Community Tree Management Plan
For Latimer, IA

Prepared by the Iowa DNR
Bureau of Forestry
2014

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Executive Summary

Overview

This plan was developed to assist the City of Latimer with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management of this resource is critical to fully reaping these rewards. 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 *(Fraxinus spp.)*. There is a strong possibility that 18% of Latimer's city-owned tree population (36 ash trees) will die once EAB becomes established in the community. With proper planning and management, the costs of removing dead and dying trees can be spread out over time, mitigating the financial burden as well as public safety issues.

Inventory and Results

In July 2013, 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 197 trees inventoried.

- Latimer's trees provide $30,027 of benefits annually, at an average of $152 a tree
- There are at least 17 different species of trees in Latimer
- The top three genus are: Maple 66%, Ash 18%, and Linden 8%
- 13% of trees are in need of some type of maintenance (trimming, removal, etc.):
    - 12 trees are recommended for removal; 2 of these are immediate recommendations while the other 10 can be considered routine over the next 6 years
    - 13 trees need maintenance in the form of trimming

Recommendations

The core recommendations are detailed in the *Recommendations* section. Some key ones include:

- Begin planting new trees using a diverse mix of species wherever space is available and replacing existing trees that are in poor health to diversify the tree population and buffer against catastrophic tree pests such as EAB
- Address the 6 trees recommended for immediate action (2 removals and 4 hazardous branches) *City ownership of the trees recommended for removal should be verified prior to any removal*
- Schedule routine maintenance (trimming, removals etc.) for the other 19 trees identified
- Begin regularly monitoring ash trees for signs or symptoms associated with EAB

Introduction

This plan was developed to assist Latimer 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 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 and replacement planting. With proper planning and management of the current canopy in Latimer, these costs can be extended over years and public safety issues from dead and dying ash trees mitigated.

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

Inventory

In July 2013, a tree inventory was conducted that included 100% of the city-owned trees on both streets. 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 of 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 197 city trees was entered into the USDA Forest service program Street Tree Resource Analysis Tool for Urban forestry Management (STRATUM), part of the i-Tree suite. The following are results from the i-Tree STRATUM analysis.

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. Latimer's trees reduce energy related costs by approximately $9,166 annually (Appendix A, Table 1). These savings are both in Electricity (43.8 MWh) and in Natural Gas (5,960 Therms).

Annual Stormwater Benefits

Latimer's trees intercept about 370,662 gallons of rainfall or snowmelt a year (Appendix A, Table 2). This interception provides $10,046 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 mater (ozone). In Latimer, it is estimated that trees remove 561 lbs of air pollution (ozone (O_3), particulate matter less than 10 microns (PM10), carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2)) per year with a net value of $1,587 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In Latimer, trees sequester about 74,099 lbs of carbon each year with an associated value of $556 (Appendix A, Table 5). This equates to 1,188,642 lbs of carbon being stored in Latimer's trees with total benefit of $8,915 (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. Latimer receives $8,165 in annual social benefits from trees (Appendix A, Table 6).

Financial Summary of all Benefits

According to the USDA Forest Service i-Tree STRATUM analysis, Latimer's trees provide $30,027 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 197 trees in Latimer provide approximately $152 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

Latimer has at least 17 different tree species along city streets and parks (Appendix A, Figure 1). The distribution of trees by genus is as follows:

Maple	130	53%
Ash	36	18%
Basswood/Linden	15	8%
Locust	5	3%
Hackberry	3	2%
All others	< 3 ea.	< 2% ea.

Size Class

Latimer's tree population is skewed toward large trees in terms of its size class distribution: most of Latimer's trees (79%) are over 12 inches in diameter at 4.5 ft (Appendix A, Figure 2). This indicates an imbalance in the city's tree population and suggests that as the larger, older trees decline and are removed, there is a lack of younger trees being planted to replace them. Having too many large trees and too few young ones increases the risk for catastrophic storm damage and a long "lag period" following major damage.

Condition: Wood and Foliage Health

Both wood condition and leaf condition are good indicators of the overall health of the urban forest. The survey results for Latimer indicate that 91% of the trees are in either good or fair health, while 9% of the trees are in poor health or are considered dead or dying (Appendix A, Figures 3 & 4 and Appendix B, Figure 3).

The 9% of trees classified as poor, dead, or dying represent opportunity costs to the city where time and space are being sacrificed. Trees in poor health should be promptly removed and replaced with new, healthy trees to diversify and improve the overall health and resiliency of Latimer's urban tree population.

Canopy Cover

The amount of tree canopy cover over Latimer is approximately 4.5 acres (Appendix A, Figure 5). According to the U.S. Census, Latimer occupies 1536 acres of land. Thus the canopy cover on city land is less than 1%.

Land Use and Location

The majority of Latimer's city and park trees are in planting strips in single family residential neighborhoods (Appendix A, Figures 6 & 7).

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, Figures 4 & 5). Crown cleaning removes dead, diseased, and broken limbs. Staking/training is for recently planted young trees that need to be staked, pruned, or shaped for proper architecture to prevent problems later on. Raising removes lower branches from the tree trunk to eliminate obstructions or clearance issues. Crown reduction is removing individual limbs to avoid interference with nearby structures, utility wires, or other branches.

Need	# Trees	Breakdown
Crown Cleaning	11	3 immediate, 8 routine
Tree Removal	12	2 immediate, 10 routine
Crown Reduction	2	1 immediate, 1 routine

Recommendations

Risk Management

Hazardous trees and branches 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 immediately.

Hazardous trees & branches: Critical concerns and Immediate needs

No "critical concern" trees were identified during the survey (defined as trees needing attention within 1 year). Six trees were marked as needing "immediate" maintenance attention, meaning within the next three years. These include 2 trees recommended for removal and 4 for some form of trimming. Refer to the maps in Figures 3 and 4 of Appendix B to view the locations of these trees.

Routine maintenance trees

After addressing the immediate need trees, there are 19 trees needing "routine" maintenance meaning sometime within the next six years (Appendix B, Figures 3 & 4). Of this number, 9 need trimming and 10 are recommended for removal & replacement with something new.

After addressing the trees mentioned above, any remaining trees that are listed in "poor" health (either wood or foliage) throughout the community should be targeted for replacement as time and resources allow.

Routine Pruning

Proper pruning can extend the life and good health of trees, as well as reduce public safety issues. It is generally recommended that all trees be inspected for pruning needs every five to ten years. This would equate to pruning roughly 20 trees per year in Latimer.

Planting

Theoretically, the city should be planting (and removing) about 2-3 trees per year in order to sustain the tree population and to spread the trees equally out among different ages (size classes). This assumes the typical lifespan of a tree in Latimer to be 80-140 years; if the trees are not living that long, or if the goal is to *increase* the tree population, the target will be higher (5-7 trees/yr). Most of the planting over the next 10-15 years can be done to replace trees that are being removed. 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 Latimer.

