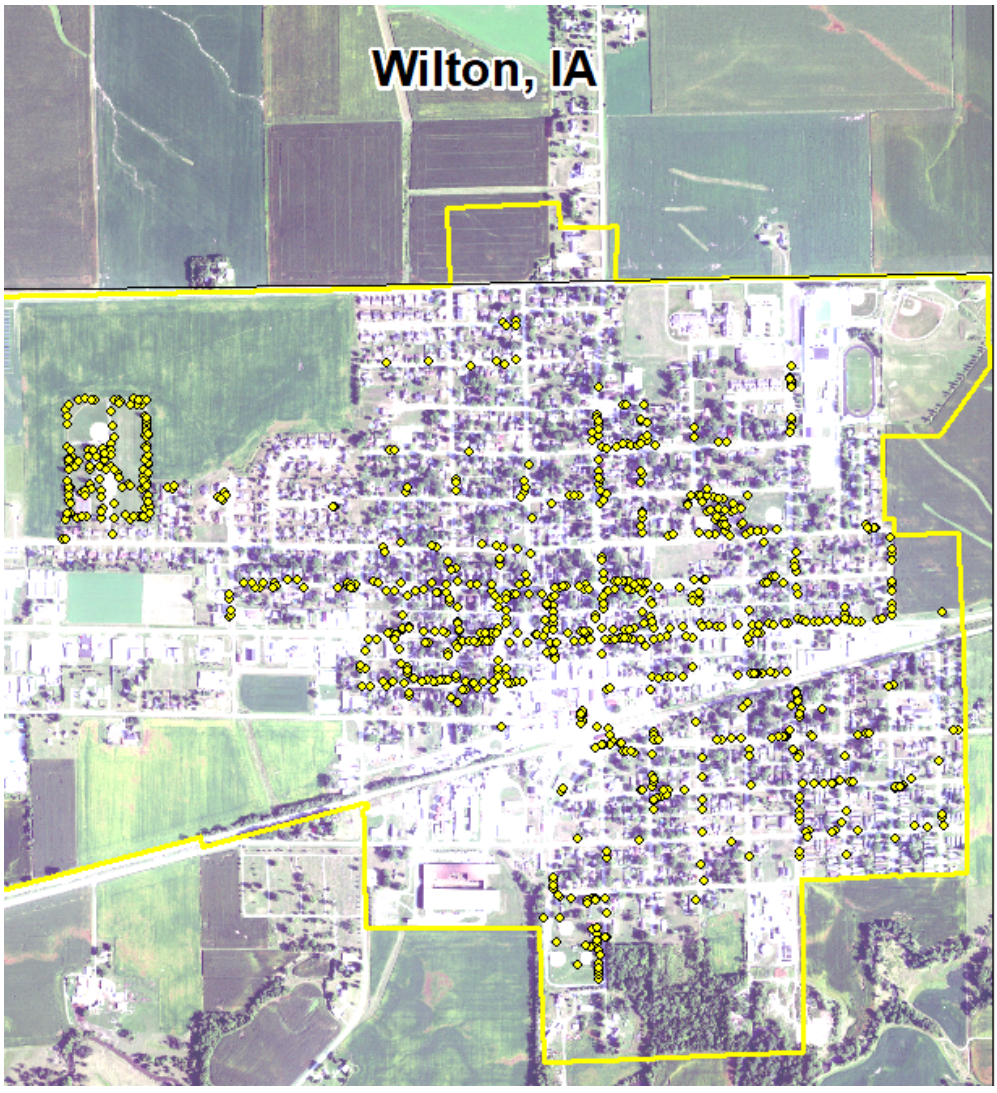
Wilton, IA



2022 Urban Forest Management Plan
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Table of Contents

Executive Summary

Overview

This plan was developed to assist the City of Wilton 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). There is a strong possibility that 10% of Wilton's city owned trees (ash) will die once EAB becomes established 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 2021, 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 812 trees inventoried.

- Wilton's trees provide $123,990 of benefits annually, an average of $152 a tree
- There are over 58 species of trees
- The top three genera are: Maple 35%, Oak 15%, and Ash 10%
- 8% of trees are in need of some type of management
- 46 trees are recommended for removal

Recommendations

The core recommendations are detailed in the Recommendations Section. The Emerald Ash Borer Plan includes management recommendations as well. Below are some key recommendations.

- Of the 46 trees needing removal, 24 are ash. *City ownership of the trees recommended for removal should be verified prior to any removal*
- 49 of the 79 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- 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, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 18 years to remove ash – Suggestion: request a budget increase to $10,000 annually and apply for grants to plant replacement trees

Introduction

This plan was developed to assist Wilton with the management, budgeting 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 recovery from 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 Wilton, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

Trees are an important component of Wilton'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 Wilton 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 Wilton's urban forestry goals.

Inventory

In 2021, 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 812 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. Wilton's trees reduce energy related costs by approximately $32,915 annually (Appendix A, Table 1). These savings are both in Electricity (158.2 MWh) and in Natural Gas (21,331.7 Therms).

Annual Stormwater Benefits
Wilton's trees intercept about 1,632,147 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $44,231of 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 Wilton, it is estimated that trees remove 1,951.9 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 $5,440 (Appendix A, Table 3).

Annual Carbon Benefits
Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Wilton, trees sequester about 371,958 lbs of carbon a year with an associated value of $4,567 (Appendix A, Table 5). In addition, the trees store 5,566,024 lbs of carbon, with a yearly benefit of $41,745 (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. Wilton receives $36,838 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, Wilton's trees provide $123,990 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 812 trees in Wilton provide approximately $152 annually (Appendix A, Table 7).

Forest Structure

Species Distribution
Wilton has over 58 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genera is as follows:

Maple	285	35%
Oak	125	15%
Ash	79	10%
Spruce	53	7%
Apple (crabapple)	45	6%
Hackberry	28	3%
Pine	25	3%
Red Cedar	22	3%
Linden	19	2%
Pear	17	2%
Walnut	16	2%
Honeylocust	12	1%
Sycamore	12	1%
Redbud	8	1%
Tuliptree	8	1%
Hickory	7	1%

Elm	7	1%
Birch	5	1%
White Cedar	5	1%
Plum/Cherry	5	1%
Other Small	4	<1%
Poplar	4	<1%
Conifer other	3	<1%
Dogwood	3	<1%
Magnolia	3	<1%
Lilac	3	<1%
Kentucky Coffeetree	2	<1%
Hophornbeam	2	<1%
Buckeye	1	<1%
Catalpa	1	<1%
Ginkgo	1	<1%
Sumac	1	<1%
Willow	1	<1%

Age Class

Most of Wilton's trees (46%) are between 6 and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Wilton's size curve is on the smaller side, indicating a younger than average stand.

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 Wilton indicate that 88% of the trees are in good health, with only 4% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 46% of Wilton'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 12% of the population. This 12% is an estimate of trees that need management follow up.

Management Needs

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

Crown Cleaning (prune)	15	2%
Crown Raising	1	<1%
Tree Staking	1	<1%
Tree Removal	46	6%
Crown Reduction	1	<1%

Canopy Cover

The total canopy with both private and public trees is 17%, 211 acres. The canopy cover on city own properties included in the Wilton inventory includes approximately 17 acres (Appendix A, Figure 4). The City's Canopy goal is to increase canopy by 3%, in 30 years on all lands. To achieve this goal it is estimated that 91 trees need to be planted annually on public and/or private lands.

Land Use and Location

The majority of Wilton'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	71%
Park/vacant/other	26%
Industrial/Large commercial	1%
Small commercial	1%
Multifamily residential	<1%

Location	
Planting strip	52%
Other maintained locations	0%
Cutout (surrounded by pavement)	0%
Front yard	48%

Changes in Forest Structure Since plan in 2011

The total number of trees has decreased since the last plan indicating the replacement is not keeping up with tree removal.

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

Wilton has 7 critical concern trees that need immediate removal. These trees can be seen on the Location of Trees with Recommended Maintenance map (Appendix B, Figure 4). It is recommended to start with the large diameter critical concern trees first. There are 16 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance.

Poor tree species

After the removal of the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 46 removals, 24 are ash trees. There are a total of 79 ash trees, and 49 of those have signs and symptoms that have been associated with EAB. In addition, there are 15 trees that are in poor health. *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 Wilton.

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 (35%) (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 public nuisances include: All evergreens, All deciduous shrubs, All poplars (populus spp) including cottonwood, white poplar, lombardy, poplar and hybrids thereof; Sycamore (platanus spp) and all cultivars; Silver maple (acer saccharinum) and all cultivars; Honey locust (gleditsia triacanthos) and all cultivars; Catalpa (catalpa speciosa); Pin oak (quercus palustris); Box-elder (acer negundo); Birch (betula spp); Russian olive (elaeagnus angustifolia); Female ginkgo (ginkgo biloba); Willows (salix spp); Oriental elms (ulmus pumila and U parvifolia); Red mulberry, white mulberry (morus rubra and morus alba); and All species of ash as outlined in section 11.12 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 11.12 (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.

Budget and Emerald Ash Borer Plan

Six Year Maintenance Plan with <u>No Additional Funding</u>

Current Budget $6,000/year, Total $36,000 over 6 years

FY 2022

Removal: 6 largest critical concern trees, $4,800
Planting and Replacement: 7 trees to be planted in open locations, $700
Young Tree Pruning & Maintenance: $500
Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

FY 2023

Removal: 5 critical concern trees
*Or saving for ash tree treatment and/or future ash removal, $4,000
Planting and Replacement: 6 trees in open locations from year one removals, $600
Young Tree Pruning & Maintenance: $400
Routine trimming: Contract to trim 1/3 of the city trees, $1,000
Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

FY 2024

Removal: 6 trees, $4,800
Planting and Replacement: 7 trees to be planted in open locations, $700
Young Tree Pruning & Maintenance: $500

Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

FY 2025

Removal: 5 trees
*Or saving for ash tree treatment and/or future ash removal, $4,000
Planting and Replacement: 6 trees in open locations from year one removals, $600
Young Tree Pruning & Maintenance: $400
Routine trimming: Contract to trim 1/3 of the city trees, $1,000
Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

FY 2026

Removal: 6 trees, $4,800
Planting and Replacement: 7 trees to be planted in open locations, $700
Young Tree Pruning & Maintenance: $500
Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

FY 2027

Removal: 5 trees
*Or saving for ash tree treatment and/or future ash removal, $4,000
Planting and Replacement: 6 trees in open locations from year one removals, $600
Young Tree Pruning & Maintenance: $400
Routine trimming: Contract to trim 1/3 of the city trees, $1,000
Visual Survey for signs and symptoms of EAB
*Or ash tree treatment

*Reduction of ash over 6 years: Approximately 24 ash trees removed (approximately 30% of ash). It will take approximately 18 years to remove all ash with the current budget. EAB could potentially kill all ash within 4 years of its arrival.
**To remove all ash trees within 6 years, the budget would need to be increased to $17,000 a year. If the budget were increased to $10,000 a year all ash could be removed in 11 years.

Ash Tree Removal

Tree removal will be prioritized with dead, dying, hazardous trees to be removed first (Appendix B, Figure 4). Next will be all ash in poor condition and displaying signs and symptoms of EAB (Appendix B, Figure 2 & Appendix B, Figure 3). *City ownership of the tree recommended for removal should be verified prior to any removal*

Treatment of Ash Trees

Chemical treatment can be effective tool for communities to spread removal costs out over several years while allowing trees to continue to provide benefits. However, treatment is not recommended if EAB is more than 15 miles away from the community. For more information on the cost of treatment strategies visit http://extension.entm.purdue.edu/treecomputer/

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In

order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:

- emerald ash borer
- firewood of all hardwood species (for example ash, oak, maple and hickory)
- nursery stock and green lumber of ash
- any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

In addition, any other article, product or means of conveyance not listed above may be designated as a regulated article if a USDA inspector determines that it presents a risk of spreading EAB once a quarantine is in effect for your county.

