

# Aiken Corporation of SC Tree Inventory and Management Plan | 2023

Submitted by:  
Bartlett Tree Experts

**Jacklyn Wildey, Field Consulting Arborist**  
ISA Arborist #FL9216A, Tree Risk Assessment Qualified

**Robert Longe, Arborist Representative**  
ISA Board Certified Master Arborist #5158B, Tree Risk Assessment Qualified



**Bartlett Tree Experts**  
Augusta Office  
1810-A Wylds Rd.  
Augusta, Georgia 30909  
706-854-0926 [www.bartlett.com](http://www.bartlett.com)

## TABLE OF CONTENTS

MAKING THE MOST OF YOUR INVENTORY MANAGEMENT PLAN .....	1
Who's Who.....	1
Subject Trees.....	2
Definitions & Bolded Terms.....	2
How This Document is Organized.....	2
EXECUTIVE SUMMARY .....	4
INTRODUCTION .....	6
GOALS & OBJECTIVES .....	6
GOALS & OBJECTIVES TABLE.....	7
DATA COLLECTION & TREE INSPECTION METHODOLOGY .....	7
Data Collection Equipment & Attribute Data.....	7
Specifications/Definitions.....	8
Age Class .....	8
Height Class.....	9
Condition Class .....	9
Tree & Shrub Work Phase .....	9
Pruning Category.....	10
Tree Risk Assessments, Limitations & Glossary.....	10
Limitations of Tree Risk Assessments.....	11
Glossary .....	11
ISA RISK TABLE 1 .....	11
ISA RISK TABLE 2 .....	12
TREE RISK ASSESSMENTS AND MITIGATION.....	15
Tree Risk Assessments and Mitigation.....	16
TREE RISK MAP.....	23
ADVANCED ASSESSMENT MAP .....	24
STAND DYNAMICS RESULTS .....	26
Stand Dynamics .....	27
Tree Species Identified .....	27
SPECIES BREAKDOWN TABLE .....	27
Condition Class.....	28
CONDITION CLASS TABLE.....	28

CONDITION CLASS MAP .....	29
Age Class .....	30
AGE CLASS TABLE .....	30
Tree Size (DBH) .....	31
Estimated Tree Asset Value .....	32
TOP TEN HIGHEST ESTIMATED VALUE TREES TABLE .....	32
TOP TEN HIGHEST ESTIMATED VALUE TREES MAP .....	33
RECOMMENDATIONS .....	35
Soil Care .....	36
Soil Sampling .....	36
Bulk Density .....	36
Soil Rx® .....	36
Root Invigoration™ .....	37
Mulch Application .....	37
Girdling Roots .....	39
Plant Health Care .....	40
Tree Pruning .....	41
Improper Pruning Practices .....	41
Pruning with a Goal .....	43
Pruning Category .....	45
Risk Mitigation Pruning .....	45
Maintenance Pruning .....	45
Developmental Pruning .....	45
Ornamental Pruning .....	45
Specialized Pruning .....	46
Structural Support Systems .....	47
Cabling .....	47
Bracing .....	47
Guying .....	47
Propping .....	47
STRUCTURAL SUPPORT TABLE .....	49
Lightning Protection Systems .....	50
Tree Removal .....	51
TREE REMOVAL TABLE .....	52

TREE REMOVAL MAP .....	53
ENTIRE INVENTORY .....	54
ENTIRE INVENTORY TABLE .....	55
ADDITIONAL RESOURCES.....	57
GLOSSARY OF TERMS .....	58

## Aiken Corporation of SC 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 Aiken Corporation of SC 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 Consulting team. They are also employees of Bartlett Tree Experts. The Bartlett Consulting team is overseen by 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 Consulting 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:

#### **Consulting Advisor**

##### **Maryellen Bell, Consulting Advisor**

ASCA Registered Consulting Arborist #703, ISA Board Certified Master Arborist #WE-5643A, ISA Tree Risk Assessment Qualified

#### **Data Collection**

##### **John Colavecchio, Consulting Arborist**

ASCA Registered Consulting Arborist #649, ISA Board Certified Master Arborist #NE-1070B, ISA Tree Risk Assessment Qualified

## Subject Trees

In this document, the term "subject trees" refers (depending on context) to some or all of the 23 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
- **Tree Risk Assessment and Mitigation**
  - Summary of *overall tree risk ratings* assigned during the inventory with corresponding table and map displays with figures if applicable
  - Summary of *Level 3 Advanced assessments* recommended during the inventory (summarized in the *overall tree risk ratings* table) with a map display and figures if applicable
- **Stand Dynamics Results**
  - Summary information for the entire tree population inventoried

- **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 October 2023, the Bartlett Consulting (BC) Team from Bartlett Tree Experts conducted an inventory of trees on the Aiken Corporation of South Carolina site located at 141 Newberry St NW. We identified 23 trees which included 6 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 are based on the number of desired management cycles. 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 23 trees (100%) 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.

### ***Level 3 Advanced Assessment***

Provide *Level 3 Advanced assessments* for 6 trees (26%) to evaluate the impact of wood decay that shows potential for failure.

### **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.

### **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, or composted leaves. To avoid potential disease problems mulch should not be placed directly against the trunk.

### **Root Collar Excavations**

At the time of inventory, no trees were recommended for **root collar** excavation. However, we recommend using proper mulching techniques to reduce the risk of **girdling roots**, basal cankers, root or lower-stem decay, and insect or disease pest infestation.



### **Plant Health Care (PHC)**

At the time of inventory, no pests or diseases were observed on the subject trees. However, we recommend implementing Bartlett's PHC program to monitor pests and disease that may not have been visible at the time of inventory. Treatments are therapeutic and preventative, and treatment timing is based on pest life cycle.

### **Pruning**

Prune 17 trees (74%) 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 3 trees (13%) 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**

At the time of inventory, no trees were recommended for lightning protection systems. However, as trees continue to grow and site changes occur, we recommend continual consultation with your local Bartlett Arborist Representative to determine if lightning protection systems are warranted in the future.

### **Removals**

Remove 6 trees (26%) due to condition or because of their location in relation to other trees to try and prevent competition or damage to infrastructure.

## INTRODUCTION

In October 2023, Aiken Corporation of SC retained Bartlett Tree Experts to perform an inventory of trees on Aiken Corporation of SC's 141 Newberry St. NW, Aiken, South Carolina site. Team members Jacklyn Wildey and John Colavecchio visited the site on October 3, 2023 to conduct the inventory.

