2019 Tree Inventory and Management Plan

TARTAN FIELDS
HOMEOWNERS ASSOCIATION

Ahlum & Arbor
TREE PRESERVATION

William S. King
ASCA Registered Consulting Arborist #563
Ahlum & Arbor Tree Preservation
10/24/2019

Contents

Introduction

Assignment

In April of 2019, the Tartan Fields Homeowners Association (Tartan Fields HOA) requested that Ahlum & Arbor Tree Preservation conduct a GIS inventory of all HOA trees located along roadways and common ground spaces. Tree locations were plotted using ArcGIS software. Inventoried trees were assessed based on species, size (diameter), and overall condition. The purpose of the inventory was to:

1. Provide an accurate account of Tartan Fields HOA's current tree resources.
2. Identify tree maintenance priorities.
3. Develop an overall management plan to promote the long-term health and sustainability of the Tartan Fields HOA trees.

The full inventory may be accessed online from the following link:

https://ahlumarbor.maps.arcgis.com/apps/View/index.html?appid=0c189053b93f4367be0d1ae3c96fc59b

Inventory

Tree Species

A total of 2,152 individual trees were included in the inventory (See Appendix A – Site Map). There are 27 tree species present across 16 different genera (See Appendix B – Attribute Reports). The three most abundant species are Norway maple (*Acer platanoides*), blue spruce (*Picea pungens*), and flowering pear (*Pyrus calleryana*). These three species represent approximately 48 percent of all HOA trees. The three most abundant genera are *Acer* (maple)*, Picea* (spruce)*, and Quercus* (oak). These genera account for about 66 percent of all trees.

Tree Condition

Tree condition was evaluated based on biological and structural health using the following percentage breakdowns:

Condition	Percentage
Excellent	90
Good	80
Fair	70
Poor	50
Very Poor	30
Dead	0

Of trees inventoried, 54 percent are in fair condition or worse. The average condition rating for the Norway maples and flowering pears is 72 percent (fair). The low condition rating of these species is primarily the result of poor structure and poor planting/mulching practices. These are the two most common tree defects noted throughout the HOA trees.

The average condition rating of blue spruce is 59 percent (approaching poor). The blue spruces are planted as screen trees at the main entrances. The condition of the blue spruce trees is expected to continue to diminish over time. This is primarily the result of a fungal needle infection (Rhizosphaera needlecast) and age. Blue spruce trees have a short service life in the Midwest (typically 20 to 30 years) due to poor tolerance to heat and humidity.

Tree Maintenance Priorities

Pruning

Pruning is integral to any tree care program. Tree condition is based on biological health and structure. For the vast majority of trees, pruning is essential to develop and maintain good structure and form. When a tree is young to middle aged, many structural defects can be corrected, including co-dominant leaders, poor branch spacing, tight branch unions with bark on bark contact (included bark), and crossing/rubbing branches. These defects, left uncorrected, will shorten the expected life span of the plant and increase the chance of structural failure. At maturity, these structural defects are often not practical to fully correct.

Pruning to improve branch structure was the most common structural maintenance item noted during the inventory process. Fortunately, approximately 88 percent (1,914) of the HOA's trees are relatively young (smaller than 12-inch diameter). This means that the majority of structural problems can be corrected, resulting in an immediate and long-term improvement to overall tree condition. A good example of this would be the sweetgums (*Liquidambar styraciflua*) that line Morris Drive. Tree health along the road is good to excellent but many trees were downgraded because of the presence of co-dominant leaders and the impact this has on their structure. Most of these trees require no more than a half dozen pruning cuts to correct these defects.

Defects that are not corrected at an early age often require more extensive, and costly, pruning later in life. The goal shifts from correcting defects to managing the defects so that they have less of an impact on the tree's structure. This can be observed in the pear trees along Brodie Boulevard. Because these flowering pears were not pruned when they were young, nearly all of them have numerous structural defects, most notably co-dominant leaders and large branches with included bark signifying weak points of attachment. Accordingly, a fair number of these trees have suffered significant branch failures. Crown reductions, done properly, would reduce the impact these defects have on a given tree's structure, prolonging the tree's service life.

