PUBLIC DRAFT

Urban Forest Management Plan

City of Bell

JANUARY 2025

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Table of Contents

SECTION **PAGE NO.**

TABLES

EXHIBITS

APPENDICES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BMP	Best Management Practices
CAL FIRE	California Department of Forestry and Fire Protection
City/Bell	City of Bell
ISA	International Society of Arboriculture
PPS	Priority Planting Score
TPO	Tree Protection Ordinance
UFMP	Urban Forest Management Plan

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Acknowledgements

Fostering an ideal urban forest for the City of Bell and its future residents is a large-scale planning effort supported by City Council, City Leadership, Commissions, Committees, City departments, staff, and community members. The following individuals and Bell's community members all contributed to the development of the City of Bell's Urban Forest Management Plan.

CITY COUNCIL

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Council Member – Ana Maria Quintana
Council Member – Francis Flores

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Interim Public Works Director – John Oskoui
Public Works Field Supervisor – Jerry Hutchison
Community Services Director – Janine Andrade
Community Development Director – Manuel Acosta
Associate Civil Engineer – German Alvarez*
Community Services Recreation Supervisor – Alvin Tumala*
Community Services Recreation Coordinator – Victor Esquivel*
*Individuals who were involved in portions of the Urban Forest Management Plan (UFMP) development process.

INDIGENOUS PEOPLE OF THE COUNTY OF LOS ANGELES

The County of Los Angeles recognizes that we occupy land originally and still inhabited and cared for by the Tongva, Tataviam, Serrano, Kizh, and Chumash Peoples. We honor and pay respect to their elders and descendants — past, present, and emerging — as they continue their stewardship of these lands and waters. We acknowledge that settler colonization resulted in land seizure, disease, subjugation, slavery, relocation, broken promises, genocide, and multigenerational trauma. This acknowledgment demonstrates our responsibility and commitment to truth, healing, and reconciliation and to elevating the stories, culture, and community of the original inhabitants of Los Angeles County. We are grateful to have the opportunity to live and work on these ancestral lands.

This language was adopted from the Los Angeles County's 2023 "'We are Still Here': A Report on Past, Present, And Ongoing Harms Against Local Tribes" (County of Los Angeles, et al. 2023).

FUNDING

Funding for the City of Bell's Urban Forest Management Plan has been made possible in part by the Governor and Legislature from the 2022/2023 State General Fund as administered by the California Department of Forestry and Fire Protection (CAL FIRE) Urban and Community Forestry Program.

1 Vision

The City of Bell's urban forest, managed by the City and supported by the community, provides clean air and shade, fosters connection to nature, and improves the quality of life for current and future generations.

1.1 What is Urban Forest Management?

What is an Urban Forest Management Plan? The UFMP is a guide for Bell and its community members to better protect, care for, and advocate for the urban forest. Over the next 50 years, Bell's goals are to increase canopy cover and enhance the urban forest's sustainability and resilience to a changing climate. The UFMP includes discussions of both trees on private property and public property as urban trees contribute to overall urban forestry benefits regardless of growing on property ownership. The City only has jurisdiction to plant trees on publicly managed land, which is limited due to its highly urbanized land use. This means, trees planting, growing, and protected on private property are a big contributor to overall urban forestry benefits provided to the community. The UFMP summarizes the City's approach to progress towards these goals and evaluates how the community may be impacted. The UFMP's Strategic Plan presents short-, medium-, and long-term actions to realize the shared urban forestry vision. By design, the UFMP should be periodically reviewed to track progress and will be monitored using an online tool as identified in the Monitoring Plan. Methodology and data used in these analyses are captured in the supplemental UFMP Technical Assessment.

What is an Urban Forest? An urban forest refers to the collection of trees within urban areas on both private and public property. These trees collectively provide numerous environmental, economic, health, and social benefits to the community as illustrated in Exhibit 1. The term "urban" is used to describe the unique circumstances, challenges, and needs of trees planted in cities, which can be in difficult growing conditions close to buildings, or near concrete and asphalt. Urban trees that make up an urban forest require ongoing maintenance to ensure trees are safe for the community, and new trees must continue to be planted to ensure future Bell residents enjoy urban forestry benefits.

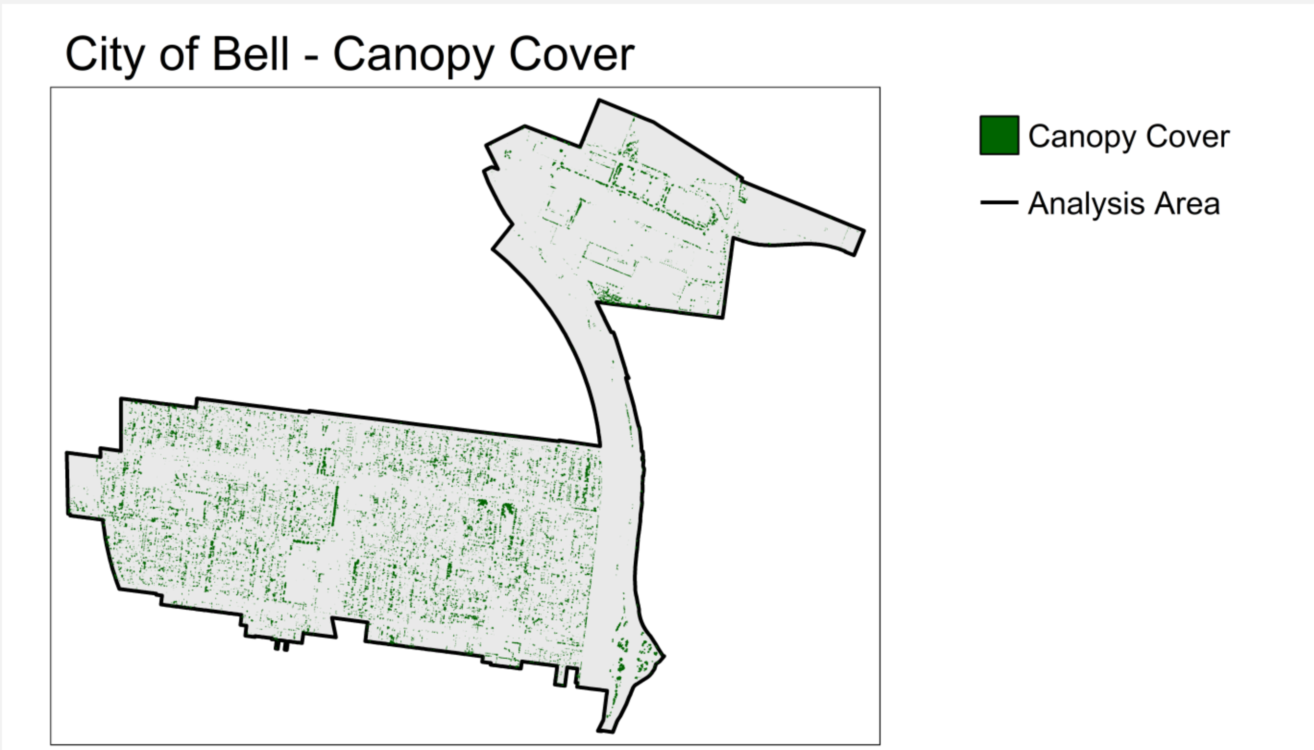
When a resilient urban forest is well-managed and maintained, it provides multi-benefit solutions to environmental issues, including increased temperatures, urban heat island effects, and air pollution. Investing in supporting the City of Bell's (City *or* Bell) urban forest results in a higher quality of life for the City's community members and visitors.

Exhibit 1. Benefits of Trees in an Urban Environment

Source: Dudek. 2025.

What is Canopy Cover? Canopy cover refers to the layer of tree leaves, branches, and stems that cover the ground when viewed from above. Canopy cover includes contributions from all trees on both public and private property. A city's canopy cover plays a critical role in the community's resilience to extreme heat and impacts of a changing climate by providing shade for pedestrians, improving air quality, saving water, and protecting infrastructure by reducing heat exposure to roads and sidewalks. Canopy cover can also be a measurement of how a city's urban forest is evolving over time by determining canopy gain and loss and identifying where the changes occurs. Canopy cover is a common method used to measure the progress and success of implementing the UFMP. Exhibit 2 illustrates the distribution of current canopy cover for the City of Bell throughout the city boundary. The City of Bell's city-wide canopy cover percentage was identified as 8.0% city-wide, using 2020 aerial imagery.

Exhibit 2. Bell's Canopy Cover – City Wide



Source: Dudek 2025.

What is a Tree Inventory? A tree inventory refers to the City's database containing the tree locations and characteristic details for all trees managed by the City. Bell's most recent tree inventory was collected in 2018 and includes street trees, park trees, and vacant planting sites. The City's tree inventory was analyzed to determine the environmental benefits and ecosystem services it provides and measured against urban forestry sustainability metrics such as species diversity, future climate suitability, and water use ratings. This analysis is used to make long-term management decisions that help maintain healthy and safe City-managed trees. Bell's tree inventory shows a total of 2,882 existing trees and 1,395 viable vacant sites with the Top 10 tree species in Bell displayed in Table 1. The i-Tree analysis of the environmental services and economic benefits of the full City inventory can be found in Appendix A.

Table 1. Top 10 Tree Species in Bell's Tree Inventory

Scientific Name	Common Name	Quantity in Inventory	Percentage of Total Inventory
Ulmus parviflora	Chinese elm	282	9.8%
Pyrus kawakamii	Evergreen pear	218	7.6%
Jacaranda mimosifolia	jacaranda	201	7.0%
Quercus ilex	Holly oak	182	6.3%
Lagerstroemia indica	crape myrtle	157	5.4%
Lophostemon confertus	brisbane box	149	5.2%

Table 1. Top 10 Tree Species in Bell's Tree Inventory

Scientific Name	Common Name	Quantity in Inventory	Percentage of Total Inventory
Geijera parviflora	Australian willow	129	4.5%
Afrocarpus falcatus	fern pine	122	4.2%
Pinus canariensis	Canary Island pine	99	3.4%
Cinnamomum camphora	camphor tree	97	3.4%

How was the Urban Forest Management Plan Developed? Development of the City of Bell's UFMP began with a through an analysis of the City's current tree management program and urban tree resources including canopy cover and tree inventory. The development process included a robust community engagement process to better understand community concerns and values while also encouraging advocacy for UFMP implementation efforts. Analysis of the urban forest and the management program were combined with community input to develop the City of Bell's UFMP and urban forestry goals. The community engagement process utilized an online survey and community engagement events to help identify the community's priorities for their urban forest. Table 2 provides a snapshot of community engagement efforts and Appendix I details all engagement efforts and results of the UFMP development process.

Table 2. Summary of Community Engagement

Engagement Method	Date	Number of Participants	Additional Giveaway Items
Online Survey	August 2023 – April 2024	18	N/A
Summer Concert Series 1	August 17, 2023	50	▪ 26 scrub Oak saplings ▪ Volunteer tree planting events in Lynwood and Southgate
Summer Concert Series 2	August 31, 2023	100	▪ 6 wildflower seed packets ▪ Field trip opportunities for Southeast Los Angeles students
Halloween Carnival	October 29, 2023	1,000	▪ Halloween Candy
Holiday Village	December 2, 2023	350	▪ Candy canes ▪ Interactive nature-based sensory activity

Source: Dudek 2024.

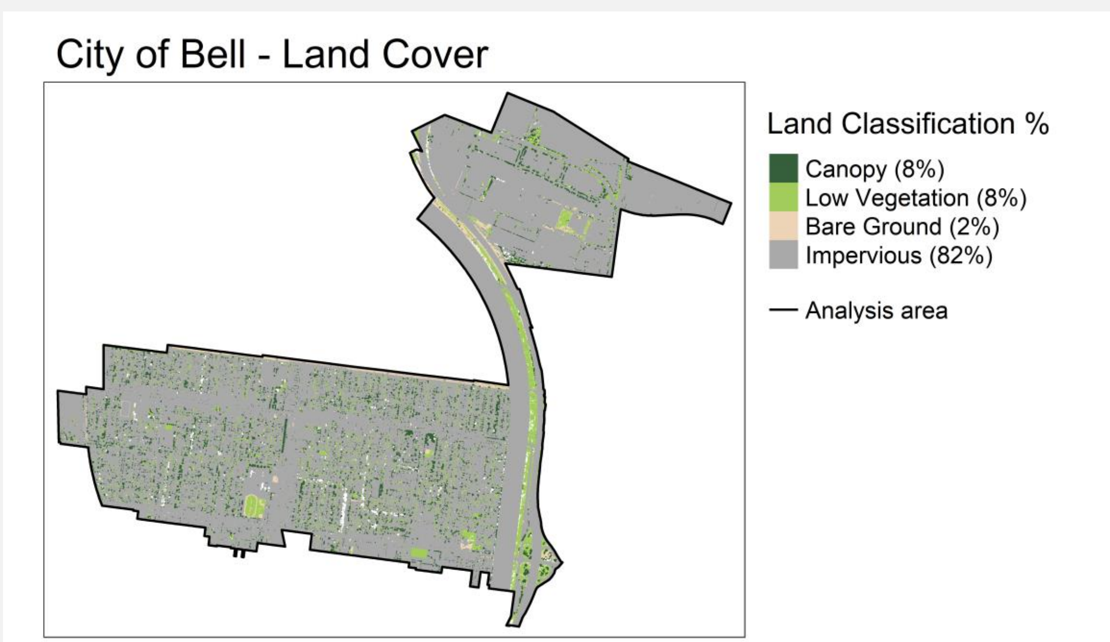
2 Bell's Need for an Urban Forest Management Plan

The City of Bell is centrally located within the greater Los Angeles metropolitan area, approximately 10 miles southeast of downtown Los Angeles. The City has a total land area of 2.6 square miles (City of Bell 2018). The northern portion of the City is located to the north of the Central City area and east of the Los Angeles River and Interstate 710 (City of Bell 2018).

The land area that is included within the corporate boundaries was originally inhabited by Native American tribes, including the Gabrieliño-Tongva Indian Tribe. The land was then settled as part of Rancho San Antonio by Don Antonio María Lugo for Spain in 1810. In 1876, ownership of the land transferred to James George Bell for whom the City was renamed due to his influence in expanding ranching, farming, and development. Bell was incorporated as a general law city in 1927 and experienced substantial population growth after World War II (City of Bell 2018). The historical vegetation types included chaparral, coastal sage scrub, grasslands, and riparian species along rivers and streams resulting from its geographical proximity to the Los Angeles River Watershed and San Gabriel Mountains foothills (Millar 2012). Chaparral populations occurred in patches throughout the City and included manzanita (*Arctostaphylos* sp.), scrub oak (*Quercus dumosa*), ceanothus (*Ceanothus* sp.), and toyon (H*eteromeles* sp.*)* (Tyrrell 1982). The riparian region of the City included woodlands consisting of willow, cottonwood, sycamore, and oak varieties (Griggs 2009). Vegetation cover is now limited due to high levels of urbanization, development, and paving, and many of the original vegetation types and plant species are no longer commonly found.

Bell is a highly developed and urbanized area, with 82% of the City's land area covered with buildings, roads, parking lots, and sidewalks, which amplify extreme heat in the City as seen in Exhibit 3.

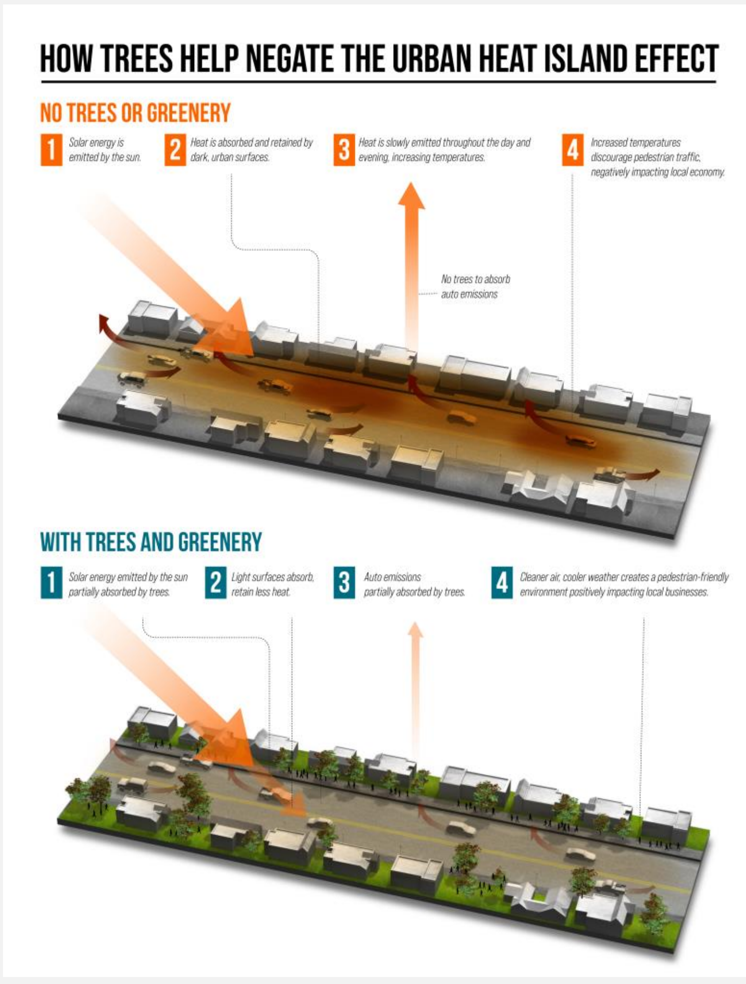
Exhibit 3. Landcover Classification of Bell



Source: Dudek 2023

The presence of such impermeable surfaces, any material that does not allow water or other fluids to pass through it, limits space to grow trees and increases reflective and residual heat, contributing to increased temperatures and the urban heat island effect. The urban heat island effect is the concept of hardscape absorbing heat while temperatures are high during the day and releasing heat during the night when urban areas are meant to cool down, increasing heat experienced by urban communities, as illustrated in Exhibit 4. Strategically planting trees and utilizing tree canopy to provide shade and cool surface temperatures is a way to reduce the urban heat island (Cheela 2021). Planting and maintaining trees surrounding major freeways can act as a barrier to noise and air pollution, reducing such negative health impacts and improving local air quality (Nowak et al. 2018). With the projected higher heat and the changing climate impacting Bell's future residents, providing a protective shade canopy can mitigate some of these effects and help residents to continue enjoying the outdoors.

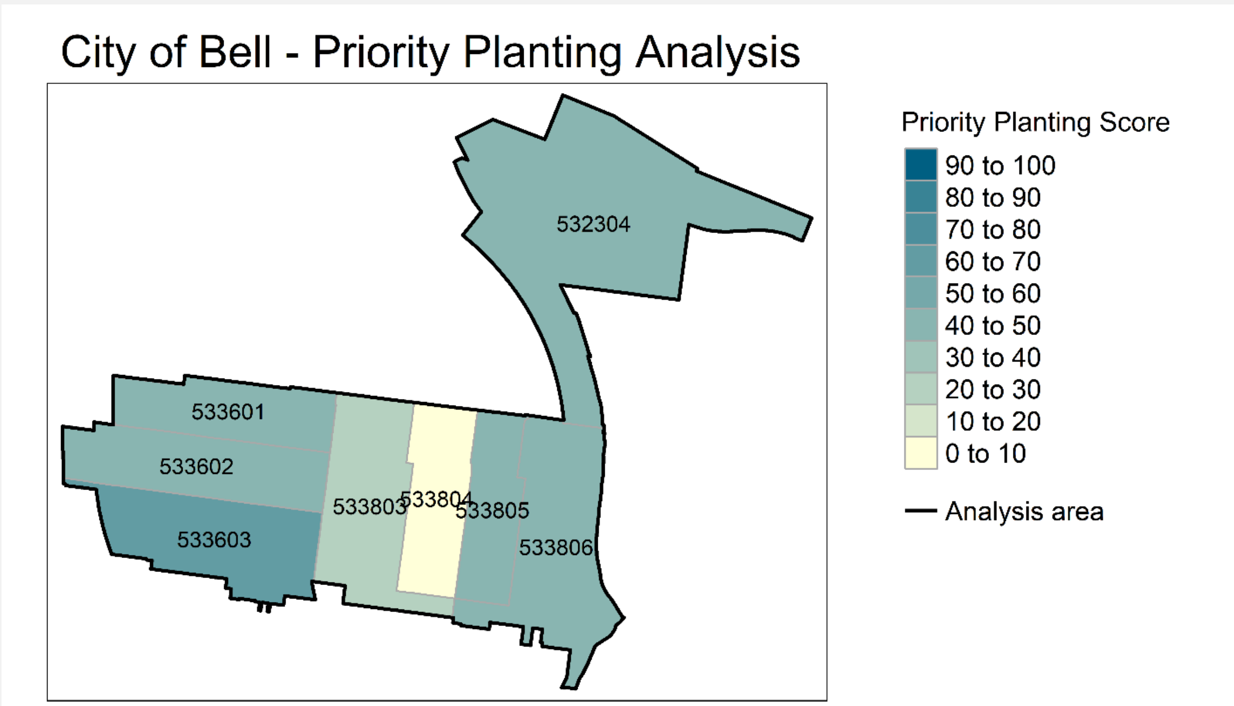
Exhibit 4. Urban Heat Island Effect



Source: Dudek

The City consists of two distinct geographic areas that are connected by the Los Angeles River and Interstate 710. Proximity to high-traffic areas, such as freeways, increases pollution experienced throughout the City, which increases potential for various respiratory and cardiovascular issues, and in addition, can impact the overall growth and development of trees (EPA 2017). Pollution burden, combined with current canopy cover, distribution of land use type, total recorded City-managed vacant planting sites, and relative population and acreage, are combined to determine a priority planting score (PPS) per census tract as presented in Exhibit 5. Planning for the future urban forest requires many considerations. Although this analysis points to areas that are priorities for planting, the City must also consider opportunistic partnerships and funding sources to reach its overall urban forestry goals. This means that areas with a low PPS may gain newly planted trees before low PPS areas due to pursuing opportunistic funding.

Exhibit 5. Priority Planting Analysis

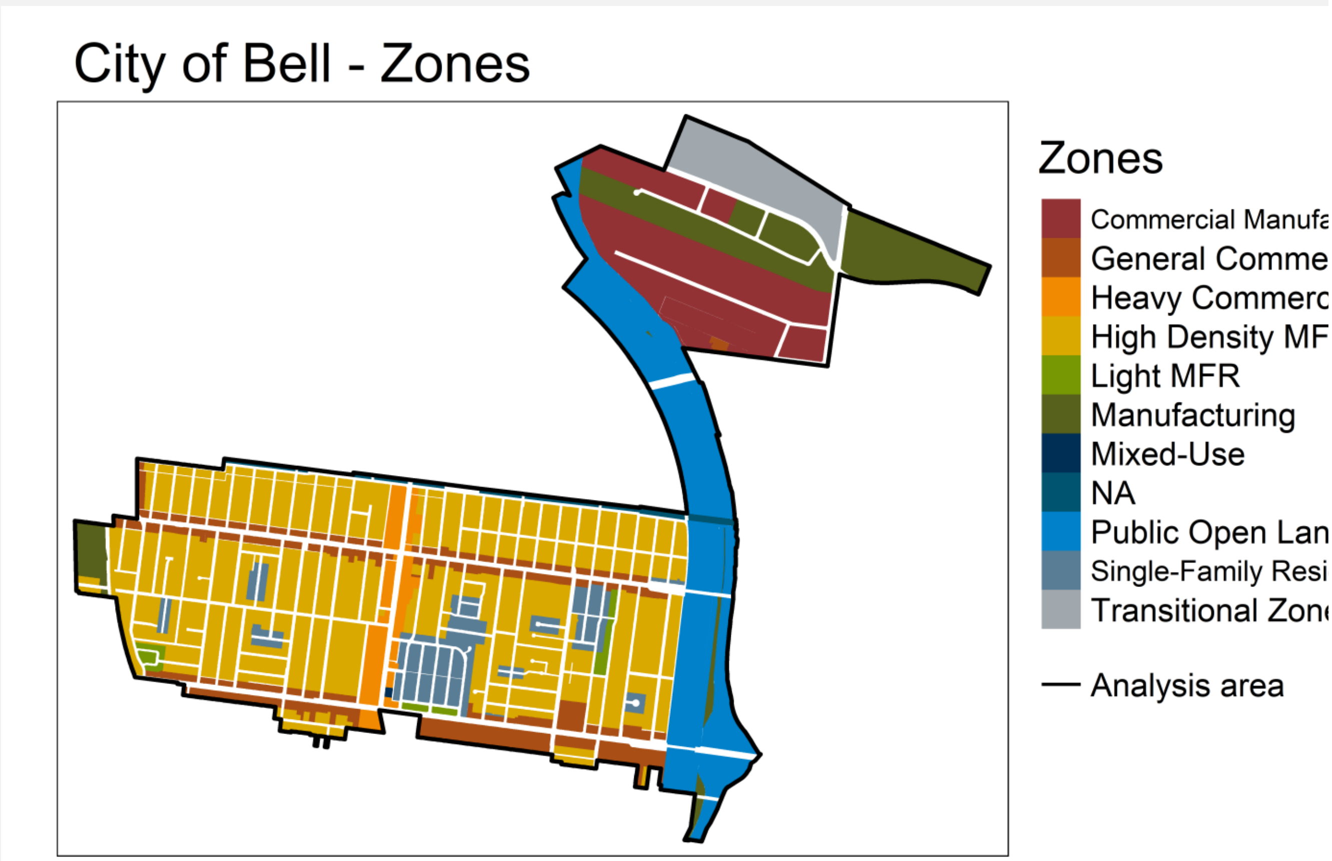


Source: Dudek. 2024.

The City's northern portion is an industrial zone and as a result, has a canopy cover ranging from 0% to 5%, with low potential for creating new planting spaces through pavement removal. Land devoted to industrial use accounts for approximately 390 acres, or 21.7% of the City's total land area. Viable future tree planting sites are limited by the large presence of industrial land use throughout the City as seen in Exhibit 6. With low potential for tree planting in Bell's industrial areas, it is crucial to maximize canopy cover in other areas of the City, including residential and commercial areas to meet urban forestry goals. Modifying parameters of zoning codes, development codes, and landscaping guidelines to include Tree Protection Zones, removal and replanting requirements, or in-lieu fee banks for urban forestry efforts is one method the City can encourage developers working in Bell contribute to overall urban forestry efforts. Emphasizing the importance of selecting a tree species that will maximize canopy cover potential within these development guidelines is crucial, as tree planting spaces are limited in Bell. This means each site's maximum canopy cover potential must be captured, and each site where a species is selected with a smaller canopy than the maximum that can be gained, limits Bell's feasibility on reaching the canopy cover target.

The southern portion of the City includes residential neighborhoods and commercial districts bounded by Randolph Street to the north and Florence Avenue to the south. Commercial development is concentrated along the City's major thoroughfares: Florence Avenue, Gage Avenue, and Atlantic Avenue, with the dominant commercial district extending along the Atlantic Avenue corridor (City of Bell 2018). These areas are identified by the City and regional partners as paths of travel and the City is actively involved in enhancing the urban forest through these Capital Improvement Projects and regional development projects. These opportunities allow Bell to utilize available, yet limited, resources for urban forestry efforts strategically. Increasing canopy cover in commercial districts and thoroughfares help Bell progress towards their goal of 15% canopy cover city-wide by 2075.

Exhibit 6. Bell's Canopy Cover per Zoning

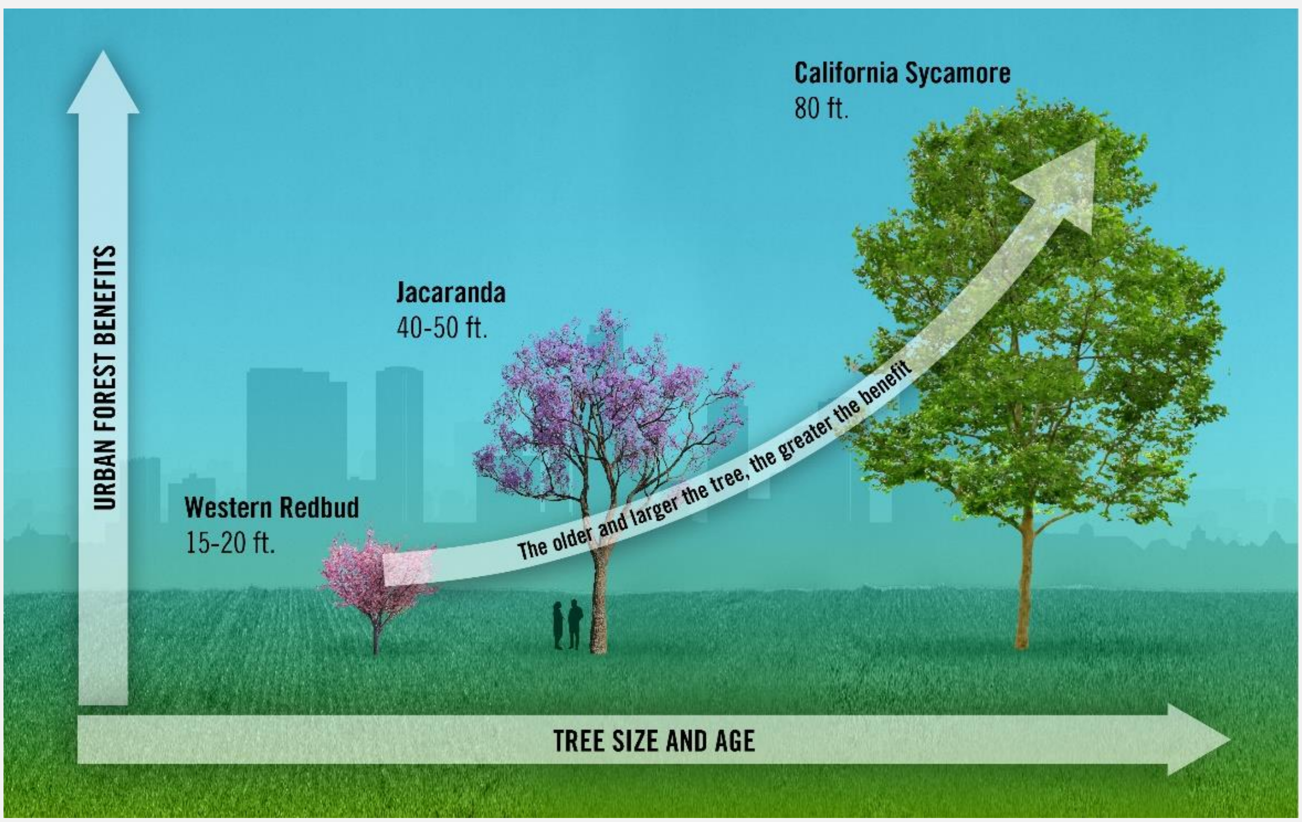


Source: Dudek (2023).

The City's unique land use types and highly urbanized landscape results in a limited number of tree planting spaces available in public areas. This emphasizes the importance of planting and protecting trees on private property, which contribute to overall urban forestry benefits for Bell's community members. Community members can help enhance their urban forest in a variety of ways including, which can be as simple as planting shade trees in suitable spaces on private properties, participating in urban forestry events, and advocating for urban forestry funding.

Maximizing canopy cover of each tree site includes selecting the largest stature species appropriate for each available planting site. Because planting spaces are limited, the City must place a high value on each individual tree and utilize every available space to its full potential as seen in Exhibit 7. In addition, the quantity of Bell's current viable vacant sites leaves approximately 3,220 trees that need to be planted. To add trees to publicly managed land, and the City's tree inventory, the City must explore opportunities to depave impermeable surfaces and create new planting sites where they previously did not exist. Each new site created should maximize soil volume, aboveground and underground space for tree growth, and a large stature species should be selected to maximize canopy cover potential at each site.

Exhibit 7. Benefits of Large Stature Trees



Source: Dudek (2023).

According to the most recent 2022 census data, the City's estimated population is 33,377 persons with 8,870 housing units, 28% of which are occupied by their owner (Data USA 2024). Renters do not typically have control over tree-related decision-making where they live and cannot readily plant trees on their rental properties. This presents a challenge to the City to increase canopy cover on private property and achieving long-term goals. The City will need to engage renters and community members on how they can participate in urban forestry through volunteer events, advocacy, and care for trees.

Call Out Box: How Renters can Participate in Urban Forestry and Resources

The City is committed to maximizing urban forestry benefits for the community by managing City-maintained trees to arboriculture best management practices (BMPs) and urban forest sustainability principles, planting large-stature trees in each viable planting site, and enhancing urban forestry education and outreach opportunities. Enhancing Bell's urban forest requires fostering a community mindset that urban trees on private property are an important contributor to the urban forest and the community. The importance of urban forests in highly urbanized environments challenges the community to think holistically about trees, the natural environment, and the City's livability to protect urban trees as assets benefiting current and future generations.

3 Bell's Urban Forestry Key Findings

The following key findings were identified during the UFMP development process. Each key finding summarizes how it may impact Bell and its community members, and details how the City plans to address identified challenges. These key findings informed the vision, guiding principles, and actions of the UFMP, which will be used as a roadmap to a sustainable urban forest. The detailed analyses and methodologies are provided in the supplemental Technical Assessment.

3.1 No. 1: Community Members and City Staff Value the Urban Forest as A Key Contributor In Enhancing Bell's Quality of Life.

Bell's urban forest is a valued community asset. Bell's community members and staff believe that enhancing and providing urban forestry benefits for future generations is a priority for the greater community. Collaboration among the Public Works Department and Community Services Department to develop a community outreach program will foster community advocacy and support from City leadership, staff, and private residents, which will be critical in realizing Bell's urban forestry vision.

Private property trees contribute greatly to the City's overall canopy cover. Community engagement efforts throughout the UFMP development process showed that residents are supportive of planting trees on private property to provide shade benefits and protection from heat.

Recommendation: The City will pursue funding, resources, and partnerships to provide residents with free private trees or programming, which may include private tree giveaways for shade trees, door-to-door outreach for tree adoption, rebates for tree planting or watering, and urban forestry education workshops. This education effort should focus on shade trees and the importance of maximizing canopy cover gained from private property trees.

Bell's residents value fruit trees. However, fruit trees increase maintenance needs when planted as street trees and provide less shade than larger stature shade trees. Due to Bell's small geographic area, encouraging the planting of large stature shade trees on private property is crucial to maximize potential canopy cover in the limited space available.

Recommendation: The City promotes utilizing parks and recognize that the geographic limitations of Bell place an even greater value on providing accessible community-based greenspaces throughout the community. These green spaces are seen as an opportunity for gathering and may be an appropriate place to plant a food forest. Planting a food forest in a publicly accessible space addresses the community's desire to have fruit trees while also leaving space on private property to plant shade trees. Identifying an optimal public space to create a food forest requires further discussion among City staff and consideration of each potential site's likelihood to be competitive for grant funding. The City qualifies for grant funded opportunities and strategic planning will assist in funding the enhancement of Bell's urban forest.

3.2 No. 2: If Bell Does Not Enhance Their Urban Forestry Program, The City Is Projected to Lose Nearly Half Of Its Current Tree Inventory.

Bell's urban forest is managed as funding becomes available. Without dedicated staff and resources to implement the newly developed UFMP, the City will continue to lose publicly managed trees. If the City continues to remove trees without replacement and does not invest in an active planting program, the City will lose approximately 50% of their publicly managed trees by 2075.

Recommendations: Following the roadmap developed through the UFMP, the City can enhance their urban forestry program to provide further analysis to determine how to meet a city-wide canopy cover goal of 15% by 2075.

3.3 No. 3: Bell's Urban Forestry Program Needs Dedicated Staff and Resources to Meet Its Long-Term Urban Forestry Goals.

The need for designated urban forestry staff, budget, and resources has cascading effects which prohibit the City from having an effective urban forestry management program.

Lack of Dedicated Urban Forestry Funding: The City manages its urban forest as funding allows and does not have dedicated staff or budget for urban forest management. Recent staff turnover and inability to hire and retain positions within the Public Works Department has left the City without an International Society of Arboriculture Certified Arborist to manage urban forestry operations. Utilizing Public Works staff with competing demands and varying levels of urban forestry knowledge, as Full Time Equivalent staff, does not allow for effective and efficient urban forest management.

Missed Opportunities to Enhance the Urban Forestry Program. Current urban forest management is reliant on capacity of employees with competing demands. Without an investment into designated urban forestry staff, opportunities to save cost, enhance efficiency, or reallocate funding for more effective management is missed. The proposed staffing structure is illustrated in Exhibit 8.

Example Opportunity: Current Pruning Cycle vs. Recommended Cycle. The City practices a 2-to-3-year grid pruning cycle, which is a more frequent than the municipal urban forestry standards in managing a safe urban forest. Increasing the pruning cycle to 7 years allows for the reallocation of this funding to support other urban forestry enhancement activities such as tree planting or establishment care, which support newly planted trees to maturity.

Ineffective Record Keeping, Unreliable Tree Inventory Data, and Lost Staff Time. The City frequently partners with nonprofit organizations and community-based partners to plant trees and pursue grant funding for urban forest enhancement. However, the City experiences a delay when inputting tree work performed by other entities or in-house, resulting in unreliable data of publicly managed trees. Not capturing urban forestry work records is a missed opportunity, as recent urban forestry investments made by the City are not reflected.

