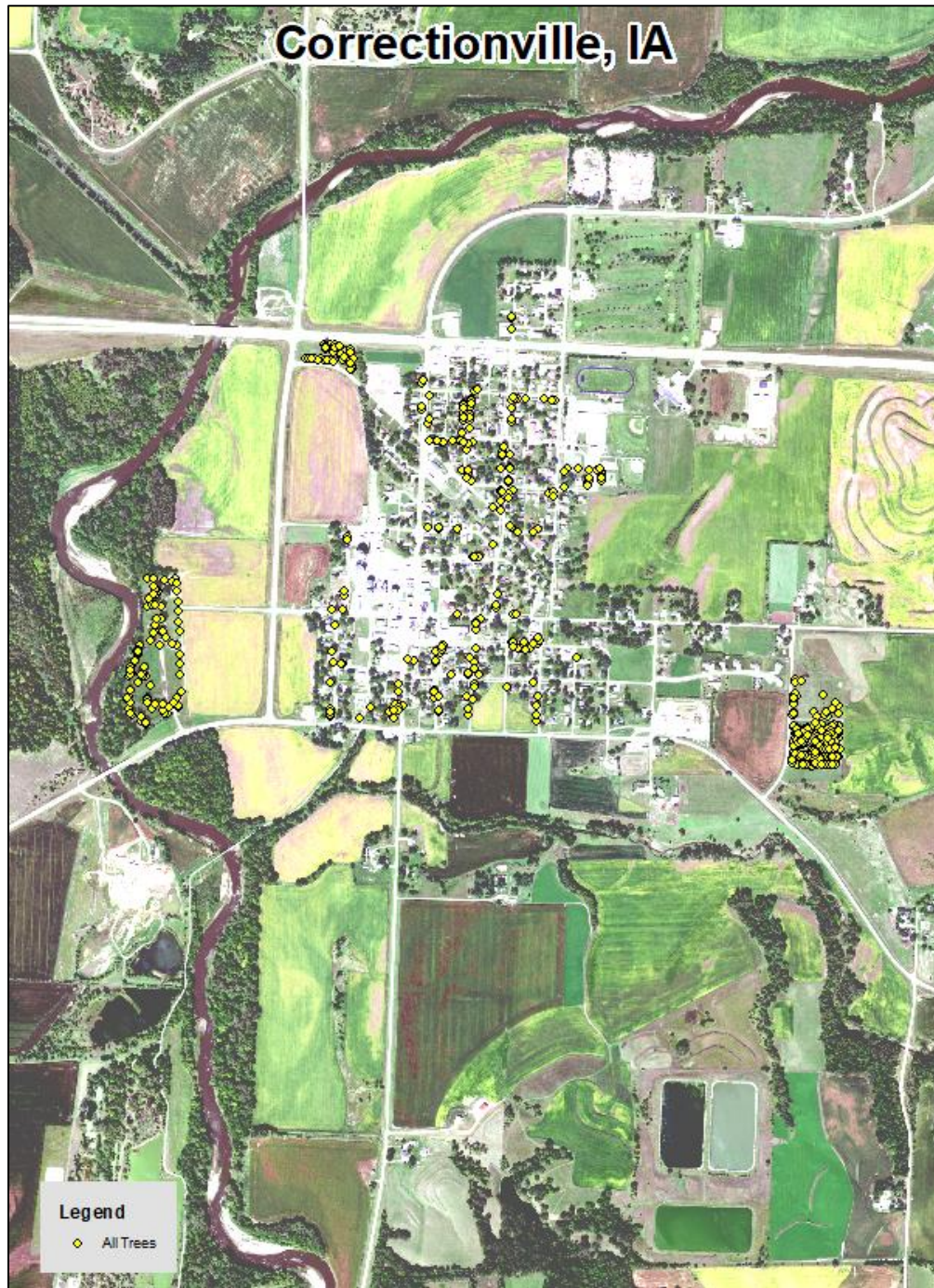


Correctionville, IA



2022 Urban Forest Management Plan
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Executive Summary

Overview

This plan was developed to assist the City of Correctionville 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 15% of Correctionville's city owned trees (ash) will die once EAB becomes established in the community, unless preventative treatment is used. With proper planning and management, the costs of removing dead and dying trees can be extended over years, mitigating public safety issues.

Inventory and Results

In 2021, a tree inventory was conducted using Global Positioning System (GPS) data collectors. The inventory was a complete inventory of street and park trees. Below are some key findings of the 536 trees inventoried.

- Correctionville's trees provide \$116,333 of benefits annually, an average of \$217 a tree
- There are over 18 species of trees
- The top three genera are: Spruce 37%, Maple 22%, Ash 15%
- 10% of trees are in need of some type of management
- 18 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 18 trees needing removal, 6 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*](#)
- 7 of the 84 ash trees should be carefully examined, as they have one or more symptoms that could be related to an EAB infestation
- All trees should be pruned on a routine schedule- one third of the city every other year
- Plant a diverse mix of trees that do not include: ash, maple, cottonwood, poplar, box elder, Chinese elm, evergreen, willow or black walnut
- Check ash trees with a visual survey yearly
- With the current budget it could take 20 years to remove ash – Suggestion: request a budget increase to \$10,000 annually and apply for grants to plant replacement trees

Introduction

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

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

Inventory

In 2021, a tree inventory was conducted that included 100% of the city owned trees on both streets and parks. The tree data was collected using a handheld Global Positioning System (GPS) receiver. The data collector gives Geographic Information Systems (GIS) coordinates with an accuracy of 3 meters, which can be used in Arc GIS as an active GIS data layer. Because the inventory is a digital document the data can be updated with new information and become a working document.

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

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

Inventory Results

The data collected for the 536 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management as part of the i-Tree suite. The following are results from the i-Tree STREETS analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Correctionville's trees reduce energy related costs by approximately \$27,233 annually (Appendix A, Table 1). These savings are both in Electricity (132.8 MWh) and in Natural Gas (17,506.5 Therms).

Annual Stormwater Benefits

Correctionville's trees intercept about 1,812,589 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides \$49,121 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 Correctionville, it is estimated that trees remove 1,662.6 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 4,558 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Correctionville, trees sequester about 346,836 lbs of carbon a year with an associated value of \$2,601 (Appendix A, Table 5). In addition, the trees store 6,817,212 lbs of carbon, with a yearly benefit of \$51,129 (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. Correctionville receives \$31,406 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, Correctionville's trees provide \$116,333 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 536 trees in Correctionville provide approximately \$217 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Correctionville has over 18 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genera is as follows:

Spruce	197	37%
Maple	119	22%
Ash	84	15%
Hackberry	42	7%
Cottonwood	15	3%
Apple	14	3%
Walnut	12	2%
Cedar	12	2%
Elm	11	2%
Linden/Basswood	7	1%
Pine	5	<1%
Oak	5	<1%
Locust	4	<1%
Boxelder	3	<1%
Coffeetree	1	<1%
Catalpa	1	<1%
Buckeye	1	<1%
Other Large Broadleaf	3	<1%

Age Class

Most of Correctionville's trees 36% are between 12 and 18 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, it is preferred that the highest amounts of trees are in the smallest size category (a downward slope) to prepare for natural mortality and to maintain canopy cover. Correctionville's size curve is on the smaller side, indicating a younger than average stand.

Condition: Wood and Foliage

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The foliage condition results for Correctionville indicate that 81% of the trees are in good health, with only 3% of the foliage in poor health, dead or dying (Appendix A, Figure 3 & Appendix B, Figure 3). Similarly, 71% of Correctionville'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 1% of the population. This 1% 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	18	3%
Tree Removal	17	3%
Crown Reduction	15	2%

Canopy Cover

The total canopy with both private and public trees is 18%, 67 acres. The canopy cover on city own properties included in the Correctionville inventory includes approximately 16 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 27 trees need to be planted annually on public and/or private lands.

Land Use and Location

The majority of Correctionville’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.

