![ArborPro Management Software logo]

City of Kingston, NY
Park Inventory Summary Report
May 17, 2018

Legend
- • Trees
- Streets
- ▢ Parks
- ▢ Parcels
- ▢ Boundary
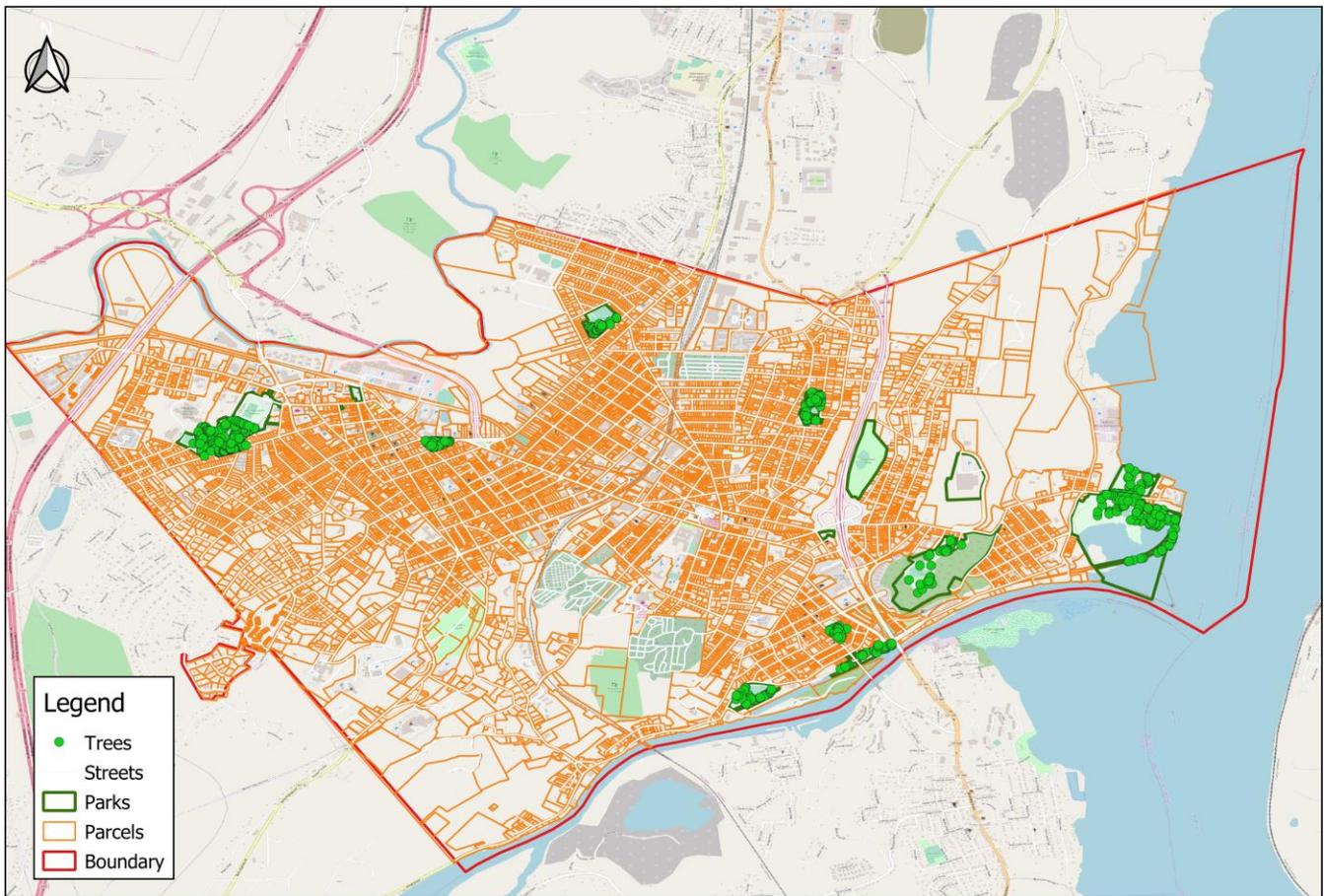
Report Summary

