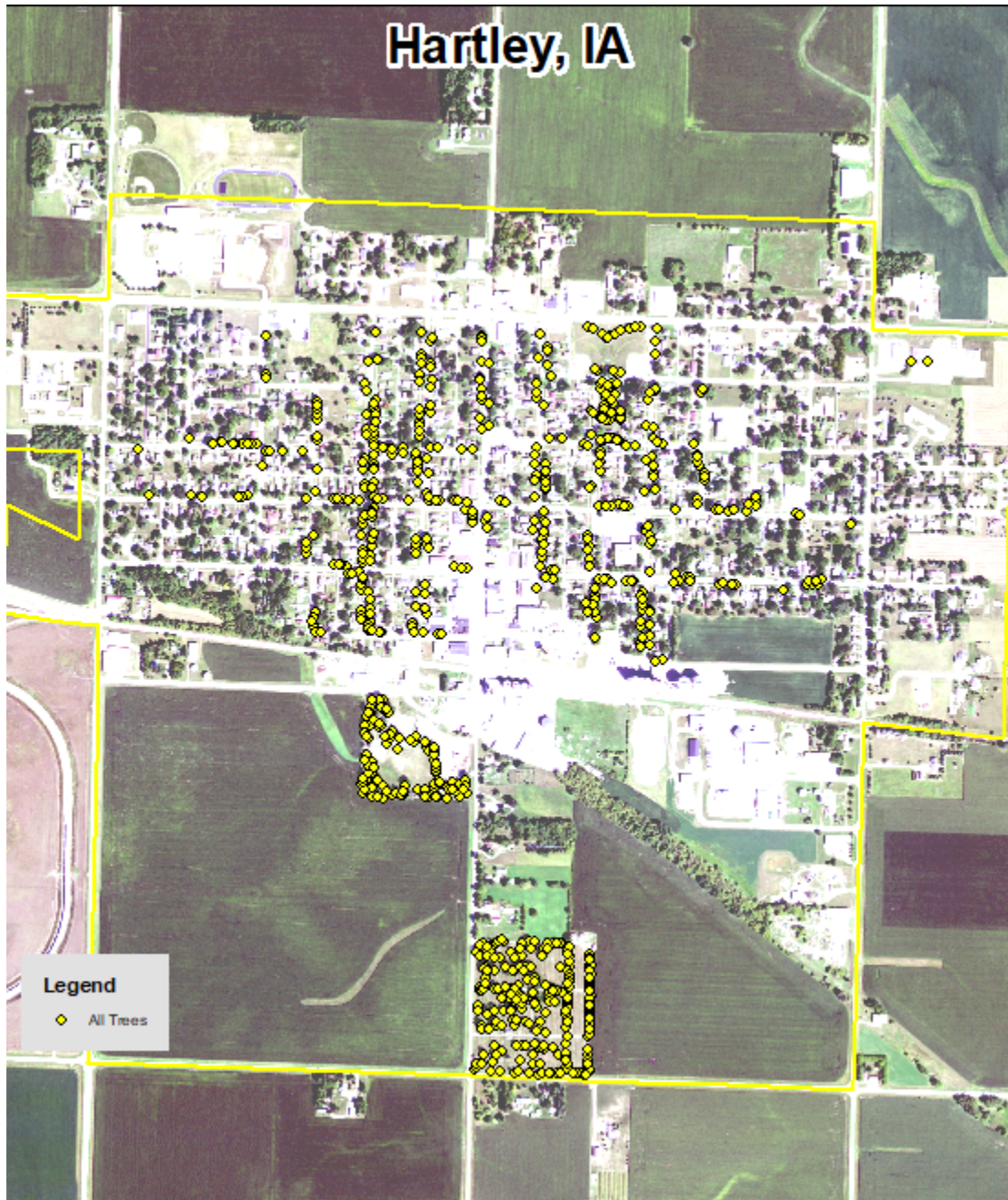


# Hartley, IA



2023 Urban Forest Management Plan  
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# Executive Summary

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## Overview

This plan was developed to assist the City of Hartley 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 23% of Hartley'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 2022, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 791 trees inventoried.

- Hartley's trees provide \$168,348 of benefits annually, an average of \$212 a tree
- There are over 38 species of trees
- The top three genera are: Maple 30%, Ash 23%, and Spruce 23%
- 21% of trees are in need of some type of management
- 25 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 25 trees needing removal, 6 trees are critical and must be addressed immediately *\*City ownership of the trees recommended for removal should be verified prior to any removal\**
- 36 of the 178 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 and staff we estimate it could take 8 years to remove ash – Suggestion: increase fund for contract removal or treatment of some ash and apply for grants to plant replacement trees

# Introduction

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This plan was developed to assist Hartley 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 Hartley, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

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

## Inventory

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

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

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

## Inventory Results

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The data collected for the 791 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

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### **Annual Energy Benefits**

Trees conserve energy by shading buildings and blocking winds. Hartley's trees reduce energy related costs by approximately \$41,119 annually (Appendix A, Table 1). These savings are both in Electricity 196.7 MWh) and in Natural Gas (26,720.6 Therms).

### **Annual Stormwater Benefits**

Hartley's trees intercept about 2,686,864 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$72,814 of benefits to the city.

### **Annual Air Quality Benefits**

Air quality is a persistent public health issue in Iowa. The urban forest improves air quality by removing pollutants, lowering air temperature, and reducing energy consumption, which in turn reduces emissions from power plants, and emitting volatile organic matter (ozone). In Hartley, it is estimated that trees remove 2,482.5 lbs of air pollution (ozone (O<sub>3</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), and sulfur dioxide (SO<sub>2</sub>)) per year with a net value of \$6,851 (Appendix A, Table 3).

### **Annual Carbon Benefits**

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Hartley, trees sequester about 746,050 lbs of carbon a year with an associated value of \$5,595 (Appendix A, Table 5). In addition, the trees store 9,921,415 lbs of carbon, with a yearly benefit of \$74,411 (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. Hartley receives \$41,969 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, Hartley's trees provide \$168,348 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 791 trees in Hartley provide approximately \$213 annually (Appendix A, Table 7).

## Forest Structure

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### **Species Distribution**

Hartley has over 38 different tree species along city streets and parks (Appendix A, Figure 1).

The distribution of trees by genera is as follows:

Maple	239	30%
Spruce	184	23%
Ash	178	23%
Walnut	39	5%
Poplar	20	3%
Oak	20	3%
Linden/Basswood	20	3%
Arborvitae	16	2%
Hackberry	15	2%
Apple (crabapple)	15	2%
Honey Locust	14	2%
Other	9	1%
Kentucky Coffeetree	6	1%
Cedar	5	1%
Pine	2	<1%
Birch	2	<1%
Mulberry	2	<1%
Japanese Tree Lilac	2	<1%
Cherry	1	<1%
Pear	1	<1%
Elm	1	<1%

### Age Class

Most of Hartley's trees (31%) are over 30 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. Hartley's size curve is on the larger side, indicating a older 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 Hartley indicate that 90% of the trees are in good health, with only 2% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 40% of Hartley'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 11% of the population. This 11% 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	25	3%
Tree Removal	25	3%

### Canopy Cover

The total canopy with both private and public trees is 11%, 90 acres. The canopy cover on city own properties included in the Hartley inventory includes approximately 23 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 61 trees need to be planted annually on public and/or private lands.

### Land Use and Location

The majority of Hartley'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	51%
Park/vacant/other	48%
Industrial/Large commercial	1%
Multifamily residential	<1%

#### Location

Front yard	52%
Planting strip	48%
Median	<1%
Cutout (surrounded by pavement)	<1%

### Changes in Forest Structure Since plan in 2015

The total number of city own trees has reduced. It is noted that both maple and ash numbers have lowered and this reduction is likely due to the need of removal of older trees and tree impacted by EAB and replanting not keeping up with this rapid change. Management needs have increased since the last plan due to an older aged stand and pest and disease issues (size class change to older trees). This increase in age and stand size has increase the benefits per tree that is provided to the city as well. No significant changes in the land use or location of trees were seen.

## Recommendations

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### 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

Hartley has 6 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 3 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately as well. 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. There are 2 trees with critical pruning noted as well.

### 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 25 removals, 7 are ash trees. There are a total of 178 ash trees, and 36 of those have signs and symptoms that have been associated with EAB. In addition, there are 34 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 Hartley.

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 151.02 of the city ordinance (Appendix C). All trees planted must meet the restrictions in city ordinance 151.02 (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**

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### **Six Year Maintenance Plan with Possible Funding for EAB Treatment**

**Current Budget** \$10,000/year Plus staff time, Total \$60,000 over 6 years plus additional cost for EAB treatment or accelerated removal. The \$18,000 annually of treatment would have removal of all other ash within 4 years

#### **FY 2023**

Removal: 6 critical concern trees plus 20 Ash– staff time and contract for stump removal or larger trees \$5,000

Planting and Replacement: 40 trees to be planted in open locations, \$4,000

Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time

Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

#### **FY 2024**

Removal: 25 trees– staff time and contract for stump removal or larger trees \$5,000

Planting and Replacement: 40 trees to be planted in open locations, \$4,000

Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time

Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

#### **FY 2025**

Removal: 25 trees– staff time and contract for stump removal or larger trees \$5,000

Planting and Replacement: 40 trees to be planted in open locations, \$4,000

Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time

Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

#### **FY 2026**

Removal: 25 trees– staff time and contract for stump removal or larger trees \$5,000

Planting and Replacement: 40 trees to be planted in open locations, \$4,000

Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time

Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

#### **FY 2027**

Removal: 25 trees– staff time and contract for stump removal or larger trees \$5,000  
Planting and Replacement: 40 trees to be planted in open locations, \$4,000  
Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time  
Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

## **FY 2028**

Removal: 25 trees– staff time and contract for stump removal or larger trees \$5,000  
Planting and Replacement: 40 trees to be planted in open locations, \$4,000  
Young Tree Pruning & Maintenance: 2 critical plus some immediate – staff time  
Possible EAB treatment – Additional budget: between 45 and 114 trees, with treating half on 2 year cycle the cost would range from \$18,000 to \$45,600 annually

**\*Reduction of ash: If no trees are treated it will take about 8 years to remove ash at current removal levels. Trees will decline faster than 8 years -estimate additional \$78,000 to remove in 4 years. This could be offset with some trees being treated to reduce removals and maintain benefits of trees.**

## **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](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 151.02 (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 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. City Code 151.06 states “If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property.”

