City of Morgan Hill Urban Forest Management Plan

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Chapter 1
Executive Summary

The City of Morgan Hill's 40-year Urban Forest Management Plan encompasses various objectives and actions needed to maintain a healthy, protected and sustainable community of trees now and for future generations. Trees along streets, in parks, and in open spaces within Morgan Hill provide a multitude of benefits for the city, its residents, and visitors. Trees benefit people and the environment by improving air quality, mitigating climate change, saving energy, reducing storm water runoff, increasing property values, creating diverse wildlife habitats, and enhancing public health and overall quality of life.

This implementation plan outlines the objectives and actions for achieving Morgan Hill's goals, principally to establish:

- Proactive and comprehensive urban forest management and monitoring
- Optimum canopy cover
- Best management practices for current and future tree preservation and plantings
- Community support and education for the urban forest

This Plan discusses the current status of Morgan Hill's urban forest with various issues and trends that have been seen over time as a result of its existing reactive maintenance program. Morgan Hill's updated tree inventory and canopy data are what set the standards for future investments and enhancements the City needs to take to sustain an effective management plan. The Plan also addresses various policies and procedures established to enhance the urban forest and create resiliency in Morgan Hill.

The Urban Forest Management Plan is meant to be a working document that will be continually implemented and monitored over the next 40 years. Recommendations for this plan were based on input from City staff, Morgan Hill's local contract arborist firm, and members of a Community Urban Forest Advisory Group. Ultimately, budget and funding decisions will either limit or enhance the quality and quantity of public trees planted and managed in Morgan Hill. These decisions will either strengthen or weaken the community and environmental benefits trees provide to our urban space.

Chapter 2
Introduction

Morgan Hill is a small city located at the southern tip of the Silicon Valley with a population size of 44,155 (U.S. Census Bureau). It is known to be a quiet city away from the hectic and fast paced living style seen in the heart of Silicon Valley. The City and its residents take pride in creating a profound sense of community through the multiple recreation programs and community spaces made for people of all ages and abilities to interact and enhance their quality of life. Morgan Hill was graciously awarded an Urban and Community Forestry Grant through the California Department of Forestry and Fire Protection as part of the California Climate Investments Program in 2017. This State funded program was created to award grantees funds to develop a comprehensive Urban Forest Management Plan (Plan) and perform community outreach and education pertaining to tree benefits in the urban environment. In early 2018, a Morgan Hill community outreach process began to assess and determine community attitudes, concerns, and current knowledge regarding public trees and the benefits urban forests bring to cities.

This Plan addresses tree issues in Morgan Hill and reflects the City's commitment to sustainability, carbon sequestration, storm water reduction, wildlife enhancement and preservation, water conservation, public health, and public safety as set out in the 2016 General Plan and the City's Municipal Code. A long-range urban forest management plan is needed to bring together existing policies and guidelines, best management practices, and community planning. Therefore, the scope of the Plan is set for forty years with the expectation that it will be reviewed for enhancements every five years.

An establishment of a local urban forest advisory group was made specifically for the development of this Plan in February 2018, where biweekly group meetings started in March 2018 and continued until July 2018. The advisory group was formed by responding to various public outreach notifications on several media platforms administered by the Community Services Department seeking volunteers interested in Morgan Hill's urban forest. The vision for the advisory group was to gain the understanding of the community's goals, values, and input regarding changes to Morgan Hill's urban forest and the implementation of the Plan. The success of the advisory group was made possible by various long-term residents of Morgan Hill, local contract arborists and architects, ecologists, horticulturalists, and local forestry and utility representatives from CAL FIRE and PG&E.

Chapter 3
Overview

History and Land Use Changes

The land where the City of Morgan Hill currently exists was first inhabited by Native Americans known as the Ohlone (Costanoan). Spanish colonists began arriving in the west central region of California in 1769, and among the earliest settlements were a presidio and mission at Monterey (1770) and a mission and civilian town at Santa Clara (1777). The road connecting these two missions serves today as Monterey Road. In 1835, the Mexican government granted 9,000 acres of Mission Santa Clara lands to Juan Maria Hernandez, as the Rancho Ojo de Agua de la Coche. Martin Murphy, an Irish-born pioneer, purchased the land in 1845 through a friend, Charles Weber, who had established Mexican citizenship and could legally own property. Ownership was conveyed to Murphy in 1846.

The first settlements in the southern Santa Clara Valley were established in the 1850s along Monterey Road, largely in response to the Gold Rush in the San Francisco Bay region. Santa Clara County also ranked as one of the region's earliest and most productive agricultural centers, famed for its grains, fruits, and vegetables. The Santa Clara & Pajaro Valley Railroad opened its first rail line through the area, from San Jose to Gilroy, in 1869. In 1882, 4,500 acres of the original Mexican land grant were passed down to Diana Murphy, granddaughter of Martin Murphy Sr. That same year, she married Hiram Morgan Hill, a San Francisco socialite; they entertained lavishly with trains often stopping at the ranch to let off guests. The stop became known informally as "Morgan Hill." In 1892, the Hills disposed of Morgan Hill Ranch in parcels of 5 to 100 acres. A downtown was established as well as a train station named "Huntington Station." In 1906, upon reaching the required population of 500 people, the City was incorporated and named, "Morgan Hill". Following World War II, the Santa Clara Valley sustained rapid growth as agricultural lands gave way to residential, commercial and industrial development. Monterey Road continued to be developed as the City's major commercial corridor, while industrial activity continued along the railroad tracks. With the opening of U.S. Highway 101 in the late 1970s, southern Santa Clara County became more attractive to suburban commuters.

Although the City's economy once thrived on the cultivation of stone fruits, pears, apples, and nuts, the City has since become urban, diversified, and modern. Manufacturing and health and educational services are Morgan Hill's largest employment sectors, and the leisure and hospitality industry has represented a growing share of employment in recent years. The industries located in Morgan Hill are largely similar to those in Santa Clara County overall, indicating that the economic activity in Morgan Hill is closely tied to the Silicon Valley economy. Nevertheless, agriculture is still an important asset to the region, as evidenced by the surrounding vineyards, orchards, row crops, and greenhouses, which boost the region's economy and tourism industry.

Environmental Context

Located in the southern Santa Clara Valley, Morgan Hill encompasses approximately 13 square miles. The city is located about 12 miles south of San Jose, 10 miles north of Gilroy, and 15 miles inland from the Pacific Coast. The Valley is approximately 4 miles wide and is surrounded by the Santa Cruz mountain range to the West, and the Diablo mountain range to the East. Morgan Hill's climate is characterized as a mild, Mediterranean climate with average midsummer temperatures reaching 90.2°F and midwinter temperatures reaching 33.6 °F.

The summers months are typically dry and characterized by a coastal fog which arrives from the Pacific Coast during the night and dissipates the next morning. Winter months have many sunny and partly cloudy days, with frequent breaks between rainstorms. Morgan Hill experiences an average precipitation of 18.9 inches annually.

The city is located in Zone 9 of the USDA Hardiness Zone Map (Figure 3.1), which identifies the climatic region where the average annual minimum temperature is between 40 and 50 degrees Fahrenheit. Tree species selected for planting in Morgan Hill should be appropriate for this zone.

The Urban Forest Ecosystems Institute: Tree Selection Guide at Cal Poly San Luis Obispo provides information on tree species suitable for the various tree hardiness zones. Popular trees suitable for Zone 9 identified by Cal Poly's Tree Selection Guide include:

- Camphor
- Chinese Hackberry
- Coast Live Oak
- Lemon-scented Tea Tree
- Oregon White Oak

Figure 3.1: USDA Hardiness Zone Morgan Hill 9b

Soil Profile:

The city of Morgan Hill is known for its vast agricultural production due to the nutrient rich soils seen throughout the valley. The soil profile in Morgan Hill is made up of clay, clay loam, loam, and gravelly loam according to a Web Soil Survey taken by the USDA Natural Resources Conservation Service. Clay soils are heavy soils that benefit from high nutrients. The soils remain wet and cold in winter and dry out in summer. Clay soils are great for agriculture and vegetation because they capture moisture in their dense composition which allows water to drain slowly. Loamy soils are a mixture of sand, silt and clay and provide the perfect balance of soil particles. These soils are fertile, easy to work with and provide good drainage.

Both types of soils have shaped the way Morgan Hill has developed due to their beneficial characteristics that produce a vast array of agricultural productivity and create the perfect environment for many species to grow. Trees native to many other regions can thrive in Morgan Hill's soils, but selecting trees with low water requirements will be prioritized due to the growing propensity for drought conditions affecting the urban forest.

Fire Hazard:

According to a CAL FIRE study pertaining to high wildfire hazard zones, Morgan Hill is listed as one of the cities in the Santa Clara County containing very high wildfire hazard zones. Significant portions of the City are at risk to wildfires. With the growing development of wind-driven firestorms, the entire community contains some degree of wildfire risk. Decisions on which trees to plant and where must reflect this growing concern.

Why a Plan is Needed

Urban forests are characterized as the collection of maintained and unmaintained trees in and around a developed area. Typically urban forests are an accumulation of trees that are planted and maintained by people within a city or developed area. Maintained urban forests are created by planned plantings of individual or groupings of trees that convey a natural feel to a city or developed area. Such trees include street trees, urban park trees, landscaped boulevards, and community gardens to name a few. Unmaintained trees in an urban forest are the natural growing trees that inhabit surrounding areas of the city as well as parks and preserves where development is planned around the natural, wildly growing trees.

The structure and function of trees contribute to a unique role in providing environmental, economic, and social benefits to urban areas. Urban forests provide each of these benefits in differing circumstances: as infrastructure that increases in value overtime, as part of design and development that beautifies the city and adds to the diversification of vital ecosystems, and as efficient and productive contributors of economic development by increasing tourism, business, and shopping. When considering the environmental services provided by trees, it is estimated that trees produce nearly $6 in benefits for every $1 of investment.

To realize these benefits, a comprehensive vision is needed along with an implementation schedule to manage the City's trees and secure its resources. The urban forest needs to be proactively managed in order to maintain the immense benefits which contribute to Morgan Hill's economic well-being and the community's quality of life. Unlike most other urban infrastructure, the value of the urban forest generally increases over time. Benefits provided by the urban forest may take years to develop to desired levels, but tree resources can be negatively impacted over short time periods by a lack of timely management or poor management choices. This Plan aims to help the community protect the investment it has made in its urban forest and provide a blueprint for enhancing and improving the assets to maximize benefits provided while minimizing costs required to maintain the urban forest.

The vision for this plan it to preserve and protect the existing population of trees and utilize best management practices that will sustain healthy tree growth and provide public safety to all residents, visitors, and businesses. The plan is meant to encourage active participation and stewardship through the collaboration between various partnerships, volunteer groups, and the City for the betterment of the community, wildlife, urban forest, and future generation.

With this Plan's implementation, the City will have data that will provide the information needed to pivot from reactive practices to proactive management that will lessen risks, emergencies, and costs associated with lack of timely management and poor maintenance choices. The City will have the ability to set management goals and regulations toward expanding and preserving growth of the urban forest, including goals for services provided to city residents, a mix of species by age and location, regulations governing tree protection and care, as well as technical oversight. The resources and actions to achieve these goals are outlined in this Plan, and need to be further detailed as tree inventory and canopy data continue to be obtained.

The Scope

The Plan is a 40-year planning scope with the expectation of review every five years. This Plan assesses the City's street trees, facility trees, and park trees. The Plan also addresses the urban forest in residential areas, business districts, and new developments as part of the proactive management approach set out for Morgan Hill's urban forest.

The following types of trees are included in this Urban Forest Management Plan:

- Street trees
- Facility trees
- Parking lot trees
- Park trees
- Private property trees
- Business district trees
- New development trees

Benefits Provided by Trees

Trees have become a popular and common way for individuals and communities to address climate change as each tree is capable of removing (sequestering) many tons of carbon-dioxide in its lifetime. While this is undeniably true and important, carbon sequestration is not the only benefit provided by trees. Morgan Hill's urban forest contributes to the well-being of its residents in numerous ways including:

Enhancing Quality of Life and Public Health:

The U.S. Department of Agriculture Urban Forest Research Facility has studied a variety of trees and quality of life issues.[1] Some of these benefits are an increase in sociological benefits such as increased student performance at shaded schools, improved recovery time where trees are visible from windows at hospitals, and reduced domestic violence at tree-lined housing developments. Studies find that residents in inner-city buildings with trees have a stronger sense of community than those living in buildings surrounded by concrete and asphalt. Thus, regular contact with natural environments correlates with lower levels of stress and improvement in performance for people living in urban cities (Ulrich).[2]

Reducing Storm Water Runoff:

Storm water is defined by US EPA as the runoff generated when precipitation from rain and snowmelt events flows over land or impervious surfaces without percolating into the ground.[3] Trees reduce storm water flow by intercepting rainwater on leaves, branches, and through their roots. Trees and soils function together to reduce storm water runoff. Some of the intercepted water evaporates back into the atmosphere and some permeates into the ground reducing the total amount of runoff that must be managed in urban areas. Without trees, cities would be considerably more vulnerable to flooding and would need to invest more in engineered storm water drainage systems to endure increased runoff.

Promoting Soil Health:

Trees also increase soil health and reduce erosion. When soils are not protected and entirely exposed to wind, rainfall and storm water runoff, the effects of soil erosion take place, decreasing its overall health. Tree roots specifically benefit soil by holding it in place and allowing soil to accept water. Tree roots also absorb pollutants that make their way to the soil through wind, rainfall and storm water runoff and recharge the soil, adding nutrients back into it. The leaves of trees benefit soils by reducing the wind and decreasing the force of rain as it hits the ground. By providing these benefits to soils, the cost for cities to process and clean sediment from storm water is greatly reduced.

Providing Energy Cost Benefits:

Trees save homeowners and businesses costs on their energy bills by cooling and protecting buildings from extreme heat and cold. During hot summer months, tree-shaded buildings require less energy to be cooled so air conditioning costs are reduced considerably. During cold winter months, buildings require less energy to be heated because trees also act as a shield against high winds.

Increasing Business Productivity:

Studies show that tree-lined business districts are places where visitors have a more favorable experience. There's an increase in shopper frequency, in time spent shopping, and customer spending in business districts with trees. Planting and providing proper maintenance for street trees in commercial districts boosts the local economy and is a smart business investment (Wolf).[4]

Footnote:
1. https://www.usda.gov/media/blog/2013/05/9/urban-trees-store-carbon-enhance-environment-provide-economic-benefits
2. http://www.natureandforesttherapy.org/uploads/8/1/4/4/8144400/view_through_a_window_may_influence_recovery_from_surgery.ulrich.pdf
3. https://www.waterboards.ca.gov/water_issues/programs/stormwater/
4. https://nacto.org/docs/usdg/city_trees_retail_wolf.pdf

Increasing Property Values:

Numerous studies prove that properties with mature trees and beautiful landscaping attract buyers, shoppers, and tenants and demand premium prices. Generally, tree and forest cover in development growth areas adds value to parcels. One study found that development costs were 5.5 percent greater for lots where trees were conserved (Wolf).[1]

Market price studies of treed versus empty lots show this range:
18% building lots with substantial mature tree cover
22% tree-covered undeveloped acreage
19-35% lots bordering suburban wooded preserves
37% open land that is two-thirds wooded

City Trees and Property Values
Wolf, Kathleen

Alleviating Heat Island Effect:

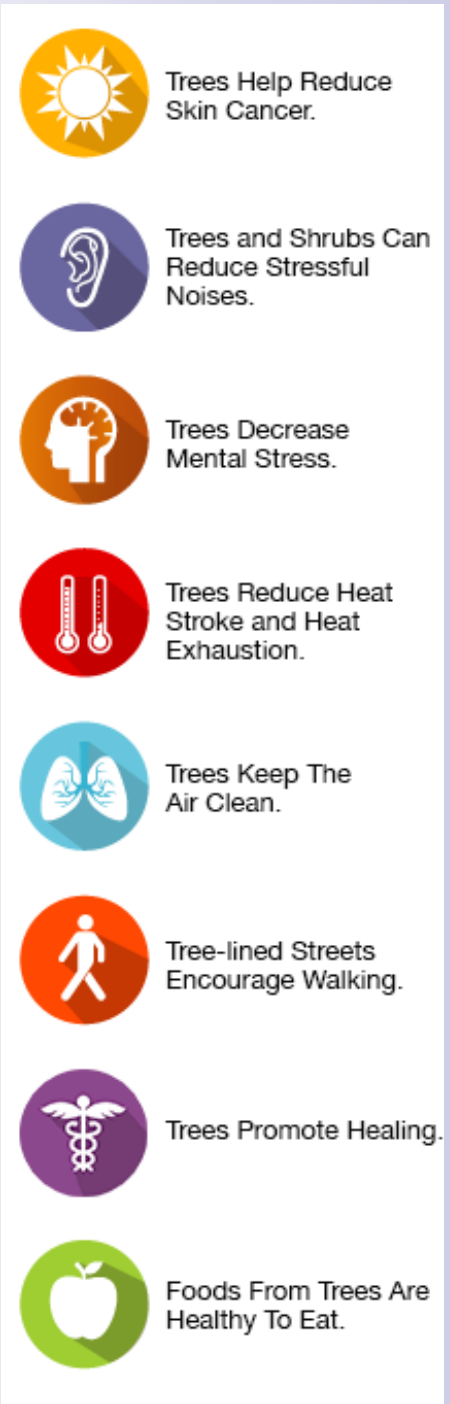
The urban forest provides indirect benefits by reducing the urban heat island effect, a phenomenon of warmer air occurring in a city, compared to lower ambient temperatures in the surrounding rural areas. This occurs in cities where impervious surfaces such as asphalt, concrete and other dark surfaces absorb sunlight and convert it to heat. Temperatures in cities have been measured at five to nine degrees warmer than in the surrounding rural areas. By continuing to plant large shade trees in cities, the heat island effect will continue to decrease in those areas and costs associated with pavement damage from extreme heat will be reduced. This phenomenon will be especially important as high temperature events become more common.