On April 25, 2018 ArborPro, Inc. began operations on a comprehensive GPS inventory of the trees along street rights-of-way and in public parks in the City of Kingston, NY. ArborPro assigned three ISA Certified Arborists to collect detailed information on the condition, size, species, maintenance recommendations, etc. for all trees owned by the City of Kingston. This summary is a result of the trees collected in parks and includes a total of **831 sites**, comprised of 818 trees (98.4%), and 13 stumps (1.6%).
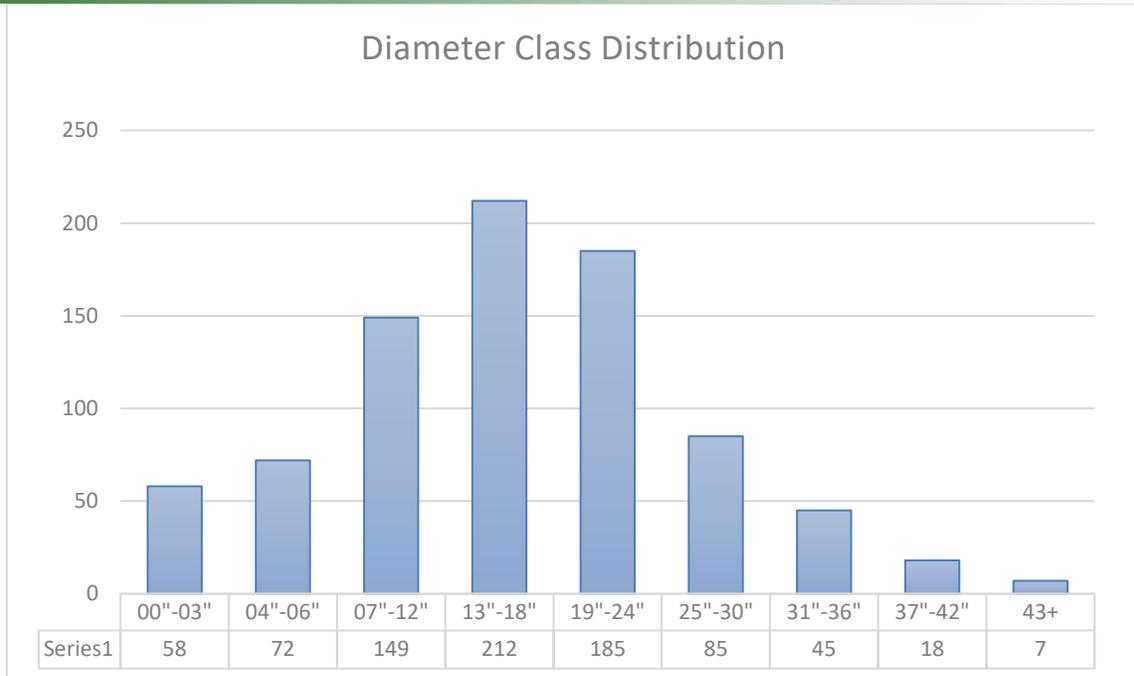
Distribution of Trees by Location

The table to the below provides a summary of the number of trees recorded in each location type.

Area	Count	%
Academy Green Park	46	5.54%
Block Park	44	5.29%
Cornell Park	34	4.09%
Forsyth Park	326	39.23%
Hasbrouck Park	32	3.85%
Hutton Park	59	7.10%
Kingston Point Park	166	19.98%
Loughran Park	79	9.51%
TR Gallo Park	45	5.42%
Grand Total	**831**	

Size Characteristics

The general size of a tree provides insight into the age and value of the tree as well as the overall age of the urban forest. There are two industry-wide recognized size characteristics, height and diameter at breast height. Diameter at breast height (DBH) is determined by the diameter of the tree at 4.5 feet above grade. DBH range distribution can be used to analyze the relative age distribution of an urban forest. This allows a city to adjust their planting plans to ensure that there are enough young trees to replace aging and over-mature trees. It is important that all age classes are adequately represented throughout the urban forest to ensure a healthy, vibrant tree canopy for future generations.

Diameter Class Distribution

	00"-03"	04"-06"	07"-12"	13"-18"	19"-24"	25"-30"	31"-36"	37"-42"	43+
Series1	58	72	149	212	185	85	45	18	7