<u>Land Use</u>	
Industrial/Large commercial	68%
Single family residential	32%
 <u>Location</u>	
Planting strip	60%
Front yard	40%

Recommendations

Risk Management

Hazardous trees can be a significant threat to both people and property. Trees that are dead or dying, or that have large issues such as trunk cracks longer than 18 inches should be removed. Broken branches and branches that interfere with motorist’s vision of pedestrians, vehicles, traffic signs and signals, etc should be removed.

Hazardous trees

There are 6 trees over 24 inches in diameter at 4.5 ft that should be addressed immediately. Please refer to the six year maintenance plan at the end of this section. After all of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance. There are a total of 14 trees with these needs.

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 18 removals, 3 are ash trees. There are a total of 84 ash trees, and 7 of those have signs and symptoms that have been associated with EAB. In addition,

there are 11 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 Correctionville.

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 Spruces (37%) (Appendix A, Figure 1). Spruces 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.

Continual Monitoring

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

Budget and Emerald Ash Borer Plan

Six Year Maintenance Plan with No Additional Funding

Current Budget: \$3,400/year, Total \$20,400 over 6 years
(\$12,200 with Ash removal, Total \$73,000 over 6 years)

FY 2022

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

FY 2023

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

FY 2024

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

FY 2025

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

FY 2026

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

FY 2027

Removal: 3 Large tree removal , \$2,400 (11 Ash trees, 8,800)
Planting and Replacement: 4 trees to be planted in open locations, \$400
Young Tree Pruning & Maintenance: \$600
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: Approximately 63 ash trees removed (approximately 25% of ash) EAB could potentially kill all ash within 4 to 15 years of its arrival.

**To remove all ash trees within 6 years, the budget would need to be increased by \$11,200 a year.

Ash Tree Removal

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

Treatment of Ash Trees

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

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of millions of ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

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

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

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

Wood Disposal

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

Canopy Replacement

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.

Proposed Budget Increase

EAB could potentially kill all ash trees in Correctionville within 4 years of its arrival. To remove all ash trees within 6 years the budget would need to be increased to \$12,200 (total ash + all other removals *removal cost + (planting and maintenance *1.2 of removals) /6) a year. Additionally, it is recommended that Correctionville apply for grants to fund replacement trees. Utility Company grants are usually between \$500 and \$10,000 for community-based, tree-planting projects that include parks, gateways, cemeteries, nature trails, libraries, nursing homes, and schools.

Another option being considered by many communities is treating a number of selected trees, either to maintain those trees in the landscape or to delay their removal – to spread out the costs and number of trees needing removed all at once. Trunk injection is administered every two years for the life of the tree. If treatment is discontinued, the tree dies. For instance, in this treatment scenario, the average ash diameter is 20 inches and at \$15 per inch, about 4 trees could be treated per year (every other year treatment) would be \$1,200. This would be 8 trees selected for treatment, and Correctionville would still need to find \$5,600 for removal. Alternatively, if there are 15 treatable trees, it would cost approximately \$2,250 a year for treatment and leave \$1,150 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 Correctionville. 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

Correctionville

Annual Energy Benefits of Public Trees

4/4/2022

Species	Total Electricity (MWh)	Electricity (\$)	Total Natural Gas (Therms)	Natural Gas (\$)	Total Standard (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Spruce	13.8	1,046	1,673.3	1,640	2,686	(N/A)	18.9	9.9	26.59
Silver maple	37.3	2,829	4,956.1	4,857	7,686	(N/A)	17.0	28.2	84.46
Green ash	23.3	1,770	3,037.7	2,977	4,747	(N/A)	15.2	17.4	58.61
Norway spruce	10.4	788	1,253.1	1,228	2,016	(N/A)	14.2	7.4	26.52
Northern hackberry	16.7	1,264	2,340.0	2,293	3,557	(N/A)	7.9	13.1	84.70
Blue spruce	2.2	166	281.6	276	442	(N/A)	3.6	1.6	23.28
Eastern cottonwood	6.5	493	865.4	848	1,341	(N/A)	2.8	4.9	89.39
Maple	1.7	132	242.5	238	369	(N/A)	2.6	1.4	26.38
Apple	0.3	20	45.4	44	64	(N/A)	2.6	0.2	4.58
Black walnut	3.5	269	460.8	452	721	(N/A)	2.2	2.6	60.04
Norway maple	2.0	150	293.6	288	438	(N/A)	1.7	1.6	48.66
Eastern red cedar	0.8	59	115.1	113	172	(N/A)	1.3	0.6	24.57
American elm	1.9	144	250.1	245	389	(N/A)	0.9	1.4	77.77
Northern white cedar	0.8	59	98.2	96	155	(N/A)	0.9	0.6	31.02
American basswood	1.3	100	192.3	188	288	(N/A)	0.7	1.1	71.99
Honeylocust	1.5	111	189.6	186	297	(N/A)	0.7	1.1	74.28
Boxelder	0.8	61	113.2	111	172	(N/A)	0.6	0.6	57.43
Littleleaf linden	0.2	18	37.4	37	55	(N/A)	0.6	0.2	18.25
Northern red oak	0.7	51	90.3	89	139	(N/A)	0.6	0.5	46.41
White ash	1.3	95	159.6	156	252	(N/A)	0.6	0.9	83.95
Scotch pine	0.4	34	53.9	53	86	(N/A)	0.6	0.3	28.82
Red maple	0.3	25	49.5	49	74	(N/A)	0.6	0.3	24.58
Elm	1.3	100	176.9	173	273	(N/A)	0.6	1.0	91.02
Siberian elm	1.3	102	174.9	171	273	(N/A)	0.6	1.0	91.06
Austrian pine	0.3	25	46.5	46	71	(N/A)	0.4	0.3	35.47
Amur maple	0.4	30	63.2	62	92	(N/A)	0.4	0.3	46.14
Bur oak	0.3	25	40.7	40	65	(N/A)	0.4	0.2	32.43
Broadleaf Deciduous Large	0.4	33	59.0	58	91	(N/A)	0.2	0.3	91.02
Black spruce	0.1	10	15.2	15	25	(N/A)	0.2	0.1	24.51
Kentucky coffeetree	0.4	29	53.7	53	82	(N/A)	0.2	0.3	82.02
Ohio buckeye	0.3	20	39.6	39	59	(N/A)	0.2	0.2	58.69
Northern catalpa	0.3	20	38.1	37	57	(N/A)	0.2	0.2	57.32
Total	132.8	10,077	17,506.5	17,156	27,233	(N/A)	100.0	100.0	51.00

**Table 2: Annual Stormwater Benefits
Correctionville**

Annual Stormwater Benefits of Public Trees

4/4/2022

Species	Total rainfall interception (Gal)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Spruce	215,957	5,852	(N/A)	18.9	11.9	57.94
Silver maple	629,955	17,072	(N/A)	17.0	34.8	187.60
Green ash	242,826	6,581	(N/A)	15.2	13.4	81.24
Norway spruce	158,708	4,301	(N/A)	14.2	8.8	56.59
Northern hackberry	181,468	4,918	(N/A)	7.9	10.0	117.09
Blue spruce	28,491	772	(N/A)	3.6	1.6	40.64
Eastern cottonwood	92,104	2,496	(N/A)	2.8	5.1	166.40
Maple	10,098	274	(N/A)	2.6	0.6	19.55
Apple	875	24	(N/A)	2.6	0.0	1.69
Black walnut	42,073	1,140	(N/A)	2.2	2.3	95.01
Norway maple	18,134	491	(N/A)	1.7	1.0	54.60
Eastern red cedar	11,442	310	(N/A)	1.3	0.6	44.30
American elm	17,823	483	(N/A)	0.9	1.0	96.60
Northern white cedar	15,256	413	(N/A)	0.9	0.8	82.69
American basswood	15,787	428	(N/A)	0.7	0.9	106.96
Honeylocust	18,739	508	(N/A)	0.7	1.0	126.96
Boxelder	10,203	277	(N/A)	0.6	0.6	92.17
Littleleaf linden	1,382	37	(N/A)	0.6	0.1	12.48
Northern red oak	6,262	170	(N/A)	0.6	0.3	56.57
White ash	16,407	445	(N/A)	0.6	0.9	148.21
Scotch pine	7,682	208	(N/A)	0.6	0.4	69.39
Red maple	1,876	51	(N/A)	0.6	0.1	16.95
Elm	21,717	589	(N/A)	0.6	1.2	196.17
Siberian elm	17,711	480	(N/A)	0.6	1.0	159.99
Austrian pine	5,849	159	(N/A)	0.4	0.3	79.26
Amur maple	2,348	64	(N/A)	0.4	0.1	31.82
Bur oak	2,073	56	(N/A)	0.4	0.1	28.09
Broadleaf Deciduous Large	7,239	196	(N/A)	0.2	0.4	196.17
Black spruce	1,544	42	(N/A)	0.2	0.1	41.85
Kentucky coffeetree	5,491	149	(N/A)	0.2	0.3	148.79
Ohio buckeye	2,479	67	(N/A)	0.2	0.1	67.19
Northern catalpa	2,591	70	(N/A)	0.2	0.1	70.21
Citywide total	1,812,589	49,121	(N/A)	100.0	100.0	91.99