The inventory included:

- identifying trees and assigning a Tree ID number (Tree ID numbers ranging from 1 to 23);
- identifying the trees' condition, health, and vigor;
- recommending risk evaluations and removals of appropriate trees;
- recommending tree care, soil care, 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
<b>Establish the tree inventory (per numbers agreed) on the Aiken Corporation of SC 141 Newberry St NW site.</b>	<ul style="list-style-type: none"> <li>• Using Trimble® DA2 hardware, the Trimble® TerraFlex application, and ArborScope™ Inventory Management Tools, collect data such as tree name, location, size, age class, and condition class</li> <li>• Assign a Tree ID number to each tree inventoried.</li> </ul>
<b>Provide mechanism for managing inventory, recommendations, and related budget planning.</b>	<ul style="list-style-type: none"> <li>• Provide map or maps of the inventoried trees to assist the client in managing property areas.</li> <li>• Submit a comprehensive management plan that documents and organizes findings and provides other resources to assist the client in efficient use of the information.</li> </ul>
<b>Maximize client understanding and implementation of management plan.</b>	<ul style="list-style-type: none"> <li>• Include in management plan specific explanations and visuals related to plan recommendations.</li> <li>• Provide appended resources that address health, procedures, and standards related to tree care.</li> <li>• Make periodic contact with client to follow up and answer any questions about the management plan's contents.</li> </ul>
<b>Maximize immediate and long-term tree health and aesthetics.</b>	Implement recommended plant-health-care program that uses <ul style="list-style-type: none"> <li>• integrated pest management</li> <li>• soil care</li> <li>• maintenance pruning</li> </ul>
<b>Manage immediate and long-term risk associated with trees in high-use areas.</b>	Implement recommended risk-management measures that include <ul style="list-style-type: none"> <li>• risk-reduction pruning</li> <li>• required removals</li> <li>• tree structure evaluations</li> </ul>

## 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 Consulting Team Using Trimble® DA2 hardware, the Trimble® TerraFlex application, and ArborScope™ Inventory Management Tools, collect data such as tree name, location, size, age class, and condition class, 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 *Level 2 Basic assessment* for 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 tree risk rating*
- Tree & Shrub Work phase (based on number of desired management cycles)
- pruning category
- need for and inspection of existing structural support systems
- need for and inspection of existing lightning protection systems
- need for *Level 3 Advanced assessment* for tree risk
- tree removals
- soil care recommendations
- plant health care recommendations
- noted defects/observations
- observed pests/diseases

## Specifications/Definitions

### Age Class

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

## Height Class

<b>Small</b>	Less than 15 feet
<b>Medium</b>	15 to 40 feet
<b>Large</b>	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 & Shrub Work Phase

Tree & Shrub Work phase takes into consideration tree species, condition, location, age, and proximity to infrastructure. We intend for this rating system to assist decision makers in prioritizing risk mitigation, tree pruning, cabling and bracing, and tree lightning protection recommendations. *Trees with an ASAP and an overall tree 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.

Phase 1, 2, 3, 4, and 5 are all based on observations by the inventory arborist according to the manager's goals. The following additional information clarifies each priority:

**ASAP** Trees with recommendations that should be addressed As Soon As Possible.

**Phase 1** Typically addressed in the first management cycle. Trees located in high-use sites, have a high aesthetic value, have an elevated *overall tree risk rating*, and/or parts that are currently in conflict with infrastructure.

**Phase 2** Typically addressed in the second management cycle. Trees with moderate aesthetic value, don't have an elevated *overall tree risk rating*, and/or parts that are anticipated to be in conflict with infrastructure.

**Phase 3** Typically addressed in the third management cycle. Tree parts that are anticipated to be in conflict with infrastructure and/or recommendations based on anticipated growth.

**Phase 4** Typically addressed in the fourth management cycle. Recommendations are for future consideration and anticipated growth.

**Phase 5** Typically addressed in the fifth management cycle. Recommendations are for future consideration and anticipated growth.

## Pruning Category

All trees identified in this management plan that have tree care recommendations are listed within a specific pruning category. Trees within each pruning category can be prioritized by the specific goals of the manager. It is recommended that specific goals be discussed prior to any pruning.

<b>Risk Mitigation</b>	This goal requires pruning of any tree where risk mitigation should take precedence over other pruning goals. Typically aims to reduce the <i>overall tree risk rating</i> by branch removal and/or branch reduction.
<b>Maintenance</b>	This goal typically requires routine pruning of large/mature trees. Includes branch removal and/or branch reduction to help reduce <i>likelihood of failure</i> and/or conflict with infrastructure. Trees with this goal are typically climbed or require the use of aerial lifts and/or other specialized equipment.
<b>Developmental</b>	This goal typically requires routine pruning of small/young trees. Includes structural pruning to develop a strong central stem, establish proper branch spacing, and/or develop branch structure.
<b>Ornamental</b>	This goal typically requires pruning of small trees. Includes reduction and/or shearing to its desired shape, size, and/or structure.
<b>Specialized</b>	Trees with this goal require a unique treatment that may include, but not limited to, targeted pruning cuts, removal of nuisance fruit/parasitic plants, and/or rejuvenation/internodal pruning.

\* The listed descriptions of goals, tools, and/or techniques are not limited to these definitions. Specific individual goals and species profiles should guide the pruning recommendations.

## 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 tree 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.

In the event that Bartlett Tree Experts observes an immediate safety issue with a tree with any such device attached, such as the presence of a dead, dying, or broken limb that could fall and injure a person or damage property, Bartlett Tree Experts may make a recommendation to remove or prune such a limb or otherwise mitigate the obvious safety issue. However, the Client should not infer that following such a recommendation and mitigating the immediate safety issue makes the tree in question safe for the use of the attached device or feature.

# TREE RISK ASSESSMENTS AND MITIGATION



## TREE RISK ASSESSMENTS AND MITIGATION

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

- **Subject Trees Summarized According to:**
  - Tree Risk Assessment Results and Mitigation Recommendations
  - *Level 3 Advanced Assessment* Recommendations

## Tree Risk Assessments and Mitigation

As part of the inventory process, the Inventory Team conducts a *Level 2 Basic assessment* from the ground. While every tree poses a risk, typically low, any trees that were found to have conditions 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 Tree Risk Ratings* are then assigned to these trees.

During the *Level 2 Basic assessment* the Regional Inventory Arborist can determine whether some aspect of tree structure or health indicates that a more comprehensive tree structure evaluation, called a *Level 3 Advanced assessment*, is needed to more thoroughly evaluate tree condition and *likelihood of failure*.



**Decay on pecan #2 necessitates a *Level 3 Advanced assessment* to thoroughly assess risk of failure.**

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), resistance-recording drilling, 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 those *Level 3 Advanced assessments* are completed, more specific recommendations can be made, such as remediation, maintenance, or removal.

The Tree Risk Table below summarizes the inventoried trees that were observed posing a hazardous situation during the course of the inventory, including those trees recommended for *Level 3 Advanced assessments*. The table is organized first by *Overall Tree Risk Rating* (highest to lowest), then by Tree & Shrub Work Phase (ascending order), and finally by Tree ID (ascending order).

