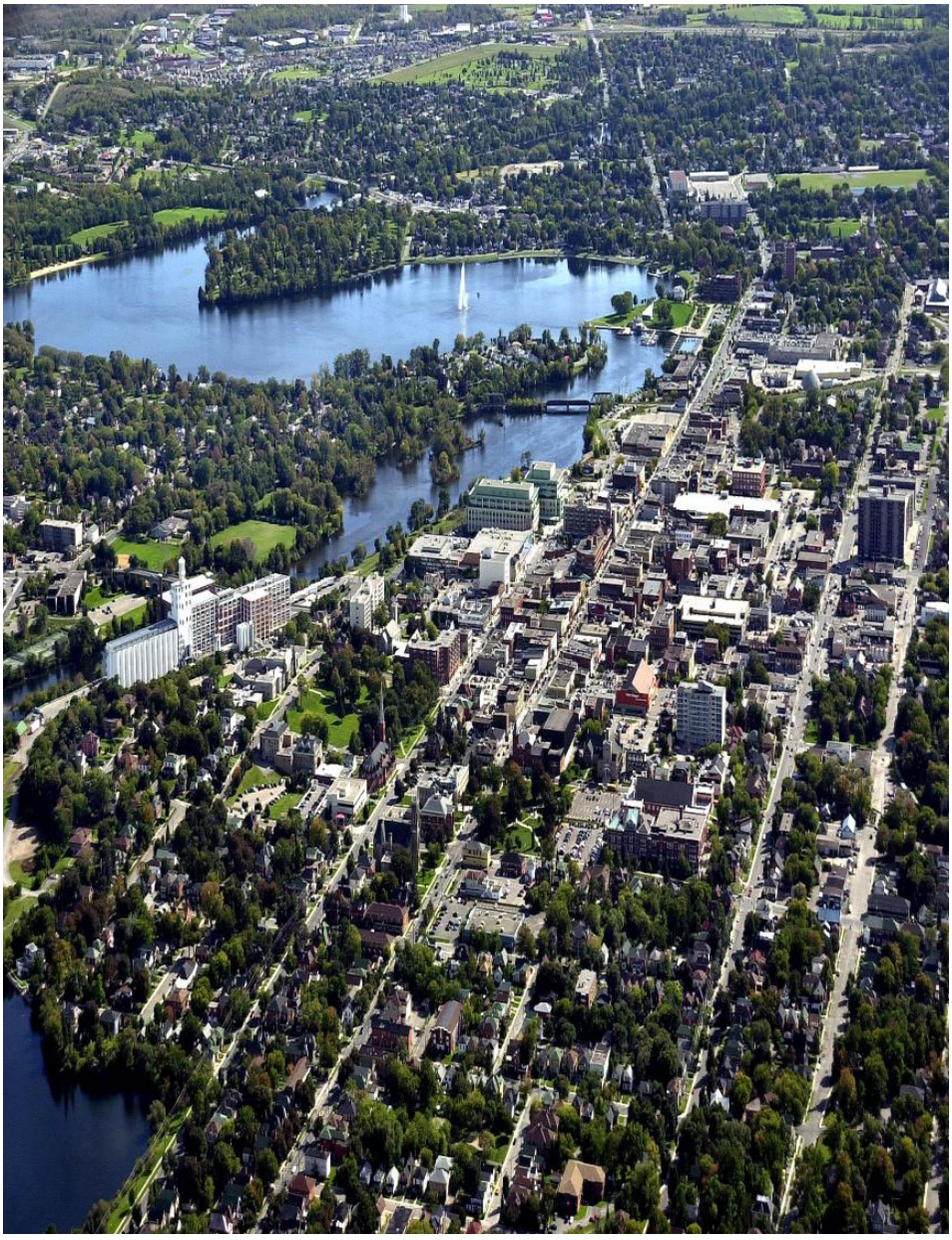
OUR FOREST - OUR FUTURE



URBAN FOREST STRATEGIC PLAN

June 2011

City of Peterborough

URBAN FOREST STRATEGIC PLAN
FOR THE
CITY OF PETERBOROUGH

Acknowledgements

The City gratefully acknowledges the contribution of the following:

Arenas, Parks and Recreation Advisory Committee
Contributing Citizens
The Urban Forest Strategic Plan Committee

Members of the Urban Forest Strategic Plan Committee

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Ian Attridge	Kawartha Heritage Conservancy
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Janet Sheward	Corporate Services, City of Peterborough
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John Williams	Otonabee Region Conservation Authority

Executive Summary

History

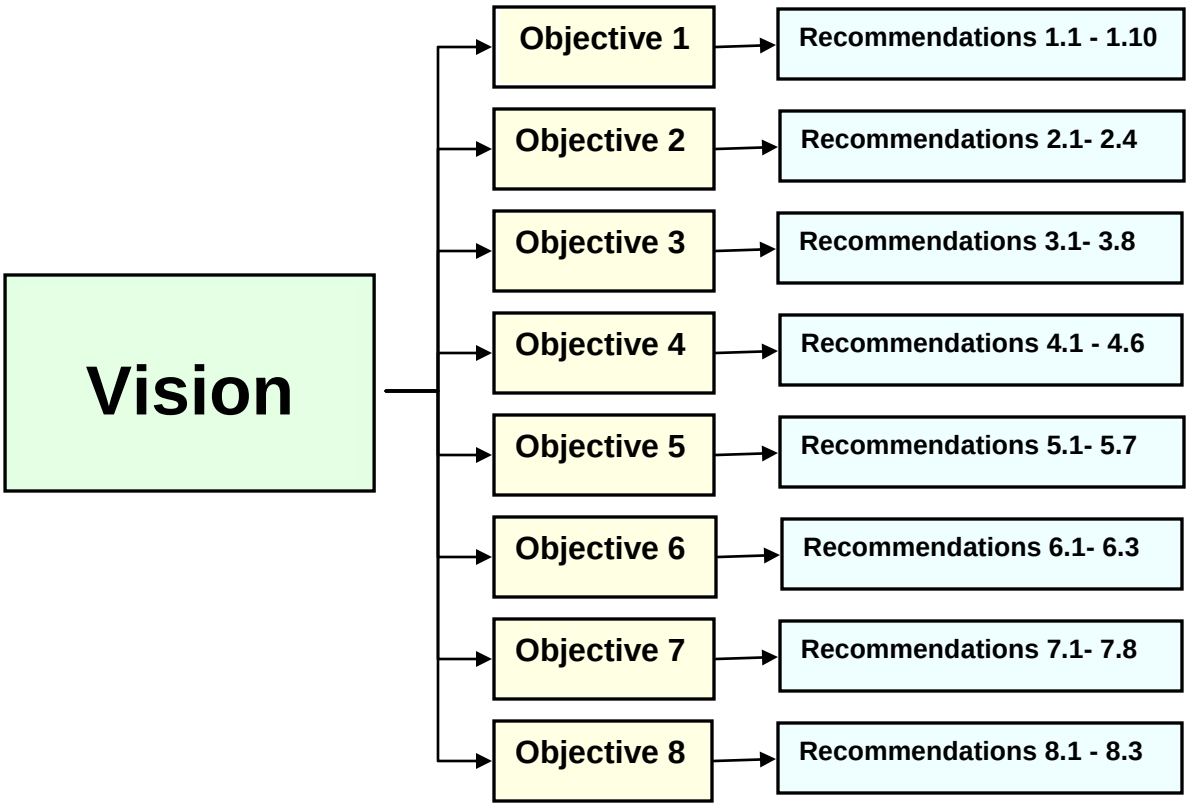
Since 1988, the City has been following a Forest Resource Management Policy that provided guidance and direction for the maintenance, renewal and community awareness of our urban forest resource. More recently it was recognized by City Council, staff and community stakeholders that Peterborough needed to renew our vision for the management of the urban forest.

How the Plan was Developed

In 2007, upon request from City Council, a planning process commenced. Methodology to develop a new Urban Forest Strategic Plan (UFSP) for the City of Peterborough included expert advice from an Urban Forest Strategic Plan Committee, political leaders and the public in concert with a review of best practices from other communities across North America.

Format for the Plan

The Urban Forest Strategic Plan is written in an action-oriented format. We move forward toward our Vision with direction from eight Strategic Objectives. To progress successfully through each Strategic Objective, specific Recommendations are advanced to guide implementation. To capture the fundamental values and management principles underpinning each Recommendation, a detailed Rationale is presented.



Our Vision Statement

The City of Peterborough recognizes and values the environmental, social, cultural and economic contribution of the urban forest to our community.

To safeguard the many benefits provided by trees, the City is committed to managing the urban forest by promoting community stewardship and strategic practice to preserve, renew and enhance this essential resource.

Strategic Objective Summary

Objective 1:	**To maintain and enhance a sustainable urban forest in the City of Peterborough.**
Objective 2:	**To maximize the benefits of the urban forest for the well-being of the community.**
Objective 3:	**To formalize and enhance the City's accountability as a steward, manager, regulator and promoter of the urban forest.**
Objective 4:	**To recognize and manage the urban forest as a key element of the City's green Infrastructure.**
Objective 5:	**To preserve and protect the health of the urban forest and prevent unnecessary damage or removal.**
Objective 6:	**To identify and recognize significant valuable trees based on historic, aesthetic, cultural, social and ecological criteria.**
Objective 7:	**To create a regulatory framework that includes ongoing monitoring and assessment.**
Objective 8:	**To increase community awareness of the benefit of trees, encourage community involvement and create a shared responsibility for the stewardship of the urban forest.**

Strategic Recommendation Summary

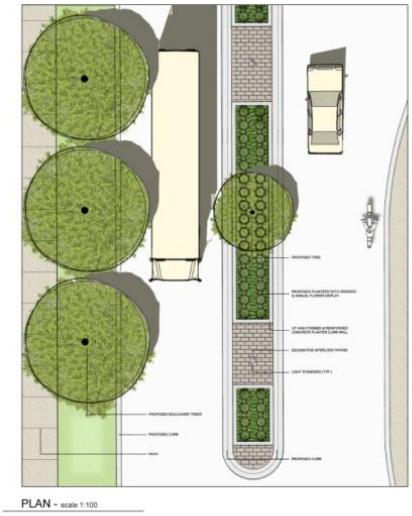
Strategic Objective 1: To maintain and enhance a sustainable urban forest in the City of Peterborough.	
Number	**Recommendation**
1.1	Develop and implement management plan targets for trees in Natural Areas, Parks, on the Right of Way and on Residential, Industrial, Commercial and Institutional lands.
1.2	Conduct plot samples, applying a recognized classification system to complete periodic inventories of the urban forest within prescribed timelines and integrate data with the City's GIS system.
1.3	Set percentage limits for cultivars, species and genera to encourage biodiversity in public tree planting programs.
1.4	Establish targets for native species composition in various land use classes.
1.5	Encourage the production of high quality native trees grown from local genetic seed sources by regional nurseries.
1.6	Create and maintain a list of recommended native and exotic tree species. Make this list available to City staff, local garden centres, community groups and individual property owners.
1.7	Implement trials with Carolinian tree species in public parks to enhance the percentages of climate adaptable species in future plantings.
1.8	Develop response plans for severe weather events such as high winds, ice storms and drought to minimize the impact on the long term health of the urban forest.
1.9	Create and maintain corridors of trees as connecting links between Natural Areas in the City.
1.10	Restore and enhance canopy cover to improve the ecological benefits in Open Spaces.

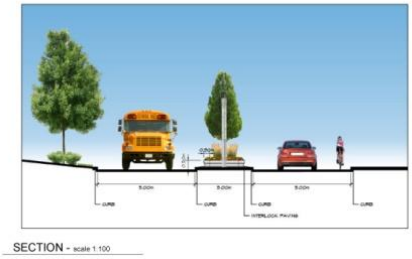
Strategic Objective 2: To maximize the benefits of the urban forest for the well-being of the community.	
Number	**Recommendation**
2.1	Establish a baseline for canopy cover and periodically update canopy cover performance (e.g. with each upgrade of the City's orthographic record).
2.2	Increase the area available for tree planting in new Site and Subdivision developments.
2.3	Identify suitable planting locations to sustain large trees and provide the environmental conditions to enable each species to reach maturity.
2.4	Seek opportunities for planting and protecting groves of recommended species on public and private land to help mitigate the impact of climate change.