Table 3: Annual Air Quality Benefits

Correctionville

Annual Air Quality Benefits of Public Trees

4/4/2022

Species	Deposition (lb)				Total Depos. (\$)	Avoided (lb)				Total Avoided (\$)	BVOC Emissions (lb)	BVOC Emissions (\$)	Total (lb)	Total Standard (\$ Error)	% of Total Trees	Avg. \$/tree
	O ₃	NO ₂	PM ₁₀	SO ₂		NO ₂	PM ₁₀	VOC	SO ₂							
Spruce	24.8	4.9	20.6	3.0	164	63.7	9.4	9.0	62.4	402	-96.8	-363	101.0	203 (N/A)	18.9	2.01
Silver maple	127.1	21.5	60.6	5.6	680	176.2	25.8	24.6	168.6	1,101	-67.4	-253	542.5	1,528 (N/A)	17.0	16.79
Green ash	31.1	5.0	14.9	1.4	166	110.0	16.1	15.4	105.7	689	0.0	0	299.5	854 (N/A)	15.2	10.54
Norway spruce	18.1	3.6	15.1	2.2	120	47.9	7.1	6.8	47.0	302	-69.1	-259	78.7	163 (N/A)	14.2	2.15
Northern hackberry	32.0	5.5	15.8	1.4	173	80.2	11.6	11.1	75.5	498	0.0	0	233.2	671 (N/A)	7.9	15.98
Blue spruce	3.6	0.7	3.1	0.4	24	10.3	1.5	1.4	9.9	64	-10.3	-38	20.7	50 (N/A)	3.6	2.64
Eastern cottonwood	18.3	2.9	8.0	0.8	96	30.8	4.5	4.3	29.4	192	0.0	0	99.1	288 (N/A)	2.8	19.19
Maple	1.5	0.3	0.8	0.1	8	8.3	1.2	1.2	7.9	52	-0.6	-2	20.5	58 (N/A)	2.6	4.12
Apple	0.1	0.0	0.1	0.0	1	1.3	0.2	0.2	1.2	8	0.0	0	3.1	9 (N/A)	2.6	0.63
Black walnut	5.7	0.9	2.7	0.3	30	16.7	2.4	2.3	16.1	105	0.0	0	47.1	135 (N/A)	2.2	11.24
Norway maple	3.6	0.6	1.8	0.2	19	9.7	1.4	1.3	9.0	60	-0.9	-3	26.7	76 (N/A)	1.7	8.44
Eastern red cedar	2.4	0.5	1.9	0.3	16	3.8	0.5	0.5	3.5	23	-6.3	-24	7.1	15 (N/A)	1.3	2.19
American elm	3.3	0.6	1.6	0.1	18	9.0	1.3	1.3	8.6	56	0.0	0	25.7	74 (N/A)	0.9	14.75
Northern white cedar	1.8	0.4	1.5	0.2	12	3.6	0.5	0.5	3.5	23	-8.2	-31	3.9	4 (N/A)	0.9	0.79
American basswood	2.2	0.4	1.1	0.1	12	6.4	0.9	0.9	5.9	39	-1.9	-7	16.0	44 (N/A)	0.7	11.10
Honeylocust	3.8	0.6	1.7	0.2	20	6.9	1.0	1.0	6.6	43	-3.0	-11	18.7	51 (N/A)	0.7	12.87
Boxelder	1.5	0.2	0.7	0.1	8	3.9	0.6	0.5	3.7	24	-0.5	-2	10.5	30 (N/A)	0.6	9.94
Littleleaf linden	0.1	0.0	0.1	0.0	1	1.2	0.2	0.2	1.1	7	-0.1	0	2.7	8 (N/A)	0.6	2.55
Northern red oak	1.3	0.2	0.6	0.1	7	3.2	0.5	0.4	3.0	20	-1.8	-7	7.5	20 (N/A)	0.6	6.65
White ash	3.2	0.5	1.4	0.1	17	5.9	0.9	0.8	5.7	37	0.0	0	18.6	54 (N/A)	0.6	17.92
Scotch pine	0.9	0.2	0.7	0.1	6	2.1	0.3	0.3	2.0	13	-4.0	-15	2.6	4 (N/A)	0.6	1.35
Red maple	0.2	0.0	0.1	0.0	1	1.6	0.2	0.2	1.5	10	-0.1	0	3.9	11 (N/A)	0.6	3.64
Elm	3.5	0.6	1.5	0.2	18	6.2	0.9	0.9	6.0	39	0.0	0	19.7	57 (N/A)	0.6	19.04
Siberian elm	3.6	0.6	1.7	0.2	19	6.3	0.9	0.9	6.1	40	0.0	0	20.3	59 (N/A)	0.6	19.64
Austrian pine	1.1	0.2	0.8	0.1	7	1.6	0.2	0.2	1.5	10	-2.3	-9	3.5	8 (N/A)	0.4	4.16
Amur maple	0.9	0.1	0.4	0.0	5	2.0	0.3	0.3	1.8	12	0.0	0	5.8	17 (N/A)	0.4	8.35
Bur oak	0.1	0.0	0.1	0.0	1	1.5	0.2	0.2	1.5	10	0.0	0	3.7	10 (N/A)	0.4	5.21
Broadleaf Deciduous Large	1.2	0.2	0.5	0.1	6	2.1	0.3	0.3	2.0	13	0.0	0	6.6	19 (N/A)	0.2	19.04
Black spruce	0.2	0.0	0.2	0.0	1	0.6	0.1	0.1	0.6	4	-0.6	-2	1.2	3 (N/A)	0.2	2.89
Kentucky coffeetree	0.8	0.1	0.4	0.0	4	1.9	0.3	0.3	1.8	12	0.0	0	5.5	16 (N/A)	0.2	15.71
Ohio buckeye	0.5	0.1	0.2	0.0	3	1.3	0.2	0.2	1.2	8	-0.1	0	3.6	10 (N/A)	0.2	10.16
Northern catalpa	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)	0.2	9.34
Citywide total	298.8	51.6	160.8	17.5	1,663	627.3	91.8	87.6	601.3	3,923	-274.0	-1,027	1,662.6	4,558 (N/A)	100.0	8.54

