

Tree Maintenance Manual Template

PURPOSE

This manual establishes guidelines and procedures needed to provide for the care and protection of trees in order to promote the health, safety, welfare, and quality of life for all city residents, business owners and visitors. The City of [REDACTED] acknowledges that trees provide environmental, aesthetic, social and economic benefits. Specifically, trees increase property values, provide aesthetic value, provide shade and cooling, reduce energy costs, decrease wind velocities, provide erosion control, conserve energy, reduce stormwater runoff, and act as filters for airborne pollutants, reduce noise, provide privacy, provide wildlife habitat and food, sequester carbon, and release oxygen.

This manual allows the City of [REDACTED] to implement best management practices as reflected by professional tree care industry standards for the planting, maintenance, removal, protection, pruning, and preservation of trees on city owned or controlled property, as well as to enforce the provisions of the city code. By assuring the preservation and protection of the urban forest through regulations and standards of care, our natural resources will continue to enhance the landscape, streets, and parks, while helping to improve [REDACTED].

This manual is coherent with City goals outlined in the City's Conservation and Environmental Justice Elements within the General Plan, and the goals outlined in the Climate Action Plan. Following this manual will ensure that the urban forest is being utilized to meet citywide goals.

The City realizes that sustaining the urban canopy, creating visually aesthetic landscaping, and maintaining and encouraging a diversity of trees, both in terms of age and species, will increase the value of our urban forest; making it an even greater asset to the City of [REDACTED].

The development of this Tree Maintenance Manual was made possible through a partnership with the California Urban Forests Council utilizing funding from Proposition 68, administered through CAL FIRE's Urban and Community Forestry Grant Program.

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SECTION 1 DEFINITIONS

For the purposes of this policy, the following definitions shall apply:

- A. **Arborist:** the person designated as such by the city who has demonstrated knowledge and competency, ideally through the obtainment of the current International Society of Arboriculture (ISA) arborist certification. This can be either a city employee or a contractor. ISA Municipal Specialist is a desirable credential requiring qualified individuals have a minimum of three years full time municipal related experience. These credential holders assist agencies in the operations of managing trees in a municipal sector. ISA Utility Specialist is another highly desirable certification requiring individuals to have a minimum of three years full time experience managing trees adjacent to utilities. This credential is important in the managing of municipal trees near powerlines or other utilities. The ISA Board Certified Master Arborists is the highest level of certification offered by the International Society of Arboriculture and could additionally be considered useful in assisting municipalities with all operational facets of managing trees.
- B. **Community forestry:** a branch of forestry whereby the local community plays a significant role in forest management and land use decision making, typically in urban forests.
- C. **Compaction:** compression of the soil structure or texture by any means that creates an upper layer that is impermeable.
- D. **Director:** the director of public works or other department head as assigned by the public agency or the director's designee, unless otherwise specified in the policy.
- E. **Disturbance:** all of the various activities from construction or development that may damage trees.
- F. **Dripline area:** the suggested minimum area within "X" distance from the trunk of a tree in a typical location, measured from the perimeter of the trunk of the tree at 54 inches above natural grade, where "X" equals a distance ten times the diameter of the trunk at 54 inches above natural grade, or the distance to the outermost edge of the tree canopy, whichever is the lesser distance.
- G. **Excessive pruning:** removing in excess of 25 percent or greater of the functioning leaves and stems in a single pruning. Excessive pruning may include the cutting of any root two inches or greater in diameter. Exceptions are when clearance from overhead utilities or public improvements is required, or to abate a hazardous condition or a public nuisance.
- H. **Hazardous condition:** in this policy, a hazardous tree condition is one in which a tree part has an observable structural issue that is imminent likelihood of failure and a high likelihood of striking a foreseeable target. These hazards can be discovered through both routine pruning work and through other forms of inspection. The city shall correct hazards related to targets that could be impacted by failure in a timely manner. If provisions for hazard mitigation cannot occur immediately, public protection measures should be taken, such as providing warning or notice.
- I. **Heritage Tree:** typically, a large, individual tree with unique value, which is considered irreplaceable.

J. Inspection: a visual observation of an individual tree or population of trees to assess condition. In this policy, inventory updates and maintenance recommendations, will be considered inspections. An inspection can lead to a risk assessment if no immediate issue is identified.

K. Injury: a wound resulting from any activity, including but not limited to excessive pruning, cutting, trenching, excavating, altering the grade, paving or compaction. Injury shall include bruising, scarring, tearing, or breaking of roots, bark, trunk, branches or foliage, herbicide or poisoning, or any other action leading to the death or permanent damage to tree health.

L. Pest control advisor: a person licensed by the California Department of Pesticide Regulation capable of writing legal prescriptions for specific pesticides.

M. Pest control applicator: a person licensed by the California Department of Pesticide Regulation who performs the application and treatment of pesticides.

N. Public nuisance: an act, condition, or a thing that is offensive to the community or that violates the rights of persons or the community, as determined by the city tree protection ordinance and/or other applicable ordinances.

O. Public tree: any tree growing within public property, easements, or the street right-of-way outside of private property.

P. Removal: complete tree removal, such as cutting to the ground or extraction of the tree.

Q. Risk assessment: a tree assessment done by an ISA certified person to provide the city with a mitigation option, if needed.

R. Topping: the undesirable practice of cutting back large-diameter branches between nodes or truncating the main stem.

S. Tree Board: a city advisory board that aides in developing, keeping current, and helping facilitate a plan to conserve and care for the urban forest resources of the city.

T. Tree City USA: a nationwide designation that provides the framework necessary for communities to manage and expand their public trees.

U. Trenching: any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage, or other property improvements below grade.

V. Unintended object: includes people, vehicles, structures, or anything subject to damage by a tree.

SECTION 2 TREE INSPECTIONS / TREE INVENTORY

A. Inspection Objectives

Inspection of city trees shall identify visually obvious problems, their relative risk, and provides a recommendation for a risk assessment if no immediate risk is identified. The inspection interval should be no greater than four years as part of a routine trimming program. Additionally, supplemental inspections and risk assessments should be done in between trim cycles to track potential tree failures. These can include major arterials, or other highly traveled locations and/or parks. Inspection and work history data should be tracked and monitored within a tree inventory management program that allows for documented work history to be recorded and accessible. This should include all publicly maintained trees, as determined by the city Arborist. The agency should frequently review the inventory for potential high risk trees and should assign trees to have risk assessments done with written documentation.