Wood Disposal

A very important aspect of planning is determining how wood infested with EAB will be handled, keeping in mind that quarantines will restrict its movement. Consider who will cut and haul the dead and dying trees? Is there an accessible, secured site big enough to store and sort the hundreds of trees and the associated brush and chips? How will wood be disposed of or utilized? Do you have equipment capable of handling the amount and size of ash trees your tree inventory has identified? Once your county is under quarantine for EAB, contact USDA-APHIS-PPQ at 515-251-4083 or visit the website http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/regulatory.shtml. Wood waste can be disposed of as you normally would if your county is not part of a quarantine.

Canopy Replacement

As budget permits, all removed trees will be replaced. All trees will meet the restrictions in city ordinance 11.12 (Appendix C). The new plantings will be a diverse mix and will not include All evergreens, All deciduous shrubs, All poplars (populus spp) including cottonwood, white poplar, lombardy, poplar and hybrids thereof; Sycamore (platanus spp) and all cultivars; Silver maple (acer saccharinum) and all cultivars; Honey locust (gleditsia triacanthos) and all cultivars; Catalpa (catalpa speciosa); Pin oak (quercus palustris); Box-elder (acer negundo); Birch (betula spp); Russian olive (elaeagnus angustifolia); Female ginkgo (ginkgo biloba); Willows (salix spp); Oriental elms (ulmus pumila and U parvifolia); Red mulberry, white mulberry (morus rubra and morus alba); and All species of ash.

Postponed Work

While finances, staffing and equipment are focused on the management of ash, usual services may be delayed. Tree removal requests on genera other than ash will be prioritized by hazardous or emergency situations only.

Monitoring

It is recommended that ash trees be checked with a visual survey every year for tree death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Private Ash Trees

It is strongly recommended that private property owners start removing ash trees on their property upon arrival of EAB if preventative treatments are not being used.

Proposed Budget Increase

EAB could potentially kill all ash trees in Wilton within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to $17,000 a year. Additionally, it is recommended that Wilton apply for grants to fund replacement trees. Utility Company grants are usually between $500 and $10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at $15 per inch, about 4 trees could be treated per year (every other year treatment) would be $1,200. This would be 8 trees selected for treatment, and Wilton would still need to find $56,8000 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately $2,250 a year for treatment and leave $48,800 for removal. These are alternatives to straight removal of ash trees. However, whether or not the treatment option is selected, there will be an increased cost of dealing with ash trees if EAB is found in Wilton. It is suggested to consider increasing the budget to plan for this.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Wilton

Annual Energy Benefits of Public Trees

5/30/2022

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	19.4	1,475	2,718.8	2,664	4,139	(N/A)	12.9	12.6	39.42
Silver maple	28.1	2,134	3,668.6	3,595	5,729	(N/A)	11.0	17.4	64.37
Green ash	17.1	1,298	2,260.5	2,215	3,513	(N/A)	7.8	10.7	55.76
Apple	2.6	194	411.7	403	597	(N/A)	5.5	1.8	13.27
Sugar maple	10.7	812	1,409.5	1,381	2,193	(N/A)	5.3	6.7	51.01
Northern red oak	6.2	469	833.1	816	1,286	(N/A)	5.1	3.9	31.36
Red maple	4.7	360	630.7	618	978	(N/A)	4.3	3.0	27.95
Swamp white oak	5.9	446	795.2	779	1,226	(N/A)	3.8	3.7	39.53
Northern hackberry	8.4	641	1,151.1	1,128	1,769	(N/A)	3.5	5.4	63.18
Pin oak	8.3	629	1,116.8	1,094	1,723	(N/A)	3.2	5.2	66.29
Blue spruce	1.9	142	271.6	266	408	(N/A)	3.1	1.2	16.31
Northern white cedar	0.8	63	128.3	126	188	(N/A)	2.7	0.6	8.56
Spruce	1.0	76	150.1	147	224	(N/A)	2.5	0.7	11.18
Eastern white pine	2.7	206	332.7	326	532	(N/A)	2.3	1.6	28.01
Pear	1.4	107	201.0	197	304	(N/A)	2.1	0.9	17.88
Black walnut	5.0	381	693.1	679	1,061	(N/A)	2.0	3.2	66.29
White ash	3.7	283	447.4	438	722	(N/A)	2.0	2.2	45.10
Bur oak	1.5	111	193.3	189	301	(N/A)	1.5	0.9	25.06
American sycamore	3.4	256	468.0	459	715	(N/A)	1.5	2.2	59.54
Honeylocust	3.6	271	462.3	453	724	(N/A)	1.5	2.2	60.32
White oak	1.9	142	257.2	252	394	(N/A)	1.4	1.2	35.82
Littleleaf linden	1.8	133	232.8	228	361	(N/A)	1.2	1.1	36.13
American basswood	1.7	126	235.1	230	356	(N/A)	1.1	1.1	39.54
Black maple	2.1	159	295.8	290	449	(N/A)	1.0	1.4	56.17
Eastern redbud	0.7	54	121.4	119	173	(N/A)	1.0	0.5	21.69
Tulip tree	1.6	123	205.8	202	325	(N/A)	1.0	1.0	40.65
Norway spruce	0.9	68	117.6	115	184	(N/A)	0.9	0.6	26.25
Hickory	1.9	145	266.3	261	406	(N/A)	0.9	1.2	57.98
Eastern red cedar	0.3	21	42.7	42	63	(N/A)	0.6	0.2	12.52
Siberian elm	1.6	121	205.1	201	322	(N/A)	0.6	1.0	64.34
Broadleaf Deciduous Small	0.2	16	29.7	29	45	(N/A)	0.5	0.1	11.32
River birch	0.2	19	31.9	31	50	(N/A)	0.5	0.2	12.52
Black poplar	1.8	136	238.9	234	370	(N/A)	0.5	1.1	92.58
Southern magnolia	0.6	44	73.2	72	116	(N/A)	0.4	0.4	38.70
Red pine	0.1	8	17.4	17	25	(N/A)	0.4	0.1	8.26
Japanese tree lilac	0.1	5	11.4	11	16	(N/A)	0.4	0.0	5.40
Northern pin oak	0.5	36	59.8	59	95	(N/A)	0.4	0.3	31.55
Maple	0.0	3	6.7	7	10	(N/A)	0.4	0.0	3.30
Conifer Evergreen Large	0.3	21	33.2	33	54	(N/A)	0.4	0.2	17.96
Austrian pine	0.4	32	53.6	53	84	(N/A)	0.4	0.3	28.16
Elm	0.7	49	91.8	90	139	(N/A)	0.2	0.4	69.67
Dogwood	0.1	11	25.7	25	36	(N/A)	0.2	0.1	18.19
Eastern hophornbeam	0.0	3	7.6	7	11	(N/A)	0.2	0.0	5.40
Cherry plum	0.0	3	7.6	7	11	(N/A)	0.2	0.0	5.40
Kentucky coffeetree	0.2	18	27.5	27	45	(N/A)	0.2	0.1	22.44
Willow	0.3	24	47.4	46	71	(N/A)	0.1	0.2	70.84
Ohio buckeye	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Oak	0.2	18	27.0	26	44	(N/A)	0.1	0.1	44.23
Black spruce	0.2	13	23.3	23	35	(N/A)	0.1	0.1	35.47
Catalpa	0.3	25	46.9	46	71	(N/A)	0.1	0.2	70.91
Plum	0.2	14	24.7	24	38	(N/A)	0.1	0.1	38.13
Flowering dogwood	0.0	2	3.8	4	5	(N/A)	0.1	0.0	5.40
Paper birch	0.0	0	0.5	0	1	(N/A)	0.1	0.0	0.66
Japanese maple	0.1	6	12.8	13	18	(N/A)	0.1	0.1	18.19
Ginkgo	0.2	18	32.0	31	49	(N/A)	0.1	0.1	49.28
Sumac	0.2	14	24.7	24	38	(N/A)	0.1	0.1	38.13
Kwanzan cherry	0.0	0	0.6	1	1	(N/A)	0.1	0.0	0.87
Black cherry	0.2	15	31.6	31	46	(N/A)	0.1	0.1	46.14
Total	158.2	12,009	21,331.7	20,905	32,915	(N/A)	100.0	100.0	40.59

Table 2: Annual Stormwater Benefits

Wilton

Annual Stormwater Benefits of Public Trees

5/30/2022

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	151,096	4,095	(N/A)	12.9	9.3	39.00
Silver maple	386,907	10,485	(N/A)	11.0	23.7	117.81
Green ash	181,361	4,915	(N/A)	7.8	11.1	78.01
Apple	10,329	280	(N/A)	5.5	0.6	6.22
Sugar maple	113,094	3,065	(N/A)	5.3	6.9	71.28
Northern red oak	51,965	1,408	(N/A)	5.1	3.2	34.35
Red maple	29,141	790	(N/A)	4.3	1.8	22.56
Swamp white oak	41,105	1,114	(N/A)	3.8	2.5	35.93
Northern hackberry	64,817	1,757	(N/A)	3.5	4.0	62.73
Pin oak	95,462	2,587	(N/A)	3.2	5.8	99.50
Blue spruce	23,004	623	(N/A)	3.1	1.4	24.94
Northern white cedar	12,923	350	(N/A)	2.7	0.8	15.92
Spruce	10,912	296	(N/A)	2.5	0.7	14.79
Eastern white pine	46,687	1,265	(N/A)	2.3	2.9	66.59
Pear	5,036	136	(N/A)	2.1	0.3	8.03
Black walnut	57,593	1,561	(N/A)	2.0	3.5	97.55
White ash	31,814	862	(N/A)	2.0	1.9	53.88
Bur oak	15,590	422	(N/A)	1.5	1.0	35.21
American sycamore	46,167	1,251	(N/A)	1.5	2.8	104.26
Honeylocust	39,459	1,069	(N/A)	1.5	2.4	89.11
White oak	19,772	536	(N/A)	1.4	1.2	48.71
Littleleaf linden	13,790	374	(N/A)	1.2	0.8	37.37
American basswood	14,984	406	(N/A)	1.1	0.9	45.12
Black maple	20,694	561	(N/A)	1.0	1.3	70.10
Eastern redbud	3,025	82	(N/A)	1.0	0.2	10.25
Tulip tree	13,938	378	(N/A)	1.0	0.9	47.21
Norway spruce	15,550	421	(N/A)	0.9	1.0	60.20
Hickory	20,436	554	(N/A)	0.9	1.3	79.12
Eastern red cedar	3,796	103	(N/A)	0.6	0.2	20.57
Siberian elm	15,363	416	(N/A)	0.6	0.9	83.27
Broadleaf Deciduous Small	750	20	(N/A)	0.5	0.0	5.08
River birch	1,446	39	(N/A)	0.5	0.1	9.79
Black poplar	27,207	737	(N/A)	0.5	1.7	184.33
Southern magnolia	5,639	153	(N/A)	0.4	0.3	50.94
Red pine	1,021	28	(N/A)	0.4	0.1	9.22
Japanese tree lilac	206	6	(N/A)	0.4	0.0	1.86
Northern pin oak	2,830	77	(N/A)	0.4	0.2	25.57
Maple	161	4	(N/A)	0.4	0.0	1.45
Conifer Evergreen Large	3,290	89	(N/A)	0.4	0.2	29.72
Austrian pine	6,013	163	(N/A)	0.4	0.4	54.32
Elm	8,081	219	(N/A)	0.2	0.5	109.50
Dogwood	529	14	(N/A)	0.2	0.0	7.17
Eastern hophornbeam	137	4	(N/A)	0.2	0.0	1.86
Cherry plum	137	4	(N/A)	0.2	0.0	1.86
Kentucky coffeetree	1,483	40	(N/A)	0.2	0.1	20.10
Willow	3,764	102	(N/A)	0.1	0.2	102.01
Ohio buckeye	586	16	(N/A)	0.1	0.0	15.88
Oak	1,466	40	(N/A)	0.1	0.1	39.72
Black spruce	2,925	79	(N/A)	0.1	0.2	79.26
Catalpa	3,943	107	(N/A)	0.1	0.2	106.85
Plum	667	18	(N/A)	0.1	0.0	18.06
Flowering dogwood	69	2	(N/A)	0.1	0.0	1.86
Paper birch	18	0	(N/A)	0.1	0.0	0.48
Japanese maple	264	7	(N/A)	0.1	0.0	7.17
Ginkgo	1,857	50	(N/A)	0.1	0.1	50.33
Sumac	667	18	(N/A)	0.1	0.0	18.06
Kwanzan cherry	7	0	(N/A)	0.1	0.0	0.20
Black cherry	1,174	32	(N/A)	0.1	0.1	31.82
Citywide total	1,632,147	44,231	(N/A)	100.0	100.0	54.54

