

The Willows Park Preserve Tree Inventory and Management Plan | 2018



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The Willows Park Preserve Tree Inventory and Management Plan

MAKING THE MOST OF YOUR INVENTORY MANAGEMENT PLAN

Those who operate a large business or institution understand how inventory impacts operations and budgeting. One must know what's there, how much or how many, and where it all is. But the task doesn't end there. To obtain the greatest benefit from inventory, owners or their designees must manage it. Are a company's tools, for example, old and defective, in need of repair, in short supply, or useless and taking up space that could be better occupied? A good management plan will address these issues and keep the inventory current, in good condition, and functioning for the benefit and safety of those involved.

Managing trees on a large property can seem like an overwhelming task, but the same principles of inventory management apply. This inventory and management plan should provide managers the data they need to develop realistic budgets for their tree maintenance needs, and it will help make The Willows Park Preserve a safer and more beautiful environment.

The following tips will assist you in making the most of this document:

Who's Who

Those who conducted the inventory and prepared this document are members of the Bartlett Inventory Solutions team. They are also employees of Bartlett Tree Experts. The Bartlett Inventory Solutions team is overseen by four technical advisors out of the Bartlett Tree Research Laboratories in Charlotte, North Carolina. The advisors are primarily charged with client support, coordination, quality control, and documentation of inventories and the related data. Extensively trained Regional Inventory Arborists from local Bartlett Tree Experts offices are the primary data collectors and authors of the management plans. Readers may interpret the terms "Bartlett Tree Experts," "Bartlett," "the Inventory Team," "the team," "we," and "our" as the Bartlett company and those who conducted the inventory and prepared this management plan. In addition to the primary author(s) listed on the cover page, Team Member(s) involved in this project included:

Technical Advisor

Kevin Weber, Bartlett Inventory Solutions Technical Advisor

Registered Consulting Arborist #636, ISA Board Certified Master Arborist #PD-2030B, ISA Tree Risk Assessment Qualified, Certified Treecare Safety Professional #732

Data Collection

Katie Kranich, Regional Inventory Arborist

ISA Certified Arborist #PD-2412A, ISA Tree Risk Assessment Qualified

Subject Trees

In this document, the term "subject trees" refers (depending on context) to some or all of the 173 trees (some of them groupings of trees) included in the inventory.

Definitions & Bolded Terms

Some definitions or specifications are detailed within a given section to explain how readers should interpret certain terms or classifications. We have also appended a Glossary for other terms that appear throughout the document. The first reference to each of these terms appears in **bold** for the reader's convenience.

How This Document is Organized

An outline appears below that introduces the order in which the sections of the management plan will appear. The management plan layout is as follows:

- **Table of Contents**
 - Road map for the management plan
- **Making the Most of Your Inventory Management Plan**
 - Explanations for how to efficiently and effectively understand and navigate this management plan document
- **Executive Summary**
 - Synopsis of the major findings and recommendations
- **Introduction**
 - Brief explanation of the inventory and what was included
- **Goals & Objectives**
 - Explanation of the specific goals and objectives for this inventory
- **Data Collection & Tree Inspection Methodology**
 - Lists, explanations, and definitions of all data collected during the inventory
- **Stand Dynamics Results**
 - Summary information for the entire tree population inventoried including risk ratings assigned during the inventory with corresponding table and map displays with figures if applicable
- **Recommendations**
 - Summary of all recommendations made during the inventory including associated table and map displays, explanations and examples, and figures if applicable
- **Defects or Observations**
 - List of all trees observed to have defects in the field in a table view with associated descriptive figures and maps if applicable

- **Entire Inventory**
 - List of all trees collected in a table display
- **Additional Resources**
 - Listing of all appended items for this management plan

EXECUTIVE SUMMARY

In August 2018, the Bartlett Inventory Solutions (BIS) Team from Bartlett Tree Experts conducted an inventory of trees on The Willows Park Preserve. We identified 173 trees, including 11 groupings, which included 48 species. The attributes that we collected include tree latitude and longitude, size, age and condition class, and a visual assessment of tree structure, health, and **vigor**.

We conducted the attribute collection using a sub-meter accuracy Global Positioning Satellite Receiver (GPSr) device with an error-in-location potential of not greater than three meters. Our recommendations for the subject trees over the next 3-year period are outlined below. All tree work activities will comply with current American National Standards Institute (ANSI) Z133.1 requirements for safety.

Tree Risk Assessments and Mitigation

Perform the recommended tree risk mitigation activities for the 1 tree (1%) which we found defects or concerns that prompted the need to use the International Society of Arboriculture's (ISA) risk matrices in the field. Risk mitigation activities will comply with current ANSI A300 standard practices. Please see the Tree Risk Assessments, Limitations & Glossary section for more information.

Soil Sampling

Taking soil samples throughout planting beds and actively managed areas. Soil analysis provides information on the presence of soil nutrients, pH, organic matter, and cation exchange capacity.

Bulk Density Sampling

Taking bulk density samples throughout planting beds and actively managed areas to determine the amount of soil compaction.

Soil Rx®

Apply Bartlett's Soil Rx® program to 28 trees (16%) to correct nutrient deficiencies and optimize soil conditions for the designated trees.

Root Invigoration™

Perform Bartlett's patented Root Invigoration™ on 1 tree (1%) to improve aeration and promote more efficient root growth, especially for high-value trees in disturbed areas.

Mulching

Wherever possible, apply 2-4 inches of mulch within the root zone to help moderate soil temperatures, reduce soil moisture loss, reduce soil compaction, provide nutrients, improve soil structure, and keep mowers and string trimmers away from tree trunks. The best mulch materials are wood chips, bark nuggets, composted leaves, or pine needles. To avoid potential disease problems, mulch should not be placed directly against the trunk.

Root Collar Excavations

Perform **root collar** excavations to 8 trees (5%) to lower risk of damaging conditions such as **girdling roots**, basal cankers, masking of root decay and lower-stem decay, and predisposing trees to various insect and disease pests.

Plant Health Care (PHC)

Implement Bartlett's PHC program to monitor pests and diseases on the subject trees. Treatments are therapeutic and preventive, and treatment timing is based on pest life cycle.

Pruning

Prune 39 trees (23%) for safety, health, structure, and appearance. Pruning will comply with current ANSI A300 standard practices for pruning.

Structural Support

There are structural support system recommendations for 2 trees (1%) to reduce risk of branch or whole tree failure. All structural support systems will comply with current ANSI A300 standard practices for supplemental support systems.

Lightning Protection

There are lightning protection system recommendations for 2 trees (1%) to try and intercept lightning strikes and conduct them to the ground. All Lightning protection systems will comply with current ANSI A300 standard practices for lightning protection systems.

Removals

Remove 12 trees (7%) due to condition or because of their location in relation to other trees to try and prevent competition or damage to infrastructure.

Tree Risk *Advanced Assessments (Level 3)*

Provide a tree risk *advanced assessment* for 1 tree (1%) to evaluate the impact of wood decay that shows potential for failure.

Vine Removal

Remove vines from 14 trees (8%) to try and prevent them from hiding defects.

INTRODUCTION

In August 2018, The Willows Park Preserve community group in Wayne, PA retained Bartlett Tree Experts to perform an inventory of trees in The Willows Park Preserve. Team member Katie Kranich visited the site on August 2 to conduct the inventory.

The inventory included:

- identifying trees and assigning a Tree ID number (Tree ID numbers ranging from 1 to 145);
- identifying the trees' condition, health, and vigor;
- recommending risk evaluations and removals of appropriate trees;
- recommending tree care, soil care and fertilization, structural support, and pest management treatments to promote tree safety, health, appearance, and longevity; and
- mapping the trees using GPSr hardware and Geographic Information System (GIS) software, and Bartlett Tree Experts' ArborScope™ web-based management system

The methods and procedures we used to make the above determinations and recommendations are detailed in the following sections.

GOALS & OBJECTIVES

An effective management plan communicates clear goals and the specific objectives designed to carry out those goals. We intend "goal" to mean the overall aim or result we expect to achieve for the client in producing the inventory and management plan. The objectives are the specific actions taken or recommended to support goal completion. The table below describes each goal and its corresponding objective(s).

GOALS & OBJECTIVES

GOAL	OBJECTIVES TO ACCOMPLISH GOAL
<p>Establish the tree inventory (per numbers agreed) in The Willows Park Preserve.</p>	<ul style="list-style-type: none"> • Using Trimble® Geo GPSr hardware and ArborScope™ Inventory Management Tools, collect data such as tree name, location, size, age class, and condition class. • Assign a Tree ID number to each tree or group of trees inventoried.
<p>Provide mechanism for managing inventory, recommendations, and related budget planning.</p>	<ul style="list-style-type: none"> • Provide map or maps of the inventoried trees and tree groupings to assist the client in managing property areas. • Submit a comprehensive management plan that documents and organizes findings and provides other resources to assist the client in efficient use of the information.
<p>Maximize client understanding and implementation of management plan.</p>	<ul style="list-style-type: none"> • Include in management plan specific explanations and visuals related to plan recommendations. • Provide appended resources that address health, procedures, and standards related to tree care. • Make periodic contact with client to follow up and answer any questions about the management plan's contents.
<p>Maximize immediate and long-term tree health and aesthetics.</p>	<p>Implement recommended plant-health-care program that uses</p> <ul style="list-style-type: none"> • integrated pest management • soil care and fertilization • maintenance pruning
<p>Manage immediate and long-term risk associated with trees in high-use areas.</p>	<p>Implement recommended risk-management measures that include</p> <ul style="list-style-type: none"> • risk-reduction pruning • required removals • tree structure evaluations

DATA COLLECTION & TREE INSPECTION METHODOLOGY

In conducting the inventory, we used specialized equipment and software and followed specific procedures to determine tree characteristics, risk evaluations, and recommendations. The following explanation will assist the reader in interpreting the findings of this management plan.

Data Collection Equipment & Attribute Data

The Inventory Team used Trimble® Geo GPSr hardware units, TerraSync® and GPS Pathfinder® Office GIS software, and Bartlett Tree Experts' ArborScope™ web-based

management system to inventory the trees. The attribute data we collected on site are listed below.

- botanical name and regional common name according to local ISA Chapter Tree Species List
- tree location based on GPS coordinate system
- tree ID number
- diameter at breast height (**DBH**)
- canopy radius
- age class
- height class
- condition class
- root zone infringement, based on **dripline** and estimated **grayscale** (e.g., sidewalks) impact on root zone
- infrastructure interaction (between trees and grayscale that may cause an undesirable condition)
- documented *basic assessment (Level 2)* of tree risk where defects or concerns were observed that prompted the need to use the ISA risk matrices in the field resulting in an *overall risk rating*
- priority of tree and shrub work (based on 3-year management plan)
- pruning
- need for and inspection of existing structural support systems
- need for and inspection of existing lightning protection systems
- need for *advanced assessments (Level 3)*
- tree removals
- soil care and fertilization recommendations
- plant health care recommendations
- noted defects/observations
- observed pests/diseases

Specifications/Definitions

Age Class

New Planting	Tree not yet established
Young	Established tree but not in the landscape for many years
Semi-mature	Established tree but has not yet reached full growth potential
Mature	Tree within its full growth potential
Over-mature	Tree that is declining or beginning to decline due to its age

Height Class

Small	Less than 15 feet
Medium	15 to 40 feet
Large	Greater than 40 feet

Condition Class

Dead

Poor Most of the canopy displays dieback and undesirable leaf color, inappropriate leaf size or inadequate new growth. Tree or parts of tree are in the process of failure.

Fair Parts of canopy display undesirable leaf color, inappropriate leaf size, and inadequate new growth. Parts of the tree are likely to fail.

Good Tree health and condition are acceptable.

Tree and Shrub Care Priority

Priority class recommendations are based on a 3-year management plan that takes into consideration tree species, condition, location, age, and proximity to infrastructure. We intend that this rating system assist decision makers in prioritizing tree pruning, cabling and bracing, and tree lightning protection recommendations. *Trees with a priority of 1 and an Overall Risk Rating of Extreme or High (see definitions in the next section) should be addressed immediately.* Prioritization does not take into account any budgetary or financial considerations.

Recommendations for Priorities 1, 2, and 3 are all based on observations by the inventory arborist. The following additional information clarifies each priority class:

Priority 1 To be addressed in years 1 or 2 of the management cycle. Priority 1 may include trees with large dead wood, structural defects, located in exposed sites, high aesthetic value, and/or parts that are currently negatively interacting with infrastructure, such as branches that touch buildings, interfere with signage or lighting, or obstruct pathways.

Priority 2 To be addressed in years 2 or 3 of the management cycle. Priority 2 may include trees with small dead wood, developing structural defects, located in semi-exposed sites, moderate esthetic value, and/or parts that are anticipated to negatively interact with infrastructure, such as branches that touch buildings, interfere with signage or lighting, or obstruct pathways.

Priority 3 To be addressed in year 3 of the management cycle. Priority 3 may include trees with small dead wood, developing structural defects, located in lesser used sites, and/or parts that are anticipated to negatively interact with infrastructure, such as branches that rub on buildings, interfere with signage or lighting, or obstruct pathways.

Pruning

Each of the following is a selective pruning technique to achieve the pruning goal described:

Clean	Remove one or more of dead, diseased, and/or broken branches
Raise	Provide vertical clearance
Thin	Reduce height or spread, sometimes for a particular branch (overextended or co-dominant)
Reduce	Reduce height or spread
Structural	Select live branches and stems to influence orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems; possibly to reduce defects or space main branches on mature trees.
Vista	A combination of thinning and reduction pruning to enhance the view from a vantage point to an area of interest while minimizing negative impacts on tree structure and health.

Tree Risk Assessments, Limitations & Glossary

In accordance with industry standards, tree risk ratings are derived from a combination of three factors: the *likelihood of failure*, the *likelihood of the failed tree part impacting a target*, and the *consequences* of the target being struck. The guidelines used to classify each of these factors are presented in the *ISA's BMP for Tree Risk Assessment* and guidelines developed by the Bartlett Tree Research Laboratories. *These factors are then used to categorize tree risk as Extreme, High, Moderate or Low.* The factors used to define your risk ratings are identified in this report. An explanation of terms used in this report appears in the glossary located in the appendix. The information provided in this report is based on the conditions identified at the time of inspection. Tree conditions do change over time so reassessment is recommended annually and after major storm events.

Limitations of Tree Risk Assessments

It is important for the tree owner or manager to know and understand that all trees pose some degree of risk from failure or other conditions. The information and recommendations within this report have been derived from the level of tree risk assessment identified in this report, using the information and practices outlined in the *International Society of Arboriculture's Best Management Practices for Tree Risk Assessment*, as well as the information available at the time of the inspection. However, the overall risk rating, the mitigation recommendations, or any other conclusions do not preclude the possibility of failure from undetected conditions, weather events, or other acts of man or nature. Trees can unpredictably fail even if no defects or other conditions are present. It is the responsibility of the tree owner or manager to schedule repeat or *advanced assessments*, determine actions, and implement follow up recommendations, monitoring and/or mitigation.

Bartlett Tree Experts can make no warranty or guarantee whatsoever regarding the safety of any tree, trees, or parts of trees, regardless of the level of tree risk assessment provided, the risk rating, or the residual risk rating after mitigation. The information in this report

should not be considered as making safety, legal, architectural, engineering, landscape architectural, land surveying advice or other professional advice. This information is solely for the use of the tree owner and manager to assist in the decision making process regarding the management of their tree or trees. Tree risk assessments are simply tools which should be used in conjunction with the owner or tree manager's knowledge, other information and observations related to the specific tree or trees discussed, and sound decision making.

Glossary

Tree risk assessment has a unique set of terms with specific meanings. Definitions of all specific terms may be found in the International Society of Arboriculture's *Best Management Practice for Tree Risk Assessment*. Definitions of some of these terms used in this report are as follows:

The *likelihood of failure* may be categorized as imminent meaning that failure has started or could occur at any time; probable meaning that failure may be expected under normal weather conditions within the next 3 years; possible meaning that failure could occur, but is unlikely under normal weather conditions during that time frame; and improbable meaning that failure is not likely under normal weather conditions, and may not occur in severe weather conditions during that time frame.

The *likelihood of the failed tree part impacting a target* may be categorized as high meaning that a failed tree or tree part will most likely impact a target; medium meaning the failed tree or tree part could impact the target, but is not expected to do so; low meaning that the failed tree or tree part is not likely to impact a target; and very low meaning that the chance of a failed tree or tree part impacting the target is remote.

The *likelihood of failure and impact* is defined by the Likelihood Matrix below.

LIKELIHOOD OF FAILURE AND IMPACT

Likelihood of Failure	Likelihood of Impacting Target			
	Very Low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very Likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

The *consequences* of a known target being struck may be categorized as severe meaning that impact could involve serious personal injury or death, damage to high value property, or disruption to important activities; significant meaning that the impact may involve personal injury, property damage of moderate to high value, or considerable disruption; minor meaning that impact could cause low to moderate property damage, small disruptions to traffic or a communication utility, or minor injury; and negligible meaning that impact may involve low value property damage, disruption that can be replaced or repaired, and do not involve personal injury.

