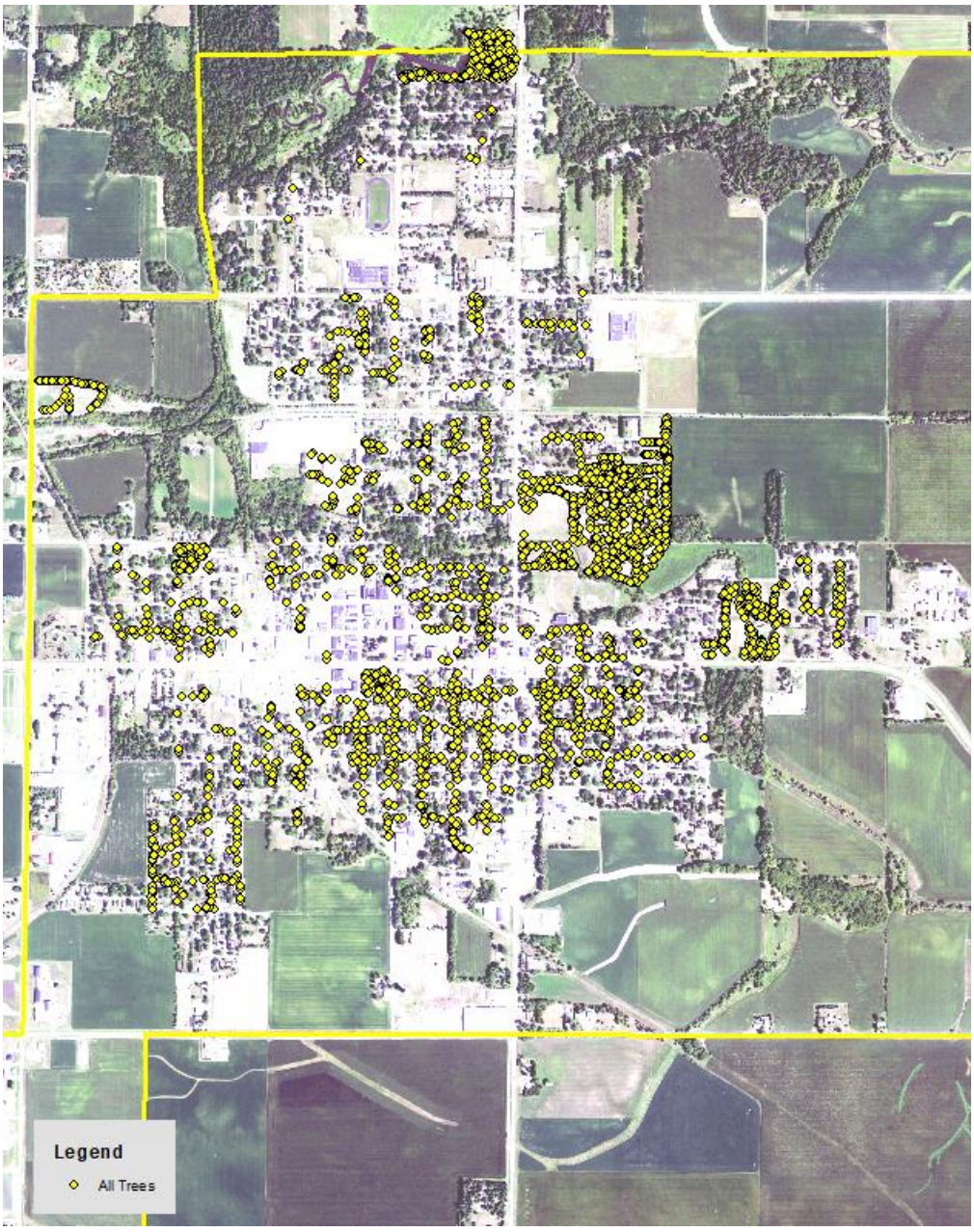
Hampton, IA



2023 Urban Forest Management Plan
Iowa Department of Natural Resources
Urban and Community Forestry

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Executive Summary

Overview

This plan was developed to assist the City of Hampton with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows a community to best take advantage of these benefits. Management is especially important considering the serious threats posed by forest pests such as the emerald ash borer (EAB). EAB is an invasive insect imported from Eastern Asia on wood shipping crates that kills all species of ash trees (this does not include mountain ash). As much as 11% of Hampton's city owned trees (ash) will die once EAB has infested all trees in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

Inventory and Results

In 2022, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 2,661 trees inventoried.

- Hampton's trees provide $466,597 of benefits annually, an average of $175 a tree
- There are at least 61 unique species of trees
- The top three genera are: Maple 29%, Spruce 16%, Ash and Oak 11% each
- 25% of trees are in need of some type of management
- 286 trees are recommended for removal

Recommendations

The core recommendations are detailed in the Recommendations Section. Below are some key recommendations.

- Of the 286 trees needing removal, 15 trees are considered "critical concerns" (implying removal needed as soon as possible) and another 82 are considered "immediate" concerns (implying removal during the next 1-3 years) *City ownership of the trees recommended for removal should be verified prior to any removal*
- 234 ash trees have one or more symptoms that could be related to an EAB infestation. This represents 81% of all ash trees
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, cottonwood, poplar, box elder, Chinese elm, willow or other trees listed in city code. Maples are also not recommended until the city-wide percentage can be brought down below 20% of the total canopy. Evergreens should not be planted in city street rights of way.
- Either begin immediately treating high-value ash trees, or schedule all ash trees for removal during the next 5 years

Introduction

This plan was developed to assist Hampton with the management and future planning of their urban forest. Across the state, forestry budgets continue to decrease with more and more of that money spent on tree removal. With the arrival of Emerald Ash Borer (EAB), an invasive pest that kills native ash trees, it is time to prepare for the increased costs of tree removal or treatment and replacement planting. With proper planning and management of the current canopy in Hampton, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Hampton's infrastructure and one of the greatest assets to the community. The benefits of trees are immense. Trees provide the community with improved air quality, stormwater runoff interception, energy conservation, lower traffic speeds, increased property values, reduced crime, improved mental health and create a desirable place to live, to name just a few benefits. It is essential that these benefits be maintained for the people of Hampton and future generations through good urban forestry management.

Good urban forestry management involves setting goals and developing management strategies to achieve these goals. An essential part of developing management strategies is a comprehensive public tree inventory. The inventory supplies information that will be used for maintenance, removal schedules, tree planting and budgeting. Basing actions on this information will help meet Hampton's urban forestry goals.

Inventory

In 2022, a tree inventory was conducted that included 100% of the city owned trees on both streets and parks. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

The programming used to collect tree information on the data collectors was written to be compatible with a state-of-the-art software suite called i-Tree. i-Tree was developed by the USDA Forest Service to quantify the structure of community trees and the environmental services that trees provide. The i-Tree suite is a public domain which can be accessed for free.

To quantify the urban forest structure and benefits, specific data is collected for each tree. This data includes: location, land use, species, diameter at 4.5 ft, recommended maintenance, priority of that maintenance, leaf health, and wood condition. Additionally, signs and symptoms associated with EAB were noted for all ash trees. The signs and symptoms noted were canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Inventory Results

The data collected for the 2,661 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban Forestry Management as part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Hampton's trees reduce energy related costs by approximately $118,790 annually (Appendix A, Table 1). These savings are both in Electricity (567 MWh) and in Natural Gas (77,298 Therms).

Annual Stormwater Benefits

Hampton's trees intercept about 7,143,959 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $193,601 of benefits to the city.

Annual Air Quality Benefits

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic matter (ozone). In Hampton, it is estimated that trees remove 6,787 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $18,434 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Hampton, trees sequester about 2,018,137 lbs of carbon a year with an associated value of $15,136 (Appendix A, Table 5). In addition, the trees store 25,059,104 lbs of carbon, with a yearly benefit of $187,943 (Appendix A, Table 4).

Annual Aesthetics Benefits

Social benefits of trees are hard to capture. The analysis does have a calculation for this area that includes: aesthetic value, property values, lowered rates of mental illness and crime, city livability and much more. Hampton receives $120,636 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STREETS analysis, Hampton's trees provide $466,597 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 2,661 trees in Hampton provide approximately $175 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Hampton has over 68 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	774	29%
Spruce	419	11%
Oak	295	11%
Ash	289	11%
Walnut	108	4%
Pine	98	3.6%
Hackberry	92	3.5%
Honey Locust	85	3.1%
All others	<85	<3%

Age/Size Class

Most of Hampton's trees (1,477 trees or 56%) are larger than 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). Conversely, 18% of Hampton's trees are between 1 and 6 inches and another 27% are between 6 and 18 inches. For age, it is preferred that approximately equal proportions of trees be evenly divided among the three size classes to prepare for natural mortality and to maintain canopy cover. Hampton's size curve is skewed toward the larger/older side, indicating an older stand which puts the trees more at risk for age-related decline, disease, and storm damage.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Hampton indicate that 92% of the trees are in good health, with only 8% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 93% of Hampton's trees are in good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 7% of the population. Trees having poor or dead/dying leaf or wood conditions should be reviewed for follow up monitoring.

Management Needs

The following outlines the specific management needs of the street and park trees by number of trees (Appendix B, Figure 3).

Pruning Category	# of Trees	Notes
Crown Cleaning	115	Removal of dead, diseased, broken, etc. limbs or thinning of surplus branches
Crown Raising	100	Pruning to raise clearance for pedestrians or street traffic
Tree Staking	3	Supporting young trees
Tree Removal	286	Mostly ash trees and other dead/dying species
Crown Reduction	117	Reduce crown to prevent encroachment into infrastructure (wires, buildings, etc) and/or thinning to prevent co-dominant stems

Canopy Cover

The total canopy coverage in Hampton including both private and public trees is about 16%, 441 acres based on satellite imagery analysis. The canopy cover on just city-owned properties included in the Hampton inventory includes approximately 64 acres (Appendix A, Figure 5). A reasonable goal would be to increase canopy to 20% across all lands within 30 years. To achieve this goal, it is estimated that 69 trees need to be planted annually on public and/or private lands.

Land Use and Location

The majority of Hampton's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figure 6 & Appendix A, Figure7). The following describes the land use and locations for the street and park trees.

Land Use	
Single family residential	50%
Park/vacant/other	49%
Industrial/Large commercial	<1%
Small commercial	<1%
Multifamily residential	<1%

Location	
Planting strip	59%
Other maintained locations	<1%
Cutout (surrounded by pavement)	<1%
Front yard	41%

Changes in Forest Structure Since plan in 2012

Not surprisingly, there have been some significant changes in the structure of Hampton's urban forest since the previous tree inventory and plan were completed in 2012. Some of these changes have been positive (increased tree population and species diversity), while others are negative (increased number of trees needing management attention and removals due to Emerald Ash Borer's arrival). The highlights of these trends are summarized below:

- Hampton added 205 trees during the time from the 2012 inventory to the 2022 inventory, an 8.3% increase
- The percentages of tree canopy made up by Maple and Ash have declined, which is good
- Species diversity increased dramatically, from 29 species in 2012 to 61 unique species in 2022
- The number of trees needing removal/trimming went from 12% of the overall population to 25%, presumably all attributed to the arrival of EAB

Recommendations

Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 18 inches should be removed. Broken

branches and branches that interfere with motorist's vision of pedestrians, vehicles, traffic signs and signals, etc should be removed.

Hazardous trees

Hampton has 21 critical concern trees that need immediate attention. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). Fifteen of these are removal candidates while the other six have large limbs that should be pruned out to mitigate the risk.

Immediate and Routine maintenance needs

After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing "Immediate" maintenance which refers to sometime in the next three years. There are a total of 128 trees with these needs.

Next, trees identified for "routine" maintenance can be addressed sometime in the next six years, of which there are 508 trees.

Ash trees

At this point, all Ash trees in public spaces should be located and either removed as soon as resources allow, or else begin receiving injection treatments as soon as possible if they are high value and still in good health. There are a total of 289 ash trees, and 234 of those have signs and symptoms that have been associated with EAB.

Poor tree species

After all of the above, any trees in either "poor" health or "dead/dying" condition (either wood condition or foliage) should be assessed for removal & replacement (Appendix B, Figure 3 & Appendix B, Figure 4). There are a total of 246 trees in this category.