Table 4: Annual Carbon Stored

Correctionville

Stored CO2 Benefits of Public Trees

4/4/2022

Species	Total Stored CO2 (lbs)	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Spruce	230,378	1,728	(N/A)	18.9	3.4	17.11
Silver maple	3,259,363	24,445	(N/A)	17.0	47.8	268.63
Green ash	1,032,657	7,745	(N/A)	15.2	15.1	95.62
Norway spruce	162,877	1,222	(N/A)	14.2	2.4	16.07
Northern hackberry	505,622	3,792	(N/A)	7.9	7.4	90.29
Blue spruce	22,539	169	(N/A)	3.6	0.3	8.90
Eastern cottonwood	638,684	4,790	(N/A)	2.8	9.4	319.34
Maple	19,373	145	(N/A)	2.6	0.3	10.38
Apple	2,875	22	(N/A)	2.6	0.0	1.54
Black walnut	193,343	1,450	(N/A)	2.2	2.8	120.84
Norway maple	59,322	445	(N/A)	1.7	0.9	49.44
Eastern red cedar	7,714	58	(N/A)	1.3	0.1	8.27
American elm	71,106	533	(N/A)	0.9	1.0	106.66
Northern white cedar	20,664	155	(N/A)	0.9	0.3	31.00
American basswood	80,381	603	(N/A)	0.7	1.2	150.71
Honeylocust	48,979	367	(N/A)	0.7	0.7	91.84
Boxelder	51,366	385	(N/A)	0.6	0.8	128.42
Littleleaf linden	3,074	23	(N/A)	0.6	0.0	7.68
Northern red oak	27,052	203	(N/A)	0.6	0.4	67.63
White ash	50,174	376	(N/A)	0.6	0.7	125.43
Scotch pine	9,831	74	(N/A)	0.6	0.1	24.58
Red maple	3,302	25	(N/A)	0.6	0.0	8.26
Elm	117,776	883	(N/A)	0.6	1.7	294.44
Siberian elm	88,059	660	(N/A)	0.6	1.3	220.15
Austrian pine	9,787	73	(N/A)	0.4	0.1	36.70
Amur maple	13,485	101	(N/A)	0.4	0.2	50.57
Bur oak	4,706	35	(N/A)	0.4	0.1	17.65
Broadleaf Deciduous	39,259	294	(N/A)	0.2	0.6	294.44
Black spruce	1,118	8	(N/A)	0.2	0.0	8.39
Kentucky coffeetree	25,943	195	(N/A)	0.2	0.4	194.57
Ohio buckeye	7,945	60	(N/A)	0.2	0.1	59.59
Northern catalpa	8,458	63	(N/A)	0.2	0.1	63.43
Citywide total	6,817,212	51,129	(N/A)	100.0	100.0	95.75

Table 5: Annual Carbon Sequestered

Correctionville

Annual CO₂ Benefits of Public Trees

4/4/2022

Species	Sequestered (lb)	Sequestered (\$)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released (\$)	Avoided (lb)	Avoided (\$)	Net Total (lb)	Total Standard (\$ Error)	% of Total Trees	% of Total \$	Avg. \$/tree
Spruce	14,245	107	-1,106	-228	-10	23,110	173	36,020	270 (N/A)	18.9	6.7	2.67
Silver maple	200,742	1,506	-15,645	-464	-121	62,517	469	247,151	1,854 (N/A)	17.0	46.2	20.37
Green ash	50,134	376	-4,957	-233	-39	39,118	293	84,063	630 (N/A)	15.2	15.7	7.78
Norway spruce	9,503	71	-782	-174	-7	17,406	131	25,953	195 (N/A)	14.2	4.8	2.56
Northern hackberry	22,561	169	-2,427	-164	-19	27,935	210	47,905	359 (N/A)	7.9	9.0	8.55
Blue spruce	1,684	13	-108	-36	-1	3,677	28	5,216	39 (N/A)	3.6	1.0	2.06
Eastern cottonwood	9,073	68	-3,066	-76	-24	10,891	82	16,822	126 (N/A)	2.8	3.1	8.41
Maple	2,787	21	-93	-17	-1	2,910	22	5,587	42 (N/A)	2.6	1.0	2.99
Apple	437	3	-14	-6	0	434	3	851	6 (N/A)	2.6	0.2	0.46
Black walnut	7,403	56	-928	-37	-7	5,943	45	12,382	93 (N/A)	2.2	2.3	7.74
Norway maple	2,468	19	-285	-22	-2	3,320	25	5,480	41 (N/A)	1.7	1.0	4.57
Eastern red cedar	129	1	-37	-14	0	1,308	10	1,386	10 (N/A)	1.3	0.3	1.48
American elm	2,239	17	-341	-18	-3	3,176	24	5,056	38 (N/A)	0.9	0.9	7.58
Northern white cedar	931	7	-99	-14	-1	1,301	10	2,119	16 (N/A)	0.9	0.4	3.18
American basswood	4,579	34	-386	-16	-3	2,199	16	6,376	48 (N/A)	0.7	1.2	11.96
Honeylocust	0	0	-235	-11	-2	2,459	18	2,213	17 (N/A)	0.7	0.4	4.15
Boxelder	3,530	26	-247	-11	-2	1,356	10	4,628	35 (N/A)	0.6	0.9	11.57
Littleleaf linden	670	5	-15	-4	0	401	3	1,052	8 (N/A)	0.6	0.2	2.63
Northern red oak	663	5	-130	-8	-1	1,121	8	1,646	12 (N/A)	0.6	0.3	4.11
White ash	2,160	16	-241	-11	-2	2,109	16	4,017	30 (N/A)	0.6	0.8	10.04
Scotch pine	231	2	-47	-8	0	744	6	920	7 (N/A)	0.6	0.2	2.30
Red maple	496	4	-16	-4	0	557	4	1,033	8 (N/A)	0.6	0.2	2.58
Elm	2,736	21	-565	-15	-4	2,203	17	4,359	33 (N/A)	0.6	0.8	10.90
Siberian elm	2,733	20	-423	-15	-3	2,248	17	4,543	34 (N/A)	0.6	0.8	11.36
Austrian pine	0	0	-47	-7	0	560	4	506	4 (N/A)	0.4	0.1	1.90
Amur maple	957	7	-65	-5	-1	670	5	1,556	12 (N/A)	0.4	0.3	5.84
Bur oak	654	5	-23	-3	0	552	4	1,180	9 (N/A)	0.4	0.2	4.43
Broadleaf Deciduous Large	912	7	-188	-5	-1	734	6	1,453	11 (N/A)	0.2	0.3	10.90
Black spruce	91	1	-5	-2	0	213	2	296	2 (N/A)	0.2	0.1	2.22
Kentucky coffeetree	960	7	-125	-4	-1	650	5	1,481	11 (N/A)	0.2	0.3	11.11
Ohio buckeye	470	4	-38	-3	0	440	3	869	7 (N/A)	0.2	0.2	6.52
Northern catalpa	660	5	-41	-3	0	441	3	1,058	8 (N/A)	0.2	0.2	7.93
Citywide total	346,836	2,601	-32,723	-1,637	-258	222,701	1,670	535,178	4,014 (N/A)	100.0	100.0	7.52

