

Tree Inventory Suggested Specification of Work

Cuyahoga County Healthy Urban Tree Canopy Grant Program

January 16, 2020

Tree Inventory Data Field Descriptions

1. **Address/Location**—Identifies the location of each tree, planting site, and stump by the following attributes.
 - a. *Address*. House address.
 - b. *On Street*. The street on which the tree is physically located.
 - c. *Side*. The side of the house on which the tree stands in relation to the physical address.
 - d. X and Y coordinates in the desired format.
2. **Species**—Trees are identified by genus and species using both botanical and common names, and by cultivars where appropriate.
3. **Tree Size**—Diameter is measured to the nearest inch in 1-inch size classes at 4½ feet above ground, or diameter at breast height (DBH), using a Biltmore Stick.
4. **Multi-Stem Tree**—If a tree has multiple stems on trunks splitting less than 1 foot above ground level, it is noted.
5. **Condition**—Signs of stress, poor structure, mechanical damage, soil and root problems, disease, and pests are all considerations in the assessment of tree condition.
 - a. *Good*. A good tree shows no major problems.
 - b. *Fair*. A fair tree has minor problems that may be corrected with time or corrective action.
 - c. *Poor*. A poor tree has major problems that are irrecoverable.
 - d. *Dead*. A dead tree shows no sign of life.
6. **Primary Maintenance**—The following maintenance needs will be assigned:
 - a. *Removal*. Trees designated for removal have defects that cannot be practically or cost-effectively treated. The majority of trees in this category have a large percentage of dead crown.
 - b. *Tree Clean*. Removal of one or more limbs to reduce risk, provide clearance, and restore the tree.
 - c. *Young Tree Train*. Pruning of young or *medium-aged trees to improve tree and branch architecture*.
 - d. *Stump Removal*. This category indicates a stump that should be removed.
 - e. *Plant*. During the inventory, vacant planting sites are identified as Vacant Site Small, Vacant Site Medium, and Vacant Site Large (indicating the ultimate size that the tree will attain), depending on the growing space available and the presence of overhead wires. Placement and Spacing guidelines will be adopted using the following criteria:
 - Do not plant in front of building entrances in order to permit easy access by the Fire Department.
 - Do not plant within bus stops.
 - Minimum distance between trees (trunk to trunk) shall be 30', and maximum of 40' depending upon the tree species and other local conditions.
 - Minimum distance from a streetlight to the tree trunk is 25 feet (this may vary with tree species).
 - Minimum distance from a stop sign to the tree trunk is 30 feet.