### **Proposed Budget Increase**

EAB could potentially kill all ash trees in Hartley within 4 years. To remove all ash trees within that timeline the budget would need to be increased to a one time removal contact estimated around \$78,000 or to treat some trees to lower the need for removal and keep existing benefits of trees.

Additionally, it is recommended that Hartley 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. Alternatively, if there are 15 treatable trees, it would cost approximately \$2,250 a year for treatment. 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 Hartley. It is suggested to consider increasing the budget to plan for removal or for some treatment and some removal.

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# Appendix A: i-Tree Data

**Table 1: Annual Energy Benefits**

**Hartley**

## Annual Energy Benefits of Public Trees

2/4/2023

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	56.2	4,266	7,644.0	7,491	11,757	(N/A)	22.4	28.6	66.42
Norway spruce	17.7	1,341	2,300.2	2,254	3,595	(N/A)	15.4	8.7	29.47
Silver maple	36.1	2,739	4,735.9	4,641	7,380	(N/A)	12.5	17.9	74.55
Norway maple	22.9	1,738	3,295.6	3,230	4,967	(N/A)	11.0	12.1	57.09
Blue spruce	6.7	510	903.5	885	1,395	(N/A)	6.8	3.4	25.83
Black walnut	12.6	953	1,708.7	1,674	2,628	(N/A)	4.9	6.4	67.38
Maple	3.4	260	420.6	412	672	(N/A)	2.5	1.6	33.61
Black poplar	7.3	556	991.0	971	1,527	(N/A)	2.5	3.7	76.34
Northern white cedar	2.1	158	281.7	276	434	(N/A)	2.0	1.1	27.15
Apple	0.8	64	135.0	132	196	(N/A)	1.9	0.5	13.05
Sugar maple	3.9	294	527.0	516	810	(N/A)	1.9	2.0	54.01
Northern hackberry	6.2	470	877.8	860	1,330	(N/A)	1.9	3.2	88.67
Honeylocust	5.1	385	658.6	645	1,030	(N/A)	1.8	2.5	73.60
American basswood	4.2	322	618.9	606	929	(N/A)	1.8	2.3	66.34
Northern red oak	0.7	55	102.0	100	155	(N/A)	1.1	0.4	17.21
Amur maple	0.3	23	45.0	44	67	(N/A)	1.1	0.2	7.44
Spruce	1.0	76	122.1	120	195	(N/A)	1.0	0.5	24.40
Bur oak	2.8	212	381.0	373	586	(N/A)	1.0	1.4	73.20
Broadleaf Deciduous Small	0.1	8	19.1	19	27	(N/A)	0.8	0.1	4.51
Kentucky coffeetree	1.9	147	268.9	263	411	(N/A)	0.8	1.0	68.46
Red maple	0.6	45	87.8	86	131	(N/A)	0.8	0.3	21.79
Littleleaf linden	0.8	61	115.7	113	174	(N/A)	0.8	0.4	29.07
Eastern red cedar	0.5	38	73.7	72	110	(N/A)	0.6	0.3	21.95
Swamp white oak	0.1	11	23.8	23	35	(N/A)	0.4	0.1	11.52
Mulberry	0.1	11	25.7	25	36	(N/A)	0.3	0.1	18.19
Japanese tree lilac	0.1	11	25.7	25	36	(N/A)	0.3	0.1	18.19
Austrian pine	0.3	20	34.7	34	54	(N/A)	0.3	0.1	27.08
Black maple	0.6	43	79.8	78	121	(N/A)	0.3	0.3	60.68
River birch	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Boxelder	0.2	15	23.9	23	39	(N/A)	0.1	0.1	38.63
White ash	0.1	7	13.3	13	20	(N/A)	0.1	0.0	20.10
Conifer Evergreen Large	0.1	11	19.7	19	30	(N/A)	0.1	0.1	30.47
Broadleaf Deciduous Large	0.3	20	38.1	37	57	(N/A)	0.1	0.1	57.32
Paper birch	0.1	7	13.7	13	21	(N/A)	0.1	0.1	20.64
Callery pear	0.1	8	16.9	17	24	(N/A)	0.1	0.1	24.47
Broadleaf Deciduous Medium	0.0	0	0.8	1	1	(N/A)	0.1	0.0	1.10
Black cherry	0.1	6	12.8	13	18	(N/A)	0.1	0.0	18.19
American elm	0.5	35	61.1	60	94	(N/A)	0.1	0.2	94.34
Total	196.7	14,933	26,720.6	26,186	41,119	(N/A)	100.0	100.0	51.98

**Table 2: Annual Stormwater Benefits**

**Hartley**

**Annual Stormwater Benefits of Public Trees**

2/4/2023

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	715,259	19,384	(N/A)	22.4	26.6	109.51
Norway spruce	349,689	9,477	(N/A)	15.4	13.0	77.68
Silver maple	590,660	16,007	(N/A)	12.5	22.0	161.69
Norway maple	230,367	6,243	(N/A)	11.0	8.6	71.76
Blue spruce	101,312	2,746	(N/A)	6.8	3.8	50.84
Black walnut	154,864	4,197	(N/A)	4.9	5.8	107.61
Maple	20,941	568	(N/A)	2.5	0.8	28.38
Black poplar	116,784	3,165	(N/A)	2.5	4.3	158.24
Northern white cedar	46,144	1,250	(N/A)	2.0	1.7	78.16
Apple	3,406	92	(N/A)	1.9	0.1	6.15
Sugar maple	46,261	1,254	(N/A)	1.9	1.7	83.58
Northern hackberry	68,263	1,850	(N/A)	1.9	2.5	123.33
Honeylocust	63,807	1,729	(N/A)	1.8	2.4	123.51
American basswood	53,159	1,441	(N/A)	1.8	2.0	102.90
Northern red oak	4,042	110	(N/A)	1.1	0.2	12.17
Amur maple	1,044	28	(N/A)	1.1	0.0	3.14
Spruce	14,227	386	(N/A)	1.0	0.5	48.19
Bur oak	35,848	971	(N/A)	1.0	1.3	121.43
Broadleaf Deciduous Small	363	10	(N/A)	0.8	0.0	1.64
Kentucky coffeetree	27,471	744	(N/A)	0.8	1.0	124.08
Red maple	3,264	88	(N/A)	0.8	0.1	14.74
Littleleaf linden	6,846	186	(N/A)	0.8	0.3	30.92
Eastern red cedar	7,197	195	(N/A)	0.6	0.3	39.01
Swamp white oak	761	21	(N/A)	0.4	0.0	6.87
Mulberry	529	14	(N/A)	0.3	0.0	7.17
Japanese tree lilac	529	14	(N/A)	0.3	0.0	7.17
Austrian pine	3,857	105	(N/A)	0.3	0.1	52.26
Black maple	5,734	155	(N/A)	0.3	0.2	77.70
River birch	586	16	(N/A)	0.1	0.0	15.88
Boxelder	1,456	39	(N/A)	0.1	0.1	39.46
White ash	614	17	(N/A)	0.1	0.0	16.63
Conifer Evergreen Large	2,969	80	(N/A)	0.1	0.1	80.46
Broadleaf Deciduous Large	2,591	70	(N/A)	0.1	0.1	70.21
Paper birch	608	16	(N/A)	0.1	0.0	16.47
Callery pear	586	16	(N/A)	0.1	0.0	15.88
Broadleaf Deciduous Medium	12	0	(N/A)	0.1	0.0	0.33
Black cherry	264	7	(N/A)	0.1	0.0	7.17
American elm	4,551	123	(N/A)	0.1	0.2	123.33
Citywide total	2,686,864	72,814	(N/A)	100.0	100.0	92.05