In all cases, City ownership of the trees recommended for removal should be verified prior to any removal

Pruning Cycle

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. In the Management Needs section of the Findings there are four main maintenance issues to be addressed: routine pruning, crown cleaning, crown raising, and crown reduction. Crown cleaning removes dead, diseased, and damaged limbs. Crown raising is the removal of lower branches that are 2 inches in diameter or larger in the case of providing clearance for pedestrians or vehicles. Crown reduction is removing individual limbs from structures or utility wires. It is recommended that all trees be pruned on a routine schedule every five to seven years. Please refer to the six year maintenance plan for further information.

Planting

Most of the planting over the next 5 years will replace the trees that are removed. It is recommended to plant 1.2 trees for every tree removed, since survival rates will not be 100%. Please refer to the six year maintenance plan at the end of this section. It is not essential that the new trees be planted in the same location of the trees being removed. However, maintaining the same number of trees helps ensure continuation of the benefits of the existing forest in Hampton.

It is important to plant a diverse mix of species in the urban forest to maintain canopy health, since most insects and diseases target a genus (ash) or species (green ash) of trees. Current diversity recommendations advise that a genus (i.e. maple, oak) not make up more than 20% of the urban forest and a single species (i.e. silver maple, sugar maple, white oak, bur oak) not make up more than 10% of the total urban forest. Presently, the forest is heavily planted with maple (29%) (Appendix A, Figure 1). Maples should not be planted until this percentage can be lowered. Also, ash trees have not been recommended since 2002, due to the threat of EAB. Other species to avoid because they are commonly considered public nuisances include: cottonwood, poplar, box elder, Chinese elm, evergreens on street rights-of-way (due to visibility issues), willow, or any others identified in section 151 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151 (Appendix C).

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that ash trees be checked with a visual survey every year for tree decline and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Hampton

Annual Energy Benefits of Public Trees

2/1/2023

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway spruce	40.4	3,065	5,393.4	5,286	8,350	(N/A)	12.3	7.0	25.54
Norway maple	80.9	6,140	11,669.4	11,436	17,576	(N/A)	11.3	14.8	58.39
Green ash	94.1	7,143	12,758.6	12,503	19,646	(N/A)	10.7	16.5	68.69
Silver maple	72.3	5,484	9,394.7	9,207	14,691	(N/A)	8.8	12.4	63.05
Sugar maple	46.5	3,532	6,247.0	6,122	9,654	(N/A)	5.8	8.1	62.69
Black walnut	26.7	2,028	3,712.7	3,638	5,667	(N/A)	4.1	4.8	52.47
Bur oak	19.7	1,496	2,725.2	2,671	4,167	(N/A)	3.6	3.5	42.96
Eastern white pine	10.8	816	1,455.4	1,426	2,243	(N/A)	3.6	1.9	23.12
Northern hackberry	26.2	1,989	3,615.8	3,543	5,532	(N/A)	3.5	4.7	60.13
Honeylocust	29.5	2,241	3,831.2	3,755	5,996	(N/A)	3.2	5.0	70.54
Apple	9.3	706	1,395.6	1,368	2,073	(N/A)	3.0	1.7	26.25
Northern red oak	11.7	886	1,610.4	1,578	2,464	(N/A)	2.8	2.1	33.30
Northern white cedar	10.3	781	1,356.5	1,329	2,111	(N/A)	2.6	1.8	30.15
Littleleaf linden	11.7	887	1,649.0	1,616	2,503	(N/A)	2.1	2.1	44.70
Swamp white oak	1.8	139	255.9	251	390	(N/A)	1.8	0.3	8.29
Blue spruce	5.3	403	661.1	648	1,051	(N/A)	1.7	0.9	22.84
Spruce	3.0	229	384.8	377	606	(N/A)	1.7	0.5	13.18
Conifer Evergreen Large	6.0	452	775.6	760	1,212	(N/A)	1.7	1.0	26.35
Pin oak	16.7	1,267	2,234.0	2,189	3,456	(N/A)	1.7	2.9	75.14
Red maple	8.1	614	1,109.2	1,087	1,701	(N/A)	1.7	1.4	36.99
American basswood	8.4	634	1,181.1	1,157	1,791	(N/A)	1.2	1.5	54.28
Broadleaf Deciduous Large	0.2	19	35.5	35	54	(N/A)	0.8	0.0	2.69
Maple	2.4	182	339.6	333	515	(N/A)	0.7	0.4	27.10
White oak	0.4	32	60.8	60	92	(N/A)	0.6	0.1	5.40
Broadleaf Deciduous Small	0.1	9	20.1	20	28	(N/A)	0.6	0.0	1.67
River birch	1.5	110	220.8	216	327	(N/A)	0.6	0.3	20.43
Ginkgo	0.9	65	108.9	107	172	(N/A)	0.6	0.1	11.44
Eastern red cedar	0.6	44	88.6	87	131	(N/A)	0.5	0.1	10.04
Amur maple	2.2	165	318.9	313	478	(N/A)	0.5	0.4	39.81
Elm	2.1	161	279.7	274	436	(N/A)	0.5	0.4	36.30
Boxelder	2.2	164	291.2	285	449	(N/A)	0.4	0.4	40.82
Catalpa	0.7	53	90.8	89	142	(N/A)	0.4	0.1	14.18
Eastern redbud	0.1	7	15.1	15	21	(N/A)	0.3	0.0	2.38
Black maple	2.1	160	296.5	291	450	(N/A)	0.3	0.4	50.04
Quaking aspen	0.8	63	111.0	109	172	(N/A)	0.3	0.1	19.10
American elm	0.8	58	92.7	91	149	(N/A)	0.3	0.1	18.60
Lilac	0.3	22	51.1	50	73	(N/A)	0.3	0.1	9.07
Oak	0.0	3	6.5	6	10	(N/A)	0.3	0.0	1.39
Broadleaf Deciduous Mediur	0.5	37	62.9	62	99	(N/A)	0.3	0.1	14.15
Kentucky coffeetree	0.2	15	29.8	29	45	(N/A)	0.3	0.0	6.36
Plum	0.3	25	49.5	49	73	(N/A)	0.2	0.1	12.23
Northern pin oak	1.8	137	268.8	263	401	(N/A)	0.2	0.3	66.79
Tulip tree	0.4	30	55.2	54	84	(N/A)	0.2	0.1	16.77
Ohio buckeye	0.8	60	120.7	118	178	(N/A)	0.2	0.2	44.62
Common chokecherry	0.6	42	74.0	73	114	(N/A)	0.1	0.1	38.13
Cherry plum	0.1	9	20.4	20	29	(N/A)	0.1	0.0	9.67
White ash	0.8	64	99.8	98	162	(N/A)	0.1	0.1	53.94
Japanese tree lilac	0.3	25	50.3	49	75	(N/A)	0.1	0.1	24.84
Hickory	0.3	20	39.0	38	59	(N/A)	0.1	0.0	19.54
Paper birch	0.8	63	112.0	110	172	(N/A)	0.1	0.1	57.49
Callery pear	0.5	36	59.8	59	95	(N/A)	0.1	0.1	31.55
Black locust	0.2	16	33.7	33	49	(N/A)	0.1	0.0	24.47
White mulberry	0.2	15	32.2	32	47	(N/A)	0.1	0.0	23.50
Eastern hophornbeam	0.0	2	4.4	4	6	(N/A)	0.1	0.0	3.13
Conifer Evergreen Small	0.2	17	32.9	32	49	(N/A)	0.1	0.0	24.57
American sycamore	0.5	39	66.8	65	104	(N/A)	0.1	0.1	52.22
Dogwood	0.1	6	13.5	13	19	(N/A)	0.1	0.0	9.53
Yellowwood	0.0	1	1.6	2	2	(N/A)	0.1	0.0	1.10
Basswood	0.2	18	27.0	26	44	(N/A)	0.0	0.0	44.23
Austrian pine	0.2	13	23.3	23	35	(N/A)	0.0	0.0	35.47
Eastern cottonwood	0.4	33	59.0	58	91	(N/A)	0.0	0.1	91.02
Southern magnolia	0.0	1	2.8	3	4	(N/A)	0.0	0.0	3.94
Siberian elm	0.4	34	58.3	57	91	(N/A)	0.0	0.1	91.06
Scarlet oak	0.0	0	0.5	0	1	(N/A)	0.0	0.0	0.66
Mulberry	0.1	6	12.8	13	18	(N/A)	0.0	0.0	18.19
Black poplar	0.0	2	3.7	4	6	(N/A)	0.0	0.0	5.82
Black cherry	0.2	14	24.7	24	38	(N/A)	0.0	0.0	38.13
Broadleaf Evergreen Large	0.1	7	14.0	14	21	(N/A)	0.0	0.0	20.59
Total	567.0	43,038	77,298.0	75,752	118,790	(N/A)	100.0	100.0	44.64

Table 2: Annual Stormwater Benefits

Hampton

Annual Stormwater Benefits of Public Trees

2/1/2023

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway spruce	833,970	22,601	(N/A)	12.3	11.7	69.11
Norway maple	802,045	21,735	(N/A)	11.3	11.2	72.21
Green ash	1,180,593	31,994	(N/A)	10.7	16.5	111.87
Silver maple	956,313	25,916	(N/A)	8.8	13.4	111.23
Sugar maple	615,451	16,679	(N/A)	5.8	8.6	108.30
Black walnut	296,386	8,032	(N/A)	4.1	4.1	74.37
Bur oak	225,030	6,098	(N/A)	3.6	3.1	62.87
Eastern white pine	237,765	6,443	(N/A)	3.6	3.3	66.43
Northern hackberry	256,937	6,963	(N/A)	3.5	3.6	75.68
Honeylocust	352,179	9,544	(N/A)	3.2	4.9	112.28
Apple	41,149	1,115	(N/A)	3.0	0.6	14.12
Northern red oak	113,954	3,088	(N/A)	2.8	1.6	41.73
Northern white cedar	237,637	6,440	(N/A)	2.6	3.3	92.00
Littleleaf linden	119,454	3,237	(N/A)	2.1	1.7	57.81
Swamp white oak	10,032	272	(N/A)	1.8	0.1	5.78
Blue spruce	66,822	1,811	(N/A)	1.7	0.9	39.37
Spruce	45,247	1,226	(N/A)	1.7	0.6	26.66
Conifer Evergreen Large	118,538	3,212	(N/A)	1.7	1.7	69.83
Pin oak	208,603	5,653	(N/A)	1.7	2.9	122.89
Red maple	69,892	1,894	(N/A)	1.7	1.0	41.18
American basswood	113,744	3,082	(N/A)	1.2	1.6	93.41
Broadleaf Deciduous Large	1,563	42	(N/A)	0.8	0.0	2.12
Maple	18,521	502	(N/A)	0.7	0.3	26.42
White oak	4,537	123	(N/A)	0.6	0.1	7.23
Broadleaf Deciduous Small	310	8	(N/A)	0.6	0.0	0.49
River birch	9,997	271	(N/A)	0.6	0.1	16.93
Ginkgo	5,303	144	(N/A)	0.6	0.1	9.58
Eastern red cedar	8,005	217	(N/A)	0.5	0.1	16.69
Amur maple	10,134	275	(N/A)	0.5	0.1	22.89
Elm	27,840	754	(N/A)	0.5	0.4	62.87
Boxelder	21,197	574	(N/A)	0.4	0.3	52.22
Catalpa	7,407	201	(N/A)	0.4	0.1	20.07
Eastern redbud	251	7	(N/A)	0.3	0.0	0.75
Black maple	20,706	561	(N/A)	0.3	0.3	62.35
Quaking aspen	6,130	166	(N/A)	0.3	0.1	18.46
American elm	5,475	148	(N/A)	0.3	0.1	18.55
Lilac	1,014	27	(N/A)	0.3	0.0	3.44
Oak	279	8	(N/A)	0.3	0.0	1.08
Broadleaf Deciduous Medium	2,879	78	(N/A)	0.3	0.0	11.15
Kentucky coffeetree	1,305	35	(N/A)	0.3	0.0	5.05
Plum	1,144	31	(N/A)	0.2	0.0	5.17
Northern pin oak	20,016	542	(N/A)	0.2	0.3	90.41
Tulip tree	4,322	117	(N/A)	0.2	0.1	23.43
Ohio buckeye	7,416	201	(N/A)	0.2	0.1	50.24
Common chokecherry	2,000	54	(N/A)	0.1	0.0	18.06
Cherry plum	402	11	(N/A)	0.1	0.0	3.63
White ash	6,550	178	(N/A)	0.1	0.1	59.17
Japanese tree lilac	1,196	32	(N/A)	0.1	0.0	10.80
Hickory	2,626	71	(N/A)	0.1	0.0	23.73
Paper birch	7,999	217	(N/A)	0.1	0.1	72.26
Callery pear	2,830	77	(N/A)	0.1	0.0	25.57
Black locust	1,172	32	(N/A)	0.1	0.0	15.88
White mulberry	1,181	32	(N/A)	0.1	0.0	16.01
Eastern hophornbeam	76	2	(N/A)	0.1	0.0	1.03
Conifer Evergreen Small	3,269	89	(N/A)	0.1	0.0	44.30
American sycamore	7,411	201	(N/A)	0.1	0.1	100.41
Dogwood	272	7	(N/A)	0.1	0.0	3.68
Yellowwood	24	1	(N/A)	0.1	0.0	0.33
Basswood	1,466	40	(N/A)	0.0	0.0	39.72
Austrian pine	2,925	79	(N/A)	0.0	0.0	79.26
Eastern cottonwood	7,239	196	(N/A)	0.0	0.1	196.17
Southern magnolia	56	2	(N/A)	0.0	0.0	1.53
Siberian elm	5,904	160	(N/A)	0.0	0.1	159.99
Scarlet oak	18	0	(N/A)	0.0	0.0	0.48
Mulberry	264	7	(N/A)	0.0	0.0	7.17
Black poplar	172	5	(N/A)	0.0	0.0	4.65
Black cherry	667	18	(N/A)	0.0	0.0	18.06
Broadleaf Evergreen Large	750	20	(N/A)	0.0	0.0	20.32
Citywide total	7,143,959	193,601	(N/A)	100.0	100.0	72.76

