New London, IA

2014 Management Plan
Prepared by Lisa Louck
Bureau of Forestry, Iowa DNR

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Executive Summary

Overview

This plan was developed to assist the City of New London with managing its urban forest, including budgeting and future planning. Trees can provide a multitude of benefits to the community, and sound management allows communities 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 4.8% of New London's city owned trees (ash) will die once EAB becomes established in the community. 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 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 147 trees inventoried.

- New London's trees provide $27,514 of benefits annually, an average of $187 a tree
- There are over 22 species of trees
- The top three genus are: Maple 60%, Elm 6.8%, and Spruce 5.4%
- 47% of trees are in need of some type of management, mostly reducing/pruning or cleaning tree canopies
- 8 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 8 trees needing removal, 1 tree is 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*
- 1 of the 7 ash trees are in need of follow up because they are displaying signs and symptoms associated with EAB in summer 2013, monitor regularly for decline as it is known to be in Henry county.
- 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 7 years to remove ash – Suggestion: request a budget increase to $4,000 annually and apply for grants to plant replacement trees

Introduction

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

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

Inventory

In 2013, a tree inventory was conducted that included 100% of the city owned street trees. 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 147 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. Findings

Annual Benefits

Annual Energy Benefits

Trees conserve energy by shading buildings and blocking winds. New London's trees reduce energy related costs by approximately $6,922 annually (Appendix A, Table 1). These savings are both in Electricity (33.4 MWh) and in Natural Gas (4,479 Therms).

Annual Stormwater Benefits

New London's trees intercept about 392,407 gallons of rainfall or snow melt a year (Appendix A, Table 2). This interception provides $10,635 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 New London, it is estimated that trees remove 432.1 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 $1,214 (Appendix A, Table 3).

Annual Carbon Benefits

Carbon sequestration and storage reduce the amount of carbon in the atmosphere, mitigating climate change. In New London, trees sequester about 135,747 lbs of carbon a year with an associated value of $1,018 (Appendix A, Table 4). In addition, the trees store 135,747 lbs of carbon, with a yearly benefit of $12,232 (Appendix A, Table 5).

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. New London receives $7,726 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, New London's trees provide $27,513.38 of benefits annually. Benefits of individual trees vary based on size, species, health and location, but on average each of the 147 trees in New London provide approximately $187 annually (Appendix A, Table 7).

Forest Structure

Species Distribution

New London has over 22 different tree species along city streets and parks (Appendix A, Figure 1).
The distribution of trees by genus is as follows:

Maple	89	60%
Elm	10	6.8%
Spruce	8	5.4%
Ash	7	4.8%
Pine	5	3.4%
Apple (Crab)	4	2.7%
Oak	4	2.7%
Pear	3	2.1%
Mulberry	3	2.1%
Hackberry	3	2.1%
Redbud	3	2.1%
Locust	3	2.1%
Lilac	2	1%
Kentucky Coffee Tree	1	<1%
Walnut	1	<1%

Age Class

Much of New London's trees (39%) are between 12 and 24 inches in diameter at 4.5 ft (Appendix A, Figure 2). For age, a Bell Curve is preferred and shows the highest amount of trees around 18 inches in diameter at 4.5 ft, which you have. However, New London's size curve leans on the larger side with 31% of trees 24" or larger, indicating an 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 New London 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, 92% of New London's trees are in good or fair health for wood condition (appendix A, Figure 4 & Appendix B, Figure 3). Wood condition that is in poor health, dead or dying is about 8% of the population. This 8% is an estimate of trees that need more immediate 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	24	16%
Crown Raising	15	10%
Tree Removal	8	5.4%
Crown Reduction	22	14%

Canopy Cover

The canopy cover of New London is approximately 4.5 acres (Appendix A, Figure 4). According to the 2000 census, New London occupies 646 acres. Thus the canopy cover on city land is less than 1%.

Land Use and Location

The majority of New London'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	92%
Park/vacant/other	6%
Industrial/Large commercial	1.4%
Small commercial	0%
Multifamily residential	<1%

Location	
Planting strip	90%
Other maintained locations	0%
Cutout (surrounded by pavement)	0%
Front yard	10%

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

New London had no critical concern trees that need immediate removal, though mature immediate removals should be looked at and there are 15 of those. 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 largest diameter trees first. There is 1 tree 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 any of the critical concern trees are addressed, there should be follow up on the trees marked as needing maintenance that do not include trimming. There are a total of 16 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 10 removals, 6 are ash trees. There are a total of 139 ash trees, and 22 of those have signs and symptoms that have been associated with EAB. In addition, there are 12 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 New London.

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 (60%) (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 recommended to be 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 death and for the following signs and symptoms: canopy dieback, epicormic shoots, bark splitting, D-shaped borer exit holes, and wood pecker damage.

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

Year 1

Removal: 3 largest mature immediate trees and any trimming on mature immediate
Planting and Replacement: 5 trees to be planted in open locations
Visual Survey for signs and symptoms of EAB

Year 2

Removal: 2 mature routine trees and 4 ash trees with poor health
Planting and Replacement: 6 trees in open locations from year one removals
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 3

Removal: 6 trees - removal of any critical concern trees and young ash in poor health
Planting and Replacement: 9 trees to be planted in open locations and locations from previous removals
Visual Survey for signs and symptoms of EAB

Year 4

Removal: 6 trees - removal of any new critical concern trees, ash or mature immediate
Planting and Replacement: 7 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

Year 5

Removal: 8 trees - removal of any new critical concern trees or declining larger trees
Planting and Replacement: 9 trees to be planted in open locations and locations from previous removals
Visual Survey for signs and symptoms of EAB

Year 6

Removal: 6 trees - removal of any new critical concern trees or declining larger trees
Planting and Replacement: 7 trees in open locations from previous removals
Routine trimming: Contract to trim 1/3 of the city trees
Visual Survey for signs and symptoms of EAB

*Reduction of ash over 6 years: 7 total ash trees to be removed. With 7 ash trees (3 are 12-18" diameter, 2 are 18-24" diameter and 1 each of 24-30" and 30-36"), 8 recommended removals and 12 additional mature immediate needs it could take 15-20 years to remove all needed and recommended trees with the current budget. EAB could potentially kill all ash within 4 years of its arrival.