### Table 3: Annual Air Quality Benefits

Hartley

#### Annual Air Quality Benefits of Public Trees

2/4/2023

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (lb)	BVOC Emissions (\$)	Total (lb)	Total (\$) Error	% of Total Trees	Avg. \$/tree
	O <sub>3</sub>	NO <sub>2</sub>	PM <sub>10</sub>	SO <sub>2</sub>		NO <sub>2</sub>	PM <sub>10</sub>	VOC	SO <sub>2</sub>							
Green ash	99.6	15.9	45.9	4.5	525	267.9	39.0	37.2	254.7	1,670	0.0	0	764.8	2,196 (N/A)	22.4	12.40
Norway spruce	41.3	8.2	33.4	5.1	271	83.1	12.2	11.6	80.0	521	-181.6	-681	93.4	110 (N/A)	15.4	0.90
Silver maple	109.2	18.5	52.6	4.8	586	170.0	24.9	23.8	163.2	1,064	-55.5	-208	511.4	1,441 (N/A)	12.5	14.56
Norway maple	49.4	8.5	24.0	2.2	266	110.9	16.0	15.3	103.9	687	-11.4	-43	318.8	911 (N/A)	11.0	10.47
Blue spruce	14.8	2.9	12.1	1.8	97	31.8	4.6	4.4	30.4	199	-38.1	-143	64.7	153 (N/A)	6.8	2.83
Black walnut	20.8	3.3	9.7	0.9	110	59.9	8.7	8.3	56.9	373	0.0	0	168.6	483 (N/A)	4.9	12.39
Maple	3.9	0.7	1.9	0.2	21	15.9	2.3	2.2	15.5	100	-1.5	-6	41.3	116 (N/A)	2.5	5.80
Black poplar	18.3	2.9	8.1	0.8	96	34.9	5.1	4.8	33.2	217	0.0	0	108.1	313 (N/A)	2.5	15.65
Northern white cedar	5.5	1.1	4.4	0.7	36	9.9	1.4	1.4	9.4	62	-26.7	-100	7.2	-2 (N/A)	2.0	-0.14
Apple	0.9	0.1	0.4	0.0	5	4.2	0.6	0.6	3.8	26	0.0	0	10.6	30 (N/A)	1.9	2.02
Sugar maple	6.3	1.1	3.1	0.3	34	18.4	2.7	2.6	17.5	115	-4.9	-18	47.0	130 (N/A)	1.9	8.70
Northern hackberry	12.0	2.1	5.9	0.5	65	29.9	4.3	4.1	28.1	185	0.0	0	86.9	250 (N/A)	1.9	16.67
Honeylocust	12.8	2.1	5.7	0.6	67	23.8	3.5	3.3	22.9	149	-10.3	-39	64.5	178 (N/A)	1.8	12.71
American basswood	7.7	1.3	3.7	0.3	41	20.6	3.0	2.8	19.3	128	-6.4	-24	52.3	145 (N/A)	1.8	10.35
Northern red oak	0.6	0.1	0.3	0.0	3	3.5	0.5	0.5	3.3	22	-0.8	-3	8.0	22 (N/A)	1.1	2.42
Amur maple	0.3	0.0	0.1	0.0	1	1.5	0.2	0.2	1.4	9	0.0	0	3.7	10 (N/A)	1.1	1.16
Spruce	1.6	0.3	1.3	0.2	11	4.6	0.7	0.7	4.5	29	-5.6	-21	8.2	18 (N/A)	1.0	2.31
Bur oak	5.4	0.9	2.5	0.2	28	13.3	1.9	1.9	12.7	83	0.0	0	38.8	112 (N/A)	1.0	13.94
Broadleaf Deciduous Small	0.0	0.0	0.0	0.0	0	0.6	0.1	0.1	0.5	3	0.0	0	1.3	4 (N/A)	0.8	0.61
Kentucky coffeetree	4.0	0.6	1.8	0.2	21	9.3	1.4	1.3	8.8	58	0.0	0	27.3	79 (N/A)	0.8	13.11
Red maple	0.4	0.1	0.2	0.0	2	2.9	0.4	0.4	2.7	18	-0.2	-1	6.9	19 (N/A)	0.8	3.22
Littleleaf linden	1.0	0.2	0.5	0.0	6	3.9	0.6	0.5	3.7	24	-0.5	-2	9.9	28 (N/A)	0.8	4.64
Eastern red cedar	1.4	0.3	1.1	0.2	9	2.4	0.3	0.3	2.2	15	-4.0	-15	4.4	9 (N/A)	0.6	1.87
Swamp white oak	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.7	5	0.0	0	1.7	5 (N/A)	0.4	1.61
Mulberry	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)	0.3	2.55
Japanese tree lilac	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)	0.3	2.55
Austrian pine	0.5	0.1	0.4	0.1	4	1.2	0.2	0.2	1.2	8	-1.4	-5	2.5	6 (N/A)	0.3	2.99
Black maple	1.5	0.3	0.7	0.1	8	2.7	0.4	0.4	2.6	17	-0.5	-2	8.1	23 (N/A)	0.3	11.54
River birch	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
Boxelder	0.1	0.0	0.1	0.0	1	0.9	0.1	0.1	0.9	6	-0.1	0	2.3	6 (N/A)	0.1	6.37
White ash	0.0	0.0	0.0	0.0	0	0.4	0.1	0.1	0.4	3	0.0	0	1.0	3 (N/A)	0.1	2.91
Conifer Evergreen Large	0.3	0.1	0.3	0.0	2	0.7	0.1	0.1	0.7	4	-1.4	-5	0.9	1 (N/A)	0.1	1.45
Broadleaf Deciduous Large	0.3	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.3	9 (N/A)	0.1	9.34
Paper birch	0.0	0.0	0.0	0.0	0	0.5	0.1	0.1	0.4	3	0.0	0	1.1	3 (N/A)	0.1	2.99
Callery pear	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
Broadleaf Deciduous Medium	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	0.14
Black cherry	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
American elm	0.9	0.2	0.5	0.0	5	2.2	0.3	0.3	2.1	13	0.0	0	6.4	19 (N/A)	0.1	18.52
Citywide total	421.3	72.0	221.4	23.9	2,326	936.8	136.5	130.2	891.3	5,841	-350.9	-1,316	2,482.5	6,851 (N/A)	100.0	8.66

**Table 4: Annual Carbon Stored**

**Hartley**

**Stored CO2 Benefits of Public Trees**

2/4/2023

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	3,302,395	24,768	(N/A)	22.4	33.3	139.93
Norway spruce	453,420	3,401	(N/A)	15.4	4.6	27.87
Silver maple	2,551,354	19,135	(N/A)	12.5	25.7	193.28
Norway maple	817,945	6,135	(N/A)	11.0	8.2	70.51
Blue spruce	108,462	813	(N/A)	6.8	1.1	15.06
Black walnut	685,124	5,138	(N/A)	4.9	6.9	131.75
Maple	45,638	342	(N/A)	2.5	0.5	17.11
Black poplar	617,835	4,634	(N/A)	2.5	6.2	231.69
Northern white cedar	68,406	513	(N/A)	2.0	0.7	32.07
Apple	14,922	112	(N/A)	1.9	0.2	7.46
Sugar maple	181,472	1,361	(N/A)	1.9	1.8	90.74
Northern hackberry	186,829	1,401	(N/A)	1.9	1.9	93.41
Honeylocust	165,926	1,244	(N/A)	1.8	1.7	88.89
American basswood	286,224	2,147	(N/A)	1.8	2.9	153.33
Northern red oak	8,930	67	(N/A)	1.1	0.1	7.44
Amur maple	4,206	32	(N/A)	1.1	0.0	3.50
Spruce	12,793	96	(N/A)	1.0	0.1	11.99
Bur oak	180,342	1,353	(N/A)	1.0	1.8	169.07
Broadleaf Deciduous	1,141	9	(N/A)	0.8	0.0	1.43
Kentucky coffeetree	129,728	973	(N/A)	0.8	1.3	162.16
Red maple	5,722	43	(N/A)	0.8	0.1	7.15
Littleleaf linden	22,933	172	(N/A)	0.8	0.2	28.67
Eastern red cedar	4,685	35	(N/A)	0.6	0.0	7.03
Swamp white oak	1,336	10	(N/A)	0.4	0.0	3.34
Mulberry	1,816	14	(N/A)	0.3	0.0	6.81
Japanese tree lilac	1,816	14	(N/A)	0.3	0.0	6.81
Austrian pine	3,779	28	(N/A)	0.3	0.0	14.17
Black maple	15,891	119	(N/A)	0.3	0.2	59.59
River birch	1,101	8	(N/A)	0.1	0.0	8.26
Boxelder	3,624	27	(N/A)	0.1	0.0	27.18
White ash	1,035	8	(N/A)	0.1	0.0	7.76
Conifer Evergreen La	3,343	25	(N/A)	0.1	0.0	25.07
Broadleaf Deciduous	8,458	63	(N/A)	0.1	0.1	63.43
Paper birch	1,035	8	(N/A)	0.1	0.0	7.76
Callery pear	1,101	8	(N/A)	0.1	0.0	8.26
Broadleaf Deciduous	17	0	(N/A)	0.1	0.0	0.13
Black cherry	908	7	(N/A)	0.1	0.0	6.81
American elm	19,728	148	(N/A)	0.1	0.2	147.96
Citywide total	9,921,415	74,411	(N/A)	100.0	100.0	94.07