Increasing Air Quality:

In addition to combating the urban heat island effect, trees are able to absorb atmospheric carbon and other air pollutants, which reduces greenhouse gases that correspond to an increase in global warming. The pollutant-related function of trees is measured in two ways: storage, which is the total amount currently stored in tree biomass and sequestration, which is the rate of absorption per year. Trees sequester dangerous pollutants such as carbon dioxide(CO_2), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), and particulate matter of 10 microns or less (PM_{10}) 2 and store it as long as they are living. Studies have shown that 100 mature trees can pull 53 tons of carbon dioxide from the air in a year which benefits the natural environment in cities as well as public health.

Protecting Wildlife and Ecosystems:

Trees create food and shelter for a diverse population of wildlife species such as racoons, squirrels, birds, opossums, insects, spiders and other important species to sustain and restore healthy ecosystems in the urban environment. Planting and protecting trees in cities provides refuge to hundreds of migratory bird species that stop to roost along their migratory course. By cities adding trees, specifically natives, valuable habitats will flourish.



Footnote:
1. https://www.naturewithin.info/Policy/Hedonics_Citations.pdf

What Makes an Urban Forestry Program

The USDA Forest Service (1990) defines the management of the urban forest as "the planning for and management of a community's forest resources to enhance the quality of life. The process integrates the economic, environmental, political and social values of the community to develop a comprehensive management plan for the urban forest."

Planning and Policy are central to urban forest management. Planning sets the course of action and coordination; policy sets the priorities and enacts the planned actions for a desired outcome. It is from here that the City's regulations, enforcements and Urban Forestry Program stems.

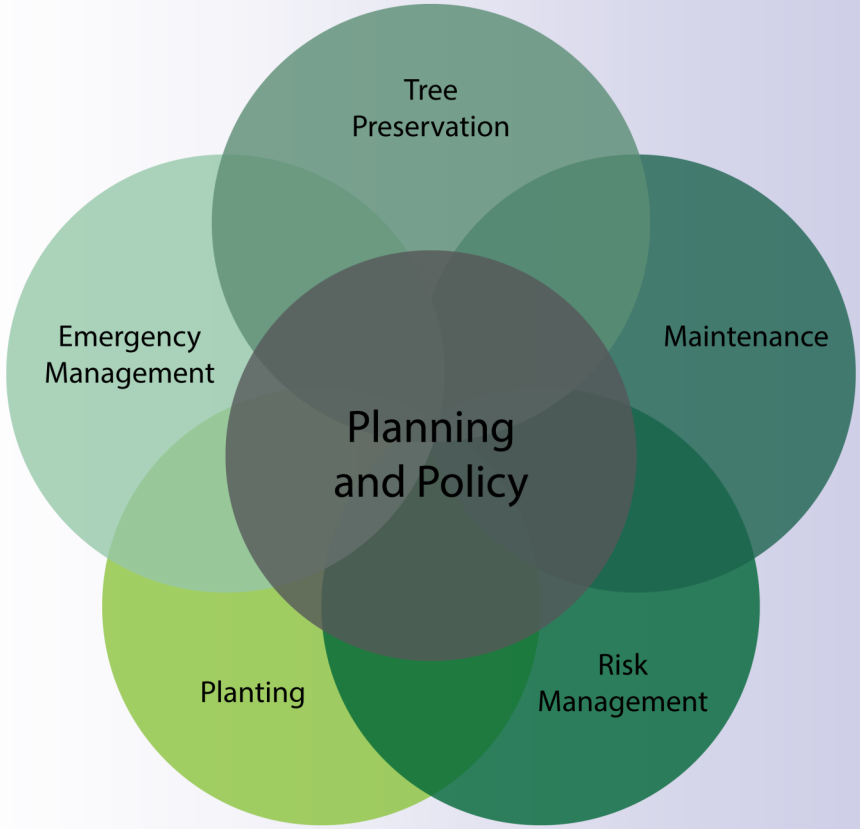
Tree Preservation is the protection of existing trees from disease, insects, drought, and construction. Preserving trees through establishing best management practices and enforcing regulations will reap the greatest benefits on the community as trees mature.

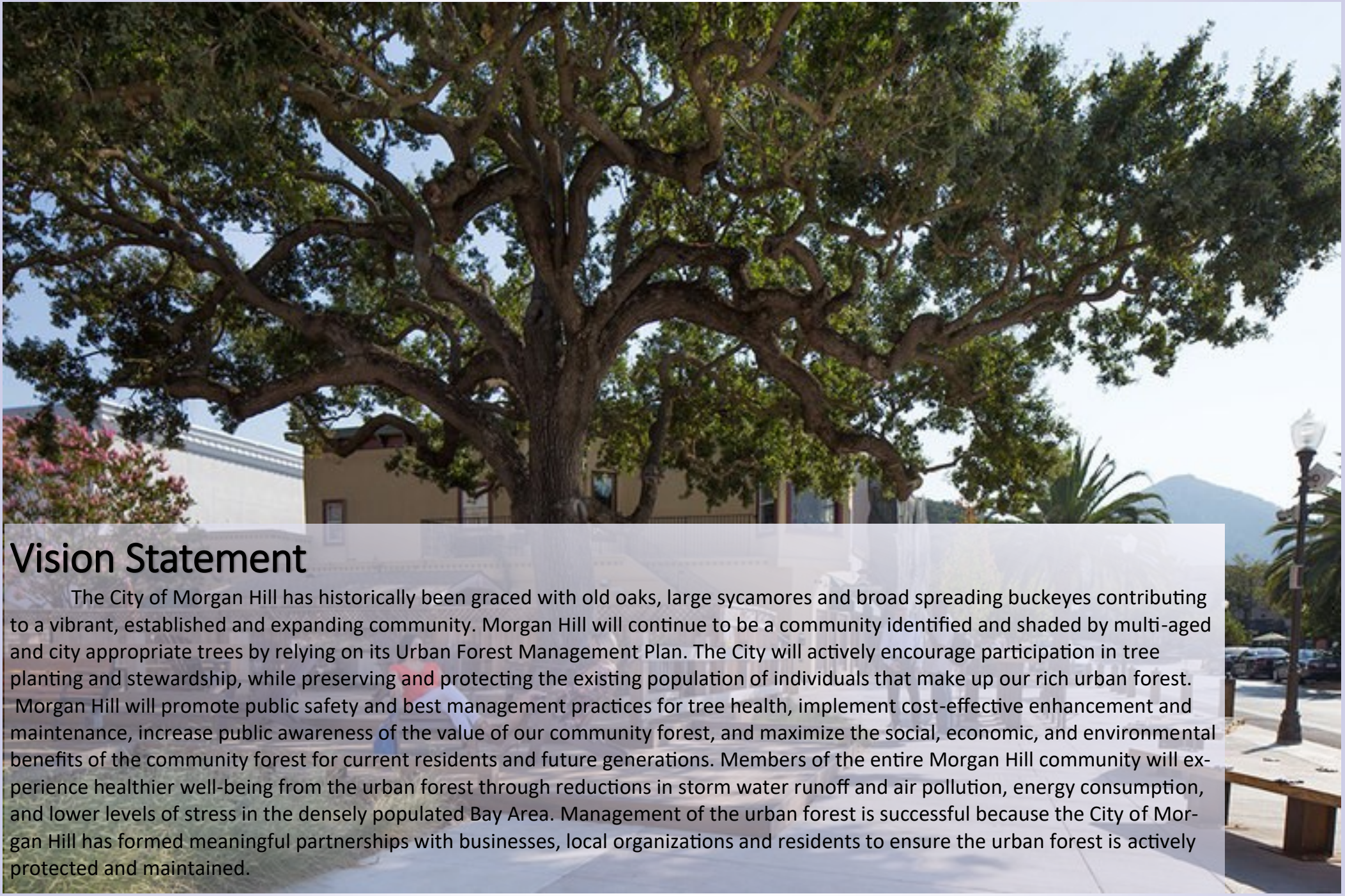
Maintenance is the watering, pruning, and treatment of established trees to promote their continued survival and growth. Good communication, coordination, and documentation helps to ensure a cost-effective program.

Planting is critical to maintaining a sustainable urban forest as the addition of new trees is necessary to replace trees that have outlived their useful lives. By focusing on planting the right tree at the right site for the right reason, there is a greater likelihood that trees will grow to their full potential and provide the greatest benefits.

Risk Management is the applied policy, procedures, and maintenance practices to monitor and mitigate tree risk. Tree risk is the combination of the likelihood of a conflict or failures occurring and impacting a target with the severity of the resulting consequences like property damage, disruption of services, injury, or death. It is impossible to maintain trees free of risk, however, trees can be managed to balance the risk they pose with the environmental benefits they provide.

Emergency Management is the coordinated effort of various departments in response to tree emergencies like downed limbs, trees, and powerlines hit by failing trees—oftentimes in the context of a greater disaster, like flooding, wind, or wildfire. In a time of crisis, it is imperative to have a plan for timely, immediate response and recovery to address emergencies systematically. Sound protocols expedite an efficient response, accelerate recovery, and avoid unnecessary tree removal.





Vision Statement

The City of Morgan Hill has historically been graced with old oaks, large sycamores and broad spreading buckeyes contributing to a vibrant, established and expanding community. Morgan Hill will continue to be a community identified and shaded by multi-aged and city appropriate trees by relying on its Urban Forest Management Plan. The City will actively encourage participation in tree planting and stewardship, while preserving and protecting the existing population of individuals that make up our rich urban forest. Morgan Hill will promote public safety and best management practices for tree health, implement cost-effective enhancement and maintenance, increase public awareness of the value of our community forest, and maximize the social, economic, and environmental benefits of the community forest for current residents and future generations. Members of the entire Morgan Hill community will experience healthier well-being from the urban forest through reductions in storm water runoff and air pollution, energy consumption, and lower levels of stress in the densely populated Bay Area. Management of the urban forest is successful because the City of Morgan Hill has formed meaningful partnerships with businesses, local organizations and residents to ensure the urban forest is actively protected and maintained.

Chapter 4
Current State of Morgan Hill's Urban Forest

Tree Resource Assessment: Canopy Cover

Urban tree canopy is the layer of leaves, branches, and stems of trees that shade the ground when viewed from above. Knowing a city's tree canopy cover percentage is an important measure of the urban forest resource because it helps quantify the benefits provided by trees and establishes a baseline value that can be used to monitor future progress.

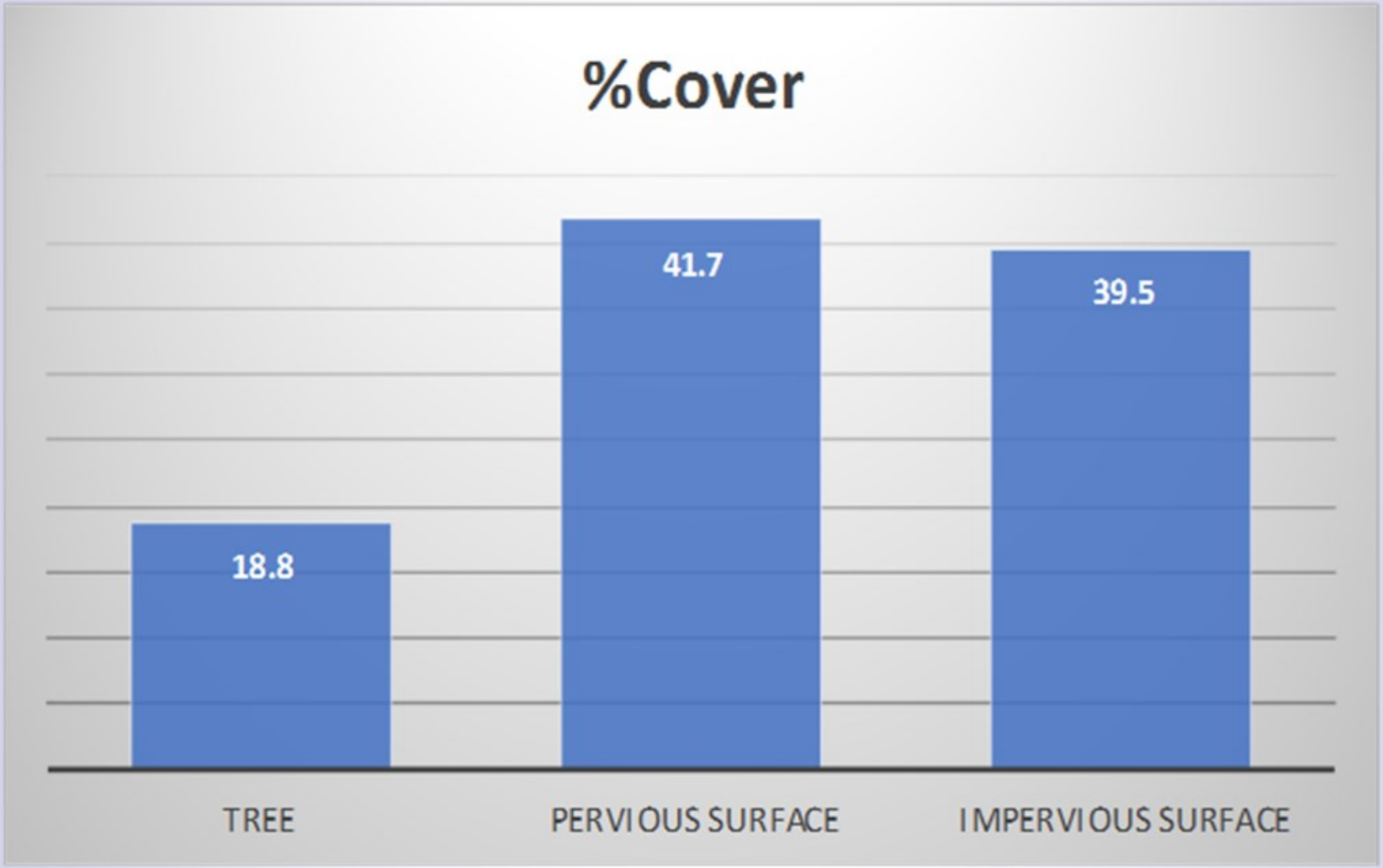
Studies have shown nearly 95% of the population in California lives in urban areas and approximately 61% of those urban areas have a low canopy between 2% and 10%. According to the 2017 California Forest Carbon Plan, California's tree canopy cover and other green spaces are distributed highly unevenly throughout the state and over half of the urban areas suffer from a low canopy cover.

Until early 2018, no data collections had been taken to assess the percentage of Morgan Hill's tree canopy cover, therefore, comparing the rate of growth or decline in canopy during previous years is not possible. City staff used the data collection system, i-Tree, to conduct the first tree canopy cover study. i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban and rural forestry analysis and benefits assessment tools. The various i-Tree tools can help strengthen forest management and advocacy efforts by quantifying forest structure and the environmental benefits that trees provide. The three parameters used to determine the baseline canopy cover percentage in Morgan Hill were identified as either being trees, pervious surfaces such as water, landscape, and green space, or impervious surfaces such as buildings, streets, and pavement.

As a result of the i-Tree Canopy analysis, an estimated 7,500 points were surveyed based on imagery from 2018 that concluded the percentage of canopy cover, pervious surfaces, and impervious surfaces in Morgan Hill. The findings showed that the overall total tree canopy cover was 18.8%, pervious surfaces accounted for 41.7%, and 39.5% of the city consisted of impervious surfaces. Reference to this analysis can be seen in the i-Tree data table (Figure 4.1) on the following page. Though Morgan Hill already has a canopy cover above half of the state, careful monitoring and management will enable the City to continue to increase the canopy to further enhance the community.

According to a national analysis by U.S. Forest Service researchers David Nowak (also on our Science Advisory Board) and Eric Greenfield, a 40-60 percent urban tree canopy is attainable under ideal conditions in forested states. Twenty percent in grassland cities and 15 percent in desert cities are realistic baseline targets, with higher percentages possible through greater investment and prioritization.

Figure 4.1: i-Tree Summary of Canopy Cover 2018



Cover Class	Description	Abbr.	Points	% Cover
Tree	Tree, non-shrub	T	1407	18.80%
Pervious Surface	non-tree pervious	PS	3130	41.70%
Impervious Surface		IS	2962	39.50%

Tree Resource Assessment: Streets & Park Inventory

Morgan Hill has approximately 9,460 street and public park trees inventoried and valued at more than $17.5 million. This includes more than 140 different tree species. The tree inventory is dominated by the popular London Plane and native Coast Live Oak (Figure 4.2). London Plane trees are large deciduous broadleaf species that are similar in structure to the native California Sycamore, but are a more vigorous, adaptable and resistant species to pests, disease and urban conditions. Coast Live Oak trees are large evergreens that are highly variable and very abundant in the valley. These trees provide a large canopy when given proper spacing and care to grow. Morgan Hill's street and park tree inventory is continually updated into two databases by the City's Maintenance Team and contract arborist firm immediately after any in-house and contract work has been completed. The teams cross reference work to ensure accurate data is collected. Though useful to track all maintenance and care, the databases typically do not include trees on privately-owned properties nor unmaintained open space properties. Thus, the two databases underestimate the total number of trees in the city since updates are only made when the contract arborist firm or in-house crews prune, plant, or treat a publicly-owned tree.

