Tree Assessment and Windshield Survey Summary Report

Town of Acton, Massachusetts

April 2018

Prepared for:
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Notice of Disclaimer

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Executive Summary

The Town of Acton commissioned a windshield survey assessment of the trees located in the street rights-of-way (ROW) and a Level 2 assessment of 120 trees possibly affected by a gas line leak. Understanding an urban forest's structure and health can promote management decisions that will improve the urban forest as well as human health and environmental quality. DRG collected and analyzed the inventory data to understand species composition and tree condition and to generate maintenance recommendations. This report will discuss the health of the inventoried tree population throughout the town.

Key Findings Level 1

- Most common species that could pose a hazard along the ROW: *Quercus rubra* (red oak), 30%; *Acer rubrum* (red maple), 22%; *Ulmus americana* (American ash), 9%; *Pinus strobus* (eastern white pine) 8%; *Fraxinus americana* (white ash), 7%
- The majority of the trees collected have a diameter of 9-17 inches (37%). DBH class >24, 23%; DBH class 0-8, 22%; DBH class 18-24, 18%.
- The condition of this tree population: Fair, 38%; Dead, 30%; Poor, 22%; Good 11%
- 55% of this population is recommended for pruning and 45% is recommended for removal.
- The most common species recommended for pruning were red oak, 50% and red maple, 20%
- The majority of trees that were recommended for pruning consisted of trees with dead branches persisting in the trees or broken and hanging branches in the trees. A majority of the persisting dead branches were in the range of 8-15 inches in diameter. A majority of the broken and hanging branches were relatively small ranging from approximately 4-8 inches in diameter.
- The most common species recommended for removal; red maple 23%; American elm 18%, white pine 14%; white ash 12%
- The most common species for dead trees is: American elm 24%; white ash 17%; red maple 17%; white pine 17%
- American elm was only 9% of the population collected but is 23% of the dead tree category and 18% of the trees recommended for removal

- White ash and white pine were respectively 7% and 8% of the population collected but each species individually comprises 17% of the dead tree category
- Red oak accounted for 30% of all trees collected but only recommended for 6% of the removals.

Key Findings Level 2

- Most common species potentially affected by gas leaks: *Quercus rubra* (red oak), 21%; *Acer platanoides* (Norway maple), 16%; *Acer rubrum* (red maple), 15%; *Acer saccharum* (sugar maple),8%; *Quercus alba* (white oak) 5%; Various species that have been recently removed, 5%
- The majority of trees collected have a diameter of >24 inches (40%). DBH class 18-24, 35%; DBH class 9-17, 18%; DBH class 0-8, 6%.
- The condition of this tree population: Fair, 52%; Good, 24%; Poor, 19%; Dead 5%
- 55% of this population is recommended for pruning, 34% is recommended for no action, and 14% is recommended for removal.
- The majority of trees potentially affected by the gas leaks were deemed low risk (90%)
- The most common defects on the Level 2 tree were dead and dying parts 46%, non-observed 27%, broken branches 12%, and missing or decayed wood 5%
- 45% of the trees with dead or dying parts were maple trees.

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Section 1: Windshield survey assessment

Project Area

In April 2018, DRG arborists completed a windshield survey looking for hazardous trees along the street ROW in Acton, MA.

Species Diversity

Throughout the town of Acton, MA 108 miles of town roads sites were assessed, and 212 trees were identified as potential hazards during this survey. Figure 1 shows the species composition of of these 212 trees.