Table 3: Annual Air Quality Benefits

Wilton

Annual Air Quality Benefits of Public Trees

5/30/2022

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 maple	27.6	4.8	14.1	1.2	151	93.5	13.6	12.9	88.2	581	-6.8	-25	249.0	706 (N/A)	12.9	6.72
Silver maple	63.8	10.8	31.6	2.8	345	132.2	19.4	18.5	127.2	828	-32.7	-122	373.7	1,051 (N/A)	11.0	11.80
Green ash	22.2	3.5	10.6	1.0	118	80.9	11.8	11.3	77.5	506	0.0	0	218.9	624 (N/A)	7.8	9.91
Apple	2.6	0.4	1.3	0.1	14	12.7	1.8	1.7	11.6	78	0.0	0	32.3	92 (N/A)	5.5	2.05
Sugar maple	14.8	2.5	7.4	0.7	80	50.5	7.4	7.1	48.5	316	-11.7	-44	127.1	352 (N/A)	5.3	8.20
Northern red oak	10.2	1.8	5.1	0.5	55	29.3	4.3	4.1	28.0	183	-14.6	-55	68.7	184 (N/A)	5.1	4.49
Red maple	5.1	0.9	2.6	0.2	28	22.4	3.3	3.1	21.5	140	-2.0	-7	57.2	161 (N/A)	4.3	4.59
Swamp white oak	7.0	1.2	3.6	0.3	38	28.0	4.1	3.9	26.7	175	-1.8	-7	73.1	207 (N/A)	3.8	6.67
Northern hackberry	8.7	1.5	4.7	0.4	48	40.3	5.9	5.6	38.3	251	0.0	0	105.4	299 (N/A)	3.5	10.69
Pin oak	17.1	3.0	8.7	0.8	94	39.4	5.7	5.5	37.5	246	-31.6	-119	86.1	221 (N/A)	3.2	8.48
Blue spruce	2.6	0.5	2.3	0.3	18	9.0	1.3	1.2	8.4	56	-7.7	-29	18.1	45 (N/A)	3.1	1.79
Northern white cedar	1.3	0.3	1.2	0.2	9	4.1	0.6	0.6	3.7	25	-5.8	-22	6.1	12 (N/A)	2.7	0.56
Spruce	0.9	0.2	0.9	0.1	7	4.9	0.7	0.7	4.6	30	-3.4	-13	9.7	24 (N/A)	2.5	1.22
Eastern white pine	5.5	1.1	4.5	0.7	36	12.6	1.9	1.8	12.3	79	-23.9	-90	16.4	26 (N/A)	2.3	1.36
Pear	1.4	0.2	0.7	0.1	7	6.8	1.0	0.9	6.4	42	0.0	0	17.5	50 (N/A)	2.1	2.92
Black walnut	7.2	1.2	3.4	0.3	38	24.0	3.5	3.3	22.8	150	0.0	0	65.7	188 (N/A)	2.0	11.74
White ash	3.9	0.6	2.0	0.2	21	17.2	2.6	2.4	16.9	109	0.0	0	45.8	130 (N/A)	2.0	8.11
Bur oak	1.9	0.3	0.9	0.1	10	6.9	1.0	1.0	6.6	43	0.0	0	18.8	54 (N/A)	1.5	4.47
American sycamore	6.6	1.0	3.0	0.3	34	16.2	2.3	2.2	15.3	100	0.0	0	46.9	135 (N/A)	1.5	11.24
Honeylocust	7.7	1.3	3.5	0.4	41	16.8	2.5	2.3	16.1	105	-6.0	-23	44.5	123 (N/A)	1.5	10.25
White oak	2.3	0.4	1.1	0.1	12	8.9	1.3	1.2	8.5	56	0.0	0	23.9	68 (N/A)	1.4	6.18
Littleleaf linden	2.0	0.3	1.0	0.1	11	8.3	1.2	1.2	8.0	52	-1.0	-4	21.1	59 (N/A)	1.2	5.92
American basswood	1.8	0.3	0.9	0.1	10	8.0	1.2	1.1	7.5	50	-1.6	-6	19.3	53 (N/A)	1.1	5.93
Black maple	5.3	0.9	2.4	0.2	28	10.1	1.5	1.4	9.5	63	-1.7	-7	29.6	84 (N/A)	1.0	10.55
Eastern redbud	0.8	0.1	0.4	0.0	4	3.6	0.5	0.5	3.3	22	0.0	0	9.2	26 (N/A)	1.0	3.27
Tulip tree	1.4	0.2	0.7	0.1	8	7.6	1.1	1.1	7.4	48	0.0	0	19.6	56 (N/A)	1.0	6.95
Norway spruce	1.8	0.4	1.5	0.2	12	4.2	0.6	0.6	4.1	27	-6.8	-25	6.6	13 (N/A)	0.9	1.84
Hickory	2.4	0.4	1.2	0.1	13	9.2	1.3	1.3	8.7	57	0.0	0	24.4	70 (N/A)	0.9	9.95
Eastern red cedar	0.5	0.1	0.5	0.1	4	1.3	0.2	0.2	1.2	8	-2.0	-8	2.1	4 (N/A)	0.6	0.85
Siberian elm	2.4	0.4	1.2	0.1	13	7.5	1.1	1.0	7.2	47	0.0	0	21.0	60 (N/A)	0.6	12.02
Broadleaf Deciduous Small	0.2	0.0	0.1	0.0	1	1.0	0.1	0.1	1.0	6	0.0	0	2.6	7 (N/A)	0.5	1.87
River birch	0.2	0.0	0.1	0.0	1	1.2	0.2	0.2	1.1	7	-0.1	0	3.0	8 (N/A)	0.5	2.08
Black poplar	5.1	0.8	2.2	0.2	27	8.5	1.2	1.2	8.1	53	0.0	0	27.5	80 (N/A)	0.5	19.96
Southern magnolia	0.4	0.1	0.5	0.1	3	2.7	0.4	0.4	2.6	17	-1.6	-6	5.6	14 (N/A)	0.4	4.74
Red pine	0.1	0.0	0.1	0.0	1	0.5	0.1	0.1	0.5	3	-0.3	-1	1.0	3 (N/A)	0.4	0.86
Japanese tree lilac	0.0	0.0	0.0	0.0	0	0.3	0.0	0.0	0.3	2	0.0	0	0.8	2 (N/A)	0.4	0.71
Northern pin oak	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)	0.4	5.32
Maple	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)	0.4	0.46
Conifer Evergreen Large	0.3	0.1	0.3	0.0	2	1.3	0.2	0.2	1.3	8	-1.1	-4	2.6	6 (N/A)	0.4	2.07
Austrian pine	0.9	0.2	0.7	0.1	6	2.0	0.3	0.3	1.9	12	-2.2	-8	4.1	10 (N/A)	0.4	3.31
Elm	1.1	0.2	0.5	0.0	6	3.1	0.5	0.4	2.9	19	0.0	0	8.7	25 (N/A)	0.2	12.53
Dogwood	0.1	0.0	0.1	0.0	1	0.8	0.1	0.1	0.7	5	0.0	0	1.8	5 (N/A)	0.2	2.55
Eastern hophornbeam	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)	0.2	0.71
Cherry plum	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)	0.2	0.71
Kentucky coffeetree	0.1	0.0	0.1	0.0	1	1.1	0.2	0.2	1.1	7	0.0	0	2.7	8 (N/A)	0.2	3.75
Willow	0.9	0.1	0.4	0.0	5	1.6	0.2	0.2	1.5	10	-0.2	-1	4.7	14 (N/A)	0.1	13.58
Ohio buckeye	0.1	0.0	0.0	0.0	0	0.5	0.1	0.1	0.5	3	0.0	0	1.2	3 (N/A)	0.1	3.47
Oak	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)	0.1	7.42
Black spruce	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)	0.1	4.16
Catalpa	0.5	0.1	0.2	0.0	3	1.6	0.2	0.2	1.5	10	0.0	0	4.4	12 (N/A)	0.1	12.48
Plum	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)	0.1	6.56
Flowering dogwood	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	0.71
Paper birch	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)	0.1	0.08
Japanese maple	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)	0.1	2.55
Ginkgo	0.5	0.1	0.3	0.0	3	1.1	0.2	0.2	1.1	7	-0.2	-1	3.3	9 (N/A)	0.1	9.29
Sumac	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)	0.1	6.56
Kwanzan cherry	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)	0.1	0.11
Black cherry	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	8.35
Citywide total	251.4	42.8	130.0	12.4	1,377	752.1	109.7	104.7	716.9	4,693	-168.1	-630	1,951.9	5,440 (N/A)	100.0	6.71