**Table 5: Annual Carbon Sequestered**

Hartley

**Annual CO<sub>2</sub> Benefits of Public Trees**

2/4/2023

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$)	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	128,822	966	-15,851	-606	-123	94,276	707	206,641	1,550 (N/A)	22.4	27.7	8.76
Norway spruce	19,509	146	-2,176	-326	-19	29,637	222	46,643	350 (N/A)	15.4	6.3	2.87
Silver maple	170,772	1,281	-12,247	-424	-95	60,537	454	218,638	1,640 (N/A)	12.5	29.3	16.56
Norway maple	21,614	162	-3,927	-257	-31	38,399	288	55,829	419 (N/A)	11.0	7.5	4.81
Blue spruce	6,297	47	-521	-124	-5	11,260	84	16,913	127 (N/A)	6.8	2.3	2.35
Black walnut	29,298	220	-3,289	-133	-26	21,065	158	46,941	352 (N/A)	4.9	6.3	9.03
Maple	6,189	46	-219	-28	-2	5,748	43	11,689	88 (N/A)	2.5	1.6	4.38
Black poplar	15,768	118	-2,966	-85	-23	12,279	92	24,997	187 (N/A)	2.5	3.4	9.37
Northern white cedar	2,442	18	-328	-40	-3	3,499	26	5,572	42 (N/A)	2.0	0.7	2.61
Apple	994	7	-72	-14	-1	1,404	11	2,312	17 (N/A)	1.9	0.3	1.16
Sugar maple	9,135	69	-871	-43	-7	6,489	49	14,710	110 (N/A)	1.9	2.0	7.35
Northern hackberry	8,643	65	-897	-61	-7	10,382	78	18,068	136 (N/A)	1.9	2.4	9.03
Honeylocust	9,851	74	-796	-38	-6	8,507	64	17,524	131 (N/A)	1.8	2.3	9.39
American basswood	15,906	119	-1,374	-51	-11	7,121	53	21,603	162 (N/A)	1.8	2.9	11.57
Northern red oak	1,083	8	-43	-9	0	1,214	9	2,245	17 (N/A)	1.1	0.3	1.87
Amur maple	472	4	-20	-5	0	504	4	950	7 (N/A)	1.1	0.1	0.79
Spruce	1,005	8	-61	-16	-1	1,670	13	2,597	19 (N/A)	1.0	0.3	2.43
Bur oak	6,082	46	-866	-30	-7	4,689	35	9,875	74 (N/A)	1.0	1.3	9.26
Broadleaf Deciduous Small	187	1	-6	-3	0	184	1	362	3 (N/A)	0.8	0.0	0.45
Kentucky coffeetree	4,801	36	-623	-22	-5	3,255	24	7,411	56 (N/A)	0.8	1.0	9.26
Red maple	865	6	-27	-6	0	988	7	1,819	14 (N/A)	0.8	0.2	2.27
Littleleaf linden	1,407	11	-110	-11	-1	1,349	10	2,635	20 (N/A)	0.8	0.4	3.29
Eastern red cedar	168	1	-22	-9	0	829	6	966	7 (N/A)	0.6	0.1	1.45
Swamp white oak	325	2	-7	-2	0	248	2	563	4 (N/A)	0.4	0.1	1.41
Mulberry	228	2	-9	-2	0	248	2	465	3 (N/A)	0.3	0.1	1.74
Japanese tree lilac	228	2	-9	-2	0	248	2	465	3 (N/A)	0.3	0.1	1.74
Austrian pine	238	2	-18	-5	0	445	3	660	5 (N/A)	0.3	0.1	2.48
Black maple	923	7	-76	-5	-1	954	7	1,796	13 (N/A)	0.3	0.2	6.73
River birch	224	2	-5	-1	0	176	1	393	3 (N/A)	0.1	0.1	2.95
Boxelder	418	3	-17	-2	0	336	3	735	6 (N/A)	0.1	0.1	5.51
White ash	182	1	-5	-1	0	156	1	331	2 (N/A)	0.1	0.0	2.49
Conifer Evergreen Large	187	1	-16	-3	0	246	2	415	3 (N/A)	0.1	0.1	3.11
Broadleaf Deciduous Large	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.1	0.1	7.93
Paper birch	209	2	-5	-1	0	159	1	361	3 (N/A)	0.1	0.0	2.71
Callery pear	224	2	-5	-1	0	176	1	393	3 (N/A)	0.1	0.1	2.95
Broadleaf Deciduous Medium	5	0	0	0	0	7	0	12	0 (N/A)	0.1	0.0	0.09
Black cherry	114	1	-4	-1	0	124	1	232	2 (N/A)	0.1	0.0	1.74
American elm	566	4	-95	-4	-1	762	6	1,230	9 (N/A)	0.1	0.2	9.22
Citywide total	466,041	3,495	-47,626	-2,376	-375	330,011	2,475	746,050	5,595 (N/A)	100.0	100.0	7.07

**Table 6: Annual Social and Aesthetic Benefits**

**Hartley**

**Annual Aesthetic/Other Benefits of Public Trees**

2/4/2023

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Green ash	9,903	(N/A)	22.4	23.6	55.95
Norway spruce	3,997	(N/A)	15.4	9.5	32.76
Silver maple	12,496	(N/A)	12.5	29.8	126.22
Norway maple	2,069	(N/A)	11.0	4.9	23.78
Blue spruce	1,100	(N/A)	6.8	2.6	20.38
Black walnut	2,271	(N/A)	4.9	5.4	58.23
Maple	881	(N/A)	2.5	2.1	44.07
Black poplar	1,060	(N/A)	2.5	2.5	52.99
Northern white cedar	362	(N/A)	2.0	0.9	22.60
Apple	54	(N/A)	1.9	0.1	3.59
Sugar maple	933	(N/A)	1.9	2.2	62.19
Northern hackberry	1,042	(N/A)	1.9	2.5	69.45
Honeylocust	2,528	(N/A)	1.8	6.0	180.57
American basswood	1,097	(N/A)	1.8	2.6	78.35
Northern red oak	116	(N/A)	1.1	0.3	12.84
Amur maple	24	(N/A)	1.1	0.1	2.68
Spruce	271	(N/A)	1.0	0.6	33.90
Bur oak	456	(N/A)	1.0	1.1	57.02
Broadleaf Deciduous Small	9	(N/A)	0.8	0.0	1.43
Kentucky coffeetree	338	(N/A)	0.8	0.8	56.38
Red maple	156	(N/A)	0.8	0.4	26.08
Littleleaf linden	180	(N/A)	0.8	0.4	29.98
Eastern red cedar	62	(N/A)	0.6	0.1	12.48
Swamp white oak	42	(N/A)	0.4	0.1	13.95
Mulberry	13	(N/A)	0.3	0.0	6.40
Japanese tree lilac	13	(N/A)	0.3	0.0	6.40
Austrian pine	45	(N/A)	0.3	0.1	22.60
Black maple	109	(N/A)	0.3	0.3	54.54
River birch	26	(N/A)	0.1	0.1	26.22
Boxelder	39	(N/A)	0.1	0.1	39.36
White ash	33	(N/A)	0.1	0.1	33.42
Conifer Evergreen Large	47	(N/A)	0.1	0.1	47.08
Broadleaf Deciduous Large	58	(N/A)	0.1	0.1	57.69
Paper birch	29	(N/A)	0.1	0.1	28.56
Callery pear	26	(N/A)	0.1	0.1	26.22
Broadleaf Deciduous Medium	3	(N/A)	0.1	0.0	2.74
Black cherry	6	(N/A)	0.1	0.0	6.40
American elm	74	(N/A)	0.1	0.2	74.47
Citywide total	41,969	(N/A)	100.0	100.0	53.06

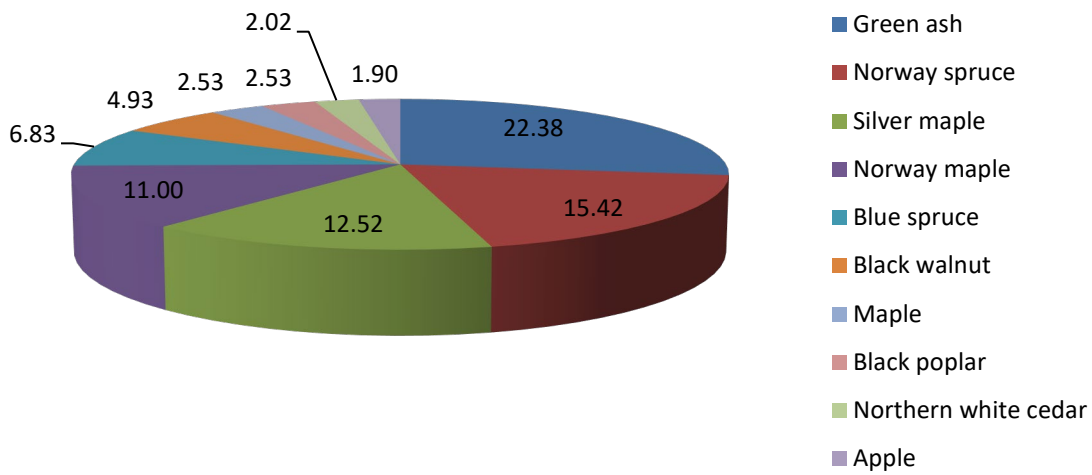
**Table 7: Summary of Benefits in Dollars**