Those performing tree inspections must adhere to current industry standards, to ensure they are being done on a consistent and regular manner. ANSI A300 standards and ISA Best Management Practices guide contractors and city staff in tree evaluations with procedures and specifications.

B. Identifying and Documenting Inspections

Inspected items should include, but are not limited to:

1. Lean/root problems: for example, leaning trees with roots heaving out of the ground.
2. Codominant or multiple trunks: competing stems that grow bark between a tight crotch union can be weakened areas prone to failure.
3. Trunk cavities, cankers, mushrooms, and decay: these are indicators of potential internal decay of a tree and, if discovered, may require further investigation and mitigation.
4. Cracks in trunks and branches: these can be indicators of future failures and, if discovered, may require further investigation and mitigation.
5. Weakly attached scaffold limbs and branches: a branch that developed as a reactionary shoot can be predisposed to failure and, if discovered, may require further investigation and mitigation.
6. Hanging or broken branches (hangers): branches that are detached from where they were grown and are hanging and could fall, impacting targets below. Broken branch stubs should be pruned off properly unless preserved for wildlife habitat reasons.
7. Dead branches (deadwood): branches within a canopy of a tree that no longer produce foliage and have begun to lose bark.
8. Pests and other diseases: identified pests that can cause tree failures such as boring, leaf chewing and leaf sucking insects or pathogenic fungus.

While most tree inspections can be conducted from the ground, there are times when an aerial inspection is necessary. These inspections can be completed as part of the routine tree pruning program. The routine tree pruning program inspections does not assign a time frame to tree hazards, they simply point out a tree condition that requires a risk assessment or mitigation decision by the city arborist. The goals of the tree inspection/tree inventory program include:

1. Documenting tree structure and condition and recording dates.
2. Identifying vacant sites suitable for trees to be planted.

3. Maintaining trees proactively, instead of reactively as budget allows.
4. Identifying the dollar value of each tree and total urban forest utilizing the Trunk Formula Method in accordance with the current Guide for Plant Appraisal.
5. Documenting work history records.
6. Scheduling tree maintenance work.
7. Improving tree structure and health through scheduled tree maintenance.
8. Reducing tree loss and liability.
9. Demonstrating due diligence via work history.
10. Identifying trees that can be salvaged or corrected with proper pruning.

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SECTION 3 ROUTINE TREE MAINTENANCE

These guidelines establish principles of care and maintenance for the city's public trees, and are set forth for pruning, planting, watering, soil and nutrient requirements, insect, disease, and fruit control.

A. Restricted Acts to be Avoided without Arborist Approval

Restricted maintenance practices for public trees include:

1. Excessive pruning, except for clearance pruning of utility lines, traffic or abating a public nuisance.
2. Topping.
3. Other action that could lead to the death of a tree or could permanently damage its health, including but not limited to cutting, poisoning, over-watering, unauthorized relocation or transportation of a tree, or trenching, excavating, altering the grade, or paving within the dripline area of a tree.

B. Standards for Pruning Public Trees

All work on public trees shall be in accordance with the current edition of the following industry standards: ANSI A300 and ANSI Z133.

C. Pruning Methods for Trees

There are seven types of pruning that may be appropriate for trees. They are:

1. Structural pruning: a type of tree pruning for young trees that establishes a strong central leader and develops subordinate branches. Structural pruning helps to alleviate future failures.
2. Crown cleaning: the selective removal of dead, diseased, detached, and broken branches. No live foliage is to be pruned during crown cleaning, and this is the preferred pruning type for mature trees.
3. Crown thinning: the selective removal of small live branches to reduce crown density. No more than 25% of live foliage should be removed in a growing season.
4. Crown raising: the selective removal of branches in order to provide vertical clearance.
5. Crown restoration: the selective removal of branches, sprouts and stubs from trees that have been topped.
6. Crown reduction: the selective removal of branches and stems to decrease the height and/or spread of a tree.
7. Utility pruning: the selective removal of branches and stems to reduce growth away from utility lines.

ANSI A300 (Part 1) Pruning and ISA Best Management Practices Pruning Third Edition should define the pruning method applied as a part routine trimming program.

Pruning may be done outside of the routine trimming program if prune will result in at least one of the following criteria:

1. Pruning will result in tree risk mitigation.
2. Pruning will result in improved tree structure
3. Pruning will establish a dominant leader in a young tree.

4. Pruning will provide clearance for new or existing infrastructure.

Climbing and pruning practices shall not injure the tree except for the pruning cuts.

It is best to clearly identify a pruning objective and then select the pruning type most suitable to achieve that objective. For example, if the objective is roadway clearance, crown raising would be the selected type of pruning.

D. Tree Care for Birds and Other Wildlife

There are many federal and state laws and regulations pertinent to wildlife and the tree care and landscape industry in California. Of particular note is the Migratory Bird Treaty Act. The city should make sure that tree care workers are qualified with proper training on inspecting for birds and other wildlife during tree care operations. The Tree Care for Birds and Other Wildlife Best Management Practices in California should be a guiding document for managing wildlife habitat as it pertains to trees. City staff working in trees and any city tree contractor shall utilize the Project Preparation Procedure (Appendix A) to determine the best plan of action to eliminate harm done to birds and other wildlife.

E. Plant Health Care Plan and Integrated Pest Management

Agencies should develop a comprehensive plant health care program with goals of how to manage the health structure and appearance of plants and trees in the landscape. As part of that plan, there should be an Integrated Pest Management strategy. This strategy is a method of controlling plant pests by combining biological, culture, mechanical, physical, and/or chemical management strategies. The Integrated Pest Management strategy should be constructed based off of the Integrated Pest Management Flowchart (Appendix B). The Integrated Pest Management Flowchart is based off of ANSI A300 standards. The flowchart will dictate the plan of action when there is an identified plant health concern.

If action against pests is warranted, always consider treatments as part of an overall plant health care program. The pest source shall be identified and targeted with a specific and timely treatment. All prescriptions for pesticides are to be issued by a Pest Control Advisor (PCA) per the Department of Pesticide Regulations. Additionally, applicators must be licensed or certified to apply. If it appears that insects or disease may lead to the death of a public tree, then it is the responsibility of the city to evaluate the condition according to the following guidelines and treat the problem in a timely fashion to prevent further decline of the tree.

