URBAN FOREST MASTER PLAN

CITY IN A FOREST

THIRD EDITION

CITY OF ROCHESTER, NY

2012

"City in a Forest"

An Urban Forest Master Plant for the City of Rochester, NY
Third Edition 2012

Prepared for
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Department of Environmental Services City of
Rochester, New York
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INTRODUCTION

One of the most distinguishing characteristics of Rochester, New York, is its forest of trees. There are numerous tree-filled parks, and practically every avenue and street in the city is lined with trees. Even the city's cemeteries, so often barren fields of funerary monuments, are veritable forests. Not only are trees everywhere, but their diversity and age are without rival.

Trees have always been one of the most significant features of Rochester's landscape. Pioneer settlers had to clear parts of the indigenous forest in order to erect buildings and roads. Then, in the early years of the 19th century, it was discovered that Rochester, with its rich soil left by glaciers and the climate-mitigating effects of Lake Ontario, possessed ideal conditions for horticultural nurseries. For the rest of the century, Rochester was the leading nursery center in the world, and these nurseries provided thousands of street and park trees to the city. So, the natural forest supplemented now by the man-made one gave Rochester one of the largest and most diverse collections of tree species anywhere. Today it is a giant arboretum, and our streets achieve a grandeur that is the envy of most other cities. Such a horticultural heritage that delivers enormous beauty as well as ecological and economic benefits deserves our most careful attention, nurture, and preservation.

Natural events in the 20th century have jeopardized the health and longevity of our urban forest. Dutch elm disease killed thousands of our elm trees in the 1950's and 1960's. A devastating ice storm in 1991 claimed 14,000 city-owned trees. Rochester responded to these disasters with organized efforts to stabilize and renew our treasured forest. In the case of the 1991 ice storm, the recovery efforts were massive and extended over several years. Planning and implementing that restoration underlined the need for an urban forest master plan. In 1992, therefore, an Urban Forest Technical Advisory Committee was appointed by the commissioner of Parks, Recreation and Human Services. The volunteer committee, which included area horticultural experts and community representatives, was charged to assist the city forester in developing the first master plan. Regional and national experts also contributed to the effort. In the process, the Forestry Division's history, policies, and management practices were evaluated; the future was envisioned and defined with comprehensive and progressive strategies. That effort was adopted on Arbor Day, 1998.

In 2012, this third edition of the plan was developed. This master plan reviews the unique history of urban forestry in our community, discusses the benefits of trees, describes Rochester's urban forest, compares benchmarks established in the previous plans, details elements influencing that forest, states the city's urban forest policy, and poses a series of challenges and recommendations.

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EXECUTIVE SUMMARY

Trees have been vitally important to Rochester since the city's founding. Charles Sprauge Sargent, the first director of Harvard University's Arnold Arboretum, called Rochester a city in a forest. Almost as quickly as trees were cut in the early settlement to make room for roads and structures, they were replanted for shade and decoration. The prominent flour miller, Hervey Ely, planted sugar maples along Washington Street in the 1830's; Josiah Bissel, a nurseryman, did the same along East Avenue in the 1840's. H. E. Hooker, owner of Hooker Brothers Nursery, recognized that street trees enhanced the value of residential properties when, as the developer of Oxford Street, he designed a mall and planted it with magnolias.

Many horticultural nurseries operated in Rochester in the 19th century. Ellwanger and Barry built the largest nursery in the world on 650 acres along Mount Hope Avenue.

The Rochester Parks Commission, at its first meeting in 1888, decided to hire Fredrick Law Olmsted to design a park system for the city. His major efforts include Genesee Valley Park, Maplewood Park, Highland Park, and Seneca Park. In 1894, the Parks Commission was empowered to care for existing street trees, and shortly thereafter, began planting them as well. The commission evolved into the Department of Parks in 1915.

In the 1950's, the Forestry Division was mobilized to remove elm trees infected by Dutch elm disease. A second challenge for Forestry occurred with the ice storm in 1991, which destroyed 14,000 public trees in the city. Additional events, such as the Labor Day windstorm of 1998, the April 2003 ice storm and the arrival of Emerald Ash Borer in 2011 continue to impact the urban forest.

BENEFITS OF TREES

The immensity and beauty of Rochester's urban forest are visible every day, but the benefits are often overlooked. Trees filter toxic pollutants from the air and release life-giving oxygen. They intercept rainfall and slow erosion and storm water runoff. Besides providing shade that cools people, street and structures, trees demonstrably cool the air itself on hot summer days. Cooling and heating energy savings of as much as 25 percent result from properly positioned trees.
Trees enhance the attractiveness of streetscapes, which results in increased property values. Trees reduce urban noise by blocking, absorbing, and diffusing sound waves. And finally, trees soften the hard surfaces of a city and connect us with nature.

TRANSFORMATION OF ROCHESTER'S URBAN FOREST

The City's managed urban forest includes 67,212 trees along city streets and in parks and cemeteries. Using the USDA's standard valuation for urban trees yields an assessed value in excess of $42 million.

52 percent are young (less than 12-inch diameter)
48 percent are mature (greater than 12-inch diameter)
5 percent are in excellent condition
53 percent are in good condition
42 percent are in fair to poor condition

Stocking is a measure of the number of existing trees versus sites available to plant more trees. The present stocking level is 75.66 percent.

There are 168 species with 15 tree genera in excess of 1 percent in the city-managed urban forest. Maples dominate the streets at 36 percent. Honeylocusts are second at 10.3 percent. Lindens constitute 8.7 percent, and Ash trees, 7.6 percent. Oaks, Sycamores, and London Planetrees also predominate.

ELEMENTS INFLUENCING ROCHESTER'S URBAN FOREST

Rochester's average temperature of 47 degrees F. places it in hardiness zone 6A. With an annual rainfall of 34 inches and snowfall of 93 inches, there is ample moisture for tree growth. This combination of temperature and moisture allows for an extraordinarily broad range of tree species to grow here.

Trees have many pests, in most cases however, it is environmentally prudent to allow natural systems to manage pest populations.

Construction is a major man-made influence affecting the urban forest. Often**,** fifty percent of mature street trees within a street re-construction project are lost within five years. Vandalism and de-icing salts also profoundly affect tree establishment and longevity.

Funding, and management practices, along with condition survey and data collection have the most direct man-made influence on our urban forest. Without funding, trees do not get planted, pruned or removed. Planning and organizing workloads, driven by data analysis, provides the foundation for effective management of our forest resource.

ROCHESTER'S URBAN FOREST POLICY

Rochester's urban forest is healthy and growing in size and grandeur. Citizens and visitors recognize and appreciate the environmental, economic, and social benefits our forest provides for our community and are engaged in its care and renewal. Rochester, a City in a Forest, is known throughout the country as a model in urban forestry stewardship and progressive management. The urban forest was considered an integral part of Rochester 2010: The Renaissance Plan, and impacted seven of the eleven campaigns.

The City of Rochester believes a healthy urban forest is an integral part of the city infrastructure and essential for the well-being of all area residents. It is the city's responsibility to protect, regulate, and fund the tree planting, maintenance, and removal on city-owned lands or within the public right-of-way in the most social, responsive, environmental and economic manner.

Mature trees will receive periodic pruning to remove potential hazards and promote tree health and longevity. Annual inspections will be performed to identify hazardous conditions. Ideally, one-fifth of the city's trees will be comprehensively inventoried each year. Tree removal will be completed to ensure public safety, urban forest health, and responsible fiscal management. Pest control will only be used when there is significant risk to a large population of trees. Stiff monetary fines will be imposed for destructive construction practices. Renewal of our urban forest will be accomplished through annual tree planting. Tree species selected for planting will not exceed 10 percent of the tree population to ensure minimal impact from future events. In 2004, the city adopted a policy of not planting trees of the Fraxinus (ash) genus in response to

the potential invasion by Emerald Ash Borer (*Agrilus planipennis)*.

CHALLENGES AND RECOMMENDATIONS

The Forestry Division and the Urban Forest Technical Advisory Committee identified current issues of importance which present challenges to sustaining the city's urban forest. In response to these issues, recommendations were developed by the committee to be utilized in the development and implementation of fiscal and operational plans. Annual status reports should be made available. This master plan should be reviewed in five year increments to evaluate its impact and to revise it as appropriate.

The environmental, economic, and social value of the city's urban forest has not been adequately quantified and recognized. In response, the Forestry Division should develop a promotional program; this could include self-guided tours of city-owned trees, cataloging champion trees, and solicitation of urban-forest research and publication projects.

Currently, more trees are being removed than are being planted. With the fiscal challenges facing northeastern municipalities, Forestry should strive to maintain adequate tree planting goals. Management and planting plans should be developed for Mount Hope and Riverside cemeteries. The city should strive to prune mature trees once every five years, and young trees once every three years.

Trees in pits and along arterial streets have an excessively high mortality rate. Forestry should continue to develop a unique management program for these trees. Also, through a series of efforts, the division should reduce the number of trees removed because of street re-construction damage to equal the overall city tree attrition rate.

Finally, a number of programs should be instituted to educate residents and secure community involvement in order to perpetuate our city in a forest. In additional to Arbor Day, an annual fall event which focuses on urban forestry should be developed and implemented. A series of brochures that inform residents about the division's services and provide useful information would be an effective educational method.

THE LEGACY OF ROCHESTER'S TREES

Trees have been vital to Rochester since the city's founding. It was practically an impenetrable forest when the first white settlers arrived. The density of trees made the trip from Stone-Tolan House, now 2370 East Avenue, to the Genesee Falls a difficult, full-day's journey, even utilizing Seneca Indian trails. Today, that four-mile distance can be traversed by car in 10 minutes. Trees then were so plentiful that early settlers built roads from them. Plank Road, though smoothly paved today, bears the name of its original composition. Another wooden highway was what has become East Henrietta Road today.

It was the forest of trees that saved Rochester from total destruction by the British in the War of 1812. The small village of Buffalo, vulnerably located on the flat sandy shores of Lake Erie, was pillaged and burned to the ground on December 30 and 31, 1813. Lewiston was similarly brutally attacked and burned. On May 14, 1814, the British fleet - consisting of eight large ships, several smaller ones, gunboats, and barges - anchored at Lake Ontario off the mouth of the Genesee River.

At the time, Rochesterville was a log cabin village of 300 people. With help from a few neighboring villages, Rochesterville mustered 33 men, 20 horses, and one cannon, and took the entire night to move its meager assemblage to the area that is now Charlotte. The next day was very foggy, and except for a few shared cannon shots, there was a stand off between the British and Americans.

Reinforcements for the Americans arrived on the second day, but they were woefully inadequate to the British might, so the Americans decided to trick the British by marching in circles in and out of the woods, with files of men passing visibly a number of times through a clearing. The British, not knowing how many troops they faced if they were to land, decided the gains were not worth the battle, and on the third day they sailed to the east. The forest had saved Rochester.

Charles Sprauge Sargent, the first director of Harvard University's Arnold Arboretum, called Rochester a city in a forest. It is an apt description because the area was originally a forest of red, black, and white oaks; beeches; red and sugar maples; basswoods; tulip trees, and white ashes. Settlers gathered butternuts for food from trees that grew along the river.

When the first saw mills were established at the falls on the Genesee River, finished lumber became available, and the architecture that the settlers remembered from their New England background sprouted here. One of the early settlers, Hamlet Scrantom, wrote in 1812, the country is very pleasant and fertile, timbered with oak, chestnut, hickory, black walnut, and white wood, some of enormous size. I saw one white-wood log twelve feet long which produced 1000 feet of clapboards.

In the 1830's, the prominent flour miller Hervey Ely, planted sugar maples and other trees along the west side of Washington Street for, he said, shade and decoration. They were the first trees in Rochester set out for ornament.

Rochester truly awakened to its horticultural potential in the 1840s. After many trees were cut to clear land for building, replanting occurred to decorate and shade city streets and lawns. The many nurseries that developed here were influential in this effort. Josiah W. Bissel, a nurseryman, was responsible for planting the first street trees on both sides of East Avenue in the mid -1840's. They were horsechestnuts. Some people contend that the horses hitched to the trees died from eating the bark of the horsechestnuts. Others maintain that the horsechestnuts died form the horses eating the bark.

Perhaps both are true. In any case, the horsechestnuts were replaced with elms, which now, too, have been replaced.

Many developers recognized that street trees enhanced the value of residential properties. H. E. Hooker, owner of Hooker Brothers Nursery, and developer of Oxford Street, designed the street in 1880 with a mall on which he planted a hybrid cross between Chinese white and Japanese purple magnolias, which are noted to this day for their delicate color.

George Ellwanger and Patrick Barry, who built the largest nursery in the world in the middle and late 1800s on 650 acres along Mount Hope Avenue, scoured Europe for fine trees that they could propagate in America. Their efforts can be seen throughout Rochester, particularly in the grand European beeches they developed. These include fern-leafed, copper, purple, and weeping beeches.