** To remove all ash and needed trees within 6 years, the budget would need to be increased to $4,000 a year. If the budget were increased to $2,000 a year all ash and recommended removals/work could be done in 13 years.

Emerald Ash Borer Plan

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*

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 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 genus 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. City Code 151.06 states "If it is determined with reasonable certainty that any such condition exists (trees or shrubs in the City reported or suspected to be infected with or damaged by any disease or insect or disease pests) on private property and that the 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."

Budget

Current Budget
Total $6,000 over 6 years ($1,000/year)

FY 2011 Budget
Removal: $1,000
Planting: Grants available through state and private sources for public ground.
Watering & Maintenance: $

FY 2012 Budget
Removal: $900
Planting: $
Routine trimming: $100
Watering & Maintenance: $

FY 2013 Budget
Removal: $1,000
Planting: $
Watering & Maintenance: $

FY 2014 Budget
Removal: $600
Planting: $400
Routine trimming: $
Watering & Maintenance: $

FY 2015 Budget
Removal: $1,000
Planting: $
Watering & Maintenance: $

FY 2016 Budget
Removal: $
Planting: $
Routine trimming: $1,000
Watering & Maintenance: $

*Reduction of ash over 6 years: 7 total ash trees to be removed. **It could take approximately 15-20 years to remove all ash, recommended removals and mature immediate trimming and possible removal needs with the current budget.**

Purposed Budget Increase

EAB could potentially kill all ash trees in New London within 4 years of its arrival. To remove all ash and needed trees within 6 years the budget would need to be increased to around $4,000 a year. If the budget were increased to $2,000 a year all ash could be removed within 13 years. Additionally, it is recommended that New London 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.

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Appendix A: i-Tree Data

Table 1: Annual Energy Benefits

New London

Annual Energy Benefits of Public Trees by Species

2/24/2014

Species	Total Electricity (MWh)	Electricity ($)	Total Natural Gas (Therms)	Natural Gas ($)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	10.8	820	1,420.1	1,392	2,212	(N/A)	25.3	32.0	59.78
Sugar maple	7.3	554	953.7	935	1,489	(N/A)	19.2	21.5	53.17
Norway maple	3.8	289	569.8	558	847	(N/A)	13.7	12.2	42.36
Chinese elm	3.9	292	521.3	511	803	(N/A)	6.9	11.6	80.34
Norway spruce	1.0	78	117.1	115	193	(N/A)	5.5	2.8	24.14
Green ash	2.0	151	263.0	258	409	(N/A)	4.8	5.9	58.47
Apple	0.1	7	15.2	15	22	(N/A)	2.7	0.3	5.40
Red maple	0.4	31	51.8	51	81	(N/A)	2.1	1.2	27.13
Eastern redbud	0.1	5	11.4	11	16	(N/A)	2.1	0.2	5.40
Conifer Evergreen Large	0.4	29	43.9	43	72	(N/A)	2.1	1.1	24.14
Northern hackberry	1.3	97	169.1	166	263	(N/A)	2.1	3.8	87.60
Honeylocust	0.4	30	60.7	60	90	(N/A)	2.1	1.3	29.94
White mulberry	0.2	17	32.3	32	49	(N/A)	2.1	0.7	16.31
Eastern white pine	0.0	3	7.9	8	11	(N/A)	1.4	0.2	5.61
Callery pear	0.1	11	23.0	23	33	(N/A)	1.4	0.5	16.73
Northern red oak	0.5	39	72.8	71	110	(N/A)	1.4	1.6	55.22
Lilac	0.0	3	7.6	7	11	(N/A)	1.4	0.2	5.40
Other street trees	1.0	73	139.2	136	209	(N/A)	4.1	3.0	34.86
Citywide total	33.4	2,532	4,479.8	4,390	6,922	(N/A)	100.0	100.0	47.41

Table 2: Annual Stormwater Benefits

New London

Annual Stormwater Benefits of Public Trees by Species

2/24/2014

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	146,263	3,964	(N/A)	25.3	37.3	107.14
Sugar maple	77,744	2,107	(N/A)	19.2	19.8	75.25
Norway maple	35,105	951	(N/A)	13.7	9.0	47.57
Chinese elm	57,609	1,561	(N/A)	6.9	14.7	156.13
Norway spruce	12,308	334	(N/A)	5.5	3.1	41.70
Green ash	20,758	563	(N/A)	4.8	5.3	80.37
Apple	275	7	(N/A)	2.7	0.1	1.86
Red maple	2,366	64	(N/A)	2.1	0.6	21.38
Eastern redbud	206	6	(N/A)	2.1	0.1	1.86
Conifer Evergreen Large	4,616	125	(N/A)	2.1	1.2	41.70
Northern hackberry	14,411	391	(N/A)	2.1	3.7	130.19
Honeylocust	1,881	51	(N/A)	2.1	0.5	17.00
White mulberry	804	22	(N/A)	2.1	0.2	7.26
Eastern white pine	425	12	(N/A)	1.4	0.1	5.77
Callery pear	749	20	(N/A)	1.4	0.2	10.14
Northern red oak	6,060	164	(N/A)	1.4	1.5	82.12
Lilac	137	4	(N/A)	1.4	0.0	1.86
Other street trees	10,688	290	(N/A)	4.1	2.7	48.28
Citywide total	392,407	10,635	(N/A)	100.0	100.0	72.84

