

Appendix III: Urban Forestry Guidelines

The Urban Forest

Trees are an important part of our towns and cities, and we are only beginning to recognize the tremendous value of a healthy urban forest. Trees perform infrastructural roles including stormwater management through root uptake and respiration, urban heat island attenuation through shading, provision of habitat for avian and insect populations, and increase resiliency in the face of climate change. Trees beautify the environment, provide psychological benefits and promote physical health in people. The economic value of a tree increases exponentially with age, with a cumulative value of \$160,000+ per tree. Over 50 years one tree will produce \$31,250 of oxygen, \$37,500 of recycled water, and \$31,500 worth of erosion control (US Forest Service, ISA, 2013). A fundamental goal of these design guidelines is to promote an expanded urban forest that exhibits health and resiliency.

With careful attention to the growing requirements of trees is intended to ensure that tree life expectancy cycles are considered in increments of 50 to 100 years. That is, even the fastest growing and shortest lived trees will thrive for 50 years, and the slower growing and longer lived trees will have an opportunity to last a century.

There are many factors that contribute to successful trees, but foremost is their soil conditions: sufficient soil volume, quality soils that are not compacted, and access to air and water. The best place to grow trees are in protected natural heritage areas. In lower density neighbourhoods where space is plentiful, soil condition requirements are easier to meet. But in Port Dover's older, more urban areas, where space is more intensively used for roads, buildings and sidewalks, deliberate care must be taken to meet the soil needs of trees.

Diversity

Biodiversity is founded on ecological principles with a host of benefits, but of particular importance is the establishment of resiliency. The International Society of Arboriculture's (ISA) best practices promote species selection based on the following guidelines:

- no more than 30% from the same family;
- no more than 20% from the same genus; and
- no more than 10% from the same species.

The purpose of this allocation is to prevent the same kind of monoculture that devastated the trees of our towns and cities including the American Chestnut, American Elm, and Ash trees. Many species today are under threat from pests and diseases, and diversity will help to ensure the urban forest is more resilient and remains green when pests and diseases inevitably strike.

It is important to look forward towards issues which may impact trees which are currently keystone species in the landscape, such as oak and maple. These species may be subject to pests and pathogens in the near future such as Oak Wilt, Gypsy Moth, and Asian Longhorn Beetle. These species should still be planted, but must not be over planted. Monoculture plantings of a single species should not be used so future pathogens do not cause widespread mortality.

Promoting Carolinian species is a unique way that Port Dover can increase urban forest diversity and resiliency against climate change and northward moving pathogens.

While the ISA percentages are a goal of the urban forest system, it will be difficult to achieve in the Downtown and Urban Waterfront, where there are fewer trees to choose from of sufficient hardiness and adaptation to urban conditions.

Tree Preservation

Existing trees are the greatest asset of the urban forest, and new developments in Port Dover should attempt to preserve healthy mature trees where they are not located within proposed building envelopes. Opportunities to preserve trees should be looked at early in the approvals process to increase the likelihood of success. When existing trees must be removed, replacement tree plantings should strive to provide equivalent benefits to the community. The Council of Tree & Landscape Appraisers provides a guide to plant appraisal which can be a useful tool for determining the value of existing trees when preservation or replacement plantings are not possible.

Existing tree preservation should prioritize large mature shade trees, trees which may have heritage value, native trees, and trees which can be managed as a group. In particular, the preservation of trees located at the perimeter of lots can often provide buffering between properties.

Tree preservation planning should consider the extent of the tree above and below ground, and the understanding that development can impact the roots of trees on adjacent properties. The critical root zone (CRZ) can be understood as a measured circle around a living tree that represents the minimum rooting area than is essential for its structural integrity and capability to remain alive and upright. The CRZ should be determined in consultation with an International Society of Arborists (ISA) certified arborist or other qualified person. However, a tree protection zone (TPZ) can be modelled as a function of the trunk diameter at breast height (DBH) and used as a guide for protection trees during development. The ISA recommends a standard TPZ of 30cm of offset per 2.54cm of diameter.

Monitoring

It is recommended that Carolinian species are incorporated into the plantings of parks and natural areas, and monitored to collect data on their performance. Producing an urban forest inventory is one way to understand the

strengths and vulnerabilities of the local tree canopy, but will require an investment of staff and other resources.