Table 3: Annual Air Quality Benefits

Hampton

Annual Air Quality Benefits of Public Trees

2/1/2023

Species	Deposition (lb)				Total Depos. ($)	Avoided (lb)				Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($) Standard Error	% of Total Trees	Avg. $/tree
	O_3	NO_2	PM_{10}	SO_2		NO_2	PM_{10}	VOC	SO_2							
Norway spruce	99.1	19.6	80.1	12.2	649	191.1	27.9	26.7	182.9	1,195	-467.5	-1,753	172.2	91 (N/A)	12.3	0.28
Norway maple	170.0	29.3	82.7	7.5	916	392.2	56.7	54.0	367.0	2,429	-39.3	-147	1,120.1	3,198 (N/A)	11.3	10.62
Green ash	173.5	27.7	79.5	7.8	914	448.3	65.3	62.3	426.5	2,795	0.0	0	1,290.9	3,709 (N/A)	10.7	12.97
Silver maple	161.3	27.3	80.0	7.1	872	339.7	49.8	47.6	326.9	2,128	-87.9	-330	951.9	2,670 (N/A)	8.8	11.46
Sugar maple	91.6	15.6	43.9	4.0	491	220.8	32.2	30.8	210.7	1,378	-70.9	-266	578.9	1,604 (N/A)	5.8	10.42
Black walnut	36.3	5.8	17.5	1.6	194	128.1	18.6	17.7	121.1	797	0.0	0	346.8	990 (N/A)	4.1	9.17
Bur oak	28.5	4.6	13.5	1.3	152	94.4	13.7	13.1	89.3	587	0.0	0	258.4	739 (N/A)	3.6	7.62
Eastern white pine	28.5	5.6	22.9	3.5	186	51.1	7.5	7.1	48.7	319	-140.4	-526	34.5	-22 (N/A)	3.6	-0.22
Northern hackberry	45.4	7.9	22.7	2.0	247	125.6	18.3	17.4	118.8	781	0.0	0	358.1	1,028 (N/A)	3.5	11.17
Honeylocust	69.8	11.5	31.6	3.2	368	138.8	20.4	19.4	133.6	869	-55.5	-208	372.7	1,029 (N/A)	3.2	12.10
Apple	13.1	2.2	6.1	0.6	70	45.5	6.5	6.2	42.1	281	-0.1	0	122.3	350 (N/A)	3.0	4.43
Northern red oak	23.8	4.1	11.6	1.1	129	55.8	8.1	7.7	52.9	347	-34.1	-128	131.0	348 (N/A)	2.8	4.70
Northern white cedar	28.9	5.7	23.0	3.6	188	48.6	7.1	6.8	46.6	304	-141.5	-531	28.7	-39 (N/A)	2.6	-0.55
Littleleaf linden	20.4	3.5	10.1	0.9	110	56.3	8.2	7.8	53.1	350	-9.9	-37	150.4	423 (N/A)	2.1	7.56
Swamp white oak	1.3	0.2	0.8	0.1	7	8.8	1.3	1.2	8.3	55	-0.4	-1	21.6	61 (N/A)	1.8	1.29
Blue spruce	8.5	1.7	7.2	1.0	57	24.7	3.6	3.5	24.0	155	-24.0	-90	50.3	122 (N/A)	1.7	2.65
Spruce	5.0	1.0	4.2	0.6	33	14.1	2.1	2.0	13.7	89	-19.6	-73	23.1	48 (N/A)	1.7	1.05
Conifer Evergreen Large	14.1	2.8	11.4	1.7	92	28.0	4.1	3.9	27.0	176	-64.6	-242	28.4	25 (N/A)	1.7	0.55
Pin oak	39.3	6.9	19.8	1.8	214	79.2	11.6	11.0	75.6	494	-72.1	-270	173.0	438 (N/A)	1.7	9.52
Red maple	16.8	2.9	7.9	0.7	89	38.6	5.6	5.4	36.7	241	-5.6	-21	108.9	309 (N/A)	1.7	6.72
American basswood	17.6	3.0	8.3	0.8	94	40.3	5.8	5.6	37.9	250	-14.4	-54	104.8	290 (N/A)	1.2	8.79
Broadleaf Deciduous Large	0.0	0.0	0.0	0.0	0	1.2	0.2	0.2	1.1	7	0.0	0	2.8	8 (N/A)	0.8	0.39
Maple	4.0	0.7	1.9	0.2	21	11.5	1.7	1.6	10.9	72	-1.4	-5	31.0	88 (N/A)	0.7	4.62
White oak	0.5	0.1	0.2	0.0	3	2.0	0.3	0.3	1.9	13	0.0	0	5.4	15 (N/A)	0.6	0.90
Broadleaf Deciduous Small	0.0	0.0	0.0	0.0	0	0.6	0.1	0.1	0.5	4	0.0	0	1.3	4 (N/A)	0.6	0.21
River birch	1.5	0.3	0.8	0.1	8	7.2	1.0	1.0	6.6	44	-0.4	-2	18.0	51 (N/A)	0.6	3.19
Ginkgo	1.3	0.2	0.7	0.1	7	4.0	0.6	0.6	3.9	25	-0.4	-2	10.9	31 (N/A)	0.6	2.05
Eastern red cedar	1.3	0.3	1.1	0.2	9	2.8	0.4	0.4	2.6	17	-4.3	-16	4.7	10 (N/A)	0.5	0.75
Amur maple	3.5	0.6	1.6	0.2	18	10.6	1.5	1.5	9.9	65	0.0	0	29.2	84 (N/A)	0.5	6.97
Elm	5.4	0.9	2.4	0.2	28	10.1	1.5	1.4	9.6	63	0.0	0	31.4	91 (N/A)	0.5	7.59
Boxelder	2.6	0.4	1.3	0.1	14	10.2	1.5	1.4	9.8	64	-1.1	-4	26.3	74 (N/A)	0.4	6.71
Catalpa	0.9	0.1	0.4	0.0	5	3.3	0.5	0.5	3.2	21	0.0	0	8.9	25 (N/A)	0.4	2.54
Eastern redbud	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	0.0	0	1.0	3 (N/A)	0.3	0.31
Black maple	5.3	0.9	2.4	0.2	28	10.1	1.5	1.4	9.5	63	-1.7	-7	29.7	85 (N/A)	0.3	9.39
Quaking aspen	0.4	0.1	0.3	0.0	2	3.9	0.6	0.5	3.8	25	0.0	0	9.6	27 (N/A)	0.3	3.01
American elm	2.2	0.4	1.0	0.1	12	3.5	0.5	0.5	3.5	22	0.0	0	11.8	34 (N/A)	0.3	4.27
Lilac	0.1	0.0	0.1	0.0	1	1.5	0.2	0.2	1.3	9	0.0	0	3.5	10 (N/A)	0.3	1.25
Oak	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.5	1 (N/A)	0.3	0.20
Broadleaf Deciduous Medium	0.4	0.1	0.2	0.0	2	2.3	0.3	0.3	2.2	15	-0.1	0	5.9	17 (N/A)	0.3	2.36
Kentucky coffeetree	0.0	0.0	0.0	0.0	0	1.0	0.1	0.1	0.9	6	0.0	0	2.3	6 (N/A)	0.3	0.91
Plum	0.3	0.0	0.1	0.0	1	1.6	0.2	0.2	1.5	10	0.0	0	4.0	11 (N/A)	0.2	1.89
Northern pin oak	4.4	0.8	2.1	0.2	24	8.8	1.3	1.2	8.2	55	-1.0	-4	26.1	75 (N/A)	0.2	12.44
Tulip tree	0.5	0.1	0.2	0.0	3	1.9	0.3	0.3	1.8	12	0.0	0	5.0	14 (N/A)	0.2	2.88
Ohio buckeye	1.5	0.3	0.7	0.1	8	3.9	0.6	0.5	3.6	24	-0.3	-1	10.8	31 (N/A)	0.2	7.67
Common chokecherry	0.6	0.1	0.3	0.0	3	2.6	0.4	0.4	2.5	16	0.0	0	6.9	20 (N/A)	0.1	6.56
Cherry plum	0.1	0.0	0.0	0.0	0	0.6	0.1	0.1	0.5	4	0.0	0	1.4	4 (N/A)	0.1	1.32
White ash	0.6	0.1	0.3	0.0	3	3.9	0.6	0.6	3.8	25	0.0	0	9.9	28 (N/A)	0.1	9.27
Japanese tree lilac	0.3	0.0	0.2	0.0	2	1.6	0.2	0.2	1.5	10	0.0	0	4.1	12 (N/A)	0.1	3.88
Hickory	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.3	10 (N/A)	0.1	3.17
Paper birch	0.9	0.1	0.4	0.0	5	3.9	0.6	0.5	3.7	25	0.0	0	10.3	29 (N/A)	0.1	9.75
Callery pear	0.4	0.1	0.2	0.0	2	2.2	0.3	0.3	2.2	14	-0.1	0	5.7	16 (N/A)	0.1	5.32
Black locust	0.1	0.0	0.1	0.0	1	1.0	0.1	0.1	1.0	6	0.0	0	2.5	7 (N/A)	0.1	3.47
White mulberry	0.4	0.1	0.2	0.0	2	1.0	0.1	0.1	0.9	6	0.0	0	2.9	8 (N/A)	0.1	4.23
Eastern hophornbeam	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)	0.1	0.41
Conifer Evergreen Small	0.7	0.1	0.5	0.1	4	1.1	0.2	0.1	1.0	7	-1.8	-7	2.0	4 (N/A)	0.1	2.19
American sycamore	1.6	0.3	0.7	0.1	8	2.4	0.4	0.3	2.3	15	0.0	0	8.0	23 (N/A)	0.1	11.71
Dogwood	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	2	0.0	0	0.9	3 (N/A)	0.1	1.33
Yellowwood	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)	0.1	0.14
Basswood	0.1	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	0.0	0	2.6	7 (N/A)	0.0	7.42
Austrian pine	0.5	0.1	0.4	0.1	3	0.8	0.1	0.1	0.8	5	-1.1	-4	1.8	4 (N/A)	0.0	4.16
Eastern cottonwood	1.2	0.2	0.5	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.6	19 (N/A)	0.0	19.04
Southern magnolia	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	0	0.0	0	0.2	0 (N/A)	0.0	0.47
Siberian elm	1.2	0.2	0.6	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.8	20 (N/A)	0.0	19.64
Scarlet oak	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0	0	0.0	0	0.0	0 (N/A)	0.0	0.08
Mulberry	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.3	2	0.0	0	0.9	3 (N/A)	0.0	2.55
Black poplar	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)	0.0	0.87
Black cherry	0.2	0.0	0.1	0.0	1	0.9	0.1	0.1	0.8	5	0.0	0	2.3	7 (N/A)	0.0	6.56
Broadleaf Evergreen Large	0.0	0.0	0.1	0.0	0	0.4	0.1	0.1	0.4	3	-0.2	-1	0.8	2 (N/A)	0.0	2.16
Citywide total	1,138.4	196.6	607.4	65.4	6,319	2,702.9	393.8	375.5	2,569.2	16,847	-1,261.9	-4,732	6,787.4	18,434 (N/A)	100.0	6.93

