

Adel, IA



2019 URBAN FOREST MANAGEMENT PLAN

IOWA DEPARTMENT OF NATURAL RESOURCES



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Executive Summary

Overview

This plan was developed to assist the City of Adel in managing its urban forest, including budgeting and future planning. Trees bring numerous benefits to a community, and sound management helps leaders take advantage of these benefits. Management is especially important now considering the serious threats posed by forest pests like 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 except mountain ash. There is a strong possibility that 18% of Adel's city owned trees (ash) will die once EAB becomes established in the community, unless local leaders begin preventative treatment. 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 2019, JEO conducted a tree inventory 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 547 trees inventoried.

- Adel's trees provide \$78,153 of benefits annually, an average of \$143 a tree
- There are over 35 species of trees
- The top three genera are: Maple 30%, Ash 18%, and Oak 4%
- 60% of trees need some type of management
- 5 trees should be removed

Recommendations

We detail our core recommendations in the Recommendations Section. In the Emerald Ash Borer Plan, we also included management recommendations. Below are some key recommendations.

- Out of the 5 trees needing removal, 0 trees are over 24 inches in diameter at 4.5 ft and must be addressed immediately [*City ownership of the trees recommended for removal should be verified prior to any removal*](#)
- Twenty-two of the 99 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 yearly with a visual survey
- With the current tree care budget provided, it could take 8 years to remove all ash trees including both Emerald Ash borer infested and non-infested trees. We suggest that city officials request a budget increase to \$12,000 annually and apply for grants to plant replacement trees

Introduction

This plan was developed to assist Adel with managing, budgeting, and future planning of their urban forest. Across the state, forestry budgets continue to decrease as a higher percentage of the budgets are devoted to tree removal. With the anticipated 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, treatment, and replacement planting. With proper planning and management of the current canopy in Adel, these costs can be spread out over the years and public safety issues from dead and dying ash trees can be mitigated.

Trees are an important part of Adel's infrastructure and one of the city's greatest assets. The benefits of trees are immense. Trees improve air quality, intercept stormwater runoff, conserve energy, lower traffic speeds, increase property values, reduce crime, improve mental health, and create a desirable place to live, to name just a few. Good urban forestry management will maintain these important benefits for the people of Adel and future generations.

Urban forestry management sets goals and develops management strategies to achieve them. To develop management strategies, a comprehensive public tree inventory must be conducted. The inventory informs maintenance, removal schedules, tree planting, and budgeting. Aligning management actions with the tree inventory results will help meet Adel's urban forestry goals.

Inventory

In 2019, JEO conducted a tree inventory that included 100% of the city-owned trees on both streets and parks. The team collected tree data 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 data collectors' programming 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, for all ash trees, the team noted signs and symptoms associated with EAB including canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

Inventory Results

The data collected for the 547 city trees were entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. Below are results from the i-Tree STREETS analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Adel's trees reduce energy related costs by approximately \$20,792 annually (Appendix A, Table 1). These savings are both in Electricity (99.9 MWh) and in Natural Gas (13,480.6 Therms).

Annual Stormwater Benefits

Adel's trees intercept about 995,175 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$26,969 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 lessens emissions of volatile organic matter (ozone). In Adel, it is estimated that trees remove 1,270 lbs of air pollution (ozone (O₃), particulate matter less than 10 microns (PM₁₀), carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂)) per year with a net value of \$3,599 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Adel, trees sequester about 220,560 lbs of carbon a year with an associated value of \$1,723 (Appendix A, Table 5). In addition, the trees store 3,604,664 lbs of carbon, with a yearly benefit of \$27,035 (Appendix A, Table 4).

Annual Aesthetics Benefits

The 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. Adel receives \$23,860 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, Adel's trees provide \$78,153 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 547 trees in Adel provide approximately \$143 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Adel has over 35 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Maple	166	30%
Ash	99	18%
Apple (Crab)	57	10%
Pear	39	7%
Oak	23	4%
Linden/Basswood	20	4%
Elm	19	4%
Hackberry	13	2%
Spruce	11	2%
Locust	12	2%
Walnut	11	2%
Birch	1	<1%
Redbud	4	<1%
Cottonwood	2	<1%
Cherry	1	<1%
Sycamore	4	<1%
Ginkgo	2	<1%
Willow	1	<1%
Magnolia	2	<1%
Cedar	4	<1%

Age Class

Most of Adel's trees (35%) are between six and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). To prepare for natural mortality and to maintain canopy cover, most trees should be in the smallest size category (a downward slope) indicating youth. Adel'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 urban forest's overall health. The foliage condition results for Adel indicate that 90% of the trees are in good health, with <1% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 83% of Adel's trees are in good health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Eight percent of the tree population's wood condition is in poor health, dead or dying. This 3% 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	192	35%
Crown Raising	15	3%
Tree Staking	2	<1%
Tree Removal	5	<1%
Crown Reduction	3	<1%

Land Use and Location

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

<u>Land Use</u>	
Single family residential	73%
Industrial/Large commercial	13%
Park/vacant/other	9%
Small commercial	3%
Multifamily residential	2%

Recommendations

Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead, dying, or 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, should be removed.

Hazardous trees

Adel has 5 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). We recommend starting with the large diameter critical concern trees first. There are no trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the Work Schedule and Budget 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. There are a total of 22 trees with maintenance needs.

Poor tree species

After removing the critical concern trees, ash trees in poor health should be assessed for removal (Appendix B, Figure 3 & Appendix B, Figure 4). Of the 5 removals, none are ash trees. There are a total of 99 ash trees, and 22 of those have signs and symptoms that have been associated with EAB. In addition, there are 5 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 removes lower branches that are two inches in diameter or larger to provide clearance for pedestrians or vehicles. Crown reduction removes individual limbs from structures or utility wires. We recommend that all trees be pruned on a routine schedule every five to seven years. Please refer to the Work Schedule and Budget for further information.

Planting

Most of the planting over the next five years will replace the trees that are removed. We recommend planting 1.2 trees for every tree removed, since survival rates will not be 100%. 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 Adel.

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 (30%) (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: cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut, as outlined in section 151.03 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.03 (Appendix C).

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. We recommend that ash trees be checked with a visual survey annually 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.

Emerald Ash Borer Plan

Ash Tree Removal

Tree removal will be prioritized by first removing dead, dying, hazardous trees (Appendix B, Figure 4). Next will be all ash in poor condition that display 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 normally disposed of 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 151.03 (Appendix C). The new plantings will be a diverse mix and will not include ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

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 EAB signs and symptoms including 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. City Code 151.11 states “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 Tree Board will notify in writing the owners of such trees. Removal shall be done by said owners at their own expense within sixty (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 cost of removal on the owner’s property tax notice.”

Proposed Work Schedule and Budget

Budget Allowance of \$8,772/Year – (Calculated at \$2/Capita, No Budget Provided)

YEAR 1

ESTIMATED COSTS

Remove 5 trees recommended for immediate removal	\$3,500
Remove 5 ash trees in poor condition	\$3,500
Plant 11 trees in open locations	\$1,650
Visual Survey of EAB Signs/Symptoms	

YEAR 2

Remove 6 ash trees in poor condition	\$4,200
Plant 12 trees in open locations	\$1,800
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

YEAR 3

Remove 10 ash trees in poor condition	\$7,000
Plant 11 trees in open locations	\$1,650
Visual Survey of EAB Signs/Symptoms	

YEAR 4

Remove 6 ash trees	\$4,200
Plant 12 trees in open locations	\$1,800
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

YEAR 5

Remove 10 ash trees	\$7,000
Plant 11 trees in open locations	\$1,650
Visual Survey of EAB Signs/Symptoms	

YEAR 6

Remove 6 ash trees	\$4,200
Plant 12 trees in open locations	\$1,800
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

Estimated costs based on average costs of \$700/tree for removal, \$150/tree for planting and maintenance, and \$15/tree for pruning.

**To remove all ash trees within 6 years, the budget would need to be increased to \$11,550 a year. If the budget were increased to \$10,000 a year all ash could be removed in 7 years.