Planting Considerations

Soil

The biomass of urban trees that we see above grade, which includes the trunk, branches and leaf volume, is approximately equal to the biomass below ground, which includes the root network. Therefore, soil volume for canopy trees should be 30 cubic metres per tree, or 20 cubic metres per tree if soil volumes are shared among more than one tree. Soil volume should be within 1.4 metres of the surface. Volumes less than 14 cubic metres will not support a long-term functional tree (James Urban, Making Space for Roots: Tree Planting Options in Urban Areas, 2009. <http://www.isa-arbor.com/myaccount/myeducation/resources/ceu-april10.pdf>).

Tree roots are opportunistic, in that they will fill the available space. This means that there is a lot of flexibility in the shape of the soil area, such as, long linear boulevard spaces between the sidewalk and a street, or even in soil cells underneath sidewalks.

It is recognized that 30m³ of soil volume will not be achievable in all locations. 20m³ of soil volume will still support a large tree, though at a lesser growth potential. At reduced soil volumes, different types of trees need to be considered. There are very few instances where trees are not possible.

Planting Conditions

Open lawn areas will comprise the majority of planting conditions along streets and parks in Port Dover. Generally, there will be no issue in achieving the required soil volumes that promote healthy tree growth. However, in measuring available soil volume, only contiguous areas of lawn or soil should be counted. Sidewalks, walkways and other infrastructure, because of the compaction of the sub-grade granular underneath them, usually create barriers for tree roots.

In the Downtown and Urban Waterfront there will typically be less space available for trees. In very constrained areas, structural soil cells can achieve required soil volumes by allowing uncompacted soils to extend under the paved surfaces, areas that would otherwise be unavailable to tree roots. These engineered techniques transfer the weight of the sidewalk, street furniture and vehicles to the ground underneath a tree's required uncompacted soil volume. Structural soil cells have significant benefits both for the long term health of the urban forest, and for increasing growth rate and reducing 1-5 year stunting common to urban locations.

Open planting beds are appropriate for areas with less pedestrian traffic. This provides space for multiple trees to be co-located within a consolidated soil volume. Open planting beds with flush curb edges allow storm water to irrigate the soil area.

Irrigation systems are not generally recommended, however, it is critical to the long term health of trees to provide weekly watering during the first two years following transplant when feeder root establishment occurs. This should be accompanied by appropriate fertilization.

Soil pH levels are important for nutrient uptake and appropriate levels vary depending on species (Soil Management for Urban Trees - Best Management Practices, 2014). Soil Organic Matter content should be 3-10% (Soil Management for Urban Trees - Best Management Practices, 2014). Soil can be amended at time of planting with micorrhizal inoculant.

Roots require air and therefore soil must be well drained. Soil should drain within 24 hours of rainfall events. Appropriate mitigation is required if soil does not drain. It is too late to do this after construction is complete.

Planting Details

Temporary tree guards can be used after tree transplant to protect trees from snow removal operations, bikes, and vandalism. Tree guards should be removed after approximately 5 years or when the tree reaches 30cm diameter at breast height. Tree guards should not touch the tree or constrain growth in any fashion. Tree grates and paving details must allow adequate space for future trunk flare. Trees should be planted with the trunk flare above finished grade (top of rootball should be planted 2 to 4 cm above grade to allow for settlement), and ensure the trunk is plumb. Planting Typology

When the canopies of mature trees interconnect overhead, the value of the urban forest in performing infrastructural benefits is significantly enhanced. Tree spacing is recommended at 10 to 15 metres on centre, or closer, depending on species growth rate expectations.

Species Selection

Tree species selection should be performance based, with the right tree matched to the right location. Trees provide the most benefits to the community when they can grow for many years and attain their natural mature size. The selection of trees for individual sites must give careful consideration to the existing conditions and potential barriers to their success, including soil type, moisture, available growing space above and below ground, and proximity to sidewalks, roads and utilities. Some planting sites, like urban boulevards surrounded by paving, are extremely harsh, and only suitable for a short list of resilient tree species, while planting sites in parks or garden beds may support many more tree species. As not all trees are suitable for all locations, tree species should be selected which possess the characteristics that most closely meet the environmental conditions of each site, with the gradient of diversity increasing as the quality of the planting site increases.

Port Dover's climate is among the most temperate in Ontario, and its location within the Canadian Carolinian Zone creates the opportunity to support an urban forest with more diversity than most other locations in Ontario. The Canadian Carolinian Zone is a unique and fragile ecosystem, with the warmest average annual temperatures, the longest frost-free seasons, and the mildest winters in Ontario. Its boundary is based on the northern limit of key species which are typically only found in more southern regions, and the term 'Carolinian' refers to its similarity to the forests found in the Carolinas in the southern United States.