Morgan Hill's street and park inventory shows London Plane trees being the highest populated tree throughout the City. According to International Society of Arboriculture (ISA) standards, no species should exceed 10% of the total population in the urban forest. This standard was formed in response to the devastation of thousands of urban elm trees that succumbed the ill effects of Dutch Elm Disease in the early 1900s. Choosing similar structured trees should be more prevalent in future tree selections to mitigate potential threats and add diversity to the urban forest. Tree species that produce large canopies and sequester generous quantities of carbon are also a priority to promote healthy living environments for the community and to clean pollution created by urban activities.

The City strives to supply adequate planting spaces for its trees along with selecting appropriate trees for each planting location, but in some locations, where trees have matured, there is overgrowth which prompts requests for removals. Future tree planting shall follow landscaping standards that take into consideration current and future maintenance needs, ensure that selected trees have adequate room to grow, and affirm their mature size and placement adds to the community's and tree's quality of life.

Botanical	Common	Total	Pct.	Estimated Value
Platanus X hispanica	London Plane	1,602	16.94%	$2,444,660.00
Quercus agrifolia	Coast Live Oak	906	9.58%	$3,238,330.00
Lagerstroemia indica	Crape Myrtle	796	8.42%	$625,350.00
Pistacia chinensis	Chinese Pistache	454	4.80%	$644,510.00
Robinia pseudoacacia	Black Locust	398	4.21%	$286,700.00
Pyrus calleryana	Ornamental Pear	392	4.14%	$541,300.00
Liquidambar styraciflua	American Sweetgum	347	3.67%	$667,560.00
Quercus lobata	Valley Oak	345	3.65%	$897,410.00
Celtis australis	European Hackberry	339	3.58%	$394,320.00
Fraxinus angustifolia oxycarpa	Raywood Ash	330	3.49%	$604,600.00
Other	Other	3,550	37.53%	$7,259,030.00
Total Trees		**9,459**	**100%**	**$17,603,770.00**

Figure 4.2: Top ten tree species in Morgan Hill's street and park inventory

Management of the Urban Forest

The success of an urban forestry program does not hinge only on the talents and work ethic of a small group of professionals trained in this field. It also relies on the commitment of allied professionals, appointed and elected public officials, and the residents and local businesses that represent the community. In a successful program, all of these people are involved at different levels and all bring something vital and necessary to the process. The following are the tree-related responsibilities of the City and property owners within Morgan Hill's limits:

Community Services Maintenance Team & Contract Arborist: Urban forestry programs are often managed by a "Streets Department" since trees and their root structure share the municipal rights-of-way where the same space must accommodate water and sewer lines and other underground utilities. Public trees in Morgan Hill are managed by the Maintenance Team as part of the Community Services Department who engage in small modifications, repairs, and damage control related to the urban forest. The City's Maintenance Team contracts all large scale tree-related work to an ISA certified arborist firm who manages the recurring issues and provides consistent tree care to all street and park trees owned by the City. The contract arborists then report urban forest needs to Maintenance staff on a case by case basis.

Development Services Department: The Development Services Department, which includes City Planners and Development Engineers, also interact with the Maintenance Team for plan review and to provide guidance with species lists. While new developments are privately-owned, their landscape plans require review and approval from Planners and Engineers who nearly always require trees to be planted or protected in new landscape designs. The Development Services Department also manages tree removal permits requested by residents and developers in Morgan Hill. Overall, the department prioritizes planting trees in new developments for their environmental, social, and economic benefits.

Private Owners: Any tree-related work performed on private property and schools is the responsibility of the property owner. The City does not limit the number of trees planted on established, privately-owned property or require a specific arborist to maintain trees. Therefore, recommendations instead of goals will be given to better assist private owners throughout this Plan.

Below is a table that illustrates the City departments and their role in managing Morgan Hill's urban forest.

CITY OF MORGAN HILL URBAN FOREST MANAGEMENT AND DEPARTMENT ROLES	Planning and Policy	Preservation	Maintenance	Planting	Risk Management	Emergency Management
Community Services Maintenance	X	X	X	X	X	X
Development Services	X	X		X		

Various federal, state, and local agencies own property and easements in Morgan Hill that also accommodate trees and native vegetation. The following are brief descriptions of the responsibilities of these agencies. It is important to mention the recommendations in this Plan, related to management and care of trees **do not** apply to these areas.

County of Santa Clara: The County of Santa Clara is responsible for any tree related work located along expressways and unincorporated county roads. The County Tree Preservation and Removal Ordinance, much like Morgan Hill's Tree Removal Permit, requires permits for tree removal or other work around trees by property owners and developers located on county-owned land.

California Department of Transportation (Caltrans): Caltrans is responsible for any tree related work along freeways and highways in Morgan Hill. Caltrans Adopt-A-Highway program utilizes volunteers to plant and maintain trees. Additional information is located on the Caltrans Adopt-A-Highway website.

Santa Clara Valley Water District: The Santa Clara Valley Water District is responsible for any tree related work along watersheds and streams located on District property and easements in Morgan Hill. A certified arborist or qualified District staff certifies trees or limbs that are hazardous with the potential to cause injury or significant property damage. More information can be found on the District's Fact Sheet located on the website.

Applicable Regulations

The City of Morgan Hill's policies, ordinances, and planning documents establish a framework for developing and managing the City's urban forest. The City's documents and publications range from the guiding General Plan to the Restrictions on Removal of Significant Tree Ordinance in Chapter 12 of the Municipal Code. The applicable regulations, actions, and policies Morgan Hill has established are for the protection of trees within the urban forest. Though fiscal budgeting and economic challenges limit the course of action the City can take, the established regulations have created a strong foundation to develop the urban forestry program. The following policies and regulations are applicable to urban forestry activities in Morgan Hill:

City of Morgan Hill's General Plan: The Plan's Natural Resources and Environment goals, policies, and actions provide descriptions and discussions of urban forestry in construction sites and identifies the benefits of trees related to wildlife, the community, and the city. (Appendix B)

City of Morgan Hill's Significant Tree Ordinance: This ordinance establishes the rules and regulations to control and protect planting on City streets, parks, facilities, and on private property in Morgan Hill. (Appendix A)

City of Morgan Hill Tree Planting Specifications: The City's tree planting specifications provide the tree planting requirements developers must follow when planting trees. The specifications are enforced to promote healthy growth and establishment for newly planted trees. (Appendix D)

Community Values

Citizen support plays a vital role in supporting urban forestry. In fact, many cities in the nation foster tree related groups whose mission is to assemble volunteer support and advocate for urban forestry programs to local officials. More importantly, citizens have the ability to provide the political support to sustain public investment in green initiatives and the urban forest. An effective urban forestry program ultimately depends on public policy supporting it financially, administratively, and legally; but citizen action has the ability to cultivate change initially.

The first steps in preparing this Plan were to gather information from the local residents of Morgan Hill. An initial presentation about urban trees and the Plan were given to a variety of community groups, local businesses, and City staff on December 13, 2016. Each attendee was invited to provide input on community forest benefits and issues as well as give their support for the development of an Urban Forest Management Plan dedicated to Morgan Hill's urban trees. After the approval of the project by CAL FIRE was granted, a local advisory group was established containing Morgan Hill residents, arborists, City staff, and leaders of multiple community organizations. The group met bi-weekly from March to July 2018 to discuss urban forest benefits, issues and trends, policy changes, and administrative and financial support that are key elements in the Plan.

Members of the advisory group along with the entire community were encouraged to participate in a city-wide tree survey that collected data from February to June 2018. The purpose of the tree survey was for City staff to gather vital information to analyze and determine the knowledge, concerns, and support Morgan Hill's community had regarding urban trees. Table 4.3 summarizes the responses completed by 113 respondents from the community.

The results of the survey showed that the respondents have a general understanding about the benefits of trees as they identified the most important as creating more pleasant neighborhoods and business districts, shading streets and parks, and reducing air pollution. About 70% of respondents stated there are too few trees in their neighborhood and would like to see more trees in the City on major arterial roads and in parks. Nearly three-fourths of respondents were concerned about the impacts trees pose on infrastructure, particularly damage to sidewalks, pavements, and underground pipes. The same amount responded to supporting a tree related webpage on the City's website as a way to learn more about the urban forest.

Table 4.3: Summary of Responses from Community Tree Survey

What is your affiliation to the City of Morgan Hill?	
I am a resident of Morgan Hill	89.38%
I am a frequent visitor to Morgan Hill	3.54%
I work in Morgan Hill	1.77%
Other	5.31%

What do you think are three (3) of the most important benefits trees provide?	
Create more pleasant neighborhoods and business districts	66.96%
Clean air by absorbing pollutants	59.13%
Shade streets and parks	53.91%
Reduce greenhouse gases and address climate change	42.61%
Provide food and shelter for wildlife	37.39%
Stabilize soil and reduce storm water runoff	31.30%
Increase property values	6.09%
Other	2.61%

In your neighborhood, are there too few or too many City-owned trees? (trees on public, not private property)	
Too few public trees	71.30%
Enough public trees	26.96%
Too many public trees	1.74%

What are your top two (2) concerns relating to tree plantings and care?	
Pavement and underground pipe problems from roots	71.30%
Blocking traffic, sidewalks, signs, and/or street lights	32.17%
Leaves and fruit droppings	23.48%
Safety problems from trees and limbs falling	16.52%
Pollen/allergies	11.30
Trees cost too much money	2.61%
Attracting insects and other pests	.87%
Other (please specify)	24.35%

How would you like to learn more about trees?	
City website providing up-to-date materials on tree selection and care	70.43%
Regular tree workshops	26.09%
I do not want to learn more about trees	16.52%
Tree related brochures at all city owned buildings	10.43%
Other (please specify)	6.96%

Issues and Trends

Morgan Hill's urban forest has a variety of issues and trends to be addressed in the Plan. These issues primarily derive from the City's small size and limited resources which is why a comprehensive urban forest management plan is needed as the city continues to grow. Many meetings with the Development Services Department, Community Services Department, Maintenance Team and members of the community advisory group took place throughout 2018 to determine the issues and trends related Morgan Hill's urban forest. The following are conclusions gathered from the meetings regarding various issues and trends:

Tree Planting: A continuous issue in Morgan Hill has been the planting of large trees in inappropriate locations such as small planting strips, under utility lines, or near underground infrastructure causing hardscape damage, stress on the tree, removals, and costly spending from the City's budget. Implementing policies to ensure that appropriate species are planted in the appropriate location will mitigate the majority of these issues. Concerns have also been raised regarding the increase in water consumption trees need due to the effects of the most recent drought and the community's desire for water conservation. Trees that require little water will be encouraged to plant on public and private property throughout Morgan Hill to lower water consumption.

It has also been of great concern the size of street tree planter strips across Morgan Hill. The typical planting strip is roughly five feet wide, which can be a very small planting space for large statured trees once they reach maturity. In Morgan Hill, street trees have uplifted sidewalks and created pedestrian safety hazards. In most cities, adjacent residents must pay for the root damage to concrete, but in Morgan Hill the City pays for the removal and replacement of concrete sidewalk. Therefore, increasing the planter strip dimensions to accommodate large, mature trees will reduce City spending on sidewalk replacement. Along with small planting strips, Morgan Hill has compacted soils in developed areas of the city due to construction activities. Policies and standards to expand the planting strips and loosen soil for proper root growth will lessen the negative impact on the health of trees, the surrounding hardscape, and infrastructure.

Tree Removals and Replacement: Tree removals will always be a part of the urban forestry program. There are a variety of reasons trees need to be removed, but replacing them is essential. When existing trees are removed in Morgan Hill, there is no clear standard or measure that states how many trees should replace a large or mature size tree. Large trees provide extended benefits to the community, and replacement typically is done with small 15-gallon size trees that require an extended amount of time to produce their expected canopy coverage. Most municipalities provide a standard ratio defining the number of trees that are required to replace a removed tree based on sizing of canopy coverage at the time of removal. The City of Morgan Hill intends to explore the feasible and beneficial options that will ensure higher replacement rates without reducing the social, environmental, and economic benefits of large and mature trees.

Tree Care: Tree care is the watering, pruning, staking, pest and disease prevention that is needed to sustain healthy trees. Typically, the City contracts its tree care procedures to a local arborist firm who follow ISA standards and best management practices. Certain procedures are efficiently performed to mitigate public safety issues, but many procedures lack timely monitoring and care that cause degradation to trees' health and growth. Addressing these issues and providing provisions that will establish proactive measures and utilize best management practices is a primary element in this Plan.

Infrastructure Conflicts: The root structure of trees are often in the City's right-of-way in spaces that must also accommodate water and sewer lines as well as other underground utilities. Proactively planning for proper placement of trees away from underground utilities that could create condensation will reduce the risk associated with costly utility repairs from invasive roots. Hardscape (sidewalks, streets, and curbs) damage from tree roots is a ceaseless issue the City is required to correct for public safety and aesthetics. Ensuring trees are selected that do not have invasive root systems, are the appropriate size, and are given proper spacing between underground utilities and other hardscape will help minimize the need for costly repairs. The City will also determine if the implementation of root barriers to avoid infrastructure conflicts is best when planting new trees around utilities and hardscape.

Regulations and Enforcement: The City's current Significant Tree Ordinance is the only regulation in place to protect urban trees. It is fairly limited in scope and is enforced solely on a complaint basis. In reality, property owners face few consequences when they use bad pruning practices or remove significant trees without a permit. In recent years there has been backlash from the community in response to the removal of large trees that brought value and represented Morgan Hill's history. Amending the ordinance and adding new components that will heed more protection and enforcement will protect more old growth species, nonnative species, and hold people accountable for violating policies.

Education: One of the main concerns regarding Morgan Hill's urban forest is the lack of knowledge associated with the benefits trees provide to the City. Education and awareness can create the foundation for change regarding the way people view trees in the urban environment.

Management: Management of the entire urban forest is divided between the Community Services and Development Services Departments and private property owners in Morgan Hill. Each City department deals with certain entities of the urban forest, but not one department focuses solely on the holistic needs of the urban forest which causes some policies and department priorities to contradict each other. Establishing a voluntary urban forestry internship program is an approach that could result is a dedicated single person available to analyze all needs related to city-owned trees while providing valuable tree care information to the community. More information on this internship program is included in Appendix C.

Chapter 5
Implementation Plan

Chapter 5.1
Master Street Tree Plan

The Master Street Tree Plan is a specialized list of various tree species best suited for Morgan Hill's climate zone, streets, medians, and planting strips. The list prioritizes species with low water-use needs, broad canopies, and a variety of native and nonnative trees that will withstand the urban soils, development projects, along with providing ecosystem support to a multitude of bird, animal and insect species. The Master Street Tree Plan was originally developed in 1998, but was not adopted by City Council at that time. Since then, an amended list was developed by City staff and a subcommittee from the Urban Forest Advisory Group in 2018 and 2019. The group referenced many urban forestry resources such as the California Department of Water Resources (WUCOLS) low water-use tree and plant list, UFEI Tree Select Guide, and researched multiple municipalities' street tree selection lists in California to develop the Master Street Tree Plan in Morgan Hill. The Master Street Tree Plan was then presented to City Council by Community Services staff and adopted in 2019.

The idea behind forming and adopting the Master Street Tree Plan is to develop different lists that will assist City staff to plant the right tree in the right place and promote structural consistency throughout Morgan Hill's urban forest. Streets, boulevards, residential and business districts, and parks that have a structural consistency of similar tree species create the sense of belonging and community to residents and visitors in Morgan Hill. The Master Street Tree Plan acknowledges differing priorities for public street trees, public park trees, public facility trees, private trees on single-family and multi-family residential property, and private trees on commercial property throughout Morgan Hill. Part of the Master Street Tree Plan divides Morgan Hill into seven zones and provides a corresponding list of tree species suitable for each zone based on available space, surrounding infrastructure, and visual aesthetics. Appendix E of this Plan provides the finalized Master Street Tree Plan information that is most beneficial to Morgan Hill's community.

The following factors were considered while selecting tree species suitable in Morgan Hill:

- Infrastructure conflicts
- Maintenance issues
- Aesthetics
- Need for age and species diversity
- Potential to become invasive
- Habitat value and attractiveness for pollinators
- Ecological benefits such as shelter, food, and breeding sites for both residential and migratory birds and wildlife
- Energy use reduction potential
- Carbon sequestration potential
- Storm water treatment potential
- City goals for water conservation
- City goals for canopy cover
- City's goal to encourage re-oaking of native and nonnative oak species
- Surrounding species theme and the past performance of that species

Chapter 5.2
Community Tree Canopy Cover

"Canopy Cover" is a measure of how much of the community's total land (both publicly and privately-owned) is covered by trees. Modern estimation tools, which rely on aerial photography, are available to enable City staff to develop a reasonably accurate estimation of the City's canopy cover. Using the i-Tree Canopy tool based on 2018 aerial photos, Morgan Hill has a canopy cover of 18.8% within its city limits. In 2030, the State has established a canopy cover goal of 20% in all urban areas stated in the California Forest Carbon Plan. With the City being just under 20%, achieving the State's goal is feasible and within reach. Therefore, the City of Morgan Hill has established a net canopy cover increase of 2% every ten years for the next forty years. This goal will be achieved with the coordination of driven staff, comprehensive city policies, and public education that will support healthy tree growth and expansion.