Tree Removal

Trees that are in very poor condition or dead, and trees that are reaching the end of their expected service lives, should be evaluated for removal. Tree that are in very poor condition or that are dead, are scattered throughout the HOA, though most are located west of Concord Road.

A removal plan should be developed for the blue spruces located at the main entrance off Concord and Jerome Roads. Most of these spruces are in poor condition and are reaching the end of their expected service life (20 to 30 years of age). The blue spruces account for 383 individual trees within the HOA. Rather than attempt to remove all of these trees at once, it would be best to develop a succession plan and slowly replace the trees over time.

Diversity and Tree Selection

Plant diversity is a maintenance practice for the tree population as a whole. Diversity, within a plant community, is best achieved at the genus level. This is largely owed to the fact that most major pest insects and diseases are relatively host specific, typically attacking plants at the genus level. A recent example of this is emerald ash borer (*Agrilus planipennis*). Emerald ash borer is a devastating pest of ash trees (*Fraxinus*) but does impact other shade tree genera.

Increasing plant diversity is critical to minimizing the risk of excessive plant loss from pest insects and disease. Maple trees, as a genus, make up 35 percent of all HOA trees. Should a pest that attacks maple trees arrive, the HOA would have 767 trees that could be impacted. That would be 767 trees that would either have to be treated or removed and replaced. Either option would require a significant financial investment that could be avoided by increasing diversity.

Another example would be the blue spruces that line out the main entrances. Nearly all of the trees in these plantings are blue spruce. Even without their short service life, the species is highly susceptible to Rhizosphaera needlecast. This disease has become widespread in recent years due to wet conditions in the spring that favor disease development. Nearly all of these trees were observed to have Rhizosphaera needlecast. Had these plantings incorporated other screening evergreens such as arborvitae (*Thuja*) or pines (*Pinus*) the HOA would only be faced with replacing a few individual trees rather than the entire plantings. In this case, even the introduction of a different species, such as Norway spruce (*Picea abies*), would have reduced plant loss, as Norway spruce is resistant to Rhizosphaera needlecast.

The notion of planting a single species/genus along an entire road has become outdated. Contemporary plantings by cities and municipalities are favoring a greater diversity of species/genera along roadways. Utilizing a variety of species adds diversity and can be done to overlap features of interest (timing/shade of fall color, height variations for visual contrast, flowering time/color, etc.). In addition to improving the diversity of the Tartan Fields HOA urban forest, the incorporation of various species will keep the community up with modern city and regional tree planting methods.

Plant Healthcare

Plant healthcare is an essential part of any tree maintenance program. Healthy, unstressed trees require very little supplemental maintenance beyond monitoring for potential threats and targeted applications when necessary. Their natural defenses are typically sufficient to keep pest population at relatively low levels. Unfortunately, trees grown under urban conditions experience a wide range of stresses throughout their life. Tree lawns (grassy areas between roadways and sidewalks) are notoriously tough sites to grow healthy, vigorous trees. Trees grown in these sites are often subjected to nutrient-poor soils, poor mulching practices, soil compaction, inconsistent soil moisture (either too much water or more commonly not enough water), salt deposition (de-icing salt), and site conflicts such as excessive pruning around overhead utility lines or limb damage from passing vehicles, to name a few.

The vast majority of the HOA's trees are grown in these tree lawns. Despite the lack of diversity and difficult growing conditions, few major pest and disease issues were observed during the inventory. Although relatively few significant pest issues were noted during the inventory, there is still a high potential for a severe pest or disease outbreak to develop. Plant healthcare should not be reactionary. The goal is to prevent outbreaks and significant plant damage from occurring, not to correct it once it has happened. The cost to prevent an outbreak, such as scale, through monitoring and targeted applications is substantially lower than the cost to treat entire tree populations after pest populations have built up to endemic levels.