1. For treatment of insects, the pest control advisor shall be consulted. Nontoxic materials shall be used whenever feasible. All chemicals must conform to the California Department of Pesticide Regulations.
2. For disease and decay that erodes the health or weakens the structure, further analysis by an arborist may be required to evaluate the stability.
3. Diseases below ground are often caused by poor landscape design surrounding old trees, which encourages harmful and often lethal ailments. The following conditions favor disease:
 - a. Compacting of the soil within the tree's dripline
 - b. Removing soil from the tree root area
 - c. Watering on or near the tree trunk area
 - d. Planting incompatible plants within the tree's dripline

Combined with poorly drained soil, these factors often activate normally dormant fungi to become opportunistic and infect the tree, which can lead to the decline and eventual death of the tree. This decline can be slow and may not be evident for many years.

When planning landscaping around a public tree, an evaluation of the tree and soil must be performed to determine if there is a disease present. If the tree is diseased and it is reasonable to expect that landscaping will contribute to decline, permanent damage or render it hazardous, it is the obligation of the city to take reasonable measures to reduce or eliminate the conditions that may cause the decline of the public tree.

F. Fertilizing

All fertilizers shall only be applied if specified by the arborist as part of a plant healthcare program. Fertilizing may be specified for trees that will be impacted by an upcoming disturbance, grade change, or a modified environment. Fertilizing in these instances may aid the tree to overcome the stress caused by disturbance. The arborist shall determine specifications for fertilizing trees on a case-by-case basis.

G. Watering Schedule

1. Newly installed trees, including drought tolerant species, are dependent upon supplemental irrigation until established, typically for two years. If a tree is native to areas of higher rainfall, then the tree will require supplemental water throughout its life cycle, unless the tree finds a subterranean water source. Periods of extreme heat, wind or drought may require more or less water than recommended in these specifications.
2. During the establishment period, new trees shall be watered thoroughly as part of an establishment program prescribed by an arborist. Local weather and environmental factors should be taken into consideration when considering a watering plan. If reclaimed water is to be used, please verify that the species of trees to be irrigated has an elevated tolerance of salts.
3. Most mature public trees in the city are established in areas without formal watering systems. These trees shall only receive manual irrigation when it is determined necessary by the arborist in order to restore the health of the tree. In this case, the arborist shall also determine the watering specifications.
4. Trees planted in association with the construction of public improvements (medians, parkways, sidewalk tree wells, etc.) shall be irrigated by automated watering systems. The arborist shall determine the type of automatic irrigation system used. Trees planted in public areas where no irrigation system exists shall be hand watered until established. After that, a watering schedule determined by the arborist shall be in effect until deemed no longer necessary.

I. Fruit Control

While many trees produce flowers or fruit, some trees can be considered a nuisance if the use area is not compatible with the debris generated by the tree. Always consider treatments as part of an overall plant health care program. For example, the dropping fruit of the European olive (*Olea europaea*), American sweetgum (*Liquidambar styraciflua*), or acorn drip of a holly oak (*Quercus ilex*) may be a safety hazard if it is in the proximity of an ADA accessible ramp or other pedestrian area.

In such cases, control measures are warranted and must be prescribed by a pest control advisor and administered by the pest control applicator to ensure successful application of treatment materials.

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SECTION 4 PROTECTION OF TREES DURING CONSTRUCTION

A. Tree Protection Objectives

The objective of this section is to reduce the negative effects of construction on trees to a less than significant level. Tree protection should begin before construction starts. Successful tree preservation occurs when designers, construction personnel, and project managers are committed to tree preservation. All members of the project team must be familiar with the rudimentary aspects of tree growth and development in order to understand the relationship between tree survival and construction practices. Utilization of an arborist will ensure everyone is understanding of the needs regarding trees.

All trees cannot and should not be preserved. Trees that are structurally unstable, dead, in poor health, or unable to survive the effects of construction become a liability to the project and may have to be removed.

B. Site Plan

For all projects, Site Plans must indicate accurately plotted trunk locations and the Tree Protection Zone (TPZ) of all trees or group of trees to be preserved within the development area. Additionally, for all trees within the development area, the plans shall accurately show the trunk diameter, dripline and clearly identify the TPZ. The type of protective fencing shall be specified and indicated with a bold dashed line.

Site Plans shall also include the following minimum information:

1. Surveyed tree locations, species, size (height, width, DBH). Dripline Area (including trees located on neighboring property that overhang or within 25 feet of the project site) and City Trees adjacent to the project site
2. Paving, concrete, Trenching, or grade change (including the limits of over-excavation) located within the Tree Protection Zone
3. Existing and proposed utility easements
4. Surface and subsurface drainage and aeration systems to be used
5. Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent
6. Landscaping, irrigation and lighting within dripline of trees, including all lines, valves, etc.

Tree Protection Zone

During the design phase of the project the Certified Arborist and the Project Manager will work together on developing the TPZ for each tree impacted by the project. If an unresolved disagreement arises between the Certified Arborist and the project manager on the size of a TPZ for a particular tree, the dispute shall be brought to the Director of Public Works, who will render a final decision on the size of the TPZ.

Each tree to be retained shall have a designated TPZ identifying the area sufficiently large enough to protect it and its roots. The TPZ shall be shown on all Site Plans including, Demolition, Grading, Irrigation, Electrical, Landscape, etc. Improvements or activities such as paving, utility and irrigation Trenching including other ancillary activities shall occur outside the TPZ, unless otherwise specified. The protection fence shall serve as the TPZ.

Activities prohibited within the Tree Protection Zone include:

1. Parking vehicles or equipment, storage of building materials, refuse, or excavated soils, or dumping poisonous material on or around trees and roots. Poisonous materials include, but are not limited to paint, petroleum products, concrete, stucco mix, dirty water or any material that may be harmful to tree health.
2. The use of tree trunks as a backstop, winch support, anchorage, as a temporary power pole, signpost or other similar function.
3. Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches, or other miscellaneous excavations without prior approval of the Certified Arborist.
4. Soil disturbance or grade change.
5. Drainage changes.

Verification of Tree Protection

The project contractor shall verify in writing that all pre-construction tree preservation conditions have been met as follows:

1. Tree fencing installed
2. Erosion control secured
3. Tree pruning completed
4. Soil Compaction preventive measures installed
5. Tree maintenance schedule established and the responsible party designated
6. Tree Protection Zone (TPZ)

The Project Manager, the City Arborist, City's construction inspector, and the contractor must sign this verification.

