City of Palo Alto
City Council Staff Report

(ID # 10034)

Report Type: Action Items **Meeting Date: 2/25/2019**

Summary Title: Urban Forest Master Plan Second Edition

Title: Adoption of the Urban Forest Master Plan Second Edition

From: City Manager

Lead Department: Public Works

Recommendation
Staff recommends that Council adopt the Urban Forest Master Plan second edition.

Background
The Urban Forest Master Plan, second edition, was included on the City Council consent agenda of December 17, 2018. Council Members Holman, Kou, and DuBois asked it to be discussed as an action item instead, thus continued it to a future agenda.

Council adopted the Urban Forest Master Plan (UFMP) in May 2015 and directed staff to return with a second iteration to include more detail in key topic areas in the Goals, Policies, and Programs chapter.

After meeting with stakeholder groups, staff presented a second edition to Council for review and comment in May 2016 (CMR 6483). The second edition Goals, Policies, and Programs chapter (Attachment A) has been completed incorporating specific Council direction, and an update to the implementation plan (Attachment B) supporting these changes has been drafted. The updated second edition also includes program implementation elements related to California's Water Efficient Landscape Ordinance.

Discussion
Programs completed during the initial two years of the first edition Urban Forest Master Plan are described in Attachment B. Some of these, such as the analysis of north-south canopy disparity, resulted in significant changes. Council-directed additions to address the management of invasive species and greater focus on tree protection during development/construction were also included.

A program was completed to analyze the canopy disparity between north and south Palo Alto and develop strategies to end the decreasing canopy trend in the south. The revised

implementation plan defines actions to increase tree canopy in south Palo Alto over the next ten years. The canopy disparity analysis recommends adding about 10,000 new trees in south Palo Alto. Staff actions on planning and development applications and landscape permits will influence the success of correcting the canopy disparity as 90% of the potential planting spaces for new trees are on private property. Likewise, public/private partnerships may strongly influence success.

Another significant effort is implementing a management program for invasive species. At present there is no inventory information or analysis to evaluate the population of invasive plants, location, species, or threat to nearby ecosystems. In addition, there is no estimate of the influence on the health or function of the native or desired ecosystem. It is likely that invasive plants inhibit optimal function of desired plants thus diminishing the financial benefits of some ecosystem services. During the coming years, this inventory and analysis work will be completed, and methods to begin managing invasive species will be initiated. This work will complement the creation and implementation of comprehensive conservation plans for open space preserves (funded through the Capital Improvement Program, capital project numbers PG-17000 Baylands Comprehensive Conservation Plan and PG-17001 Foothills Park, Pearson Arastradero Preserve, and Esther Clerk Park Conservation Plan). Management of invasive species will require changes to Palo Alto Municipal Code, policies, and staff authority and processes.

In general, more interdepartmental collaboration is required to accomplish the goals, policies, and programs of the UFMP. Enhanced partnerships and diversified funding will also affect success. The implementation plan includes approximate costs for each of the UFMP programs. While the total cost for most years exceeds the current ongoing budget of $150,000, the implementation plan costs include programs that are expected to use existing staff without the need for additional budget requests. Implementation strategies will be reviewed and adjusted as needed on an annual basis and may include proposals for changes to budget, policy, staff, and authority.

Timeline
Implementation of Year 4 programs began in Fiscal Year 2019.

Resource Impact
Ongoing annual funding of $150,000 was adopted as part of the Fiscal Year 2019 operating budget. This funding, along with existing staff resources, is intended to be used to accomplish the annual goals of the UFMP. Any additional funding that may be necessary to meet the implementation schedule prescribed in the revised UFMP will be subject to review and approval by the City Council through the annual budget process.

Policy Implications
Changes to Chapter 8 (Trees and Vegetation) of Palo Alto Municipal Code are being drafted and reviewed at this time. Changes will focus on correcting authorized officers, addressing invasive

species, protecting native species, managing landscapes as ecosystems for multiple benefits (including storm water control, water efficiency, and property value), and minimizing the impacts while optimizing the benefits of construction. Designated officers will need to exercise interdepartmental authority.

Some policy changes will require additional review time for planning and development applications and/or education or training for staff and contractors. Other policies, such as "no net loss of canopy," may require drafting procedures for interpretation of decisions or conditions of approval. Conflicts or competing objectives may need to be resolved with other policies such as zoning requirements (for parking lot shading or accessory dwelling units) or solar power readiness mandates.

Environmental Review

It is the opinion of staff that the Initial Study and Negative Declaration of Environmental Impacts for the adopted plan sufficiently addresses potential impacts, added content is similar in concept, and therefore the environmental review does not need to be supplemented.

Attachments:

- ATTACH A GPP Revised 2nd Ed 4 Council in Fall of 2018 reduced
- ATTACH B Imp Plan 2nd Ed 4 Council in Fall of 2018 draft optimized

Goals, Policies, and Programs

2nd Edition

Goal 1. A well developed contiguous, healthy, and ecologically resilient citywide urban forest that:

- Is a mix of native and introduced climate adaptive species—to minimize vulnerability to disease, storms, drought, pests, and other stressors.
- Emphasizes locally-evolved species, with particular focus on regenerating a native woodland ecosystem on a landscape scale.
- Avoids invasive species
- Is a mix of young, semi-mature and mature ages—to facilitate uniformity in annual maintenance costs and continuity of benefits.
- Maximizes habitat, environmental, and aesthetic benefits while ~~trying to minimize~~ minimizing conflicts with infrastructure and water-conservation goals.
- Maximizes the potential in each neighborhood—to achieve the greatest possible canopy equity.

Policy 1.A. Strive for:

- A greater percentage of native, drought-tolerant, and fruit tree species.
- Species choices that are appropriate to the setting and site conditions e.g.,
  - Maximize opportunities for fruit, nut, and flower bearing trees where there are fewer maintenance concerns.
  - Maximize opportunities to include less drought tolerant trees where water is not as limited such as riparian corridors, special design or bioretention landscapes, or where groundwater level is higher e.g., plant riparian trees such as box elder, sycamores, cottonwood and willows near creeks and where groundwater conditions allow.
  - 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 oak woodland species based on the principles of San Francisco Estuary Institute's "Landscape resilient Framework" and "Vision for a resilient Silicon Valley Landscape".
  - Minimize infrastructure conflicts, hazards, and maintenance issues.
- Appropriate age diversity.
- No loss of benefits—as defined in iTree eco analysis *(or other peer-reviewed benefits-estimation model.)*
- Increased habitat, health, and social benefits.

Program 1.A.i. Work with Canopy to complete the online "Tree Library"—to achieve a helpful tool for staff and property owners. Include information from the Santa Clara Valley Audubon Society and Native Plant Society about the value for birds and butterflies of species listed in the library. Ensure that searches can include multiple attributes.

Program 1.A.ii. Work with Canopy and stakeholders to develop a "Preferred and Restricted Species List" that will be a helpful tool for staff and property owners.

The list will acknowledge differing priorities for:

- Public street trees
- Public park trees near playing fields or playing fields, paths, or hardscape.

Attachment A

- Public park trees further from playing fields, paths, or hardscape.
- Public trees in nature preserves.
- Private trees on single-family residential property.
- Private trees on multi-family residential property.
- Private trees on commercial property.
- All trees in riparian corridors.

The list will consider:

- Habitat value and attractiveness for birds, butterflies and pollinators.
- Opportunities to create riparian habitat.
- Ecological benefits such as shelter, food, and breeding sites for both resident and migratory birds and pollinators.
- Energy use reduction potential.
- Carbon sequestration potential.
- Stormwater treatment potential.
- City goals for conserving potable water.
- City goals for recycled water.
- Infrastructure conflicts.
- Maintenance issues.
- Aesthetics.
- City's goal of 50% shading goals for rights-of-way, parking lots, and heat islands.
- City's goal to emphasize native species.
- Need for age diversity.
- Toxicity to birds.
- Potential to become invasive.
- Potential to provide healthy, local food to residents.

Notes:

- *The resulting list should be searchable by attributes.*
- *Special consideration should be given to the golf course.*
- *A comprehensive conservation plan is needed to address the complexity of the ecosystems of preserves, and open spaces recognizing that the desirability of traits is often contingent upon location or limited rooting area i.e., problems on one site may be benefits on another. For example, species with maintenance concerns such as those that drop fruit, nuts, and flowers might not be appropriate in some urban areas.*
- *Although allergens are a concern, current research does not support species selection for allergens.*

Program 1.A.iii Work with Canopy and stakeholders to develop site-specific-species-selection protocols to complement the "Preferred and Restricted Species List." In addition to the criteria above, include consideration of:

- Resident's requests.
- Regeneration of native woodland.
- Surrounding species theme and the past performance of that species.
- Adjacent property use.
- Potential visibility issues (e.g., at intersections).
- Available soil volume.
- Available water.
- Potential conflicts with overhead power lines.
- Potential conflicts with hardscape.
- Potential conflicts with underground utilities.
- Avoidance of monocultures.
- Avoidance of inappropriate species in areas that are ideal for rainwater bioretention areas.
- Creation of habitat corridors and ecologically resilient landscapes, contribution to native woodland recovery.

For sites within parks, selection should also consider:

- The *Comprehensive Plan's* vision that parks should integrate nature with recreation and aesthetics and strive to bring people closer to nature.
- Existing and future irrigation systems for nearby park turf.
- Maintenance issues specific to each park e.g., litter on playing fields.
- Wildlife habitat needs e.g., the creation of understory to provide shelter for birds.