**Hartley**

**Total Annual Benefits of Public Trees by Species (\$)**

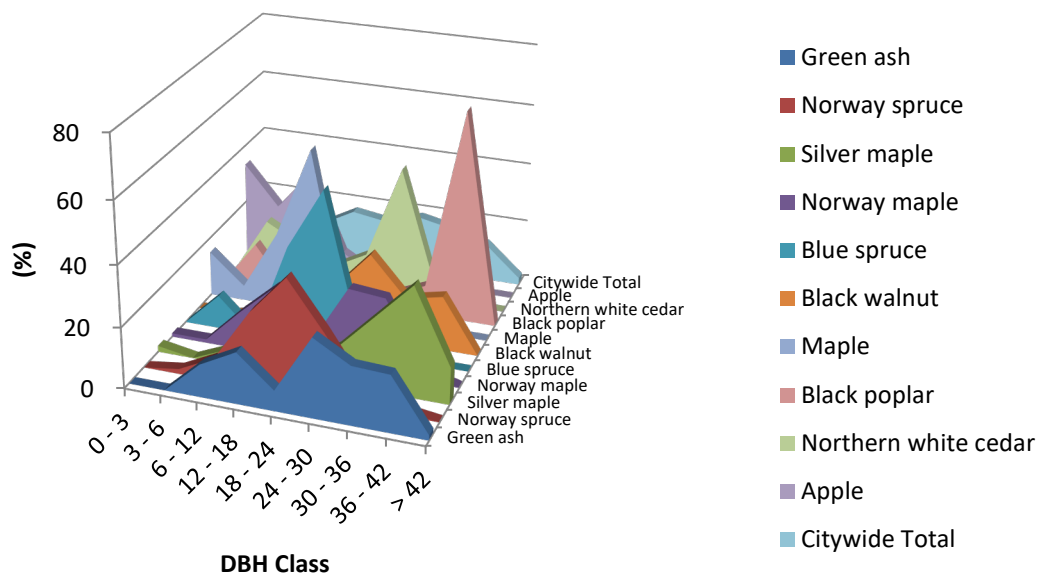
2/4/2023

Species	Energy	CO <sub>2</sub>	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Green ash	11,757	1,550	2,196	19,384	9,903	44,789	(N/A)	26.6
Norway spruce	3,595	350	110	9,477	3,997	17,529	(N/A)	10.4
Silver maple	7,380	1,640	1,441	16,007	12,496	38,965	(N/A)	23.1
Norway maple	4,967	419	911	6,243	2,069	14,609	(N/A)	8.7
Blue spruce	1,395	127	153	2,746	1,100	5,521	(N/A)	3.3
Black walnut	2,628	352	483	4,197	2,271	9,931	(N/A)	5.9
Maple	672	88	116	568	881	2,325	(N/A)	1.4
Black poplar	1,527	187	313	3,165	1,060	6,252	(N/A)	3.7
Northern white cedar	434	42	-2	1,250	362	2,086	(N/A)	1.2
Apple	196	17	30	92	54	390	(N/A)	0.2
Sugar maple	810	110	130	1,254	933	3,237	(N/A)	1.9
Northern hackberry	1,330	136	250	1,850	1,042	4,607	(N/A)	2.7
Honeylocust	1,030	131	178	1,729	2,528	5,597	(N/A)	3.3
American basswood	929	162	145	1,441	1,097	3,773	(N/A)	2.2
Northern red oak	155	17	22	110	116	419	(N/A)	0.2
Amur maple	67	7	10	28	24	137	(N/A)	0.1
Spruce	195	19	18	386	271	890	(N/A)	0.5
Bur oak	586	74	112	971	456	2,199	(N/A)	1.3
Broadleaf Deciduous Sn	27	3	4	10	9	52	(N/A)	0.0
Kentucky coffeetree	411	56	79	744	338	1,628	(N/A)	1.0
Red maple	131	14	19	88	156	409	(N/A)	0.2
Littleleaf linden	174	20	28	186	180	587	(N/A)	0.3
Eastern red cedar	110	7	9	195	62	384	(N/A)	0.2
Swamp white oak	35	4	5	21	42	106	(N/A)	0.1
Mulberry	36	3	5	14	13	72	(N/A)	0.0
Japanese tree lilac	36	3	5	14	13	72	(N/A)	0.0
Austrian pine	54	5	6	105	45	215	(N/A)	0.1
Black maple	121	13	23	155	109	422	(N/A)	0.3
River birch	24	3	3	16	26	73	(N/A)	0.0
Boxelder	39	6	6	39	39	129	(N/A)	0.1
White ash	20	2	3	17	33	76	(N/A)	0.0
Conifer Evergreen Large	30	3	1	80	47	163	(N/A)	0.1
Broadleaf Deciduous La	57	8	9	70	58	202	(N/A)	0.1
Paper birch	21	3	3	16	29	71	(N/A)	0.0
Callery pear	24	3	3	16	26	73	(N/A)	0.0
Broadleaf Deciduous M	1	0	0	0	3	4	(N/A)	0.0
Black cherry	18	2	3	7	6	36	(N/A)	0.0
American elm	94	9	19	123	74	320	(N/A)	0.2
Citywide Total	41,119	5,595	6,851	72,814	41,969	168,348	(N/A)	100.0

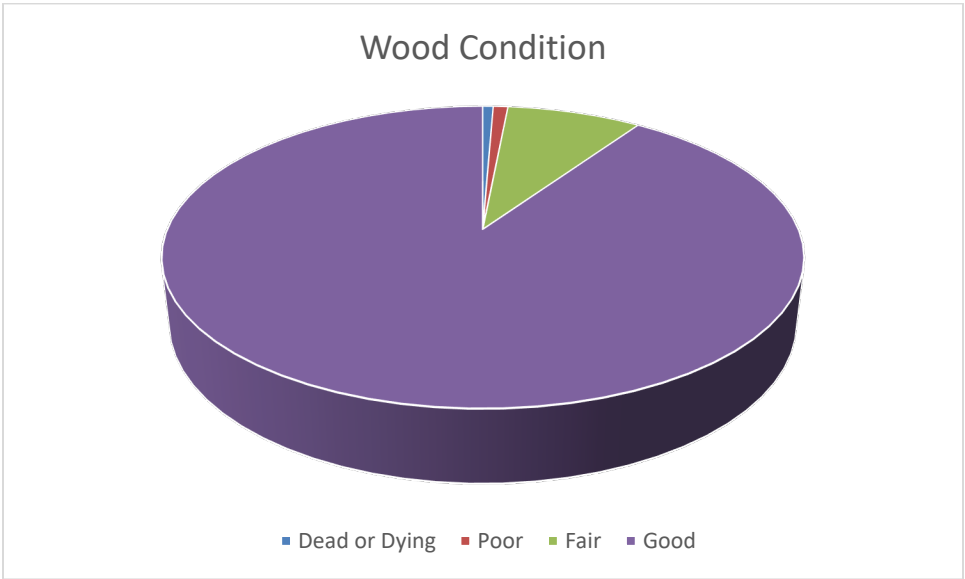


**Figure 1: Species Distribution**

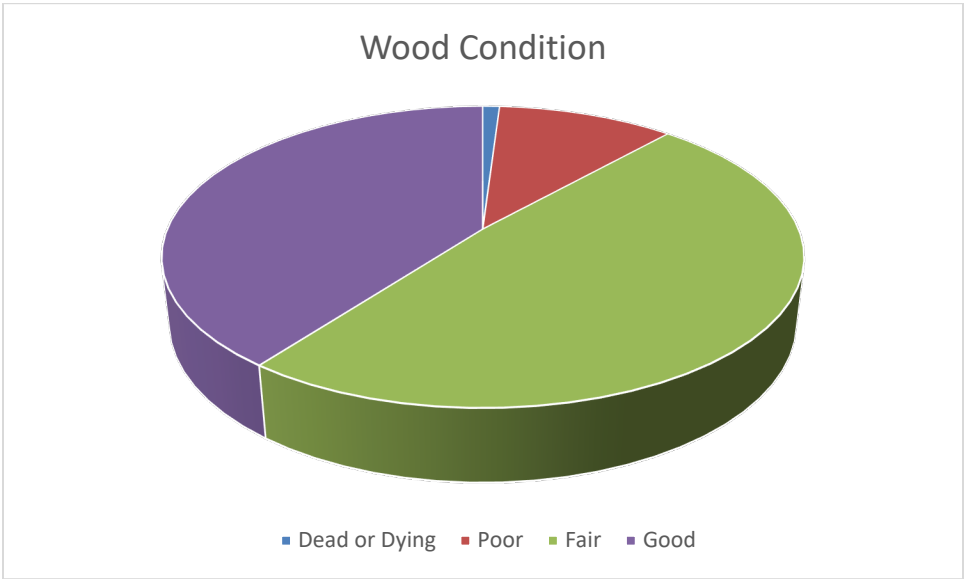
## Relative Age Distribution of Top 10 Public Tree Species (%)