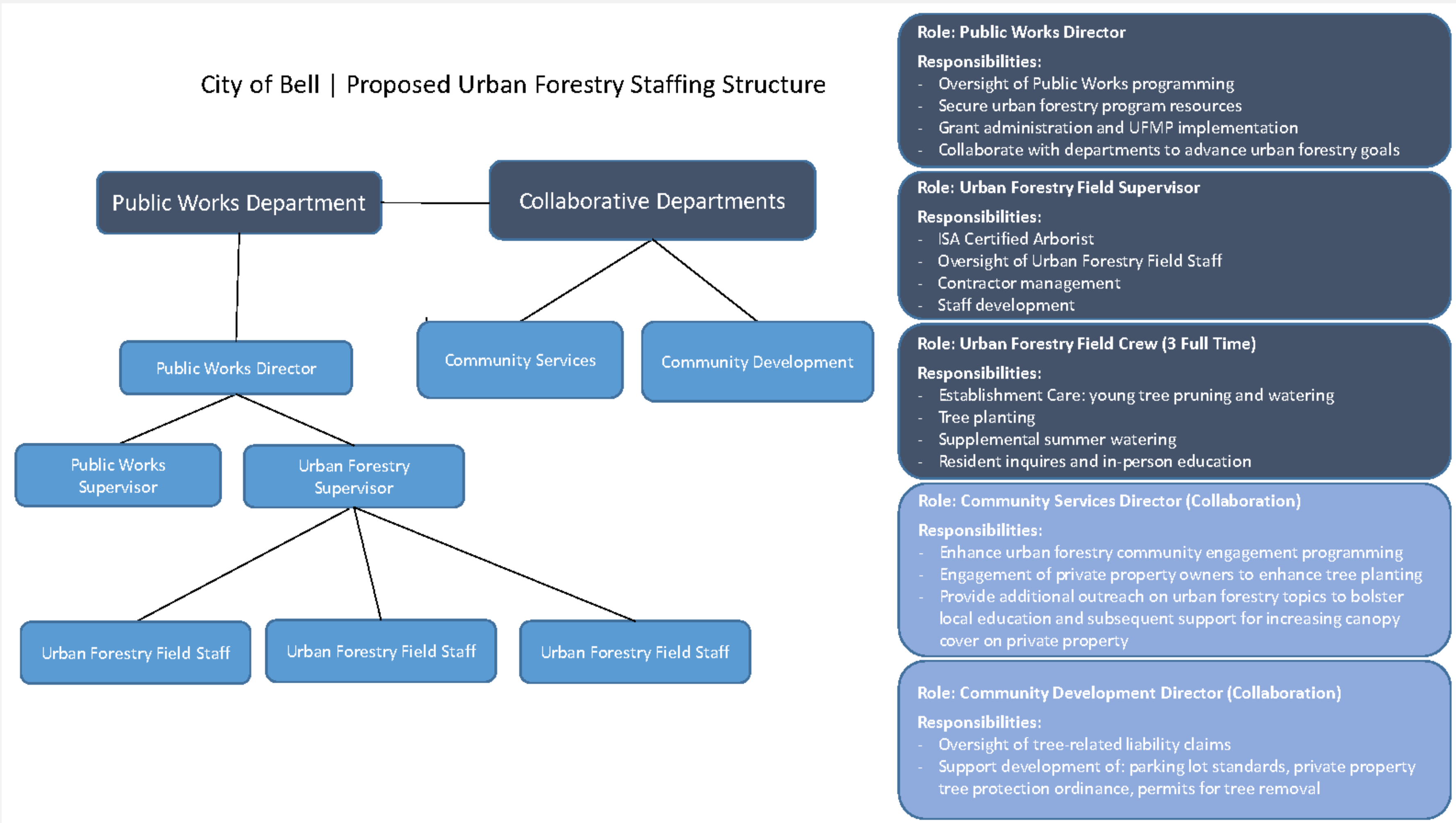
Unreliable data prohibits effective administration and reporting for grant-funded projects, where staff time spent on accurately reporting progress can be considerable, as the grant supporting data is not reliable. The current level of administrative support and process does not provide staff with the necessary data and tools to effectively plan for urban forest management.

Recommendation: The City has multiple positions within the Public Works Department that are vacant but not specific to urban forestry. This means the budget already invested in urban forestry through Full Time Equivalents, is not being used due to hiring challenges.

Ensuring the urban forestry program is managed by an ISA Certified Arborist with the necessary urban forestry expertise will help Bell recognize opportunities to effectively align with arboricultural BMPs. Allocating funding to either hire, consult, or support existing staff to become an ISA Certified Arborist, will help the City identify when operational efficiencies can be enhanced. Funding currently used in the too-frequent pruning cycle may be reallocated to support staff development in arboricultural knowledge and skills. Dedicating staff specifically to urban forestry provided highly skilled job opportunities for their community members, while fostering responsibility and ownership of the program for City staff. Establishing budget and staff for the urban forestry program protects the City's initial investment in tree planting and will help ensure the recommendations of Bell's UFMP are implemented, progressing towards the City's urban forestry goals.

During the development process of the UFMP, the City hired a new Public Works Manager to fill a vacant position. Filling the Public Works Manager position is a step towards active urban forest management, however, the urban forestry program still lacks an ISA Certified Arborist to oversee the program. This additional staff member is not considered a dedicated staff person for the urban forestry program and dedicated staff and budget remain a need.

Exhibit 8. Bell's Proposed Urban Forestry Staffing Structure



Source: Dudek (2023).

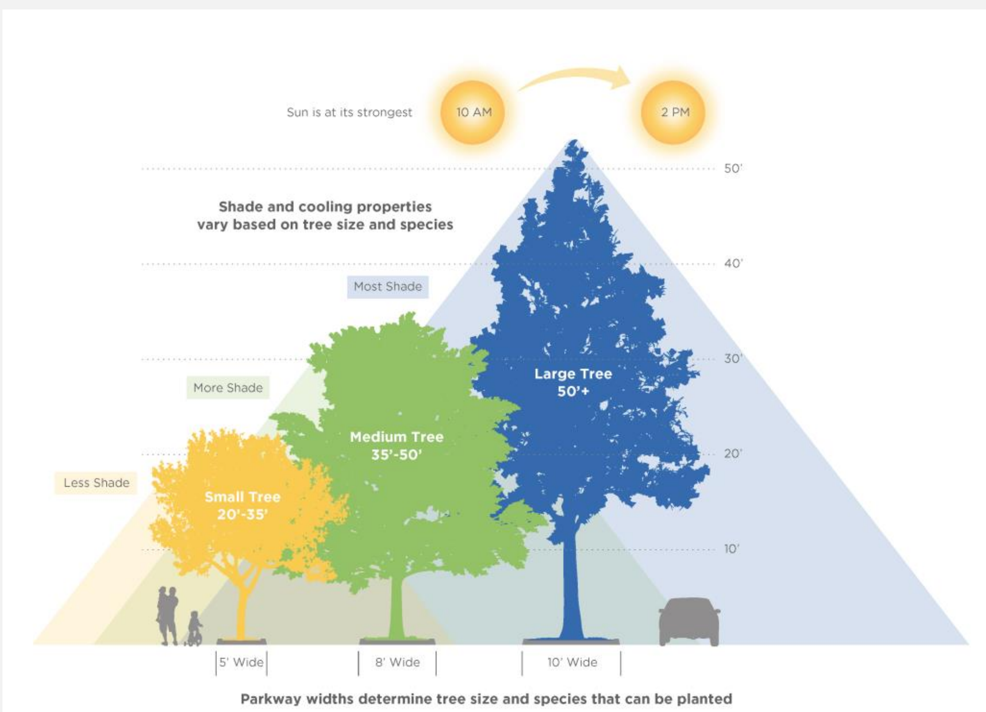
3.4 No. 4: The Dense Urban Environment Limits the Space for Public Trees.

Limited Planting Spaces. The City is committed to maximizing its potential tree canopy within public spaces by planting all vacant sites and modifying its urban forestry program to support newly planted trees to maturity. However, due to Bell's current land use, 82% of land is covered with buildings, roads, parking lots, and sidewalks; planting trees in public spaces is limited. These areas cannot be planted without site changes such as removing concrete to create tree wells. This is a costly task that will require a focused planning effort.

Due to a lack of readily available planting spaces, the City must maximize each opportunity to plant the "right tree in the right place" (Exhibit 9), and support trees to maturity by providing a level of care that meets arboriculture BMPs. Choosing the largest appropriate tree species for the available growing space maximizes the potential benefits for the limited space available for public trees.

Recommendation: Securing funding, long-term partnerships, and resources to remove hardscape and create new tree wells is a long-term City goal. These long-term efforts require collaboration on departmental, city-wide, and regional efforts. Seeking collaborative partnerships to apply for grant funded programs allows the City to strategically allocate budget and resources to other urban forestry enhancements. Pursuing grant funding is seen as a valuable effort as it is a fixed-use funding source that cannot be reallocated to other purposes as opposed to the City's budget, which can be reallocated.

Exhibit 9. Right Tree, Right Place



Source: Dudek (2023).

3.5 No. 5: Private Property Trees are Critical in Growing Bell's Canopy Cover.

Due to the lack of appropriate public tree planting spaces, trees planted on private property and the preservation of mature trees on private properties will be a necessary and impactful contributor in reaching the City's urban forestry goals. When residents plant, maintain, and protect trees on private property, they can individually enjoy the benefits of trees while contributing to canopy cover in their communities for generations to come.

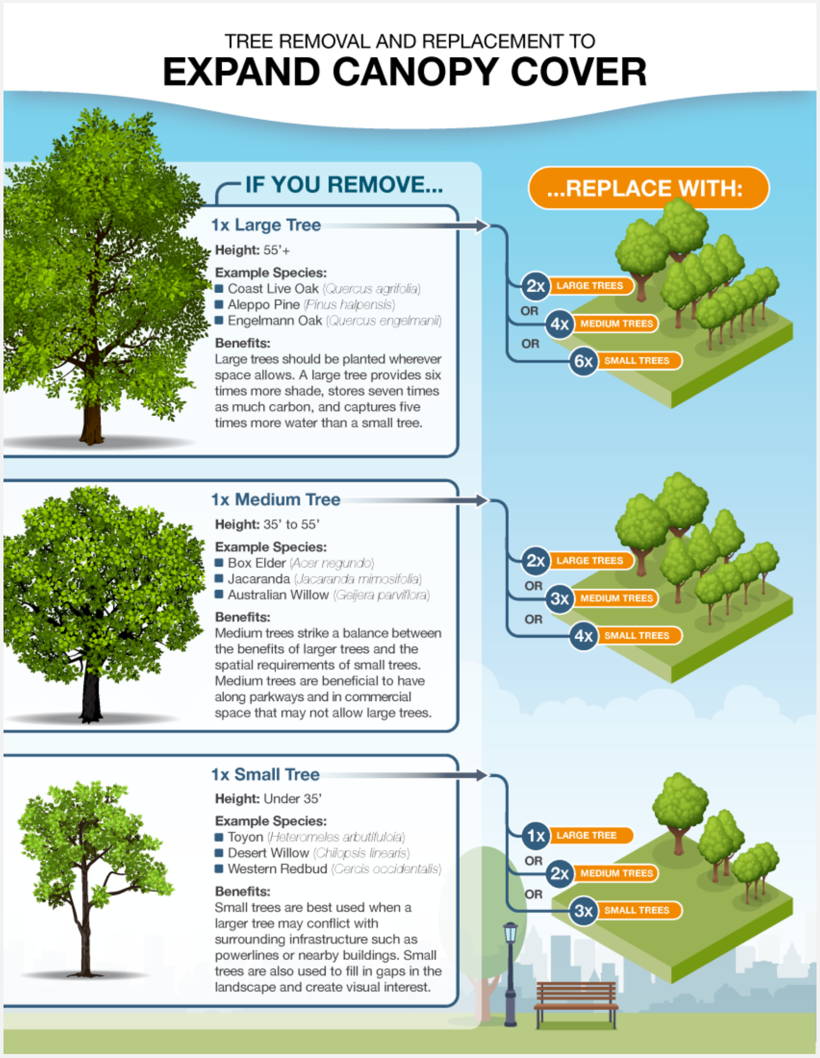
Preserving Mature Trees. Increasing canopy cover from private property trees by 25% requires preserving mature, shade-providing trees on private property. Mature trees provide greater carbon sequestration, air and water filtering, and shade benefits. Young trees need time to mature before providing a similar benefit to large, mature trees as seen in Exhibit 10. Trees also live much longer than humans, meaning it will take decades for a young tree planted now to provide the same benefits of a mature tree existing in the landscape.

Recommendation: A Tree Protection Ordinance (TPO) for trees on private property is another long-term goal that requires careful planning, collaboration, and leadership to achieve these efforts. TPOs establish official policies and set standards for conserving community trees and require a robust community engagement process to ensure the community supports tree protection on private land.

Planting Trees on Private Property. Planting trees with large mature stature on private property will contribute greatly to the City's overall canopy cover percentage.

Recommendation: Bell's community members showed great interest in the tree giveaway hosted as part of the UFMP development process. Community members expressed the desire for more tree giveaway programs for private property. Providing residents with resources such as how to plant the right tree in the right place, planting trees to maximize shade, proper watering guidelines, and free trees, will help plant more trees throughout residential neighborhoods, which contribute to the City's overall canopy cover.

Exhibit 10. Mature Tree Benefits vs. Young Tree Benefits



Source: Dudek (2023).

Bell's urban forest in 50 years will provide residents with more shaded paths of travel, cooler and cleaner air, access to green spaces, and a better quality of life overall.

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4 Strategic and Implementation Plan

The Strategic and Implementation Plan includes Guiding Principles, urban forestry goals, and recommended actions for 'short- ', 'medium- ', and 'long-term, for 5 years, 15 years, and to complete at the 50-year mark, respectively.

During UFMP development, the City identified areas of improvement within their management program and created the following Strategic Plan to progress towards sustainable urban forest management principles. Recommended actions and how they relate to strategies and guiding principles are displayed as on-going-, short-, medium-, and long-term actions in the implementation plan with responsible parties and estimated costs. Implementing the short-, medium-, and long-term actions of the UFMP will fulfill the incremental milestones to reach these long-term canopy cover and urban forestry programmatic goals of the City of Bell.

4.1 Vision

The City of Bell's urban forest, managed by the City and supported by the community, provides clean air and shade, fosters connection to nature, and improves the quality of life for current and future generations.

4.2 Guiding Principles

Guiding Principles are overall concepts that influence the goals and actions of the UFMP. Themes discovered through the UFMP development process were captured as Guiding Principles as illustrated in Table 3. Urban forestry goals and recommended actions follow, which will help actualize the vision for Bell's urban forest.

Table 3. Guiding Principles and Strategies

#	Guiding Principle	Strategy
1	Canopy Cover is Maximized on Public Land	Increase operational efficiencies and identify collaborative opportunities to optimize current resources and increase potential resources for the City's urban forestry program.
2	Bell's Urban Forest Aligns with Environmental and Sustainability Principles	Foster the growth of an adaptive urban forest through intentional planning and management that considers future climate conditions.
3	Community Supported Urban Forestry	Enhance planning for, support of, and resources for community engagement and education opportunities to foster the community's connection with, appreciation for, and understanding of their urban forest.

4.3 Urban Forestry Goals

Urban Forestry Program Goal: Become a Tree City USA by 2030.

The City's most recent fiscal year spending shows a per capita spending of $4.11 on urban forestry efforts. This spending exceeds the minimum requirement of $2 per capita annual spending for urban forestry efforts and therefore, meets one of the four requirements to apply for the Tree City USA program. The City has a volunteer annual tree planting partnership with local community groups. Designating this annual celebration as the City of

Bell's Arbor Day, will meet this requirement. However, should partnership opportunities decrease, to maintain the Tree City USA recognition, the City will be held responsible for meeting this requirement. The remaining requirements include having a Tree Board or Department and adopting a Tree Ordinance. The Tree Board may consist of City leadership, staff, or community members who are invested in Bell's urban forest. The Tree Board may provide oversight on the implementation of urban forestry policies, advocate for funding, or support staff in engaging community members. The Tree Ordinance codifies tree protection, removal, and replacement requirements through regulation of developers and private property. Developing a Tree Ordinance requires a robust community engagement effort and community buy-in and is identified as a long-term goal for the City.

Through the recommendations of this UFMP, with designated allocations to the program, staff can establish a tree board, host an Arbor Day Celebration annually as part of the enhancement to the community engagement program, and pursue long-term goals like developing a tree ordinance with urban forestry designated staff and enhanced capacity to carry out the program. To implement the UFMP and achieve Bell's urban forestry goals, each goal and recommended actions, associated guiding principles, responsible parties, and timeframe (Table 4), are detailed in the Implementation Plan (Tables 5 and 6).

Table 4. Implementation Plan Definitions

Acronym	Department
CD	Community Development
CMO	City Manager's Office
PW	Public Works
CS	Community Services
Short	Reach by 2030
Medium	Reach by 2040
Long	Reach by 2075

Table 5. Implementation Plan – Becoming a Tree City USA by 2030.

<table>
<tr><th colspan="6">Urban Forestry Goal: Become a Tree City USA by 2030.</th></tr>
<tr><th colspan="3">GP#1: Canopy Cover is Maximized on Public Land</th><th colspan="3">GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles</th></tr>
<tr><td colspan="3">What this means: Increase operational efficiencies and identify collaborative opportunities to optimize current resources and increase potential resources for the City's urban forestry program.</td><td colspan="3">What this means: Foster the growth of an adaptive urban forest through intentional planning and management that considers future climate conditions.</td></tr>
<tr><td colspan="3">Strategy: Optimizing urban forestry resources.</td><td colspan="3">Strategy: Develop a Tree Board or Department.</td></tr>
<tr><td>Implementation Actions</td><td>Dept</td><td>Term</td><td>Implementation Actions</td><td>Dept</td><td>Term</td></tr>
<tr><td>Reduce the mature tree grid pruning cycle to 5 years to align with arboriculture standards.</td><td>PW</td><td>Short</td><td>Identify staff and community members to join Tree Board.</td><td>PW/ CMO</td><td>Short</td></tr>
<tr><td>Reallocate pruning funding to formalize a 3-year establishment care program for newly planted trees.</td><td>PW</td><td>Short</td><td>Task Tree Board with planning annual Arbor Day Celebration.</td><td>PW/ CMO</td><td>Short</td></tr>
<tr><td colspan="3">Strategy: Developing In-House Expertise.</td><td colspan="3">Strategy: Protect Mature Trees.</td></tr>
</table>

Table 5. Implementation Plan – Becoming a Tree City USA by 2030.

Urban Forestry Goal: Become a Tree City USA by 2030.					
GP#1: Canopy Cover is Maximized on Public Land			**GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles**		
Implementation Actions	*Dept*	*Term*	*Implementation Actions*	*Dept*	*Term*
Secure resources to hire for, or support staff to obtain an ISA Certified Arborist credential.	PW/ CMO	Short	Protect trees on private property by developing a clear and enforceable Tree Protection Ordinance.	CD/ PW	Short
Allocate resources for staff development to obtain arboriculture knowledge. *(Western Chapter of the International Society of Arboriculture, the Tree Care Industry Association, Street Tree Seminar, etc.)*	PW/ CMO	Medium	Ensure ordinance emphasizes the importance of tree protection in areas with limited planting space, such as industrial areas.	CD/ PW	Short
Modify Public Works' in-house staffing structure to create a designated Urban Forestry Supervisor and Urban Forestry Field Crew (3).	PW/ CMO	Long	**Strategy: Enable Residents to Support Urban Forestry While Allowing Flexibility.**		
Provide staff training from ISA Certified Arborist to ensure all in-house tree maintenance practices meet standards.	PW	Medium	*Implementation Actions*	*Dept*	*Term*
Strategy: Allow Staff to Effectively Manage the Urban Forest.			Identify a tree removal and replacement ratio for private properties and implement through a tree ordinance.	CD/ PW	Short
Implementation Actions	*Dept*	*Term*	Develop an in-lieu planting fee for private property owners who cannot replant on site to designate for tree planting using a tree ordinance.	CD/ PW	Short
Establish an effective data collection process for all work records including contractor, in-house, and external partners.	PW	Short	**Strategy: Evaluate zoning of low-canopy areas.**		
Designate staff to implement and monitor record keeping processes to use data for funding opportunities.	PW	Short	*Implementation Actions*	*Dept*	*Term*
Request software training from tree maintenance contractor.	PW	Short	Policy adjustments may be necessary in lower-canopy areas (like commercial/industrial zones) to enable tree planting.	CD	Medium
Pursue grant funding to update inventory data.	PW	Short			

City-Wide Canopy Cover Goal: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

The potential canopy cover that can be achieved in any city is based on historical and existing conditions. Bell's canopy cover goal was determined through analysis of the current canopy cover (8.2%), identifying the potential growth of the canopy, and the amount of space available for planting. The City is committed to caring for its urban trees and planting all viable vacant sites to maximize the currently available space for trees on public land. Reaching the 15% goal city-wide will necessitate the community's participation in urban forestry efforts such as preserving large mature trees on private property and planting new trees.

Table 6. Implementation Plan – The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

Canopy Cover Target: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.								
GP#1: Canopy Cover is Maximized on Public Land			GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles			GP#3: Community Supported Urban Forestry		
What this means: Increase operational efficiencies and identify collaborative opportunities to optimize current resources and increase potential resources for the City's urban forestry program.			**What this means:** Foster the growth of an adaptive urban forest through intentional planning and management that considers future climate conditions.			**What this means:** Enhance planning for, support of, and resources for community engagement and education opportunities to foster the community's connection with, appreciation for, and understanding of their urban forest.		
Strategy: Supporting and Enhancing Bell's Urban Forest.			**Strategy: Replace Every Removed Tree with A Suitable Species.**			**Strategy: Foster Urban Forest Advocacy In The Community.**		
Implementation Actions	Dept	Term	Implementation Actions	Dept	Term	Implementation Actions	Dept	Term
Align with Arboriculture standards and ISA BMPs by updating tree care guidelines.	PW	Short	Establish a policy for tree removal and replacement ratio for tree removals on public land.	PW	Short	Designate the annual volunteer planting event as an annual Arbor Day Celebration.	PW/CS/CMO	Short
Establish a 3-year establishment care program for newly planted trees.	PW	Short	Plant tree species suitable for future climate conditions using the recommended species list.	PW	On-going	Add urban forestry education in existing programming during in-person events in parks.	CS/PW	Short
Secure funding and resources to plant all vacant sites and provide establishment care for 279 trees annually, until 2030.	PW	Short	When high maintenance species are removed from the landscape consider planting a lower maintenance species to plant. (i.e. Chinese elms, palms)	PW	On-going	Encourage use of "Bell on the Go App" to encourage resident interaction with urban forestry and reporting of incidents.	CS/PW	Short

Table 6. Implementation Plan – The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

Canopy Cover Target: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.								
GP#1: Canopy Cover is Maximized on Public Land			GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles			GP#3: Community Supported Urban Forestry		
Maximize the canopy cover potential of each planting site by selecting the largest stature tree that fits each planting site.	PW	On-Going	**Strategy: Companies Working in Bell Support Urban Forestry**			Engage educational institutions with off-the-shelf urban forestry lessons aligning with Next Generation Science Standards. (Project Learning Tree)	CS	Short
Strategy: Increasing Planting Areas			Implementation Actions	Dept	Term	Identify a location for a community food forest, pursue grant funding for this project.	CS/PW	Medium
Implementation Actions	Dept	Term	Leverage relationships with existing providers to request mitigation trees for utility-related removals.	PW	Short	Create a staff position to act as the liaison for the City and the community on urban forestry efforts.	CS	Medium
Identify areas appropriate for large stature trees in green spaces and parks throughout the City.	PW	Short	Develop minimum tree canopy requirements for new commercial development and parking lots.	PW/ CD	Medium	Update the community annually on the urban forestry program and progress towards UFMP goals.	CS/PW	Medium
Explore competitive funding sources for depaving efforts.	PW/CD	Long	**Strategy: Align and Collaborate on Community Urban Forestry Efforts**			Foster advocacy, develop programs, and identify a data collection	PW/CS	Medium

Table 6. Implementation Plan – The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

Canopy Cover Target: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.								
GP#1: Canopy Cover is Maximized on Public Land			**GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles**			**GP#3: Community Supported Urban Forestry**		
						methodology to encourage tree planting on private property.		
Utilize landcover classification to identify potential sites for groundbreaking.	PW/CD	Long	Implementation Actions	Dept	Term	Develop an urban forestry education program and annual volunteer tree planting event.	CS/PW	Medium
			Identify areas to create approximately 3,220 tree sites on both public and private property.	PW/ CS	Short	**Strategy: Encourage Tree Ownership on Private Property.**		
Strategy: Strategic Partnerships for Tree Planting.			Engage with Los Angeles Unified School District to advocate for LAUSD schools within Bell's city boundary to participate in the Green Schools program.	CS/ PW	Short	Implementation Actions	Dept	Term
Implementation Actions	Dept	Term				Explore programs such as water and utility-related tree giveaway and rebate programs.	CS/PW	Short
Utilize census data, canopy cover assessment, and community engagement data to support need for funding.	CS	Short				Distribute urban forestry education resources to guide private tree ownership.	CS/PW	Short

Table 6. Implementation Plan – The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

Canopy Cover Target: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.								
GP#1: Canopy Cover is Maximized on Public Land			GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles			GP#3: Community Supported Urban Forestry		
Prioritize tree planting locations utilizing the Priority Planting Plan.	PW	Short				Develop a bi-annual private property shade tree giveaway program.	CS/PW	Medium
Continue to explore regional grant programs in urban forestry including workforce development programs.	PW/CD/ CS	Short						
Maximize the City of Bell's participation in each large-scale planning effort to create more planting spaces and decrease impermeable surfaces.	PW/CD/CS	Short						
Ensure that each Capital Improvement Project or other large scale planning efforts create spaces for large stature trees in the planning phase of each project.	PW/CD/CS	Short						

Table 6. Implementation Plan – The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.

Canopy Cover Target: The City of Bell will Achieve a 15% City-Wide Canopy Cover by 2075.								
GP#1: Canopy Cover is Maximized on Public Land			GP#2: Bell's Urban Forest Aligns with Environmental and Sustainability Principles			GP#3: Community Supported Urban Forestry		
Identify areas appropriate for large stature trees in green spaces and parks throughout the City.	PW	Short						

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5 Monitoring Plan

5.1 Vibrant Cities Lab Community Goal Setting and Assessment Tool

The UFMP is a working document, and its implementation will be reviewed every 5 years to evaluate progress, update goals based on newly identified challenges and unforeseen opportunities and identify the feasible steps for the next 5 years.

The City utilized the Vibrant Cities Lab Community Assessment and Goalsetting tool to monitor the implementation of the UFMP. The online assessment tool is used to identify a city's current and goal statuses within specific areas of urban forest sustainability. Each metric is assigned a point value, and the city is assigned a "Total Current Score" and a "Gap Score." The gap score indicates the difference between the current level of service for the urban forest and the desired goal based on responses to the questionnaire. A gap score between 20 to 40 indicates a city is close to achieving the goals of its urban forest program. Conversely, gap scores of 40+ indicate that a city needs programs and policies to reach its sustainable urban forestry goals.

Bell's initial assessment was conducted in September 2024. This section provides the results from this assessment, which set the baseline for the City's "Total Current Score" during the UFMP development process.

The City's current score is 20 with a gap score of 51. The Vibrant Cities Lab Community Assessment and Goal Setting Tool can be utilized each year to track, measure, and highlight progress within each of the urban forest sustainability metrics. The assessment can also be used to demonstrate successes and justify additional funding requests. The monitoring plan can be found in Appendix D. The City should plan to review, reassess, and update its UFMP every 5 years to 10 years to ensure it is still relevant to the conditions of the City and accounts for unanticipated challenges and opportunities.

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Appendix A
iTree Report and Analysis

Introduction

Trees provide environmental services and benefits that hold real economic value for the City. These values were calculated for the City-managed tree inventory using i-Tree Eco. i-Tree Eco (USFS 2022) was developed by the U.S. Forest Service and was used to calculate the value of city-managed trees using tree specific data such as species, diameter as standard height (DSH), and health condition.

Vacant sites were considered plant-able if they were labeled as a vacant site or stump. The City's stocking rate is 67%, which is calculated by dividing the total number of existing trees by the total number of available sites. The stocking rate does not include potential sites that need modification to be viable or are not captured in the inventory data.

The i-Tree Eco analysis is based on 2,424 trees from the City inventory. **Table A.1** details the annual sum of the environmental services provided by City trees in the amount of carbon sequestered, stormwater diverted into soil, and removed air pollution. The development of the Urban Forest Management Plan identified a data gap in the tree inventory. When work is performed by in-house crews or external partners, the tree inventory is not updated to reflect new trees planted or cared for within the inventory. This analysis, therefore, does not capture the entire population of publicly managed trees.

Bell's tree inventory also increases property values, provides shade and habitat for wildlife, reduces the urban heat island effect, and improves public health. These services directly contribute to the communities' quality of life and the livability of Bell. The results from the analysis are captured in Table A.1 and the i-Tree Eco report follows.

Table A.1. Environmental Services Provided by City-Managed Tree Inventory

Service	Annual Environmental Service	Annual Environmental Impact	Annual Economic Benefit Value
Carbon Sequestration (carbon dioxide removed from air by trees)	91.7 tons	Carbon removed from the City's air by the urban forest is equivalent to annual carbon emissions from 21.8 cars.	$15,600
Avoided Runoff	263,600 gallons	Equivalent to the average annual water usage of 3,215 American homes.	$2,360
Air Pollution Removal (ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter < 2.5 μm)	1.8 tons	Equivalent to the annual nitrogen dioxide, carbon monoxide, and sulfur dioxide emissions from 1.6 cars	$36,000

Sources: i-Tree 2023, Environmental Protection Agency's Greenhouse Gas Equivalencies Calculator. ArborAccess. 2023.

The financial value of Bell's tree inventory is presented in **Table A.2.** The replacement value of all of Bell's trees is estimated to be $15.6 million, or $6,436 per tree. This reflects the estimated cost to replace every tree in the inventory of the same species and size. The $15.6 million does not include the increased annual costs or initial capital costs to construct the built environment to compensate for the increased energy use from air conditioning due to homes losing their shade from their trees or increases on transportation costs for families to drive further away to find parks/places to recreate that is not concrete. The functional value represents the annual value of the environmental services that the trees provide ($54,060/year). Each tree delivers approximately $179 in ecosystem services based on the combined functional and carbon storage values each year. This value is higher than the California average of $110.63 (McPherson et al. 2016).

Table A.2. Financial Value of City-Managed Trees

Value	Description	Asset Amount	Per-Tree Value
Carbon Storage (23.58 tons)	Amount of Carbon held in trees	$379,000	$156
Structural	Tree replacement cost	$15,600,000	$6,436
Functional	Value based on the services trees perform	$54,060	$22.30

Sources: i-Tree 2023. ArborAccess. 2023.

i-Tree
Ecosystem Analysis

Bell

Urban Forest Effects and Values
August 2023

Summary

Understanding an urban forest's structure, function and value can promote management decisions that will improve human health and environmental quality. An assessment of the vegetation structure, function, and value of the Bell urban forest was conducted during 2023. Data from 2424 trees located throughout Bell were analyzed using the i-Tree Eco model developed by the U.S. Forest Service, Northern Research Station.

- Number of trees: 2,424
- Tree Cover: 39.38 acres
- Most common species of trees: Chinese elm, Blue jacaranda, Holly oak
- Percentage of trees less than 6" (15.2 cm) diameter: 12.1%
- Pollution Removal: 1.772 tons/year ($36.1 thousand/year)
- Carbon Storage: 2.22 thousand tons ($379 thousand)
- Carbon Sequestration: 91.67 tons ($15.6 thousand/year)
- Oxygen Production: 244.4 tons/year
- Avoided Runoff: 263.6 thousand gallon/year ($2.36 thousand/year)
- Building energy savings: N/A – data not collected
- Avoided carbon emissions: N/A – data not collected
- Replacement values: $15.6 million

Ton: short ton (U.S.) (2,000 lbs)
Monetary values $ are reported in US Dollars throughout the report except where noted.
Ecosystem service estimates are reported for trees.
With Complete Inventory Projects, oxygen production is estimated from gross carbon sequestration and does not account for decomposition. Oxygen production in Plot Inventory Projects is estimated from net carbon sequestration.

For an overview of i-Tree Eco methodology, see Appendix I. Data collection quality is determined by the local data collectors, over which i-Tree has no control.

Table of Contents

I. Tree Characteristics of the Urban Forest

The urban forest of Bell has 2,424 trees with a tree cover of Chinese elm. The three most common species are Chinese elm (11.8 percent), Blue jacaranda (8.6 percent), and Holly oak (7.4 percent).

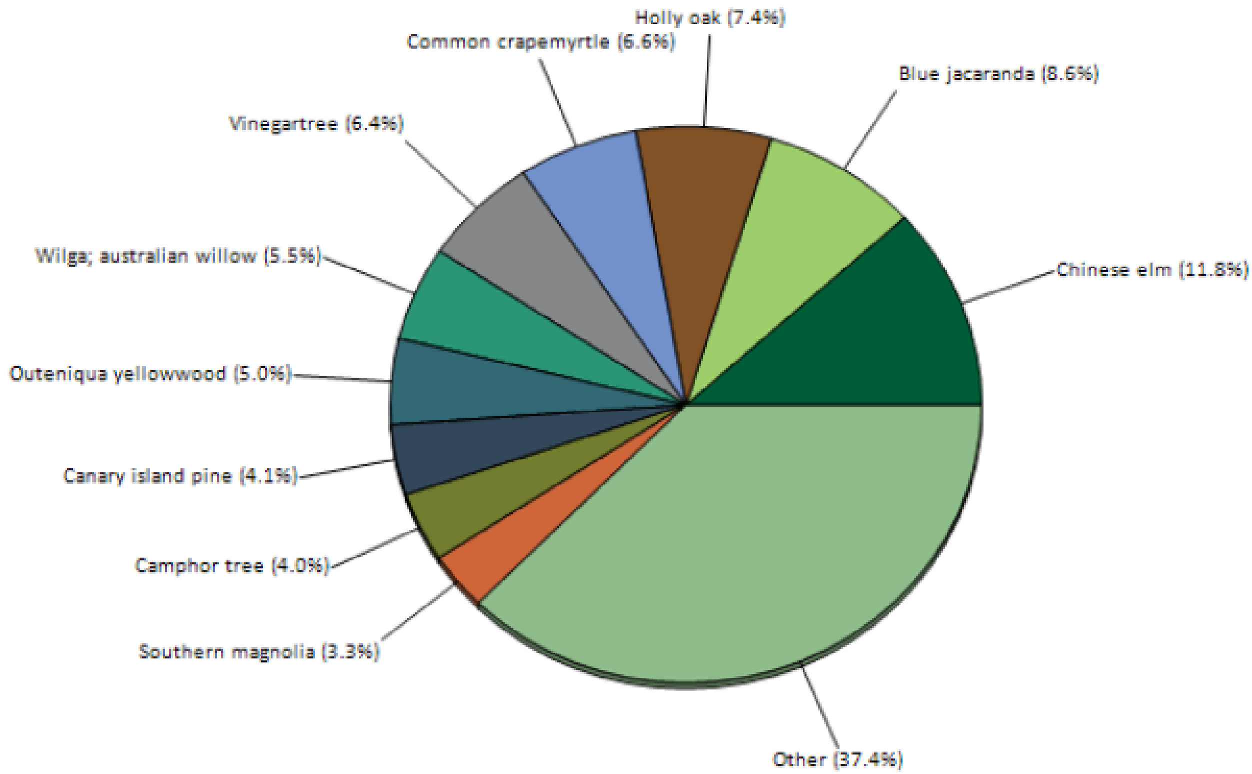


Figure 1. Tree species composition in Bell

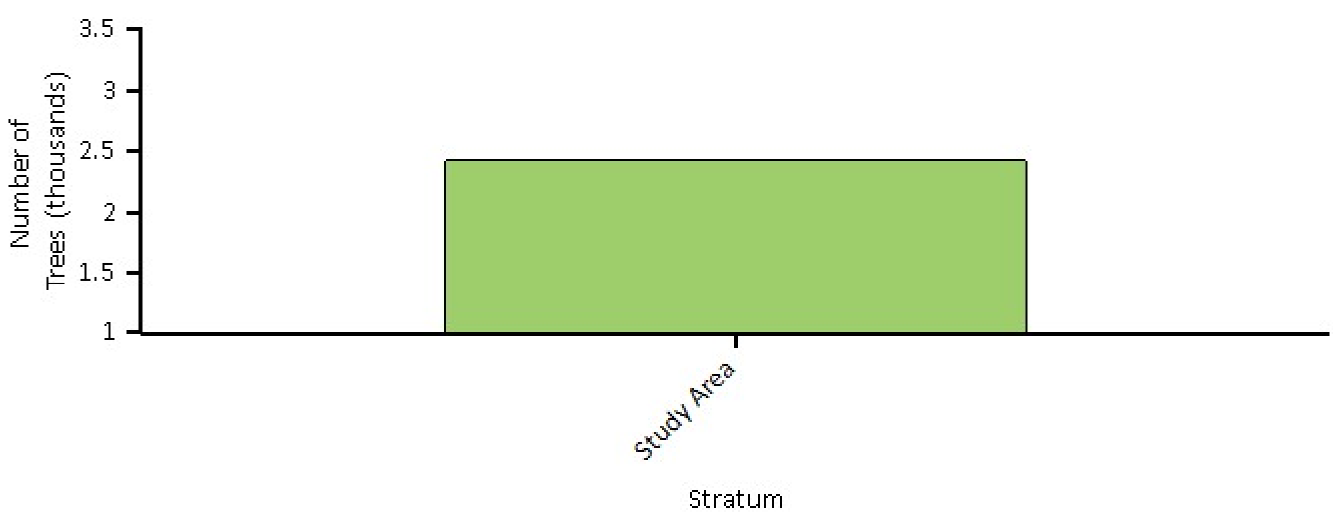


Figure 2. Number of trees in Bell by stratum

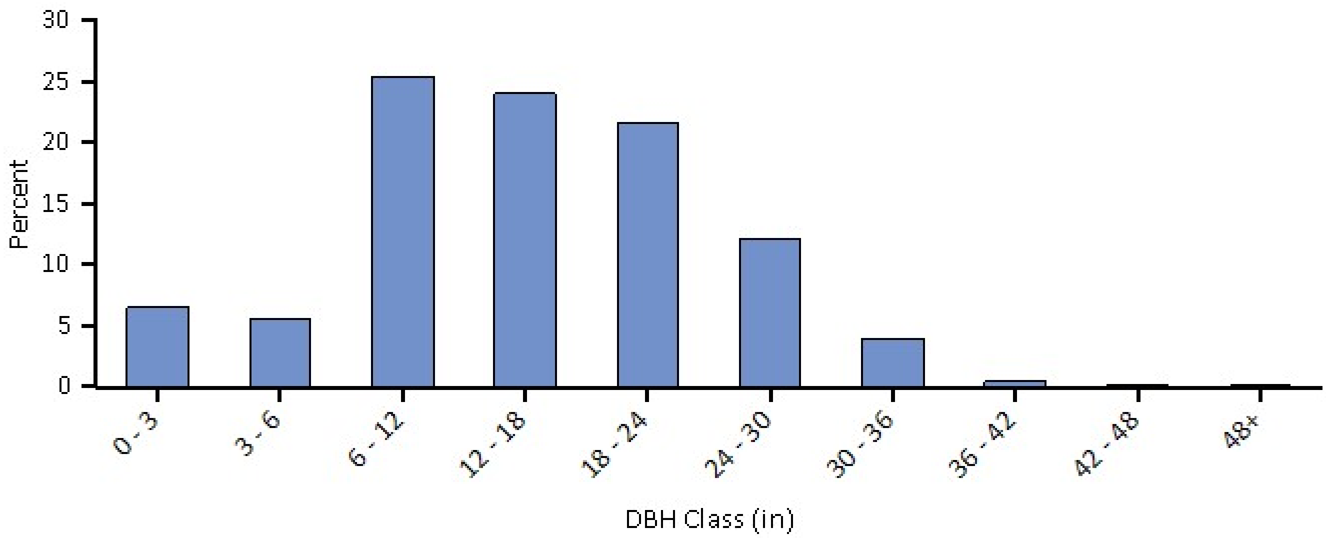


Figure 3. Percent of tree population by diameter class (DBH - stem diameter at 4.5 feet)

Urban forests are composed of a mix of native and exotic tree species. Thus, urban forests often have a tree diversity that is higher than surrounding native landscapes. Increased tree diversity can minimize the overall impact or destruction by a species-specific insect or disease, but it can also pose a risk to native plants if some of the exotic species are invasive plants that can potentially out-compete and displace native species. In Bell, about 8 percent of the trees are species native to North America, while 1 percent are native to California. Species exotic to North America make up 92 percent of the population. Most exotic tree species have an origin from Asia (29 percent of the species).