**TREE RISK ASSESSMENTS AND MITIGATION (23 Trees)**

<b>Tree ID</b>	<b>Common Name</b>	<b>DBH</b>	<b>Condition</b>	<b>Overall Tree Risk Rating</b>	<b>Primary Target</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Recommendation</b>	<b>Defect(s) or Observation(s)</b>
1	Hackberry-Southern	11	Poor	Low	Sidewalk	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Decay-stem</li> <li>• Poor branch structure</li> <li>• Topping/heading cuts</li> </ul>
2 *	Pecan	34	Fair	Low	Street	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• <i>Level 3 Advanced Assessment: Root</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> </ul>	<ul style="list-style-type: none"> <li>• Dead branches &gt;2</li> <li>• Decay-root flare</li> <li>• Overextended branch</li> </ul>
3	Pecan	27	Poor	Low	Building	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Dead branches &gt;2</li> <li>• Decay-stem</li> <li>• Hanger</li> <li>• Poor branch structure</li> </ul>
4	Cherry Laurel-Carolina	6	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Decay-stem</li> <li>• Poor branch structure</li> </ul>
5	Pecan	10	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> </ul>	<ul style="list-style-type: none"> <li>• Low live crown ratio</li> </ul>
6	Tree of Heaven	7	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Corrected lean</li> <li>• Poor branch structure</li> </ul>

<b>Tree ID</b>	<b>Common Name</b>	<b>DBH</b>	<b>Condition</b>	<b>Overall Tree Risk Rating</b>	<b>Primary Target</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Recommendation</b>	<b>Defect(s) or Observation(s)</b>
7 *	Pecan	26	Fair	Low	Parking	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Crown</i></li> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> <li>• Cable: New 1</li> </ul>	<ul style="list-style-type: none"> <li>• Burl</li> <li>• Co-dominant stems</li> <li>• Dead branches &gt;2</li> <li>• Hanger</li> </ul>
8	Hackberry-Southern	19,12	Fair	Low	Parking	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-branch</li> <li>• Co-dominant stems</li> <li>• Dead branches &gt;2</li> <li>• Poor branch structure</li> </ul>
9	Pecan	11	Fair	Low	Infrastructure	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Clearance</li> </ul>	<ul style="list-style-type: none"> <li>• Co-dominant stems</li> <li>• Topping/heading cuts</li> <li>• Uneven crown</li> </ul>
10	Hackberry-Southern	11	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-stem</li> <li>• Uneven crown</li> </ul>

<b>Tree ID</b>	<b>Common Name</b>	<b>DBH</b>	<b>Condition</b>	<b>Overall Tree Risk Rating</b>	<b>Primary Target</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Recommendation</b>	<b>Defect(s) or Observation(s)</b>
11 *	Pecan	30,29	Fair	Low	Building	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Crown</i></li> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> <li>• Cable: New 4</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-suspected</li> <li>• Co-dominant stems</li> <li>• Hanger</li> </ul>
12	Hackberry-Southern	16	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Co-dominant stems</li> <li>• Poor branch structure</li> <li>• Uneven crown</li> </ul>
13	Cherry Laurel-Carolina	9	Fair	Low	Other	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> </ul>	<ul style="list-style-type: none"> <li>• Poor branch structure</li> <li>• Suppressed</li> </ul>
14	Hackberry-Southern	17	Good	Low	Other	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Poor branch structure</li> </ul>
15	Hackberry-Southern	9	Poor	Low	Other	1	<ul style="list-style-type: none"> <li>• Removal</li> </ul>	<ul style="list-style-type: none"> <li>• Dead branches &gt;2</li> <li>• Poor branch structure</li> <li>• Uneven crown</li> </ul>



<b>Tree ID</b>	<b>Common Name</b>	<b>DBH</b>	<b>Condition</b>	<b>Overall Tree Risk Rating</b>	<b>Primary Target</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Recommendation</b>	<b>Defect(s) or Observation(s)</b>
16 *	Pecan	31	Fair	Low	Building	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> <li>• Cable: New 1</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-stem</li> <li>• Co-dominant stems</li> <li>• Dead branches &gt;2</li> <li>• Poor branch structure</li> </ul>
17 *	Pecan	18,17	Fair	Low	Building	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Burl</li> <li>• Cavity-stem</li> <li>• Co-dominant stems</li> </ul>
18 *	Pecan	32	Fair	Low	Potential Building	1	<ul style="list-style-type: none"> <li>• <i>Level 3 Advanced Assessment: Crown</i></li> <li>• <i>Level 3 Advanced Assessment: Stem</i></li> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-stem</li> <li>• Co-dominant stems</li> <li>• Dead/dying stem</li> </ul>
19	Hackberry-Southern	18	Fair	Low	Potential Building	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Co-dominant stems</li> <li>• Included bark</li> <li>• Poor branch structure</li> </ul>

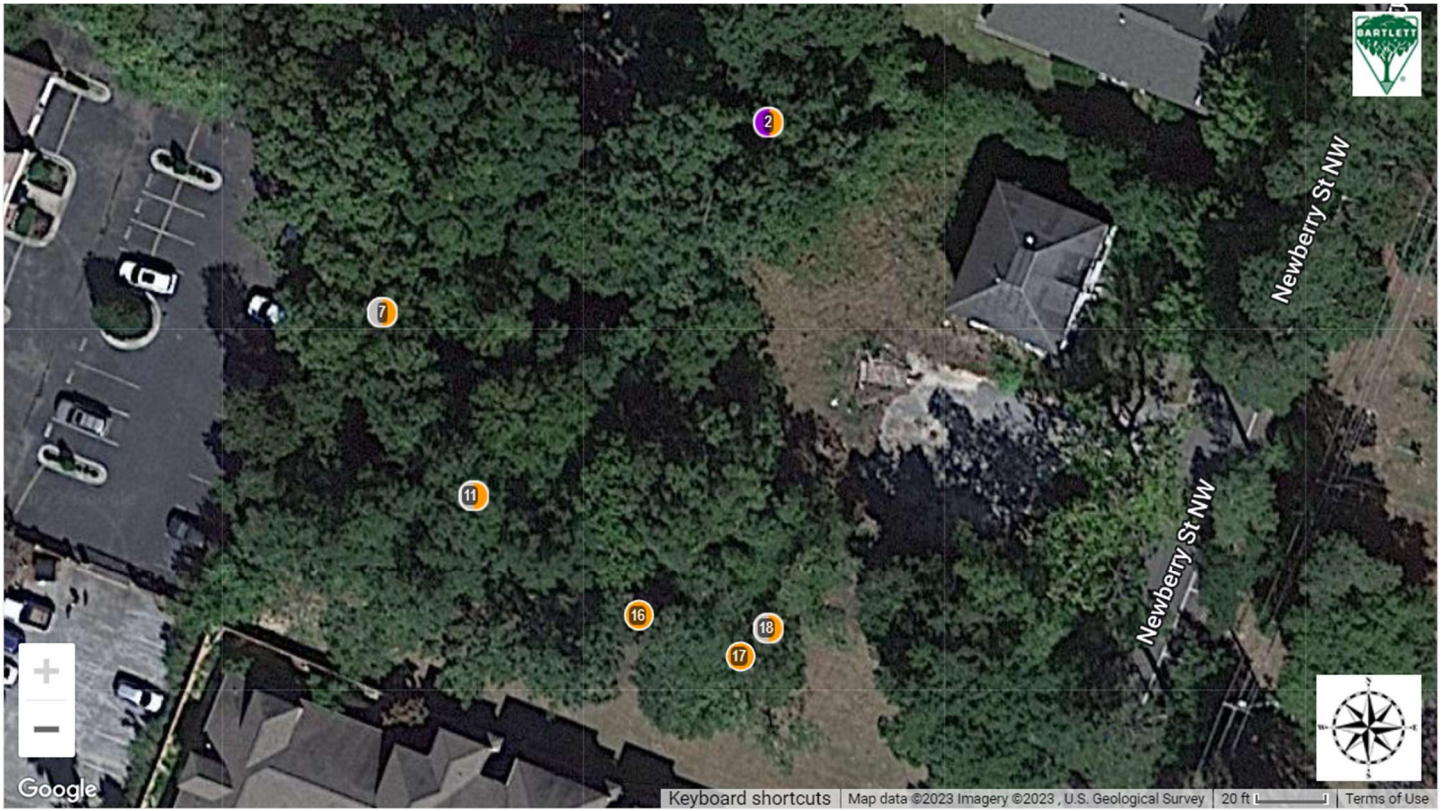
Tree ID	Common Name	DBH	Condition	Overall Tree Risk Rating	Primary Target	Tree & Shrub Work Phase	Recommendation	Defect(s) or Observation(s)
20	Pecan	23	Fair	Low	Potential Building	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Hanger</li> <li>• Included bark</li> <li>• Overextended branch</li> </ul>
21	Crapemyrtle	11,6,4	Fair	Low	Potential Building	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Co-dominant stems</li> </ul>
22	Hackberry-Southern	16	Fair	Low	Potential Building	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Poor branch structure</li> <li>• Uneven crown</li> </ul>
23	Oak-Water	37	Fair	Low	Sidewalk	1	<ul style="list-style-type: none"> <li>• Prune: Reduce risk of branch stem and/or root failure</li> <li>• Prune: Reduce weight of branch ends</li> </ul>	<ul style="list-style-type: none"> <li>• Cavity-branch</li> <li>• Dead branches &gt;2</li> <li>• Overextended branch</li> <li>• Poor branch structure</li> </ul>