Strategic Objective 3: To formalize and enhance the City's accountability as a steward, manager, regulator and promoter of the urban forest.	
Number	**Recommendation**
3.1	Provide sufficient qualified personnel, equipment and other supporting resources for planned urban forest management programs. Recommend budget requirements for personnel, equipment, software and inventory to fulfill the objectives of the Urban Forest Strategic Plan.
3.2	Develop and update training programs and provide professional membership for arborist personnel.
3.3	Investigate providing line clearing services for other utilities and develop strategic alliances for Urban Forest Management.
3.4	Participate in professional associations and extend professional relationships with other municipalities to share urban forest management practices.
3.5	Develop and maintain a common information system on woodlots, street trees, heritage trees and invasive species. For new development, require consultants to provide information in compatible format.
3.6	Track, monitor, evaluate and communicate the progress of the Urban Forest Strategic Plan using recognized criteria to evaluate and measure performance outcomes.
3.7	Adopt a 5 year time frame to review and update the Strategic Plan to support the development of management priorities in order to respond to the condition and sustainability of the Urban Forest.
3.8	Establish departmental, individual and associated roles and responsibilities for the management of the urban forest.

A flight over any neighbourhood shows a mosaic of both private and public trees that contribute to the urban forest. (Courtesy: The Little Lake Cemetery Company)

Strategic Objective 4: To recognize and manage the urban forest as a key element of the City's green Infrastructure.	
Number	**Recommendation**
4.1	Recognize the urban forest as a key element of the City's green infrastructure.
4.2	Promote the contribution that the urban forest, as an element of green infrastructure, provides to the health and well-being of the community.
4.3	Invest in a corporate compatible asset management program for trees that combines tree inventory, GIS spatial information and work order tracking capability.
4.4	Monitor and assess the performance and benefits of the urban forest through the use of models such as the Urban Forest Effects Model (UFORE).
4.5	Require that all Development Agreements include an approved green infrastructure plan whereby a developer, as part of the development improvements, is required to plant trees of approved species along the Right of Way and provide landscape and environmental improvements to Open Space lands within the development area.
4.6	Undertake a study to identify canopy cover targets for land use classes as described within the Official Plan and identify locations to increase tree planting in order to meet these targets.





Recognizing the urban forest as a key element of green infrastructure and its incorporation within good design. (Courtesy: Basterfield & Associates Inc.)

Strategic Objective 5: To preserve and protect the health of the urban forest and prevent unnecessary damage or removal.	
Number	**Recommendation**
5.1	Investigate a permitting process for the removal of healthy trees in the City.
5.2	Introduce regular inspection cycles and utilize inventory data of City owned trees to establish cyclic maintenance programs and a system of Work Order response priority.
5.3	Inform the community of the potential for damage from invasive species and the preventable actions that may be taken. Respond to threats from invasive species in cooperation with stakeholders.
5.4	Establish a committee of City departments and utility representatives to develop and recommend corporate policy and procedures to ensure the protection of trees during installation and/or maintenance of grey infrastructure.
5.5	Produce a guidance document for planners, developers and architects on trees and development that includes minimum protection distances and methods of tree protection during the development process.
5.6	Adopt a method of risk assessment that safeguards the public while preserving the benefits of the urban forest.
5.7	Re-establish an environmental or sustainability committee to oversee the management and protection of designated Natural Areas in the City with a proactive and planning review mandate.

Strategic Objective 6: To identify and recognize significant valuable trees based on historic, aesthetic, cultural, social and ecological criteria.	
Number	**Recommendation**
6.1	Implement a heritage tree identification, designation and protection program following recognized standards (e.g. as recommended by the Ontario Heritage Tree Alliance).
6.2	Investigate economic incentives for land owners with designated heritage trees on their property.
6.3	Implement a seed collection and propagation program in cooperation with regional nurseries to preserve the genetic heritage of significant trees in the City.

Strategic Objective 7: To create a regulatory framework that includes ongoing monitoring and assessment.	
Number	**Recommendation**
7.1	Amend the Official Plan (Section 3) to include a segment directly related to the urban forest. Recognize the Urban Forest Strategic Plan as the mechanism by which urban forest management is guided. Include the term 'Urban Forest' in the appropriate context in the Official Plan where reference is made to trees
7.2	Investigate developing a by-law to maintain the urban forest with no net loss of canopy cover.
7.3	Review existing tree by-laws and make recommendations to protect and preserve trees on public and private lands, including the adoption of an appropriate compensatory model for tree removal.
7.4	Implement a mechanism for replacing losses to the urban forest, either on a development site, or at an off-site location as directed by the City by providing a monetary contribution to a tree reserve fund. The reserve fund will be designated for planting trees on municipally managed or other protected lands to replace leaf area lost through development and construction.
7.5	Create an incentive and recognition program for developers who, through creative planning, develop sites that preserve and protect existing significant trees, woodlots and hedgerows.
7.6	Require that prior to approval, all applications for Committee of Adjustment, Site Plans and Subdivision Agreements provide an arborist report on the health and condition of trees on the site to be developed and a statement describing the impact of development and construction on each tree.
7.7	Implement and enforce development standards for the preservation, protection and enhancement of the urban forest during site development and construction projects.
7.8	Provide professional support to implement and administer the Urban Forest Strategic Plan.

Strategic Objective 8: To increase community awareness of the benefit of trees, encourage community involvement and create a shared responsibility for the stewardship of the urban forest.	
Number	**Recommendation**
8.1	Develop and maintain alliances with stakeholders to engage the community and maximize opportunities for the protection and enhancement of the urban forest.
8.2	Provide public access to information about Peterborough's urban forest through a City web page.
8.3	Work with community stakeholders to provide a variety of incentives and support services to encourage stewardship of the urban forest.

"In the true nature of things, if we rightly consider, every green tree is far more glorious than if it were made of gold and silver" (Martin Luther)

2008 LEAF – Local Enhancement and Appreciation of Forests. (Courtesy: Liza Badaloo)

Introduction

The concept of having a managed urban forest in the City of Peterborough is not new. Since 1988, the City has been following a Forest Resource Management Policy approved by the Board of Parks and Recreation. This document provided a foundation for the maintenance and renewal of our urban forest.

Today, a new strategic direction is required. The reasons to act without delay are compelling:

- Utility reconstruction, new development and urban intensification impact the urban forest.
- Urban trees are under stress. As an example, from canopy analysis in the Downey Secondary Planning Area, north from Barnardo Avenue to Milroy Drive and west from Hilliard Street to Chemong Road, the forest canopy has declined from 1996 to 2005, as shown in the table below.

Our common future calls for political will and citizen involvement in activities to sustain and enhance the City's urban forest and its benefits to the community in particular and world climate in general

Land Use Class	Canopy Cover by Area	
	1996	2005
Major Open Space	33.6%	26.0%
Residential	11.6%	6.1%
Commercial	5.1%	3.4%

In 1991, the Peterborough Round Table on Environment and Economy coordinated the planting of 10,000 trees by local school children at Fleming College

- New exotic pests and introduced diseases target specific species and groups of trees.
- Unbalanced species composition and age distribution threatens urban forest sustainability.
- The long term 'pay back' from investment in the urban forest makes budget commitment an immediate necessity.
- Public expectations for urban forest management programs have increased.
- There has never been a more urgent need for informed political will to champion the benefits of trees. Perhaps trees are the most critical element of our natural world to mitigate the processes now converging in world wide climate change.

Building A Shared Sense of Purpose and Common Vision

This plan is the result of input from city residents, community advisors, municipal and provincial government staff as well as local community stakeholders and technical experts. It is built upon an extensive review of other community documents as well as models used in many other municipalities. The intent of this strategy is to focus on the positive things that we are doing today as a community in maintaining the urban forest that we have, but it also recognizes that we cannot stop here. For the benefit of generations to come, we must plan and take action for the future.

The overall action strategy of the plan relies on the following strategic objectives:

- To maintain and enhance a sustainable urban forest in the City of Peterborough.
- To maximize the benefits of the urban forest for the well-being of the community.
- To formalize and enhance the City's accountability as a steward, manager, regulator and promoter of the urban forest.
- To recognize and manage the urban forest as a key element of the City's green infrastructure.
- To preserve and protect the health of the urban forest and prevent unnecessary damage or removal.
- To identify and recognize significant valuable trees based on historic, aesthetic, cultural, social and ecological criteria.
- To create a regulatory framework that includes on-going monitoring and assessment.
- To increase community awareness of the benefit of trees, encourage community involvement, and create a shared responsibility for the stewardship of the urban forest.

The plan provides a Vision and proposes step-wise actions to sustain and expand the benefits of the urban forest for today and the future.

A view of Sherbrooke Street looking east: one of the many green streetscapes of Peterborough

Background

The urban forest performs a vital role impacting the social, environmental and economic standard of living. It is imperative that trees, like other urban assets such as roads, sewers, sidewalks and parks be recognized as a valued contributor to our quality of life. We must therefore commit resources, energy and action to enhance and sustain our urban forest.

Purpose

The purpose of the City of Peterborough's Urban Forest Strategic Plan is to recommend direction and actions for the City to optimize the benefits of trees. To do this, we need to identify and follow an integrated approach with all related jurisdictions directed by a common purpose to preserve and enhance the City's urban forest resource now and for the future.

The concept of having a managed urban forest in the City has a history that goes back to the mid eighteen hundreds. In the *First By-Laws of the Town of Peterborough* in 1850, it was enacted that:

> *Any person who shall injure a tree, planted or reserved for shade within the said Town shall be liable to a penalty of not less than two shillings.*

Careful planning is required to enhance tree canopy in the urban environment. (Courtesy Basterfield & Associates Inc.)

Since 1988, the City has followed the Forest Resource Management Policy approved by the Board of Parks and Recreation. This policy has been the foundation for the stewardship program that we have followed in an effort to achieve sound maintenance of our existing forest assets. Today, a new direction building upon the successes of the past is needed if we are to secure all of the potential benefits that trees provide.

"It is time to make some changes in the design and construction of our cities…Just planting more trees is not the answer. Trees have long been fit into spaces left over after everything else is written into the design. This approach will not work if we want our trees to be a major element in a city's structure." (Moll and Ebenreck, 1989)

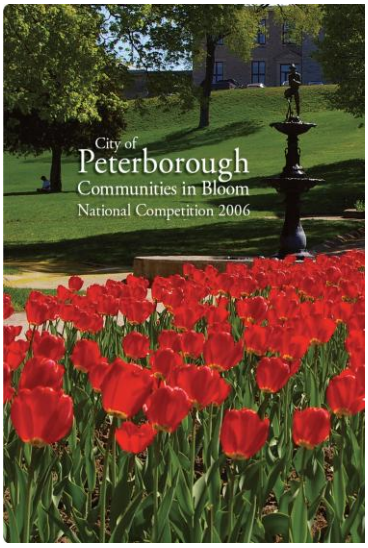
At Millennium Park, municipal departments came together with a common objective to enhance the urban forest resource.

How we developed our plan

This plan is based on the experience and expertise of many advisors. These advisors include concerned citizens as well as representatives from many different agencies, organizations and municipal departments who came together with the common objective to develop a dynamic urban forest management strategy and the desire to sustain a healthy community.