At its first organizational meeting on May 7, 1888, the Rochester Parks Commission decided to invite the great American landscape architect, Frederick Law Olmsted, to design a park system for the city. His major efforts included Genesee Valley Park, Highland Park, Seneca Park and Maplewood Park. Olmsted's concept was to connect the parks to other areas of the city by means of a parkway system. Today, Seneca Parkway is the only element of his original plan that remains substantially as planned.

Rochester was the last municipal park system designed by the renowned Olmsted. After he retired, his firm continued to do work in Rochester, designing Brown Square, Cobbs Hill Park, Jones Square, Susan B. Anthony Park, the University of Rochester quadrangle, and several smaller public spaces.

In its first annual report, the city's Parks Commission mentioned street trees and residents efforts to plant trees in front of their houses. By 1894, the Common Council empowered the Park Commission to care for existing street trees.

Beginning in 1896, the commissions annual reports record areas which had street trees pruned. The reports also document an ongoing battle with tussok moths, commonly called tent caterpillars. Work requested by residents each year far exceeded the Park Commissions ability to accomplish it.

In 1899, the Commission began to plant trees along city streets. By 1915, the Park Commission was abolished and its duties transferred to the newly organized Department of Parks.

In the early 1900s, the influence of Rochester's nurseries was apparent in the species selections made by the city or planted by developers and available to residents at low rates. The Ellwanger and Barry Nursery noted certain trees in its catalogs as suitable for parks, avenues, and streets. These included a wide variety of maples, elms, and poplars along with select species of linden, larch, horsechestnut, and locust designated as suitable. Not surprisingly, these species are still found on city streets, and some continue to be planted.

In the 1950s, the Forestry Division was mobilized to remove elm trees infected by Dutch elm disease. An inventory was completed that was a progressive management approach for the time. The common practice of planting a single type of tree (monoculture) along a street or park unfortunately created favorable conditions for the spread of Dutch elm disease in the American elm. An estimated 20,000 American elms along numerous residential streets and grand boulevards in Rochester were lost to the disease over a 15-year period. As a result, subsequent planting included a diversity of tree species on a street. In the years to come, however, the practice varied depending on the decisions of the City Forester

Elm trees along East Avenue circa 1930

The ice storm of 1991 had a great impact on Rochester's urban forest. Approximately 14,000 public trees were removed and subsequently replaced over a four year period. The ice storm shaped the future of Rochester's urban forest. A tree planting plan was developed to guide the replanting. Key to the plan was integrating a diversity of tree species along a street to minimize the impact of future events. Planting plans were developed for every street with a selection of trees matching a desired visual image and considering the site characteristics.

Rochester's verdant environment of indigenous flora, extensive horticultural nurseries and masterfully designed parks, has had a profound effect on the city in a forest that we know today. The Forestry Division is committed to continuing this legacy of gracious, tree-lined streets and glorious parks.

Special Thanks to Richard O. Reisem who authored
'The Legacy of Rochester's Trees'
for the first edition of 'City in a Forest. '

TRANSFORMATION OF ROCHESTER'S URBAN FOREST

It is the city's responsibility to manage the care of trees located within the city right-of-way and on city properties. This includes trees lining city streets, in our parks and cemeteries, in vacant lots and on other public properties.

The city's managed urban forest includes 67,212 trees located along city streets and in parks and cemeteries. Using the USDA's standard valuation for urban trees, these trees have an assessed value in excess of $42 million. Included are approximately:

56,500 street trees
18,200 street sites available to plant trees
10,700 park and cemetery trees on 1,076 acres
~10,000 trees on vacant lots and other properties

The park tree inventory does not include Ontario Beach Park, Durand Eastman Park, Highland Park, Genesee Valley Park East, and Seneca Park. These five (5) parks are maintained by the County of Monroe under terms of the 1966 City / County Parks Agreement.

In 1998, the first 'Master Plan: A City in a Forest,' included detailed information on the city maintained urban forest. The data used in that information was generated in 1996. This gives us a window in time, a glimpse into the past, and provides a baseline of data for comparison purposes. Interpretation of the data should be made from a thorough understanding of the data collected, as well as how the data is maintained and managed.

The original inventory data was collected in a DOS based relational database. With the necessity in 1999 to prepare for the data conversion in anticipation of Y2K, the original provider, ACRT, Inc. was contracted to perform the task. In the migration process, the mapping sub-program of the database was rendered unusable. This has led to the slow degradation of data related to park trees, specifically the ability to track work performed on specific trees. Thus, the information reviewed here has been impacted.

In the fall of 2003, another problem arose. The database began to duplicate information erroneously; statistical functions became unreliable. It was estimated that 5 to 10 percent of the data was corrupted. Working with the vendor, the source of the corruption was identified, and the data was repaired. As this plan is written, the vendor is preparing an up-grade of the database program. It is anticipated that during 2005, the data will again undergo a migration to this new software up-grade.

In 2009 Forestry set out to add GIS data to the parks tree inventory. The previous parks inventory was contained in the ACRT Tree Manager database under an address location. Each address location contained hundreds to thousands of sites, these sites referenced hand drawn and computer generated maps. The old maps were outdated, clustered and hard to read. Many of the maps had not been updated since the mid 1990's. Forestry's new Parks tree database is GIS driven. Every park tree in the city has a digital point on an electronic map, each point contains the same information previously stored in Tree Manager. Points were collected with a GPS and uploaded into the ESRI mapping software where they were connected to forms, requests, and records in a database. Trees can now be created, deleted, and modified in the field keeping an up to date inventory that can be visually deciphered by crews and technicians.

STATE OF THE URBAN FOREST

Assessing the state of the urban forest is accomplished by an analysis of the age of the trees, their condition (health) and the stocking rate, which compares the number of existing trees to the number of available planting sites. Analysis of the evolution of the forest over nearly a decade provides a waypoint in the path laid out in the original master plan. That original document recommended the re-evaluation of the contents and condition of the urban forest on a regular basis. The regular evaluation of benchmarks serves to map the path the urban forest has taken; it is a reflection of the maintenance efforts, it records the impact of natural events (ice, wind and drought) and serves as a guide post on the journey to maintain a healthy urban forest.

Age

The age of Rochester's urban forest is gauged by summarizing the diameter of each tree in the inventory and grouping the summary into six-inch diameter classes. The assumption is that the larger the diameter, the older the tree. The diameter distribution of an ideal urban forest should have a negatively skewed slope in the one- to six- inch diameter class. This would indicate a large population of young trees. The slope should then even out through the 30- to 36-inch diameter class. This would indicate a stable middle-aged tree population. Finally, the slope should taper off, indicating the maturing of the urban forest.

In 1996, sixty-eight percent of the trees were 12" in diameter or less; in 2004 this figure had dropped to fifty-eight percent. (Figure 1). The 1996 figure reflects an exceptionally large population of young trees, the result of the restoration efforts from the 1991 ice storm. The 2004 percentage continues to reflect that planting, as the young trees begin to age.

However, the slope has begun to level out as the forest slowly approaches a more ideal state. Although it is desirable to have the highest percentage of the forest in young trees, this trend also leads to increasing maintenance needs as the trees age.

Mature trees are categorized as having a diameter breast height (DBH) of 13- to 25-inches. The 1996 population percentage, twenty-seven percent, had increased to thirty-three percent in 2004. This change in population reflects the growth of trees planted immediately after the 1991 ice storm. The 1996 percentage was considered low, the direct result of ice-storm damage and removal. The percentage of trees in the 19- to 24-inch class has begun to level out as compared to 1996. This reflects the continued recovery of the urban forest from the 1991 storm, and approaches the ideal distribution within the forest.

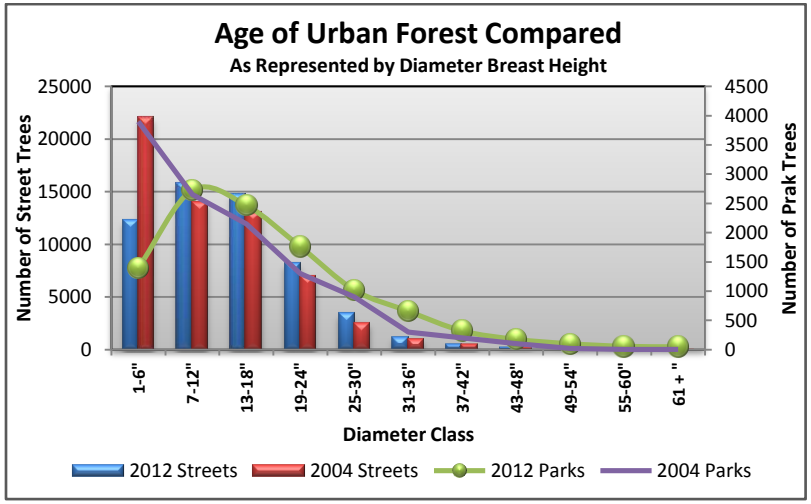


Figure 1

The number of "old" large trees, 25 inches and greater in diameter, tapers off as anticipated, mirroring percentages present in the 1996 data.

The importance of these large trees cannot be overlooked. They are a link to our past, and provide proof that a species will perform well in similar.conditions. These are the proven survivors, and warrant special care and recognition.

Condition

The number, or quantity of trees within the forest is important, but the quality or condition of the trees is critical. The condition of a tree is determined using a tree condition evaluation chart. Points are awarded for factors in six (6) categories: Crown development, Trunk Condition, Major Branch Structure, Twig Growth Rate, Insect & Disease and Roots. The points accumulate, generating a condition value for the tree. With the change in the number of trees, the percentage of trees within each condition class is compared. (Figure 2). Inventory data does not exist for trees on vacant lots, thus they are not included in the graph.

Trees determined to be in 'Excellent' condition exhibit a well balanced crown, a sound and solid trunk, no defects in branching structure, and twig growth that is typical for the age and specie of the tree. These trees show no sign of both insect or disease problems, and have no root problems. To be considered 'Excellent' the tree must rate at the top of each variable: it must have a perfect score. Thus statistically, one should expect a very small percentage of trees to fall into this condition rating.

In the period between 1996 and 2004, there is a more than 75% increase in the percentage of trees in the 'Excellent' category. This is due, in part, to procedural practices, specifically the systematic pruning of street trees.

Trees in 'Good' condition have decreased by approximately 10% between 1996 and 2004. Normally this would not be considered a positive change; however, high populations of young trees present in 1996 impacts the percentage.

The number of trees in 'Fair' condition reflects an increase in both street and park settings. An ice storm in April of 2003 severely impacted the condition of trees, particularly north of the Route104 corridor. Continued benchmarking of the percentage of trees in good condition will provide long-term measure with which to compare management practices, and to track recovery from the storm event.

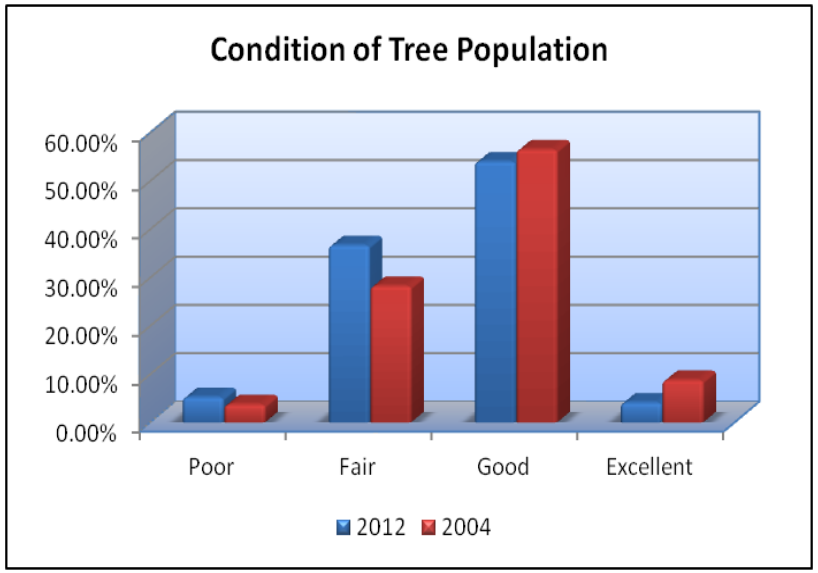


Figure 2

The condition of trees on city-owned vacant lots and other properties was unknown in 1996. However, Forestry's workload was gradually increasing in response to problem trees on vacant lots. This situation intensified after the April2003 ice storm. During summer of 2003, Forestry Technicians surveyed every then city-owned vacant lot and identified trees with a high risk of failure. Forestry crews were then dispatched to mitigate the hazards.

Stocking

Stocking is a measure of the number of existing trees compared to the total number of available tree sites. Stocking provides a measure of the forest population stability. The figure is only calculated for street trees, as sites to plant trees in parks are not inventoried and are most appropriately evaluated using long-term data. In 2004, there were 58,262 trees in 77,613 available sites with a resultant stocking rate of 75.07%. In January 2012, the stocking rate was 75.66%, with 56,494 trees in 74,666 available sites. Compared with national statistics, and trends in urban areas, this is an encouraging statistic.

Young Tree Mortality Rate

Beginning in 2001, the Forestry Division undertook the responsibility for planting trees in-house. Initially instituted in an effort to contain rising costs, the process has yielded additional benefits: the mortality rate of 15 – 25% after a three year period using contract planting has dropped to an outstanding mortality rate of less than 5 %. The mortality rate for the fall 2003 bare root planting was 1% after a one (1) year period.