Table 4: Annual Carbon Stored

Wilton

Stored CO2 Benefits of Public Trees

5/30/2022

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	462,341	3,468	(N/A)	12.9	8.3	33.02
Silver maple	1,363,936	10,230	(N/A)	11.0	24.5	114.94
Green ash	727,138	5,454	(N/A)	7.8	13.1	86.56
Apple	44,855	336	(N/A)	5.5	0.8	7.48
Sugar maple	426,938	3,202	(N/A)	5.3	7.7	74.47
Northern red oak	211,730	1,588	(N/A)	5.1	3.8	38.73
Red maple	61,299	460	(N/A)	4.3	1.1	13.14
Swamp white oak	116,777	876	(N/A)	3.8	2.1	28.25
Northern hackberry	122,486	919	(N/A)	3.5	2.2	32.81
Pin oak	451,615	3,387	(N/A)	3.2	8.1	130.27
Blue spruce	14,919	112	(N/A)	3.1	0.3	4.48
Northern white cedar	12,916	97	(N/A)	2.7	0.2	4.40
Spruce	5,689	43	(N/A)	2.5	0.1	2.13
Eastern white pine	59,241	444	(N/A)	2.3	1.1	23.38
Pear	21,549	162	(N/A)	2.1	0.4	9.51
Black walnut	231,942	1,740	(N/A)	2.0	4.2	108.72
White ash	81,343	610	(N/A)	2.0	1.5	38.13
Bur oak	64,690	485	(N/A)	1.5	1.2	40.43
American sycamore	216,951	1,627	(N/A)	1.5	3.9	135.59
Honeylocust	99,453	746	(N/A)	1.5	1.8	62.16
White oak	76,874	577	(N/A)	1.4	1.4	52.41
Littleleaf linden	44,506	334	(N/A)	1.2	0.8	33.38
American basswood	65,706	493	(N/A)	1.1	1.2	54.76
Black maple	56,718	425	(N/A)	1.0	1.0	53.17
Eastern redbud	13,098	98	(N/A)	1.0	0.2	12.28
Tulip tree	46,430	348	(N/A)	1.0	0.8	43.53
Norway spruce	15,968	120	(N/A)	0.9	0.3	17.11
Hickory	76,255	572	(N/A)	0.9	1.4	81.70
Eastern red cedar	1,976	15	(N/A)	0.6	0.0	2.96
Siberian elm	59,917	449	(N/A)	0.6	1.1	89.88
Broadleaf Deciduous	3,243	24	(N/A)	0.5	0.1	6.08
River birch	3,675	28	(N/A)	0.5	0.1	6.89
Black poplar	177,166	1,329	(N/A)	0.5	3.2	332.19
Southern magnolia	6,731	50	(N/A)	0.4	0.1	16.83
Red pine	333	2	(N/A)	0.4	0.0	0.83
Japanese tree lilac	533	4	(N/A)	0.4	0.0	1.33
Northern pin oak	7,265	54	(N/A)	0.4	0.1	18.16
Maple	252	2	(N/A)	0.4	0.0	0.63
Conifer Evergreen La	2,379	18	(N/A)	0.4	0.0	5.95
Austrian pine	7,130	53	(N/A)	0.4	0.1	17.82
Elm	34,401	258	(N/A)	0.2	0.6	129.00
Dogwood	1,816	14	(N/A)	0.2	0.0	6.81
Eastern hophornbeam	356	3	(N/A)	0.2	0.0	1.33
Cherry plum	356	3	(N/A)	0.2	0.0	1.33
Kentucky coffeetree	3,684	28	(N/A)	0.2	0.1	13.81
Willow	14,280	107	(N/A)	0.1	0.3	107.10
Ohio buckeye	1,101	8	(N/A)	0.1	0.0	8.26
Oak	3,672	28	(N/A)	0.1	0.1	27.54
Black spruce	4,893	37	(N/A)	0.1	0.1	36.70
Catalpa	15,773	118	(N/A)	0.1	0.3	118.30
Plum	3,037	23	(N/A)	0.1	0.1	22.78
Flowering dogwood	178	1	(N/A)	0.1	0.0	1.33
Paper birch	12	0	(N/A)	0.1	0.0	0.09
Japanese maple	908	7	(N/A)	0.1	0.0	6.81
Ginkgo	7,800	59	(N/A)	0.1	0.1	58.50
Sumac	3,037	23	(N/A)	0.1	0.1	22.78
Kwanzan cherry	14	0	(N/A)	0.1	0.0	0.10
Black cherry	6,743	51	(N/A)	0.1	0.1	50.57
Citywide total	5,566,024	41,745	(N/A)	100.0	100.0	51.47

Table 5: Annual Carbon Sequestered

Wilton

Annual CO Benefits of Public Trees

5/30/2022

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 maple	30,884	232	-2,226	-192	-18	32,587	244	61,053	458 (N/A)	12.9	10.0	4.36
Silver maple	108,464	813	-6,549	-299	-51	47,157	354	148,773	1,116 (N/A)	11.0	24.4	12.54
Green ash	38,945	292	-3,490	-173	-27	28,678	215	63,960	480 (N/A)	7.8	10.5	7.61
Apple	4,010	30	-216	-42	-2	4,282	32	8,034	60 (N/A)	5.5	1.3	1.34
Sugar maple	22,879	172	-2,051	-113	-16	17,944	135	38,659	290 (N/A)	5.3	6.3	6.74
Northern red oak	7,195	54	-1,016	-75	-8	10,368	78	16,472	124 (N/A)	5.1	2.7	3.01
Red maple	8,410	63	-294	-44	-3	7,957	60	16,028	120 (N/A)	4.3	2.6	3.43
Swamp white oak	9,833	74	-563	-55	-5	9,862	74	19,076	143 (N/A)	3.8	3.1	4.62
Northern hackberry	8,914	67	-588	-72	-5	14,165	106	22,420	168 (N/A)	3.5	3.7	6.01
Pin oak	40,814	306	-2,168	-89	-17	13,901	104	52,458	393 (N/A)	3.2	8.6	15.13
Blue spruce	1,269	10	-72	-33	-1	3,131	23	4,295	32 (N/A)	3.1	0.7	1.29
Northern white cedar	907	7	-62	-18	-1	1,386	10	2,212	17 (N/A)	2.7	0.4	0.75
Spruce	895	7	-27	-20	0	1,688	13	2,536	19 (N/A)	2.5	0.4	0.95
Eastern white pine	2,975	22	-284	-46	-2	4,558	34	7,204	54 (N/A)	2.3	1.2	2.84
Pear	2,105	16	-104	-18	-1	2,363	18	4,346	33 (N/A)	2.1	0.7	1.92
Black walnut	12,389	93	-1,113	-52	-9	8,430	63	19,653	147 (N/A)	2.0	3.2	9.21
White ash	8,706	65	-391	-31	-3	6,260	47	14,544	109 (N/A)	2.0	2.4	6.82
Bur oak	3,164	24	-311	-16	-2	2,460	18	5,298	40 (N/A)	1.5	0.9	3.31
American sycamore	8,005	60	-1,041	-38	-8	5,654	42	12,580	94 (N/A)	1.5	2.1	7.86
Honeylocust	12,497	94	-477	-27	-4	5,984	45	17,977	135 (N/A)	1.5	3.0	11.24
White oak	4,414	33	-369	-21	-3	3,136	24	7,160	54 (N/A)	1.4	1.2	4.88
Littleleaf linden	5,149	39	-214	-20	-2	2,943	22	7,858	59 (N/A)	1.2	1.3	5.89
American basswood	4,209	32	-315	-19	-3	2,774	21	6,649	50 (N/A)	1.1	1.1	5.54
Black maple	1,089	8	-272	-20	-2	3,524	26	4,320	32 (N/A)	1.0	0.7	4.05
Eastern redbud	797	6	-63	-12	-1	1,204	9	1,926	14 (N/A)	1.0	0.3	1.81
Tulip tree	3,572	27	-223	-16	-2	2,729	20	6,062	45 (N/A)	1.0	1.0	5.68
Norway spruce	1,033	8	-77	-16	-1	1,513	11	2,454	18 (N/A)	0.9	0.4	2.63
Hickory	4,741	36	-366	-20	-3	3,202	24	7,557	57 (N/A)	0.9	1.2	8.10
Eastern red cedar	176	1	-9	-6	0	459	3	619	5 (N/A)	0.6	0.1	0.93
Siberian elm	2,819	21	-288	-16	-2	2,667	20	5,182	39 (N/A)	0.6	0.9	7.77
Broadleaf Deciduous Smal	323	2	-16	-3	0	357	3	661	5 (N/A)	0.5	0.1	1.24
River birch	402	3	-18	-3	0	417	3	798	6 (N/A)	0.5	0.1	1.50
Black poplar	2,829	21	-850	-21	-7	3,010	23	4,968	37 (N/A)	0.5	0.8	9.32
Southern magnolia	459	3	-32	-6	0	980	7	1,400	11 (N/A)	0.4	0.2	3.50
Red pine	89	1	-2	-2	0	170	1	255	2 (N/A)	0.4	0.0	0.64
Japanese tree lilac	114	1	-3	-2	0	112	1	221	2 (N/A)	0.4	0.0	0.55
Northern pin oak	777	6	-35	-4	0	797	6	1,536	12 (N/A)	0.4	0.3	3.84
Maple	44	0	-1	-1	0	74	1	116	1 (N/A)	0.4	0.0	0.29
Conifer Evergreen Large	249	2	-11	-4	0	471	4	704	5 (N/A)	0.4	0.1	1.76
Austrian pine	370	3	-34	-7	0	706	5	1,034	8 (N/A)	0.4	0.2	2.58
Elm	1,619	12	-165	-7	-1	1,091	8	2,539	19 (N/A)	0.2	0.4	9.52
Dogwood	228	2	-9	-2	0	248	2	465	3 (N/A)	0.2	0.1	1.74
Eastern hophornbeam	76	1	-2	-1	0	74	1	147	1 (N/A)	0.2	0.0	0.55
Cherry plum	76	1	-2	-1	0	74	1	147	1 (N/A)	0.2	0.0	0.55
Kentucky coffeetree	448	3	-18	-2	0	397	3	825	6 (N/A)	0.2	0.1	3.09
Willow	370	3	-69	-4	-1	539	4	837	6 (N/A)	0.1	0.1	6.27
Ohio buckeye	224	2	-5	-1	0	176	1	393	3 (N/A)	0.1	0.1	2.95
Oak	445	3	-18	-2	0	393	3	819	6 (N/A)	0.1	0.1	6.14
Black spruce	0	0	-23	-4	0	280	2	253	2 (N/A)	0.1	0.0	1.90
Catalpa	857	6	-76	-4	-1	552	4	1,330	10 (N/A)	0.1	0.2	9.97
Plum	268	2	-15	-2	0	308	2	560	4 (N/A)	0.1	0.1	4.20
Flowering dogwood	38	0	-1	-1	0	37	0	74	1 (N/A)	0.1	0.0	0.55
Paper birch	3	0	0	0	0	4	0	7	0 (N/A)	0.1	0.0	0.05
Japanese maple	114	1	-4	-1	0	124	1	232	2 (N/A)	0.1	0.0	1.74
Ginkgo	0	0	-37	-4	0	396	3	355	3 (N/A)	0.1	0.1	2.66
Sumac	268	2	-15	-2	0	308	2	560	4 (N/A)	0.1	0.1	4.20
Kwanzan cherry	9	0	0	0	0	6	0	14	0 (N/A)	0.1	0.0	0.10
Black cherry	0	0	-32	-4	0	335	3	299	2 (N/A)	0.1	0.0	2.24
Citywide total	371,958	2,790	-26,733	-1,713	-213	265,405	1,991	608,917	4,567 (N/A)	100.0	100.0	5.63

Table 6: Annual Social and Aesthetic Benefits

Wilton

Annual Aesthetic/Other Benefits of Public Trees

5/30/2022

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	3,153	(N/A)	12.9	8.6	30.03
Silver maple	8,749	(N/A)	11.0	23.8	98.31
Green ash	3,287	(N/A)	7.8	8.9	52.17
Apple	225	(N/A)	5.5	0.6	5.00
Sugar maple	2,413	(N/A)	5.3	6.6	56.12
Northern red oak	628	(N/A)	5.1	1.7	15.31
Red maple	1,268	(N/A)	4.3	3.4	36.24
Swamp white oak	1,004	(N/A)	3.8	2.7	32.39
Northern hackberry	1,363	(N/A)	3.5	3.7	48.68
Pin oak	3,092	(N/A)	3.2	8.4	118.93
Blue spruce	504	(N/A)	3.1	1.4	20.18
Northern white cedar	266	(N/A)	2.7	0.7	12.08
Spruce	273	(N/A)	2.5	0.7	13.66
Eastern white pine	561	(N/A)	2.3	1.5	29.51
Pear	118	(N/A)	2.1	0.3	6.97
Black walnut	977	(N/A)	2.0	2.7	61.09
White ash	1,081	(N/A)	2.0	2.9	67.58
Bur oak	314	(N/A)	1.5	0.9	26.15
American sycamore	605	(N/A)	1.5	1.6	50.43
Honeylocust	3,154	(N/A)	1.5	8.6	262.85
White oak	417	(N/A)	1.4	1.1	37.90
Littleleaf linden	557	(N/A)	1.2	1.5	55.66
American basswood	332	(N/A)	1.1	0.9	36.89
Black maple	139	(N/A)	1.0	0.4	17.37
Eastern redbud	45	(N/A)	1.0	0.1	5.60
Tulip tree	335	(N/A)	1.0	0.9	41.83
Norway spruce	268	(N/A)	0.9	0.7	38.34
Hickory	394	(N/A)	0.9	1.1	56.35
Eastern red cedar	91	(N/A)	0.6	0.2	18.22
Siberian elm	210	(N/A)	0.6	0.6	41.90
Broadleaf Deciduous Small	18	(N/A)	0.5	0.0	4.40
River birch	47	(N/A)	0.5	0.1	11.84
Black poplar	182	(N/A)	0.5	0.5	45.52
Southern magnolia	98	(N/A)	0.4	0.3	32.71
Red pine	29	(N/A)	0.4	0.1	9.70
Japanese tree lilac	6	(N/A)	0.4	0.0	2.06
Northern pin oak	81	(N/A)	0.4	0.2	27.02
Maple	7	(N/A)	0.4	0.0	2.45
Conifer Evergreen Large	71	(N/A)	0.4	0.2	23.82
Austrian pine	63	(N/A)	0.4	0.2	21.09
Elm	124	(N/A)	0.2	0.3	62.14
Dogwood	13	(N/A)	0.2	0.0	6.40
Eastern hophornbeam	4	(N/A)	0.2	0.0	2.06
Cherry plum	4	(N/A)	0.2	0.0	2.06
Kentucky coffeetree	51	(N/A)	0.2	0.1	25.56
Willow	31	(N/A)	0.1	0.1	31.46
Ohio buckeye	26	(N/A)	0.1	0.1	26.22
Oak	46	(N/A)	0.1	0.1	45.86
Black spruce	0	(N/A)	0.1	0.0	0.00
Catalpa	66	(N/A)	0.1	0.2	65.59
Plum	15	(N/A)	0.1	0.0	15.48
Flowering dogwood	2	(N/A)	0.1	0.0	2.06
Paper birch	5	(N/A)	0.1	0.0	5.26
Japanese maple	6	(N/A)	0.1	0.0	6.40
Ginkgo	0	(N/A)	0.1	0.0	0.00
Sumac	15	(N/A)	0.1	0.0	15.48
Kwanzan cherry	0	(N/A)	0.1	0.0	0.03
Black cherry	0	(N/A)	0.1	0.0	0.00
Citywide total	36,838	(N/A)	100.0	100.0	45.42