\*Tree has a Mitigation Recommendation and a *Level 3 Advanced Assessment* Recommendation. Outcome of the *Level 3 Advanced assessment* will guide the final recommendations.

**INVENTORIED TREES ASSIGNED *OVERALL TREE RISK RATINGS* AT THE TIME OF DATA COLLECTION**



## INVENTORIED TREES RECOMMENDED FOR *LEVEL 3 ADVANCED ASSESSMENTS*



**Advanced Assessments:** ● Stem ● Roots, Stem ● Crown, Stem

## 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:

- **Subject Trees Summarized According to:**
  - Tree Species Identified
  - Condition Class
  - Age Class
  - Tree Size per DBH
  - Estimated Tree Asset Value

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

## Stand Dynamics

### Tree Species Identified

Our inventory revealed 6 species of trees, as detailed in the following table:

#### TREE SPECIES IDENTIFIED

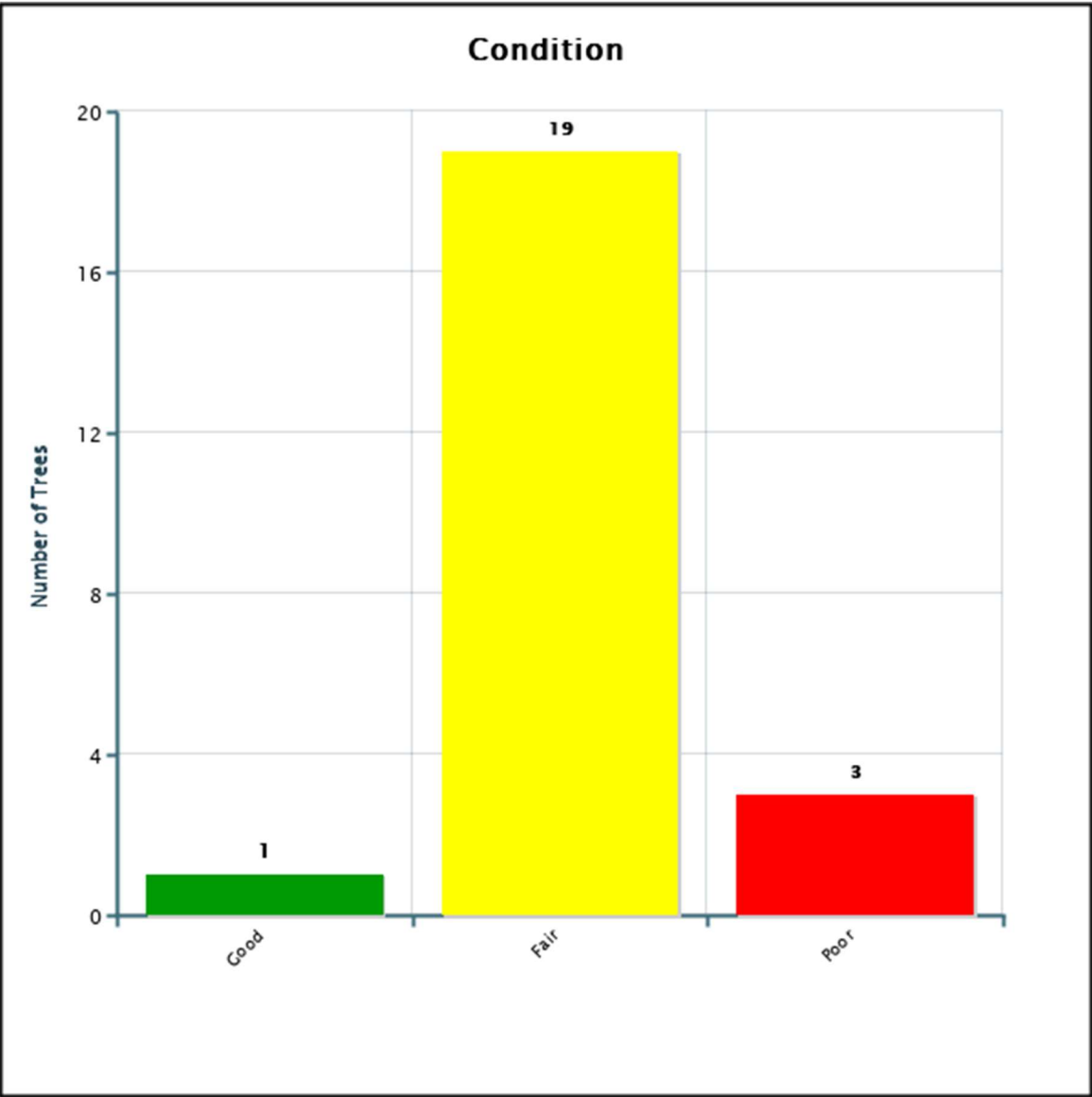
Genus	Species	Common Name	Count	% Distribution Total
<i>Ailanthus</i>	<i>altissima</i>	Tree of Heaven	1	4%
<i>Carya</i>	<i>illinoensis</i>	Pecan	10	43%
<i>Celtis</i>	<i>laevigata</i>	Hackberry-Southern	8	35%
<i>Lagerstroemia</i>	sp.	Crapemyrtle	1	4%
<i>Prunus</i>	<i>caroliniana</i>	Cherry Laurel-Carolina	2	9%
<i>Quercus</i>	<i>nigra</i>	Oak-Water	1	4%
<b>Grand Total</b>			<b>23</b>	<b>100%</b>