Additionally, species selection for trees in natural areas should prefer native species and also consider:

- Threats that may be more likely to affect trees in natural areas than in urban areas—especially Sudden Oak Death.
- Relationship and impact to trails.
- Soil types and natural heritage.
- Opportunities for planting species that drop fruit, nuts, and flowers in areas where maintenance is not as big of a concern.

Note: As mentioned earlier, a separate Resource Management Plan—or Comprehensive Conservation Plan—is needed to address the complexity of the ecosystems of preserves, and open spaces.

Program 1.A.iv. Manage species diversity in such a way as to:

- Emphasize regeneration of an native woodland landscape through the creation of species patches at a scale that supports regional ecological resilience.
- Avoid monocultures that create vulnerability to catastrophic losses due to species-specific threats—especially in the urbanized area.

Note: Urban forestry guidelines suggest that—as a precaution against catastrophic losses due to species-specific threats—no one species should account for more than 10% of the population and no one genus for more than 20% of the population.

Policy 1.B. Endeavor to ensure commercial availability of appropriate tree species.

Program 1.B.i. Upon completing the "Preferred and Restricted Species List", work with Canopy to encourage local and regional nurseries and garden centers to defer to stock the "preferred" species—with emphasis on increasing the availability of species that are drought-tolerant as well as tolerant to recycled water—and to avoid stocking invasive species.

Program 1.B.ii. Consider feasibility of a city-owned nursery or partnership with California Native Plant Society, Acterra, or other local non-profits.

Policy 1.C. Conserve viable street tree planting sites.

Program 1.C.i. Work with relevant departments to develop criteria for viable street tree planting sites, increased planting of street trees, and related protocols to ensure optimal stocking level of 98%. Add criteria to *Tree Technical Manual*.

Program 1.C.ii. Use criteria for viable street planting sites to review and update information about existing and available viable sites in TreeKeeper, and GIS—as well as an interactive open-source mapping solution such as OpenTreeMap.

Program 1.C.iii. Work with relevant departments to evaluate implementation and effectiveness of the requirement for 50% shading for parking lots (public and private) and identified heat islands. Identify reasons for success and or failure. Modify as needed.

Program 1.C.iv. Work with relevant departments to develop requirements for new commercial, multi-unit, and single-family housing development projects to provide street trees (or space for future trees) and related irrigation systems. *Note: The requirement for public art may be a useful model.*

Policy 1.D. Strive for optimal stocking levels for street trees. Plantings should exceed removals until a goal of 98% full stocking of identified viable planting sites within right-of-ways and parks is achieved. Assume an average 50 year life span and consistent replacement and removal rates. Fluctuations should be expected due to past trends of planting as well as other variables.

Program 1.D.i. Develop a monitoring program and produce annual reports of removals and plantings to show progress toward the goal of 98% full stocking of identified viable planting sites within right-of-ways and parks.

Goal 2. Re-generated native woodland and riparian landscapes as the key ecological basis of the urban forest with focus on native species and habitat.

Policy 2.A. Conserve and grow native and introduced climate adaptive tree population to regenerate and recover native woodland ecosystem on a landscape scale .

Program 2.A.i. Work with Canopy to update the Oakwell survey to:

- Assess changes in the population of native oaks since 1997.
- Evaluate the health of existing native trees and take actions to improve conditions as needed (e.g., remove hardscaping or turf watering around tree drip line.)
- Evaluate gaps and opportunities to plant native oaks and native woodland species to create a mosaic of native woodland species distribution that mimics the spatial distribution of an native woodland ecosystem.

Program 2.A.ii. ~~Consider incorporating~~ Incorporate the Oakwell survey data into Tree-Keeper, the City's GIS, and an interactive open-source mapping system such as OpenTreeMap.

Program 2.A.iii. Develop a plan for restoring a city-wide native woodland landscape by increasing the percentages of native trees especially oaks and by tracking progress. Implementation should begin as soon as possible by providing more native trees and introduce climate adaptive species for all tree installations——to create a mosaic of native woodland species distribution that mimics the spatial distribution of an native woodland ecosystems. Specifically, achieve the following goals:

- Street trees: Increase native woodland and introduced climate adaptive trees from 7% to 10% within the life of this 10-year plan—and to 20% within the next 20 years.
- Urban parks: Increase native woodland and introduced climate adaptive trees from 11% to 25% within the life of this 10-year plan—and to 50% within the next 20 years.
- Open spaces and preserves: Existing to at least 80% native woodland and introduced climate adaptive trees within the life of this 10-year plan.
- Private land: Increase percentage of native trees by providing property owners, gardeners, landscapers, and developers with educational resources, supply information, and incentives for native plants, emphasizing native woodland species.
- Re-oaking where oaks are appropriate—ensuring that oaks are spaced so there are no gaps wider than 100-ft among the trees.

Program 2.A.iv. Initiate "tree giveaway" events that provide residents with free fruit trees, native trees and introduced climate adaptive trees.

Program 2.A.v. Work with Canopy and stakeholders such as the California Native Plant Society, and Acterra to:

- Inventory the invasive tree species population as defined by the Recommended and Restricted list.
- Formalize a plan for decreasing that population *(Note: This will need to be a recurring task..)*

Upon completion of the inventory and establishment of a plan work with Canopy, and stakeholders such as the California Native Plant Society, and Acterra to:

- Develop procedures and coordinate field activities for removing invasive species—with special attention given to the removal of seedlings and saplings
- Provide education and incentives to homeowners to remove invasive species on their property.
- Develop specifications for invasive species removal to be conditionally applied during Planning development review for projects, when appropriate, in all zoning districts or abutting creek areas (e.g. open space, residential estates, commercial, research park, etc.)
- Develop monitoring programs to track progress.

Program 2.A.vi. Utilize public space opportunities--and encourage the use of private space opportunities--to implement management techniques that enable trees, shrubs, and compatible

vegetation to coexist with the goals of producing ecosystem benefits, aesthetic interest, layered wildlife habitat, and food for people.

Program 2.A.vii. Create educational materials on oak tree care and pro actively reach out to property owners, landscaping firms, real estate agents and other audiences to educate them about the importance of oaks, other native, and introduced climate adaptive trees and how to care for these trees.

Program 2.A.viii. When a property transfers, provide information on how to care for oaks

Goal 3. A citywide *Sustainability Plan* that integrates the goals of the *Urban Forest Master Plan* with other sustainability goals such as those related to water conservation, carbon neutrality, and solar energy—and communicates the value of the urban forest and the importance of tree protection.

Policy 3.A. The City's *Sustainability Plan* shall...

- Incorporate the contributions and needs (including water needs) of the urban forest emphasizing the importance of habitat as well as carbon sequestration by the urban forest and the need to preserve canopy and ecosystems.
- Identify conflicts as well as alignment between urban forest goals and those of other sustainability concepts especially Green Building water use review and the associated *Water Use Classification Of Landscape Species* (WUCOLS) plant species list.
- Describe procedures for prioritizing and mitigating conflicts.

Program 3.A.i. Work with the city's *Office of Sustainability* as well as Canopy and other related organizations (herein after et.al.) to evaluate the "Preferred and Restricted Species List" to ensure that it complements the City's *Sustainability Plan* and incorporates the need to preserve public health as well as ecological and habitat benefits pro-vided by native species such as oak trees, cottonwood and willows, large broadleaf trees, and key introduced climate adaptive species.

Program 3.A.ii. Work with the city's *Office of Sustainability et.al.* to evaluate future participation in carbon credit programs.

Program 3.A.iii. Work with the city's *Office of Sustainability et.al.* to evaluate the establishment of an oversight group (elected or appointed by the City Council), to investigate and comment on the impact of projects on the urban forest and overall ecosys-tem—and monitor the progress of the *Urban Forest Master Plan* goals.

Program 3.A.iv. Work with the Utilities Department to publish tools and priorities for siting of solar collection devices.

Program 3.A.v. Work with the city's *Office of Sustainability et.al.* and/or the Utilities Department and Canopy to create a guidance document—how to successfully incorporate solar collection and trees into site design—for those considering solar.

Program 3.A.vi. Work with the city's *Office of Sustainability et.al* to explore new funding sources for the Urban Forestry program.

Program 3.A.vii. Work with the city's *Office of Sustainability* et.al. to reevaluate costs and fees related to efforts to coordinate sustainability programs.

Policy 3.B. The well being of the urban forest and preservation of its ecological, environmental, public health, aesthetic, economical, social, and community benefits will be considered in all decisions pertaining to the environment, sustainability, and capital improvements.

Program 3.B.i. Formalize the Urban Forester's role relative to:

- Citywide *Sustainability Plan*.
- Development of citywide policy.
- Inter-departmental collaboration.
- Technical advice.

Program 3.B.ii. Work with the city's *Office of Sustainability* et.al. to develop a "Landscape Sustainabil-ity Checklist"—for development review—that incorporates

citywide goals for water use, sustainability, storm water management, tree pruning, tree retention, and tree selection —and strives for ecological balance and resilience. Incorporate into the *Landscape Technical Manual*.

Program 3.B.iii. Work with the city's *Office of Sustainability* et.al. to educate staff about the importance of describing potentially negative—or unintended—impacts to the urban forest and ecologic bal-ance/resilience in staff reports about Capital Improvement Projects—whether or not California Environmental Quality Act (CEQA) review is required.

Policy 3.C. Monitor the salinity levels of recycled water and explore options for adjusting potable/recycled mix rates, soil modification/augmentation—to improve leaching—on a site by site basis.

Program 3.C.i. Review existing monitoring programs regarding the use of recycled water for landscape irrigation at the Municipal Golf Course and Greer Park. Modify as needed.