The most significant health problem observed during the inventory was poor mulching and planting practices. Most of the newer street trees inventoried (3-inch diameter or less) were in poor condition as a result of being planted too deep and/or having excess mulch piled up at the base of the trunks. Most of the established street trees have excess soil/mulch against the root collar as well.

A tree should have a visible flare near the ground where trunk tissue widens out into root tissue. This area is known as the tree's root collar or root flare. A tree's root collar should be visible, without mulch or soil piled on top of it because this part of the tree must be able to exchange oxygen and carbon dioxide. Too deep of planting, excess soil piled at the base of the tree, or excess mulching (volcano mulching) interferes with this process, resulting in root decline and poor plant performance, including death.

Management Plan

Pruning

The pruning cycle for this site should be about one pruning every three to five years for trees 12 inch and smaller, once every five to seven years for trees between 12 and 24 inches, and once every seven to 10 years on trees greater than 24 inches (note that these intervals are based on structural pruning only, removal of dead branches and clearance needs may require shorter pruning cycles). Pruning should focus on developing and/or maintaining a central leader, spacing scaffold branches along the trunk, removing or reducing branches with weak attachment points, and reducing temporary branches to avoid making larger than necessary wounds later in the tree's life (especially important for trees with site restrictions that require height clearance over cars, sidewalks, and utilities).

All pruning work should be conducted by or under the direct supervision of an International Society of Arboriculture (ISA) Certified Arborist, Board Certified Master Arborist, or American Society of Consulting Arborists (ASCA) Registered Consulting Arborist. All work should be done in accordance with industry standards (ANSI A-300 Pruning Standard).

Tree Removal

Trees that are noted as being in very poor condition or dead, should be individually assessed for removal. Each tree should be ranked based on removal urgency, with preference going to trees that have the greatest potential to cause significant property damage or personal injury. A landscape architect should be consulted to develop a succession plan for the main entrances, currently lined with blue spruces.

Tree Replacement and Selection

No single species should be used for replacement. Rather, a variety of different species should be used to increase plant diversity and reduce maintenance costs and the potential for excessive tree loss due to insect or disease. Trees should be selected that are known to have good tolerance to urban conditions and are adapted to a wide range of soil conditions, especially alkaline soils (pH>7). A partial list of good tree selections can be found in Appendix C -Recommended Replacement Species. Trees should be spaced according to mature sizes for the given plant to prevent over-crowding.

Trees should be purchased in the 2 to 4-inch caliper range. Smaller trees require less upfront maintenance, establish quicker, and are less likely to have significant structural defects. Only high quality, ball and burlap trees should be purchased. Prior to installation, a qualified arborist should be employed to assure that root balls are of sufficient size and that the trees are free of significant pest insect/disease issues and have reasonably good structure. The tree's root collar should be located prior to planting (even if this requires shaving down the original root ball). The root collar should then be planted at or within 2 inches of existing grade. Following installation, the new trees must be watered. The trees will require 1 inch of water per week. There are many commercial products available to perform this function. Mulch may be applied but should be installed at a depth of no more than 2 inches.

Plant Healthcare

Plant healthcare refers to inspecting plant material during the growing season, scouting for pest insects and diseases and monitoring overall tree health, providing recommendations to resolve issues that are likely to lead to tree decline such as moisture stress, nutrient deficiencies, excessive mulching and soil compaction. Again, the key concept is that healthy plants are less likely to develop significant pest issues and are better suited to tolerate minor pest issues when they occur.

