Advisory Board will consider monitoring and reporting on planning decisions that impact upon trees as part of plan implementation. • Will recommend as feedback on the City's Tree By-Law for the next update – recommend higher fines
Note relationship with other levels of government within the UFMP and range of partnership opportunities	• Include reference to urban forest on other public lands – provincial, federal, such as DND base with significant woodland {also Cataraqui Conservation Authority, Queen's University} – and how the City will work with these partners to protect these contributing valuable community resources. • In addition to many individual residents and community associations that have offered to assist in caring for Kingston's urban forest, there are many other organizations that have expressed interest in participating actively in urban forest management. They include: Katarokwi Native Friendship Centre, Lemoine Point Nursery, Kingston Horticultural Society, Kingston Field Naturalists, Society for Conservation Biology, Urban Agriculture Kingston, Ferguson Forest Centre in Kemptville, schools and TD Friends of the Environment with the potential for others to be identified over time. • Reference the UNESCO World Heritage Designation of the Great Cataraqui River to help with woodland conservation along the river. • Be more precise in the reference to managing "species at risk"	• References will be included – work in partnership on other public lands, community partners, UNESCO designation of Rideau Canal with protection of cultural heritage (O.P. section 7.3.A). • Reference protection of species at risk through federal and provincial legislation
Clarity in management directions and overall plan language	• Ensure that the plan clearly states the urban forest/trees to which it applies. It is currently drafted to reflect management of public trees and forests. It would be desirable to have the plan also apply to private trees or, if not, consider changing the reference to 'urban forest" (trees vs. forest?) and clearly state the plan's application up front. • Specify how the contribution of individual trees to the urban forest differs from that of forests. Develop separate targets and monitoring strategies for individual trees vs. forests (forest cover). • Suggest that forest cover be defined within the Plan. Individual trees are recommended to be part of the inventory but not part of the forest cover measurement for the City. • Concern expressed that the plan may not receive the ongoing needed attention and priority once it is approved.	• The plan will remain an "Urban Forest Management Plan" with clear statement up front as to its primary purpose at present for the management of public trees. Will also include excerpt from the Council direction for preparation of this plan. • Include a subtitle for the Plan, such as "For Trees on Municipal Lands" • The plan will include acknowledgement of the important contribution of private trees to the City's urban forest and will clearly state the current planned management directions for private trees management and how these directions relate to existing City policies and programs and future initiatives. • Components of the urban forest will be further described,

Category	Comment	Recommended Response (for discussion)
		such as individual trees, forest areas, other public lands, and relevant activities noted for partnership efforts. • Annual reporting on the plan progress and regular review of the UFMP will maintain attention on the plan and keep its directions and actions up-to-date
Forest Cover target	• Set a target and stick to it • Reference the Environment Canada 30% target, and its inclusion in Official Plan policy. Consider inclusion of the target within the vision statement. • Set a forest cover target higher than 30% in line with Kingston to be "the most sustainable city in Canada". See London's target of 45%, for example.	• The 30% forest cover OP policy is referenced in the plan – make this more prominent. • The 30% target will be included within the Plan goals and/or as part of a City program/policy integration section. • The long term forest cover target will be considered as part of the process to develop Plan indicators for monitoring progress.
Enhance City's tree management role	• Identify the City as taking a leadership role in tree management • Align the directions and recommendations of the UFMP with Kingston's goal of becoming Canada's Most Sustainable City.	Will integrate this concept into the goals relating to the City's role.
Encourage native food-bearing trees	• The majority of Plan commenters urged that the City plant native food-bearing (fruit and nut) trees in public spaces. Favour native or heirloom species. • Consider prioritizing planting of these trees in lower income neighbourhoods, in partnership with others. • Encourage others to plant fruit bearing trees for their floral aesthetics and for food. • Note that such initiatives would support the Urban Agriculture policies of the OP. The Plan should then reference that it will contribute to provision of local food and support Kingston's sustainable food strategy. • Work with schools to plant fruit and nut bearing trees in school yards and to integrate understanding of these species and their benefits into school programs, education of communities.	An action will be added to the Plan to encourage community action and pilot project for establishment and care for fruit and nut bearing trees on private lands or school yards with an interested group to do this.
Specific Forest Management suggestions	• Ensure diversity in planting of new trees; avoid favouring of planting fast-growing species only • Actively control invasive species, such as *Rhamnus cathartica* (buckthorn); the City should set an example through controlling invasives in City parks and public spaces • A strong preference for planting native species is recommended; avoid use of hybrids such as *Acer platanoides* • Like the proposed actions in Table 3; consider addition of permeable sidewalks, soil boxes and direction of surface runoff to underway Williamsville study • Establish trees in all City parking lots, along edges and in islands where feasible to provide shade to cars and reduce heat island effect in the City • Plant more trees in parks and streetscapes. Please allocate budget resources to this activity sooner rather than later. • Place more emphasis on managing woodlands over individual trees. Focus upon remaining woodlands for protection to maintain ecological connectivity across the City.	• Most items recommended for consideration during the development of the more detailed operational plans, with advice from the Tree Advisory Board • The planting of new trees will be considered in balance with available City and community resources available for their care, as noted within the Plan.