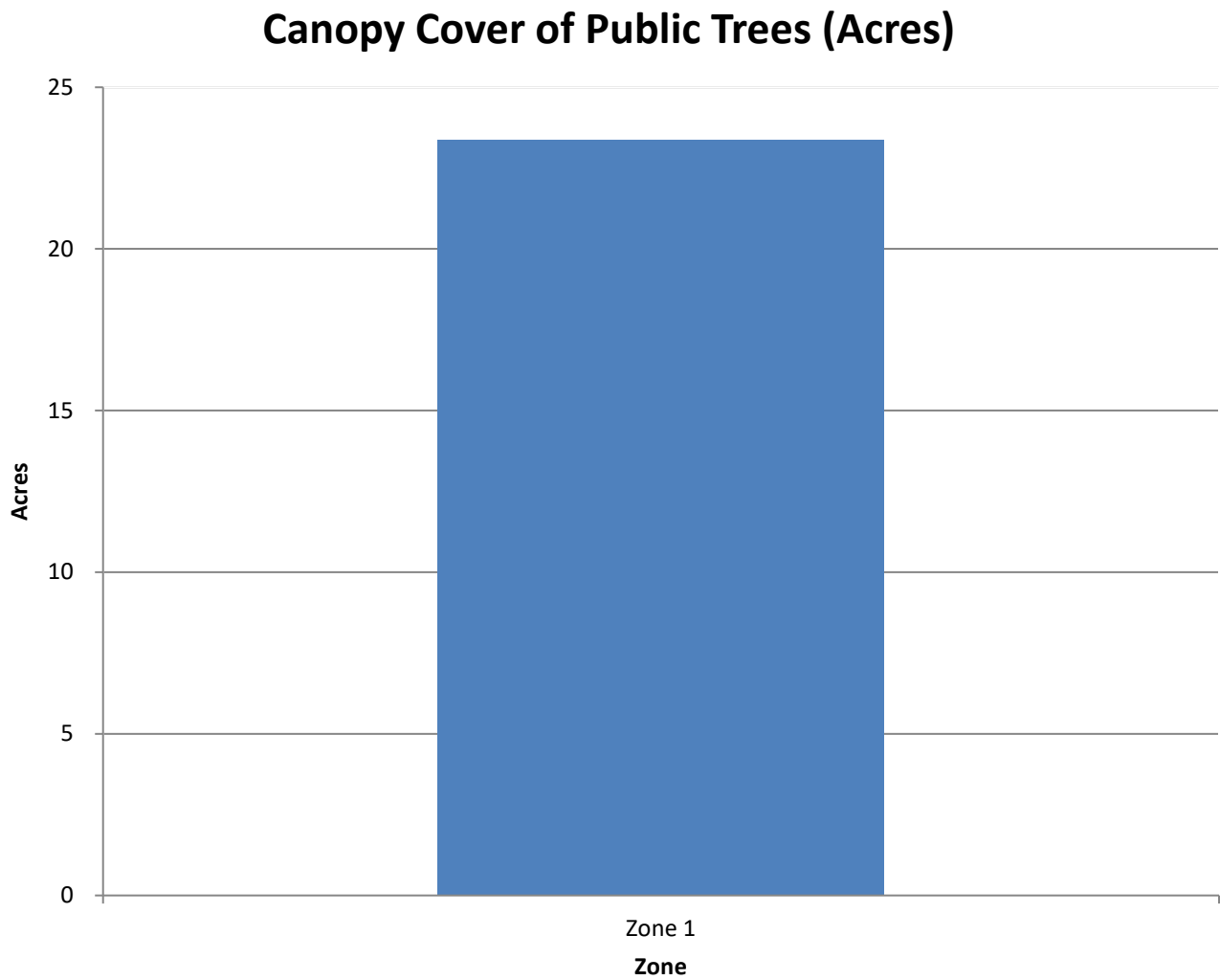
**Figure 2: Relative Age Class**



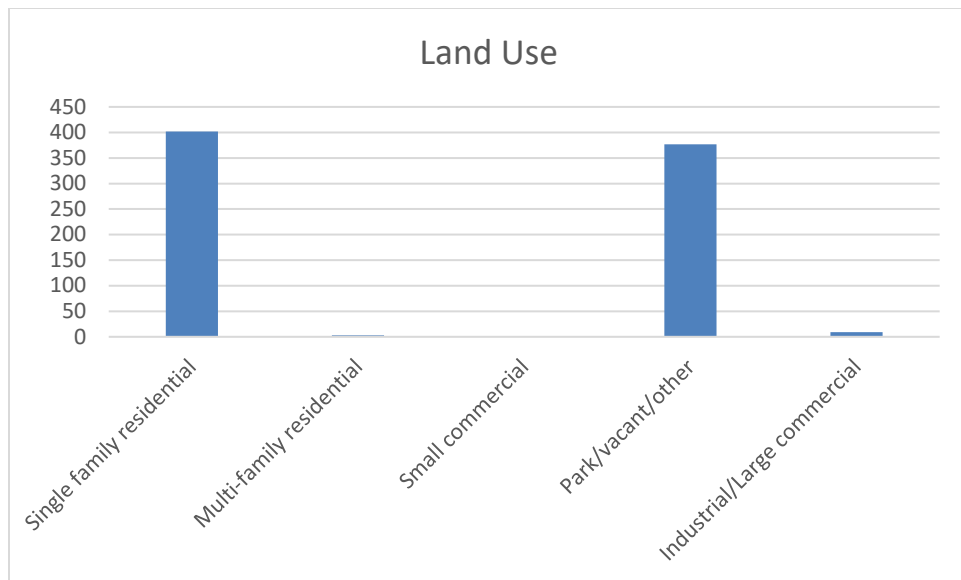
**Figure 3: Foliage Condition**



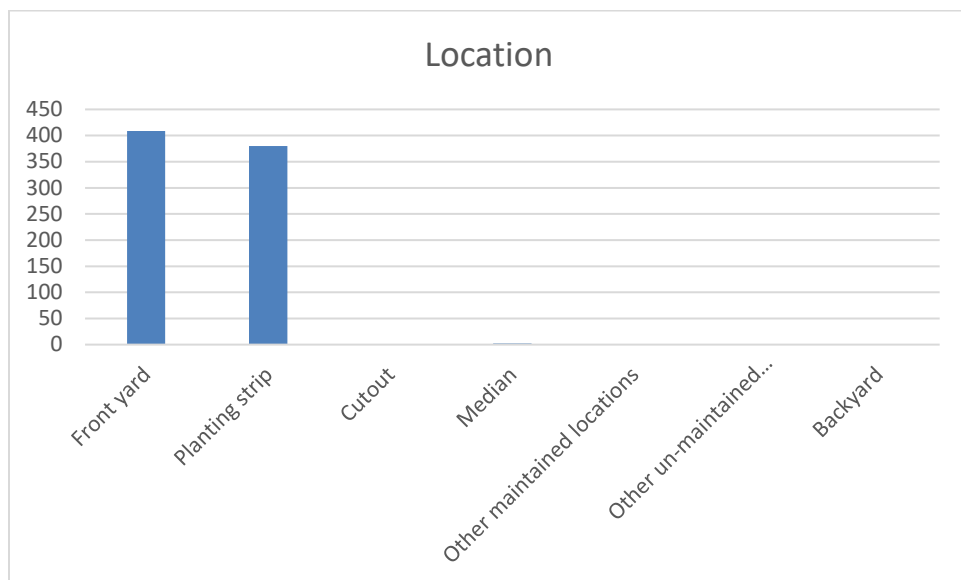
**Figure 4: Wood Condition**



**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

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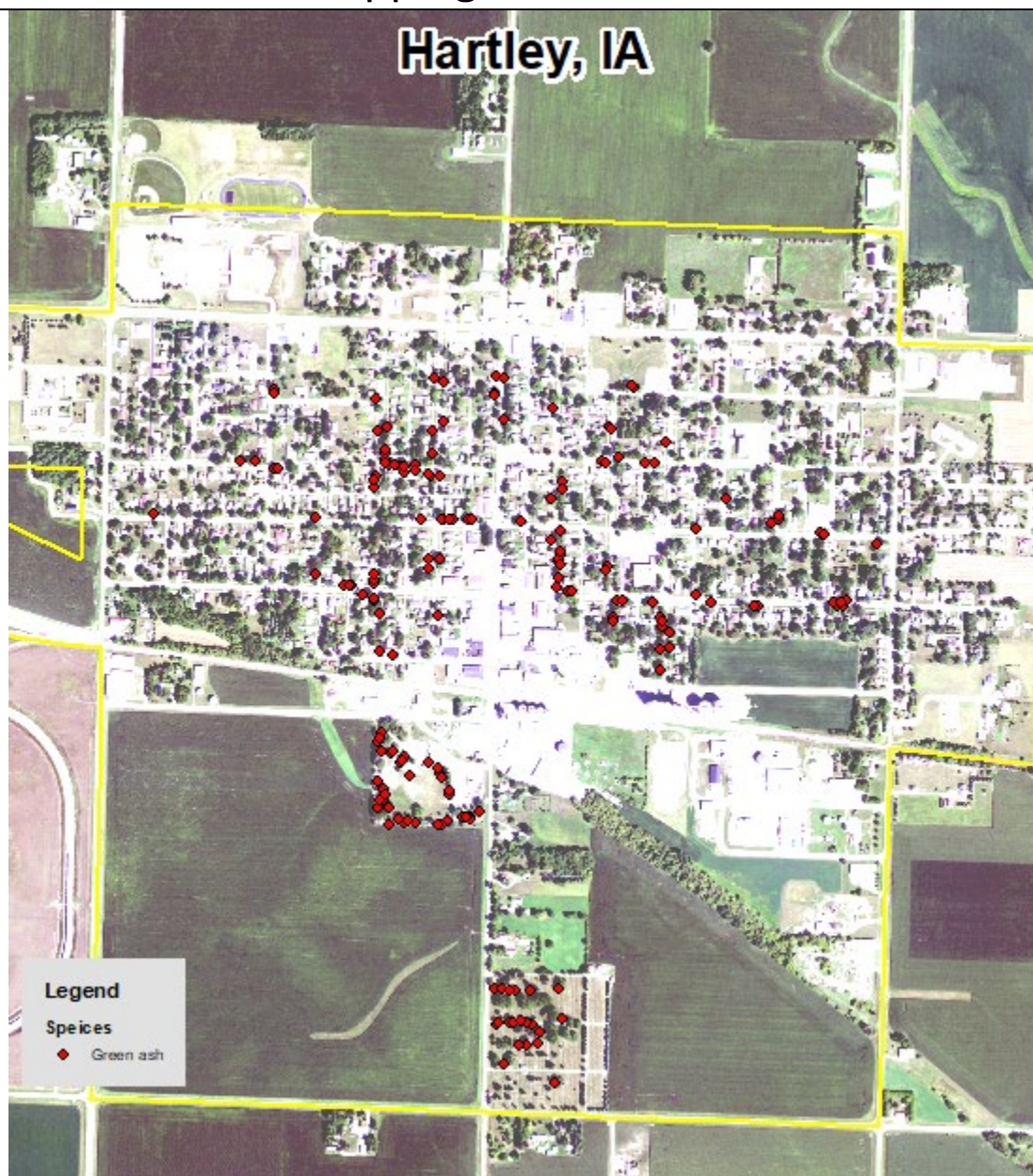