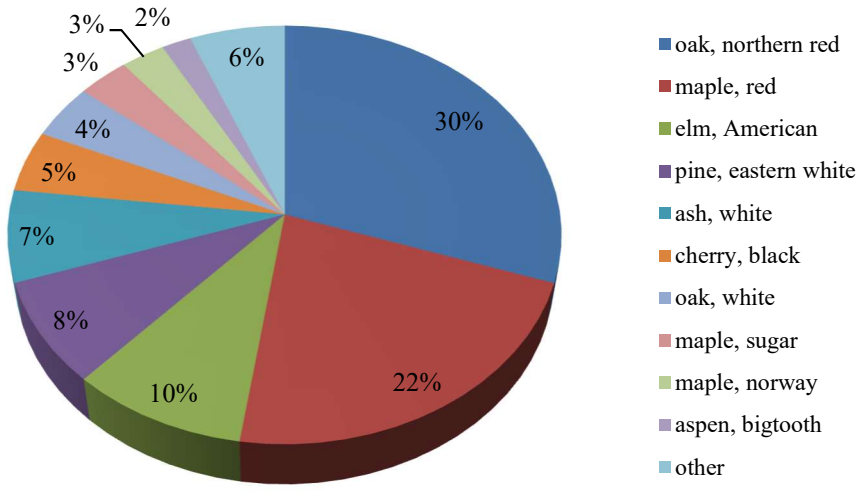

Figure 1. Hazard tree species composition found during windshield survey

Condition

Several factors were considered for the condition of each tree, including root characteristics; branch structure; trunk, canopy, and foliage condition; as well as the presence of pests. The condition of each inventoried tree was rated Good, Fair, Poor, and Dead.

Most of the inventoried ROW trees were recorded to be in Fair condition, 37%. Over 50% of the inventoried hazard trees were rated as poor or dead. Those trees that were rated as in good condition were included due to broken/dead hanging branches despite their otherwise good condition. Figure 2 illustrates the overall condition of the collected trees.

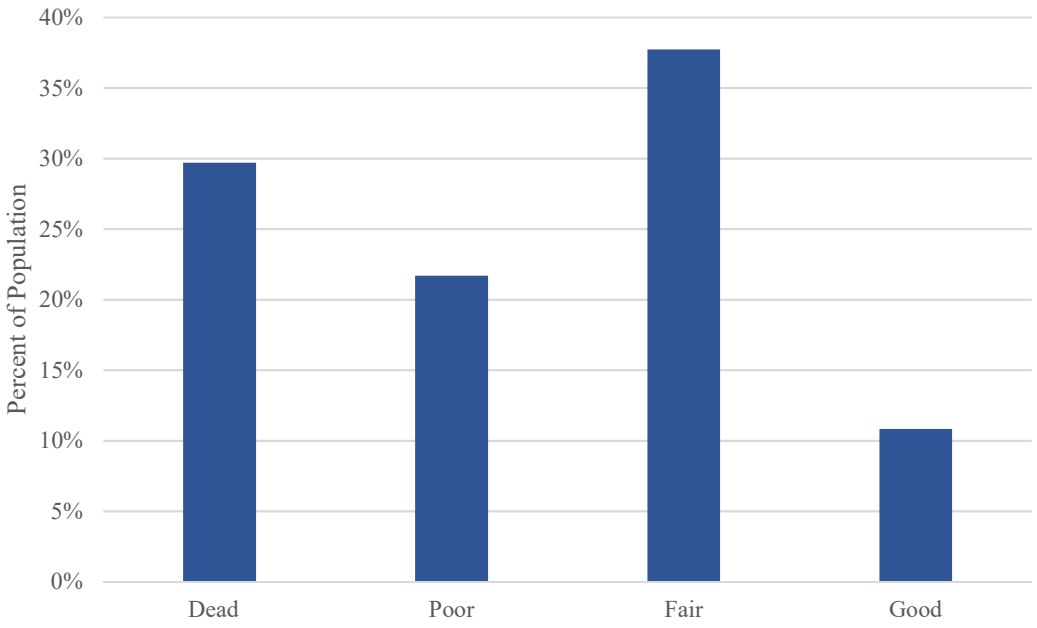

Figure 2. Overall condition of trees during windshield survey

Primary Maintenance

Primary maintenance refers to the task identified for a tree or site: removal, prune or N/A. Risk ratings were not collected for windshield survey trees as all trees collected were deemed to be hazard trees. Figure 3 illustrates the major defects found in these trees.