Category	Comment	Recommended Response (for discussion)
	• Plan now for expected impacts from emerald ash borer to the City's mature ash trees	
Specific Public Education suggestions	• Use UFMP as an opportunity to advise people on the location of City street trees – within first 10 feet of property – and that it is a by-law violation to remove them • Also note in the plan that the Tree By-Law does not apply to individual residential properties • Include concept that trees are a shared community resource; when they are removed, public or *private*, there is an impact to other residents. • Include promotion and education on the ecological importance of trees	Will integrate these ideas into the public education activities recommendations.
Specific wording suggestions for Plan	• Call this the UFM Strategy rather than Plan, in keeping with the Sustainable Kingston documents (environmental sustainability). • Include "cultural" as a sustainability pillar. • Tree Benefits discussion should include social, mental health benefits as well as the benefits to other life (plant and animal) such as habitat, food, not just human-centric. • Also include the role that trees play in reducing ultraviolet radiation exposure and hence to reduce the occurrence of skin cancer. Suggestions for enhancement in sections 1.3, 2.1 and an added activity in section 4.0 for a new activity 7e in relation to encouraging the provision of shade in new developments. • Include reference to the health benefits (potential $value) that trees provide in Table 1; • Adjust economic values for trees in Table 1 – can be up to $50,000 value (replacement value that is derived from authority under the Municipal Act, not related to the tree characteristics) per mature street tree, as provided in the Tree By-Law • Kingston has a wetland or riparian system, not "ravine" (p. 15) • Be careful about the introduction of non-native hardy species • Reference potential community partners such as Lemoine Point Nursery, Urban Agriculture Kingston, Kingston Horticultural Society, Society for Conservation Biology, Cataraqui Region Conservation Authority, Kingston Field Naturalists, etc. • Make action #19 more specific to Kingston • Reconsider the use of the term "significant trees"; this could be confused with significant woodlands. Could use "important trees". • Modify the description of the Tree By-Law requirements to clearly reflect their intent. • Consider adding activities that include: o encouraging rooftop gardens, o indicators developed for monitoring urban forest health should focus on indigenous tree species o encourage ecological groups and high school student volunteers for tree seeding, planting and maintenance o access potential carbon tax/credit incentives for municipalities that increase their areas of green space	• Maintain as UFMP. • All specific comments will be considered for inclusion in the final plan. • Qualifications will be added to the suggestion for use of non-native hardy species, i.e. avoid use of invasive species • Propose that keep the term "significant trees" and define within the plan (expand current description – includes distinctive trees from Tree By-Law plus trees that are unique in size, shape and/or have cultural value

Appendix C: Summary of Jurisdictional Review

1. Review of Municipal Urban Forest Management Plans

Urban forestry information from the websites from the Ontario cities of London, Markham, Stratford, Hamilton, Oshawa, Mississauga, Burlington, Peterborough, and Oakville, as well as the cities of Montreal and Quebec City in Quebec were scanned to obtain a familiarity with the commonalities and trends shared in approaches to urban forestry, tree asset management planning and data management, and the economic analysis of the contribution of trees in an urban environment.

Recent research undertaken recently in support of the City of Burlington's UFMP indicates that while over 50 municipalities in southern Ontario have implemented public or private tree by-laws, most focus on the protection of woodlands and not individual trees, and have been enacted by upper tier (regional) municipalities. However, 16 lower tier municipalities have tree by-laws that focus on the protection of individual 'significant' trees on private property. Fewer Ontario municipalities also have a comprehensive Urban Forest Management Plan (UFMP). The following table provides an overview of initiatives underway within other comparable Canadian municipalities.

Municipality	Urban Forest Management Plan	Tree By-Law	Tree Protection Plans	Tree Planting Guidelines	Public Tree Removal Plan		
Alberta							
Calgary	X	X	X				
Ontario							
Burlington	X	X	X				
Guelph	X	X	X				
Hamilton		X	X	X	X		
London		X		X			
Niagara	X	X					
Niagara Falls			X				
Oakville	X	X	X	X			
Ottawa	X	X	X	X			
Peterborough	X	X		X			
Richmond Hill		X	X	X			
Stratford		X		X			
Thunder Bay	X	X		X			
Toronto		X	X				
York Region		X	X	X			
Quebec							
Montreal							
Quebec City							

The UFMP's of the municipalities of Burlington, Calgary, Guelph have recent and comprehensive UFMP's and were selected for a more detailed review of their content and structure, issues, unique features, and with a view to best management practices. Most UFMP share common elements and considerations. Listed below are the common elements shared amongst the UFMP's of five municipalities that were examined in detail. NA means "Not Applicable". An empty space means that the element was not addressed in the UFMP.