Trees in the Forest

There are 168 tree species (Appendix A) with 15 tree genera in excess of one percent (1%) of the total tree population. Maples dominate the population with thirty-six percent (36%) of the street population, and twenty-two percent (22.1%) of the park trees. The remaining fourteen tree genera constitute 10 percent, or less, of the total population. Norway maple is the most dominant species. This presents a significant risk for high losses if an aggressive insect or disease pest were to attack Norway maples. Dutch elm disease devastated American elm trees throughout eastern cities in the 1950's because the elms were so numerous and lined many city streets. As a result, current arboricultural standards recommend that a tree species not exceed ten percent (10%) of the forest population in order to minimize potential losses and to passively control pests attacking a specific species.

Norway Maples

The percentage of Norway Maples in the 13 to 18 inch DBH (diameter breast height) class peaks in the early mature age (Figure 3). The remainder of the maples fall evenly distributed in two other distinct categories: 1 to 12 inches in diameter, and 19 inches and above. As this middle third ages, it should be anticipated that maintenance needs will increase.

Thirty-eight percent (38%) of the maples located on the street are in good or excellent condition; Fourty-nine percent (49%) are considered fair, and the remainder poor (Figure 4). The high percentage of fair and poor trees indicates that there will be high maintenance needs and costs and a significant reduction in the total population in coming years. The decline from the 13- to 18-inch diameter class also suggests a high mortality rate with few trees surviving to larger diameter classes.

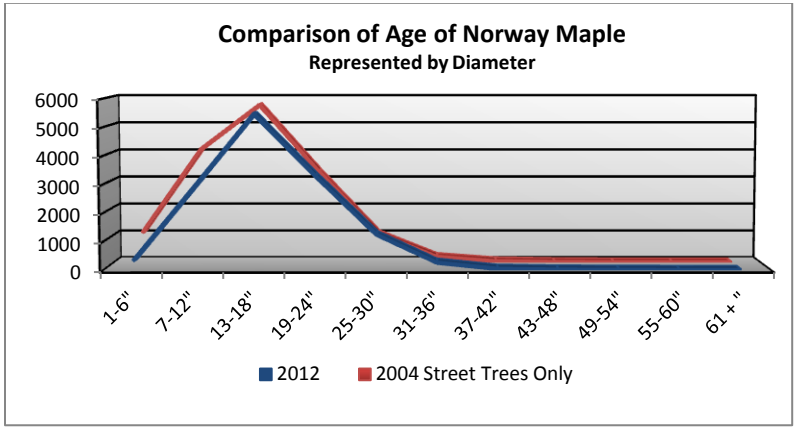


Figure 3

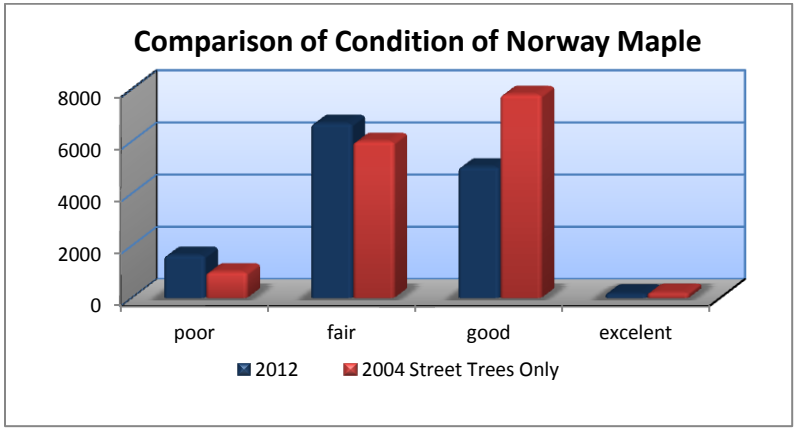


Figure 4

Honeylocust

Honeylocust trees represent the second highest percentage of street trees at ten percent (10.34%) (Table 1). Thirty-four percent (34.1%) of them are young trees, 12 inches and less in diameter (Figure 5). In 1998, seventy percent (70%) of them were twelve inches in diameter or less, and in 2004 fourty-six percent (46%) were twelve inches in diameter or less. This is a reflection of this species growth rate. However, there will be fewer of this species planted in the future, as the recommended threshold of not exceeding ten percent of any one species to maintain healthy species diversity, has been crossed. These tenacious trees policy of only one replacement for each one removed.

The condition of honeylocust (Figure 6) reflects the species adaptability to the urban environment; they are a proven survivor of the varied site conditions along city streets.

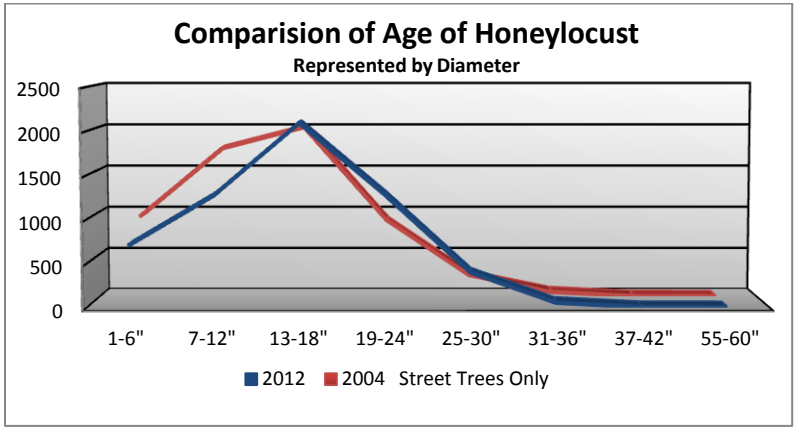


Figure 5

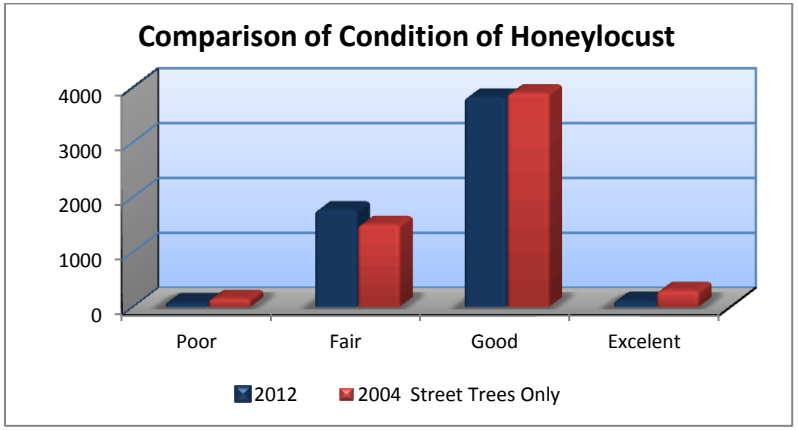


Figure 6

Linden

Linden trees represent the third highest percentage of street trees at nearly eight percent (8.72%) (Table 1). Of these, eighty percent (80%) of them are littleleaf linden, the official city tree. Fifty-five percent (55.3%) of the lindens are 12 inches in diameter or less and fifty-six percent (56.4%) are in good to excellent condition (Figures 7 & 8). Several city streets display the grandeur of large silver lindens planted at the turn of the century.

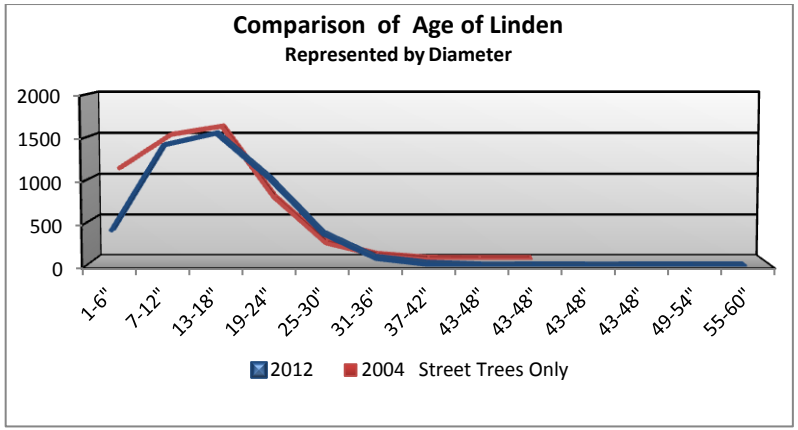


Figure 7

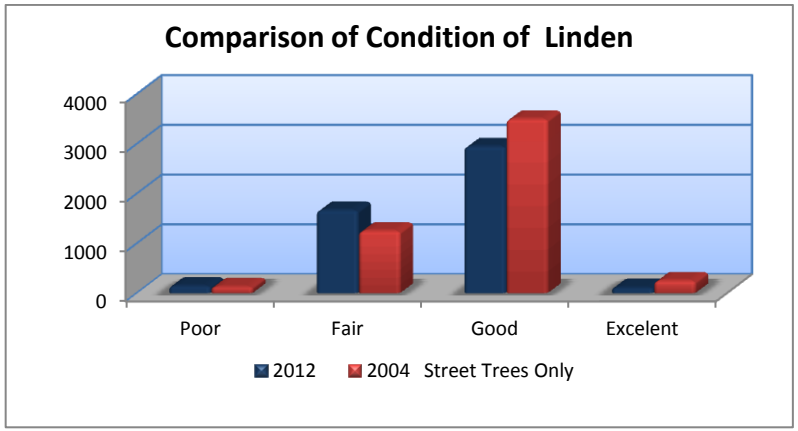


Figure 8

Ash

Ash trees represent eight percent (8%) of street trees, and four percent (4%) of park trees (Table 1). Nearly seventy (70%) of the street ash are young trees less that 12 inches DBH (Figure9). With the moratorium on the planting of ash in anticipation of their susceptibility to Emerald Ash Borer (EAB), their percentage will change. Currently, two-thirds of them are in good to excellent condition (Figure 10).

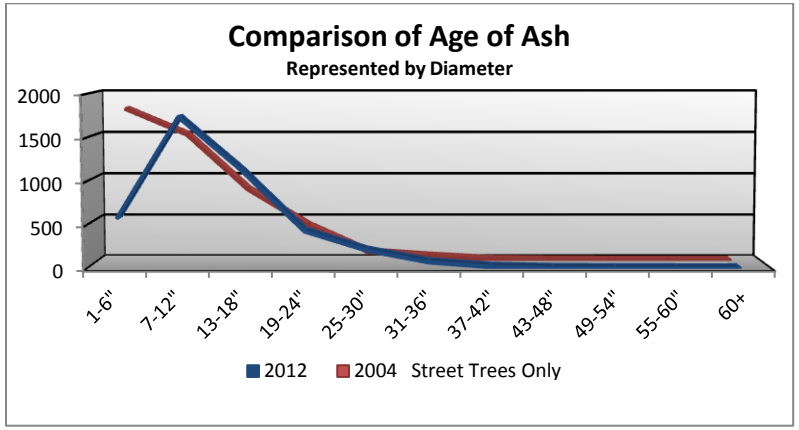


Figure 9

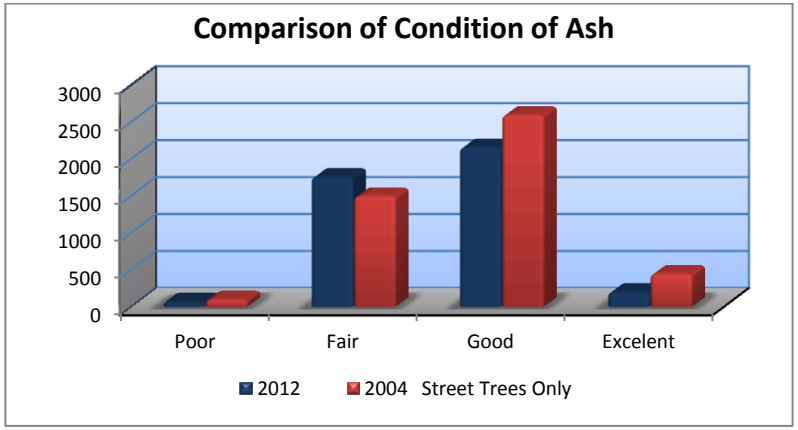


Figure 10

Oak

Oaks are comprised of sixteen different species with red oak being predominant. Rochester's hardiness zone permits a wide variety of oaks in the population including the opportunity to utilize some of the oaks, such as *Quercus nigra* and *Quercus impricaria*, both native to more southerly regions of North America.

Sixty-two percent (62.8%) of the oaks are 12 inches or less in diameter and twenty-four percent (24.69%) are nineteen inches or greater in diameter (Figure 11). Eighty-five percent (81.36%) of the oaks are in good or excellent condition (Figure 12).