Program 3.C.ii. Develop a report describing what has been achieved relative to the City's goals for reducing the salinity of recycled water from the Regional Water Quality Control Plant since Council adopted Resolution 9035 in January of 2010. The report should include a draft handout brochure for property owners considering conversion to recycled water--outlining site drainage expectations, exemption process and new plant material conversion and responsibilities. Ensure that staff are aware of this City policy and understand its implications.

Program 3.C.iii. Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, and the Santa Clara Valley Audubon Society to develop a list of tree species appropriate for use in areas where recycled water is or may be used for irrigation. Incorporate into the *Landscape Technical Manual.*

Program 3.C.iv. Work with relevant departments to develop an emergency program to provide water to trees during severe drought.

Program 3.C.v. Work with relevant departments to encourage construction of rain gardens and use of condensation water from air-conditioning units, groundwater dewatering water, and hydrant flushing water to provide water for "thirsty" habitat trees such as willows, sycamores and cottonwoods

Program 3.C.vi. Emphasize the Utilities Department's "Waste Avoidance" programs (for water) on the Urban Forestry website.

Policy 3.D. Use wood chips and mulch appropriately.

Program 3.D.i. Review existing procedures and protocols for using mulch to suppress weeds (including state requirements) and develop site-specific criteria to ensure minimal impacts to wildlife–especially in the wetlands and natural areas. Upon completion:

- Incorporate into the *Tree Technical Manual*.
- Incorporate into the *Landscape Technical Manual (Program 6.F.i.)*
- Work with stakeholders such as the California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society on an outreach program to educate property owners and residents about mulch use.

Program 3.D.ii. To prevent runoff of polluted water, avoid use of recycled-tire or synthetic mulch and discourage use of recycled-tire or synthetic mulch on private property

Program 3.D.iii. To prevent runoff of polluted water, avoid use of dyed mulch and discourage use of dyed mulch on private property.

Program 3.D.iv. Explore an expansion of the existing urban-wood recycling program to include higher end products that do not break the wood down. Include consideration of the following:

- Breaking wood up to create mulch releases previously sequestered carbon.
- Conversion to energy requires burning which releases previously sequestered carbon.
- Recycling urban wood as a higher end product that does not break it down e.g., using logs for habitat or outdoor furniture, will allow the carbon to remain sequestered within the wood.
- Carbon credit programs.

Goal 4. A community that appreciates its urban forest and partners with the city, Canopy, and other local organizations and stakeholders to steward it.

Policy 4.A Optimize communication between the City, residents, property owners, business owners, other cities and other government agencies, and non-profits.

Program 4.A.i. Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society to conduct at least 4 community outreach meetings to educate and get feedback:

- Introduce the website as a resource.
- Discuss "Hot Topics" from Master Plan survey.
- Discuss interactive open-source mapping.

Program 4.A.ii. Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society and the community to develop outreach procedures to follow prior to making any significant changes to the urban forest —whether or not California Environmental Quality Act (CEQA) review is required.

Program 4.A.iii. Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, and the Santa Clara Valley Audubon Society to establish a recurring forum that provides the community an opportunity to communicate with staff and members of the decision making bodies about tree benefits, concerns, and ideas. *Note: this may coincide with the similar ideas for the citywide Sustainability Plan.*

Program 4.A.iv. Continue pruning workshops and tree walks and consider additional ways for community and staff to interact.

Program 4.A.v. Coordinate with the Palo Alto Unified School District regarding plantings, species selection, maintenance, management of landscapes, Arbor Day, and other events.

Program 4.A.vi. Develop a capability for community input on the Urban Forestry website.

Program 4.A.vii. Work with Canopy the California Native Plant Society, Acterra, and the Santa Clara Valley Audubon Society to develop the content for outreach possibilities such as city mailings, e-mail blasts, door hangers, bill inserts, social media, press releases, and newspaper columns.

Program 4.A.viii. Partner with Santa Clara Valley Audubon Society for the Palo Alto Christmas Bird Count, Spring Bird Count, and the Backyard Bird Count.

Program 4.A.ix. Work with Santa Clara Valley Audubon Society to develop programs to familiarize residents with Palo Alto's urban forest's birds and butterflies—and ways to attract them.

Program 4.A.x. Educate citizens about correct pruning at the best time to protect bird habitat and nesting.

Program 4.A.xi. Partner with Acterra, Audubon and California Native Plant Society to develop educational materials and workshops on native woodland ecosystems, other native habitats and the benefits of native tree species in the urban landscape for both the public and urban forestry staff.

Policy 4.B. Ensure exhaustive exploration into the common concerns that emerged from the responses to the Master Plan survey and ensure that the resulting information is well communicated.

Program 4.B.i. Work with relevant departments to develop ways to avoid root damage to sidewalks beyond just matching growth characteristics to the conditions of the planting site. Explore root barriers and special design solutions such as meandering sidewalks around trees, suspending sidewalks above tree roots, and replacing concrete sidewalks with sidewalks made of recycled rubber or other material.

Program 4.B.ii. Work with relevant departments to develop ways to prevent conflicts between tree roots and underground infrastructure such as requirements that limit the location of underground utilities to a corridor—preferably coincident with driveway.

Program 4.B.iii. Work with relevant departments to develop ways to avoid disfigurement of trees from power line clearing such as running the power lines through protective conduits that don't require as much clearance.

Program 4.B.iv. Work with relevant departments to develop funding goals and strategies to obtain desired tree pruning cycle.

Goal 5 An effective and efficient Urban Forestry Division.

Policy 5.A. Ensure that the City has adequate baseline information—so changes in the urban forest and ecological benefits can be monitored.

Program 5.A.i. Follow up the 2010 canopy cover assessment done by UC Davis that established the baseline for this master plan—with a similar assessment in approximately 2020. Present a comparison of the two assessments to the City Council.

Ensure that the follow-up canopy cover assessment considers the open spaces as well as the urban forest.

Note: This type of survey will provide canopy density of the entire urban forest—both public and private trees and is generally accepted as the best method for comparisons between municipalities, assessing canopy equity, and monitoring change from development impacts etc.

Program 5.A.ii. Follow up the 2010 inventory update and i-Tree streets analysis done by Davey Resources with either:

- A similar comprehensive inventory update and i-Tree streets analysis in approximately 2020.
- OR a series of seven partial inventories done—annually—on one-seventh of the entire street tree population.
- Ensure that follow-up analyses consider open spaces as well.
- Ensure that any economic analysis of tree value consider the costs inherent in invasive trees.

Note: This type of survey will provide multi-faceted and detailed data about each city-owned tree and is essential to the City's asset management requirements.

Program 5.A.iii. Conduct an i-Tree eco analysis (or similar) to establish a city wide benchmark that spans the entire population of both public and private trees and then to monitor change in the future.

Metrics should be compared to changes in order to craft policies, provide incentives, and adapt partnerships.

Note: This type of survey will provide multi-faceted information such as health and composition of the entire urban forest—both public and private trees.

Program 5.A.iv. Conduct an i-Tree wildlife (or similar) assessment of the existing habitat and biodiversity—to establish a baseline and help identify and prioritize needs.

Note: The software used for this type of analysis is relatively new. This type of survey will provide information about the potential for both public and private trees to provide habitat or to damage habitat (e.g., species that can be invasive) and will help the City incorporate ecological needs into the decision making process for many issues.

Policy 5.B. Strive for best possible tools—such as technology, information about the trees, procedural documentation, knowledgeable staff, and fiscal resources—to support the Urban Forest Master Plan vision, goals, policies and programs.

Program 5.B.i. Conduct electronic tree surveys to enable analysis of development impact.

Program 5.B.ii. Develop database management tools to assist with monitoring, documentation, and evaluation of tree restoration work.

Program 5.B.iii. Develop open portals for data entry–as a way of engaging the community as partners in stewardship and to improve data currency and accuracy:

- Electronic submittals of tree surveys might allow more accurate queries and reports to quantify the influence of development.
- Open source mapping might allow input by anyone agreeing to comply with standards and complete training.
- Open portals might accommodate reports of maintenance needs from community members.

Note: Any such tools should be compatible with the mobile reporting application that is currently being developed for the city to both report and monitor service requests.

Program 5.B.iv. Update the City's GIS and Tree Keeper database information about trees within the 32 parks, Municipal Golf Course,

utility easements, city facilities, and city-owned property such as fire stations—to ensure completeness and accuracy.

Program 5.B.v. Integrate the information in Tree-Keeper with the city's GIS to enable review of the relationship between trees and other relevant geographic information such as parcel lines, land uses, zoning, soil types, watersheds, creeks, pavement, hazard areas, and utility infrastructure.

Program 5.B.vi. Use the City's GIS system to highlight native trees especially oak species, and create a layer that identifies connectivity and spatial distribution of oaks and riparian tree species.

Program 5.B.vii. Develop or obtain a more up-to-date and accurate soils map and add it into the GIS.

Program 5.B.viii. Develop a map showing the depth of available water within the urban forest.

Program 5.B.ix. Update the *Tree Technical Manual*. The update should be coordinated with the *Landscape Technical Manual* as well as the *Sustainability Plan*—and should:

- Include new and innovative ways to add trees in difficult circumstances.
- Review and expand the requirements and options for mitigating the removal of existing trees for development projects and consideration of alternatives to removal. For example, *roof top plantings-which are expensive initially but have a long term life cycle may be worth more as a mitigation measure than a transplanted tree–which often suffer from diminished survival potential.*
- Include information, specifications, and standard details for employing structural grids to provide an adequate volume of quality soil to grow trees to desired mature size.
- Establish soil volume requirements in a manner similar to those described in the city of Raleigh's Landscape Manual.
- Work with Public Works sidewalk maintenance to consider contract language to implement rooting channels for confined existing or new trees to achieve longer life and tree benefits.
- Establish requirements for providing independent spaces for trees and turf so that water can be applied appropriately and efficiently and nearby plantings will support optimal performances e.g., only forest species should be planted near trees where as turf areas may support ornamental landscape plants or riparian habitat trees and shrubs.
- Prohibit the planting of new turf in public rights-of-way, medians, planter strips, and other roadway adjacent areas of landscaping.