Common Elements in UFMP's	Burlington	Calgary	Guelph	Montreal	Oakville	Peterborough
Applies to City-owned trees only	N/A					
Applies to all urban trees	Yes	Yes	Yes	Yes	Yes	
Vision for the Urban Forest	Yes		Yes	Yes	Yes	Yes
Guiding Principles	Yes	Yes				
Objectives &Recommendations						Yes
Strategic Goals	Yes		Yes	Yes	Yes	
Time Horizon (approx. 20 years)	Yes				Yes	
Benefits Trees (economic, social, environmental, cultural)	Yes	Yes	Yes	Yes	Yes	Yes
Manage the urban forest as critical green infrastructure	Yes	Yes	Yes	Yes	Yes	Yes
Estimated canopy cover	23%		24%		29.1%	
Establish canopy cover targets	No	20%			30%	No
Optimize canopy cover without setting a target	Yes					
Educate politicians and the public regarding the value of the urban forest within a broader context (i.e as green infrastructure)	Yes	Yes	Yes	Yes	Yes	Yes
Importance of actively involving the community in sustaining the urban forest		Yes			Yes	Yes
Amend the Official Plan to recognize the full complement of tree benefits	Yes		Yes		Yes	Yes
Set percentage targets for species	Yes				Yes	Yes
Develop a risk management strategy	Yes		Yes		Yes	Yes
Use adaptive management strategies to monitor, evaluate, and respond to urban forest threats (eg. climate change, pests, invasive species).		Yes			Yes	Yes
Develop a tree health care and Integrated Pest Management (IPM) strategy		Yes				
Create a Working Group with a diverse membership to oversee and advise upon UFMP implementation			Yes		Yes	Yes
Identified municipal growth as a stressor	Yes	Yes			Yes	Yes
Consolidate all tree protection policies, guidelines, and recommendations into one	Yes					Yes

Common Elements in UFMP's	Burlington	Calgary	Guelph	Montreal	Oakville	Peterborough
technical document						
Maximize native species diversity	Yes		Yes	Yes		Yes
Importance of diversity (tree species, age) to sustaining the urban forest	Yes	Yes			Yes	Yes
Need to develop a tree inventory			Yes	Yes	Yes	Yes
Need to enhance existing tree inventory	Yes		Yes	Yes		
Need to adopt an integrated asset management system	Yes					Yes
Need to enhance existing asset management system	Yes			Yes	Yes	
Enhanced annual inspections of hazard and diseased trees	Yes				Yes	
Need to identify measurable criteria and indicators to track the state of the urban forest and the status of UFMP implementation	Yes				Yes	Yes
Formalize a Working Group to enhance communication among agencies , organizations, and private contractors tasked with caring for the urban forest.	Yes		Yes	Yes	Yes	Yes
Find creative, efficient ways to engage the community and promote the value of the urban forest to community health and well being		Yes	Yes	Yes	Yes	
Enhance tree replacement	Yes			Yes	Yes	Yes
Review strengths and weaknesses of joint service delivery models (i.e. service delivery provided by both public and private sector workers)	Yes					
Undertaken Urban Forest Effects (UFORE) studies					Yes	
Tree inventory maintained in GIS format				Yes	Yes	
Increase community engagement and stewardship			Yes	Yes	Yes	
Calculate the economic value of urban trees	Yes	Yes			Yes	
Increase staffing and resources to implement UFMP components	Yes			Yes	Yes	Yes
Create a tree planting reserve fund	Yes			Yes		Yes
Develop a program to designate Heritage Trees					Yes	Yes
UFMP is supported by 5 Year Management Plans with associated Annual Work Plans.	NA				Yes	Yes
Glossary of Terms	Yes	Yes			Yes	Yes

1. The City of Burlington Urban Forest Management Plan 2011-2030 (Final Draft June 2010)

Preparation of this informative, clearly written, well structured and comprehensive final draft Plan was directed through the City of Burlington Strategic Plan. |It applies to public and private lands in urban and rural Burlington. The Plan purpose is stated as "to increase urban forest management effectiveness and efficiency, improve tree health and diversity, minimize risks to the public, and maximize the benefits provided by a healthy and sustainable urban forest".