Table 7: Summary of Benefits in Dollars

Wilton

Total Annual Benefits of Public Trees by Species ($)

5/30/2022

Species	Energy	CO_2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Norway maple	4,139	458	706	4,095	3,153	12,550	(N/A)	10.1
Silver maple	5,729	1,116	1,051	10,485	8,749	27,130	(N/A)	21.9
Green ash	3,513	480	624	4,915	3,287	12,818	(N/A)	10.3
Apple	597	60	92	280	225	1,254	(N/A)	1.0
Sugar maple	2,193	290	352	3,065	2,413	8,314	(N/A)	6.7
Northern red oak	1,286	124	184	1,408	628	3,629	(N/A)	2.9
Red maple	978	120	161	790	1,268	3,317	(N/A)	2.7
Swamp white oak	1,226	143	207	1,114	1,004	3,693	(N/A)	3.0
Northern hackberry	1,769	168	299	1,757	1,363	5,356	(N/A)	4.3
Pin oak	1,723	393	221	2,587	3,092	8,017	(N/A)	6.5
Blue spruce	408	32	45	623	504	1,613	(N/A)	1.3
Northern white cedar	188	17	12	350	266	833	(N/A)	0.7
Spruce	224	19	24	296	273	836	(N/A)	0.7
Eastern white pine	532	54	26	1,265	561	2,438	(N/A)	2.0
Pear	304	33	50	136	118	641	(N/A)	0.5
Black walnut	1,061	147	188	1,561	977	3,934	(N/A)	3.2
White ash	722	109	130	862	1,081	2,904	(N/A)	2.3
Bur oak	301	40	54	422	314	1,130	(N/A)	0.9
American sycamore	715	94	135	1,251	605	2,800	(N/A)	2.3
Honeylocust	724	135	123	1,069	3,154	5,205	(N/A)	4.2
White oak	394	54	68	536	417	1,468	(N/A)	1.2
Littleleaf linden	361	59	59	374	557	1,410	(N/A)	1.1
American basswood	356	50	53	406	332	1,197	(N/A)	1.0
Black maple	449	32	84	561	139	1,266	(N/A)	1.0
Eastern redbud	173	14	26	82	45	341	(N/A)	0.3
Tulip tree	325	45	56	378	335	1,139	(N/A)	0.9
Norway spruce	184	18	13	421	268	905	(N/A)	0.7
Hickory	406	57	70	554	394	1,480	(N/A)	1.2
Eastern red cedar	63	5	4	103	91	265	(N/A)	0.2
Siberian elm	322	39	60	416	210	1,046	(N/A)	0.8
Broadleaf Deciduous Su	45	5	7	20	18	96	(N/A)	0.1
River birch	50	6	8	39	47	151	(N/A)	0.1
Black poplar	370	37	80	737	182	1,407	(N/A)	1.1
Southern magnolia	116	11	14	153	98	392	(N/A)	0.3
Red pine	25	2	3	28	29	86	(N/A)	0.1
Japanese tree lilac	16	2	2	6	6	32	(N/A)	0.0
Northern pin oak	95	12	16	77	81	280	(N/A)	0.2
Maple	10	1	1	4	7	24	(N/A)	0.0
Conifer Evergreen Large	54	5	6	89	71	226	(N/A)	0.2
Austrian pine	84	8	10	163	63	328	(N/A)	0.3
Elm	139	19	25	219	124	527	(N/A)	0.4
Dogwood	36	3	5	14	13	72	(N/A)	0.1
Eastern hophornbeam	11	1	1	4	4	21	(N/A)	0.0
Cherry plum	11	1	1	4	4	21	(N/A)	0.0
Kentucky coffeetree	45	6	8	40	51	150	(N/A)	0.1
Willow	71	6	14	102	31	224	(N/A)	0.2
Ohio buckeye	24	3	3	16	26	73	(N/A)	0.1
Oak	44	6	7	40	46	143	(N/A)	0.1
Black spruce	35	2	4	79	0	121	(N/A)	0.1
Catalpa	71	10	12	107	66	266	(N/A)	0.2
Plum	38	4	7	18	15	82	(N/A)	0.1
Flowering dogwood	5	1	1	2	2	11	(N/A)	0.0
Paper birch	1	0	0	0	5	7	(N/A)	0.0
Japanese maple	18	2	3	7	6	36	(N/A)	0.0
Ginkgo	49	3	9	50	0	112	(N/A)	0.1
Sumac	38	4	7	18	15	82	(N/A)	0.1
Kwanzan cherry	1	0	0	0	0	1	(N/A)	0.0
Black cherry	46	2	8	32	0	89	(N/A)	0.1
Citywide Total	32,915	4,567	5,440	44,231	36,838	123,990	(N/A)	100.0