Here is a synopsis of the history of this plan:

- In 2006, City Council requested the 1988 Forest Management Plan be updated.
- In 2007, a Stakeholder Committee (SHC) was created to discuss and provide guidance for the new Urban Forest Strategic Plan.
- The SHC was established to provide an opportunity for key organizations and individuals to contribute to the review process. Participants in this committee included Fleming College, Trent University, Peterborough Home Builders Association, Peterborough Utility Services Inc, Parks Canada, Peterborough Field Naturalists, Kawartha Heritage Conservancy, Peterborough Golf and Country Club, a Consulting Arborist, City staff from Utility Services, Community Services, Land Information, Planning and Legal Services, Peterborough Green-Up, the Ministry of Natural Resources, and the Otonabee Region Conservation Authority
- Existing by-laws, municipal documents and relevant policies were collected, reviewed and referenced.
- The SHC identified key areas of importance that now form the foundation for a successful and dynamic approach to urban forest management.



"We need to protect, conserve and enhance the Urban Forest for present and future generations". (City of Peterborough, Communities in Bloom, National Competition, 2008)

"We tend to think of Peterborough as being a green city. The City's slogan is 'Peterborough It's a Natural' but can we continue to take for granted that we will always have a green city? It's something that requires a lot of careful planning in advance and something that the average property owner really needs to know about" Cathy Dueck, Peterborough Green-Up

- In the development of the plan, other municipal documents were reviewed such as Vision 2010: A Strategic Plan Update for Recreation, Parks and Culture for the City of Peterborough and the City of Peterborough, Communities in Bloom, National Competition, 2008 Community Profile, the Little Lake Master Plan and the Downtown Master Plan.

- Finally, we learned from others. We reviewed what other municipalities across the country had done in developing their urban forest management plans to learn from their experiences.

- A Public Information Centre (PIC) took place in June 2009. At this event displays were arranged showing the process that was followed in order to reach the key objectives and recommendations supporting this new Urban Forest Strategic Plan. Participants were encouraged to ask questions, complete a questionnaire and provide comments on the Recommendations advanced in the Plan.

Vision Statement

The Urban Forest Strategic Plan documents the importance of the urban forest in our community. Our vision expresses the thoughts and hopes of the Stakeholder Committee and forms the basis for the City's future commitment to urban forest management.

> *The City of Peterborough recognizes and values the environmental, social, cultural and economic contribution of the urban forest to our community.*
>
> *To safeguard the many benefits provided by trees, the City is committed to managing the urban forest by promoting community stewardship and strategic practice to preserve, enhance and renew this essential resource.*

Our Vision underpins eight Strategic Objectives supported by Recommendations designed to action the Urban Forest Strategic Plan.

The Importance of Cataloguing What We Have, So That We Can Plan For The Future

Community Volunteers inventory trees in the NeighbourWoods program.

We must collect data to understand the stratification and diversity of our current urban forest. It is essential to understand species, age composition, structural condition and ownership in order to develop management plans. Such an inventory would identify the species that perform better for certain site conditions and what invasive species are currently part of the City's tree inventory. We need this information to understand how the urban forest can be managed effectively by developing management plans.

Peterborough Green Up has undertaken sample inventories in certain areas of the City through the NeighbourWoods program. With volunteer assistance, information has been collected regarding various aspects of trees. Some analysis of the data collected from two sample areas is shown below.

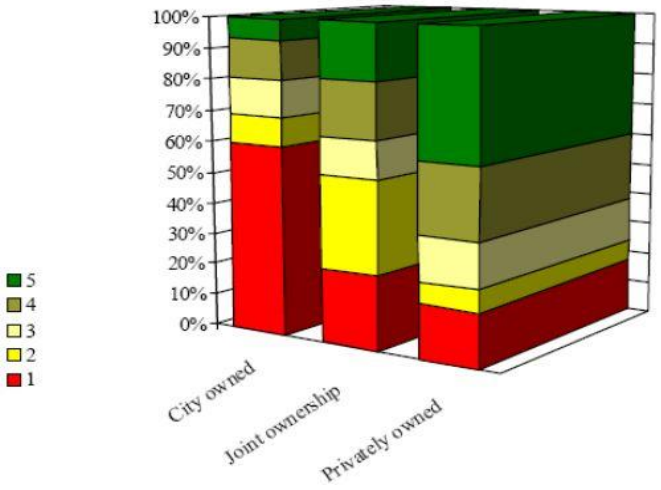
City Trees vs. Private Trees

Area	City Trees	Private Trees
Bonnerworth	15%	85%
Downey	19%	81%

(Courtesy: NeighbourWoods Inventory Analysis)

Species Condition for Bonnerworth Sample Area

Figure - 13. The proportion of tree condition classes for municipal and private trees



5-EXCELLENT: tree is without any visible defects
4-GOOD: no apparent problem
3-FAIR: minor problems with a tree
2-POOR: major problems with a tree
1-VERY POOR: extreme problems

To achieve success everyone must be involved

Education and public involvement is recognized as being crucial to the acceptance of policies, procedures and standards necessary to manage the urban forest effectively.

Recognizing that approximately 80 per cent of the urban forest is privately owned, it is imperative that community involvement through schools, community associations, neighbourhood groups and individual citizens are informed about the benefits, maintenance and management of the urban forest.

All elements of the community including private citizens, developers and contractors, City departments and public officials of provincial and federal government agencies must work together to safeguard an urban forest that contributes to the quality of life we expect for our City.

Urban forest education at local schools (Courtesy: Peterborough Green-Up)

A comprehensive review of the benefits of urban forests is documented in the MNR Natural Reference Manual. http://tinyurl.com/3p7ky59

The Benefit of Trees

The urban forest is an essential part of a liveable and economically-sound community. A healthy community is one that has a strong and vibrant green infrastructure. The environmental benefits of trees include the reduction in air pollution, greenhouse gases and storm water runoff. Economically, trees moderate the need for summer cooling and winter heating. Trees increase property values, and, as part of the green infrastructure, trees provide important ecological and social functions that result in cost savings to local government and stimulation of the local economy. Unlike traditional municipal infrastructure such as transportation systems that depreciate, green infrastructure accrues in value and provides greater benefits to the community as time passes.

Urban Forest's Environmental Benefits		
Pollutant	Quantity Removed Tons	Value ($)
Particulate	194	1,165,000
Ozone	171	875,000
Nitrogen dioxide	97	655,000
Sulphur dioxide	29	48,000
Carbon monoxide	11	11,000
Total air pollution removal	502	2,745,000

In 1998, the City of Calgary quantified the benefits of their urban forest across the entire city for Air Quality using the Urban Forest Effects Model.

The Environmental Benefits

For the Air: Trees have the ability to collect and remove pollutants from the air, such as nitrogen oxides, and sulphur dioxide. Through the consumption of carbon dioxide, greenhouse gases are reduced and as a bi-product, oxygen is released. Trees filter dust, pollens and smoke.

Tree cover, such as these trees in Jackson Park, reduces the incidence of flooding by intercepting rainfall and enhancing percolation of storm water into the soil.

For Storm Water: The urban forest takes up water from the ground and delays the movement of rain water, thus diminishing the capacity requirement of storm water conveyance systems such as storm sewers. Roots provide bank stabilization along open watercourses and remove toxins from ground water. The leaves of trees impede and soften the impact of heavy rain on ground conditions, thereby reducing erosion.

For Wind Reduction: Wind impacts at ground level can be mitigated with the strategic placement of trees as wind breaks.

The benefits from just 100 mature trees

100 mature trees provide the following benefits:

- Remove 52 tons of CO_2 from the atmosphere per year
- Remove 430lbs. of particulate pollutants per year
- Catch 538,000 gallons of rainfall per year

Source: 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.

The Social Benefits

For Mental Health: Studies indicate that one of the social benefits of trees is an improved sense of well-being. Trees reduce the stress of every day life by creating greenery and softness among the hustle and hard surfaces of the City and provide the public with a sense of calmness. (City of Vancouver Urban Forest Management Plan, 2007)

Trees grace the autumn landscape at Mount St. Joseph.

Studies have demonstrated that patients recover more quickly after surgery if their windows look out over treed landscapes.

For Public Safety: Trees along transportation corridors narrow a driver's field of vision, reducing traffic speeds and increasing pedestrian safety by providing a natural, physical barrier. Studies have found that urban highways lined with trees decrease driver stress, resulting in fewer incidents of road rage. (City of Vancouver Urban Forest Management Plan, 2007)

For Social Interaction: Public spaces with trees are inviting to visitors. Trees encourage social interaction and increase a sense of community. Trees foster sociable neighbourhood environments. (Sullivan, W.C. and Kuo, E.E. 1996, "Do Trees Strengthen Urban Communities, Reduce Domestic Violence?" Arborist News, 5)

"By means of trees, wildlife could be conserved, pollution decreased and the beauty of our landscapes enhanced. This is the way, or at least one of the ways to spiritual, moral, and cultural regeneration." E.F. Schumacher.

Tree lined landscapes distinguish our City: Looking west on Hunter Street

The Cultural Benefits

For Heritage: People associate many different events and memories with specific trees and stands of trees. Trees offer a link to past histories, providing connection to times and events of a bygone era. This connectivity gives society a sense of belonging not only to the here and now but also a sense of purpose for continuing to enjoy and appreciate these living memories.

For Sense of Place: The character of a neighbourhood is determined by private and public trees. People feel an immediate connection to the landscape fostered by ongoing association with trees.

The Economic Benefits

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. "A mature tree can often have an appraised value of between $1,000 and $10,000 (Council of Tree and Landscape Appraisers, www.arborday.org/trees/benefits.cfm)

For Municipal Infrastructure: Tree cover reduces storm water run-off through interception and absorption. In 50 years, one tree can generate $30,000 in oxygen, recycle $35,000 of water and eliminate pollutants that would otherwise cost $60,000 to remove from the air.

For Energy Conservation: The reduction in energy costs as a result of tree shade is well documented. Trees reduce heating and cooling costs. (Sustainable Forests in Urban Ontario: A Report of the Urban Forest Working Group, Queen's Printers for Ontario, 1995).

The Engineering Benefits

Shade from trees increases the lifespan of pavement, decreasing replacement costs for the municipality

Trees provide acoustical control. A screen of dense coniferous trees 30 meters wide can absorb 6-8 decibels. In terms of traffic control, trees provide pedestrian and vehicular-safety barriers and screen headlight glare (Faulkner, 2004).

Trees improve pavement performance. Research has documented that tree canopy over a road extends pavement life. (McPherson et al. 1999)

Trees and people in concert are a common sight throughout the City

Objective 1

To maintain and enhance a sustainable urban forest in the City of Peterborough.

Recommendation 1.1

Develop and implement management plan targets for trees in Natural Areas, Parks, on the Right of Way and on Residential, Industrial, Commercial and Institutional lands.

Rationale 1.1

- Objective 1 is the very foundation of the Urban Forest Strategic Plan. What is meant by 'sustainable' in the context of an urban forest? An urban forest is much more than a collection of trees in a city.

- A sustainable urban forest is actually a complex ecosystem that includes trees, soil, water, sunlight and a host of other living things, including human activity. To manage a sustainable forest, we must consider not only today's needs, but provide the requirements for a vibrant, dynamic and thriving forest for future generations.

- This requires careful planning and skilled management, as urban trees are threatened by increasing pressures such as exotic pests, air pollution and constrained by limited growing space.

- Recalling the tragic results of the invasion of Dutch Elm Disease in North America when many cities were stripped of their majestic roadside elm trees, Peterborough must act wisely to ensure a forest legacy that can resist and withstand present and future stresses.

- Our urban forest is comprised of many different parts. The trees on residential, commercial, industrial, natural areas and park lands are all important contributors to our urban forest. Each has different features and requires unique management strategies.

"Fundamental to the sustainability of a city's urban forest is the public understanding of the value of its trees. People who value trees elect officials who value trees. In turn, officials who value trees are more likely to require the agencies they oversee to maintain high standards for management and provide adequate funds for implementation." (Clarke J, Matheny, N., Cross, G., Wake, V., "A Model of Urban Forest Sustainability, Journal of Arboriculture 23 (1): January 1997)

Recommendation 1.2

Conduct plot samples, using a recognized classification system to complete periodic inventories of the urban forest within prescribed timelines and integrate the data with the City's GIS system.