Factors Affecting Canopy Cover

Changes to the community's canopy cover occur on a daily basis as result of tree growth, death, removal, trimming, or planting. Some of these changes are incremental, like the natural growth that occurs daily or when a resident plants a sapling, while others are monumental, like when an orchard is removed to make way for development or a large oak falls in a windstorm. Since so many of these factors are the result of natural processes, it is likely that the canopy cover number will rise and fall slightly each year. The keys to developing a positive growth trend in the canopy cover number include:

- **Protecting Existing Trees:** Because of the large size of many existing trees, each tree removal results in a canopy loss that requires many new trees to be planted in order to replace the removed tree's canopy value in the near term. While there are numerous other reasons to protect and preserve existing trees, as discussed in Chapter 5.4, reducing tree removals minimizes reductions in the City's canopy cover.
- **Encouraging Healthy Tree Care and Proper Pruning**: As discussed in Chapter 5.4, the City will establish a tree care education program and conduct outreach to encourage the development of a healthy urban forest that will contribute to continued increases in canopy cover.
- **Requiring Tree Planting in New Development**: The City's planning regulations requires new development projects to plant trees in their landscape as a condition of approval. Ensuring that the right trees are planted, to preventing the desire to remove them in the future, will support continued canopy growth.

- **Planting Trees in Open Areas:** While much of Morgan Hill is developed and much of the surrounding area is dedicated to agricultural (row crops, orchards, and rangeland) production, it may seem like there are limited opportunities to plant new trees. Planting opportunities are significant and the City will maximize opportunities for species groupings that form interconnected ecosystems and an ecologically resilient landscape that supports birds, pollinators, and other beneficial insects with an emphasis on native oak woodland species. The following are priorities for planting new trees the City has identified:

  "Empty" Street Tree Locations: There are many empty park strips and other locations such as school yards and parking lots available for tree plantings. These areas are prioritized.

  Open Spaces: The City owns or controls a significant amount of open space in the community that is not planned for development or used for active recreation. Planting opportunities in these areas abound.

  Freeway Frontage Areas: Planting trees directly along US 101 could significantly beautify the freeway viewshed as well as provide an opportunity to plant hundreds of trees. While much of this land is under private ownership, providing free or reduced cost trees for planting along the freeway could lead to hundreds of new trees being planted.

  Private Yards: Similar to the above concept, providing incentives to private property owners to plant more trees, along with education on planting the right tree in the right location, could lead to countless additional trees being planted.

Community Goal

Given the high value placed on the City's urban forest, the City has established a goal of increasing the City's canopy cover by 2% every ten years.

Year	Canopy Cover
2018	18.8%
2028	20.8%
2038	22.8%
2048	24.8%
2058	26.8%

Chapter 5.3
Tree Planting Guidelines

Planting trees in Morgan Hill will remain the primary strategy for the City to increase its canopy cover. New plantings increase the canopy slowly at first, then significantly as each new tree grows to its mature size. Large broadleaf, wide spreading trees will help shade streets, decrease the heat island effect, and store large amounts of carbon and greenhouse gases. Small broadleaf trees will be planted in areas where they will not block signage and when utility lines are above, so they are not harmed by topping or significant pruning. All trees should be planted between Fall and early Spring when they are dormant to limit stress.

All new trees planted will be carefully selected from the Master Street Tree Plan to promote planting the right tree in the right place in new developments, City facilities, parks, and along streets and medians. Since Morgan Hill is an urbanized environment, it is inadvertent to singularly plant species native to Morgan Hill because urban environments do not necessarily favor them. Issues such as poor soil conditions, high compaction, limited space, and insect and disease infestations can deteriorate the health of native trees that flourish in open spaces and native soils. Thus, it is important to note that species diversity, which includes nonnative and hybrid species, is necessary to create a more resilient urban forest that will not fall susceptible to unfavorable urban conditions.

Tree Planting Opportunities

Each year new tree plantings vary throughout Morgan Hill. Prioritizing opportunities to increase new plantings in the city are important in order to maintain a vibrant and diverse urban forest. The City's tree planting goals derive from the 40 -year canopy cover goal mentioned in the previous chapter. To achieve that goal, tree species with the largest canopy that favor the certain site specifications of a planting location will be strategically selected from the Master Street Tree Plan and planted to achieve optimal growth and spread.

The tree characteristics determined by City staff and the community that will serve the greatest benefits to Morgan Hill when planted and increase canopy are those species with low water-use requirements, deciduous and evergreen species, native and nonnative species, and species that are most resistant to common urban pest and disease problems. These characteristics are predicted to produce the greatest ecosystem benefits and sustain a healthy urban forest that will allow trees to expand to their full canopy cover potential.

Along with selecting optimal tree characteristics , various planting opportunities are necessary to utilize when planning for new additions to the urban forest population. Key opportunities in Morgan Hill include:

- **Utilizing "Empty" Street Locations:** As mentioned in the previous chapter, there are many empty park strips (over 1,600) and other locations that were occupied by a street tree in the past. The City will plant new trees in these vacant locations when feasible and when the adjacent property owner or business agrees to care for the tree.
- **Utilizing Open Space**: The City owns or controls a significant amount of open space that is not planned for development or used for active recreation. Planting trees in open spaces that are native to Morgan Hill will be prioritized. Nonnative species will be carefully analyzed if desired in the areas to avoid invasiveness and develop an urban forest that is less susceptible to disease. The City's Master Street Tree Plan will guide City staff to make the best choices for plantings in open space areas in Morgan Hill.
- **Applying for Tree Planting Grants**: Grants from the State and other agencies will be utilized by the City to increase the number of new trees planted.
- **Requiring Trees in New Development**: The Development Services Department typically requires tree plantings in the landscape for all new developments. With reference to the Master Street Tree Plan, the Development Service Department will continue to encourage developers to plant new trees when existing trees need to be removed on-site, when there are no trees existing on-site, and when there is space for trees and "greenscape".
- **Increasing Private Property Plantings**: Most of the City's urban forest exists on private property within Morgan Hill. The City's Community Services team will form outreach and education efforts through the City's website and use days such as Earth Day and Arbor Day to promote new plantings on private residents' property.

Goals to Establish Healthy Growth for New Tree Plantings

There are many factors that limit healthy growth for newly planted trees in the city. Providing optimal living conditions for trees to thrive is critical for the development of a shaded and environmentally sound community. Many tree health issues in urban areas can be traced to physical changes, such as introduced hardscapes, poor soils, small planting spaces and street and sidewalk construction that result in reduced supplies of nutrient rich soil, water and oxygen. The City will work to establish standards and procedures for new tree plantings that promote healthy growth now, for the future, and during times of drought. Standards and procedures to promote young tree health include:

- **Enhancing Street Parkway Growing Conditions Where Feasible:** Sidewalk damage caused by tree roots is a large public safety issue the City is continuously addressing. The average park strip space for a street tree in Morgan Hill is 4.5-5 feet wide. This limited space has proven to greatly inhibit root growth and cause severe hardscape damage. As a major part of the Plan is to expand the City's canopy cover with larger tree species, park strip measurements should be widened when feasible.

  Implementation Action 5.3-A: The City will revise City infrastructure construction specifications to maximize tree health and longevity and minimize infrastructure damage. The City will also identify existing parkways that can be enlarged to accommodate greater canopy and/or larger canopy trees when feasible.

- **Developing New Planting Standards in Public Right-of-Way:** Though Morgan Hill has prosperous soils for agriculture and vegetation, the more developed parts of the City suffer soil compaction and nutrient depletion from construction which restricts roots from expanding and decreases the expected rate of tree growth each year. Amending the current tree planting standard by including specifications that allow for adequate rootable soil volume and good drainage will increase root and tree growth for all newly planted trees.

  Implementation Action 5.3-B: The City will establish new planting specifications that will encourage non-compacted and rootable soil volume under structurally supported sidewalk.

- **Creating a Monitoring Cycle**: Monitoring trees, especially those planted in areas that are highly populated with people such as the downtown area, shopping centers, and parks are important to frequently monitor for protection from downed limbs or trees and public safety. Monitoring a newly planted tree by visiting the site a year after planting is a proactive practice the City will encourage volunteers to assist with to ensure proper care is taken on trees needing extra attention.

- **Establishing Stewardship Agreements for Park Strip Plantings**: The first three years after planting a tree is the most essential period for healthy tree development and establishment. Caring for a park strip tree is unique in that the tree requires collaborative maintenance from the City Maintenance Department as well as the private property owner living adjacent to the tree. Currently, there is no written agreement between the property owner and Maintenance Department that discloses to a homeowner the exact requirements and limitations they have over the park strip tree. Without a formal agreement, many park strip trees in Morgan Hill have been removed, severely pruned, or expired from homeowners being unaware of the tenure they possess over the tree.

  Implementation Action 5.3-C: Create a formal agreement between the homeowner and Maintenance Department regarding park strip trees that states all requirements needed by the homeowner for the success of the tree's survival along with illicit actions the homeowner should not participate in to promote community awareness, tree preservation, and support canopy growth.

- **Operating New Irrigation Technologies**: As the City continues to plant trees when feasible on public property, implementing new irrigation technologies for water conservation when new plantings occur will be applied to conserve water, provide sufficient irrigation needs to new plantings, and support community values for water conservation. The City primarily installs bubbler irrigation to newly planted trees on streets and in parks which does not always sufficiently irrigate at the drip line or soak deep in the soil grade. It is essential to keep a newly planted tree adequately watered by applying water less frequently, but for longer periods of time. The objective is to water slowly, dispersing the flow of water to get the water deep down to the tree's roots. This waterwise method supports healthy growth, drives roots away from hardscape, lessens the financial burden for future maintenance and removal, and supports water conservation efforts.

  Along with bubbler irrigation, the City utilizes water bags and water trucks in areas where irrigation cannot be installed, as well as drip irrigation in new development landscapes. In developed areas, there are not adequate resources or funds to support grey water irrigation systems, but as new developments continue, the City will encourage private developers to install grey water systems when feasible and when the landscape allows for it.

- **Increasing Species Diversity**: Strategically selecting a wide variety of both native and nonnative species, particularly as street trees, is necessary for the City to maintain healthy trees in developed areas. Tree plantings in historic districts and new developments add to the aesthetic appeal of Morgan Hill. However, species diversity in new plantings should be a primary concern. The dangers (such as disease and insect infestation) of planting monocultures have proven to be devastating throughout the United States. The goal will be to avoid monocultures that create vulnerability to catastrophic losses due to species-specific threats by planting a variety of native and nonnative tree species. ISA recommendations and Urban Forestry guidelines suggest that, as a precaution against catastrophic species loss, no one species should account for more than 10% of the population and no one genus for more than 20% of the population.

- **Enforce Right-Tree-Right-Place Standard**: Planting the right tree in the right place takes a significant role in the promotion or declination of trees and their health. In Morgan Hill, there are many locations where the wrong tree was planted in a location where a much more suitable tree would have thrived, such as pine trees that grew into the above utility lines and were topped for public safety reasons as well as large street trees planted in small sections of a street causing serious hardscape damage and forcing the City to spend maintenance funds repaving and cutting out major roots. Many cities now implement Right-Tree-In-The-Right-Place standards that encourage City staff to plant the right trees in vacant and open space locations throughout their city to increase public safety, protect infrastructure, and support healthy tree growth.

  Implementation Action 5.3-D: Implement the Right-Tree-In-Right-Place standard to all new plantings on public property. This new standard will create a positive trend in tree health and reduce undue spending associated with root damage to hardscape.

- **Ensuring Clearance Safety**: The shape of a tree is an important factor when choosing a street tree species to meet the above ground clearance requirements. Clearance for vehicle and pedestrian traffic requires that the lowest woody branch of a street tree must be a minimum of fourteen feet above the street pavement and eight feet above the pedestrian walkway or sidewalk.

  PG&E recommends to "Choose a tree and location where the ultimate height and spread of the tree will remain at least 10 feet away from power lines." PG&E offers extensive literature titled "A Guide to Small Trees Near Distribution Lines" through the "Right Tree Right Place" program.

- **Promoting Alternative Designs to Accommodate Trees:** There are several alternative structural designs to promote healthy tree growth without roots encroaching on hardscape. Such designs include sidewalk bulb outs, arched sidewalk ramps, permeable pavers, structural cells, and curb cutouts for rainwater capture. These techniques have proven beneficial in many cities in the Bay Area and will be promoted in Morgan Hill when feasible.

- **Enhancing Wildlife Habitats**: Life thrives where the complex interactions between organisms and their ecological surroundings are balanced. Trees provide habitat for a wide variety of wildlife that might otherwise have a difficult time living in our cities. Although a variety of native and nonnative species is necessary for the city, an emphasis on native trees that can withstand urban conditions will be prioritized to enhance wildlife habitats in parks, trails and other community spaces. Native trees support insects that provide pollination services as well as move energy up the food chain from plants to birds, to amphibians and other wildlife species. For example, an individual oak tree can support up to 500 species of insects and invertebrates, thereby providing a broad range of dietary choices to birds, bats, and other wildlife. This support for wildlife can in turn provide pest control services in gardens and agricultural land in Morgan Hill.

- **Increasing Soil Conditions in New Developments**: As stated in policy NRE-6.5 of the General Plan regarding soil and erosion, the City will encourage development to be designed to conserve soil and avoid erosion. Soils in development sites throughout Morgan Hill are often severely compacted and eroded which inhibit the development of new roots, restricts drainage that dehydrates roots, enables water mold fungi to develop, and depletes nutrients from the soil. Optimal soil conditions for most trees include porous soils where roots can expand and grow downward with high drainage to guide water deep in the soil to the root system. The City will encourage developers to amend soils around newly planted trees and reference the City's planting standards for best management practices to create nutrient-rich soil for healthy development of trees.

- **Implementing Right-Tree-In-Right-Place Program in New Developments:** As mentioned regarding public property, the City will develop a Right-Tree-In-Right-Place standard. This standard will guide the Development Services Department to require the most appropriate trees to be planted in new developments. The standard supports long-term tree health and aims to limit the need or desire to remove or excessively prune trees in the future.

- **Promoting Right-Tree-In-Right-Place to Community:** The City's comprehensive website will help residents and businesses interested in planting trees select the right tree for the right location based on the benefits the property owner wants to accomplish through planting their tree and the constraints of the planting location. Some examples may be to reduce their energy bill by providing shade, what to plant under a utility line, how to shade their property, or to ensure their solar panels do not become shaded by their new tree. Promoting the right tree in the right place to the community on Morgan Hill's website will promote tree health to the urban forest on existing private property.

Tree Planting Guidelines

1. How to Prepare the Planting Area

Mark an area several times wider than the root ball diameter (the wider the better). Loosen this area about the depth of the root ball. This will enable your tree to extend a dense mat of tiny roots out into the soil in the several weeks in the ground.

2. How to Dig the Hole

Dig the hole in the center of the loosened area (2-3 times the diameter of the root ball and no deeper than the depth of the root ball- shallow is better than deep in this instance).

3. When the Tree is in a Container

Gently remove the container from the root ball (don't pull by the trunk). Loosen roots with finger tips and prune away damaged or circling roots.

4. When the Tree is Balled or Burlapped

Rest the root ball in the center of the hole and reshape the hole so the tree will be straight and at the proper level. After adjusting the tree, pull the burlap and any other material away from the sides and top of the root ball. Carefully remove the burlap material from the hole.

5. Place the Tree in the Hole

The bottom of the ball should rest on solid undisturbed soil. When finished, the trunk flare should be at or just above the soil surface. Planting too deep is the most common mistake, since soil above the trunk flare causes bark or root rot.

6. Adjust Placement of Tree

Before putting soil back into the hole, make careful adjustments to the planting height and the direction the branches face without significantly harming the roots.

7. Backfill

Gently backfill with the original soil removed before the tree was planted. Do not add fertilizer, compost or other materials. Add the soil back in layers to eliminate large air pockets that may dry out the roots. The best soil for root growth has spaces for both air and water, so also avoid heavily compacting soil. Once the soil is filled and even to the top of the root ball, water briefly. The trunk flare should be slightly above the soil when finished. Water thoroughly.

8. Mulch

Cover the entire loosened area with 3-4 inches of mulch (wood chips or bark, compost, or dry leaves). Mulch will slow water loss, reduce competition from weeds and grasses, will moderate soil temperature and provide a small amount of nutrients. Keep mulch away from the trunk of the tree to prevent rot and disease.

9. Staking

The number of stakes you will need vary on the location of the tree. Staking is a temporary measure to allow the trunk to develop strength. Stakes and ties should only stay on the newly planted tree for 1-2 years. Any longer could damage and weaken the tree.

Chapter 5.4
Tree Maintenance Guidelines

Tree maintenance is characterized as the pruning, watering, pest prevention, and monitoring of the urban forest population. The City's Maintenance Team and contract arborist firm provide all the pruning, watering, pest prevention, and monitoring needs required to sustain a healthy and protected urban forest in Morgan Hill. Maintenance is routinely performed on a seven-year cycle to ensure all city-owned trees are performing properly, increasing their longevity, reducing premature failures, and maximizing their benefits. As Morgan Hill grows as a community, it is critical to enhance all tree maintenance needs to promote best management practices as stated in the International Society of Arboriculture (ISA) Industry. Therefore, tree care education will be a part of the holistic approach to urban management the City will promote. Actively providing care and maintenance creates a long stream of benefits for people and trees in the community therefore, this chapter will encourage the industry's best maintenance practices for private residents of Morgan Hill and City staff. The following are specific maintenance needs that will benefit Morgan Hill's urban forest:.

Tree Pruning Goals

Morgan Hill currently has 9,459 street and park trees that are maintained by the City, which only accounts for about 1% of the urban forest population. On the current seven-year cycle, approximately 1,350 trees are pruned annually. Large trees are the most significant component of Morgan Hill's urban forest. They form the umbrella over streets and create the backbone of the urban form. Tree care, which substantially relies on pruning of established trees is the costliest maintenance element in the budget but is a priority because of the importance for safety and tree health. In all cities, consequences associated with the lack of pruning are more immediate for large trees than smaller trees, therefore establishing corrective pruning practices are fundamental to the development of a healthy urban forest and safe community. Ways to promote pruning processes in Morgan Hill include:

- **Increasing City Pruning Cycles:** Healthy trees contribute to Morgan Hill's environmental health and quality of life. Trees pruned on a regular, frequent cycle are healthier, live longer, reduce conflicts with urban infrastructure, and increase safety. Regular programmed maintenance is more cost effective than daily work orders, as pruning trees based on work requests requires additional travel time, set up time, and break down of equipment several times throughout the day. The seven year grid pruning cycle the City of Morgan Hill currently contracts to a professional arborist firm has been a sufficient starting point for the City, but striving to increase the cycle to every five years when feasible will result in optimal use of the pruning and trimming budget as more plantings take place. Increasing pruning cycles will also mitigate problems associated with declining tree health and risk and emergency maintenance.