C. Activities During Construction and Demolition Near Trees

Soil disturbance or other damaging activities within the TPZ is prohibited unless approved by the Certified Arborist and mitigation for specific injuries is implemented. No encroachment within 5 feet of a trunk will be permitted under any circumstances.

Trenching, Excavation and Equipment Use

Trenching, excavation or boring within the TPZ shall be limited to activities approved by the Certified Arborist or either the Director of Engineering Services, Director of Public Works, the Director of Parks and Recreation, or Director of Planning and Building. Explore alternatives for trenching outside the root zone. Avoid exposing roots during hot, dry weather. Backfill trenches as soon as possible with soil and soak with water the same day. Small roots can die in 10 to 15 minutes and large roots may not survive an hour of exposure. If the trench must be left open all roots must be kept moist by wrapping them in peat moss and burlap.

If *Trenching* is unavoidable, the following distances should be maintained:

TRUNK DIAMETER (measured at 4.5 feet above natural grade)	DISTANCE FROM OF THE TRUNK ON BOTH SIDES
Up to 9 inches	5 feet
10-14 inches	10 feet
15-19 inches	12 feet
over 19 inches	15 feet

Alternative Methods for Hardscape to Prevent Root Cutting

The following remedies should be considered as an alternative to severing tree roots:

1. Grinding a raised walkway or concrete pad
2. Ramping the walkway surface over the roots or lifted slab with pliable paving
3. Re-routing the walkway around tree roots
4. Permeable paving materials (e.g., decomposed granite), interlocking pavers, or flagstone walkways on sand foundations
5. Root bridging

D. Tree Maintenance During Construction

Providing adequate maintenance can mitigate stressful changes that occur to a tree's environment during construction. To remain vigorous, the tree needs to maintain stored carbohydrates and preserve the effectiveness of its growth regulators. It is recommended that large projects provide:

Irrigation

Providing supplemental irrigation for trees under water stress may be the single most important treatment. Irrigation should be designed to wet the soil within the TPZ to the depth of the root zone and to replace that water once it is depleted. Light, frequent irrigation should be avoided. Create a six-inch berm around trees at the edge of the TPZ and fill with no more than six inches of mulch. Fill the basin with water. Irrigation should wet the top two to three feet of soil to replicate similar volumes and normal seasonal distribution.

Soil Compaction Mitigation

To prevent negligent encroachment into the TPZ, trees to be preserved during construction must have the specified type of protection fences in place at all times. Removal of fences, even temporarily, to allow deliveries or equipment access is not allowed unless approved by the Certified Arborist and a Root Buffer is installed. The Root Buffer components: mulch, gravel and plywood, must be maintained continually to assure its effectiveness against soil Compaction.

Dust Control

During periods of extended drought, wind or grading, trunks, limbs and foliage should be sprayed with water to remove accumulated construction dust.

SECTION 5 TREE REMOVAL

A. Tree Removal Objectives

Public trees are considered an important asset of the city. As such, it is the policy of the city to preserve trees whenever possible. There are certain conditions in which a tree must be removed, such as when it is considered an emergency. This includes trees identified as an imminent hazard and/or trees that exceed the threshold of risk. Other conditions require the review and approval of the arborist.

B. Removal Criteria

Trees will be removed only when one or more of the following criteria are met:

1. The tree is in a state of decline due to disease or insect pest for which there is no likelihood return to good health.
2. The tree poses a safety risk that cannot be corrected or where an unreasonable safety risk would be created by the construction process or root pruning
3. Work improvements required to be made around the tree will likely kill the tree or render it a hazardous tree.
4. Tree preservation is not cost effective compared to the tree's monetary value
5. The tree poses a public nuisance because of its species, size, location, fruit and seed drop, limb breakage or other objectionable conditions such as smell.
6. The tree interferes with the growth and development of a more desirable tree.

If a public tree's root system has been found to be elevating the sidewalk to a degree greater than the city's policy where the tree's removal is not an option, the sidewalk repair will be made using an approved replacement or modification method which best corrects the sidewalk anomaly while minimizing harm to the tree.

C. Tree Evaluation for Removal

A tree must be evaluated and determined to be hazardous before it can be removed for hazardous reasons. It is the responsibility of the city to mitigate or abate any known hazardous condition of a tree that may be of questionable structure or deemed as hazardous. The arborist shall be responsible for hazard assessment of public trees, and will use the following criteria:

1. If a tree possesses a structural defect that may cause the tree or part of the tree to fall, and the condition is determined to be imminent, the tree is considered hazardous. Mitigation pruning or removal should be considered to reduce the level of risk.
2. If the hazardous condition cannot be mitigated or reduced to a less than significant level, then the tree shall be authorized by the city to be removed to abate the condition.

Evaluation of other factors that contribute to tree failure shall be considered, including the following:

1. Structural defects in the tree, including branches, trunk, and roots.
2. Potential unintended objects, including people, structures, or property use and occupancy.

Advanced assessment methods can include an evaluation of structural defects utilizing current methods of internal decay inspection available; soil/slope and/or creek bank stability; individual species' susceptibility to failure; pruning; history; decay weaknesses and any other

compromising or pertinent factors considered. This is an option or may be considered for high value trees. Evaluation of unintentional objects shall consider structures or activities under or around the tree (e.g., building, parking, pedestrian, recreational, utility lines, hardscape, etc.). Occupancy shall consider frequency of use, and whether the unintended object will be present when failure occurs. Consideration shall be given to whether the unintended object can reasonably be removed or isolated to mitigate the hazard.

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SECTION 6 REPLACEMENT AND PLANTING OF TREES

The City should develop a master street tree management plan that incorporates policy goals, designated street trees, species diversity, planting space criteria, and drought tolerance.

A. Tree Planting Specifications

The following specifications pertain to all trees that are to be planted within the public right-of-way or on publicly owned property:

1. Replacement trees should be selected from the street tree masterplan for recommended species.
2. The location of a replacement tree shall be subject to the approval of the arborist. A replacement tree shall be planted in a reasonable location as close as possible to the removed tree, unless otherwise noted in an approved streetscape or master planting plan.
3. The minimum size planting area for the tree species will be dictated by the street tree master plan.