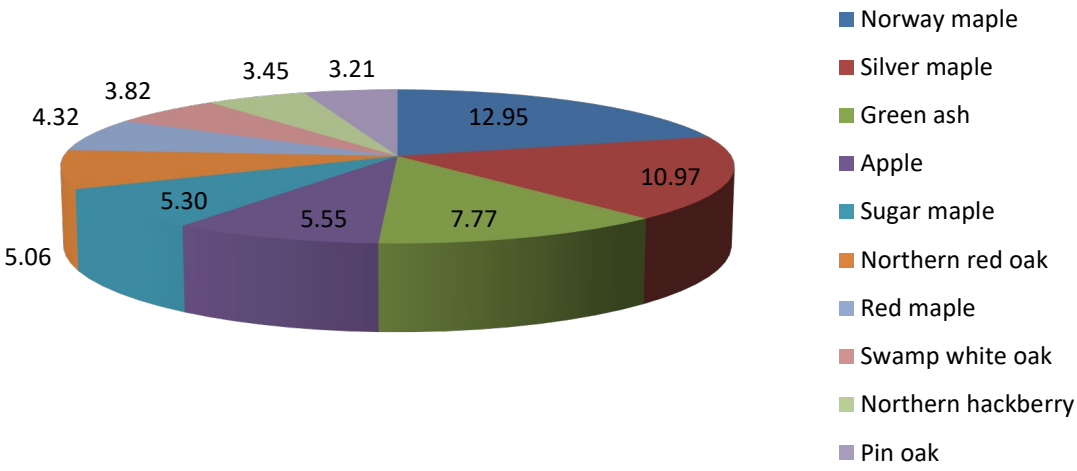

Figure 1: Species Distribution

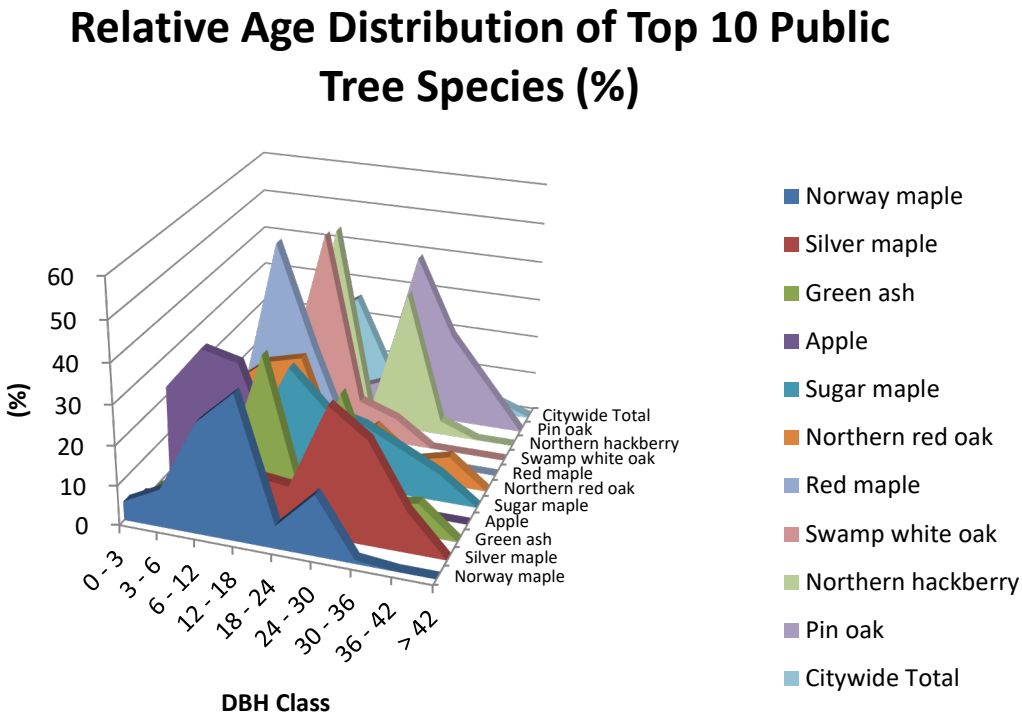

Figure 2: Relative Age Class

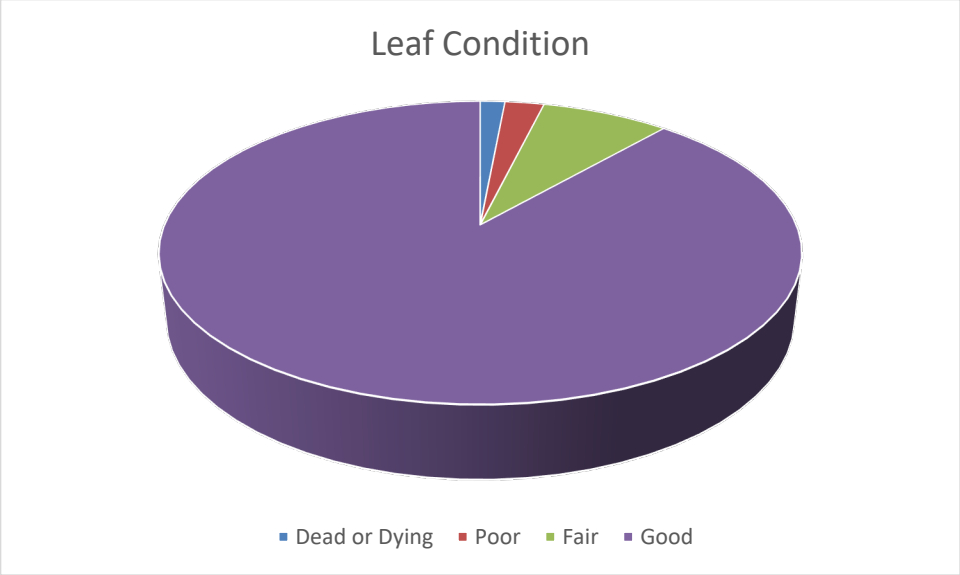

Figure 3: Foliage Condition

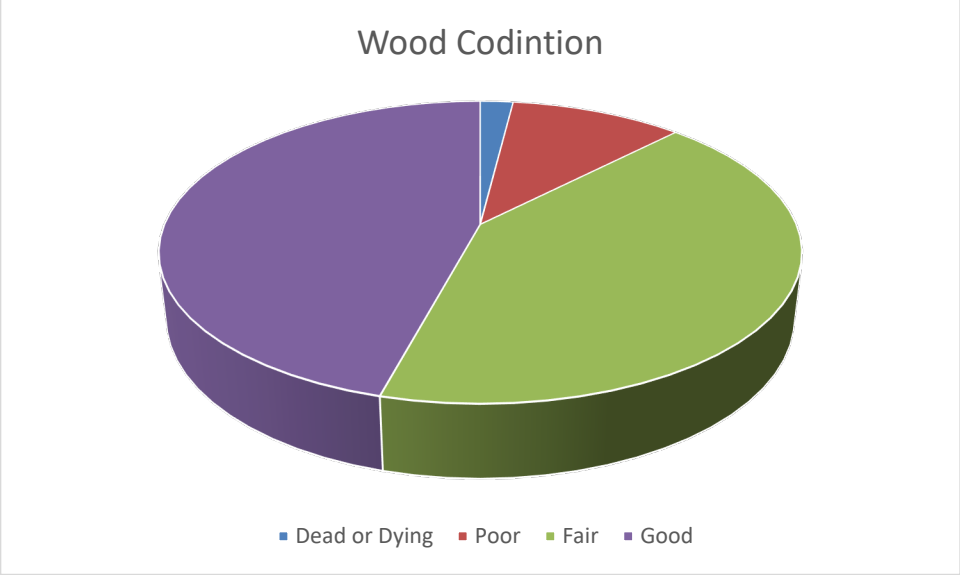

Figure 4: Wood Condition

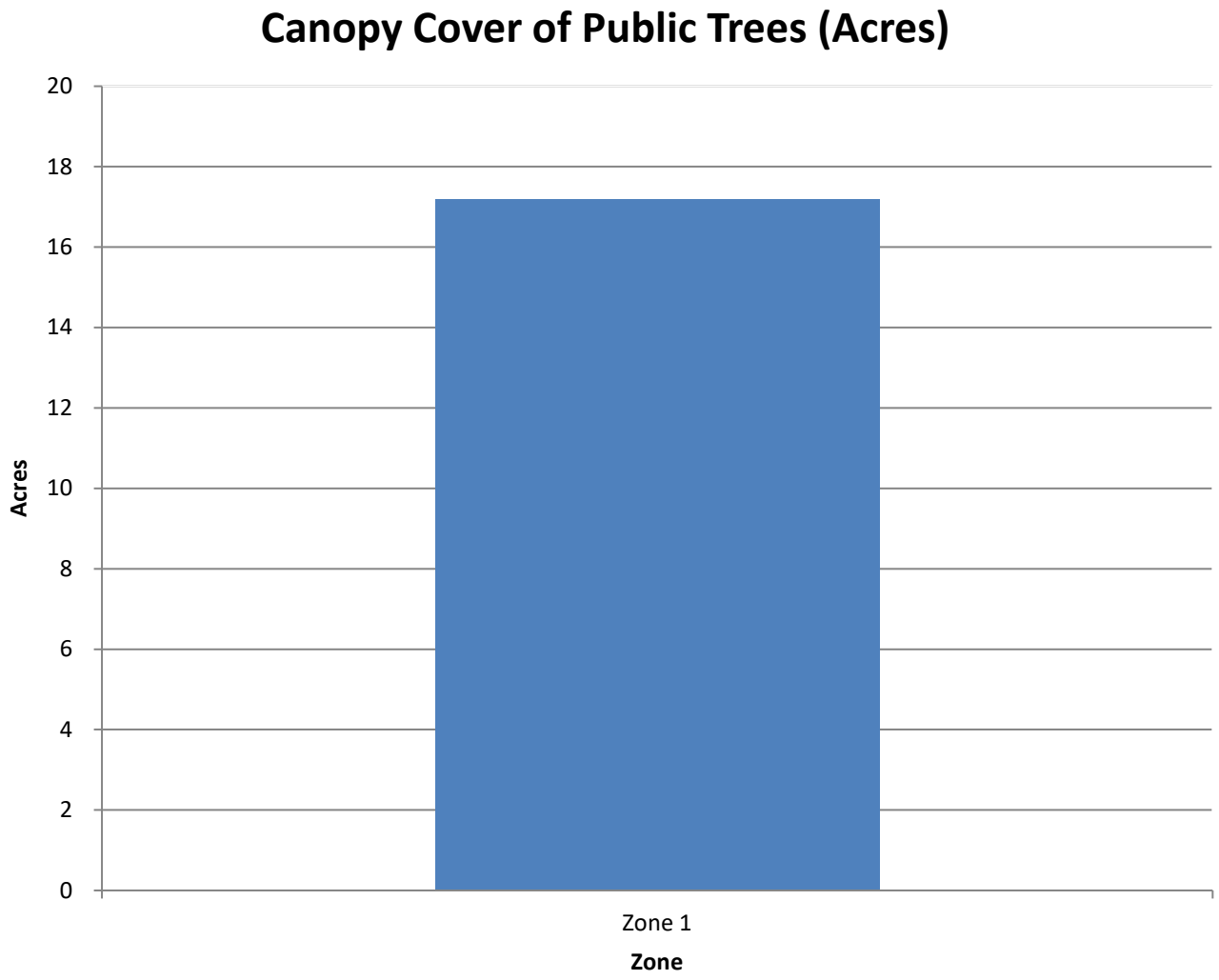

Figure 5: Canopy Cover in Acres

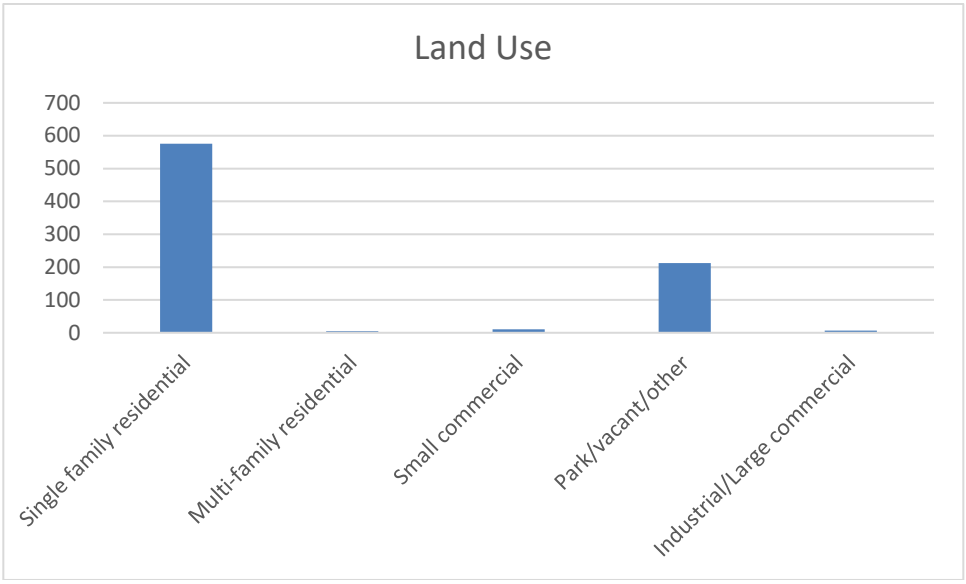