Proposed Work Schedule with Increased Budget

Budget Allowance of \$12,000/Year – (Budget Increase Suggested to Best Manage City Trees)

YEAR 1

ESTIMATED COSTS

Remove 5 trees recommended for immediate removal	\$3,500
Remove 10 ash trees in poor condition	\$7,000
Plant 10 trees in open locations	\$1,500
Visual Survey of EAB Signs/Symptoms	

YEAR 2

Remove 12 ash trees in poor condition	\$8,400
Plant 5 trees in open locations	\$750
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

YEAR 3

Remove 15 ash trees	\$10,500
Plant 10 trees in open locations	\$1,500
Visual Survey of EAB Signs/Symptoms	

YEAR 4

Remove 12 ash trees	\$8,400
Plant 5 trees in open locations	\$750
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

YEAR 5

Remove 12 ash trees	\$8,400
Plant 24 trees in open locations	\$3,600
Visual Survey of EAB Signs/Symptoms	

YEAR 6

Remove 10 ash trees	\$7,000
Plant 15 trees in open locations	\$2,250
Prune 1/3 of city owned Trees	\$2,745
Visual Survey of EAB Signs/Symptoms	

Proposed Budget Increase

EAB could potentially kill all ash trees in Adel within four years of its arrival. To remove all ash trees within six years, the budget would need to be increased to \$11,550 a year. If the budget were increased to \$10,000 per year, all ash could be removed within 7 years. Additionally, we recommend that Adel 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 considered by many communities is treating 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 removal 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). Eight trees would be selected for treatment, and Adel would still need to find \$8,000 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately \$2,250 a year for treatment and leave \$1,800 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 Adel. 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

Annual Energy Benefits of Public Trees

3/3/2020

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	21.6	1,636	2,826.7	2,770	4,406	(N/A)	17.7	21.2	45.42
Silver maple	20.6	1,565	2,702.8	2,649	4,214	(N/A)	16.3	20.3	47.35
Apple	2.5	188	406.3	398	586	(N/A)	10.4	2.8	10.27
Black maple	9.5	723	1,313.7	1,287	2,010	(N/A)	7.3	9.7	50.26
Pear	1.2	91	192.8	189	280	(N/A)	7.1	1.3	7.17
Norway maple	7.5	570	1,027.7	1,007	1,578	(N/A)	6.8	7.6	42.64
Sugar maple	6.7	511	906.8	889	1,400	(N/A)	5.3	6.7	48.27
Siberian elm	5.0	378	661.0	648	1,026	(N/A)	2.9	4.9	64.11
Swamp white oak	0.4	27	50.6	50	77	(N/A)	2.6	0.4	5.49
Littleleaf linden	2.2	171	306.0	300	470	(N/A)	2.6	2.3	33.60
Northern hackberry	4.0	305	563.0	552	857	(N/A)	2.4	4.1	65.91
Honeylocust	3.0	225	386.9	379	604	(N/A)	2.2	2.9	50.34
Black walnut	3.0	226	397.5	390	616	(N/A)	2.0	3.0	56.00
Northern red oak	1.0	75	139.6	137	212	(N/A)	2.0	1.0	19.25
Pin oak	2.0	150	271.7	266	417	(N/A)	1.5	2.0	52.07
Black spruce	0.1	10	23.0	23	33	(N/A)	1.3	0.2	4.67
Red maple	1.1	87	138.2	135	222	(N/A)	1.3	1.1	31.78
American basswood	1.8	136	263.8	259	394	(N/A)	1.1	1.9	65.71
American sycamore	1.8	136	238.9	234	370	(N/A)	0.7	1.8	92.58
Eastern redbud	0.3	23	48.9	48	71	(N/A)	0.7	0.3	17.65
Eastern red cedar	0.4	34	65.8	64	98	(N/A)	0.7	0.5	24.57
American elm	1.6	124	203.5	199	323	(N/A)	0.5	1.6	107.75
Broadleaf Deciduous Sm:	0.0	1	1.9	2	3	(N/A)	0.5	0.0	0.87
Norway spruce	0.0	3	7.9	8	11	(N/A)	0.4	0.1	5.61
Blue spruce	0.0	3	6.1	6	9	(N/A)	0.4	0.0	4.29
Ginkgo	0.2	13	19.3	19	32	(N/A)	0.4	0.2	16.01
White ash	0.4	30	56.3	55	86	(N/A)	0.4	0.4	42.85
Eastern cottonwood	0.7	50	93.7	92	142	(N/A)	0.4	0.7	70.91
White oak	0.6	45	85.0	83	128	(N/A)	0.4	0.6	64.12
Plum	0.0	2	4.4	4	6	(N/A)	0.4	0.0	3.13
Bur oak	0.5	36	54.0	53	88	(N/A)	0.4	0.4	44.23
Southern magnolia	0.0	2	5.7	6	8	(N/A)	0.4	0.0	3.94
Pussy willow	0.0	2	3.8	4	5	(N/A)	0.2	0.0	5.40
Maple	0.0	0	0.7	1	1	(N/A)	0.2	0.0	1.03
River birch	0.0	3	6.2	6	9	(N/A)	0.2	0.0	8.99
Common chokecherry	0.0	0	0.6	1	1	(N/A)	0.2	0.0	0.87
Total	99.9	7,581	13,480.6	13,211	20,792	(N/A)	100.0	100.0	38.01

Table 2: Annual Stormwater Benefits

Annual Stormwater Benefits of Public Trees						
3/3/2020						
Species	Totalrainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	193,369	5,246	(N/A)	17.7	19.3	54.08
Silver maple	278,678	7,552	(N/A)	16.3	28.0	84.86
Apple	8,571	232	(N/A)	10.4	0.9	4.07
Black maple	87,212	2,363	(N/A)	7.3	8.8	59.09
Pear	4,081	111	(N/A)	7.1	0.4	2.84
Norway maple	52,720	1,429	(N/A)	6.8	5.3	38.61
Sugar maple	70,726	1,917	(N/A)	5.3	7.1	66.09
Siberian elm	51,306	1,390	(N/A)	2.9	5.2	86.90
Swamp white oak	1,869	51	(N/A)	2.6	0.2	3.62
Littleleaf linden	18,698	507	(N/A)	2.6	1.9	36.19
Northern hackberry	41,764	1,132	(N/A)	2.4	4.2	87.06
Honeylocust	30,627	830	(N/A)	2.2	3.1	69.17
Black walnut	30,719	832	(N/A)	2.0	3.1	75.68
Northern red oak	7,091	192	(N/A)	2.0	0.7	17.47
Pin oak	17,114	464	(N/A)	1.5	1.7	57.97
Black spruce	1,140	31	(N/A)	1.3	0.1	4.41
Red maple	7,064	191	(N/A)	1.3	0.7	27.35
American basswood	20,216	548	(N/A)	1.1	2.0	91.31
American sycamore	27,207	737	(N/A)	0.7	2.7	184.33
Eastern redbud	1,515	41	(N/A)	0.7	0.2	10.26
Eastern red cedar	6,538	177	(N/A)	0.7	0.7	44.30
American elm	13,653	370	(N/A)	0.5	1.4	123.33
Broadleaf Deciduous Small	22	1	(N/A)	0.5	0.0	0.20
Norway spruce	426	12	(N/A)	0.4	0.0	5.77
Blue spruce	295	8	(N/A)	0.4	0.0	3.99
Ginkgo	725	20	(N/A)	0.4	0.1	9.82
White ash	3,839	104	(N/A)	0.4	0.4	52.02
Eastern cottonwood	7,886	214	(N/A)	0.4	0.8	106.85
White oak	6,534	177	(N/A)	0.4	0.7	88.53
Plum	76	2	(N/A)	0.4	0.0	1.03
Bur oak	2,931	79	(N/A)	0.4	0.3	39.72
Southern magnolia	113	3	(N/A)	0.4	0.0	1.53
Pussy willow	69	2	(N/A)	0.2	0.0	1.86
Maple	12	0	(N/A)	0.2	0.0	0.32
River birch	163	4	(N/A)	0.2	0.0	4.41
Common chokecherry	7	0	(N/A)	0.2	0.0	0.20
Citywide total	995,175	26,969	(N/A)	100.0	100.0	49.30