- **Enforcing Pruning Policies:** As stated in the Municipal Code section 12.32.030, it is unlawful to prune a tree and reduce the canopy area by more than twenty-five percent without a permit from the Development Services Department on both public and private land. This policy is not often known by the community or enforced. Therefore, enforcement and established pruning policies will be a goal of the City.

  Implementation Action 5.4-A: Establish an Anti-Topping Ordinance that will penalize violators who severely cut back limbs to stubs larger than three inches in diameter within the tree's crown to such a degree so as to remove the normal canopy and disfigure the tree.

- **Creating Pruning Education:** There are various types of tree pruning techniques to utilize based on the type of species, age, and location of a tree. There is a need for more outreach pertaining to pruning practices, cycles, and times to avoid pruning in order to protect wildlife migration patterns and the wellbeing of a tree. Providing the community resources, workshops, and education regarding appropriate pruning techniques and cycles will be utilized on the City's website as well as promoted by the Urban Forest Internship Program.

Irrigation Opportunities

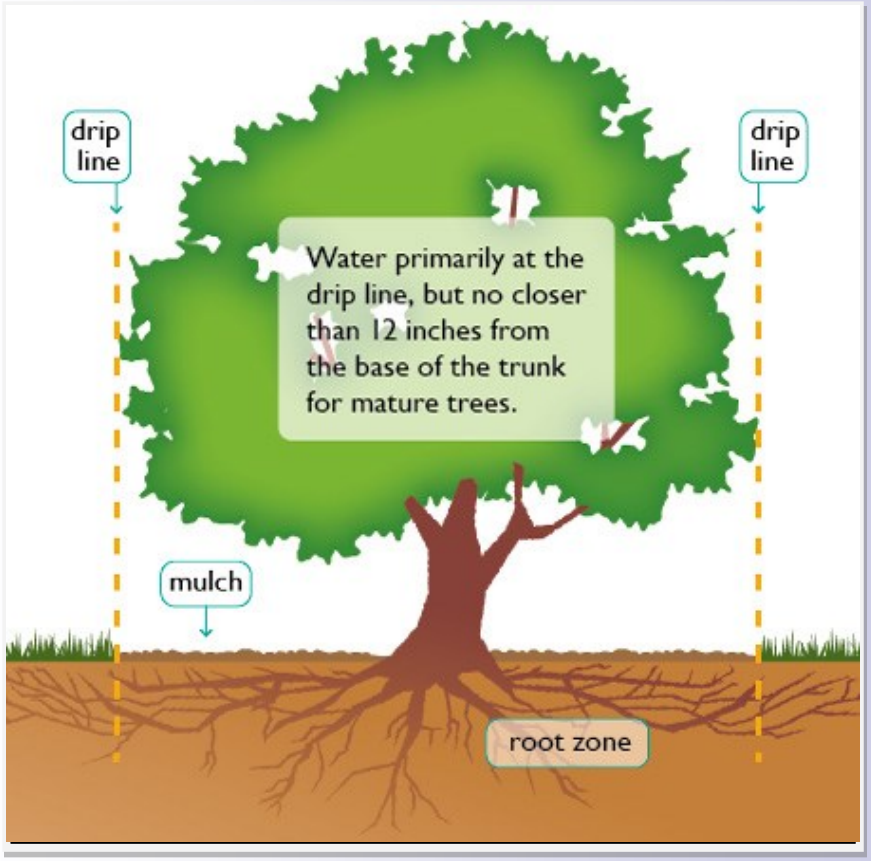
The need for water conservation is incontrovertible and the Plan envisions an urban forest that is more climate adapted with a much smaller proportion of trees being vulnerable to water constraints. The transition to a more climate adapted urban forest will be accomplished through management programs that emphasize the planting of drought tolerant species as well as programs for guiding other benefit-rich species to adapt to local conditions in Morgan Hill. Studies have shown the onset of drought stress trees endure causes species to become more susceptible to pests and various diseases that are detrimental to the state of the urban forest. The following are ways the City will encourage best water management practices and water conservation:

- **Enforcing Water Conservation Regulations:** The governor of California issued Executive Order B-37-16 on May 9, 2016 instructing State agencies to establish a long-term water conservation framework that enhances the resiliency of California communities against climate change and drought. The City of Morgan Hill's water conservation and supply shortage program has functioned adequately since its adoption in 2009. Although, regular evaluations to the program are necessary in order to expand and establish the permanent water conservation practices needed to best manage the City of Morgan Hill's potable water supply in the short and long-term. Changes are also important to avoid or minimize the negative effects of drought and climate change on the urban forest.

- **Exploring New Irrigation Technologies**: As water conservation measures become more prominent in the state, new irrigation technologies will continue to evolve to reduce water consumption and sufficiently water landscape in urban areas. With many thirsty tree species in Morgan Hill suffering from the effects of the recent cyclical drought, the City intends to explore the latest irrigation technologies as they arise for public trees and in new developments to reduce costs, support healthy tree growth, and promote sustainable practices.

- **Decreasing Permanent Irrigation Installations**: Some trees that are in the city require permanent irrigation systems for supplemental water. The contents of the Master Street Tree Plan list only low water-use species as trees to plant on streets, in parks and at City facilities. This list will be utilized to reduce the installation of permanent irrigation systems on public property.

- **Promoting Water Conservation Programs to Community**: The Urban Forest Internship Program will utilize the City's Environmental Services webpage to provide valuable water management education. Resources will include types of irrigation systems available, appropriate irrigation schedules, and important landscape conservation incentives by local agencies to develop drought tolerant landscapes that require very little irrigation.



Integrated Pest Management

Insect and disease problems can occur at any time subsequently requiring many cities to establish an Integrated Pest Management Plan (IPM) to ensure proactive pest prevention is utilized during maintenance and assessments. Morgan Hill's Integrated Pest Management Plan was established for all facilities, parks, streets and open spaces in Morgan Hill and revisions took place in March 2018. The City's Integrated Pest Management (IPM) goals are to align city maintenance practices in public buildings, parks, landscaped grounds, the public right-of-way and open space areas with the IPM approach to pest control. This approach uses a combination of preventive and suppressive pest control methods. IPM optimizes pest control effectiveness and reduces problems that can result from reliance on a single method. Even though the City has an established IPM to control pests and diseases once they have occurred, there are further preventative methods the City will utilize to reduce the onset of widespread disease and pest infestations. The following are effective measures to prevent uncontrolled pest and disease issues:

- **Increasing Diversity**: Urban forests are typically composed of a mix of native and nonnative 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. The current City tree inventory lists London Plane (16.9%) and Coast Live Oak (9.58%) trees as the most abundant species on streets and in parks. Diversifying the urban forest with species with similar structures will decrease the likelihood of widespread disease and pest infestations that could negatively affect one-fourth of the urban forest population in Morgan Hill. Future City tree plantings will limit the plantings of these two species.

Implementation Action 5.4-B: The City will strive to meet the 10-20-30 rule as suggested by the International Society of Arboriculture.

1. No more than 10% of any single tree species.
2. No more than 20% of species in any single tree genus.
3. No more than 30% of species in any single tree family.

- **Informing the Public**: Private residents are encouraged to contact an ISA certified arborist professional or company of their choice to assess and perform best management practices to trees when they are experiencing an insect or disease problem that is harming the species. The City's website assists private residents on Integrated Pest Management practices that can mitigate an issue before it transpires along with what tree species to choose that are more resistant to pests and disease. It is important to choose species that are vigorous and resistant pest infestations.

Integrated Pest Management Practices

Biological Controls: This method refers to the use of natural enemies such as predators, parasites, pathogens, and competitors to control pests and their damage.

Cultural Controls: This method reduces pest establishment, reproduction, dispersal, and survival. This refers to proper installation, maintenance, watering, pruning, and thinning to increase tree health and resistance.

Mechanical and Physical Controls: This method is used to kill a pest directly or make the environment unsuitable for it to survive. Physical controls include mulches for weed management, stem sterilization of the soil for disease management, or barriers such as screens to keep birds or insects out.

Chemical Control: This is a method that uses pesticides. Pesticides should only be used when needed and in combination with other approaches for more effective, long-term control and minimal harm to humans and the environment.

Tree Removals and Replacements

As trees decline in health and reach the end of their lifespan, tree removal becomes a high priority to cities because a dead tree poses serious public safety and wildfire concerns. The City's Maintenance Team typically contracts tree removals to a professional arborist firm to properly and safely remove a dead or diseased tree from a certain location. Replacement trees are planted when feasible and are typically purchased in 15-gallon container sizes. Tree removals are very costly, so taking measures to protect tree health before removals is important. The following are factors that will mitigate frequent tree removals:

- **Frequently Maintenance Diseased Trees:** Providing routine and appropriate maintenance is necessary to abate the number of removals of diseased trees. Removing a diseased tree should only occur after all proactive maintenance and care, as stated throughout this chapter, has been conducted and the final mitigation measure is to remove the tree.

- **Replacing Poorly Planted Trees**: There are many poorly planted trees throughout the City that have been removed or will need to be removed. After trees are removed, it is important to replace them with appropriate species that will not become a hazard to public safety or damage infrastructure. This will strengthen the prosperity of the urban forest and reduce future maintenance costs.

More information on tree removals and replacements can be found on page 43.

Chapter 5.5
Tree Protection
(Permits, Laws, and Outreach)

Protecting trees through policy changes is another key element to creating a sustainable Morgan Hill and enhancing the population and health of trees in the city. As many studies have proven to show that urban trees provide a multitude of benefits to the economic, social, and environmental wellbeing of cities, a shift has been made to protect species that bring visitors, businesses, and families who invest time and money into tree-lined cities.

To align with tree protection trends and policies throughout the Bay Area that foster safe and desirable cities, Morgan Hill has two major policy documents that enforce tree protection and sustainability. The two documents are the Municipal Code and General Plan, which both provide sections that incorporate policies and standards to protect existing tree species and canopy on public and private property. The related sections can be referenced in the Appendices.

Though the provisions in the two documents have protected many tree species that would have otherwise been removed or harmed without them, there continues to be a great deal of opportunity to preserve distended varieties of healthy tree species in Morgan Hill by amending established policies, recognizing historically significant trees, implementing stricter protection provisions, and creating community awareness. In an effort to enhance tree protection in Morgan Hill, the City intends to explore the following protection options:

- **Protecting Farther Species Under the Significant Tree Ordinance:** As stated in the Significant Tree Ordinance, it is unlawful for any person to cut down, remove, poison, or otherwise kill or destroy, or cause to be removed, any ordinance sized tree, street tree, or a community of trees on any city or private property without first securing a permit. An ordinance sized tree in Morgan Hill, is any single trunk tree with a circumference of forty inches or more for nonindigenous species and eighteen or more for indigenous species. The ordinance later explains that all nonindigenous species are not protected under the ordinance. Morgan Hill's Significant Tree Ordinance has limitations as to which trees are protected, however, which limits the impact and the number of trees it protects.

The primary focuses of the ordinance are protecting ordinance sized native trees, addressing tree removals, and requiring a permit for large tree related work located on public and private property in the city.

While Morgan Hill has a diverse array of species, both native and nonnative that contribute to the vibrant character of the city and community, the ordinance offers no protection to all newly planted trees, small native trees, and all nonnative species. Therefore, the City has faced challenges protecting and enforcing the removal of newly planted park strip trees, small trees in new developments, and large nonnative species that add historical value and broad canopy cover to Morgan Hill. Amending the Significant Tree Ordinance to protect a broader range of species and sizes will provide diversity, decrease removals of large healthy trees, and give the Development Services Department stricter guidelines before approving permits.

Implementation Action 5.5-A: Establish stricter removal regulations to protect a greater number of species under the Significant Tree Ordinance which include the following provisions:

1. Nonnative tree species that are climate adapted to Morgan Hill with 30 inch or greater in circumference size
2. Native tree species with 18 inch or greater circumference size
3. Require written agreement to protect young park strip trees with private resident

- **Requiring an Independent Arborist Review During Tree Removal Permit Process**: Requiring a certified, independent arborist during tree removal permits that need further assessments beyond the typical protocol will provide the Development Services Department accurate and professional reports and protect healthy species from being removed for development projects or false accusations. Private owners and developers who appeal declined tree removal permits are required to provide an arborist review that lists reasons a tree must be removed. This requirement poses two specific issues. One being not all arborist reports are conducted by certified professionals, and second, some reports are biased to the developer and not the tree the City wants to protect. Requiring a certified third party arborist will expedite time and investigative effort from the Development Services Department who determine the validity of each appeal.

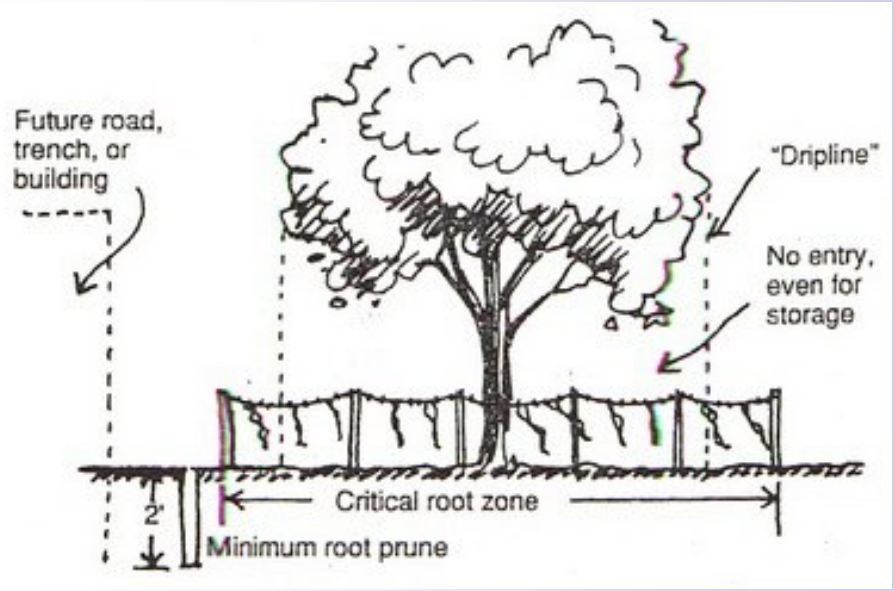
- **Including Old Growth/Heritage Trees in Ordinance**: Including an implementation action for a new ordinance that will preserve historic and community valued trees will be implemented in Morgan Hill's Municipal Code:

  Implementation Action 5.5-B: Present an ordinance to City Council, which includes the following provisions:

  1. Allows for the nomination of trees on public and private property within the City
  2. Native and nonnative tree species
  3. Meet criteria for age, size, shape, species, location, historical association, visual quality, or other contribution to the City's character
  4. Found worthy of Landmark status after public hearings
  5. Require permit for removal in developments, residential and nonresidential properties after Landmark status

- **Protecting Existing Trees During Construction**: As stated in Morgan Hill's General Plan, Action NRE-6A relating to construction activities, the City will develop a set of standard measures requiring construction activities to avoid disturbance to natural features to the extent feasible. Many times, fencing is not properly placed around the dripline during construction activities which poses a severe threat to the health of tree roots. With stricter measures to extend fencing to the dripline of a tree in place of the trunk, less stress will be constrained on the tree during construction and root destruction will be avoided. Recommended provisions will include:

  1. Plot accurate trunk location and "dripline areas" of all trees or groups of trees to be preserved within the development area.
  2. A root protection zone that shall be defined by a minimum 42" high barrier constructed around any potentially impacted tree. The barrier shall be at the drip line or at a distance from the trunk equal to 6 inches for each inch of trunk diameter 4.5 feet above the ground if this method defines a larger area senescence.
  3. Establish a tree protection zone specification for City staff to enforce and developers to follow on private and public developments with existing trees.



Tree Removals and Replacement Opportunities

The City of Morgan Hill relies on its Significant Tree Ordinance to protect the entire urban forest. As mentioned, protecting trees from unlawful removals is one of the primary focuses of the ordinance. The City will continue to evaluate policies regarding tree removals to determine the effectiveness of the ordinance, the enforcement needed to protect further species from removal, and the required number of replacement trees to plant when removals occur. Due to the high costs associated with removals, seeking opportunities to replace trees is a necessary measure for greater protection. The City departments and Urban Forest Internship program will both work together to ensure replacements of removed trees are attainable. They will do so by determining the feasible opportunities that will increase canopy cover and protect the urban forest from rapid decline after removals. The following opportunities will be considered:

- **Applying for Grants with Tree Planting Requirements:** There are a variety of federal, state, and locally funded grants that contain a tree planting component as part of the award. As stated throughout the Plan, the City has a limited budget allocated to serve the needs of the urban forest. More removals take place than replacements, therefore, applying to grants with tree planting requirements is a strategy the City and Urban Forest Internship program intend to explore each fiscal year to preserve the urban forest population and increase canopy coverage.

- **Developing a Tree Removal and Replacement Program**: Some trees have poor structures or disease and insect problems, which could be due to lack of or improper maintenance practices. A poorly structured tree is more likely to break and drop a limb with the possibility of causing damage to its surroundings. For trees that cannot be saved, a tree removal program schedules their removal and replacement over a long timeframe so that neighborhoods are not left bare.