This unique climate means that Port Dover could have success using tree species which have little documented use in other municipalities, but are suited to the local climate.

Trees with Different Growth Rates

Growth rate stratification is based on the fact that different species grow at different rates and have different life expectancies. Generally, fast growing species are shorter lived than slow growing species. By mixing both types throughout the urban area, it ensures that a green canopy is achieved as quickly as possible, and that it remains green over time, because when the fast growing species reach the end of their lives, the slower growing species will have reached their mature size.

Natural Areas

In naturalized areas, particularly in proximity to shorelines and forested areas, native species should be planted. Invasive species which have negative impacts do the most harm when they can escape cultivation into the habitat of native species which they are able to outcompete. In particular, the species of trees for planting near riparian areas should be carefully considered.

Native species often do better in undisturbed soil, and tend to be less tolerant of the imported and compacted soil that is often found in streetscapes and new subdivisions. Many native

tree species which do not have suitable qualities for parks or streets, but are valuable habitat or food sources for pollinators and wildlife can be planted in or adjacent to naturalized areas. For example, some native species produce an abundance of fruit that can stain pavements at certain times of the year. These species should still be planted, as they are important to wildlife lifecycles, but they should be sited within an awareness of their characteristics.

Pin cherry is a good example of this type of native tree; the fruit is valuable to birds, and the bright red berries and spring flowers are attractive; however, it is a short-lived and weak wooded tree with is prone to black knot fungus. It is best planted in locations where it can freely spread by suckers and naturalize into colonies.

Refer to local conservation authorities for more extensive species planting list.

Waterfront Areas

Plantings in waterfront areas should take into account local water tables and floodplains. Many tree species which are urban and drought tolerant are intolerant of standing water. Some species which are tolerant of flooding, like silver maple, river birch, poplars and willows, have other characteristics which can be problematic, like weak wood or poor disease resistance. These species should only be used if they can be located in areas where their vulnerability to storm damage will not cause safety hazards.

Some desirable native trees like red maple, hackberry, swamp white oak and black gum can do well in wet conditions, but adaptation to flooding will depend on the source of seed stock, so this requirement should be communicated with the supplier, and locally adapted specimens grown in flood prone habitats should be sourced.

Some non-native trees, like Dutch-Elm Disease resistant hybrid elms, and hybrid soft maples are appropriate for waterfront areas, but care should be taken to avoid using any species with invasive qualities near riparian areas.

Roadside Plantings

Rural and peri-urban roadside plantings are typically subject to stress such as road salt spray, wind, compacted soil and drought. Native species from the urban boulevards list are appropriate for roadside plantings, however, if plantings can be set back further from the road the planting palette can be expanded to include native species with a lower salt and pollution tolerance from the general list, such as sugar maples.

Species Lists

The following tables provide an overview of suggested planting for Port Dover's natural areas, parks and streets. It should be considered as a starting point, to be refined through observation and local knowledge of tree health and performance in Port Dover's context.

The trees are organized in three groups:

Urban Boulevards, Constrained Conditions

- these trees are suitable for planting on sites with a high degree of impermeable surfaces and/or low opportunities for planting areas. These areas can include downtown's commercial streets, like Main Street, where the right of way is almost continuously paved. Constrained soil volumes, compaction from vehicles and pedestrian traffic, road salt and other stressors create difficult growing conditions. Species must be tolerant of these stressors. By necessity, there are a higher number of non-native trees in this group in order to provide the diversity and performance needed to achieve an urban canopy.

Sub-urban Boulevards, Parks - these areas typically have significantly improved growing conditions and as a result a much greater variety of trees that can thrive. Trees designated for Urban Boulevards should be assumed to be suitable for Softscape Boulevards and Parks. Trees designated for Softscape Boulevards should be assumed to be suitable for Park as well, but not Urban Boulevards. Trees designated Parks should be assumed to be sensitive, and should be considered on a species by species basis for

open lawn, and planting beds. Only native trees are suitable for naturalized areas, and the local conservation area can provide a more extensive list of acceptable species.

Trees to be Avoided - these trees are known to be problems, because they are invasive (they take over natural areas and compromise their ecological function), they are weak wooded and pose safety hazards in our urban areas, or they harbour invasive pests; sometimes all three.