Note: In addition to the above listed enhancements, the Tree Technical Manual will be the repository for many of the products called for by programs in this master plan such as: criteria for a viable street tree planting site. As a result, the role of the Tree Technical Manual will be significantly expanded.

Program 5.B.x. Incorporate stormwater treatment and bioretention best management practices into the *Tree & Landscape Technical Manual,* Standard Conditions of Approval, and Standard Details, and citywide *Sustainability Plan*, Include best practices and other requirements from both Municipal and Regional Permits and emphasize the advantages (or disadvantages) of:

- Planting trees, shrubs, and ground cover to provide an understory and a more complex habitat for birds in private and public landscaping.
- Planting less drought resistant species (e.g., native riparian species that provide habitat), where there is a natural water sources such as a creek or higher water table level—to help provide diversity.
- Planting larger broadleaf trees where there are no overhead wires—to help provide ecological benefits.
- Planting introduced climate adaptive trees in areas that are ideal for bioretention of stormwater.
- Rain gardens and use of condensation water from air-conditioning units to provide water for "thirsty" habitat trees such as willows, sycamores and cottonwoods

Program 5.B.xi. Complete the update of the *Street Tree Management Plan*. Include information,criteria, procedures, and strategies regarding:

- Selecting street tree species.
- Providing for age diversity.
- Ensuring that planting parallels tree removal to avoid canopy and benefit loss.
- Young tree care.
- Preventing loss of viable street tree sites.
- Optimizing opportunities for adding trees for new private development and Capital Improvement projects.
- Canopy disparity between north and south Palo Alto.
- Standards used for line clearing and criteria for selecting contractors.
- Sidewalk repair.
- Recycled water and progress relative to the Salinity Reduction Policy for Recycled Water.
- Benefits to local birds, butterflies, bees, and other pollinators.
- Regeneration of spatially connected native woodland ecosystem.
- Shade for pedestrians.

Program 5.B.xii. Work with relevant departments to improve the way maintenance work done by field crews is documented and uploaded into TreeKeeper and/or the City's GIS. Improvements should explore Smart Phone capabilities as well as the ability for the public to both access information about tree maintenance and contribute information about potential maintenance needs.

Program 5.B.xiii. Consider transferring maintenance responsibilities from Community Services Parks Division to Public Works Urban Forestry Division for:

- All trees on the golf course.
- Trees in developed areas of Open Space (along park roads and around structures/park facilities)

Program 5.B.xiv. Nurture existing volunteer support groups and work with non-profit organizations to reach out to businesses and corporate sponsors for forest-restoration projects.

Program 5.B.xv. Work with relevant departments to explore a collaboration between relevant local fire protection districts and CAL FIRE regarding an educational campaign to inform homeowners about selecting species and pruning trees to achieve "defensible spaces" as part of vegetation management in appropriate areas of the city. Incorporate into *Sustainability Plan* as well as the *Tree and Landscape Technical Manual.*

Program 5.B.xvi. Provide opportunities for training Urban Forest staff and park rangers that include:

- Certification as arborist.
- Certification in pesticide application.
- Education in Integrated Pest Management.
- Education in Best Management Practices for management of invasive plants.
- Education in ecology and native plant management.
- Proficiency in relevant software programs.
- Tree Risk Management Protocols.

Review should include exploration of conferences, in-house training, online training, etc.

Program 5.B.xvii. Develop a flexible staffing model that ensures staffing commensurate to work load increases and decreases. (*Manpower shortages cause delays in project review.)*

Program 5.B.xviii. Work with relevant departments to update development review fees—to accommodate intensification of the review process to ensure that all ecological and environmental concerns are met.

Program 5.B.xix. ~~Evaluate the cost resources needed~~ Work with relevant departments to establish written risk management protocol and training for scheduled inspections.

Goal 6. An Urban Forest that enhances the built environment and connects it to the natural environment.

Policy 6.A. Updates to Palo Alto's Zoning Regulations, Green Building Standards, Standard Conditions of Approval, Standard Details, Green Infrastructure Practices, and stormwater permitting procedures shall consider the following as key factors:

- Conservation of existing trees and replacement of undesirable species when appropriate.
- Appropriate native and introduced climate adaptive species and placement for new trees.
- Respect for regional ecosystems and natural functions.
- Respect for watersheds and wildlife corridors.
- Habitat overlay zones.
- Green space systems within and among communities.
- Absorption of carbon dioxide and air pollutants.
- Responsible storm water management.
- Responsible ground water management.
- Responsible soil conservation.
- Vibrancy of the community.
- Quantification of ecological benefits based on peer-reviewed models such as the analytical software, iTree.

Program 6.A.i. Work with relevant departments, divisions, Canopy, and related organizations to review up-to-date sources for new measures and possible modifications to Palo Alto's Zoning Regulations, Building Standards, Green Building Standards, Standard Conditions of Approval, Standard Details, Green Infrastructure Practices, storm water permitting procedures, and other relevant documents—to ensure currency with environmental laws, best practices, and innovative solutions and to enable the policies and goals of this plan.

Review to include but not be limited to these resources:

- Updated Green Building Standards.
- Sustainable Sites Initiative.
- American Planning Association recommendations for land use objectives and actions.
- Best Practices for responsible stormwater management.
- Best Practices for soil conservation.
- Landscape Resilience Framework and Vision for a resilient Silicon Valley Landscape (San Francisco Estuary Institute.)

Program 6.A.ii. Work with relevant departments to augment project-review standard conditions of approval with:

- Requirements for no net canopy loss per project site.
- Soil volume requirements for trees per species group.
- Habitat connectivity and regeneration of an native woodland ecosystem on a landscape scale.

Program 6.A.iii. Ensure that *(in addition to building standards)* Palo Alto's standards for landscape installations and renovations, consider appropriate species selection and placement of trees—especially relative to existing trees and habitat value.

Program 6.A.iv. Work with relevant departments, Canopy and related organizations to analyze the impact of basement construction—and dewatering by wells and basement sump pumps—on tree health and the urban forest. Focus shall include but not be limited to:

- Soil volume.
- Water table.
- Root impact on the development and/or adjacent sites.

Policy 6.B. Review of both private and public projects will:

- Occur early in the design phase.
- Be coordinated with the reviews of other departments.
- Seek ways to add trees, canopy, and habitat benefits.
- Promote solutions that promote regional ecosystems and natural functions including watersheds and wildlife connectivity.
- Promote regionally native and introduced climate adaptive plants and discourage the use of invasive species.
- Promote green space systems within/among communities.
- Promote bicycle and public transportation nodes and routes.
- Promote shade to encourage pedestrian and bicycle mobility.
- Consider absorption of carbon dioxide and air pollutants.
- Evaluate impacts to ecosystems and natural functions.
- Evaluate impacts to watersheds and wildlife corridors.
- Evaluate impacts to stormwater systems.
- Evaluate impacts to existing impervious surfaces.
- Evaluate impacts to groundwater.
- Evaluate impacts to soil volume and quality.
- Evaluate impacts to bird especially re: nesting seasons.

Program 6.B.i. Work with relevant departments and divisions to ensure that the Urban Forestry Division is included in the early phases of design and review of private projects. For discretionary reviewed projects, work with the Planning Department to ensure that in each environmental assessment prepared it will include trees in the aesthetic resources section (designated landscape and public trees) and biological resource section (protected trees) as applicable in the early review phase.

Program 6.B.ii. Work with the relevant departments and divisions to ensure that the Urban Forestry Division is included in the early phases of budgeting (for staff resources) as well as the early phases of design for Capital Improvement Projects.

Program 6.B.iii. Provide education to Urban Forestry staff about innovative ways to add trees to development projects and in limiting situations.

Program 6.B.iv. Provide education to all relevant staff about the "Preferred and Restricted Species List."

Program 6.B.v. Provide education to citywide development review staff about City *Sustainability Plan* priorities and need for staff reports to include information about the role of trees in moderating potential negative impacts to the environment or add beneficial services related to:

- Canopy.
- Birds and pollinators.
- Watershed health.
- Storm water systems.
- Ground water stability.
- The need for adequate soil volume and/or quality.
- Soil stability on hillsides.
- The value of trees with regard to aesthetics and privacy concerns.

Program 6.B.vi. Educate citywide development review staff about City priorities and need for staff reports to include information about potential opportunities to enhance:

- The vibrancy of the community including economy and employment opportunities e.g., teen career opportunities, training, and local food production.
- Human health benefits —both physical and psycho-social health—of green spaces within and among communities.
- Bicycle and public-transportation nodes and routes.

Program 6.B.vii. Provide education to citywide development review staff to ensure that tree maintenance practices continue to consider bird nesting seasons.

Program 6.B.viii. Work with Canopy and other stakeholders to educate the development community about the need to discuss trees during the early stage of a project's design.

Program 6.B.ix. Work with Santa Clara Valley Audubon Society and other organizations to educate the development community about minimizing project effects on local wildlife.

Policy 6.C. Strive for no net loss /increase in canopy cover.

Program 6.C.i. Continue to enforce the City's Tree Protection Ordinance but also review it to ensure that it reflects state water efficiency standards as well as this master plan's goals for regeneration of native woodland landscape.

Program 6.C.ii. Evaluate needs and benefits of a possible requirement that digital information about protected trees be submitted to the City as a condition of approval for permit applications.