Table 4: Annual Carbon Stored

Hampton

Stored CO2 Benefits of Public Trees

2/1/2023

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway spruce	1,185,977	8,895	(N/A)	12.3	4.7	27.20
Norway maple	2,799,706	20,998	(N/A)	11.3	11.2	69.76
Green ash	5,801,608	43,512	(N/A)	10.7	23.2	152.14
Silver maple	3,800,868	28,507	(N/A)	8.8	15.2	122.35
Sugar maple	2,700,391	20,253	(N/A)	5.8	10.8	131.51
Black walnut	1,180,083	8,851	(N/A)	4.1	4.7	81.95
Bur oak	929,837	6,974	(N/A)	3.6	3.7	71.89
Eastern white pine	360,289	2,702	(N/A)	3.6	1.4	27.86
Northern hackberry	723,411	5,426	(N/A)	3.5	2.9	58.97
Honeylocust	904,165	6,781	(N/A)	3.2	3.6	79.78
Apple	204,049	1,530	(N/A)	3.0	0.8	19.37
Northern red oak	513,894	3,854	(N/A)	2.8	2.1	52.08
Northern white cedar	365,885	2,744	(N/A)	2.6	1.5	39.20
Littleleaf linden	436,435	3,273	(N/A)	2.1	1.7	58.45
Swamp white oak	23,088	173	(N/A)	1.8	0.1	3.68
Blue spruce	53,296	400	(N/A)	1.7	0.2	8.69
Spruce	44,791	336	(N/A)	1.7	0.2	7.30
Conifer Evergreen La	163,023	1,223	(N/A)	1.7	0.7	26.58
Pin oak	1,066,084	7,996	(N/A)	1.7	4.3	173.82
Red maple	182,662	1,370	(N/A)	1.7	0.7	29.78
American basswood	680,889	5,107	(N/A)	1.2	2.7	154.75
Broadleaf Deciduous	1,959	15	(N/A)	0.8	0.0	0.73
Maple	44,917	337	(N/A)	0.7	0.2	17.73
White oak	16,314	122	(N/A)	0.6	0.1	7.20
Broadleaf Deciduous	726	5	(N/A)	0.6	0.0	0.32
River birch	25,959	195	(N/A)	0.6	0.1	12.17
Ginkgo	19,297	145	(N/A)	0.6	0.1	9.65
Eastern red cedar	4,511	34	(N/A)	0.5	0.0	2.60
Amur maple	52,844	396	(N/A)	0.5	0.2	33.03
Elm	188,498	1,414	(N/A)	0.5	0.8	117.81
Boxelder	81,431	611	(N/A)	0.4	0.3	55.52
Catalpa	30,059	225	(N/A)	0.4	0.1	22.54
Eastern redbud	616	5	(N/A)	0.3	0.0	0.51
Black maple	56,735	426	(N/A)	0.3	0.2	47.28
Quaking aspen	15,126	113	(N/A)	0.3	0.1	12.60
American elm	43,075	323	(N/A)	0.3	0.2	40.38
Lilac	3,285	25	(N/A)	0.3	0.0	3.08
Oak	258	2	(N/A)	0.3	0.0	0.28
Broadleaf Deciduous	7,333	55	(N/A)	0.3	0.0	7.86
Kentucky coffeetree	2,130	16	(N/A)	0.3	0.0	2.28
Plum	4,492	34	(N/A)	0.2	0.0	5.62
Northern pin oak	73,011	548	(N/A)	0.2	0.3	91.26
Tulip tree	16,168	121	(N/A)	0.2	0.1	24.25
Ohio buckeye	24,427	183	(N/A)	0.2	0.1	45.80
Common chokecherry	9,111	68	(N/A)	0.1	0.0	22.78
Cherry plum	1,263	9	(N/A)	0.1	0.0	3.16
White ash	15,801	119	(N/A)	0.1	0.1	39.50
Japanese tree lilac	4,853	36	(N/A)	0.1	0.0	12.13
Hickory	8,482	64	(N/A)	0.1	0.0	21.21
Paper birch	27,902	209	(N/A)	0.1	0.1	69.76
Callery pear	7,265	54	(N/A)	0.1	0.0	18.16
Black locust	2,201	17	(N/A)	0.1	0.0	8.26
White mulberry	6,756	51	(N/A)	0.1	0.0	25.34
Eastern hophornbeam	192	1	(N/A)	0.1	0.0	0.72
Conifer Evergreen Sn	2,204	17	(N/A)	0.1	0.0	8.27
American sycamore	56,167	421	(N/A)	0.1	0.2	210.63
Dogwood	922	7	(N/A)	0.1	0.0	3.46
Yellowwood	34	0	(N/A)	0.1	0.0	0.13
Basswood	3,672	28	(N/A)	0.0	0.0	27.54
Austrian pine	4,893	37	(N/A)	0.0	0.0	36.70
Eastern cottonwood	39,259	294	(N/A)	0.0	0.2	294.44
Southern magnolia	3	0	(N/A)	0.0	0.0	0.02
Siberian elm	29,353	220	(N/A)	0.0	0.1	220.15
Scarlet oak	12	0	(N/A)	0.0	0.0	0.09
Mulberry	908	7	(N/A)	0.0	0.0	6.81
Black poplar	185	1	(N/A)	0.0	0.0	1.39
Black cherry	3,037	23	(N/A)	0.0	0.0	22.78
Broadleaf Evergreen I	1,025	8	(N/A)	0.0	0.0	7.68
Citywide total	25,059,104	187,943	(N/A)	100.0	100.0	70.63

Table 5: Annual Carbon Sequestered

Hampton

Annual CO₂ Benefits of Public Trees

2/1/2023

Species	Sequestered (lb)	Sequestered ($)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total Standard ($) Error	% of Total Trees	% of Total $	Avg. $/tree
Norway spruce	21,639	162	-5,693	-892	-49	67,728	508	82,782	621 (N/A)	12.3	4.1	1.90
Norway maple	90,342	678	-13,442	-886	-107	135,690	1,018	211,705	1,588 (N/A)	11.3	10.5	5.28
Green ash	203,854	1,529	-27,848	-1,016	-216	157,855	1,184	332,845	2,496 (N/A)	10.7	16.5	8.73
Silver maple	287,631	2,157	-18,247	-776	-143	121,193	909	389,801	2,924 (N/A)	8.8	19.3	12.55
Sugar maple	120,573	904	-12,965	-531	-101	78,049	585	185,126	1,388 (N/A)	5.8	9.2	9.02
Black walnut	64,506	484	-5,665	-283	-45	44,823	336	103,381	775 (N/A)	4.1	5.1	7.18
Bur oak	47,209	354	-4,464	-213	-35	33,066	248	75,597	567 (N/A)	3.6	3.7	5.85
Eastern white pine	3,589	27	-1,729	-262	-15	18,040	135	19,637	147 (N/A)	3.6	1.0	1.52
Northern hackberry	32,223	242	-3,474	-253	-28	43,952	330	72,447	543 (N/A)	3.5	3.6	5.91
Honeylocust	74,553	559	-4,340	-223	-34	49,533	371	119,523	896 (N/A)	3.2	5.9	10.55
Apple	15,501	116	-980	-123	-8	15,597	117	29,995	225 (N/A)	3.0	1.5	2.85
Northern red oak	13,530	101	-2,467	-150	-20	19,587	147	30,499	229 (N/A)	2.8	1.5	3.09
Northern white cedar	4,905	37	-1,756	-239	-15	17,268	130	20,177	151 (N/A)	2.6	1.0	2.16
Littleleaf linden	30,692	230	-2,096	-144	-17	19,610	147	48,062	360 (N/A)	2.1	2.4	6.44
Swamp white oak	3,264	24	-116	-23	-1	3,070	23	6,195	46 (N/A)	1.8	0.3	0.99
Blue spruce	3,557	27	-256	-85	-3	8,900	67	12,115	91 (N/A)	1.7	0.6	1.98
Spruce	3,113	23	-215	-54	-2	5,066	38	7,910	59 (N/A)	1.7	0.4	1.29
Conifer Evergreen Large	4,395	33	-783	-121	-7	9,991	75	13,482	101 (N/A)	1.7	0.7	2.20
Pin oak	79,180	594	-5,117	-184	-40	28,004	210	101,882	764 (N/A)	1.7	5.0	16.61
Red maple	9,995	75	-877	-78	-7	13,577	102	22,617	170 (N/A)	1.7	1.1	3.69
American basswood	35,740	268	-3,269	-104	-25	14,009	105	46,377	348 (N/A)	1.2	2.3	10.54
Broadleaf Deciduous Larg	544	4	-10	-6	0	419	3	947	7 (N/A)	0.8	0.0	0.36
Maple	3,777	28	-216	-25	-2	4,025	30	7,561	57 (N/A)	0.7	0.4	2.98
White oak	1,042	8	-79	-7	-1	711	5	1,666	12 (N/A)	0.6	0.1	0.74
Broadleaf Deciduous Smal	235	2	-4	-4	0	190	1	417	3 (N/A)	0.6	0.0	0.18
River birch	2,850	21	-128	-16	-1	2,441	18	5,147	39 (N/A)	0.6	0.3	2.41
Ginkgo	307	2	-93	-13	-1	1,435	11	1,635	12 (N/A)	0.6	0.1	0.82
Eastern red cedar	274	2	-22	-12	0	965	7	1,205	9 (N/A)	0.5	0.1	0.70
Amur maple	4,112	31	-254	-27	-2	3,649	27	7,481	56 (N/A)	0.5	0.4	4.68
Elm	2,963	22	-905	-25	-7	3,569	27	5,602	42 (N/A)	0.5	0.3	3.50
Boxelder	6,716	50	-391	-26	-3	3,616	27	9,915	74 (N/A)	0.4	0.5	6.76
Catalpa	1,569	12	-145	-9	-1	1,167	9	2,582	19 (N/A)	0.4	0.1	1.94
Citywide total	1,194,320	8,957	-120,315	-6,988	-955	951,119	7,133	2,018,137	15,136 (N/A)	100.0	100.0	5.69