Urban Boulevards, Constrained Conditions

Tree Species	Native Range	Comments and Notes	Size
<i>Acer ginnala</i> Amur Maple	Non-Native	Compact form/red & yellow fall colour/ lots of seeds/tends to sucker/specify single stem form	Small
<i>Acer griseum</i> Paperbark Maple	Non-Native	Compact form, exfoliating bark. Prefers moist soil.	Medium
<i>Acer x freemanii</i> Hybrid Soft Maple	Native to Ontario	Tolerant of urban conditions. Caution: Many cultivars of <i>Acer rubrum</i> and <i>A. saccharinum</i> exist under the name <i>Freemanii</i> , each with different characteristics	Large
<i>Acer myabei</i> Myabei Maple	Non-Native	Compact form	Medium
<i>Acer tataricum</i> Tatarian Maple	Non-Native	Compact form/red & yellow fall colour. Specify single stem form.	Small
<i>Amelanchier x grandiflora</i> Serviceberry (specific cultivars) 'Robin Hill' 'Autumn Brilliance'	Native to Ontario (cultivar)	Tolerant of urban stress, flowering. Specify single stem form.	Medium
<i>Amelanchier laevis</i> Serviceberry (specific cultivars) 'Spring Flurry' 'Cumulus'	Native to Ontario (cultivar)	Tolerant of urban stress, flowering. Specify single stem form.	Medium
<i>Carpinus caroliniana</i> Blue beech or Musclewood	Native to Ontario	Difficult to transplant. Keep away from road salt & spray, likes wet soil thin bark and sculptured trunk	Medium
<i>Celtis occidentalis</i> Common Hackberry	Native to Ontario	Tolerant of urban conditions, and poor drainage. Requires pruning for general form.	Large
<i>Cockspur hawthorn</i> <i>Crataegus crus-galli</i>			
<i>Cornus alternifolia</i> Alternate-leaf Dogwood	Native to Ontario	Use local winter hardy material only. Specify single stem	Medium
<i>Gymnocladus dioica</i> Kentucky Coffeetree	Native to Ontario	Tolerant of urban conditions. Male trees drop large seed pods.	Large

Urban Boulevards, Constrained Conditions

Tree Species	Native Range	Comments and Notes	Size
<i>Ginkgo biloba</i> Ginkgo Tree	Non-Native	Tolerant of urban conditions. Plant male cultivars to avoid fruit litter. This species is very slow growing, and takes a long time to provide canopy cover. However, it can be useful in constrained conditions.	Large
<i>Gleditsia triacanthos var. inermis</i> Thornless Honey Locust 'Shademaster' 'Skyline'	Native to North America (cultivar)	Tolerant of urban conditions. Provides a filtered shade/susceptible to defoliation by leafhopper/susceptible to canker and other pests and diseases. Prone to over-use.	Large
<i>Liquidambar styraciflua</i> Sweetgum	Native to Eastern North America	Carolinian species, uncommon as street tree in Ontario.	Large
<i>Nyssa sylvatica</i> Black Gum	Native to Ontario	Carolinian species, tolerant of urban conditions, but uncommon as a street tree in Ontario. Tolerates poor drainage.	Large
<i>Quercus bicolor</i> Swamp White Oak	Native to Ontario	Grows in wetter conditions than most oak species. Tolerates urban conditions, but best located away from potential exposure to salt spray (eg. Wide boulevards)	Large
<i>Quercus muehlenbergii</i> Chinquapin Oak	Native to Ontario	Attractive tree, especially in old age. Limited planting, due to possibility of Oak Wilt entering Ontario	Medium
<i>Quercus robur</i> English Oak	Non-Native	Needs well drained soil/difficult to transplant/large size at maturity	Large
<i>Sophora japonica</i> Japanese Pagoda Tree	Non-Native	Showy flowers, produces seed pods, tolerant of urban conditions, but uncommon as a street tree in Ontario.	Medium
<i>Syringa reticulata</i> Japanese Tree Lilac (Ivory Silk)	Non-Native	Good white summer flower excellent small specimen Prone to over-use	Small
<i>Tilia cordata</i> Littleleaf Linden 'Glenleven' 'Greenspire'	Non-Native	Aphid & borer problems; suckers from base; messy species	Medium

Urban Boulevards, Constrained Conditions

Tree Species	Native Range	Comments and Notes	Size
<i>Tilia Americana</i> Basswood	Native to Ontario	Prefers deep moist fertile soil will grow on drier heavier soil needs large space	Large
<i>Ulmus japonica x Ulmus wilsoniana</i> Accolade Elm Princeton Morton Morton Glossy Frontier	Non-Native, Hybrid species	Tolerant of urban conditions and moist soil. These cultivars are currently shown to have good resistance to Dutch Elm Disease, but this is something in flux and should be constantly reassessed.	Large
<i>Ulmus americana</i> (DED resistant cultivars) Elm 'Homestead' 'Pioneer' 'Jefferson'	Native to North America (cultivar)	Tolerant of urban conditions and moist soil. These cultivars are currently shown to have good resistance to Dutch Elm Disease, but this is in flux and should be constantly reassessed.	Large