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- Minimum distance from other traffic signs to the tree trunk is 6 feet.
 - Suggested distance from a parking meter back to tree trunk shall be no more than 5 feet, to allow for the swing of car doors.
 - Minimum distance from a gas or water valve to the tree trunk is 6 feet.
 - Minimum distance from a fire hydrant to the tree trunk is 6 feet.
 - Minimum distance from the corner of a street intersection to the tree trunk is 40 feet.
 - Minimum distance from the edge of the pit to any opposite obstruction (building wall, stoop, railing, property line etc.) is from 4 to 6 feet, depending upon local conditions and the amount of sidewalk traffic.
 - Minimum width of tree lawn required to plant a tree is 4 feet.
- 7. Secondary Maintenance.** The following secondary maintenance needs will be determined based on ANSI A300 standard specifications:
- a. Raise—Trees requiring pruning to provide vertical clearance by removing low branches that interfere with sight and/or traffic. Lacking specific information on clearance required by local code per the client, 8 feet over sidewalk for Pedestrian clearance, 14 feet over roads for Traffic clearance, and 7 feet in public/park areas to allow for grounds maintenance will be used.
 - b. Reduce—Selective pruning to decrease height and/or spread of the crown in order to provide clearance for electric utilities and lighting.
 - c. None—No secondary maintenance is recommended for the tree. This will be used as the default value when Primary Maintenance equals Removal, Stump Removal, or Plant Tree.
- 8. Observations.** Significant observations affecting a tree’s health, structure, and location will be made.
- 9. Grate**— For each tree or site, the presence of a grate will be recorded.
- 10. Hardscape Damage**— Damage to sidewalks and curbs by tree roots is noted
- 11. Space Size**—The minimum dimension of the Growing Space Type recorded in feet.
- 12. Overhead Utilities**—For each tree or site, overhead utilities will be recorded if lines are:
- No Conflict - Trees with no overhead electrical wire conflicts.
 - Secondary Line Conflict - Trees with electrical “secondary service drop” conflicts. Secondary service drops are wires that provide electricity to homes.
 - Primary Line Conflict - Trees with overhead primary wire conflicts.
- 13. Growing Space Type**—Growing space locations are categorized as:
- Island—Sites surrounded by pavement or hardscape (eg., parking lot, cul-de-sac).
 - Median—Sites located between opposing lanes of traffic.
 - Natural Area—Sites developed through natural growth instead of design or planning.
 - Open/Restricted—Open sites with restricted growing space on 2 or 3 sides.
 - Open/Unrestricted—Open sites with unrestricted growing space on at least 3 sides.
 - Raised Planter—Sites located in an above-grade or elevated planter.
 - Tree Lawn/Parkway—Sites located between the street curb and the public sidewalk.
 - Well/Pit—Sites at grade level and completely surrounded by sidewalk.

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14. Further Inspection—Trees in this category require additional and/or future inspections due to a variety of issues beyond the scope of a standard tree inventory. Categories for further inspections include:

- a. Advanced risk assessment (e.g., a tree with a defect requiring additional or specialized equipment for investigation).
- b. None.
- c. Present
- d. Not present.

15. Date of Inventory—The date data are collected is recorded.

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Tree Inventory Data Field Descriptions – Qualified Arborist Required

The following fields are completed using arborists trained in the Tree Risk Assessment Qualification (TRAQ) methodology. For tree risk assessment, each tree will receive a single qualitative risk rating using the risk categorization matrices found in the International Society of Arboriculture *Best Management Practices: Tree Risk Assessment* (Smiley, Matheny, and Lilly 2011). The failure mode with the greatest risk will serve as the overall tree risk rating (e.g., branch, whole tree, codominant stem).

1. Risk Rating—A risk rating is assigned based on an assessment of the failure mode with the greatest risk. The specified period for the risk assessment is one year. The risk component of an inventory is used to maintain compliance with the most recent standards and practices in the arboricultural industry. It is important to note that inspections are “rapid assessments” and are meant to indicate a need for further study and are not considered legally binding in any litigation.

The following criteria and matrices, which are based on the International Society of Arboriculture *Best Management Practices: Tree Risk Assessment* (Smiley, Matheny, and Lilly 2011), are used to arrive at a risk rating.

- a. *Likelihood of Failure.* Identifies the most probable failure and rates the likelihood that a structural defect(s) will result in failure based on observed current conditions.
- b. *Likelihood of Impacting a Target.* The rate of occupancy of targets within the target zone and any factors that could affect the failed tree as it falls towards the target.
- c. *Consequences of Failure.* The consequences of tree failure are based on the level of target and potential harm that may occur. Consequences can vary depending on the size of the defect, a distance of fall for the tree or limb, and any other factors that may protect a target from harm. Target values are subjective, but efforts will be made to assess them from the client's perspective.

The likelihood of failure and the likelihood of target impact are combined in the matrix below to determine the likelihood of tree failure impacting a target.

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

Risk rating is estimated based on combining the likelihood of tree failure impacting a target and the consequences of failure in the following matrix. Risk ratings are Low, Moderate, High, and Extreme. A Low-Risk tree poses a low overall level of risk. A Moderate-Risk tree may pose some risk, particularly during storm events or abnormal weather. A High-Risk tree presents a high likelihood of tree or tree part failure, even during normal weather conditions. An Extreme-Risk tree poses a significant risk and probability of failure at any time.