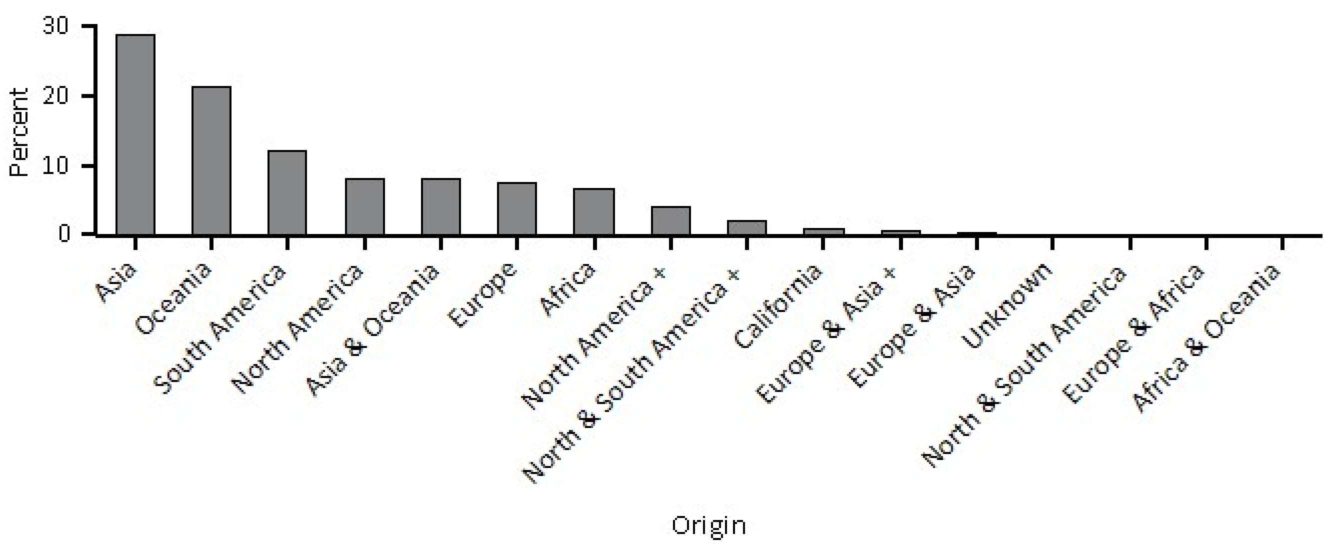


Figure 4. Percent of live tree population by area of native origin, Bell

The plus sign (+) indicates the tree species is native to another continent other than the ones listed in the grouping.

Invasive plant species are often characterized by their vigor, ability to adapt, reproductive capacity, and general lack of natural enemies. These abilities enable them to displace native plants and make them a threat to natural areas. Three of the 86 tree species in Bell are identified as invasive on the state invasive species list (California Invasive Species Advisory Committee 2010). These invasive species comprise 0.7 percent of the tree population though they may only cause a minimal level of impact. These three invasive species are Punk tree (0.5 percent of population), California peppertree (0.1 percent), and Tree of heaven (0.1 percent) (see Appendix V for a complete list of invasive species).

II. Urban Forest Cover and Leaf Area

Many tree benefits equate directly to the amount of healthy leaf surface area of the plant. Trees cover about 39.38 acres of Bell and provide 213.7 acres of leaf area.

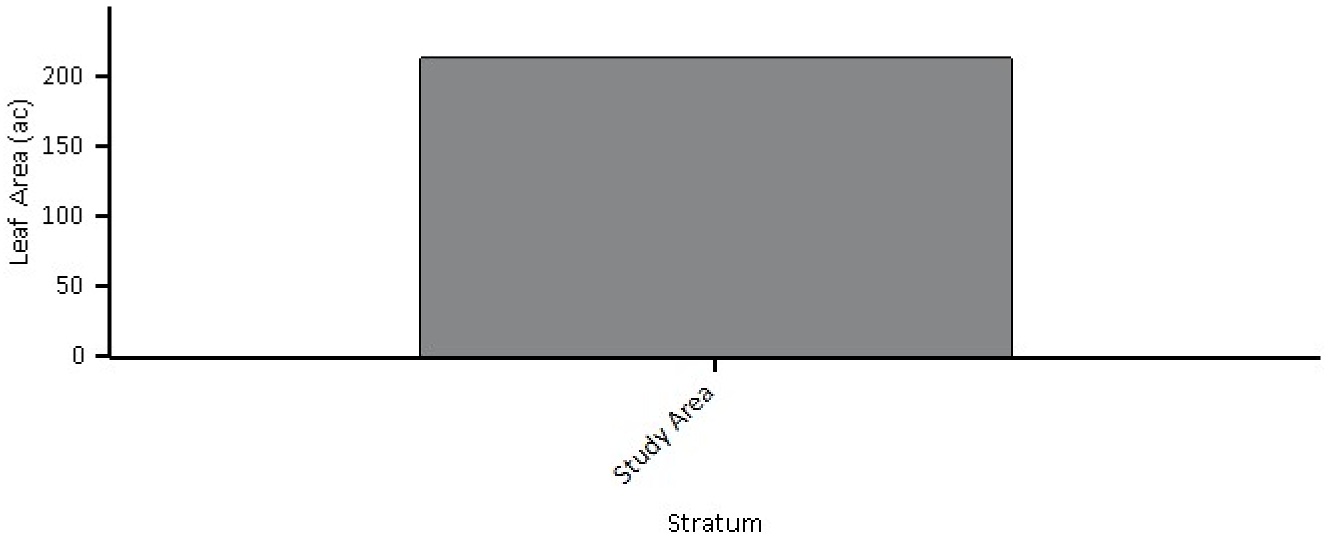


Figure 5. Leaf area by stratum, Bell

In Bell, the most dominant species in terms of leaf area are Holly oak, Chinese elm, and Blue jacaranda. The 10 species with the greatest importance values are listed in Table 1. Importance values (IV) are calculated as the sum of percent population and percent leaf area. High importance values do not mean that these trees should necessarily be encouraged in the future; rather these species currently dominate the urban forest structure.

Table 1. Most important species in Bell

Species Name	*Percent Population*	*Percent Leaf Area*	*IV*
Chinese elm	11.8	13.9	25.6
Holly oak	7.4	14.3	21.7
Blue jacaranda	8.6	12.8	21.4
Lemonscented gum	2.6	10.3	12.9
Outeniqua yellowwood	5.0	4.5	9.5
Canary island pine	4.1	5.3	9.4
Southern magnolia	3.3	5.5	8.8
Vinegartree	6.4	2.2	8.6
Common crapemyrtle	6.6	0.9	7.4
Wilga; australian willow	5.5	1.8	7.3

Common ground cover classes (including cover types beneath trees and shrubs) in Bell are not available since they are configured not to be collected.

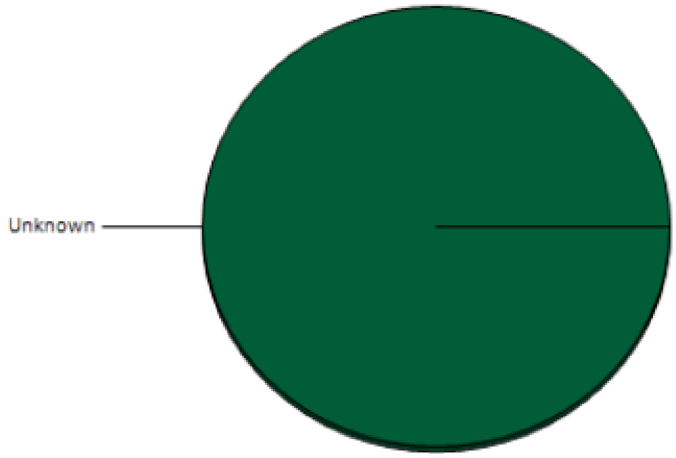


Figure 6. Percent of land by ground cover classes, Bell

III. Air Pollution Removal by Urban Trees

Poor air quality is a common problem in many urban areas. It can lead to decreased human health, damage to landscape materials and ecosystem processes, and reduced visibility. The urban forest can help improve air quality by reducing air temperature, directly removing pollutants from the air, and reducing energy consumption in buildings, which consequently reduces air pollutant emissions from the power sources. Trees also emit volatile organic compounds that can contribute to ozone formation. However, integrative studies have revealed that an increase in tree cover leads to reduced ozone formation (Nowak and Dwyer 2000).

Pollution removal[1] by trees in Bell was estimated using field data and recent available pollution and weather data available. Pollution removal was greatest for ozone (Figure 7). It is estimated that trees remove 1.772 tons of air pollution (ozone (O3), carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter less than 2.5 microns (PM2.5), particulate matter less than 10 microns and greater than 2.5 microns (PM10*)[2], and sulfur dioxide (SO2)) per year with an associated value of $36.1 thousand (see Appendix I for more details).

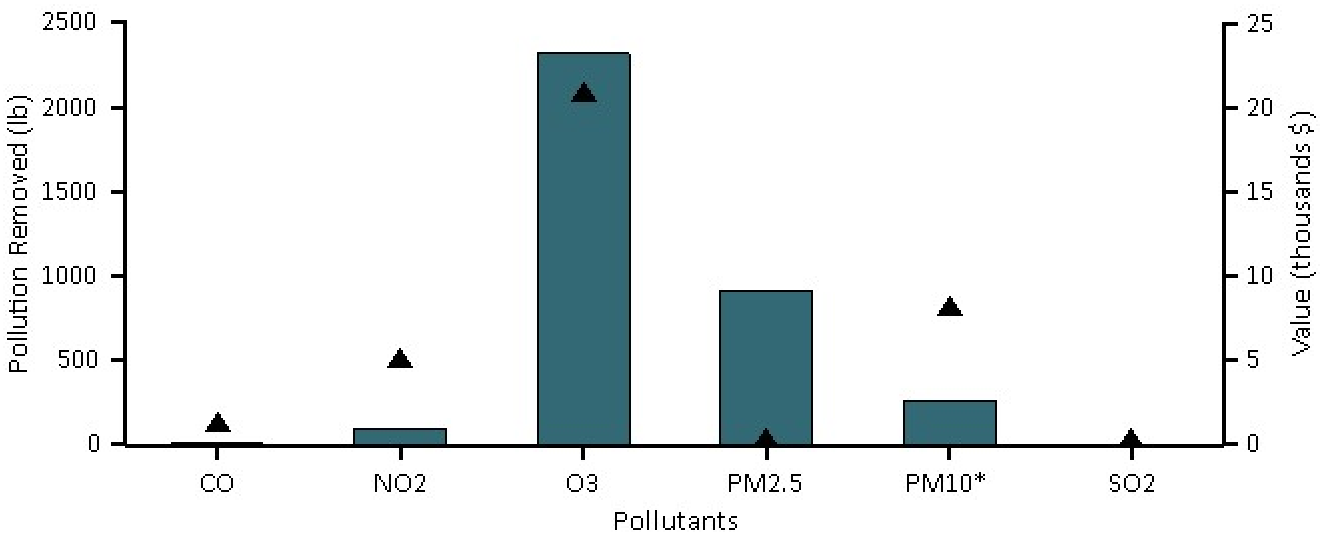


Figure 7. Annual pollution removal (points) and value (bars) by urban trees, Bell

[1] PM10* is particulate matter less than 10 microns and greater than 2.5 microns. PM2.5 is particulate matter less than 2.5 microns. If PM2.5 is not monitored, PM10* represents particulate matter less than 10 microns. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

[2] Trees remove PM2.5 and PM10* when particulate matter is deposited on leaf surfaces. This deposited PM2.5 and PM10* can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors (see Appendix I for more details).

In 2023, trees in Bell emitted an estimated 1.817 tons of volatile organic compounds (VOCs) (0.8848 tons of isoprene and 0.9322 tons of monoterpenes). Emissions vary among species based on species characteristics (e.g. some genera such as oaks are high isoprene emitters) and amount of leaf biomass. Sixty- four percent of the urban forest's VOC emissions were from Holly oak and Lemonscented gum. These VOCs are precursor chemicals to ozone formation.[3]

General recommendations for improving air quality with trees are given in Appendix VIII.

[3] Some economic studies have estimated VOC emission costs. These costs are not included here as there is a tendency to add positive dollar estimates of ozone removal effects with negative dollar values of VOC emission effects to determine whether tree effects are positive or negative in relation to ozone. This combining of dollar values to determine tree effects should not be done, rather estimates of VOC effects on ozone formation (e.g., via photochemical models) should be conducted and directly contrasted with ozone removal by trees (i.e., ozone effects should be directly compared, not dollar estimates). In addition, air temperature reductions by trees have been shown to significantly reduce ozone concentrations (Cardelino and Chameides 1990; Nowak et al 2000), but are not considered in this analysis. Photochemical modeling that integrates tree effects on air temperature, pollution removal, VOC emissions, and emissions from power plants can be used to determine the overall effect of trees on ozone concentrations.

IV. Carbon Storage and Sequestration

Climate change is an issue of global concern. Urban trees can help mitigate climate change by sequestering atmospheric carbon (from carbon dioxide) in tissue and by altering energy use in buildings, and consequently altering carbon dioxide emissions from fossil-fuel based power sources (Abdollahi et al 2000).

Trees reduce the amount of carbon in the atmosphere by sequestering carbon in new growth every year. The amount of carbon annually sequestered is increased with the size and health of the trees. The gross sequestration of Bell trees is about 91.67 tons of carbon per year with an associated value of $15.6 thousand. See Appendix I for more details on methods.

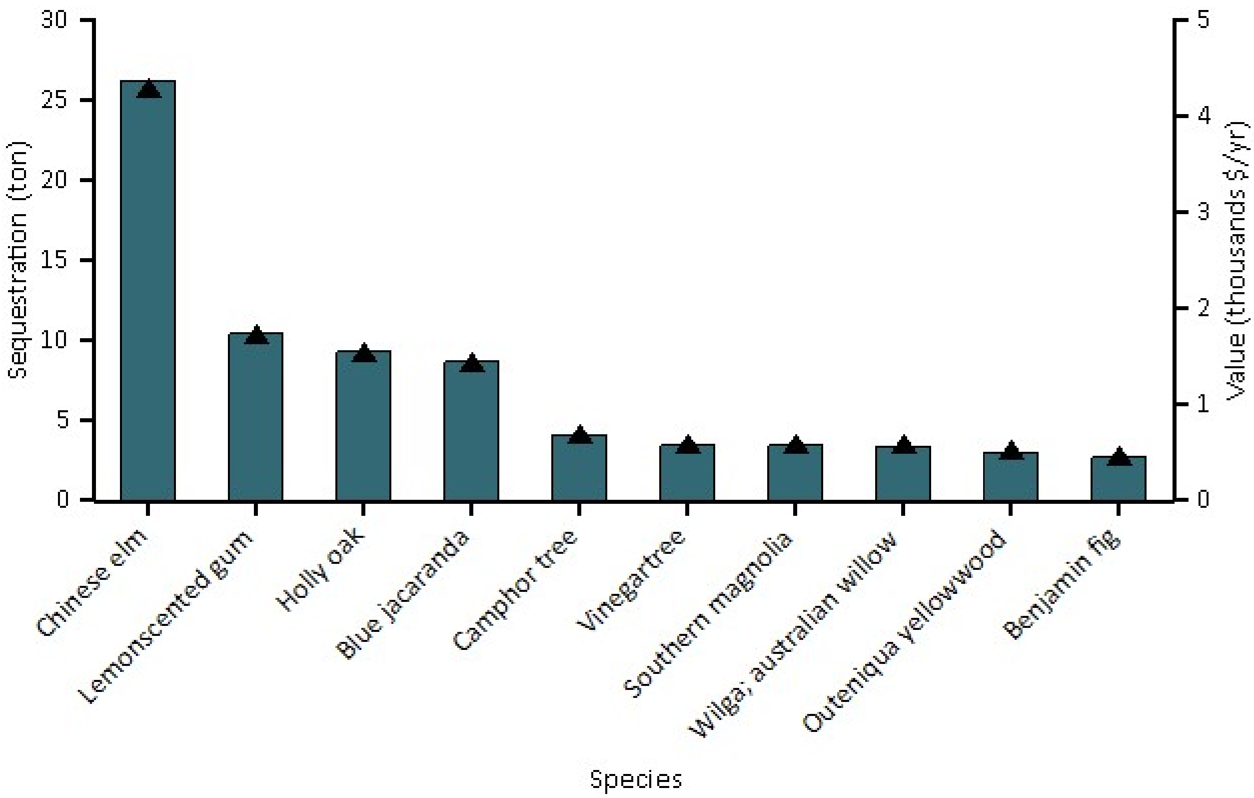


Figure 8. Estimated annual gross carbon sequestration (points) and value (bars) for urban tree species with the greatest sequestration, Bell

Carbon storage is another way trees can influence global climate change. As a tree grows, it stores more carbon by holding it in its accumulated tissue. As a tree dies and decays, it releases much of the stored carbon back into the atmosphere. Thus, carbon storage is an indication of the amount of carbon that can be released if trees are allowed to die and decompose. Maintaining healthy trees will keep the carbon stored in trees, but tree maintenance can contribute to carbon emissions (Nowak et al 2002c). When a tree dies, using the wood in long-term wood products, to heat buildings, or to produce energy will help reduce carbon emissions from wood decomposition or from fossil-fuel or wood-based power plants.

Trees in Bell are estimated to store 2220 tons of carbon ($379 thousand). Of the species sampled, Chinese elm stores and sequesters the most carbon (approximately 23.5% of the total carbon stored and 28% of all sequestered carbon.)

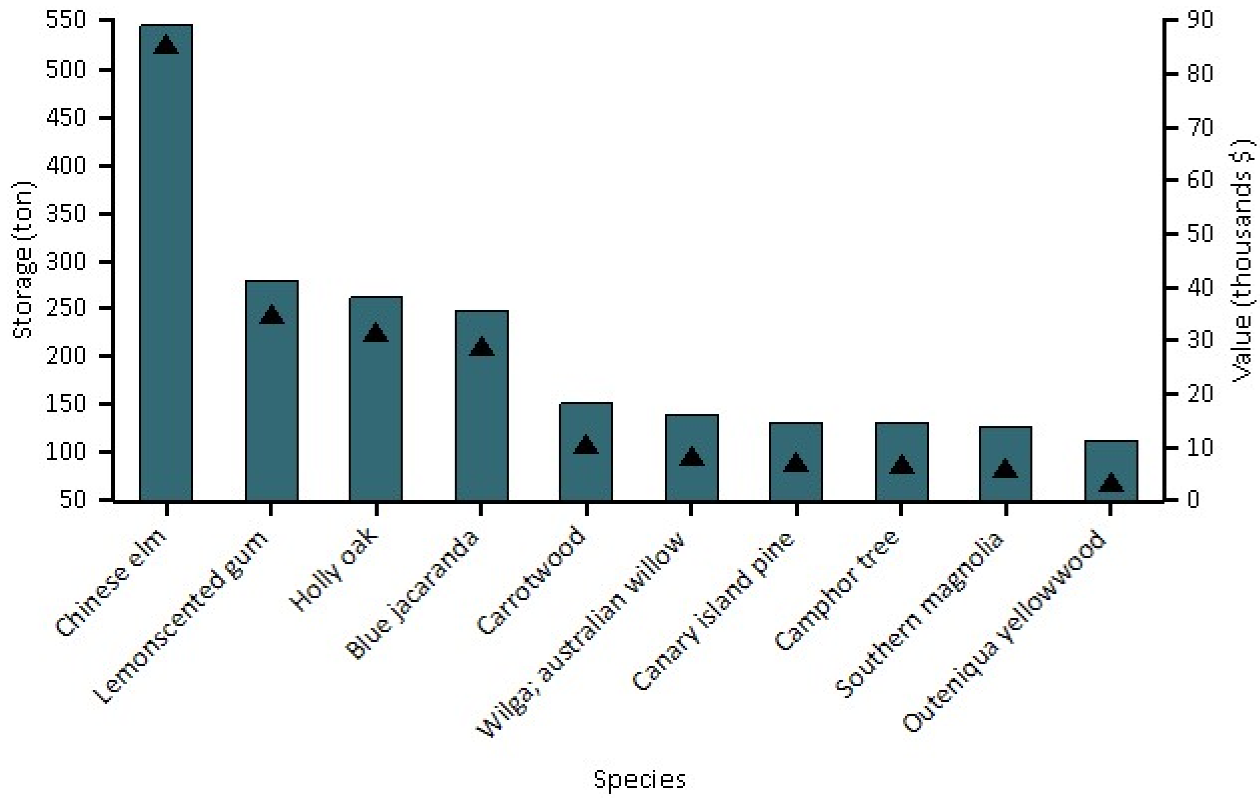


Figure 9. Estimated carbon storage (points) and values (bars) for urban tree species with the greatest storage, Bell

V. Oxygen Production

Oxygen production is one of the most commonly cited benefits of urban trees. The annual oxygen production of a tree is directly related to the amount of carbon sequestered by the tree, which is tied to the accumulation of tree biomass.

Trees in Bell are estimated to produce 244.4 tons of oxygen per year.[4] However, this tree benefit is relatively insignificant because of the large and relatively stable amount of oxygen in the atmosphere and extensive production by aquatic systems. Our atmosphere has an enormous reserve of oxygen. If all fossil fuel reserves, all trees, and all organic matter in soils were burned, atmospheric oxygen would only drop a few percent (Broecker 1970).

Table 2. The top 20 oxygen production species.

Species	*Oxygen (ton)*	*Gross Carbon Sequestration (ton/yr)*	*Number of Trees*	*Leaf Area (acre)*
Chinese elm	68.41	25.66	285	29.67
Lemonscented gum	27.26	10.22	64	21.99
Holly oak	24.29	9.11	179	30.62
Blue jacaranda	22.75	8.53	208	27.36
Camphor tree	10.78	4.04	98	6.30
Vinegartree	9.04	3.39	155	4.69
Southern magnolia	8.98	3.37	81	11.67
Wilga; australian willow	8.92	3.35	133	3.89
Outeniqua yellowwood	7.88	2.96	121	9.55
Benjamin fig	7.03	2.64	66	4.45
Canary island pine	6.25	2.34	99	11.38
Common crapemyrtle	4.91	1.84	159	1.86
Kurrajong	4.85	1.82	51	4.61
Crimson bottlebrush	3.30	1.24	48	4.42
Carrotwood	2.93	1.10	70	5.93
Illwarra Flame Tree	2.29	0.86	26	2.67
Sweetshade	1.88	0.70	27	1.39
Mountain ebony	1.87	0.70	51	2.19
Pride of bolivia	1.71	0.64	26	1.39
Sweetgum	1.65	0.62	16	2.61

VI. Avoided Runoff

Surface runoff can be a cause for concern in many urban areas as it can contribute pollution to streams, wetlands, rivers, lakes, and oceans. During precipitation events, some portion of the precipitation is intercepted by vegetation (trees and shrubs) while the other portion reaches the ground. The portion of the precipitation that reaches the ground and does not infiltrate into the soil becomes surface runoff (Hirabayashi 2012). In urban areas, the large extent of impervious surfaces increases the amount of surface runoff.

Urban trees and shrubs, however, are beneficial in reducing surface runoff. Trees and shrubs intercept precipitation, while their root systems promote infiltration and storage in the soil. The trees and shrubs of Bell help to reduce runoff by an estimated 264 thousand gallons a year with an associated value of $2.4 thousand (see Appendix I for more details). Avoided runoff is estimated based on local weather from the user-designated weather station. In Bell, the total annual precipitation in 2020 was 8.0 inches.

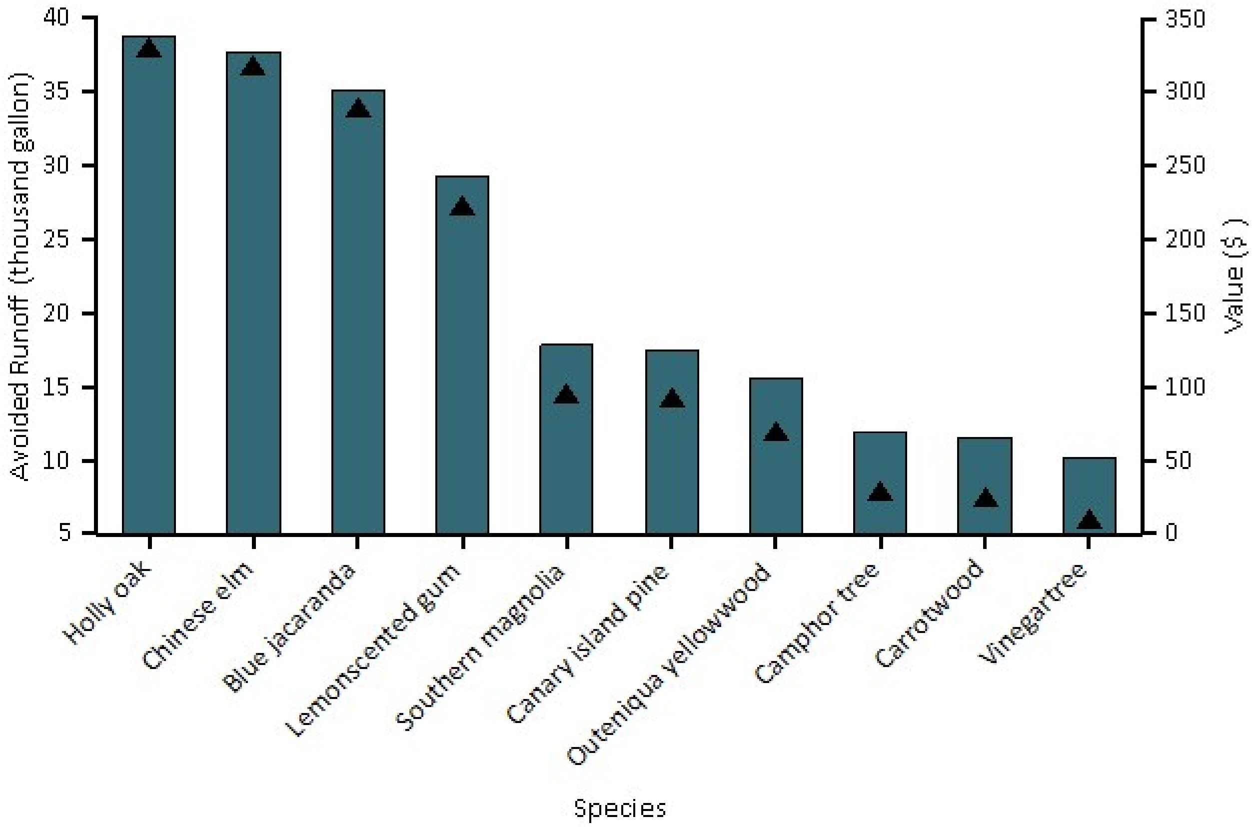


Figure 10. Avoided runoff (points) and value (bars) for species with greatest overall impact on runoff, Bell

VII. Trees and Building Energy Use

Trees affect energy consumption by shading buildings, providing evaporative cooling, and blocking winter winds. Trees tend to reduce building energy consumption in the summer months and can either increase or decrease building energy use in the winter months, depending on the location of trees around the building. Estimates of tree effects on energy use are based on field measurements of tree distance and direction to space conditioned residential buildings (McPherson and Simpson 1999).

Because energy-related data were not collected, energy savings and carbon avoided cannot be calculated.

Table 3. Annual energy savings due to trees near residential buildings, Bell

	Heating	*Cooling*	*Total*
MBTU[a]	0	N/A	0
MWH[b]	0	0	0
Carbon Avoided (pounds)	0	0	0

[a]MBTU - one million British Thermal Units

[b]MWH - megawatt-hour

Table 4. Annual savings [a]($) in residential energy expenditure during heating and cooling seasons, Bell

	Heating	*Cooling*	*Total*
MBTU[b]	0	N/A	0
MWH[c]	0	0	0
Carbon Avoided	0	0	0

[b]Based on the prices of $204.7 per MWH and $12.9396400362223 per MBTU (see Appendix I for more details)

[c]MBTU - one million British Thermal Units

[c]MWH - megawatt-hour

[5] Trees modify climate, produce shade, and reduce wind speeds. Increased energy use or costs are likely due to these tree-building interactions creating a cooling effect during the winter season. For example, a tree (particularly evergreen species) located on the southern side of a residential building may produce a shading effect that causes increases in heating requirements.

VIII. Replacement and Functional Values

Urban forests have a replacement value based on the trees themselves (e.g., the cost of having to replace a tree with a similar tree); they also have functional values (either positive or negative) based on the functions the trees perform.

The replacement value of an urban forest tends to increase with a rise in the number and size of healthy trees (Nowak et al 2002a). Annual functional values also tend to increase with increased number and size of healthy trees. Through proper management, urban forest values can be increased; however, the values and benefits also can decrease as the amount of healthy tree cover declines.

<u>Urban trees in Bell have the following replacement values:</u>

- Replacement value: $15.6 million
- Carbon storage: $379 thousand

<u>Urban trees in Bell have the following annual functional values:</u>

- Carbon sequestration: $15.6 thousand
- Avoided runoff: $2.36 thousand
- Pollution removal: $36.1 thousand
- Energy costs and carbon emission values: $0

(Note: negative value indicates increased energy cost and carbon emission value)

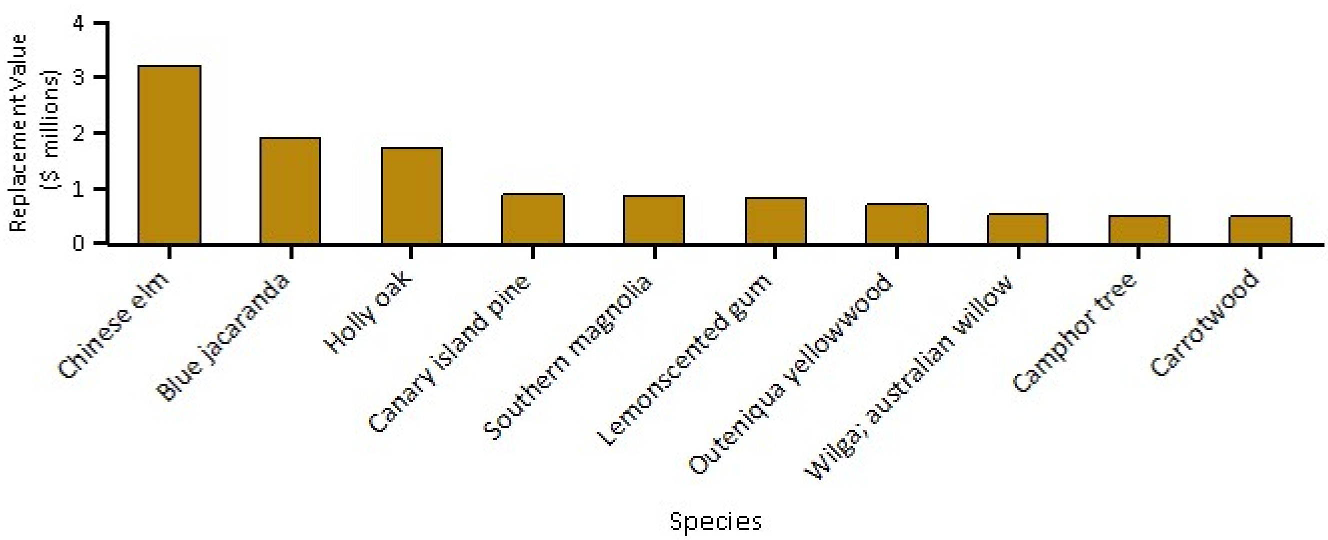


Figure 11. Tree species with the greatest replacement value, Bell

IX. Potential Pest Impacts

Various insects and diseases can infest urban forests, potentially killing trees and reducing the health, replacement value and sustainability of the urban forest. As pests tend to have differing tree hosts, the potential damage or risk of each pest will differ among cities.Fifty-three pests were analyzed for their potential impact and compared with pest range maps (Forest Health Technology Enterprise Team 2014) for the conterminous United States to determine their proximity to Los Angeles County. Ten of the fifty-three pests analyzed are located within the county. For a complete analysis of all pests, see Appendix VII.

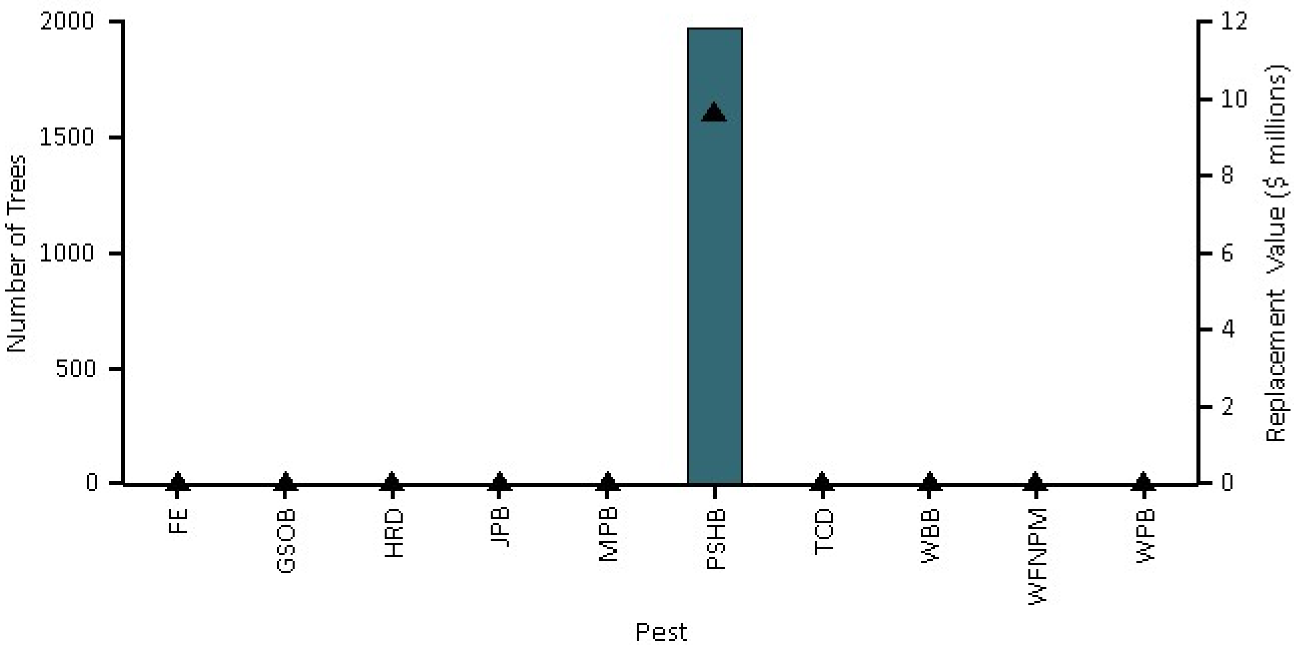


Figure 12. Number of trees at risk (points) and associated compensatory value (bars) for most threatening pests located in the county, Bell

One common pest of white fir, grand fir, and red fir trees is the fir engraver (FE) (Ferrell 1986). FE poses a threat to 0.0 percent of the Bell urban forest, which represents a potential loss of $0 in replacement value.

Infestations of the goldspotted oak borer (GSOB) (Society of American Foresters 2011) have been a growing problem in southern California. Potential loss of trees from GSOB is 0.0 percent ($0 in replacement value).

Heterobasidion Root Disease (HRD) poses a threat to 0.0 percent of the Bell urban forest, which represents a potential loss of $0 in replacement value.

The Jeffrey pine beetle (JPB) (Smith et al 2009) is native to North America and is distributed across California, Nevada, and Oregon where its only host, Jeffrey pine, also occurs. This pest threatens 0.0 percent of the population, which represents a potential loss of $0 in replacement value.

Mountain pine beetle (MPB) (Gibson et al 2009) is a bark beetle that primarily attacks pine species in the western United States. MPB has the potential to affect 0.0 percent of the population ($0 in replacement value).

Polyphagous shot hole borer (PSHB) (University of California 2014) is a boring beetle that was first detected in California. Bell could possibly lose 66.0 percent of its trees to this pest ($11.9 million in replacement value).

Thousand canker disease (TCD) (Cranshaw and Tisserat 2009; Seybold et al 2010) is an insect-disease complex that kills several species of walnuts, including black walnut. Potential loss of trees from TCD is 0.0 percent ($0 in replacement value).

Western Bark Beetle (WBB) poses a threat to 0.0 percent of the Bell urban forest, which represents a potential loss of $0 in replacement value.

Western Five-Needle Pine Mortality (WFNPM) poses a threat to 0.0 percent of the Bell urban forest, which represents a potential loss of $0 in replacement value.

The western pine beetle (WPB) (DeMars and Roettgering 1982) is a bark beetle and aggressive attacker of ponderosa and Coulter pines. This pest threatens 0.0 percent of the population, which represents a potential loss of $0 in replacement value.

Appendix I. i-Tree Eco Model and Field Measurements

i-Tree Eco is designed to use standardized field data and local hourly air pollution and meteorological data to quantify urban forest structure and its numerous effects (Nowak and Crane 2000), including:

- Urban forest structure (e.g., species composition, tree health, leaf area, etc.).
- Amount of pollution removed hourly by the urban forest, and its associated percent air quality improvement throughout a year.
- Total carbon stored and net carbon annually sequestered by the urban forest.
- Effects of trees on building energy use and consequent effects on carbon dioxide emissions from power sources.
- Replacement value of the forest, as well as the value for air pollution removal and carbon storage and sequestration.
- Potential impact of infestations by pests, such as Asian longhorned beetle, emerald ash borer, gypsy moth, and Dutch elm disease.