Rationale 1.2

- It is impossible to effectively manage our forest resource without accurate information about what kinds of trees are growing in the City, where they are growing, their age and current state of health and safety.
- Across North America, many cities are recognizing the wisdom of establishing and maintaining accurate tree inventories as a baseline for guiding planning, measuring performance and tracking management programs.
- An inventory of established trees and improved record keeping for newly planted trees will help to identify the resource requirements for a managed urban forest.
- Resource requirements must not focus only on the health and safety of older trees to the detriment of post planting, young tree maintenance. The requirements of older, mature trees can be tempered through a system of risk assessment so that resource requirements are assessed realistically across the broad spectrum of the urban forest. This can be enabled by undertaking plot sampling components of the urban forest to project resource requirements for the care of newly planted and older trees.
- In the absence of a complete survey of the urban forest and clearly defined objectives for its management, resource requirements are difficult to determine. Information available to date enables only limited projection of management requirements to sustain the City's urban forest.

The City's GIS system may be used to compile a tree inventory for canopy analysis

Recommendation 1.3

Set percentage limits for cultivars, species and genera to encourage biodiversity in public tree planting programs.

Trees from vigorous, locally grown mature trees are well adapted to conditions in the Peterborough region. These white oak acorns were planted in the Ecology Park's community tree nursery.

The 10-20-30 rule for biodiversity of the urban forest.

No more than:

- 10% of the same species
- 20% of the same genera
- 30% of the same family

(International Society of Arboriculture)

Many citizens will recall the Elm trees that once dominated the City landscape. Devastated by Dutch Elm Disease (DED), the loss of the Elms left significant openings in a once green forest canopy. The impact of DED highlights the need to manage the urban forest to achieve a high level of biodiversity in order to mitigate the increasing stress on trees resulting from imported pests and diseases.

Rationale 1.3

- The natural world exemplifies the old adage: 'there is strength in diversity.' Variety in families, genera, species, age and structure in an urban forest helps to limit potential damage from disease or infestation. Most pests and diseases target specific families, genera or species and/or ages of their hosts.

- Managing Peterborough's urban forest to ensure a wide variety of species and a good mix of old, medium-aged and young trees, will offer enhanced protection from the many different stresses that impact trees.

- A multi-layered urban forest with woody plants of many heights also provides habitat for forest birds that inhabit specialized 'niches', and play an important role in controlling leaf-eating insects.

- In intensively managed areas where lawns surrounding trees are mown (e.g. residential areas, parkland etc.) natural regeneration of trees cannot take place. This makes the selection of planting stock a key factor in the diversity of the urban forest.

- Biodiversity at the genetic level is an important consideration for all new plantings. In the horticultural trade, cultivars represent many identical copies, or genetic clones of a parent tree. These clones will succumb to the same diseases that may affect the parent tree, whereas trees grown from seed that was naturally cross-pollinated will exhibit enhanced potential to adapt to changing conditions and resist new infestations.

- Genetic diversity can be enhanced by including open-pollinated trees from local seed sources wherever possible.

Recommendation 1.4

Establish targets for native species composition in various land use classes.

Recommendation 1.5

Encourage the production of high quality native trees grown from local genetic seed sources by regional nurseries.

Rationale 1.4 and 1.5

- Biodiversity is threatened worldwide by a number of factors. The most important is loss of habitat from development, agriculture, and deforestation. The second greatest threat is from invasive species *(OMNR).*
- Our world of global transport enables the entry of many foreign species of plants, animals, insects and pathogens into areas where their natural controls are absent. This leads to excessive reproduction and spread of these foreign species, often at the expense of the native plants and animals in the new habitat.
- The same is true in the urban forest, where foreign pests such as the Asian Long-horned Beetle or Emerald Ash Borer have the potential to destroy a significant percentage of local trees. Equally hazardous, especially to natural areas, are invasive plants such as European Buckthorn, Garlic Mustard and Dog Strangling Vine.
- Monitoring and control of invasive species is an important factor in protecting biodiversity. Recommendations regarding invasive species can be found under Objective 5.
- Native plants evolved with links to local geology, soils, climate and ecology. A foundation of native vegetation is a key element that enhances biodiversity and the stability of Peterborough's urban forest.

The Emerald Ash Borer now threatens Ontario urban forests

The Emerald Ash Borer has killed millions of ash trees in South-western Ontario. The spread of this pest is from west to east in Ontario. From first sightings in Sarnia in 2005, The Canadian Food Inspection Agency has confirmed the presence of the Emerald Ash Borer in Ottawa in July 2008 and in Pickering in December 2008. No sightings have been observed in Peterborough, as of July, 2010. City staff are on the alert.

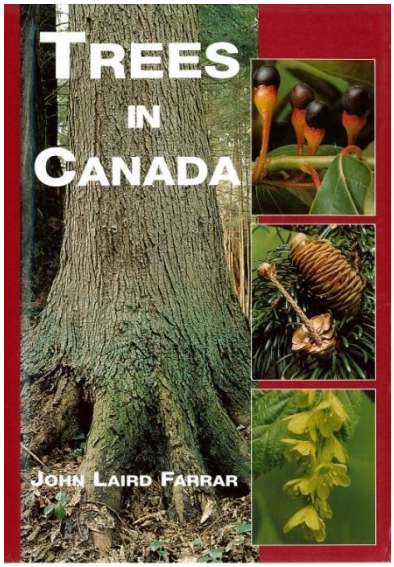
- Research confirms the importance of native plants as a prerequisite for the healthy population of natural predators (birds, predatory insects etc.), which keep pests in check *(Tallamy, 2007)*. Planning for a high percentage of native species in the urban forest protects our natural heritage and enhances sustainability.

- Not all native Ontario species are tolerant of urban stresses such as road salt, air pollution and soil compaction. However, urban hardy species can be an important component that will help to preserve roadside tree population, while more sensitive species can be integrated into planting programs in parks and other natural areas.

Recommendation 1.6

Create and maintain a list of recommended native and exotic tree species. Make this list available to City staff, local garden centres, community groups and individual property owners.

There are many sources of information to help guide the selection of tree species for planting in the urban forest such as 'Trees in Canada' (John Laird Farrar 2007)



Rationale 1.6

- The biodiversity of Peterborough's urban forest can be enhanced by including a wide variety of approved species for planting on public lands.

- Parkland provides opportunities to establish tree species that may be too sensitive for roadside stresses.

- Private property owners should be encouraged to plant a wide variety of species in their yards, as long as the species selected suits the particular site conditions. The City can provide leadership with suggestions of appropriate species to enhance biodiversity.

Recommendation 1.7

Implement trials with Carolinian tree species in public parks to enhance the percentages of climate adaptable species in future plantings.

Rationale 1.7

- Indications are that climate change is likely to result in warmer temperatures with more active weather events. This promises the potential for more southerly temperate climate trees to thrive in the Peterborough region. Species with qualities that are adapted to the likely fluctuations in climate should be included in future plantings.

Recommendation 1.8

Develop response plans for severe weather events such as high winds, ice storms and drought to minimize the impact on the long term health of the urban forest.

Windblown tree July 2006

Rationale 1.8

- With the onset of more severe weather events, trees are being subjected to increasing drought, heat, high velocity winds such as squalls, tornadoes, wind shear and ice storms. The requirement for a planned emergency response is required.

- Broaden the approved planting list to include trees with known qualities that are adaptable to fluctuations in changing weather patterns.

96% of terrestrial birds feed insects to their young. Providing habitat for birds is an important factor in keeping pests in check. (Tallamy, 2007)

2.1.2 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, recognizing linkages between and among *natural heritage features* and *areas, surface water features* and *ground water features.*
(MNR Natural Heritage Reference Manual 2010)

Recommendation 1.9

Create and maintain corridors of trees as connecting links between Natural Areas in the City.

Rationale 1.9

- A sustainable urban forest is a community of interdependent forms of life. From the soil micro-organisms that assist nutrient uptake by tree roots to the birds that feast on caterpillars in the treetops, the living things that depend on and in turn protect the urban forest require adequate space and protection.

- Natural areas and forested developed areas provide the best protection for urban wildlife when these areas are connected. Corridors of uninterrupted mature tree canopies permit safe passage of urban wildlife from feeding to nesting areas. This is an important factor in maintaining biodiversity. This planning consideration has the potential to enhance the sustainability of the urban forest.

Hedgerow preservation at Milroy Park

Recommendation 1.10

Restore and enhance canopy cover to improve the ecological benefits in Open Spaces.

Rationale 1.10

- Open Space lands provide opportunity to restore biodiversity, control soil erosion, improve wildlife habitat and enhance the beauty of open space in the City. Such initiatives provide and ideal project for community involvement.

Preparing trees at Ecology Park for planting out along the trail

Objective 2

To maximize the benefits of the urban forest for the well-being of the community.

"The urban forest is an integral part of our woodland heritage in southern Ontario. This resource is typically located in areas under intense pressures from human activity. At the same time, these forests have a direct influence on the urban population and provide us with a host of essential environmental, economic and psychological 'goods and services'. Often it is the most common connection that urbanites have with their natural environment." Urban Forests: An Important Part of our Natural Heritage, Federation of Ontario Naturalists, www.ontarionature.org

Recommendation 2.1

Establish a baseline for canopy cover and periodically update canopy cover performance (e.g. with each upgrade of the City orthographic photographs).

Rationale 2.1

- Adequate space must be allocated for homes, businesses, parks, institutions and the urban forest. The urban forest provides many benefits to the community, including cleaning the air, preventing floods, enhancing property values, moderating temperatures and stimulating business.

- Most land uses are compatible with tree cover. The total land area covered by tree branches and leaves, if viewed from above, is called 'canopy cover'. Given the many requirements for City functions, what is a reasonable amount of space to dedicate to trees?

- Many cities across North America are beginning to assess their canopy cover and set targets for canopy cover that maximizes the benefits that trees offer to the community. In eastern North America, urban forest experts agree that a desirable and achievable target for overall canopy cover in cities is 30-40% *(American Forests).*

- The City of Toronto, for example, estimates that its current canopy cover is 17%. Toronto has set a goal of 30% for its overall canopy cover, and has implemented many new programs to help achieve this goal. The tree canopy for the City of Peterborough has not been accurately calculated but is estimated to be in the order of 17 percent.

Recommendation 2.2

Increase the area available for tree planting in all new Site and Subdivision developments.

Rationale 2.2

- Once a tree canopy baseline has been established, policies can be implemented to achieve and sustain targeted canopy coverage for the City. This will involve specific reforestation efforts, as well as the tree protection strategies outlined under Objective 5.

- The City of Peterborough and surrounding area contains many beautiful, Natural Areas. These are a critical part of our identity as 'Peterborough It's a Natural' and one reason why people want to live here and why tourists want to visit. Future development must be guided by the necessity to protect and connect Natural Areas as the foundation of our tree canopy cover and its resulting benefit to the community.

"As the size of a tree increases, the leaf area also increases. The benefits that trees can offer increase exponentially as leaf area increases. From a planning perspective, we need to provide adequate growing spaces for the establishment and maintenance of large canopied trees where possible."
(W.A. Kenney and P. Van Wassenaer, 'Strategic Urban Forest Planning', September 2001, pg.8)

Recommendation 2.3

Identify suitable planting locations to sustain large trees and provide the environmental conditions to enable each species to reach maturity.

Rationale 2.3

- While overall land coverage by tree canopy is one way of measuring community benefits provided by the urban forest, another factor, known as leaf area is an equally important consideration. Canopy coverage is a flat, two-dimensional measurement, while leaf area considers the height of trees as a measure of overall benefit. A mature tree has many layers of leaves, which if laid out on the ground would cover a much larger area than the two dimensional extent of the canopy.

"Most urban soils are no longer suitable for adequate root growth. As larger buildings, wider roads, and larger and more powerful construction equipment press down on soil surfaces, the overall result is massive soil compaction...in some urban areas; soil density is comparable to concrete!" (James Urban in 'Shading Our Cities: A Resource Guide for Urban and Community Forests.' G. Moll and S. Ebenreck eds., 1989, Pg. 97)

Limited space on the Rubidge Street, Right of Way restricts the potential for trees to reach maturity.