Targets are people, property, or activities that could be injured, damaged or disrupted by a tree failure.

Levels of assessment 1) *Limited visual assessments* are conducted to identify obvious defects. 2) *Basic assessments* are visual inspections done by walking around the tree looking at the site, buttress roots, trunk and branches. It may include the use of simple tools to gain information about the tree or defects. 3) *Advanced assessments* are performed to provide detailed information about specific tree parts, defects, targets of site conditions. Drilling to detect decay is an advanced assessment technique.

Tree Risk Ratings are terms used to communicate the level of risk rating. They are defined in defined in the Risk Matrix below as a combination of Likelihood and Consequences:

ISA RISK MATRIX

Likelihood of Failure & Impact	Consequences of the Tree Failure			
	Negligible	Minor	Significant	Severe
Very Likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low

Overall tree risk rating is the highest individual risk identified for the tree. The *residual risk* is the level of risk the tree should pose after the recommended mitigation.

Bartlett Tree Experts can inventory trees that have ropes courses, zip lines, swings, tree houses, or any other life support system attached for several different attributes; however, Bartlett Tree Experts is unable to provide tree risk assessment information on such trees, nor is Bartlett Tree Experts able to determine whether the correct hardware has been used, the systems are attached to the trees correctly, or whether the trees can withstand the additional forces that are placed on the tree or trees from such systems or structures. Bartlett Tree Experts does not recommend that any hardware or structures, other than those recommended by and installed by qualified arborists to aid the tree in structural support or protections from lightning, be installed in or attached to any tree(s). Bartlett Tree Experts recommends removing, or discontinuing the use of, any such system or recreational

structure until the Client hires or consults with an engineer/specialist that deals specifically with ropes courses, zip lines, swings, tree houses, or any other life support systems and how they attach to and impact trees to determine if the trees can handle the forces being placed on them.

STAND DYNAMICS RESULTS



STAND DYNAMICS RESULTS

In reviewing the results and recommendations, the reader will find useful the specifications and definitions detailed in the preceding methodology above. We used the following categories to organize the stand dynamics results, which are displayed in tables:

- **Tree Risk Assessment Report and Mitigation**
- **Subject Trees Summarized According to:**
 - Tree Species Identified
 - Tree Groupings
 - Condition Class
 - Age Class
 - Tree Size per DBH
 - Estimated Tree Asset Value
 - Tree Location Value

Where appropriate, we have included explanations, photos, drawings, or other information to illuminate the table contents.

Tree Risk Assessment Report and Mitigation

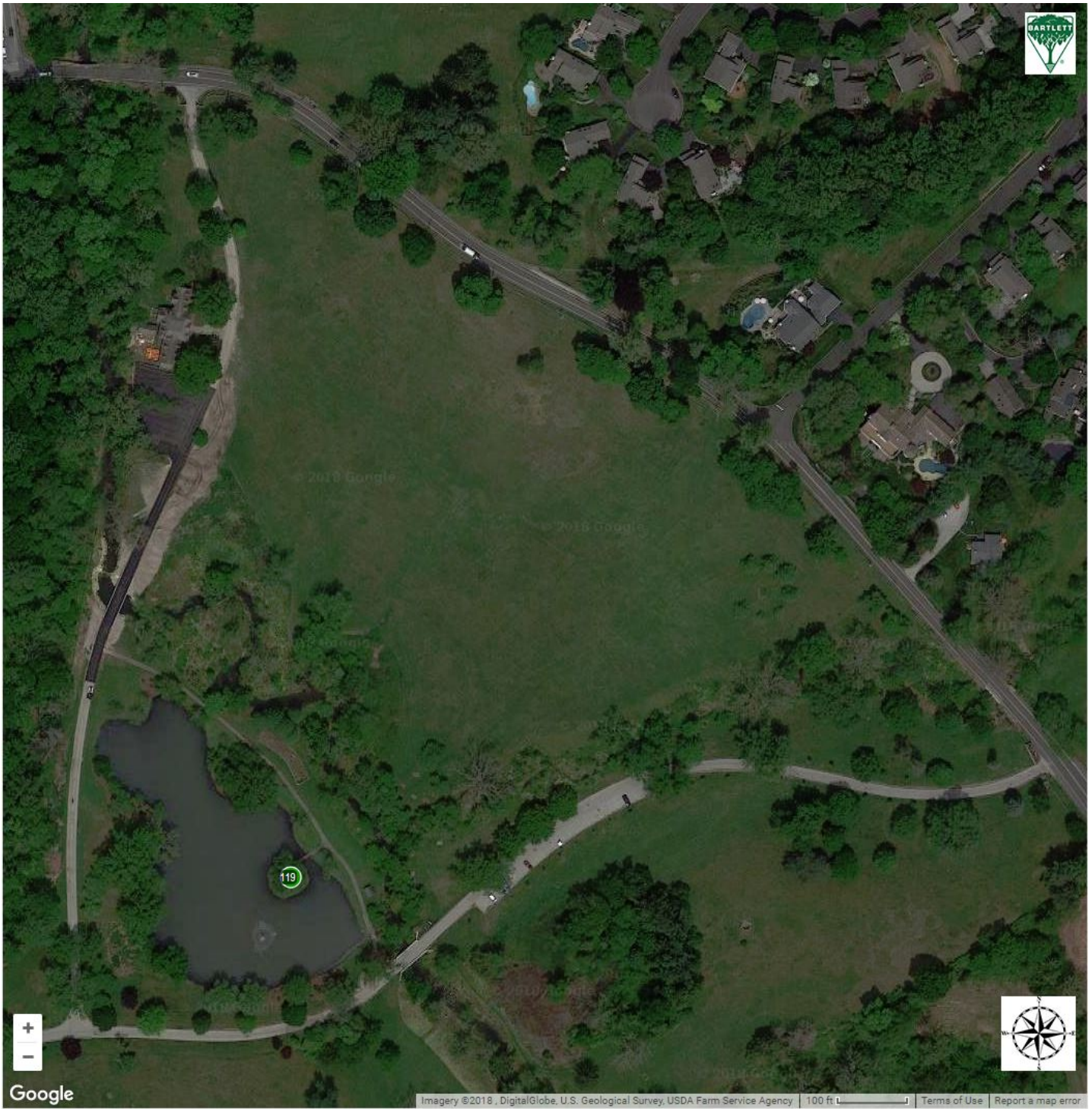
As part of the inventory process, the Inventory Team conducts a *basic assessment (Level 2)* from the ground. While every tree poses a risk, typically *Low*, the trees in the following table were assigned *likelihood of failure, likelihood of the failed tree part impacting a target, and consequences* ratings in the field. The Inventory Team found conditions with these trees that posed a hazardous situation, prompting the arborists to go through the steps outlined in the Tree Risk Assessments, Limitations, and Glossary section of this plan. *Overall risk ratings* were then assigned to these trees.

The Tree Risk Table below summarizes the inventoried trees that were observed posing a hazardous situation during the course of the inventory. The table is organized first by *Overall Risk Rating* (highest to lowest), then by Tree Care Priority (ascending order), and finally by Tree ID (ascending order).

TREE RISK ASSESSMENT REPORT AND MITIGATION (1 Trees)

Tree ID	Common Name	DBH	Condition	Overall Risk Rating	Primary Target	Tree Care Priority	Advanced Assessment	Defect(s) or Observation(s)
119	Willow-Babylon Weeping	35	Fair	Low	Bench	2	<ul style="list-style-type: none"> • Stem 	<ul style="list-style-type: none"> • Fungi/conks • Decay-Root flare • Flush cuts

INVENTORIED TREE ASSIGNED A RISK RATING AT THE TIME OF DATA COLLECTION



Overall Risk Rating: ● Low

Stand Dynamics

Tree Species Identified

Our inventory revealed 48 species of trees, as detailed in the following table:

TREE SPECIES IDENTIFIED

Genus	Species	Common Name	Count	% Distribution Total
<i>Acer</i>	<i>palmatum</i>	Maple-Japanese	3	2%
	<i>platanoides</i>	Maple-Norway	1	1%
	<i>rubrum</i>	Maple-Red	12	7%
	<i>saccharum</i>	Maple-Sugar	6	3%
Acer Total			22	13%
<i>Ailanthus</i>	<i>altissima</i>	Tree of Heaven	1	1%
<i>Betula</i>	<i>lenta</i>	Birch-Sweet	1	1%
	<i>nigra</i>	Birch-River	4	2%
	<i>populifolia</i>	Birch-Gray	1	1%
Betula Total			6	3%
<i>Castanea</i>	<i>mollissima</i>	Chestnut-Chinese	2	1%
<i>Cercis</i>	<i>canadensis</i>	Redbud-Eastern	1	1%
<i>Cornus</i>	<i>florida</i>	Dogwood-Flowering	10	6%
	<i>kousa</i>	Dogwood-Kousa	3	2%
Cornus Total			13	8%
<i>Crataegus</i>	sp.	Hawthorn	5	3%
<i>Euonymus</i>	sp.	Euonymus	2	1%
<i>Fagus</i>	<i>sylvatica</i>	Beech-European	1	1%
<i>Fraxinus</i>	<i>americana</i>	Ash-White	1	1%
<i>Halesia</i>	<i>carolina</i>	Silverbell-Carolina	1	1%
<i>Liquidambar</i>	<i>styraciflua</i>	Sweetgum	5	3%
<i>Liriodendron</i>	<i>tulipifera</i>	Tuliptree	2	1%
<i>Magnolia</i>	sp.	Magnolia	5	3%
<i>Malus</i>	sp.	Crabapple	3	2%
<i>Metasequoia</i>	<i>glyptostroboides</i>	Redwood-Dawn	1	1%
<i>Nyssa</i>	<i>sylvatica</i>	Tupelo-Black	2	1%
<i>Oxydendrum</i>	<i>arboreum</i>	Sourwood	1	1%
<i>Picea</i>	<i>abies</i>	Spruce-Norway	2	1%
	<i>pungens</i>	Spruce-Colorado Blue	1	1%
Picea Total			3	2%
<i>Pinus</i>	<i>densiflora</i>	Pine-Japanese Red	2	1%
	<i>nigra</i>	Pine-Austrian	1	1%
	<i>strobus</i>	Pine-Eastern White	5	3%
Pinus Total			8	5%
<i>Platanus</i>	<i>occidentalis</i>	Sycamore-American	5	3%
	<i>x acerifolia</i>	Planetree-London	5	3%

Genus	Species	Common Name	Count	% Distribution Total
Platanus Total			10	6%
Prunus	<i>cerasifera</i>	Plum-Purple Leaf	1	1%
	<i>serotina</i>	Cherry-Black	7	4%
	<i>serrulata</i>	Cherry-Flowering	4	2%
	<i>subhirtella</i>	Cherry-Weeping	1	1%
Prunus Total			13	8%
Quercus	<i>alba</i>	Oak-White	1	1%
	<i>macrocarpa</i>	Oak-Bur	1	1%
	<i>palustris</i>	Oak-Pin	12	7%
	<i>phellos</i>	Oak-Willow	6	3%
	<i>rubra</i>	Oak-Northern Red	1	1%
Quercus Total			21	12%
Robinia	<i>pseudoacacia</i>	Locust-Black	1	1%
Salix	<i>babylonica</i>	Willow-Babylon Weeping	6	3%
	sp.	Willow	3	2%
Salix Total			9	5%
Sassafras	<i>albidum</i>	Sassafras-Common	1	1%
Stewartia	<i>pseudocamellia</i>	Stewartia-Japanese	1	1%
Styrax	<i>japonicus</i>	Snowbell-Japanese	3	2%
Tilia	<i>cordata</i>	Linden-Littleleaf	3	2%
Tsuga	<i>canadensis</i>	Hemlock-Canadian	26	15%
Grand Total			173	100%

2018 TREE INVENTORY (PARK DRIVE AREA)



**2018 TREE INVENTORY
(MANSION AREA)**



Tree Groupings

The following table displays inventoried trees that were recorded as groupings. Throughout the management plan, those trees recorded as groupings will be displayed with the number of plantings in parentheses after the common name.

TREE GROUPINGS

Tree ID	Common Name	Total Plants
4	Hemlock-Canadian	4
5	Hemlock-Canadian	4
6	Hemlock-Canadian	4
8	Hemlock-Canadian	4
9	Hemlock-Canadian	5
10	Hemlock-Canadian	2
17	Hemlock-Canadian	3
100	Planetree-London	2
107	Birch-River	3
114	Magnolia	5
122	Oak-Willow	3