It is important to plant a diverse mix of differing species in the urban forest to maintain canopy health, since most insects and diseases target a single genus of trees (e.g., ash, maple, oak). Current diversity recommendations advise that a single genus not make up more than 20% of the urban forest and a single species (e.g. 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 the genus Maple, at 66% (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 for various reasons include: cottonwood, poplar, boxelder, Chinese elm, evergreens, willow, or black walnut, and any others identified in the city tree code.

A list containing generally acceptable and recommended trees for planting in Iowa is provided with this plan. Ensure each individual planting is tailored for the environmental conditions, available space, and other factors.

Continual Monitoring

Due to the threat of EAB, it is important to continuously check the health of ash trees. It is recommended that all ash trees which are showing any signs or symptoms of EAB be checked annually with a visual survey for tree death and for additional symptoms (canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage). All other ash trees in the city which aren't exhibiting these symptoms should still be routinely monitored as time allows.

Proposed Work Schedule & Estimated Costs

EAB could potentially kill all 36 ash trees in Latimer within 4 years of its arrival, with tree removal costs likely to exceed $25,000. By budgeting for routine maintenance, replacement, and removals now, the city can be proactive and preventative rather than reactive when this pest arrives.

The following is a proposed 3-year work plan that would address the highest priority issues at this time. Estimated costs are based on $700/tree average for removal, $75/tree average for

trimming*, and $150/tree average for planting. *Individual homeowners are presumed to be responsible for light trimming and staking/training of young trees in the City right-of-way.
For new tree plantings & replacements, it is recommended that Latimer apply for grants. 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.

Year 1	Estimated Costs
Removals: 4 of the 12 recommended trees (2 immediate, 2 routine)	$2800
Planting and replacements: 2-3 new trees	$375
Trimming: 5 of the 13 recommended trees (4 immediate, 1 routine)	$325
Year 2	
Removals: 4 of the 12 recommended trees (4 routine)	$2800
Planting and replacements: 2-3 new trees	$375
Trimming: 4 of the 13 recommended trees (4 routine)	$300
Year 3	
Removals: 4 of the 12 recommended trees (4 routine)	$2800
Planting and replacements: 2-3 new trees	$375
Trimming: 4 of the 13 recommended trees (4 routine)	$300
Annually thereafter	
Removals: 2-3/year avg. focusing on poor condition ash & maple	$6300
Planting and replacements: 2-3/year avg.	$1350
Routine trimming: 20 trees/year avg.	$1500
Routine monitoring for EAB symptoms on ash trees	

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Maps and figures provided by Emma Bruemmer, Urban Forestry Coordinator. All data and information used for this report may be obtained by contacting the Iowa DNR Forestry Bureau.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

Latimer

Annual Energy Benefits of Public Trees by Species

3/11/2014

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	20.9	1,588	2,832.5	2,776	4,364	(N/A)	45.2	47.6	49.03
Ash	8.7	662	1,259.1	1,234	1,896	(N/A)	18.3	20.7	52.67
Red maple	1.2	93	157.6	154	247	(N/A)	6.1	2.7	20.60
Silver maple	2.7	205	344.4	337	542	(N/A)	6.1	5.9	45.18
American basswood	1.6	122	217.6	213	335	(N/A)	4.6	3.7	37.25
Black maple	1.7	127	219.5	215	342	(N/A)	4.1	3.7	42.74
Sugar maple	1.7	132	215.6	211	344	(N/A)	3.6	3.8	49.10
Littleleaf linden	0.9	66	119.1	117	183	(N/A)	3.1	2.0	30.42
Honeylocust	1.7	128	217.9	214	341	(N/A)	2.5	3.7	68.28
Northern hackberry	1.2	94	175.6	172	266	(N/A)	1.5	2.9	88.52
Boxelder	0.1	7	11.9	12	19	(N/A)	1.0	0.2	9.27
Apple	0.1	7	16.6	16	24	(N/A)	1.0	0.3	11.80
Eastern cottonwood	1.0	74	126.2	124	197	(N/A)	1.0	2.2	98.63
Other street trees	0.3	22	46.3	45	67	(N/A)	2.0	0.7	16.80
Citywide total	43.8	3,326	5,959.7	5,840	9,166	(N/A)	100.0	100.0	46.53

Table 2: Annual Stormwater Benefits

Latimer

Annual Stormwater Benefits of Public Trees by Species

3/11/2014

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	158,808	4,304	(N/A)	45.2	42.8	48.36
Ash	83,055	2,251	(N/A)	18.3	22.4	62.53
Red maple	7,134	193	(N/A)	6.1	1.9	16.11
Silver maple	28,954	785	(N/A)	6.1	7.8	65.39
American basswood	11,236	305	(N/A)	4.6	3.0	33.84
Black maple	12,421	337	(N/A)	4.1	3.4	42.08
Sugar maple	13,097	355	(N/A)	3.6	3.5	50.71
Littleleaf linden	6,267	170	(N/A)	3.1	1.7	28.31
Honeylocust	18,515	502	(N/A)	2.5	5.0	100.36
Northern hackberry	13,588	368	(N/A)	1.5	3.7	122.75
Boxelder	554	15	(N/A)	1.0	0.2	7.50
Apple	333	9	(N/A)	1.0	0.1	4.51
Eastern cottonwood	14,477	392	(N/A)	1.0	3.9	196.17
Other street trees	2,223	60	(N/A)	2.0	0.6	15.06
Citywide total	370,662	10,046	(N/A)	100.0	100.0	50.99

Table 3: Annual Air Quality Benefits

Latimer

Annual Air Quality Benefits of Public Trees by Species

3/11/2014

Species	Deposition (lb) O_3	NO_2	PM_{10}	SO_2	Total Depos. ($)	Avoided (lb) NO_2	PM_{10}	VOC	SO_2	Total Avoided ($)	BVOC Emissions (lb)	BVOC Emissions ($)	Total (lb)	Total ($)	Standard Error	% of Total Trees	Avg. $/tree
Norway maple	29.0	5.0	14.7	1.3	158	99.8	14.5	13.9	95.0	622	-7.1	-27	266.1	754	(N/A)	45.2	8.47
Ash	17.2	3.0	8.4	0.8	93	42.3	6.1	5.8	39.6	262	-4.0	-15	119.1	340	(N/A)	18.3	9.44
Red maple	1.2	0.2	0.6	0.1	7	5.7	0.8	0.8	5.5	36	-0.5	-2	14.6	41	(N/A)	6.1	3.41
Silver maple	3.9	0.7	2.0	0.2	21	12.6	1.9	1.8	12.2	79	-2.3	-9	32.9	92	(N/A)	6.1	7.65
American basswood	1.1	0.2	0.6	0.0	6	7.7	1.1	1.1	7.3	48	-1.1	-4	18.0	50	(N/A)	4.6	5.55
Black maple	2.7	0.5	1.3	0.1	14	7.9	1.2	1.1	7.6	49	-0.9	-4	21.3	60	(N/A)	4.1	7.53
Sugar maple	1.4	0.2	0.8	0.1	8	8.1	1.2	1.1	7.9	51	-1.2	-4	19.7	55	(N/A)	3.6	7.80
Littleleaf linden	0.8	0.1	0.4	0.0	5	4.2	0.6	0.6	3.9	26	-0.4	-2	10.3	29	(N/A)	3.0	4.79
Honeylocust	3.6	0.6	1.6	0.2	19	7.9	1.2	1.1	7.6	50	-2.8	-11	21.0	58	(N/A)	2.5	11.63
Northern hackberry	2.3	0.4	1.1	0.1	12	6.0	0.9	0.8	5.6	37	0.0	0	17.1	49	(N/A)	1.5	16.43
Boxelder	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)	1.0	1.36
Apple	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)	1.0	1.63
Eastern cottonwood	3.2	0.5	1.4	0.1	16	4.6	0.7	0.6	4.4	29	0.0	0	15.5	45	(N/A)	1.0	22.55
Other street trees	0.2	0.0	0.2	0.0	1	1.4	0.2	0.2	1.3	9	-0.4	-2	3.1	9	(N/A)	2.0	2.14
Citywide total	66.6	11.4	33.3	3.0	361	209.1	30.5	29.1	198.8	1,303	-20.8	-78	560.9	1,587	(N/A)	100.0	8.05