- A mature tree is much more effective at cooling the air in summer and filtering air pollutants. There is a direct relationship between the size of a tree and the benefits it provides. Multiplied many times by the total number of urban trees, the community reaps many benefits from a large number of mature trees.

- Providing conditions that enable young trees to reach their full potential, as well as preventing undue loss of large stature trees are important strategies enabling the urban forest to provide the maximum benefit to the community.

- Current development practices across North America create very poor growing conditions for urban trees. Soil compaction from heavy machinery, removing natural topsoil and replacing only a thin layer of topsoil creates conditions where tree roots are starved for oxygen and nutrients.

- Poor growing conditions combined with limited rooting space restricts the potential for young trees in new subdivisions to develop and realize the benefits provided by trees in older neighbourhoods which provide deeper topsoil and more rooting space. Recommendations related to site specifications in new developments are addressed in Objective 7.

Recommendation 2.4

Seek opportunities for planting and protecting groves of recommended species on public and private land to help mitigate the impact of climate change.

Rationale 2.4

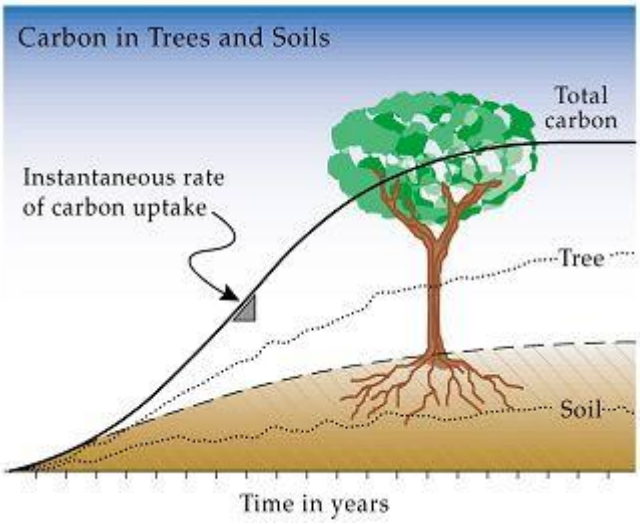
- During the summer months, large trees shade buildings and paved surfaces thereby preventing the intense heating of these hard surfaces known as the 'urban heat-island effect'. This shade, combined with the cooling effect of leaves transpiring water can make a well-treed neighbourhood several degrees cooler than a similar area without trees.

- This benefit not only keeps residents more comfortable on hot days, but significantly reduces the need for air conditioning, thereby reducing energy costs and the need for peak hydro supply. Roads, parking lots and sidewalks that are shaded from sunlight on hot summer days also have a longer lifespan, easing the burden on municipal budgets by extending the life of paved surfaces.

- A challenge that faces all communities worldwide is the growing threat of climate change. The build up of gases, primarily carbon dioxide in the atmosphere causes more heat from the sun to stay trapped close to the earth. Maximizing the benefits of the urban forest to the community will require a baseline calculation to quantify carbon sequestration, and pollution mitigation.

- The increased energy in the atmosphere poses many serious threats, such as more frequent storms and droughts. Maintaining a thriving urban forest is one of the tools available for combating climate change, since trees pull carbon dioxide out of the air and replace it with oxygen.

- To maximize the benefits of the urban forest encourage land acquisition and agreements, such as conservation easements, for the urban forest by the City or other conservation organizations through various means. This would include identifying key areas, aligning City policies, encouraging donations and supporting appropriate funding, incentive and recognition programs.



Objective 3

To formalize and enhance the City's accountability as a steward, manager, regulator and promoter of the urban forest.

Recommendation 3.1

Provide sufficient qualified personnel, equipment and other supporting resources for planned urban forest management programs. Recommend budget requirements for personnel, equipment, software and inventory to fulfill the objectives of the Urban Forest Strategic Plan.

"An urban forest's sustainability is increased when all city tree staff, utility and commercial tree workers and arborists are adequately trained. Continuing education in addition to initial minimum skills and/or certifications are desirable" (Clarke J, Matheny, N., Cross, G., Wake, V., "A Model of Urban Forest Sustainability, Journal of Arboriculture 23 (1): January 1997)

Rationale 3.1

- The City is the leading stakeholder in the stewardship of the urban forest. As such, the City must provide leadership in all aspects of the City's urban forest resource management.
- The public visibility of Peterborough's trees, their care, new and replacement plantings, structural pruning, removals and emergency response requires that the City be at the forefront of urban forest management.
- Present Arboriculture Operations at Public Works includes:
  - **Public Safety**: This involves inspection of trees and recommendation for removal, structural pruning and emergency response.
  - **Planting**: This involves planting trees for new land developments, replacement trees following removal, infilling street trees and park tree planting.
  - **Pruning**: This involves structural pruning of City owned trees and removal of dangerous branches.

Experienced arboriculture staff at Public Works monitor tree health.

The City's Urban Forestry Crew at work

Lack of regular inspection and timely pruning leads to premature tree failure, and unnecessary loss of public assets.

- **Removals**: This involves assessment and removal of City owned trees due to danger to the public, disease, structural failure, emergency response and construction activities for utility companies and other City departments.
- **Stumping**: This involves removal of stumps from City-owned trees previously removed.
- **Tree Care:** This involves ongoing monitoring of biotic and abiotic stressors and species performance.
- **Work Order Management:** This involves the management of a database to record Arboriculture work activities.

- Current staffing and equipment resources are not adequate to meet arboriculture requirements and public requests for tree work. Of greater concern, the resources are not adequate to maintain City trees on a planned, regular basis. Activities are undertaken in a reactive mode. Municipal trees should be inspected and where required receive arboricultural intervention on a pre-planned rotation cycle.

- To become a leader in the stewardship of the urban forest and encourage residents, developers and planners to play their part in looking after the urban forest, the City needs to lead by example.

- Adequate financial and qualified human resources are required to manage this key element of the City's green infrastructure.

Recommendation 3.2

Develop and update training programs and provide professional membership for arborist personnel.

Rationale 3.2

- Maintaining well-trained personnel is not only imperative from a safety perspective but is essential to remain current with arboricultural practice. Training for existing procedural processes by internal resources currently exists.

"Urban trees, just like forests everywhere, respond to good management. We can extend the lives of urban and community trees from their current average of thirty-two years to something far longer – and in the process double or triple the benefits each tree confers on the community. Good forest management doesn't cost. It pays."
(R. Neil Sampson in 'Shading Our Cities: A Resource Guide for Urban and Community Forests.' G. Moll and S. Ebenreck eds., 1989, pg. 7).

- Further training through external organizations such as the Electrical Utility Safety Association (EUSA) and professional development and certification from associations such as the International Society of Arboriculture (ISA) is required.

Recommendation 3.3

Investigate providing line clearing services for other utilities and develop strategic alliances for Urban Forest Management Programs.

Rationale 3.3

- Increased staff and equipment to implement a planned arboricultural program will result in increased financial obligation to the City.
- Opportunities to partner may be used to apportion the increased costs and enhance synergies for related service providers.

Recommendation 3.4

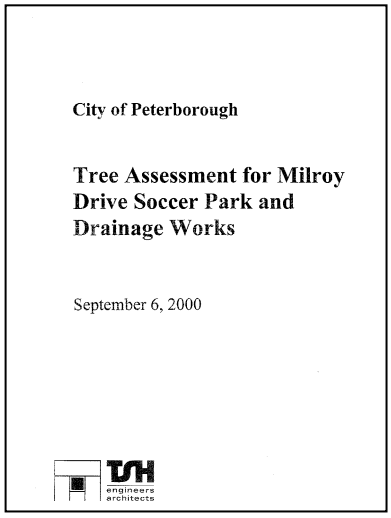
Participate in professional associations and extend professional relationships with other municipalities to share urban forest management practices.

Rationale 3.4

- Learning from other organizations will enable the City to provide leadership for tree care to the community.
- By providing easily accessible information to the public through various venues, the City can promote the importance of its green resource.
- Tapping into the experience of other municipalities, non-government organizations, the academic community and other agencies, Peterborough can utilize the positive experiences and provide current successful management practices to promote the stewardship of the City's urban forest.

ISA International Society of Arboriculture

Ontario Urban Forest Council


City of Peterborough

Tree Assessment for Milroy Drive Soccer Park and Drainage Works

September 6, 2000

TSH engineers architects

Recommendation 3.5

Develop and maintain a common information system on woodlots, street trees, heritage trees and invasive species. For new development, require consultants to provide information in compatible format.

Rationale 3.5

- The ability to collect, analyze and use data is essential for the management of the urban forest. Many departments within the City require information on trees as part of their every day activities.
- Planning and Development Services, Utility Services, and Community Services all require information on trees relating to their activities and work programs such as Site Plan and Secondary Plan developments, Right of Way construction and heritage designation.
- These City departments often make use of external agencies to provide this information. The information from all of these sources needs to be in a format that is compatible and easily utilized for the management of the urban forest.

Recommendation 3.6

Track, monitor, evaluate and communicate the progress of the Urban Forest Strategic Plan using recognized criteria to evaluate and measure performance outcomes.

Rationale 3.6

- Monitoring the implementation of the Urban Forest Strategic Plan is essential in order to identify areas that need improvement and to develop well-planned work programs. In order to report on the progress of the Strategic Plan, annual updates are essential. Performance indicators are required to measure effectiveness.

An urban forest with a variety of ages and species is more resistant to devastation by specific diseases and pests.

- Performance indicators such as those described by Clark et al (1997) may be used to quantify progress in meeting key objectives of a sustainable urban forest. Criteria and performance indicators revolve around the following key elements: Resource Management Programs; Tree Resource Inventory and Community Response. By establishing these indicators a municipality can follow set objectives that are measurable.

Recommendation 3.7

Adopt a 5 year time frame to review and update the Strategic Plan to support the development of management priorities in order to respond to the condition and sustainability of the Urban Forest.

Rationale 3.7

- Through practices and strategies approved by the City, the urban forest may be managed to provide current and future benefits.

Recommendation 3.8

Establish departmental, individual and associated roles and responsibilities for the management of the Urban Forest.

Rationale 3.8

- The management of the urban forest is an ever-evolving process administered through the forestry operations of Public Works. Other departments are also responsible for activities that directly affect the overall performance of the urban forest.

- Communication between all parties that have an effect on the urban forest is a fundamental necessity. Only through continued collaboration can the urban forest be managed in a way to meet today's environmental challenges and ensure preservation and enhancement for the future.

Objective 4

To recognize and manage the urban forest as a key element of the City's green infrastructure.

Recommendation 4.1

Recognize the urban forest as a key element of the City's green infrastructure.

Rationale 4.1

- Infrastructure is a well used term that conjures images of built structures such as roads, curbs, sidewalks, sewers and utility corridors. We recognize and accept these structures as being necessary to our every day lives.
- These facilities are commonly referred to as grey infrastructure. In conjunction with readily accepting the category of grey infrastructure is the acceptance of the ongoing commitment to maintain this infrastructure through asset management programs.
- The urban forest provides many social, environmental, economic and cultural benefits to the community. Reducing the 'urban heat island' effect, removing pollutants, reducing human stress, complementing recreational uses and other documented benefits are all important to sustaining a healthy and vibrant community.
- Through careful management of urban forest green infrastructure, the benefits to the population and ecosystem including reduced health care costs and reduced grey infrastructure requirements may be realized.

Tree lined streets such as Homewood Avenue are important assets to the City.

The forest floor in spring at Mapleridge Park; one of more than 20 forest communities in the City protected by municipal acquisition and policy.

The Green/Grey Continuum

http://www.greeninfrastructure.eu

Recommendation 4.2

Promote the contribution that the urban forest as an element of green infrastructure provides to the health and well-being of the community.