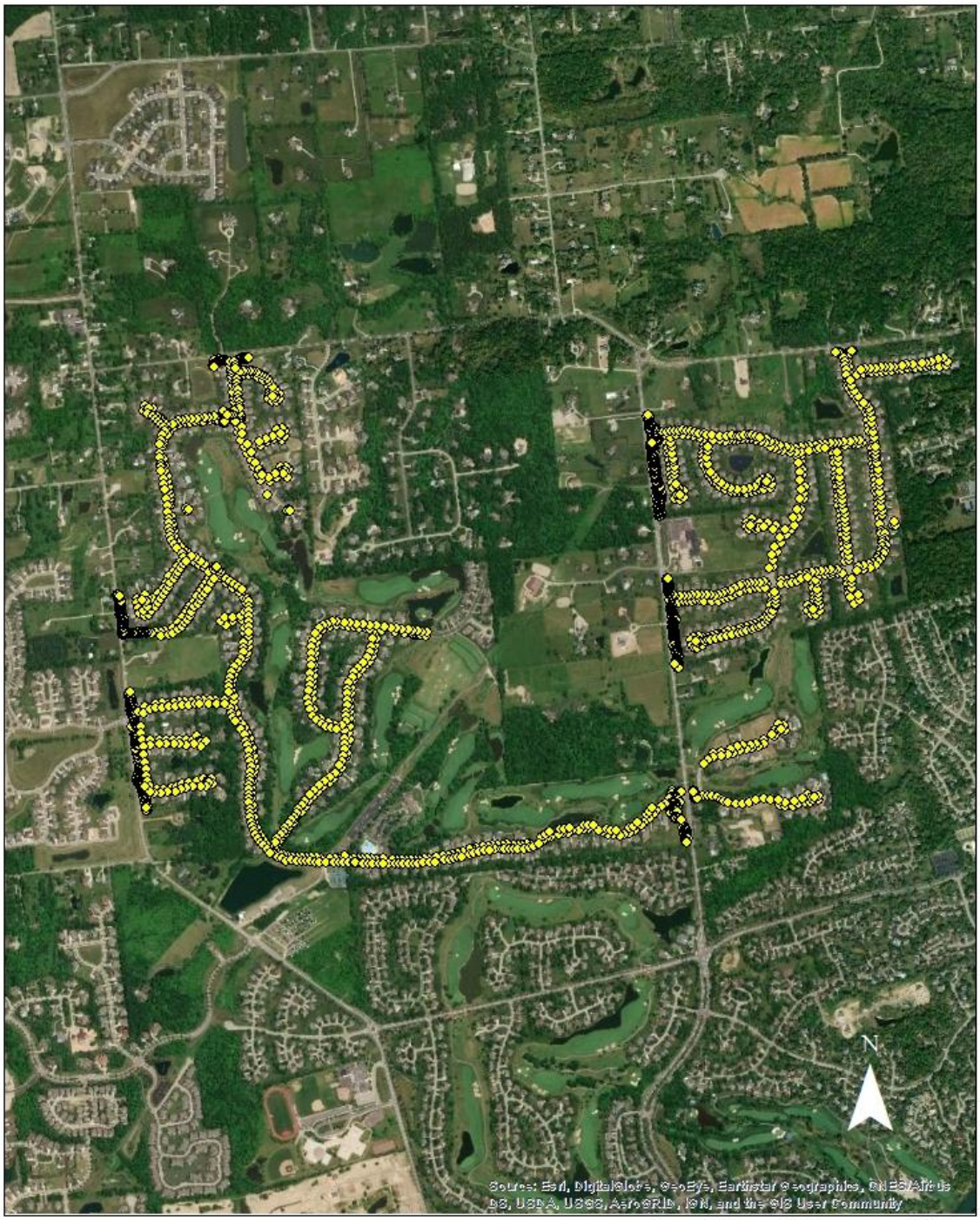
At least twice per growing season, a Certified Arborist should conduct an overall assessment of the HOA's trees. At this time, common pest insects and mites should be treated on an as needed basis to prevent pest populations from building up. Trees showing below average growth rates, off-color foliage, and/or any other visible indication of stress, should be identified and further evaluate to determine the underlying cause of the stress. Additional management recommendations, such as fertilization, therapeutic micro-nutrient treatments, vertical mulching (aeration), etc. should then be made to alleviate plant stress.

Root collar excavations should be performed throughout the HOA. This service is performed using compressed air to excavate the soil/mulch to an appropriate depth without significantly damaging tree roots. Ideally, all HOA trees would have this service done within the next 5 years. A Certified Arborist should evaluate each street based on how excessive the mulch/soil depth is as well as species tolerance to this problem. Trees more heavily impacted trees, or streets with highly sensitive species, should be given priority.