Program 6.C.iii. Work with relevant departments to develop canopy thresholds—possibly based on zoning and land use goals of the *Comprehensive Plan*. Consider appropriateness to the ecotype e.g., Baylands canopy should be much less than riparian corridors.

Note: This program does not intend to concentrate plantings in open space grasslands and, thereby, reduce plantings in developed areas. Thresholds suggested by organizations such as American Forests may be helpful as guidelines. However, where such suggestions are less than existing density, they should not imply a need or desire to reduce density.

Policy 6.D. Strive for canopy equity—prioritizing areas in which the UC Davis report indicated a decrease between 1982 and 2010.

Program 6.D.i. Investigate reasons for less canopy in south Palo Alto. This should include evaluation of:

- Development review procedures.
- Maintenance activities and contracts
- Property-owner objections to street trees.
- Prohibitive physical conditions such as soil type, absence of planting strip, etc.

Program 6.D.ii. Develop strategies to end the trend of decreasing canopy in South Palo Alto e.g.,

- Work with Canopy and stakeholders such as Acterra, the California Native Plant Society, and the Audubon Society on an outreach program to ensure residents, property owners, and business owners understand how their decisions affect the canopy and encourage them to plant trees.
- Create incentives for home and business owners.
- Add new planting sites for street trees where possible—and focus on planting native species.
- Incorporate the use of interactive open source mapping.

Program 6.D.iii. Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.

Program 6.D.iv. Ensure adequate budget to accomplish the strategies—including incentives—for preserving and increasing the canopy in South Palo Alto.

Policy 6.E . Recognize El Camino Real's importance as the preeminent link between Palo Alto and adjoining communities.

Program 6.E.i. Utilize the following resources when reviewing projects on El Camino Real:

- *El Camino Real Master Planning Guidelines and Appendices.* Incorporate into sidewalk maintenance replacement contracts and *Landscape Technical Manual,* the remedial specification BMP's for existing trees (Appendix 5) and design guidelines for new trees.(Section 5.4)
- Appropriate scenic design plans
- Appropriate plans of nearby jurisdictions and agencies
- Santa Clara Valley Urban Runoff Pollution Prevention Program

Program 6.E.ii. Coordinate with nearby jurisdictions and agencies regarding trees within the El Camino Real Corridor e.g.,

- Management of existing trees.
- Development impacts and opportunities.
- Projected future needs.
- Grand Boulevard Project.

Note: These guidelines for reviewing projects within the El Camino Real Corridor should be reflected in the Tree Technical Manual.

Policy 6.F. Private and public landscape and irrigation plans that include both trees and turf will be reviewed to ensure that each is provided enough independent space to ensure that their differing maintenance needs can be met efficiently e.g., so that:

- Water can be applied appropriately and efficiently.
- Nearby plantings will support optimal performance e.g., only forest species *(e.g., understory species)* should be planted near trees whereas turf areas may support ornamental landscape plants *(e.g., plants requiring more frequent watering.)*

Program 6.F.i. Develop a *Landscape Technical Manual* that aggregates landscape requirements and best management practices from all relevant sections of the Municipal Code as well as the *Baylands Master Plan, El Camino Real Master Plan* and Appendices, *Comprehensive Plan, Sustainability Plan, Green Building Code*, and T*ree Technical Manual.* Focus to include but not be limited to:

- Solutions to promote canopy equity for South Palo Alto e.g., planting, soil, and watering recommendations.
- Special concerns related to the development of properties within OS (Open Space) and Residential Estate Zoning Districts e.g., fire safe landscapes and hydroseeding.
- Retention of existing mature (non-invasive) trees.
- Regeneration of an native woodland ecosystem on a landscape scale.

Policy 6.G. Provide incentives to increase canopy and ecological benefits.

Program 6.G.i. Work with relevant departments to monitor and comment on proposed changes to relevent zoning policies and regulations to ensure that the process considers the impacts on the ability to add tree canopy and to preserve planting sites. If changes to zoning policies and regulations occur, look for opportunities to increase the canopy.

Program 6.G.ii. Work with relevant departments to develop incentives to retain and plant trees—and where appropriate, trees of high habitat value and fruit trees—through additional points via LEED certification , Build It Green (BIG) Green Points, Backyard Habitat Programs, and/or similar certification systems such as those defined by the Sustainable Sites Initiative, the National Wildlife Federation, and the San Francisco Estuary Institute's Vision for a Resilient Silicon Valley.

Program 6.G.iii. Work with relevant departments to explore the feasibility of a tree adoption program—possibly to be modeled after programs offered by the Sacramento Municipal Utility District (SMUD) which has been operating successfully for 15 years.

Policy 6.H. Minimize the negative effect on the urban forest from development and infrastructure maintenance.

Program 6.H.i. Work with relevant departments to review line clearing standards and criteria for selecting contractors; publish on the Urban Forest website.

Program 6..H.ii. Work with relevant departments to analyze and resolve conflicts regarding the space required between utilities underground equipment and other criteria related to what makes a planting site viable for street trees.

Program 6.H.iii. Evaluate the current street tree pruning program and the possible advantages of a more frequent pruning cycle. Ensure that pruning continues to consider bird nesting seasons.

Program 6.H.iv. Work with relevant departments to create criteria for minimum tree plantings as development requirements.

Program 6.H.v. Work with relevant departments to review and update current fines and incentives as related to tree malpractice and vandalism.

Program 6.H.vi. Work with relevant departments to amend fee schedule to include development fees to enable appropriate participation in project review, building and other permit issuance, regulatory compliance, and auditing.

Policy 6.I. Approved development plans shall not be modified in any way that may affect street trees or approved landscape plans without review of those modifications by the Urban Forestry Division.

Program 6.I.i. Work with relevant departments to reevaluate and adjust development review fees to accommodate work load increases and staffing impacts if necessary in order to address:

- Failure to include tree protection review in the permitting process.
- Failure to comply with tree protection requirements.
- Unapproved modifications to approved plans—made in the field.

Policy 6.J. Strive for optimal conditions in the natural areas of the city preserves and open spaces.

Note: the needs of preserves and open spaces may differ from those of the urban forest and Resource Management Plans—specific to those environments—are needed.

Program 6.J.i.. Ensure that the follow up citywide canopy cover analysis *(Program 5.A.i.)* is sufficient to establish a baseline of canopy cover in the city's preserves and open spaces.

Note: Natural habitats are complex and it is important to keep both habitat diversity and specific species interactions in mind when dealing with natural areas. Therefore, although the percentage of canopy cover in the natural areas is worth monitoring, it may not have the same relevance—in terms of optimal conditions—as it does in the urban forest.

Program 6.J.ii. Establish a baseline for relevant information to be monitored—in addition to canopy cover—such as native versus non-native species populations.

A statistically valid sample should be collected to analyze current conditions. Sampling methodology should enable long term monitoring, direct management decisions, and analyze the effectiveness of current practices. A permanent plot system would be an option.

Experimentation in conjunction with analysis of natural regeneration practices, simulated disturbance regimes, and predation relationships should be employed.

Note: This is not redundant with programs 5.A.iii. the analysis of 5.A.iii. will inform this task.

Program 6.J.iii. Work with relevant departments to develop a long-range budget for tree management and maintenance in the open spaces that includes:

- Tree inspections.
- Tree removal and replacements.
- Forest restoration.
- Training for rangers.
- Technology for tracking maintenance tasks.
- Retention of dead trees and snags.
- Protection of native volunteer saplings.
- Survey of invasive tree species.
- Mapping of soil types and depth to water table to inform selection of ideal locations for a variety of tree species.
- A plan to increase native canopy and decrease the population of invasive tree species—and monitor results.

Program 6.J.iv. Work with relevant departments to develop a Comprehensive Conservation Plan that includes and/or considers:

- Up-to-date information regarding Sudden Oak Death Disease and other pathogens that impact the local ecosystem.
- Maintaining healthy ecosystems by reducing the impact on trees by the implementation of fire management plans.
- Best Management Practices for forest restoration.
- A well-defined plan for tree replacement within the parks and open spaces.
- Detailed map of locations of sensitive species.
- Consideration of snags and dead trees.
- Protection of native volunteer tree saplings.
- Consideration for removal of invasive trees and replacement with native trees.
- Trail placement that avoids impacts to native trees and sensitive understory species.

Program 6.J.v. Work with relevant departments to update existing park plans and/or develop new plans to ensure that tree issues are addressed.

Program 6..J.vi. Coordinate between departments and outside partners re:

- Appropriate mixes of trees, shrubs, and grasses
- Natural cycles of disturbance such as fire
- Response to use and impacts.
- Appreciation by the community.

Program 6.J.vii. Ensure that the "Restricted Species List" includes consideration of species appropriate for the golf course, parks, preserves, and open spaces e.g.,

- Importance of native species in natural areas.

- Importance of avoiding invasive species.
- Importance of fruit trees.
- Need for evergreen canopy to support watershed protection and wildlife habitat.
- Need for shrub and understory species for increased and multi-layered canopy and habitat.
- Maintenance impacts of root damage to trails.
- Maintenance impact of litter on playing fields.

Program 6.J.viii. Work with Canopy to educate the community regarding the necessity of tree removals— and where safe, snag preservation—in the parks and open spaces.

Program 6.J.ix. Work with relevant departments to ensure consideration of tree preservation and tree replacement for capital improvement projects within city parks and open spaces.

Implementation Plan

2nd Edition

In May of 2015, the City Council adopted the Urban Forest Master Plan—and directed staff to develop a 2nd Edition of the "Goals, Policies, and Programs.