B. Planting Stock and Materials

1. Quality
 - a. All plants and trees installed within the city shall conform to most current ANSI Z60.1 standard.
 - b. Plants shall be sound, healthy, vigorous, and free of plant disease and insect pests and their eggs.
 - c. Container stock shall be grown for at least eight months in containers and shall not be root bound or have girdling roots.
 - d. Trees shall not have been topped.
 - e. Nursery stakes shall be removed when tree is installed in the ground.
2. Miscellaneous Materials

When deemed necessary by the arborist, the following materials shall be used:

 - a. Support stakes shall be treated or untreated two-inch diameter lodge pole pine without the use of cross braces.
 - b. Tree ties shall be used and installed in a figure eight fashion to support the tree to the stakes at the bending point of the trunk.
 - c. Screened untreated mulch shall be used that are one-half to one inch in size and spread to a two-inch depth out to the edge of the root ball. The mulch shall be kept at least six inches away from the trunk and shall be applied to each tree at two times the diameter of the tree root ball.
 - d. Where appropriate for use along public sidewalks, 12-inch linear root barrier shall be used and shall be ten feet in length and placed on center with the tree and on the sidewalk or curbside only. Root barrier boxes or barrier circles that encircle the tree are not approved. Species selection should be suitable to minimize infrastructure conflicts.
 - e. Where sidewalk and parkway width are less than eight feet and new trees will be installed, tree well designs should consider reduction of trip hazards as approved by the arborist.
 - f. Stem guard devices are recommended for new trees in turf areas to help reduce damage to lower trunks by weed trimmers.

C. Planting Site Preparation

All debris, wood chips, pavement, concrete and rocks over two inches in diameter shall be removed from the planting pit to a depth dictated by the root ball size of the tree being installed, unless approved otherwise by the arborist.

D. Planting in Difficult Soil Conditions

1. Trees planted in turf areas shall have a ring of mulch. The turf shall be maintained a minimum of one foot from the new tree stem, with mulch placed on top of the root ball. The mulch shall be six inches away from and not touching the tree stem.
2. Occasionally, tree planting must occur in poor or difficult soil where standard planting techniques will result in poor-to-average performance or mortality. In this case, alternative or specified soils, such as engineered, amended or structural urban tree soil mix, including written specifications and physical samples, shall be submitted for approval by the arborist.
3. Planting schematic from International Society of Arboriculture located in Appendix C.

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SECTION 7 APPROVED STREET TREE PALETTE

Guided by Urban Forest Master Plan and/or Street Tree List.

References to parkway size, species diversity, etc.

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SECTION 8 HERITAGE TREES

A. Designation of Heritage Trees

Upon nomination by any person or city and with the written consent of the property owner(s), a tree, or trees may be designated as a Heritage Tree or trees. Heritage Trees may be located on City or private property.

Nominations for a Heritage Tree shall be reviewed by the [REDACTED] and the [REDACTED] shall make a recommendation on Heritage Tree nominations to the [REDACTED].

The Planning Commission may designate a tree as a Heritage Tree upon a finding that it is unique and of importance to the community due to any of the following factors:

1. It is one of the oldest and largest of its species located in [REDACTED]
2. It is a tree of unique form or species.
3. It has historic significance due to an association with an historic building, site, street, person, or event, or cultural significance.
4. It is a defining landmark or significant outstanding feature of a neighborhood which can include significant aesthetic, botanical, or ecological value.

B. Once Heritage Tree is Designated

Upon Planning Commission approval, the tree(s) shall be designated as a Heritage Tree(s). Any work on or in the vicinity of a designated Heritage Tree shall be done in accordance with this Manual and under supervision of an ISA Certified Arborist. The requirement for ISA Certified Arborist supervision may be waived in cases of hazardous trees or other cases where immediate action must be taken for public health or safety reasons.

After Planning Commission approval of a Heritage Tree designation, the City shall notify the property owner(s) in writing. A listing of trees so designated, including the specific locations thereof, shall be kept by the City.

Once designated, a Heritage Tree shall be subject to the provisions of this Manual unless removed from the list of Heritage Trees by action of the [REDACTED]. The Planning Commission may remove a tree from the list upon its own motion or upon written request. Request for such action must originate in the same manner and proceed through the same process as nomination for Heritage Tree designation.

Any person may appeal the designation of a tree or trees as a Heritage Tree(s), or the removal of such designation, in accordance with the procedures set forth in [REDACTED].

SECTION 9 EDUCATION AND COMMUNITY OUTREACH

A. Community Forestry Objectives

Education is an integral and primary element of a city's urban forest. Education tempers the use of regulations by empowering citizens. The City believes citizens will act responsibly if given the information they need to make sound decisions.

Distinct educational strategies can be developed to reach a wide range of affected people, including the general public, the development community (property owners, architects, realtors, investors, builders, and contractors), public agencies, and educational institutions. The common factor in educating these groups is to provide them with information about how proper tree planting, maintenance, and protection can contribute to and enrich the quality of life.

Additionally, awareness will be raised surrounding benefits of trees and the urban forest as a whole. Information circulation places trees and their care in front of the public and allows them to learn, understand, and relate to the City's forest management program. Additionally, public tree and community forest knowledge is raised, either through the Tree City USA celebrations, city social media, presentations, press releases, handouts, or conversations, raising the tree awareness of citizens will have a significant positive affect on the community forest at large.

B. Public Relations

There are several effective methods available for raising the awareness of citizens in terms of tree care. Many citizens are unaware that there are resources for information regarding proper tree selection, planting, and maintenance. The City will employ the following methods to educate its citizens and its staff.

1. Direct Public Relations are practiced when any city employee discusses tree care or tree issues with members of the public. All employees who have contact with the public concerning urban forest management issues will be trained to answer questions properly. Staff will carry International Society of Arboriculture handouts describing common tree issues and proper practices that can be easily distributed. Staff will also participate in regional tree related activities.
2. Indirect Public Relations are no less important than direct public relations and can often reach a larger audience. The City will provide news releases when appropriate, hold Arbor Day celebrations, provide exhibits in local fairs, and provide educational programs and material to schools. City social media will be the primary platform to disseminate information on urban forestry.

C. Distribution of Education Material

The City will develop and provide education material to be used as handouts, displays, and web-based resources. The City will develop an approach to educating its citizens and provide some of the following education material: flyers, newsletters, fact sheets, brochures, maps, and informational signs. Materials will be developed into infographics, diagrams, and visual representations where applicable to best convey messaging. In addition, the City will develop a section dedicated to the Urban Forest Management program on its website which will include

links to maintenance schedules, removal requests, heritage tree nomination forms and protected tree lists, educational materials, contact information and general tree care information.