The City of Burlington uses the Avantis Enterprise Asset Management System to manage the urban forest, and other components of municipal infrastructure. The City has proactively budgeted to respond to catastrophic weather events and to manage Emerald Ash Borer infestation on City-owned trees. While the City will continue to track canopy cover as an indicator of urban forest extent, setting a specific percentage canopy cover target was intentionally avoided in lieu of a target to optimize canopy cover in an effort to ensure balanced resource allocation to tree planting over other equally important components of urban forest management. Percentage diversity targets for tree species, genus and family are recommended.

Unique features of this UFMP include:

- An economic net benefit of $67 per street tree was calculated using the United States Forest *Services i-Tree Streets* computer model as a result of reduced building energy use, improved air quality, and carbon storage.

Key issues identified in this UFMP include:

- lack of coordination between the pruning and planting activities of the municipality, Hydro One and the local utility provider as they relate to utility corridor maintenance;
- lack of coordination with Ministry of Transportation regarding tree protection and replacement along roadways and their rights-of-way;
- requirement for an enhanced tree inventory to include park trees, rural street trees, and trees removed or planted through the Site Plan Approval Process;
- requirement for a method to link and update tree inventory information with the results of cyclical tree inspections or individual tree work requirements;

2. The City of Peterborough Urban Forest Strategic Plan (Draft, September 2009)

The City of Peterborough's UFMP addresses the urban forest on all land in the City. The purpose of Peterborough's UFMP is "to recommend direction and actions for the City to optimize the benefits of trees."

Unique features of this UFMP include:

- a commitment to undertake species suitability trials to ensure appropriate resource allocation and longterm viability of new plantings;
- recommendation to initiate a seed collection and propagation program at local nurseries developed from local genetic stock;
- Link parks with corridors of mature trees;
- Create an incentive program for developers to protect existing trees;
- Citizen volunteers undertook tree inventories through the "Neighbourwoods" program;

3. City of Guelph

The City of Guelph has completed a comprehensive strategic framework for their urban forest management plan, currently under development. The framework provides a detailed direction for preparation of the plan, focusing upon establishing goals and objectives, updating their tree inventory, outlining plan components for tree planting, pruning, health care plan and risk management , public education and communication and budget.

4. Town of Oakville Urban Forest Strategic Management Plan (March 2008)

The Town of Oakville UFMP applies to all trees located throughout the Town south of Dundas Street. An additional Plan will be prepared to address lands north of Dundas St. It is a 20 year strategic planning spanning 2008-2027. The vision for the urban forest is, "Oakville's urban forest, an equal part of the community's infrastructure, contributes positively to the health of all residents. Oakville is a proud leader in urban forest stewardship."

A brief summary of this extremely well thought-out UFMP will not do justice to the detail, logic, and rationale supporting each and every recommendation. Of the UFMP's reviewed Oakville's Plan embraces the exploration of leading edge technology and current scientific approaches the most, and design guidelines for trees (e.g. planting in parking lots). This well structured, detailed, and well presented UFMP recommends formalizing partnerships with national and international associations an expertise in the areas of gene conservation, invasive species control and economic modeling, and NGO's to enhance community engagement.. Canopy cover targets are based on detailed scientific modeling and interpretation.

The Town is committed to producing a high quality GIS based tree inventory that will be available on the internet for viewing by the public, and use of infrared photography for identification of hazard trees . Create one permanent sample plot per hectare in woodlands for ongoing monitoring. attempted to quantify the ability of its existing urban forest to address pollution by identifying canopy area….(careful…used UFORE model 2009) . This information is contained in a separate report from the UFMP, called "Oakville's Urban Forest: Our Solution to Our Pollution" (2006). The UFMP recommends using the UFORE model to determine leaf area by land use type to unveil trends and guide planting initiatives. The City uses the asset management system called CityWorks. Town-wide canopy cover targets are recommended as well as targets within parking lots.

Unique features of the Town of Oakville's UFMP include:

- a commitment to undertake species suitability trials to ensure appropriate resource allocation and long-term viability of new plantings;
- create urban forest management units of roughly equal area to direct management activities;
- direct tree inventories toward young and old age classes first;
- consider developing a municipal arboretum
- trees make communities "loveable".

5. Calgary…A City of Trees. Parks Urban Forest Strategic Plan (2007)

If left to nature, Calgary's landscape would be devoid of trees, reflective of its arid climate. Yet the Calgary of today supports large trees and shrubs valued at over $400 million dollars; a testament to the commitment of Calgarians to beautify their city. Climate pressures and recent intense growth add a new dimension to what it takes to sustain the urban forest here. The purpose of Calgary's UFSP and policies is "to provide a framework for City staff and the community partners to make key decisions about the management of the urban forest for sustainability today that will have a positive impact for future generations".