In April of 2016, the City Council adopted the 2nd Edition "Goals, Policies, and Programs"--and directed staff to make minor modification

The following timeline, implementation plan, and annual budget needs apply to the 2nd Edition programs *(adopted in April 2016)* **as well as the modifications directed by the City Council at that time. Timing and amounts are approximate.**

Some programs will require collaboration between departments and/or changes to the Municipal Code.

Some programs support the main focus by means of technology, administration, partner-ships, and monitoring.

For readability, the program are abbreviated; for complete language, see "Goals, Policies,& Programs" section.

Attachment B

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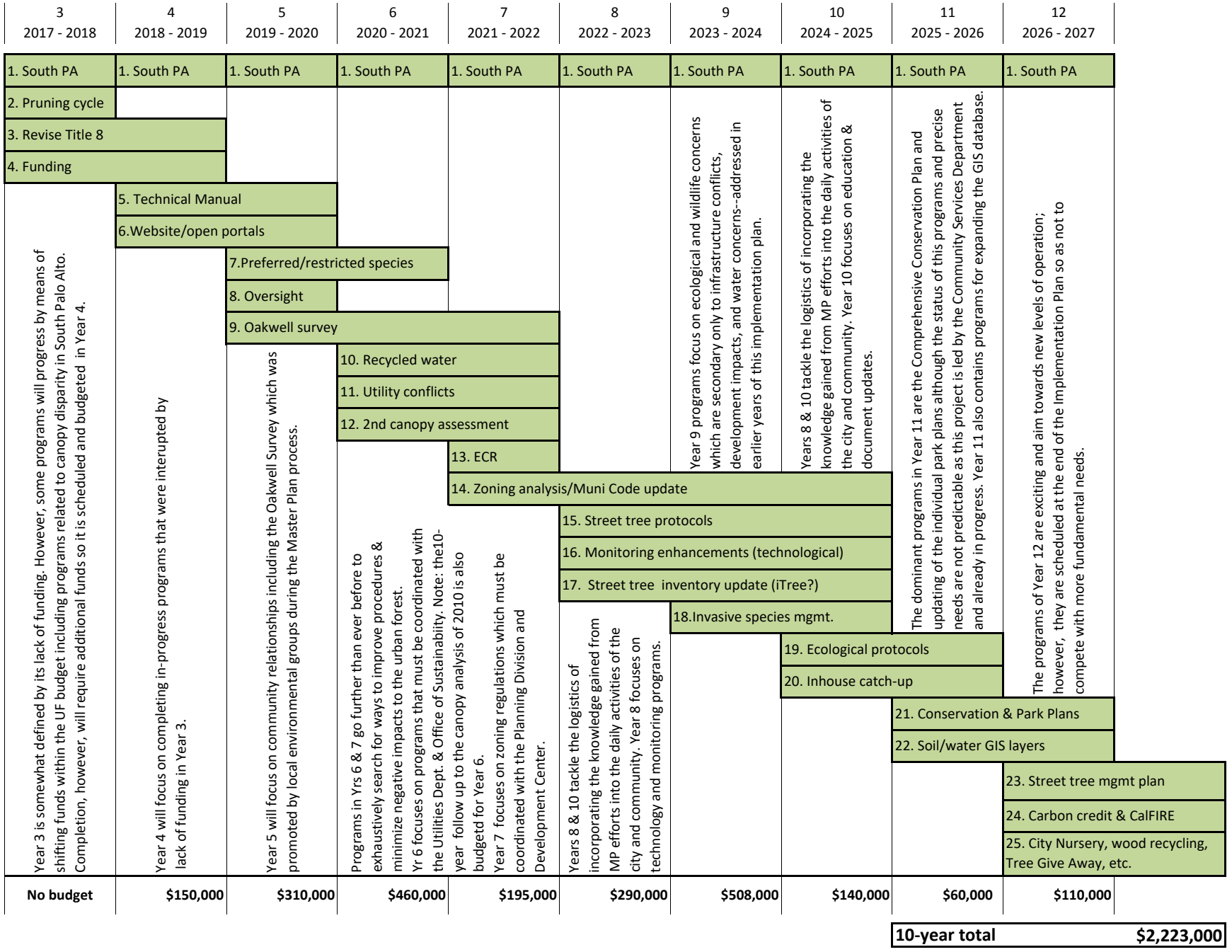
Implementation Timeline & Annual Budget Needs for the Remaining Years of the **2nd Edition** of the ***Urban Forest Master Plan***



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Completed Years 1 & 2 — July 1, 2015 thru June 30, 2017 — Yrs 1-2

In years 1 & 2 the South Palo Alto analysis was completed enabling work towards increasing that area of canopy to begin in year 3. The online tree library was also completed providing a helpful tool for species selection. The UF staff began several inhouse interdepartmental dialogs pertaining to organization and procedure--which will be continued as other programs are implemented. Staff collaborated with local environmental groups and produced the 2nd Edition of the UFMP in which programs have been added or enhanced to A) require more rigorous attention to ecological concerns during development review and B) collect and monitor more data about ecological conditions.

	Overview of Program or Program Group	Individual Programs			Costs
1	COMPLETED as 1.D.i.: Findings presented to CC in 2017.	6.D.i.	Investigate reasons for less canopy in south Palo Alto…	NA	**NA**
2	COMPLETED as 1.A.i.: Tree library is now available via UF & Canopy websites.	1.A.i.	Work with Canopy to complete the online "Tree Library" to achieve a helpful tool for staff and property owners.	NA	**NA**
3	COMPLETED as 3.Ai., 3.A.vii., & 4.i.xiii. UF Division collaborated with Canopy, California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society to incorporate additional ecologically oriented paramaters and requirements into the programs for this 2nd Edition. UF Division collaborated w/stakeholders to revise outreach/notification procedures for utility pruning--and w/ local realtors about distributing FAQ list. Stewardship Agreement with Acterra enhanced to protect native seedlings within Arastradero Preserve.	4.A.i.	Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society to conduct at least 4 community outreach meetings to educate and get feedback: Introduce the website as a resource, Discuss "Hot Topics" from Master Plan survey, Discuss interactive open-source mapping.	NA	**NA**
		4.A.vii.	Work with Canopy the California Native Plant Society, Acterra, and the Santa Clara Valley Audubon Society to develop the content for outreach possibilities such as city mailings, e-mail blasts, door hangers, bill inserts, social media, press releases, and newspaper columns.	NA	
		5.B.xiv.	Nurture existing volunteer support groups and work with non-profit organizations to reach out to businesses and corporate sponsors for forest-restoration projects.	NA	
4	COMPLETED as 3.A.iv.: Stanford tree tour piloted in October of 2015. Stanford pruning workshop held in July 2016.	4.A.iv.	Continue pruning workshops and tree tours and consider additional ways for community and staff to interact.	NA	**NA**

Completed programs continued on next page

5	COMPLETED as 2.B.i,. 4.B.ii., 4.K.ii., 4.K.iii., 4.I.xii., 4.I.xi., 3.B.i., The new Urban Forester has begun discussions to identify and mitigate the potential conflicts between the multiple departments and disciplines of the city's functions. So far.... UF Division's role at the DRC meetings formalized / counter technicians trained to provide back up for UF staff. Power Point presentation developed for both staff & developers (at DC.) Initiated contract for an arborist to review the IR compliance requirements regarding tree protection. The UF and Parks Divisions jointly updated language in Parks Master Plan-- also coordinating with the JPA and SCVWD regarding impacts along San Francisquito Creek and Palo Alto Golf Course. Parks Division staff can now log into TreeKeeper to input data / produce reports. The UF Division developed / presented possible design solutions to the Engineering Division re: future sidewalk design and maintenance tasks.	3.B.i.	Formalize the Urban Forester's role relative to: • Citywide Sustainability Plan; • Development of citywide policy; • Inter-departmental collaboration; • Technical advice.	NA	**NA**
		6.B.i.	Ensure that the UF Division is included in the early phases of design and review of private projects. For discretionary review projects, work with Planning to ensure that each environmental assessment... will include trees in the aesthetic resources section... and biological resource section... as applicable in the early review phase.	NA	
		6.B.viii.	Work with Canopy to educate the development community about the need to discuss trees during the early stage of a project's design.	NA	
		5.B.xvii.	Develop a flexible staffing model that ensures staffing commensurate to work load increases and decreases.	NA	
		5.B.xiii.	Consider transferring maintenance responsibilities from Community Services Parks Division to Public Works Urban Forestry Division for: • All trees on the golf course. • Trees in developed areas of Open Space (along park roads and around structures/park facilities)	NA	
		6.J.ix.	Ensure consideration of tree preservation and tree replacement for capital improvement projects within city parks and open spaces.	NA	
		4.B.i.	Explore ways to avoid root damage to sidewalks… explore root barriers and solutions such as meandering sidewalks around trees, suspending sidewalks above tree roots, and replacing concrete sidewalks with recycled rubber sidewalks.	NA	
6	COMPLETED as 3.A.iv.: Stanford tree tour (by Canopy) piloted in October of 2015. Stanford pruning workshop held in July 2016.	4.A.iv.	Continue pruning workshops and tree tours and consider additional ways for community and staff to interact.	NA	**NA**
Completed Programs (Yrs 1 & 2)					**NA**

Year 3 July 1, 2017 thru June 30, 2018 — Yr 3

Year 3 is somewhat defined by its lack of funding. However, some programs progressed by means of shifting funds within the UF budget. *Note: Programs related to canopy disparity in South Palo Alto will also progress in Year 3 by means of shifting funds within the UF budget; however, completion will require additional funds so it is scheduled and budgeted in Year 4.*