"Urban woodlands serve a wide variety of functions. They provide stable cover and erosion protection in sensitive areas, habitat and migratory paths for wildlife species and connected and accessible systems of natural areas for human recreation" Urban Forests: An Important Part of our Natural Heritage, Federation of Ontario Naturalists, www.ontarionature.org

Rationale 4.2

- Green infrastructure is a term that is relatively new. Increased awareness of climate change has pushed the recognition of green infrastructure terminology to the forefront. Green infrastructure can be described as "an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations". (http://www.sprawlwatch.org/greeninfrastructure.pdf Green Infrastructure: Smart Conservation for the 21st Century).

"What is the relationship of sustainable development for (urban forests) to new technology, effectively applied research and investment in forest management? Urban forests stand to benefit tremendously from new technology, information and investment. Not only will the ability to select and grow trees in cities be enhanced but the ability to quantify the benefits accrued by their presence will expand. (Clarke J. Matheny, N., Cross, G., Wake, V., "A Model of Urban Forest Sustainability, Journal of Arboriculture 23 (1): January 1997).

- Green infrastructure is comprised of many individual components. The City of Peterborough, like other municipalities, provides a key link in the larger provincial urban forest green infrastructure network. Natural areas, woodlots, parks, street trees, and private property, all contribute to this network.

- It is increasingly documented that green infrastructure is as important as its grey counterpart and requires sound planning, management and the necessary financial and human resource commitment to maintain and enhance its role in the community. Green infrastructure is as important to the vitality of the City as grey infrastructure and will require ongoing management, regular maintenance and investment to meet and maintain optimum functioning of this asset.

"For every dollar spent on tree planting and establishment, a 250 percent return on investment is provided back to the city in terms of the total services provided at tree maturity…"(City of Vancouver Urban Forest Management Plan, 2007)".

Recommendation 4.3

Invest in a corporate compatible asset management program for trees that combines tree inventory, GIS spatial information and work order tracking capability.

Rationale 4.3

- To maintain and enhance the City's tree inventory as a contributor to green infrastructure, asset management software is required to inform decision making, justify budget expenditure and support management plans.

Recommendation 4.4

Monitor and assess the performance and benefits of the urban forest through the use of models such as the Urban Forest Effects Model (UFORE).

Rationale 4.4

- Green infrastructure provides many benefits. Trees individually and as a collective whole have value that is measurable. Carbon sequestering and air pollutant removal can be quantified and the associated cost savings calculated.

- Computer modeling of the urban forest through programs such as Urban Forest Effects (UFORE) are proving to be valuable tools that many leading municipalities are turning to in order to assess the value of their urban forest asset. The UFORE model, developed by the United States Department of Agriculture Forestry Service is a computer model that calculates the structure, environmental effects and value of urban forests.

- Leading edge municipalities such as the City of Oakville and the City of Calgary are utilizing the UFORE model to track canopy coverage, the environmental benefits of the urban forest and use the information as a planning tool to indicate specific planting opportunities for specific tree species.

Recommendation 4.5

Require that all Development Agreements include an approved green infrastructure plan whereby a developer, as part of the development improvements, is required to plant trees of approved species along the Right of Way and provide landscape and environmental improvements to Open Space lands within the development area.

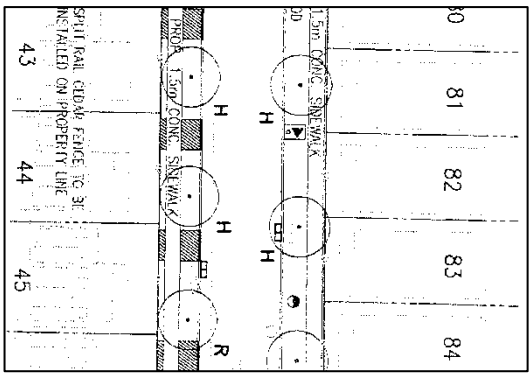
"A tree planting program alone is not a comprehensive urban forest management strategy because it does not consider the care and maintenance of established trees that will allow them to survive a long period of time in a stressful environment. It is important to conserve and maintain the ageing tree population into a mature canopy." Urban Forests: An Important Part of our Natural Heritage, Federation of Ontario Naturalists, www.ontarionature.org

Rationale 4.5

- Requiring a developer to supply and install trees in accordance with an approved landscape plan provides City arborists the opportunity to focus on scheduled urban forest maintenance that requires a high level of arboriculture expertise.

- Providing opportunity for a developer to plant trees and other landscape improvements in new subdivisions enables the developer to promote greater environmental sustainability for their land development projects.

- Currently, in accordance with By-law 90-231, monies are collected from developers for the planting of trees by the City. The elimination of the collection of money from the developer to plant subdivision trees using City arborists and placing the responsibility for a developer to plant trees will therefore not have an impact on the overall cost of development.



Right of Way Tree Planting Plan for a new north end subdivision

Recommendation 4.6

Undertake a study to identify canopy cover targets for land use classes as described within the Official Plan and identify locations to increase tree planting in order to meet these targets.

Rationale 4.6

- A significant indicator of the contribution of the urban forest is the amount of canopy cover compared to total land area. Communities in Ontario have generally accepted a canopy cover of 30 – 40 % as being an appropriate and attainable target. The total canopy cover is comprised of trees and shrubs on City owned lands and on private property.

- In order to set a target, it is necessary to understand what canopy cover currently exists. Identification of locations where the planting of trees may take place is necessary to meet canopy cover objectives.

In new developments canopy cover takes many years to make an impact.

Established canopy cover of around 28%, seen here in an area of 'The Avenues', provides significant environmental benefits

Objective 5

To preserve and protect the health of the urban forest and prevent unnecessary damage or removal.

Recommendation 5.1

Investigate a permitting process for the removal of healthy trees in the City.

'The sense of community celebrated by the very presence of trees is perhaps the most inspiring of all effects. Our care for the trees in our communities is a reflection of our care for the environment at large.' (James Urban in 'Shading Our Cities: A Resource Guide for Urban and Community Forests.' G. Moll and S. Ebenreck eds., 1989, pg. 111).

Rationale 5.1

- An urban forest that is in good health and condition maximizes the benefits that trees provide to the community and the environment. Healthy trees will have a greater capacity to respond to and withstand periods of stress, particularly through extremes of weather and exposure to pests and diseases.

- As with any living entity the urban forest is not immune to damage through poor health and management and its' ecological and environmental values will be eroded through successive losses. Recognizing that the urban forest is the primary source of biomass in the City is an important step in understanding its true environmental value.

- Why is biomass important? Biomass is defined as the total mass of living matter within a given unit of environmental area. It is important in environmental terms because biomass absorbs or sequesters carbon from the atmosphere. Biomass has the capacity, where appropriately managed, to offset some of the carbon-based activities of the community in an entirely beneficial way. An underpinning principal should be no net-loss of biomass provided by the urban forest.

"A healthy tree in an urban area is easily worth twenty-five times its rural counterpart and a few trees left on a lot that's being developed adds thousands of dollars to the site's value.
(Gary Moll in 'Shading Our Cities: A Resource Guide for Urban and Community Forests.' G. Moll and S. Ebenreck eds., 1989, pg. 160).

"The condition of trees is dependent on the site conditions that they grow in, the species and the past and present management practices that enhance or detract from their health. Trees in poor condition can become structurally hazardous and are generally more prone to attack by insects and diseases."
(W.A. Kenney and P. Van Wassenaer, "Strategic Urban Forest Planning", September 2001, pg. 8).

- Trees will be lost from the urban forest over time due to a variety of natural causes, such as declining health, storm damage or for safety reasons. However, if the urban forest is to remain vibrant and endure over time, its most essential component is a mix of healthy trees. To control removal of healthy trees in the city is to retain the integrity of the urban forest and to this end administering the removal of healthy trees is considered necessary.

Recommendation 5.2

Introduce regular inspection cycles and utilize inventory data of City owned trees to establish cyclic maintenance programs and a system of Work Order response priority.

Rationale 5.2

- A proactive system of tree management is one where a regular cycle of inspection and assessment informs an overall management strategy. It recognizes current needs and anticipates future requirements. A proactive management approach facilitates planning and optimizes opportunity for the efficient use of available resources.

- The current system of tree care within the City is based upon a reactive style of management. Because the current reactive style of tree management does not yet include inventory or a regular inspection cycle, it is not possible to formulate or implement effective Urban Forest Management Plans.

- Without a complete inventory of trees, the overall condition of the publicly-owned component of the urban forest, and the resource required to manage it, cannot be assessed.

- With reactive management there remains the possibility that significant safety problems go unidentified with potentially damaging consequences.

Regular pruning cycles can significantly reduce the number of crisis calls and tree failures." (W.A. Kenney and P. Van Wassenaer, "Strategic Urban Forest Planning", September 2001, pg. 11).

- A proactive maintenance system based upon regular inspection and response cycles will identify the management requirements of the urban forest thereby promoting its health and sustainability. Resources can be targeted in the most efficient way toward achieving the objectives of the Urban Forest Strategic Plan.

- Pruning cycles for the urban forest in Peterborough are difficult to determine in the absence of inventory data and thus it is difficult to project the frequency required. In municipalities where proactive maintenance is well established, attention to each street tree is usually anticipated at least once every 10 years.

- The cost benefits of proactive structural pruning in both young and early mature trees are measurable compared to focusing on the reactive health and risk mitigation of mid-age and mature trees.

Informed decision making and appropriate planning is needed to ensure 'planting the right tree in the right place'. Inappropriate tree selection may result in conflicting space requirements with utilities.

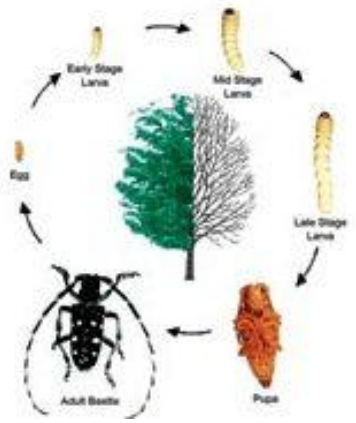
Recommendation 5.3

Inform the community of the potential for damage from invasive species and the preventable actions that may be taken. Respond to threats from invasive species in cooperation with stakeholders.

Rationale 5.3

- Underpinning the long-term health and sustainability of the urban forest is the suitability of a tree species to its surrounding growth environment. Many of the species traditionally planted in the city have not fared well with changes in the urban environment and increased human activity.

- Recognizing current growth limiting conditions as well as anticipating future changes can assist with improved tree selection. The improvement in species selection needs to be implemented in tandem with improvements in plant quality and seed origin.



Asian long-horned beetle (ALHB) Life cycle. ALHB infests many species of native trees including maple, hackberry, poplar and birch. The identification and control of ALHB and other exotic pest outbreaks is paramount in preserving the urban forest. (Photo Credit: Michael Bohne, University of Vermont)

"The urban environment is becoming increasingly hostile to the long-term health of trees and shrubs. Environmental stresses both above and below ground weaken natural defence systems and can leave plants prone to insect infestations and diseases. Structural and health problems with trees often go undetected until part of the tree fails or the whole tree dies…An integral part of Plant Health Care is regular monitoring. Early detection of health or structural problems will allow for expedient remedial care and will help to prevent damage to trees or the loss of whole trees."
(Urban Forest Strategic Management Plan for the Town of Oakville 2008-2027, Page 68).

- The globalization of trading and the increasing movement of people, produce and materials have created unprecedented opportunity for the introduction of invasive species. In the context of the urban forest, an invasive species would include any type of plant, insect or organism that has been introduced to an environment where it is not native and has the potential to cause damage to trees, through loss of plants and by out competing native flora and fauna.

- Examples of invasive species include the introduction of exotic pests and diseases such as the Asian Longhorn Beetle and Emerald Ash Borer, but also include European Buckthorn, a rapidly colonizing shrubby tree that will suppress regeneration in natural areas.

- Introduced invasive pests place increased stress upon the urban forest with the potential to devastate entire species of trees should they become established in the area.