Table 3: Annual Air Quality Benefits

New London

Annual Air Quality Benefits of Public Trees by Species

2/24/2014

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
Silver maple	25.8	4.4	12.7	1.1	139	51.0	7.5	7.1	48.9	319	-14.3	-54	144.1	404	(N/A)	25.3	10.93
Sugar maple	10.6	1.8	5.3	0.5	58	34.4	5.0	4.8	33.1	215	-8.4	-31	87.2	242	(N/A)	19.2	8.63
Norway maple	6.9	1.2	3.4	0.3	38	18.6	2.7	2.5	17.3	115	-1.6	-6	51.4	146	(N/A)	13.7	7.32
Chinese elm	9.7	1.5	4.3	0.4	51	18.3	2.7	2.6	17.5	114	0.0	0	57.0	165	(N/A)	6.8	16.50
Norway spruce	1.4	0.3	1.2	0.2	9	4.7	0.7	0.7	4.7	30	-4.4	-16	9.3	23	(N/A)	5.5	2.82
Green ash	2.5	0.4	1.2	0.1	13	9.4	1.4	1.3	9.0	59	0.0	0	25.4	72	(N/A)	4.8	10.35
Apple	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)	2.7	0.71
Red maple	0.4	0.1	0.2	0.0	2	1.9	0.3	0.3	1.8	12	-0.2	-1	4.8	14	(N/A)	2.1	4.50
Eastern redbud	0.0	0.0	0.0	0.0	0	0.3	0.0	0.0	0.3	2	0.0	0	0.8	2	(N/A)	2.1	0.71
Conifer Evergreen Large	0.5	0.1	0.4	0.1	3	1.8	0.3	0.3	1.8	11	-1.6	-6	3.5	8	(N/A)	2.1	2.82
Northern hackberry	3.0	0.5	1.5	0.1	16	6.1	0.9	0.8	5.8	38	0.0	0	18.7	54	(N/A)	2.1	18.06
Honeylocust	0.2	0.0	0.1	0.0	1	2.0	0.3	0.3	1.8	12	-0.1	0	4.6	13	(N/A)	2.1	4.28
White mulberry	0.2	0.0	0.1	0.0	1	1.1	0.2	0.2	1.0	7	0.0	0	2.8	8	(N/A)	2.1	2.66
Eastern white pine	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	-0.1	0	0.4	1	(N/A)	1.4	0.56
Callery pear	0.1	0.0	0.0	0.0	0	0.7	0.1	0.1	0.7	4	0.0	0	1.7	5	(N/A)	1.4	2.34
Northern red oak	1.3	0.2	0.6	0.1	7	2.5	0.4	0.3	2.3	15	-1.9	-7	5.8	15	(N/A)	1.4	7.65
Lilac	0.0	0.0	0.0	0.0	0	0.2	0.0	0.0	0.2	1	0.0	0	0.5	1	(N/A)	1.4	0.71
Other street trees	1.7	0.3	0.8	0.1	9	4.7	0.7	0.6	4.3	29	-0.2	-1	13.0	37	(N/A)	4.1	6.22
Citywide total	64.5	10.9	32.1	3.0	349	158.4	23.1	22.1	151.1	988	-32.9	-123	432.1	1,214	(N/A)	100.0	8.32

Table 4: Annual Carbon Stored

New London

Stored CO2 Benefits of Public Trees by Species

2/24/2014

Species	Total Stored CO2 (lbs)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	641,944	4,815	(N/A)	25.3	39.4	130.12
Sugar maple	309,952	2,325	(N/A)	19.2	19.0	83.02
Norway maple	114,421	858	(N/A)	13.7	7.0	42.91
Chinese elm	330,377	2,478	(N/A)	6.9	20.3	247.78
Norway spruce	9,362	70	(N/A)	5.5	0.6	8.78
Green ash	82,962	622	(N/A)	4.8	5.1	88.89
Apple	711	5	(N/A)	2.7	0.0	1.33
Red maple	4,943	37	(N/A)	2.1	0.3	12.36
Eastern redbud	533	4	(N/A)	2.1	0.0	1.33
Conifer Evergreen	3,511	26	(N/A)	2.1	0.2	8.78
Northern	51,124	383	(N/A)	2.1	3.1	127.81
Honeylocust	2,724	20	(N/A)	2.1	0.2	6.81
White mulberry	3,393	25	(N/A)	2.1	0.2	8.48
Eastern white pine	76	1	(N/A)	1.4	0.0	0.29
Callery pear	1,319	10	(N/A)	1.4	0.1	4.95
Northern red oak	30,478	229	(N/A)	1.4	1.9	114.29
Lilac	356	3	(N/A)	1.4	0.0	1.33
Other street trees	19,378	320	(N/A)	4.1	2.6	53.40
Citywide total	1,630,907	12,232	(N/A)	100.0	100.0	83.78

Table 5: Annual Carbon Sequestered

New London

Annual CO_2 Benefits of Public Trees by Species

2/24/2014

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
Silver maple	46,021	345	-3,081	-7	-23	18,124	136	61,057	458	(N/A)	25.3	45.0	12.38
Sugar maple	15,912	119	-1,488	-5	-11	12,249	92	26,667	200	(N/A)	19.2	19.6	7.14
Norway maple	6,405	48	-549	-4	-4	6,381	48	12,233	92	(N/A)	13.7	9.0	4.59
Chinese elm	7,394	55	-1,586	-2	-12	6,463	48	12,270	92	(N/A)	6.9	9.0	9.20
Norway spruce	924	7	-45	-2	0	1,732	13	2,610	20	(N/A)	5.5	1.9	2.45
Green ash	4,424	33	-398	-1	-3	3,348	25	7,373	55	(N/A)	4.8	5.4	7.90
Apple	152	1	-3	-1	0	149	1	296	2	(N/A)	2.7	0.2	0.56
Red maple	687	5	-24	-1	0	677	5	1,340	10	(N/A)	2.1	1.0	3.35
Eastern redbud	114	1	-3	-1	0	112	1	222	2	(N/A)	2.1	0.2	0.56
Conifer Evergreen	347	3	-17	-1	0	649	5	979	7	(N/A)	2.1	0.7	2.45
Northern hackberry	1,654	12	-245	-1	-2	2,146	16	3,554	27	(N/A)	2.1	2.6	8.88
Honeylocust	604	5	-13	-1	0	670	5	1,261	9	(N/A)	2.1	0.9	3.15
White mulberry	344	3	-16	-1	0	383	3	710	5	(N/A)	2.1	0.5	1.77
Eastern white pine	36	0	0	0	0	76	1	111	1	(N/A)	1.4	0.1	0.42
Callery pear	320	2	-6	0	0	240	2	553	4	(N/A)	1.4	0.4	2.07
Northern red oak	740	6	-146	0	-1	864	6	1,457	11	(N/A)	1.4	1.1	5.46
Lilac	76	1	-2	0	0	74	1	148	1	(N/A)	1.4	0.1	0.56
Other street trees	1,504	11	-205	-1	-2	1,609	12	2,907	22	(N/A)	4.1	2.1	3.63
Citywide total	87,658	657	-7,828	-28	-59	55,946	420	135,747	1,018	(N/A)	100.0	100.0	6.97