D. Tree City USA

The City will become a Tree City USA or maintain Tree City USA status. There are many benefits to becoming designated as a Tree City USA that has immediate benefits for our community. This includes a framework for community forest standards: it elevates the public image of the City and of citizen pride, provides access to urban forestry related financial assistance and provides opportunities for good direct public relations.

To qualify as a Tree City USA community, a town or city must meet four standards established by The Arbor Day Foundation and the National Association of State Foresters. These standards were established to ensure that every qualifying community would have a viable Citywide tree program.

1. A Tree Board or Department
2. A Tree Care Ordinance
3. A Community Forestry Program with an Annual Budget of at Least \$2 Per Capita
4. An Arbor Day Observance and Proclamation.

E. Developing a Tree Advisory Commission (Tree Board)

The purpose of the City designated Tree Board will be to review and advise the city on its policies, procedures, programs, and operations regarding trees. They will assist in setting long term goals and strategies to promote and sustain a healthy, diverse urban forest.

The Tree Board will involve a diverse group of interested people such as city employees, volunteers, city council representatives, parks personnel, local business people, civic groups, etc.

The Tree Board will meet monthly with a designated City staff liason that is either the city Arborist. The Tree Board will also have an annual meeting with the city and the State Urban Forest Coordinator discussing the community, its challenges, and goals. Meeting topics include: Arbor Day event planting, tree planting event planting, consulting on Heritage tree applications, recommending urban forest budgetary needs to the city council, being notified of upcoming removal projects and routine trim cycles. The Tree Board will be involved in budgetary discussions in order to convey the need for sufficient funding.

The benefits of having a Tree Board to support urban forest related activities are immense. Involving residents, business owners, and policymakers creates wider awareness of what trees do for the community and provides broad support for better tree care.

SECTION 10 URBAN WOOD RECYCLING PROGRAM

A. Urban Wood Recycling Objectives

This program supports the City of [REDACTED]'s Sustainability Plan, Climate Action Plan, and/or Urban Forestry Management Plan to ensure the sustainability of the urban forest. The goal is to maximize sequestered carbon and utilize removed trees in the most efficient method possible. This effort is to utilize trees removed from urban environments for their highest potential environmental value. Environmental benefits are realized by diverting wood that would otherwise populate landfills and reduce greenhouse gas emissions that are released through traditional disposal processes. Co-benefits include sourcing local raw materials for construction, maximizing benefit from trees being removed, and displaying urban wood products in the community - telling the story of the City in which the trees matured.

B. Tree Recycling Plan

1. Trees that are removed are subject to be potentially repurposed for their highest use. This includes, but is not limited to, being milled into lumber, left in public spaces as natural architecture including wildlife habitat or crafted into useable products such as benches, picnic tables, new construction elements and / or other wood crafts/projects.
2. Suggested resources for wood processing can be found at urbansalvagedwoods.com & urbanwoodnetwork.org.
3. The selection criteria for urban wood shall be made at the discretion of the arborist.
4. Should wood not be eligible for repurposing into product, trees may be mulched or other biomass products for use in the community.

C. Species Replacement Plan

1. Tree replacement criteria should include a consideration for end of life uses, including lumber. For trees that are removed, with the potential for urban wood, a replacement tree from the Replacement Sustainable Species List (Appendix D) will be considered for replant.
2. It is recommended that these replacement species be selected in collaboration with local experts based upon the unique region and climate.

D. Urban Wood Public Construction Projects

1. Use of the certification standards as set by the Urban, Salvaged, or Reclaimed Woods Network and endorsed by the Urban Wood Network is recommended to ensure quality. (<https://urbansalvagedwoods.com/standards-for-certification-and-chain-of-custody-for-urban-salvaged-and-reclaimed-woods/>)
2. Urban wood should be considered in all city projects. To gain the maximized benefits of repurposed lumber from city trees, it is recommended that any new or modified public construction development that takes place within the city limits should include an urban wood element that is at a minimum cost of 1% of the overall project. This 1% is not in addition to project budget but can be included in items that would be necessary (i.e. locally sourced urban wood table vs harvested lumber table).
3. This measure assures that the market for the City of [REDACTED]'s urban wood is local and sustainable, maximizing the benefit of repurposed lumber from urban trees.

4. It is suggested that urban wood utilization plans be approved by the City of [REDACTED]'s planning department, if applicable. When approval is required, all project scope details shall be in accordance with all municipal construction and/or building code standards.

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SECTION 11 REFERENCES

ANSI A300: Standards for Tree Care Operations

ANSI Z133: Safety Requirements for Arboricultural Operations

ANSI Z60.1: Nursery Stock Standard

Guide for Plant Appraisal, Current Edition

ISA Tree Risk Assessment BMP

ISA Tree Pruning BMP

California JPIA Tree Inspection and Maintenance Policy

Tree Care for Birds and Other Wildlife BMP

<https://www.urban-forestry.com/city-trees-roundtables>

<http://www.isa-arbor.com/education/onlineresources/cadplanningspecifications.aspx>