Table 3: Annual Air Quality Benefits

Annual Air Quality Benefits of Public Trees

3/3/2020

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								
Green ash	20.7	3.3	10.5	0.9	112	101.8	14.9	14.2	97.7	637	0.0	0	264.1	749 (N/A)	17.7	7.72	
Silver maple	46.5	7.9	23.1	2.1	251	97.1	14.2	13.6	93.3	608	-25.4	-95	272.4	764 (N/A)	16.3	8.59	
Apple	1.6	0.3	0.9	0.1	9	12.4	1.8	1.7	11.2	76	0.0	0	29.8	84 (N/A)	10.4	1.48	
Black maple	21.6	3.7	10.0	1.0	115	45.5	6.6	6.3	43.1	283	-7.2	-27	130.7	372 (N/A)	7.3	9.29	
Pear	0.8	0.1	0.4	0.0	4	6.0	0.8	0.8	5.4	36	0.0	0	14.4	41 (N/A)	7.1	1.05	
Norway maple	8.9	1.5	4.6	0.4	49	35.9	5.2	5.0	34.1	224	-2.3	-8	93.5	264 (N/A)	6.8	7.14	
Sugar maple	9.1	1.5	4.6	0.4	49	32.0	4.7	4.5	30.5	200	-7.1	-27	80.0	222 (N/A)	5.3	7.65	
Siberian elm	8.5	1.5	4.2	0.4	46	23.6	3.4	3.3	22.6	147	0.0	0	67.4	193 (N/A)	2.9	12.08	
Swamp white oak	0.2	0.0	0.1	0.0	1	1.7	0.3	0.2	1.6	11	-0.1	0	4.2	12 (N/A)	2.6	0.85	
Littleleaf linden	2.8	0.5	1.4	0.1	15	10.7	1.6	1.5	10.2	67	-1.4	-5	27.4	77 (N/A)	2.6	5.48	
Northern hackberry	6.9	1.2	3.5	0.3	38	19.3	2.8	2.7	18.2	120	0.0	0	54.9	158 (N/A)	2.4	12.13	
Honeylocust	5.9	1.0	2.7	0.3	31	13.9	2.0	2.0	13.4	87	-4.5	-17	36.7	102 (N/A)	2.2	8.48	
Black walnut	3.6	0.6	1.8	0.2	19	14.1	2.1	2.0	13.5	88	0.0	0	37.9	108 (N/A)	2.0	9.80	
Northern red oak	1.2	0.2	0.7	0.1	7	4.7	0.7	0.7	4.5	29	-1.8	-7	11.0	30 (N/A)	2.0	2.70	
Pin oak	2.5	0.4	1.4	0.1	14	9.5	1.4	1.3	9.0	59	-4.8	-18	20.6	55 (N/A)	1.5	6.81	
Black spruce	0.1	0.0	0.1	0.0	0	0.7	0.1	0.1	0.6	4	-0.3	-1	1.3	4 (N/A)	1.3	0.51	
Red maple	1.4	0.2	0.7	0.1	7	5.3	0.8	0.8	5.2	33	-0.5	-2	13.9	39 (N/A)	1.3	5.56	
American basswood	2.7	0.5	1.3	0.1	15	8.7	1.3	1.2	8.1	54	-2.3	-9	21.6	60 (N/A)	1.1	9.98	
American sycamore	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)	0.7	19.96	
Eastern redbud	0.5	0.1	0.2	0.0	3	1.5	0.2	0.2	1.4	9	0.0	0	4.1	12 (N/A)	0.7	2.93	
Eastern red cedar	1.4	0.3	1.1	0.2	9	2.2	0.3	0.3	2.0	13	-3.6	-14	4.1	9 (N/A)	0.7	2.19	
American elm	5.4	0.9	2.5	0.2	28	7.6	1.1	1.1	7.4	48	0.0	0	26.2	76 (N/A)	0.5	25.43	
Broadleaf Deciduous Small	0.0	0.0	0.0	0.0	0	0.1	0.0	0.0	0.0	0	0.0	0	0.1	0 (N/A)	0.5	0.11	
Norway spruce	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	-0.1	0	0.4	1 (N/A)	0.4	0.56	
Blue spruce	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	-0.1	0	0.4	1 (N/A)	0.4	0.47	
Ginkgo	0.1	0.0	0.1	0.0	1	0.8	0.1	0.1	0.8	5	0.0	0	2.0	6 (N/A)	0.4	2.76	
White ash	0.4	0.1	0.2	0.0	2	1.9	0.3	0.3	1.8	12	0.0	0	5.0	14 (N/A)	0.4	7.04	
Eastern cottonwood	1.0	0.2	0.5	0.0	5	3.2	0.5	0.4	3.0	20	0.0	0	8.7	25 (N/A)	0.4	12.48	
White oak	0.8	0.1	0.4	0.0	4	2.9	0.4	0.4	2.7	18	0.0	0	7.6	22 (N/A)	0.4	10.91	
Plum	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)	0.4	0.41	
Bur oak	0.2	0.0	0.1	0.0	1	2.1	0.3	0.3	2.1	14	0.0	0	5.3	15 (N/A)	0.4	7.42	
Southern magnolia	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.1	1	0.0	0	0.3	1 (N/A)	0.4	0.47	
Pussy willow	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)	0.2	0.71	
Maple	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)	0.2	0.13	
River birch	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.4	1 (N/A)	0.2	1.21	
Common chokecherry	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)	0.2	0.11	

Table 4: Annual Carbon Stored

Annual CO₂ Benefits of Public Trees

3/3/2020

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
Green ash	47,504	356	-3,274	-214	-26	36,152	271	80,168	601(N/A)	17.7	20.5	6.20	
Silver maple	82,577	619	-5,268	-229	-41	34,594	259	111,675	838(N/A)	16.3	28.5	9.41	
Apple	3,885	29	-146	-43	-1	4,144	31	7,840	59(N/A)	10.4	2.0	1.03	
Black maple	13,807	104	-1,118	-90	-9	15,975	120	28,574	214(N/A)	7.3	7.3	5.36	
Pear	1,915	14	-71	-22	-1	2,002	15	3,823	29(N/A)	7.1	1.0	0.74	
Norway maple	12,758	96	-713	-70	-6	12,606	95	24,580	184(N/A)	6.8	6.3	4.98	
Sugar maple	14,475	109	-1,237	-72	-10	11,294	85	24,460	183(N/A)	5.3	6.2	6.33	
Siberian elm	9,163	69	-1,008	-52	-8	8,353	63	16,456	123(N/A)	2.9	4.2	7.71	
Swamp white oak	637	5	-22	-5	0	603	5	1,212	9(N/A)	2.6	0.3	0.65	
Littleleaf linden	6,837	51	-290	-26	-2	3,768	28	10,290	77(N/A)	2.6	2.6	5.51	
Northern hackberry	5,096	38	-523	-39	-4	6,745	51	11,279	85(N/A)	2.4	2.9	6.51	
Honeylocust	9,733	73	-362	-24	-3	4,969	37	14,317	107(N/A)	2.2	3.7	8.95	
Black walnut	6,792	51	-572	-30	-5	5,004	38	11,194	84(N/A)	2.0	2.9	7.63	
Northern red oak	1,458	11	-116	-12	-1	1,657	12	2,986	22(N/A)	2.0	0.8	2.04	
Pin oak	6,418	48	-289	-20	-2	3,323	25	9,432	71(N/A)	1.5	2.4	8.84	
Black spruce	53	0	-1	-3	0	225	2	274	2(N/A)	1.3	0.1	0.29	
Red maple	2,104	16	-75	-9	-1	1,923	14	3,942	30(N/A)	1.3	1.0	4.22	
American basswood	5,908	44	-479	-21	-4	3,000	22	8,408	63(N/A)	1.1	2.1	10.51	
American sycamore	2,829	21	-850	-21	-7	3,010	23	4,968	37(N/A)	0.7	1.3	9.32	
Eastern redbud	639	5	-38	-5	0	502	4	1,098	8(N/A)	0.7	0.3	2.06	
Eastern red cedar	129	1	-21	-8	0	747	6	847	6(N/A)	0.7	0.2	1.59	
American elm	2,015	15	-491	-16	-4	2,736	21	4,244	32(N/A)	0.5	1.1	10.61	
Broadleaf Deciduous Sn	26	0	0	-1	0	17	0	42	0(N/A)	0.5	0.0	0.10	
Norway spruce	36	0	0	-1	0	76	1	110	1(N/A)	0.4	0.0	0.41	
Blue spruce	14	0	0	-1	0	59	0	72	1(N/A)	0.4	0.0	0.27	
Ginkgo	136	1	-9	-2	0	289	2	415	3(N/A)	0.4	0.1	1.55	
White ash	1,027	8	-46	-4	0	674	5	1,651	12(N/A)	0.4	0.4	6.19	
Eastern cottonwood	1,714	13	-151	-7	-1	1,105	8	2,660	20(N/A)	0.4	0.7	9.97	
White oak	1,517	11	-116	-6	-1	994	7	2,388	18(N/A)	0.4	0.6	8.95	
Plum	47	0	-1	-1	0	43	0	88	1(N/A)	0.4	0.0	0.33	
Bur oak	891	7	-35	-4	0	786	6	1,637	12(N/A)	0.4	0.4	6.14	
Southern magnolia	3	0	0	0	0	51	0	54	0(N/A)	0.4	0.0	0.20	
Pussy willow	38	0	-1	-1	0	37	0	74	1(N/A)	0.2	0.0	0.55	