Overview of Program or Program Group		Individual Programs	Costs Program	Costs Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Continued progress inYears 4 through 12 will rely on specific funding.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	NA	**NA**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
2 The City Council identified this as a priority and although there is no funding for Year 3, it is scheduled for completion by means of shifting funds within the UF budget.	6.H.iii.	Evaluate the current street tree pruning program and the possible advantages of a more frequent pruning cycle. Ensure that pruning continues to consider bird nesting seasons.	NA	**NA**
3 This program is ongoing and even though there is no funding in Year 3, progress will continue by means of shifting funds within the UF budget. The main task in Year 3 will be to revise Title 8 of the Muni Code, "Trees and Vegetation."	6.C.i.	Continue to enforce the City's Tree Protection Ordinance but also review it to ensure that it reflects state water efficiency standards as well as this Master Plan's goals for regeneration of native woodland landscape	NA	**NA**

Year 3 continuted on next page

4	6.H.vi.	Amend fee schedule to include development fees to enable appropriate participation in project review, building and other permit issuance, regulatory compliance, and auditing.		
	5.B.xviii.	Work with relevant departments to update development fees--to accommodate intensification of the review process to ensure that all ecological and environmental concerns are met.		
	3.A.vii.	Work with the city's Office of Sustainability to reevaluate costs and fees related to efforts to coordinate sustainability programs.	NA	
	6.I.i.	Reevaluate and adjust development review fees to accommodate work load increases and staffing impacts…		
These funding-oriented programs reflect multiple constituencies and vantage points; however, they have been consolidated in Year 3 for discussion--with the goal of precipitating funding in Years 4-12. Discussion resulted in the conclusion that implementation of the UFMP should be an ongoing budget adjustment.	6.H.v.	Review and update current fines and incentives as related to tree malpractice and vandalism.		
	6.J.iii.	Develop long range operating budget that includes: •Inspections; •Removal / replacements; • Restoration.; Training; •Technology; •Retention of dead trees and snags; •Protection of native saplings.; Survey of invasive species; •Mapping of soil and water table; •Increase native/decrease invasives—monitor results.		**NA**
	3.A.vi.	Work with the city's Office of Sustainability to explore new funding sources for the Urban Forestry program.	NA	
	6.B.ii.	Ensure that the Urban Forestry Division is included in the early phases of budgeting (for staff resources) as well as the early phases of design for Capital Improvement Projects.		
	6.D.iv.	Ensure adequate budget to accomplish the strategies for preserving and increasing the canopy in South Palo Alto.		
	4.B.iv.	Work with relevant departments to develop funding goals and strategies for desired tree pruning cycle.	NA	
Year 3 total				**NA**

Year 4 July 1, 2018 thru June 30, 2019 — Yr 4

Year 4 will focus on completing in-progress programs that were interupted by lack of funding in Year 3.

Overview of Program or Program Group		Individual Programs	Costs Program	Costs Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 300 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Continues progress inYears 4 through 12 will rely on specific funding.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….		
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.	$50,000	**$50,000**
5 Updating the *Tree Technical Manual* is now merged with devleoping a *Tree & Landscape Technical Manual*-- and is in progress. Completion of the manual will encompass all the programs within this group. *Note: Funding will be provided by means of shifting $55,000 from existing funds previously allocated for Years 1& 2.*	5.B.ix.	Update the *Tree Technical Manual*		
	6.F.i.	Develop a *Tree & Landscape Technical Manual (T&LTM)*		
	6.J.vi.	Coordinate between departments and with partners re: • Appropriate mixes of trees, shrubs, and grasses; • Natural cycles of disturbance such as fire; • Response to use and impacts; and • Appreciation by the community.		
	5.B.x.	Incorporate stormwater treatment and bioretention BMPs into the *T&LTM*....		
	3.D.i.	Review existing procedures and protocols for using mulch to suppress weeds (including state requirements) and develop site-specific criteria to ensure minimal impacts to wildlife…	$0	**$0**
	3.D.ii.	To prevent runoff of polluted water, avoid use of recycled-tire or synthetic mulch and discourage use of recycled-tire or synthetic mulch on private property		
	3.D.iii.	To prevent runoff of polluted water, avoid use of dyed mulch and discourage use of dyed mulch on private property.		
	3.B.ii.	Work with the *Office of Sustainability* and environmental groups to develop a "Landscape Sustainability Checklist"—for development review.		

Year 4 continuted on next page

7 These programs aim to make the UF website an easy means of communication--and a useful tool.	4.A.vi.	Develop a capability for community input on the Urban Forestry website.	$10,000	
	5.B.iii.	Develop open portals for data entry as a way of engaging the community as partners in stewardship and to improve data currency and accuracy….Ensure compatibility with mobile reporting application developed by the city.	$10,000	
15	5.B.xii.	Improve the way maintenance work is documented/uploaded into TreeKeeper/GIS. Explore Smart Phone capabilities as well as the ability for the public to both access information about tree maintenance and contribute information about maintenance needs.	$10,000	**$100,000**
	5.B.v.	Integrate the information in Tree-Keeper with the city's GIS to enable review of the relationship between trees and other relevant geographic information such as parcel lines, land uses, zoning, soil types, watersheds, creeks, pavement, hazard areas, and utility infrastructure.	$60,000	
21	5.B.iv.	Update the City's GIS and Tree Keeper database information about trees within the 32 parks, Municipal Golf Course, utility easements, city facilities, and city-owned property such as fire stations—to ensure completeness and accuracy.	$10,000	
Year 4 total				**$150,000**

Year 5 July 1, 2019 thru June 30, 2020 — Yr 5

Year 5 will focus on community relationships including the Oakwell Survey which was promoted by local environmental groups during the Master Plan process.

Overview of Program or Program Group		Individual Programs	Costs Program	Costs Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 300 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Continues progress inYears 4 through 12 will rely on specific funding.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….		
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.	$0	**$0**
6 Development of the "Preferred and Restricted Species List" will be informed by the "Tree Library" (Program 1.A.i.) and will--inturn--inform the Tree & Landscape Technical Manual (Program 6.F.i.,) Completion will encompass the other programs in this group. Funding for this group is budgeted for Year 5; completion may take more than one year.	1.A.ii.	Work with Canopy and stakeholders to develop a "Preferred and Restricted Species List" that will be a helpful tool for staff and property owners.		
	6.J.vii.	Ensure that the "Restricted Species List" includes consideration of species appropriate for the golf course, parks, preserves, and open spaces e.g., importance of native species, avoiding invasive species, fruit trees, watershed protection, wildlife habitat, need for understory species, layerd canopy, root damage to trails, and litter on playing fields.		
	3.A.i.	Work with the *Office of Sustainability* and environmental groups to ensure that the "Preferred and Restricted Species List" complements the City's Sustainability Plan.		
	1.A.iii.	Develop site-specific species selection protocols to complement the "Preferred and Restricted Species List"	$75,000	**$75,000**
	1.A.iii.	Work with Canopy and stakeholders to develop site-specific-species-protocols to complement the "Preferred Species List"…		
	6.B.iv.	Provide education to all relevant staff about the "Preferred and Restricted Species List."		
	1.B.i.	Work with Canopy to encourage local and regional nurseries and garden centers to defer to stock the "preferred species"…		
	1.A.iv.	Manage species diversity in such a way as to: • Emphasize regeneration of a native woodland landscape. • Avoid monocultures that create vulnerability.		

Year 5 continuted on next page

8				
These programs seek to establish a forum for interaction and explore the possibility of an oversight group simililar to existing boards and commissions.	3.A.iii.	Work with the city's Office of Sustainability to evaluate the establishment of an oversight group... to investigate and comment on the impact of projects on the urban forest and overall ecosystem—and monitor the progress of the *Urban Forest Master Plan* goals.	$55,000	**$55,000**
	4.A.iii	Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, and the Santa Clara Valley Audubon Society to establish a recurring forum that provides the community an opportunity to communicate with staff and members of the decision making bodies...		
9				
Local environmental groups have expressed an urgent need to update the Oakwell survey done in 1997 and have contributed several programs related to that need. These programs will involve the participation of Canopy and local environmental groups. Funding is budgeted for Year 5; it may take multiple years to complete these programs.	2.A.i.	Update the Oakwell survey to: • Assess changes since 1997; • Evaluate the health/take actions to improve conditions; • Evaluate gaps and opportunities.	$30,000	**$180,000**
	2.A.ii.	Incorporate the Oakwell survey data into Tree-Keeper, the City's GIS, and an interactive open-source mapping system such as OpenTreeMap.	$15,000	
	2.A.vii.	Create educational materials on oak tree care and pro actively reach out to property owners, landscaping firms, real estate agents and other audiences to educate them about the importance of oaks, other native, and introduced climate adaptive trees and how to care for these trees.	$45,000	
	2.A.viii.	When a property transfers, provide information on how to care for oaks	$45,000	
	4.A.xi.	Partner with Acterra, Audubon and California Native Plant Society to develop educational materials and workshops on native woodland ecosystems, other native habitats and the benefits of native tree species in the urban landscape for both the public and urban forestry staff.	$30,000	
	5.B.vi.	Use the City's GIS system to highlight native trees especially oak species, and create a layer that identifies connectivity and spatial distribution of oaks and riparian tree species.	$15,000	
Year 5 total				**$310,000**

Year 6 July 1, 2020 thru June 30, 2021 — Yr 6

Programs in Yrs 6 & 7 go further than ever before to exhaustively search for ways to improve procedures & minimize negative impacts to the urban forest. **Yr 6 focuses on programs that must be coordinated with the Utilities Dept. & Office of Sustainabiity.** *Note: the10-year follow up to the canopy analysis of 2010 is also budgetd for Year 6.*