Height Class Distribution

	00'-15'	15'-30'	30'-45'	45'-60'	60'+
Series1	104	134	188	248	144

Tree Condition

Good – The tree has no major structural problems; no significant damage from diseases or pests; no significant mechanical damage; a full, balanced crown, and normal twig condition and vigor for its species.
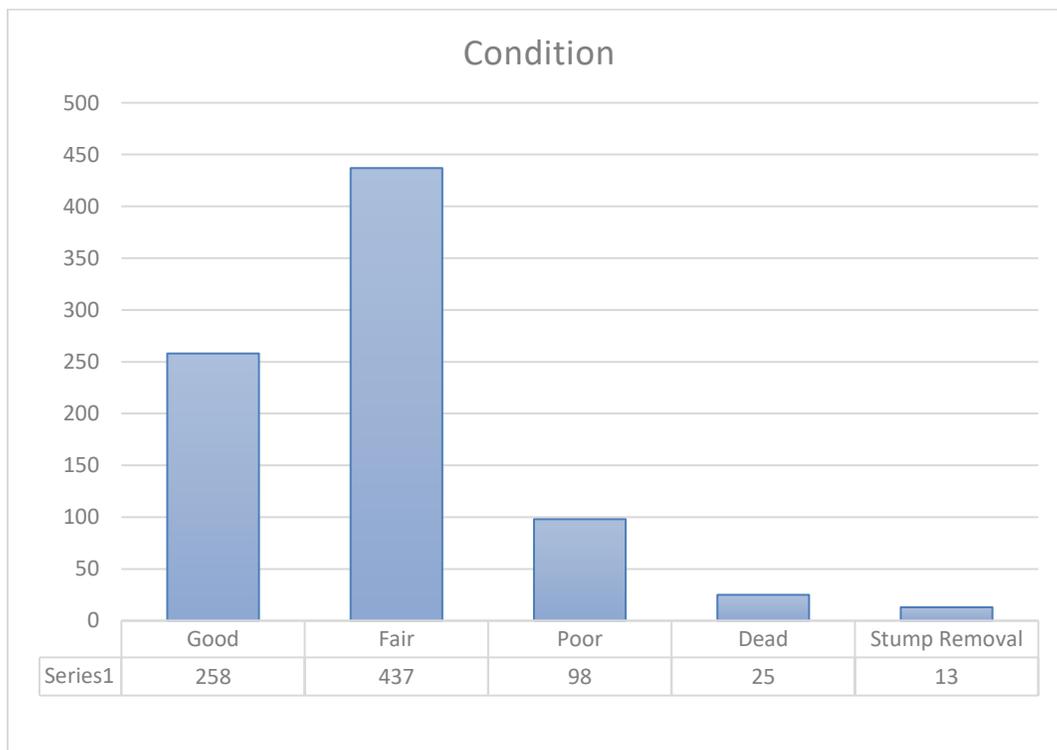
Tree Condition	Tree Count	%
Good	258	31.0%
Fair	437	52.6%
Poor	98	11.8%
Dead	25	3.0%
Stump Removal	13	1.6%
Total	**831**	

Fair – The tree may exhibit the following characteristics: minor structural problems and/or mechanical damage; significant damage from non-fatal or disfiguring diseases; minor crown imbalance or thin crown; minor structural imbalance; or stunted growth compared to adjacent trees.

Poor – The tree appears healthy, but may have structural defects. This classification also includes healthy trees that have unbalanced structures or have been topped. Trees in this category may also have severe mechanical damage, decay, severe crown dieback or poor vigor/failure to thrive.

Critical – The tree is in a physical state that requires immediate attention. Generally these trees are recommended for a Priority One Removal.

Dead – Trees in advanced states of decline are not included. This category refers only to dead trees.

Condition

	Good	Fair	Poor	Dead	Stump Removal
Series1	258	437	98	25	13

Recommended Maintenance

Maintenance	Tree Count	%
Priority 1 Prune	35	4.2%
Priority 1 Removal	31	3.7%
Priority 2 Prune	116	14.0%
Priority 2 Removal	42	5.1%
Routine Prune	521	62.7%
Training Prune	73	8.8%
Stump Removal	13	1.6%
Total	**831**	

Priority 1 Prune - Trees that require priority one pruning are recommended for trimming to remove hazardous deadwood, hangers, or broken branches. These trees have broken or hanging limbs, hazardous deadwood, and dead, dying, or diseased limbs or leaders greater than four inches in diameter.

Priority 1 Removal - Trees designated for removal have defects that cannot be cost- effectively or practically treated. The majority of the trees in this category will have a large percentage of dead crow n and pose an elevated level of risk for failure. Any hazards that could be seen as potential dangers to persons or property and seen as potential liabilities would be in this category. Large dead and dying trees that are high liability risks are included in this category. These trees are the first ones that should be removed.