Table 4: Annual Carbon Stored

Latimer

Stored CO2 Benefits of Public Trees by Species

3/11/2014

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	476,744	3,576	(N/A)	45.2	40.1	40.18
Ash	282,883	2,122	(N/A)	18.3	23.8	58.93
Red maple	14,880	112	(N/A)	6.1	1.3	9.30
Silver maple	87,623	657	(N/A)	6.1	7.4	54.76
American	40,073	301	(N/A)	4.6	3.4	33.39
Black maple	30,065	225	(N/A)	4.1	2.5	28.19
Sugar maple	40,346	303	(N/A)	3.6	3.4	43.23
Littleleaf linden	18,482	139	(N/A)	3.1	1.6	23.10
Honeylocust	46,514	349	(N/A)	2.5	3.9	69.77
Northern	35,062	263	(N/A)	1.5	3.0	87.65
Boxelder	437	3	(N/A)	1.0	0.0	1.64
Apple	1,086	8	(N/A)	1.0	0.1	4.07
Eastern	111,964	840	(N/A)	1.0	9.4	419.86
Other street trees	1,126	19	(N/A)	2.0	0.2	4.66
Citywide total	1,188,642	8,915	(N/A)	100.0	100.0	45.25

Table 5: Annual Carbon Sequestered

Latimer

Annual CO_2 Benefits of Public Trees by Species

3/11/2014

Species	Sequestered (lb)	Sequestered ($)	Decomposition Release (lb)	Maintenance Release (lb)	Total Released ($)	Avoided (lb)	Avoided ($)	Net Total (lb)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	33,698	253	-2,288	-17	-17	35,098	263	66,490	499	(N/A)	45.2	46.9	5.60
Ash	10,837	81	-1,358	-7	-10	14,633	110	24,106	181	(N/A)	18.3	17.0	5.02
Red maple	2,070	16	-71	-2	-1	2,051	15	4,047	30	(N/A)	6.1	2.9	2.53
Silver maple	8,453	63	-421	-2	-3	4,523	34	12,553	94	(N/A)	6.1	8.9	7.85
American basswood	3,060	23	-192	-2	-1	2,697	20	5,562	42	(N/A)	4.6	3.9	4.64
Black maple	2,869	22	-144	-2	-1	2,803	21	5,526	41	(N/A)	4.1	3.9	5.18
Sugar maple	2,874	22	-194	-1	-1	2,927	22	5,606	42	(N/A)	3.6	4.0	6.01
Littleleaf linden	2,488	19	-89	-1	-1	1,455	11	3,852	29	(N/A)	3.1	2.7	4.82
Honeylocust	4,382	33	-223	-1	-2	2,825	21	6,983	52	(N/A)	2.5	4.9	10.47
Northern hackberry	1,732	13	-168	-1	-1	2,067	16	3,630	27	(N/A)	1.5	2.6	9.07
Boxelder	114	1	-2	0	0	152	1	263	2	(N/A)	1.0	0.2	0.99
Apple	152	1	-5	0	0	161	1	308	2	(N/A)	1.0	0.2	1.15
Eastern cottonwood	958	7	-537	0	-4	1,626	12	2,046	15	(N/A)	1.0	1.4	7.67
Other street trees	414	3	-12	-1	0	484	4	885	7	(N/A)	2.0	0.6	1.66
Citywide total	74,099	556	-5,705	-38	-43	73,503	551	141,857	1,064	(N/A)	100.0	100.0	5.40

Table 6: Annual Social and Aesthetic Benefits

Latimer

Annual Aesthetic/Other Benefits of Public Trees by Species

3/11/2014

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Norway maple	3,300	(N/A)	45.2	40.4	37.07
Ash	1,037	(N/A)	18.3	12.7	28.79
Red maple	309	(N/A)	6.1	3.8	25.76
Silver maple	783	(N/A)	6.1	9.6	65.29
American basswood	263	(N/A)	4.6	3.2	29.17
Black maple	396	(N/A)	4.1	4.9	49.53
Sugar maple	333	(N/A)	3.6	4.1	47.53
Littleleaf linden	285	(N/A)	3.1	3.5	47.54
Honeylocust	1,075	(N/A)	2.5	13.2	215.02
Northern hackberry	209	(N/A)	1.5	2.6	69.63
Boxelder	38	(N/A)	1.0	0.5	19.09
Apple	8	(N/A)	1.0	0.1	4.23
Eastern cottonwood	57	(N/A)	1.0	0.7	28.57
Other street trees	71	(N/A)	2.0	0.9	17.87
Citywide total	8,165	(N/A)	100.0	100.0	41.45

Table 7: Summary of Benefits in Dollars

Average Annual Benefits of Public Trees by Species

Species	Energy	CO2	Air Quality	Stormwater	Aesthetic/Other	Total ($)	Standard Error	% of Total $
Norway maple	4,364	499	754	4,304	3,300	$13,219.83	(±0)	44.03
Ash	1,896	181	340	2,251	1,037	$5,703.99	(±0)	19.00
Red maple	247	30	41	193	309	$820.97	(±0)	2.73
Silver maple	542	94	92	785	783	$2,296.30	(±0)	7.65
American basswood	335	42	50	305	263	$993.98	(±0)	3.31
Black maple	342	41	60	337	396	$1,176.53	(±0)	3.92
Sugar maple	344	42	55	355	333	$1,128.06	(±0)	3.76
Littleleaf linden	183	29	29	170	285	$695.23	(±0)	2.32
Honeylocust	341	52	58	502	1,075	$2,028.80	(±0)	6.76
Northern hackberry	266	27	49	368	209	$919.23	(±0)	3.06
Boxelder	19	2	3	15	38	$76.42	(±0)	0.25
Apple	24	2	3	9	8	$46.65	(±0)	0.16
Eastern cottonwood	197	15	45	392	57	$707.19	(±0)	2.36
Other street trees	67	7	9	60	71	$214.11	(±0)	0.71
Citywide total	9,166	1,064	1,587	10,046	8,165	$30,027.30	(±0)	100.00