Typically, all field data are collected during the leaf-on season to properly assess tree canopies. Typical data collection (actual data collection may vary depending upon the user) includes land use, ground and tree cover, individual tree attributes of species, stem diameter, height, crown width, crown canopy missing and dieback, and distance and direction to residential buildings (Nowak et al 2005; Nowak et al 2008).

During data collection, trees are identified to the most specific taxonomic classification possible. Trees that are not classified to the species level may be classified by genus (e.g., ash) or species groups (e.g., hardwood). In this report, tree species, genera, or species groups are collectively referred to as tree species.

Tree Characteristics:

Leaf area of trees was assessed using measurements of crown dimensions and percentage of crown canopy missing. In the event that these data variables were not collected, they are estimated by the model.

An analysis of invasive species is not available for studies outside of the United States. For the U.S., invasive species are identified using an invasive species list (California Invasive Species Advisory Committee 2010)for the state in which the urban forest is located. These lists are not exhaustive and they cover invasive species of varying degrees of invasiveness and distribution. In instances where a state did not have an invasive species list, a list was created based on the lists of the adjacent states. Tree species that are identified as invasive by the state invasive species list are cross-referenced with native range data. This helps eliminate species that are on the state invasive species list, but are native to the study area.

Air Pollution Removal:

Pollution removal is calculated for ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter less than 2.5 microns, and particulate matter less than 10 microns and greater than 2.5 microns. PM2.5 is generally more relevant in discussions concerning air pollution effects on human health.

Air pollution removal estimates are derived from calculated hourly tree-canopy resistances for ozone, and sulfur and nitrogen dioxides based on a hybrid of big-leaf and multi-layer canopy deposition models (Baldocchi 1988; Baldocchi et al 1987). As the removal of carbon monoxide and particulate matter by vegetation is not directly related to transpiration, removal rates (deposition velocities) for these pollutants were based on average measured values from the literature (Bidwell and Fraser 1972; Lovett 1994) that were adjusted depending on leaf phenology and leaf area. Particulate removal incorporated a 50 percent resuspension rate of particles back to the atmosphere (Zinke 1967). Recent updates (2011) to air quality modeling are based on improved leaf area index simulations, weather and pollution processing and interpolation, and updated pollutant monetary values (Hirabayashi et al 2011; Hirabayashi et al 2012; Hirabayashi 2011).

Trees remove PM2.5 and PM10* when particulate matter is deposited on leaf surfaces (Nowak et al 2013). This deposited PM2.5 and PM10* can be resuspended to the atmosphere or removed during rain events and dissolved or transferred to the soil. This combination of events can lead to positive or negative pollution removal and value depending on various atmospheric factors. Generally, PM2.5 and PM10* removal is positive with positive benefits. However, there are some cases when net removal is negative or resuspended particles lead to increased pollution concentrations and negative values. During some months (e.g., with no rain), trees resuspend more particles than they remove. Resuspension can also lead to increased overall PM2.5 and PM10* concentrations if the boundary layer conditions are lower during net resuspension periods than during net removal periods. Since the pollution removal value is based on the change in pollution concentration, it is possible to have situations when trees remove PM2.5 and PM10* but increase concentrations and thus have negative values during periods of positive overall removal. These events are not common, but can happen.

For reports in the United States, default air pollution removal value is calculated based on local incidence of adverse health effects and national median externality costs. The number of adverse health effects and associated economic value is calculated for ozone, sulfur dioxide, nitrogen dioxide, and particulate matter less than 2.5 microns using data from the U.S. Environmental Protection Agency's Environmental Benefits Mapping and Analysis Program (BenMAP) (Nowak et al 2014). The model uses a damage-function approach that is based on the local change in pollution concentration and population. National median externality costs were used to calculate the value of carbon monoxide removal (Murray et al 1994).

For international reports, user-defined local pollution values are used. For international reports that do not have local values, estimates are based on either European median externality values (van Essen et al 2011) or BenMAP regression equations (Nowak et al 2014) that incorporate user-defined population estimates. Values are then converted to local currency with user-defined exchange rates.

For this analysis, pollution removal value is calculated based on the prices of $1,397 per ton (carbon monoxide), $22,430 per ton (ozone), $4,041 per ton (nitrogen dioxide), $1,280 per ton (sulfur dioxide), $712,810 per ton (particulate matter less than 2.5 microns), $6,565 per ton (particulate matter less than 10 microns and greater than 2.5 microns).

Carbon Storage and Sequestration:

Carbon storage is the amount of carbon bound up in the above-ground and below-ground parts of woody vegetation. To calculate current carbon storage, biomass for each tree was calculated using equations from the literature and measured tree data. Open-grown, maintained trees tend to have less biomass than predicted by forest-derived biomass equations (Nowak 1994). To adjust for this difference, biomass results for open-grown urban trees were multiplied by 0.8. No adjustment was made for trees found in natural stand conditions. Tree dry-weight biomass was converted to stored carbon by multiplying by 0.5.

Carbon sequestration is the removal of carbon dioxide from the air by plants. To estimate the gross amount of carbon sequestered annually, average diameter growth from the appropriate genera and diameter class and tree condition was added to the existing tree diameter (year x) to estimate tree diameter and carbon storage in year x+1.

Carbon storage and carbon sequestration values are based on estimated or customized local carbon values. For international reports that do not have local values, estimates are based on the carbon value for the United States (U.S. Environmental Protection Agency 2015, Interagency Working Group on Social Cost of Carbon 2015) and converted to local currency with user-defined exchange rates.

For this analysis, carbon storage and carbon sequestration values are calculated based on $171 per ton.

Oxygen Production:

The amount of oxygen produced is estimated from carbon sequestration based on atomic weights: net O2 release (kg/yr) = net C sequestration (kg/yr) × 32/12. To estimate the net carbon sequestration rate, the amount of carbon sequestered as a result of tree growth is reduced by the amount lost resulting from tree mortality. Thus, net carbon sequestration and net annual oxygen production of the urban forest account for decomposition (Nowak et al 2007). For complete inventory projects, oxygen production is estimated from gross carbon sequestration and does not account for decomposition.

Avoided Runoff:

Annual avoided surface runoff is calculated based on rainfall interception by vegetation, specifically the difference between annual runoff with and without vegetation. Although tree leaves, branches, and bark may intercept precipitation and thus mitigate surface runoff, only the precipitation intercepted by leaves is accounted for in this analysis.

The value of avoided runoff is based on estimated or user-defined local values. For international reports that do not have local values, the national average value for the United States is utilized and converted to local currency with user-defined exchange rates. The U.S. value of avoided runoff is based on the U.S. Forest Service's Community Tree Guide Series (McPherson et al 1999; 2000; 2001; 2002; 2003; 2004; 2006a; 2006b; 2006c; 2007; 2010; Peper et al 2009; 2010; Vargas et al 2007a; 2007b; 2008).

For this analysis, avoided runoff value is calculated based on the price of $0.01 per gallon.

Building Energy Use:

If appropriate field data were collected, seasonal effects of trees on residential building energy use were calculated based on procedures described in the literature (McPherson and Simpson 1999) using distance and direction of trees from residential structures, tree height and tree condition data. To calculate the monetary value of energy savings, local or custom prices per MWH or MBTU are utilized.

For this analysis, energy saving value is calculated based on the prices of $204.70 per MWH and $12.94 per MBTU.

Replacement Values:

Replacement value is the value of a tree based on the physical resource itself (e.g., the cost of having to replace a tree with a similar tree). Replacement values were based on valuation procedures of the Council of Tree and Landscape Appraisers, which uses tree species, diameter, condition, and location information (Nowak et al 2002a; 2002b). Replacement value may not be included for international projects if there is insufficient local data to complete the valuation procedures.

Potential Pest Impacts:

The complete potential pest risk analysis is not available for studies outside of the United States. The number of trees at risk to the pests analyzed is reported, though the list of pests is based on known insects and disease in the United States.

For the U.S., potential pest risk is based on pest range maps and the known pest host species that are likely to experience mortality. Pest range maps for 2012 from the Forest Health Technology Enterprise Team (FHTET) (Forest Health Technology Enterprise Team 2014) were used to determine the proximity of each pest to the county in which the urban forest is located. For the county, it was established whether the insect/disease occurs within the county, is within 250 miles of the county edge, is between 250 and 750 miles away, or is greater than 750 miles away. FHTET did not have pest range maps for Dutch elm disease and chestnut blight. The range of these pests was based on known occurrence and the host range, respectively (Eastern Forest Environmental Threat Assessment Center; Worrall 2007).

Relative Tree Effects:

The relative value of tree benefits reported in Appendix II is calculated to show what carbon storage and sequestration, and air pollutant removal equate to in amounts of municipal carbon emissions, passenger automobile emissions, and house emissions.

Municipal carbon emissions are based on 2010 U.S. per capita carbon emissions (Carbon Dioxide Information Analysis Center 2010). Per capita emissions were multiplied by city population to estimate total city carbon emissions.

Light duty vehicle emission rates (g/mi) for CO, NOx, VOCs, PM10, SO2 for 2010 (Bureau of Transportation Statistics 2010; Heirigs et al 2004), PM2.5 for 2011-2015 (California Air Resources Board 2013), and CO2 for 2011 (U.S. Environmental Protection Agency 2010) were multiplied by average miles driven per vehicle in 2011 (Federal Highway Administration 2013) to determine average emissions per vehicle.

Household emissions are based on average electricity kWh usage, natural gas Btu usage, fuel oil Btu usage, kerosene Btu usage, LPG Btu usage, and wood Btu usage per household in 2009 (Energy Information Administration 2013; Energy Information Administration 2014)

- CO2, SO2, and NOx power plant emission per KWh are from Leonardo Academy 2011. CO emission per kWh assumes 1/3 of one percent of C emissions is CO based on Energy Information Administration 1994. PM10 emission per kWh from Layton 2004.
- CO2, NOx, SO2, and CO emission per Btu for natural gas, propane and butane (average used to represent LPG), Fuel #4 and #6 (average used to represent fuel oil and kerosene) from Leonardo Academy 2011.
- CO2 emissions per Btu of wood from Energy Information Administration 2014.
- CO, NOx and SOx emission per Btu based on total emissions and wood burning (tons) from (British Columbia Ministry 2005; Georgia Forestry Commission 2009).

Appendix II. Relative Tree Effects

The urban forest in Bell provides benefits that include carbon storage and sequestration, and air pollutant removal. To estimate the relative value of these benefits, tree benefits were compared to estimates of average municipal carbon emissions, average passenger automobile emissions, and average household emissions. See Appendix I for methodology.

Carbon storage is equivalent to:

- Amount of carbon emitted in Bell in 4 days
- Annual carbon (C) emissions from 1,570 automobiles
- Annual C emissions from 644 single-family houses

Carbon monoxide removal is equivalent to:

- Annual carbon monoxide emissions from 1 automobiles
- Annual carbon monoxide emissions from 1 single-family houses

Nitrogen dioxide removal is equivalent to:

- Annual nitrogen dioxide emissions from 36 automobiles
- Annual nitrogen dioxide emissions from 16 single-family houses

Sulfur dioxide removal is equivalent to:

- Annual sulfur dioxide emissions from 129 automobiles
- Annual sulfur dioxide emissions from 0 single-family houses

Annual carbon sequestration is equivalent to:

- Amount of carbon emitted in Bell in 0.2 days
- Annual C emissions from 100 automobiles
- Annual C emissions from 0 single-family houses

Appendix III. Comparison of Urban Forests

A common question asked is, "How does this city compare to other cities?" Although comparison among cities should be made with caution as there are many attributes of a city that affect urban forest structure and functions, summary data are provided from other cities analyzed using the i-Tree Eco model.

I. City totals for trees

City	*% Tree Cover*	*Number of Trees*	*Carbon Storage (tons)*	*Carbon Sequestration (tons/yr)*	*Pollution Removal (tons/yr)*
Toronto, ON, Canada	26.6	10,220,000	1,221,000	51,500	2,099
Atlanta, GA	36.7	9,415,000	1,344,000	46,400	1,663
Los Angeles, CA	11.1	5,993,000	1,269,000	77,000	1,975
New York, NY	20.9	5,212,000	1,350,000	42,300	1,676
London, ON, Canada	24.7	4,376,000	396,000	13,700	408
Chicago, IL	17.2	3,585,000	716,000	25,200	888
Phoenix, AZ	9.0	3,166,000	315,000	32,800	563
Baltimore, MD	21.0	2,479,000	570,000	18,400	430
Philadelphia, PA	15.7	2,113,000	530,000	16,100	575
Washington, DC	28.6	1,928,000	525,000	16,200	418
Oakville, ON , Canada	29.1	1,908,000	147,000	6,600	190
Albuquerque, NM	14.3	1,846,000	332,000	10,600	248
Boston, MA	22.3	1,183,000	319,000	10,500	283
Syracuse, NY	26.9	1,088,000	183,000	5,900	109
Woodbridge, NJ	29.5	986,000	160,000	5,600	210
Minneapolis, MN	26.4	979,000	250,000	8,900	305
San Francisco, CA	11.9	668,000	194,000	5,100	141
Morgantown, WV	35.5	658,000	93,000	2,900	72
Moorestown, NJ	28.0	583,000	117,000	3,800	118
Hartford, CT	25.9	568,000	143,000	4,300	58
Jersey City, NJ	11.5	136,000	21,000	890	41
Casper, WY	8.9	123,000	37,000	1,200	37
Freehold, NJ	34.4	48,000	20,000	540	22

II. Totals per acre of land area

City	*Number of Trees/ac*	*Carbon Storage (tons/ac)*	*Carbon Sequestration (tons/ac/yr)*	*Pollution Removal (lb/ac/yr)*
Toronto, ON, Canada	64.9	7.8	0.33	26.7
Atlanta, GA	111.6	15.9	0.55	39.4
Los Angeles, CA	19.6	4.2	0.16	13.1
New York, NY	26.4	6.8	0.21	17.0
London, ON, Canada	75.1	6.8	0.24	14.0
Chicago, IL	24.2	4.8	0.17	12.0
Phoenix, AZ	12.9	1.3	0.13	4.6
Baltimore, MD	48.0	11.1	0.36	16.6
Philadelphia, PA	25.1	6.3	0.19	13.6
Washington, DC	49.0	13.3	0.41	21.2
Oakville, ON , Canada	78.1	6.0	0.27	11.0
Albuquerque, NM	21.8	3.9	0.12	5.9
Boston, MA	33.5	9.1	0.30	16.1
Syracuse, NY	67.7	10.3	0.34	13.6
Woodbridge, NJ	66.5	10.8	0.38	28.4
Minneapolis, MN	26.2	6.7	0.24	16.3
San Francisco, CA	22.5	6.6	0.17	9.5
Morgantown, WV	119.2	16.8	0.52	26.0
Moorestown, NJ	62.1	12.4	0.40	25.1
Hartford, CT	50.4	12.7	0.38	10.2
Jersey City, NJ	14.4	2.2	0.09	8.6
Casper, WY	9.1	2.8	0.09	5.5
Freehold, NJ	38.3	16.0	0.44	35.3

Appendix IV. General Recommendations for Air Quality Improvement

Urban vegetation can directly and indirectly affect local and regional air quality by altering the urban atmosphere environment. Four main ways that urban trees affect air quality are (Nowak 1995):

- Temperature reduction and other microclimate effects
- Removal of air pollutants
- Emission of volatile organic compounds (VOC) and tree maintenance emissions
- Energy effects on buildings

The cumulative and interactive effects of trees on climate, pollution removal, and VOC and power plant emissions determine the impact of trees on air pollution. Cumulative studies involving urban tree impacts on ozone have revealed that increased urban canopy cover, particularly with low VOC emitting species, leads to reduced ozone concentrations in cities (Nowak 2000). Local urban management decisions also can help improve air quality.

Urban forest management strategies to help improve air quality include (Nowak 2000):

Strategy	*Result*
Increase the number of healthy trees	Increase pollution removal
Sustain existing tree cover	Maintain pollution removal levels
Maximize use of low VOC-emitting trees	Reduces ozone and carbon monoxide formation
Sustain large, healthy trees	Large trees have greatest per-tree effects
Use long-lived trees	Reduce long-term pollutant emissions from planting and removal
Use low maintenance trees	Reduce pollutants emissions from maintenance activities
Reduce fossil fuel use in maintaining vegetation	Reduce pollutant emissions
Plant trees in energy conserving locations	Reduce pollutant emissions from power plants
Plant trees to shade parked cars	Reduce vehicular VOC emissions
Supply ample water to vegetation	Enhance pollution removal and temperature reduction
Plant trees in polluted or heavily populated areas	Maximizes tree air quality benefits
Avoid pollutant-sensitive species	Improve tree health
Utilize evergreen trees for particulate matter	Year-round removal of particles

Appendix V. Invasive Species of the Urban Forest

The following inventoried tree species were listed as invasive on the California invasive species list (California Invasive Species Advisory Committee 2010):

Species Name[a]	*Number of Trees*	*% of Trees*	*Leaf Area (ac)*	*Percent Leaf Area*
Punk tree	11	0.5	1.7	0.8
California peppertree	3	0.1	0.3	0.1
Tree of heaven	2	0.1	0.1	0.1
Total	**16**	**0.66**	**2.12**	**0.99**

[a]Species are determined to be invasive if they are listed on the state's invasive species list

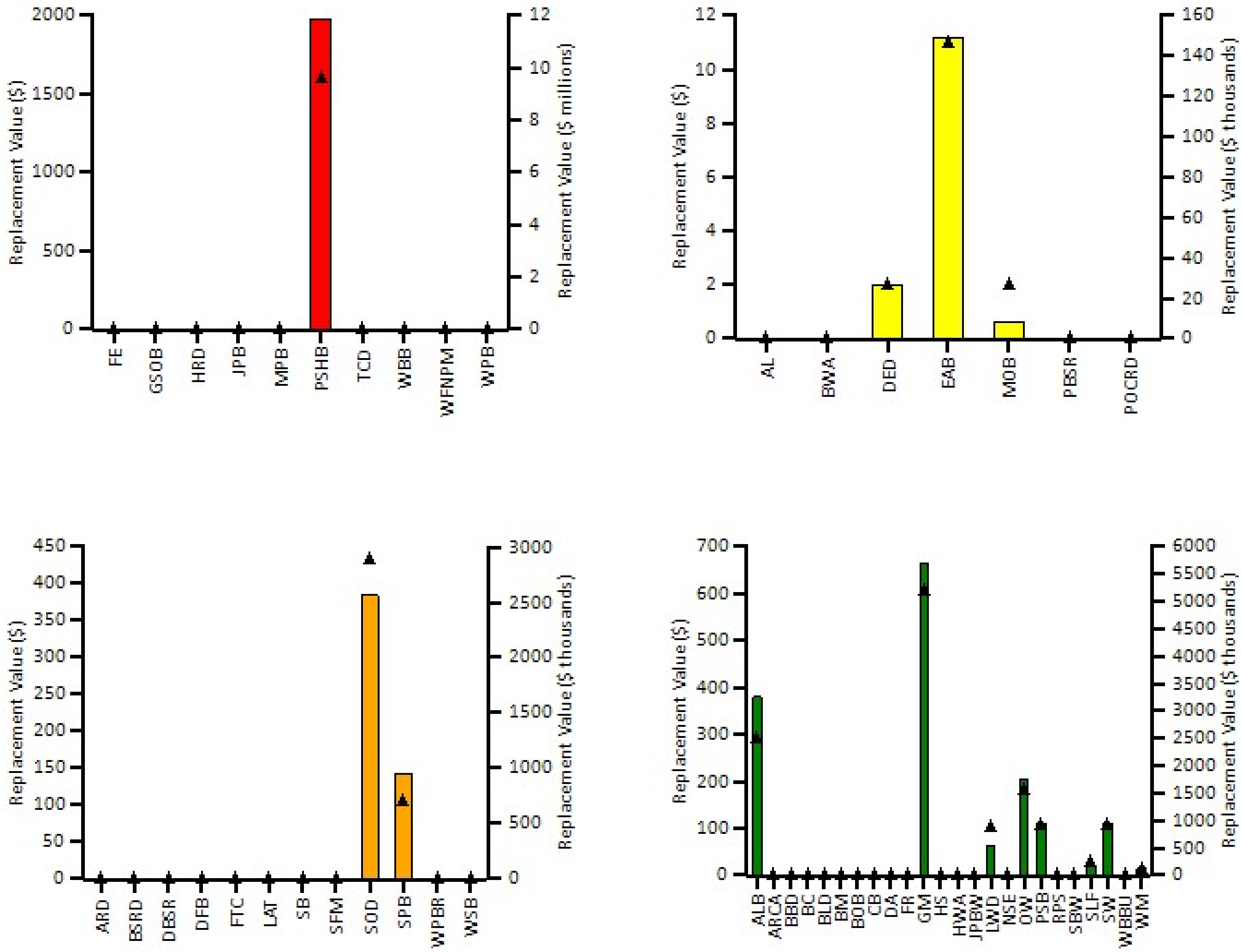
Appendix VI. Potential Risk of Pests

Fifty-three insects and diseases were analyzed to quantify their potential impact on the urban forest. As each insect/ disease is likely to attack different host tree species, the implications for {0} will vary. The number of trees at risk reflects only the known host species that are likely to experience mortality.

Code	Scientific Name	Common Name	Trees at Risk (#)	Value ($ thousands)
AL	Phyllocnistis populiella	Aspen Leafminer	0	0.00
ALB	Anoplophora glabripennis	Asian Longhorned Beetle	290	3,259.77
ARCA	Neodothiora populina	Aspen Running Canker	0	0.00
ARD	Armillaria spp.	Armillaria Root Disease	0	0.00
BBD	Neonectria faginata	Beech Bark Disease	0	0.00
BC	Sirococcus clavigignenti juglandacearum	Butternut Canker	0	0.00
BLD	Litylenchus crenatae mccannii	Beech Leaf Disease	0	0.00
BM	Euproctis chrysorrhoea	Browntail Moth	0	0.00
BOB	Tubakia iowensis	Bur Oak Blight	0	0.00
BSRD	Leptographium wageneri	Black Stain Root Disease	0	0.00
BWA	Adelges piceae	Balsam Woolly Adelgid	0	0.00
CB	Cryphonectria parasitica	Chestnut Blight	0	0.00
DA	Discula destructiva	Dogwood Anthracnose	0	0.00
DBSR	Leptographium wageneri var. pseudotsugae	Douglas-fir Black Stain Root Disease	0	0.00
DED	Ophiostoma novo-ulmi	Dutch Elm Disease	2	26.25
DFB	Dendroctonus pseudotsugae	Douglas-Fir Beetle	0	0.00
EAB	Agrilus planipennis	Emerald Ash Borer	11	148.93
FE	Scolytus ventralis	Fir Engraver	0	0.00
FR	Cronartium quercuum f. sp. Fusiforme	Fusiform Rust	0	0.00
FTC	Malacosoma disstria	Forest Tent Caterpillar	0	0.00
GM	Lymantria dispar	Gypsy Moth	605	5,709.39
GSOB	Agrilus auroguttatus	Goldspotted Oak Borer	0	0.00
HRD	Heterobasidion irregulare/ occidentale	Heterobasidion Root Disease	0	0.00
HS	Neodiprion tsugae	Hemlock Sawfly	0	0.00
HWA	Adelges tsugae	Hemlock Woolly Adelgid	0	0.00
JPB	Dendroctonus jeffreyi	Jeffrey Pine Beetle	0	0.00
JPBW	Choristoneura pinus	Jack Pine Budworm	0	0.00
LAT	Choristoneura conflictana	Large Aspen Tortrix	0	0.00
LWD	Raffaelea lauricola	Laurel Wilt	101	528.34
MOB	Xyleborus monographus	Mediterranean Oak Borer	2	7.92
MPB	Dendroctonus ponderosae	Mountain Pine Beetle	0	0.00
NSE	Ips perturbatus	Northern Spruce Engraver	0	0.00
OW	Ceratocystis fagacearum	Oak Wilt	179	1,746.37
PBSR	Leptographium wageneri var. ponderosum	Pine Black Stain Root Disease	0	0.00
POCRD	Phytophthora lateralis	Port-Orford-Cedar Root Disease	0	0.00

Code	Scientific Name	Common Name	Trees at Risk (#)	Value ($ thousands)
PSB	Tomicus piniperda	Pine Shoot Beetle	105	946.43
PSHB	Euwallacea nov. sp.	Polyphagous Shot Hole Borer	1,601	11,860.72
RPS	Matsucoccus resinosae	Red Pine Scale	0	0.00
SB	Dendroctonus rufipennis	Spruce Beetle	0	0.00
SBW	Choristoneura fumiferana	Spruce Budworm	0	0.00
SFM	subalpine fir mortality summary	Subalpine Fir Mortality	0	0.00
SLF	Lycorma delicatula	Spotted Lanternfly	26	181.56
SOD	Phytophthora ramorum	Sudden Oak Death	433	2,563.46
SPB	Dendroctonus frontalis	Southern Pine Beetle	105	946.43
SW	Sirex noctilio	Sirex Wood Wasp	105	946.43
TCD	Geosmithia morbida	Thousand Canker Disease	0	0.00
WBB	Dryocoetes confusus	Western Bark Beetle	0	0.00
WBBU	Acleris gloverana	Western Blackheaded Budworm	0	0.00
WFNPM	western five-needle pine mortality summary	Western Five-Needle Pine Mortality	0	0.00
WM	Operophtera brumata	Winter Moth	12	132.00
WPB	Dendroctonus brevicomis	Western Pine Beetle	0	0.00
WPBR	Cronartium ribicola	White Pine Blister Rust	0	0.00
WSB	Choristoneura occidentalis	Western Spruce Budworm	0	0.00

In the following graph, the pests are color coded according to the county's proximity to the pest occurrence in the United States. Red indicates that the pest is within the county; orange indicates that the pest is within 250 miles of the county; yellow indicates that the pest is within 750 miles of the county; and green indicates that the pest is outside of these ranges.



Note: points - Number of trees, bars - Replacement value

Based on the host tree species for each pest and the current range of the pest (Forest Health Technology Enterprise Team 2014), it is possible to determine what the risk is that each tree species in the urban forest could be attacked by an insect or disease.

Spp. Risk	Risk Weight	Species Name	AL	ALB	ARCA	ARD	BBD	BC	BLD	BM	BOB	BSRD	BWA	CB	DA	DBSR	DED	DFB	EAB	FE	FR	FTC	GM	GSOB	HRD	HS	HWA	JPB	JPBW	LAT	LWD	MOB	MPB	NSE	OW
	9	Holly oak																																	
	9	Camphor tree																																	
	7	Velvet ash																																	
	6	Chinese elm																																	
	6	Shamel ash																																	
	6	Persian silk tree																																	
	5	Canary island pine																																	
	5	Callery pear																																	
	5	Sweetgum																																	
	5	Tulip tree																																	
	5	Chinaberry																																	
	5	Avocado																																	
	5	Afghan pine																																	
	5	California peppertree																																	
	5	Tree of heaven																																	
	5	White mulberry																																	
	5	Italian stone pine																																	
	5	Aleppo pine																																	
	5	American sycamore																																	
	4	Blue jacaranda																																	
	4	Outeniqua yellowwood																																	
	4	Southern magnolia																																	
	4	Chinese pistache																																	
	4	Carrotwood																																	
	4	Benjamin fig																																	
	4	Mexican fan palm																																	
	4	Mountain ebony																																	
	4	Kurrajong																																	
	4	Sweetshade																																	
	4	Illwarra Flame Tree																																	
	4	Pride of bolivia																																	
	4	King palm																																	
	4	California palm																																	
	4	Olive																																	
	4	Redflower gum																																	
	4	Carolina laurelcherry																																	
	4	Chinese flame tree																																	
	4	Weeping bottlebrush																																	
	4	Victorian box																																	
	4	Loquat tree																																	

Spp. Risk	Risk Weight	Species Name	AL	ALB	ARCA	ARD	BBD	BC	BLD	BM	BOB	BSRD	BWA	CB	DA	DBSR	DED	DFB	EAB	FE	FR	FTC	GM	GSOB	HRD	HS	HWA	JPB	JPBW	LAT	LWD	MOB	MPB	NSE	OW
Red	4	ice cream bean tree																																	
Red	4	Saucer magnolia																																	
Red	4	Gold medallion tree																																	
Red	4	Silk floss tree																																	
Yellow	4	Sweet cherry																														Yellow			
Red	4	Chilean mesquite																																	
Yellow	4	Siberian elm		Green													Yellow																		
Red	4	Lemon																																	
Yellow	4	Green ash		Green															Yellow																
Red	4	Kaffir plum																																	
Red	4	Goldenrain tree																																	
Red	4	Honey mesquite																																	
Orange	3	Vinegartree																																	
Orange	3	Coast redwood																																	
Green	1	Glossy privet																																	
Green	1	Pomegranate																																	

Spp. Risk	Risk Weight	Species Name	PBSR	POCRD	PSB	PSHB	RPS	SB	SBW	SFM	SLF	SOD	SPB	SW	TCD	WBB	WBBU	WFNPM	WM	WPB	WPBR	WSB
Red	9	Holly oak				Red						Orange										
Red	9	Camphor tree				Red						Orange										
Red	7	Velvet ash				Red													Green			
Red	6	Chinese elm				Red																
Red	6	Shamel ash				Red																
Red	6	Persian silk tree				Red					Green											
Orange	5	Canary island pine			Green								Orange	Green								
Red	5	Callery pear				Red																
Red	5	Sweetgum				Red																
Red	5	Tulip tree				Red					Green											
Red	5	Chinaberry				Red					Green											
Red	5	Avocado				Red																
Orange	5	Afghan pine			Green								Orange	Green								
Red	5	California peppertree				Red																
Red	5	Tree of heaven				Red					Green											
Red	5	White mulberry				Red					Green											
Orange	5	Italian stone pine			Green								Orange	Green								
Orange	5	Aleppo pine			Green								Orange	Green								
Red	5	American sycamore				Red					Green											
Red	4	Blue jacaranda				Red																
Red	4	Outeniqua yellowwood				Red																
Red	4	Southern magnolia				Red																
Red	4	Chinese pistache				Red																
Red	4	Carrotwood				Red																
Red	4	Benjamin fig				Red																
Red	4	Mexican fan palm				Red																

Spp. Risk	Risk Weight	Species Name	PBSR	POCRD	PSB	PSHB	RPS	SB	SBW	SFM	SLF	SOD	SPB	SW	TCD	WBB	WBBU	WFNPM	WM	WPB	WPBR	WSB
	4	Mountain ebony																				
	4	Kurrajong																				
	4	Sweetshade																				
	4	Illwarra Flame Tree																				
	4	Pride of bolivia																				
	4	King palm																				
	4	California palm																				
	4	Olive																				
	4	Redflower gum																				
	4	Carolina laurelcherry																				
	4	Chinese flame tree																				
	4	Weeping bottlebrush																				
	4	Victorian box																				
	4	Loquat tree																				
	4	ice cream bean tree																				
	4	Saucer magnolia																				
	4	Gold medallion tree																				
	4	Silk floss tree																				
	4	Sweet cherry																				
	4	Chilean mesquite																				
	4	Siberian elm																				
	4	Lemon																				
	4	Green ash																				
	4	Kaffir plum																				
	4	Goldenrain tree																				
	4	Honey mesquite																				
	3	Vinegartree																				
	3	Coast redwood																				
	1	Glossy privet																				
	1	Pomegranate																				

Note:

Species that are not listed in the matrix are not known to be hosts to any of the pests analyzed.

Species Risk:

- Red indicates that tree species is at risk to at least one pest within county
- Orange indicates that tree species has no risk to pests in county, but has a risk to at least one pest within 250 miles from the county
- Yellow indicates that tree species has no risk to pests within 250 miles of county, but has a risk to at least one pest that is 250 and 750 miles from the county
- Green indicates that tree species has no risk to pests within 750 miles of county, but has a risk to at least one pest that is greater than 750 miles from the county

Risk Weight:

Numerical scoring system based on sum of points assigned to pest risks for species. Each pest that could attack tree species is scored as 4 points if red, 3 points if orange, 2 points if yellow and 1 point if green.

Pest Color Codes:

- Red indicates pest is within Los Angeles county
- Red indicates pest is within 250 miles county
- Yellow indicates pest is within 750 miles of Los Angeles county
- Green indicates pest is outside of these ranges

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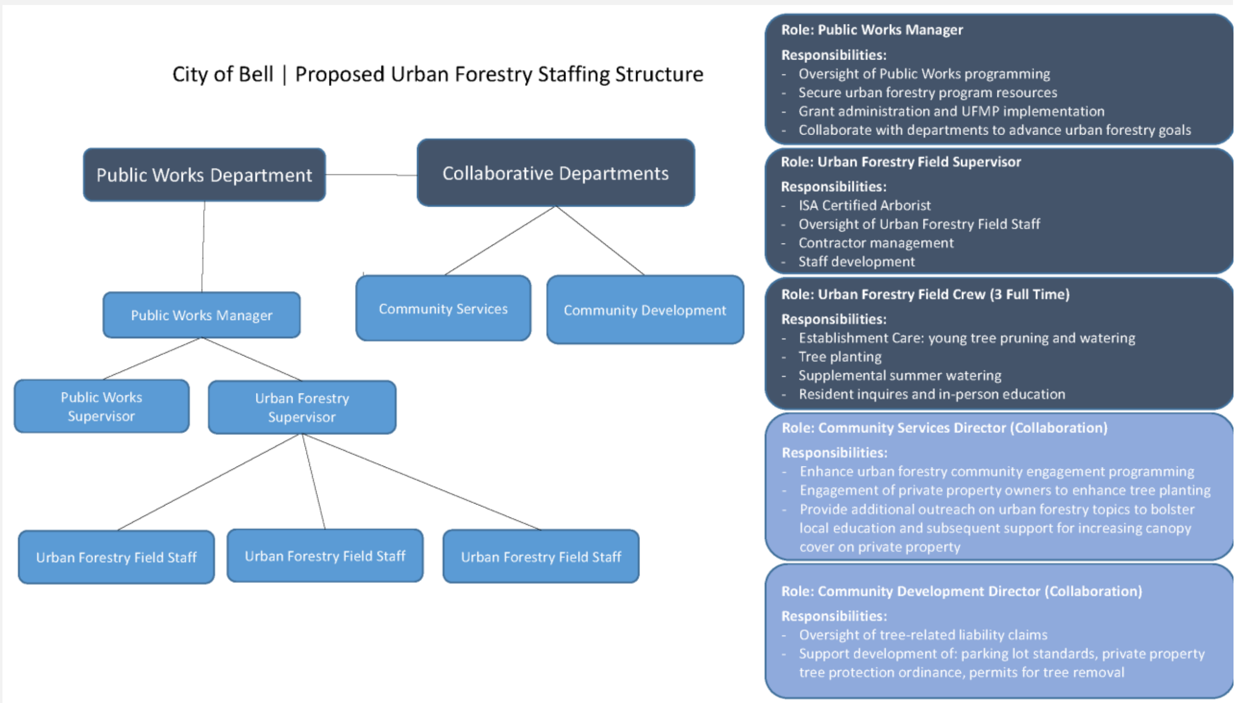
Appendix B
Staffing Structure

Proposed Staffing Structure

The City of Bell's Public Works Department does not have dedicated urban forestry staff. Approximately 2.5 Full Time Equivalent (FTE) staff work on urban forestry tasks as needed and as capacity allows. The City also has three (3) vacant FTE positions that could contribute to urban forestry maintenance tasks. Exhibit B-1 displays a proposed staffing structure that designates staff positions specifically to the urban forestry program.

Exhibit B-1. Proposed Staffing Structure



Considerations for an In-House Crew

Most public agencies utilize a combination of contracted services and in-house tree crews to provide efficient tree maintenance, at the lowest possible cost, with the greatest level of expertise available (APWA 2023.) Although utilizing in-house crews for tree care allow the City to more effectively control the quality of services provided, investments in equipment and arboriculture knowledge is necessary and should be considered when determining if an in-house crew is valuable for the City's current operational program (APWA. 2023.)

Maintenance tasks with high levels of specialization or tasks which necessitate large equipment have higher upfront costs and should be considered only if operational capacity and funding allow. Costs estimated in this analysis focus on tasks that can be performed with a lower initial cost. ANSI Standards outline the minimum Personal Protective Equipment (PPE) required for tree care operations and **Table B.1** provides an itemized list and costs. Costs in Table B.1. are estimated using the proposed staffing structure in Exhibit B-1. **Table B.2** reflects the estimated costs for recommended equipment to perform in-house tree planting, tree watering, and young tree pruning. Cost estimates for Table 3.2 was calculated for a three-person crew and therefore is reflective of typical quantity of equipment needed for an in-house crew.

As staff positions are filled, internal needs such as responding to resident inquiries, tree planting, establishment care, and young tree pruning may be absorbed by City staff and removed from contractor responsibilities as capacity allows.