Conclusion

The majority of trees within the Tartan Ridge HOA will improve in condition over the next 5-10 years with proper maintenance. After five years, the tree inventory should be updated. New trees should be added to the inventory and trees no longer present removed from the inventory. Existing trees should be re-assessed for size and condition. The existing management plan should be evaluated for effectiveness and a new management plan should be outlined.

Appendix A – Site Maps



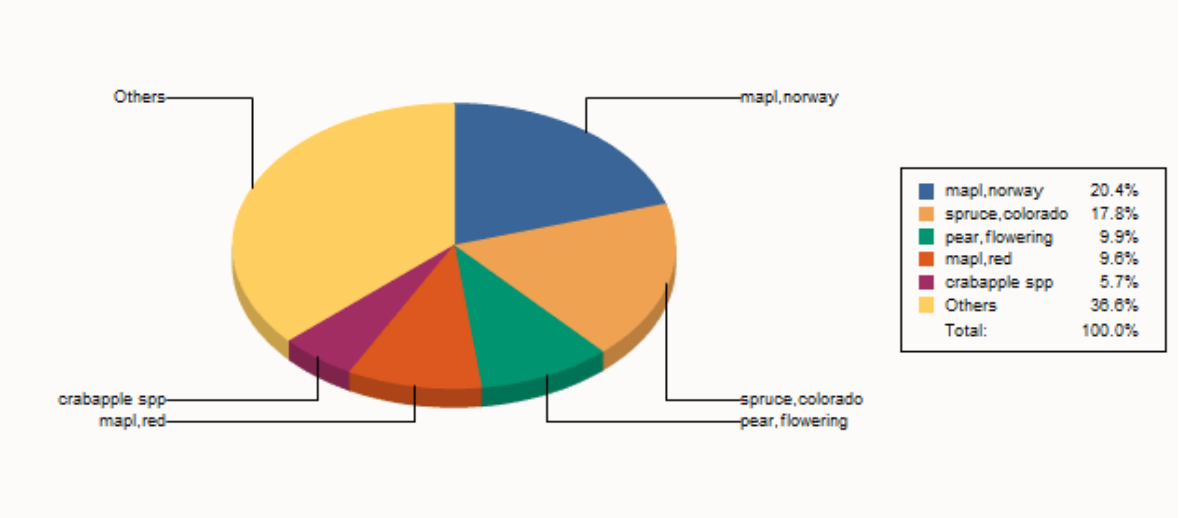
Site Type

- tree

0 750 1,500 3,000 Feet

Appendix B – Attribute Summary Reports

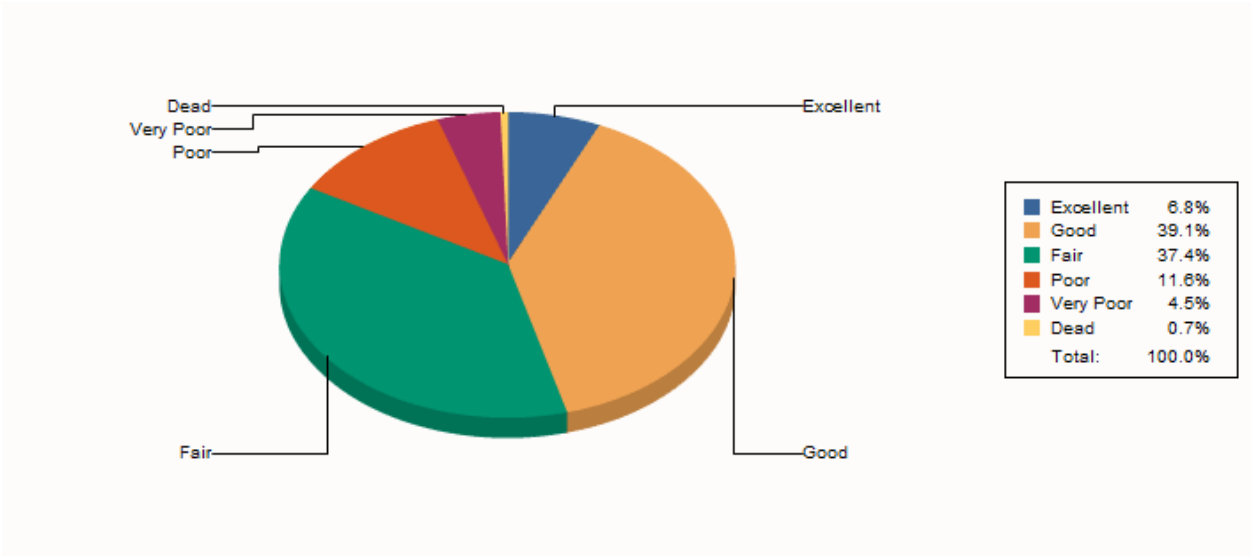
Species Distribution