Table 5: Annual Carbon Sequestered

Stored CO₂ Benefits of Public Trees

3/3/2020

Species	Total Stored CO ₂ (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	682,018	5,115 (N/A)	17.7	18.9	32.73	
Silver maple	1,094,464	8,208 (N/A)	16.3	30.4	92.23	
Apple	30,288	227 (N/A)	10.4	0.8	3.99	
Black maple	232,840	1,746 (N/A)	7.3	6.5	43.66	
Pear	14,647	110 (N/A)	7.1	0.4	2.82	
Norway maple	148,371	1,113 (N/A)	6.8	4.1	30.08	
Sugar maple	257,475	1,931 (N/A)	5.3	7.1	66.59	
Siberian elm	209,936	1,575 (N/A)	2.9	5.8	98.41	
Swamp white oak	4,246	32 (N/A)	2.6	0.1	2.27	
Littleleaf linden	60,301	452 (N/A)	2.6	1.7	32.30	
Northern hackberry	108,807	816 (N/A)	2.4	3.0	62.77	
Honeylocust	75,323	565 (N/A)	2.2	2.1	47.08	
Black walnut	119,214	894 (N/A)	2.0	3.3	81.28	
Northern red oak	24,181	181 (N/A)	2.0	0.7	16.49	
Pin oak	60,110	451 (N/A)	1.5	1.7	56.35	
Black spruce	178	1 (N/A)	1.3	0.0	0.19	
Red maple	15,631	117 (N/A)	1.3	0.4	16.75	
American basswood	99,769	748 (N/A)	1.1	2.8	124.71	
American sycamore	177,166	1,329 (N/A)	0.7	4.9	332.19	
Eastern redbud	7,842	59 (N/A)	0.7	0.2	14.70	
Eastern red cedar	4,408	33 (N/A)	0.7	0.1	8.27	
American elm	102,257	767 (N/A)	0.5	2.8	255.64	
Broadleaf Deciduous	41	0 (N/A)	0.5	0.0	0.10	
Norway spruce	76	1 (N/A)	0.4	0.0	0.29	
Blue spruce	45	0 (N/A)	0.4	0.0	0.17	
Ginkgo	1,791	13 (N/A)	0.4	0.0	6.72	
White ash	9,492	71 (N/A)	0.4	0.3	35.60	
Eastern cottonwood	31,546	237 (N/A)	0.4	0.9	118.30	
White oak	24,230	182 (N/A)	0.4	0.7	90.86	
Plum	192	1 (N/A)	0.4	0.0	0.72	
Bur oak	7,344	55 (N/A)	0.4	0.2	27.54	
Southern magnolia	6	0 (N/A)	0.4	0.0	0.02	
Pussy willow	178	1 (N/A)	0.2	0.0	1.33	
Maple	17	0 (N/A)	0.2	0.0	0.13	
River birch	218	2 (N/A)	0.2	0.0	1.64	
Common chokeche	14	0 (N/A)	0.2	0.0	0.10	
Citywide total	3,604,664	27,035 (N/A)	100.0	100.0	49.42	

Table 6: Annual Social and Aesthetic Benefits

Annual Aesthetic/Other Benefits of Public Trees					
3/3/2020					
Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	4,446	(N/A)	17.7	18.6	45.83
Silver maple	6,868	(N/A)	16.3	28.8	77.17
Apple	212	(N/A)	10.4	0.9	3.72
Black maple	1,753	(N/A)	7.3	7.3	43.82
Pear	99	(N/A)	7.1	0.4	2.54
Norway maple	1,297	(N/A)	6.8	5.4	35.06
Sugar maple	1,528	(N/A)	5.3	6.4	52.70
Siberian elm	670	(N/A)	2.9	2.8	41.87
Swamp white oak	95	(N/A)	2.6	0.4	6.79
Littleleaf linden	730	(N/A)	2.6	3.1	52.15
Northern hackberry	674	(N/A)	2.4	2.8	51.84
Honeylocust	2,346	(N/A)	2.2	9.8	195.50
Black walnut	582	(N/A)	2.0	2.4	52.95
Northern red oak	141	(N/A)	2.0	0.6	12.81
Pink oak	587	(N/A)	1.5	2.5	73.42
Black spruce	64	(N/A)	1.3	0.3	9.19
Red maple	293	(N/A)	1.3	1.2	41.92
American basswood	424	(N/A)	1.1	1.8	70.61
American sycamore	182	(N/A)	0.7	0.8	45.52
Eastern redbud	37	(N/A)	0.7	0.2	9.32
Eastern red cedar	41	(N/A)	0.7	0.2	10.26
American elm	248	(N/A)	0.5	1.0	82.62
Broadleaf Deciduous Small	0	(N/A)	0.5	0.0	0.03
Norway spruce	14	(N/A)	0.4	0.1	6.83
Blue spruce	17	(N/A)	0.4	0.1	8.67
Ginkgo	12	(N/A)	0.4	0.1	6.22
White ash	135	(N/A)	0.4	0.6	67.39
Eastern cottonwood	131	(N/A)	0.4	0.5	65.59
White oak	123	(N/A)	0.4	0.5	61.64
Plum	2	(N/A)	0.4	0.0	1.05
Bur oak	92	(N/A)	0.4	0.4	45.86
Southern magnolia	0	(N/A)	0.4	0.0	0.01
Pussy willow	2	(N/A)	0.2	0.0	2.06
Maple	0	(N/A)	0.2	0.0	0.04
River birch	13	(N/A)	0.2	0.1	12.89
Common chokecherry	0	(N/A)	0.2	0.0	0.03
Citywide total	23,860	(N/A)	100.0	100.0	43.62

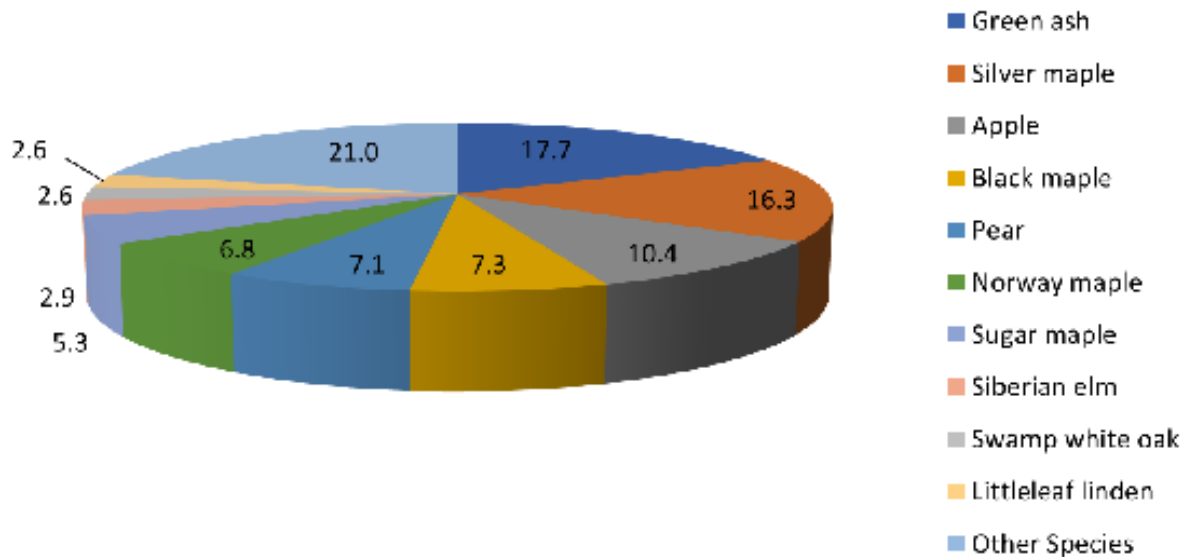
Table 7: Summary of Benefits in Dollars
Annual Benefits of Public Trees by Species (\$/tree)

3/3/2020

Species	Energy	CO ₂	Air Quality	Stomwater	Aesthetic/Other	Total (\$)	Standard Error
Green ash	45.42	6.20	7.72	54.08	45.83	159.25	(N/A)
Silver maple	47.35	9.41	8.59	84.86	77.17	227.37	(N/A)
Apple	10.27	1.03	1.48	4.07	3.72	20.58	(N/A)
Black maple	50.26	5.36	9.29	59.09	43.82	167.81	(N/A)
Pear	7.17	0.74	1.05	2.84	2.54	14.32	(N/A)
Norway maple	42.64	4.98	7.14	38.61	35.06	128.44	(N/A)
Sugar maple	48.27	6.33	7.65	66.09	52.70	181.04	(N/A)
Siberian elm	64.11	7.71	12.08	86.90	41.87	212.67	(N/A)
Swamp white oak	5.49	0.65	0.85	3.62	6.79	17.39	(N/A)
Littleleaf linden	33.60	5.51	5.48	36.19	52.15	132.94	(N/A)
Northern hackberry	65.91	6.51	12.13	87.06	51.84	223.46	(N/A)
Honeylocust	50.34	8.95	8.48	69.17	195.50	332.43	(N/A)
Black walnut	56.00	7.63	9.80	75.68	52.95	202.06	(N/A)
Northern red oak	19.25	2.04	2.70	17.47	12.81	54.27	(N/A)
Pin oak	52.07	8.84	6.81	57.97	73.42	199.12	(N/A)
Black spruce	4.67	0.29	0.51	4.41	9.19	19.08	(N/A)
Red maple	31.78	4.22	5.56	27.35	41.92	110.83	(N/A)
American basswood	65.71	10.51	9.98	91.31	70.61	248.12	(N/A)
American sycamore	92.58	9.32	19.96	184.33	45.52	351.70	(N/A)
Eastern redbud	17.65	2.06	2.93	10.26	9.32	42.22	(N/A)
Eastern red cedar	24.57	1.59	2.19	44.30	10.26	82.90	(N/A)
American elm	107.75	10.61	25.43	123.33	82.62	349.74	(N/A)
Broadleaf Deciduou	0.87	0.10	0.11	0.20	0.03	1.31	(N/A)
Norway spruce	5.61	0.41	0.56	5.77	6.83	19.18	(N/A)
Blue spruce	4.29	0.27	0.47	3.99	8.67	17.69	(N/A)
Ginkgo	16.01	1.55	2.76	9.82	6.22	36.37	(N/A)
White ash	42.85	6.19	7.04	52.02	67.39	175.50	(N/A)
Eastern cottonwood	70.91	9.97	12.48	106.85	65.59	265.81	(N/A)
White oak	64.12	8.95	10.91	88.53	61.64	234.15	(N/A)
Plum	3.13	0.33	0.41	1.03	1.05	5.95	(N/A)
Bur oak	44.23	6.14	7.42	39.72	45.86	143.36	(N/A)
Southern magnolia	3.94	0.20	0.47	1.53	0.01	6.15	(N/A)
Pussy willow	5.40	0.55	0.71	1.86	2.06	10.58	(N/A)
Maple	1.03	0.07	0.13	0.32	0.04	1.58	(N/A)
River birch	8.99	1.18	1.21	4.41	12.89	28.68	(N/A)
Common chokecher	0.87	0.10	0.11	0.20	0.03	1.31	(N/A)
Citywide Total	38.01	5.37	6.57	49.30	43.62	142.88	(N/A)