- Strategies, such as limiting the numbers of any one species, can be adopted to control the impacts of invasive species. These strategies however, will never remove the need for constant vigilance through monitoring and management to respond to threats from invasive species.

Tree protection in land development should be a shared community responsibility. Developers need to approach their projects with some environmental sensitivity. Citizens need to understand the needs of developers and local governments must be flexible yet recognize and support the need for tree protection and replacement. If all three sectors cooperate, our cities can grow while remaining beautiful and environmentally healthy."
(Edward Macie and Gary Moll in 'Shading Our Cities: A Resource Guide for Urban and Community Forests.' G. Moll and S. Ebenreck eds., 1989, pg. 158).

Recommendation 5.4

Establish a committee of City departments and utility representatives to develop and recommend corporate policy and procedures to ensure the protection of trees during installation and/or maintenance of grey infrastructure.

Rationale 5.4

- A significant proportion of the urban forest in the city exists on land zoned for development. Traditionally, development of new residential subdivisions and commercial properties results in removal of all existing vegetation. Arguments in favour of this usually revolve around grading and storm water management. However, in specific situations it may be possible to incorporate some of the existing vegetation on a site. Site design should be directed toward preservation as the first principle.

- New planting on development sites, although an essential component of a renewed landscape, can never replace the loss of established trees and hedgerows in terms of biomass, ecological habitat and aesthetic values.

- Tree preservation on construction sites should not be a detriment to effective land use or unfairly burdensome upon the developer. With more effort from all professionals involved in the planning and construction process, tree and hedgerow preservation is entirely possible but far too often overlooked in favour of ease of design.

- Urban stress has a significant impact on the growth and longevity of the urban forest. Street trees are increasingly difficult to establish and maintain. There is a need to carefully manage activities through good working practice when installing and maintaining the infrastructure around trees.

- A code of good practice when working in proximity to trees requires consensus and support from all agencies with a potential to affect the health of trees. It can take only minutes to destroy a tree's healthy sustainable existence through root severance or soil compaction.

- When planners and contractors adopt practices to protect trees during the installation and maintenance of grey infrastructure, damage to trees may be mitigated.

Recommendation 5.5

Produce a guidance document for planners, developers and architects on trees and development that includes minimum protection distances and methods of tree protection during the development process.

Rationale 5.5

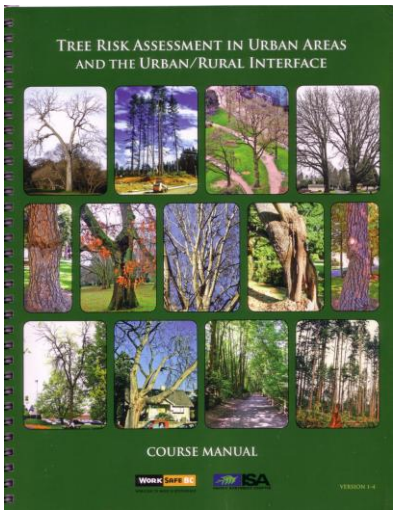
- The most significant trees in terms of future contribution should be identified and form part of a development design in order to reap tangible rewards in enhanced property values, increased saleability of lots and significant benefits for the environment. Tree inventory, classification and environmental assessment for new subdivisions should form part of the site appraisal with retention of the best trees factored into the design wherever possible. Appropriate tree protection standards during construction would ensure the successful retention and sustainability of these trees and hedgerows.

- Tree retention on both new and existing development is fundamental to maintain the biomass, health and sustainability of the urban forest in the City. The process of providing optimal conditions for the success of retained trees requires understanding and cooperation of all those involved in the planning and construction process.

- Trees require space to grow and develop to maturity as well as existing in scale and proportion to their surroundings.

- There are differing opinions on minimum areas of protection for retained trees. For example, the City of Toronto requires a protection distance of 3m for a tree of 41-50cm diameter, whereas in the UK this distance would be based upon a multiplier of 10 or 12 times diameter (e.g. 4.92m for a 41cm diameter tree). Tree preservation zones need to be established and adhered to in order to minimize damage to trees during construction projects.

Tree Protection Barrier Information
httpp://www.toronto.ca/trees/pdfs/
TreeProtSpecs.pdf



Pacific Northwest International Society of Arboriculture provides detailed criteria for the assessment of tree hazard.

Recommendation 5.6

Adopt a method of risk assessment that protects the public while considering all of the needs of the urban forest.

Rationale 5.6

- In managing the urban forest there will never be unlimited resources to attend to every aspect of tree care and maintenance. There will be many components of the forest equally worthy of attention, often with conflicting management requirements. Thus a practical approach needs to be adopted in the allocation of resources.

- Although a primary concern will be the health and safety of mature trees, the resources used in safety management must not be disproportionate to the risk that trees present. A proportionate approach to tree risk management needs to be undertaken using a robust and recognised assessment methodology.

- Trees having structural defects, such as dead wood, splits, cavities and areas of decay may be identified as having a high probability of failure but present little or no risk of harm to people or property. Such trees may also have significant ecological benefits.

- It is important that the components of risk are duly considered in assessing trees so that resources are used only where they are required while accepting the natural imperfections of the trees.

- The assessment of tree condition by qualified personnel is the starting point and any system must then go on to consider:
  - the target; based on frequency of use, occupancy and/or value of property,
  - the size of the part likely to fail,
  - the probability of failure.

- Any change to one or more of these criteria will alter the potential for risk of harm. It is important that with the knowledge of a declining mature tree population in the City, hazard assessment methods for trees are improved and applied within a system that balances the need for safety with the needs of a diverse and sustainable urban forest.

- The system should also recognize the benefits of trees in varying conditions and seek to preserve a balance of these through appropriate management practices and maintenance systems.

Recommendation 5.7

Re-establish an environmental or sustainability committee to oversee the management and protection of designated Natural Areas in the City with a proactive and planning review mandate.

Rationale 5.7

- The City has a heritage of natural green spaces. Residents have enjoyed the benefits of this green infrastructure.

- Historically the City has had a Natural Areas advisory committee to oversee the protection and management of this valuable resource. The committee was responsible for co-ordinating response and input to City policy, where policy impacted Natural Areas. The Natural Areas Advisory Committee was an important mechanism that provided guidance to the City on issues related to the sustainability of Natural Areas.

- Natural Areas and significant woodlots need to be recognized as part of a natural heritage system. The City needs to identify and protect, plan, regulate, manage and monitor these key components of the urban forest in order to maintain the integrity of its natural heritage.

A legacy to cherish: Eastern White Cedar climax woodlot at Wallis Heights Park.

Retained mixed deciduous woodlot at Sherbrooke Heights

Objective 6

To identify and recognize significant valuable trees based on historic, aesthetic, cultural, social and ecological criteria.

Recommendation 6.1

At Little Lake Cemetery, care has been taken to protect (prop-up) a gnarled, centenary, Camperdown Elm (Ulmus glabra 'Pendula'). This Elm was grafted from an 1835 Camperdown brought to Peterborough from Dundee Scotland.

Implement a heritage tree identification, designation and protection program following recognized standards (e.g. recommended by the Ontario Heritage Tree Alliance).

Rationale 6.1

- Trees provide an unmistakable sense of place, identity and community pride. The white pine that accompanies Peterborough's slogan is a reminder of our history, our unique environment, and a symbol of the landscapes of our region.
- The City of Peterborough has many significant trees that are linked with historical events, are excellent representatives of their species, play a key role in local ecology or are valued by residents for personal reasons.
- Similar to heritage architecture, once lost, these significant trees can never be replaced. While trees do have a natural life span and cannot live forever, the recognition and preservation of significant trees fosters a respect for our natural heritage, a link between the past and the present and a reminder that we share this community with all living things.

Heritage maple tree

White Pine Climax Forest at Jackson Park

Heritage Bur Oak on Homewood Avenue

Recommendation 6.2

Investigate economic incentives for landowners with designated heritage trees on their property.

Rationale 6.2

- Protecting Heritage trees, woodlots and remnant forests can help prevent unnecessary loss of natural heritage. Incentives play an important role in building a sense of shared responsibility among property owners for their efforts in maintaining and protecting the heritage of the community.

Recommendation 6.3

Implement a seed collection and propagation program in cooperation with regional nurseries to preserve the genetic heritage of significant trees in the City.

Rationale 6.3

- An important benefit of protecting the best of our trees is to preserve their genetic history through the seeds they produce. The local tree giants that have survived many stages of development and have adapted to changing conditions may provide the keys to a stable urban forest for future generations.

- A program to collect the seeds from our best heritage trees and grow them into seedlings for local replanting would provide an excellent foundation for the forest of the future

"*These plains [of Peterborough] form a beautiful natural park, finely diversified with hill and dale, covered with a lively green sward, enamelled with a variety of the most exquisite flowers and planted, as if by Nature's own hand, with groups of feathery pines, oaks, balsam, poplar and silver birch. The views from these plains are delightful, which every way you turn your eyes they are gratified by a diversity of hill and dale, wood and water."*
(Catharine Parr Trail, "The Backwoods of Canada". 1832)

Objective 7

To create a regulatory framework that includes ongoing monitoring and assessment.

Recommendation 7.1

Amend the Official Plan (Section 3) to include a segment directly related to the urban forest. Recognize the Urban Forest Strategic Plan as the mechanism by which urban forest management is guided. Include the term 'Urban Forest' in the appropriate context in the Official Plan where reference is made to trees.

Rationale 7.1

- The Official Plan (OP) for the City of Peterborough provides guiding policy for planning and development within the City.
- The Official Plan includes many references and statements regarding the significance of the natural environment. Although significance of the natural environment and ecosystems are noted, the urban forest is not specifically identified or defined
- Provisions in the Official Plan directly impact the urban forest. Open Space, Natural Areas, recreational usage, Site Plan control, the Transportation Master Plan, housing, Zoning By-laws and the development of various land use types all affect the urban forest.

Recommendation 7.2

Investigate developing a by-law to maintain the urban forest with no net loss of canopy cover.

Rationale 7.2

- Through clarifying the role and importance of the urban forest in the Official Plan, the protection, sustainability, enhancement, maintenance and management of the urban forest can be addressed through the Urban Forest Strategic Plan.

City of Peterborough

Official Plan

To safeguard a sense of community, the Official Plan recognizes the benefit of;
".....preserving treed areas in high profile locations in order to maintain the natural image of Peterborough as a city in the country" (Section 4.5.1.2, Official Plan of the City of Peterborough, December 31, 2009

- To protect the urban forest, the Official Plan must identify the significance and benefits that trees provide to the community. Past practice on City owned lands has been to replace any tree removed with a new tree replacement. This practice results in a net loss of leaf area. This is of concern because large, deciduous, big leafed trees provide increased carbon sequestering, pollutant removal, and energy savings than do smaller trees.

- Specifically important to safeguarding the benefits of the urban forest is maintenance of leaf area. To accomplish this, the Official Plan needs to recognize the significance of leaf area and include protection objectives in the Official Plan.

Recommendation 7.3

Review existing tree by-laws and make recommendation to protect and preserve trees on public and private lands, including the adoption of an appropriate compensatory model for tree removal.

Rationale 7.3

- Canopy cover is an important measure of the status of the urban forest. The larger the canopy cover, the greater the benefits the community realizes. Studies in various municipalities show that on average 80 percent of trees are privately owned and 20 percent are publicly owned. Two sample areas in Peterborough indicated that 17% of trees in a sample residential area were publicly owned.

- In order to promote and protect the urban forest, mechanisms need to be established to protect, sustain and enhance trees and shrubs on both public lands and private property. This will require refinement of existing tree protection By-laws. Section OP 3.3.5 (5) states that “the City of Peterborough may assist in the protection... through the following actions: regulating the destruction or removal of trees from properties through the requirement of a permit”.

- The Official Plan currently identifies methods of protection specifically relating to Natural Areas (OP 3.3.5). The urban forest is a composite of all space in the municipality that sustains tree, shrub and ground cover. To protect the urban forest in all land use classifications, mechanisms for protection need to be updated or advanced for all land use classes in the City.