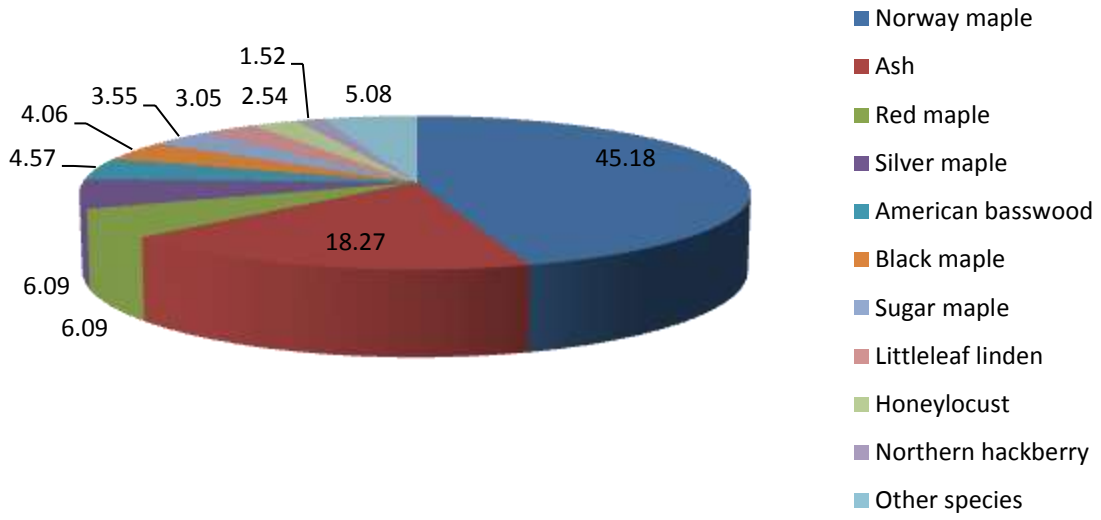

Figure 1: Species Distribution

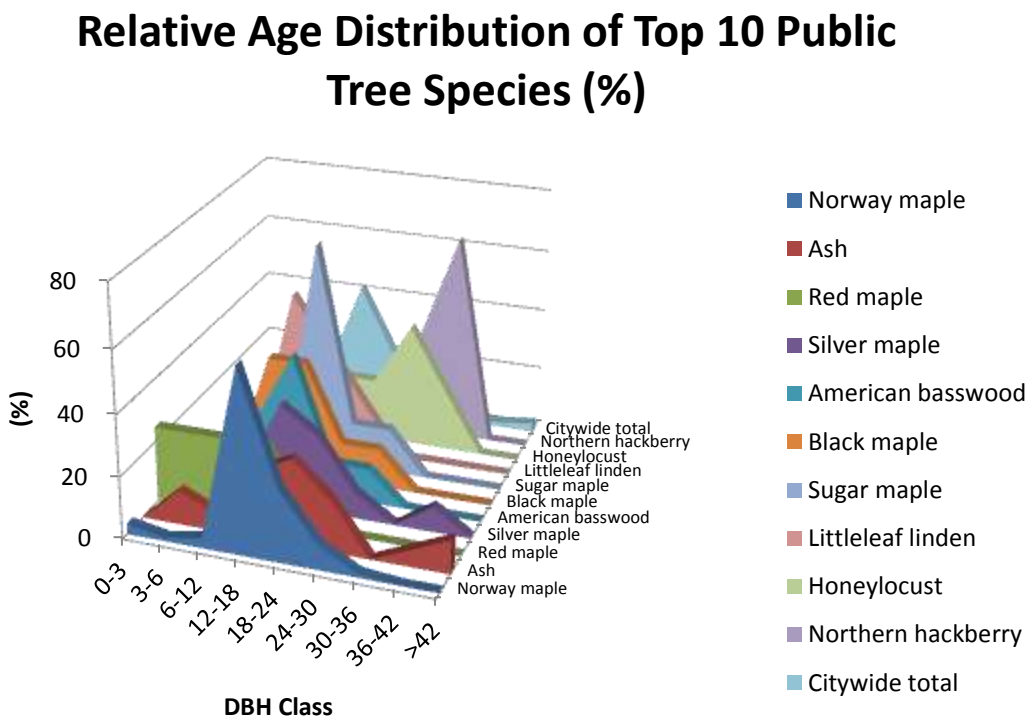

Figure 2: Relative Age Class

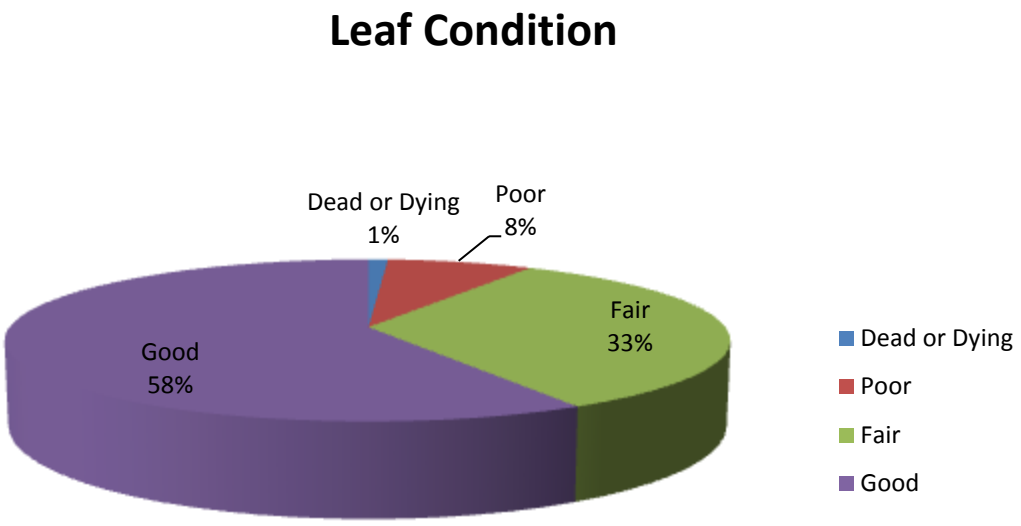

Figure 3: Foliage Condition

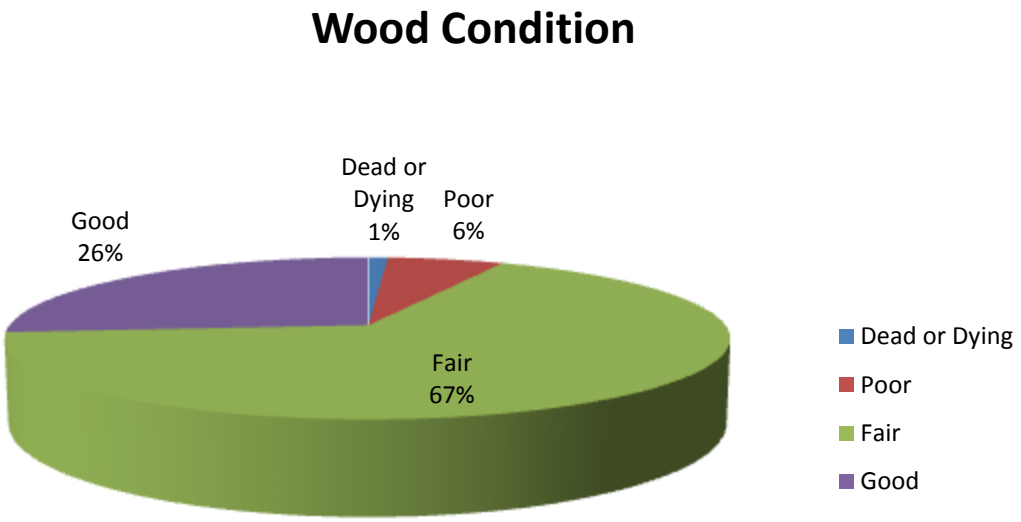

Figure 4: Wood Condition

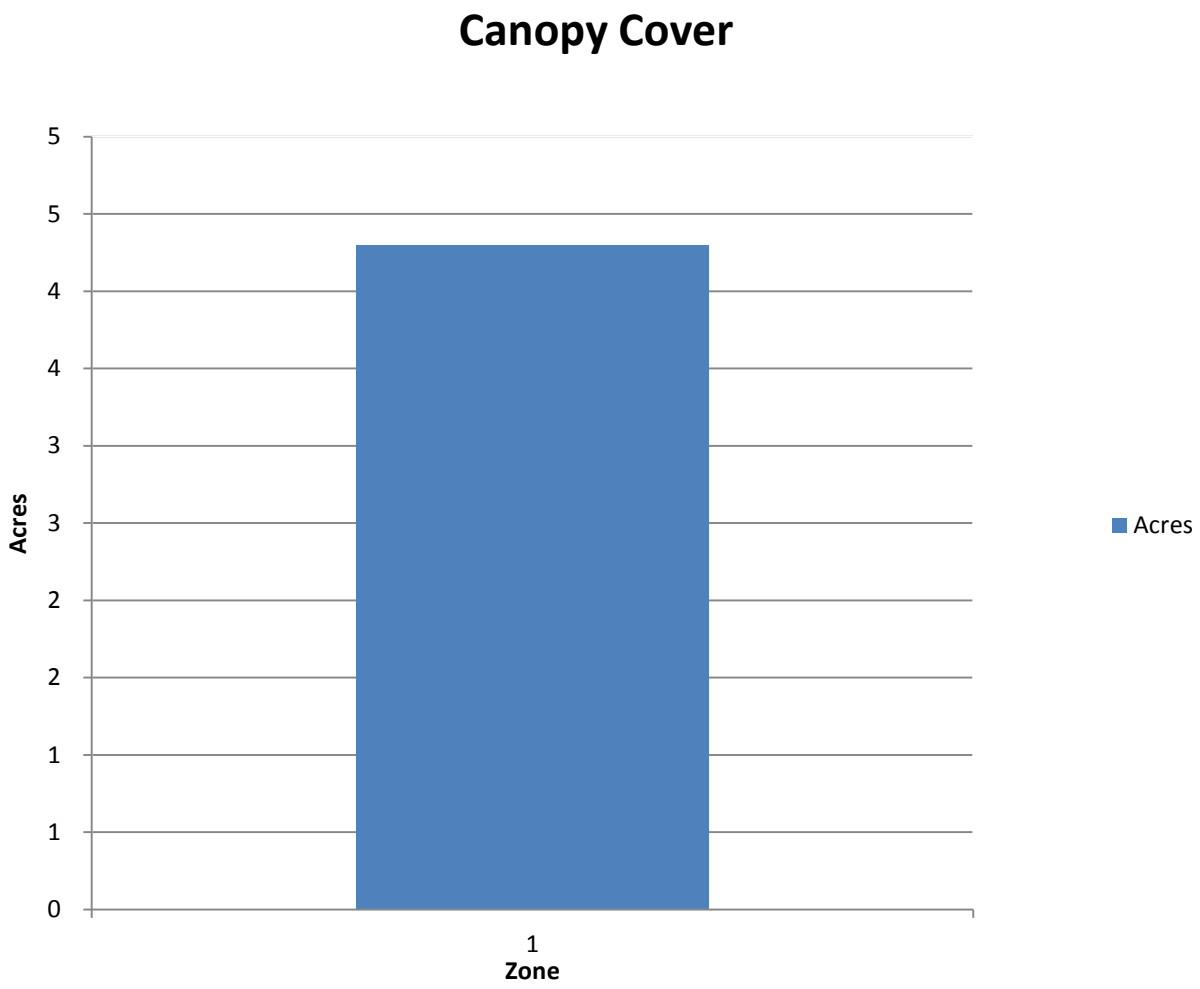

Figure 5: Canopy Cover in Acres

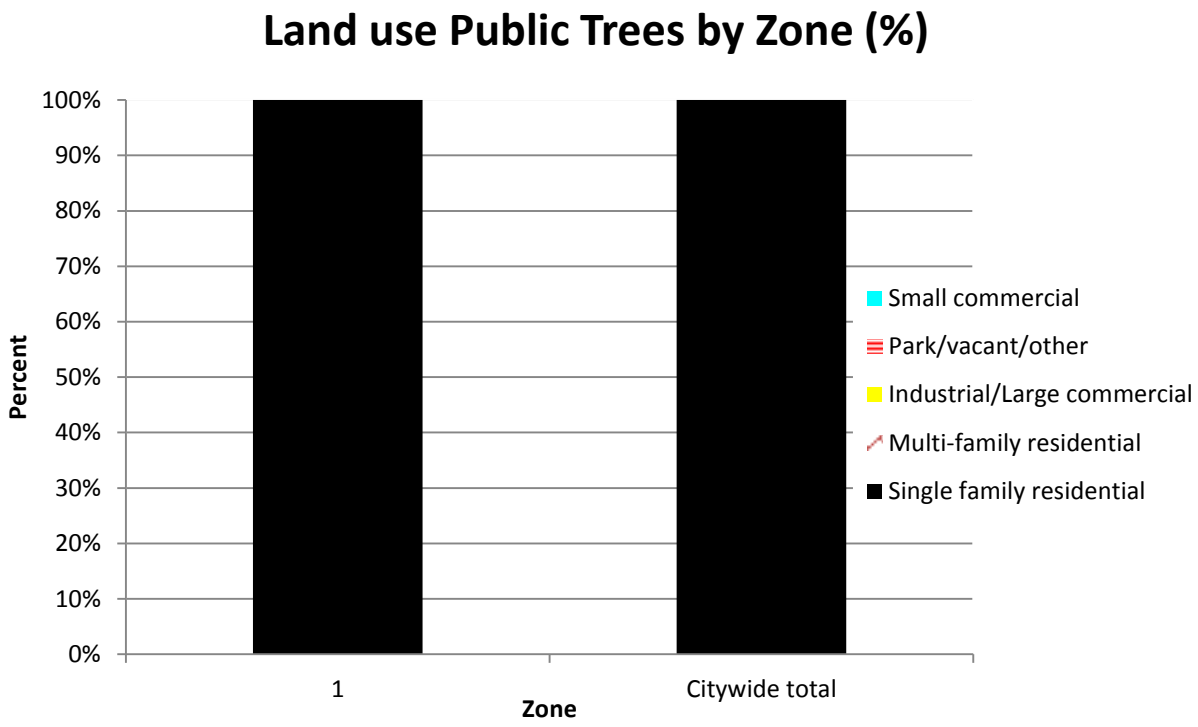

Figure 6: Land Use of city/park trees

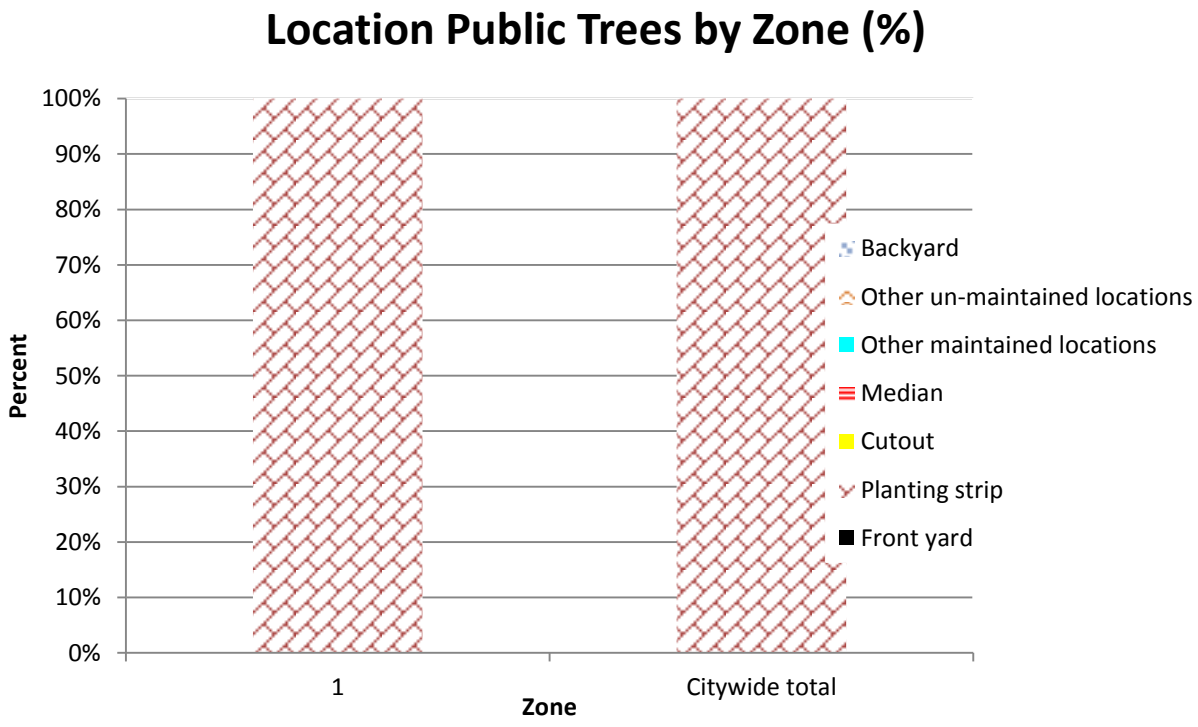

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

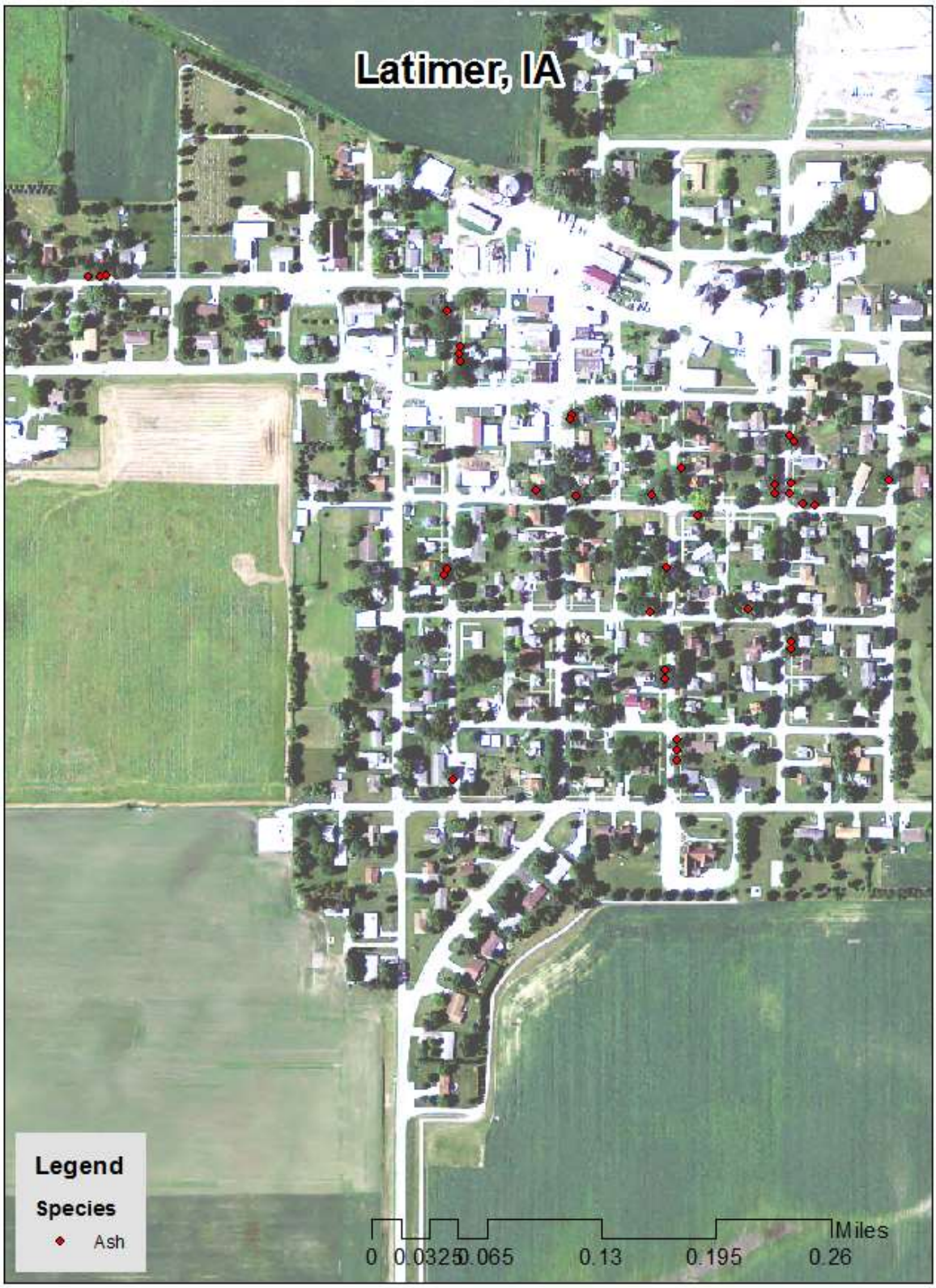