**INVENTORIED TREES RECORDED AS GROUPINGS
(PARK DRIVE AREA)**



**INVENTORIED TREES RECORDED AS GROUPINGS
(MANSION AREA)**

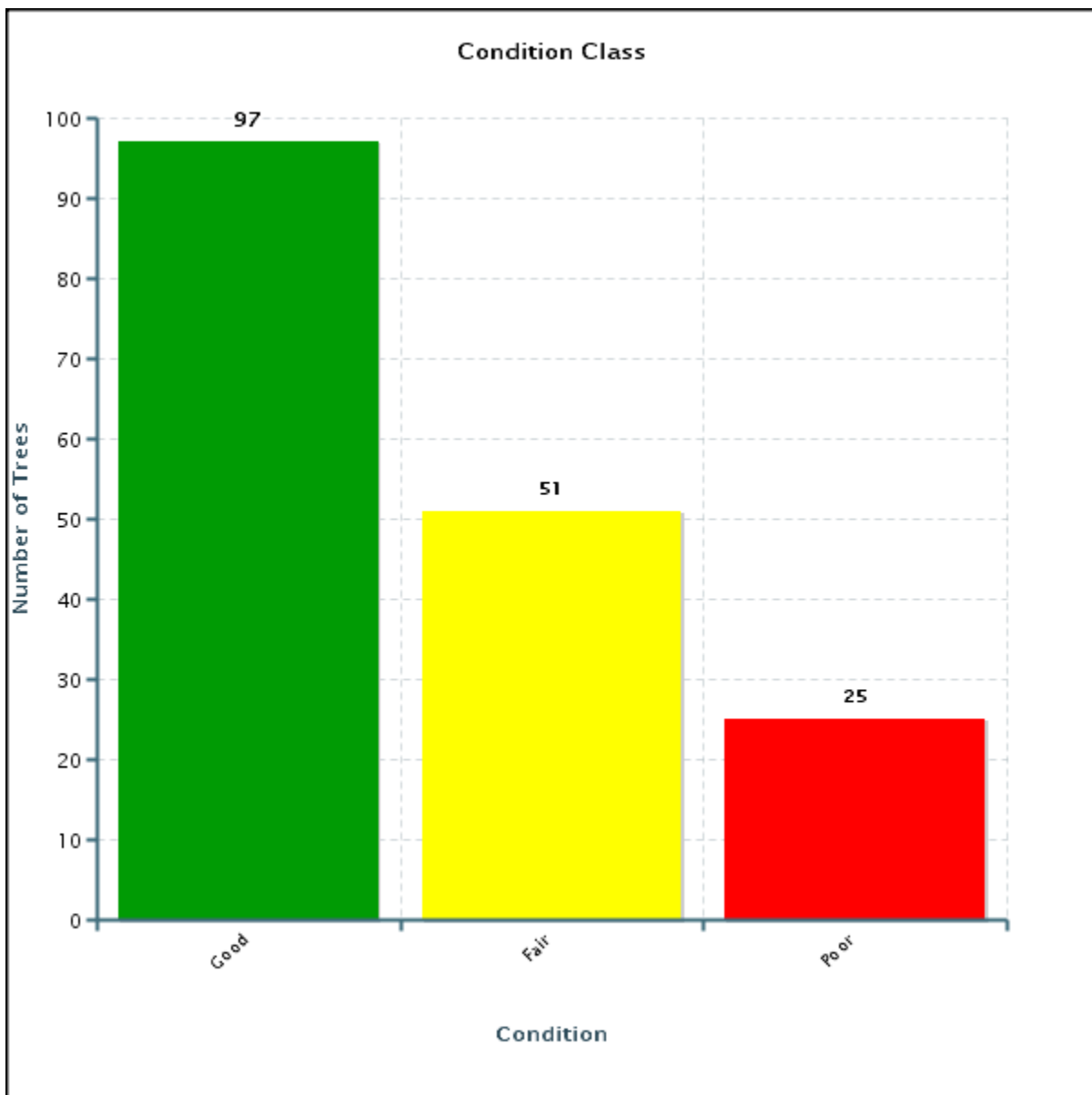


Condition Class

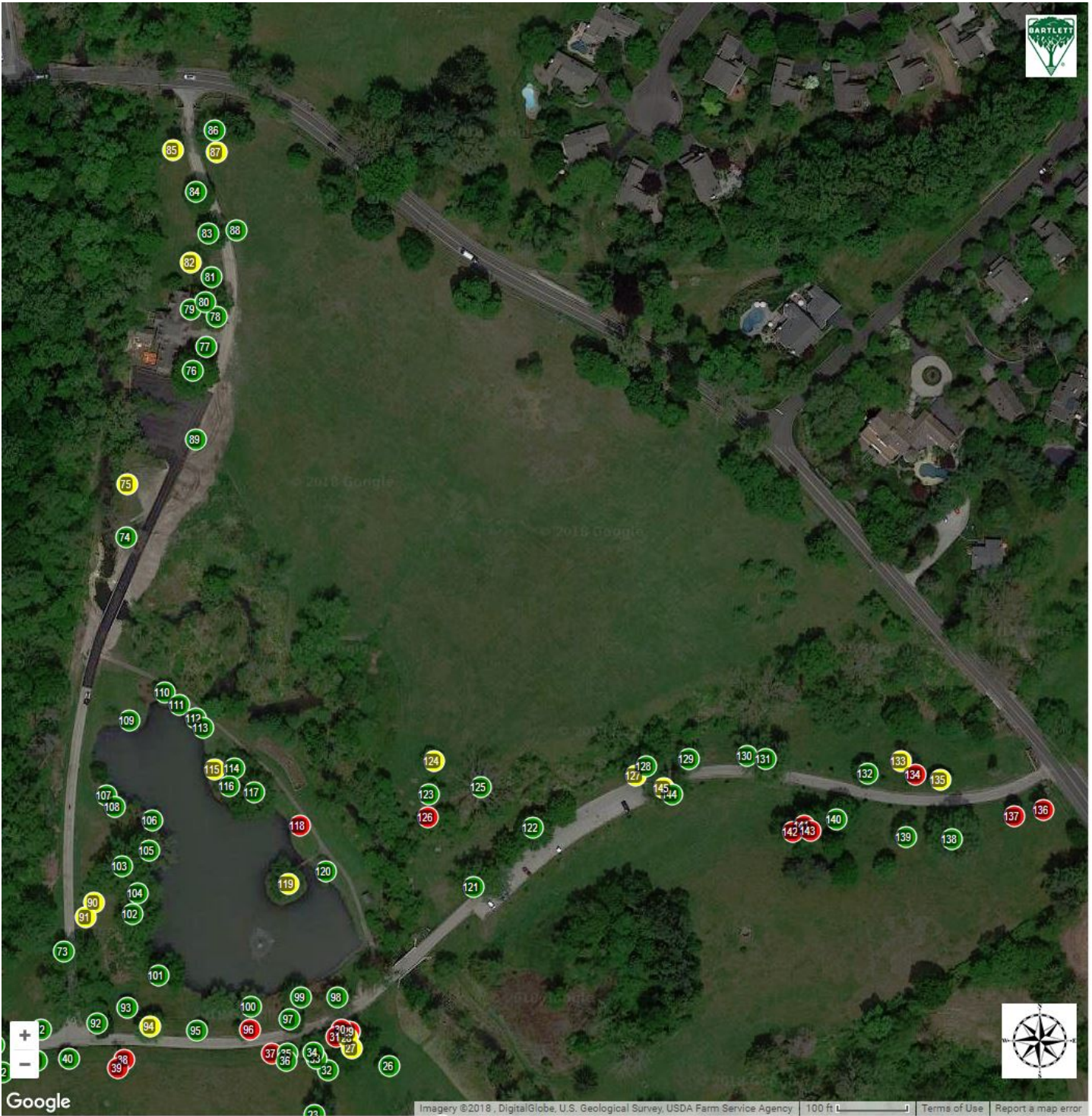
The breakdown of tree condition follows:

CONDITION CLASS BREAKDOWN

Condition Class	Quantity	% of Total
Good	97	56%
Fair	51	29%
Poor	25	14%



INVENTORIED TREES BY CONDITION CLASS (PARK DRIVE AREA)



Condition: ● Good ● Fair ● Poor

INVENTORIED TREES BY CONDITION CLASS (MANSION AREA)

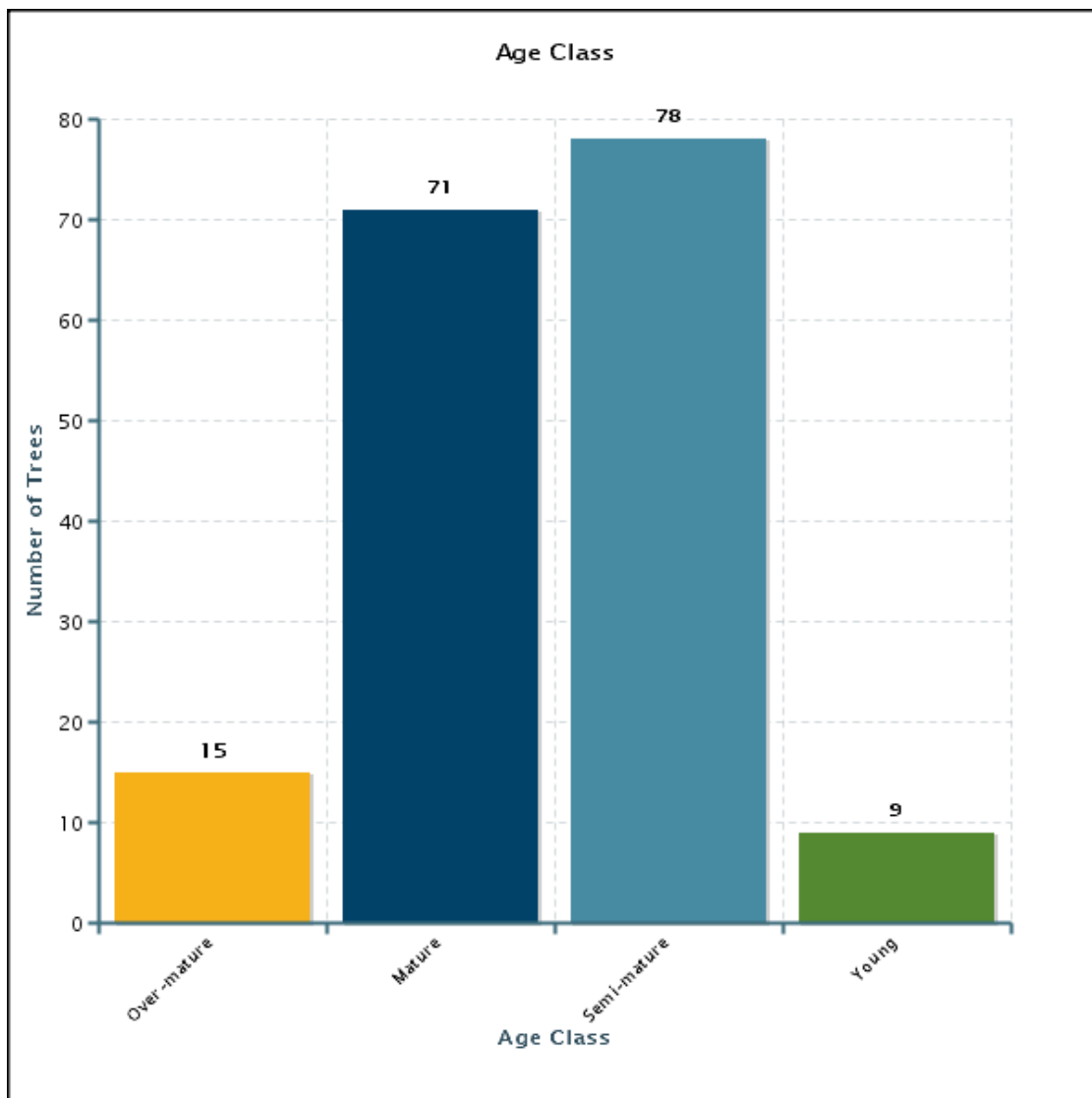


Age Class

The breakdown of tree age class follows:

AGE CLASS BREAKDOWN

Age Class	Quantity	% of Total
Over-mature	15	9%
Mature	71	41%
Semi-mature	78	45%
Young	9	5%



INVENTORIED TREES BY AGE CLASS (PARK DRIVE AREA)



Age: ● Young ● Semi-Mature ● Mature ● Over-Mature

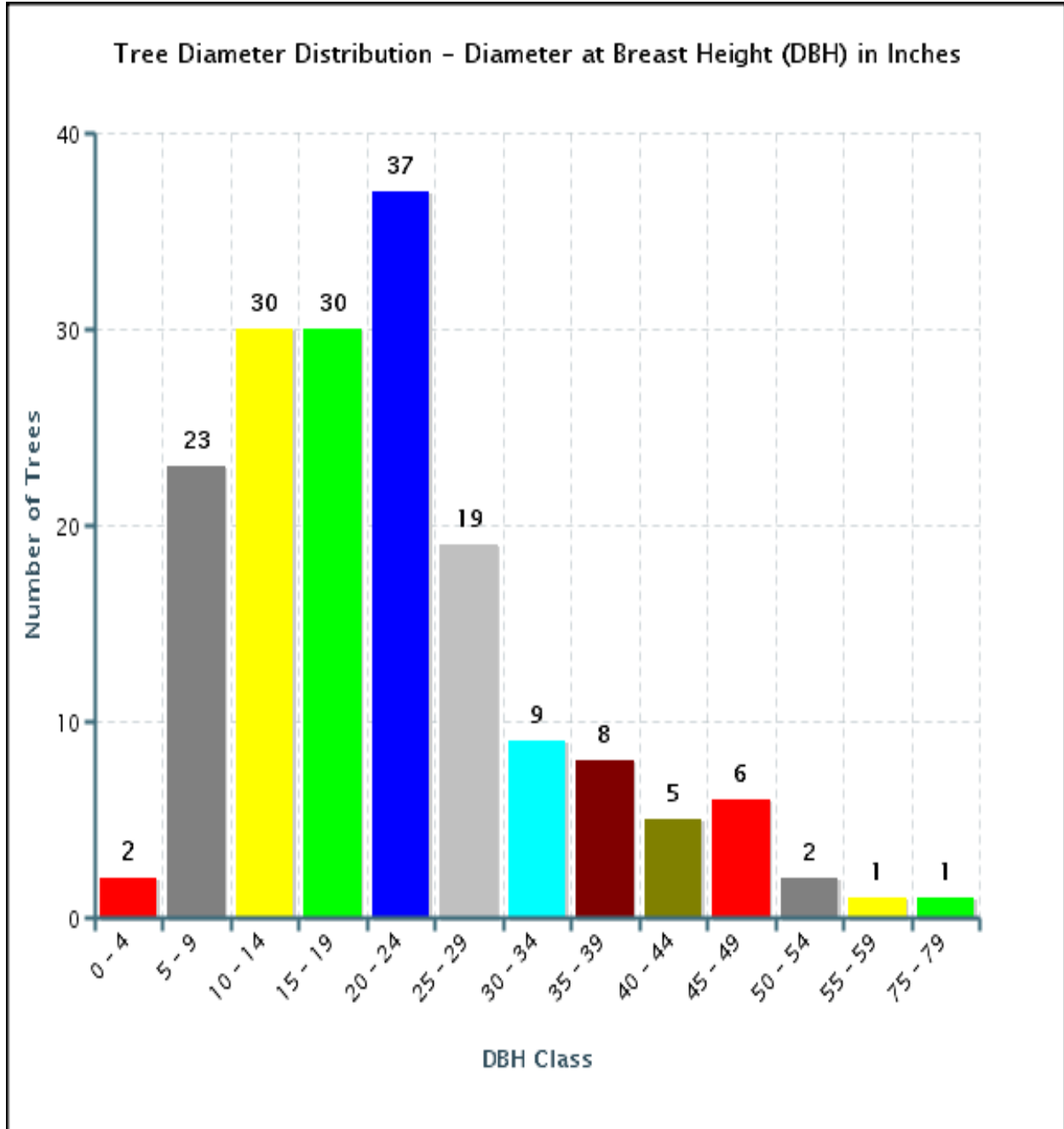
INVENTORIED TREES BY AGE CLASS (MANSION AREA)



Age: ● Young ● Semi-Mature ● Mature ● Over-Mature

Tree Size (DBH)

The following chart illustrates numbers of trees according to size per DBH:



Estimated Tree Asset Value

As part of the Bartlett inventory process, we have included an Estimated Tree Asset Value for each tree and a cumulative total for all trees inventoried. We use an average per square inch nursery price, size (DBH), species factor, condition factor, and location factor to estimate the tree asset value. This is not intended to replace a tree appraisal.

The following data fields are used in this formula:

Data Field	Description
Average Per Square Inch Nursery Price	Based on the average nursery prices for two common tree species and one exotic tree species within a region, then taking the average of those three as the average per square inch price for the region
Size	Based on tree DBH (4.5 feet above grade)
Species Factor	Relative species desirability based on 100% for the tree in that geographical location. In most cases, species desirability ratings, published by the International Society of Arboriculture, are used for adjustment.
Condition Factor	Rating of the tree's structure and health based on 100%
Location Factor	Average rating for the site and the tree's contribution and placement, based on 100%

$$\text{Estimated Tree Asset Value} = (\text{Average Per Square Inch Nursery Price} * \text{Size}) * \text{Species Factor} * \text{Condition Factor} * \text{Location Factor}$$

The estimated cumulative total value for all trees inventoried is **\$1,859,290.87**. The following table lists the ten trees with the highest Tree Asset Values:

TOP TEN TREES - HIGHEST ESTIMATED TREE ASSET VALUE

Tree ID	Common Name	Genus	Species	DBH	Tree Asset Value
24	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	75	\$63,702.79
103	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	58	\$55,203.75
1	Redwood-Dawn	<i>Metasequoia</i>	<i>glyptostroboides</i>	46	\$50,744.57
138	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	53	\$50,294.00
125	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	50	\$44,082.95
76	Ash-White	<i>Fraxinus</i>	<i>americana</i>	46	\$42,559.96
101	Maple-Red	<i>Acer</i>	<i>rubrum</i>	43	\$39,936.49
23	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	46	\$39,831.75
130	Tuliptree	<i>Liriodendron</i>	<i>tulipifera</i>	42	\$37,689.81
13	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	43	\$36,442.05

**TOP TEN TREES - HIGHEST TREE ASSET VALUE
(PARK DRIVE AREA)**



**TOP TEN TREES - HIGHEST TREE ASSET VALUE
(MANSION AREA)**



Condition: ● Good

Tree Location Value

Each tree at The Willows Park Preserve was assigned a location value of good or fair. Five trees (3%) were assigned a location value of fair due to present or anticipated conflicts with infrastructure or utilities. Trees with conflicts that can easily be mitigated with a one-time raise or reduction prune were not classified as existing in a fair or poor location.

It is recommended that these 5 trees continue to be monitored for intolerable levels of conflict with the surrounding infrastructure. If the level of conflict continues to increase and cannot be easily mitigated, a removal and replacement program should be considered for these trees. If removal and replacement is deemed appropriate, please consult with your local Bartlett Arborist Representative for information on desirable replacement plantings.

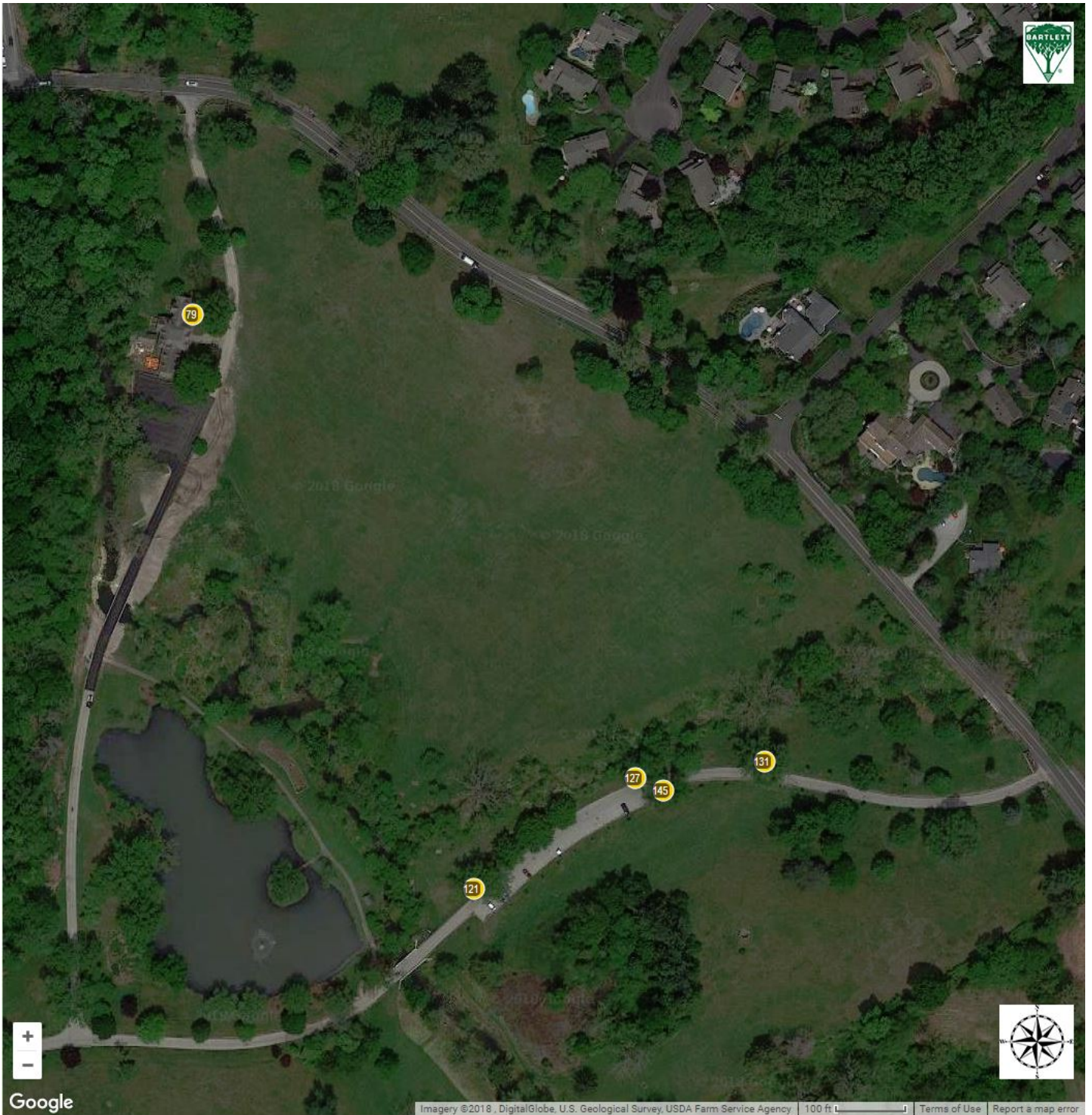


Tree #121 with a fair location value.