Table 6: Annual Social and Aesthetic Benefits

Correctionville

Annual Aesthetic/Other Benefits of Public Trees

4/4/2022

Species	Total (\$)	Standard Error	% of Total Trees	% of Total \$	Avg. \$/tree
Spruce	3,422	(N/A)	18.9	10.9	33.88
Silver maple	13,748	(N/A)	17.0	43.8	151.08
Green ash	4,251	(N/A)	15.2	13.5	52.48
Norway spruce	2,523	(N/A)	14.2	8.0	33.19
Northern hackberry	2,771	(N/A)	7.9	8.8	65.98
Blue spruce	447	(N/A)	3.6	1.4	23.53
Eastern cottonwood	614	(N/A)	2.8	2.0	40.91
Maple	460	(N/A)	2.6	1.5	32.86
Apple	20	(N/A)	2.6	0.1	1.40
Black walnut	607	(N/A)	2.2	1.9	50.55
Norway maple	247	(N/A)	1.7	0.8	27.44
Eastern red cedar	41	(N/A)	1.3	0.1	5.87
American elm	309	(N/A)	0.9	1.0	61.79
Northern white cedar	164	(N/A)	0.9	0.5	32.84
American basswood	328	(N/A)	0.7	1.0	81.93
Honeylocust	0	(N/A)	0.7	0.0	0.00
Boxelder	209	(N/A)	0.6	0.7	69.79
Littleleaf linden	94	(N/A)	0.6	0.3	31.20
Northern red oak	52	(N/A)	0.6	0.2	17.18
White ash	228	(N/A)	0.6	0.7	75.91
Scotch pine	65	(N/A)	0.6	0.2	21.55
Red maple	90	(N/A)	0.6	0.3	29.84
Elm	175	(N/A)	0.6	0.6	58.34
Siberian elm	161	(N/A)	0.6	0.5	53.50
Austrian pine	0	(N/A)	0.4	0.0	0.00
Amur maple	58	(N/A)	0.4	0.2	28.80
Bur oak	74	(N/A)	0.4	0.2	37.21
Broadleaf Deciduous Large	58	(N/A)	0.2	0.2	58.34
Black spruce	25	(N/A)	0.2	0.1	25.23
Kentucky coffeetree	67	(N/A)	0.2	0.2	66.60
Ohio buckeye	43	(N/A)	0.2	0.1	43.05
Northern catalpa	58	(N/A)	0.2	0.2	57.69
Citywide total	31,406	(N/A)	100.0	100.0	58.81

Table 7: Summary of Benefits in Dollars

Correctionville

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

4/4/2022

Species	Energy	CO ₂	Air Quality	Stormwater	Aesthetic/Other	Total (\$)	Standard Error	% of Total \$
Spruce	2,686	270	203	5,852	3,422	12,433	(N/A)	10.7
Silver maple	7,686	1,854	1,528	17,072	13,748	41,888	(N/A)	36.0
Green ash	4,747	630	854	6,581	4,251	17,063	(N/A)	14.7
Norway spruce	2,016	195	163	4,301	2,523	9,197	(N/A)	7.9
Northern hackberry	3,557	359	671	4,918	2,771	12,277	(N/A)	10.6
Blue spruce	442	39	50	772	447	1,751	(N/A)	1.5
Eastern cottonwood	1,341	126	288	2,496	614	4,865	(N/A)	4.2
Maple	369	42	58	274	460	1,203	(N/A)	1.0
Apple	64	6	9	24	20	123	(N/A)	0.1
Black walnut	721	93	135	1,140	607	2,695	(N/A)	2.3
Norway maple	438	41	76	491	247	1,293	(N/A)	1.1
Eastern red cedar	172	10	15	310	41	549	(N/A)	0.5
American elm	389	38	74	483	309	1,293	(N/A)	1.1
Northern white cedar	155	16	4	413	164	753	(N/A)	0.6
American basswood	288	48	44	428	328	1,136	(N/A)	1.0
Honeylocust	297	17	51	508	0	873	(N/A)	0.8
Boxelder	172	35	30	277	209	723	(N/A)	0.6
Littleleaf linden	55	8	8	37	94	201	(N/A)	0.2
Northern red oak	139	12	20	170	52	393	(N/A)	0.3
White ash	252	30	54	445	228	1,008	(N/A)	0.9
Scotch pine	86	7	4	208	65	370	(N/A)	0.3
Red maple	74	8	11	51	90	233	(N/A)	0.2
Elm	273	33	57	589	175	1,126	(N/A)	1.0
Siberian elm	273	34	59	480	161	1,007	(N/A)	0.9
Austrian pine	71	4	8	159	0	242	(N/A)	0.2
Amur maple	92	12	17	64	58	242	(N/A)	0.2
Bur oak	65	9	10	56	74	215	(N/A)	0.2
Broadleaf Deciduous La	91	11	19	196	58	375	(N/A)	0.3
Black spruce	25	2	3	42	25	97	(N/A)	0.1
Kentucky coffeetree	82	11	16	149	67	324	(N/A)	0.3
Ohio buckeye	59	7	10	67	43	186	(N/A)	0.2
Northern catalpa	57	8	9	70	58	202	(N/A)	0.2
Citywide Total	27,233	4,014	4,558	49,121	31,406	116,333	(N/A)	100.0