**Condition Class**

The breakdown of tree condition follows:

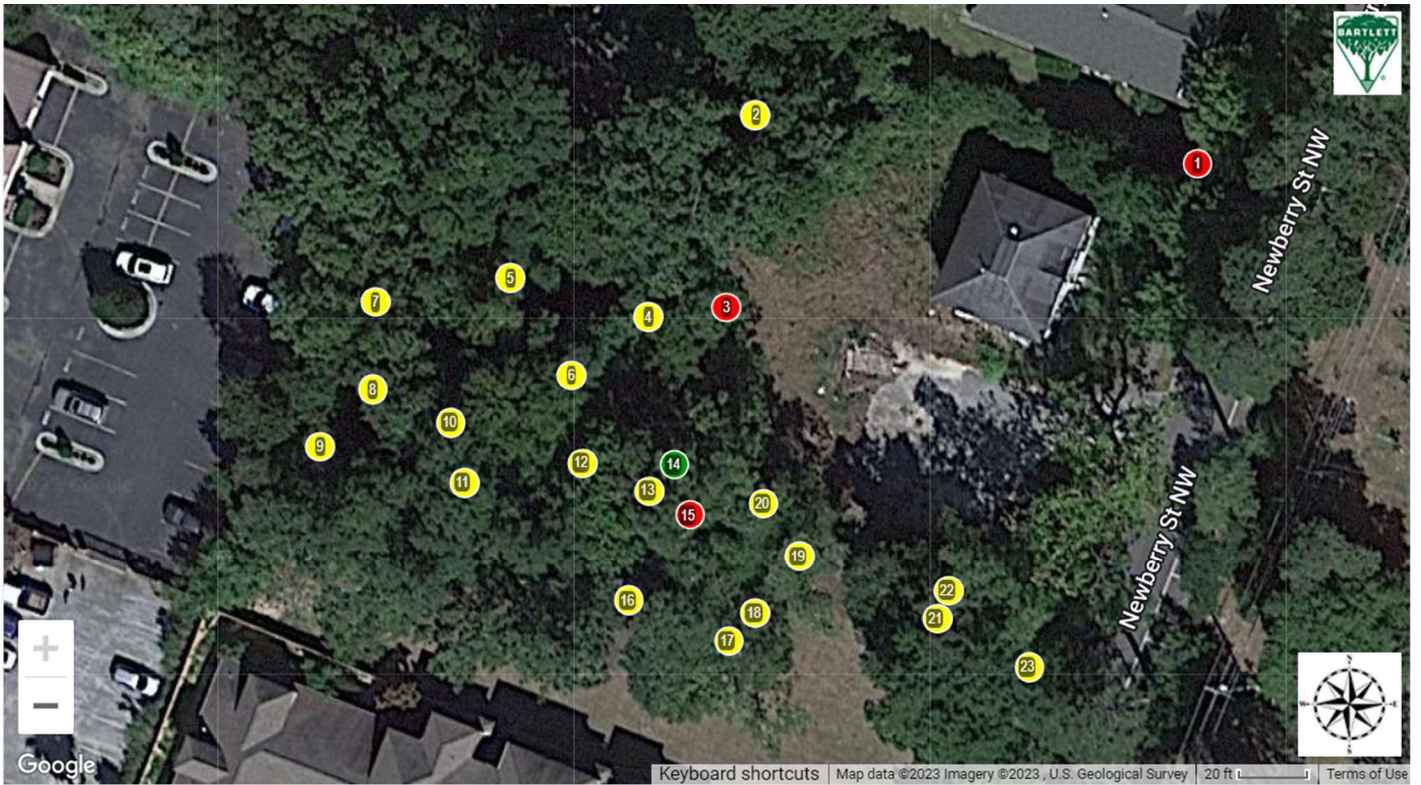
**CONDITION CLASS BREAKDOWN**

Condition Class	Quantity	% of Total
Good	1	4%
Fair	19	83%
Poor	3	13%





## INVENTORIED TREES BY CONDITION CLASS



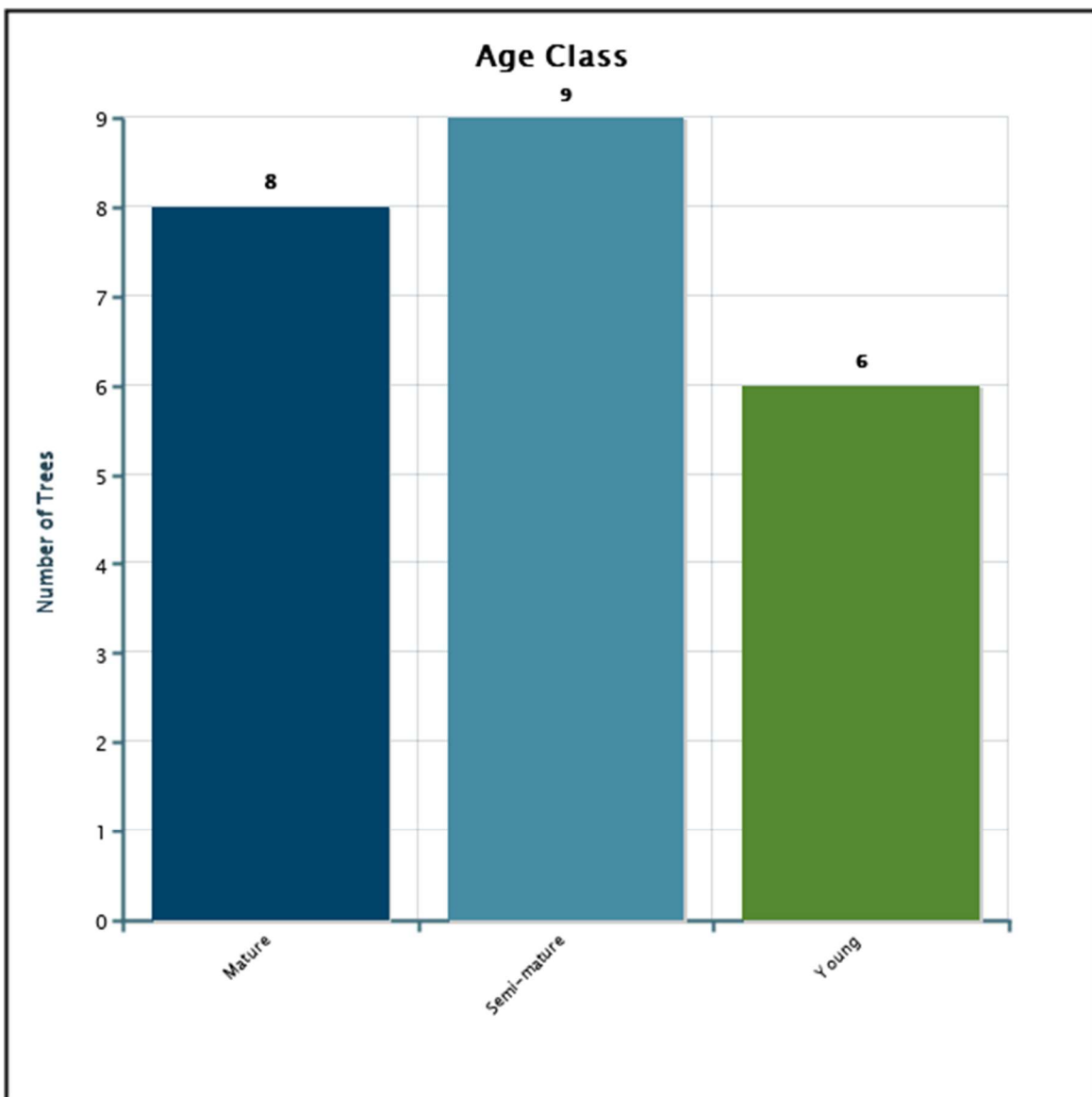
**Condition:** ● Fair ● Good ● Poor

## Age Class

The breakdown of tree age class follows:

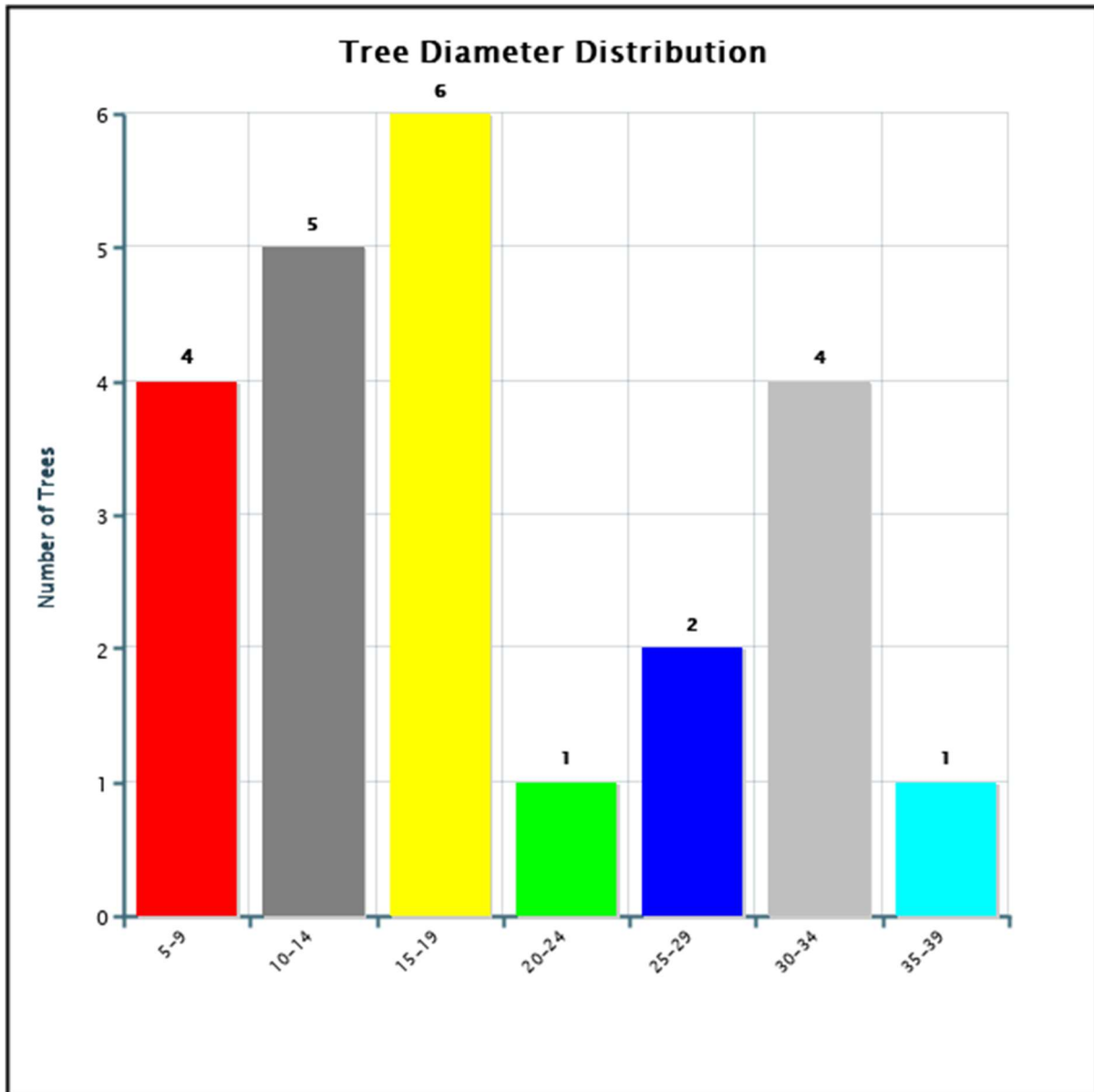
### AGE CLASS BREAKDOWN

Age Class	Quantity	% of Total
Mature	8	35%
Semi-mature	9	39%
Young	6	26%



## 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
<b>Average Per Square Inch Nursery Price</b>	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
<b>Size</b>	Based on tree DBH (4.5 feet above grade)
<b>Species Factor</b>	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.
<b>Condition Factor</b>	Rating of the tree's structure and health based on 100%
<b>Location Factor</b>	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 **\$184,163.70**. 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
11	Pecan	<i>Carya</i>	<i>illinoensis</i>	30,29	\$29,465.00
23	Oak-Water	<i>Quercus</i>	<i>nigra</i>	37	\$21,958.00
2	Pecan	<i>Carya</i>	<i>illinoensis</i>	34	\$19,014.00
18	Pecan	<i>Carya</i>	<i>illinoensis</i>	32	\$16,979.00
16	Pecan	<i>Carya</i>	<i>illinoensis</i>	31	\$15,940.00
7	Pecan	<i>Carya</i>	<i>illinoensis</i>	26	\$11,441.00
17	Pecan	<i>Carya</i>	<i>illinoensis</i>	18,17	\$10,374.00
20	Pecan	<i>Carya</i>	<i>illinoensis</i>	23	\$8,953.00
8	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	19,12	\$8,546.00
3	Pecan	<i>Carya</i>	<i>illinoensis</i>	27	\$7,402.00

### TOP TEN TREES - HIGHEST TREE ASSET 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
- Root Collar Excavation
- Plant Health Care
- Tree Pruning
- Structural Support Systems
- Lightning Protection Systems
- Tree Removal

## **Soil Care**

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 treatments should be applied as soon as possible, therefore they do not have a Tree & Shrub Work phase.

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 soil amendment 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, applying soil amendments (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.