Species Distribution of Public Trees

3/3/2020

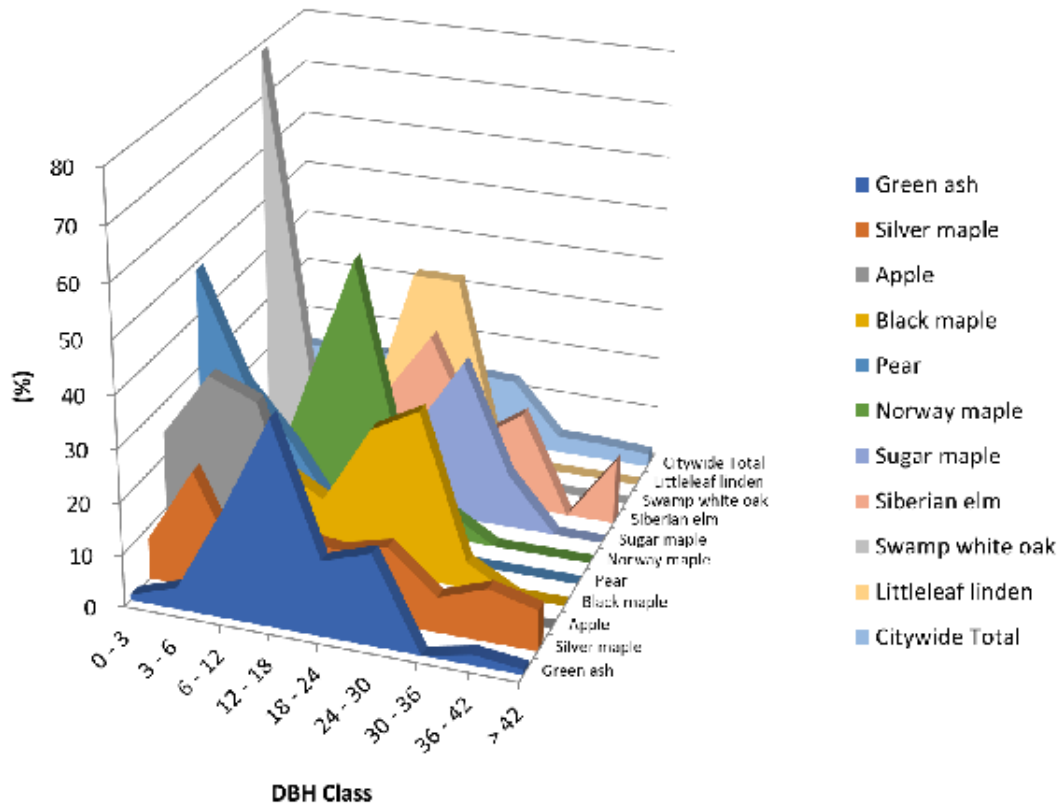


Species	Percent
Green ash	17.7
Silver maple	16.3
Apple	10.4
Black maple	7.3
Pear	7.1
Norway maple	6.8
Sugar maple	5.3
Siberian elm	2.9
Swamp white oak	2.6
Littleleaf linden	2.6
Other Species	21.0
Total	100.0

Figure 1: Species Distribution

Relative Age Distribution of Top 10 Public Tree Species for All Zones (%)

3/3/2020



Species	DBH class (in)									
	0-3	3-6	6-12	12-18	18-24	24-30	30-36	36-42	> 42	
Green ash	1.03	4.12	20.62	39.18	14.43	17.53	0.00	2.06	1.03	
Silver maple	7.87	22.47	4.49	13.48	12.36	14.61	6.74	10.11	7.87	
Apple	24.56	36.84	33.33	5.26	0.00	0.00	0.00	0.00	0.00	
Black maple	0.00	5.00	17.50	12.50	27.50	32.50	5.00	0.00	0.00	
Pear	48.72	28.21	17.95	5.13	0.00	0.00	0.00	0.00	0.00	
Norway maple	0.00	2.70	27.03	51.35	13.51	5.41	0.00	0.00	0.00	
Sugar maple	10.34	6.90	6.90	17.24	17.24	31.03	10.34	0.00	0.00	
Siberian elm	0.00	0.00	6.25	18.75	31.25	12.50	18.75	0.00	12.50	
Swamp white oak	78.57	14.29	0.00	7.14	0.00	0.00	0.00	0.00	0.00	
Littleleaf linden	14.29	7.14	7.14	35.71	35.71	0.00	0.00	0.00	0.00	
Citywide Total	14.44	14.44	14.81	20.66	13.53	13.16	3.29	3.11	2.56	

Figure 2: Relative Age Class

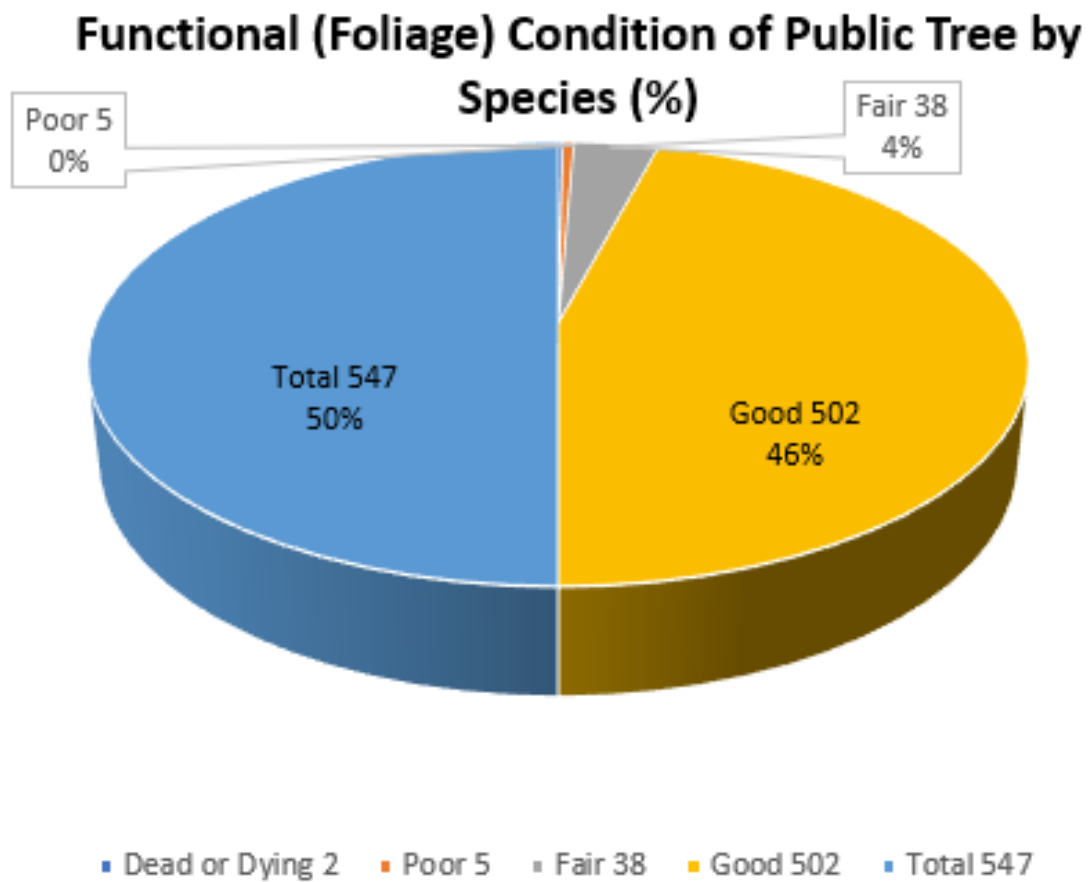


Figure 3: Foliage Condition

Structural (Woody) Condition of Public Trees by Species (%)