INVENTORIED TREES WITH A FAIR LOCATION VALUE (5 Trees)

Tree ID	Common Name	Location Type	Location Value	DBH	Root Zone Infringement
79	Stewartia-Japanese	Foundation	Fair	5	25-50%
121	Oak-Willow	Street tree	Fair	49	51-75%
127	Sweetgum	Open	Fair	39	25-50%
131	Tuliptree	Open	Fair	45	25-50%
145	Sweetgum	Street tree	Fair	31	25-50%

INVENTORIED TREES WITH A FAIR LOCATION VALUE



RECOMMENDATIONS



RECOMMENDATIONS

In reviewing the results and recommendations, the reader will find useful the specifications and definitions detailed in the preceding methodology. We used the following categories to organize the results and recommendations, which are displayed in tables:

Recommendations

- Soil Care and Fertilization
- Plant Health Care
- Tree Pruning
- Structural Support Systems
- Lightning Protection Systems
- Tree Removal
- Tree Risk *Advanced Assessments (Level 3)*
- Vine Removal

Soil Care and Fertilization

Healthy soil is critical to the health and longevity of trees. Soil provides trees with the essential nutrients required for their growth. Many secondary problems such as reduced vigor, inadequate growth, branch dieback, and pest or disease concerns are related to the primary stress of poor soil conditions. Undisturbed, native forest soils generally contain adequate levels of organic matter, soil microbes, and nutrients. Urban, suburban, and landscape soils (as opposed to forest soils) usually lack these qualities, and are often compacted. In many cases, trees in a landscaped environment suffer from inadequate soil fertility, soil compaction, root zone competition with turf grasses, and inadequate total soil volume. Soil care recommendations are intended to correct these concerns and improve or maintain overall plant health.

Bartlett Tree Experts recommends several procedures and treatments that address soil quality. Taking soil samples is perhaps the most important. Proper tree care cannot be initiated unless it is known what type of soil environment the trees are growing in. Soil testing results can help to create a path forward for improved tree health. We address some of these below.

Soil Sampling

Collecting soil samples and having them tested helps determine nutrients that may be lacking, unfavorable soil pH values, and adequacy of soil organic matter. Laboratory tests and analyses can determine the need for soil amendments.

Bulk Density

Compacted soils are regrettably common in the urban setting. A bulk density test, which requires an undisturbed core sample, measures the level of soil compaction. Arborists can use the results to diagnose problems or to determine what size holes to dig for planting. If soil density exceeds a measured threshold for a given soil type and tree species, we recommend Bartlett's Root Invigoration™ program.

Soil Rx®

Bartlett's Soil Rx® program, which is a prescription fertilization program, aims to correct nutrient deficiencies and optimize soil conditions for designated trees.

Root Invigoration™

The aim of Bartlett's patented Root Invigoration™ Program is to improve soil conditions by addressing soil compaction and promoting efficient root growth, especially for high-value trees in disturbed areas. The process includes taking soil samples to determine what nutrients are deficient, performing a root collar excavation, "air-tilling" a portion of the root zone to find fine roots, incorporating organic matter, fertilizing (based on soil sample), and applying mulch. The area of the root system treated can vary by tree. For the Root Invigoration™ Program to be successful, proper watering techniques must be employed after the process is complete.



Tree #1 recommended for Root Invigoration™ due to soil compaction from log loader.

Mulch Application

Proper mulching (top left and bottom left) provides many benefits to trees and shrubs. It moderates soil temperatures, reduces soil moisture loss, reduces soil compaction, provides nutrients, and improves soil structure. This practice results in more root growth and

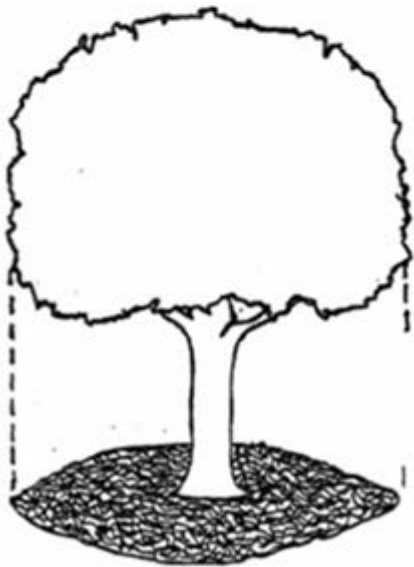
healthier plants. The image on the top right illustrates root growth density under grass versus mulch. Mulch is frequently applied incorrectly (bottom right), so we recommend that readers inspect the technical report on mulch application guidelines that appears in the Appendix.



Example of how mulch should be installed, 2-4 inches thick and not against the trunk.



Example of root density under grass versus mulch.



Example of how mulch should be applied from the trunk to the dripline.



Example of improper mulch application, known as "volcano mulch".

The following inventoried trees are recommended for soil management because of possible nutrient deficiencies, soil compaction, or inadequate soil conditions:

INVENTORIED TREES RECOMMENDED FOR SOIL MANAGEMENT (39 Trees)

Tree ID	Common Name	DBH	Soils Management Type	Mulch Recommended
1	Redwood-Dawn	46	Root Invigoration™	Yes
24	Sycamore-American	75	Soil Rx®	...
32	Snowbell-Japanese	16,8	Soil Rx®	...
33	Snowbell-Japanese	13,10,9	Soil Rx®	...
34	Snowbell-Japanese	14,12	Soil Rx®	...
35	Sourwood	7,5	Soil Rx®	...
68	Chestnut-Chinese	38	Soil Rx®	...
69	Chestnut-Chinese	21	Soil Rx®	...
70	Oak-Pin	27	Soil Rx®	Yes
71	Oak-Pin	28	Soil Rx®	Yes
73	Oak-Pin	18	Soil Rx®	No
79	Stewartia-Japanese	5,3,3	Soil Rx®	...
80	Oak-Pin	30	Soil Rx®	...
81	Redbud-Eastern	6	...	Yes
83	Oak-Pin	22	Soil Rx®	Yes
84	Oak-Pin	24	Soil Rx®	Yes
85	Sassafras-Common	40	Soil Rx®	Yes
87	Silverbell-Carolina	17,13	Soil Rx®	Yes
88	Maple-Sugar	10	...	Yes
89	Oak-Bur	10	Soil Rx®	Yes
91	Dogwood-Flowering	12	Soil Rx®	...
93	Beech-European	14	Soil Rx®	Yes
94	Maple-Red	20	...	Yes
95	Linden-Littleleaf	18	...	Yes
102	Oak-Pin	36	Soil Rx®	...
103	Oak-Pin	58	Soil Rx®	No
109	Willow-Babylon Weeping	12	...	Yes
114	Magnolia (5)	6,5,4,4	...	Yes
117	Oak-Willow	30	Soil Rx®	...
121	Oak-Willow	49	Soil Rx®	...
125	Sycamore-American	50	Soil Rx®	...
133	Pine-Japanese Red	22	Soil Rx®	...
138	Oak-Pin	53	Soil Rx®	...
139	Oak-Pin	19	Soil Rx®	...
140	Oak-Pin	26	Soil Rx®	Yes

INVENTORIED TREES RECOMMENDED FOR SOIL MANAGEMENT (PARK DRIVE AREA)



INVENTORIED TREES RECOMMENDED FOR SOIL MANAGEMENT (MANSION AREA)



Root Collar Excavation

Excavating the root collar is necessary for trees whose buttress roots are covered by excess soil or mulch. Buried root collars can contribute to tree health problems, including girdling roots, basal cankers, and masking root and lower stem decay.

The top image shows a buried root collar and the bottom image shows an exposed root collar.



Example of a buried root collar.



Example of an exposed root collar.

Girdling Roots

Girdling roots (top left and right) restrict water and nutrient movement throughout the tree. If left untreated they can cause the tree to decline, fail (bottom), and eventually die in severe cases. Girdling roots should be removed as soon as possible, unless removal will significantly impact the condition of the tree. In some cases, the presence of significant or severe girdling roots may cause the tree to be recommended for removal.



Examples of girdling roots.



Example of tree failure from girdling roots.

The following trees are recommended for a root collar excavation:

INVENTORIED TREES RECOMMENDED FOR A ROOT COLLAR EXCAVATION (8 Trees)

Tree ID	Common Name	DBH
35	Sourwood	7,5
61	Maple-Sugar	7
62	Maple-Japanese	15
72	Maple-Sugar	5
79	Stewartia-Japanese	5,3,3
89	Oak-Bur	10
93	Beech-European	14
108	Planetree-London	17

INVENTORIED TREES RECOMMENDED FOR A ROOT COLLAR EXCAVATION (PARK DRIVE AREA)



INVENTORIED TREES RECOMMENDED FOR A ROOT COLLAR EXCAVATION (MANSION AREA)



Condition: ● Good

Plant Health Care

The Inventory Team also recommends Plant Health Care (PHC) programs for trees in the formal landscape. In addition, an Integrated Pest Management (IPM) program monitors for potentially damaging insects, diseases and cultural problems that are often seasonal and may not have been evident during our inventory visit. These pests and diseases include, but are not limited to, the following:

- Anthracnose - on a variety of species
- Aphids - on a variety of species
- Bacterial Leaf Scorch - on trees within red oak group
- Bagworms - on a variety of tree species
- Boring Insects - on a variety of tree species
- Caterpillar Defoliators - on a variety of tree species, especially oak
- Gall Insects - on a variety of species
- Lacebugs - on a variety of species
- Scab and Rust Fungi - on crabapple and apple species.
- Suspected Phytophthora Root Rot and Canker - on a variety of tree species, especially beech species
- Scale Insects - on a variety of tree species, especially oak
- Spider Mites - on a variety of tree species



Tree #22 with rust present.

We identified pests or diseases on the following inventoried trees at the time of the inventory:

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (34 Trees)

Tree ID	Common Name	DBH	Pest(s) or Disease(s)
4	Hemlock-Canadian (4)	19,4	• Woolly adelgid
5	Hemlock-Canadian (4)	24	• Woolly adelgid
6	Hemlock-Canadian (4)	14	• Woolly adelgid
8	Hemlock-Canadian (4)	24	• Woolly adelgid
16	Pine-Eastern White	33	• Resinosis
22	Crabapple	10	• Rust
26	Sweetgum	24	• Webworm
33	Snowbell-Japanese	13,10,9	• Sapsucker
43*	Dogwood-Flowering	11	• Powdery mildew
44*	Dogwood-Flowering	12,10	• Powdery mildew
45	Dogwood-Flowering	12,11	• Powdery mildew
55	Cherry-Black	22	• Japanese beetle
58	Dogwood-Flowering	15	• Powdery mildew
59	Dogwood-Flowering	15	• Powdery mildew
63	Crabapple	15	• Rust • Scab
76	Ash-White	46	• Emerald ash borer (suspected)
77	Cherry-Flowering	16	• Webworm
102	Oak-Pin	36	• Bacterial leaf scorch (suspected)
103	Oak-Pin	58	• Bacterial leaf scorch (suspected)
133	Pine-Japanese Red	22	• Needlecast
137	Spruce-Colorado Blue	25	• Needlecast
143	Pine-Japanese Red	16	• Borers

* Trees that are recommended for removal in the Tree Removal Section

INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (PARK DRIVE AREA)



INVENTORIED TREES IDENTIFIED WITH PESTS OR DISEASES (MANSION AREA)



Tree Pruning

A commonly offered service among tree companies, pruning trees is one of the most poorly executed practices by tree workers who lack training in the basics of tree biology. "Lion's tailing," topping, and flush cuts are a few examples, and these can lead to hazardous conditions over time.

Because this practice is so misunderstood, and because specific standards exist to perform pruning correctly, the Inventory Team decided to include some explanation in the main body of this management plan.

Tree owners and tree-care practitioners should always keep in mind that any pruning cut is a wound. Informed tree-care professionals have learned to manage that wounding to preserve the health, safety, and integrity of the tree.

Improper Pruning Practices

A few of the most common pruning abuses are

- Lion's Tailing - pruning that removes interior branches along the stem and scaffold branches. This encourages poor branch taper, poor wind load distribution, and risk of branch failure. It also deprives the tree of foliage it needs to produce **photosynthates**. See next page, top left
- Topping - pruning cuts that reduce a tree's size by using heading cuts that shorten branches to a predetermined size. Topping substantially reduces the functional benefits a tree is capable of providing and predisposes trees to structural defects that can contribute to failures in the future. It also reduces the value of the trees substantially and deprives the tree of adequate foliage. See next page, top right.
- Flush Cuts - pruning cut through the **branch collar**, flush against the trunk or parent stem, causing unnecessary injury. See next page, bottom.
- Using Climbing Spikes Inappropriately - Using climbing spikes on a healthy tree, for example, wounds healthy stem tissues and can lead to infection by fungal pathogens.



Example of Lion's tailing.



Examples of topping.



Examples of flush cuts.

Correct Pruning Practices

We have included below some key pruning categories and diagrams to illuminate the goal of each.

Cleaning

Selective pruning to remove one or more of the following parts: dead, diseased, and/or broken branches.

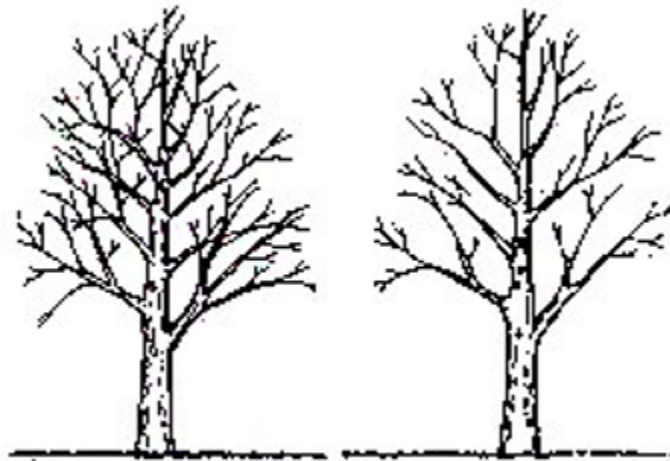


Illustration of crown cleaning.

Raising

Selectively pruning to provide vertical clearance.

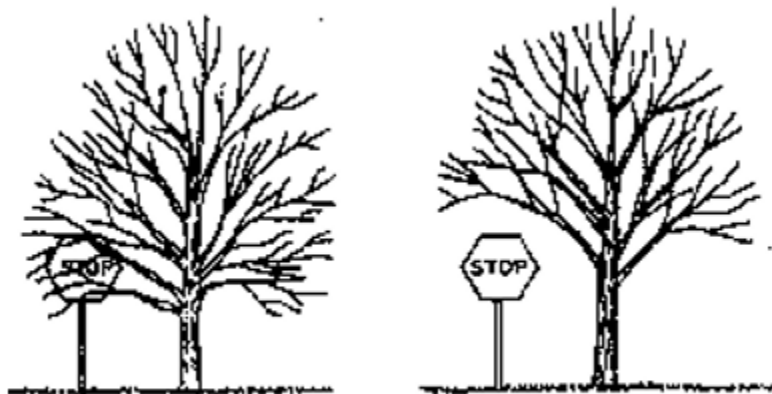


Illustration of crown raising.

Thinning

Selective pruning to reduce density of live branches.



Illustration of thinning.

Reducing (Reduction Pruning)

Selective pruning to reduce height or spread.



Illustration of reduction pruning.

Structural

Selective pruning of live branches and stems to influence orientation, spacing, growth rate, strength of attachment, and ultimate size of branches and stems.