Table B.1. Estimated Costs for Personal Protective Equipment (PPE)

Equipment	Example	Quantity	Cost	Total Cost
Helmet	Kask Super Plasma	4	$140	$560
Safety Glasses	Notch Safety Glasses	4	$9	$36
Gloves	Atlas Work Glove (Dozen)	4	$65	$260
Ear protection	Kask Defenders SC3	4	$36	$144
Estimated Subtotal				**$1,000**

Table B.2. Equipment Inventory

Equipment	Example	Quantity	Cost	Total Cost
Pruning Pole	Notch Marvin 4'	1	$40	$40
Pruning Pole	Notch Marvin 6'	1	$45	$45
Pruning Pole Head	Marvin Pruner Head	2	$100	$200
Pruning Pole Blade	Notch Mondo Blade	2	$35	$70
Stake Pounder		1	$50	$50
Shovel		2	$20	$40
Hand Pruner		3	$30	$90
Watering Trailer		1	$10,000	$10,000
Estimated Subtotal				**$10,535**

Appendix C
Potential Funding Sources

Funding Opportunities

Grants	
Sustainable Forestry Initiative Urban Forest Improvement Grant Program	Sustainable Forestry Initiative established in 1994 as a response to increasing public concern about forest management practices and their impact on the environment. Initially focused on large-scale forest management, the SFI has expanded its scope to include urban and community forestry, recognizing the unique challenges and opportunities in these environments. The organization will have 1 year (12 months) from the execution of the grant to complete the assessment. Consistent progress towards completion of the assessment in a 1-year (12 month) period must be demonstrated at each quarterly check-in. The final deliverable will be due 1 year (12 months) from the start of the grant period. If you have any difficulty with the online application process, SFI staff would be happy to assist you. Applications will be on a rolling basis until May 30, 2027, or until all funds are awarded, whichever comes first.
Urban Flood Protection Grant Program (California Natural Resources Agency)	The Urban Flood Protection Program was created by Proposition 68 targeting multi-benefit projects in urbanized areas to address flooding. Projects must address flooding in urban areas, protect people, and protect property from flood damage. Examples of eligible projects include tree planting, establishment care, and creating native landscapes with stormwater capture features like bioswales. There have been two funding cycles between 2020 and 2022, directing $87.6 million in grant funding to 26 projects across California, 19 of which will benefit disadvantaged communities.
Urban and Community Forestry Program (CAL FIRE)	Multiple grant programs supported by the Urban and Community Forestry Program have funded tree planting, tree inventories, urban wood and biomass utilization, blighted urban lands improvements, and green schoolyards to advance the goals and objectives of supporting healthy urban forests and reducing greenhouse gas emissions. Application submission deadlines occur in May annually.
Urban Greening Grant Program (California Natural Resources Agency)	Consistent with Assembly Bill 32 (2006), the Urban Greening Grant Program funds projects that reduce greenhouse gases by sequestering carbon, decreasing energy consumption, and reducing vehicles miles traveled, while also transforming the built environment into more sustainable, enjoyable, and effective places, creating healthy and vibrant communities. In previous years, approximately $20-30 million was available for selected project applicants, which included public agencies, nonprofit organizations, and qualifying districts. As of February 2024, budget allocations are uncertain. The proposed 2024-2025 budget includes a new appropriation of $23.75M from the Greenhouse Gas Reduction Fund (GGRF) for the Urban Greening Program.
Active Transportation Program (California Department of Transportation)	This program provides funding to encourage increased use of active modes of transportation, such as biking and walking. Trees and other vegetation are significant components of several eligible projects under the Active Transportation Program, including parks, trails, and safe routes to schools. Applicants include public agencies, transit agencies, school districts, tribal governments, and nonprofit organizations.
Affordable Housing and Sustainable Communities (California Strategic Growth Council)	The Strategic Growth Council is authorized to fund land use, housing, transportation, and land preservation projects to support infill and compact development that reduce greenhouse gas emissions. Urban Greening is a threshold requirement for all Affordable Housing and Sustainable Communities funded projects. Eligible urban greening projects include, but are not limited to, rainwater recycling; flow and filtration systems including

Grants	
	rain gardens, stormwater planters, and filters; vegetated swales; bioretention basins; infiltration trenches; and integration with riparian buffers, shade trees, community gardens, parks, and open space. Funding for 2024 is estimated at $675 million and will be available to locality (e.g., local agencies), developer (entity responsible for project construction), or program operator (day-to-day operational project administrator) applicants.
Storm Water Grant Program (California State Water Resources Control Board)	The State Water Resources Control Board is funding surface and groundwater storage, ecosystem and watershed protection and restoration, and drinking water protection through the Storm Water Grant Program. The program prioritizes multiple benefit projects, including projects that increase tree canopy. Approximately $200 million in grant funding have been awarded.
Extreme Heat and Community Resilience Program (California Office of Planning and Research)	This program funds and supports local, regional, and tribal efforts to reduce the impacts of extreme heat. The Extreme Heat and Community Resilience Program coordinates the state's efforts to address extreme heat and the urban heat island effect and will allocate $20 million in grant funding. Eligible projects include increasing shade. Planning and implementation projects include studies, development of planning documents, providing shade, increasing building and surface reflectance, and developing passive or low-energy cooling strategies.

*Fees, Assessments, Taxes	
Parcel Tax	A parcel tax is a special tax levied for the provision of special benefits. Revenues from special taxes must be used for the specific purpose for which they are intended, so a parcel tax would create a dedicated funding stream for street trees. Similar to a special assessment, a parcel tax cannot be based on the value of property; however, the amount levied on each parcel need not be directly related to the benefits provided (ILG 2008). Cities have the flexibility to levy parcel taxes as they see fit, but they are typically based on lot square footage or levied as a flat tax, with the same amount per parcel (CTD 2012a). Parcel taxes are designed to encompass entire cities and therefore, are good candidates for a citywide street tree program, as opposed to the district-level approach that often occurs under special assessments.
Landscape and Lighting Assessment Districts	LLADs are a form of special assessment that finance improvements to landscaping, lighting and open space, along with open space acquisition. The Landscape and Lighting Act of 1972 authorizes municipal agencies in California to initiate and administer LLADs. The creation of a LLAD, as with any special assessment, requires the preparation of an Engineer's Report that demonstrates the nexus between fees assessed and benefits provided, followed by majority (50 percent plus one) approval via a special ballot, pursuant to Proposition 218. LLADs are widely used throughout California to fund a range of public realm improvements and services related to street trees, streetscape improvements, street and traffic lights, and recreational facilities, among others. As with parcel taxes, LLADs typically fund more than just street tree planting, establishment care, and maintenance. While a LLAD could be designed for street trees alone, the process may attract other agencies in need of additional revenue and interested in expanding the scope to services, such as park and recreation maintenance. One caution would be to avoid setting the assessment so

	high as to generate voter backlash. Local municipalities have often convened focus groups to determine the appropriate assessment level.
General Obligation Bonds	Local governments commonly use General Obligation (GO) bonds to fund construction and improvement of projects involving real property (e.g., buildings, infrastructure, and parks). GO bonds typically carry low interest rates, making them attractive for capital projects, which may include tree planting. However, funding is available for discrete projects, often over a limited time rather than an extended period. In addition, ongoing maintenance is ineligible for GO bond funding pursuant to federal tax law. California cities pay debt service from GO bonds through ad valorem property taxes, where assessments are based on property value. As a result, the issuance of GO bonds requires two-thirds voter approval (State Treasurer 2008).
Maintenance Assessment Districts	The Landscape and Lighting Act of 1972 authorizes Maintenance Assessment Districts (MADs), which are closely related to LLADs. The key difference is that charter cities, can create MADs for the provision of services not specifically authorized under state law, thereby broadening their use (Griffin, pers. comm., 2012). MADs may be used to finance street tree care, but as with a LLAD, a MAD intended for street trees alone could also attract the attention of other agencies interested in funding the provision of additional non-related services.
Community Benefit Districts	Community Benefit Districts (CBDs) are used to finance neighborhood revitalization, commonly in commercial areas. Special benefits typically include public safety, economic development, beautification, and streetscape improvements. Formation of a CBD requires property owners to petition the appropriate local agency and demonstrate an interest in paying for additional services. A non-profit Board of Directors typically comprised of property owners, businesses, and government representatives administers a CBD. While CBDs may include street tree planting and maintenance, this is rarely the focus.

* Source: City of San Francisco, Financing San Francisco's Urban Forest 2013

Appendix D
Monitoring Plan

Introduction

The following Monitoring Plan utilized the Vibrant Cities Lab Community Assessment and Goal-Setting Tool to monitor the implementation of the UFMP. This tool is meant to help City staff around the county to understand how they can contribute to a more productive urban forestry program and is generalized to apply to myriad cities throughout the nation. Keeping these generalizations in mind, the City of Bell staff and the consulting team filled out the current status and goal for each question presented in the Community Assessment and Goal-Setting Tool's questionnaire. During this process, City staff highlighted the need to change wording referencing reporting to the "forestry department" to the "Public Works department" for the "Tree Risk Management" section of the report. This change is also noted within the Monitoring Plan below.

Table X-1. City of Bell Community Assessment and Goal-Setting Tool Results

FINAL SCORECARD

COMMUNITY ASSESSMENT & GOAL-SETTING	TOTAL CURRENT	TOTAL GOAL	SCORE GAP
	20	71	51

SECTION	CURRENT	GOAL
Measure Your Current Tree Canopy and Set Goals	2	4
Urban Forest Inventory and Assessment	0	6
Know What's Happening to Trees in Your Community	1	5
Urban Forest Characteristics	-2	3
Engaging Peers and Residents in Process	8	16
Creating Essential, Effective Public/Private Partnerships	3	5
Resource Management: Planning	5	8
Resource Management: Implementation	2	17
Resource Management: Monitoring and Maintenance	1	7

City of Bell – UFMP

Measure Your Current Tree Canopy and Set Goals

CANOPY COVER: NO DATA, NO ACTION

Achieve desired degree of tree cover, based on potential or according to goals set for entire municipality and for each neighborhood or land use.

	CURRENT	GOAL
LOW (-1) The existing canopy cover for entire municipality is <50% of the desired canopy.	○	○
FAIR (1) The existing canopy is 50%-75% of desired.	○	○
GOOD (2) The existing canopy is >75%-100% of desired.	●	○
OPTIMAL (4) The existing canopy is >75%-100% of desired – at individual neighborhood level as well as overall municipality.	○	●

Urban Forest Inventory and Assessment

INVENTORY

Current and comprehensive inventory of tree resource to guide its management, including data such as age distribution, species mix, tree condition, and risk assessment.

	CURRENT	GOAL
LOW (-1) No inventory	○	○
FAIR (1) Complete or sample-based inventory of publicly owned trees.	●	○
GOOD (2) Inventory guides planning, management decisions.	○	●
OPTIMAL (4) Systematic comprehensive inventory system of entire urban forest – with information tailored to users and supported by mapping in municipality-wide GIS system. Provides for change analysis.	○	○

ASSESSMENT METHODOLOGY

Urban forest policy and practice driven by accurate, high-resolution, and recent assessments of existing and potential canopy cover, with comprehensive goals municipality-wide and at neighborhood or smaller management level.

	CURRENT	GOAL
LOW (-1) No assessment.	○	○
GOOD (2) Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery, for example i-Tree Canopy.	○	○
BETTER (3) Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LIDAR) – accompanied by comprehensive set of goals by land use and other parameters.	○	○
OPTIMAL (4) As described for "Better" rating – and all utilized effectively to drive urban forest and green infrastructure policy and practice municipality-wide and at neighborhood or smaller management level.	○	○

Know What's Happening to Trees in Your Community

ASSESSMENT OF PUBLICLY-OWNED TREES

Current and detailed understanding of the condition and risk potential of all publicly owned trees that are managed intensively (or individually).

	CURRENT	GOAL
LOW (-1) No information.	○	○
FAIR (1) Sample-based tree inventory indicating tree condition and risk level.	○	○
GOOD (2) Complete tree inventory that includes detailed tree condition ratings.	○	○
OPTIMAL (4) Complete GIS tree inventory that includes detailed tree condition and risk ratings.	○	○

ASSESSMENT OF PUBLICLY-OWNED NATURAL AREAS

Detailed understanding of the ecological structure and function of all publicly owned natural areas (such as woodlands, ravines, stream corridors, etc.), as well as usage patterns.

	CURRENT	GOAL
LOW (-1) No information.	○	○
FAIR (1) Identified only in natural area survey.	○ (selected)	○
GOOD (2) Level and type of public use documented.	○	○ (selected)
BETTER (3) Ecological structure and function of all natural areas assessed and documented.	○	○
OPTIMAL (4) Management plan focused on sustaining and, where possible, improving overall ecological structure and function while facilitating appropriate public use. Plan should consider impacts on contiguous natural areas [open space corridors] outside the community's borders	○	○

ASSESSMENT OF TREES ON PRIVATE PROPERTY

Understanding of extent, location, and general condition of privately owned trees across the urban forest.

	CURRENT	GOAL
LOW (-1) No information.	○	○
FAIR (1) Aerial, point-based assessment – capturing extent and location.	○	○
GOOD (2) Bottom-up sample based assessment, as well as basic aerial view.	○	○
OPTIMAL (4) Bottom-up sample based assessment, as well as detailed UTC analysis of entire urban forest, including private property, integrated into municipality-wide [multi-agency] GIS system. LIDAR and hyper-spectral imaging most helpful.	○	○

Urban Forest Characteristics

RELATIVE PERFORMANCE INDEX BY SPECIES

Understanding the age, health and condition of publicly-owned trees, by species. Note: **Establishing an RPI for common public tree species** requires at least a sample-based field inventory and assessment.

	CURRENT	GOAL
LOW (-1) No information.	●	○
FAIR (1) Six most common species have lower RPI scores than the average of all species in community. (<1.)	○	○
GOOD (2) Half of the six most common species have higher RPI scores than the average of all species in community. (>1.)	○	●
OPTIMAL (4) All six most common species have higher RPI scores than the average of all species in community. (>1.)	○	○

USE OF NATIVE VEGETATION

Preservation and enhancement of local natural biodiversity.

	CURRENT	GOAL
LOW (-1) No coordinated focus on native vegetation.	○ (selected)	○
FAIR (1) Voluntary use of native species on publicly and privately owned lands; invasive species are recognized.	○	○ (selected)
GOOD (2) Use of native species is encouraged on a project-appropriate basis in all areas; invasive species are recognized and discouraged on public and private lands.	○	○
OPTIMAL (4) Native species are widely used on a project-appropriate basis in all areas; invasive species are proactively managed for eradication to the full extent possible.	○	○

Engaging Peers and Residents in Process

ALIGN MUNICIPAL DEPARTMENTS

Align affected municipal departments, county and regional authorities and state agencies behind common agenda.

	CURRENT	GOAL
LOW (-1) Municipal departments/agencies take actions impacting urban forest with no cross-departmental coordination or consideration of the urban forest resource.	○	○
FAIR (1) Municipal departments/agencies recognize potential conflicts and reach out to urban forest managers on an ad hoc basis – and vice versa.	○	○
GOOD (2) Informal teams among departments and agencies communicate regularly and collaborate on a project-specific basis.	○	○
OPTIMAL (4) Municipal policy implemented by formal interdepartmental/interagency working teams on all municipal projects.	○	○

ENGAGE RESIDENTS IN PLANNING AND IMPLEMENTATION

Enable community stakeholders to participate in and help shape planning process.

	CURRENT	GOAL
LOW (-1) Little or no citizen involvement or neighborhood action.		
FAIR (1) Some neighborhood groups engaged across the community but no minimal outreach to assure underserved neighborhoods participate effectively.		
GOOD (2) Many active neighborhood groups engaged in advancing urban forest goals, but with little or no overall coordination with municipality or its partnering NGOs.		
OPTIMAL (4) Proactive outreach and coordination efforts by municipality and NGO partners resulting in widespread citizen involvement and structured engagement among diverse neighborhood groups.		

ENVIRONMENTAL EQUITY

Ensure that the benefits of urban forests are made available to all, especially to those in greatest need of tree benefits.

	CURRENT	GOAL
LOW (-1) Tree planting and outreach is not determined equitably by canopy cover or need for benefits.	○	○
FAIR (1) Planting and outreach includes attention to low canopy neighborhoods or areas.	○	○
GOOD (2) Planting and outreach targets neighborhoods with low canopy and a high need for tree benefits.	○	○
OPTIMAL (4) Equitqable planting and outreach at the neighborhood level is guided by strong resident involvement in low canopy/high need areas. Residents participate actively in identifying needs for their neighborhoods, planning, implementation and monitoring.	○	○

TREES ACKNOWLEDGED AS VITAL COMMUNITY RESOURCE

Stakeholders from all sectors and constituencies within municipality – private and public, commercial and nonprofit, entrepreneurs and elected officials, community groups and individual citizens – understand, appreciate, and advocate for the role and importance of the urban forest as a resource.

	CURRENT	GOAL
LOW (-1) General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.	○	○
FAIR (1) Trees generally recognized as important and beneficial.	○	○
GOOD (2) Trees widely acknowledged as providing environmental, social, and economic services – resulting in some action or advocacy in support of the urban forest.	●	○
OPTIMAL (4) Urban forest recognized as vital to the community's environmental, social, and economic well-being.	○	●

Creating Essential, Effective Public/Private Partnerships

ENGAGE LARGE PRIVATE LANDOWNERS AND INSTITUTIONS

Large private landholders – including school systems, universities and corporate campuses – embrace and advance municipality-wide urban forest goals and objectives by implementing specific resource management plans.

	CURRENT	GOAL
LOW (-1) Large private landholders are generally uninformed about urban forest issues and opportunities.	○	○
FAIR (1) Municipality educates landowners, provides technical assistance, sets goals and provides incentives for managing resources in accordance with plan.	○	○
GOOD (2) Landowners develop tree management plans that advance municipal urban forest goals.	○	○
OPTIMAL (4) Tree management plans developed with input from community, and public access to the property's forest resource.	○	○

ALL UTILITIES WORK WITH MUNICIPALITY, EMPLOY BMPS

All utilities – above and below ground – employ best management practices and cooperate with municipality to advance goals and objectives related to urban forest issues and opportunities.

	CURRENT	GOAL
LOW (-1) No utility consideration of the health of the urban forest resource.	○	○
FAIR (1) Utilities take actions impacting urban forest with no municipal coordination.	○	○
GOOD (2) Utilities employ best management practices, recognize potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	○	○
BETTER (3) Utilities are included in informal municipal teams that communicate regularly and collaborate on a project-specific basis.	○	○

GREEN INDUSTRY EMBRACES GOALS, HIGH STANDARDS

Green industry works together to advance municipality-wide urban forest goals and objectives, and adheres to high professional standards.

	CURRENT	GOAL
LOW (-1) Little or no cooperation among segments of green industry or awareness of municipality-wide urban forest goals and objectives.	○	○
FAIR (1) Some cooperation among green industry as well as general awareness and acceptance of municipality-wide goals and objectives.	●	○
GOOD (2) Specific collaborate arrangements across segments of green industry in support of municipality-wide goals and objectives.	○	●
OPTIMAL (4) Shared vision and goals and extensive committed partnerships in place. Solid adherence to high professional standards, and commitment to credentialing and continuing education.	○	○

Resource Management: Planning

DEVELOP URBAN FOREST MANAGEMENT PLAN

Develop and implement a comprehensive urban forest management plan for public and private property.

	CURRENT	GOAL
LOW (-1) No urban forest management plan.	○	○
LOW (-1) Modest planting on public lands primarily for replacement on case-by-case basis, reactive risk management.	○	○
GOOD (2) Community adopted a city-wide canopy goal as official policy, based on best available canopy data, and scaled from community to neighborhood level.		○
GOOD (2) New or recent urban forest management plan developed to achieve goal for publicly-owned forest resources.	○	○
BETTER (3) New or recent urban forest and green infrastructure management plan which targets public tree planting sites, protection and maintenance based on assessment of anticipated benefits ranging from stormwater to heat island mitigation, public health, etc.		○
OPTIMAL (4) New or recent urban forest and green infrastructure management plan which targets public and private tree planting and protection based on assessment of anticipated benefits – and assures these benefits are distributed equitably among neighborhoods.		○

COOPERATIVE PLANNING WITH OTHER MUNICIPALITIES

Cooperation and interaction on urban forest plans among neighboring municipalities within a region, and/or with regional agencies.

	CURRENT	GOAL
LOW (-1) Municipalities have no interaction with each other or the broader region. No regional planning or coordination on urban forestry.	○	○
FAIR (1) Some neighboring municipalities and regional agencies share similar urban forest policies and plans.	◉	○
GOOD (2) Some urban forest planning and cooperation across municipalities and regional agencies.	○	◉
OPTIMAL (4) Widespread regional cooperation resulting in development of regional urban forestry strategy.	○	○

FORESTRY PLAN INTEGRATED INTO OTHER MUNICIPAL PLANS

Forestry plan is designed to reinforce, and be reinforced through comprehensive plans, sustainability plans, park development, storm water and watershed plans, neighborhood revitalization, climate mitigation and sustainability plans, etc.

	CURRENT	GOAL
LOW (-1) Urban forestry plan mentions how it could meet other municipal objectives, or inform other planning efforts.	○	○
FAIR (1) Urban forestry planning team presents plan to other agencies, encouraging them to consider how forestry might help achieve their objectives.	○	○
GOOD (2) Once completed, urban forestry planning team works with other agencies to align current and future objectives.	○	○
OPTIMAL (4) All agencies whose goals are served by urban forestry practices, participate in creation of forestry plan, and commit to designated roles and responsibilities.	○	○

Resource Management: Implementation

URBAN FORESTRY PROGRAM CAPACITY [APPLIES TO IN-HOUSE AND CONTRACTED STAFF]

Maintain sufficient well-trained personnel and equipment – whether in-house or through contracted or volunteer services – to implement municipality-wide urban forest management plan.

	CURRENT	GOAL
LOW (-1) Lack of personnel and/or adequate equipment severely limits needed maintenance. Few resources, if any available to achieve new goals.	○	○
FAIR (1) Lack of staff training and/or access to adequate equipment limits effectiveness.	○	○
GOOD (2) Team has capacity in terms of trained staff and equipment to achieve many of the goals of the urban forest management plan.	○	○
OPTIMAL (4) Team has no and will in the future to achieve all goals of the urban forest management plan, to maintain the resource over time, and adapt management as circumstances change.		○

MUNICIPALITY-WIDE URBAN FORESTRY FUNDING

Develop and maintain adequate funding to implement municipality-wide urban forest management plan.

	CURRENT	GOAL
LOW (-1) Little or no dedicated funding.	○	○
FAIR (1) Ad hoc funding for emergency, reactive management.	○	○
GOOD (2) Funding sufficient for some proactive management based on urban forest management plan.	○	○
OPTIMAL (4) Sustained, long-term funding from multiple municipal, regional and/or state angencies, along with private sources to implement a comprehensive urban forest management plan, and provide for maintenance and adaptive management as circumstances change.	○	○

GROWING SITE SUITABILITY

All publicly owned trees are selected for each site and planted in conditions that are modified as needed to ensure survival and maximize current and future tree benefits.

	CURRENT	GOAL
LOW (-1) Trees selected and planted without consideration of site conditions.	○	○
FAIR (1) Appropriate tree species are considered in site selection.	●	○
GOOD (2) Municipality-wide guidelines for the improvement of planting site conditions and selection of suitable species.	○	●
OPTIMAL (4) All trees planted in sites with adequate soil quality and quantity, and with sufficient growing space and overall site conditions to achieve their genetic potential and thus provide maximum ecosystem services. Where growing conditions are poor, guidance provided on how to improve soil volume, quality, other factors.	○	○

TREE ESTABLISHMENT AND MAINTENANCE

Comprehensive and effective tree planting and establishment program is driven by canopy cover and goals and other considerations according to plan.

	CURRENT	GOAL
VERY LOW (-2) Little or no tree planting. Tree establishment is ad hoc.		
LOW (-1) Some tree planting and establishment occurs, but with limited overall municipality-wide planning and post-planting care.		
FAIR (1) Limited planning and post-planting care. Planting takes place on plan-identified sites. None or only fragmentary planting and maintenance protocols.		
GOOD (2) Planting and post-planting care and maintenance protocols in place.		
OPTIMAL (4) Comprehensive tree establishment plan provides concrete guidance on most of the following criteria: site selection, size, age class, diversity of species, native plant choice; planting protocols [e.g. minimum soil volumes, soil conditions]; young tree care, including region appropriate irrigation requirements. Includes provisions and funding for maintenance.		

MANAGEMENT OF PUBLICLY-OWNED NATURAL AREAS

The ecological integrity of all publicly owned natural areas is protected and enhanced – while accommodating public use where appropriate.

	CURRENT	GOAL
LOW (-1) No natural areas management plans or implementation in effect.		
FAIR (1) Only reactive management to facilitate public use, e.g. hazard abatement, trail maintenance.		
GOOD (2) Management plan in place for each publicly owned natural area to facilitate appropriate public use.		
OPTIMAL (4) Management plan for each publicly owned natural area focused on sustaining and, where possible, improving overall ecological integrity (i.e., structure and function) – while facilitating appropriate public use.		

POLICIES THAT FOSTER GOOD URBAN FORESTRY ON PRIVATE LANDS

Because private lands comprise the majority of canopy cover for most municipalities, plans and policies should address – through rules, fees and incentives – how owners contribute to the overall health of the urban forest and the benefits it delivers.

	CURRENT	GOAL
LOW (-1) No tree protection ordinance, or one that's weak and rarely enforced.	○	○
FAIR (1) Strong tree protection ordinance focused on maintaining mature trees with effective procedures.	○	○
GOOD (2) Policies regarding stormwater, site and subdivision planning, zoning and other issues that affect private forests are included in management plan.	○	○
OPTIMAL (4) All relevant municipal policies require or incentivize adherence by private owners to standards incorporated in the plan. Incentives and sanctions applied when appropriate. SEE LIST OF POLICIES.	○	○

Resource Management: Monitoring and Maintenance

TREE PROTECTION POLICY AND ENFORCEMENT

The benefits derived from trees on public and private land are ensured by the enforcement of municipality-wide policies, including tree care "best management practices."

CURRENT GOAL

LOW (-1)
No tree protection policy

FAIR (1)
Policies in place to protect public trees and employ industry best management practices, but rare or inconsistent enforcement.

GOOD (2)
Policies and practices in place to protect public trees, generally enforced. As a companion to the public tree care policy, community issues a guide to aid compliance for all affected agency staffs and contractors.

BETTER (3)
Policies include construction standards for on-site tree protection, establishment and maintenance. Conforms to and references ANSI Standards for arboricultural practices (A300), safety (Z133), and nursery stock (Z60.1), as well as applicable ISA BMPs.

OPTIMAL (4)
Integrated municipality-wide policies and practices to protect public and private trees, consistently enforced and with penalties sufficient to deter violations.

MONITORING

Periodic, cyclical inspection of urban trees to identify health, pests and disease, growth, canopy, site conditions, and potential risks. Regular inspections guide urban forest management activities, including regular maintenance, species selection, planting sites, preventative and reactive disease and pest control.

	CURRENT	GOAL
LOW (-1) No monitoring.	○	○
FAIR (1) Monitoring is infrequent and reactive to reported changes in tree health, site condition.	○	○
GOOD (2) Monitoring on a regular basis with rotating schedule for each area. Monitors are professionals or volunteers trained to collect specific data required by municipality. Multi-year data available for trend analyses.	○	○
OPTIMAL (4) Monitoring adheres to the standards and protocols established by the Urban Tree Growth and Longevity network.	○	○

TREE RISK MANAGEMENT

Comprehensive tree risk management program fully implemented, according to ANSI A300 (Part 10) “Tree Risk Assessment” standards, and supporting industry best management practices.

	CURRENT	GOAL
LOW (-1) No tree risk assessment or risk management program. Response is on a reactive basis only.	○	○
FAIR (1) Citizens and city staff report tree safety issues to the Public Works* department or manager (e.g. 3-1-1 system, online form, etc.). System tracks the time between damage report and mitigation action.	●	○
GOOD (2) The community has written tree risk management policy (aka, 'standard of care') and an operational plan for inspecting and mitigating reported tree problems, including a timetable for mitigating potential hazards.	○	●
BETTER (3) Policies and ordinances in place to minimize tree damage and removal on commercial developments, and public capital. Protection measures conform to ANSI A300 standards and ISA BMPs.	○	○
OPTIMAL (4) Includes "better" but with TRAQ-qualified contractors on city projects. Educate tree care companies and public about importance of TRAQ qualifications.	○	○

URBAN WOOD AND GREEN WASTE UTILIZATION

Create a closed system diverting all urban wood and green waste through reuse and recycling.

	CURRENT	GOAL
LOW (-1) No utilization plan; wood and other green waste goes to landfill with little or no recycling and reuse.	○	○
FAIR (1) While most green waste does not go to landfill, uses are limited to chips or mulch.	○	○
GOOD (2) The majority of green waste is reused or recycled – for energy, products, and other purposes beyond chips or mulch.	○	○
OPTIMAL (4) Comprehensive plan and processes in place to utilize all green waste one way or another, to the fullest extent possible.	○	○

Appendix E
Methodologies

Land Cover Classification

The Land Cover Classification, developed specifically for the Los Angeles County region, was utilized by the City of Bell for its canopy cover analysis. This dataset was generated using 2020 digital aerial imagery provided by the Los Angeles Region Imagery Acquisition Consortium (LARIAC) Program. LARIAC6 includes color orthogonal imagery at 4-inch resolution for urban areas and 9-inch resolution for national forests. A composite raster for the entire Los Angeles County (LA County) was produced by integrating the red, green, and blue spectral bands from the dataset, in conjunction with the derived normalized difference vegetation index (NDVI) calculated from the infrared wavelength bands. The composite image underwent segmentation, and representative training samples were selected for each land classification. These samples were used to train a deep learning model based on the U-Net classifier architecture, producing a land cover classification with seven distinct classes: non-deciduous trees, deciduous trees (canopy), medium vegetation (shrubs), low vegetation (grass), bare earth, impervious surfaces (pavement and roofs), and water.

Accuracy Assessment

An accuracy assessment was conducted using a stratified random sample of over 200 locations per land cover class across both urban and non-urban areas of LA County. This process generated a confusion matrix, revealing an overall accuracy of 92% for urban areas and an estimated mean accuracy of 90% for canopy across all regions. However, in non-urban areas, impervious surfaces were slightly overestimated due to the presence of snowfall. This overestimation does not affect the City of Bell, which is entirely urban.

Canopy Cover Percentages

To analyze the distribution of canopy cover in the City of Bell, canopy cover percentages were determined by calculating the area of canopy and dividing it by the total land area. The total canopy cover percentage for the City of Bell is 8.0%.

$$Canopy\ Cover\ (\%) = \left(\frac{Canopy\ Area}{Total\ Land\ Area}\right)\ X\ 100$$

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Potential Growth of City Managed Trees

A land cover dataset was created using 2020 digital aerial imagery provided by the Los Angeles Region Imagery

Existing Canopy Growth Estimate

The City-managed tree inventory does not include canopy width measurements but does include tree height and diameter at standard height (DSH). These attributes were used to estimate the cumulative canopy area increase for all trees in the City-managed inventory. These estimations do not consider canopy lost due to tree mortality or removal.

Table E-1 shows the calculations used to estimate canopy growth of existing trees in the City-managed inventory. The average height at maturity is calculated from all trees in the inventory with a DSH of 19 inches or more (38 feet). An estimated cumulative height at maturity is estimated based on this average for trees in each DSH category. The expected additional cumulative height for each DSH category is calculated from the difference between the estimated cumulative mature height and current cumulative height. This number is divided by the total trees in the inventory to get an average expected additional height per tree, which is then converted to the average expected additional canopy width per tree at a 1 to 0.8 ratio (height to canopy). Finally, the additional canopy cover area is estimated based on the cumulative canopy acreage increase for each DSH category.

Table E-1. Estimated Canopy Growth for City-Managed Tree Inventories

DSH (in)	Total Trees	Current and Estimated Height			Estimated Canopy	
		Current Cumulative Height (ft)	Estimated Mature Cumulative Height (ft)	Estimated Additional Cumulative Height (ft)	Estimated Additional Canopy Width per Tree (ft)	Estimated Additional Cumulative Canopy (acre)
0–6.9	327	1,254	12,429	11,175	163	4.4
7–12.9	788	12,073	29,952	17,879	109	4.7
13–18.9	764	18,361	29,040	10,679	62	1.9
19–24.9	557	20,071	21,172	1,134	12	0.04
25–30.9	322	12,720	12,239	92	8	0
31+	123	5,295	4,675	2	0.4	0
Total	**2,881**	**69,774**	**109,507**	**40,961**	**355**	**11.1**

Based on these criteria, the analysis shows that growth from existing trees within the City-managed inventory could increase the City's canopy cover by 11.1 acres at maturity. This growth could increase the existing canopy cover by approximately 0.7%.

Vacant Site Planting Estimate

The City-managed tree inventory was used to estimate the potential increase in canopy cover from planting trees in all viable vacant sites. Vacant sites were classified as viable if they were labeled either as a vacant site or a stump, with a minimum available planting width of 3 feet. Table E-2 shows the calculations used to project the increases in canopy cover that could be achieved at maturity from introducing new trees to these viable vacant sites within the City-managed inventory.

Table E-2. Estimated Canopy at Maturity from Viable Vacant Sites

Parkway Size (ft)	Total Trees	Estimated Mature Canopy Width per Tree (ft)	Estimated Cumulative Canopy (acre)
3–5	163	30	1.2
5.1–7	1,025	45	8.7
7–9.9	203	60	4.8
10+	4	75	0.4
Total	**1,395**	**180**	**15.1**

Based on these criteria, the analysis shows that planting new trees in all viable vacant sites within the City-managed inventory could increase the City's canopy cover by 15.1 acres at maturity. This growth could increase the existing canopy cover by approximately 0.9%.

Priority Planting Analysis

The Priority Planting Score (PPS) multiplies a canopy gap index by a priority equity index for each census tract to calculate the relative tree planting needs within the City. A canopy goal is calculated for each census tract based on the current canopy as well as distribution of land use types and vacant planting sites relative to other census tracts. The canopy gap index is then calculated based on the difference between the current canopy and the goal for each census tract. The canopy gap index is a number between 0 and 100, with a higher number indicating a greater gap between the current canopy cover and the goal. A priority equity index is calculated for each census tract based on CalEnviroScreen, an equity-focused metric of pollution vulnerability and burden, and relative population and acreage sizes. The priority equity index is a number between 0 and 1, with a higher number indicating a higher need for trees based on equity metrics.