Figure 1: Location of Ash Trees

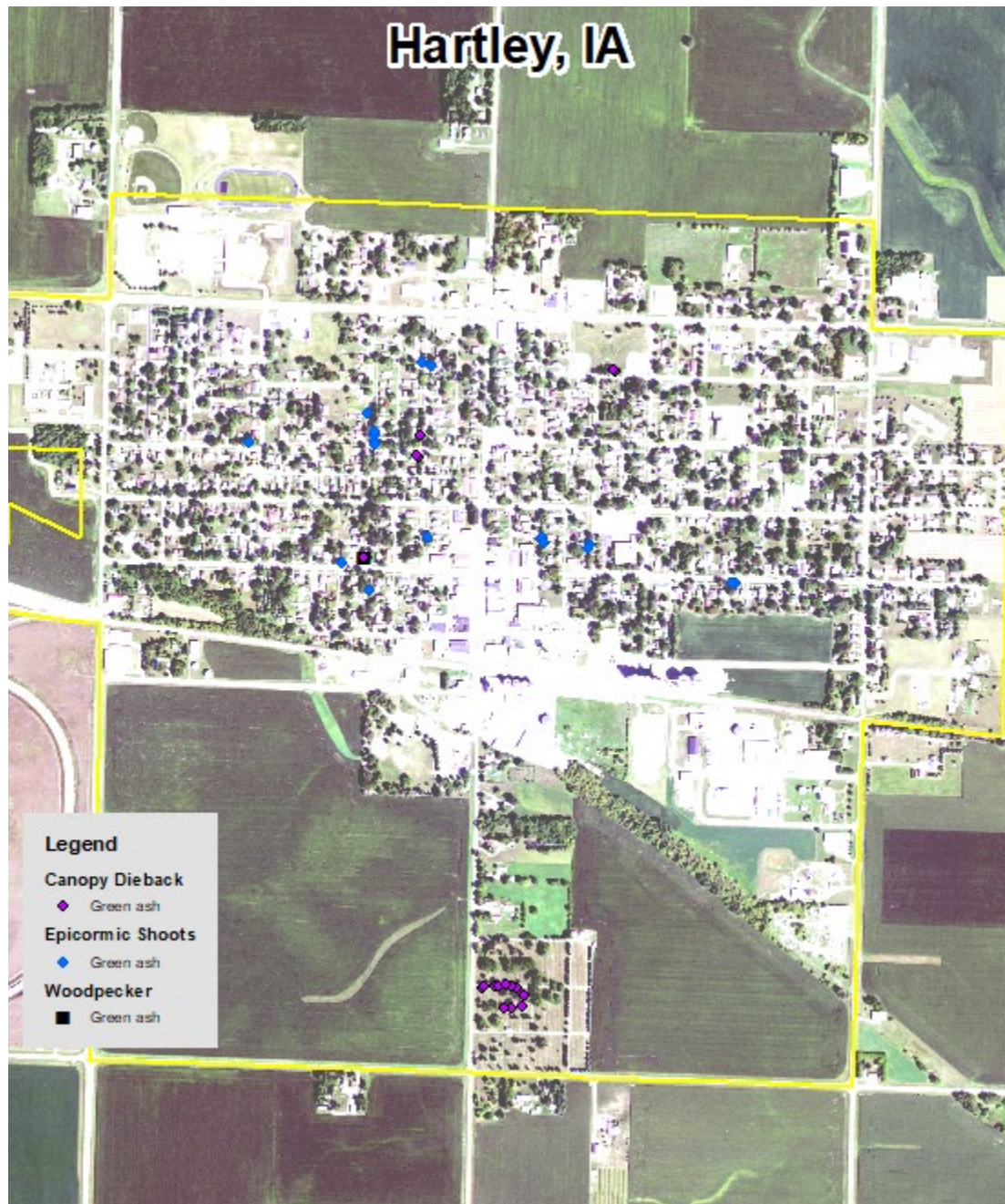
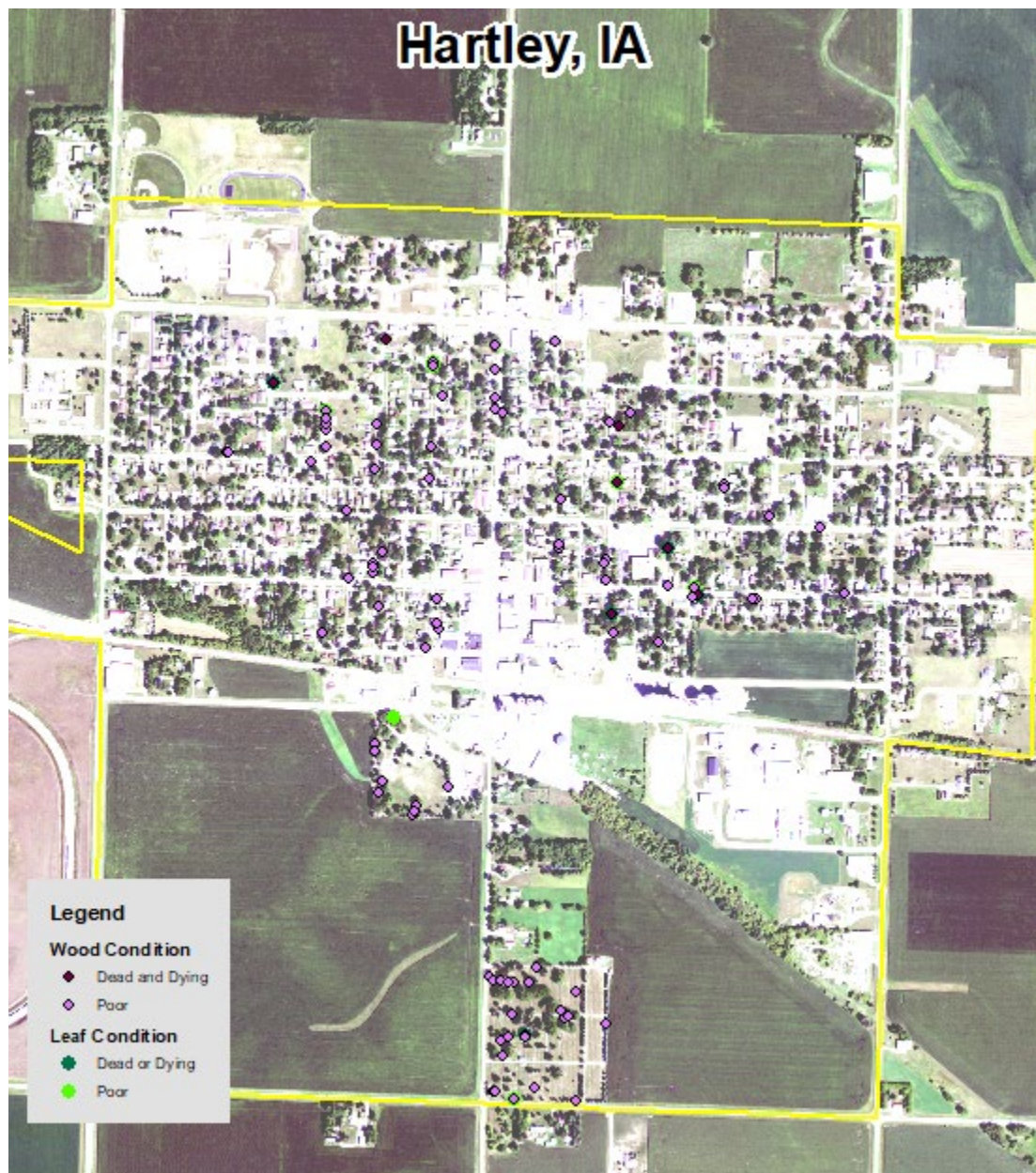
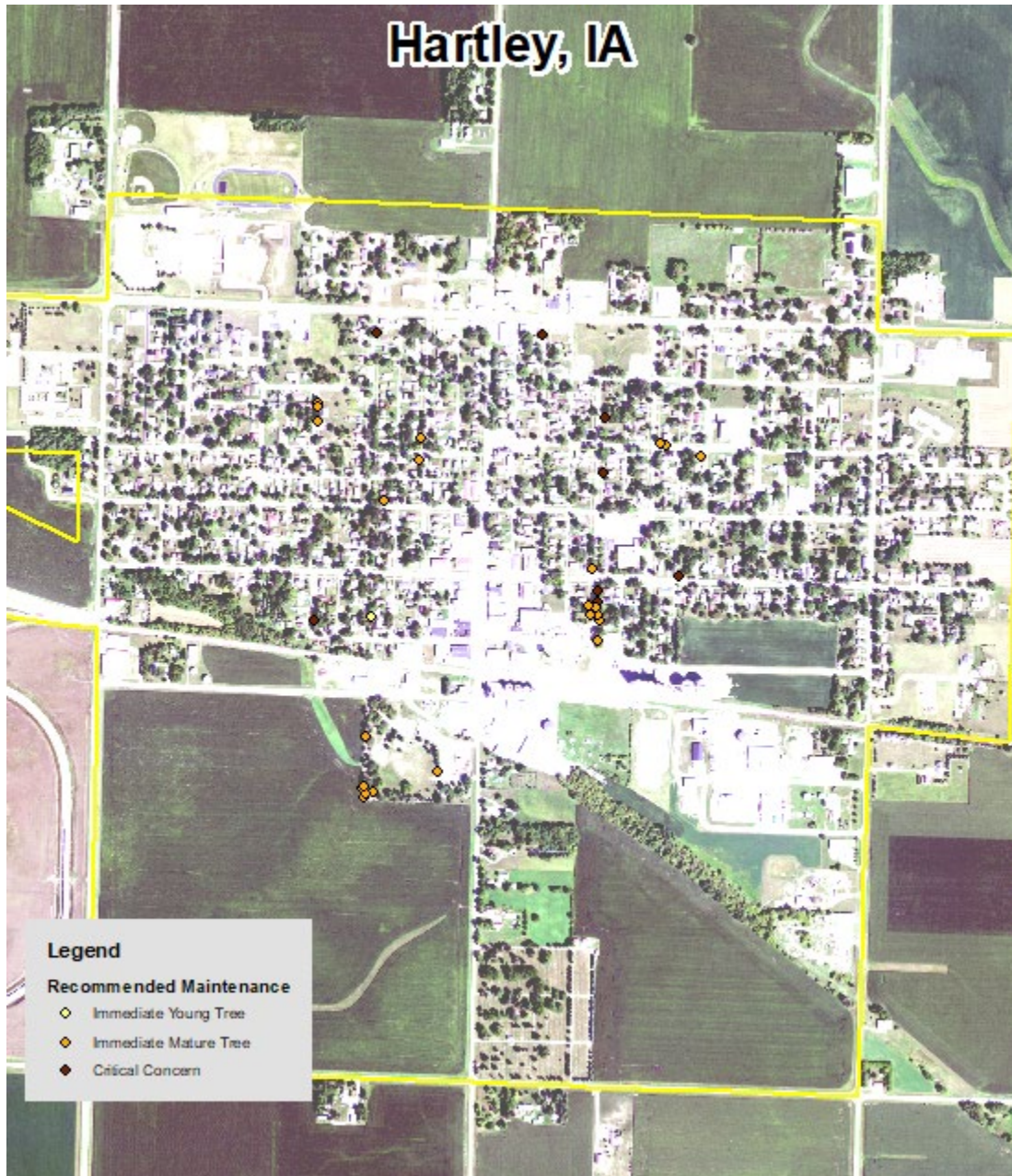