Table 6: Annual Social and Aesthetic Benefits

New London

Annual Aesthetic/Other Benefits of Public Trees by Species

2/24/2014

Species	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	3,532	(N/A)	25.3	45.7	95.46
Sugar maple	1,657	(N/A)	19.2	21.4	59.17
Norway maple	621	(N/A)	13.7	8.0	31.05
Chinese elm	510	(N/A)	6.9	6.6	50.99
Norway spruce	259	(N/A)	5.5	3.4	32.32
Green ash	377	(N/A)	4.8	4.9	53.84
Apple	8	(N/A)	2.7	0.1	2.06
Red maple	103	(N/A)	2.1	1.3	34.34
Eastern redbud	6	(N/A)	2.1	0.1	2.06
Conifer Evergreen Large	97	(N/A)	2.1	1.3	32.32
Northern hackberry	199	(N/A)	2.1	2.6	66.41
Honeylocust	94	(N/A)	2.1	1.2	31.49
White mulberry	20	(N/A)	2.1	0.3	6.53
Eastern white pine	14	(N/A)	1.4	0.2	6.83
Callery pear	39	(N/A)	1.4	0.5	19.55
Northern red oak	48	(N/A)	1.4	0.6	23.84
Lilac	4	(N/A)	1.4	0.1	2.06
Other street trees	138	(N/A)	4.1	1.8	23.03
Citywide total	7,726	(N/A)	100.0	100.0	52.91

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 $
Silver maple	2,212	458	404	3,964	3,532	$10,569.96	(±0)	38.42
Sugar maple	1,489	200	242	2,107	1,657	$5,694.22	(±0)	20.70
Norway maple	847	92	146	951	621	$2,657.73	(±0)	9.66
Chinese elm	803	92	165	1,561	510	$3,131.63	(±0)	11.38
Norway spruce	193	20	23	334	259	$827.32	(±0)	3.01
Green ash	409	55	72	563	377	$1,476.48	(±0)	5.37
Apple	22	2	3	7	8	$42.35	(±0)	0.15
Red maple	81	10	14	64	103	$272.08	(±0)	0.99
Eastern redbud	16	2	2	6	6	$31.76	(±0)	0.12
Conifer Evergreen Large	72	7	8	125	97	$310.25	(±0)	1.13
Northern hackberry	263	27	54	391	199	$933.43	(±0)	3.39
Honeylocust	90	9	13	51	94	$257.59	(±0)	0.94
White mulberry	49	5	8	22	20	$103.62	(±0)	0.38
Eastern white pine	11	1	1	12	14	$38.36	(±0)	0.14
Callery pear	33	4	5	20	39	$101.68	(±0)	0.37
Northern red oak	110	11	15	164	48	$348.60	(±0)	1.27
Lilac	11	1	1	4	4	$21.18	(±0)	0.08
Other street trees	209	22	37	290	138	$696.17	(±0)	2.53
Citywide total	6,922	1,018	1,214	10,635	7,725	$27,514.38	(±0)	100.00