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Appendix F

Recommended Tree Species List

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
Mulga	*Acacia aneura*	Very Low	E	Rounded	4	Low	20	20	No		X	Root Rot and Invasive Shot Hole Borer	Showy yellow	Spring	Large brown legume	Fall, Winter, Summer	No	
Shoestring Acacia	*Acacia stenophylla*	Very Low	E	Rounded	4 to 7	Moderate	30	20	No	X	X	N/A	Inconspicuous yellow	Winter, Spring	Very large brown legume	Fall, Spring, Summer	No	
African Fern Pine	*Afrocarpus falcatus / gracilior*	Medium	E	Rounded	>7	Moderate	50 to 65	10 to 20	No			N/A	Inconspicuous	Spring	Small green to pruple cone	Fall	No	
Peppermint Willow	*Agonis flexuosa*	Low	E	Rounded	5 to 6	Moderate	20 to 40	20 to 40	No	X		Phytophthora, Root Rot	Showy white	Spring, Summer	Brown capsule	Fall	No	
Gum Myrtle / Rose Gum	*Angophora costata* / Eucalyptus apocynifolia*	Low	E	Conical or rounded, erect or spreading with high canopy	>10	Low	50	40	No	X	X	Resistant to oak root fungus.	Showy white	Summer	Brown capsule, 0.25-0.5"	Fall	No	Tolerates smog.
Strawberry Madrone	*Arbutus unedo*	Medium	E.	Rounded	4 to 7	Low	35	35	No			Anthracnose, Phytophthora, Root Rot, Rust and Scales, Thrip; Resistant to oak root fungus.	Showy white	Fall, Winter	Orange or red berry	Fall, Winter, Summer	No	
Marina Madrone / Strawberry Tree	*Arbutus 'marina'*	Medium	E	Rounded	3 to 5	Low	40 to 50	40	No			Anthracnose, Phytophthora, Root Rot, Rust and Scales, Thrip; Resistant to oak root fungus.	Inconspicuous pink or rose	Fall, Winter, Spring, Summer	Small red or yellow berry	Fall, Winter	No	
Purple Orchid Tree	*Bauhinia variegata*	Medium	SD	Rounded	5 to 6	Low	20 to 35	20 to 35	No			N/A	Lavendar or pink	Winter, Spring	Very large brown legume	Summer	No	
Bottle Tree	*Brachychiton populneus*	Medium	E	Conical	>7	Low	50	30	No			Root Rot and Invasive Shot Hole Borer	White	Spring, Summer	Large brown follicle	Fall, Summer	No	
Lemon Bottlebrush	*Callistemon citrinus*	Low	E	Rounded	3 to 5	Low	20 to 25	20	No			Chlorosis	Showy red	Spring, Summer	Small brown capsule	Fall	No	
Weeping Bottlebrush	*Callistemon viminalis*	Low	E	Rounded	3 to 5	Low	25	15 to 20	No	X		Armillaria, Root Rot	Showy red	Spring, Summer	Small brown capsule	Fall	No	
Crown Of Gold Tree	*Cassia excelsa*	Medium	E	Rounded	5 to 6	Moderate	25 to 30	25 to 30	No			N/A	Yellow	Fall, Summer	Legume	Fall	No	
Gold Medallion Tree	*Cassia leptophylla*	Medium	SD	Rounded	3 to 5	Low	25	15 to 20	No			N/A	Showy yellow	Summer	Very large brown legume	Fall	No	Poisonous seeds.
River She-Oak	*Casuarina cunninghamiana*	Low	E	Conical or Rounded	>7	Low	70	30	No			hytophthora, Root Rot	Inconspicuous green	Fall	Small brown cone	Spring	No	Smog and salt tolerant.
Blue Atlas Cedar	*Cedrus atlantica 'glauca'*	Low	E	Conical	>7	Moderate	60	25 to 40	No			Phytophthora, Root Rot, Sooty Mold	Fragrant	Spring	Brown cone	Fall, Winter	No	
Deodar Cedar	*Cedrus deodara*	Medium	E	Conical	8 to 12	Moderate	80	40	No		X	Armillaria, Phytophthora, Root Rot, Sooty Mold and Beetle Borers	Fragrant	Fall	Very large brown cone	Spring	No	
Cedar Of Lebannon	*Cedrus libani*	Medium	E	Conical	>7	Low	100	80 to 100	No			Verticillium	Fragrant	N/A	N/A	N/A	No	Needs ample room as it matures
Floss Silk Tree	*Ceiba speciosa*	Low	SD	Rounded	>7	Moderate	60	40 to 50	No			N/A	Showy maroon, pink, purple, or rose	Fall, Winter	Very large white capsule	Spring, Summer	No	

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
Eastern Redbud	*Cercis canadensis**	Medium	D	Rounded or Umbrella, erect or spreading with a low canopy	5 to 10	Low	25	25	No	X		Anthracnose, Crown Rot, Armillaria, Phytophthora and Caterpillars, Scales	Showy pink or rose	Spring	Large brown, purple, or mostly green legume	Summer	No	Showy pink flowers bloom best in full sun, and with moderate moisture. It may require light top pruning (not topping) of vigorous top shoots to maintain its height below 25'.
Western Redbud	*Cercis occidentalis*	Medium	D	Rounded	4	Low	25	20	No			Crown Rot, Phytophthora, Root Rot and Caterpillars, Scales; Resistant to oat root fungus	Showy purple	Spring	Large brown or purple legume	Fall, Summer	Yes	Commonly found in riparian canyons. It is usually sold as a multi-trunk shrub, rather than a single trunk tree standard, but can be trained into either a single or multi-trunk tree, where it is effective as a flowering accent. It tolerates dry conditions, but exhibits more vigorous, lush growth with regular deep watering.
Oklahoma Rredbud	*Cercis reniformis 'Oklahoma'*	N/A	D	Rounded	>7	Low	18	15 to 20	No			Canker, Leaf Spot, Verticillium and Scales	Showy pink	Spring	Large purple legume	Summer	No	
Desert Willow	*Chilopsis linearis*	Very Low	D	Rounded	2 to 4	Low	30	20	No		X	Texas Root Rot	Showy lavendar, pink, rose, or white	Spring, Summer	Very large brown capsule	Fall	Yes	
Chitalpa	*Chitalpa tashkentensis*	Low	D	Rounded	7	Low	35	30	No			Root Rot, Verticillium and Aphids	Showy lavendar	Fall, Spring, Summer	Very large brown, beige, or mostly green capsule	Fall	No	
Texas Olive	*Cordia boissieri*	Low	E	Rounded	2 to 4	Low	30	10 to 15	No			N/A	Showy yellow or white	Spring, Summer	Small to medium beige, white, or yellow drupe	Fall, Winter, Summer	No	
Lemon Scented Gum	*Corymbia citriodora*	Low	E	Rounded	>7	Moderate	80	50 to 100	No			Armillaria, Phytophthora, Root Rot and Beetle Borers, Psyllid, Thrip	White	Winter	Small brown capsule	Spring	No	
Red Flowering Gum	*Corymbia ficifolia*	Low	E	Rounded, erect or spreading with a low canopy	5 to 10	Moderate	35	30	No	X	X	Resistant to Texas root rot and verticillium. Susceptible to beetle borers and thrips, oak root rot, phytophthora and root rot.	Showy orange, pink, red or rose	Spring, Summer, Fall, Winter	Brown capsule, 0.5-1.5"	Spring, Summer, Fall	No	Red flowering gum is very desirable as a flowering accent tree, with its profusion of bright flower clusters in late summer, and sporadically throughout the year. Has fragrant leaves.
Ghost Gum	*Corymbia papuana*	Very Low	E	Rounded	4 to 7	Moderate	50	20 to 35	No			Armillaria, Root Rot and Beetle Borers	Inconspicuous white	Summer	Very small brown or mostly green capsule	Fall	No	
Smoke Tree	*Cotinus coggygria 'purpureus'*	Low	D	Rounded	3 to 5	Low	25'	10 to 12	No			Leaf Spot, Canker, Scab, Verticillium and Leaf Rollers	Showy lavendar or purple	Spring, Summer	Very small pink drupe	Summer	No	Resistant to oak root fungus.
Indian Rosewood	*Dalbergia sissoo*	Very Low	D	Rounded	7	Moderate	60	30 to 40	No		X	Root Rot, Butt Rot, Fusarium, Rust, Powdery Mildew and Termites, Defoliators, Sissoo leaf webber	Inconspicuous white or yellow	Spring	Medium to large brown legume	Fall, Summer	No	Useful for erosion control as it has wide spreading root system

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
Bronze Loquat	*Eriobotrya deflexa*	Medium	E	Rounded	3 to 5	Low	25	25	No			Fire blight	Showy white	Spring	Medium yellow or mostly green pome	Summer	No	It looks best with regular pruning to maintain its shape, and regular deep watering to promote healthy growth. It may require regularly scheduled light top-trimming (but not necessarily shearing) of vigorous top shoots to maintain its height below 25. It is not drought tolerant.
Modesto Ash	*Fraxinus velutina 'modesto'*	Medium	D	Rounded	3 to 6	Moderate	50	30 to 40	No			Anthracnose, Mistletoe, Root Rot, Rust and Beetle Borers, Psyllid, Spider Mites, White Fly	Inconspicuous	Spring	Medium yellow or mostly green samara	Fall, Summer	Yes	
Australian Willow, Wilga	*Geijera parviflora*	Medium	E	Rounded	4 to 7	Low	45	20	No			Armillaria	White	Fall, Spring	Small mostly green capsule	Summer	No	Makes good street tree; noninvasive roots, casts light shade. Moderate growth rate. Pendulus habit. These Australian trees have water-filled leaves that are fire resistant.
Autumn Gold Maidenhair Tree	*Ginkgo biloba*	Medium	D	Conical	5 to 6	Moderate	70	25	No			Anthracnose	N/A	Spring	Medium orange or yellow	Fall	No	Resistant to oak root fungus. Smog tolerant. Female tree has fruit with obnoxious odor. Plant male trees to avoid fruit. Can grow to 100 feet in the right conditions but commonly shorter.
Sea Urchin /Pincushion Hakea	*Hakea laurina*	Low	E	Rounded	2 to 4	Low	15	9 to 20	No			N/A	Showy red or yellow	Fall, Winter	Medium brown capsule	Spring, Summer	No	Smog tolerant.
Golden Trumpet Tree	*Handroanthus chrysotrichus*	Medium	D	Rounded or Vase	3 to 5	Moderate	25	25	No			N/A	Showy yellow	Spring	Very large brown capsule	Fall, Summer	No	
Pink Trumpet Tree	*Handroanthus heptaphyllus*	Medium	D	Rounded	4 to 7	Moderate	30	25	No			N/A	Showy pink or purple	Winter, Spring	Very large green to brown capsule	Summer	No	
Arizona Cypress	*Hesperocyparis arizonica*	Low	E.	Columnar	4 to 7	Low	40	20	Yes			Leaf blight	N/A	Spring	Brown cone	Spring	No	
Jacaranda	*Jacaranda mimosifolia*	Medium	D	Oval, rounded, umbrella or vase, spreading with a high canopy	5 to 10	Low	50	25 to 40	No	X		Resistant to oak root fungus. Susceptible to aphids, phytophthora and root rot.	Showy blue or lavender	Spring, Summer, Fall	Brown capsule, 1.5-3"	Summer, Fall	No	Well-adapted to Alameda's sandy soils. Place where it will get frequent watering. Neighborhood specific. Reported to have weak branch strength.
Chinese Flame Tree	*Koelreuteria bipinnata*	Medium	D	Rounded, umbrella or vase	5 to 10	Moderate	35	35	No	X	X	Susceptible to beetle borers and scales.	Yellow	Summer, Fall	Prolific red-pink capsules, 1.5-3""	Fall	No	Becomes a round-headed tree requiring little pruning at maturity, but needs training when young, as it tends to form multiple leaders.
Flamegold	*Koelreuteria elegans*	Medium	E	Rounded	2 to 4	Low	15	9 to 20	No			Verticillium and Scales, Root Rot, Canker	Showy yellow	Fall, Summer	Medium to large pink capsule	Fall, Winter	No	
Goldenrain Tree	*Koelreuteria paniculata*	Medium	D	Rounded	4 to 7	Low	40	40	Not in Parks			Root Rot, Verticillium and Beetle Borers, Plant Bug, Scales	Showy yellow	Summer	Large brown or yellow capsule	Fall	No	
Primrose Tree	*Lagunaria patersonii*	Medium	E	Rounded	4 to 7	Low	50	20	No			Phytophthora, Root Rot	Showy pink, rose, or white	Fall, Summer	Medium brown capsule	Fall	No	Saline and smog tolerant. Fine hairs within the seed capsule can cause itchiness. Little watering necessary.

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
Sweet Bay, Grecian Laurel	*Laurus nobilis*	Medium	E	Conical or oval	5 to 10	Moderate	35	20	Yes	X	X	Susceptible to psyllids and scales, phytophthora and root rot.	Yellow-green	Spring	Black berry, 0.5"	Summer	Yes	Dense canopy of fragrant leaves. Early pruning needed to train a good shape; pruning needed less frequently with age. Requires removal of suckers.
Tristania, Brisbane Box	*Lophostemon confertus*	Medium	E	Oval or rounded, erect or spreading and covers and extensive area	5 to 10	Low	50	30	NO	X	X	Phytophthora, Root Rot and Scales	Showy white	Spring	Brown capsule, 0.25-0.5"	Summer	No	Previously known at *Tristanis conferta* . Drought resistant once established. Smog tolerant. The red peeling bark and foliage are reminiscent of native Arbutus. Use like a small Eucalyptus tree with few structural problems. Extensive fruit drop from mature trees sometimes causes complaints.
Flaxleaf Paperbark	*Melaleuca linariifolia*	Low	E	Rounded	4 to 7	Low	30	25	No			Chlorosis, Phytophthora, Root Rot	White	Summer	Small brown or gray capsule	Fall	No	Tolerates smog and saline soils.
Cajeput Tree, Paperbark	*Melaleuca quinquenervia*	Low	E	Rounded	5 to 6	Low	35	20	No			Chlorosis, Phytophthora, Root Rot	White	Summer	Small brown or gray capsule	Fall	No	
Fruitless Olive	*Olea europaea*	Low	E	Rounded or Vase	7 to 8	Moderate	35	25 to 30	No			Anthracnose, Armillaria, Phytophthora, Root Rot and Scales, Psyllid	Inconspicuous	Spring	Medium black, purple, or mostly green drupe	Fall	No	
Desert Ironwood	*Olneya tesota*	Low	E	Rounded or Vase	4 to 7	Low	30	15 to 30	No		X	N/A	Showy lavendar or pink	Summer	Large brown or mostly green legume	Fall, Summer	No	
Mexican Palo Verde	*Parkinsonia aculeata*	Very Low	D	Rounded or Vase	3 to 5	Low	25	20	No			Null	Showy yellow	Spring, Summer	Very large brown legume	Fall	No	
Canary Island Pine	*Pinus canariensis*	Medium	E	Columnar	8 to 12	Moderate	80	35	No			Armillaria, Phytophthora, Root Rot, Sooty Mold and Aphids, Beetle Borers, Spider Mites	N/A	N/A	Very large brown cone	Winter	No	The Canary Island pine, the most widely cultivated pine in all of California
Mondell Pine	*Pinus eldarica*	Low	E	Conical	7 to 8	Moderate	80	25	No		x	Armillaria and Aphids, Pine Tip Moth	N/A	N/A	Large brown, yellow, or mostly green cone	Winter	No	
Aleppo Pine	*Pinus halepensis*	Medium	E	Conical	8 to 12	Moderate	65	60 to 80	No			Armillaria, Phytophthora, Root Rot, Pitch Canker and Aphids, Spider Mites	Inconspicuous	Spring	Large brown, yellow, or mostly green cone	Fall, Winter	No	
Torrey Pine	*Pinus torreyana*	Low	E	Conical or Vase	>7	Moderate	50	20 to 25	No			Armillaria, Pitch Canker and Aphids, Beetle Borers, Spider Mites	Inconspicuous	Spring	Very large brown cone	Winter	No	

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
Chinese Pistache	*Pistacia chinensis*	Low	D	Rounded	4 to 7	Low	40	35	No			Verticillium, Root Rot	Inconspicuous	Spring	Medium red or mostly blue drupe	Fall, Summer	No	Potential invasiveness: This plant is classified as potentially invasive in specific areas of California by the California Invasive Plant Council (California Invasive Plant Council) lists this plant as unknown potentially invasive in specific areas of Californianess.
Red Push Pistache	*Pistacia x Red Push*	Medium	D	Rounded	7	Low	40	40	No		X	Null	Inconspicuous	Spring	N/A	N/A	No	
California Sycamore	*Platanus racemosa*	High	D	Rounded	>7	Moderate	80	50	Yes	x		Anthracnose, Armillaria, Phytophthora, Mistletoe and Invasive Shot Hole Borer, Leaf Miner, Scales, Spider Mites	Inconspicuous	Spring	Medium brown or mostly green achene	Fall, Summer	Yes	California riparian species. Best planted in riparian areas with and sites with high groundwater levels
Maverick Thornless Texas Honey Mesquite	*Prosopis glandulosa / Neltuma odorata*	Very Low	D	Drooping	4 to 7	Low	35	35	No		X	N/A	Yellow	Spring, Summer	Very large brown legume	Fall, Spring, Summer	Yes	Highly tolerant of urban settings
Catalina Cherry	*Prunus ilicifolia ssp. Lyonii*	Low	E	Rounded	4 to 7	Low	40	20 to 30	Yes			Root Rot, Rust, Verticillium, Virus	Showy cream or white	Spring	Medium black drupe	Winter, Summer	Yes	
Coast Live Oak	*Quercus agrifolia*	Low	E	Rounded	8 to 12	Moderate	65'	20 to 70	No			Sudden Oak Death, Crown Rot, Mistletoe, Armillaria and Carpenterworm, Invasive Shot Hole Borer, Goldspotted Oak Borer, Aphids	Brown or yellow-green	Spring	Large brown acorn	Fall, Winter	Yes	
Holly Oak, Holm Oak	*Quercus ilex*	Medium	E	Rounded	5 to 6	Low	40 to 50	40 to 50	No			Anthracnose, Drippy Oak, Root Rot and Scales, Spider Mites	Inconspicuous	Winter, Spring	Medium brown acorn	Winter, Summer	No	
Valley Oak	*Quercus lobata*	Medium	D	Rounded	8 to 12	Moderate	70	50	No			Armillaria, Crown Rot, Mistletoe, Root Rot and Invasive Shot Hole Borer, Beetle Borers, Caterpillars, Insect Gall	Inconspicuous	Spring	Medium brown acorn	Fall, Winter	Yes	
Cork Oak	*Quercus suber*	Low	E	Oval, rounded or umbrella, erect or spreading and covers an extensive area	7 to 8	Moderate	70 to 100	70	No	X	X	Resistant to verticillium wilt. Susceptible to phytophthora and root rot.	Inconspicuous	Spring	Prolific acorns, 0.5-1.5"	Fall, Winter	No	Does not like having persistently wet roots, therefore, cannot be planted in grass, or near irrigation. Leaf drop in spring may seem abnormal, but is typical pattern for the tree. Bark is the source of commercial cork.
Southern Live Oak, Live Oak	*Quercus virginiana**	Medium	E	Rounded	7 to 8	Moderate	60	60 to 120	No			Armillaria, Phytophthora, Root Rot and Insect Galls	Yellow-green or brown	Spring	Medium brown acorn	Fall, Winter	No	
African Sumac	*Rhus lancea / Searsia lancea**	Very Low	E	Rounded or umbrella, spreading or weeping with a low canopy	5 to 10	Low	25	25	No	X	X	Root Rot, Verticillium	Inconspicuous	Summer	Red or yellow drupe, 0.25-0.5"	Fall	No	A dense shade tree, rather graceful with its arching branches and weeping foliage. It is tough and reliable in dry conditions, though it looks best with regular deep watering. It may require regularly scheduled light pruning (but not topping) of vigorous top shoots to maintain its height below 25 feet.

Common Name	Tree Species / Botanical Name	SelecTree Water Use Rating	Deciduous/ Evergreen	Shape	Min Tree Well Size (feet)	Hardscape Damage Potential	Height at Maturity (feet)	Canopy Spread at Maturity (feet)	Park Tree Only (Yes/No)	Tolerates Moist Soil	Drought Tolerant	Pests & Diseases	Flower Color	Flower Period	Fruit	Fruiting Period	Native tree to Los Angeles Region (Yes/No)	Comments
African Tulip Tree	*Spathodea campanulata*	Medium	SD	Rounded	5 to 6	Moderate	50	30	No			Null	Showy orange or red	Winter, Spring	Very large brown capsule	Summer	No	
Firewheel Tree	*Stenocarpus sinuatus*	Medium	E	Rounded	2	Low	35	5 to 10	No			N/A	Showy red or yellow	Fall	N/A	N/A	No	
Tipu Tree	*Tipuana tipu*	Medium	D	Rounded	8 to 12	Moderate	50	25 to 50	No			Null	Showy orange or yellow	Summer	Large brown legume	Fall, Summer	No	
Water Gum	*Tristaniopsis laurina*	Medium	E	Rounded	3 to 5	Low	40	30	No			Null	Showy yellow	Spring, Summer	Small brown or red capsule	Fall, Summer	No	Can be trained as a single or multi-trunked tree. Slow growing tree, so planting a larger specimen is desirable.
California Bay Laurel	*Umbellularia californica*	High	E	Rounded	>7	Moderate	80	60 to 75	Yes			Armillaria, Sudden Oak Death, Anthracnose, White Mottled Rot and Beetle Borers, Leaf Miner, Cottony Cushion Scale, Beetle Leaves	Yellow	Spring	Medium brown, purple, yellow, or mostly green drupe	Summer	Yes	Best planted in riparian areas with and sites with high groundwater levels
Sweet Acacia	*Vachellia farnesiana*	Very Low	SD	Rounded or Vase	4 to 7	Low	25	15 to 25	No			Root Rot and Invasive Shot Hole Borer, Caterpillars	Orange or yellow	Spring	Large brown legume	Winter, Summer	No	

Appendix G
Arboriculture Best Management Practices (BMPs)

Spacing Guidelines for Residential Yard Trees

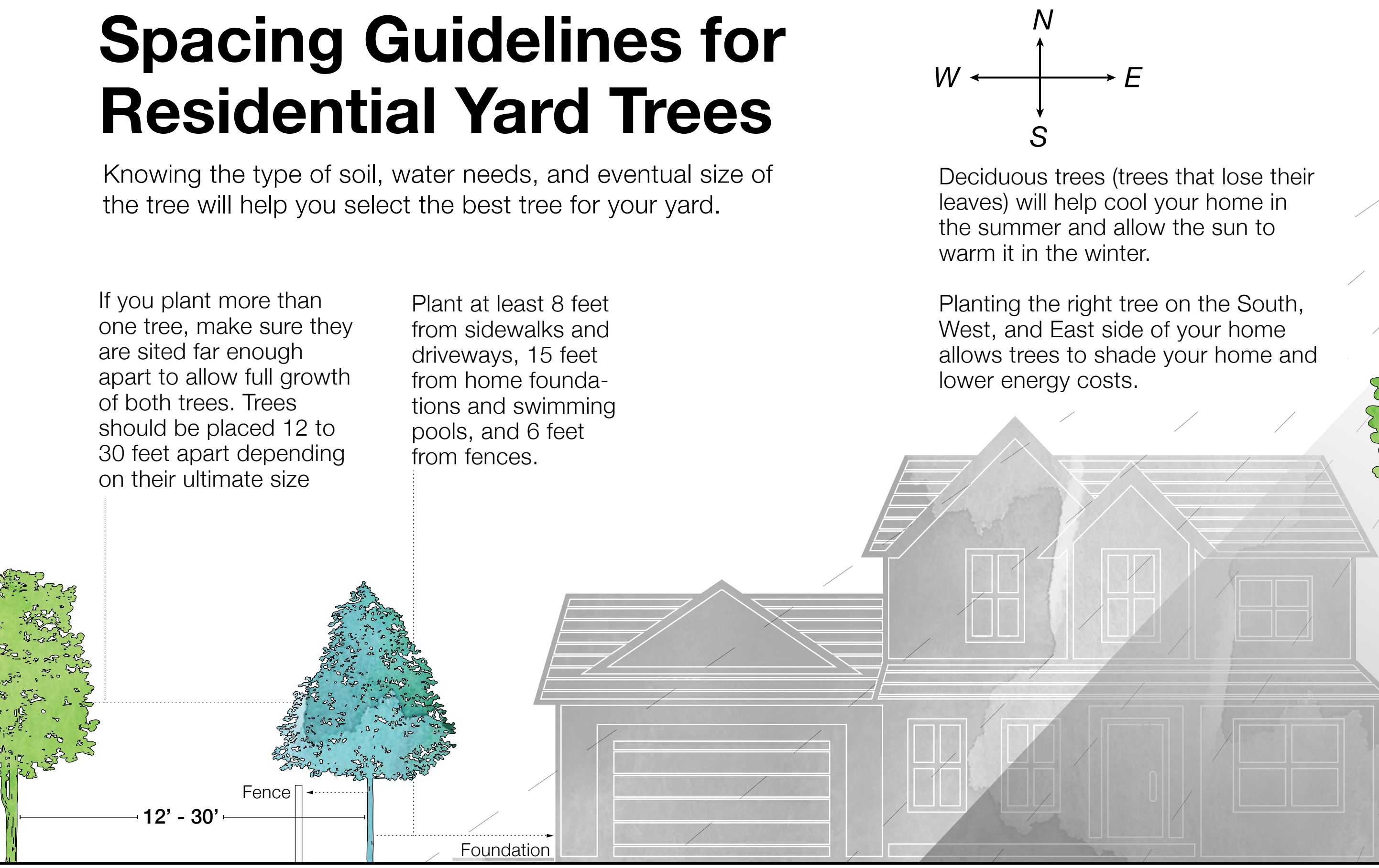
Knowing the type of soil, water needs, and eventual size of the tree will help you select the best tree for your yard.

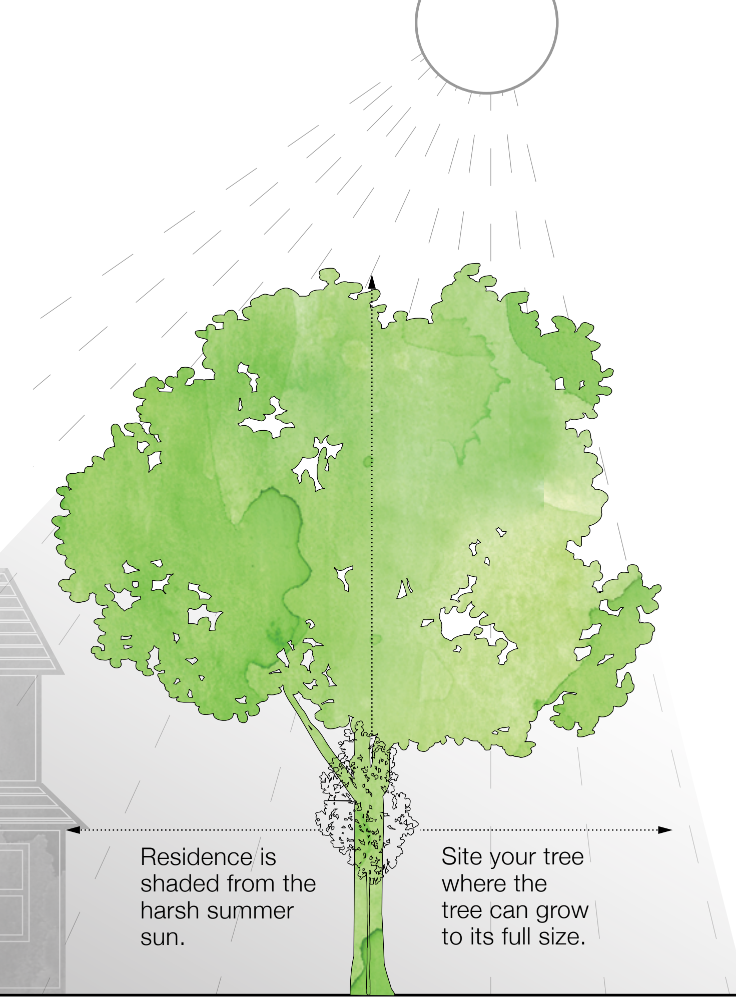
If you plant more than one tree, make sure they are sited far enough apart to allow full growth of both trees. Trees should be placed 12 to 30 feet apart depending on their ultimate size

Plant at least 8 feet from sidewalks and driveways, 15 feet from home foundations and swimming pools, and 6 feet from fences.

Deciduous trees (trees that lose their leaves) will help cool your home in the summer and allow the sun to warm it in the winter.

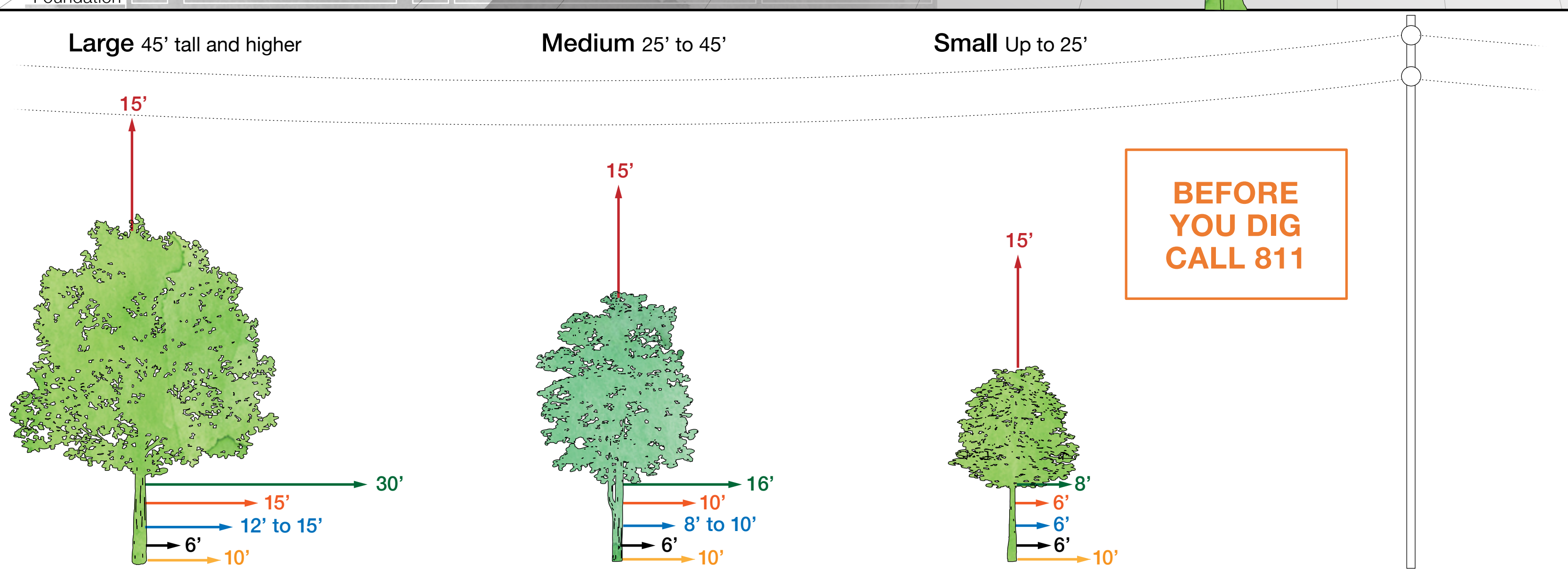
Planting the right tree on the South, West, and East side of your home allows trees to shade your home and lower energy costs.





Spacing requirements by tree size

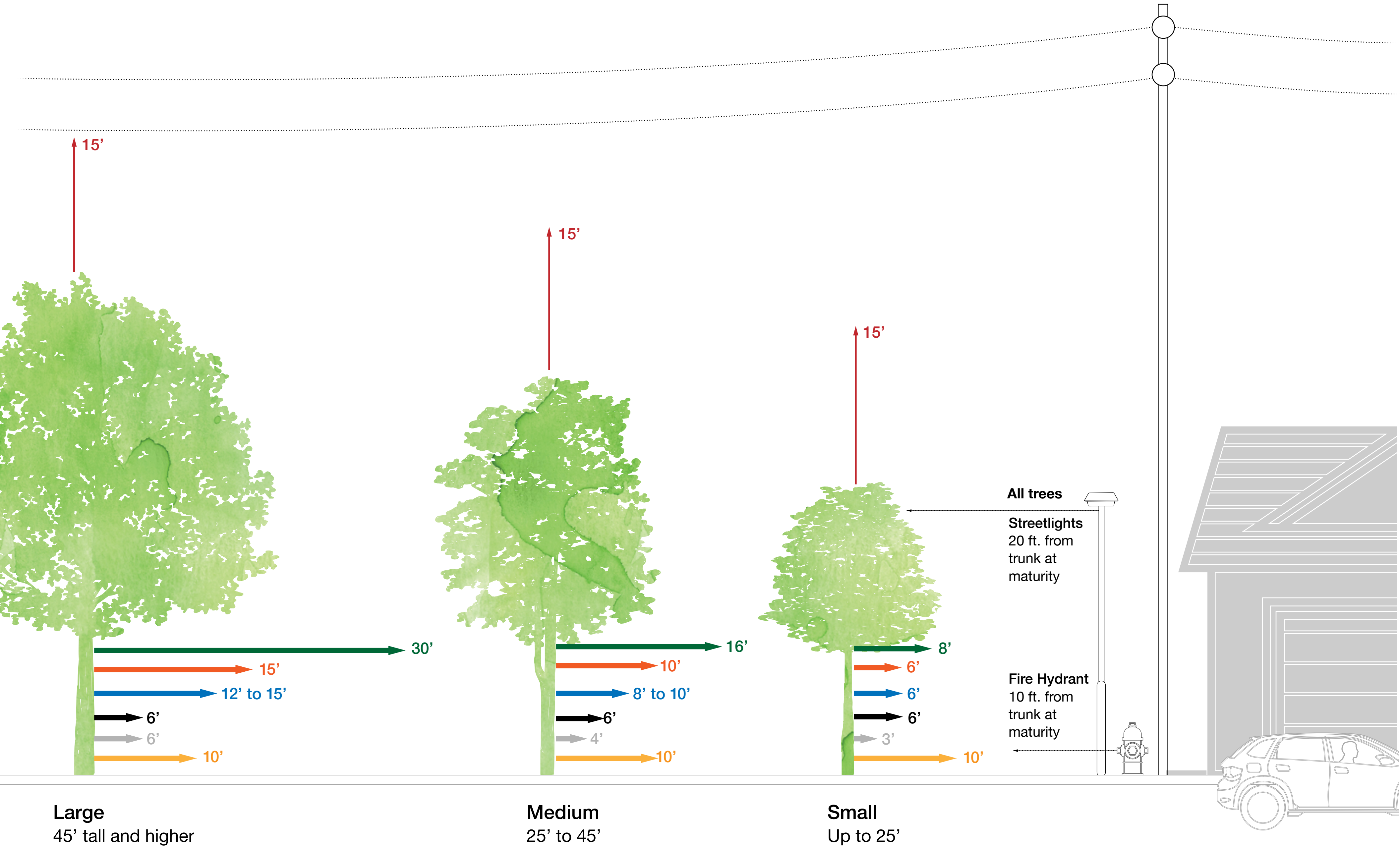
- Spacing from other trees
- Spacing from building foundations
- Spacing from sidewalks. curbs and driveways
- Spacing from limbs to overhead wires
- Spacing from trunk at maturity to in-ground electrical lines
- Spacing from trunk at maturity to in-ground gas lines



Source: Sacramento Tree Foundation

Spacing Guidelines for Street Trees

- Spacing from other trees
- Spacing from building foundations
- Spacing from sidewalks, curbs and driveways
- Spacing from sides of median
- Spacing from limbs to overhead wires
- Spacing from trunk at maturity to in-ground electrical lines
- Spacing from trunk at maturity to in-ground gas lines



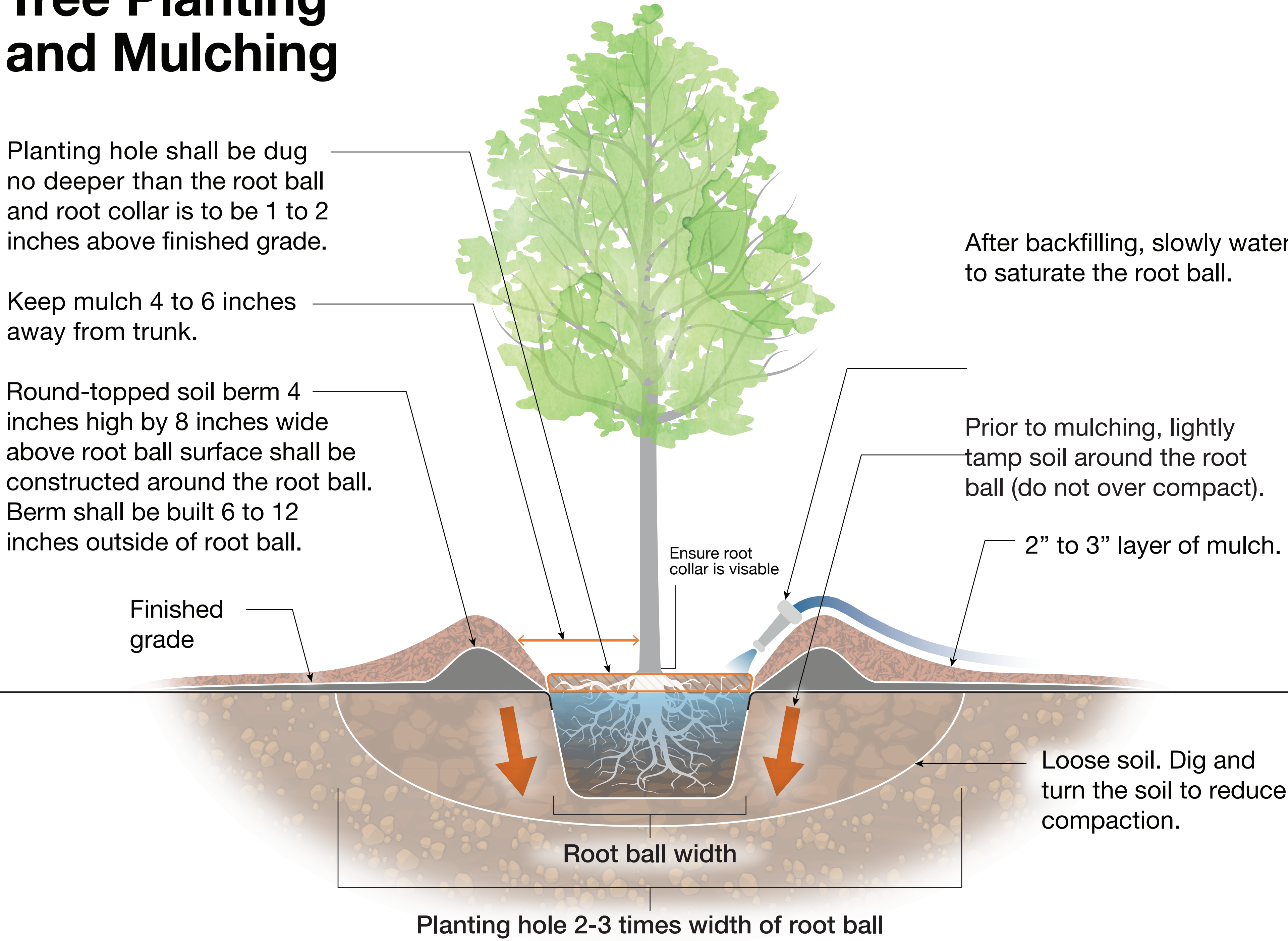
Introduction

Tree establishment and long-term survival can be impacted greatly by the actions taken during planting, such as the width and depth of the planting hole, placing the tree at the right depth, and proper staking. The table below provide explanations on why these practices are important for tree longevity.

Tree Planting Characteristics

Characteristic	Reasoning	Relation to Longevity
Planting depth	Planting a tree too deep or too shallow will inhibit the tree's establishment and growth.	If planted too shallow, tree roots will not have soil to establish in, decreasing the water and nutrients available to the tree overall. Planting a tree too deeply, may cause roots to suffocate and cause root rot.
Water at planting	Ensure newly planted trees receives 15 gallons of water, applied slowly upon planting.	Watering a tree after planting reduces transplant shock experienced by the tree and its roots, helping establishment.
Staking at planting	Trees that lean at the time of planting should be staked with one, two, or three stakes and supported by flexible ties. Each stake and tie shall allow movement of the tree trunk to develop trunk taper.	Leaning trees can be corrected to grow vertically with the support of stakes and ties. Trees that grow with a lean into maturity can potentially cause conflicts with pedestrian or vehicle paths of travel. Tying stakes to a tree too tightly will prevent movement of the tree, slowing the growth of the trunk and inhibiting establishment of a strong root system that can support the tree during high wind events.
Plant early in the planting season	Plant trees in winter months while rain events are likely and high heat events are less frequent.	Planting new trees in winter months will allow the tree to take advantage of rain events and limited heat stress. Providing water to newly planted trees through the planting season when not naturally occurring, assist the tree in the early phases of establishment.