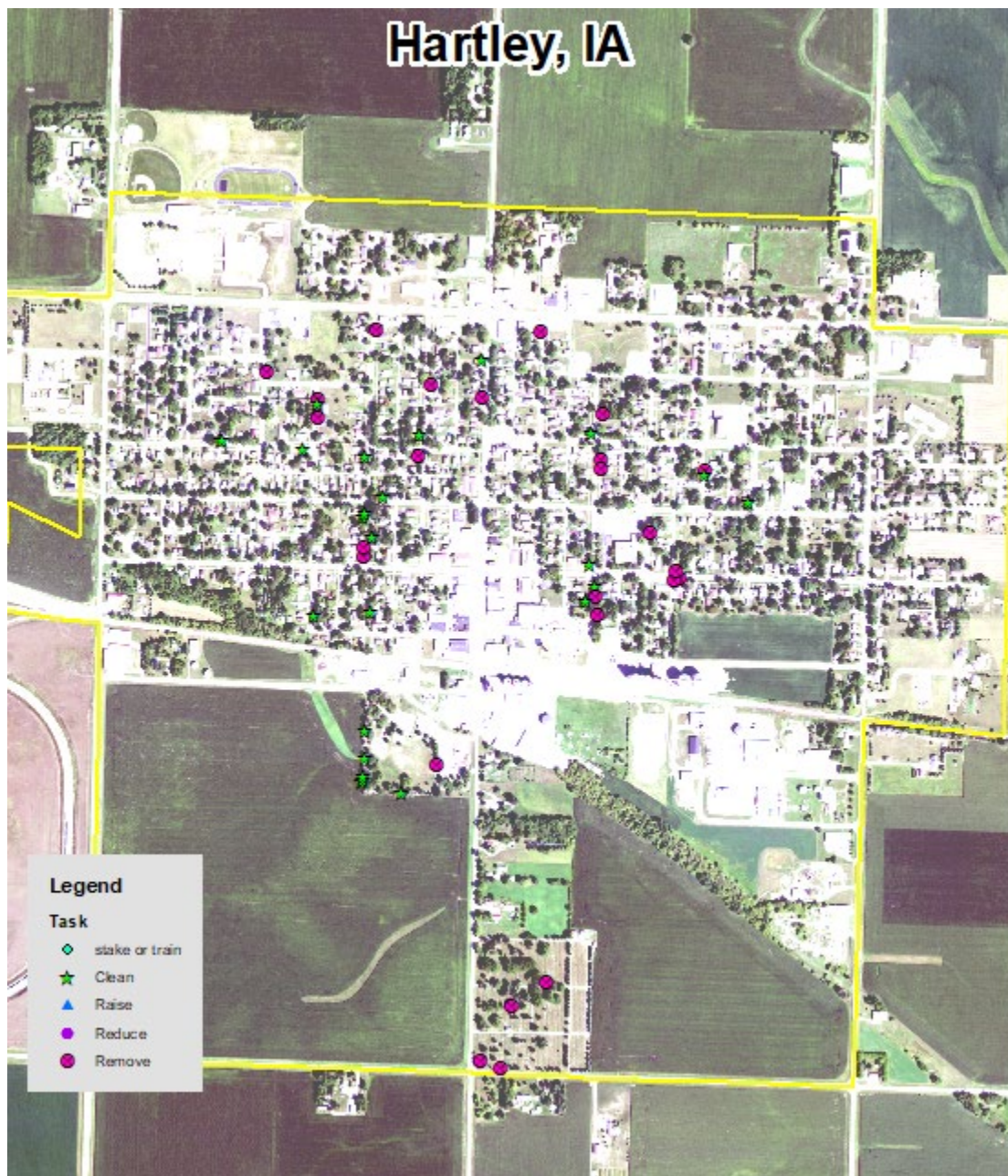
Figure 2: Location of EAB symptoms



**Figure 3: Location of Poor Condition Trees**



**Figure 4: Location of Trees with Recommended Maintenance**



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

# Appendix C: Hartley Tree Ordinances

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## CHAPTER 151

### TREES

151.01 Definition  
151.02 Planting Restrictions  
151.03 Duty to Trim Trees

151.04 Trimming Trees to Be Supervised  
151.05 Disease Control  
151.06 Inspection and Removal

**151.01 DEFINITION.** For use in this chapter, “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.

**151.02 PLANTING RESTRICTIONS.** No tree shall be planted in any parking or street except in accordance with the following:

1. **Alignment.** All trees planted in any street shall be planted in the parking 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 ten (10) feet from the property line.
2. **Spacing.** Trees shall not be planted on any parking which is less than nine (9) feet in width, or contains less than eighty-one (81) square feet of exposed soil surface per tree. Trees shall not be planted closer than twenty (20) feet from street intersections (property lines extended) and ten (10) feet from driveways. If it is at all possible trees should be planted inside the property lines and not between the sidewalk and the curb.
3. **Prohibited Trees.** No person shall plant in any street any fruit-bearing tree or any tree of the kinds commonly known as cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut.

**151.03 DUTY TO TRIM TREES.** The owner or agent of the abutting property shall keep the trees on, or overhanging the street, trimmed so that all branches will be at least fifteen (15) feet above the surface of the street and eight (8) feet above the sidewalks. 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.

*(Code of Iowa, Sec. 364.12[2c, d & e])*

**151.04 TRIMMING TREES TO BE SUPERVISED.** Except as allowed in Section 151.03, 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.

**151.05 DISEASE CONTROL.** Any dead, diseased or damaged tree or shrub which may harbor serious insect or disease pests or disease injurious to other trees is hereby declared to be a nuisance.

**151.06 INSPECTION AND REMOVAL.** The Council shall inspect or cause to be inspected any trees or shrubs in the City reported or suspected to be dead, diseased or damaged, and such trees and shrubs shall be subject to the following:

CODE OF ORDINANCES, HARTLEY, IOWA

- 727 -

1. **City Property.** If it is determined that any such condition exists on any public property, including the strip between the curb and the lot line of private property, the Council may cause such condition to be corrected by treatment or removal. The Council may also order the removal of any trees on the streets of the City which interfere with the making of improvements or with travel thereon.

2. **Private Property.** If it is determined with reasonable certainty that any such condition exists on private property and that danger to other trees or to adjoining property or passing motorists or pedestrians is imminent, the Council shall notify by certified mail the owner, occupant or person in charge of such property to correct such condition by treatment or removal within fourteen (14) days of said notification. If such owner, occupant or person in charge of said property fails to comply within 14 days of receipt of notice, the Council may cause the condition to be corrected and the cost assessed against the property.

*(Code of Iowa, Sec. 364.12[3b & h])*

[The next page is 751]

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