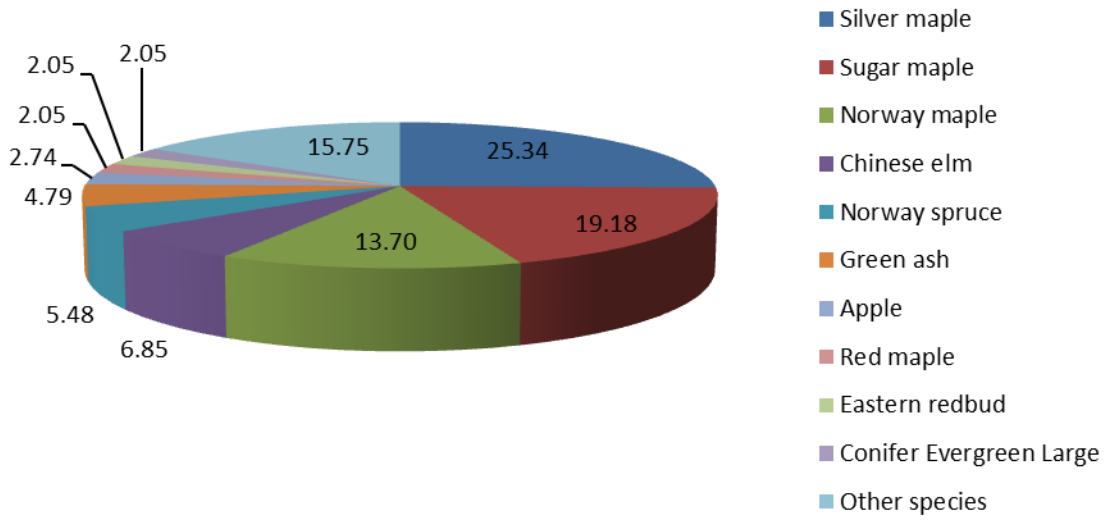

Figure 1: Species Distribution

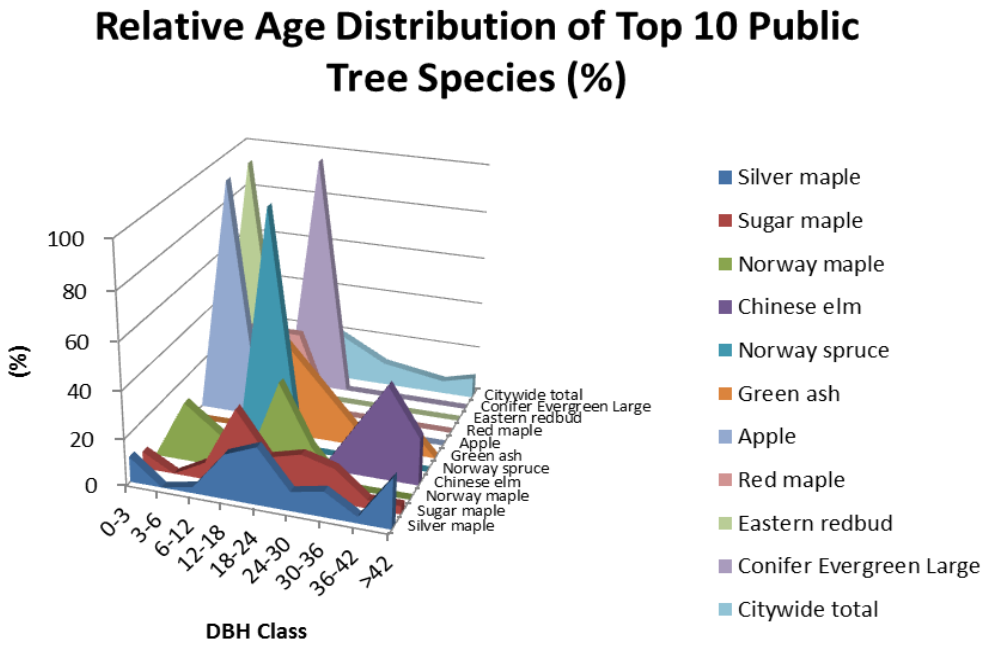

Figure 2: Relative Age Class

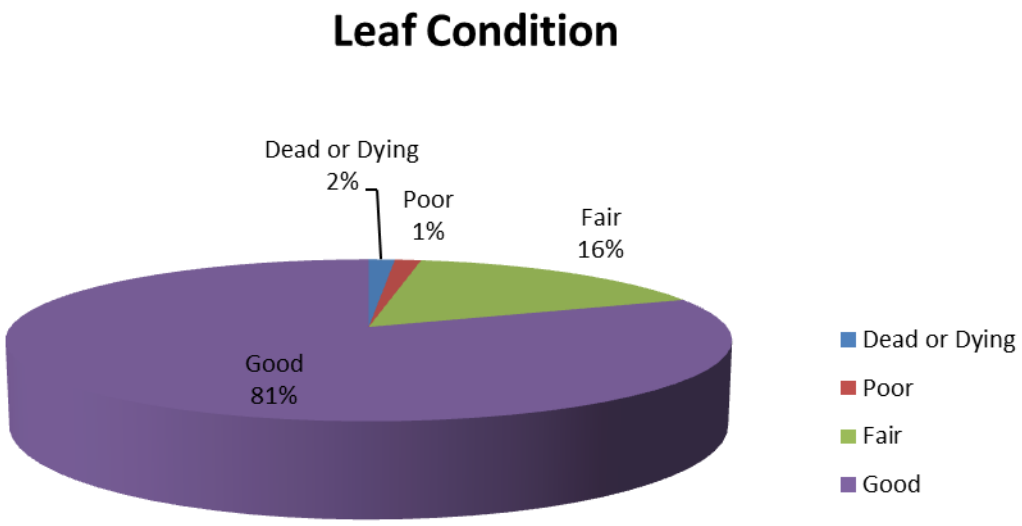

Figure 3: Foliage Condition

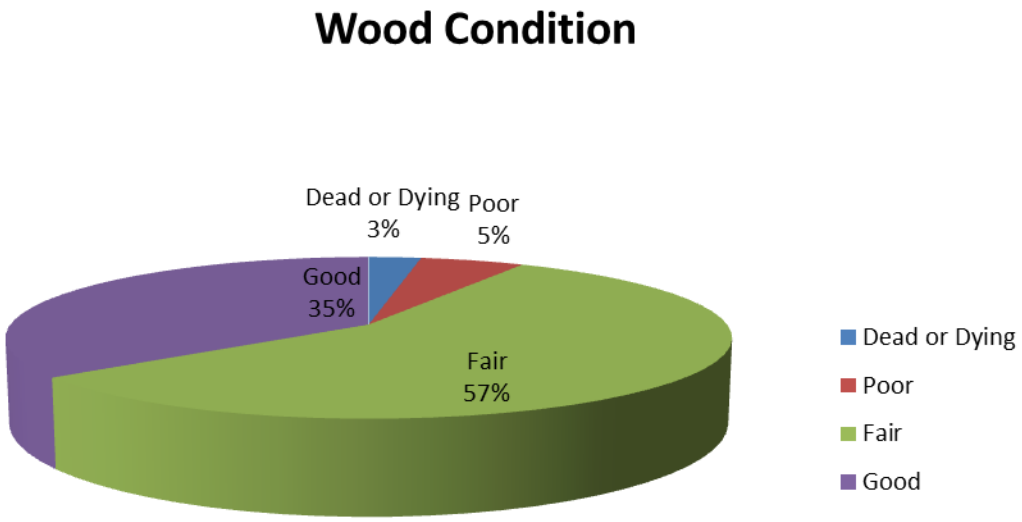

Figure 4: Wood Condition

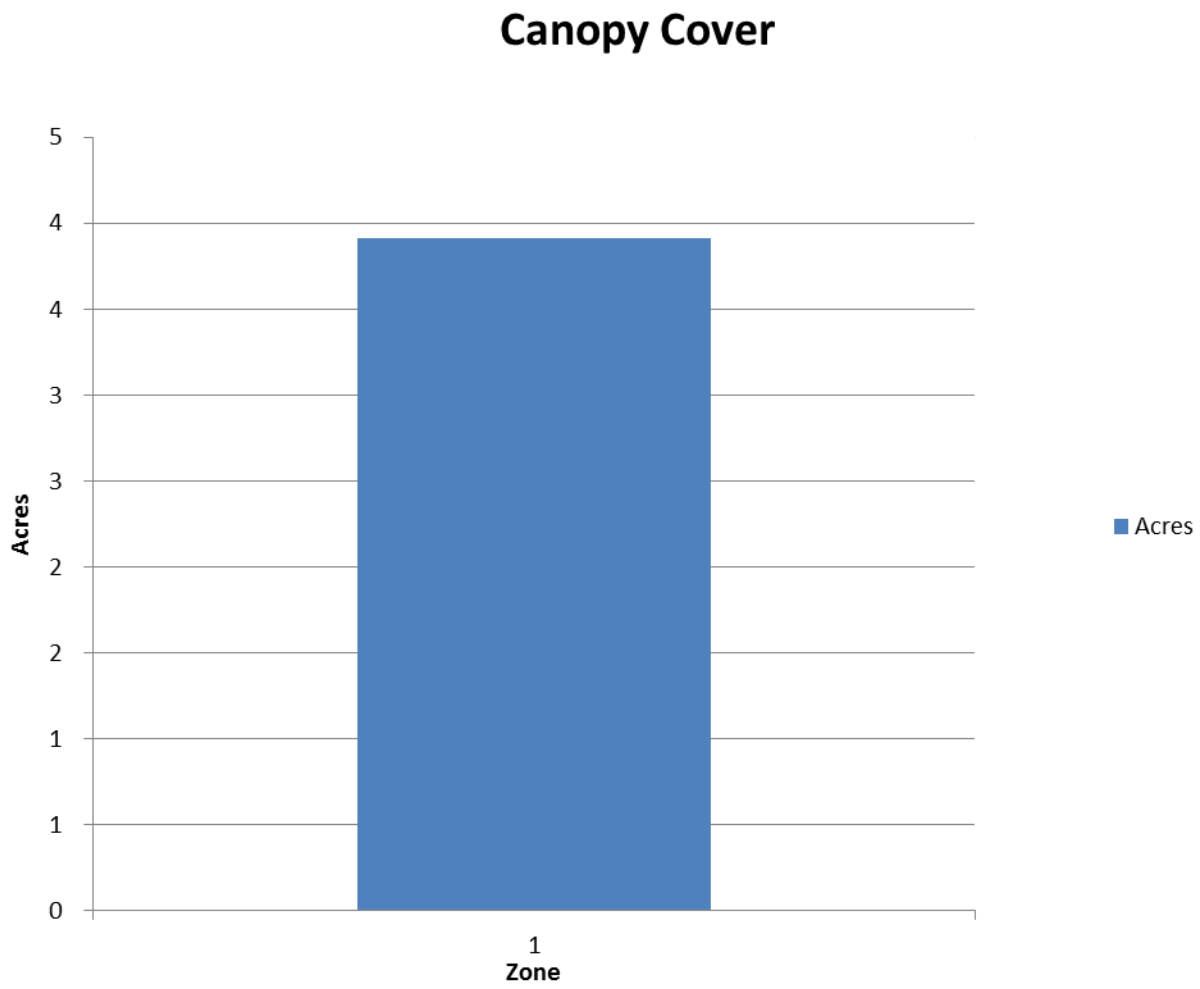

Figure 5: Canopy Cover in Acres

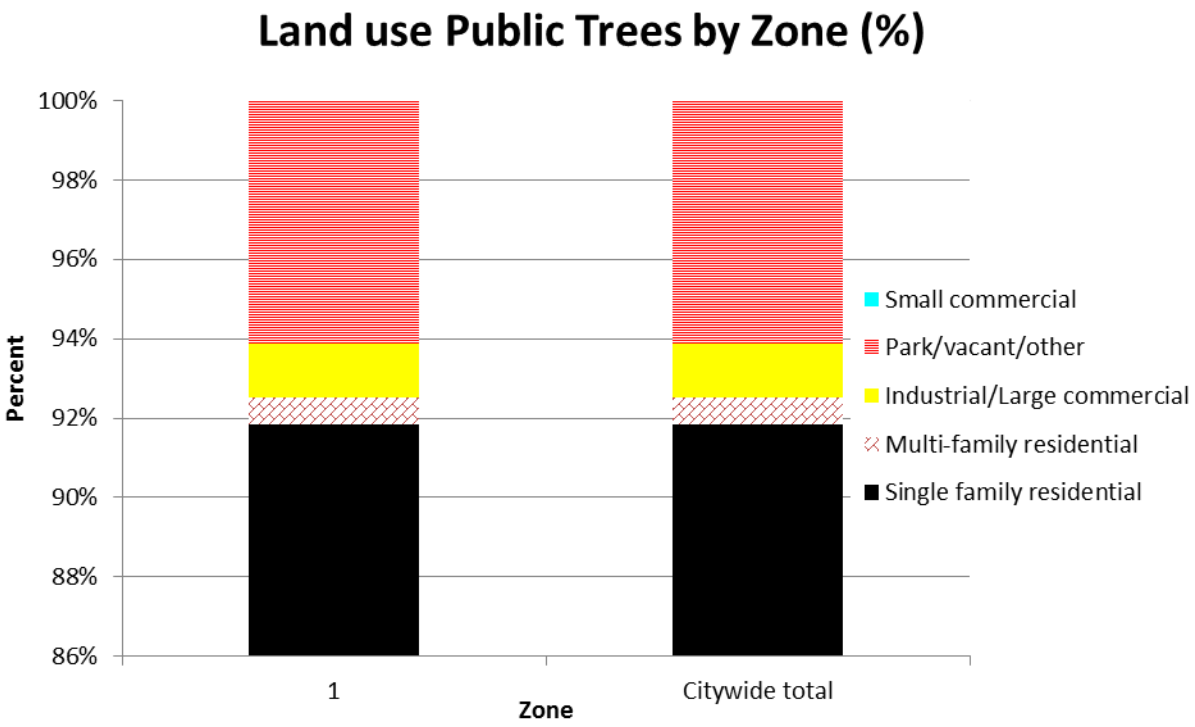

Figure 6: Land Use of city/park trees