Table 6: Annual Social and Aesthetic Benefits

Hampton

Annual Aesthetic/Other Benefits of Public Trees

2/1/2023

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway spruce	5,038	(N/A)	12.3	4.2	15.41
Norway maple	8,469	(N/A)	11.3	7.0	28.14
Green ash	15,700	(N/A)	10.7	13.0	54.90
Silver maple	22,776	(N/A)	8.8	18.9	97.75
Sugar maple	11,772	(N/A)	5.8	9.8	76.44
Black walnut	5,377	(N/A)	4.1	4.5	49.78
Bur oak	3,976	(N/A)	3.6	3.3	40.99
Eastern white pine	830	(N/A)	3.6	0.7	8.56
Northern hackberry	4,332	(N/A)	3.5	3.6	47.09
Honeylocust	18,867	(N/A)	3.2	15.6	221.97
Apple	902	(N/A)	3.0	0.7	11.42
Northern red oak	1,053	(N/A)	2.8	0.9	14.23
Northern white cedar	887	(N/A)	2.6	0.7	12.67
Littleleaf linden	3,184	(N/A)	2.1	2.6	56.86
Swamp white oak	432	(N/A)	1.8	0.4	9.19
Blue spruce	1,039	(N/A)	1.7	0.9	22.60
Spruce	859	(N/A)	1.7	0.7	18.68
Conifer Evergreen Large	950	(N/A)	1.7	0.8	20.66
Pin oak	5,925	(N/A)	1.7	4.9	128.81
Red maple	1,332	(N/A)	1.7	1.1	28.95
American basswood	2,316	(N/A)	1.2	1.9	70.19
Broadleaf Deciduous Large	166	(N/A)	0.8	0.1	8.32
Maple	545	(N/A)	0.7	0.5	28.67
White oak	169	(N/A)	0.6	0.1	9.93
Broadleaf Deciduous Small	7	(N/A)	0.6	0.0	0.39
River birch	319	(N/A)	0.6	0.3	19.93
Ginkgo	31	(N/A)	0.6	0.0	2.04
Eastern red cedar	157	(N/A)	0.5	0.1	12.04
Amur maple	243	(N/A)	0.5	0.2	20.27
Elm	257	(N/A)	0.5	0.2	21.44
Boxelder	512	(N/A)	0.4	0.4	46.55
Catalpa	173	(N/A)	0.4	0.1	17.35
Eastern redbud	6	(N/A)	0.3	0.0	0.71
Black maple	30	(N/A)	0.3	0.0	3.32
Quaking aspen	234	(N/A)	0.3	0.2	26.04
American elm	135	(N/A)	0.3	0.1	16.91
Lilac	25	(N/A)	0.3	0.0	3.18
Oak	46	(N/A)	0.3	0.0	6.62
Broadleaf Deciduous Medium	92	(N/A)	0.3	0.1	13.14
Kentucky coffeetree	83	(N/A)	0.3	0.1	11.92
Plum	28	(N/A)	0.2	0.0	4.68
Northern pin oak	118	(N/A)	0.2	0.1	19.60
Tulip tree	106	(N/A)	0.2	0.1	21.12
Ohio buckeye	95	(N/A)	0.2	0.1	23.87
Common chokecherry	46	(N/A)	0.1	0.0	15.48
Cherry plum	11	(N/A)	0.1	0.0	3.51
White ash	229	(N/A)	0.1	0.2	76.28
Japanese tree lilac	28	(N/A)	0.1	0.0	9.43
Hickory	68	(N/A)	0.1	0.1	22.74
Paper birch	169	(N/A)	0.1	0.1	56.38
Callery pear	81	(N/A)	0.1	0.1	27.02
Black locust	52	(N/A)	0.1	0.0	26.22
White mulberry	0	(N/A)	0.1	0.0	0.02
Eastern hophornbeam	2	(N/A)	0.1	0.0	1.05
Conifer Evergreen Small	27	(N/A)	0.1	0.0	13.68
American sycamore	43	(N/A)	0.1	0.0	21.65
Dogwood	6	(N/A)	0.1	0.0	3.22
Yellowwood	5	(N/A)	0.1	0.0	2.74
Basswood	46	(N/A)	0.0	0.0	45.86
Austrian pine	13	(N/A)	0.0	0.0	12.81
Eastern cottonwood	58	(N/A)	0.0	0.0	58.34
Southern magnolia	0	(N/A)	0.0	0.0	0.01
Siberian elm	54	(N/A)	0.0	0.0	53.50
Scarlet oak	5	(N/A)	0.0	0.0	5.26
Mulberry	6	(N/A)	0.0	0.0	6.40
Black poplar	15	(N/A)	0.0	0.0	14.73
Black cherry	15	(N/A)	0.0	0.0	15.48
Broadleaf Evergreen Large	58	(N/A)	0.0	0.0	58.26
Citywide total	120,636	(N/A)	100.0	100.0	45.33

Table 7: Summary of Benefits in Dollars

Hampton

Total Annual Benefits of Public Trees by Species ($)

2/1/2023

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Norway spruce	8,350	621	91	22,601	5,038	36,700	(N/A)	7.9
Norway maple	17,576	1,588	3,198	21,735	8,469	52,566	(N/A)	11.3
Green ash	19,646	2,496	3,709	31,994	15,700	73,545	(N/A)	15.8
Silver maple	14,691	2,924	2,670	25,916	22,776	68,977	(N/A)	14.8
Sugar maple	9,654	1,388	1,604	16,679	11,772	41,097	(N/A)	8.8
Black walnut	5,667	775	990	8,032	5,377	20,841	(N/A)	4.5
Bur oak	4,167	567	739	6,098	3,976	15,547	(N/A)	3.3
Eastern white pine	2,243	147	-22	6,443	830	9,642	(N/A)	2.1
Northern hackberry	5,532	543	1,028	6,963	4,332	18,399	(N/A)	3.9
Honeylocust	5,996	896	1,029	9,544	18,867	36,333	(N/A)	7.8
Apple	2,073	225	350	1,115	902	4,666	(N/A)	1.0
Northern red oak	2,464	229	348	3,088	1,053	7,182	(N/A)	1.5
Northern white cedar	2,111	151	-39	6,440	887	9,551	(N/A)	2.0
Littleleaf linden	2,503	360	423	3,237	3,184	9,709	(N/A)	2.1
Swamp white oak	390	46	61	272	432	1,201	(N/A)	0.3
Blue spruce	1,051	91	122	1,811	1,039	4,114	(N/A)	0.9
Spruce	606	59	48	1,226	859	2,800	(N/A)	0.6
Conifer Evergreen Large	1,212	101	25	3,212	950	5,501	(N/A)	1.2
Pin oak	3,456	764	438	5,653	5,925	16,237	(N/A)	3.5
Red maple	1,701	170	309	1,894	1,332	5,406	(N/A)	1.2
American basswood	1,791	348	290	3,082	2,316	7,828	(N/A)	1.7
Broadleaf Deciduous La	54	7	8	42	166	277	(N/A)	0.1
Maple	515	57	88	502	545	1,706	(N/A)	0.4
White oak	92	12	15	123	169	411	(N/A)	0.1
Broadleaf Deciduous Su	28	3	4	8	7	50	(N/A)	0.0
River birch	327	39	51	271	319	1,006	(N/A)	0.2
Ginkgo	172	12	31	144	31	389	(N/A)	0.1
Eastern red cedar	131	9	10	217	157	523	(N/A)	0.1
Amur maple	478	56	84	275	243	1,135	(N/A)	0.2
Elm	436	42	91	754	257	1,580	(N/A)	0.3
Boxelder	449	74	74	574	512	1,684	(N/A)	0.4
Catalpa	142	19	25	201	173	561	(N/A)	0.1
Eastern redbud	21	2	3	7	6	40	(N/A)	0.0
Black maple	450	26	85	561	30	1,152	(N/A)	0.2
Quaking aspen	172	24	27	166	234	624	(N/A)	0.1
American elm	149	16	34	148	135	483	(N/A)	0.1
Lilac	73	7	10	27	25	143	(N/A)	0.0
Oak	10	1	1	8	46	66	(N/A)	0.0
Broadleaf Deciduous M	99	12	17	78	92	297	(N/A)	0.1
Kentucky coffeetree	45	6	6	35	83	175	(N/A)	0.0
Plum	73	8	11	31	28	152	(N/A)	0.0
Northern pin oak	401	30	75	542	118	1,165	(N/A)	0.2
Tulip tree	84	12	14	117	106	333	(N/A)	0.1
Ohio buckeye	178	16	31	201	95	522	(N/A)	0.1
Common chokecherry	114	13	20	54	46	247	(N/A)	0.1
Cherry plum	29	3	4	11	11	57	(N/A)	0.0
White ash	162	24	28	178	229	620	(N/A)	0.1
Japanese tree lilac	75	8	12	32	28	155	(N/A)	0.0
Hickory	59	8	10	71	68	216	(N/A)	0.0
Paper birch	172	24	29	217	169	612	(N/A)	0.1
Callery pear	95	12	16	77	81	280	(N/A)	0.1
Black locust	49	6	7	32	52	146	(N/A)	0.0
White mulberry	47	2	8	32	0	90	(N/A)	0.0
Eastern hophornbeam	6	1	1	2	2	12	(N/A)	0.0
Conifer Evergreen Smal	49	3	4	89	27	173	(N/A)	0.0
American sycamore	104	9	23	201	43	381	(N/A)	0.1
Dogwood	19	2	3	7	6	37	(N/A)	0.0
Yellowwood	2	0	0	1	5	9	(N/A)	0.0
Basswood	44	6	7	40	46	143	(N/A)	0.0
Austrian pine	35	3	4	79	13	135	(N/A)	0.0
Eastern cottonwood	91	11	19	196	58	375	(N/A)	0.1
Southern magnolia	4	0	0	2	0	6	(N/A)	0.0
Siberian elm	91	11	20	160	54	336	(N/A)	0.1
Scarlet oak	1	0	0	0	5	7	(N/A)	0.0
Mulberry	18	2	3	7	6	36	(N/A)	0.0
Black poplar	6	1	1	5	15	27	(N/A)	0.0
Black cherry	38	4	7	18	15	82	(N/A)	0.0
Broadleaf Evergreen Lar	21	3	2	20	58	104	(N/A)	0.0
Citywide Total	118,790	15,136	18,434	193,601	120,636	466,597	(N/A)	100.0