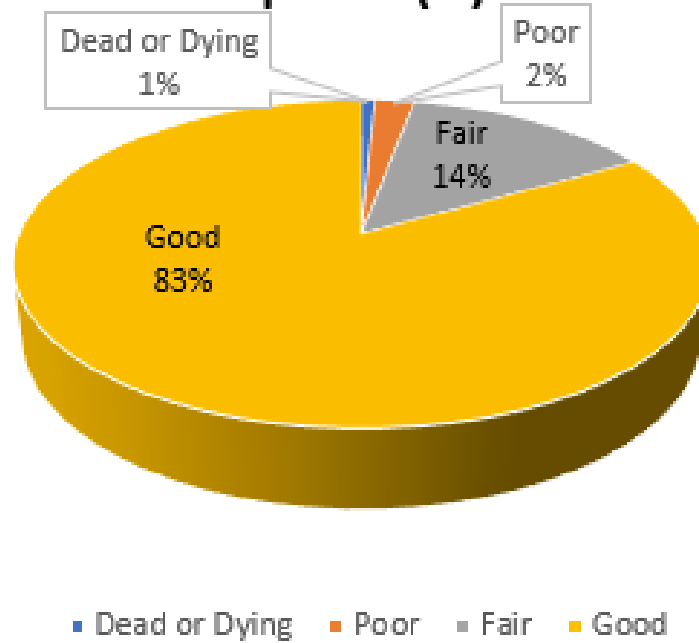
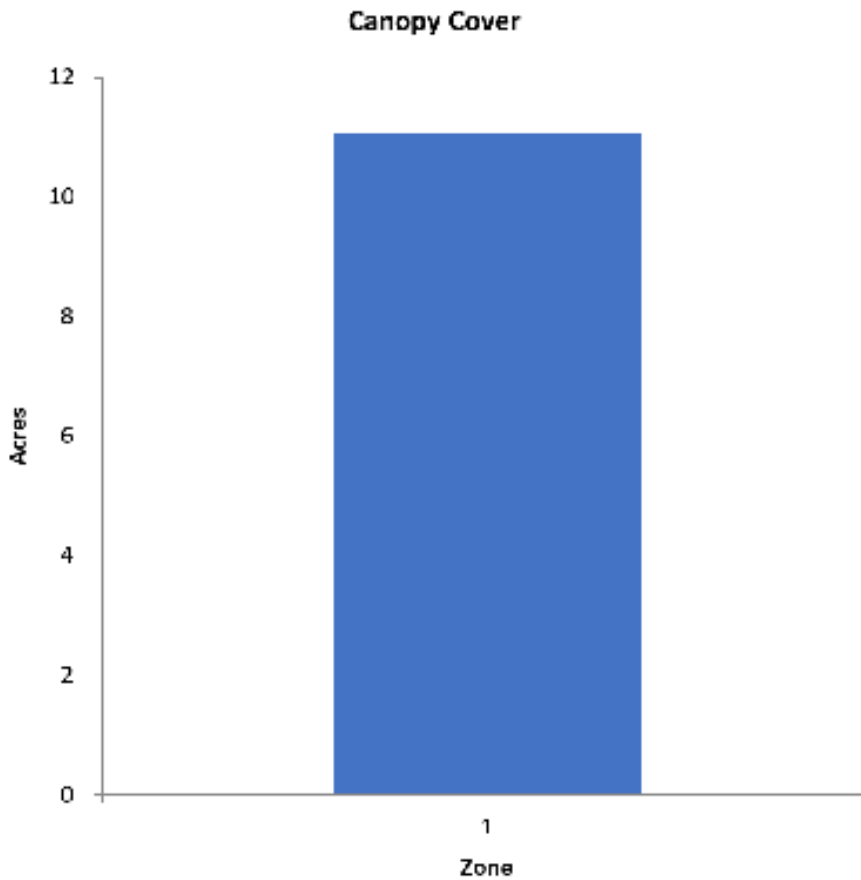


Figure 4: Wood Condition

Canopy Cover of Public Trees (Acres)

3/3/2020



Zone	Acres	% of Total Canopy Cover
1	11	100.0
Citywide total	11	100.0

	Total Land Area	Total Street and Sidewalk Area	Total Canopy Cover	Canopy Cover as % of Total Land Area	Canopy Cover as % of Total Streets and Sidewalks
Citywide Total	0	0	11	0.00	0.00

Figure 5: Canopy Cover in Acres

Land Use of Public Trees by Zone (%)