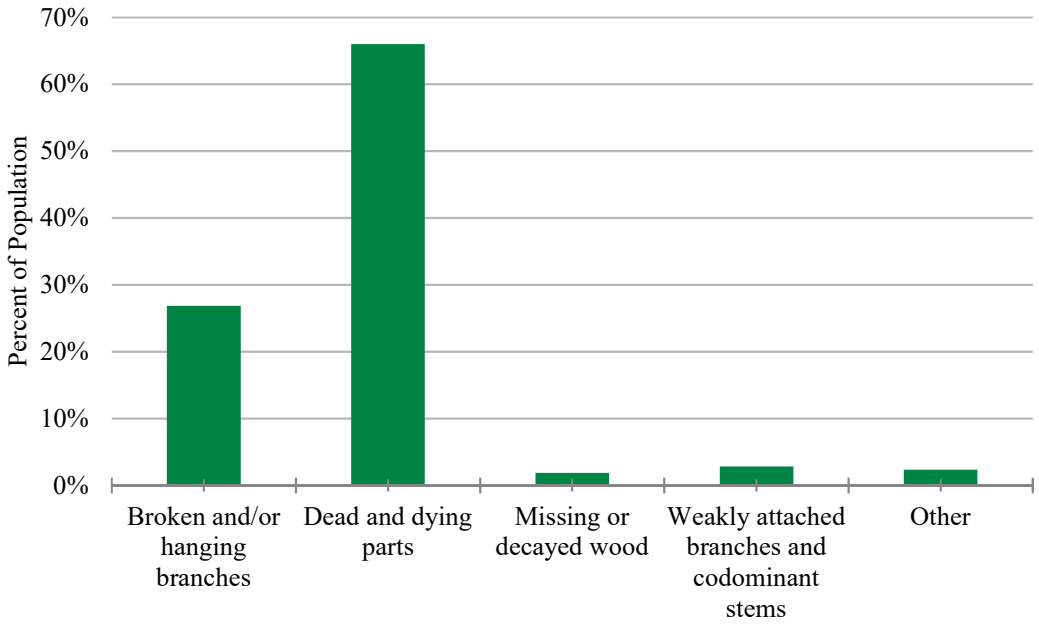

Figure 3. Defects found in trees during windshield survey

The inventoried population in Acton, MA has a total of 93 recommended removals and 115 recommended prunings. Figure 4 illustrates the maintenance recommendations for these hazardous trees.

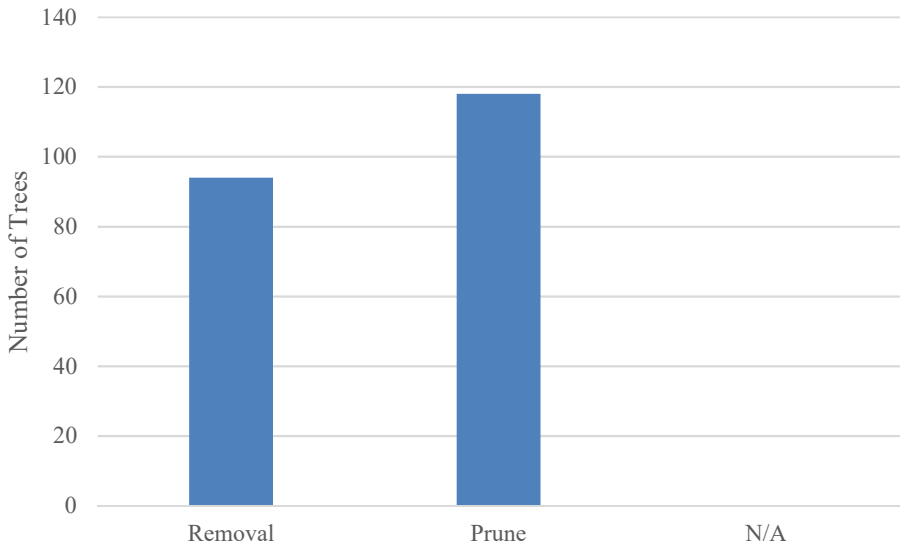

Figure 4. Maintenance needs for windshield survey

Section 2: Level 2 assessment of trees potentially affected by gas line leaks

Project Area

In April 2018, DRG arborists completed Level 2 assessment of 120 tree potentially affected by a gas line leak in Acton, MA

Species Diversity

Throughout the town of Acton, MA a level 2 survey was completed of 120 trees. Figure 5 shows the composition of the species of these trees.