Tree Planting and Mulching



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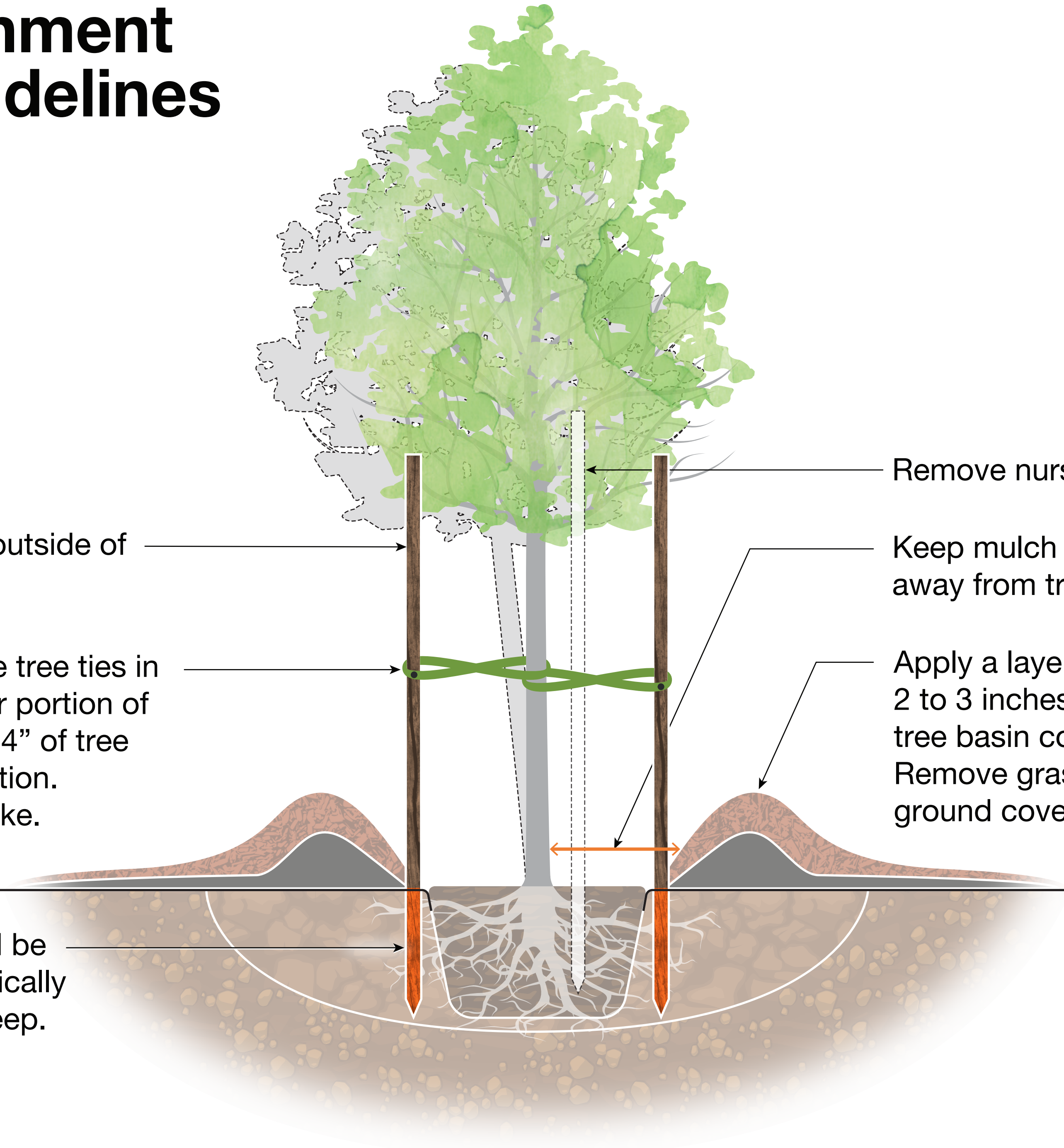
Establishment Care Guidelines



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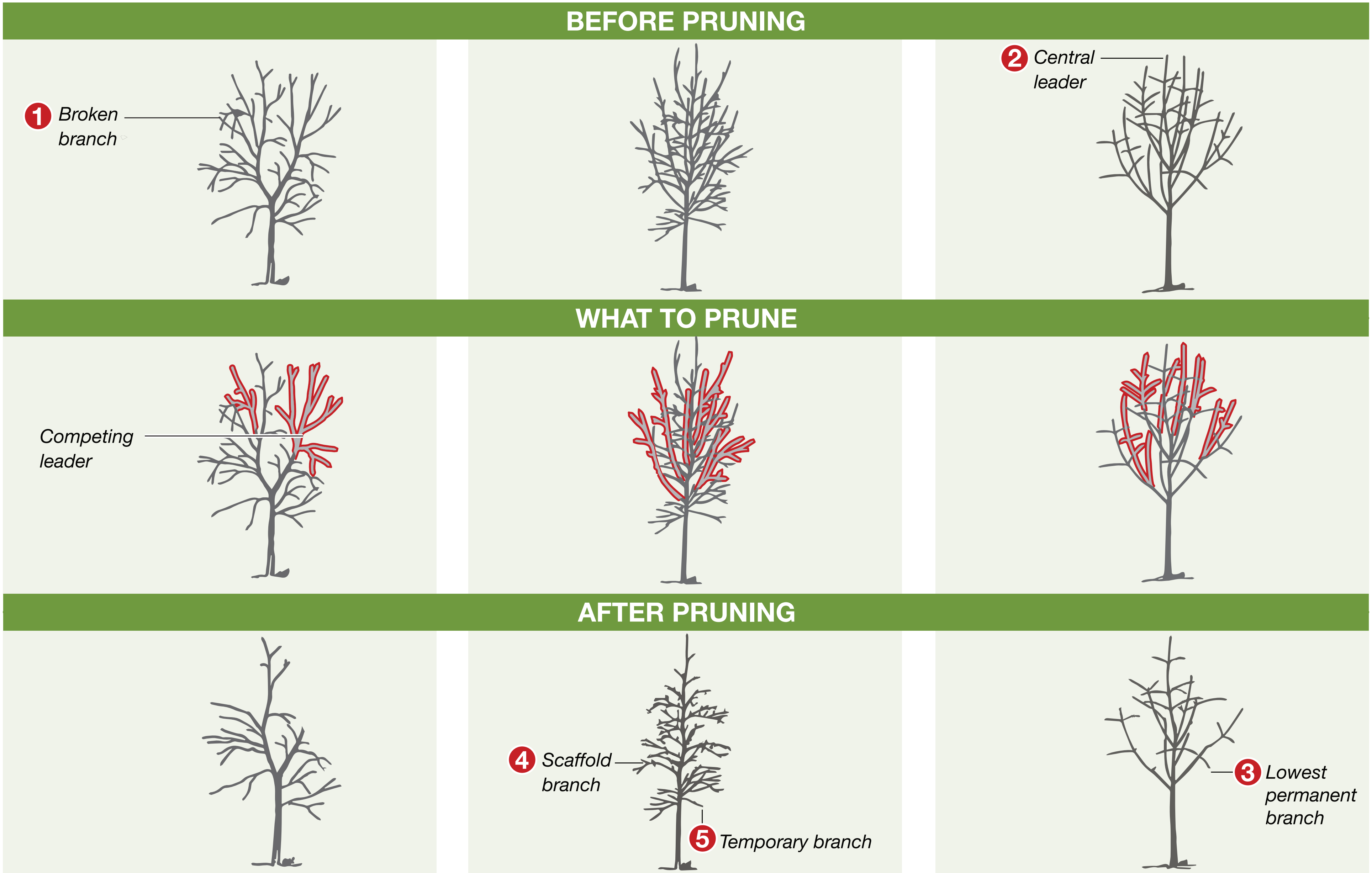
Pruning to Improve Young Tree Structure

1. Remove broken branches.
2. Select central leader and remove competing leaders.
3. Select lowest permanent branch.
4. Select scaffold branches.
5. Select low temporary branches. Cut back and leave as temporary.



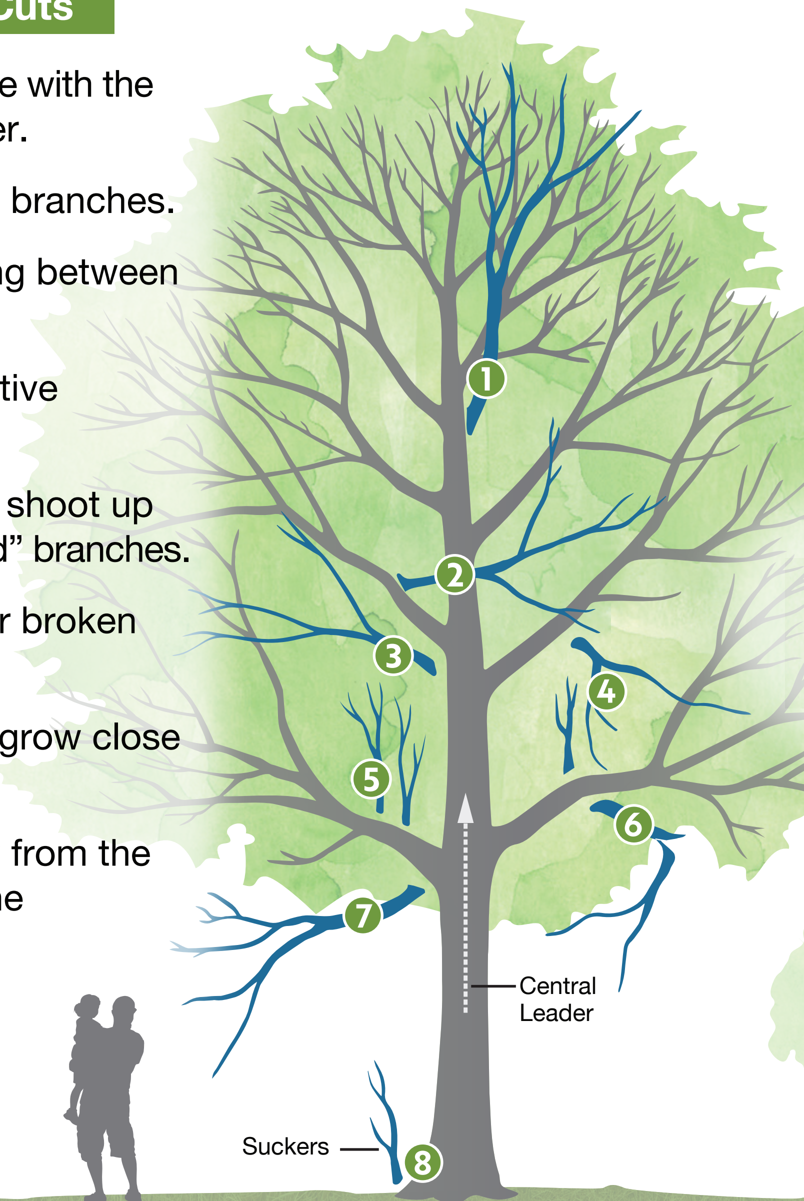
NOTE:* *1. At the time of planting, limit pruning to removal of broken, dead, or diseased branches only.
2. Young Tree Structural Pruning is to occur only after trees establish and resume normal growth rates following planting.

Structural Pruning: A Guide for the Green Industry
URBAN TREE FOUNDATION | ADAPTED BY DUDEK

Tree Pruning

Healthy Pruning Cuts

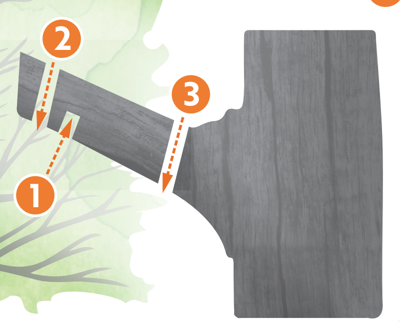
1. Limbs that compete with the tree's central leader.
2. Rubbing, crossing branches.
3. Inadequate spacing between branches.
4. Awkward unattractive branches.
5. Watersprouts that shoot up from main "scaffold" branches.
6. Dead, diseased, or broken limbs.
7. Limbs that sag or grow close to the ground.
8. Suckers that grow from the roots or base of the trunkground.



How to Make a Pruning Cut

To prune a tree limb larger than 2 inches in diameter cleanly and safely, as shown in the image above, use a pruning saw and make these three sequential cuts:

1. On the bottom of the limb between 6 and 12 inches from the trunk; cut about one-quarter of the way through.



2. Through the limb from the top, starting about 1 inch beyond the first cut. The weight of the branch may cause it to snap off before the cut is complete.
3. Cut completely through the short remaining stub from top to bottom just beyond the swollen branch collar. Support the stub while sawing to make a clean cut.

TREE REMOVAL AND REPLACEMENT TO

EXPAND CANOPY COVER

IF YOU REMOVE...

...REPLACE WITH:

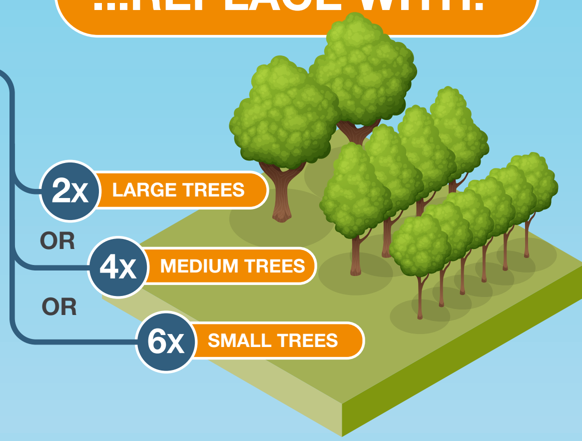
1x Large Tree

Height: 55’+

Example Species:

- Coast Live Oak (*Quercus agrifolia*)
- Aleppo Pine (*Pinus halpensis*)
- Engelmann Oak (*Quercus engelmanii*)

Benefits:
Large trees should be planted wherever space allows. A large tree provides six times more shade, stores seven times as much carbon, and captures five times more water than a small tree.



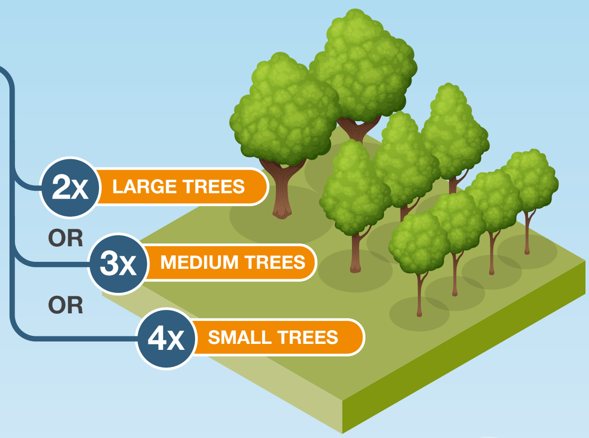
1x Medium Tree

Height: 35’ to 55’

Example Species:

- Box Elder (*Acer negundo*)
- Jacaranda (*Jacaranda mimosifolia*)
- Australian Willow (*Geijera parviflora*)

Benefits:
Medium trees strike a balance between the benefits of larger trees and the spatial requirements of small trees. Medium trees are beneficial to have along parkways and in commercial space that may not allow large trees.



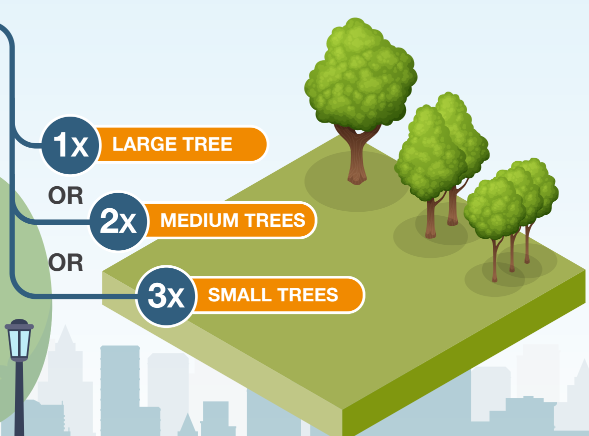
1x Small Tree

Height: Under 35’

Example Species:

- Toyon (*Heteromeles arbutifuloia*)
- Desert Willow (*Chilopsis linearis*)
- Western Redbud (*Cercis occidentalis*)

Benefits:
Small trees are best used when a larger tree may conflict with surrounding infrastructure such as powerlines or nearby buildings. Small trees are also used to fill in gaps in the landscape and create visual interest.

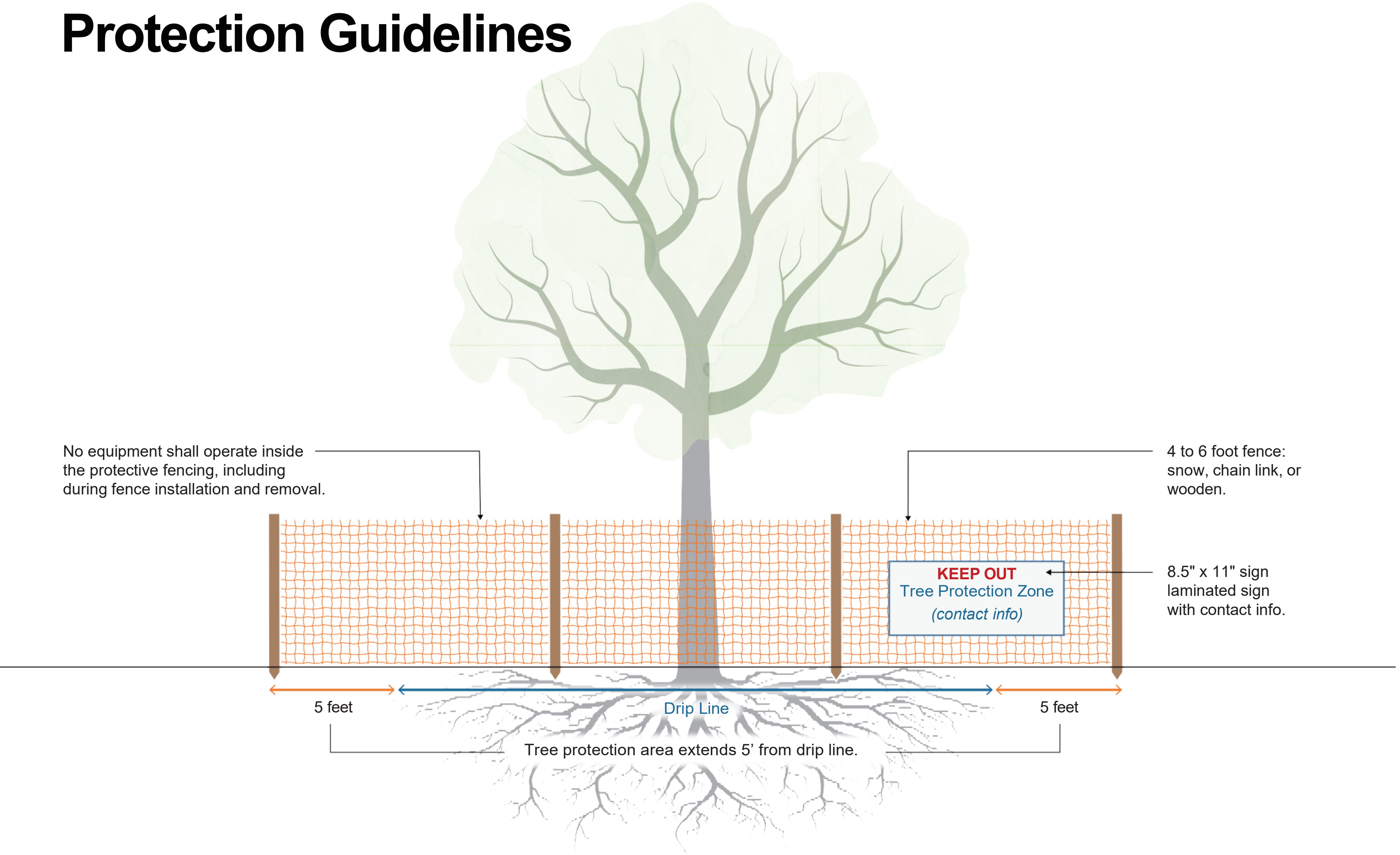


Introduction

Construction for development, maintenance, and renovation can pose threats to tree survivability in numerous ways. Threats include injury to roots, trunks, and branches; soil compaction; soil contamination; and improper pruning. Including an arborist in the planning stages of construction helps avoid damage when trees intersect with the built environment. Further detail for tree protection requirements may have significant benefits on the urban forest, as described below:

1. **Tree Protection Zones:** A Tree Protection Zone (TPZ) is an area surrounding a tree and its critical root zone where no grading, excavation, construction activity, equipment storing, or vehicle parking is to occur. The purpose of the TPZ is to protect all parts of the tree, both above and below ground. The size of TPZ ranges between tree owners; however, research suggests that a TPZ should be at least 1.5 inches wide per every inch DSH (Day et al. 2010). A successful TPZ is surrounded by signed fencing that reads “Keep Out: Tree Protection Zone.”
2. **Reducing Compaction:** When soil is compacted, water and oxygen available to tree roots is limited, leading to detrimental issues for a tree. In construction areas, compaction occurs purposefully through mechanical compaction or incidentally through the passage of vehicles and construction equipment over soil containing a tree’s roots.
3. **Minimizing Effects of Grade Changes:** The optimal zone for root growth is within the first 12 inches of soil depth. Any change in grade within a tree’s rooting zone will likely cause negative impacts for tree health. The degree to which these impacts affect the tree depends on the age of the tree, species, prior stressors, and environmental factors.
4. **Inspection:** Trees impacted during construction, maintenance, or renovations, should be monitored for decline annually by an ISA Certified Arborist for the first 5 years after construction. Monitoring should include photographs, annual reports, and mitigation techniques if necessary.

Mature Tree Protection Guidelines



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Tree Care for Birds and Wildlife BMP

Tree care professionals need to be aware of their impact on wildlife because their activities can directly or indirectly harm animals. Direct harm includes injuring or killing wildlife or removing nests with eggs or young. Indirect harm involves actions like removing vegetation that protects nests from weather or predators. Understanding these impacts helps arborists balance their work with wildlife care, ensuring they minimize harm while maintaining and creating habitats. This awareness is crucial for preserving urban biodiversity and supporting species that depend on specific tree structures, like dead branches.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712) plays a significant role in tree care by protecting migratory birds from harm during tree care activities. Here are some key points:

Protection of Birds: The MBTA makes it illegal to harm, kill, or disturb migratory birds, their nests, or their eggs without a permit. This includes both direct harm (e.g., cutting down a tree with an active nest) and indirect harm (e.g., removing vegetation that protects a nest).

Industry Standards: Tree care professionals must follow best practices to comply with the MBTA. This includes conducting pre-work inspections to identify and avoid disturbing active nests.

Minimizing Impact: The MBTA encourages arborists to adopt methods that minimize the impact on bird habitats. This can involve timing tree care activities to avoid nesting seasons (birds in California generally nest between February and August) and using techniques that reduce the risk of disturbing birds.

Legal Implications: Violating the MBTA can result in significant fines and penalties. Therefore, municipalities and tree care companies must be diligent in their practices to avoid unintentional harm to migratory birds.

By adhering to the MBTA, tree care professionals can help protect bird populations and contribute to the conservation of biodiversity in urban environments.

Minimizing Impacts to Wildlife During Tree Care:

Tree care work varies in its risk to wildlife, and proper preparation and on-site actions can reduce these impacts. Best management practices for minimizing impacts for wildlife are organized into the following categories:

Training:

Ensuring tree care workers are aware of wildlife and can involve trained professionals when needed. Training levels range from basic awareness to Wildlife Trained Arborists to Wildlife Biologist with specialized knowledge in wildlife protection and habitat assessment.

Project Preparation:

Assessing the breeding season and habitat value of a site to categorize the work and minimize impacts. This involves desktop reviews and site visits to understand potential wildlife presence. In California, nesting season for birds is generally from February through August. For standalone projects involving trees, work should be done outside of these nesting season months if possible. For municipalities that need to prune thousands of trees each year, it is usually not possible to conduct pruning and removal activities only during the non-nesting season months, so measures should be implemented to minimize impacts to birds and other wildlife.

Tree care work can be roughly divided into three categories, based on the level of expertise and caution required to mitigate impacts to wildlife:

	Low Habitat Value	High Habitat Value	Sensitive Habitat
Non-breeding Season	Category 1	Category 2	Category 3
Breeding Season	Category 2	Category 3	Category 3

Summary of Categories for Minimizing Impacts to Wildlife:

- **Category 1**: Low value habitat during the non-breeding season. Nesting wildlife are least likely to be encountered. A pre-work inspection by a tree care worker with awareness training is recommended.
- **Category 2**:
    - Low value habitat during the breeding season, where nesting wildlife are more likely to be encountered.
    - High value habitat during the non-breeding season, where valuable habitats are more likely to be encountered.
    - A pre-work inspection by a Wildlife Trained Arborist is recommended.
- **Category 3:**
    - High value habitat during the breeding season or sensitive habitat at any time of the year, where nesting wildlife and valuable habitats are more likely to be encountered.
    - Best practice is to contact a Wildlife Biologist for direction. Companies with a programmatic approach may use a well-trained arborist to minimize impacts.
    - The Wildlife Biologist will provide recommendations on how the project can proceed, which may include timing or methodological changes. Permits from regulatory agencies may be required for work in sensitive areas.

Note: Wildlife can nest year-round in any habitat, so the assessed category may change during fieldwork. Signs of wildlife encountered during fieldwork may require further expertise.

Fieldwork:

Practices should be implemented based on the project's category to protect wildlife during tree care activities. Staff with the appropriate training should conduct the pre-work inspection as mentioned above. If active nests are found that may be impacted by the tree work, the Wildlife Biologist should delay the work until the young no longer depend on the nest and work can safely proceed. In some cases the Wildlife Biologist may be able to suggest alternative methods to use near the nest, which are discussed below.

Considerations for Work Performed Near Active Bird Nests:

Special guidelines for working near nests to avoid disturbing breeding wildlife include:

- The duration of the work to be completed
- The tools being used
- The species involved
- The distance of the work to the active nest
- The status of the nest (e.g. eggs present, parent incubating, young unable to fly, mature nestlings close to fledging),
- The location specifics (e.g. urban vs. rural)
- The environmental conditions (temperature and wind)

Many nests require sufficient cover to provide protection from the elements and disguise from predators so vegetation removal should be minimized around nests. Additionally, a no-activity buffer, or an area in which no work should occur, should be established around the nest where possible.

Emergencies:

Wildlife emergencies during tree work involve situations where wildlife are injured, orphaned, or in danger, or where nests are abandoned or disturbed. The priority is to avoid these emergencies, but appropriate responses are crucial when they occur:

- **Contacting Wildlife Rehabilitators**: If wildlife are injured or abandoned, contact a local wildlife rehabilitator. Provide detailed information about the situation and species involved. The rehabilitator will guide the next steps, which may include doing nothing to allow parents to return or safely transporting the wildlife.
- **Continuing Work**: After a wildlife emergency, consult a Wildlife Biologist before resuming work. If no emergencies occur and no nesting wildlife are observed, continue working while remaining vigilant. Contact a Wildlife Trained Arborist or Wildlife Biologist if unsure how to proceed.
- **Human Health and Safety Emergencies**: These involve immediate risks to human health or safety. A Wildlife Biologist can help coordinate permission to remove active nests with the US Fish and Wildlife Service and other agencies. In extreme situations, action may be taken before permission is received, but this should be a last resort.

These guidelines help ensure that tree care activities are conducted responsibly, minimizing harm to wildlife while addressing emergencies effectively.

Municipalities and contractors can adopt a programmatic approach to consistently apply these practices across multiple sites. The goal is to balance tree care with wildlife protection, ensuring minimal harm while maintaining habitat value.

References:

U.S. Fish And Wildlife Service. “Migratory Bird Treaty Act of 1918.” Accessed October 9, 2024. https://www.fws.gov/law/migratory-bird-treaty-act-1918

Basset, Corey; Donohue, Kara; Gilpin, Ryan. 2022. Tree Care for Wildlife Best Management Practices with Western Chapter ISA Appendices. https://treecareforbirds.com/wp-content/uploads/2022/04/Tree-Care-for-Wildlife-BMPs-4.13.22-2.pdf

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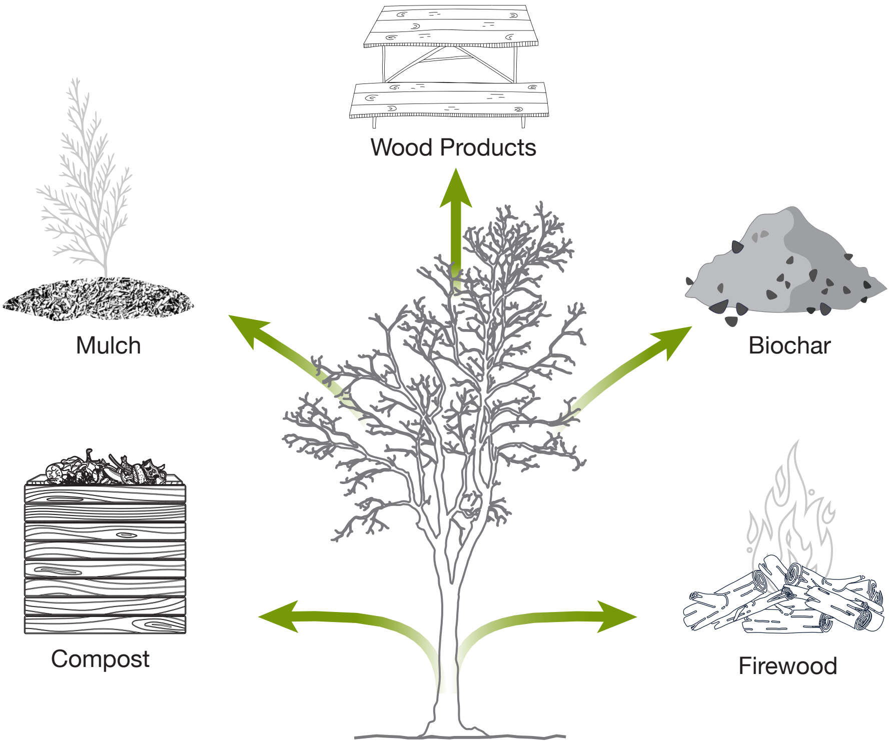
Tree Recycling

When a tree requires removal, the second life of the tree as urban wood begins. A removed tree can be processed into firewood, mulch, compost, biochar, or end-use wood products like a bench or table.



Appendix H
Department Interviews

Introduction

During the information gathering phase of UFMP development, City staff who manage trees were interviewed to discuss current challenges, program needs from a staff perspective, and goals and outcomes for the UFMP. Participants in these interviews are presented in Table H.1, and their comments are provided in Table H.2.

Department Interviews

Table H.1. Staff Interview Participants

Interviewee	Position
Manuel Acosta	Community Development Director
Janine Andrade	Community Services Director
Jerry Hutchison	Field Supervisor
John Oskoui	Interim Public Works Director

Table H.2. Staff Interview Comments

Theme	Staff Comments
Management Practices	Current pruning schedule not sufficient, consistent tree emergencies, broken branches, or complete failures in storm or rain events.
	Current pruning cycle is 2-3 years. Interest in adopting 4–5-year aesthetic pruning cycle.
	Continue providing arborist reports for tree removals when determined necessary.
	Provide tools for staff to reference to meet arboriculture BMPs.
	Continue and streamline monitoring for success of newly planted public and private trees, continue contractor specification to monitor and establish newly planted trees under warranty for one year after planting.
	Consult with the Community Development Department to add and include trees in Curbing Plan, increasing interdepartmental partnerships.
	Establish watering guidelines and agreements for residents for newly planted trees on City-owned property adjacent to or near the resident's property.
	Most parks have broadcast irrigation, open to using recycled water in parks.
Staffing and Budget	Increase budget for newly planted trees during establishment period, especially during summer months.
	Consider increasing Public Works budget, staffing, and equipment to establish an in-house tree crew.
	Increase Public Works budget to increase in-house capacity and reduce work contracted out. (2)
	Increase funding for Community Services Department to increase transparency and promote advocacy for the UFMP through regular community updates and hosting urban forest workshops.
	Increase funding to adopt active rather than reactive tree management.
	Community Services Department could benefit from an ISA Certified Arborist to ensure all Park trees are properly maintained and help with sustainable planning.
Private Property	Provide a list of requirements and criteria for residents for their trees to be eligible for trimming.

Table H.2. Staff Interview Comments

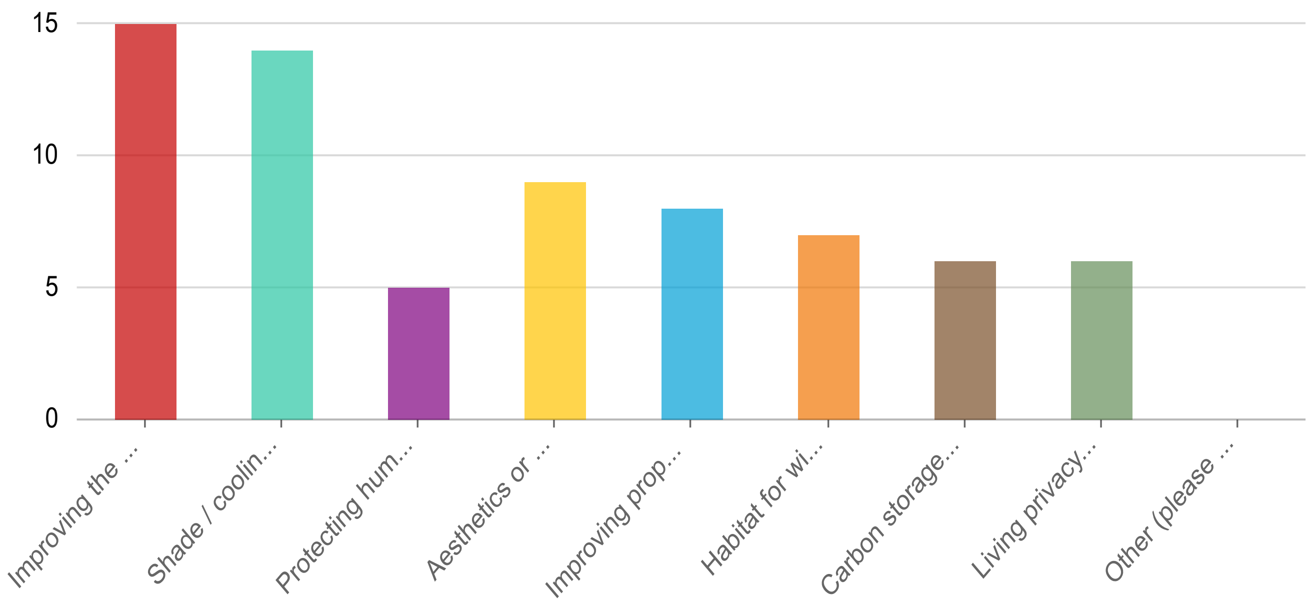
Theme	Staff Comments
	Adopt zoning ordinances to establish permitting request processes for planting, removing, and trimming trees on private property.
	Create a request form, including watering agreement, to gauge interest in private property tree plantings.
	Provide a list of recommended tree species for private property plantings.
	Desire for fruit trees among community members.
	Need for more consistent plan for maintenance and replacement of residential trees.
	Provide community resources for post-planting maintenance for private property trees.
	Important to consider properties in Bell are majority rented, so care for trees on private property will change as renters move in and out.
Community Education	Consider increasing outreach prior to planting in public areas to encourage residential support, including participation in volunteer planting events and caring for nearby trees on or near their property. (2)
	Education on the benefits of the cluster effect and having many trees planted in one area to motivate residents to water trees on or near their property.
	Encourage use of “Bell on the Go App” to increase community interaction and provide increased ease in reporting urban forest-related incidents and opportunities.
	Help the community to place value on trees and to view trees as important factors in increasing quality of life. (2)
	Continue to promote local parks as opportunities to access green spaces and shade.
	Educate the community on local flora and fauna by hosting activities like community scavenger hunts in public parks.
	Educate the community by displaying species information and environmental benefits for trees in public spaces.
	Partner with local schools to provide educational opportunities for youth.
Future Plantings	More plantings in commercial areas, especially parking lots. (2)
	City-owned vacant lots currently do not have trees.
	Need for creation of open green space and land to plant on. (2)
	Fill vacant sites throughout the City and provide increased level of maintenance for existing trees in these wells.
	Partner with local community-based organizations to identify potential funding sources for tree planting opportunities in Bell.

(2): Mentioned by two interviewees.

Appendix I
Community Survey Results

City of Bell Urban Forest Management Plan Survey

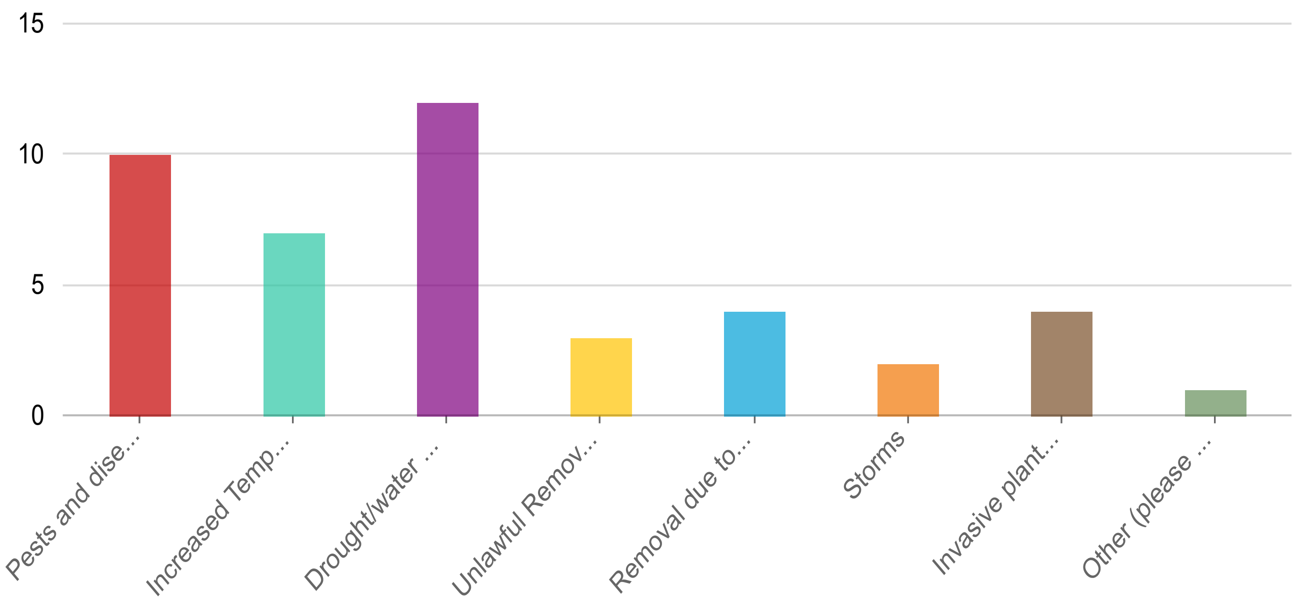
1.Of the following options, select the most important benefits that trees provide in yo…



Answers	Count	Percentage
Improving the environment (such as air quality, water, pollution)	15	83.33%
Shade / cooling neighborhoods and homes	14	77.78%
Protecting human health (physical and mental)	5	27.78%
Aesthetics or appearance	9	50%
Improving property value	8	44.44%
Habitat for wildlife	7	38.89%
Carbon storage to mitigate climate change.	6	33.33%
Living privacy screen/natural fence	6	33.33%
Other (please specify):	0	0%

Answered: 18 Skipped: 0

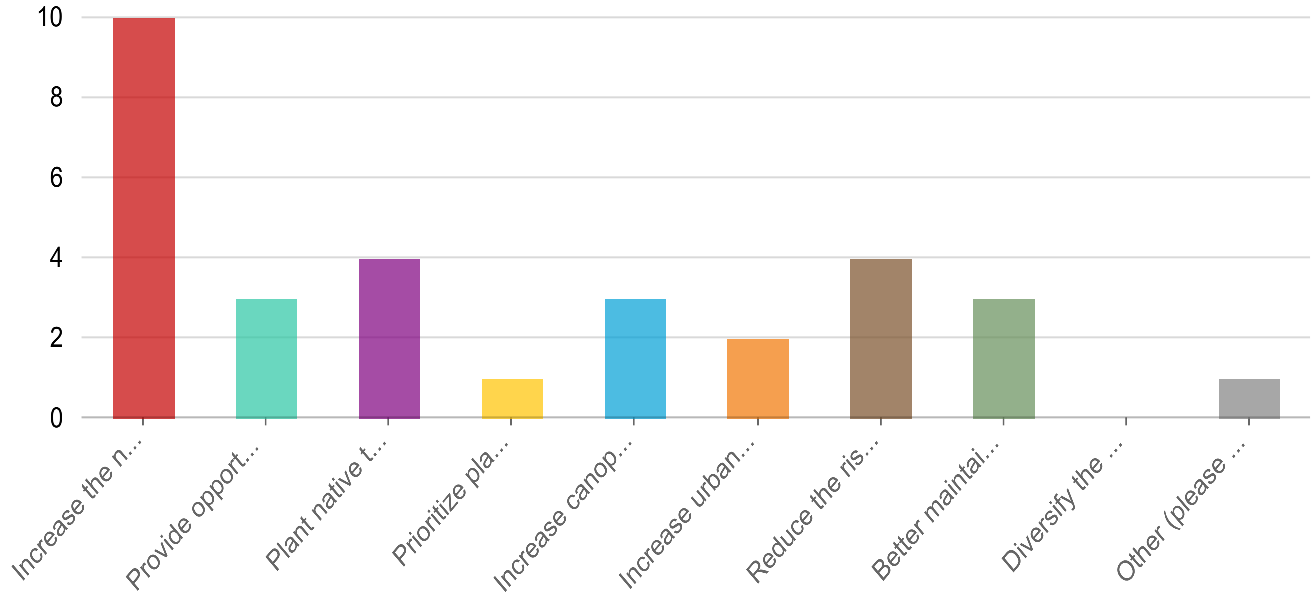
2.Of the following options, select the threats facing trees in your neighborhood.