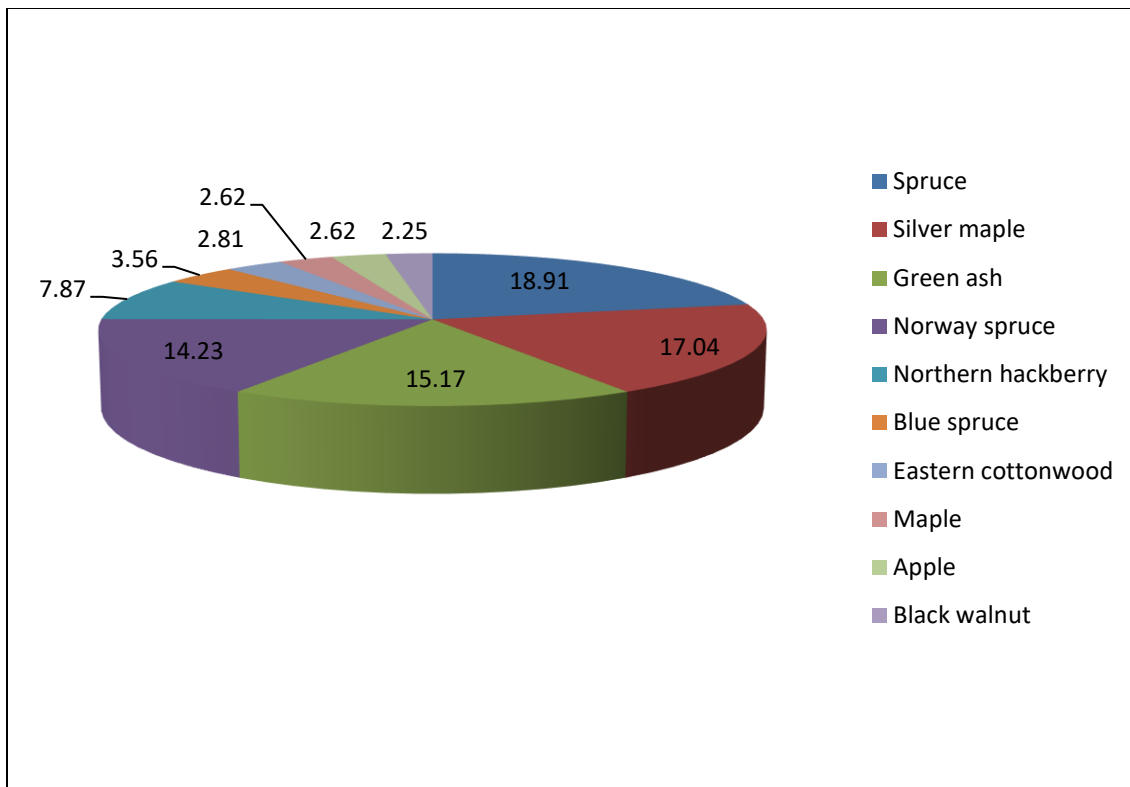


Figure 1: Species Distribution

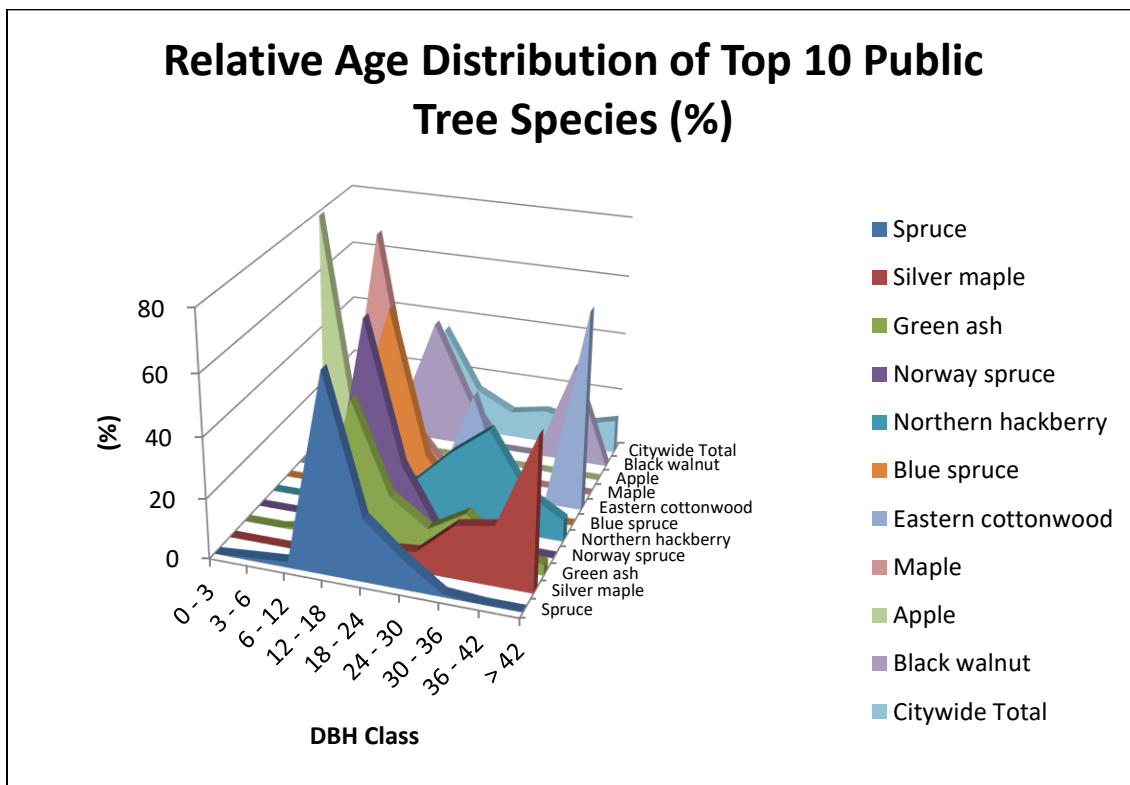


Figure 2: Relative Age Class

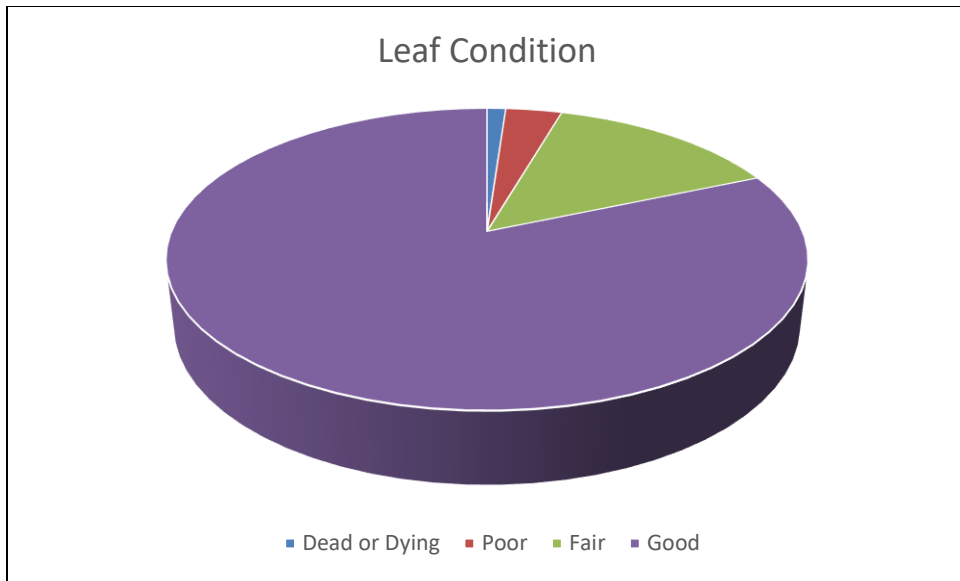


Figure 3: Foliage Condition

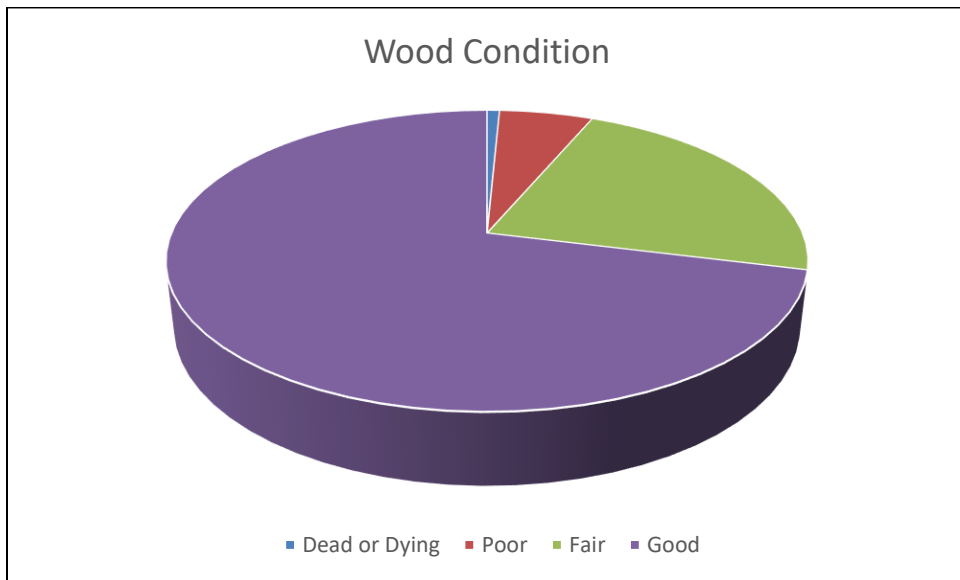


Figure 4: Wood Condition

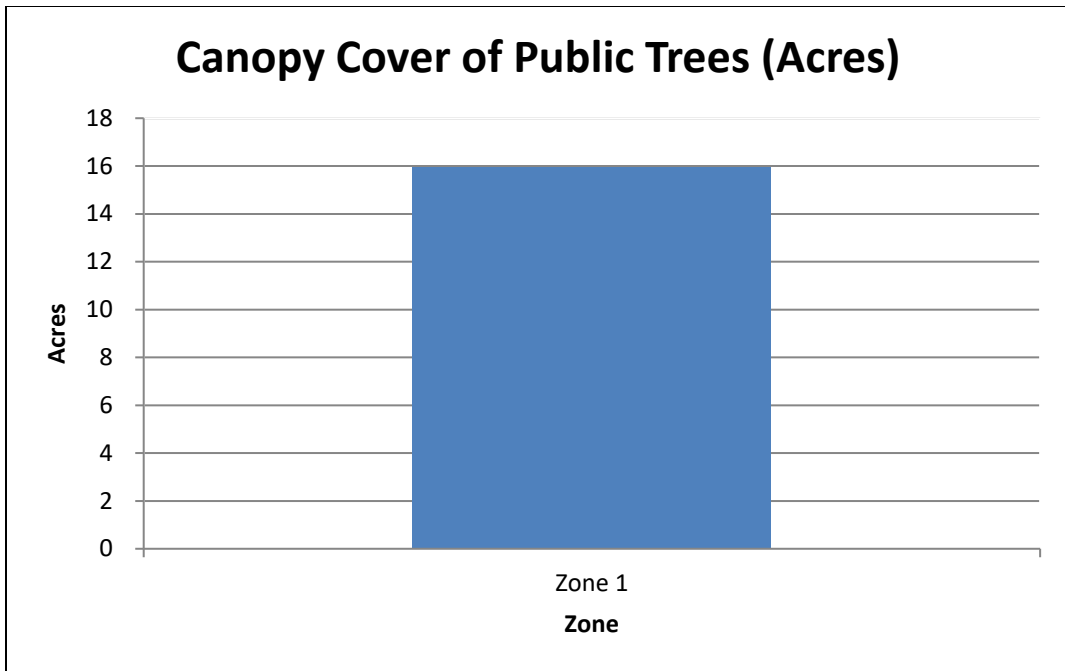


Figure 5: Canopy Cover in Acres

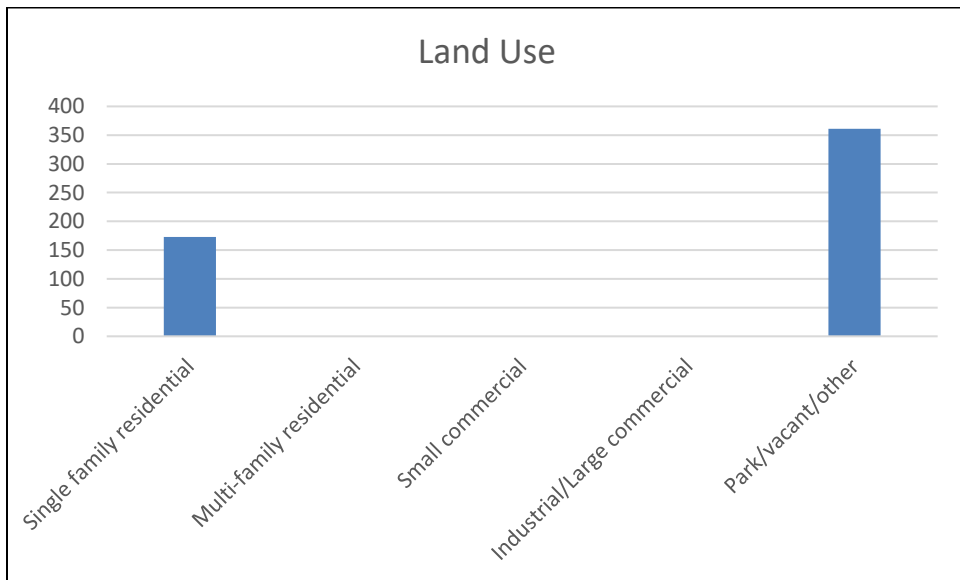


Figure 6: Land Use of city/park trees