Priority 2 Prune - These trees have dead, dying, diseased, or weakened branches between two and four inches in diameter and are potential safety hazards.
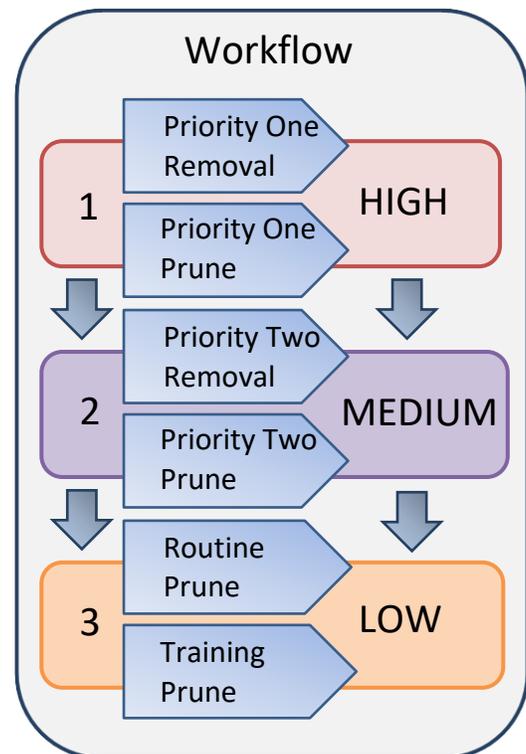
Priority 2 Removal - Trees that should be removed but do not pose a liability as great as the first priority will be identified here. This category would need attention as soon as "Priority One" trees are removed.
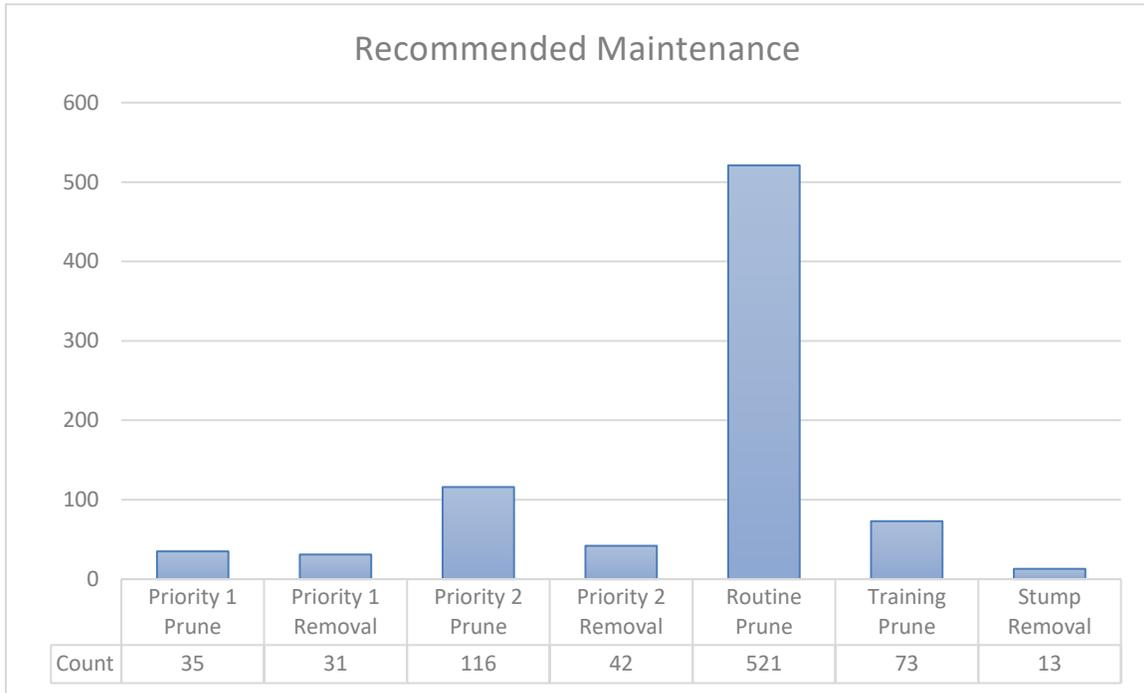
Routine Prune - These trees require routine horticultural pruning to correct structural problems or growth patterns, which would eventually obstruct traffic or interfere with utility wires or buildings.

Training Prune - Young, large-growing trees that are still small must be pruned to correct or eliminate weak, interfering, or objectionable branches in order to minimize future maintenance requirements. These trees, up to 20 feet in height, can be worked with a pole-pruner by a person standing on the ground.

Stump Removal - This category indicates a stump that should be removed.

Recommended Maintenance

Count	Priority 1 Prune	Priority 1 Removal	Priority 2 Prune	Priority 2 Removal	Routine Prune	Training Prune	Stump Removal
	35	31	116	42	521	73	13

Species and Distribution

Below are the top 10 species for this delivery.