## **Mulch Application**

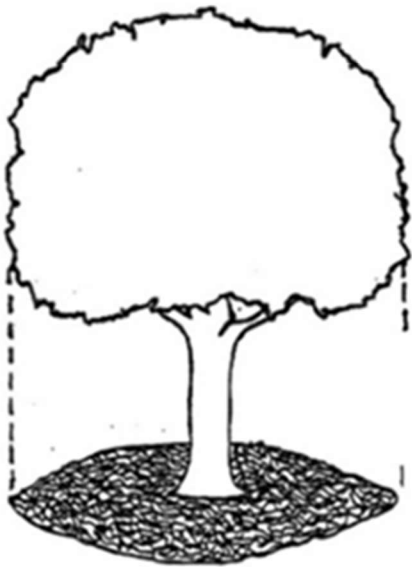
Proper mulching (top left and bottom left) provides many benefits to trees and shrubs. It moderates soil temperatures, reduces soil moisture loss, reduces soil compaction, provides nutrients, and improves soil structure. This practice results in more root growth and healthier plants. The image on the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

At the time of inventory, no trees were directly recommended for soil care. However, we recommend soil sampling across maintained areas with prominent landscape plantings to identify opportunities to optimize soil conditions moving forward.

## 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 of roots will significantly impact the condition or stability 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.

At the time of inventory, no trees were recommended for root collar excavation. However, we recommend using proper mulching techniques to reduce the risk of girdling roots, basal cankers, root or lower-stem decay, and insect or disease pest infestation.

## 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. Plant Health Care treatments should be applied as soon as possible, therefore they do not have a Tree & Shrub Work phase. 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

At the time of inventory, no pests or diseases were observed on the subject trees. However, we recommend implementing Bartlett's PHC program to monitor pests and disease that may not have been visible at the time of inventory. Treatments are therapeutic and preventative, and treatment timing is based on pest life cycle.

## 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.**

## Pruning with a Goal

Below are illustrations of common pruning goals:



Illustration of improving airflow to reduce disease.



Illustration of branch weight reduction.

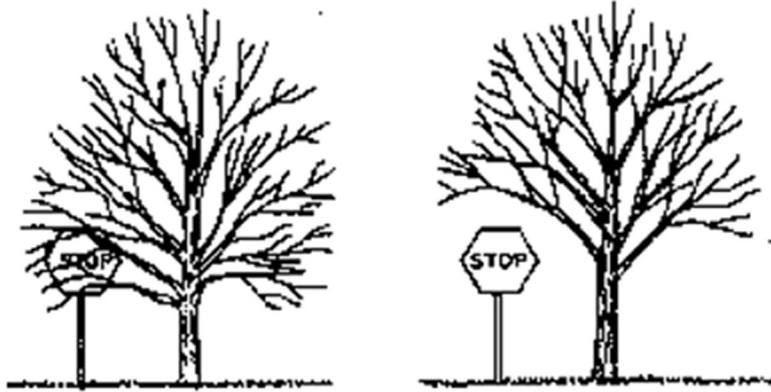


Illustration of raising branch elevation to improve clearance.

Without Development of Central Leader				
	At Planting	2-4 Years	5-7 Years	8-10 Years
With Development of Central Leader				

Illustration of promoting a strong central leader.



## **Pruning Category**

All trees identified in this management plan that have pruning recommendations are listed with a specific pruning category. The listed order of these pruning categories are typical to most managers. Trees within each category are prioritized by the specific goals of most managers. It is recommended that specific goals be discussed with your local Bartlett Arborist Representative. Pruning categories are separated into individual tables below where each table lists specific arboricultural pruning goals and recommendations for each tree.

## **Risk Mitigation Pruning**

Any tree identified with a Risk Mitigation Pruning category to reduce the *Overall Tree Risk Rating*, was previously summarized in the Tree Risk Assessments and Mitigation section earlier in the document.

## **Maintenance Pruning**

This goal typically requires routine pruning of large/mature trees. Includes branch removal and/or branch reduction to help reduce *likelihood of failure* and/or conflict with infrastructure. Trees with these goals are typically climbed or require the use of aerial lifts and/or other specialized equipment.

At the time of inventory, no trees were recommended for maintenance pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the area.

## **Developmental Pruning**

This goal typically requires routine pruning of small/young trees. Includes structural pruning to develop a strong central stem, establish proper branch spacing, and/or develop branch structure.

At the time of inventory, no trees were recommended for developmental pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the area.

## **Ornamental Pruning**

This goal typically requires pruning of small trees. Includes reduction and/or shearing to its desired shape, size, and/or structure.

At the time of inventory, no trees were recommended for ornamental pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the area.

## **Specialized Pruning**

Trees with this goal require a unique treatment that may include, but not limited to, targeted pruning cuts, removal of nuisance fruit/parasitic plants, and/or rejuvenation/internodal pruning.

At the time of inventory, no trees were recommended for specialized pruning. However, we recommend close monitoring of trees for changes in condition, especially after weather events not considered normal for the 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 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 co-dominant 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.



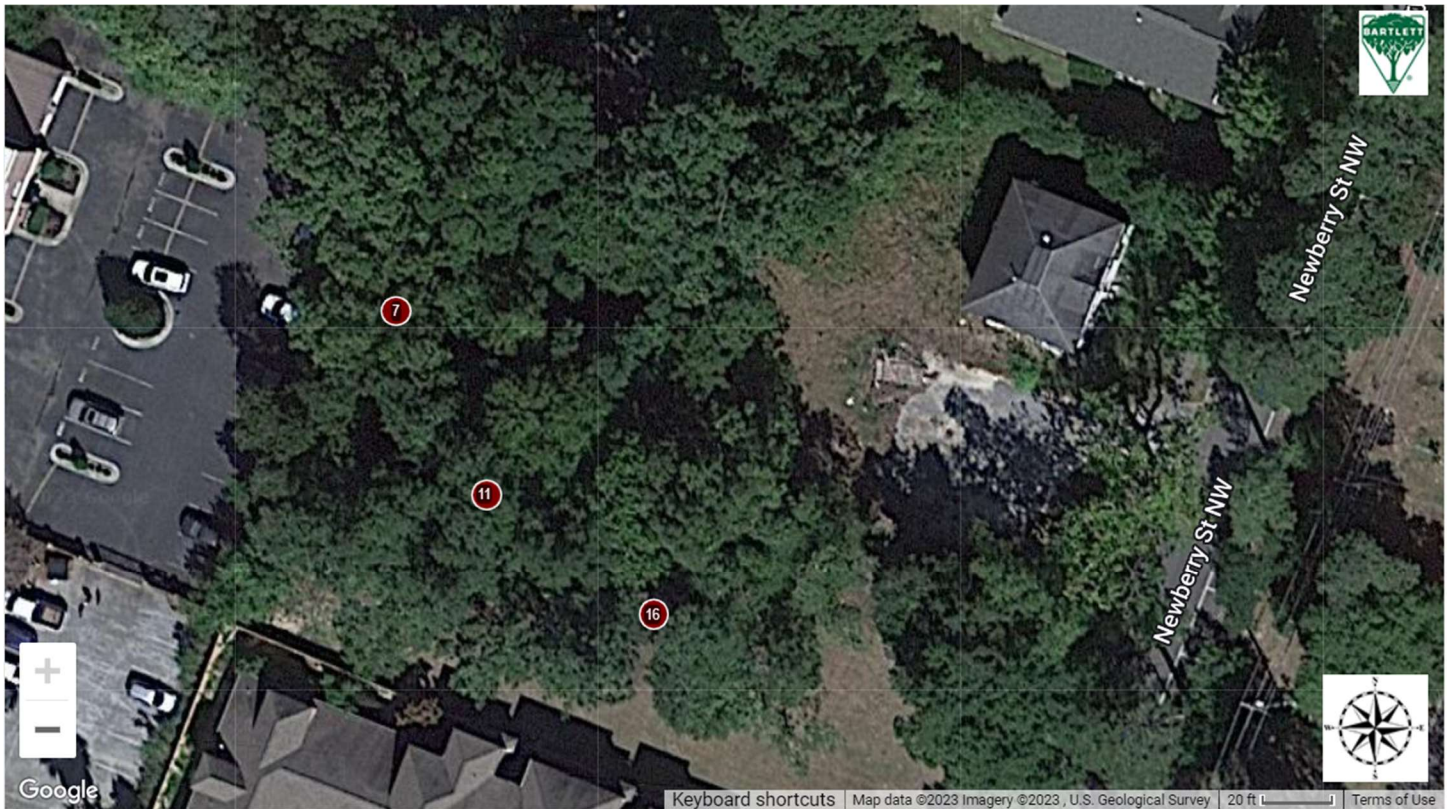
**Pecan #7 recommended for cabling due to co-dominant stem.**