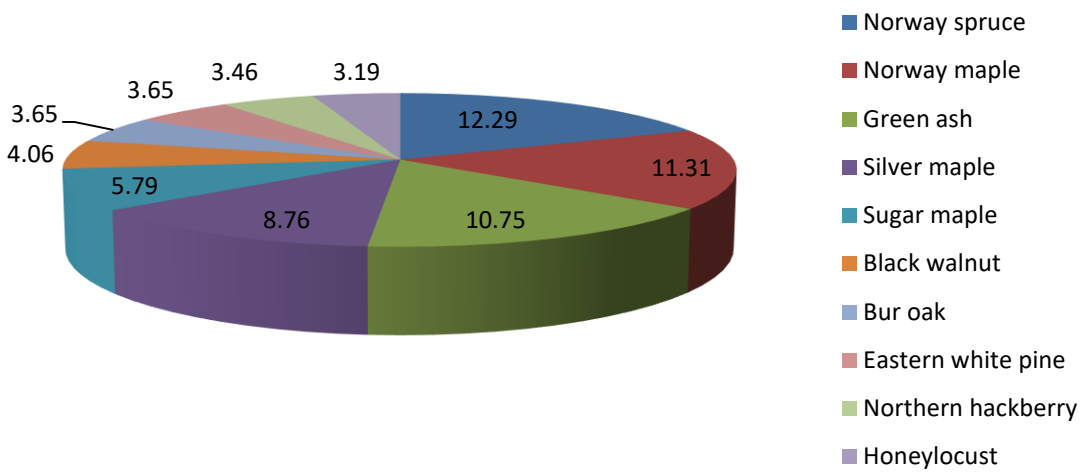

Figure 1: Species Distribution

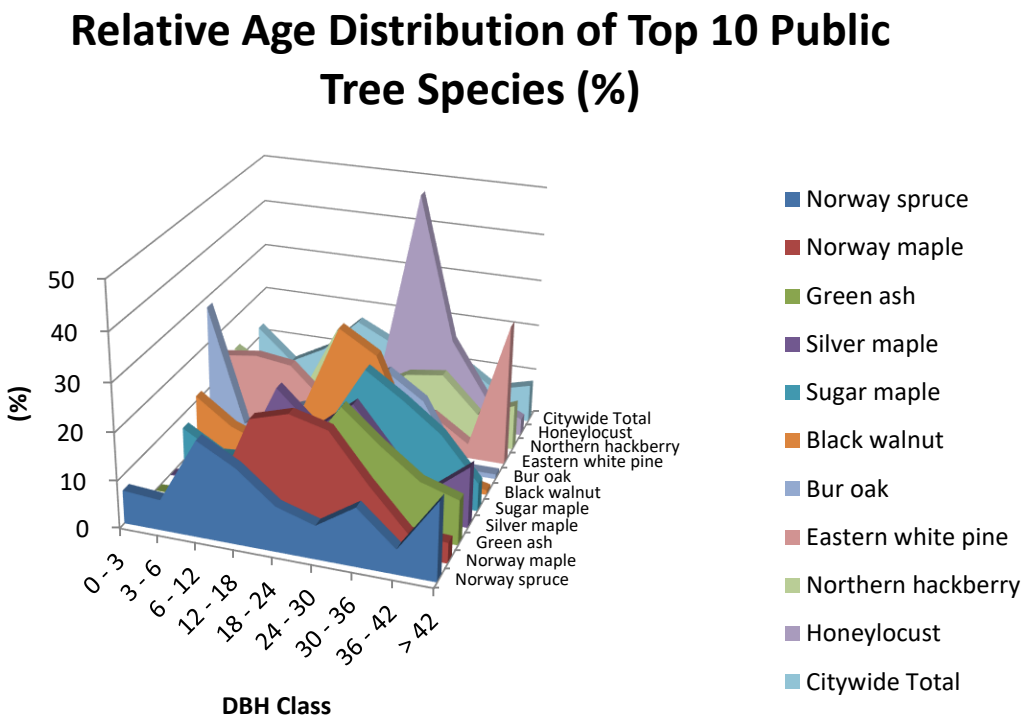

Figure 2: Relative Age Class

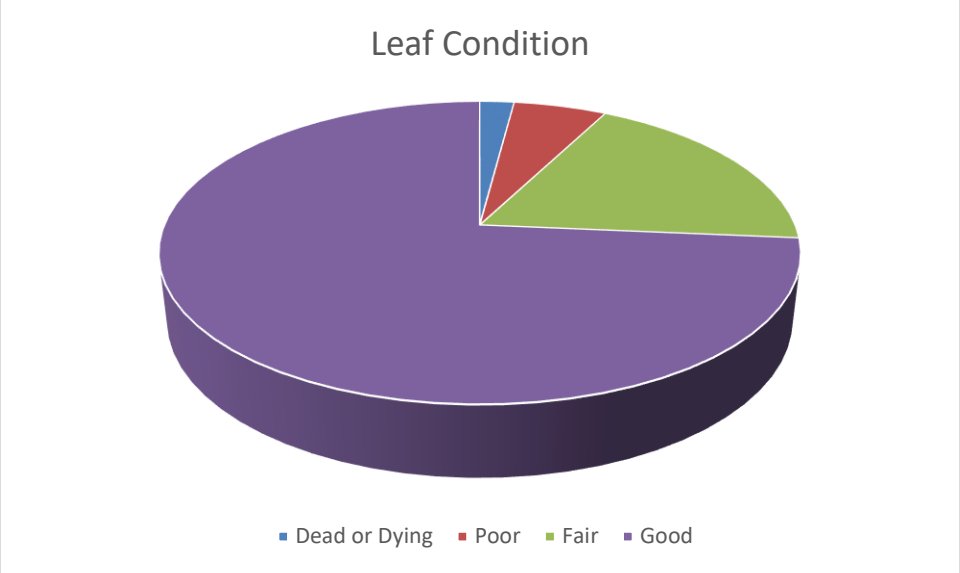

Figure 3: Foliage Condition

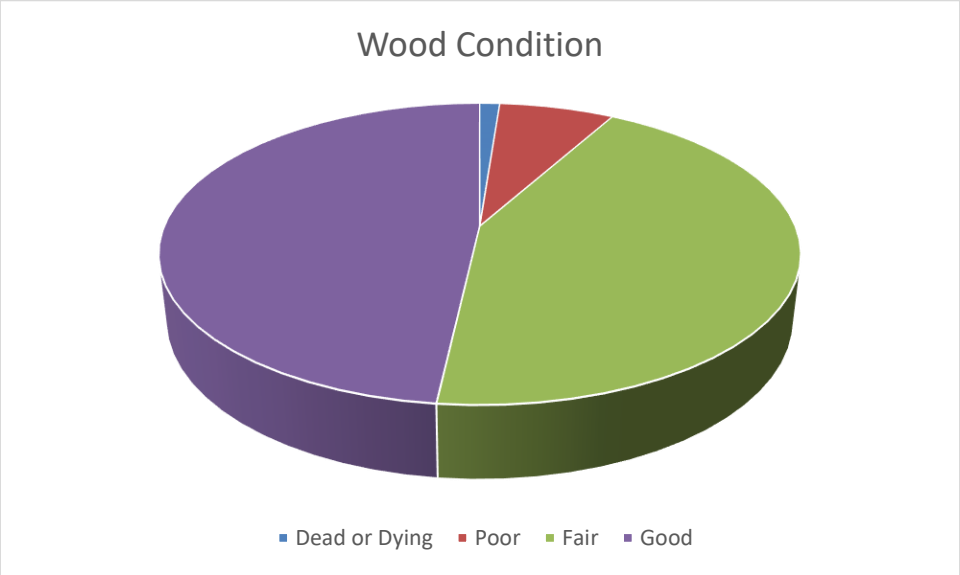

Figure 4: Wood Condition

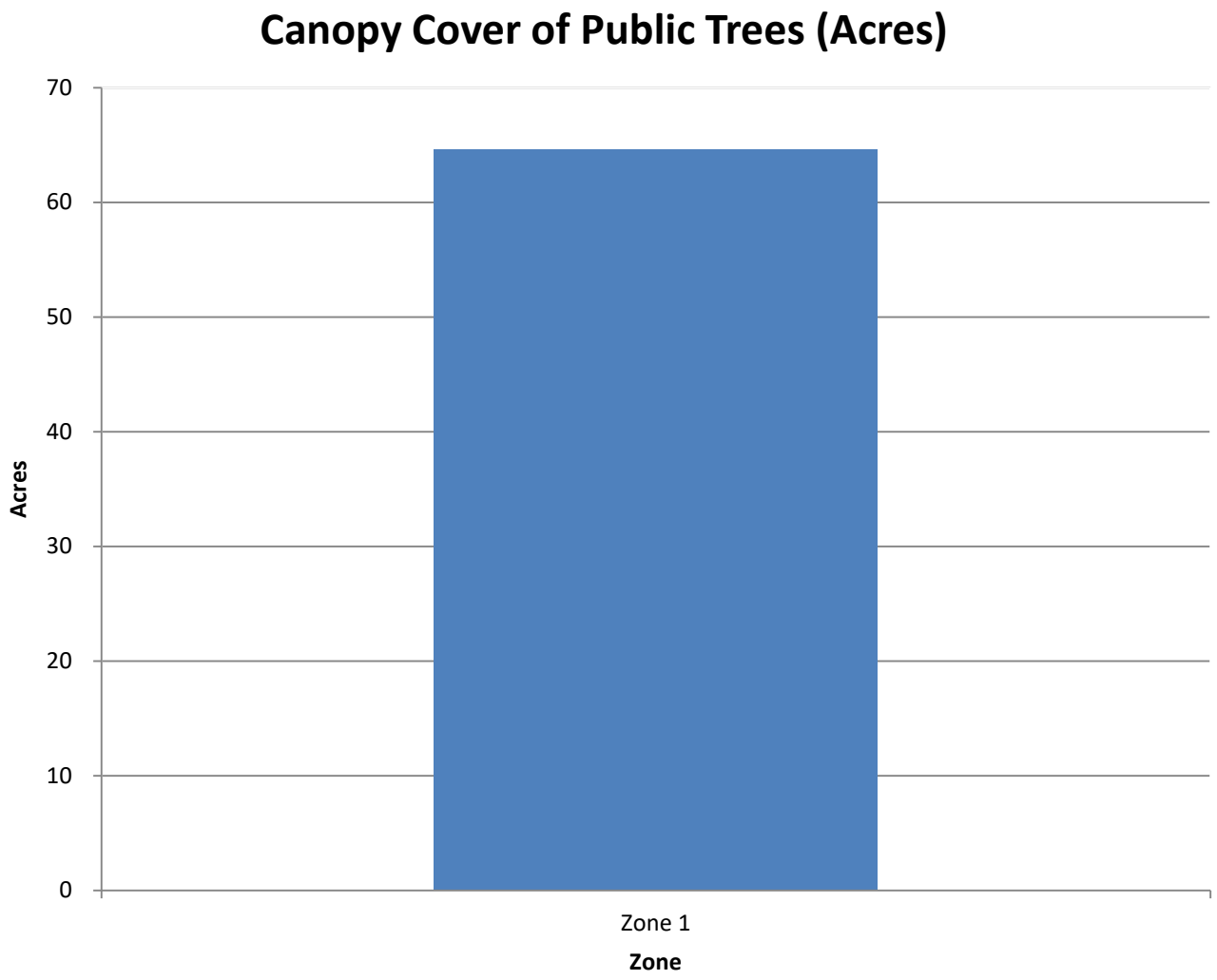

Figure 5: Canopy Cover in Acres

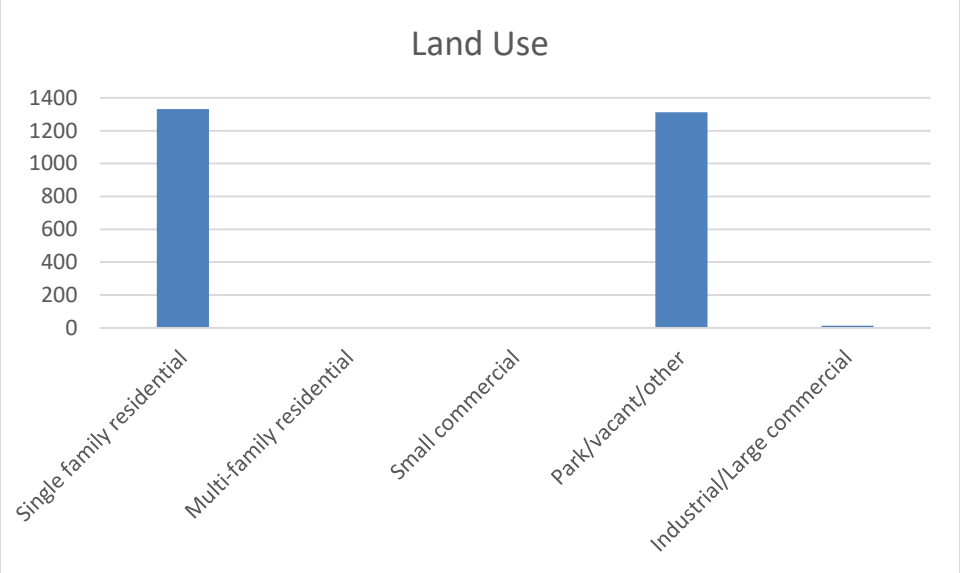

Figure 6: Land Use of city/park trees

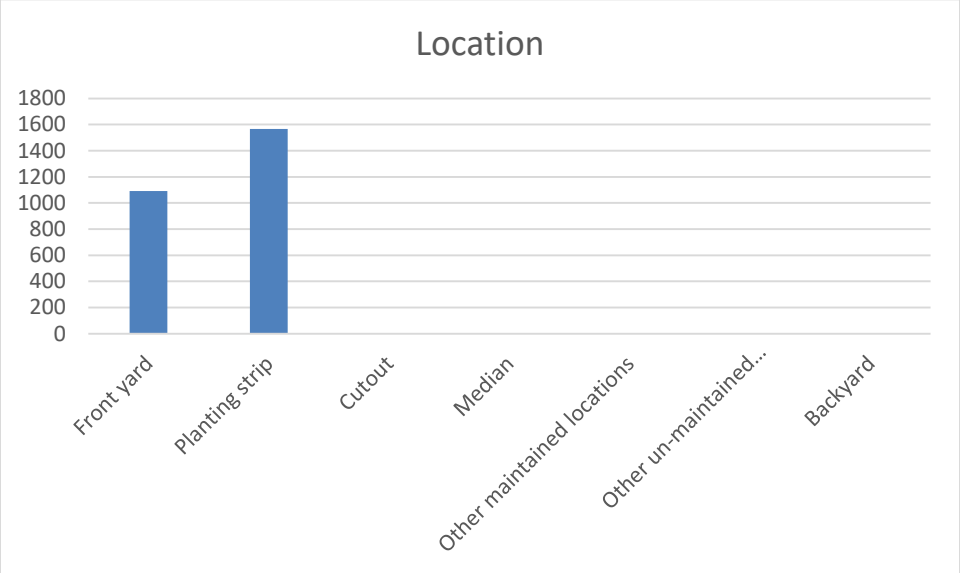

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

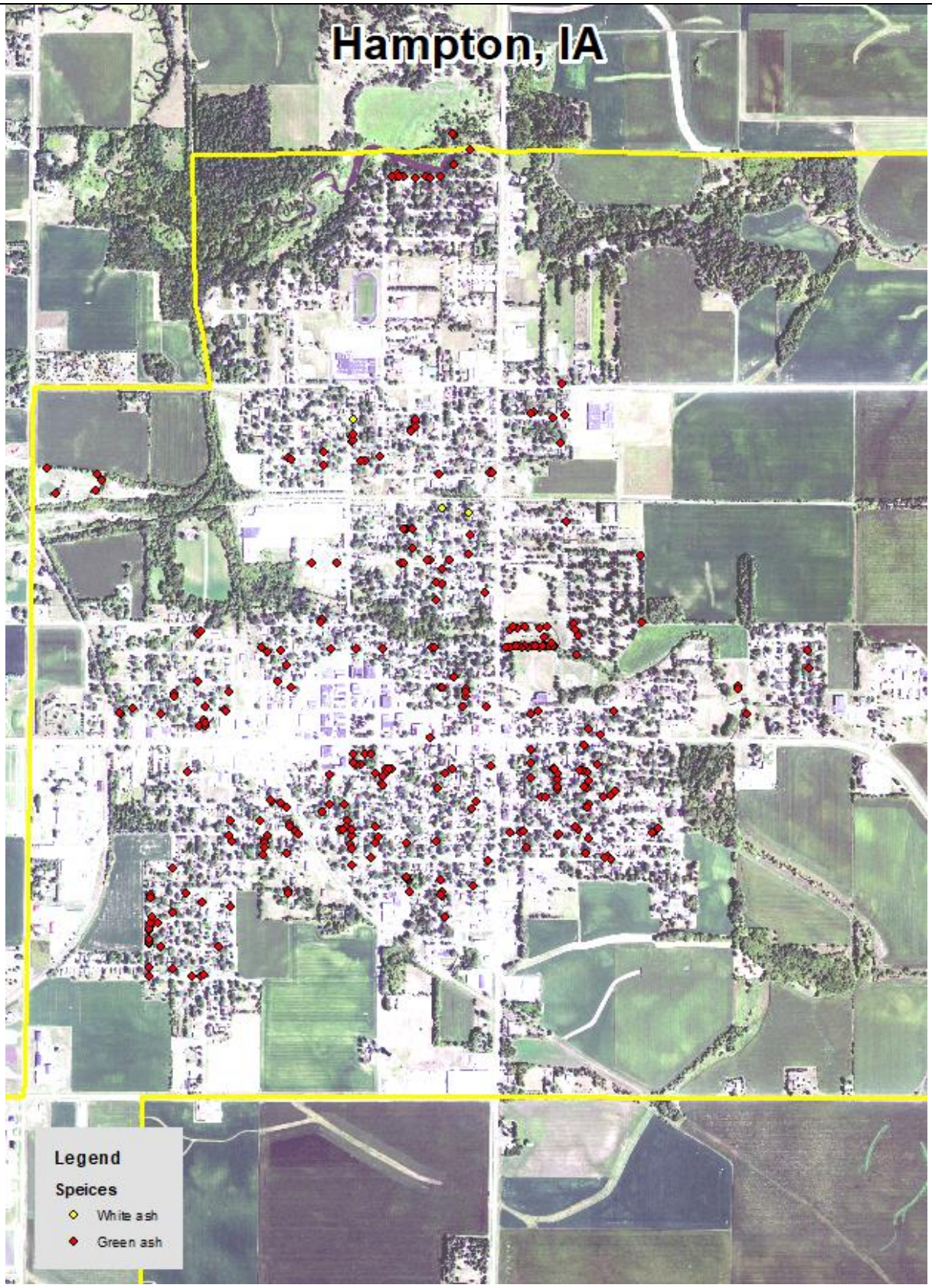

Figure 1: Location of Ash Trees

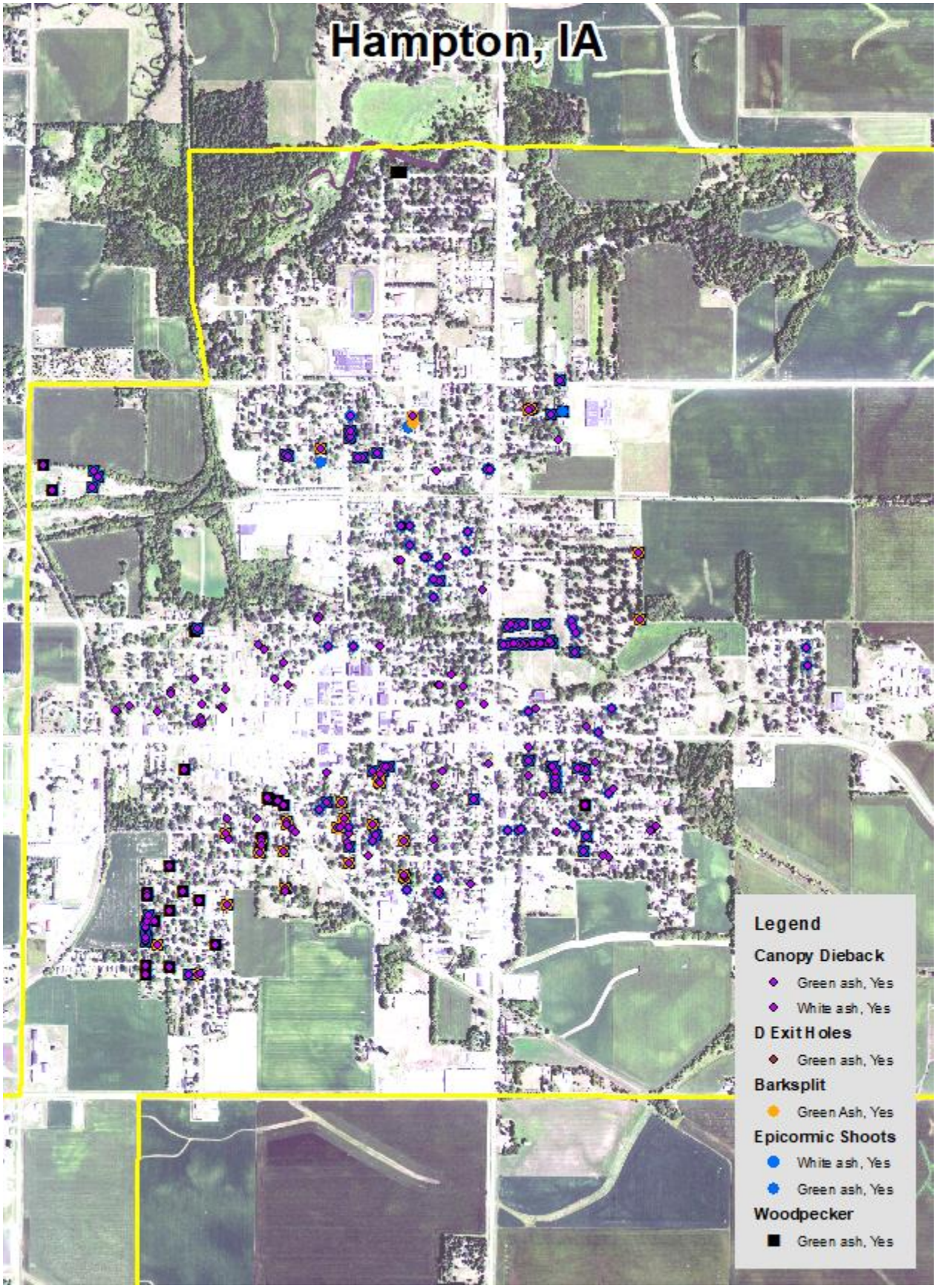

Figure 2: Location of EAB symptoms

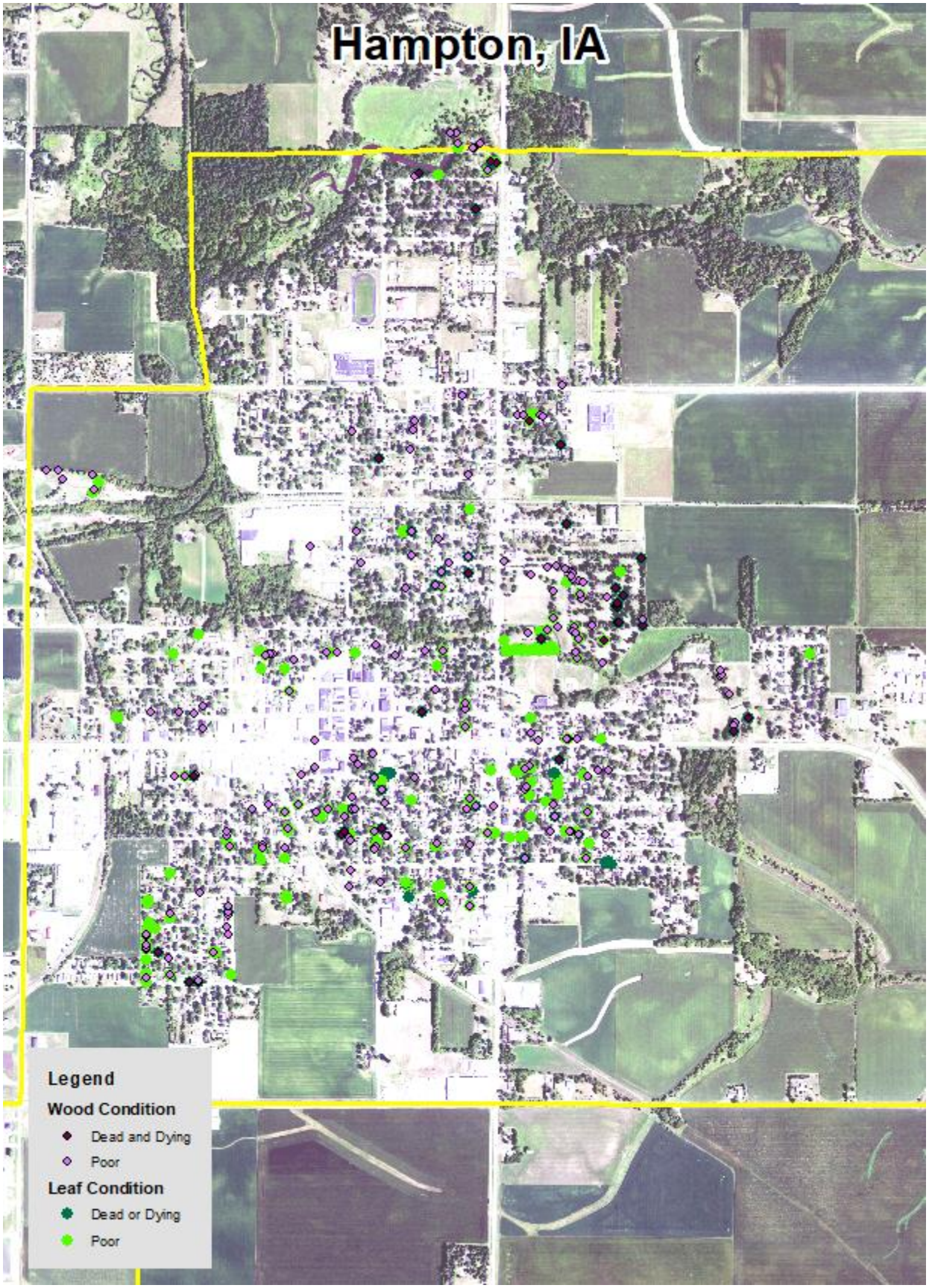

Figure 3: Location of Poor Condition Trees

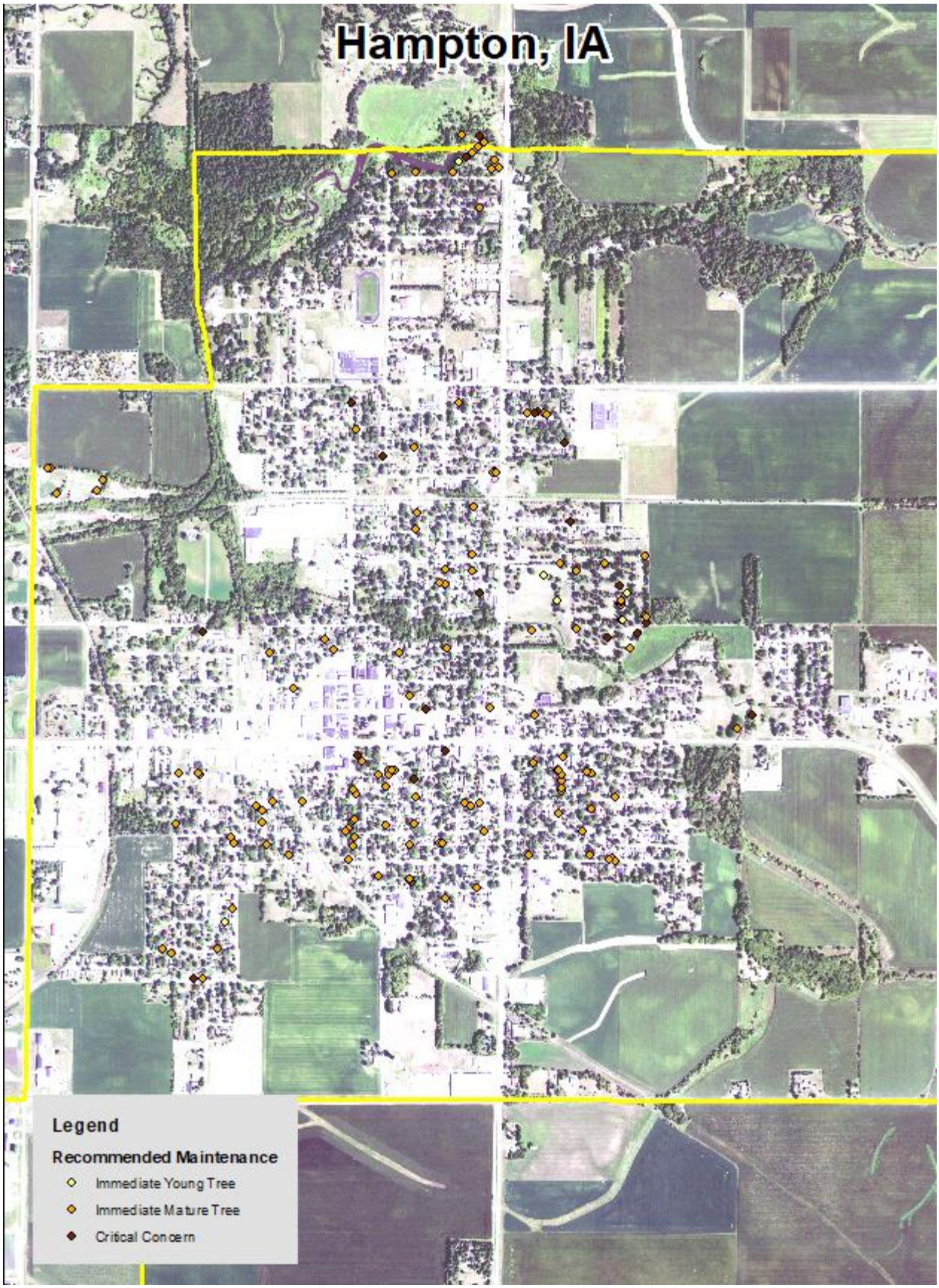

Figure 4: Location of Trees with Recommended Maintenance

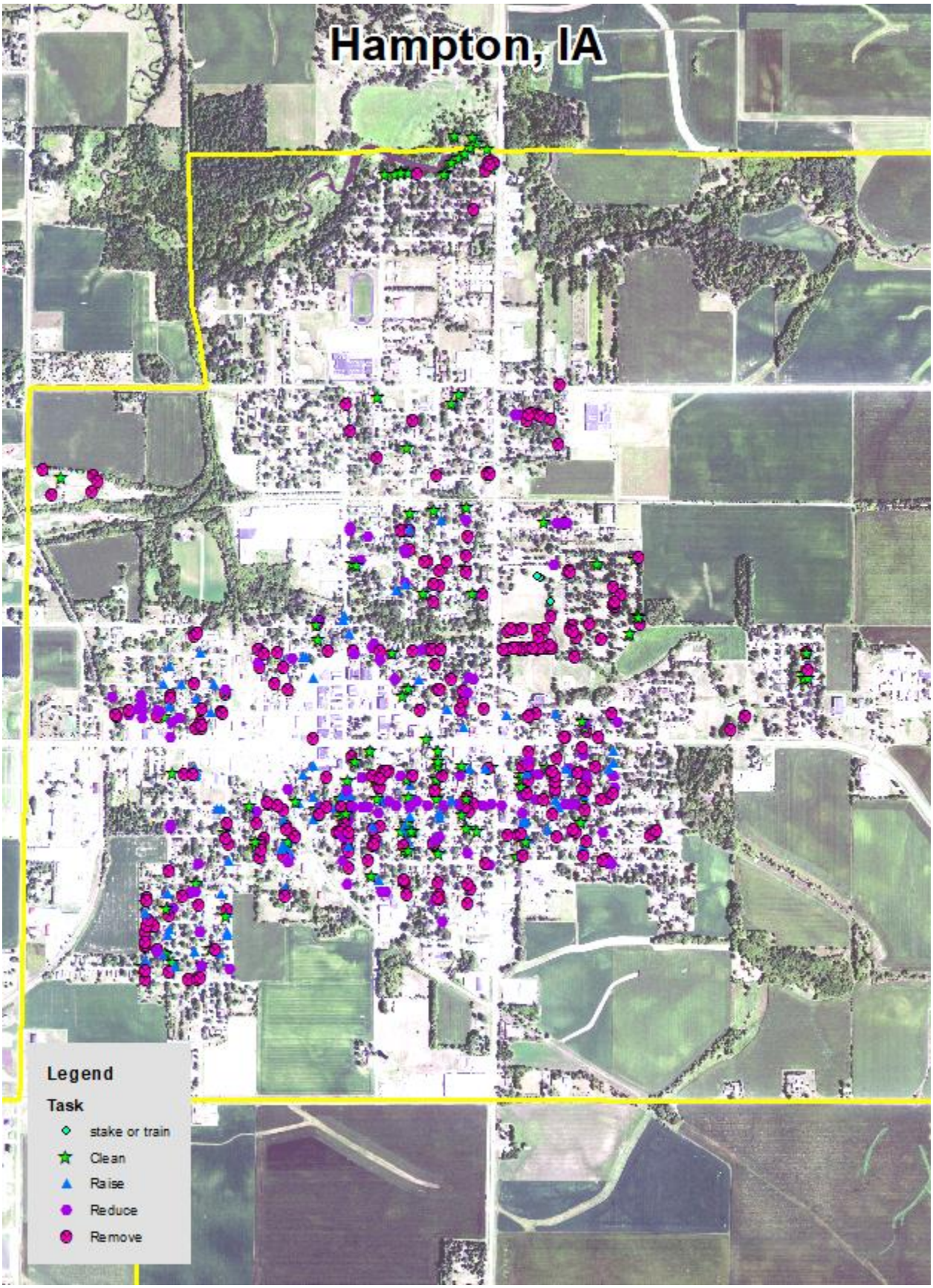

Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

Appendix C: Hampton Tree Ordinances

CODE OF ORDINANCES, HAMPTON, IOWA

CHAPTER 151

TREES

151.01 PURPOSE. The purpose of this chapter is to encourage the safe and educated land stewardship practices within the corporate City limits of the City of Hampton, preserving the appearance of the City.

151.02 DEFINITIONS. For use in this chapter, the following definitions are given.

1. "Hampton Tree Board" means a seven-member board appointed by the Mayor to serve a term of up to five years, with no term limits.
2. "Parking" means that part of the street not covered by the sidewalk and lying between the lot line and the curb line.
3. "Park trees" means trees, shrubs, bushes, and all other woody vegetation in public parks and other areas owned by the City to which the public has free access as parks.
4. "Street trees" means trees, shrubs, bushes, and all other woody vegetation on land owned by the City and lying between property lines on either side of all streets, avenues, or ways within the City.
5. "Tree Management Plan" means a document utilized for conducting urban forest management within the corporate City limits.
6. "Tree permit" means a signed document issued by the City, authorizing tree removal and tree planting on City-owned properties within the corporate City limits.

151.03 PLANTING RESTRICTIONS. Tree planting shall be allowed along any street, avenue, or highway between the outer line of the sidewalk and the curb, where the curb line is established, or within any public right-of-way, parking, or street, provided an application for permit is first submitted, reviewed, and approve by the City.

151.04 DISTANCE FROM SIDEWALK. The distance trees may be planted from sidewalks will be in accordance with the tree species size classes and no trees may be planted closer to any sidewalk than the following:

1. Small trees (any species with maturity heights of less than 25 feet) – three feet;
2. Medium trees (any species with projected maturity height between 25 and 50 feet) – four feet;
3. Large trees (any species with projected maturity height of more than 50 feet) – five feet.