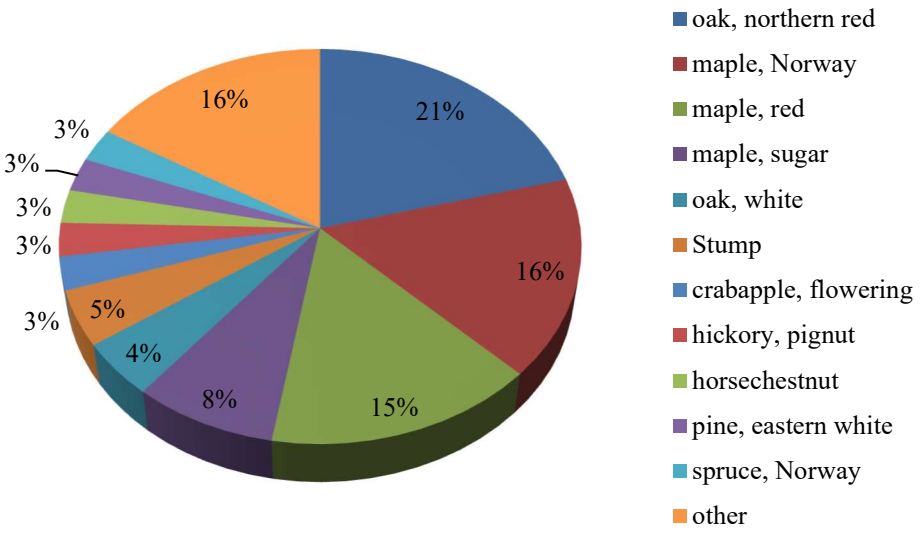

Figure 5. Species composition for Level 2 survey

Condition

Several factors were considered for the condition of each tree, including root characteristics; branch structure; trunk, canopy, and foliage condition; as well as the presence of pests. The condition of each inventoried tree was rated Good, Fair, Poor, and Dead. The majority of trees inventoried was rated as Fair or Good condition. Less than 30% of trees inventoried were rated as poor or dead condition.

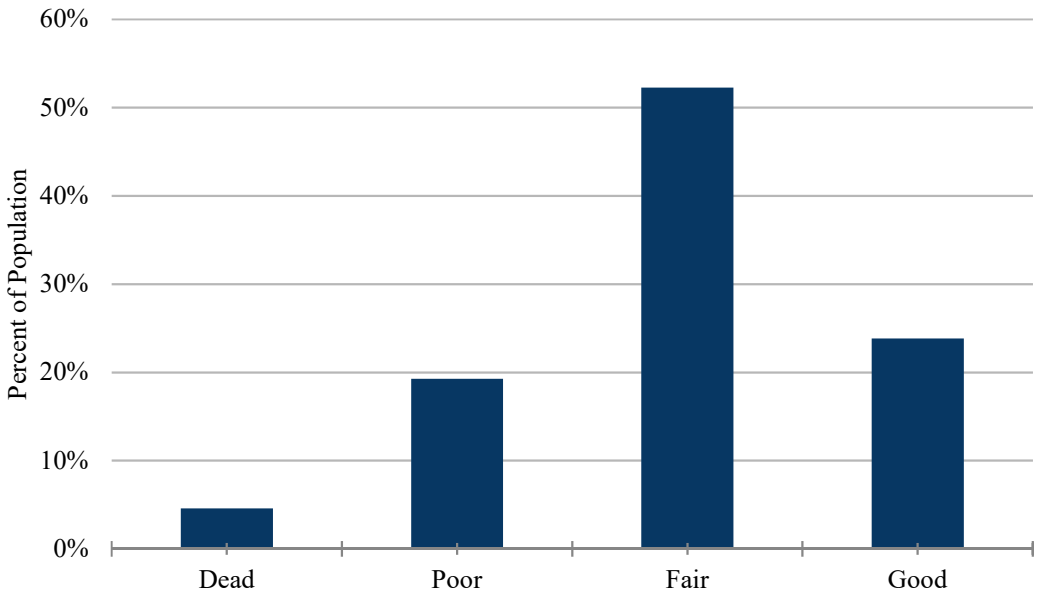

Figure 6. Tree condition found in Level 2 survey

Primary Maintenance and Risk

Primary maintenance refers to the task identified for a tree or site: removal, prune, or N/A. Risk is a graduated scale that measures potential tree-related hazardous conditions. A tree is considered hazardous when the potential risks associated with it exceed an acceptable level. Figure 7 illustrates the various defects that were found in the Level 2 assessment trees.