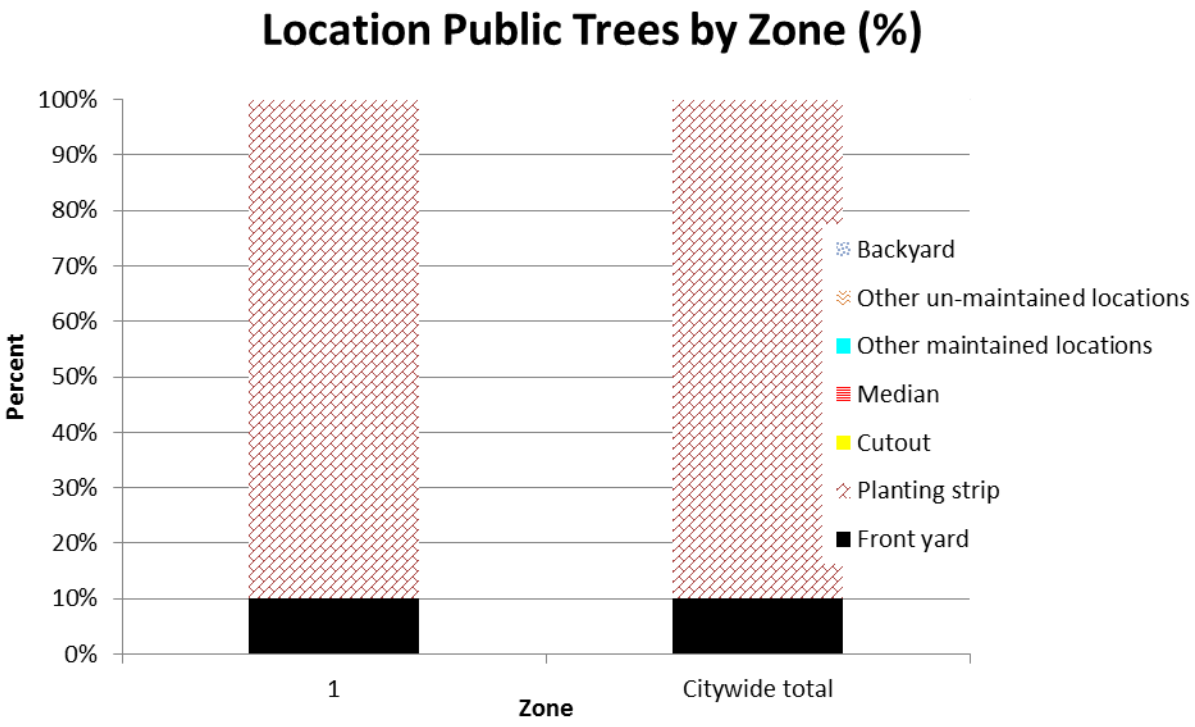

Figure 7: Location of city/park trees

Appendix B: ArcGIS Mapping

Figure 1: Location of Ash Trees

Figure 2: Location of EAB symptoms

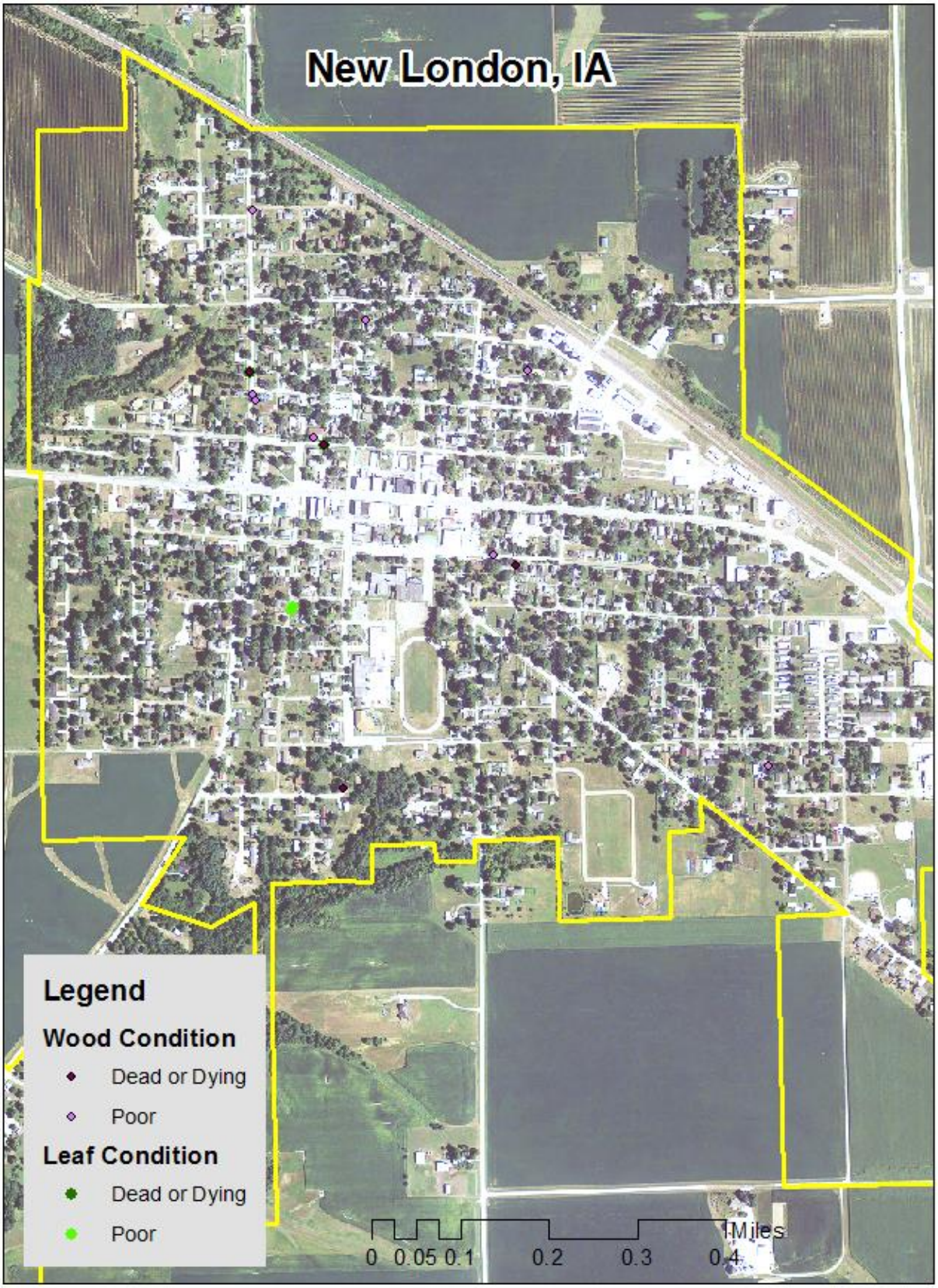

Figure 3: Location of Poor Condition Trees

Figure 4: Location of Trees with Recommended Maintenance

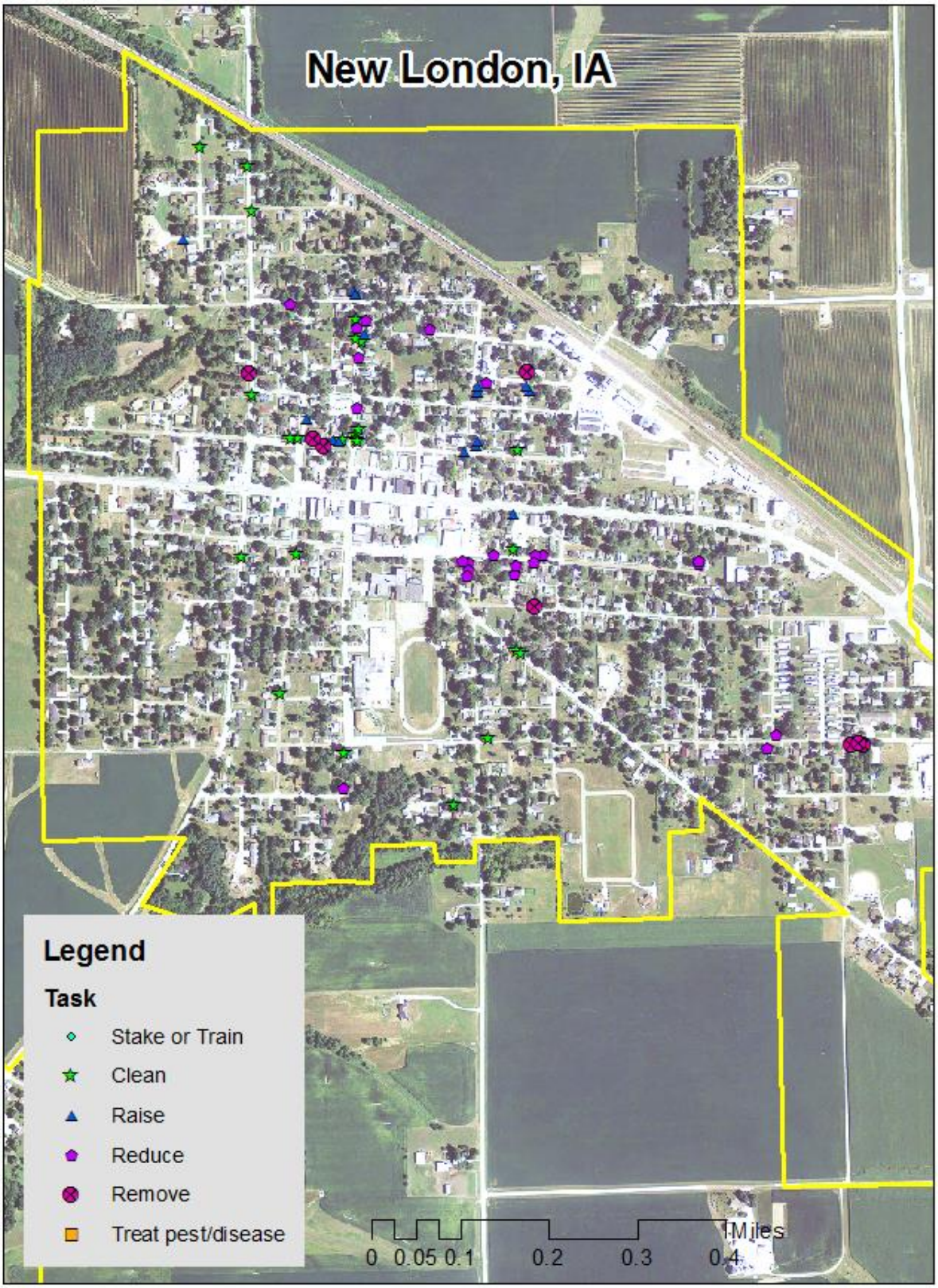

Figure 5: Maintenance Tasks *City ownership of the trees recommended for removal should be verified prior to any removal*

Appendix C: New London Tree Ordinances

CHAPTER 151

TREES

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 shall be planted on any property belonging to the City except by permission of the City Council. No trees shall be planted in any street, right-of-way, parking areas or in any City or utility easements. This includes the area between the sidewalk and the curb. These areas shall be kept free for current or future City and/or utility usage. Trees should be planted inside the property owner's property lines.

(Ord. 19 – Jan. 13 Supp.)

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:

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 725]

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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.