Calgary's unprecedented in recent years prompted the preparation of specific policies to sustain the urban forest as part of the UFMP. While the current tree target of one tree for every 2 Calgarians has fallen short, the new Plan recommends a tree canopy target of 20%. The Plan recognizes the role of trees aesthetics in urban design and in attracting residents to the City and within commercial districts. A poplar replacement program has been implemented to enhance the forest canopy with less aggressive species. The Plan strongly supports equipping the community with the essential stewardship tools. Partnering with expert groups and universities to develop internship programs are encouraged. Recycle waste products produced by urban forestry operations.

Unique features of the Calgary UFMP include:

- Birthplace Forests
- Innovating "tree bag" watering system

6. City of Montreal Tree Policy

The City of Montréal prepared their Tree Policy as a follow-up to their commitment at a public Sommet de Montréal. The plan emphasizes joint public, private and community responsibility for care of these "treasured companions". The four main objectives of this policy are:

- Develop and provide the tools necessary for defining a long-term vision;
- Establish rules and practices relating to protection, management and appropriate maintenance of the urban forest while supporting applied research in the field;
- Increase the number of trees planted based on the principle of planting the right tree in the right location with a view to augmenting the island's arboreal reserve; and
- Step up information publication and awareness initiatives with a view to involving everyone – citizens, municipal employees, institutional and association partners, large land owners, etc. – in the effort to protect Montréal's arboreal heritage.

Other documents such as the Urban Forest Management Plan prepared by the American Public Works Association (APWA) as well as work undertaken by the Eastern Ontario Model Forest have been reviewed.

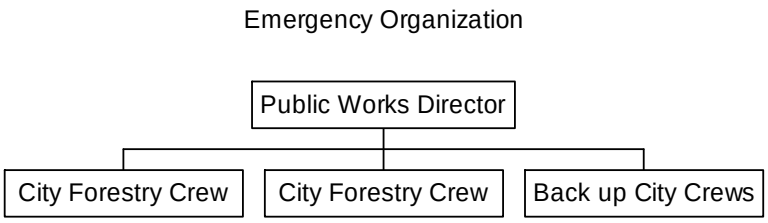
Appendix D: Emergency Response Plan

Kingston's Emergency Response

Objective:
To be ready to deal with Storms and Infestations that affect the Urban Forest.

Operational Policies and Practices:
To identify and establish roles and responsibilities prior to a storm or infestation for both minor and major events.

Organization Chart:

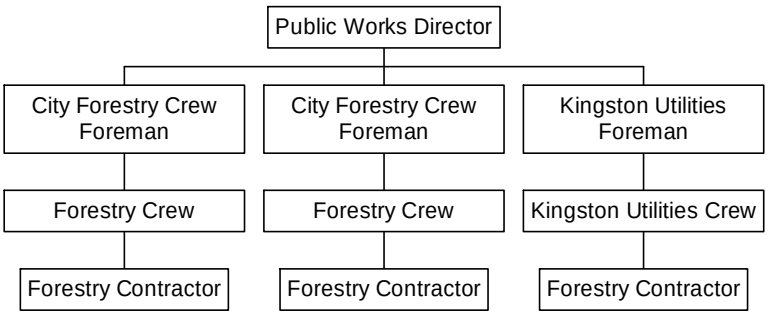


Minor Events:
Can be handled by City Forestry Crews with some assistance by other City staff.

City Forestry Crews:

- Up-to-date Call-in Lists
- Emergency Numbers and Contacts
- Inventory of Equipment
    - In-house Equipment; location and authorization process
    - Rental equipment: where and how to access
- Kingston Utilities:
    - How to access equipment and when and who to call.

Major Events:
City Forestry Crews required Assistance From outside City Staff.



City Forestry Crews:

- Up-to-date Call-in Lists
- Assigned Foremen from both City Crews and Kingston Utilities.
- Emergency Numbers and Contacts
- Inventory of Equipment
    - In-house Equipment; location and authorization process
    - Rental equipment: where and how to access
- Kingston Utilities:
    - How to access equipment and when and who to call
- Forestry Contractors:
    - List of contractors
    - How to access these contractors
    - Standard contracts are ready

Appendix E: Proposed Communications Strategy

Communications Strategy to Inform and Engage an Appreciative Community

Key to the implementation and success of the Urban Forestry Management Plan is communicating the Plan's goals and objectives to interested parties including the Mayor and Council, City staff, members of the Tree Advisory Council, interested members of the public and the general public at large. Communication is essential because mere operation and implementation, alone, will not build a community that cares for, participates in, and helps mitigate problems concerning urban tree health. When the community is engaged in caring for Kingston's trees, the benefits that urban trees provide to visitors, residents, and businesses, become an asset that everyone takes pride in caring for and maintaining.