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

**INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS (3 Trees)**

Tree ID	Common Name	DBH	Overall Tree Risk Rating	Tree & Shrub Work Phase	Structural Support
7	Pecan	26	Low	1	Cable: Yes
11	Pecan	30,29	Low	1	Cable: Yes
16	Pecan	31	Low	1	Cable: Yes

**INVENTORIED TREES WITH STRUCTURAL SUPPORT SYSTEM RECOMMENDATIONS**



## **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, "side flashes", and step voltage.

At the time of inventory, no trees were recommended for lightning protection systems. However, as trees continue to grow and site changes occur, we recommend continual consultation with your local Bartlett Arborist Representative to determine if lightning protection systems are warranted in the future.

## 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.



**Hackberry #1 recommended for removal because of poor condition.**

The trees listed in the table below are recommended for removal:

**INVENTORIED TREES RECOMMENDED FOR REMOVAL (6 Trees)**

<b>Tree ID</b>	<b>Common Name</b>	<b>DBH</b>	<b>Condition</b>	<b>Overall Tree Risk Rating</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Defect(s) or Observation(s)</b>
1	Hackberry-Southern	11	Poor	Low	1	<ul style="list-style-type: none"> <li>• Decay-stem</li> <li>• Poor branch structure</li> <li>• Topping/heading cuts</li> </ul>
3	Pecan	27	Poor	Low	1	<ul style="list-style-type: none"> <li>• Dead branches &gt;2</li> <li>• Decay-stem</li> <li>• Hanger</li> <li>• Poor branch structure</li> </ul>
4	Cherry Laurel-Carolina	6	Fair	Low	1	<ul style="list-style-type: none"> <li>• Decay-stem</li> <li>• Poor branch structure</li> </ul>
6	Tree of Heaven	7	Fair	Low	1	<ul style="list-style-type: none"> <li>• Corrected lean</li> <li>• Poor branch structure</li> </ul>
10	Hackberry-Southern	11	Fair	Low	1	<ul style="list-style-type: none"> <li>• Cavity-stem</li> <li>• Uneven crown</li> </ul>
15	Hackberry-Southern	9	Poor	Low	1	<ul style="list-style-type: none"> <li>• Dead branches &gt;2</li> <li>• Poor branch structure</li> <li>• Uneven crown</li> </ul>



## INVENTORIED TREES RECOMMENDED FOR REMOVAL



# ENTIRE INVENTORY



**ENTIRE INVENTORY (23 Trees)**

<b>Tree ID</b>	<b>Common Name</b>	<b>Genus</b>	<b>Species</b>	<b>DBH</b>	<b>Height Class</b>	<b>Age Class</b>	<b>Condition Class</b>	<b>Tree &amp; Shrub Work Phase</b>	<b>Tree Asset Value</b>
1	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	11	Medium	Young	Poor	1	\$1,228.00
2	Pecan	<i>Carya</i>	<i>illinoensis</i>	34	Large	Mature	Fair	1	\$19,014.00
3	Pecan	<i>Carya</i>	<i>illinoensis</i>	27	Large	Mature	Poor	1	\$7,402.00
4	Cherry Laurel-Carolina	<i>Prunus</i>	<i>caroliniana</i>	6	Medium	Young	Fair	1	\$609.00
5	Pecan	<i>Carya</i>	<i>illinoensis</i>	10	Large	Young	Fair	1	\$1,692.00
6	Tree of Heaven	<i>Ailanthus</i>	<i>altissima</i>	7	Medium	Young	Fair	1	\$355.00
7	Pecan	<i>Carya</i>	<i>illinoensis</i>	26	Large	Mature	Fair	1	\$11,441.00
8	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	19,12	Large	Semi-mature	Fair	1	\$8,546.00
9	Pecan	<i>Carya</i>	<i>illinoensis</i>	11	Large	Semi-mature	Fair	1	\$2,047.00
10	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	11	Large	Semi-mature	Fair	1	\$2,047.00
11	Pecan	<i>Carya</i>	<i>illinoensis</i>	30,29	Large	Mature	Fair	1	\$29,465.00
12	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	16	Large	Semi-mature	Fair	1	\$4,332.00
13	Cherry Laurel-Carolina	<i>Prunus</i>	<i>caroliniana</i>	9	Medium	Young	Fair	1	\$1,370.00
14	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	17	Large	Semi-mature	Good	1	\$6,847.00
15	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	9	Medium	Young	Poor	1	\$822.00
16	Pecan	<i>Carya</i>	<i>illinoensis</i>	31	Large	Mature	Fair	1	\$15,940.00
17	Pecan	<i>Carya</i>	<i>illinoensis</i>	18,17	Large	Mature	Fair	1	\$10,374.00
18	Pecan	<i>Carya</i>	<i>illinoensis</i>	32	Large	Mature	Fair	1	\$16,979.00
19	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	18	Large	Semi-mature	Fair	1	\$5,483.00
20	Pecan	<i>Carya</i>	<i>illinoensis</i>	23	Large	Semi-mature	Fair	1	\$8,953.00
21	Crapemyrtle	<i>Lagerstroemia</i>	sp.	11,6,4	Medium	Semi-mature	Fair	1	\$2,927.00
22	Hackberry-Southern	<i>Celtis</i>	<i>laevigata</i>	16	Large	Semi-mature	Fair	1	\$4,332.70
23	Oak-Water	<i>Quercus</i>	<i>nigra</i>	37	Large	Mature	Fair	1	\$21,958.00

# 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**

**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]

**cabling:** 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 non-fruiting 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 Management]

**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]