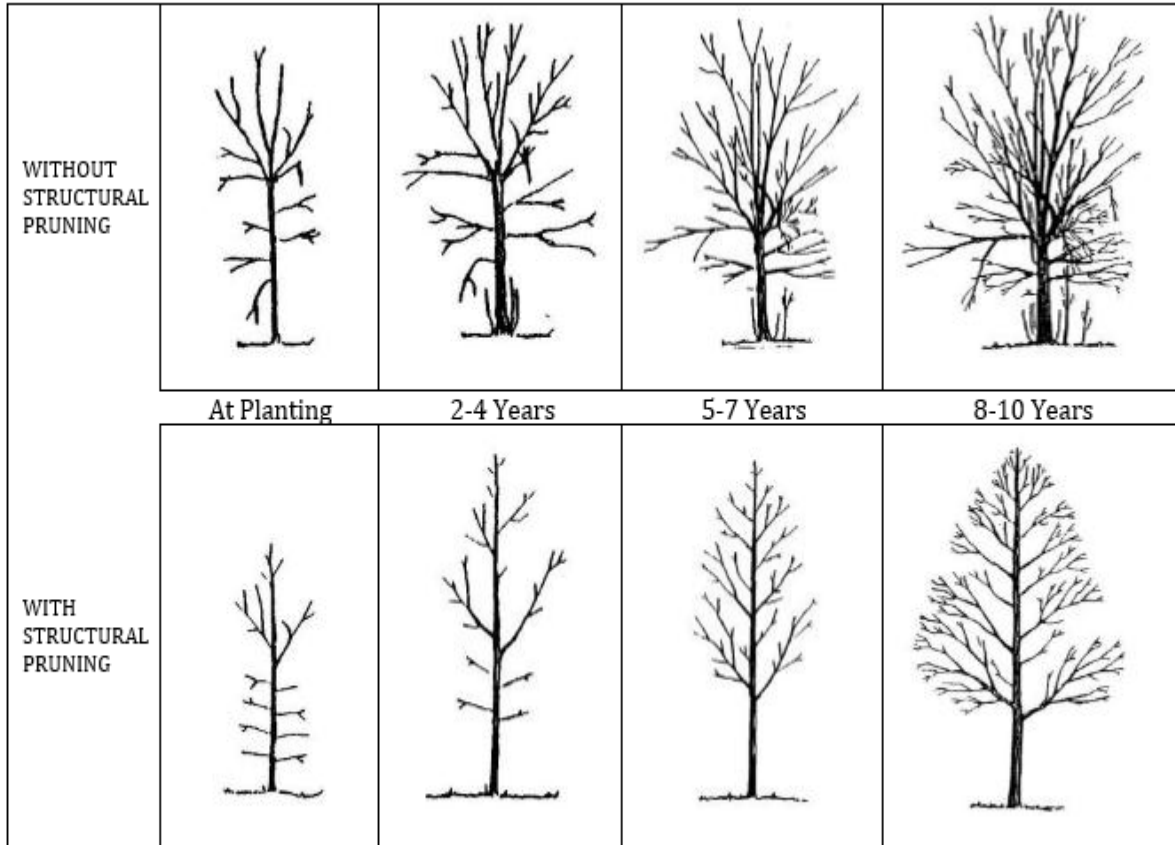


Illustration of structural pruning.

Vista Pruning

Vista pruning is a combination of thinning and reduction pruning to enhance the view from a vantage point to an area of interest while minimizing negative impacts on tree structure and health.

We recommended pruning on the following trees:

INVENTORIED TREES RECOMMENDED FOR PRUNING (39 Trees)

Tree ID	Common Name	DBH	Tree Care Priority	Pruning Recommended
13	Pine-Eastern White	43	2	• Clean
23	Pine-Eastern White	46	2	• Clean
24	Sycamore-American	75	2	• Clean
41	Maple-Sugar	4	2	• Structural
42	Maple-Sugar	4	2	• Structural
73	Oak-Pin	18	2	• Clean
79	Stewartia-Japanese	5,3,3	2	• Reduce: Building • Structural
88	Maple-Sugar	10	2	• Structural
89	Oak-Bur	10	2	• Structural
91	Dogwood-Flowering	12	2	• Clean
93	Beech-European	14	2	• Structural
95	Linden-Littleleaf	18	2	• Reduce: Branch weight
97	Linden-Littleleaf	21	2	• Reduce: Branch weight • Structural
99	Tupelo-Black	23	2	• Reduce: Branch weight • Structural
103	Oak-Pin	58	2	• Clean
124	Crabapple	14,10,10,10	2	• Clean
125	Sycamore-American	50	2	• Clean
132	Oak-White	22	2	• Structural
135	Maple-Sugar	17	2	• Reduce: Branch weight
138	Oak-Pin	53	2	• Clean
145	Sweetgum	31	2	• Clean
22	Crabapple	10	3	• Structural
36	Maple-Japanese	6,5	3	• Structural
46	Hawthorn	7	3	• Structural
47	Hawthorn	7	3	• Structural
48	Hawthorn	6	3	• Structural
61	Maple-Sugar	7	3	• Structural
68	Chestnut-Chinese	38	3	• Clean
69	Chestnut-Chinese	21	3	• Clean
72	Maple-Sugar	5	3	• Structural
87	Silverbell-Carolina	17,13	3	• Clean
109	Willow-Babylon Weeping	12	3	• Structural
116	Willow-Babylon Weeping	32	3	• Clean
117	Oak-Willow	30	3	• Clean
122	Oak-Willow (3)	25	3	• Structural

Tree ID	Common Name	DBH	Tree Care Priority	Pruning Recommended
139	Oak-Pin	19	3	• Clean
140	Oak-Pin	26	3	• Clean

INVENTORIED TREES RECOMMENDED FOR PRUNING (PARK DRIVE AREA)



INVENTORIED TREES RECOMMENDED FOR PRUNING (MANSION AREA)



Structural Support Systems

Structural support systems can reduce risk of tree or tree part(s) failure by limiting movement of stems or branches in certain situations. Examples include co-dominant stems or overextended branches with heavy foliage loads.

Cabling

Cabling is the process of connecting two or more upright stems or leaders to one another to add stability and reduce the likelihood of failure. In some instances, a lateral branch may be secured to the central leader using a cabling system to support the weight of the branch.

Bracing

Bracing is the process of securing the union of two codominant leaders or stems using high strength steel rods to alleviate stresses at the union and reduce the likelihood of failure. Bracing may also be used to reinforce trees that have a partial failure and are likely to benefit from bracing.

Guying

Guying is the process of anchoring a tree's stem to the ground or another immovable object to reduce the likelihood of root failure. Guying can be temporary or permanent and is most often used for establishing a tree in the landscape.

Propping

Propping is the process of using rigid structures that are built on or into the ground to help support the trunk or branch(s) that are oriented near the ground in a horizontal position to reduce the likelihood of failure from the weight or defect of the tree part being supported.



Tree #135 recommended for brace rods due to a crack.

The following table lists all inventoried trees with structural support system recommendations:

INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS (2 Trees)

Tree ID	Common Name	DBH	Tree Care Priority	Cable	Brace Rod
24	Sycamore-American	75	2	Inspect	Inspect
135	Maple-Sugar	17	2	...	New 2

INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS (PARK DRIVE AREA)



INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS (MANSION AREA)



Structural Support: ● Cable, Brace Rod ● Brace Rod

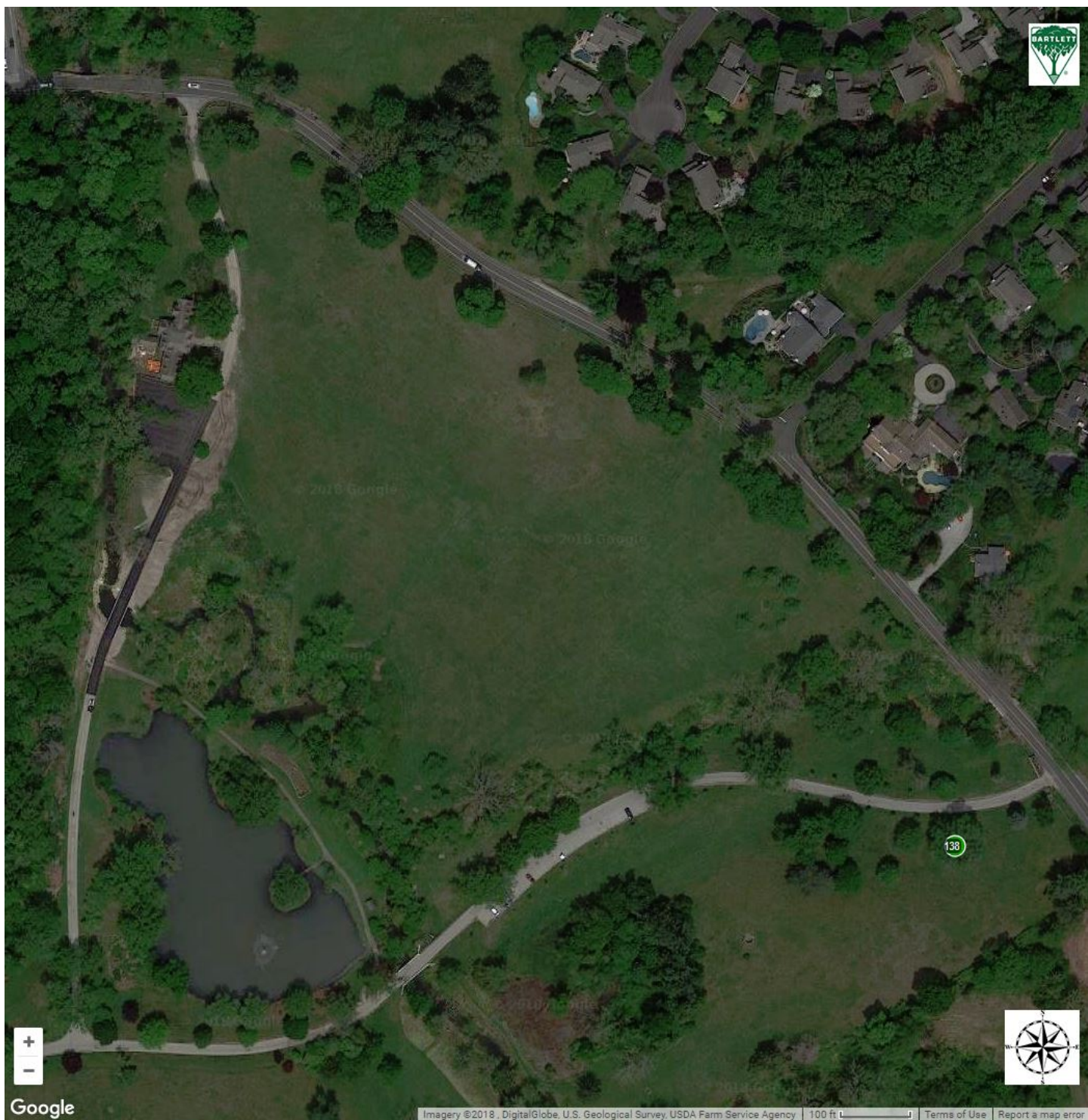
Lightning Protection Systems

Lightning strikes kill many people each year and can cause significant damage to objects on the property. Lightning protection systems are designed to provide a preferred path for lightning to the ground in a manner that minimizes tree damage; adjacent tree damage; and also to buildings, property, animals, and people near the tree. Tree species that are naturally more susceptible to lightning strikes, valuable to the landscape, and trees that are within 10 feet of, taller than, or have limbs that are extending over a structure are recommended for lightning protection systems due to the possibility of damage, "sideflashes", and step voltage.

INVENTORIED TREES WITH LIGHTNING PROTECTION SYSTEM RECOMMENDATIONS (2 Trees)

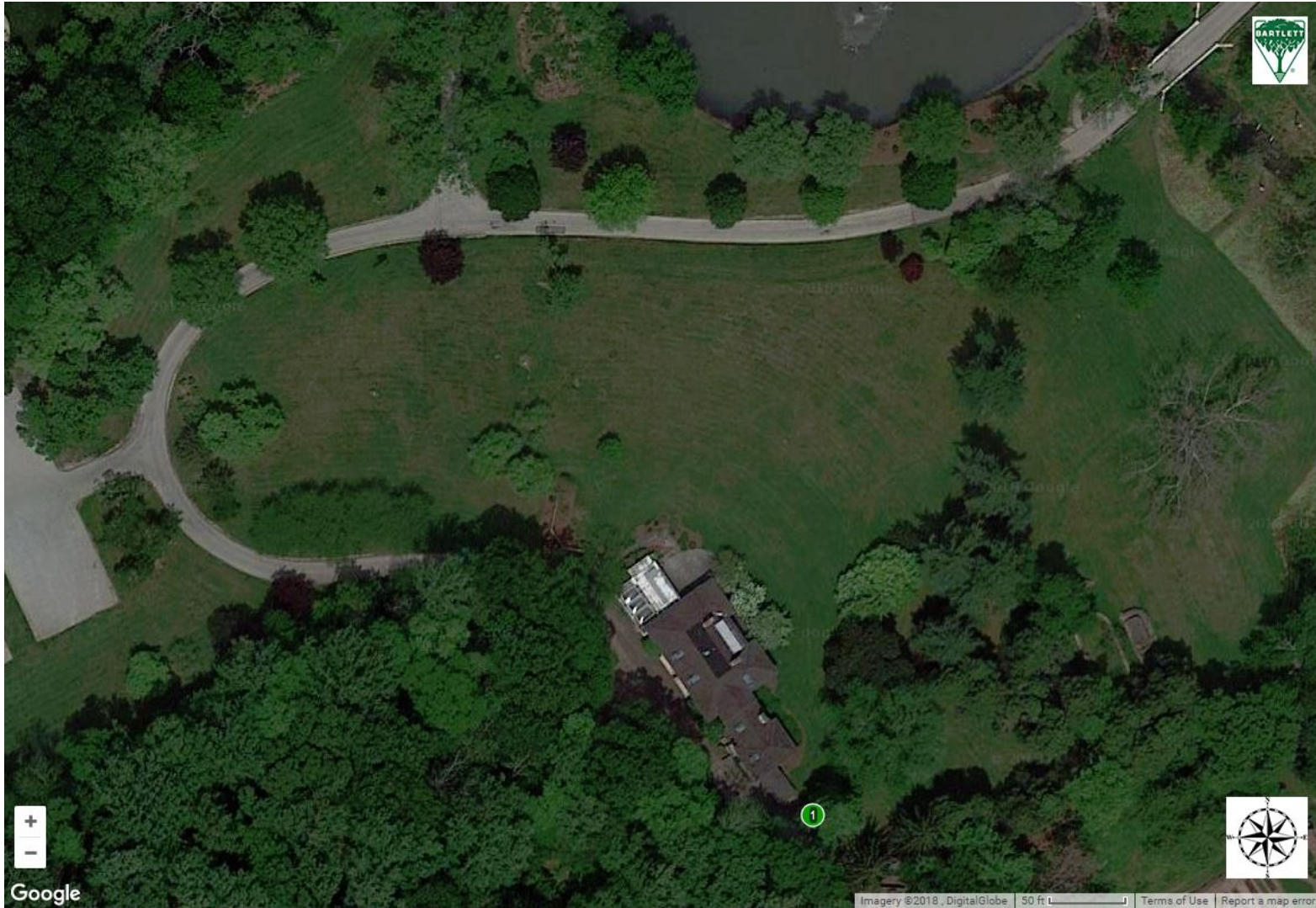
Tree ID	Common Name	DBH	Lightning Protection
1	Redwood-Dawn	46	New
138	Oak-Pin	53	New

INVENTORIED TREES WITH LIGHTNING PROTECTION SYSTEM RECOMMENDATIONS (PARK DRIVE AREA)



Lightning Protection: ● New

**INVENTORIED TREES WITH LIGHTNING PROTECTION SYSTEM RECOMMENDATIONS
(MANSION AREA)**



Lightning Protection: ● New

Tree Removal

In some cases, the inspector may determine need for removal while assessing the tree. Trees may be recommended for removal during the inventory for several reasons:

- The tree is dead;
- The tree is in poor condition and thought to be beyond rehabilitation;
- The tree is over-mature and will continue to decline in condition;
- The tree has significant structural weaknesses that cannot be addressed;
- The tree is already or will interfere with infrastructure (overhead lines for example);
- The location value for the tree is poor or unacceptable (for example, large maturing tree growing directly under overhead lines); and/or,
- The tree species has been declared an invasive for the given area or region.



Tree #126 recommended for removal due to advanced decay.