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Abies balsamea</i> Balsam Fir		Park		
<i>Acer griseum</i> Paperbark Maple	Non-Native	Park	Compact form, exfoliating bark. Prefers moist soil.	Medium
<i>Acer nigrum</i> Black Maple	Native to Ontario	Softscape Boulevard	Lots of seed for winter interest/rare/needs moist soil	Large
<i>Acer pseudoplatanus</i> Sycamore Maple	Non-Native	Softscape Boulevard	Very pollution and salt tolerant. Cankers can cause high maintenance	Large
<i>Acer rubrum</i> Red Maple 'October Glory' 'Red Sunset'	Native to Ontario	Softscape Boulevard	Green summer foliage & yellow to red fall colour. Tolerates wet soil/ poor drainage.	Large
<i>Acer saccharinum</i> Silver Maple	Native to Ontario	Softscape Boulevard	Fast growing softwood maple; Maintenance issues as tree nears maturity due to weak wood. Tolerates wet soil/ poor drainage.	Large
<i>Acer saccharum</i> Sugar Maple	Native to Ontario	Softscape Boulevard	Upright form/fall colour varies/prefers good drainage/shallow roots/salt sensitive	Large
<i>Acer x freemanii</i> Hybrid Soft Maple	Native to Ontario	Hardscape Boulevard	Caution: Many cultivars of <i>Acer rubrum</i> and <i>A. saccharinum</i> exist under the name <i>Freemanii</i> , each with different characteristics	Large
<i>Aesculus glabra</i> Ohio Buckeye	Native to Ontario	Park	Showy flowers. More resistant to anthracnose than other chestnut species.	Medium
<i>Aesculus hippocastanum</i> Horsechestnut 'Baumannii'	Non-Native	Park	Good spring flower with no fruit/limit use due to disease susceptibility	Large
<i>Aesculus flava</i> Yellow Buckeye	Native to North America	Park	Showy flowers. More resistant to anthracnose than other chestnut species.	Medium
<i>Amelanchier arborea</i> Downy Serviceberry	Native to Ontario	Naturalizing	Showy flower & fruit/ tolerant of wet & dry soil	Medium

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Amelanchier laevis</i> Smooth Serviceberry	Native to Ontario	Softscape Boulevard	Multi-stem specimens by prior approval only	Small
<i>Amelanchier canadensis</i> Shadblow Serviceberry	Native to Ontario	Softscape Boulevard	Difficult to maintain single stem. Four-season interest. Tolerates moist soil	Medium
<i>Asimina triloba</i> Pawpaw	Native to Ontario	Park	Large fruit has food value to humans	Large
<i>Betula alleghaniensis</i> Yellow Birch	Native to Ontario	Park	Interesting bark features and good fall colour	Large
<i>Betula papyrifera</i> White Birch	Native to Ontario	Park	Interesting bark features and good fall colour. Susceptible to Bronze Birch Borer, use in limited circumstances.	Large
<i>Betula populifolia</i> Grey Birch	Native to Ontario	Park	Ornamental bark. Susceptible to Bronze Birch Borer, use in limited circumstances.	Large
<i>Betula nigra</i> River Birch	Native to North America	Park	Ornamental bark. Susceptible to Bronze Birch Borer, use in limited circumstances. Tolerant of poor drainage.	Large
<i>Carpinus caroliniana</i> Blue beech or Musclemwood	Native to Ontario	Softscape Boulevard	Difficult to transplant. Keep away from road salt & spray, likes wet soil thin bark and sculptured trunk	Medium
<i>Carpinus betulus</i> European Hornbeam	Non-Native	Park	Difficult to transplant. Keep away from road salt & spray	Large
<i>Catalpa speciosa</i> Northern Catalpa	Native to North America	Park	Pods can be messy	Large
<i>Carya cordiformis</i> Bitternut Hickory	Native to Ontario	Park	Difficult to transplant due to large tap root. Messy fruit	Large
<i>Carya glabra</i> Pignut Hickory	Native to Ontario	Park	Difficult to transplant due to large tap root. Messy fruit	Large