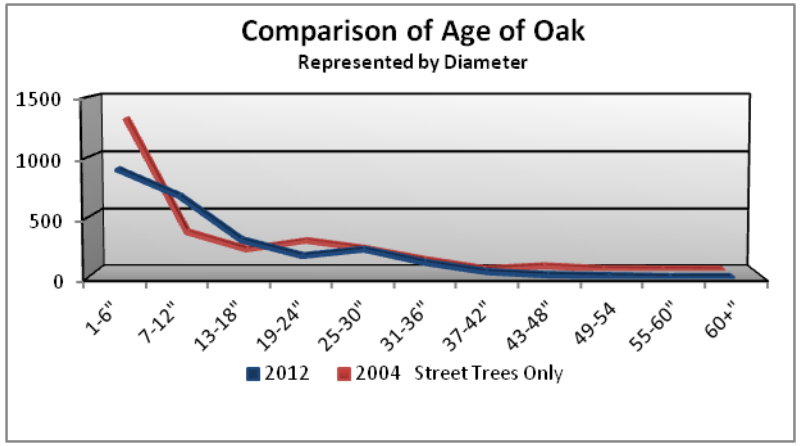


Figure 11

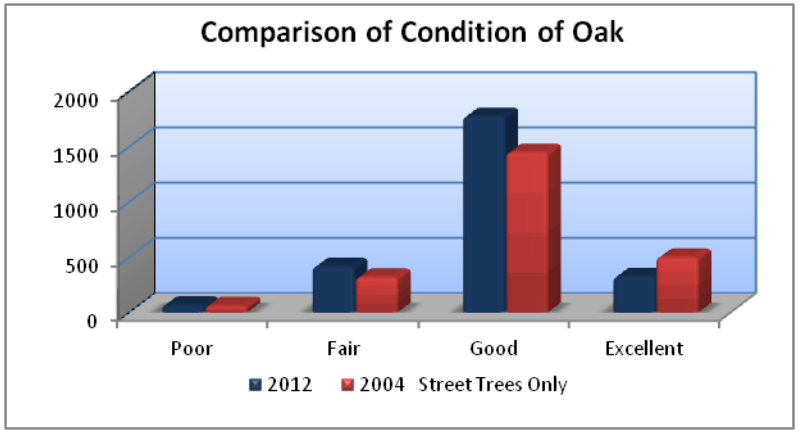


Figure 12

Planetree

Sycamores and London planetrees have a broad size distribution with thirty percent (30.57%) being twelve inches or less in diameter (Figure13). There is a significant population fourteen percent (13.94%) that are 31 inches in diameter or greater, Seventy-five percent (75.28%) of the planetrees are in good to excellent condition (Figure 14).

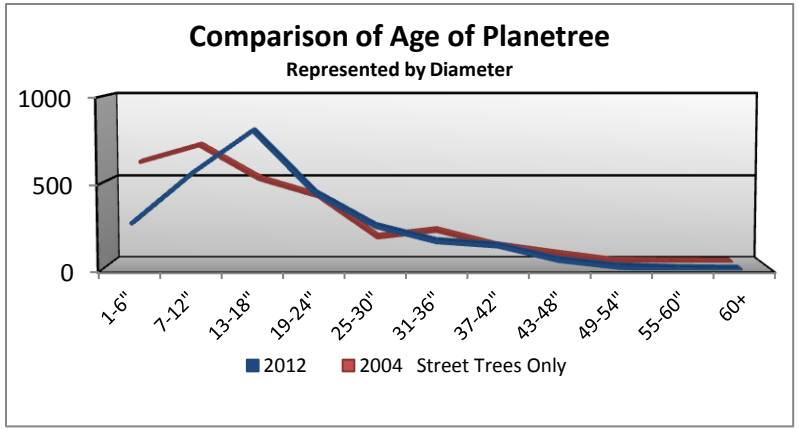


Figure 13

Other Species

The remaining genera with a population greater than two percent are small ornamental trees with showy flowers, boosting our flower-city image. The conifers, pine and fir are found predominantly in the city parks. With the variety of tree species in Rochester's urban forest, diversity is not limited and is the result of pioneering efforts over the years. This diversity is made possible by our climate and other influences unique to the Rochester region that allows experimentation with different tree species. Continued commitment to planting a diverse population is enhanced by the development and availability of pest resistant varieties and cultivars in the nursery industry.

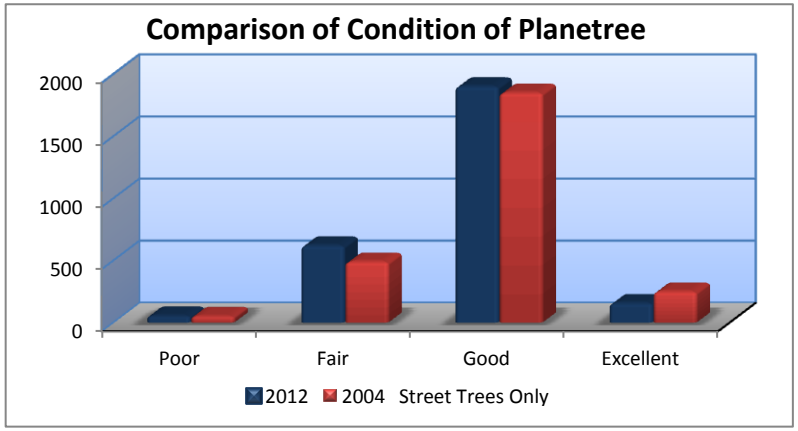


Figure 14

Dominant Species of the 2012 Street Tree Population

Tree Species	Number	Percent
Maple	20,356	36.03%
Honeylocust	5,842	10.34%
Linden	4,925	8.72%
Ash	4,314	7.64%
Planetree	2,746	4.86%
Oak	2,590	4.59%
Pear	2,304	4.08%
Japanese Tree Lilac	1,922	3.40%
Cherry	1,478	2.62%
Zelcova	1,401	2.48%
Crabapple	1,308	2.32%
Hackberry	916	1.62%
Hawthorn	743	1.31%
Sweet Gum	723	1.28%
Other Species	4919	8.71%
		100.00%

Dominant Species of the 2012 Park Tree Population

Tree Species	Number	Percent
Maple	2,376	22.17%
Oak	1,716	16.01%
Pine	638	5.95%
Spruce	595	5.55%
Linden	548	5.11%
Crabapple	521	4.86%
Honeylocust	465	4.34%
Arborvitae	450	4.20%
Ash	330	3.08%
Planetree	330	3.08%
Cherry	174	1.62%
Walnut	151	1.41%
Magnolia	131	1.22%
Yew	124	1.16%
Hickory	107	1.00%
Other Species	2062	19.24%
		100.00%

Dominant Species of Rochester's Urban Forest
Table 1

USDA Plant Hardiness Zones

Figure 15

ELEMENTS INFLUENCING THE URBAN FOREST

The urban forest is constantly subjected to elements of influence, both man-made and natural. This is no different than a natural forest system. Periodic natural events and urbanization cause tree mortality and create opportunities for rejuvenation. In the urban environment, managing these elements can be accomplished provided the elements are identified, defined, and considered as tasks associated with managing our tree population.

NATURAL ELEMENTS OF INFLUENCE

Climate

Annual rainfall and temperature ranges of regional climates create environments for various tree species to thrive and others to fail. Rochester's temperate climate has an average rainfall of 34 inches per year and an average snowfall of 93 inches per year, which provides ample moisture for plant growth.

Rochester's average temperature is 47 degrees F.; its average high is 90 degrees F. and average low, 2 degrees F. This places the region in U.S.D.A. hardiness zone 6A. (Figure 15). Interestingly, 30 miles south of Rochester is actually one hardiness zone colder. Typically, as you travel south climates get warmer and correspondingly so do hardiness zones; however, Lake Ontario moderates temperature extremes and dominates our weather patterns.

These moisture and temperature patterns allow the use of a broader range of tree species than regions with more extreme temperatures and less annual rainfall.

Storms

Rochester regularly experiences high wind events that damage trees. The region experiences an average of one 60 mph gust event per year and twelve events with wind gusts in excess of 25 mph. These wind storms may cause damage to trees by breaking limbs or uprooting trees.

The region experiences an ice storm on average once every seven years, significant events once every 30 years. The city has had significant ice storms in 1927, two in the 1950s, another in 1991 and most recently in 2003. The 1991 storm was classified as a 100-year event and destroyed 14,000 publicly owned trees worth over 12 million dollars. To remove, replace, and prune damaged trees cost approximately $4.8 million and this event continues to have a long-term impact on forest health. The frequency of these events dictates that tree selections should be made utilizing those with inherently strong branch structure.

After the 1991 ice storm, an Urban Forest Emergency Response Plan was developed to reduce the response time and impact of storm events. The plan has demonstrated its strength on several occasions; most notably the Labor Day wind storm of 1998 and the ice storm of April 2003.

Soils

Rochester soil is classified as urban; however, it is predominantly sand/clay in texture and alkaline in pH. Such composition dictates evaluation of the soil at a planting site, selection of trees that are tolerant of higher pH, and avoidance

of trees that prefer acid soil.

Insect and Disease Pests

Insect pest populations fluctuate annually, damaging city trees. In most cases, however, it is environmentally prudent to allow natural systems to control pest populations (Table 2). Some of these pests do create nuisance problems for adjacent homeowners. Aphids drop sticky honeydew from trees on cars and property. Elm leaf beetles may enter homes to winter. Over time, high pest populations stress a tree and effect tree health. Control measures may be warranted in these cases; however, current pesticide application laws make it prohibitive along city streets. New reliable injection methods may provide cost effective treatment with minimal tree and environmental side effects.

Common Diseases & Pests of Rochester's Urban Forest

Disease	Insect Pests
Verticillum Wilt	Aphids
Fire Blight	Adelgids
Dutch Elm Disease	Scale
Anthracnose	Elm Leaf Beetle
Polyporus squamosus	Locust Plant Bug
Ganoderma	Bees
Applantum	Ants
Lucidum	Eriophyd mites
Nectria	Vibernum Leaf Beetle
Eutypella	
Sooty Mold	

Table 2

Forestry monitors insect pest populations and the presence of tree diseases. Targeted control measures are used as needed. Large scale control measures are rarely required. An exception is Dutch elm disease (DED). DED devastated American elm populations throughout American cities including Rochester. An estimated 20,000 American elms were lost in Rochester from the late 1950s through the early 1970s. Large-scale chemical control measures were used in an attempt to control the spread of DED; however, they proved ineffective. Removal of infected trees ultimately proved to be the most effective control measure. This event changed urban tree management from a single-tree management approach to a forest-system approach, which considers the dynamics of influence and interaction within a group of trees and effects on the population as a whole.

The discovery of Asian Longhorned Beetle (*Anoplophora glabripennis*) (ALB) in New York City, Chicago, IL, Rahway, NJ, Worcester, MA, and Toronto, Ontario, Canada, and the potential for an infestation in Rochester led to the implementation of a proactive search for this invasive species in 2000.

Asian Longhorned Beetle on Maple

Posing a greater threat to the urban forest is the discovery of Emerald Ash Borer *(Agrilus planipennis*) (EAB) in seventeen trees within the City of Rochester in 2011. Larvae feed in the phloem and outer sapwood of ash trees, producing galleries that eventually girdle and kill branches and entire trees within a few years. The aggressive invasive nature of this pest, coupled with the large percentage of ash in Rochester's urban forest, led to the prohibition of planting ash by the Forestry Division in 2004.

With the discovery of EAB in Cattaraugus County NY in 2009 city personnel began formulating an EAB management plan. In 2010, 300 Ash trees in poor condition were removed and replaced. Also in 2010, EAB was discovered in Chili, New York within Monroe County. With the discovery of EAB closer to the city limits city personnel changed direction for managing EAB and acquired additional funding to chemically tree Ash tree that were in fair to excellent condition. An additional 400 poor condition or untreatable trees were removed and replaced in 2011. Beginning in the spring of 2011 Forestry staff chemically treated 4000 ash trees using a trunk injection method and the pesticide TREE-äge® (*Emamectin Benzoate*). This treatment will protect Ash trees from EAB for three years at which time the trees will need to be treated again. Forestry staff will continue to monitor Ash trees and inspect for EAB presence. Research and information is continually being update and many different agencies battle this invasive insect.

Adult Emerald Ash Borer (*Agrilus planipennis*)

MAN-MADE ELEMENTS OF INFLUENCE

In contrast to the tree-friendly environments of our parks and cemeteries, street tree sites present difficult conditions for tree survival. Street trees must co-exist with utilities in the right-of-way. Underground utilities and overhead communication and electrical distribution lines present potential conflicts. Motor vehicle traffic may cause direct damage by hitting trees, and exhaust fumes may create a stressful environment for tree health. Motor vehicle safety and citizen expectations require the use of de-icing salts during the winter months. Soil compaction from pedestrian traffic and vehicles stresses root systems. Increased summer temperatures, created by heat held and radiated by pavement, increases moisture stress on trees.

These influences increase in intensity as the growing space for trees decreases. Tree lawn width is a measure that can indicate relative degrees of influence, potential management requirements, and restrictions for plant selection. The wider the tree lawn the more potential growing space there is for trees; stress decreases, and tree health improves.