Key Messages:

- Kingston’s urban forest is sustainable, healthy and beautiful. It is a valued component of the City’s infrastructure, benefitting everyone.
- Caring for Kingston's Urban Forest is a shared responsibility
- Kinston's trees need everyone's help: observing, protecting, caring (or)
- Observe, maintain, protect, care - Kingston's trees need you.

Desired Communications Objectives:

Although the Urban Forestry Management Plan pertains to trees managed in the urban area by the City of Kingston, the over 28,000 plus inventoried trees do not exist in isolation of other privately owned trees and other green infrastructure.

The City of Kingston cannot care for its trees alone. There are too many trees and too few financial and human resources to manage each individual tree. While the Urban Forestry Management Plan provides the most effective and thorough approach to managing Kingston's trees, a truly healthy urban forest needs the support of an active and engaged community.

There are three main ways in which an engaged, informed and active community will help the urban forest:

1: Residents and local businesses can monitor tree health
City of Kingston staff are not able to be "on the ground" monitoring each individual tree's health on a daily basis; however, citizens are easily able to notice changes to the health of trees, whether by observing sudden pest infestations, drought damage, or physical damage such as fallen tree limbs after a storm event. The day-to-day observance of trees is best taken care of by their nearest residents and businesses.

2: Residents and businesses can help maintain newly planted and existing trees
Simple messages and advice to residents and businesses about watering, caring for, and protecting urban trees will go a long way in ensuring the health of Kingston's urban trees. City staff are not able to water all trees in a hot or dry period during the summer, but with community awareness and participation, all of Kingston's trees can be easily cared for. Although the trees are City property, local residents can nevertheless take on a stewardship role in helping to protect and care for these "green assets." In addition to helping in the maintenance of trees,

residents can assist by not damaging trees. This involves avoiding damaging tree branches, trunk or roots as well as avoiding compacting the soil around trees.

3: Landowners can help by planting additional trees

Landowners can also help the urban forest by planting trees in appropriate areas of their own property, to enhance the City's overall forest cover and aesthetics. Although the Urban Forestry Management Plan covers City-owned trees, when landowners are able to plant the right tree in the correct conditions for soil, space and light on their own property, this additional tree growth will strengthen and diversify the overall health of the urban forest.

4: Residents and landowners can become stewards: caring for and monitoring the urban forest

How best to communicate these desired objectives and messages to key stakeholders:

Communications methods:

The City of Kingston's Web site

The City Web site is the most efficient means of reaching the widest general public, for posting timely information, as well as hosting all information that relates to the Urban Forestry Management Plan. In addition, the City's Web site must contain feedback mechanisms so that residents can get in touch with City staff to report a problem, request information, ask for assistance etc.

Under the "Environment" tab on the City's web site, a simple section could be established called "trees" or "urban forest" as a one-stop-site for housing all tree-related information. Here, the Urban Forestry Management Plan, as well as related information pertaining to the Tree Advisory Board, and any other communications material (maps, tree inventory, brochures) can be posted and kept up-to-date. This one-stop site would also appropriately direct visitors to existing web information regarding tree-related items in Official Plan policies, site plan and subdivision application guidelines and the Tree By-Law. Public Works staff would work with Planning to integrate posted information in a manner that best informs site visitors.

Timely, seasonal messages could also be included, such as advisories on tree watering during the summer months, and information about tree removal, or cutting, or tree planting when and if necessary.

Print material: brochures

Upon adoption of the UFMP, two brochures, designed for a general public audience (residents, local landowners, businesses in the urban core etc.) could be easily produced and widely available distributed.

1: Caring for Urban Trees

This brochure could include information about the Urban Forestry Management Plan, the benefit of urban trees, how to care for and prevent damage, how to report problems, who to contact for more information.

2: How to plant the right tree in the right place

A simple document could explain soil types, explain species types, some factors to consider when planting trees (such as hydro lines, utilities, sun exposure, etc. etc.). This brochure could be available as a print resource, or more comprehensively located on the City's Web site.

Newspapers

In addition to the Web site and print resources, when needed, notices should and could be included in **the Whig-Standard** and the **"Your City: Working for You" newspaper supplement.** Information conveyed through these media could relate to seasonal tree maintenance issue; notices of tree plantings; assistance required in preventing and detecting pest infestations. These media are best adapted to seasonal and timely messages and should be considered as a companion to any notices posted on the Cit's Web site.

City Councillors and the Mayor's Office

The City's Mayor, City Councillors and the front-line staff in their offices will probably field direct questions from residents about trees, the Urban Forestry Management Plan, and, more probably, receive complaints about tree maintenance and tree cutting. These staff are a crucial link in the successful communications of the UFMP and for providing accurate and timely information to concerned residents who have questions about urban trees. It is essential that staff in the Public Works Department maintain close links with these offices, in order to answer questions, address resident's concerns, provide advices and provide maintenance updates and practices concerning tree management.