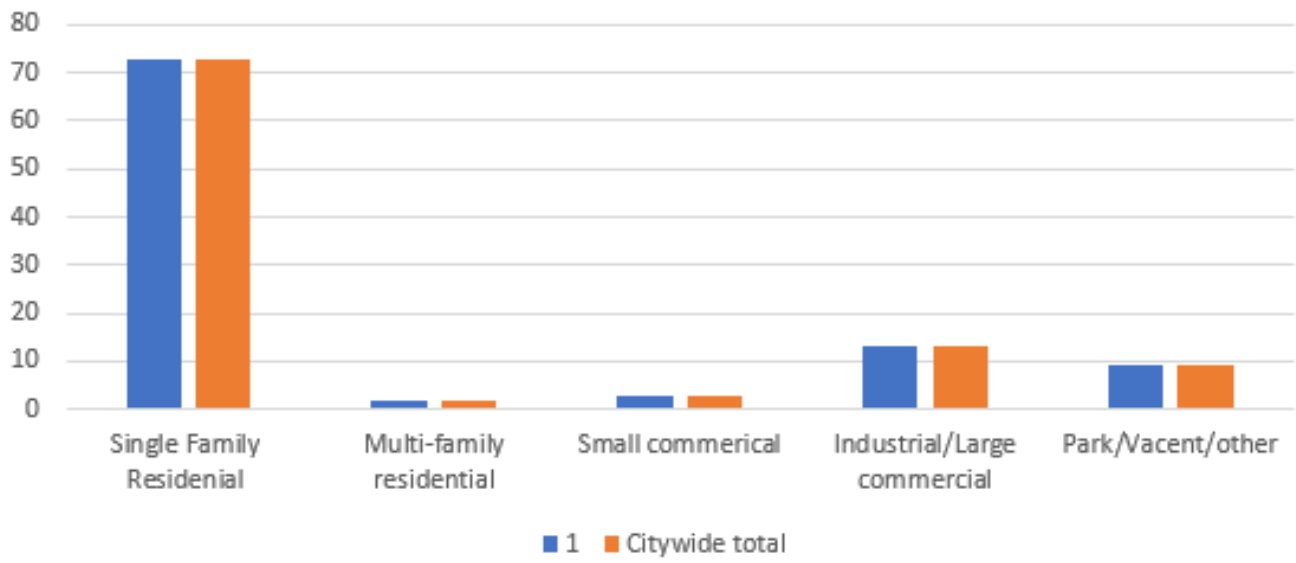


Figure 6: Land Use of city/park trees

Appendix B: ArcGIS Mapping

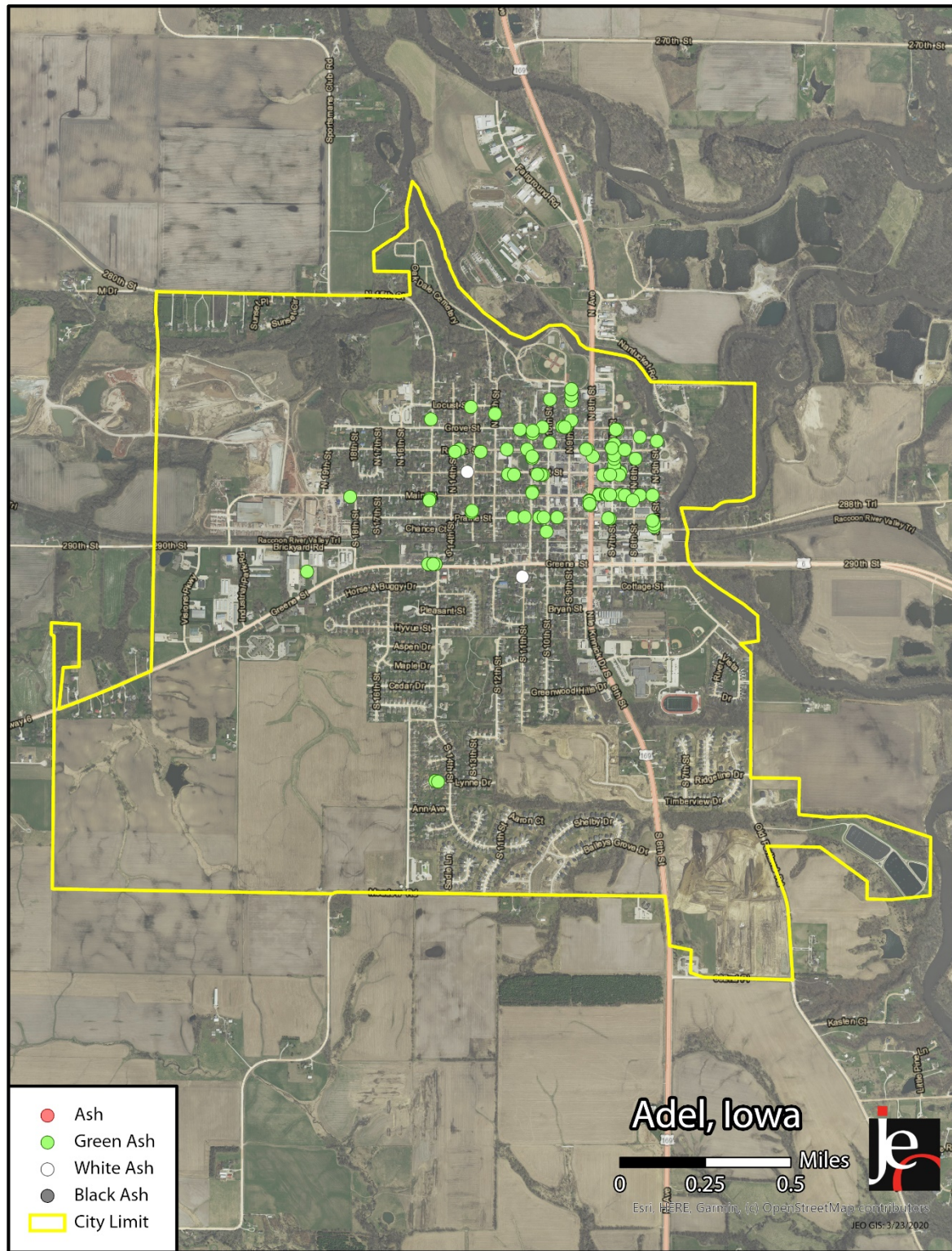


Figure 1: Location of Ash Trees

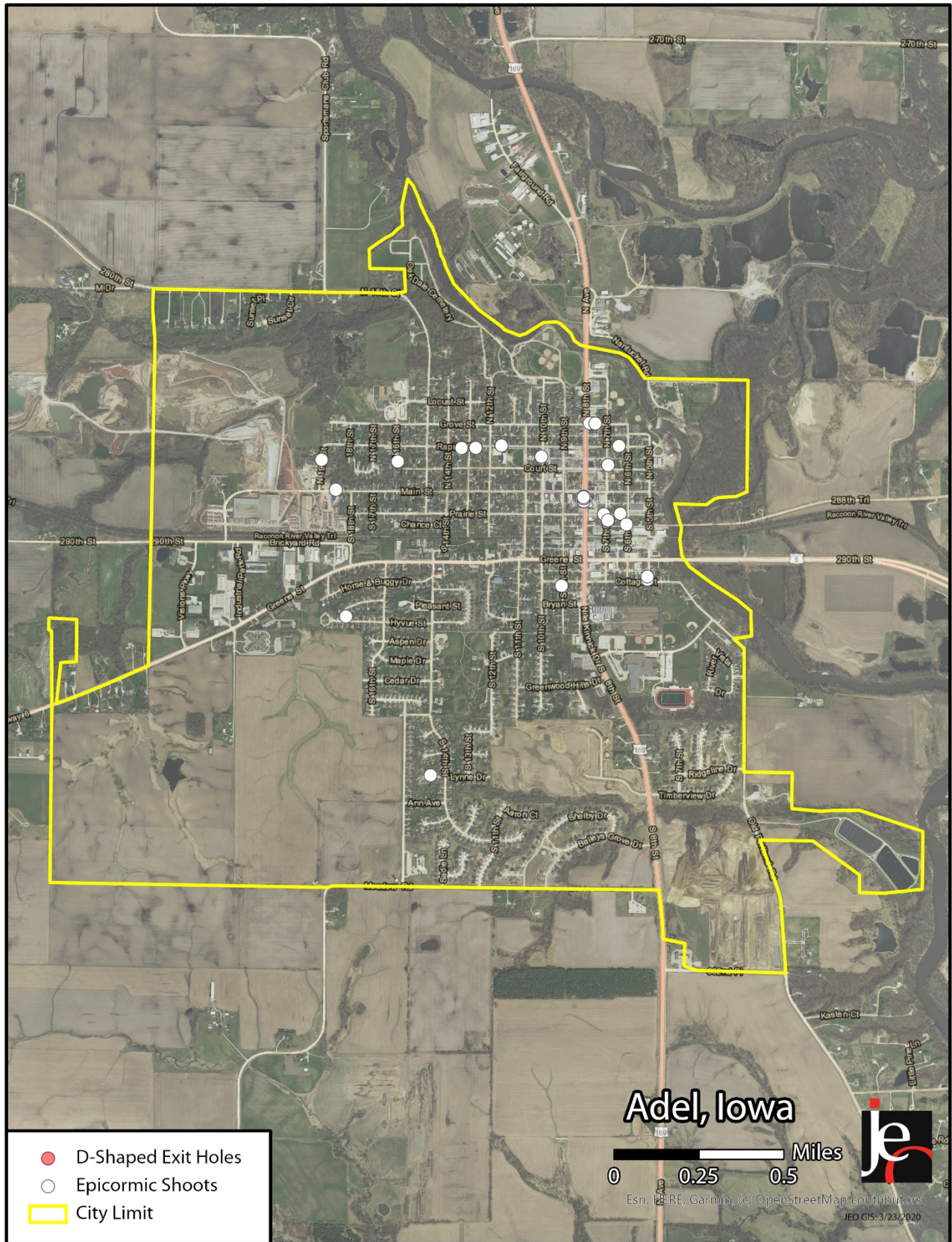


Figure 2: Location of EAB symptoms

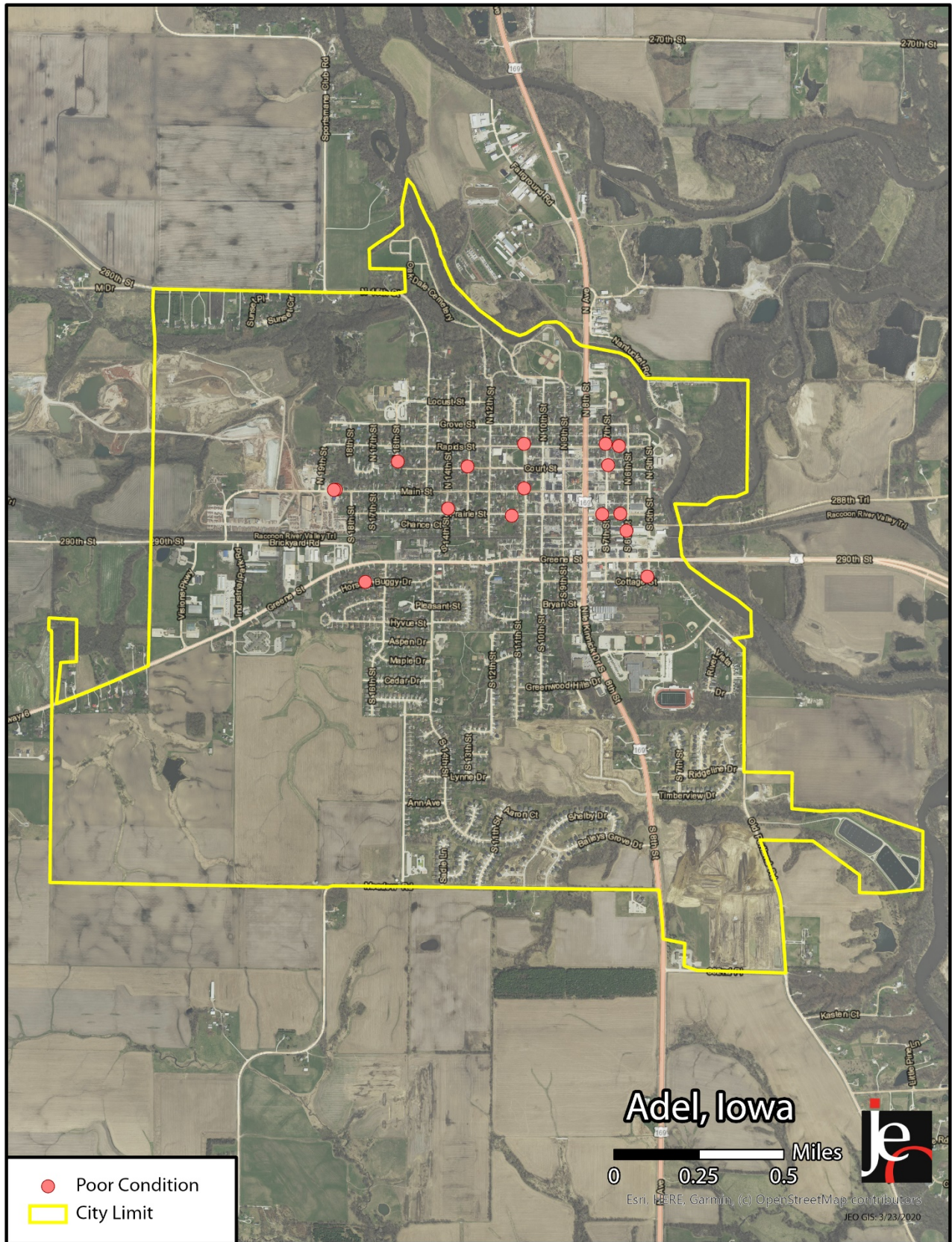


Figure 3: Location of Poor Condition Trees

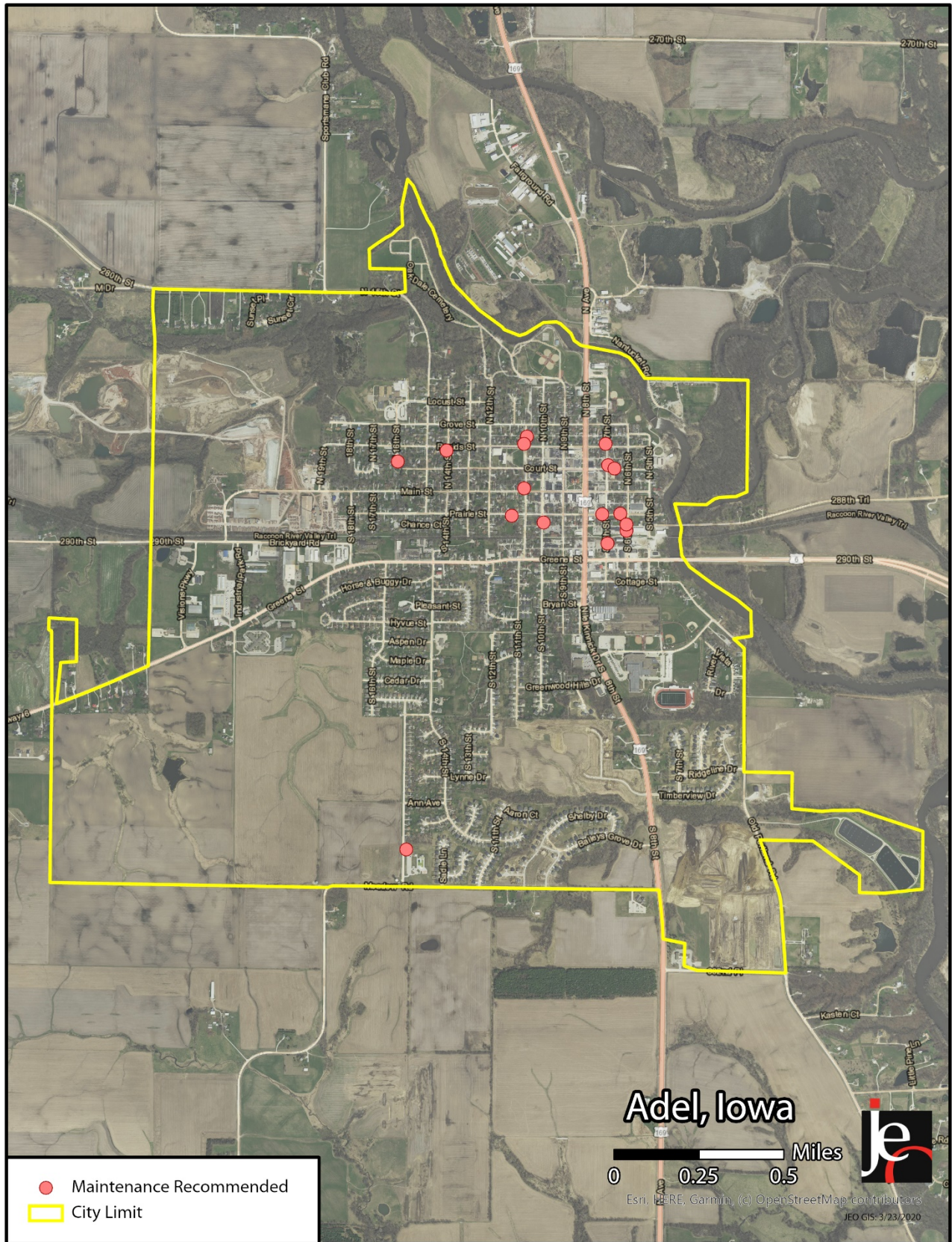


Figure 4: Location of Trees with Recommended Maintenance

Appendix C: Adel Tree Ordinances

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

1. “Parking” means that part of the street, avenue or highway in the City not covered by sidewalk and lying between the lot line and the curb line; or, on unpaved 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.
2. “Park trees” are trees, shrubs, bushes and all other woody vegetation in public parks having individual names, and all areas owned by the City to which the public has free access as a park.
3. “Street trees” are trees, shrubs, bushes and all other woody vegetation on land lying between property lines on either side of all streets, avenues or ways within the City.

151.02 CITY TREE BOARD. The Park and Recreation Board serves as City Tree Board for the City.†

151.03 STREET TREE SPECIES TO BE PLANTED. No person shall plant any tree in the parking or street without written permission of the Council, after recommendation by the City Tree Board. The following list constitutes the official street tree species for the City.

Small Trees	Medium Trees	Large Trees
Crabapple, Flowering	Hackberry	Coffeetree, Kentucky
Spring Snow	Honeylocust (thornless)	Maple, Sliver
Profusion	Linden, Basswood	Oak, Bur
David	Oak, English	Sycamore
Red Jewel	Oak, Red	Sycamore, London planetree
Professor Springer	Birch, River	Cottonwood (cottonless, male)
Donald Wyman	Ginkgo Biloba (male)	
Mary Potter	Saucer Magnolia	
Fuji	Pear, Flowering	
Adams	Aristocrat	
Ormiston Roy	Chanticleer	
Sentinel		
White Angel		
Hawthorn, Glossy, Downey,		
Margaret		
Redbud		
Plum, Purple leaf		
Serviceberry		

(Ord. 247 – Sep. 08 Supp.)

151.04 SPACING. The spacing of street trees will be in accordance with the three species size classes listed in Section 151.03, and no trees may be planted closer together than the following: small trees,

30 feet; medium trees, 40 feet; and large trees, 50 feet, except in special plantings designated or approved by a landscape architect.

151.05 DISTANCE FROM SIDEWALK. The distance trees may be planted from sidewalks will be in accordance with the tree species size classes listed in Section 151.03 and no trees may be planted closer to any sidewalk than the following: small trees, 2 feet; medium trees, 3 feet; and large trees, 4 feet.

151.06 DISTANCE FROM STREET CORNERS AND FIRE PLUGS. No street tree shall be planted closer than thirty-five (35) feet from any street corner, measured from the point of nearest intersecting curbs or curb lines. No street tree shall be planted closer than ten (10) feet from any fireplug.

151.07 UTILITIES. No street trees other than those species listed as small trees in Section 151.03 may be planted under or within ten (10) lateral feet of any overhead electrical wire, or over or within five (5) lateral feet of any underground water line, sewer line, transmission line or other utility.