Almost 36 percent of available street tree sites are located in tree lawns with widths of 5 feet or less (Figure 16). This is a concern, because this condition is increasing with road widening.

Narrower tree lawns and overhead utilities necessitate the use of smaller, shorter-lived trees in order to minimize potential conflicts with utilities, and because their growing-space requirements are less than larger trees.

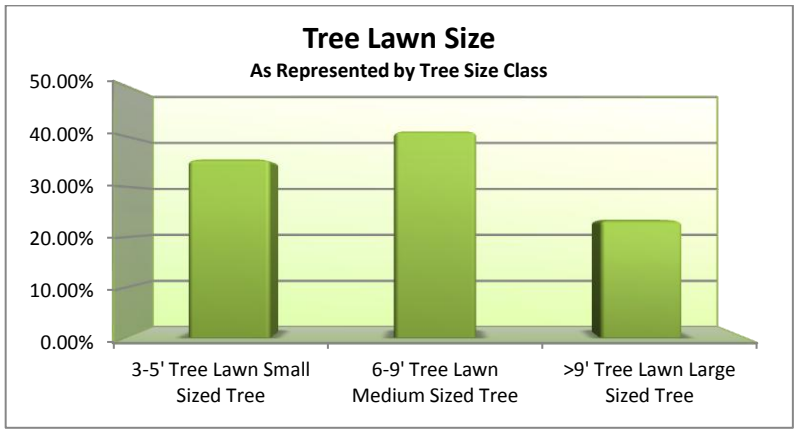


Figure 16

These stresses are increased along arterial streets. Ambient summer temperatures increase with wider street pavement; air pollution increases with increased traffic; and de-icing salts impact tree longevity. There are approximately 14,000 tree sites along arterial streets.

Tree pits are an additional site feature found along arterial streets. Tree pits are surrounded by concrete, which increases ambient temperatures, reduces usable soil for the moisture. Tree pits serve as drainage points for winter de-icing salts, greatly increasing the concentration of these salts in tree pits. Concrete surrounding trees leaches lime which further increases the effect of our already high pH-soil. Tree pits in sidewalks constitute less than 3 percent of the available street tree sites

Construction

Construction is a major man-made influence affecting the urban forest. Fifty percent of mature street trees within a construction project are lost within five years. Tree damage and loss is the result of cumulative effects of construction practices. Root cutting, soil compaction, grade changes, stockpiling of soil, and construction debris (Figure 17) all profoundly affect tree health. Backfilling tree lawns with construction debris degrades soil quality, which in turn, impacts tree health and survivability.

Utility Improvements

The Department of Environmental Services issues an average of 1,400 work permits annually to conduct work within the city right-of-ways. This work includes repair and improvements to underground utilities and usually involves working adjacent to trees. Excavation equipment can damage root zones by severing roots when digging and compacting the soil.

Figure 17
Typical Stockpiling of Construction Materials

Tree pruning to provide clearance for overhead utilities and street lights also creates additional stress on trees. It can be, and is, avoided by proper tree and site selection used today when planting. However, proper pruning and coordination of pruning activities between the city and utilities is needed to minimize the impact to existing trees.

Suitable protection standards have been developed, and were

published as 'Standards for Utility and Construction Work in the Right Of Way and on Public Property which Impacts Street and Public Trees.' Enforcement of these standards is required to prevent unnecessary damage and prolong tree longevity.

In some cases tree removal may be a more desirable management tool to eliminate these conflicts and reduce management costs over the long term.

Vandalism

Vandalism is a widespread problem and causes significant damage to Rochester's urban forest. Trees are damaged by motor vehicles, adults who consider them a nuisance and children who don't appreciate their value.

Pollution

Air pollution and de-icing salts have a profound effect on tree longevity. The City of Rochester applies an average of 25,000 tons of sodium chloride and 16,000 gallons of calcium chloride on arterial and collector street each year to control ice and snow. Since significant reductions of either of these materials is not yet practical, the use of tree species that are tolerant of these conditions limits the choice of trees that can be used along these streets.

Funding, Management and Condition Studies

Funding, management practices, and periodic condition studies have the most direct man-made influence on our urban forest. Without funding, trees do not get planted, pruned or removed. Planning and organizing workloads and conducting condition studies provide the foundation for effective and efficient management of our forest resource.

Funding Allocations

The City of Rochester's primary sustained funding source for forestry operations is the operating budget. Allocations have averaged $882,500 over the last 10 fiscal years (Figure 18). Capital funds are allocated for the purchase of small and motor equipment to support operations.

Capital funds are allocated for Forestry Operations including tree planting, tree removal, and pruning. Allocations have increased for tree planting and pruning. Tree planting has historically been funded under the capital budget for street improvement projects. In 1996, capital funds were allocated for tree pruning as part of the city's 50 percent match for a

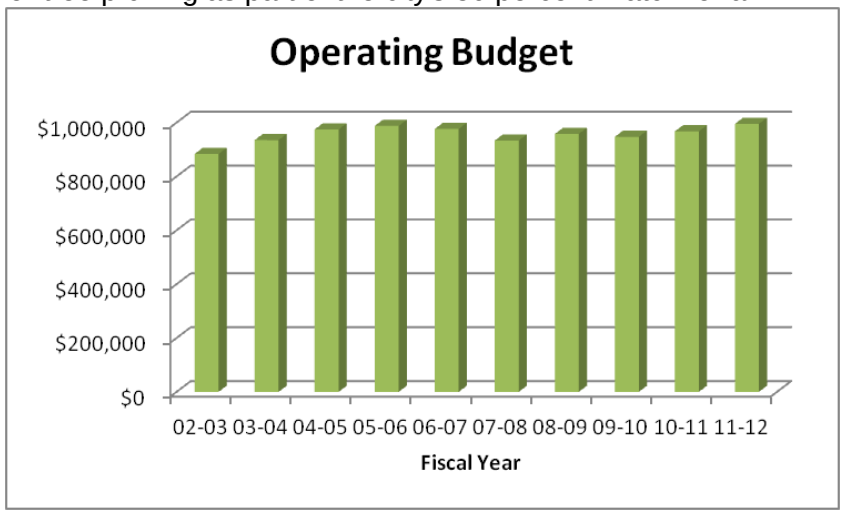


Figure 18 - Operating Budget

Federal Emergency Management Agency (FEMA) grant. Funding continued in fiscal years 1996-1997 and 1997-1998. These funds were used to hire contractual labor, and represent a shift in management philosophy. Beginning in fiscal year 1998-1999, the cost of contractual pruning was wholly borne by the city. Trees were acknowledged as part of the city's infrastructure. In fiscal year 2004-2005, this allocation was severely reduced as part of overall city

budgetary constraints. It is anticipated that this is a one time allocation reduction (Figure 19).

Capital funding for Forestry equipment is allocated to the Department of Environmental Services. This equipment is needed for in-house staff to complete the various management tasks required. This allocation had decreased significantly until fiscal year 1995-1996; however, capital funding has increased in subsequent fiscal years.

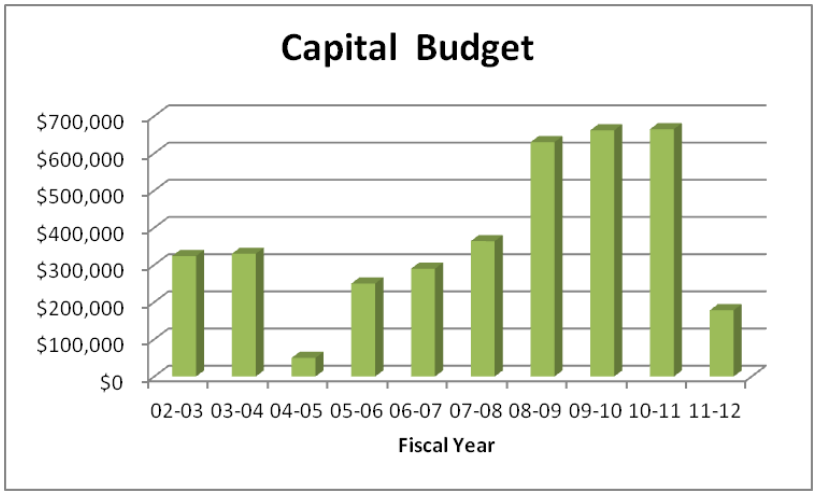


Figure 19 - Capital Allocations

Beginning in 2000, the Forestry Division undertook the responsibility for planting trees in-house. Initially instituted in an effort to contain rising costs, the process yielded additional benefits including improved survival rates and fiscal efficiency

Outside Funding Sources

The Forestry Division has received funding from outside sources. When a 'disaster' is formally declared, the Federal Emergency Management Agency (FEMA) provides reimbursement for recovery activities; providing 75 percent of the covered costs. Funds are also made available from New York State by State Emergency Management Organization (SEMO), providing 12.5 percent. The remaining 12.5 percent is the responsibility of the city. Beginning with the 2003 ice storm, the Federal Highway Administration (FHWA) also began providing 100 percent reimbursement for covered activities on specific streets.

In 1996, FEMA awarded a grant for tree pruning under the Hazard Mitigation Grant Program, which involves equal amounts of federal and local funding. This program was designated to fund projects in disaster areas in order to minimize the impact of future natural events. The grant funded pruning of 6,000 street trees in fiscal year 1995-1996, and again in fiscal years 1996-1997 and 1997-1998.

The city received reimbursement in excess of $85,000 for Forestry related expenses from FEMA for the 1998 Labor Day wind storm. The clean-up effort for the April 2003 ice storm resulted in FEMA, SEMO and FHWA reimbursements to the city of $116,000 for Forestry-related work.

In 1991, the Reforest Rochester Trust Fund was established to solicit private donations for tree planting, thereby assisting with the restoration from the ice storm. The fund is still in place and has received donations in excess of $50,000, and has been used to plant more than 250 trees. It is, however, underutilized and under promoted. The fund can be used as a vehicle to solicit additional private donations. Tree planting has historically been a popular project that spans economic, social, and political lines thereby creating unique opportunities. It also generates pressure to plant trees at the expense of maintenance which can result in long-term management problems.

Management and Condition Studies

Forestry divides Rochester into 39 Management Units (Appendix C). These units are also used as street maintenance units by the Department of Environmental Services. This standardization helps to coordinate planning and work activities. City Forestry maintains a computerized inventory of all street, park and cemetery trees. This inventory was first compiled in 1991, and presently one-sixth of the city's street trees a re-inventoried annually. Effective and efficient management requires knowledge of the pertinent variables of the resource.

The inventory identifies the following information for all trees:

- Address
- Street and street block or park/cemetery
- Management Unit
- Relative location on the site
- Tree species
- Tree diameter
- Maintenance need
- Condition of the tree
- Evaluation of the placement of the tree (good to bad)
- Presence of utilities-overhead electric, street lights
- Type of site-tree lawn, brick, grate, or open tree planter
- Width of tree lawn or dimensions of the tree pit
- Whether the site is suitable for a replacement when removed
- Inventory date
- Person conducting inventory

The computerized inventory database also tracks work histories for each tree and creates summarized management reports for planning, budgeting, and work scheduling. Conversion of the database in 2000, the result of Y2K issues, combined with staffing vacancies in the Forestry Division contributed to the lack of data collection in the parks and cemeteries for a five year period. The park and cemetery data has therefore become progressively less accurate. With the filling of the Forestry Technician vacancy in 2004, Forestry should strive to update the park and cemetery data, establishing a five year data collection rotation.

An annual windshield survey is conducted to identify problem street trees for priority pruning or removal. This survey is completed by driving each street in a management area, identifying trees that require remedial pruning and a walk-around inspection of potential tree removals. All inventory information regarding these trees is collected using hand-held field computers and downloaded to update the main computerized inventory. Additional surveys are done each year to facilitate work planning and operations. Dead trees are identified for removal.

Beginning in the mid-90's, a program to improve the management of trees in tree pits along arterial streets was initiated. The goal was to eliminate poor sites, complete improvements to the pits to improve growing conditions, plant trees that have proven hardy in these sites, and provide an increased level of maintenance for these trees until they are fully established. Unfortunately, establishment of trees in pits has not improved to acceptable levels. Thus, this work continues today. The Urban Forest Technical Advisory Committee has recommended specific species for use in tree pits (Appendix B).

In 2003, an inventory of trees at a high risk for loss was completed on city-owned vacant lots. Remediation was performed by Forestry staff in collaboration with DES Special Services personnel. Formalization of an inventory of trees on these public properties is needed to develop a work plan that efficiently addresses the management needs of these trees.

ROCHESTER'S URBAN FOREST POLICY

Rochester's urban forest is healthy and growing in number of trees and grandeur. Citizens and visitors recognize and realize the environmental, economic, and social benefits our forest provides for our community and are engaged in its care and renewal. Rochester, a "City in a Forest," is known throughout the country as a model of urban forestry stewardship and progressive management.

The City of Rochester believes a healthy urban forest is an integral part of the city infrastructure and essential for the well-being of all area residents. It is the city's responsibility to protect, regulate, and fund planting, maintenance, and removal of trees on city owned lands or within the public right-of-way in the most responsive, environmental and economic manner.