- **Establishing a Carbon Calculator Removal and Replacement Standard:** Many cities have developed tree removal and replacement ratios as part of their standards to sufficiently replace significant trees. Though this does increase canopy, it does not mean the replacement trees will provide the same benefits. For example, an old oak tree stores copious amounts of carbon and creates a considerable amount of shade. If this tree is replaced by several small trees such as crape myrtles, the same benefits will never be met. Therefore, the City with the help of the Urban Forestry Intern, will utilize a selected carbon greenhouse gas calculator to determine the number of trees that will sufficiently replace an old tree based on carbon calculations. The development of this standard will provide the City with the most accurate replacement calculations when mature or diseased trees in the urban forest are removed.

- **Creating a City Tree Fund**: As trees are removed and development transpires, residents and the City are finding the difficulties in replacing a single large tree with enough young trees to produce the same benefits due to limited space. If a large tree is removed on private property, not often does the private property owner have a sufficient amount of space to replace it with several 15-gallon trees. With the creation of a City Tree Fund, private property owners can replace removed trees with a portion of the trees their property can sustain. Then the property owner will pay the remaining balance of the 15-gallon trees needed to replace the old one into a City Tree Fund. Those funds will then be used by the City's Maintenance Team to plant the remaining trees in suitable locations throughout the City and support growth of the urban forest.

- **Endorsing the Adopt a Park Program**: The Adopt a Park Program supports Morgan Hill's parks, trails, and streets and supports maintenance activities that beautify public spaces in Morgan Hill. Part of the Adopt a Park Program allows members of the community to become sponsors of a tree by giving donations toward the City's program to plant a new tree or maintain an existing tree dedicated to a family or business for a predetermined term. The donations given are used to maintain the newly planted tree or existing tree of the sponsor's choice. Frequently endorsing this program to the public will increase opportunities to replace trees that were removed and protect existing species that are sponsored from removal.

Public Outreach and Education Initiatives

Throughout the Plan, education and outreach has been continuously mentioned as important goals and opportunities for the City and Urban Forest Internship program to take advantage of. In order for the urban forest to prosper, the entire population of Morgan Hill must be aware of the unique role trees play in the city. When City officials and communities are aware of the importance of trees, more regulations, development designs, and tree plantings take place instead of removals and limited planting space for trees.

Public outreach and education will provide the community with better opportunities to learn about the benefits of trees and help encourage planting the right tree in the right place. Trees should not be looked at as a temporary amenity to the city, but as a long-term investment that will produce a multitude of ecological, social, and economic prosperity. Thus, reaching the public and providing education and volunteer opportunities will be a primary role the City's Urban Forest Internship program will address to gain community support for trees. The following are outreach and education opportunities the City and Urban Forest Internship program will utilize to promote urban forestry:

- **Utilizing School and Club Programs**: There are many schools and clubs in Morgan Hill that promote conservation by requiring volunteer hours to graduate school or reach a promotional goal in their club. The City will utilize these programs and provide volunteer opportunities for students and club members to plant, care, and monitor trees in Morgan Hill. Examples: Boy Scouts, Girl Scouts, Eagle Scouts, K-12 programs.

- **Developing School Programs**: Partnering with K-12 science programs and teachers to develop comprehensive school programs within the City that provide urban forest education and interactive activities will protect more trees in the future by connecting younger generations with nature, wildlife, and trees that support ecosystem diversity.

- **Utilizing Annual Environmental and City Events**: The City celebrates annual events such as Earth Day and National Night Out, which draw in many members of the public. A tree-related booth will be a part of these events and will display interactive activities for children and adults as well as provide information for future volunteer opportunities.

- **Promoting Agency Resources and Brochures**: The Urban Forest Intern will work with agencies offering urban forestry and tree-related brochures to promote at City events and public facilities. The City in conjunction with local and state agencies will bring awareness to the public regarding the needs of the urban forest and project an unified mission to protect and care for trees.

- **Promoting Volunteer Opportunities on Social Media Platforms**: The City runs an Environmental Services Facebook page, Instagram, and Twitter account to advertise important volunteer opportunities, workshops, and educational videos and posts. The City will use these platforms as well as City facility monitors to display upcoming events and educational opportunities.

- **Monitoring the Urban Forest with Volunteer Support:** Coordinating City volunteer events to monitor tree health, provide basic care when needed, encourage public participation, and promote stewardship activates will protect far greater city-owned trees from declining and connect people of all ages to trees in Morgan Hill.

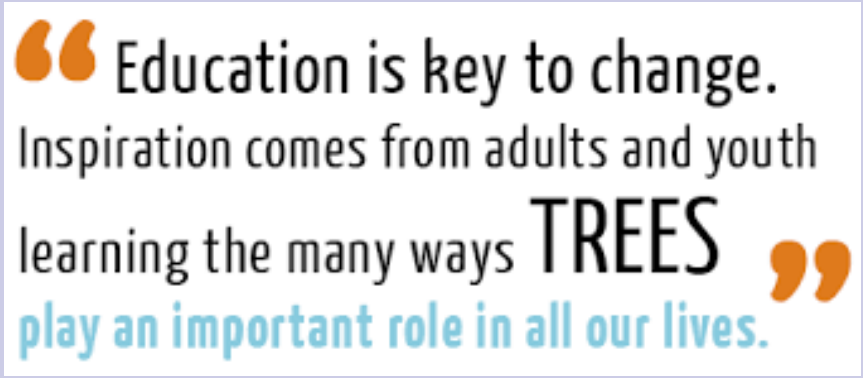
- **Becoming a Tree City USA:** The City will become a Tree City USA through the Arbor Day Foundation to establish Morgan Hill's pledge to care for trees and promote future plantings. The City will choose a day to celebrate Arbor Day and utilize that day to promote tree education. This recognition will be applied for annually by the Urban Forest Intern to keep the Tree City USA status for Morgan Hill.

- **Partnering with Morgan Hill Businesses:** Partnering with businesses leaders will increase awareness of the benefits trees provide to business districts and minimize damage to parking lot trees. The Urban Forest Intern will supplement businesses by helping to revive older, blighted retail districts through landscape rebates and incentives offered by local and state agencies.

- **Partnering with Local Utility Company:** The City will consider partnering with the local utility company to create an incentive program for residents that plant trees for energy reduction.

Opportunities for Public Outreach and Education

- Trees Are Good Brochure
- Right Tree in Right Place website page
- City summer camps programs
- Rotary Club and Kiwanis Club involvement
- Arbor Day attendance
- Earth Day attendance
- Informational Websites:
  - Our City Forest
  - Friends of the Urban Forest
  - SelecTree
  - Canopy
  - 4Hmilliontrees
  - California Urban Forest Council
  - California Native Plant Society
  - Santa Clara Valley Audubon Society



Chapter 5.6
Risk Management

As trees age and increase in size the more likely they are to shed branches and limbs or develop conditions that can increase the likelihood of failure. While it is impossible to entirely avoid the risk of trees in an urban environment; it is possible to minimize the risk through sound planting, routine inspection and maintenance, and a proper risk management protocol. The risk management protocol should focus on the prevention and correction of high risk defects, and provide a written systematic procedure for inspecting and evaluating potentially high risk trees, and implementing corrective actions as outlined in the current industry standards. This should also include training and certification for key staff in the International Society of Arboriculture Tree Risk Assessment Qualification when feasible.

The City of Morgan Hill relies on the managing professional arborist firm contracted to address tree risk on streets, in parks, City facilities, and other public spaces. They follow industry standards by preforming three assessments on trees to determine if their potential hazard rating is low, moderate, or high. Trees with high-risk ratings are most often slated for removal, whereas a tree with a moderate risk rating warrants extra attention from managing parties to reduce liabilities and ensure public safety. Time is the ultimate modifier for all risk in trees, and even low-risk trees should be inspected periodically and regularly maintained to reduce the likelihood of potentially costly or tragic incidents. The following will improve risk management in Morgan Hill:

- **Developing a Mitigation Program**: Developing a City mitigation program for tree risk will ensure that proactive assessments and safety precautions are taken throughout the City. The program and assessments can be based on criteria developed by the International Society of Arboriculture. Such assessments take into account factors including history of tree failure, topography, soil conditions, tree foliage, vigor and possible defects, crown size, wind exposure, and conditions of roots. A mitigation program will increase the City's chances of preserving the livelihood individual and groupings of trees in the urban forest and ensuring public safety around such trees.

Emergency Management

Severe weather can result in a significant number of tree emergencies in a short period of time and cause an overload in the capacity to respond to these emergencies by City staff. The Maintenance Department addresses tree emergencies in the right-of-way and in parks. The department typically handles emergencies with in-house crews during business hours and prompts contract crews when the demand exceeds their capacity and is outside of business hours. In extreme events, they will mutually aide each other as resources permit. Along with the current procedures, the City will benefit from the following:

- **Establishing a City Storm and Wildfire Emergency Protocol**: A storm and wildfire emergency protocol should be developed that outlines the roles of each department and their jurisdiction. It should include how urban forestry will fit within City emergency protocols, clearly define the priorities and process for forestry response, identify a method for routine reporting to monitor the event, and address the Federal Emergency Management Agency (FEMA) documentation criteria for reimbursement.

- **Training Staff for Emergency Responses**: Regularly training City staff responsible for tree related emergencies is an element the City will implement when resources are available to ensure effective and safe measures are taken when dealing with tree related emergencies.

Tree Emergency Priorities

1. Life and Safety (e.g., trees on occupied homes and cars, trees blocking roads)
2. Property Preservation (e.g., trees on homes and trees on cars)
3. Quality of Life (e.g., trees down on streets & sidewalks and in parks)

Chapter 5.7
Financing the Urban Forestry Program

Options for Funding

An enhanced funding strategy would be useful if additional tree plantings and ongoing maintenance are to occur in Morgan Hill. As is true for many areas, identifying and securing consistent funding is a challenge for the City. If the goals of this plan are to be met, additional and consistent funding for a higher standard of care and management for trees in Morgan Hill will need to be identified. Various options include:

- **Increasing Annual Maintenance Funding for the Management and Care of City Trees**: the City currently supports the maintenance of public trees with funding from the City's General Fund. Competition for these funds is very strong as the same pool of funds is used to support public safety, street maintenance, and all building maintenance in the City. Nonetheless, as the failure to properly maintain publicly-owned trees can cost the City money if the trees cause damage, it is expected that General Fund support for tree maintenance will continue and possibly be increased if resources allow.
- **Developing Public-Private Partnerships to Address Tree Resource Needs**: Establishing stewardship agreements to maintain public trees adjacent to private property will increase funds allocated to the urban forest by decreasing the amount of time City staff allocate to removing or treating park strip trees
- **Identifying and Obtaining External Sources of Funding to Support the Goals and Strategies of the Management Plan**: Typically, tree planting grants are fairly accessible to municipalities. Obtaining external funds from the numerous state and federal programs supporting urban forestry will be explored annually by the urban forest intern. Other funding sources include:
    - Grants: CAL FIRE, CAL EPA, CA Natural Resources Agency, Caltrans, Strategic Growth Council– Affordable Housing & Sustainable Communities
    - Donations for tree adoption
    - Tree bank
    - Foundation established for planting trees
    - Establish an Urban Forestry Internship Program
    - Social media for volunteer groups

- **Enhancing City Investment In Health and Management of the Urban Forest:** Public resources to plant and maintain trees have not kept pace with tree maintenance needs to ensure a healthy urban forest and cannot support expanding programs. Increased funding will be an important first step as the City seeks to increase its level of tree service. Further, dedicated funding is not allocated for community outreach and public education, yet nearly 80 percent of the urban forest lies on private property. Long-term urban forest health will require programs that integrate the community. Establishing funding for programs and resources will drive the development of urban forest education. The City will continue to seek funds from grants and other sources to further Plan Objectives.

  Implementation Actions 5.7-A:
  1. Consider an increase annual maintenance funding for the management and care of City trees.
  2. Establish an annual capital improvement program to plant and maintain new trees.
  3. Establish funding for community outreach programs and public education resources.
  4. Develop public-private partnerships to address tree resource needs.
  5. Identify and obtain external sources of funding to support the goals and strategies of the Management Plan.
  6. Evaluate the feasibility of a Street Tree/Parkway Management Assessment District to fund street tree maintenance.

Chapter 5.8
Plan Administration

Short-Term Goals

The following are short-term goals the City of Morgan Hill will address throughout the course of the 40-year Urban Forest Management Plan. These goals have been set by City staff from the Community Services Department and community members from the Urban Forest Advisory Group. These goals may change over the 40-year period, thus revising the terms every ten years will be part of maintaining a proactive Urban Forest Management Plan in Morgan Hill.

Short-Term Goal 1: Maintain and update the public street tree inventory.

- **Action A:** Update GIS tree inventory on an ongoing basis to reflect plantings, removals and maintenance.
- **Action B:** Expand the current street tree inventory to include all city maintained street trees and plantable spaces.
- **Action C:** Conduct a complete street tree inventory every 10 years.

Short-Term Goal 2: Maintain and update the public canopy data

- **Action A:** Update i-Tree data or use similar data system every 5 years to track canopy cover progressions.
- **Action B:** Analyze the data and determine if goals are being met.

Short-Term Goal 3: Create an Urban Forest Internship Program to manage and update arboriculture practices.

- **Action A:** Create a position for, and hire, a voluntary intern to coordinate and oversee all tree-related activities and best management practices as outlined in the Urban Forest Master Plan.
- **Action B:** Update and revise elements of the Plan when policies and funding have changed.

Short-Term Goal 4: Maintain the Master Tree Plan of suitable trees to be recommended in future plantings.

- **Action A:** Revise the list of recommended street trees every five years to reflect the successes and failures of the existing street tree population.

Short-Term Goal 5: Continue to encourage and maintain a balance between tree-lined streets and safe utility and transportation corridors

- **Action A:** Provide and encourage effective coordination and compliance with applicable design and development standards for each type of land use or street type associated with the establishment and maintenance of public trees.

Short-Term Goal 6: Encourage and maintain a balance between tree-lined streets and safe utility and transportation corridors.

- **Action A:** Provide improved guidelines and standards for utility design, which will coexist with established and future tree plantings.
- **Action B:** Trees shall be planted and maintained in locations where street trees do not conflict with standards for sight distance triangles and traffic sign placement.

Short-Term Goal 7: Develop a public tree ordinance that presents planting and maintenance standards for all street trees within public right of way.

- **Action A:** Encourage continual input from the public and from City departments with regard to street tree standards and procedures associated with the planting, removal, and maintenance of public street trees.
- **Action B:** Review and update procedures, and standards for establishing and maintaining the City's street trees.

Long-Term Goals

The following are long-term goals the City of Morgan Hill will address throughout the course of the 40-year Urban Forest Management Plan.

Long-Term Goal 1: Sustain and expand a healthy urban forest that benefits the community with improved safety, air quality, erosion control, storm water retention, temperature reduction, and aesthetics, while also enhancing wildlife resources.

- **Action A:** Fill in all available planting spaces for an increase in the street tree population within the next 25 years. Based on available funding plant tree species appropriate for the location by using the planting palettes and tree matrix in this Master Street Tree Plan (MSTP). The city would need to aim to plant 200 street trees a year in order to meet this goal.
- **Action B:** Mitigate all hazardous street trees by following the tree maintenance and removal guidelines in this MSTP.

Long-Term Goal 2: Work toward no net loss of the overall community urban forest over; in the long term, to work toward measurable gain.

- **Action A:** Mitigate the net loss of healthy forest canopy cover on publicly owned lands. In the long term, the City will achieve measurable gain with consideration of species performance, practicality, and maintenance requirements.

Long-Term Goal 3: Discourage the unnecessary removal of existing healthy trees in the design, construction, or reconstruction of street projects, and other property development.

- **Action A:** Develop tree planting, and removal standards.
- **Action B:** Removal of trees in unavoidable construction condition to be approved only by Development Services Director.

Long-Term Goal 4: Shift from a reactive, hazard-based maintenance program to a proactive, cyclic maintenance program.

- **Action A:** Continue to expand support for the street tree program and maintenance crew.
- **Action B:** Maintain city street trees on a five-year cycle, using the City's existing maintenance zones. New plantings should be addressed until established.

Long-Term Goal 5: Establish funding mechanisms for the expansion and sustainability of the City's street tree program.

- **Action A:** Allocate funds and research alternative funding sources to ensure the sustainability of the street tree maintenance program.
- **Action B:** Create incentives for property owners to share in the cost of planting street trees in front of their property.

Annual Work Plan

Objective	Annual Work Plan
Inventory	1. Records of the following tree related work will be kept as it occurs by staff and contractors, and the tree inventory updated with the following information weekly: a. Pruning shade trees b. Removal c. Root Pruning d. Infrastructure damage e. Disease and insect damage/treatment f. Others 2. Urban Forest Intern will compare updated inventory data annually to monitor and assess progress towards age and species diversity. 3. Urban Forest Intern will track from inventory data the age and species of each tree removed and planted. 4. Urban Forest Intern will track all vacant locations suitable for tree planting
Canopy	1. Urban Forest Intern will conduct an aerial study of the urban tree canopy every five years using i-Tree or a similar application. 2. Urban Forest Intern will oversee coordination of tree planting and recommendations for increasing the urban tree canopy assessment.
Tree Planting	1. City staff or other designee will spot-check all trees planted by in-house staff, contractors, or developers for compliance. 2. Contract Arborist will submit semiannual reports to the Urban Forest Intern that contain the number of trees inspected, number of species accepted, and the number of specimens rejected 3. City staff or other designee will spot-check tree planting areas to assess adequacy of soil and physical planting conditions. 4. Urban Forest Intern will track locations suitable for tree planting from inventories and community plans
Young Tree Maintenance	1. Inspect young trees every six months for the first four years after planting. 2. City staff and Urban Forest Intern will annually review the six-month inspections of young trees.