151.08 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. If the abutting property owner fails to trim the trees, the City may serve notice on the abutting property owner requiring that such action be taken within five (5) 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. The City Tree Board may remove or cause or order to be removed 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 or other public improvements, or is affected with any injurious fungus, insect or other pest. This section does not prohibit the planting of street trees by adjacent property owners providing that the selection and location of said trees is in accordance with this chapter.

151.09 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 property. Topping is defined as the severe cutting back of limbs to stubs larger than three (3) 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 at the determination of the Tree Board.

151.10 PRUNING, CORNER CLEARANCE. Every owner of any tree overhanging any street or right-of-way within the City shall prune the branches so that such branches shall not obstruct the light from any street lamp or obstruct the view of any street intersection and so that there shall be a clear space of fifteen (15) feet above the surface of the street or eight (8) feet above the sidewalk. Said owners shall remove all dead, diseased or dangerous trees or broken or decayed limbs which constitute a menace to the safety of the public. The City shall have the right to prune any tree or shrub on private property when it interferes with the proper spread of light along the street from a street light or interferes with visibility of any traffic control device CHAPTER 151 TREES CODE OF ORDINANCES, ADEL, IOWA - 685 - or sign. It is unlawful for any person to trim or cut any tree in a street or public place unless the work is done under the supervision of the City.

151.11 DEAD OR DISEASED TREE REMOVAL 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 Tree Board will notify in writing the owners of such trees. Removal shall be done by said owners at their own expense within sixty (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 cost of removal on the owner's property tax notice.

151.12 REPLACEMENT OF TREES. If the City has cause to remove a tree or trees for any reason, the City will plant three (3) trees for each tree removed. The trees will be planted in accordance with the comprehensive City Tree Plan.

151.13 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.

151.14 INTERFERENCE WITH CITY TREE BOARD. It is unlawful for any person to prevent, delay or interfere with the City Tree Board or any of its agents while engaging in and about the planting, cultivating, mulching, pruning, spraying or removing of any street trees, park trees or trees on private ground, as authorized in this chapter.

151.15 REVIEW BY COUNCIL. The Council shall have the right to review the conduct, acts and decisions of the City Tree Board. Any person may appeal from any ruling or order of the City Tree Board to the Council who may hear the matter and make final decision.

151.16 PENALTY. Any violation of the provisions of this chapter is hereby declared a nuisance, subject to appropriate penalties and actions as provided in Chapter 50 of this Code of Ordinances. The State of Iowa is an Equal Opportunity Employer and provider of ADA services.

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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.