MAINTENANCE AND MANAGEMENT

Maintenance and management of our urban forest resource is accomplished by periodic tree pruning, watering, inspection and evaluation, integrated pest management, tree protection, tree removal, and planting.

Forestry Service Delivery

*Forestry maintenance practices and services will be delivered equally to all areas of the city regardless of social or economic status of the residents, in a responsive manner.**

*Italicized portions of this section designate City of Rochester Forestry Division policies.

Tree Maintenance

Trees require periodic care. Pruning, watering, and fertilization ensure long-term health, increase longevity, and limit storm damage. As trees grow, limbs may block street lighting or traffic control devices. Providing adequate clearance over the street and sidewalks is necessary for pedestrian and vehicular traffic. These efforts maximize the benefits of trees while limiting the potential negative impacts of the activities and infrastructure in our city.

Young trees and mature trees have different maintenance needs. Young trees grow at a more accelerated rate compared to mature trees. As a result, young trees will receive more frequent care, including pruning to promote strong branching and watering to help them become established.

Mature trees will receive periodic pruning to remove potential hazards and promote tree health and longevity.

Forestry will strive to prune each mature street tree once every six years and young trees once every three years. Mature park trees will be pruned once every seven years. The schedule and standards for this work is detailed in annual work schedules and the "Forestry Standards and Specifications" document.

Assessing the condition and needs of city trees requires periodic inspection.

An annual windshield inspection of city trees will be completed to identify hazardous situations for pruning or removal if necessary. In addition, each year, one-fifth of the city's trees will be inventoried.

All inventory information, including tree condition and maintenance needs, will be updated by a walk-around inspection of each tree. The information will be entered into a computerized inventory as detailed in the “Forestry Technical and Administrative Procedures Manual.”

Insect pests and diseases can impact tree health. They are also part of our natural biological system providing ecological benefits.

> *Control measures will only be used when a pest presents a significant risk to a large population of our city trees. When control measures are used, the methods will be biologically sensitive, limited in scope, in accordance with all state and federal laws, and the “Forestry Standards and Specifications.”*

Tree Protection

Construction practices have significant impact on tree health. Physical damage to tree roots, soil compaction, and degradation of the soil cause a decline in tree health and can create a threat to public safety.

> *City trees shall be protected through on-site control measures, utilizing alternative construction practices, and stiff monetary fine for violations, as defined in “The Code of the City of Rochester, New York.”*

Tree Removal

Tree removal is a necessary management practice to ensure public safety, urban forest health, and responsible fiscal management.

> ***A city tree will only be removed under the following circumstances**:*
> ***Public Safety**: When a hazard constitutes removal of more than 50 percent of the live crown or when the structural integrity of the tree is undermined to the point that it is susceptible to wind fall.*
>
> ***Urban Forest Health**: When tree disease significantly threatens the health of other city trees.*
>
> ***Fiscal Management**: When alternative tree management practices exceed the value of the tree or will not prolong the tree’s life beyond five years.*

Trees considered for removal will be evaluated using the city’s tree-removal evaluation as defined in the “Forestry Administrative and Technical Services Manual.”

> *Trees that are located in preservation districts, that are of historical significance, or that are rare/large specimens, will be given remedial treatments for preservation until such time as the tree presents an unacceptable threat to public safety.*
>
> *The resident of the property adjacent to a city tree scheduled for removal will be notified in writing a minimum of two weeks prior to the scheduled removal. The resident will be notified by personal contact or door hanger in cases in which a tree must be removed immediately due to hazardous conditions.*

Tree Planting

Renewal of our urban forest resource is accomplished by tree planting.

> *Tree planting will occur in locations that have the least impact with other features in the right-of-way and in accordance with current urban forestry standards as defined by the "Forestry Standards and Specifications" document.*

Trees planted on an annual basis will exceed annual tree removals in number and will be completed in accordance with the city's Master Tree Planting Plan.

Tree Planting Plan

As history has demonstrated, storms and tree pest infestations are natural events that have an impact on tree health. Their occurrences cannot be controlled by human beings. The impact of such events, however, can be limited by planning for their occurrence and managing elements in the environment that we can control. Planting a diversity of tree species in our urban forest can help to mitigate the impact of these events by limiting the number of hosts for diseases or other specific events. Diverse trees on a street will help to limit the impact on a locality.

> *Tree species selected for planting will not exceed 10 percent of the city's current tree population to ensure minimum impact from future natural events.*

Determination of the percentage will be completed prior to ordering trees for planting. The planting plan for a street will include three to seven species of tree. A focal tree will be selected which can constitute 40 percent of the tree species on the street. Complementary trees will be interspaced with the focal trees and constitute up to 30 percent of the trees along the street. Trees will be selected from the City of Rochester Street Tree List.

Trees grow to varying sizes and shapes (habit). They have various aesthetic characteristics such as showy flowers or fall leaf color. City streets and other potential tree planting locations have physical features above or below the ground that may limit the size or shape of a tree that should be selected. Overhead utilities, sidewalks, curbing, buildings, and street lighting may be adversely affected and maintenance costs increased if too large a tree is planted. Conversely, the architectural features on a street can be complemented by thoughtful landscaping. The type of soil and the area available for root growth impact tree longevity and health. The street tree plan will consider these limitations and variables and suggest a selection of trees for a street that match the site limitations and are of the same size, shape, and branching characteristics.

The Street Tree List is comprised of trees that are hardy to the Rochester climate (USDA Zone 6A). Trees are grouped by size, shape, branching, and texture. Physiological limitations are noted for each tree.

> *This list will be reviewed by the City Forester each year and trees added or deleted from the list as the City Forester deems appropriate based on tree species performance.*

The approved list of trees for a street (the plan) will be used without exception when replanting unless approved by the City Forester. New species potentially suitable in our urban environment will be considered as they become available. Certain species designated for a street may over time prove to perform poorly on these sites. Street reconstruction may

significantly change site limitations along a street. Street tree plans will be reviewed during each construction project and changes made to the plan which accommodates changes in the street features.

Community Involvement and Outreach

The Forestry Division and our community are the stewards of our urban forest. Urban trees provide a sense of place and link our children and residents to the natural environment. Volunteers initiated tree plantings along our streets and continue to support those efforts today.

The Forestry Division will actively provide educational services and opportunities for our residents and children concerning the value of trees in our environment, their care, and career opportunities these needs present.

> *The Forestry Division will actively solicit public input and assistance from residents in order to build partnerships in the care of our city trees and to improve the quality of city living.*

CHALLENGES AND RECOMMENDATIONS

In the 1998 edition of "Masterplan: City in a Forest", the Forestry Division and the Urban Forest Technical Advisory Committee identified issues of importance which presented challenges to sustaining the city's urban forest. In response to these issues, recommendations were made by the committee to be utilized in the development and implementation of fiscal and three-year operational action plans.

This chapter details the status of those original Challenges and Recommendations; and identifies recommended response to challenges which have arisen since the initial publication.

KEY:

☆ **Accomplishments**
This category indicates recommendations, made in the first edition of this document, which have been achieved.

⊗ **Work in Progress**
Work has begun on these recommendations; however, additional effort needs to be expended to achieve completion.

☐ **Continuing Recommendations**
The completion of these recommendations either hinge on the completion of related tasks, or upon action by non-forestry entities.

▢ **Long Range Goal**
These items are dependant on the achievement of other recommendations. By nature, they have a long term focus, and should be considered benchmarks.

✸ **New Recommendation**
The 2004 Urban Forest Technical Advisory Committee made additional recommendations in response to new challenges. [Items in this category may also include a ⊗, indicating that work has already begun on these tasks.]

☆ This master plan should be reviewed and updated in 10 years as necessary.

Benefits

⊗ The city's horticultural tradition and 150-year history of planting and maintaining public trees are under-recognized in promoting visitation and residence in the city. Our trees are an indispensable part of the horticultural legacy and deserve recognition as such.

⊗ ▢ Additionally, the scope and magnitude of the environmental, economic, and social value of the city's urban tree population have not been adequately quantified and need further recognition by the public, and city government.

☆ Trees should be recognized as essential elements of the city's infrastructure ▢ and are underutilized in improving the economic, environmental, and social conditions of the city. To respond to these challenges, a promotional program that demonstrates these benefits should be developed and maintained. The program should include:

- ☆ self-guided tours of city-owned trees,
- ⊗ identification and preparation of a register for large trees

⊗ identification and preparation of a register for historic trees;
☐ application of national and state tree champion
⊗ scoring criteria for city trees;
administrative procedures for identifying and cataloging champion trees, and
☆ a brochure on Rochester's urban forest history.

⊗ Formal resolution from City Council celebrating Rochester's urban forest would serve as a strong statement of the city's commitment to maintain our urban forest legacy and the benefits the urban forest provides in improving the quality of city living. It is recommended that this action coincide with the adoption of this document.

☐ Also, the city should identify opportunities that the benefits of trees provide in improving economic, environmental, and social conditions in Rochester and capture these opportunities in work and program planning implementation.

Rochester is recognized for its progressive urban forest management. The city has also been designated as a "Tree City USA" for 30 (in 2011) consecutive years by the National Arbor Day Foundation and the National Association of State Foresters. The Forestry Division should continue its pursuit to maintain Rochester as a leader in urban forest management through:

☆ solicitation of urban forestry research projects,
☆ publication of city forestry projects in professional journals, and
⊗ promotion of urban forestry and arboricultural trade organization conferences in Rochester.

✸ Additionally, the city should seek recognition from the Society of Municipal Arborists through their Municipal Forestry Department Accreditation Program.

Perpetuation

Rochester's urban forest is declining in numbers of trees. It is also estimated that 90 percent of urban trees are located on private property in urban areas. Larger trees are being lost as the space along city streets and green spaces dwindle to accommodate street widening and development. This diminishes the visual impact and the environmental benefits provided by the urban forest resource.

☐ At a minimum, Forestry should strive to neutralize tree attrition by planting a tree for each tree removed.

☐ The use of bareroot plantings should be increased for non-fall risk plantings.

☐ Additional plantings, in the form of neighborhood based bareroot projects, should be undertaken.

▢ With this combined effort, a gradual improvement in the stocking rate should be realized

⊗ Tree planting is a popular political and public relations issue. Rochester business, corporations and other community, private, and governmental organizations could provide resources and realize the public relations benefits of tree planting projects. This could be promoted using the current Reforest Rochester Trust Fund program.

In the early 1990's, a palette system was developed to aid in the selection of suitable tree species for planting. The premise of the palette system was to select up to nine (9) species for each street that related to the nature and scale of a street, and create a particular unified 'look', which includes texture, form, summer leaf color, fall color, and blossom color

□ Revisions to a street's palette should be considered each time the street is subject to improvements. □ Streets in designated historic districts should, when possible, reflect the original street tree image.

⊗ Steps should be taken to stabilize the tree population in city parks to a zero percent decline. □ Planting plans should be developed for city parks and Mount Hope and Riverside cemeteries to guide planting efforts in a thoughtful and designed manner.

□ Zoning ordinances should be reviewed to evaluate the impact to large trees on private property. Guidelines could be developed to preserve these trees or to provide suitable replacement plantings if preservation is not possible.

Construction

⊗ Construction practices and utility improvements are killing many trees and increasing the potential for tree failure due to root and trunk damage. Current ordinances and fines are not sufficient to prevent construction practices that destroy city trees and deter offenders.

⊗ Reducing the number of trees removed because of construction or utility installation damage to equal the annual city attrition rates would be a significant accomplishment.

⊗ This can be achieved by developing monetary fines for construction damages and revising the city code to bolster legal jurisdiction.

☆ Suitable tree protection specifications, □ enforcement, and training for city staff and contractors are needed to provide the necessary education in damage prevention and serve as the basis for competing operational tasks.

☆ Forestry should actively work with the Department of Environmental Services to ensure: inclusion of tree protection standards in every appropriate construction contract □ compliance with protection specification by contractors and the ability to withhold payments from contractors when fines are assessed due to a contractor's failure to abide with contract specifications related to tree protection.

□ Similar enforcement issues persist with utility contractors and sub-contractors. The Forestry Division should be included in the distribution of information regarding utility work.

⊗ Forestry should work with the city's Law Department to secure the ability to issue stop work orders, and levy fines on-site for the disregard of tree protection standards.

Storm Events

Storm events have had and will continue to have a significant impact on the health of the urban forest.

☆ A storm restoration plan is needed to guide the recovery and minimize the impact from these events. The plan should categorize storm events by magnitude of impact, as well as identify the types of damage and work required to mitigate them.

☆ The plan should detail the procedures to be implemented in response to these events.

☐ Each time the plan is utilized, its effectiveness should be reviewed, and the plan revised as needed.

☐ Each major storm event should be documented in a manner suitable for federal re-imbursement requirements.

✸ The computerized database should be modified to separate street segments covered by Federal Highway Administration (FHWA) reimbursement, from those covered by the Federal Emergency Management Administration (FEMA).

Protection and Health

Periodic tree pruning decreases the exposure of the urban forest to weather damage and is the most arboriculturally and fiscally effective method to improve the overall health of trees maintained by the city.