Cottonwood, 0.6%
Norway Spruce, 2.2%
Austrian Black Pine, 0.6%
Thornless Honey Locust, 0.6%
White Mulberry, 0.7%
Eastern Red Cedar,…
Black Locust, 2.0%
Norway Maple, 1.1%
White Pine, 1.7%
Red Maple, 1.2%
Sugar Maple, 1.3%
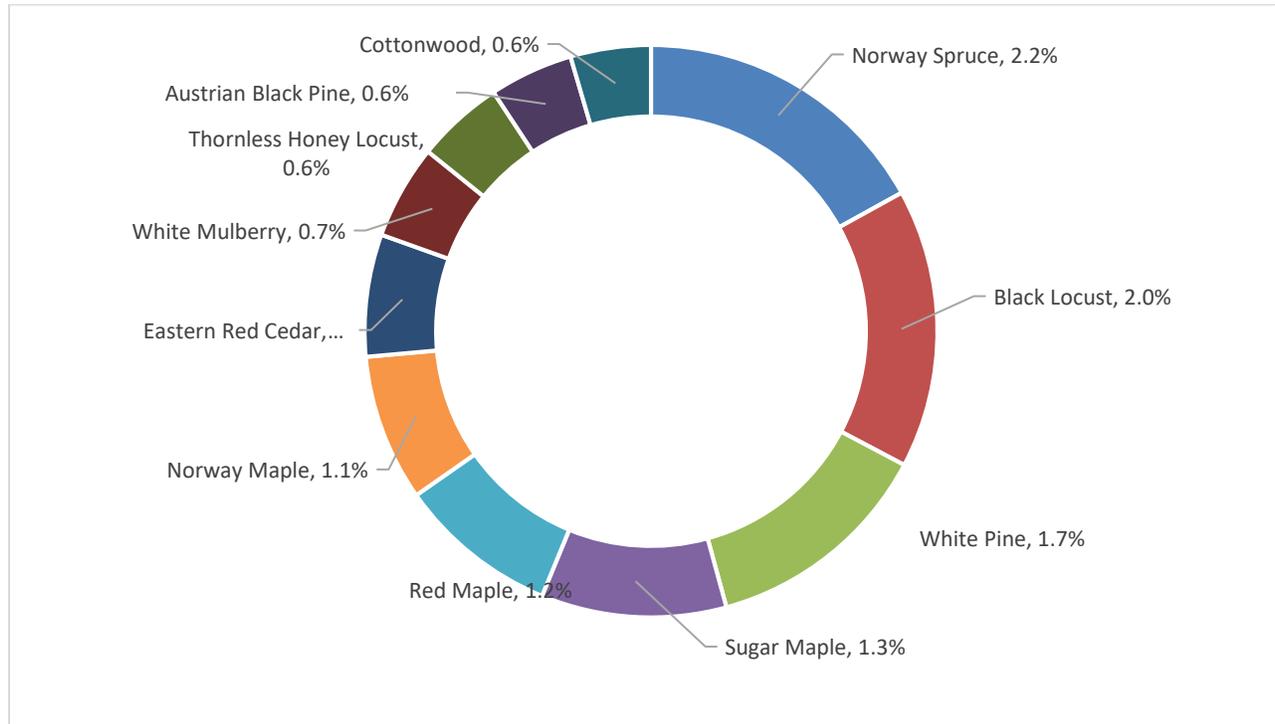
Benefits of a Healthy Urban Forest

Trees provide a host of environmental, social, and economic benefits in urban areas. When properly maintained, trees can reduce pollution, improve mental health, and lower energy costs. It is important to understand the benefits trees provide 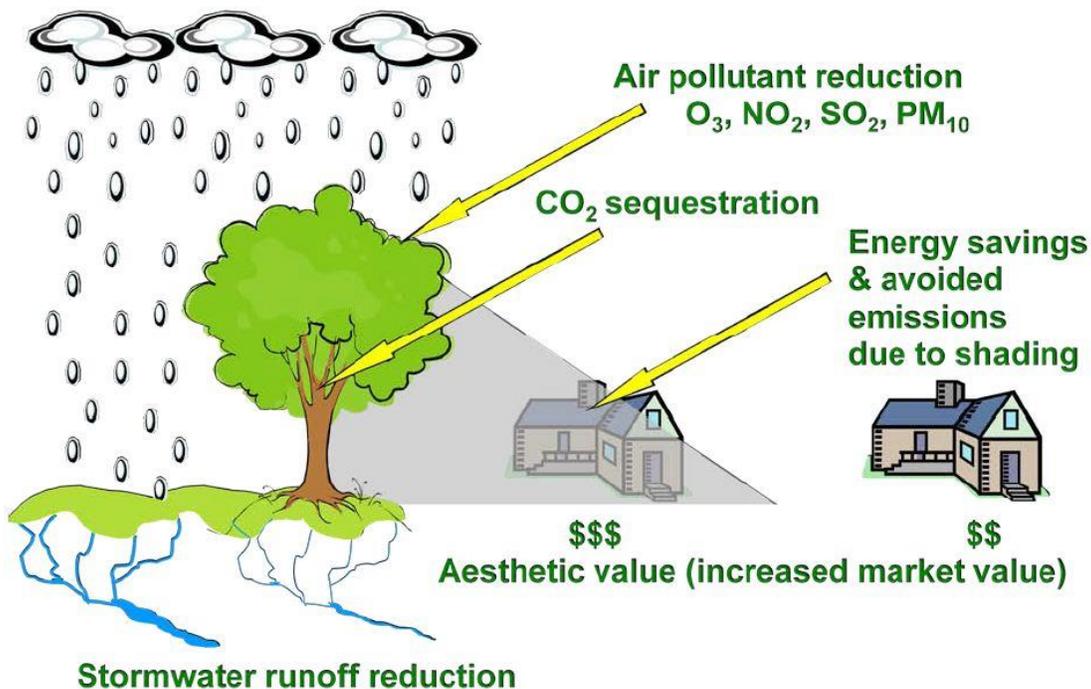as they can offset the cost associated with tree maintenance. A properly implemented tree maintenance program will maximize tree benefits in the urban setting, allowing trees to provide benefits that meet or exceed the time and money invested in maintenance activities.