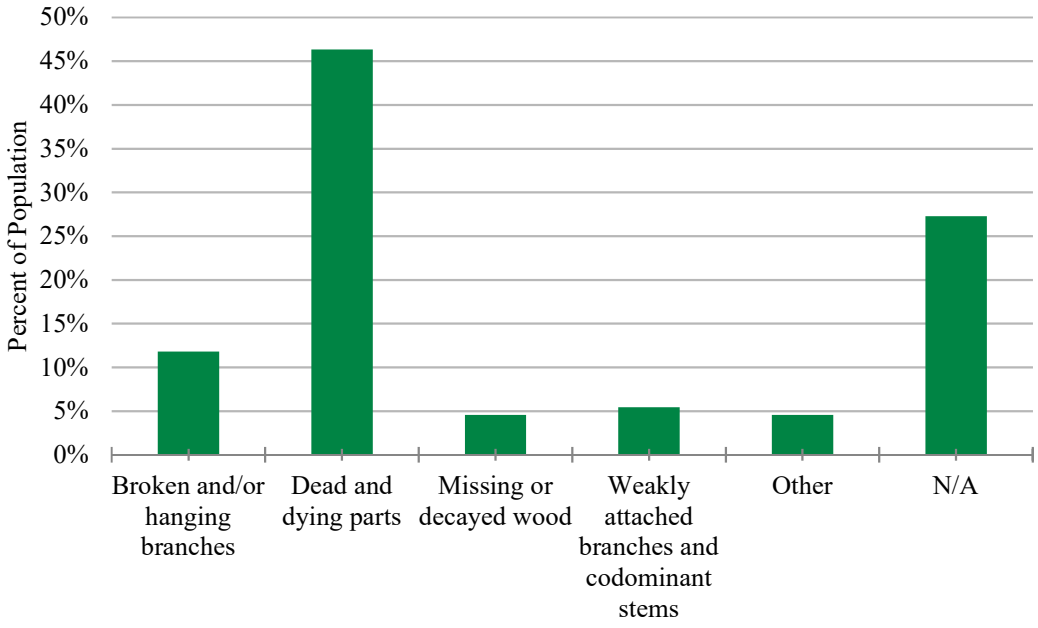

Figure 7. Defects found in trees during Level 2 survey

DRG based the maintenance recommendations and risk values (Figure 8), in part, on the evaluation of species, diameter class, condition, impact of hazard, and defects found in the individual tree. Identifying and ranking the maintenance needs of a tree population enables tree work to be assigned priority based on observed risk. Once tree work is prioritized, it can be accomplished systematically to eliminate the greatest risk and liability first (Stamen 2011).

The inventoried population in Acton has a total of 14 recommended removals, 55 recommended prunings, and 34 with no action needed. Figure 8 expresses the risk values associated with each maintenance need.

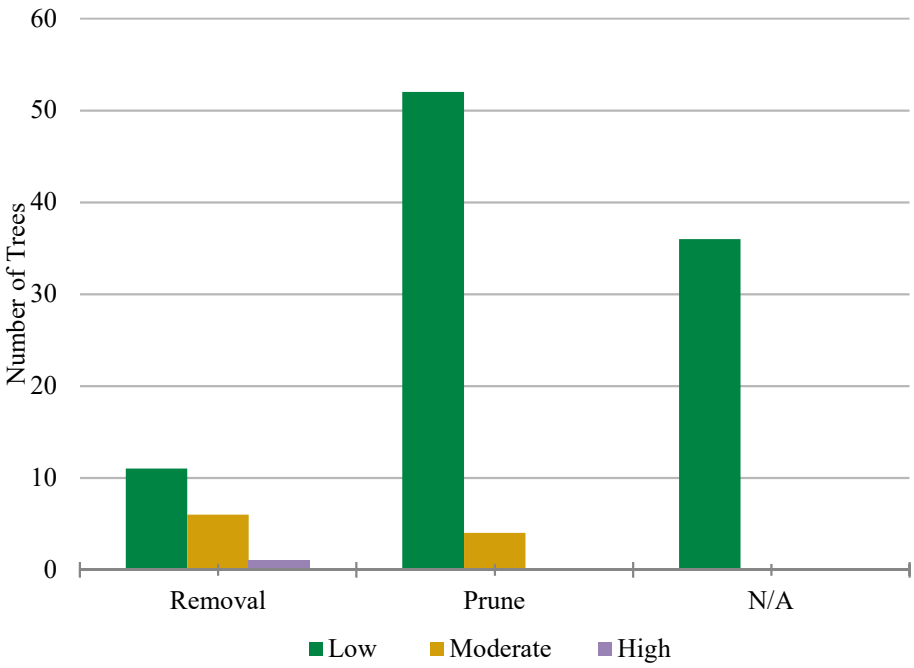

Figure 8. Risk values associated with maintenance needs in Level 2 survey.