Answers	Count	Percentage
Pests and diseases	10	55.56%
Increased Temperature	7	38.89%
Drought/water restrictions	12	66.67%
Unlawful Removals	3	16.67%
Removal due to property development	4	22.22%
Storms	2	11.11%
Invasive plant species	4	22.22%
Other (please specify):	1	5.56%

Answered: 18 Skipped: 0

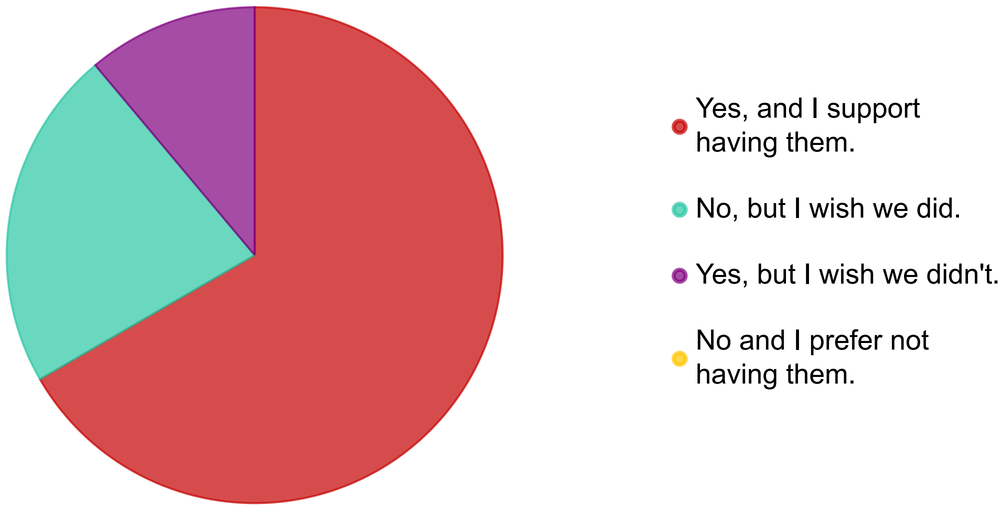
3.Bell's Urban Forest Management Plan will be a comprehensive guide for the City's…



Answers	Count	Percentage
Increase the number of trees planted each year.	10	55.56%
Provide opportunities and educational resources for communit y members relating to trees.	3	16.67%
Plant native trees that enhance native pollinators and wildlife h abitats.	4	22.22%
Prioritize planting drought tolerant and low- maintenance tree species.	1	5.56%
Increase canopy coverage to protect from urban heat island ef fects.	3	16.67%
Increase urban forest safety by removing dead, dying, or other wise hazardous trees.	2	11.11%
Reduce the risk of invasive pests and diseases.	4	22.22%
Better maintain and preserve existing trees.	3	16.67%
Diversify the urban forest by planting a variety of tree species.	0	0%
Other (please specify)	1	5.56%

Answered: 18 Skipped: 0

4.Does your neighborhood have planted street trees? (Street trees - Any…



Answers	Count	Percentage
Yes, and I support having them.	12	66.67%
No, but I wish we did.	4	22.22%
Yes, but I wish we didn't.	2	11.11%
No and I prefer not having them.	0	0%

Answered: 18 Skipped: 0

Please specify why or why not in the comments.

The word cloud requires at least 20 answers to show.

Word	Count
trees	6
shade	3

makes	2
environment	2
street	2
tall	2
provide	2
offer	1
great	1
streets	1
appealing.	1
essential	1
nicer	1
shadier.	1
branch	1
beauty	1
neighborhood	1
homeowner	1
support	1
tress....	1
residents	1
planted	1
type	1
fit	1
City	1

approval...	1
made	1
removed..	1
*****Renters	1
program	1
city’s	1
cleaner	1
pleasing	1
eye.	1
specific	1
drop	1
lot	1
trash	1
sap	1
cars	1
Don’t	1
plant	1

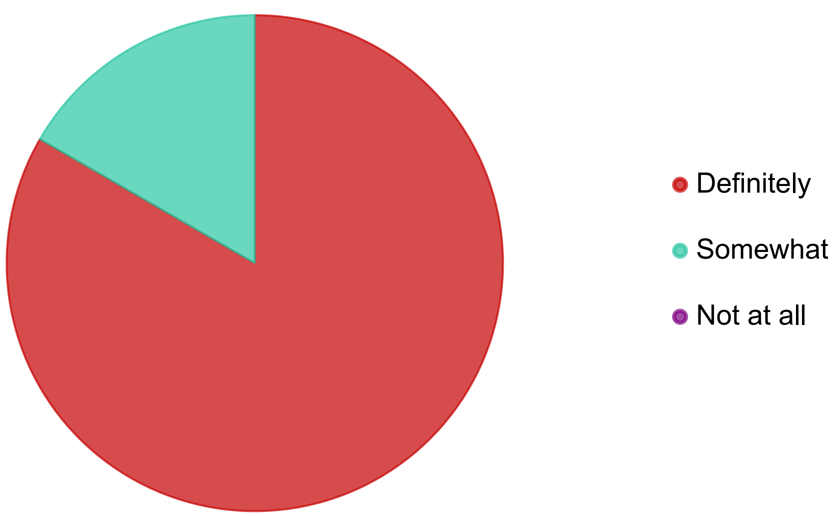
Answered: 7 Skipped: 11

5.Trees are considered part of the City’s infrastructure. How important do…

Answers	Count	Percentage
Trees are equally as important as other infrastructure.	16	88.89%
Trees are more important than other infrastructure.	1	5.56%
Trees are not as important as other infrastructure.	1	5.56%

Answered: 18 Skipped: 0

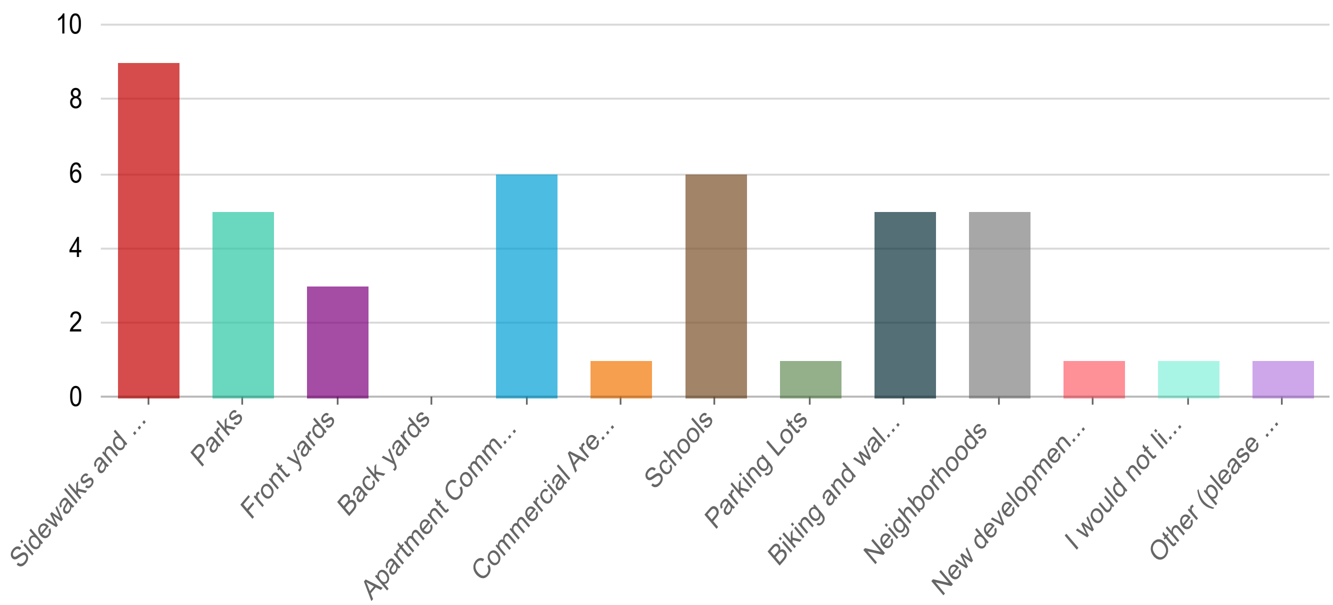
6.Do you consider neighborhood trees a valuable community asset that…



Answers	Count	Percentage
Definitely	15	83.33%
Somewhat	3	16.67%
Not at all	0	0%

Answered: 18 Skipped: 0

7.Where would you like to see more trees planted in Bell?

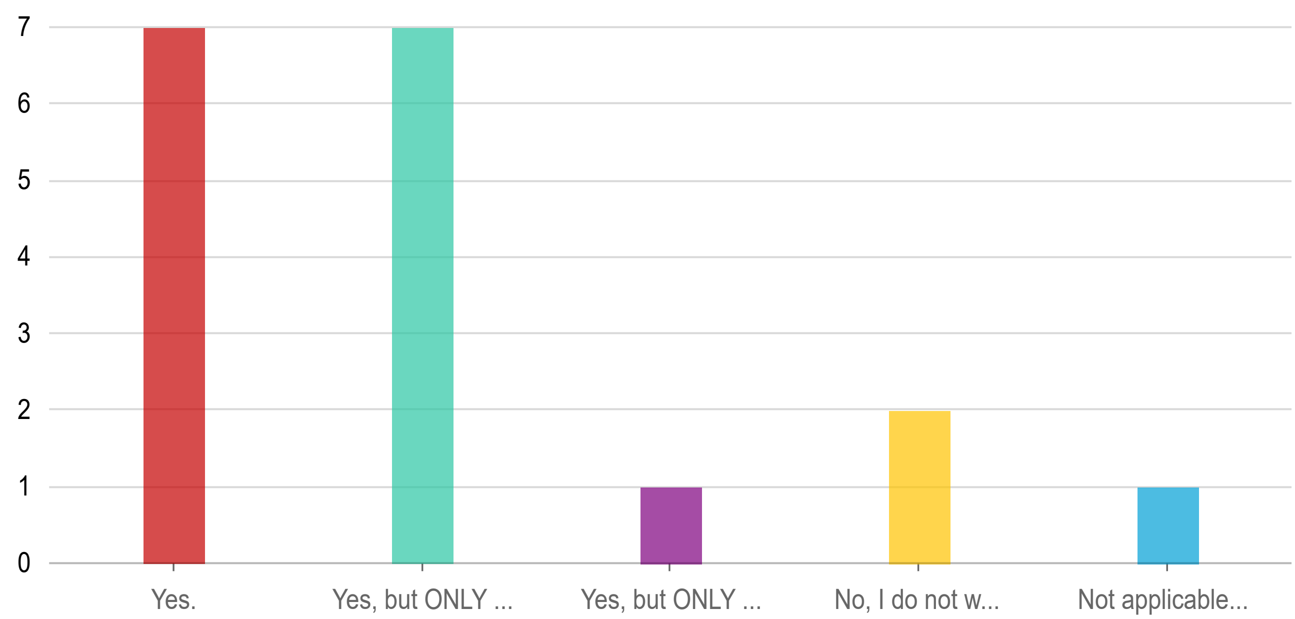


Answers	Count	Percentage
Sidewalks and streets	9	50%
Parks	5	27.78%
Front yards	3	16.67%
Back yards	0	0%
Apartment Communities	6	33.33%
Commercial Areas	1	5.56%
Schools	6	33.33%

Parking Lots	1	5.56%
Biking and walking paths	5	27.78%
Neighborhoods	5	27.78%
New developments	1	5.56%
I would not like to see more trees in Bell.	1	5.56%
Other (please specify):	1	5.56%

Answered: 18 Skipped: 0

8.Would you be willing to plant, maintain, and care for a tree on your…



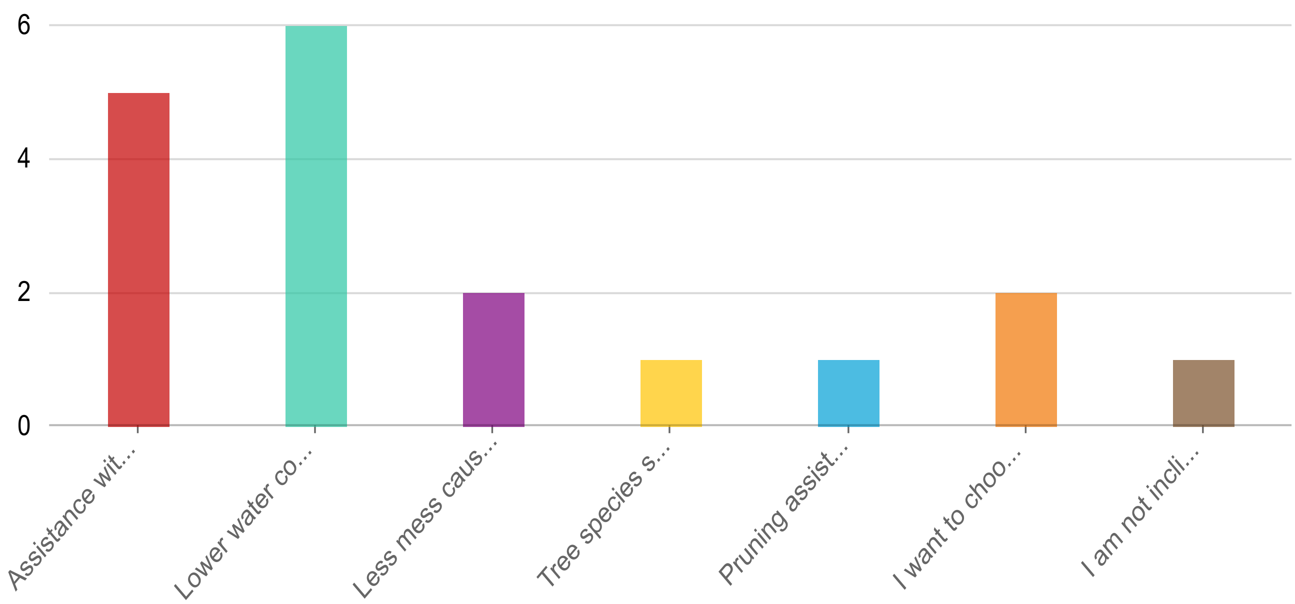
Answers	Count	Percentage
Yes.	7	38.89%
Yes, but ONLY if the City provides financial support or rebates for watering the tree.	7	38.89%
Yes, but ONLY if the tree itself is free and planted by volunteer s.	1	5.56%
No, I do not want to plant more trees on my property.	2	11.11%

Not applicable (I do not own a yard or land to plant on).	1	5.56%

Answered: 18 Skipped: 0

Page 4 of 4

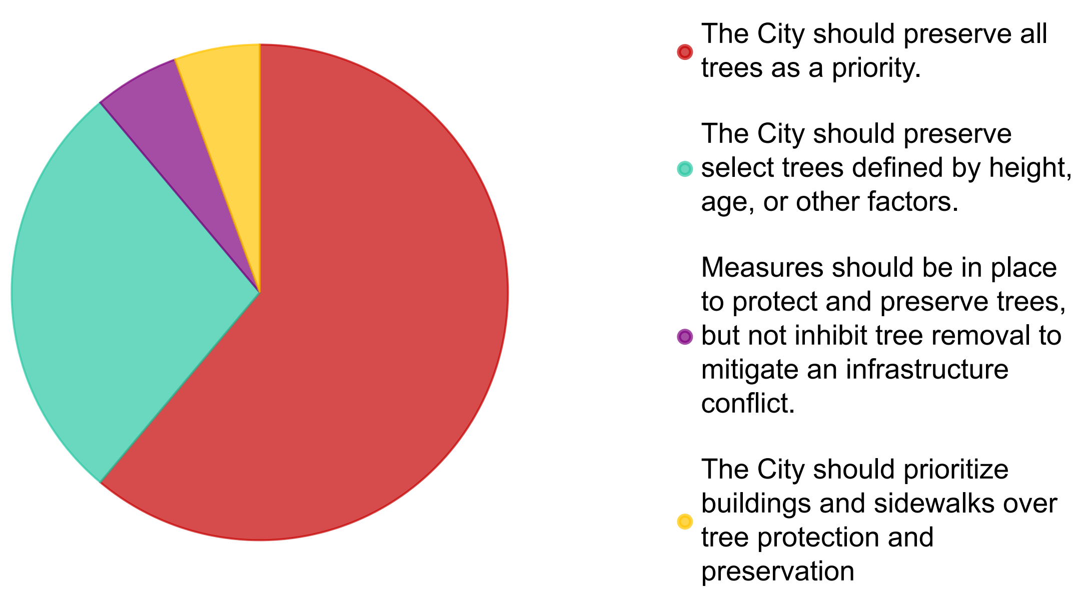
9.What factors would make you more inclined to plant a tree on your…



Answers	Count	Percentage
Assistance with cost to maintain and trim trees.	5	27.78%
Lower water costs to water trees.	6	33.33%
Less mess caused by leaves, fruit, or bark.	2	11.11%
Tree species suggestions that do not damage sewer pipes/ sid ewalks/ driveways.	1	5.56%
Pruning assistance to reduce risk of damage by falling branch es.	1	5.56%
I want to choose my own tree species. (palms, fruit trees, etc.)	2	11.11%
I am not inclined to plant a tree on my property.	1	5.56%

Answered: 18 Skipped: 0

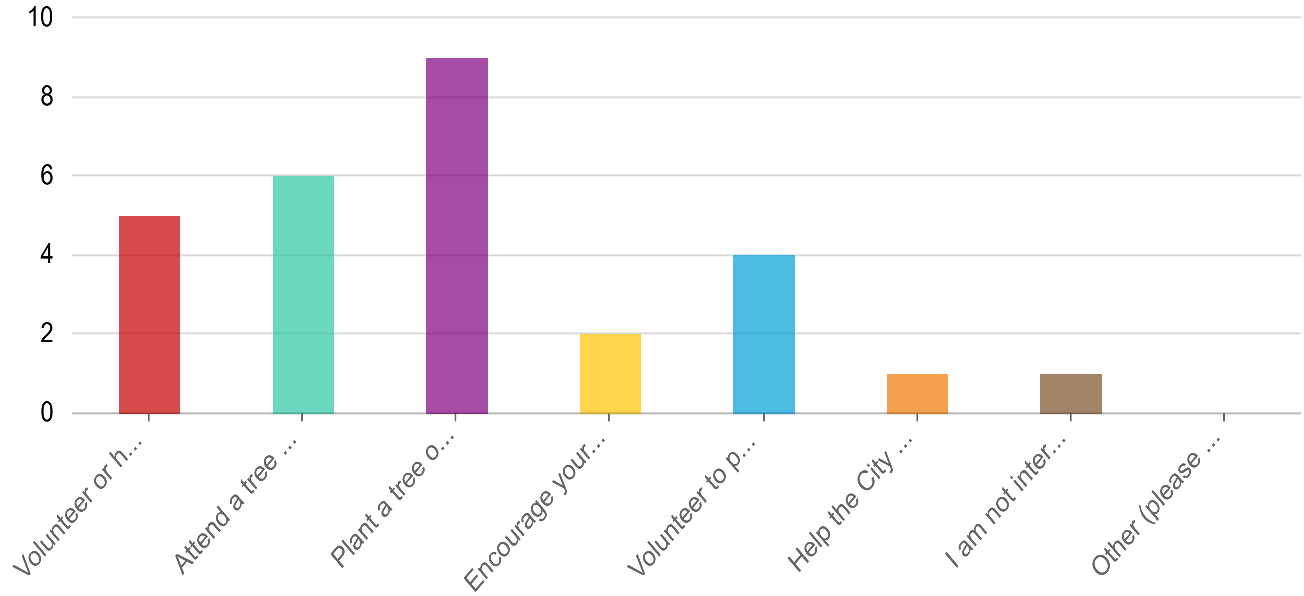
10.Which of the following best describes your thoughts about preserving…



Answers	Count	Percentage
The City should preserve all trees as a priority.	11	61.11%
The City should preserve select trees defined by height, age, or other factors.	5	27.78%
Measures should be in place to protect and preserve trees, bu t not inhibit tree removal to mitigate an infrastructure conflict.	1	5.56%
The City should prioritize buildings and sidewalks over tree pr otection and preservation	1	5.56%

Answered: 18 Skipped: 0

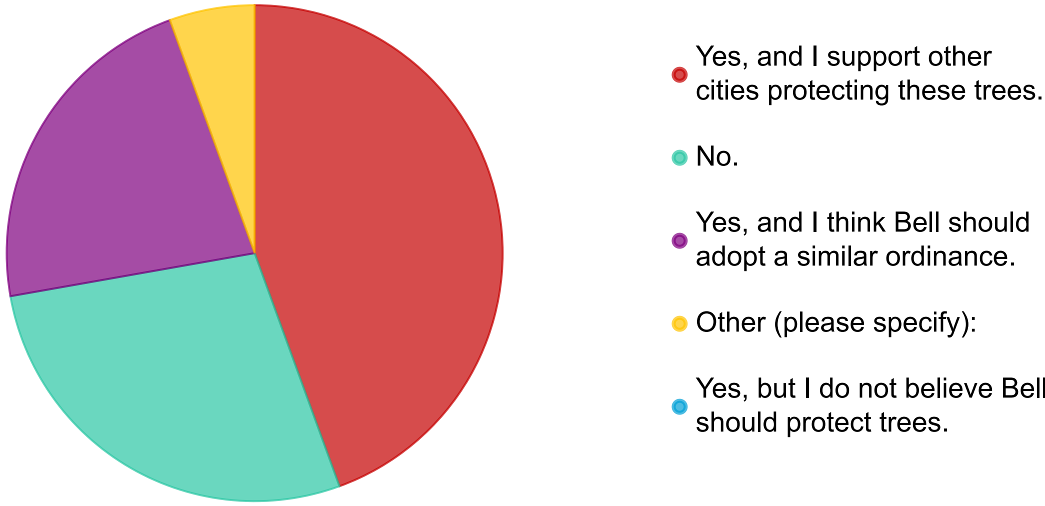
11.Which of the following activities would you be willing to participate in?



Answers	Count	Percentage
Volunteer or help organize a community tree planting event.	5	27.78%
Attend a tree education workshop (in person or virtual).	6	33.33%
Plant a tree on your private property.	9	50%
Encourage your landlord to allow tree planting on a property y ou rent.	2	11.11%
Volunteer to provide basic tree care in your neighborhood (wat ering and weeding).	4	22.22%
Help the City promote the Urban Forest program through com munity outreach and social media.	1	5.56%
I am not interested in helping to support the City's urban forest program.	1	5.56%
Other (please specify):	0	0%

Answered: 18 Skipped: 0

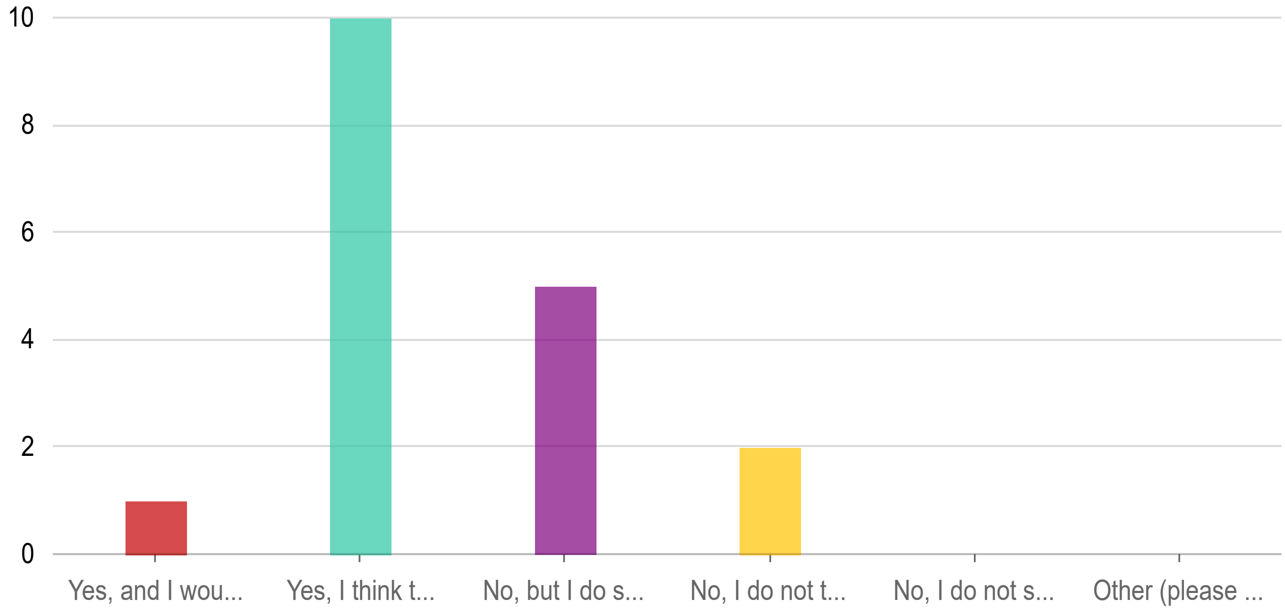
- **12.Some cities throughout California designate and protect certain specie…**



Answers	Count	Percentage
Yes, and I support other cities protecting these trees.	8	44.44%
No.	5	27.78%
Yes, and I think Bell should adopt a similar ordinance.	4	22.22%
Other (please specify):	1	5.56%
Yes, but I do not believe Bell should protect trees.	0	0%

Answered: 18 Skipped: 0

- **13. Tree City USA is a designation program developed by the Arbor Day…**

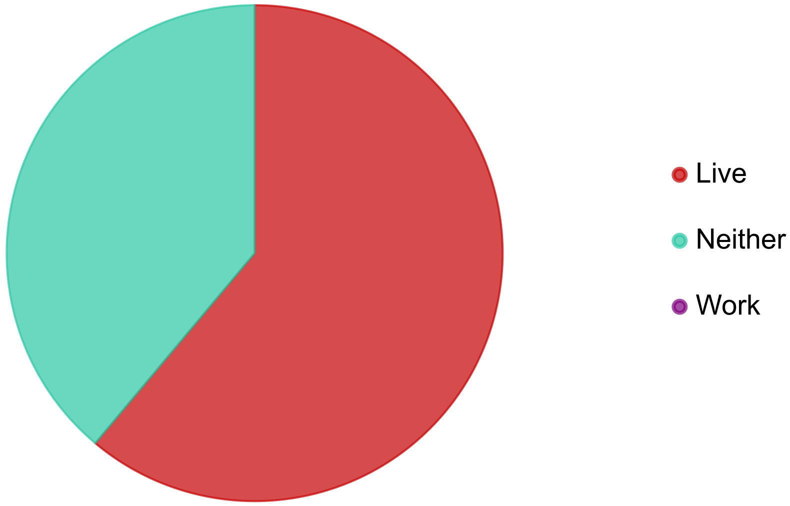


Answers	Count	Percentage
Yes, and I would be interested in receiving more information and offering support.	1	5.56%
Yes, I think this would be a useful resource for Bell.	10	55.56%
No, but I do support our City's investment in urban forestry, just not to this capacity.	5	27.78%
No, I do not think these requirements are a worthy investment for the City to pursue.	2	11.11%
No, I do not see a point in investing in the urban forest in this capacity.	0	0%
Other (please specify)	0	0%

Answered: 18 Skipped: 0

Page 5 of 5

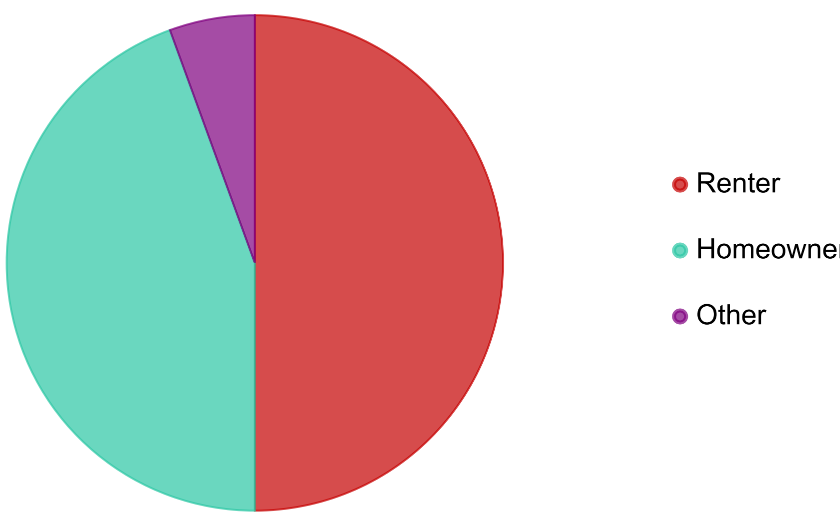
- **14.Do you live or work in the City of Bell?**



Answers	Count	Percentage
Live	11	61.11%
Neither	7	38.89%
Work	0	0%

Answered: 18 Skipped: 0

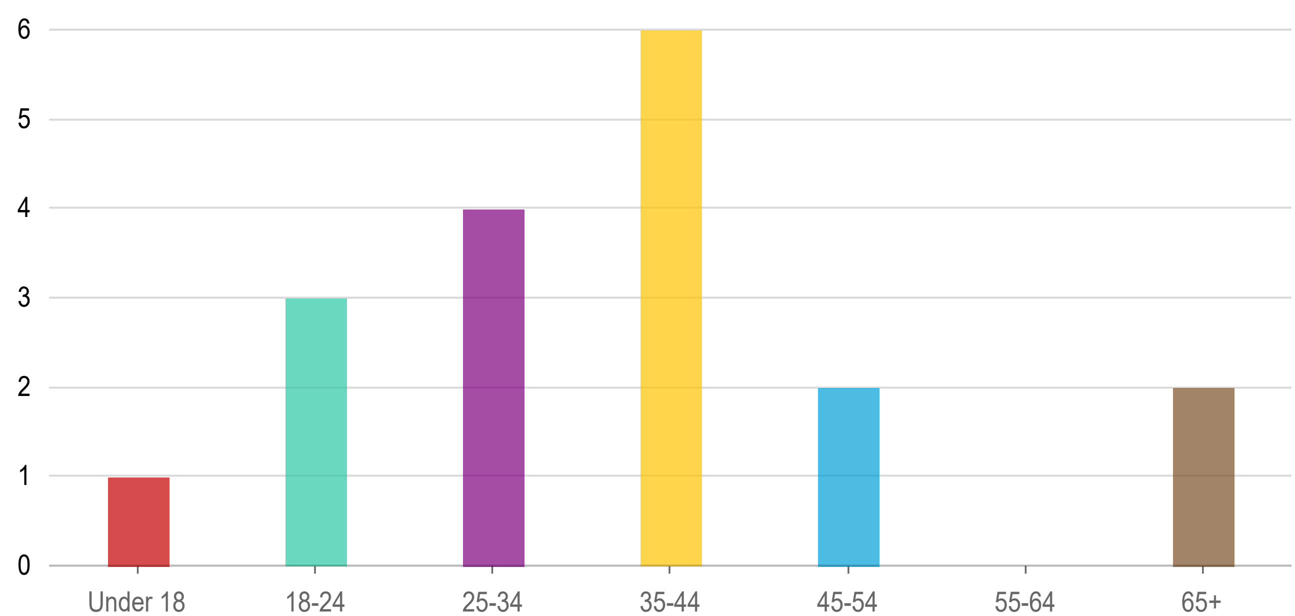
- **15.Which best describes your housing situation?**



Answers	Count	Percentage
Renter	9	50%
Homeowner	8	44.44%
Other	1	5.56%

Answered: 18 Skipped: 0

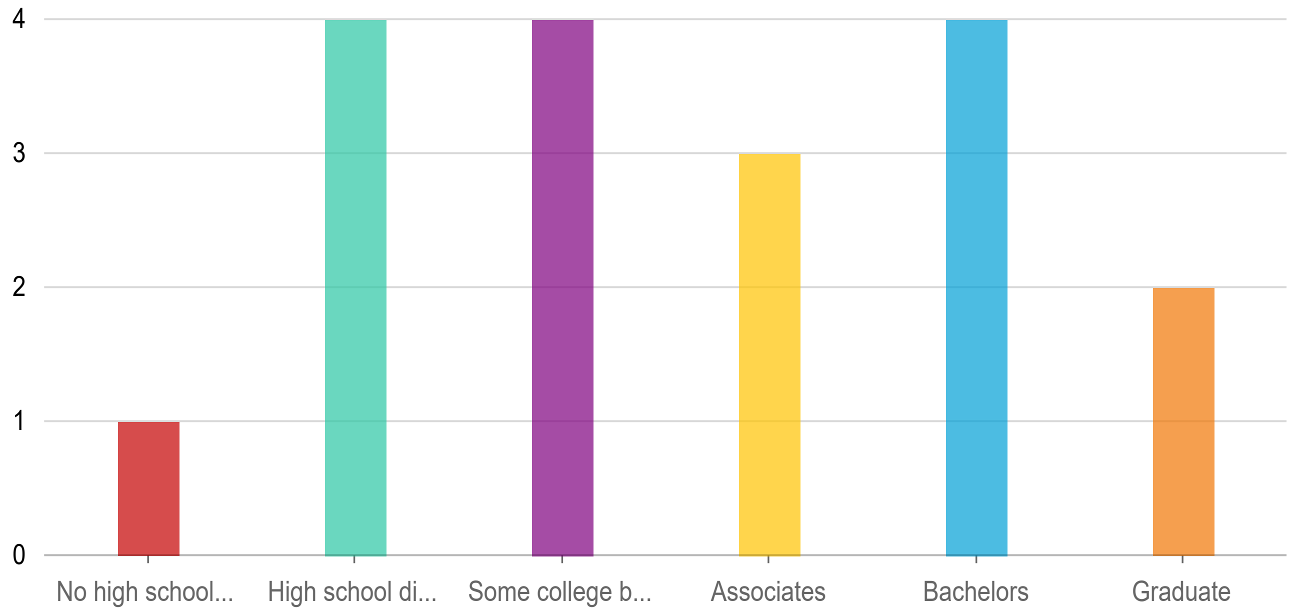
17.Which of the following age groups are you a part of?



Answers	Count	Percentage
Under 18	1	5.56%
18-24	3	16.67%
25-34	4	22.22%
35-44	6	33.33%
45-54	2	11.11%
55-64	0	0%
65+	2	11.11%

Answered: 18 Skipped: 0

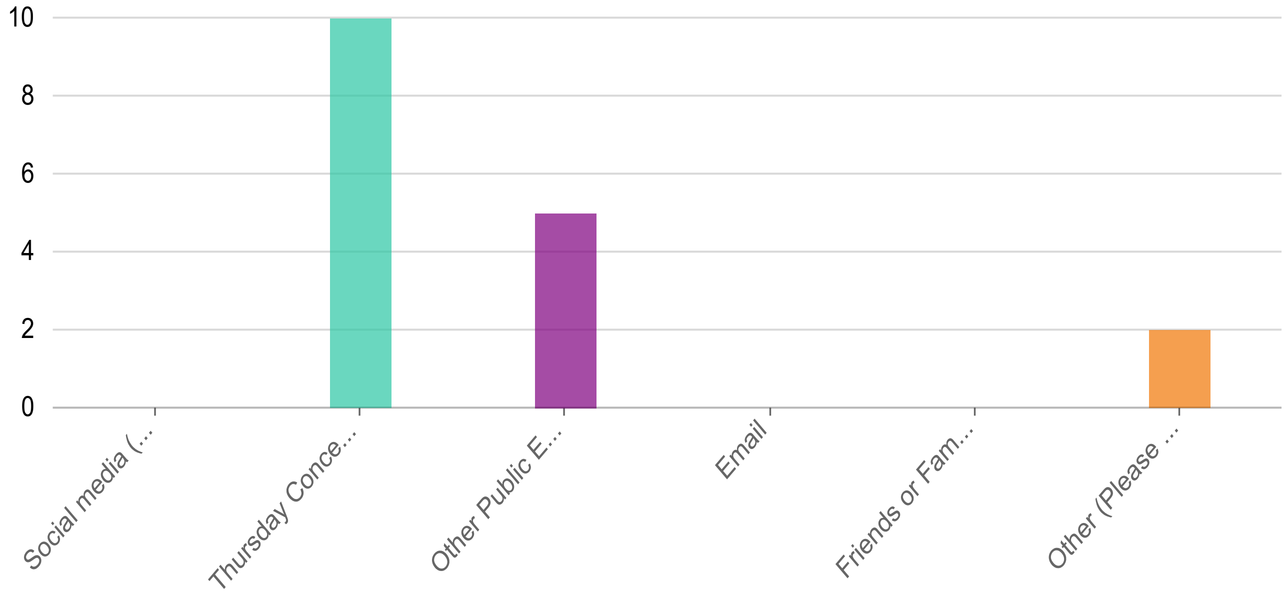
18.What is the highest level of education you have attained?



Answers	Count	Percentage
No high school diploma	1	5.56%
High school diploma	4	22.22%
Some college but no degree	4	22.22%
Associates	3	16.67%
Bachelors	4	22.22%
Graduate	2	11.11%

Answered: 18 Skipped: 0

19.How did you hear about this survey?



Answers	Count	Percentage
Social media (Website, Facebook, Instagram, Nextdoor, etc.)	0	0%
Thursday Concerts in the Park	10	55.56%
Other Public Event	5	27.78%
Email	0	0%
Friends or Family	0	0%
Other (Please specify):	2	11.11%

Answered: 17 Skipped: 1