The city should strive to prune:

- ▯ mature street trees every six years
- ▯ young street trees every three years
- ▯ mature park trees every eight years
- ▯ young park trees every three years

To accomplish this, sufficient budget allocations will be required.

⊗ Reviewing operational costs for efficiencies and seeking other funding opportunities should be continued; however, the use of ☐ volunteers, ☆ seasonal staff, ☐ school interns, and ☐ youth workers, could be expanded to complete the pruning tasks of young trees through the Tree Team Program.

⊗ The standards and specifications for the planting and maintenance of city trees and for working around trees should be clear to those working within the city.

☆ A Forestry Standards and Specifications document that cites the standards and specifications for completing various tree- maintenance tasks and for working around trees should be developed, maintained, and ☐ distributed to all contractors working within the city.

☐ The Forestry Standards and Specifications document, developed after the 1998 master plan was published, should be reviewed on an annual basis, and revisions made as necessary.

☆ Trees located in tree pits along arterial streets have an excessively high mortality rate. Re-evaluation of the cultural practices, suitability of planting locations, and costs to improve survival are needed.

☆ A unique management program for trees located in pits and

along arterial streets should be developed.

New tree-pit planting specifications should be explored to enhance growing conditions, and a watering and maintenance program should be employed to improve tree survival.

Additionally, tree-pit planting specifications should be continually explored to enhance growing conditions, and the watering and maintenance program should be continued.

Federal Highway Administration (FHWA) designations should be incorporated in the database, facilitating the analysis of the life history of arterial trees, and to quantify the impact of future efforts.

Currently, the city GIS tree layer reflects 1991's baseline data. The city should include an accurate tree layer in its GIS data. This could be accomplished, in part, by developing, and maintaining, an interface between GIS and Forestry's computerized database.

The city should seek opportunities to establish collaborative research projects, designed to address new planting mortality along arterial streets.

Frequent vandalism of trees by juveniles and other residents results in significant damage and loss of trees. Efforts should focus on prevention through educating children and residents about the benefits of trees (See recommendations in Benefits and Community Involvement).

Aggressive measures should be undertaken to prepare for the potential of an EAB outbreak. Annual surveys of all ash trees should be initiated.

Parks and Cemeteries

The lack of funding for Mount Hope and Riverside cemeteries has allowed tree management to become remedial and tree health to decline.

Tree management and planting plans, for parks, and the two municipal cemeteries, along with sufficient funding to implement these plans is required to reverse this trend.

Both cemeteries are arboretums with many unique specimen trees. Marketing these unique assets could serve to attract business and visitors, help to increase revenue, and assist in funding tree-maintenance efforts.

Safety and Training

An emergency response plan is required to deal effectively the Forestry emergencies caused by frequent and infrequent storm events.

A plan detailing procedures for various levels of emergencies should be developed and maintained.

The plan should categorize storm events by impact and number of calls for service, as well as review current Forestry and city procedures, modifying them where necessary.

Trees on vacant city-owned lots are in poor health and potential safety hazards. Currently, the population size and maintenance requirements of these trees are unknown.

A vacant-lot tree management program, designed to monitor and reduce tree hazards, should be developed and implemented.

Forestry should include the vacant lots in its annual priority pruning and removal surveys, and integrate necessary remedial activity into its work schedules.

The vacant lot tree management plan should involve preparing a complete inventory of tree management needs on vacant lots.

Reduction of hazardous trees is the highest priority maintenance issue requiring substantial time and funding. Forestry should continue its current priority pruning and hazardous tree removal program.

Training of workers is an ongoing need requiring annual attention to maintain safe working practices for the public and employees.

The Forestry Division should continually review and revise safety policies and procedures to improve and foster a safe working environment.

A Forestry Safety Policies manual should be published and annual Electrical Hazard Awareness, aerial rescue and arboricultural standards training for Forestry line and technical staff, should be continued.

In 1996, only one Forestry Division employee had received recognition by the International Society of Arboriculture (ISA) as a Certified Arborist. Currently, seven Forestry Division employees have achieved that designation. An additional program, 'Certified Municipal Arborist', is available; employee certification at the additional level should be supported. Efforts should be continued to certify additional Forestry Division employees, and to support additional levels of certification.

Budgetary

The city has made significant increases in funding for tree maintenance and planting needs in recent years. The capital budget plan also projects incremental funding increases in future fiscal years, representing a strong commitment to these efforts.

In spite of all that, these allocations are insufficient to meet all the goals and recommendations of this plan. This will impact the length of periodic tree pruning schedules or numbers of trees which can be planted in coming years. The Reforest Rochester Trust Fund has been under promoted to solicit private donations. The use of this fund should be promoted, operational efficiencies explored and outside funding sources pursued to help offset any city funding shortfalls.

The value and benefits of the city's urban forest should be consistently considered among the many priorities weighing on the city budget.

Additionally, as the urban forest increases in number and size, so does the cost of maintenance. Evaluating the budget implications of this increase and the efficiency of contractual versus in-house operations in order to maintain cost and performance effectiveness is required.

Education

Residents are poorly informed about the benefits of trees, proper care of trees, need to manage the urban forest as a

renewable resource, and how to become involved in the city's forestry program. City residents are also undereducated about Forestry Division services.

☆ A series of brochures that inform city residents about the division's services and provide useful information on proper tree care would be an effective method to educate our residents.

⊗ This information should be distributed through the Neighborhood Service Center (NSC) offices, community associations, libraries, and other established distribution methods.

☆ Forestry should continue to expand its participation in city- school science classroom, career, and Arbor Day programs; ✸ and establish an annual fall event which focuses on Urban Forestry.

Community Involvement

Trees make our city a better place to live. People are the fabric that make a city great. Engaging our residents in the care of our city and community builds the sense of ownership of our urban forest resource.

□ City efforts are building new lines for communication and citizen involvement. Implementation of recommendations in this master plan should be coordinated with these and other citizen participation efforts.

✸ The volunteer organization network, promoting tree care, assisting in tree maintenance, and supporting and interacting with the urban forestry programs in the city, can be expanded.

✸ Recognition of residents who participate in volunteer efforts should be an integral part of a program.

✸ The number of volunteers could be increased by identifying Tree Team projects that are limited in scope and time requirements and well defined geographically and then linking individuals and groups to these projects as opportunities arise.

The city's recreation centers and other community organizations provide an established infrastructure and an opportunity to reach many children in our community. ⑤The city should seek opportunities at recreation centers and other organizations to develop programs for children aged 11 to 14 years. These programs would teach children the benefits of urban trees and promote strong work ethics, moral values, and community service. This could also decrease tree vandalism and help to improve juvenile behavior in the city.

☆ The efforts of the Urban Forest Technical Advisory Committee provide a successful example of community involvement in city planning and building credibility of city operations in the community.

✸ The Urban Forest Technical Advisory Committee could be reconvened to develop a recommendation of establishing a tree board or on-going tree committee and future review of the master plan.

✸ An annual 'State of the Urban Forest' report should be developed.

Members of the Urban Forest Technical Advisory Committee could be reconvened on an annual basis to review the report and make recommendations.

An update of the “Masterplan: A City in a Forest” is recommended on a five to 10 year cycle.

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Abies	*balsamea*		Balsam Fir	7
	concolor		White Fir	29
	species		Unidentified Fir	42
Acer	*buergeranum*		Trident Maple	3
	campestre		Hedge Maple	1469
	freemanii	Celebration	Celebration Maple	3
	ginnala		Amur Maple	162
	griseum		Paperbark Maple	24
	miyabei		Miyabei Maple	20
	negundo		Boxelder	53
	palmatum		Japanese Maple	58
	platanoides		Norway Maple	10017
	platanoides	Columnare	Columnar Norway	1220
	platanoides	Crimson King	Crimson King Norway	2370
	platanoides	Globosum	Globe Norway	23
	platanoides	Olmsted	Olmsted Norway	17
	platanoides	Schwedleri	Schwedler Norway	1304
	platanoides	Emerald Queen, Summer Shade	Emerald Queen, Summer Shade Norway	25
	pseudoplatanus		Sycamore Maple	582
	pseudoplatanus	Atropurpurum	Purple Sycamore Maple	25
	rubrum		Red Maple	1251
	rubrum	Autumn Flame	Autumn Flame Red	49
	rubrum	Karpick	Karpick Red	38
	rubrum	Red Sunset	Red Sunset Red	138
	rubrum	October Glory	October Glory Red	107

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Acer	*rubrum*	Bowhall	Bowhall Red	5
	rubrum	Franks Red	Franks Red	8
	rubrum	Autumn Radiance	Autumn Radiance Red	11
	rubrum	Red Northwood	Red Northwood Red	7
	saccharinum		Silver Maple	1287
	saccharum		Sugar Maple	1642
	saccharum	Columnare	Columnar Sugar	114
	saccharum	Adirondak	Adirondak Sugar	5
	saccharum	Legacy	Legacy Sugar	3
	saccharum	Bonfire	Bonfire Sugar	1
	saccharum	Green Mountain	Green Mountain Sugar	80
	saccharum	Seneca Chief	Seneca Chief Sugar	5
	species		Unidentified Maple	42
	tataricum		Tatarian Maple	112
	tataricum	Rubrum	Red Tatarian Maple	5
	truncatum	Norwegian Sunset	Norwegian Sunset Maple	87
	truncatum	Pacific Sunset	Pacific Sunset Maple	53
	truncatum	Purple Blow	Purple Blow Maple	12
	x freemanii	Armstrong	Armstrong Maple	28
	x freemanii	Autumn Blaze	Autumn Blaze Maple	138
	x hybrid		Hybrid Maple	18
Aesculus	*glabra*		Ohio Buckeye	44
	hippocastanum		Horsechestnut	207
	x carnea		Red Horsechestnut	26
	x carnea	Ft. McNair	Ft. McNair Red Horsechestnut	171
Ailanthus	*altissima*		Ailanthus	63
Albiziaa	*jubibrissin*		Silk Tree	3
Alnus	*cordata*		Italian Alder	13

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Alnus	*glutinosa*		Alder	39
Amelanchier	*canadensis*		Serviceberry	65
	species		Serviceberry	51
	species	Grandiflora	Apple Serviceberry	29
Aralia	*spinosa*		Devils Walkingstick	1
Betula	*lenta*		Sweet Birch	1
	nigra		River Birch	33
	papyrifera		Paper Birch	19
	pendula		European Birch	0
	species		Birch Species	41
Carpinus	*betulus*		European Hornbeam	138
	betulus	Fastigiata	Upright European Hornbeam	51
	caroliniana		American Hornbeam	89
Carya	*cordiformis*		Bitternut Hickory	12
	glabra		Pignut Hickory	4
	ovata		Shagbark Hickory	31
	species		Unidentified Hickory	66
Catalpa	*speciosa*		Northern Catalpa	83
Celtis	*laevigata*		Sugar Hackberry	9
	occidentalis		Hackberry	921
Cercidiphyllum	*japonicum*		Katsura Tree	223
Cercis	*canadensis*		Eastern Redbud	32
Chionanthus	*retusus*		Fringetree	10
Cladrastis	*lutea*		Yellowwood	57
Cornus	*florida*		Flowering Dogwood	11
	kousa		Kousa Dogwood	8
	mas		Cornelian Dogwood	19
	species		Unidentified Dogwood	106

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Corylus	*colurna*		Turkish Filbert	119
Cotinus	*coggygria*		Purple Smoketree	1
Crataegus	*crusgalli*	Inermis	Cockspur Hawthorn	595
	viridis	Winter King	Winter King Hawthorn	99
	x lavallei		Lavelle Hawthorne	2
	mollis		Mollis Hawthronre	1
Elaeagnus	*angustifolia*		Russian Olive	2
Eucommia	*ulmoides*		Hardy Rubber Tree	25
Fagus	*grandifolia*		American Beech	9
	sylvatica		European Beech	92
	sylvatica	Purpurea	Purple European Beech	7
Fraxinus	*americana*		White ash	682
	americana	Autumn Purple	Autumn Purple White Ash	300
	americana	Empire	Empire White Ash	2
	excelsior		European Ash	242
	excelsior	Hessei	Hessi European Ash	22
	nigra	Fall Gold	Fall Gold Black Ash	2
	ornus		Flowering Ash	32
	pennsylvanica		Green Ash	3044
	pennsylvanica	Cimmaron	Cimmaron Green Ash	23
	pennsylvanica	Patmore	Patmore Green Ash	102
	pennsylvanica	Summit	Summit Green Ash	66
	species		Ash Species	135
Gingko	*biloba*		Gingko	538
	biloba	Autumn Gold	Gingko Autumn Gold	17
	biloba	Samurai	Gingko Samurai	3
	biloba	Magyar	Gingko Magyar	9
	biloba	Prinston Sentry	Gingko Prinston Sentry	70