Conclusion

Managing trees in urban areas is often complicated. Dealing with the recommendations of experts, the needs of residents, the pressures of local economics and politics, the concerns for public safety and liability issues, the physical aspects of trees, the forces of nature and severe weather events, and the expectation for all of these issues to be resolved simultaneously is a considerable challenge. The Town of Acton has taken the first step towards confronting these challenges through the identification of hazard trees located along the ROW and risk assessments of trees that may have been affected by gas leaks.

Glossary

arboriculture: The art, science, technology, and business of commercial, public, and utility tree care.

canopy: Branches and foliage that make up a tree's crown.

community forest: see **urban forest**.

condition (data field): The general condition of each tree rated during the inventory according to the following categories adapted from the International Society of Arboriculture's rating system: Excellent (100%), Very Good (90%), Good (80%), Fair (60%), Poor, (40%), Critical (20%), Dead (0%).

diameter at breast height (DBH): See **tree size**.

diameter: See **tree size**.

failure: In terms of tree management, failure is the breakage of stem or branches, or loss of mechanical support of the tree's root system.

genus: A taxonomic category ranking below a family and above a species and generally consisting of a group of species exhibiting similar characteristics. In taxonomic nomenclature, the genus name is used, either alone or followed by a Latin adjective or epithet, to form the name of a species.

High Risk tree: Tree that cannot be cost-effectively or practically treated. Most High Risk trees have multiple or significant defects affecting less than 40% of the trunk, crown, or critical root zone. Defective trees and/or tree parts are most likely between 4–20 inches in diameter and can be found in areas of frequent occupation, such as a main thoroughfare, congested streets, and/or near schools.

inventory: See **tree inventory**.

Low Risk tree: Tree with minor visible structural defects or wounds in areas with moderate to low public access.

mapping coordinate (data field): Helps to locate a tree; X and Y coordinates were generated for each tree using GPS.

Moderate Risk tree: Tree with defects that may be cost-effectively or practically treated. Most of the trees in this category exhibit several moderate defects affecting more than 40% of a tree's trunk, crown, or critical root zone.

primary maintenance need (data field): The type of tree work needed to reduce immediate risk.

prune (primary maintenance need): Based on *ANSI A300 (Part 1)* standards, selective removal of dead, dying, broken, and/or diseased wood to minimize potential risk.

removal (primary maintenance need): Data field collected during the inventory identifying the need to remove a tree. Trees designated for removal have defects that cannot be cost-effectively or practically treated. Most of the trees in this category have a large percentage of dead crown.

right-of-way (ROW): See **street right-of-way**.

risk: Combination of the probability of an event occurring and its consequence.

Severe Risk tree: Tree rated to be Severe Risk cannot be cost-effectively or practically treated. Most Severe Risk trees have multiple and significant defects present in the trunk, crown, or

critical root zone. Defective trees and/or tree parts are most likely larger than 20 inches in diameter and can be found in areas of frequent occupation, such as a main thoroughfare, congested streets, and/or near schools.

species: Fundamental category of taxonomic classification, ranking below a genus or subgenus, and consisting of related organisms capable of interbreeding.

stem: A woody structure bearing buds and foliage, and giving rise to other stems.

street name (data field): The name of a street right-of-way or road identified using posted signage or parcel information.

street right-of-way (ROW): A strip of land generally owned by a public entity over which facilities, such as highways, railroads, or power lines, are built.

street tree: A street tree is defined as a tree within the right-of-way.

structural defect: A feature, condition, or deformity of a tree or tree part that indicates weak structure and contributes to the likelihood of failure.

tree benefit: An economic, environmental, or social improvement that benefits the community and results mainly from the presence of a tree. The benefit received has real or intrinsic value associated with it.

tree inventory: Comprehensive database containing information or records about individual trees typically collected by an arborist.

tree size (data field): A tree's diameter measured to the nearest inch in 1-inch size classes at 4.5 feet above ground, also known as diameter at breast height (DBH) or diameter.

tree: A tree is defined as a perennial woody plant that may grow more than 20 feet tall. Characteristically, it has one main stem, although many species may grow as multi-stemmed forms.

urban forest: All of the trees within a municipality or a community. This can include the trees along streets or rights-of-way, in parks and greenspaces, in forests, and on private property.

References

Stamen, R.S. "Understanding and Preventing Arboriculture Lawsuits." Presented at the Georgia Urban Forest Council Annual Meeting, Madison, Georgia, November 2–3, 2011.