Figure 6: Land Use of city/park trees

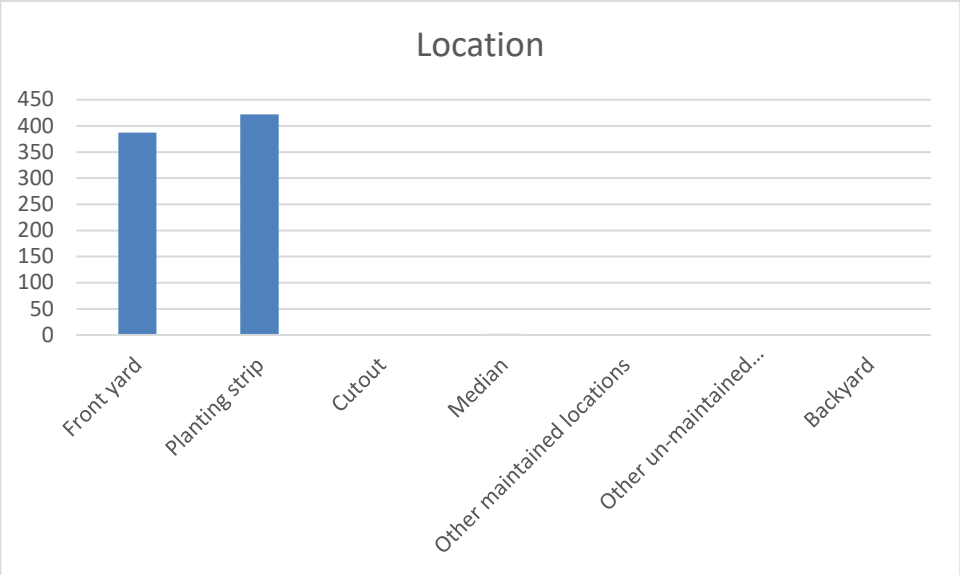

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

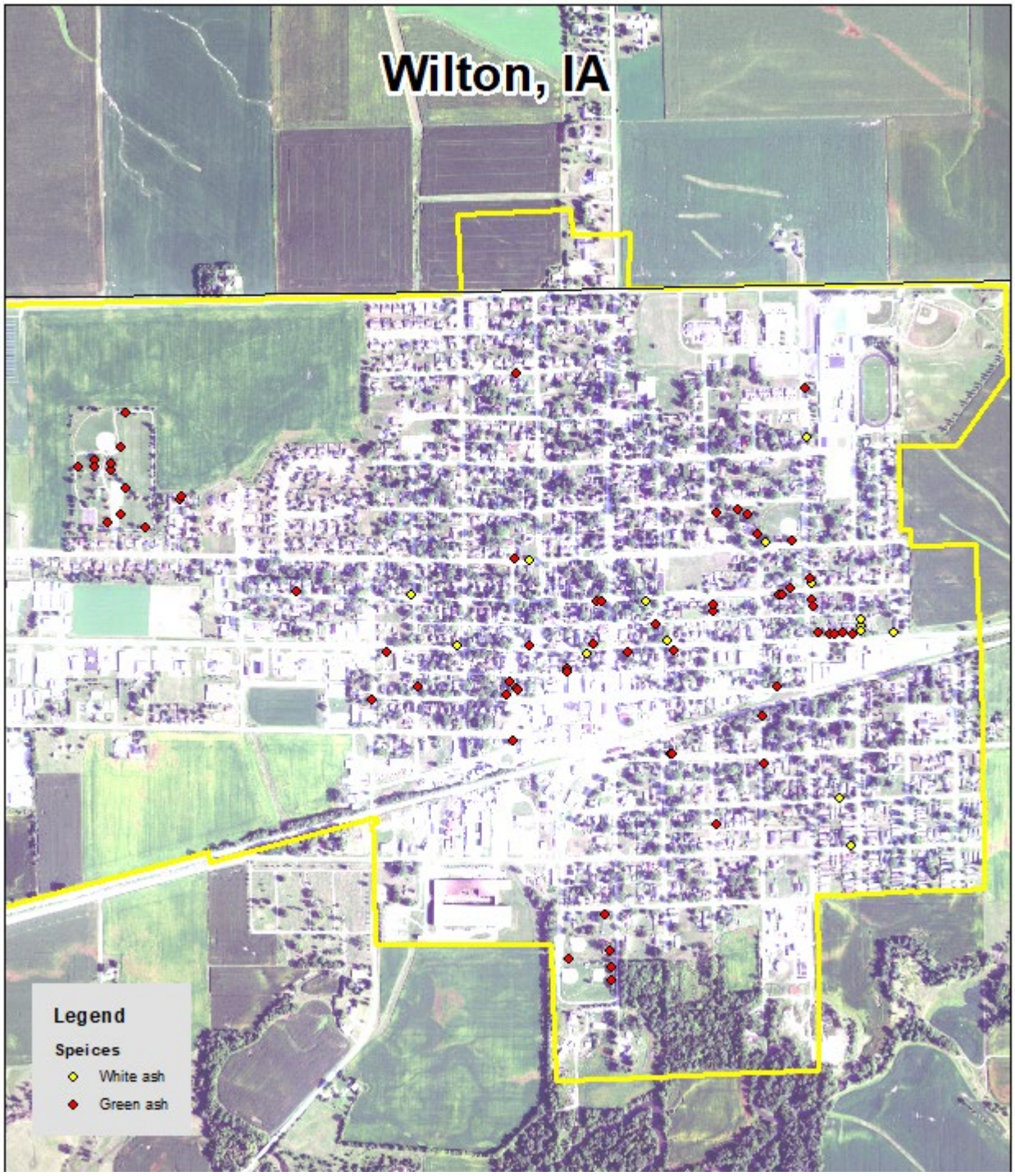

Figure 1: Location of Ash Trees

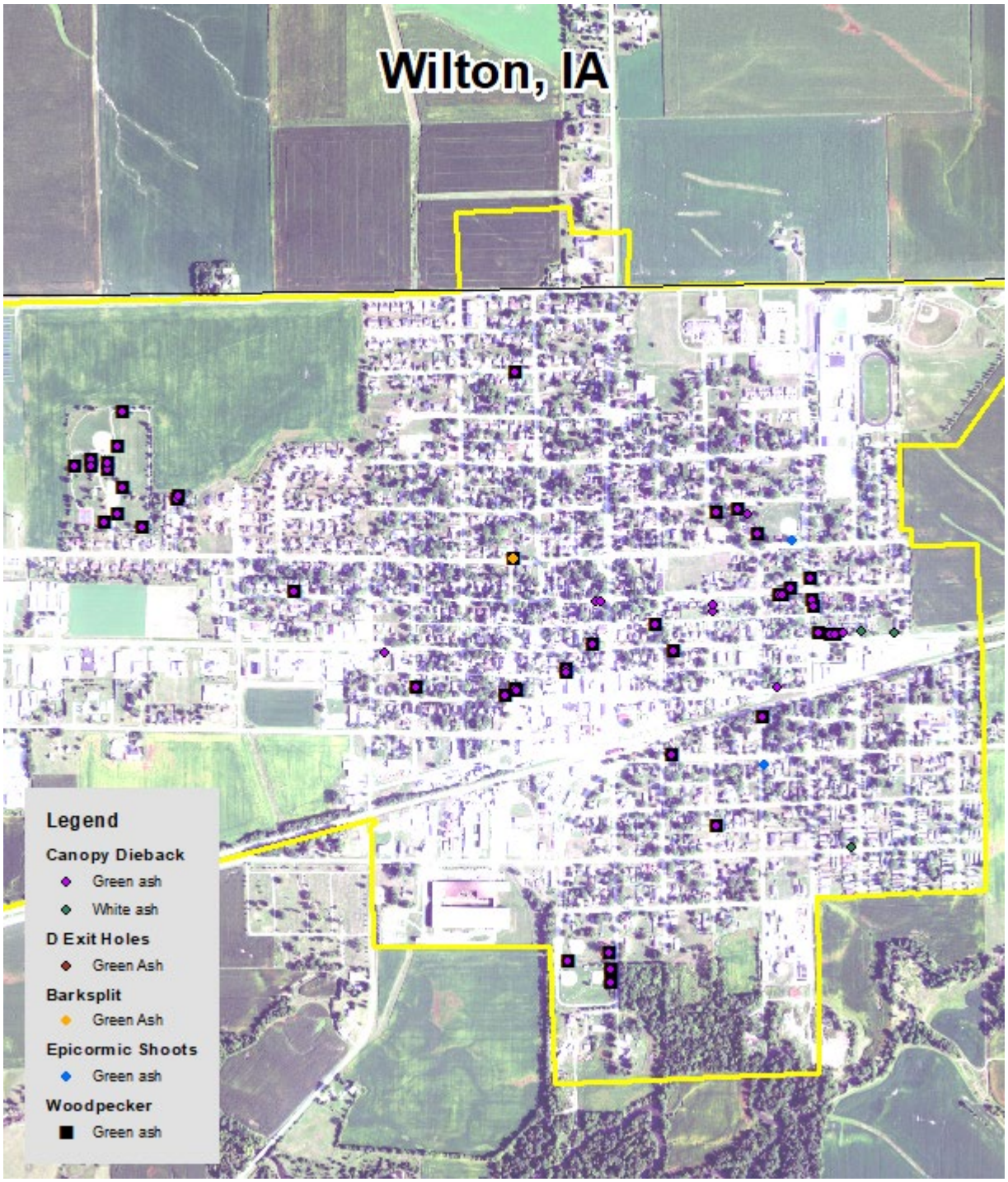

Figure 2: Location of EAB symptoms

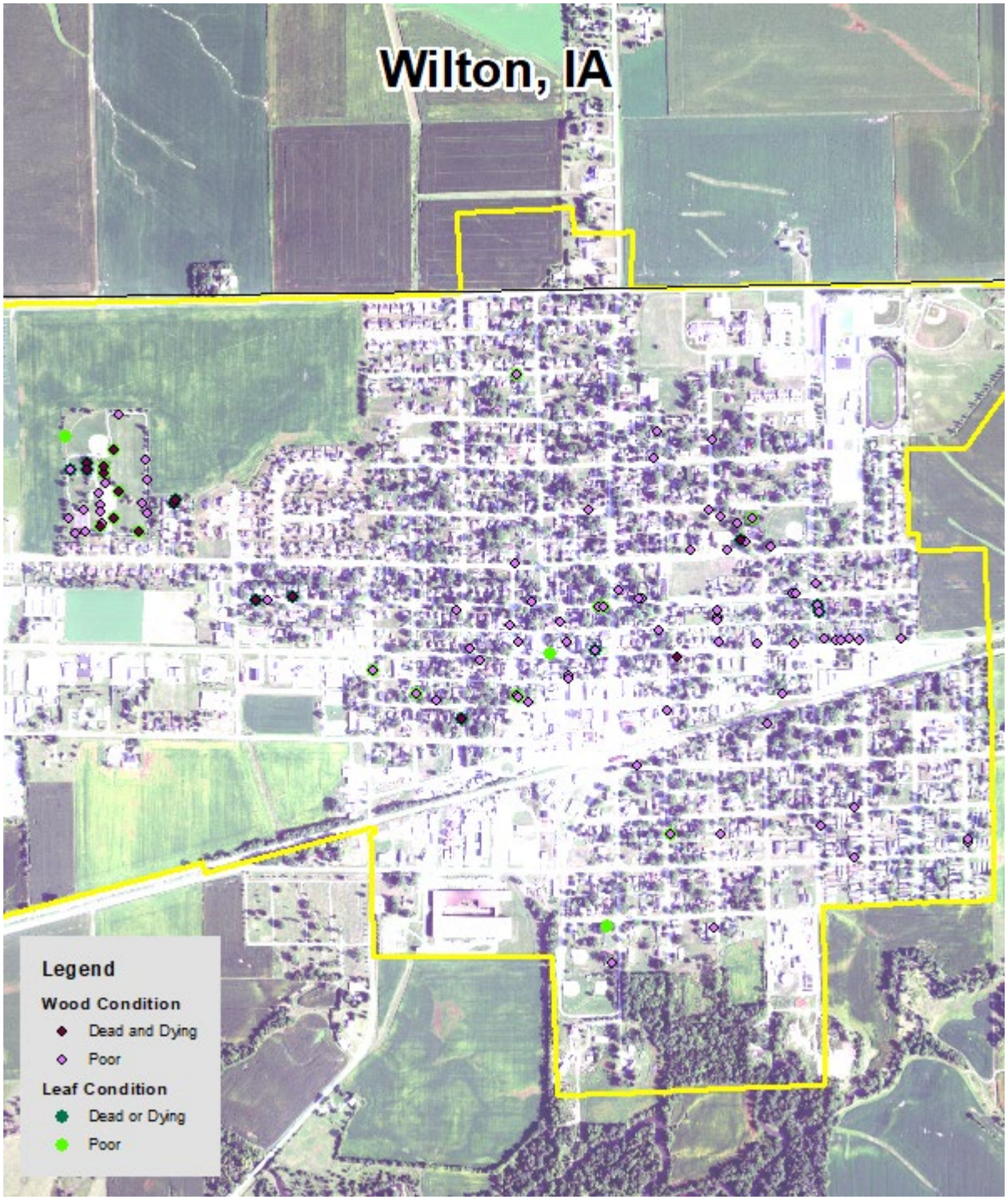
Wilton, IA
Legend
Wood Condition
Dead and Dying
Poor
Leaf Condition
Dead or Dying
Poor