151.05 DISTANCE FROM STREET CORNERS AND FIRE PLUGS. No tree shall be planted closer than 20 feet from any street corner, measured from the point of nearest intersecting curbs or curb lines. No tree shall be planted closer than 10 feet from any fire plug.

151.06 PUBLIC TREE CARE. The City has the right to plant, prune, maintain and remove trees, plants and shrubs within the lines of all streets, alleys, avenues, lanes, squares and public grounds, as may be necessary to insure public safety or to preserve or enhance the symmetry and beauty of such public grounds. The City may order the removal of any tree or part thereof which is in an unsafe condition or which by reason of its nature is injurious to sewers, electric power lines, gas lines, water lines and other public improvements; provided,

however, such removal shall be conducted in accordance with tree removal policies as defined within this chapter.

151.07 TREE TOPPING. It is unlawful as a normal practice for any person or City department to top any street tree, park tree or other tree on public or private property. Topping is defined as the severe cutting back of limbs to stubs larger than three inches in diameter within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree. Trees severely damaged by storms or other causes or certain trees under utility wires or other obstructions where other pruning practices are impractical may be exempted from this section.

151.08 DUTY TO TRIM TREES. The owner or agent of the abutting property shall keep the trees on public or private property trimmed so that all branches will be at least 10 feet above the sidewalks and 15 feet above streets. If the abutting property owners fail to trim the trees, the City may serve notice on the abutting property owner requiring that such action be taken within five days. If such action is not taken within that time, the City may perform the required action and assess the costs against the abutting property for collection in the same manner as a property tax. Except as allowed in this section, it is unlawful for any property owner to trim or cut any tree in a public place.

151.09 REMOVAL OF DEAD OR DISEASED TREES ON PRIVATE PROPERTY. The City has the right to cause the removal of any dead or diseased trees on private property within the City when such trees constitute a hazard to life and property, or harbor insects or diseases which constitute a potential threat to other trees within the City. The City will notify in writing the owners of such trees. Removal shall be done by said owners at their expense within 60 days after the date of service of notice. In the event of failure of owners to comply with such provisions, the City shall have the authority to remove such trees and charge the costs of removal on the owner's property tax notice.

151.10 REMOVAL OF DEAD OR DISEASED TREES ON PUBLIC PROPERTY. See Section 364.12 of the *Code of Iowa* and Section 135.10 of this Code of Ordinances.