The Tree Advisory Council

The Tree Advisory Council is perfectly poised to foster community involvement and stewardship of urban trees. Through the Advisory Council, partnerships could be established with Queen's University, the Cataraqui Conservation Authority, interested local businesses and horticultural society(ies). These partnerships can facilitate in both communicating with interested stakeholders as well as providing the City with expert advice, volunteers, and community ambassadors. As an established advisory body, the Tree Advisory Council could be the perfect arms-length body who could help distribute information to the public as well as funnel feedback back to the City.

Mitigating negative feedback / press

The best approach is that more communication is better than none when issues arise with concerns addressed proactively. It is recommended that the City be open and up-front about times when older, heritage trees may need to be removed.

Appendix F: DRAFT Species
Planting List

	English (common) name		Scientific name				suitability					
Abbre-viation	Genus	Species	Genus	Species	native/ exotic	origin	City	near to natural	Street	develope d park	passive park	woodlan d park
Alt	Aspen	large tooth	Populus	grandidentata	native		low	good	low	moderate	good	moderate
At	Aspen	trembling	Populus	tremuloides	native		low	good	low	moderate	good	moderate
Bd	Basswood		Tilia	americana	native		moderate	good	moderate	moderate	good	good
Bb	Beech	blue	Carpinus	caroliniana	native		good	good	low	good	good	good
Bw	Birch	white	Betula	papyrifera	native		moderate	good	moderate	moderate	good	good
By	Birch	yellow	Betula	alleghaniensis	native		low	good	low	low	good	good
BO	Buckeye	Ohio	Aesculus	glabrus	exotic	US midwest	moderate	good	low	good	good	low
Cn	Catalpa	northerm	Catalpa	speciosa	exotic		moderate	good	moderate	good	good	low
Cr	Cedar	red, eastern	Juniperus	virginiana	native		moderate	good	low	good	good	good
Cw	Cedar	white, eastern	Thuja	Occidentalis	native		moderate	good	low	good	good	good
Cb	Cherry	black	Prunus	serotina	native		moderate	good	moderate	moderate	good	good
Ch	Chestnut	horse-	Aesculus	hippocastanum	exotic	Europe	good	good	low	good	good	low
Chr	Chestnut	Horse- ruby red	Aesculus	carnea brioti	exotic	Europe	good	good	low	good	good	low
CK	Coffee tree	Kentucky	Gymnocladus	dioicus	exotic	Ont sw	good	good	moderate	good	good	moderate
Ca	Cork	amur	Phellodendron	amurense	exotic	Asia			moderate	good	good	low
Poc	Cottonwood	eastern	Populus	deltoides	native		low	good	low	moderate	moderate	moderate
Cu	Cucumbertre e		Magnolia	acuminata	exotic	Ont sw	moderate	good	moderate			moderate
Ehyb	Elm	hybrid	Ulmus	x			low	good	moderate	moderate	moderate	
El	Elm	lacebark	Ulmus	parifolia			good		moderate	good	good	
Epx	Elm	pioneer	Ulmus	glabra x carpinifolia			good		good	good	good	good
Es	Elm	slippery (red)	Ulmus	rubra	native		moderate	good	good	moderate	moderate	good
Ewl	Elm	white - liberty	Ulmus	americana 'libertas'			moderate	good	good	good	good	good
Gi	Ginko		Ginko	biloba	exotic	Asia	good	good	good	good	good	low
Gb	Gum	black	Nyssa	sylatica	exotic	US south	good	good	good	good	good	low
Gs	Gum	sweet	Liquidambar	styraciflua	exotic	US south	good	good	good	good	good	low
Hack	Hackberry		Celtis	occidentalis L.	native		good	good	good	good	good	good