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Likelihood of Failure	Consequences			
	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

Even though trees may pose multiple risks at once, one risk rating is assigned to each tree during the inventory process. Risk rating is designed to serve as a prioritization mechanism, but the municipality is ultimately responsible for determining their level of acceptable risk.

2. **Residual Risk**—Risk for each tree is assessed after the recommended maintenance is performed. Residual risk is categorized as None, Low, Moderate, High, or Extreme and based solely on professional judgement and is not a guarantee or warranty of risk reduction.

3. **Defect Assessed**—The most significant defect is identified to base the risk assessment upon. Defects are limited to:
 - a. Twigs/Canopy
 - b. Root
 - c. Scaffold Branch
 - d. Trunk
 - e. None

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Tree Inventory Data Dictionary

Data Field Name	Input Notes	Definition
Address	Numeric	Property address
Assigned?	100X Main Street 100 Main Street	Yes = address assigned No = address not assigned
Street	Street name:	Unique # per address and side
On Street	Street name:	Street tree is located on
Side	Front Side To Side Away Rear Median	Location of site at address
Species		Common and Botanical
Tree Size	Numeric	DBH (inches)
Multi- Tree Stem	Yes No	
Condition	Good Fair Poor Dead	80%+ 60% 40%- 0%
Primary Maintenance	Tree Clean Young Tree Train Removal Stump Removal Plant Tree	Mature trees suitable for 5 to 7-year cycle Young trees suitable for 3-year cycle Tree requiring removal Stumps requiring grinding Vacant site suitable for planting
Secondary Maintenance	Raise Reduce None	Clearance pruning for pedestrians & vehicles Crown reduction for buildings and utilities None
Observations	Cavity/Decay Improperly Installed Improperly Mulched Improperly Pruned Mechanical Damage Memorial Tree Nutrient Deficiency Pest Problem Poor Location Poor Root System Poor Structure Remove Hardware Serious Decline	
Grate	No Yes	Tree grate or guard not present Tree grate or guard present
Hardscape Damage	No Yes	Damage not present Damage present

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Tree Inventory Data Dictionary, continued.

Data Field Name	Input Notes	Definition
Grate	No Yes	Tree grate or guard not present Tree grate or guard present
Hardscape Damage	No Yes	Damage not present Damage present
Growing Spacing Size	Numeric	Narrowest dimension (feet)
Overhead Utilities	No Conflict (default) Secondary line Conflict Primary line Conflict	Primary/Secondary lines not conflicting Secondary lines conflicting Primary lines conflicting
Growing Space Type	Island Median Natural Area Open/Unrestricted Open/Restricted Raised Planter Tree Lawn/Parkway Well/Pit	
Further Inspection	No Yes	No Further Inspection Level 3 Risk Assessment Recommended
Notes		Special conditions noted
GPS/GIS X	Alpha & Numeric	Projected longitude coordinate
GPS/GIS Y	Numeric	Projected latitude coordinate
Serial Number	Numeric	Unique identifier #
Date	Numeric	Date collected or edited
Time	Numeric	Time collected (24 hour)
Staff		Staff name or initials

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Tree Inventory Data Dictionary, – Qualified Arborist Required

Data Field Name	Input Notes	Definition
Risk Rating	None Low Risk Moderate Risk High Risk Extreme Risk	
Likelihood of Failure	N/A Improbable Possible Probable Imminent	
Likelihood of Impacting Target	N/A Very Low Low Medium High	
Likelihood of Failure + Impact	N/A Unlikely Somewhat Likely Likely Very Likely	
Consequence	N/A Negligible Minor Significant Severe	
Residual Risk Rating	None Low Risk Moderate Risk High Risk Extreme Risk	
Defect Assessed	None Root Trunk Scaffold Branch Twigs/Canopy	