The tree(s) listed in the table below are recommended for removal:

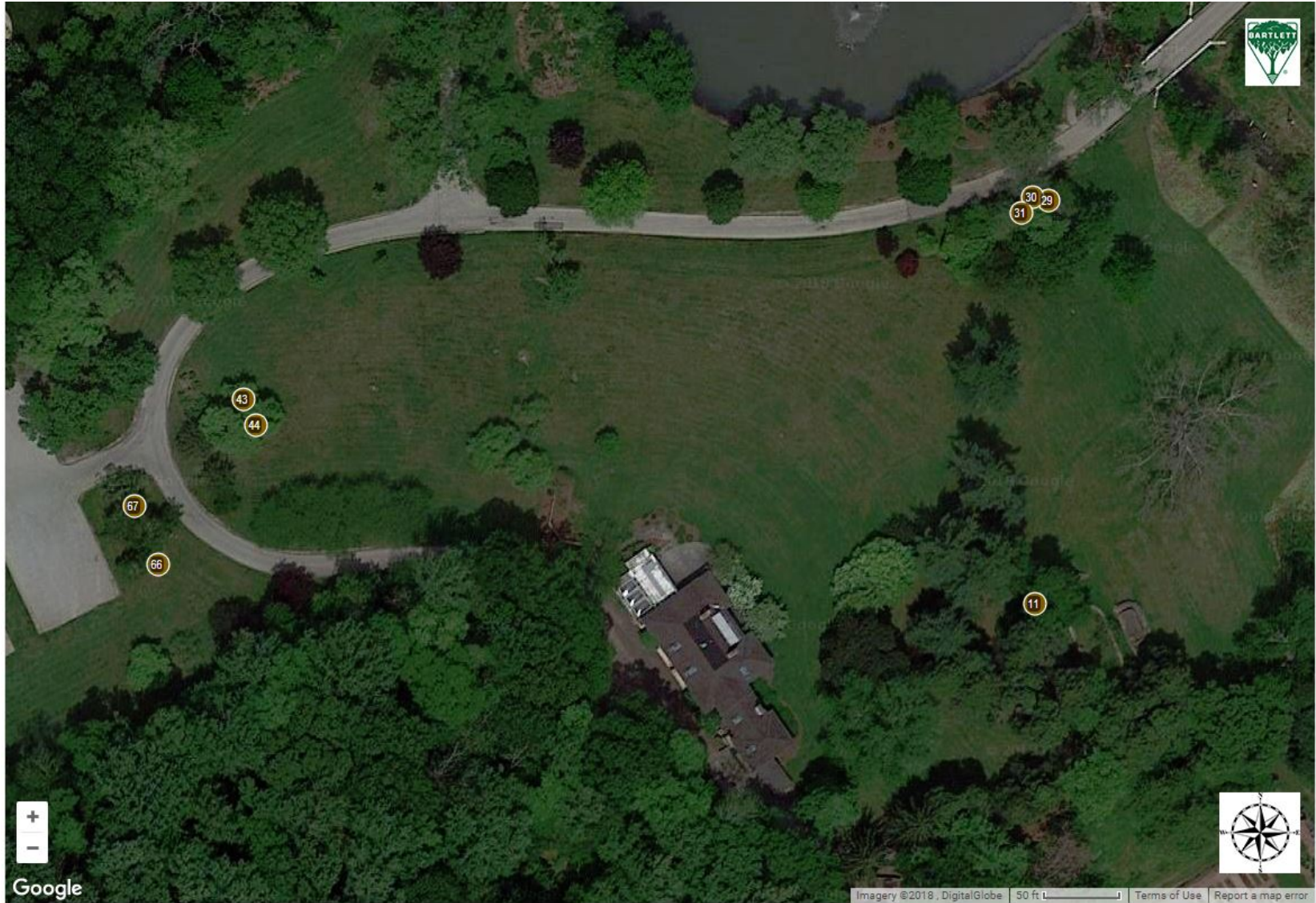
INVENTORIED TREES RECOMMENDED FOR REMOVAL (12 Trees)

Tree ID	Common Name	DBH	Condition	Tree Care Priority	Defect(s) or Observation(s)
31	Maple-Red	23	Poor	1	<ul style="list-style-type: none"> • Dead branches >2 • Cavity-stem • Dieback (severe)
66	Cherry-Flowering	24	Poor	1	<ul style="list-style-type: none"> • Decay-Root flare • Burl • Cavity-root flare • Flush cuts • Flush cuts
136	Birch-River	22	Poor	1	<ul style="list-style-type: none"> • Decay-Root flare • Dieback (moderate) • Dead branches >2
11	Maple-Red	35	Poor	2	<ul style="list-style-type: none"> • Burl • Decay-Stem • Cavity-stem • Poor branch structure
30	Maple-Red	23	Poor	2	<ul style="list-style-type: none"> • Cavity-stem • Hanger • Dead branches >2 • Rib • Dieback (moderate)
67	Cherry-Flowering	20	Poor	2	<ul style="list-style-type: none"> • Decay-Stem • Decay-Root flare • Cavity-root flare • Dead branches >2
126	Birch-Sweet	25	Poor	2	<ul style="list-style-type: none"> • Decay-Stem • Cavity-stem • Dead branches >2
29	Maple-Red	21	Poor	3	<ul style="list-style-type: none"> • Dead branches >2 • Decay-Stem • Co-dominant leaders
43	Dogwood-Flowering	11	Poor	3	<ul style="list-style-type: none"> • Decay-Root flare • Flush cuts
44	Dogwood-Flowering	12	Poor	3	<ul style="list-style-type: none"> • Decay-Stem • Flush cuts
118	Willow-Babylon Weeping	25	Poor	3	<ul style="list-style-type: none"> • Dead branches >2 • Dieback (moderate) • Flush cuts
134	Pine-Japanese Red	19	Poor	3	<ul style="list-style-type: none"> • Dieback (severe)

INVENTORIED TREES RECOMMENDED FOR REMOVAL (PARK DRIVE AREA)



**INVENTORIED TREES RECOMMENDED FOR REMOVAL
(MANSION AREA)**



Tree Risk *Advanced Assessments (Level 3)*

As part of the inventory process, the Inventory Team conducts a *basic assessment (Level 2)* from the ground. During this assessment the inspector can determine whether some aspect of tree structure or health indicates that a more comprehensive tree structure evaluation (*Level 3 advanced assessment*) is needed to more thoroughly evaluate tree condition and risk of failure. The image below provides an example of a tree defect that merits a (*Level 3 advanced assessment*).

In such cases, we may recommend (*Level 3 advanced assessments*) of the roots, stem, or crown. These assessments may include climbing inspections, examination of the root system using a compressed-air tool (that avoids damage to roots and underground utilities), or one or more of the following: resistance drilling; using the resistograph (a precision drilling instrument that provides graphical output); or sonic tomography that produces a visual representation of internal conditions based on how sound moved through the tree. The goal is to use the appropriate method to evaluate impact of wood decay in stems and buttress roots that show potential for failure and to determine presence and condition of the root system.

Once we complete such (*Level 3 advanced assessments*), we can then recommend appropriate measures, such as remediation, maintenance, or removal.

The inventoried tree listed in the table below met the conditions for a (*Level 3 advanced assessment*).

INVENTORIED TREE RECOMMENDED FOR *LEVEL 3 ADVANCED ASSESSMENT (1 Tree)*

Tree ID	Common Name	DBH	Overall Risk Rating	Tree Care Priority	Advanced Assessment	Defect(s) or Observation(s)
119	Willow-Babylon Weeping	35	Low	2	<ul style="list-style-type: none">• Stem	<ul style="list-style-type: none">• Fungi/conks• Decay-Root flare• Flush cuts

INVENTORIED TREE RECOMMENDED FOR A *LEVEL 3 ADVANCED ASSESSMENT*



Vine Removal

The following trees were recommended for removal of vines. Vines and suckers can cover the trunk of a tree and hide defects that may be present.

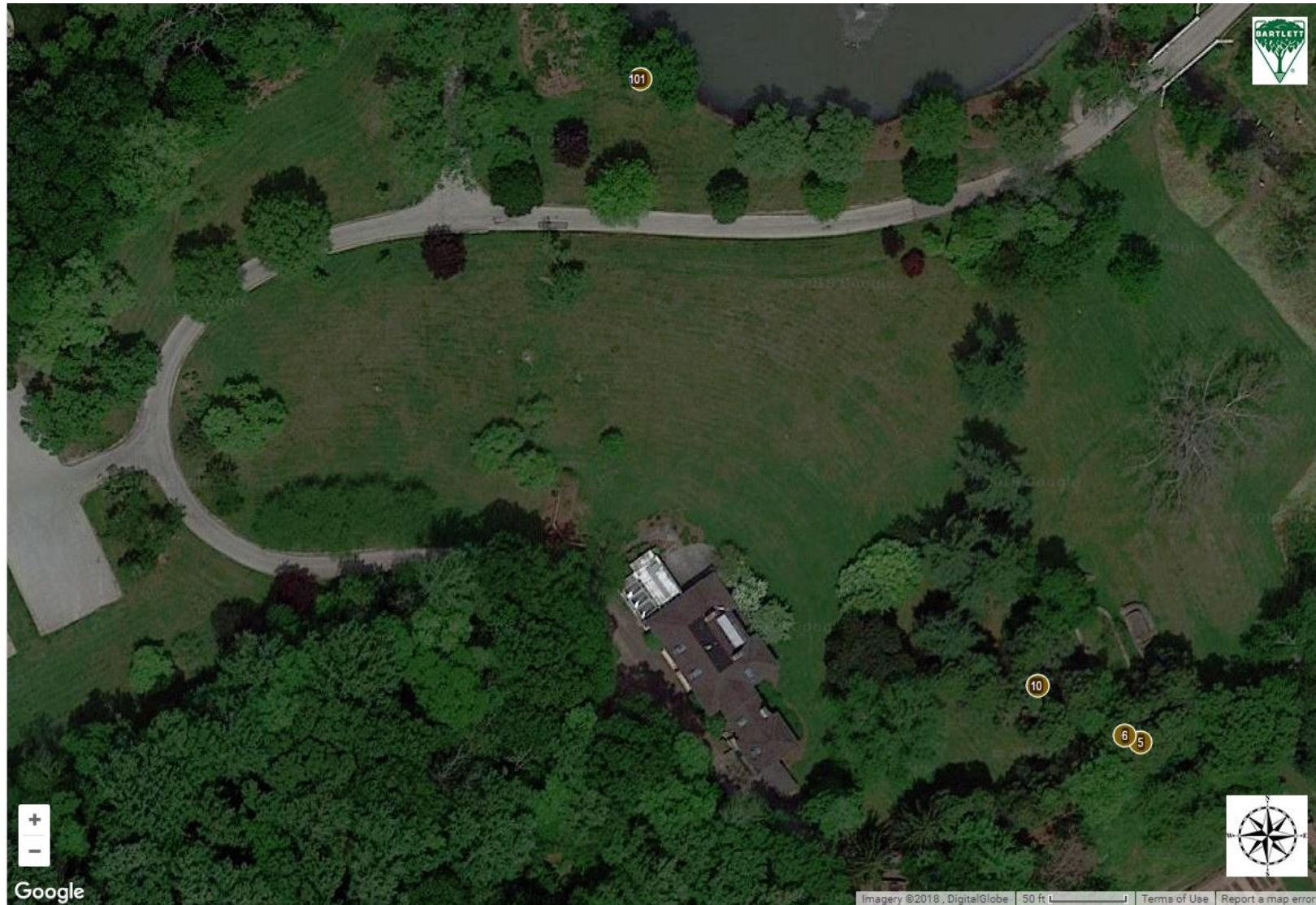
INVENTORIED TREES RECOMMENDED FOR VINE REMOVAL (14 Trees)

Tree ID	Common Name	DBH	Poisonous Plants
5	Hemlock-Canadian (4)	24	...
6	Hemlock-Canadian (4)	14	...
10	Hemlock-Canadian (2)	24	...
74	Sycamore-American	27,20	...
75	Sycamore-American	42	...
76	Ash-White	46	...
101	Maple-Red	43	Yes

INVENTORIED TREES RECOMMENDED FOR VINE REMOVAL (PARK DRIVE AREA)



**INVENTORIED TREES RECOMMENDED FOR VINE REMOVAL
(MANSION AREA)**



DEFECTS OR OBSERVATIONS



DEFECTS OR OBSERVATIONS

The following table lists inventoried trees for which we noted defects, observations, or other structural issues. The image below provides an example of a wound on a root collar.



Tree #20 exhibiting a root collar wound.

**INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES
(146 Trees)**

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
1	Redwood-Dawn	46	<ul style="list-style-type: none"> • Dead branches >2 • Construction damage • Wound-root flare
4	Hemlock-Canadian (4)	19,4	<ul style="list-style-type: none"> • Dead branches >2 • Broken branch(s)
5	Hemlock-Canadian (4)	24	<ul style="list-style-type: none"> • Broken branch(s)
7	Maple-Red	23	<ul style="list-style-type: none"> • Seam • Co-dominant leaders • Broken branch(s)
8	Hemlock-Canadian (4)	24	<ul style="list-style-type: none"> • Dead branches >2 • Storm damage • Co-dominant stems
9	Hemlock-Canadian (5)	12,10	<ul style="list-style-type: none"> • Dead branches >2 • Storm damage • Co-dominant leaders
10	Hemlock-Canadian (2)	24	<ul style="list-style-type: none"> • Dead branches >2
11	Maple-Red	35	<ul style="list-style-type: none"> • Burl • Decay-Stem • Cavity-stem • Poor branch structure
12	Cherry-Weeping	14	<ul style="list-style-type: none"> • Dieback (moderate) • Seam • Wound-stem • Storm damage
13	Pine-Eastern White	43	<ul style="list-style-type: none"> • Dead branches >2 • Wound-root • Poor branch structure
14	Pine-Eastern White	30	<ul style="list-style-type: none"> • Storm damage
15	Pine-Eastern White	36	<ul style="list-style-type: none"> • Dead branches >2 • Storm damage
16	Pine-Eastern White	33	<ul style="list-style-type: none"> • Seam • Decay-Stem • Dead branches >2
17	Hemlock-Canadian (3)	26	<ul style="list-style-type: none"> • Co-dominant leaders • Dead branches >2 • Wound-root
18	Maple-Norway	49	<ul style="list-style-type: none"> • Decay-Stem • Storm damage • Rib
19	Dogwood-Kousa	17	<ul style="list-style-type: none"> • Included bark • Wound-root flare

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
20	Dogwood-Kousa	15	<ul style="list-style-type: none"> • Wound-root flare • Cavity-stem
21	Dogwood-Kousa	26	<ul style="list-style-type: none"> • Wound-root flare
22	Crabapple	10	<ul style="list-style-type: none"> • Wound-branch • Dead branches >2 • Poor branch structure
23	Pine-Eastern White	46	<ul style="list-style-type: none"> • Poor branch structure • Storm damage • Hanger
24	Sycamore-American	75	<ul style="list-style-type: none"> • Co-dominant leaders • Dead branches >2
25	Sycamore-American	23	<ul style="list-style-type: none"> • Suppressed • Wound-root flare • Dead branches >2
27	Maple-Red	38	<ul style="list-style-type: none"> • Cavity-branch • Rib • Cavity-stem • Dead branches >2
28	Maple-Red	25	<ul style="list-style-type: none"> • Burl • Cavity-stem
29	Maple-Red	21	<ul style="list-style-type: none"> • Dead branches >2 • Decay-Stem • Co-dominant leaders
30	Maple-Red	23	<ul style="list-style-type: none"> • Cavity-stem • Hanger • Dead branches >2 • Rib • Dieback (moderate)
31	Maple-Red	23	<ul style="list-style-type: none"> • Dead branches >2 • Cavity-stem • Dieback (severe)
32	Snowbell-Japanese	16,8	<ul style="list-style-type: none"> • Poor branch structure • Cavity-branch
33	Snowbell-Japanese	13,10,9	<ul style="list-style-type: none"> • Storm damage • Cavity-branch
34	Snowbell-Japanese	14,12	<ul style="list-style-type: none"> • Cavity-branch • Dead branches <=2 • Wound-branch
35	Sourwood	7,5	<ul style="list-style-type: none"> • Buried root collar
36	Maple-Japanese	6,5	<ul style="list-style-type: none"> • Poor branch structure
37	Plum-Purple Leaf	6	<ul style="list-style-type: none"> • Wound-stem • Seam • Lean • Decay-Branch

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
38	Euonymus	15,11	<ul style="list-style-type: none"> • Cavity-branch • Decay-Branch • Dieback • Lean
39	Euonymus	30	<ul style="list-style-type: none"> • Wound-root flare • Decay-Root flare • Cavity-root flare • Cavity-branch • Included bark
41	Maple-Sugar	4	<ul style="list-style-type: none"> • Poor branch structure
43	Dogwood-Flowering	11	<ul style="list-style-type: none"> • Decay-Root flare • Flush cuts
44	Dogwood-Flowering	12,10	<ul style="list-style-type: none"> • Decay-Stem • Flush cuts
45	Dogwood-Flowering	12,11	<ul style="list-style-type: none"> • Storm damage
49	Cherry-Black	16	<ul style="list-style-type: none"> • Girdling roots present
50	Cherry-Black	13	<ul style="list-style-type: none"> • Wound-stem • Wound-root flare
51	Cherry-Black	16	<ul style="list-style-type: none"> • Flush cuts • Wound-root
53	Cherry-Black	13	<ul style="list-style-type: none"> • Wound-stem • Flush cuts • Suppressed • Girdling roots present
54	Cherry-Black	20	<ul style="list-style-type: none"> • Wound-root
55	Cherry-Black	22	<ul style="list-style-type: none"> • Flush cuts • Wound-stem
57	Hawthorn	6	<ul style="list-style-type: none"> • Storm damage • Cavity-stem
58	Dogwood-Flowering	15	<ul style="list-style-type: none"> • Cavity-branch • Hanger
59	Dogwood-Flowering	15	<ul style="list-style-type: none"> • Wound-branch • Wound-stem
60	Dogwood-Flowering	14	<ul style="list-style-type: none"> • Storm damage • Wound-stem • Decay-Stem • Fungi/conks • Broken branch(s)
61	Maple-Sugar	7	<ul style="list-style-type: none"> • Buried root collar
62	Maple-Japanese	15	<ul style="list-style-type: none"> • Buried root collar
63	Crabapple	15	<ul style="list-style-type: none"> • Flush cuts • Cavity-branch