Objective	Annual Work Plan
Mature Tree Maintenance	1. Contract Arborist will maintain database on the number of completed tree failures and limb drops, species, approximate age, when last pruned, the probable cause of failure, and share findings with City staff and Urban Forest Intern 2. Urban Forest Intern will meet annually with the Contract Arborist and City staff to determine if the current tree-pruning program is reducing the number of failures.
Tree Removal and Replacement	City staff and Contract Arborist will track progress of the tree removal and replacement over 40-year period and review annually with the Urban Forest Intern
Urban Forest Master Tree Plan	1. Urban Forest Intern will renew and update Master Tree Plan every ten years.
Enforcement	1. Urban Forest Intern and City staff will assess effectiveness of Code Enforcement of illegal activity regarding public trees.
Community Outreach	1. Urban Forest Intern will use public surveys to assess public awareness, attitudes, and actions resulting from public education programs. 2. Urban Forest Intern will manage and update the City's Urban Forest webpage. 3. Urban Forest Intern will utilize public and environmental events and social media platforms to promote tree education and volunteer events.

Chapter 6
Appendices

Appendix A
Significant Tree Ordinance

Definitions

"Ordinance Sized Tree" means any live woody plant rising above the ground with a single stem or trunk of a circumference of forty inches or more for nonindigenous species and eighteen inches or more for indigenous species measured at four and one-half feet vertically above the ground or immediately below the lowest branch, whichever is lower, and having the inherent capacity of naturally producing one main axis continuing to grow more vigorously than the lateral axes. All commercial tree farms, nonindigenous tree species in residential zones and orchards (including individual fruit trees) are exempted from the definition of tree for the purpose of this chapter.

"Street Tree" is a tree, of any size, situated within the public street right-of-way or publicly accessible private street (e.g., trees within a landscape park strip), or within five feet of a publicly accessible sidewalk adjacent to a public or private street in the case of a street without a landscape park strip.

"Indigenous tree" means any tree which is native to the Morgan Hill region. Such trees include, oaks (all types), California Bays, Madrones, Sycamore, and Alder.

12.32.030 - Permit—Required.

It is unlawful for any person to cut down, remove, poison, or otherwise kill or destroy, or cause to be removed, any ordinance sized tree, street tree, or a community of trees on any city or private property without first securing a permit as provided in this chapter; provided, however, that a permit shall not be required for the following:

A. Developments which have been reviewed and approved by the planning commission or community development director and the tree removal conforms with the landscape plans of those developments.

B. Commercial tree farms.

C. Non-indigenous trees within a single-family residential zoning district that do not qualify as street trees.

A permit shall otherwise be required for the removal of or pruning of which would reduce the canopy area by more than twenty-five percent of any trees as defined in subsection G. of Section 12.32.020 of this chapter.

(Ord. No. 2205 N.S., § 1, 6-15-2016)

12.32.040 - Permit—Application.

Any person desiring to cut down, remove, destroy, or cause to be removed any tree regulated in this chapter shall apply to the community development department for a tree cutting permit on forms provided by the department. The application shall be accompanied by such drawings, written material, photographs, and other information as are necessary to provide necessary data concerning trees within the affected area and which shall include:

A. The diameter and height of the tree;

B. The type of trees (e.g. coniferous, evergreen hardwood and deciduous hardwood);

C. A map or accurate sketch of location and trees proposed to be cut (showing other significant trees, shrubs, buildings or proposed buildings; photographs may be used to show the area);

D. Method for marking the tree proposed to be cut down, removed, or destroyed;

E. Description of method to be used in removing the tree;

F. Description of tree planting or replacement program;

G. Reasons for proposing removal of the tree;

H. Address where tree is located;

I. General health of tree to be cut down or removed; and

J. Other pertinent information which the community development director may require.

(Ord. No. 2205 N.S., § 1, 6-15-2016)

12.32.050 - Permit—Public notice procedures.

Within five days after submission of a completed application, the applicant shall cause a notice of application on a form provided by the community development department to be posted in at least two conspicuous locations clearly visible to the public on or close to the property affected, indicating the date of the application, a brief description thereof, identification of the subject property, the address to which comments may be directed and from which further information may be obtained, and the final date for receipt of comments. No action shall be taken upon any application until the applicant has filed an affidavit that such posting has been done.
(Ord. No. 2205 N.S., § 1, 6-15-2016)

12.32.060 - Permit—Review and action.

The community development director or his or her designee shall review the application and, if necessary, inspect the site, and shall determine on the basis of the information provided, the site inspection, and the criteria contained in this chapter whether to grant, grant with conditions, or deny the permit. Such action shall be taken within twenty days after receipt of the affidavit referred to in the preceding section. Upon taking action, the community development director or his or her designee shall provide the applicant with a written statement indicating the action taken, any conditions imposed, and the findings made in support thereof.
(Ord. No. 2205 N.S., § 1, 6-15-2016)

12.32.070 - Permit—Approval—Criteria.

The community development director or any other person or body charged with determining whether to grant, conditionally grant, or deny a tree cutting permit may approve a permit only if one or more of the following findings are made:

A. Removal of the tree is warranted because the tree meets one of the following conditions:

- Is diseased as demonstrated in a report provided by a qualified arborist or tree surgeon documenting the extent and nature of the disease and how the diseased conditions warrants the trees removal,
- Could adversely affect the general public health and safety,
- Could cause substantial damage,
- Is a public nuisance,
- Is in danger of falling,
- Is too closely located to existing structures,
- All practical design alternatives for site layout have been exhausted without being able to design around the tree(s), etc.
- Interferes with utility service,
- Acts as a host for a plant which is parasitic to another species of tree which is in danger of being infested or exterminated by the parasite,
- Is a substantial fire hazard,
- Is necessary for the continuing agricultural use of the property, or
- Is a street tree that is not identified on a list of suitable street trees maintained by the community development director.

B. The required action is necessary:

To utilize the property in a manner which is of greater public value than any environmental degradation caused by the action, or

To allow reasonable economic or other enjoyment of the property.

C. The tree will be replaced by plantings approved by the community development director, unless special conditions indicate otherwise.
(Ord. No. 2205 N.S., § 1, 6-15-2016)

Appendix B
General Plan Policies

Policy NRE-6.4 Tree Preservation and Protection. Preserve and protect mature, healthy trees whenever feasible, particularly native trees, historically significant trees, and other trees which are of significant size or of significant aesthetic value to the immediate vicinity or to the community as a whole.

Action NRE-6.A Standard Measures for Construction Activities. Develop a set of standard measures requiring construction activities to avoid disturbance to natural features to the extent feasible.

Policy NRE-6.5 Soil and Erosion. Require development to be designed to conserve soil and avoid erosion. (South County Joint Area Plan 13.06)

Policy NRE-6.6 Use of Native Plants. Encourage use of native plants, especially drought-resistant species, in landscaping.

Policy NRE-6.7 Habitat Protection and Enhancement. Encourage the protection, restoration, and enhancement of remaining native grasslands, oak woodlands, marshlands, and riparian habitat.

Action NRE-7.B Drought-Tolerant Landscaping. Develop local ordinances that require new commercial and industrial development to use only drought-tolerant landscaping and that increase the use of drought-tolerant landscaping in new residential development.

Policy NRE-11.6 Vegetation Buffers. Encourage the use of pollution-absorbing trees and vegetation in buffer areas between substantial sources of toxic air contaminants and sensitive receptors.

Policy NRE-15.9 Urban Forest. Support development and maintenance of a healthy, vibrant urban forest through outreach, incentives, and strategic leadership.

Policy NRE-16.6 Landscaping for Energy Conservation. Encourage landscaping plans for new development to address the planting of trees and shrubs that will provide shade to reduce the need for cooling systems and allow for winter daylighting.

Policy SSI-3.5 Fire Risks. Work cooperatively with CAL FIRE and other public agencies with responsibility for fire protection to reduce fire risks in Morgan Hill.

Appendix C
Urban Forestry Internship Program (Lorax Position)

Updating Tree Related Records: Record keeping provides the foundation to monitor and apply appropriate tree care in the urban forest. The urban forestry internship program will require the appointed staff member to frequently update tree related records pertaining to canopy cover, tree inventory, and tree care of the city-owned and maintained urban forest. They will be in close coordination with the contract arborists crews performing the majority of tree care to street and park trees. This job duty will alleviate inventory responsibilities from the Maintenance Department while keeping all tree analyses up-to-date and accurate.

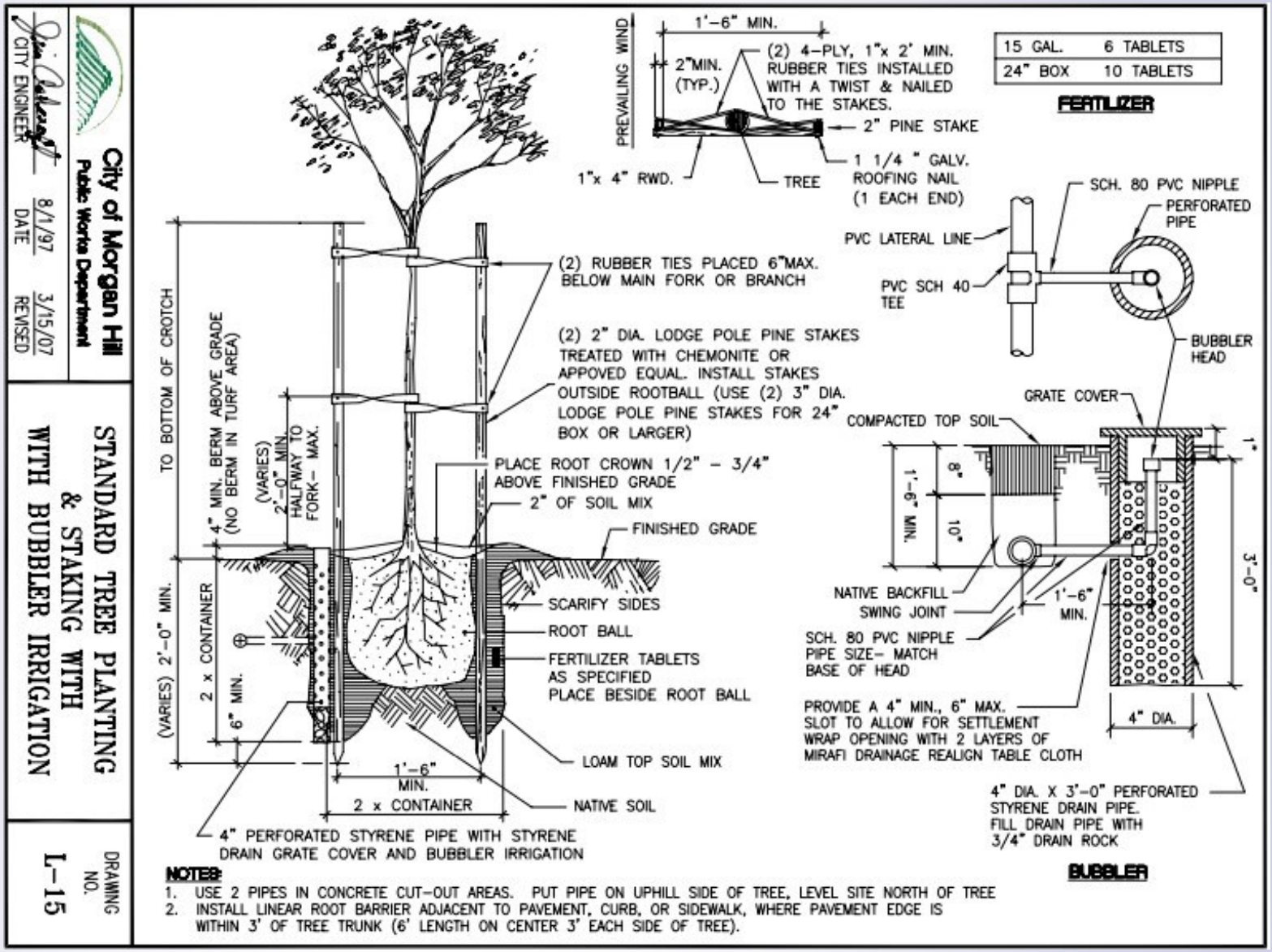
Promoting Tree Care Education: Promoting tree care education will be another primary duty the urban forestry intern will adhere. Tree care education is a crucial factor to growing healthy trees that will benefit the community, increase revenue, and add stability to valuable ecosystems in Morgan Hill. Communities who have access to frequent tree care information and resources gain more appreciation for the urban forest around them and care for their own trees in the right way.

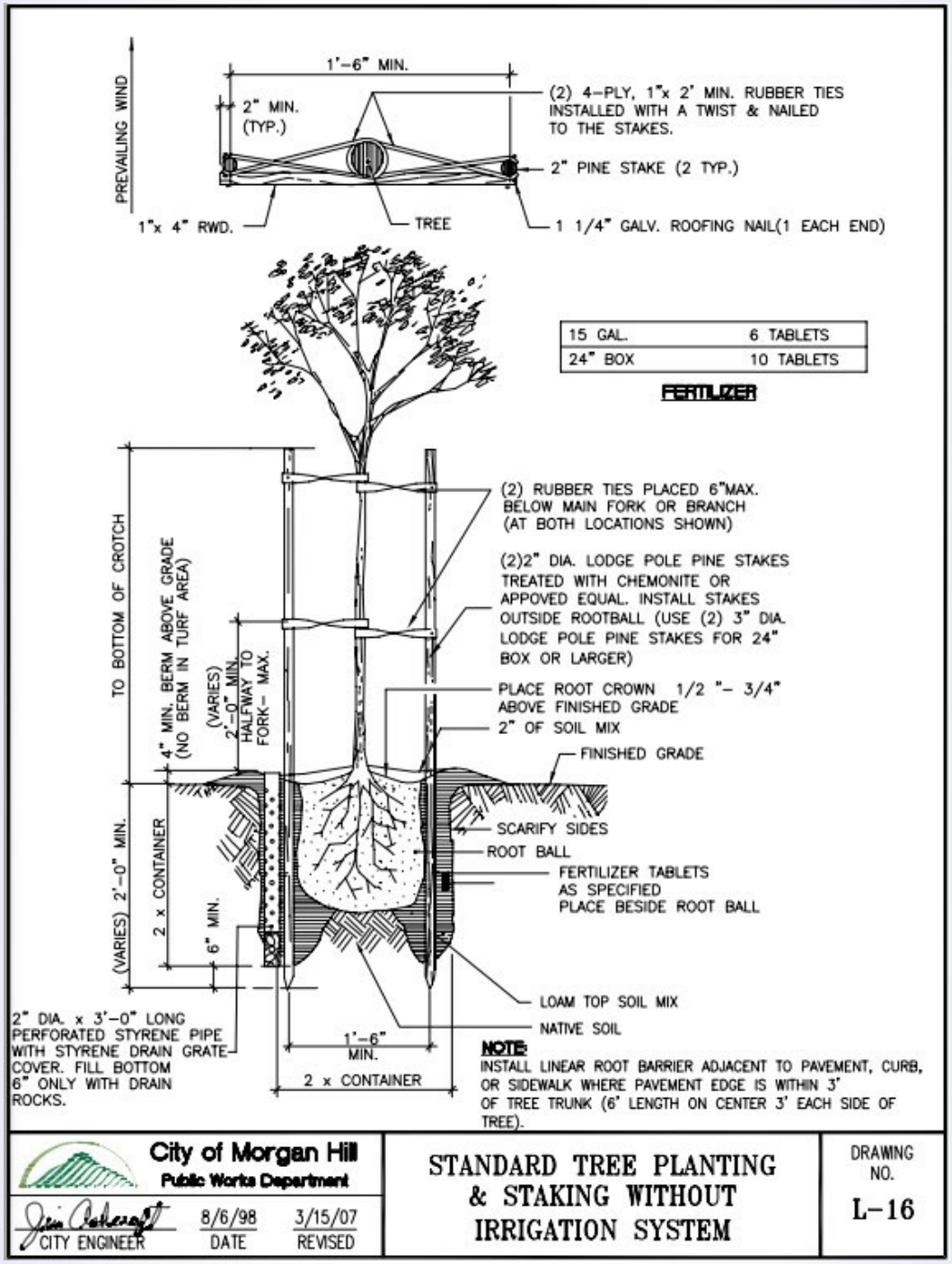
Gaining Volunteer Tree Care Support: Gaining volunteer support is integral to sustain healthy urban forests since most trees in cities are owned and maintained by residents and private businesses. Volunteers raise awareness, promote tree care policies and procedures, and bring residents, businesses, and local officials together. Volunteer support from the community in regard to tree care and education will be an element of the urban forestry internship program. The urban forestry intern will maintain various media platforms for community members to become active tree care supporters, organize volunteer activities, and educate the community in Morgan Hill on new and existing policies for tree care.

Appendix D
Tree Planting Specifications

Specifications for tree planting with stakes and bubbler irrigation shown to the right and continues on page 59.