Top 20 Species

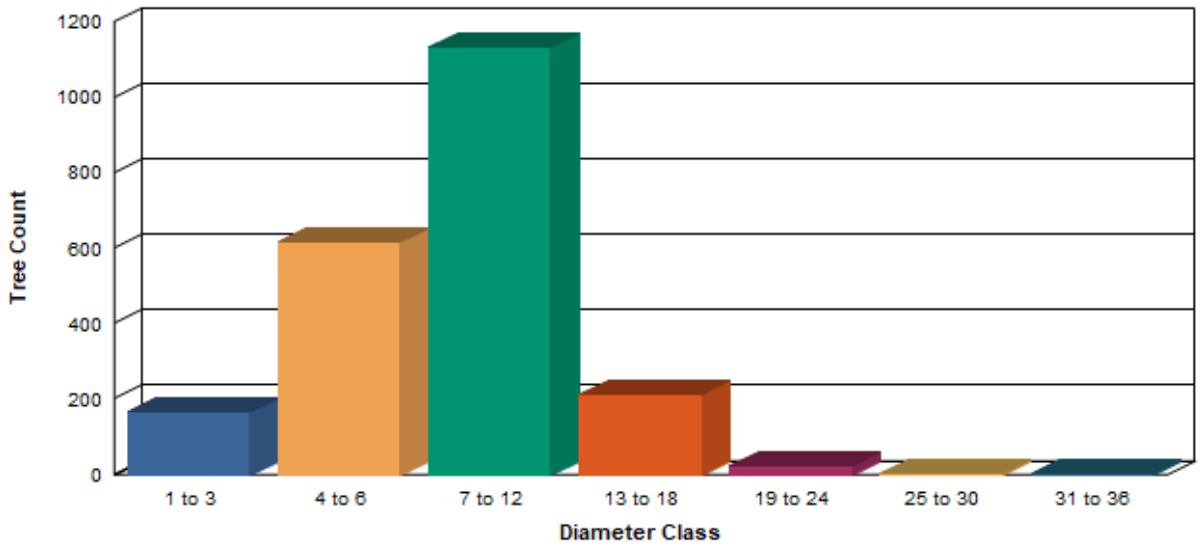
Species	Percent	Count
Norway maple	20.4%	439
Blue spruce	17.8%	383
Flowering pear	9.9%	212
Red maple	9.6%	207
Crabapple spp.	5.7%	123
Pin oak	4.3%	92
River birch	4.1%	89
Swamp white oak	3.8%	82
Norway spruce	3.4%	73
Sugar maple	3.3%	70
Sweetgum	2.9%	62
Elm spp.	2.4%	52
Freeman maple	2.4%	51
Honeylocust	2.3%	49
London planetree	1.7%	36
Scarlet oak	1.5%	33
Eastern redbud	1.3%	28
Chinese elm	0.7%	14
White pine	0.6%	12
Hawthorn spp.	0.5%	10
Others	1.6%	35
Total		**2,152**

Condition Distribution



Condition	Percent	Count
Excellent	6.8%	146
Good	39.1%	842
Fair	37.4%	805
Poor	11.6%	249
Very Poor	4.5%	96
Dead	0.7%	14
Total		**2,152**