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Carya laciniosa</i> Shellbark Hickory	Native to North America	Park	Difficult to transplant due to large tap root. Messy fruit. Sensitive	Large
<i>Carya ovata</i> Shagbark Hickory	Native to Ontario	Park	Difficult to transplant due to large tap root. Messy fruit	Large
<i>Carya tomentosa</i> Mockernut Hickory		Park		
<i>Celtis occidentalis</i> Common Hackberry	Native to Ontario	Hardscape Boulevard	Requires pruning for general form. Very hardy. Tolerant of poor drainage.	Large
<i>Cercidiphyllum japonicum</i> Katsura Tree	Non-Native	Softscape Boulevard	Specify single or multi-stem. Difficult to transplant. Thin bark. Needs supplemental water.	Large
<i>Cercis canadensis</i> Redbud	Native to Ontario	Softscape Boulevard	Seeds readily. Suitable for lawns but not formal boulevard due to low branching.	Medium
<i>Chamaecyparis nootkatensis</i> 'Pendula' Weeping Nookta cypress		Park		
<i>Cladrastis kentukea (lutea)</i> Yellowwood	Native to North America	Park	Few problems/use local seed sources or stock only/prune early. Sensitive	Large
<i>Cornus alternifolia</i> Alternate-leaf Dogwood	Native to Ontario	Softscape Boulevard	Use local winter hardy material only. Specify single stem	Medium
<i>Cornus florida</i> Eastern Flowering Dogwood	Native to North America	Park, Naturalizing	Endangered. Susceptible to dogwood anthracnose. Plant in limited quantities only. Symbol of Norfolk County	Small
<i>Cornus kousa</i> Kousa dogwood	Non-Native	Park	Resistant to dogwood anthracnose; berries have human food value	Small
<i>Cornus racemosa</i> Grey dogwood	Native to Ontario	Hardscape Boulevard	Specify single stem. Tolerant of poor drainage.	Small

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Corylus americana</i> American Hazel		Park		
<i>Corylus colurna</i> Turkish Hazel	Non-Native	Park	Good form/ difficult to transplant/ winter interest/ needs supplemental water	Large
<i>Crataegus (varieties)</i> Hawthorns	(Dependent on species)	Softscape Boulevard	Thornless & disease resistant varieties only. <i>Crataegus monogyna</i> is invasive, not to be used	Medium
<i>Fagus sylvatica</i> European Beech	Non-Native	Park	Needs moist soil/different leaf colours with varieties/sensitive to activity within root zone/leaves persist through winter/thin bark	Large
<i>Ginkgo biloba</i> Maidenhair tree (Male cultivar only)	Non-Native	Hardscape Boulevard	Good yellow fall colour, thin bark. Tolerant of city conditions & pollution. Slow growing but very large at maturity, virtually pest and disease free	Large
<i>Gleditsia triacanthos var. inermis</i> Thornless Honey Locust 'Shademaster' 'Skyline'	Native to North America	Hardscape Boulevard	Provides a filtered shade/susceptible to defoliation by leafhopper/susceptible to canker and other pests and diseases	Large
<i>Juglans cinerea</i> Butternut Walnut		Park		
<i>Juglans nigra</i> Black Walnut	Native to North America	Park	Messy fruit/needs large area.	Large
<i>Juglans regia</i> Persian Walnut		Park		
<i>Liquidambar styraciflua</i> Sweetgum	Native to Eastern North America	Softscape Boulevard	Carolinian species, uncommon as street tree in Ontario.	Large

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Liriodendron tulipifera</i> Tulip tree	Native to Ontario	Softscape Boulevard	Good flowers and yellow fall colour/local sources/moist well drained soil/very large tree most appropriate for lawn areas/somewhat weak wooded	Large
<i>Maackia amurensis</i> Amur Maackia	Non-Native	Softscape Boulevard	Small, round headed tree/slow growing/summer, flowering/bronze coloured bark. Not for use near naturalized areas.	Small
<i>Magnolia acuminata</i> Cucumber tree	Native to Ontario	Park	Status: Endangered	Medium
<i>Malus</i> Flowering & Domestic Crab Apple	(Dependent on species)	Park	Maintenance problems. Disease & insect problems. Tolerates most soils. Choose persistent fruit-holding, or poorly-fruited types.	Small to Medium
<i>Malus coronia</i> Wild Crabapple	Native to Ontario	Park		Large
<i>Nyssa sylvatica</i> Black Gum	Native to Ontario	Hardscape Boulevard	Carolinian species, tolerant of urban conditions, but uncommon as a street tree in Ontario. Tolerant of poor drainage.	Large
<i>Ostrya virginiana</i> Hop Hornbeam or Ironwood	Native to Ontario	Softscape Boulevard	Mainly an understory species	Medium
<i>Phellodendron amurense</i> Amur corktree	Non-Native	Softscape Boulevard	Good winter texture in bark, lots of black berries. Not appropriate near naturalized areas.	Medium
<i>Physocarpus</i> Common Ninebark		Park		
<i>Picea abies</i> Norway spruce		Park		
<i>Picea glauca</i> White spruce		Park		