The i-Tree Streets application was used to quantify the benefits provided by Kingtson's trees. This application uses growth and benefit models designed around predominant urban trees to calculate the specific benefits that trees provide in dollar amounts. The benefits calculated by i-Tree Streets include energy conservation, air quality improvements, carbon dioxide (CO_2) reduction, stormwater control, and aesthetic/other. It creates annual benefit reports that demonstrate the value urban trees provide to the surrounding community.

The trees in Kingston's parks provide a total of **$114,816 in annual benefits**.

The total replacement cost for the park trees is **$4,067,268**.

Ecosystem services provided by urban trees

Air pollutant reduction O_3, NO_2, SO_2, PM_{10}

CO_2 sequestration

Energy savings & avoided emissions due to shading

$$$ Aesthetic value (increased market value) $$

Stormwater runoff reduction

Energy Conservation

Public trees contribute to energy conservation by providing shade that reduces cooling costs in the summer and diverting wind to reduce heating costs in the winter. The savings in electricity and natural gas are converted into monetary values to illustrate the annual energy savings that trees provide. Kingston's trees account for a savings of $50,796 in energy consumption each year.

Air Quality

Trees improve air quality by removing a number of pollutants from the atmosphere, including ozone, nitrogen dioxide, and particulate matter. The estimated value of pollutants removed by the inventoried tree population each year is $9,661.

Carbon Dioxide Sequestration

It is well known that trees absorb carbon dioxide and release oxygen into the atmosphere as a product of photosynthesis. Carbon absorbed during this process is ultimately stored in the wood of trees. The amount of carbon sequestered by the inventoried tree population is valued at $1,152 annually.

Stormwater Control

Trees reduce the costs associated with diverting stormwater by intercepting rainfall before it hits the ground and enters the storm runoff system. This greatly reduces the strain placed on public stormwater runoff systems and can represent a significant monetary savings by reducing the amount of infrastructure needed to divert stormwater throughout the city. The estimated savings for the City in the management of stormwater runoff is $13,279 annually.

Aesthetic/Other

Trees provide many social and economic benefits that are classified as aesthetic/other in the i-Tree Streets application. The major economic benefit in this category is increased property values. Trees contribute to higher property values when compared to similar properties that do not have trees. The major social benefits provided by trees are lower crime rates, improved mental health, greater time spent in businesses with tree lined streets, and higher productivity in the workplace when a view of nature is available. The inventoried trees contribute $39,928 annually in aesthetic/other benefits.

■	Energy
■	CO2
■	Air Quality
■	Stormwater
■	Aesthetic / Other
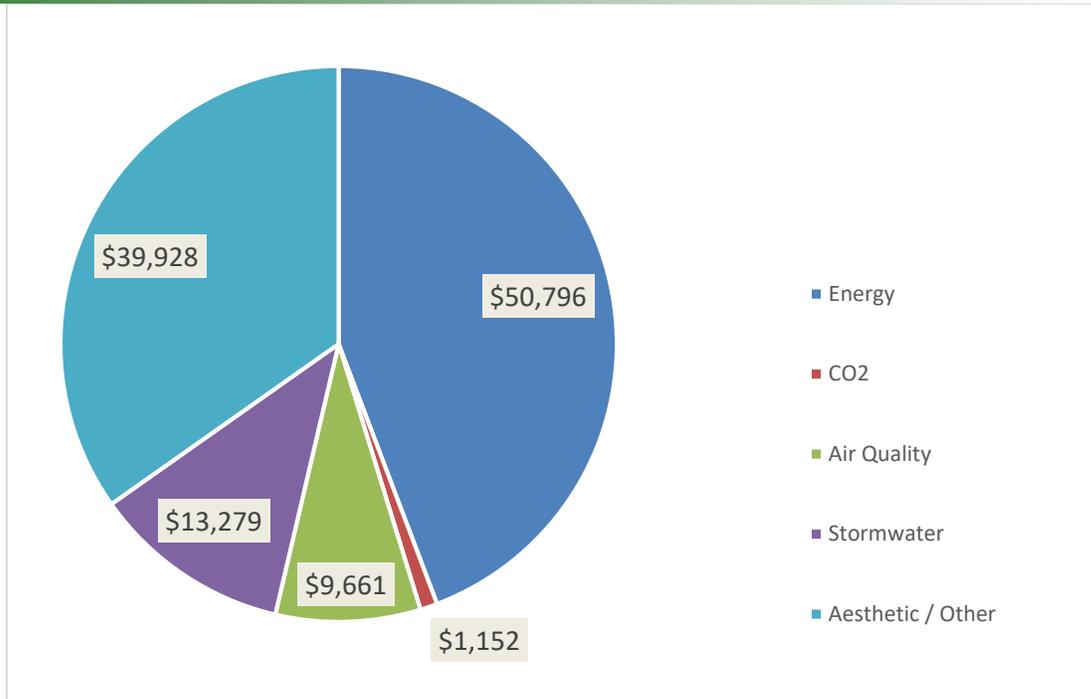
Total Replacement Value