Figure 3: Location of Poor Condition Trees

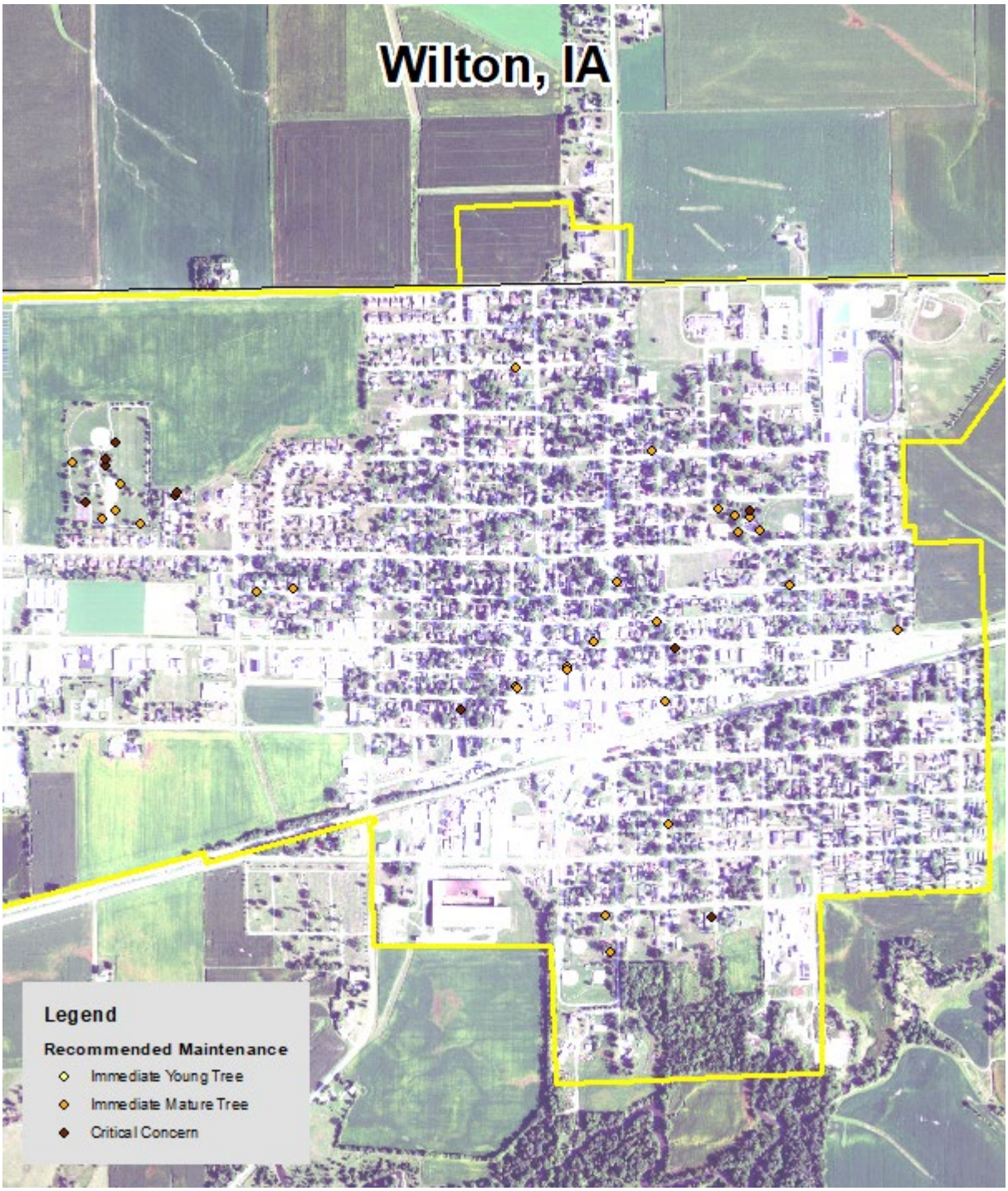

Figure 4: Location of Trees with Recommended Maintenance

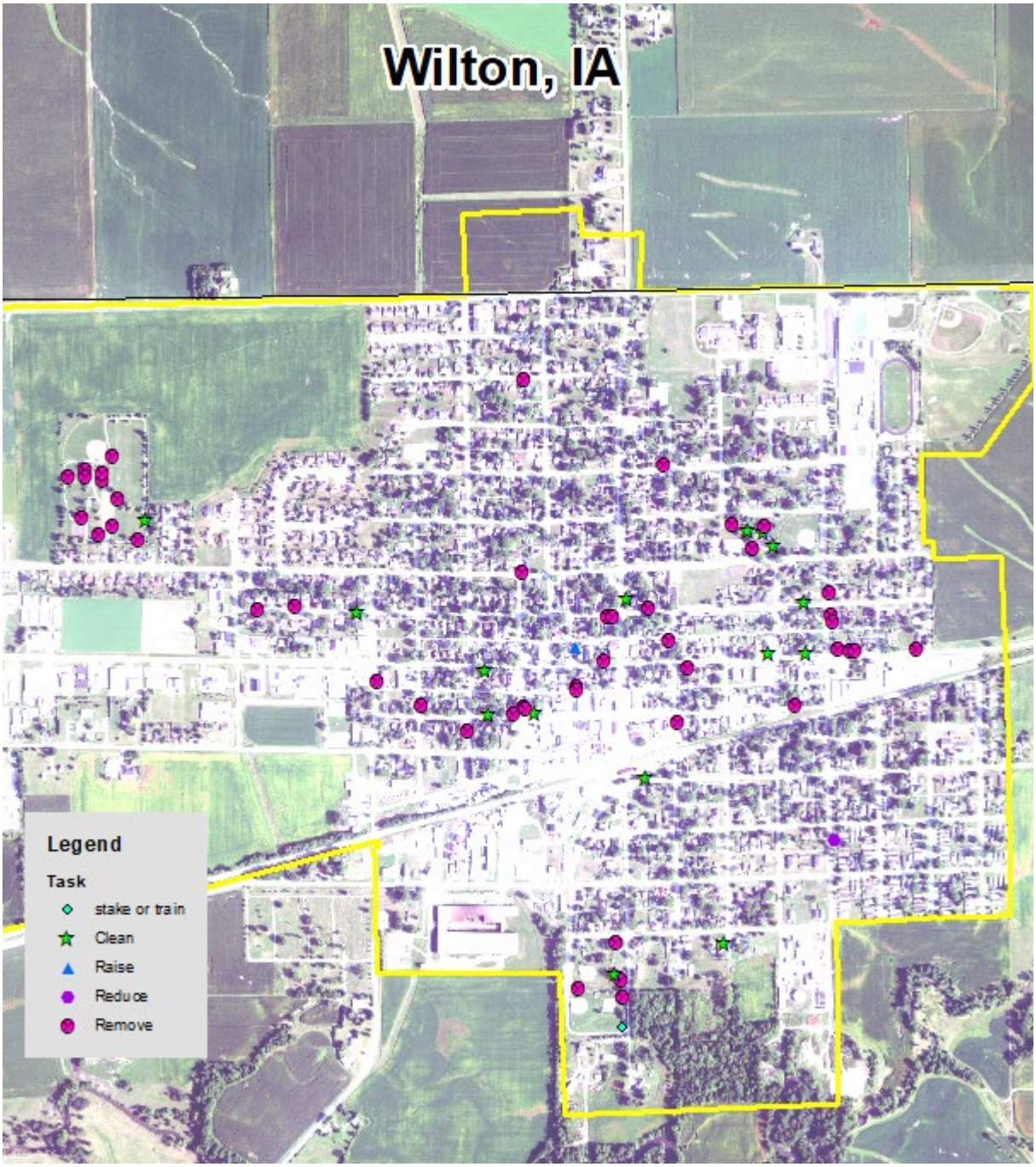

Figure 5: Maintenance Tasks ***City ownership of the trees recommended for removal should be verified prior to any removal***

Appendix C: Wilton Tree Ordinances

Chapter 11.12 - STREET TREES*

Sections:

* Prior ordinance history: Ord. 166.

11.12.010 - Purpose of this chapter.

The purpose of this chapter is to beautify and preserve the appearance of the city by requiring street trees to be uniformly located and maintained. The primary responsibility for maintaining street trees is placed upon the abutting property owner or his agent, but the zoning administrator shall personally supervise any cutting or trimming of these trees.

(Ord. 433 §2(part), 2005).

11.12.020 - Definitions.

For the purpose of this chapter:

"Person" means and includes any individual, firm, corporation, trust, association, or any other organized group.

"Property owner" means and includes a person owning private property in Wilton, Iowa as shown by the county auditor's plat of Muscatine County, Iowa.

"Public property" means and includes any and all property located within the confines of the city and owned or held in the name of the city by any of the departments, commissions or agencies within the city government.

"Right-of-way" means and includes that part of the street or avenue or highway in the city not covered by sidewalk and lying between the lot line and the curb line; or, on paved streets, that part of the street, avenue, or highway lying between the lot line and that portion of the street usually traveled by vehicular traffic.

"Street" means and includes the entire width between property lines of avenues or highways.

(Ord. 433 §2(part), 2005).

11.12.30 - Planting specifications.

Arboricultural specifications and standards of practice shall be as follows:

(1) Spacing. All trees hereafter planted in any street shall be planted midway between the outer line of the sidewalk and the curb. In the event a curb line is not established, trees shall be

planted on a line not less than seven feet nor more than ten feet from the property line.

(2) Planting.

(A) Size. All trees planted on the streets shall be of sufficient size to warrant satisfactory results and stand the abuse common to street trees.

(B) Grade. All trees must be free of insect, disease, mechanical injuries, and other objectionable features at the time of planting. To compensate for any serious loss of roots, the top of the tree should be reduced by thinning or cutting back as determined by the growth characteristics of the tree species. The leader shall not be cut off in such trimming.

(C) Planting. Trees shall not be planted on the right-of-way if it is less than four feet in width, or within twenty feet of an existing tree in the right-of-way. Trees shall not be planted closer than twenty-five feet to street intersections (property lines extended) and ten feet of all public utility easements. No tree shall be planted closer than five feet to a driveway, alley, fire hydrant or water valve. No tree other than those listed as small trees may be planted under or within ten lateral feet of any overhead electrical lines.

(Ord. 433 §2(part), 2005).

11.12.040 - Removal.

The city shall cause to be removed, at city expense, any tree on the streets of this municipality which interferes with the making of improvements thereon which: (1) affect any underground utilities; (2) affect any overhead electrical lines; (3) have become dead or diseased; or (4) have been declared a nuisance. No abutting property owner shall cause a tree to be removed without written permission of the city.

(Ord. 433 §2(part), 2005).

11.12.050 - Trimming—Requirements.

The property owner of the abutting property shall keep the trees on, or overhanging, the street trimmed so that all branches will be at least fifteen feet above the surfaced portion of the street and eight feet above the sidewalks. If the abutting property owner fails to trim the trees as required in this section, the city may serve notice on the abutting property owner requiring that such action be taken within a reasonable time. 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 property taxes.

(Ord. 433 §2(part), 2005).

11.12.060 - Trimming—Supervision.

Except as allowed in Section 11.12.050 of this chapter, no person may trim or cut any tree in a street or public place unless the work is done under the personal supervision of the city administrator.

(Ord. 433 §2(part), 2005).

11.12.70 - Recommended street tree species.

The following constitutes the official tree species for the city. This does not mean it is complete or will remain unchanged; however, it provides a broad selection of trees that show promise as tough, attractive additions to the city landscape. No species other than these may be planted as street trees without permission of the city:

(1) Small:

(A) Flowering crab (fruitless);

(B) Hophornbean;

(C) Amur maple;

(D) Serviceberry;

(E) Japanese pagoda tree;

(F) Hornbean;

(G) Amur corktree;

(H) Red Bud;

(I) Japanese tree lilac;

(J) Howthorn (thornless).

(2) Medium:

(A) Little-leaf linden;

(B) Redmond linden.

(3) Large:

(A) Ginkgo (male);

(B) Red oak;

(C) Swamp white oak;

(D) Hackberry;

(E) White oak;

(F) Black oak;

(G) Basswood;

(H) Maples (hard).

(Ord. 433 §2(part), 2005).

11.12.80 - Prohibited street tree species.

It shall be unlawful to plant any of the following plant species on or adjacent to any street, terrace, avenue or highway in the city:

(1) All evergreen trees and shrub species except those with a mature height of twelve inches or less;

(2) All deciduous shrubs;

(3) All poplars (populus spp) including cottonwood, white poplar, lombardy, poplar and hybrids thereof;

(4) Sycamore (platanus spp) and all cultivars;

(5) Silver maple (acer saccharinum) and all cultivars;

(6) Honey locust (gleditsia triacanthos) and all cultivars;

(7) Catalpa (catalpa speciosa);

(8) Pin oak (quercus palustris);

(9) Box-elder (acer negundo);

(10) Birch (betula spp);

(11) Russian olive (elaeagnus angustifolia);

(12) Female ginkgo (ginkgo biloba);

(13) Willows (salix spp);

(14) Oriental elms (ulmus pumila and U parvifolia);

(15) Red mulberry, white mulberry (morus rubra and morus alba);

(16) All species of ash.

(Ord. 433 §2(part), 2005).

11.12.090 - Planting permit.

No person shall plant a tree in the right-of-way unless a planting permit application has been filed with and approved by the city.

(Ord. 433 §2(part), 2005).

11.12.100 - Locating underground utilities.

Any person granted a permit by the city to plant a tree in the right-of-way shall call the Iowa One Call number (1-800-292-8989) at least forty-eight hours prior to planting in order to verify all underground utilities located in the right-of-way.

(Ord. 433 §2(part), 2005).

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.