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Pinus strobus</i> White Pine	Native to Ontario	Park	Locate with care in boulevards, due to possible sight line and access issues when mature (bushy) Avoid Ribes (alternate host for white pine blister rust)	Large
<i>Platanus occidentalis</i> Sycamore	Native to Ontario	Softscape Boulevard	Frost cracks on trunk/attractive peeling bark/fruit can cause problems/very large at maturity – reserve for large lots and lawn areas	Large
<i>Platanus x acerifolia</i> London Planetree	Hybrid of <i>Platanus occidentalis</i> (N. America) and <i>Platanus orientalis</i> (Europe), so has no native range	Softscape Boulevard	Prone to frost cracks on trunk. Attractive peeling bark. Fruit can cause problems. Very large at maturity – reserve for large lots and lawn areas	Large
<i>Populus ssp.</i> Balsam Poplar, Eastern Cottonwood, Large-tooth Aspen, Trembling Aspen	Balsam Poplar, Eastern Cottonwood, Large-tooth Aspen: Native to Ontario	Park, Naturalizing Not permitted in Boulevard	Wood is light, soft and weak, breaks easily in storms. Drops flowers, fruit, twigs and branches; tolerant of poor drainage	Large
<i>Populus ssp.</i> Dwarf varieties (eg. <i>Populus balsamifera</i> 'Paskapoo')		Park	Limited numbers may be considered in Boulevards on a trial basis	Medium
<i>Prunus spp</i> Flowering Cherry <i>Prunus sargentii</i> <i>Prunus kwanzan</i> <i>Prunus x yedoensis</i>	(Dependent on species; most popular flowering cherries are non-continental)	Softscape Boulevard	Weeping cankers; prone to fungal infections. For use in limited circumstances	Small
<i>Prunus Americana</i> American plum	Native to Ontario	Park	Somewhat thorny. Not Suitable for boulevards	Small

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Prunus nigra</i> Canada plum	Native to Ontario	Park	Somewhat thorny. Not suitable for boulevards	Medium
<i>Prunus pensylvanica</i> Pin Cherry	Native to Ontario	Park; naturalizing	Excellent flowers with no fruit. Single stem to be specified. Weeping cankers. Not specimen tree.	Small
<i>Prunus serotina</i> Black Cherry	Native to Ontario	Park; naturalizing	Interesting bark, messy fruit. Better in lawns than in formal boulevard.	Large
<i>Prunus virginiana</i> Choke Cherry	Native to Ontario	Park; naturalizing	Green spring foliage & red in summer/bark. Tends to split. Black knot. Not specimen tree.	Small
<i>Ptelea trifoliata</i> Hop Tree	Native to Ontario	Softscape Boulevard	Easily grown in average, dry to medium, well-drained soils in part shade to full shade. Tolerates full sun. One of two native larval host plants for the rare Giant Swallowtail butterfly. Adaptable to wide range of growing conditions.	Medium
<i>Quercus alba</i> White Oak	Native to Ontario	Softscape Boulevard	Needs moist soil/fruit maintenance/needs large space at maturity	Large
<i>Quercus ellipsoidalis</i> Northern Pin Oak	Native to Ontario	Softscape Boulevard	Vulnerable to iron deficiency	
<i>Quercus macrocarpa</i> Bur Oak	Native to Ontario	Hardscape Boulevard	Large size at maturity – reserve for large lots and lawn areas fruit drop. Difficult to transplant; requires good soils	Large
<i>Quercus robur</i> 'Fastigata' Fastigate English Oak	Non-Native	Park	Needs well drained soil holds leaves through the winter difficult to transplant very upright in form – reserve for sites with specific need for this form	Large
<i>Quercus robur</i> English Oak	Non-Native	Park	Needs well drained soil/difficult to transplant/large size at maturity	Large
<i>Quercus muehlenbergii</i> Chinquapin Oak	Native to Ontario	Softscape Boulevard	Attractive tree, especially in old age. Limited planting, due to possibility of Oak Wilt entering Ontario	Medium