In addition to Environmental Benefits, the City can consider the Total Replacement Value for its urban forest. Total Replacement Value is the amount of money it would take to completely replace the existing urban forest with trees of the same size. While this is a scenario that will likely never happen, it gives the City a specific dollar value of its trees in their current state. Replacement value differs from Environmental Benefits in that it shows how much the trees are worth instead of the dollar values that they provide in benefits. For example, a mature sugar maple could provide $2,100 in environmental benefits by reducing stormwater runoff, improving air quality, etc. but the total cost of replacing an 18" DBH sugar maple would be $24,270. According to i-Tree Streets, the total replacement cost for the parks in Kingston is $4,067,268. The table below shows the breakdown of Replacement Value by Diameter Class.

DBH (inches)	Replacement Value
00"-03"	$4,563
04"-06"	$29,912
07"-12"	$201,153
13"-18"	$648,241
19"-24"	$1,183,333
25"-30"	$931,049
31"-36"	$605,220
37"-42"	$317,762
43+	$146,035
Total	**$4,067,268**

Below is a Species Frequency report for the parks.

Botanical Name	Common Name	Tree Count	%
Abies concolor	White Fir	1	0.1%
Acer ginnala	Amur Maple	1	0.1%
Acer negundo	Box Elder	3	0.4%
Acer palmatum	Japanese Maple	5	0.6%
Acer plantanoides	Norway Maple	42	5.1%
Acer rubrum	Red Maple	46	5.5%
Acer saccharinum	Silver Maple	7	0.8%
Acer saccharum	Sugar Maple	53	6.4%
Acer x freemanii	Freeman Maple	1	0.1%
Albizia julibrissin	Mimosa, Silk Tree	1	0.1%
Amelanchier canadensis	Canadian Serviceberry	4	0.5%
Betula nigra	River Birch	5	0.6%
Betula populifolia	Gray Birch	1	0.1%
Carya cordiformis	Bitternut Hickory	7	0.8%
Carya ovata	Shagbark Hickory	2	0.2%
Carya tomentosa	Mockernut Hickory	1	0.1%
Castanea mollissima	Chinese Chestnut	1	0.1%
Catalpa speciosa	Western Catalpa	4	0.5%
Celtis occidentalis	Common Hackberry	9	1.1%
Cercis canadensis	Eastern Redbud	3	0.4%
Cornus florida	Eastern Dogwood	6	0.7%
Cornus kousa	Kousa Dogwood	3	0.4%
Crataegus crus-galli inermis	Thornless Hawthorn	3	0.4%
Fagus sylvatica	European Beech	1	0.1%
Fraxinus americana	White Ash	1	0.1%
Fraxinus pennsylvanica	Green Ash	6	0.7%
Gleditsia triacanthos forma inermis	Thornless Honey Locust	25	3.0%
Juglans nigra	Black Walnut	5	0.6%
Juniperus virginiana	Eastern Red Cedar	35	4.2%
Liquidambar styraciflua	American Sweet Gum	2	0.2%
Liriodendron tulipifera	Tulip Tree	1	0.1%
Magnolia stellata	Star Magnolia	1	0.1%
Magnolia x soulangiana	Saucer Magnolia	1	0.1%
Malus domestica	Edible Apple Species	10	1.2%
Malus floribunda	Crabapple	22	2.6%
Morus alba	White Mulberry	27	3.2%
Picea abies	Norway Spruce	86	10.3%
Picea glauca	White Spruce	4	0.5%