Diameter Distribution



Diameter Class	Percent	Count
1 to 3	7.7%	166
4 to 6	28.6%	615
7 to 12	52.6%	1,133
13 to 18	9.8%	211
19 to 24	1.1%	23
25 to 30	0.1%	3
31 to 36	0.0%	1
Total		**2,152**

Species Detail Report

Rank	Percent	Common Name	Species	Average Condition	Average Diameter	Tree Count
1	20.4	Norway maple	*Acer platanoides*	72	8	439
2	17.8	Blue spruce	*Picea pungens*	59	8	383
3	9.9	Flowering pear	*Pyrus calleryana*	72	11	212
4	9.6	Red maple	*Acer rubrum*	74	6	207
5	5.7	Crabapple	*Malus spp.*	72	5	123
6	4.3	Pin oak	*Quercus palustris*	75	9	92
7	4.1	River birch	*Betula nigra*	73	16	89
8	3.8	Swamp white oak	*Quercus bicolor*	76	10	82
9	3.4	Norway spruce	*Picea abies*	74	4	73
10	3.3	Sugar maple	*Acer saccharum*	74	5	70
11	2.9	Sweetgum	*Liquidambar stryraciflua*	75	9	62
12	2.4	Elm	*Ulmus spp.*	78	8	52
13	2.4	Freeman maple	*Acer x freemanii*	78	11	51
14	2.3	Honeylocust	*Gleditsia triacanthos*	78	6	49
15	1.7	London planetree	*Platanus x acerifolia*	79	7	36
16	1.5	Scarlet oak	*Quercus coccinea*	73	12	33
17	1.3	Eastern redbud	*Cercis canadensis*	74	2	28
18	0.7	Chinese elm	*Ulmus parvifolia*	78	12	14
19	0.6	White pine	*Pinus strobus*	47	5	12
20	0.5	Hawthorn	*Crataegus spp.*	73	6	10
21	0.4	Red oak	*Quercus rubra*	68	5	8
22	0.4	Schumard oak	*Quercus shumardii*	71	9	8
23	0.2	White birch	*Betula pendula*	60	11	5
24	0.2	Littleleaf linden	*Tilia cordata*	54	4	5
25	0.2	Serviceberry	*Amelanchier spp.*	80	7	5
26	0.1	Chokecherry	*Prunus virginiana*	30	5	3
27	0	Serbian spruce	*Picea omorika*	70	2	1
Totals				**71**	**8**	**2,152**

Appendix C – Recommended Replacement Species

LARGE TREES	
Catalpa	*Catalpa speciosa*
Hackberry	*Celtic occidentalis*
Ginko (male)	*Ginkgo biloba*
Kentucky coffeetree	*Gymnocladus diocus*
Tuliptree	*Liriodendron tulipifera*
Dawn redwood	*Metasequoia glyptostroboides*
London planetree	*Platanus x acerifolia*
Yellow buckeye	*Aesculus flava*
Turkish filbert	*Corylus colurna*
American linden	*Tilia americana*
Black alder	*Alnus glutinosa*
Baldcypress	*Taxodium distichum*
MEDIUM TREES	
Japanese zelkova	*Zelkova serrata*
Katsura	*Cercidiphyllum japonicum*
Hardy rubber tree	*Eucommia ulmoides*
Golden raintree	*Koelreuteria paniculata*
Amur corktree	*Phellodendron amurense*
Japanese pagoda tree	*Styphnolobium japonicum*

Appendix D – Certificate of Performance

I, William S. King, certify that:

- The analysis, opinions, and conclusions outlined within the report are my own and based on current arboricultural practices.
- No one provided significant professional assistance to me, except as indicated in the report.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors any outcome or client.

Signed: *William S. King*

Dated: October 24, 2019

William S. King
Certified Arborist #OH-6091A (International Society of Arboriculture)
Registered Consulting Arborist #563 (American Society of Consulting Arborists)