151.11 REMOVAL OF STUMPS. All stumps of street and park trees shall be removed below the surface of the ground so that the top of the stump does not project above the surface of the ground. When the City causes a tree on City property to be removed, the City shall remove the stump to six inches below ground level.

151.12 PERMITTING. No person shall plant or cause to be removed any tree on any City-owned property or public right-of-way without first obtaining an approved permit, the application for which is available at City Hall. Tree species will be monitored as part of the permitting process and only those species identified on the permit form will be allowed for planting. This subsection is implemented to encourage the planting of trees promoting safety, educated land stewardship, and protection of vital infrastructure.

151.13 APPEALS. Any person receiving notice to remove dead or diseased trees and/or any person denied a permit for removal or planting of trees may appeal the decision of City staff to the Hampton Tree Board. Appeal must be in writing and received at City Hall no later than 10 days following date of notice or denial of permit. The Board will then set a date for public hearing before the Board within 30 days. Persons filing an appeal must appear before the Board at the scheduled hearing and will be notified no less than five days prior to the public hearing. In the event the Board denies initial appeal, a secondary appeal may be filed at City Hall and must be received in writing no later than 10 days following the Board's decision. The City Council will then schedule a hearing within 30 days of receipt of the appeal. Persons filing secondary appeal will be notified of the scheduled date and time of the City Council hearing no later than 10 days prior to the hearing and must appear before the City Council at the date and time scheduled.

151.14 HAMPTON TREE MANAGEMENT PLAN. The City adopts and utilizes the document identified as the 2012 Management Plan, prepared by Bureau of Forestry, Iowa DNR, as a guide for implementing best practices for land stewardship, and will continue to update and adhere to this plan no less than once every five year period.

The State of Iowa is an Equal Opportunity Employer and provider of ADA services.

Federal law prohibits employment discrimination on the basis of race, color, age, religion, national origin, sex or disability. State law prohibits employment discrimination on the basis of race, color, creed, age, sex, sexual orientation, gender identity, national origin, religion, pregnancy, or disability. State law also prohibits public accommodation (such as access to services or physical facilities) discrimination on the basis of race, color, creed, religion, sex, sexual orientation, gender identity, religion, national origin, or disability. If you believe you have been discriminated against in any program, activity or facility as described above, or if you desire further information, please contact the Iowa Civil Rights Commission, 1-800-457-4416, or write to the Iowa Department of Natural Resources, Wallace State Office Bldg., 502 E 9th St, Des Moines IA 50319.

If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-725-8200.