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Gleditsia	*triacanthos*		Honeylocust	6115
		Skyline	Skyline Honeylocust	58
		Shademaster	Shademaster Honeylocust	88
Gleditsia		Imperial	Imperial Honeylocust	46
Gymocladus	*dioicus*		Kentucky Coffee Tree	147
Halesia	*carolina*		Carolina Silverbell	9
Hibiscus	*syriacus*		Rose of Sharon	26
Hydrangea	*paniculata*		Pee Gee Hydrangea	6
Juglans	*nigra*		Black Walnut	172
	regia		English Walnut	23
	cinera		Butternut	2
Juniperus	*virginiana*		Eastern Red Cedar	65
Koelreuteria	*paniculata*		Goldenraintree	152
Laburnum	*x watereri*		Goldenchain Tree	3
Larix	*decidua*		Larch	46
	laricina		American Larch	1
Liquidambar	*styraciflua*		Sweetgum	810
Liriodendron	*tulipifera*		Tuliptree	404
Maackia	*amurensis*		Amur Maackia	127
Maclura	*pomifera*		Osage-Orange	25
Magnolia	*acuminata*		Cucumbertree Magnolia	8
	soulangiana		Saucer magnolia	15
	species		Unidentified magnolia	170
	stellata		Star Magnolia	1
Malus	*angustifolia*		Southern Crabapple	29
	pumila		Common Apple	2
	species	Strawberry Parfait	Strawberry Parfait Crab	11
	species	Harvest Gold	Harvest Gold Crab	128

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Malus	*species*	Baskatong, Robinson	Baskatong, Robinson Crab	105
	species	Madonna	Madonna Crab	7
	species	Prairifire	Prairifire Crab	61
	species	Red Splendor	Red Splendor Crab	5
	species	Snowdrift	Snowdrift Crab	20
	species		Unidentified Crabapple	1305
	species	Sugartyme	Sugartyme Crab	131
	species	Summersnow	Summersnow Crab	8
	species	Donald Wyman	Donald Wyman Crab	38
Metasequoia	*glyptostroboides*		Dawn Redwood	29
Morus	*alba*		White Mulberry	51
	species		Mulberry species	13
Nyssa	*sylvatica*		Blackgum	25
Ostrya	*virginiana*		Hophornbeam	33
Phellodendron	*amurense*		Amur Cork Tree	454
Picea	*abies*		Norway Spruce	449
	glauca		White Spruce	19
	pungens		Blue Spruce	241
	species		Unidentified Spruce	72
Pinus	*nigra*		Austrian Pine	511
	resinosa		Red Pine	118
	species		Unidentified Pine	7
	strobus		White Pine	75
	sylvestris		Scotch Pine	39
	mugo		Mugo Pine	2
Platanus	*acerifolia*		London Planetree	2807
	occidentalis		American Sycamore	171
	x acerifolia	Bloodgood	Bloodgood London Plane	98

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Populus	*species*		Poplar	2
	alba		White Poplar	7
	deltoides		Eastern Cottonwood	57
Prunus	*cerasifera*		Purpleleaf Plum	10
	cerasifera	Newport	Newport Cherry Plum	1
	sargentii		Sargent Cherry	185
	sargentii	Accolade	Accolade Sargent Cherry	95
	sargentii	Columnaris	Columnar Sargent Cherry	45
	serotina		Black Cherry	35
	serrulata		Kwanzan Cherry	998
	species		Unidentified Cherry	106
	subhirtella	Autumnalis	Autumnalis Higan Cherry	46
	subhirtella	Pendula	Weeping Higan Cherry	3
	triloba		Double Flowering Plum	1
	virginiana		Common Chokecherry	100
	x yodoensis		Yoshino Cherry	12
Pseudotsuga	*menziesii*		Douglas Fir	106
Pyrus	*calleryana*	Capital	Capital Pear	18
	calleryana	Aristocrat	Aristocrat Pear	480
	calleryana	Callery	Callery Pear	708
	calleryana	Chanticleer or Clevland Select	Canticleer or Clevland Select Pear	1004
	calleryana	Redspire	Redspire Pear	74
	calleryana		unidentified Pear	105
Quercus	*acutissima*		Sawtooth Oak	68
	alba		White Oak	503
	alba	x Robur	Crimson Spire Oak	3
	bicolor		Swamp White Oak	24
	coccinea		Scarlet Oak	138

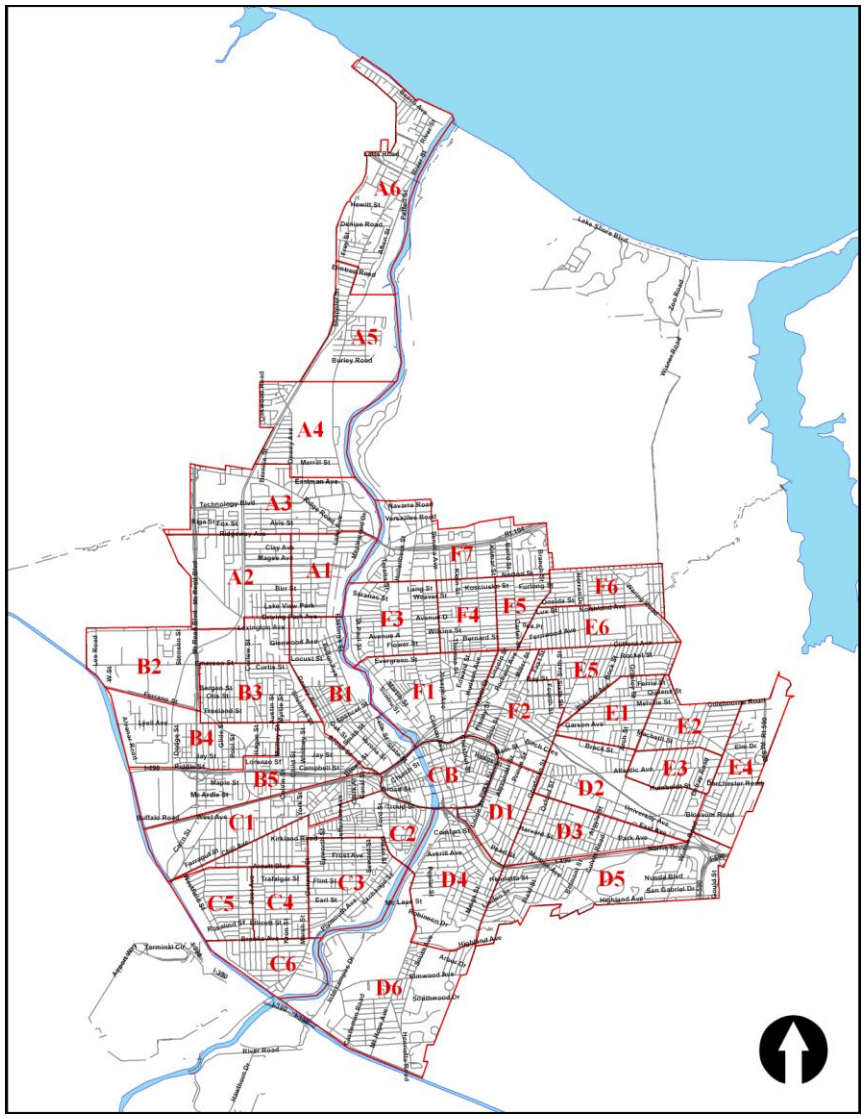
GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Quercus	*macrocarpa*		Bur Oak	139
	nigra		Water Oak	1
	palustris		Pin Oak	297
	phellos		Willow Oak	6
	prinus		Chestnut Oak	28
	robur		English Oak	305
	robur	Skymaster	Skymaster English Oak	30
	robur	Skyrocket	Skyrocket English Oak	29
	robur	Fastigata	Upright English Oak	108
	rubra		Northern Red Oak	2345
	shumardii		Shumard Oak	173
	species		Unidentified Oak	86
	velutina		Black Oak	7
	imbricaria		Shingle Oak	23
Robinia	*pseudocacia*		Black Locust	145
	pseudocacia	Globe	Globe Black Locust	185
	pseudocacia	Purple Robe	Purple Robe Black Locust	56
Salix	*babylonica*		Weeping Willow	6
	discolor		Pussy Willow	3
	nigra		Black Willow	6
	matsudana		Corkscrew Willow	1
Sassafras	*albidum*		Sassafras	39
Sorbus	*alinifolia*		Korean Mountain Ash	1
	americana		American Mountain Ash	16
	aucuparia		European Mountain Ash	14
Stypholobium	*japonica*		Japanese Pagoda Tree	402
Syringa	*reticulata*		Ivory Silk Tree Lilac	1027
	reticulata		Summersnow Tree Lilac	57

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Syringa	*reticulata*		Tree Lilac	805
	vulgaris		Tree Lilac Shrub	7
	vulgaris		Standard Tree Lilac	26
Taxodium	*distichum*		Baldcypress	15
Taxus	*species*		Yew	125
Thuja	*occidentalis*		Arborvitae	478
Tilia	*americana*		American Linden	686
Tilia	*americana*	Redmond	Redmond American Linden	27
	cordata		Littleleaf Linden	3676
	cordata	Glenleven	Glenleven Littleleaf Linden	196
	cordata	Greensprire	Greensprire Littleleaf Linden	88
	euchlora		Crimean Linden	279
	species		Unidentified Linden	273
	tomentosa		Silver Linden	245
	tomentosa	Sterling	Sterling Silver Linden	3
Tsuga	*canadensis*		Eastern Hemlock	76
Ulmus	*americana*		American Elm	54
	americana	Accolade	Accolade Elm	81
	americana	Delaware II	Delaware Elm	24
	americana	Princeton	Princeton Elm	39
	americana	Valley Forge	Valley Forge Elm	2
	hybrid		Hybrid Elm	27
	parvifolia		Chinese Elm	95
	parvifolia	Bosque	Bosque Chinese Elm	4
	parvifolia	Ohio	Ohio Chinese Elm	8
	pumila		Siberian Elm	36
	species		Unidentified Elm	121
	carpinifolia	Homestead	Homestead Elm	49

GENUS	SPECIES	CULTIVAR	COMMON NAME	NUMBER
Viburnum	*species*		Viburnum	1
Wisteria	*floribunda*		Japanese Wisteria	3
Zelkova	*serrata*	Musashino	Musashino Zelkova	5
	serrata	Village Green	Village Green Zelkova	101
	serrata		Japanese Zekova	1286
	serrata	City Sprite	City Sprite Zelkova	10
	species		Unidentified Zelkova	17

Arterial and Tree Pit Approved Tree List

Genus, species	Cultivar	Arterial	Tree Pit	Genus, species	Cultivar	Arterial	Tree Pit
Acer campestre		√	√	*Phellodendron amurense*		√	
Acer pseudoplantanus		√	√	*Plantanus occidentalis*	Bloodgood	√	
Acer negundo	Baron	√	√	*Plantanus x acerfolia*	Columbia	√	
Acer negundo	Flamingo	√	√	*Plantanus x acerfolia*	Liberty	√	
Acer negundo	Sensation	√	√	*Plantanus x acerfolia*	Aristocrat	√	
Acer truncatum	Norweigian Sunset	√	√	*Pyrus calleryana*	Autumn Blaze	√	√
Acer truncatum	Pacific Sunset	√	√	*Pyrus calleryana*	Capital	√	√
Acer x	Autumn Blaze	√	√	*Pyrus calleryana*	Chanticleer	√	√
Acer x	Celebration	√	√	*Pyrus calleryana*	Cleveland Select	√	√
Acer x	Fremann	√	√	*Pyrus calleryana*		√	√
Acer x	Morgan	√	√	*Quercus coccinea*		√	
Alnus cordata				*Quercus macrocarpa*		√	
Alnus cordata	Spikes	√	√	*Quercus muehlenbergi*	Fastigiata	√	
Alnus glutinosa	Fastigata	√	√	*Quercus robur*		√	√
Carpinus betulus	Pyramidalis	√	√	*Quercus robur*		√	
Celtis laevigata	All Season	√	√	*Quercus rubra*		√	
Celtis occidentalis	Praire Pride	√	√	*Quercus shumardii*		√	
Corylus colurna		√	√	*Syringa reticulata*	Ivory Silk	√	√
Cratagus x lavallei	Winter King	√		*Syringa reticulata*	Summer Snow k	√	√
Elaeagnus angustifolia		√		*Ulmus parvifolia*	Across Central Park	√	√
Gingko biloba	Hessei	√		*Ulmus parvifolia*	Dynasty	√	√
Gingko biloba	Princeton Sentry	√		*Ulmus parvifolia*	Kings Choice	√	√
Gleditsia trichanthos, inermis	Shademaster	√		*Ulmus species*	Urban	√	√
Gleditsia trichanthos, inermis	Skyline	√	√	*Zelkova serrata*	Columnari	√	√
Gymnocladus dioicus		√	√	*Zelkova serrata*	Green Vase	√	√
Koelreuteria paniculata		√	√	*Zelkova serrata*	Halka	√	√
Maackia amurensis		√	√				



	FY12	FY13	FY14	FY15	FY16	FY17
Unit	B1	A5	A4	A3	A1	B3
	B2	A6	B5	C4	A2	C6
	E1	B4	C1	D6	C3	D3
	E4	C2	D2	E3	C5	E2
	E6	D4	F1	F2	D1	F3
	F5	D5	F6	F7	E5	F4
				CX		
Parks		NW		NE		SE/SW