Recommendation 7.4

Implement a mechanism for replacing losses to the urban forest, either on a development site, at an off-site location as directed by the City or by providing a monetary contribution to a tree reserve fund. The reserve fund will be designated for planting trees on municipally managed or other protected lands to replace leaf area lost through development and construction.

Thoughtful planning preserves trees while opening development opportunities along Sherbrooke Street West

Rationale 7.4

- Development in each of the identified land use classes in the Official Plan is regulated through Zoning By-law. It is often impossible to preserve all trees on a development site and maintain the objectives of development. In many of these instances once development is completed, the ability to meet the objectives of the Urban Forest Strategic Plan on the developed site can be challenging.

- Administered through Zoning By-law, Site Plan Control and Subdivision Control; a mechanism needs to be developed to provide mitigating options for developers and landowners that require the removal of trees during the development of their land.

Trees identified for retention are protected by barriers during construction

Recommendation 7.5

Create an incentive and recognition program for developers who, through creative planning, develop sites that preserve and protect existing significant trees, woodlots and hedgerows.

Rationale 7.5

- The inclusion of a standard for tree protection that can be monitored and recognized by excellence awards in the development process will contribute to sustaining and enhancing the urban forest.

Recommendation 7.6

Require that prior to approval, all applications for Committee of Adjustment, Site Plans and Subdivision Agreements provide an arborist report on the health and condition of trees on the site to be developed and a statement describing the impact of development and construction on each tree.

Rationale 7.6

- Situations occur whereby applicants file requests to the Committee of Adjustment (CoA) to make adjustments to current Zoning By-law conditions permitting a development to proceed. It is imperative that all applications are 'field' inspected to ensure that the impact on trees is recognized in the approval process.

- A recent CoA approval permitted an increase in building footprint for the applicant. The result of this approval was the demise of a one metre plus diameter Black Walnut in excellent condition. Without specific mechanisms set for the protection of trees in the CoA or Site Plan process, applications such as this circumvent the ability of controls to protect such valuable trees.

Recommendation 7.7

Implement and enforce development standards for the preservation, protection and enhancement of the urban forest during site development and construction projects.

Rationale 7.7

- Zoning By-laws are the instruments by which land use is governed. Each land use has set criteria to which it must comply. When a particular land use is being developed, criteria such as total lot area, building coverage, parking area and landscaped open space is specified, among other regulations.

- Landscaped open space is generally indicated in the Zoning By-law as a buffer strip around the perimeter of property, encompassing about 10 percent of the total lot area of the development site. Considering that by definition, landscaped open space can include surface walks, patios, pools or similar areas not suitable to vehicular traffic, the opportunity to plant trees in areas that will ensure the tree reaches full maturity is reduced.

- In order to meet a canopy cover target of 30%, additional tree planting allowances need to be introduced. The introduction of engineered soils that enhance the opportunity for a tree to reach maturity in hard surface environments needs to be considered.

- Identifying tree planting areas in parking lots, the use of engineered soils, and ensuring that tree spacing is adequate to reach maximum canopy cover are mechanisms by which the Zoning By-law, through Site Plan control can be applied to help achieve canopy cover targets.

- The Planning Act authorizes the City to implement Site Plan control. Section 3.8.1 of the Official Plan states 'It is the intent of this Plan to designate the whole of the City of Peterborough as a Site Plan control area'.

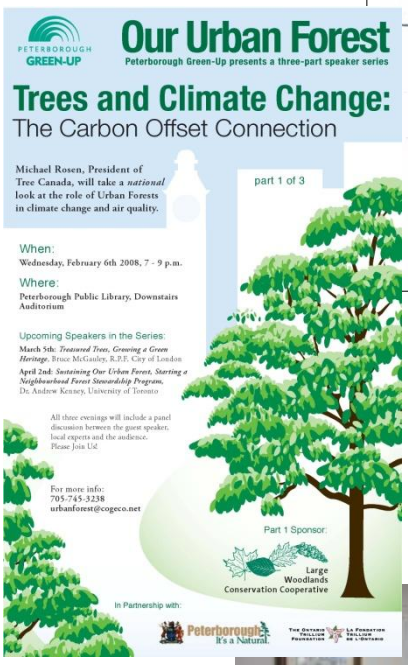
Adequate allowances and structural soils provide sustainable trees for the future.

Recommendation 7.8

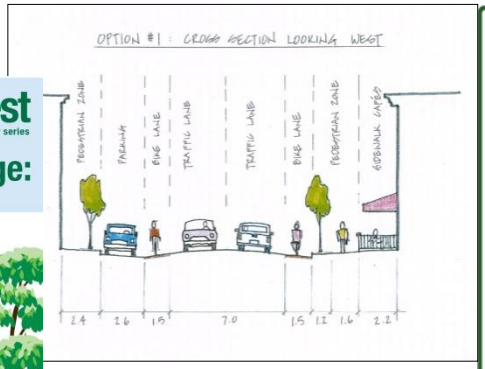
Provide professional support to implement and administer the Urban Forest Strategic Plan.

Rationale 7.8

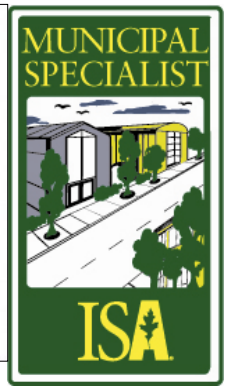
- To implement the Urban Forest Strategic Plan, professional resources are required to develop policy and procedures, recommend new and revised by-laws, engage the community and enforce municipal regulations. Such resource requires a high level of urban forest knowledge and experience at a recognized level of certification



Learning together



Planning



Professional administration

Tree records inform decision making

Community involvement

Objective 8

To increase community awareness of the benefit of trees, encourage community involvement and create a shared responsibility for the stewardship of the urban forest.

Recommendation 8.1

Develop and maintain alliances with stakeholders to engage the community and maximize opportunities for the protection and enhancement of the urban forest.

Rationale 8.1

- Managing the urban forest is an enormous task that requires the cooperation of many community partners. Fortunately, other agencies, community groups and private citizens can and do play an important role in the stewardship of this natural resource. The entire community shares in the benefits of a healthy urban forest and must be engaged in its care and protection.
- The City must play a leadership and coordination role in guiding the involvement of other stakeholders in the stewardship of the urban forest we all share.
- To encourage a collective sense of responsibility and ownership of the urban forest, it is important to consult and collaborate with stakeholders as the Urban Forest Strategic Plan is implemented, monitored and evaluated.

Community volunteers participate in a 'My Tree Project' in their local neighbourhood.

Recommendation 8.2

Provide public access to information about Peterborough's urban forest through a City web page.

"Having public agencies, private landholders, the green industry and neighbourhood groups share the same vision of the city's urban forest is a crucial part of sustainability. This condition is not likely to result from legislation. It is only the result from a shared understanding of the urban forest's value to the community and commitment to dialogue and cooperation among stakeholders". (Clarke J, Matheny, N., Cross, G., Wake, V., A Model of Urban Forest Sustainability, Journal of Arboriculture 23 (1): January 1997)

Rationale 8.2

- In residential areas, more trees are located on private land than on public land.

- Because of their large stake in caring for trees in residential areas, up-to-date information must be made available to City residents on tree selection, tree care and tree planting programs offered by the City and other agencies.

- This information should include:
  - the benefits of trees;
  - tree by-laws (protection, preservation, permits, penalties);
  - planting requests and species availability for public Rights of Way;
  - species selection, planting, aftercare and long term maintenance;
  - responding to invasive species;
  - pruning and removal requests, process and response time for public tree maintenance;
  - tree ownership;
  - City and community programs;
  - links to other organizations;
  - incentives and support;

"Sustainable urban forests require human intervention. ...Sustainable urban forests cannot be separated from the activities of humans. Such activity can be both positive and negative. In the latter case, creation and maintenance of urban infrastructures can be extremely destructive. In essence, we superimpose cities atop forests. The greater the imposition, the less natural the forests appear to functions" (Clarke J, Matheny, N., Cross, G., Wake, V., A Model of Urban Forest Sustainability, Journal of Arboriculture 23 (1): January 1997)

This information will enable all members of the community to be informed and up to date on all aspects of the City's urban forest program.

On Arbour Day, 1978 a group of local cub scouts planted a tree at City Hall to recognize the 25th Silver Jubilee of the Ontario Parks Association. This same tree now graces the south entrance to City Hall

Recommendation 8.3

Work with community stakeholders to provide a variety of incentives and support services to encourage stewardship of the urban forest.

Rationale 8.3

- An effective communications strategy identifies key messages and delivers them using a variety of mechanisms. Engaging the community requires not only delivering information, but providing incentives, support and encouragement to become engaged as stewards of the urban forest.

- Different segments of the community have differing priorities and motivations. Recognizing these, removing the barriers to action and recognizing positive efforts are all important strategies for earning and maintaining public support.

- Cooperatively working with the community to provide ownership and a sense of stewardship for the urban forest can be promoted in the following manner:

    - Neighbourhood fundraising for tree planting and maintenance programs;
    - sponsorship of urban forest initiatives by the commercial sector;
    - public tree care workshops;
    - public participation in neighbourhood tree inventories;
    - incentives for tree planting and stewardship in schoolyards and public parks;
    - recognition of volunteer efforts.

He who plants a tree, plants a hope. (Lucy Larcom, Plant a Tree)

Glossary of Terms

Available Growing Space: The space above and below ground that is available to grow and sustain a tree unimpeded, both physically and biologically, from a transplant through to maturity.

Biomass: Biological material from living organisms usually defined as the total mass of living matter within a given unit of environmental area.

Canopy Cover: The two dimensional extent of tree canopy viewed from above and usually expressed as a percentage of total land area.

Carbon Sequestration: The process of removing carbon from the atmosphere often referred to as carbon capture.

Carbon Storage: Carbon which is stored and prevented from re-entering the atmosphere e.g. the carbon stored in the woody tissues of trees.

Enhanced Rooting Environment Techniques: Specific engineering solutions designed to provide adequate sub-surface growing conditions for tree roots while fulfilling the engineering requirements of the site.

Green Infrastructure: The component of the environment that includes all plant material, privately or publicly owned, forming a strategically planned and managed network that conserves eco-system values and functions and provides associated benefits to human populations.

Greenhouse Gas: Gasses which absorb and emit radiation within the thermal infrared range. Primarily these are water vapour, carbon dioxide, methane, nitrous oxide and ozone.

Grey Infrastructure: The inorganic structure that supports functions such as transport, communications, utilities, business and commerce, and is comprised of structures such as roads, sewers, gas and water pipelines, hydro lines and the built forms that services societal functions.

Leaf Area Index: The total area of upper leaf surface of plants expressed as the ratio of leaf area divided by the surface area of the land on which the vegetation grows. It is a 3 dimensional component unlike canopy cover.

Significant Trees: Trees that are meaningful or important for a variety of reasons. These may include, but are not limited to; species, size, ecological value, location, historical or social importance.

Strategic Planning: "A continuous and systematic process where people make decisions about intended future outcomes, how these outcomes are to be accomplished and how success is to be measured and evaluated." (Industry Canada)

Sustainable Urban Forest: An urban forest that has the capacity to endure and maintain long-term benefit to the surrounding community and environment.

Tree: A woody perennial plant having a distinct trunk or trunks and crown, and, generally, a mature height greater than 5 metres (16 feet) (ISA Glossary of Arboricultural Terms 2009).

Urban Forest: A collection of trees that grow within an urban area or any human settlement. Trees may be naturally occurring or planted and may exist as mixtures of individual trees, woodlot/s or forest, riparian complexes and fields in various stages of succession toward a tree-dominated landscape.

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The Urban Forest Strategic Plan is presented as a guide to inform management of the urban forest in the City of Peterborough. Following the recommended actions in the Plan, By-laws, Policies and Codes of Practice will be advanced to help the City achieve the shared Vision of the Plan and thereby safeguard and enhance the benefits of our forest for today and future generations.