<http://www.ansi.org>

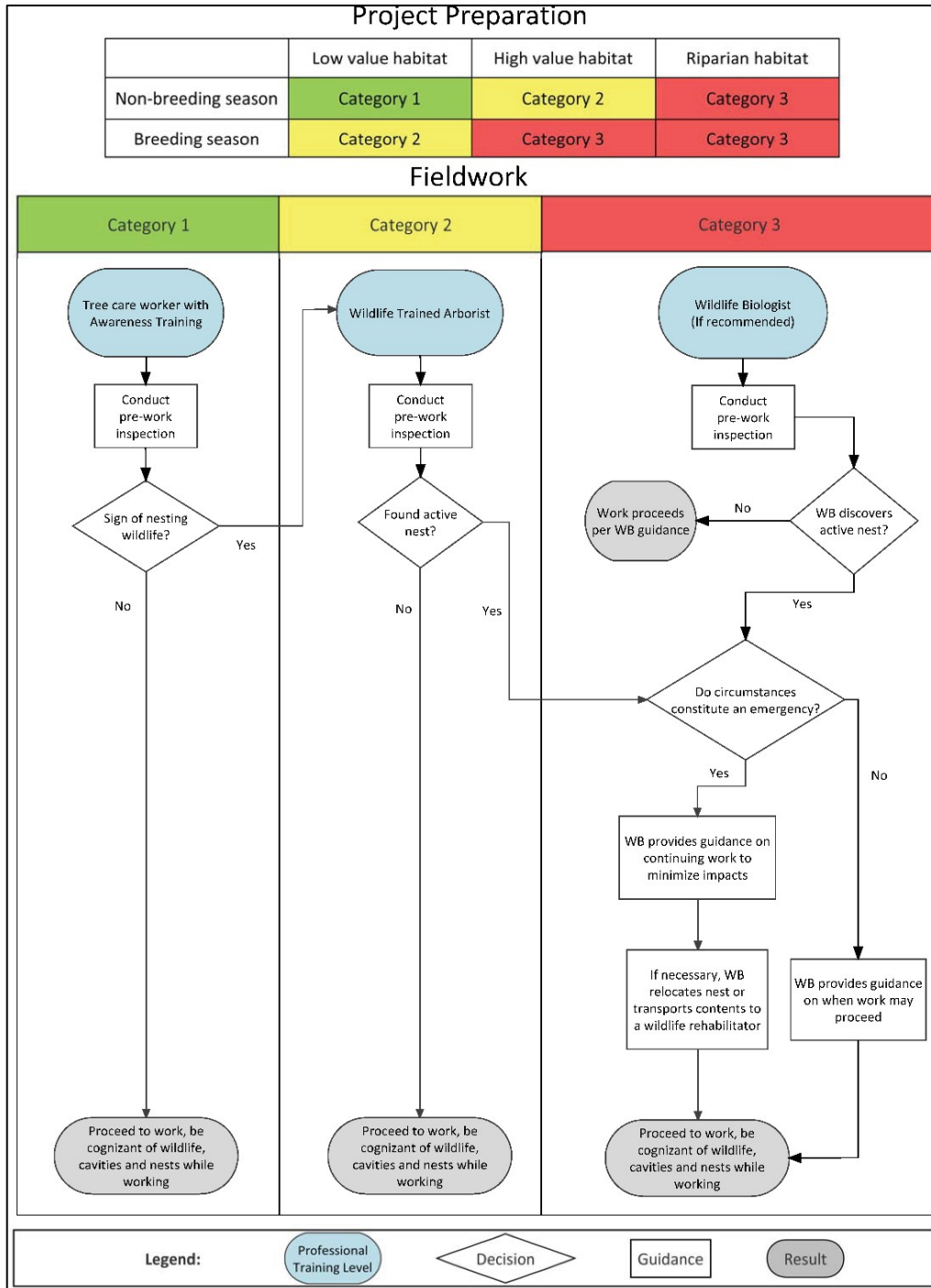
<https://www.arboday.org/programs/treecityusa/>

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SECTION 12 APPENDICES

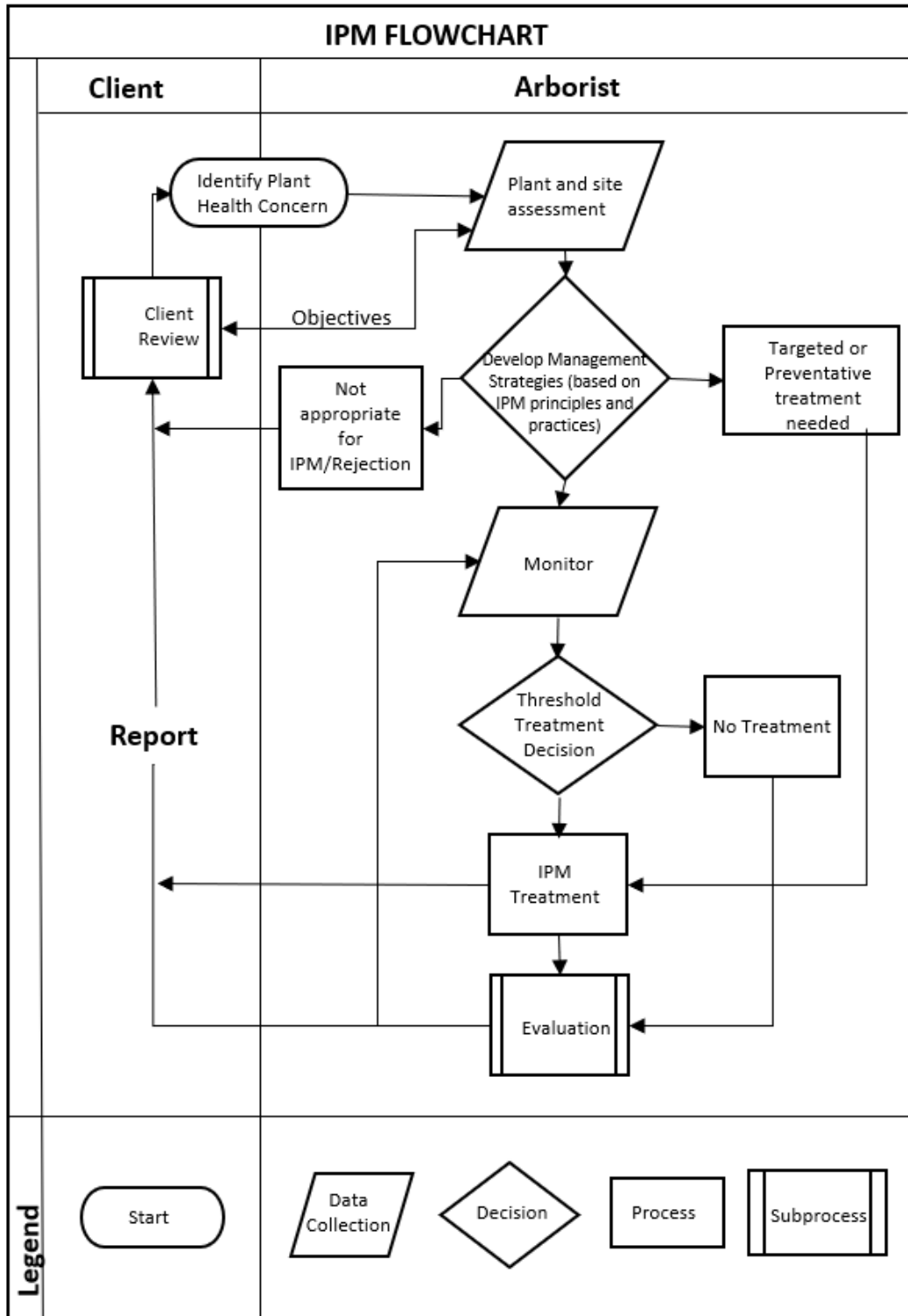
Appendix A

Tree Care for Birds and Other Wildlife Best Management Practices Project Preparation Procedure