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
64	Dogwood-Flowering	11	<ul style="list-style-type: none"> • Decay-Stem • Wound-branch • Cavity-branch • Dead branches >2
65	Dogwood-Flowering	11	<ul style="list-style-type: none"> • Cavity-stem • Decay-Stem
66	Cherry-Flowering	24,20,20	<ul style="list-style-type: none"> • Decay-Root flare • Burl • Cavity-root flare • Flush cuts • Flush cuts
67	Cherry-Flowering	20,20,18	<ul style="list-style-type: none"> • Decay-Stem • Decay-Root flare • Cavity-root flare • Dead branches >2
68	Chestnut-Chinese	38	<ul style="list-style-type: none"> • Dead branches >2 • Wound-stem • Flush cuts
69	Chestnut-Chinese	21	<ul style="list-style-type: none"> • Flush cuts • Dead branches <=2
70	Oak-Pin	27	<ul style="list-style-type: none"> • Wound-root flare • Wound-root • Flush cuts
71	Oak-Pin	28	<ul style="list-style-type: none"> • Wound-root flare • Wound-root • Flush cuts
72	Maple-Sugar	5	<ul style="list-style-type: none"> • Buried root collar
73	Oak-Pin	18	<ul style="list-style-type: none"> • Dead branches >2
74	Sycamore-American	27,20	<ul style="list-style-type: none"> • Co-dominant stems • Dead branches >2
75	Sycamore-American	42	<ul style="list-style-type: none"> • Wound-branch • Cavity-branch
76	Ash-White	46	<ul style="list-style-type: none"> • Dead branches >2
79	Stewartia-Japanese	5,3,3	<ul style="list-style-type: none"> • Buried root collar
80	Oak-Pin	30	<ul style="list-style-type: none"> • Dead branches >2
82	Tree of Heaven	23	<ul style="list-style-type: none"> • Wound-root flare • Dead branches >2 • Poor branch structure
85	Sassafras-Common	40	<ul style="list-style-type: none"> • Cavity-branch • Dead branches >2 • Girdling material
86	Locust-Black	28	<ul style="list-style-type: none"> • Wound-root • Dead branches >2

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
87	Silverbell-Carolina	17,13	<ul style="list-style-type: none"> • Cavity-branch • Dead branches >2 • Suppressed
88	Maple-Sugar	10	<ul style="list-style-type: none"> • Wound-root flare • Poor branch structure
89	Oak-Bur	10	<ul style="list-style-type: none"> • Poor branch structure • Buried root collar
90	Dogwood-Flowering	11	<ul style="list-style-type: none"> • Wound-branch • Uneven crown • Hanger
91	Dogwood-Flowering	12	<ul style="list-style-type: none"> • Dead branches >2
92	Linden-Littleleaf	22	<ul style="list-style-type: none"> • Seam
93	Beech-European	14	<ul style="list-style-type: none"> • Poor branch structure • Buried root collar
94	Maple-Red	20	<ul style="list-style-type: none"> • Storm damage • Included bark • Girdling roots present
95	Linden-Littleleaf	18	<ul style="list-style-type: none"> • Co-dominant leaders
96	Maple-Red	16	<ul style="list-style-type: none"> • Co-dominant leaders • Rib • Seam • Cavity-stem • Flush cuts • Wound-root flare
97	Linden-Littleleaf	21	<ul style="list-style-type: none"> • Included bark • Co-dominant leaders
98	Planetree-London	23	<ul style="list-style-type: none"> • Co-dominant leaders • Wound-root
99	Tupelo-Black	23	<ul style="list-style-type: none"> • Included bark • Poor branch structure
100	Planetree-London (2)	20	<ul style="list-style-type: none"> • Poor branch structure • Cavity-stem • Flush cuts
101	Maple-Red	43	<ul style="list-style-type: none"> • Wound-stem • Flush cuts
102	Oak-Pin	36	<ul style="list-style-type: none"> • Dieback • Dead branches <=2 • Dead branches >2 • Flush cuts
103	Oak-Pin	58	<ul style="list-style-type: none"> • Dead branches >2 • Dead branches <=2 • Storm damage • Wound-branch
104	Maple-Red	28	<ul style="list-style-type: none"> • Co-dominant stems • Lean

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
105	Planetree-London	23	<ul style="list-style-type: none"> • Lean • Poor branch structure • Storm damage
108	Planetree-London	17	<ul style="list-style-type: none"> • Lean • Buried root collar
109	Willow-Babylon Weeping	12	<ul style="list-style-type: none"> • Wound-root flare
111	Maple-Red	6,4	<ul style="list-style-type: none"> • Co-dominant leaders
112	Willow	9	<ul style="list-style-type: none"> • Lean
113	Tupelo-Black	11	<ul style="list-style-type: none"> • Buried root collar
114	Magnolia (5)	6,5,4,4	<ul style="list-style-type: none"> • Wound-branch • Wound-root
115	Willow	15,15	<ul style="list-style-type: none"> • Burl • Co-dominant leaders • Dieback
116	Willow-Babylon Weeping	32	<ul style="list-style-type: none"> • Dead branches >2
117	Oak-Willow	30	<ul style="list-style-type: none"> • Dead branches >2
118	Willow-Babylon Weeping	25	<ul style="list-style-type: none"> • Dead branches >2 • Dieback (moderate) • Flush cuts
119	Willow-Babylon Weeping	35	<ul style="list-style-type: none"> • Fungi/conks • Decay-Root flare • Flush cuts
120	Willow-Babylon Weeping	21	<ul style="list-style-type: none"> • Wound-root flare
121	Oak-Willow	49	<ul style="list-style-type: none"> • Sidewalk lifting-minor • Dead branches >2 • Flush cuts • Fungi/conks • Cavity-stem
122	Oak-Willow (3)	25	<ul style="list-style-type: none"> • Poor branch structure
123	Birch-Gray	18	<ul style="list-style-type: none"> • Cavity-branch • Co-dominant leaders • Lean
124	Crabapple	14,10,10,10	<ul style="list-style-type: none"> • Storm damage • Dead branches >2 • Flush cuts
125	Sycamore-American	50	<ul style="list-style-type: none"> • Dead branches >2 • Wound-root
126	Birch-Sweet	25	<ul style="list-style-type: none"> • Decay-Stem • Cavity-stem • Dead branches >2
127	Sweetgum	39	<ul style="list-style-type: none"> • Dead branches >2 • Dieback (moderate) • Girdling roots present • Wound-root • Co-dominant leaders

Tree ID	Common Name	DBH	Defect(s) or Observation(s)
130	Tuliptree	42	<ul style="list-style-type: none"> • Hanger
132	Oak-White	22	<ul style="list-style-type: none"> • Poor branch structure
133	Pine-Japanese Red	22	<ul style="list-style-type: none"> • Dieback (moderate)
134	Pine-Japanese Red	19	<ul style="list-style-type: none"> • Dieback (severe)
135	Maple-Sugar	17	<ul style="list-style-type: none"> • Included bark • Crack • Co-dominant leaders
136	Birch-River	22	<ul style="list-style-type: none"> • Decay-Root flare • Dieback (moderate) • Dead branches >2
137	Spruce-Colorado Blue	25	<ul style="list-style-type: none"> • Dead branches >2 • Dieback (moderate) • Co-dominant leaders
138	Oak-Pin	53	<ul style="list-style-type: none"> • Cavity-branch • Fungi/conks • Hanger • Dead branches >2
139	Oak-Pin	19	<ul style="list-style-type: none"> • Dead branches >2
140	Oak-Pin	26	<ul style="list-style-type: none"> • Dead branches >2 • Wound-root flare
141	Oak-Pin	34	<ul style="list-style-type: none"> • Included bark • Poor branch structure • Dead branches <=2 • Storm damage
142	Oak-Northern Red	37	<ul style="list-style-type: none"> • Included bark • Poor branch structure
143	Pine-Austrian	16	<ul style="list-style-type: none"> • Suppressed • Dieback
144	Sweetgum	34	<ul style="list-style-type: none"> • Flush cuts • Uneven crown • Storm damage • Dead branches >2 • Wound-root flare
145	Sweetgum	31	<ul style="list-style-type: none"> • Wound-root flare • Cavity-root flare • Cavity-stem • Dead branches >2

INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES (PARK DRIVE AREA)



**INVENTORIED TREES WITH DEFECTS, OBSERVATIONS, OR OTHER STRUCTURAL ISSUES
(MANSION AREA)**



ENTIRE INVENTORY



ENTIRE INVENTORY (173 Trees)

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
1	Redwood-Dawn	<i>Metasequoia</i>	<i>glyptostroboides</i>	46	Large	Mature	Good	3	\$50,744.57
2	Spruce-Norway	<i>Picea</i>	<i>abies</i>	27	Large	Mature	Good	...	\$17,946.23
3	Spruce-Norway	<i>Picea</i>	<i>abies</i>	27	Large	Mature	Good	...	\$17,946.23
4	Hemlock-Canadian (4)	<i>Tsuga</i>	<i>canadensis</i>	19,4	Large	Mature	Fair	...	\$23,202.09
5	Hemlock-Canadian (4)	<i>Tsuga</i>	<i>canadensis</i>	24	Large	Semi-mature	Fair	...	\$35,449.34
6	Hemlock-Canadian (4)	<i>Tsuga</i>	<i>canadensis</i>	14	Large	Semi-mature	Fair	...	\$12,062.62
7	Maple-Red	<i>Acer</i>	<i>rubrum</i>	23	Large	Mature	Fair	...	\$9,301.94
8	Hemlock-Canadian (4)	<i>Tsuga</i>	<i>canadensis</i>	24	Large	Mature	Fair	...	\$35,449.34
9	Hemlock-Canadian (5)	<i>Tsuga</i>	<i>canadensis</i>	12,10	Large	Semi-mature	Fair	...	\$18,770.92
10	Hemlock-Canadian (2)	<i>Tsuga</i>	<i>canadensis</i>	24	Large	Mature	Fair	...	\$17,724.67
11	Maple-Red	<i>Acer</i>	<i>rubrum</i>	35	Large	Mature	Poor	2	\$12,474.00
12	Cherry-Weeping	<i>Prunus</i>	<i>subhirtella</i>	14	Medium	Semi-mature	Poor	...	\$2,067.88
13	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	43	Large	Over-mature	Good	2	\$36,442.05
14	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	30	Large	Mature	Good	...	\$20,217.20
15	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	36	Large	Mature	Fair	...	\$19,901.20
16	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	33	Large	Mature	Fair	...	\$17,069.14
17	Hemlock-Canadian (3)	<i>Tsuga</i>	<i>canadensis</i>	26	Large	Mature	Fair	...	\$31,202.81
18	Maple-Norway	<i>Acer</i>	<i>platanoides</i>	49	Large	Over-mature	Fair	...	\$24,430.89
19	Dogwood-Kousa	<i>Cornus</i>	<i>kousa</i>	17	Small	Semi-mature	Good	...	\$8,003.80
20	Dogwood-Kousa	<i>Cornus</i>	<i>kousa</i>	15	Small	Semi-mature	Fair	...	\$4,450.95
21	Dogwood-Kousa	<i>Cornus</i>	<i>kousa</i>	26	Small	Mature	Good	...	\$18,721.68
22	Crabapple	<i>Malus</i>	sp.	10	Small	Semi-mature	Good	3	\$2,400.22
23	Pine-Eastern White	<i>Pinus</i>	<i>strobus</i>	46	Large	Over-mature	Good	2	\$39,831.75
24	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	75	Large	Over-mature	Good	2	\$63,702.79
25	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	23	Large	Mature	Good	...	\$11,883.22
26	Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>	24	Large	Mature	Good	...	\$14,179.74
27	Maple-Red	<i>Acer</i>	<i>rubrum</i>	38	Large	Mature	Fair	...	\$23,803.58
28	Maple-Red	<i>Acer</i>	<i>rubrum</i>	25	Large	Semi-mature	Fair	...	\$10,990.00
29	Maple-Red	<i>Acer</i>	<i>rubrum</i>	21	Large	Semi-mature	Poor	3	\$4,652.73

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
30	Maple-Red	<i>Acer</i>	<i>rubrum</i>	23	Large	Semi-mature	Poor	2	\$5,581.16
31	Maple-Red	<i>Acer</i>	<i>rubrum</i>	23	Large	Mature	Poor	1	\$5,581.16
32	Snowbell-Japanese	<i>Styrax</i>	<i>japonicus</i>	16,8	Medium	Semi-mature	Good	...	\$8,665.40
33	Snowbell-Japanese	<i>Styrax</i>	<i>japonicus</i>	13,10,9	Medium	Semi-mature	Good	...	\$9,477.78
34	Snowbell-Japanese	<i>Styrax</i>	<i>japonicus</i>	14,12	Medium	Semi-mature	Good	...	\$9,206.98
35	Sourwood	<i>Oxydendrum</i>	<i>arboreum</i>	7,5	Medium	Young	Good	...	\$2,049.42
36	Maple-Japanese	<i>Acer</i>	<i>palmatum</i>	6,5	Medium	Semi-mature	Good	3	\$1,745.70
37	Plum-Purple Leaf	<i>Prunus</i>	<i>cerasifera</i>	6	Medium	Semi-mature	Poor	...	\$332.34
38	Euonymus	<i>Euonymus</i>	sp.	15,11	Medium	Semi-mature	Poor	...	\$3,194.13
39	Euonymus	<i>Euonymus</i>	sp.	30	Medium	Mature	Poor	...	\$8,308.44
40	Maple-Japanese	<i>Acer</i>	<i>palmatum</i>	15	Medium	Semi-mature	Good	...	\$6,439.04
41	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	4	Medium	Young	Good	2	\$433.27
42	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	4	Medium	Young	Good	2	\$433.27
43	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	11	Medium	Semi-mature	Poor	3	\$1,117.02
44	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	12,10	Medium	Semi-mature	Poor	3	\$2,252.51
45	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	12,11	Medium	Semi-mature	Fair	...	\$4,077.29
46	Hawthorn	<i>Crataegus</i>	sp.	7	Medium	Semi-mature	Good	3	\$1,055.48
47	Hawthorn	<i>Crataegus</i>	sp.	7	Medium	Semi-mature	Good	3	\$1,055.48
48	Hawthorn	<i>Crataegus</i>	sp.	6	Small	Semi-mature	Good	3	\$775.45
49	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	16	Medium	Semi-mature	Good	...	\$3,781.26
50	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	13	Medium	Semi-mature	Fair	...	\$1,783.02
51	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	16	Medium	Semi-mature	Good	...	\$3,781.26
52	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	17	Medium	Semi-mature	Good	...	\$4,268.69
53	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	13	Medium	Semi-mature	Fair	...	\$1,783.02
54	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	20	Medium	Mature	Good	...	\$5,908.22
55	Cherry-Black	<i>Prunus</i>	<i>serotina</i>	22	Medium	Mature	Good	...	\$7,148.95
56	Hawthorn	<i>Crataegus</i>	sp.	6	Medium	Young	Good	...	\$775.45
57	Hawthorn	<i>Crataegus</i>	sp.	6	Medium	Young	Good	...	\$775.45
58	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	15	Medium	Semi-mature	Fair	...	\$3,461.85
59	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	15	Medium	Semi-mature	Poor	...	\$2,077.11
60	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	14	Medium	Semi-mature	Poor	...	\$1,809.39
61	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	7	Medium	Young	Good	3	\$1,326.89