To learn more visit Morgan Hill's [Tree Planting Specification]



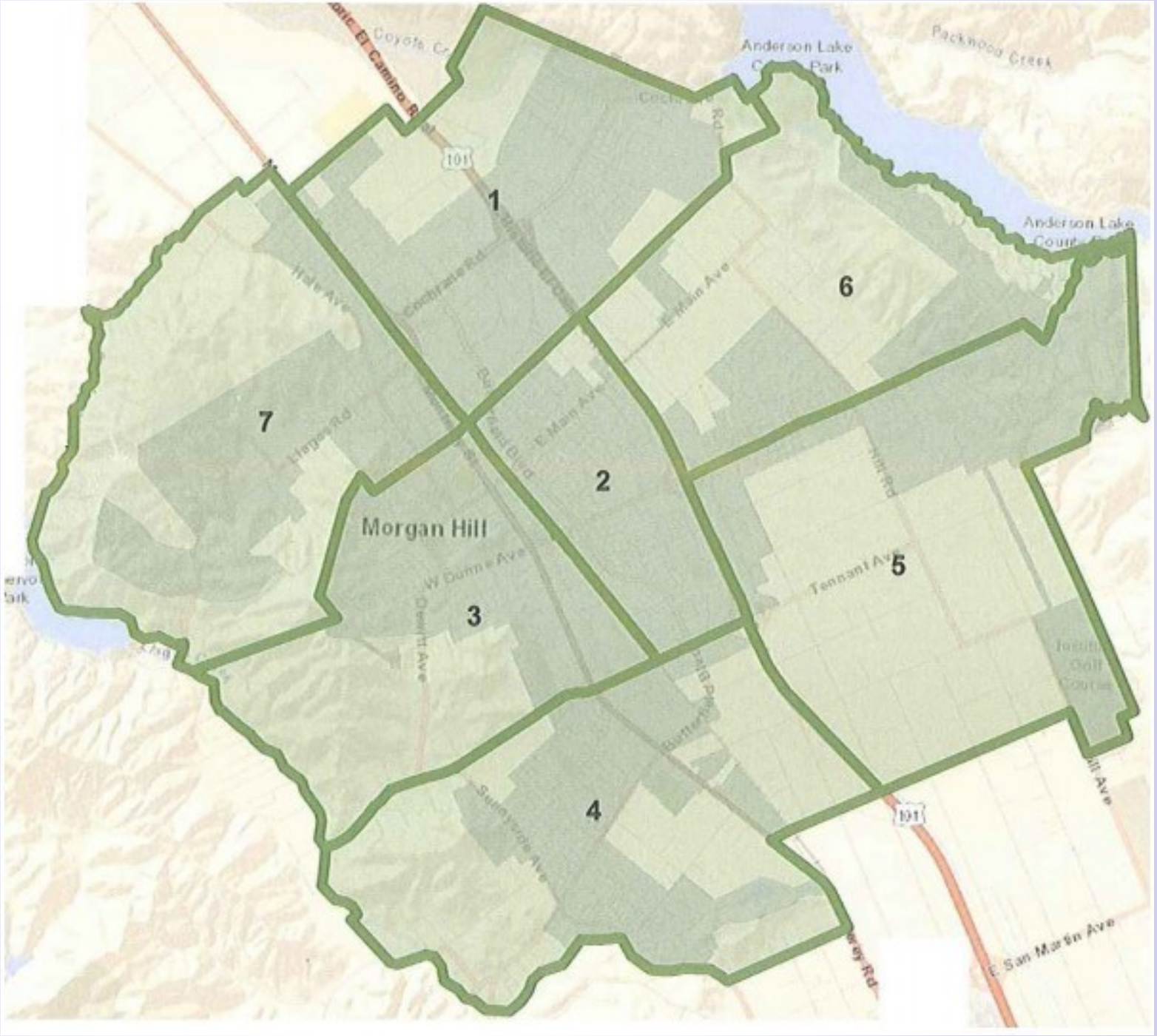

PREVAILING WIND
1'-6" MIN.
2" MIN. (TYP.)
(2) 4-PLY, 1"x 2' MIN. RUBBER TIES INSTALLED WITH A TWIST & NAILED TO THE STAKES.
2" PINE STAKE (2 TYP.)
1"x 4" RWD.
TREE
1 1/4" GALV. ROOFING NAIL(1 EACH END)
15 GAL. 6 TABLETS
24" BOX 10 TABLETS
FERTILIZER
(2) RUBBER TIES PLACED 6"MAX. BELOW MAIN FORK OR BRANCH (AT BOTH LOCATIONS SHOWN)
(2)2" DIA. LODGE POLE PINE STAKES TREATED WITH CHEMONITE OR APPOVED EQUAL. INSTALL STAKES OUTSIDE ROOTBALL (USE (2) 3" DIA. LODGE POLE PINE STAKES FOR 24" BOX OR LARGER)
PLACE ROOT CROWN 1/2 "- 3/4" ABOVE FINISHED GRADE
2" OF SOIL MIX
FINISHED GRADE
SCARIFY SIDES
ROOT BALL
FERTILIZER TABLETS AS SPECIFIED PLACE BESIDE ROOT BALL
LOAM TOP SOIL MIX
NATIVE SOIL
TO BOTTOM OF CROTCH
4" MIN. BERM ABOVE GRADE (NO BERM IN TURF AREA)
(VARIES) 2'-0" MIN. HALFWAY TO FORK- MAX.
(VARIES) 2'-0" MIN.
2 x CONTAINER
6" MIN.
2" DIA. x 3'-0" LONG PERFORATED STYRENE PIPE WITH STYRENE DRAIN GRATE COVER. FILL BOTTOM 6" ONLY WITH DRAIN ROCKS.
1'-6" MIN.
2 x CONTAINER
NOTE:
INSTALL LINEAR ROOT BARRIER ADJACENT TO PAVEMENT, CURB, OR SIDEWALK WHERE PAVEMENT EDGE IS WITHIN 3' OF TREE TRUNK (6' LENGTH ON CENTER 3' EACH SIDE OF TREE).
City of Morgan Hill
Public Works Department
CITY ENGINEER
8/6/98
DATE
3/15/07
REVISED
STANDARD TREE PLANTING & STAKING WITHOUT IRRIGATION SYSTEM
DRAWING NO.
L-16

Appendix E Master Street Tree Plan

As mentioned in Chapter 5.1, the Master Street Tree Plan is categorized into 7 zones, each with specific tree species assigned to them. Specific tree species for each zone are noted in pages 61-67.

The Master Street Tree Plan designates tree species for each public street or segments of streets throughout the City based on spacing metrics available on each site. The tree species identified in the Master Street Tree Plan are provided as the requirement for what basic species of tree shall be planted in a given location.

Additionally, tree species that are restricted can be found in the Master Street Tree Plan.



Zone 1

Zone	Size	Botanical Name	Common Name	Remarks	Foliage	Spacing
1	Planter Space 6' >	Aesculus californica	California Buckeye		Deciduous	20-30ft
		Quercus agrifolia	Coast Live Oak		Evergreen	30ft
		Quercus kelloggii	Black Oak		Deciduous	30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus suber	Cork Oak		Evergreen	30ft
		Quercus virginiana	Southern Live Oak		Evergreen/partly Deciduous	30ft
	Planter Space Between 4-6'	Acer rubrum 'Columnare'	Columnar Red Maple		Deciduous	20-30ft
		Acer x freemanii 'Jeffersed'	Autumn Blaze Red Maple		Deciduous	20-30ft
		Albizia julibrissin	Silk Tree		Deciduous	20-30ft
		Brachychiton populneus	Kurrajong	Predominant	Evergreen	20-30ft
		Celtis sinensis	Chinese Hackberry		Deciduous	20-30ft
		Ginkgo biloba	Maidenhair Tree	Males only	Deciduous	20-30ft
		Lophostemon confertus	Brisbane Box		Evergreen	20-30ft
		Ulmus parvifolia	Chinese Elm	Predominant	Evergreen/partly Deciduous	20-30ft
	Planter Space 4' <	Celtis laevigata var. reticulata	Western Hackberry		Deciduous	6-15ft
		Cercis occidentalis	Western Redbud		Deciduous	6-15ft
		Chilopsis linearis	Desert Willow		Deciduous	6-15ft
		Fraxinus dipetala	California Ash		Deciduous	6-15ft
		Heteromeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 2

2	**Planter Space 6' >**	Aesculus californica	California Buckeye		Deciduous	20-30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus suber	Cork Oak		Evergreen	30ft
	Planter Space Between 4-6'	Acer rubrum 'October Glory'	October Glory Red Maple		Deciduous	20-30ft
		Acer x freemanii 'Jeffersed'	Autumn Blaze Red Maple		Deciduous	20-30ft
		Brachychiton populneus	Kurrajong		Evergreen	20-30ft
		Lophostemon confertus	Brisbane Box		Evergreen	20-30ft
		Lyonothamnus floribundus subsp. asplenifolius	Catalina Ironwood		Evergreen	20-30ft
		Nyssa sylvatica	Sour Gum	Predominant	Deciduous	20-30ft
		Pistacia chinensis	Chinese Pistache		Deciduous	20-30ft
		Rhus lancea	African Sumac		Evergreen	20-30ft
		Ulmus parvifolia	Chinese Elm	Predominant	Evergreen/partly Deciduous	20-30ft
	Planter Space 4' <	Celtis laevigata var. reticulata	Western Hackberry		Deciduous	6-15ft
		Chilopsis linearis	Desert Willow		Deciduous	6-15ft
		Heteromeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 3

3	**Planter Space 6' >**	Casuarina cunninghamiana	River She-Oak		Evergreen	30ft
		Quercus agrifolia	Coast Live Oak		Evergreen	30ft
		Quercus douglasii	Blue Oak		Deciduous	30ft
		Quercus kelloggii	Black Oak		Deciduous	30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus wislizeni	Interior Live Oak	Predominant	Evergreen	30ft
	Planter Space Between 4-6'	Acer rubrum 'October Glory'	October Glory Red Maple	Predominant	Deciduous	20-30ft
		Arbutus 'Marina'	Marina Madrone		Evergreen	20-30ft
		Brachychiton populneus	Kurrajong		Evergreen	20-30ft
		Ginkgo biloba	Maidenhair Tree	Males only	Deciduous	20-30ft
		Lophostemon confertus	Brisbane Box		Evergreen	20-30ft
		Lyonothamnus floribundus subsp. asplenifolius	Catalina Ironwood		Evergreen	20-30ft
		Nyssa sylvatica	Sour Gum	Predominant	Deciduous	20-30ft
		Pistacia chinensis	Chinese Pistache		Deciduous	20-30ft
	Planter Space 4' <	Adenostoma sparsifolium	Red shank	Predominant	Evergreen	6-15ft
		Cercis occidentalis	Western Redbud		Deciduous	6-15ft
		Fraxinus dipetala	California Ash		Deciduous	6-15ft
		Hetermeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 4

4	**Planter Space 6' >**	Aesculus californica	California Buckeye		Deciduous	20-30ft
		Casuarina cunninghamiana	River She-Oak		Evergreen	30ft
		Laurus 'saratoga'	Saratoga Laurel		Evergreen	20-30ft
		Quercus agrifolia	Coast Live Oak		Evergreen	30ft
		Quercus ilex	Holly Oak		Evergreen	30ft
		Quercus kelloggii	Black Oak		Deciduous	30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus suber	Cork Oak		Evergreen	30ft
		Quercus virginiana	Southern Live Oak		Evergreen/partly Deciduous	30ft
	Planter Space Between 4-6'	Acer rubrum 'Columnare'	Columnar Red Maple		Deciduous	20-30ft
		Acer rubrum 'October Glory'	October Glory Red Maple	Predominant	Deciduous	20-30ft
		Acer x freemanii 'Jeffersed'	Autumn Blaze Red Maple		Deciduous	20-30ft
		Celtis sinensis	Chinese Hackberry	Predominant	Deciduous	20-30ft
		Laurus 'saratoga'	Saratoga Laurel		Evergreen	20-30ft
		Nyssa sylvatica	Sour Gum	Predominant	Deciduous	20-30ft
		Ulmus parvifolia	Chinese Elm		Evergreen/partly Deciduous	20-30ft
	Planter Space 4' <	Celtis laevigata var. reticulata	Western Hackberry		Deciduous	6-15ft
		Cercis occidentalis	Western Redbud		Deciduous	6-15ft
		Chilopsis linearis	Desert Willow		Deciduous	6-15ft
		Fraxinus dipetala	California Ash		Deciduous	6-15ft
		Hetermeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 5

5	**Planter Space 6' >**	Casuarina cunninghamiana	River She-Oak		Evergreen	25-30ft
		Quercus agrifolia	Coast Live Oak		Evergreen	25-30ft
		Quercus douglasii	Blue Oak		Deciduous	25-30ft
		Quercus kelloggii	Black Oak		Deciduous	25-30ft
		Quercus lobata	Valley Oak		Deciduous	25-30ft
		Quercus suber	Cork Oak		Evergreen	25-30ft
	Planter Space Between 4-6'	Acer rubrum 'Columnare'	Columnar Red Maple		Deciduous	20-30ft
		Acer rubrum 'October Glory'	October Glory Red Maple		Deciduous	20-30ft
		Arbutus 'Marina'	Marina Madrone		Evergreen	20-30ft
		Brachychiton populneus	Kurrajong		Evergreen	20-30ft
		Ginkgo biloba	Maidenhair Tree	Males only	Deciduous	20-30ft
		Lophostemon confertus	Brisbane Box		Evergreen	20-30ft
		Lyonothamnus floribundus subsp. asplenifolius	Catalina Ironwood		Evergreen	20-30ft
		Pistacia chinensis	Chinese Pistache		Deciduous	20-30ft
	Planter Space 4' <	Adenostoma sparsifolium	Red shank	Predominant	Evergreen	6-15ft
		Cercis occidentalis	Western Redbud		Deciduous	6-15ft
		Fraxinus dipetala	California Ash	Predominant	Deciduous	6-15ft
		Hetermeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 6

6	**Planter Space 6' >**	Aesculus californica	California Buckeye		Deciduous	20-30ft
		Casuarina cunninghamiana	River She-Oak		Evergreen	30ft
		Quercus agrifolia	Coast Live Oak		Evergreen	30ft
		Quercus coccinea	Scarlet Oak	Predominant	Deciduous	30ft
		Quercus ilex	Holly Oak	Predominant	Evergreen	30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus suber	Cork Oak		Evergreen	30ft
		Quercus virginiana	Southern Live Oak		Evergreen/partly Deciduous	30ft
		Quercus wislizeni	Interior Live Oak		Evergreen	30ft
	Planter Space Between 4-6'	Acer rubrum 'October Glory'	October Glory Red Maple		Deciduous	20-30ft
		Celtis sinensis	Chinese Hackberry		Deciduous	20-30ft
		Laurus 'saratoga'	Saratoga Laurel		Evergreen	20-30ft
		Nyssa sylvatica	Sour Gum		Deciduous	20-30ft
		Pistacia chinensis	Chinese Pistache		Deciduous	20-30ft
		Ulmus parvifolia	Chinese Elm	Predominant	Evergreen/partly Deciduous	20-30ft
	Planter Space 4' <	Celtis laevigata var. reticulata	Western Hackberry		Deciduous	6-15ft
		Cercis occidentalis	Western Redbud		Deciduous	6-15ft
		Chilopsis linearis	Desert Willow		Deciduous	6-15ft
		Fraxinus dipetala	California Ash		Deciduous	6-15ft
		Hetermeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Zone 7

7	**Planter Space 6' >**	Aesculus californica	California Buckeye		Deciduous	20-30ft
		Quercus agrifolia	Coast Live Oak	Predominant	Evergreen	30ft
		Quercus ilex	Holly Oak		Evergreen	30ft
		Quercus kelloggii	Black Oak		Deciduous	30ft
		Quercus lobata	Valley Oak		Deciduous	30ft
		Quercus suber	Cork Oak	Predominant	Evergreen	30ft
		Quercus wislizeni	Interior Live Oak		Evergreen	30ft
	Planter Space Between 4-6'	Acer x freemanii 'Jeffersed'	Autumn Blaze Red Maple		Deciduous	20-30ft
		Albizia julibrissin	Silk Tree		Deciduous	20-30ft
		Arbutus 'Marina' & meniziesii	Madrone		Evergreen	20-30ft
		Celtis sinensis	Chinese Hackberry		Deciduous	20-30ft
		Ginkgo biloba	Maidenhair Tree	Males only	Deciduous	20-30ft
		Laurus 'saratoga'	Saratoga Laurel		Evergreen	20-30ft
		Lyonothamnus floribundus subsp. asplenifolius	Catalina Ironwood		Evergreen	20-30ft
		Ulmus parvifolia	Chinese Elm	Predominant	Evergreen/partly Deciduous	20-30ft
	Planter Space 4' <	Celtis laevigata var. reticulata	Western Hackberry		Deciduous	6-15ft
		Cercis occidentalis	Western Redbud	Predominant	Deciduous	6-15ft
		Chilopsis linearis	Desert Willow		Deciduous	6-15ft
		Fraxinus dipetala	California Ash		Deciduous	6-15ft
		Hetermeles arbutifolia	Toyon		Evergreen	6-15ft
		Prunus ilicifolia	Hollyleaf Cherry		Evergreen	6-15ft

Glossary

Webinar: https://www.fs.fed.us/research/urban-webinars/

Cities:
City of Davis
City of Long Beach
City of San Francisco
City of Alameda
City of Palo Alto
City of Norwalk
City of San Diego
City of Forest Grove
https://alamedaca.gov/sites/default/files/document-files/mstp_vol1_8.5x11_final1_cover2.pdf
https://www.forestgrove-or.gov/sites/default/files/fileattachments/community_forestry_commission/page/371/forest_grove_urban_forest_management_plan_final_april_25_2016.pdf
http://calfire.ca.gov/communications/downloads/fact_sheets/UrbanForestry_Water_Wise_Young_Tree_Factsheet.pdf

Websites:
Wuclos
CAL FIRE
USDA Forest Service
i-Tree
Trees Pay Us Back: Benefits of Trees
https://selectree.calpoly.edu/search/
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