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Quercus rubra</i> Red Oak	Native to Ontario	Hardscape Boulevard	Limited planting, due to possibility of Oak Wilt entering Ontario. Needs sandy loam soil difficult to transplant more salt tolerant and faster growing than other oaks	Large
<i>Quercus shumardii</i> Shumard Oak				
<i>Quercus velutina</i> Black Oak	Native to Ontario	Park	Limited planting, due to possibility of Oak Wilt entering Ontario. Needs well drained soil/difficult to transplant/large size at maturity	Large
<i>Rhus ssp.</i> Staghorn Sumac, Smooth Sumac, Fragrant	Native to Ontario	Park; naturalizing	Spreads quick, freely suckers from roots creating wide spreading colonies. Tolerates dry sterile soils	Small
<i>Sassafrass albidum</i> Sassafrass	Native to Ontario	Park, Naturalizing	Prefers sandy soils	Medium
<i>Sophora japonica</i> Japanese Pagoda Tree	Non-Native	Hardscape Boulevard	Excellent white flower green stem when young. Limit use due to messy characteristics	Large
<i>Staphylea trifolia</i> Bladdernut		Park		
<i>Syringa reticulata</i> Japanese Tree Lilac (Ivory Silk)	Non-Native	Hardscape Boulevard	Good white summer flower. Excellent small specimen. Prone to over-use	Small
<i>Tilia Americana</i> Basswood	Native to Ontario	Hardscape Boulevard	Prefers deep moist fertile soil. Will grow on drier heavier soil. Needs large space	Large
<i>Tilia cordata</i> Littleleaf Linden 'Glenleven' 'Greenspire' 'Greenglobe'	Non-Native	Hardscape Boulevard	Aphid & borer problems; suckers from base	Medium
<i>Tilia tomentosa</i> Silver Linden	Non-Native	Softscape Boulevard	Heat and drought tolerant.	Medium

Sub-urban Boulevards, Parks

Tree Species	Native Range	Use	Comments and Notes	Size
<i>Tilia x euchlora</i> Crimean Linden	Non-Native	Softscape Boulevard	Fruit messy suckers from base. For use in limited circumstances	Medium
<i>Tsuga canadensis</i> Eastern Hemlock		Park		
<i>Ulmus Americana</i> Elm 'Homestead' 'Pioneer' 'Jefferson'	Specific cultivars hybridized for disease resistance	Hardscape Boulevard	Tolerant of urban conditions and moist soil. These cultivars are currently shown to have good resistance to Dutch Elm Disease, but this is in flux and should be constantly reassessed.	Large
<i>Zelkova serrata</i> Japanese Zelkova 'Green Vase' 'Village Green'	Non-Native	Softscape Boulevard	Rapid growth Narrow branch angles promote fork split. Frost susceptibility when young	Large

Trees to be Avoided

Tree Species	Native Range	Comments and Notes	Size
<i>Acer platanoides</i> OR <i>Acer x platanoides</i> Norway Maple (many cultivars) or Norway maple cross	Non-Native	Surface roots conflict with and turf/girdling roots/aphid and wilt problems. Invasive.	Medium
<i>Acer negundo</i> Manitoba maple	Native to North America	Weak-wooded	Large
<i>Ailanthus altissima</i> Tree of Heaven	Non-Native	Invasive, host for spotted lantern fly	Large
<i>Alnus glutinosa</i> European Alder	Non-Native	Tolerant of wet & dry soil. Invasive tendencies checked by dry sites.	Medium
<i>Caragana arborescens</i> Siberian Pea-shrub	Non-Native	Toxic	Small
<i>Eleagnus angustifolia</i> Russian Olive	Non-Native	Invasive	Medium
<i>Fraxinus spp.</i> Ash (all species)	Native to Ontario	Susceptible to Emerald Ash Borer.	Large
<i>Morus spp.</i> Mulberry			
<i>Paulownia spp.</i> Princess Tree	Non-Native	Invasive (within the United States)	
<i>Pyrus calleryana</i> Callery Pear 'Chanticleer' 'Bradford'	Non-Native	Fireblight problems, weak wooded	Small
<i>Robina pseudoacacia</i> Black locust			
<i>Sorbinia spp.</i> Mountain Ash			

Trees to be Avoided

Tree Species	Native Range	Comments and Notes	Size
<i>Ulmus pumila</i> Siberian Elm	Non-Native	Invasive	Large
<i>Chionanthus virginicus</i> Fringe tree	Non-Native	Alternate host for Emerald Ash Borer	Medium