Picea pungens	Colorado Spruce	2	0.2%
Pinus nigra	Austrian Black Pine	24	2.9%
Pinus strobus	White Pine	66	7.9%
Platanus occidentalis	American Sycamore	13	1.6%
Populus deltoides	Cottonwood	23	2.8%
Prunus cerasifera	Purple-Leaf Plum	3	0.4%
Prunus domestica	Plum	1	0.1%
Prunus serotina	Eastern Black Cherry	17	2.0%
Prunus serrulata	Japanese Flowering Cherry	2	0.2%
Prunus species	Stone Fruit species	1	0.1%
Prunus subhirtella 'Pendula'	Weeping Flowering Cherry	2	0.2%
Prunus yeodensis	Yoshino Cherry	7	0.8%
Pyrus calleryana	Ornamental Pear	15	1.8%
Pyrus communis	Edible Pear	13	1.6%
Quercus alba	White Oak	9	1.1%
Quercus bicolor	Swamp White Oak	4	0.5%
Quercus coccinea	Scarlet Oak	3	0.4%
Quercus palustris	Pin Oak	9	1.1%
Quercus rubra	Red Oak	8	1.0%
Quercus velutina	Black Oak	3	0.4%
Robinia pseudoacacia	Black Locust	80	9.6%
Salix babylonica	Weeping Willow	1	0.1%
Salix discolor	Pussy Willow	1	0.1%
Salix nigra	Black Willow	4	0.5%
Sorbus americana	American Mountain Ash	2	0.2%
Stump	Stump	13	1.6%
Taxodium distichum	Bald Cypress	12	1.4%
Thuja occidentalis	American Arborvitae	15	1.8%
Tilia americana	American Linden	2	0.2%
Tilia cordata	Little-Leaf Linden	2	0.2%
Tsuga canadensis	Eastern Hemlock	22	2.6%
Ulmus americana	American Elm	7	0.8%
Ulmus pumila	Siberian Elm	4	0.5%
Ulmus rubra	Slippery Elm	3	0.4%
Ulmus x species	Hybrid Elm	2	0.2%

Recommended Maintenance Maps

Legend

Trees
- 🔴 Priority 1 Prune
- 🟠 Priority 1 Removal
- 🟡 Priority 2 Prune
- ⚪ Priority 2 Removal
- 🟢 Routine Prune
- 🟢 Stump Removal
- 🔵 Training Prune

Academy Green Park
Kingston, NY 2018

ArborPro
Management Software

Legend

Trees
- 🔴 Priority 1 Prune
- 🟠 Priority 1 Removal
- 🟡 Priority 2 Prune
- ⚪ Priority 2 Removal
- 🟢 Routine Prune
- 🟢 Stump Removal
- 🔵 Training Prune

Block Park
Kingston, NY 2018

ArborPro
URBAN FOREST MANAGEMENT

Legend

Trees
- 🔴 Priority 1 Prune
- 🟠 Priority 1 Removal
- 🟡 Priority 2 Prune
- ⚪ Priority 2 Removal
- 🟢 Routine Prune
- 🟢 Stump Removal
- 🔵 Training Prune

Cornell Park
Kingston, NY 2018

ArborPro
URBAN FOREST MANAGEMENT

ArborPro
Management Software

Legend

Trees
- Priority 1 Prune
- Priority 1 Removal
- Priority 2 Prune
- Priority 2 Removal
- Routine Prune
- Stump Removal
- Training Prune

Forsyth Park
Kingston, NY 2018

ArborPro
URBAN FOREST MANAGEMENT

Legend

Trees
- Priority 1 Prune
- Priority 1 Removal
- Priority 2 Prune
- Priority 2 Removal
- Routine Prune
- Stump Removal
- Training Prune

Hasbrouck Park
Kingston, NY 2018

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URBAN FOREST MANAGEMENT

Prepared for the City of Kingston, NY by ArborPro, Inc.

Legend

Trees
- 🔴 Priority 1 Prune
- 🟠 Priority 1 Removal
- 🟡 Priority 2 Prune
- ⚪ Priority 2 Removal
- 🟢 Routine Prune
- 🟢 Stump Removal
- 🔵 Training Prune

Hutton Park
Kingston, NY 2018

Legend

Trees
- 🔴 Priority 1 Prune
- 🟠 Priority 1 Removal
- 🟡 Priority 2 Prune
- ⚪ Priority 2 Removal
- 🟢 Routine Prune
- 🟢 Stump Removal
- 🔵 Training Prune

Kingston Point Park
Kingston, NY 2018

Loughran Park
Kingston, NY 2018

Legend

Trees
- Priority 1 Prune
- Priority 1 Removal
- Priority 2 Prune
- Priority 2 Removal
- Routine Prune
- Stump Removal
- Training Prune

TR Gallo Park
Kingston, NY 2018

Legend

Trees
- Priority 1 Prune
- Priority 1 Removal
- Priority 2 Prune
- Priority 2 Removal
- Routine Prune
- Stump Removal
- Training Prune