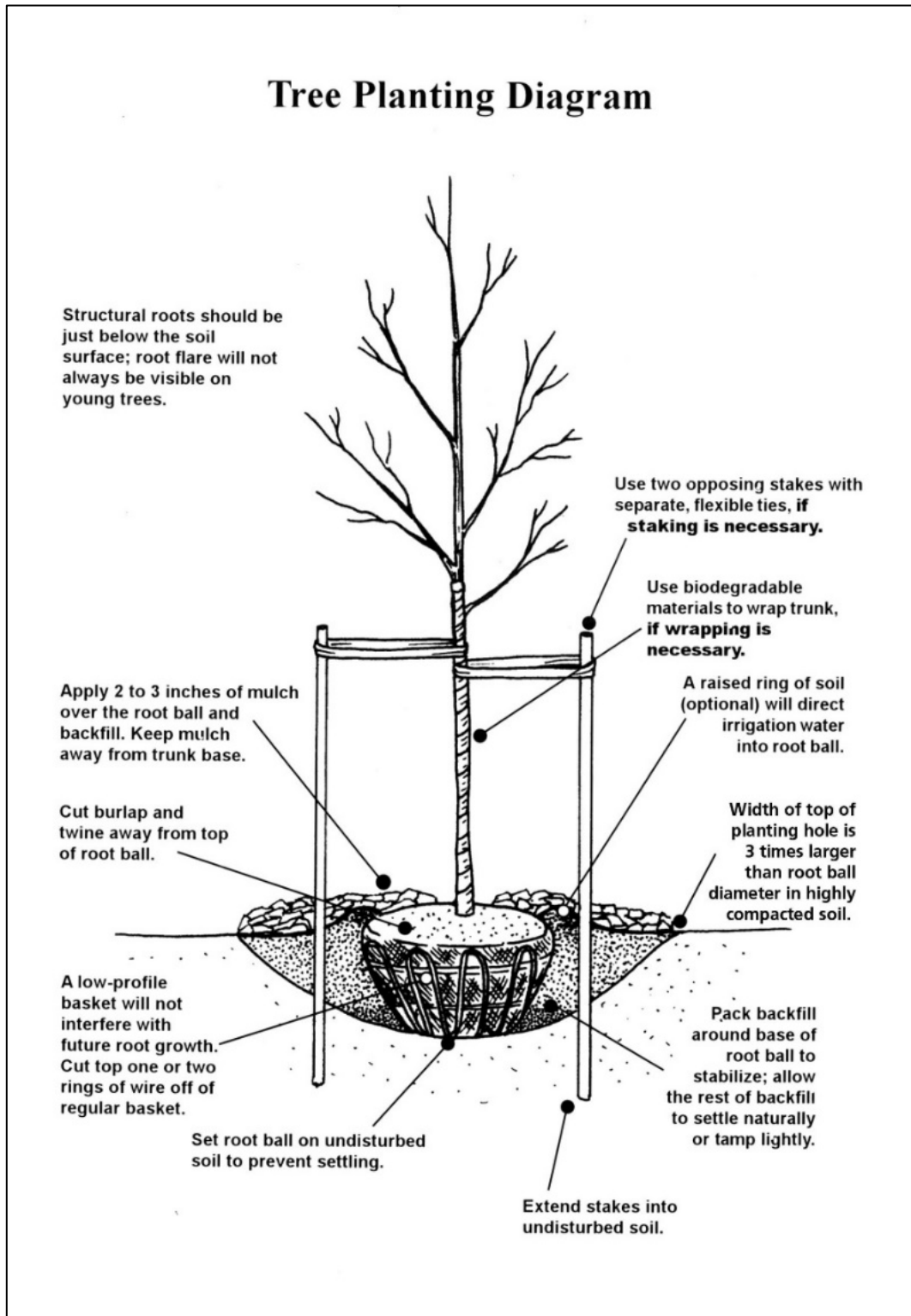
Appendix B

Integrated Pest Management Plan Flowchart



Appendix C

ISA Tree Planting Diagram



Appendix D

Urban Wood Sustainability Species List

Botanical name	Common Name	Type	Height	Spread	Growth Rate	Water use
<i>Acacia melanoxylon</i>	Black Acacia	Evergreen	40-50	20-30	Fast	Moderate
<i>Alnus cordata</i>	Italian Alder	Deciduous	40-50	25-30	Fast	Moderate
<i>Calocedrus decurrens</i>	Incense Cedar	Evergreen	50-70	15-20	Slow	Moderate
<i>Casuarina equisetifolia</i>	River she-oak	Evergreen	60-70	30-40	Moderate	Moderate
<i>Ceratonia siliqua</i>	Carob tree	Evergreen	30-40	30-40	Moderate	Moderate
<i>Cupressus arizonica</i>	Arizona cypress	Evergreen	30-40	15-20	Slow	Low
<i>Dalbergia sissoo</i>	Indian Rosewood	Deciduous	45-60	30-40	Moderate	Moderate
<i>Eucalyptus camaldulensis</i>	River red gum	Evergreen	45-150	45-105	Fast	Moderate
<i>Eucalyptus sideroxylon</i>	Red ironbark	Evergreen	30-90	30-60	Fast	Moderate
<i>Fraxinus uhdei</i> 'Majestic Beauty'	Majestic Beauty' ash	Deciduous	70-80	50-60	Fast	Moderate
<i>Gleditsia tricanthos</i> var. <i>inermis</i>	Thornless honey locust	Deciduous	50-60	30-40	Fast	Moderate
<i>Grevillea robusta</i>	Silk oak	Evergreen	50-65	25-40	Fast	Moderate
<i>Hesperocyparis macrocarpa</i>	Monterey cypress	Evergreen	45-60	45-50	Fast	Moderate
<i>Juglans nigra</i>	Black walnut	Deciduous	90-100	60-70	Moderate	Moderate
<i>Morus alba</i> 'Fruitless'	Fruitless mulberry	Deciduous	20-30	30-45	Fast	Moderate
<i>Pinus torreyana</i>	Torrey pine	Evergreen	40-50	30-40	Fast	Moderate
<i>Populus fremontii</i> 'Nevada'	Western cottonwood	Deciduous	40-80	30-50	Fast	Moderate
<i>Prunus caroliniana</i>	<i>Prunus caroliniana</i>	Evergreen	20-30	15-25	Fast	Moderate