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HT	Hazel	Turkish	Corylus	columa	exotic	Asia	good	low	low	good	good	low
He	Hemlock	eastern	Tsuga	canadensis	native		moderate	good	low	moderate	good	good
Hib	Hickory	bitternut	Carya	cordiformes	native		moderate	good	low	moderate	good	good
Id	Ironwood		Ostrya	virginiana	native		good	good	good	good	good	good
KJ	Katsura	Japanese	Cercidiphyllu m	japonicum	exotic	Asia	good			good	good	low
LE	Larch	European	Larix	decidua	exotic	Europe	moderate	good	low	good	good	moderate
LJ	Larch	Japanese	Larix	kaempferi	exotic	Asia	moderate	good	low	good	good	moderate
Lil	Lilac	Japanese tree	Syringa	reticulate 'ivory silk'	exotic	Asia	good	moderate	good	good	good	low
Ll	Linden	Little-leaf	Tila	cordata	exotic	Europe	good	good	good	good	good	low
Lb	Locust	black	Ribinia	psuedoaccacia	exotic	US east	moderate	good	moderate	moderate	good	moderate
Lh	Locust	honey	Gleditsia	triacanthos L.	exotic	Ont sw	good	good	good	good	good	low
Lh sk	Locust	Honey 'skyline'	Gleditsia	triacanthos L.	exotic	Ont sw	good	good	good	good	good	low
Ma	Maackia	amur	Maackia	amurense	exotic	Asia, east	good	low	moderate	good	good	low
Mam	Maple	amur	Acer	ginnala	exotic	Asia, east	good	low	moderate	good	good	low
Mbl	Maple	black	Acer	nigrum	native		good	good	good	good	good	good
Mf	Maple	freeman	Acer x	freemanii	native		moderate	good	moderate	good	good	good
Mhe	Maple	hedge	Acer	campestre	exotic			low		good	good	low
MN	Maple	Norway	Acer	platanoides	exotic	Europe	moderate	low	good	good	good	low
Mpa	Maple	paperbark	Acer	griseum	exotic		good	moderate	moderate	good	good	low
Mr	Maple	red	Acer	rubrum	native		moderate	good	good	good	good	good
Mr col	Maple	red 'columnar'	Acer	rubrum	native		moderate	moderate	good	good	good	low
Msi	Maple	silver	Acer	saccarinum	native		moderate	good	moderate	good	good	good
Mstr	Maple	striped	Acer	pensylvanicum	native		moderate	good		good	good	good
Msu	Maple	sugar	Acer	saccarum	native		moderate	good	good	good	good	good
Msyc	Maple	sycamore	Acer	pseudoplatanus	exotic	Europe	good	low	good	good	good	low
MtnA	Mtn Ash	American	Sorbus	americana	native		good	good	good	good	good	good

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Mtno	Mtn Ash	Oakleaf	Sorbus	thuringiaca	exotic	?	good	moderate	good	good	good	low
Mtns	Mtn Ash	showy	Sorbus	decora	native		good	good	good	good	good	good
Ob	Oak	burr	Quercus	macrocarpa Michx.	native		good	good	good	good	good	good
Och	Oak	chinquapin	Quercus	muehlenbergii	exotic	Ont sw	moderate	good	moderate	moderate	moderate	moderate
OE	Oak	English	Quercus	robur	exotic	Europe	good	good	good	good	good	low
Op	Oak	pin	Quercus	palustris	exotic	Ont sw	moderate	good	moderate	moderate	good	moderate
Or	Oak	red	Quercus	rubrum L.	native		moderate	good	moderate	moderate	good	good
Os	Oak	Shumard	Quercus	shumardii	exotic	Ont sw	good	good	good	good	good	good
Osw	Oak	swamp white	Quercus	bicolor	exotic		moderate	good	moderate	moderate	moderate	good
Ow	Oak	white	Quercus	alba L.	native		moderate	good	moderate	moderate	good	good
Pe	Pear	ornamental	Pyrus	calleryana x	exotic	Asia, east	good	low	good	good	good	low
PAu	Pine	Austrian	Pinus	banksiana	exotic	Europe	moderate	moderate	low	good	good	low
Pp	Pine	pitch	Pinus	rigida	native		moderate	good	low	good	good	good
Pr	Pine	red	Pinus	resinosa	native		low	good	low	moderate	moderate	good
Pw	Pine	white,eastern	Pinus	strobus	native		moderate	good	low	moderate	good	good
PL	Planetree	London	Platanus x	acerifolia	exotic	Europe	good	good	good	good	good	low
Poh	Poplar	hybrid	Populus	x	exotic	Europe	low	moderate	low	low	moderate	low
Re	Redbud	eastern	Cercis	canadensis	exotic	Ont sw	good	good	low	good	good	good
Sa	Sasafrass		Sasafrass	albidum	exotic	Ont sw	good	good	low	good	good	good
Sd	Serviceberry	downy	Amelanchier	arborea	native		good	good	low	good	good	good
SCb	Spruce	Colorado blue	Picea	pungens	exotic	US west	good	good	low	good	good	moderate
SN	Spruce	Norway	Picea	abies	exotic	Europe	good	good	low	good	good	good
Sw	Spruce	white	Picea	glauca	native		moderate	good	low	moderate	good	good
Sy	Sycamore		Platanus	occidentalis	exotic	Ont sw	moderate	good	moderate	moderate	moderate	moderate
Ta	Tamarack		Larix	laricina	native		moderate	good	low	good	good	good
Tu	Tuliptree		Liriodendron	tulipifera	exotic	Ont sw	good	good	good	good	good	good
Yd	Yellow-wood		Cladastris	kentukea	exotic	US south	moderate	good	moderate	good	good	low