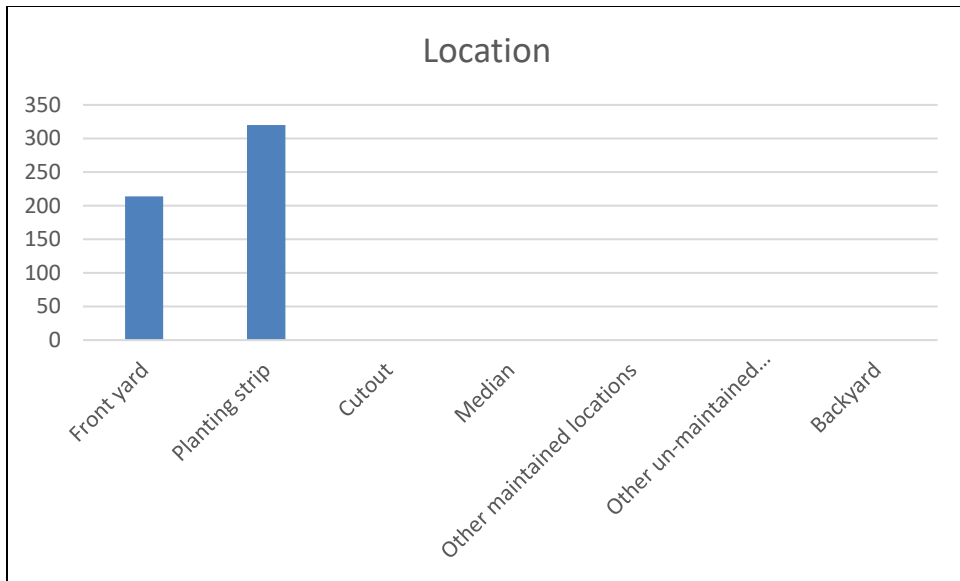


Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping



Figure 1: Location of Ash Trees

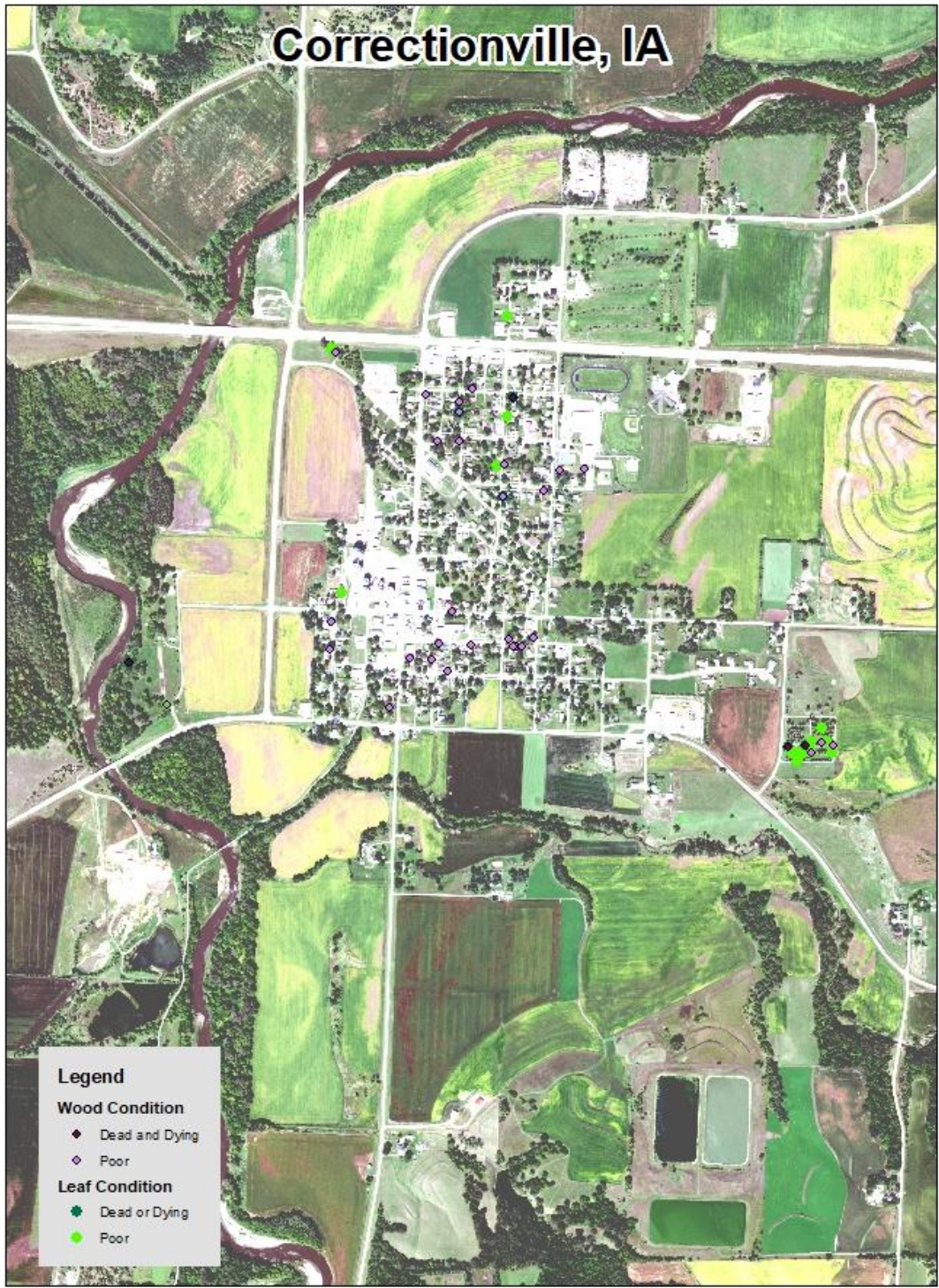


Figure 2: Location of EAB symptoms

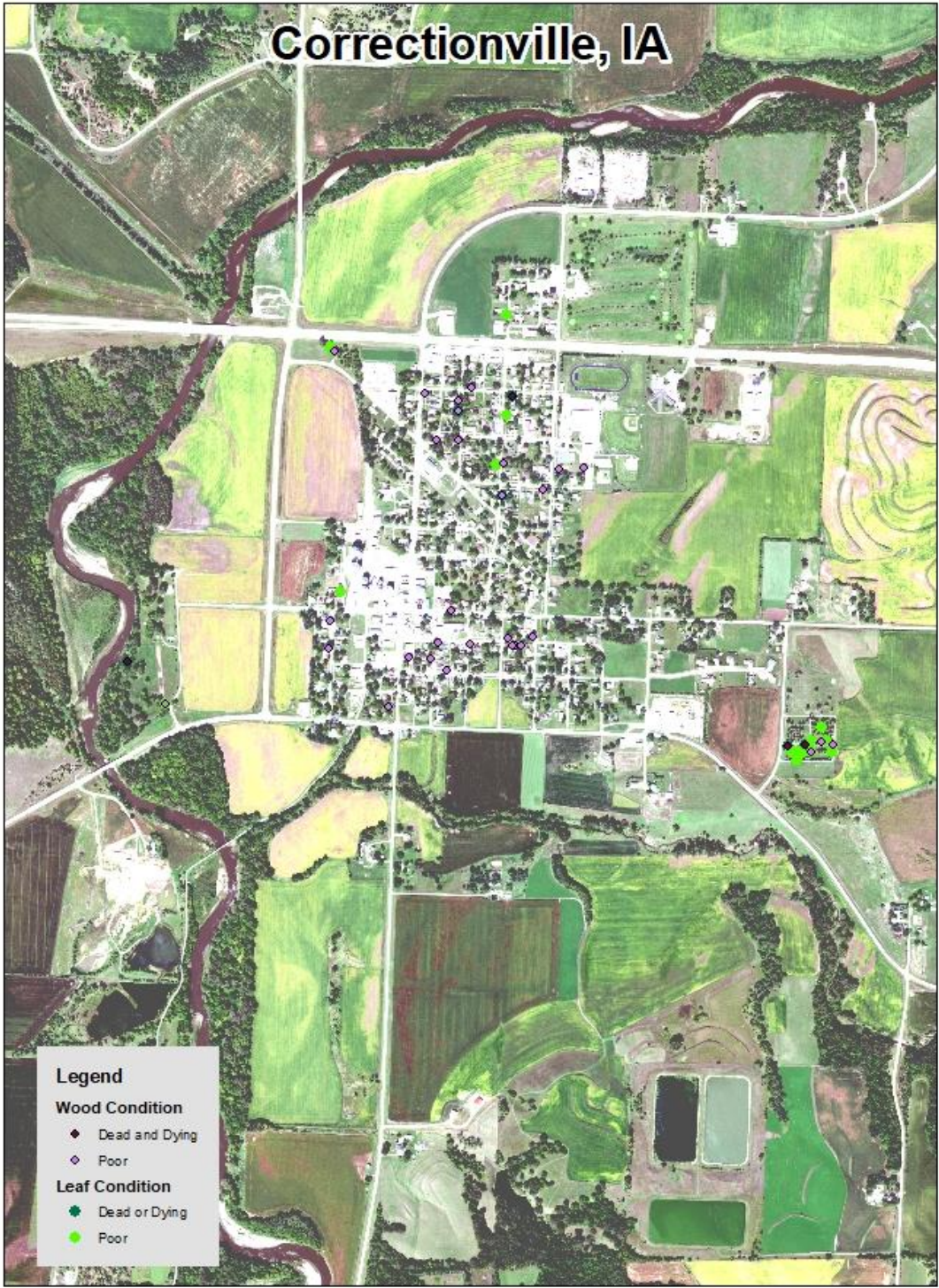


Figure 3: Location of Poor Condition Trees



Figure 4: Location of Trees with Recommended Maintenance

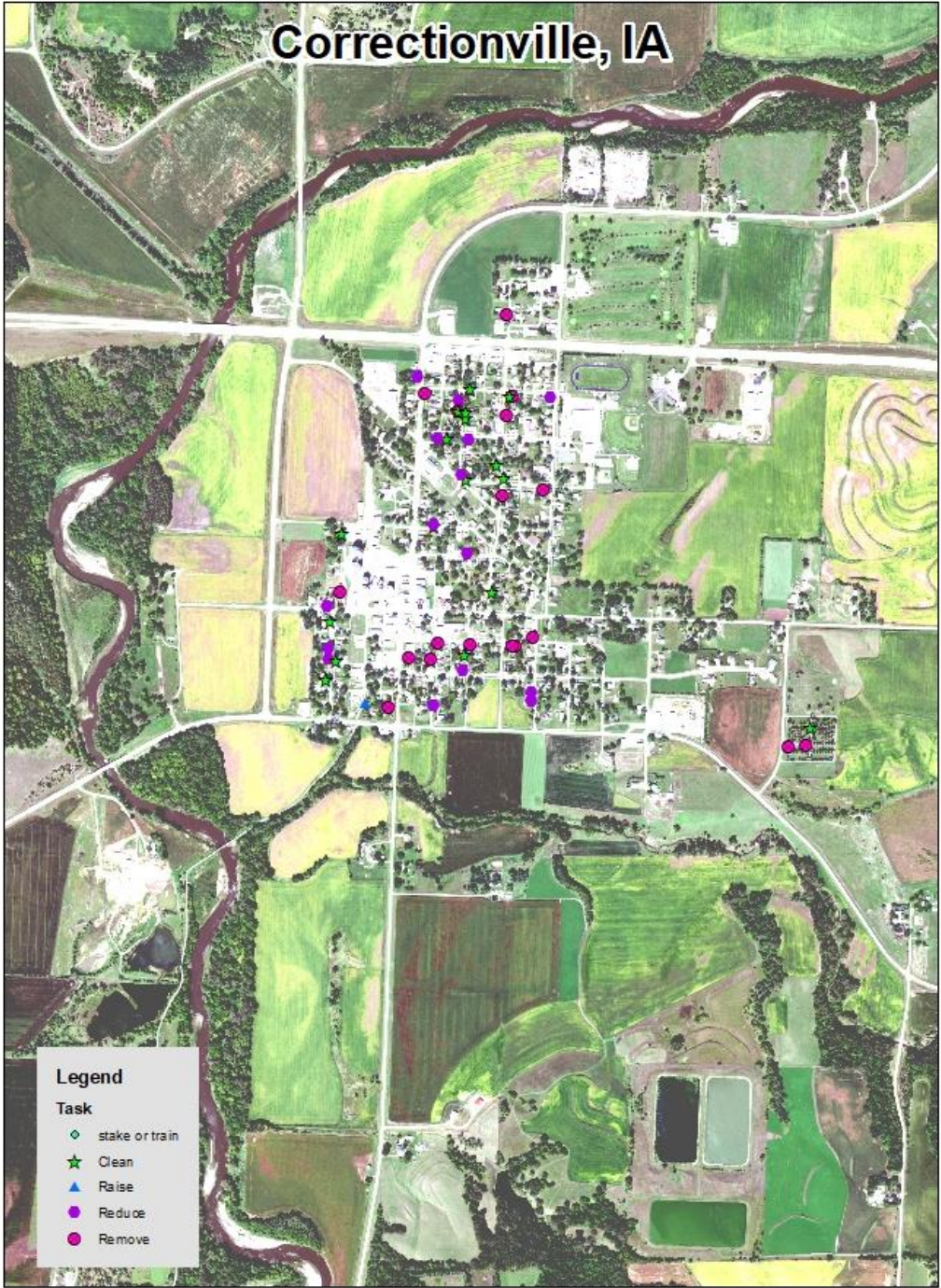


Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: Correctionville Tree Ordinances

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 trees, shrubs, or other plants shall be planted in any parking or street.

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 that 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:

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

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