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
62	Maple-Japanese	<i>Acer</i>	<i>palmatum</i>	15	Medium	Semi-mature	Good	...	\$6,439.04
63	Crabapple	<i>Malus</i>	sp.	15	Medium	Mature	Good	...	\$5,400.49
64	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	11	Medium	Semi-mature	Poor	...	\$1,117.02
65	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	11	Medium	Semi-mature	Poor	...	\$1,117.02
66	Cherry-Flowering	<i>Prunus</i>	<i>serrulata</i>	24,20,20	Medium	Over-mature	Poor	1	\$13,247.08
67	Cherry-Flowering	<i>Prunus</i>	<i>serrulata</i>	20,20,18	Medium	Mature	Poor	2	\$10,821.02
68	Chestnut-Chinese	<i>Castanea</i>	<i>mollissima</i>	38	Large	Mature	Good	3	\$27,076.58
69	Chestnut-Chinese	<i>Castanea</i>	<i>mollissima</i>	21	Medium	Semi-mature	Good	3	\$8,820.79
70	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	27	Large	Mature	Good	...	\$17,497.57
71	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	28	Large	Mature	Good	...	\$18,817.69
72	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	5	Medium	Young	Good	3	\$676.98
73	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	18	Large	Semi-mature	Good	2	\$7,776.70
74	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	27,20	Large	Mature	Good	...	\$25,361.36
75	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	42	Large	Over-mature	Fair	...	\$25,195.57
76	Ash-White	<i>Fraxinus</i>	<i>americana</i>	46	Large	Over-mature	Good	...	\$42,559.96
77	Cherry-Flowering	<i>Prunus</i>	<i>serrulata</i>	16	Medium	Semi-mature	Good	...	\$5,750.67
78	Cherry-Flowering	<i>Prunus</i>	<i>serrulata</i>	14	Small	Semi-mature	Good	...	\$4,402.86
79	Stewartia-Japanese	<i>Stewartia</i>	<i>pseudocamellia</i>	5,3,3	Medium	Semi-mature	Good	2	\$878.98
80	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	30	Large	Mature	Good	...	\$21,601.94
81	Redbud-Eastern	<i>Cercis</i>	<i>canadensis</i>	6	Small	Young	Good	...	\$864.08
82	Tree of Heaven	<i>Ailanthus</i>	<i>altissima</i>	23	Large	Mature	Fair	...	\$3,255.68
83	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	22	Large	Mature	Good	...	\$11,617.05
84	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	24	Large	Mature	Good	...	\$13,825.24
85	Sassafras-Common	<i>Sassafras</i>	<i>albidum</i>	40	Large	Over-mature	Fair	...	\$22,520.40
86	Locust-Black	<i>Robinia</i>	<i>pseudoacacia</i>	28	Large	Mature	Good	...	\$13,268.89
87	Silverbell-Carolina	<i>Halesia</i>	<i>carolina</i>	17,13	Medium	Mature	Fair	3	\$8,456.15
88	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	10	Medium	Semi-mature	Good	2	\$2,707.94
89	Oak-Bur	<i>Quercus</i>	<i>macrocarpa</i>	10	Medium	Semi-mature	Good	2	\$2,861.80
90	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	11	Medium	Semi-mature	Fair	...	\$1,861.71
91	Dogwood-Flowering	<i>Cornus</i>	<i>florida</i>	12	Medium	Semi-mature	Fair	2	\$2,215.58
92	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	22	Large	Mature	Good	...	\$12,361.73
93	Beech-European	<i>Fagus</i>	<i>sylvatica</i>	14	Large	Semi-mature	Good	2	\$5,428.18

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
94	Maple-Red	<i>Acer</i>	<i>rubrum</i>	20	Large	Mature	Fair	...	\$7,033.60
95	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	18	Large	Semi-mature	Good	2	\$8,275.21
96	Maple-Red	<i>Acer</i>	<i>rubrum</i>	16	Large	Semi-mature	Poor	...	\$2,700.90
97	Linden-Littleleaf	<i>Tilia</i>	<i>cordata</i>	21	Large	Mature	Good	2	\$11,263.48
98	Planetree-London	<i>Platanus</i>	<i>x acerifolia</i>	23	Large	Mature	Good	...	\$11,883.22
99	Tupelo-Black	<i>Nyssa</i>	<i>sylvatica</i>	23	Large	Mature	Good	2	\$14,324.98
100	Planetree-London (2)	<i>Platanus</i>	<i>x acerifolia</i>	20	Large	Mature	Good	...	\$17,970.85
101	Maple-Red	<i>Acer</i>	<i>rubrum</i>	43	Large	Over-mature	Good	...	\$39,936.49
102	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	36	Large	Mature	Good	...	\$29,770.02
103	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	58	Large	Over-mature	Good	2	\$55,203.75
104	Maple-Red	<i>Acer</i>	<i>rubrum</i>	28	Large	Mature	Good	...	\$19,300.20
105	Planetree-London	<i>Platanus</i>	<i>x acerifolia</i>	23	Large	Mature	Good	...	\$11,883.22
106	Willow	<i>Salix</i>	sp.	7,5,5	Medium	Semi-mature	Good	...	\$1,827.86
107	Birch-River (3)	<i>Betula</i>	<i>nigra</i>	7,5	Large	Semi-mature	Good	...	\$6,011.62
108	Planetree-London	<i>Platanus</i>	<i>x acerifolia</i>	17	Large	Semi-mature	Good	...	\$6,491.97
109	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	12	Medium	Semi-mature	Good	3	\$3,101.82
110	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	18	Large	Semi-mature	Good	...	\$6,979.09
111	Maple-Red	<i>Acer</i>	<i>rubrum</i>	6,4	Medium	Young	Good	...	\$1,280.12
112	Willow	<i>Salix</i>	sp.	9	Large	Semi-mature	Good	...	\$1,495.52
113	Tupelo-Black	<i>Nyssa</i>	<i>sylvatica</i>	11	Large	Semi-mature	Good	...	\$3,276.60
114	Magnolia (5)	<i>Magnolia</i>	sp.	6,5,4,4	Medium	Semi-mature	Good	...	\$10,016.29
115	Willow	<i>Salix</i>	sp.	15,15	Medium	Semi-mature	Fair	...	\$5,934.60
116	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	32	Large	Mature	Good	3	\$21,610.65
117	Oak-Willow	<i>Quercus</i>	<i>phellos</i>	30	Large	Mature	Good	3	\$23,540.58
118	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	25	Medium	Mature	Poor	3	\$5,769.75
119	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	35	Large	Mature	Fair	2	\$18,191.25

Tree ID	Common Name	Genus	Species	DBH	Height Class	Age Class	Condition Class	Tree Care Priority	Tree Asset Value
120	Willow-Babylon Weeping	<i>Salix</i>	<i>babylonica</i>	21	Medium	Mature	Good	...	\$9,499.32
121	Oak-Willow	<i>Quercus</i>	<i>phellos</i>	49	Large	Over-mature	Good	...	\$35,803.89
122	Oak-Willow (3)	<i>Quercus</i>	<i>phellos</i>	25	Large	Mature	Good	3	\$49,042.88
123	Birch-Gray	<i>Betula</i>	<i>populifolia</i>	18	Large	Semi-mature	Good	...	\$6,979.09
124	Crabapple	<i>Malus</i>	sp.	14,10,10,10	Medium	Mature	Fair	2	\$8,503.62
125	Sycamore-American	<i>Platanus</i>	<i>occidentalis</i>	50	Large	Over-mature	Good	2	\$44,082.95
126	Birch-Sweet	<i>Betula</i>	<i>lenta</i>	25	Large	Mature	Poor	2	\$6,017.02
127	Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>	39	Large	Mature	Fair	...	\$17,698.64
128	Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>	22	Large	Mature	Good	...	\$11,914.92
129	Oak-Willow	<i>Quercus</i>	<i>phellos</i>	18	Large	Semi-mature	Good	...	\$8,474.61
130	Tuliptree	<i>Liriodendron</i>	<i>tulipifera</i>	42	Large	Over-mature	Good	...	\$37,689.81
131	Tuliptree	<i>Liriodendron</i>	<i>tulipifera</i>	45	Large	Over-mature	Good	...	\$29,552.25
132	Oak-White	<i>Quercus</i>	<i>alba</i>	22	Large	Mature	Good	2	\$14,148.97
133	Pine-Japanese Red	<i>Pinus</i>	<i>densiflora</i>	22	Large	Semi-mature	Fair	...	\$8,829.81
134	Pine-Japanese Red	<i>Pinus</i>	<i>densiflora</i>	19	Large	Semi-mature	Poor	3	\$3,951.52
135	Maple-Sugar	<i>Acer</i>	<i>saccharum</i>	17	Large	Semi-mature	Fair	2	\$5,589.95
136	Birch-River	<i>Betula</i>	<i>nigra</i>	22	Large	Mature	Poor	1	\$5,617.03
137	Spruce-Colorado Blue	<i>Picea</i>	<i>pungens</i>	25	Small	Mature	Poor	...	\$5,769.75
138	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	53	Large	Over-mature	Good	2	\$50,294.00
139	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	19	Large	Semi-mature	Good	3	\$8,664.78
140	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	26	Large	Mature	Good	3	\$16,225.46
141	Oak-Pin	<i>Quercus</i>	<i>palustris</i>	34	Large	Mature	Poor	...	\$11,556.94
142	Oak-Northern Red	<i>Quercus</i>	<i>rubra</i>	37	Large	Mature	Poor	...	\$15,912.81
143	Pine-Austrian	<i>Pinus</i>	<i>nigra</i>	16	Large	Semi-mature	Poor	...	\$1,620.54
144	Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>	34	Large	Mature	Good	...	\$27,657.64
145	Sweetgum	<i>Liquidambar</i>	<i>styraciflua</i>	31	Large	Mature	Fair	2	\$11,829.84

APPENDIX



ADDITIONAL RESOURCES

Bartlett publishes a variety of tree-resource documents, including technical reports, plant health care recommendations, and service brochures. The following technical reports may be pertinent to your inventory. To access these documents and view the complete Bartlett Resource Library online, please follow this URL:

<https://www.bartlett.com/resourcelist.cfm>

Girdling Roots

Lightning Protection Systems

Maintenance Pruning Program

Monitor IPM Program

Mulch Application Guidelines

Tree Risk Assessments

Tree Structure Evaluation

GLOSSARY OF TERMS

air pollution removal: removal of pollutants from the air by plants through natural processes

arborist: 1. An individual engaged in the profession of arboriculture who, through experience, education and related training, possesses the competence to provide for, or supervise the management of, trees and other woody ornamentals. [ANSI A300 (Part 1, 2, 4, 5, 6)] 2. An individual engaged in the profession of arboriculture. [ANSI Z133.1-2000 Safety Requirements for Arboricultural Operations]

bracing: The installation of lag-thread screw or threaded-steel rods in limbs, leaders, or trunks to provide supplemental support. [ANSI A300 (Part 3)-2000 Support Systems]

branch: An outgrowing shoot, stem or twig that grows from the main stem or trunk. [ANSI Z60.1-2004 Nursery Stock]

buttress roots: Lateral surface roots that aid in stabilizing the tree.

cable: 1) Zinc coated strand per ASTM A-475 for dead-end grip applications. 2) Wire rope or strand for general applications. 3) Synthetic-fiber rope or synthetic-fiber webbing for general applications. [ANSI A300 (Part 3)-2000 Support Systems]

cabbling: The installation of a steel wire rope, steel strand, or synthetic-fiber system within a tree between limbs or leaders to limit movement and provide supplemental support. [ANSI A300 (Part 3)-2000 Support Systems]

canopy: collective branches and foliage of a tree or group of trees' crowns

carbon sequestration: removal of carbon from the air by plants through natural processes

carbon storage: storage of carbon removed from the air in plant tissues

cation exchange capacity(CEC): The ability of soil to absorb nutrients.

cavity: An open wound characterized by the presence of decay and resulting in a hollow.

cleaning: Selective pruning to remove one or more of the following parts: dead, diseased, and/ or broken branches (5.6.1). [ANSI A300 (Part 1)-2001 Pruning]

co-dominant branches: Equal in size and importance, usually associated with either the trunks, stems, or scaffold limbs.

conk: fruiting body or nonfruiting body of a fungus. Often associated with decay. critical root zone(CRZ): area of soil around a tree trunk where roots are located that provide

stability and uptake of water and minerals required for tree survival.

crown: 1. The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree. [ANSI A300 (Part 1)-2001 Pruning] [ANSI A300 (Part 6)-2005 Transplanting] 2. The portion of a tree comprising the branches. [ANSI Z60.1-2004 Nursery Stock]

D.B.H. [diameter at breast height]: Measurement of trunk diameter taken at 4.5 feet (1.4 m) off the ground. [ANSI A300 (Part 6)- 2005 Transplanting]

decay: The degradation of woody tissue caused by microorganisms. [ANSI A300 (Part 1)-2001 Pruning]

Geographic Information System (GIS): is any system for capturing, storing, analyzing and managing data and associated attributes which are spatially referenced to earth.

girdling root: A root that may impede proper development of other roots, trunk flare, and/or trunk. [ANSI A300 (Part 6)-2005 Transplanting]

Global Positioning System (GPS): A constellation of at least 24 Medium Earth Orbit satellites that transmit precise microwave signals, the system enables a GPS receiver to determine its location, speed, direction, and time.

Global Positioning System receiver (GPSr): A receiver that receives its input from GPS satellites to determine location, speed, direction, and time.

heading: cutting a shoot back to a bud or cutting branches back to buds, stubs, or lateral branches not large enough to assume apical dominance. Cutting an older branch or stem back to meet a structural objective

integrated pest management (IPM): A pest control strategy that uses an array of complementary methods: mechanical devices, physical devices, genetic, biological, legal, cultural management, and chemical management. These methods are done in three stages of prevention, Observation, and finally Intervention. It is an ecological approach that has its main goal is to significantly reduce or eliminate the use of pesticides.

lateral branch: A shoot or stem growing from a parent branch or stem. [ANSI A300 (Part 1)- 2001 Pruning]

leader: A dominant or co-dominant, upright stem. [ANSI A300 (Part 1)-2001 Pruning]

lean: Departure from vertical of the stem, beginning at or near the base of the trunk.

limb: A large, prominent branch. [ANSI A300 (Part 1)-2001 Pruning] lion's tailing: The removal of an excessive number of inner, lateral branches from parent branches. Lion's tailing is not an acceptable pruning practice (5.5.7). [ANSI A300 (Part 1)- 2001 Pruning]

macronutrient: Nutrient required in relatively large amounts by plants, such as nitrogen (N), phosphorus (P), potassium (K), and sulfur (S). [ANSI A300 (Part 2)-2004 Fertilization]

micronutrient: Nutrient required in relatively small amounts by plants, such as iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), and boron (B). [ANSI A300 (Part 2)-2004 Fertilization]

noise attenuation: reducing sound levels via materials, structures, plants, etc.

nutrient: Element or compound required for growth, reproduction or development of a plant. [ANSI A300 (Part 2)-2004 Fertilization]

organic matter: material derived from the growth (and death) of living organisms. The organic components of soil.

parent branch or stem: A tree trunk, limb, or prominent branch from which shoots or stems grow. [ANSI A300 (Part 1)-2001 Pruning]

pH: unit of measurement that describes the alkalinity or acidity of a solution. Measured on a scale of 0 to 14. Greater than 7 is alkaline, less than 7 is acid, and 7 is neutral (pure water).

pruning: The selective removal of plant parts to meet specific goals and objectives. [ANSI A300 (Part 1)-2001 Pruning]

qualified arborist: An individual who, by possession of a recognized degree, certification, or professional standing, or through related training and on-the-job experience, is familiar with the equipment and hazards involved in arboricultural operations and who has demonstrated ability in the performance of the special techniques involved. [ANSI Z133.1-2000 Safety Requirements for Arboricultural Operations]

raising: Selective pruning to provide vertical clearance (5.6.3). [ANSI A300 (Part 1)-2001 Pruning]

reduction: Selective pruning to decrease height and/or spread (5.6.4). [ANSI A300 (Part 1)-2001 Pruning]

risk assessment: process of evaluating what unexpected things could happen, how likely it is, and what the likely outcomes are. In tree management, the systematic process to determine the level of risk posed by a tree, tree part, or group of trees.

root collar: 1. The transition zone between the trunk and the root system. [ANSI A300 (Part 6)-2005 Transplanting] 2. See COLLAR. [ANSI Z60.1-2004 Nursery Stock]

root flare or trunk flare: The area at the base of the plant's stem or trunk where the stem

or trunk broadens to form roots; the area of transition between the root system and the stem or trunk. [ANSI Z60.1-2004 Nursery Stock] [ANSI A300 (Part 6)-2005 Transplanting]

root zone: The volume of soil containing the roots of a plant. [ANSI A300 (Part 5)-2005

secondary nutrient: Nutrient required in moderate amounts by plants, such as calcium (Ca) and magnesium (Mg). [ANSI A300 (Part 2)-2004 Fertilization]

seam: Vertical line that appears where two edges of wound wood or callus ridge meet.

soil amendment: Any material added to soil to alter its composition and structure, such as sand, fertilizer, or organic matter. [ANSI A300 (Part 6)-2005 Transplanting]

soil pH: A measure of the acidity or alkalinity of the soil.

stormwater runoff: water (generally from rain or snow melt) that flows over the ground after storm events.

structural support system: hardware installed in tree, may be; cables, braces, or guys, to provide supplemental support.

sweep: Departure from vertical of the stem, beginning above the base of the trunk.

thinning: Selective pruning to reduce density of live branches (5.6.2). [ANSI A300 (Part 1)-2001 Pruning]

tree risk assessment: Closer inspection of visibly damaged, dead, defected, diseased, leaning or dying tree to determine management needs.

topping: The reduction of a tree's size using heading cuts that shorten limbs or branches back to a predetermined crown limit. Topping is not acceptable pruning practice. (5.5.7). [ANSI A300 (Part 1)-2001 Pruning]

tree inventory: A comprehensive list of individual trees providing descriptive information on all or a portion of the project area. [ANSI A300 (Part 5)-2005 Management during site planning, site development, and construction]

tree protection zone: A space above and belowground within which trees are to be retained and protected. [ANSI A300 (Part 5)-2005 Management during site planning, site development, and construction]

trunk: That portion of a stem or stems of a tree before branching occurs. [ANSI Z60.1-2004 Nursery Stock]

vigor : Overall health. Capacity to grow and resist stress. [ISA Municipal Specialist Certification Study Guide 2008]

wound: An opening that is created when the bark of a living branch or stem is penetrated, cut, or removed. [ANSI A300 (Part 1)-2001 Pruning]