Figure 1: Location of Ash Trees

Figure 2: Location of EAB symptoms

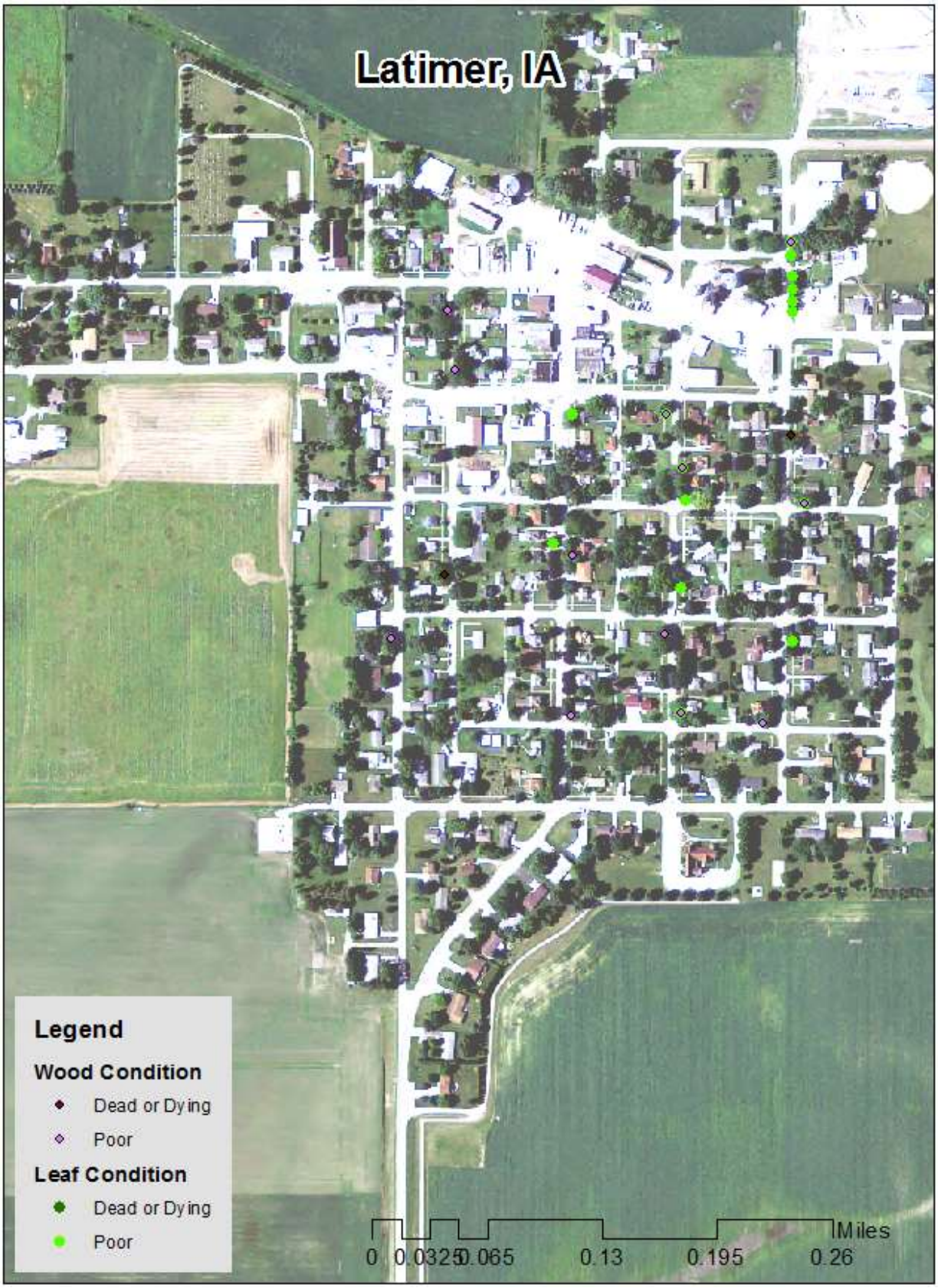

Figure 3: Location of Poor Condition Trees

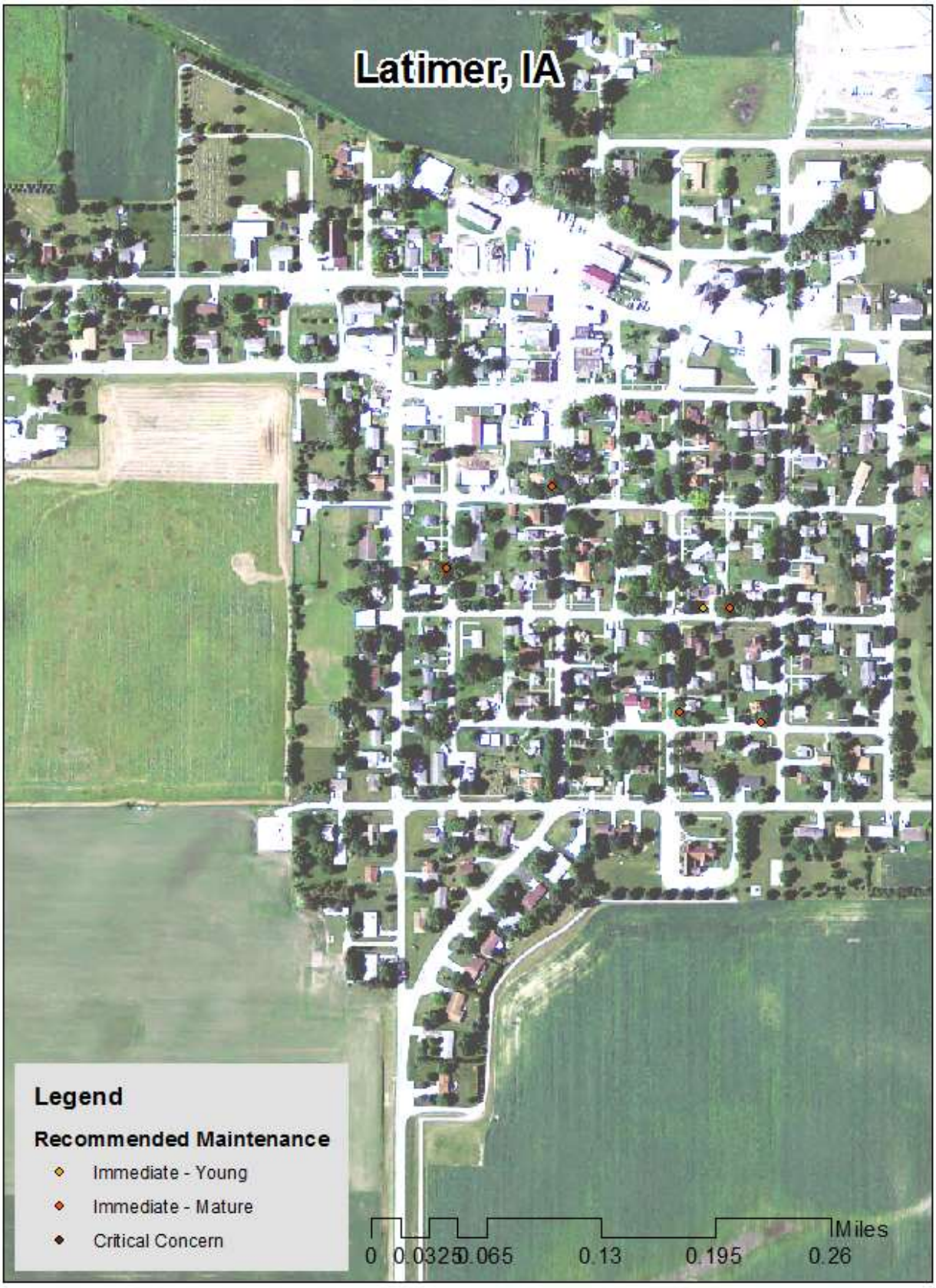

Figure 4: Location of Trees with Recommended Maintenance

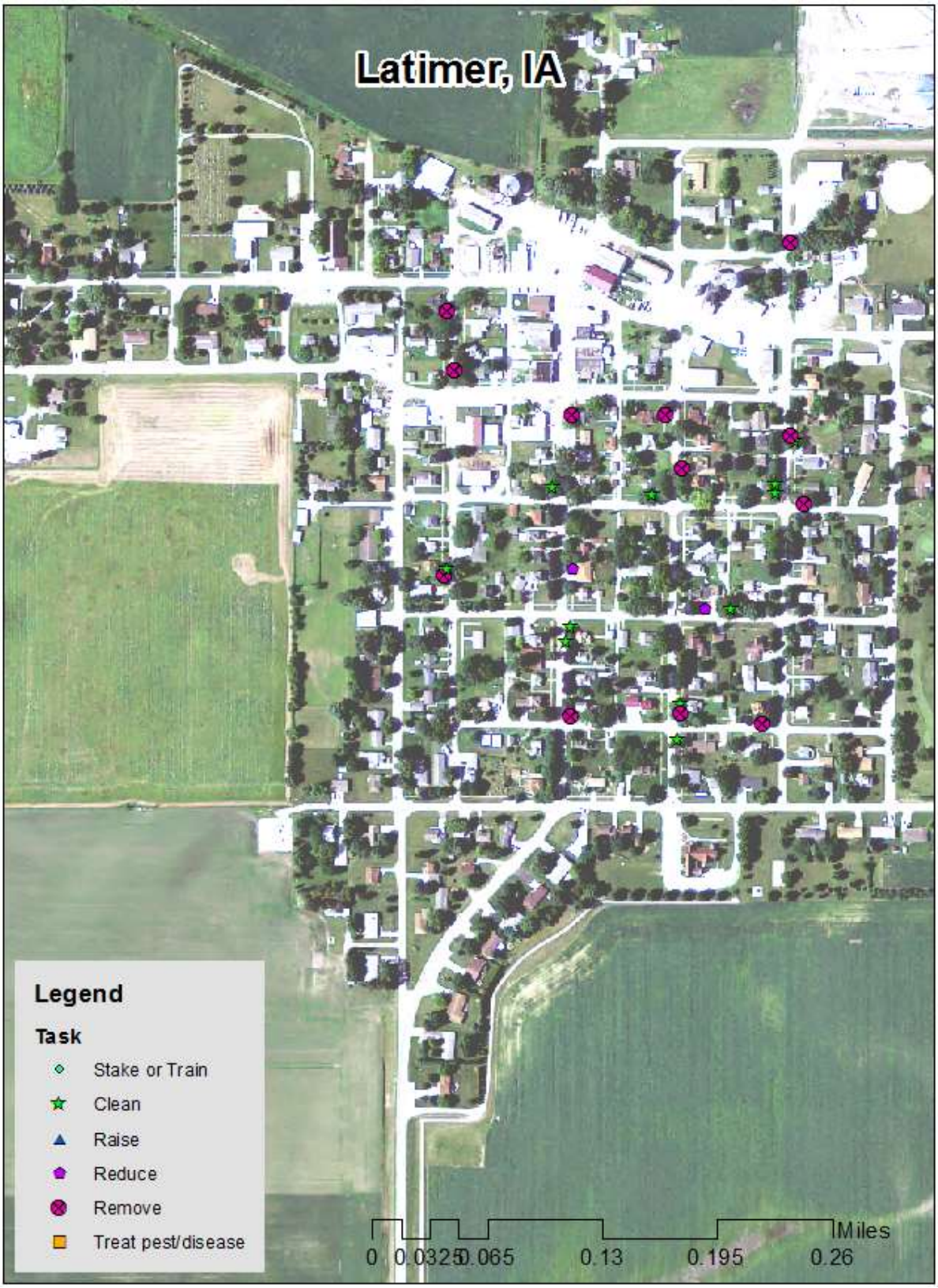

Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: Proposed Emerald Ash Borer Plan

Ash Tree Removal

Ash tree removal will be prioritized with dead, dying, hazardous trees to be removed first. Next will be all ash in poor condition and displaying signs and symptoms of EAB. *City ownership of the tree recommended for removal should be verified prior to any removal*

EAB Quarantines

EAB is an extremely destructive plant pest and it is responsible for the death and decline of over 25 million ash trees. Ash in both forested and urban settings constitute a significant portion of the canopy cover in the United States. Current tools to detect, control, suppress and eradicate this pest are not as robust as the USDA would desire. In order to stay ahead of this hard to detect beetle, the USDA is attempting to contain the beetle before it spreads beyond its known positions by regulating articles.

A regulated article under the USDA's quarantine includes any of the following items:
- emerald ash borer
- firewood of all hardwood species (for example ash, oak, maple and hickory)
- nursery stock and green lumber of ash
- any other ash material, whether living, dead, cut or fallen, including logs, stumps, roots, branches, as well as composted and not composted chips of the genus ash (Mountain ash is not included)

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

Wood Disposal

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

Canopy Replacement

As budget permits, all removed ash trees will be replaced. All trees will meet the guidelines in the City Code.

Postponed Work

While finances, staffing and equipment are focused on the management of ash, usual services may be delayed. Tree removal requests on trees 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.

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If you need accommodations because of disability to access the services of this Agency, please contact the Director at 515-281-5918.