Overview of Program or Program Group		Individual Programs	Costs: Program	Costs: Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
10 These Year 6 programs address a variety of water concerns. Success will involve the cooperation of the Office of Sustainabiity, multiple departments, and possible changes to the Munidipal Code. ** Note: Program 3.C.iv. (emergency program to provide water to trees during severe drought) aims to ensure that money is held in reserve for if and when needed. These reserves do not necessarily need to be associated with funding for the UFMP. Rather, these funds can be part of citywide emergency funds.*	3.C.ii.	Develop a report re: achievements towards reducing salinity of recycled water from the RWQCP since Resolution 9035.	$8,000	**$235,000**
	3.C.iii.	Work with Canopy and stakeholders… to develop a list of tree species appropriate for use in areas where recycled water is or may be used for irrigation.	$1,000	
	3.C.i.	Review existing monitoring programs regarding the use of recycled water for landscape irrigation at the Municipal Golf Course and Greer Park. Modify as needed.	$8,000	
	3.C.vi.	Emphasize the Utilities Department's "Waste Avoidance" programs (for water) on the Urban Forestry website.	$1,000	
	3.C.iv.	Work with relevant departments to develop an emergency program to provide water to trees during severe drought.*	$200,000	
	3.C.v.	Work with relevant departments to encourage construction of rain gardens and use of condensation water from air-conditioning units, groundwater dewatering water, and hydrant flushing water to provide water for "thirsty" habitat trees…	$17,000	

Year 6 continuted on next page

11				
These Year 6 programs focus on improvements that must be worked out with the help of the Utilities Department and are fundamental to sustaining Palo Alto's legacy of beautiful tree-lined streets. * Note: Programs 6.H.ii., 4.B.ii, 6.H.i., & 4.B.iii. funded by Utilities Depart.	6.H.ii.	Analyze and resolve conflicts regarding the space required between utilities underground equipment and other criteria related to what makes a planting site viable for street trees.*	$0	**$50,000**
	4.B.ii.	Explore ways to prevent conflicts between tree roots and underground infrastructure such as requirements that limit the location of underground utilities to a corridor…*		
	6.H.i.	Review line clearing standards and criteria for selecting contractors; publish on the Urban Forest website.*		
	4.B.iii.	Develop ways to avoid disfigurement of trees from power line clearing such as running the power lines through protective conduits that don't require as much clearance.*		
	3.A.iv.	Work with the Utilities Department to publish tools and priorities for citing of solar collection devices. Same	$25,000	
	3.A.v.	Work with the city's Office of Sustainability and/or the Utilities Department and Canopy to create a guidance document—how to successfully incorporate solar collection and trees into site design—for those considering solar.	$25,000	
12				
A canopy comparison (1982 to 2010) was done to inform this MP. It clarified many questions about development impacts and identified where the urban forest most needed help. Subsequent discussions indicated a desire to repeat a similar comparison every 10 years.	6.J.i.	Ensure that the follow up citywide canopy cover analysis (Program 5.A.i.) is sufficient to establish a baseline of canopy cover in the city's preserves and open spaces.	$175,000	**$175,000**
	5.A.i.	Follow up the 2010 canopy cover assessment done by UC Davis that established the baseline for this master plan—with a similar assessment in approximately 2020. Present a comparison of the two assessments to the City Council.		
	6.J.ii.	Establish a baseline for relevant information to be monitored (in addition to canopy cover). *Note: This is not necessarily redundant with Program 5.A.iii..*		
Year 6 total				**$460,000**

Year 7 July 1, 2021 thru June 30, 2022 — Yr 7

Programs in Years 6 & 7 go further than ever before to exhaustively search for ways to improve procedures and minimize negative impacts to the urban forest. **Year 7 focuses on zoning regulations which must be coordinated with the Planning Division and Development Center.**

Overview of Program or Program Group		Individual Programs	Costs Program	Costs Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
13 Like Group 12, these programs also involve Zoning; and therefore, coordination with the Planning Division. The initial scope of these programs was completed in 2016; however, 2nd Edition augmentation will likely require furrther review and additional efforts. * *Note: Most costs associated with these programs should be funded by application fees. Although some changes to the fees and fines were accomplished in Year 2, additional changes may be required. Further review of fees and fines is scheduled for Year--Program Group 4.*	6.E.i.	Utilize the following resources when reviewing projects on El Camino Real (ECR): • ECR Master Planning Guidelines.; •... scenic design plans; • ... plans of nearby jurisdictions and agencies; and • County Urban Runoff Pollution Prevention Program.*	$0	**$0**
	6.E.ii.	Coordinate with nearby jurisdictions/agencies re: trees within the ECR Corridor e.g., • Management of existing trees; • ...impacts and opportunities; and •...future needs; • Grand Boulevard Project.*		

Year 7 continuted on next page

14					
		1.C.iii.	Evaluate implementation/effectiveness of the requirement for 50% shading for parking lots and identified heat islands. Identify reasons for success and or failure. Modify as needed.	$45,000	
		6.A.iv.	Analyze the impact of basement construction—and dewatering by wells and basement sump pumps—on tree health and the urban forest. Focus shall include but not be limited to: • Soil volume; • Water table; • Root impact on the development and/or adjacent sites.	$50,000	
These Year 7 programs focus on improvements that can only be provided through zoning-and can only be accomplished with the help of the Planning Division. These programs are fundamental to sustaining Palo Alto's legacy of an urban canopy that is above average in density. These programs will likely require changes to Title 18 of the Municipal Code, "Zoning."		6.G.i.	Work with relevant departments to monitor and comment on zoning changes.		**$195,000**
		6.C.iii.	Develop canopy thresholds— possibly based on zoning and land use goals of the Comprehensive Plan…		
		6.G.ii.	Develop incentives to retain/plant trees...of high habitat value and fruit trees—through... LEEDs , Build It Green, Green Points, & Backyard Habitat Programs, and/or similar...such as defined by Sustainable Sites Initiative, National Wildlife Federation, and San Francisco Estuary Institute's Vision for a Resilient Silicon Valley.		
		1.C.iv.	Develop requirements for new commercial, multi-unit, and single-family housing development projects to provide street trees (or space for future trees) and related irrigation systems. *Note: The requirement for public art may be a useful model.*	$100,000	
		6.A.iii.	Ensure that (in addition to building standards) Palo Alto's standards for landscape installations and renovations, consider appropriate species selection and placement of trees—especially relative to existing trees and habitat value.		
		6.H.iv.	Work with relevant departments to create criteria for minimum tree plantings as development requirements.		
		6.A.ii.	Augment project-review standard conditions w/ • Requirements for no net canopy loss per project site; • Soil volume requirements for trees per species group.; and • Habitat connectivity and regeneration of a native woodland ecosystem on a landscape scale.		
Year 7 total					**$195,000**

Year 8 July 1, 2022 thru June 30, 2023 — Yr 8

Years 8 & 10 tackle the logistics of incorporating the knowledge gained from MP efforts into the daily activities of the city and community. **Year 8 focuses on technology and monitoring programs.**

Overview of Program or Program Group		Individual Programs	Costs Program	Costs Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
15 These programs aim to monitor the city's commitment to achieving a 98% stocking level for street trees.	1.C.i.	Develop criteria for viable street tree planting sites, increased planting of street trees, and related protocols to ensure stocking level of 98%.	$70,000	**$70,000**
	1.C.ii.	Use criteria for viable street planting sites to review and update information about existing and available viable sites in TreeKeeper, and GIS—as well as an interactive open-source mapping solution such as OpenTreeMap.		
	1.D.i.	Develop a monitoring program and produce annual reports of removals and plantings to show progress toward the goal of 98% full stocking of identified viable planting sites within right-of-ways and parks.		
	5.B.xii.	Improve the way maintenance work is documented/uploaded into TreeKeeper/GIS. Explore Smart Phone capabilities as well as the ability for the public to both access information about tree maintenance and contribute information about maintenance needs.		
	5.B.v.	Integrate the information in Tree-Keeper with the city's GIS to enable review of the relationship between trees and other relevant geographic information such as parcel lines, land uses, zoning, soil types, watersheds, creeks, pavement, hazard areas, and utility infrastructure.		

Year 8 continuted on next page

16	These programs aim to grow a database of explicit knowledge about individual properties and development projects.	6.C.ii.	Evaluate needs and benefits of a possible requirement that digital information about protected trees be submitted to the City as a condition of approval for permit applications.	$2,000	**$80,000**
		5.B.i.	Conduct electronic tree surveys to enable analysis of development impact.	$58,000	
		5.B.ii.	Develop database management tools to assist with monitoring, documentation, and evaluation of tree restoration work.	$20,000	
17	The street tree inventory was updated in 2010 as part of this MP. 2022 is a logical time for a follow up.	5.A.ii.	Follow up 2010 inventory update and i-Tree streets analysis with either: • A similar cmprehensive inventory & analysis OR a series of 7 partial ones done annually.	$140,000	**$140,000**
Year 8 total					**$290,000**

Year 9 July 1, 2023 thru June 30, 2024 — Yr 9

Year 9 programs focus on ecological and wildlife concerns which are secondary only to infrastructure conflicts, development impacts, and water concerns--addressed in earlier years of this implementation plan.

Overview of Program or Program Group		Individual Programs	Costs: Program	Costs: Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
18 The i-Tree eco analysis (or similar) and the i-Tree wildlife (or similar) assessment will be demanding endeavors. These programs will involve working closely with local environmental groups. ** Note: Inventory of invasive species (a component of Program 2.A.v.) to be coordinated with the Parks & Open Spaces Division--and may begin as early as Year 3 or 4.*	5.A.iii.	Conduct an i-Tree eco analysis (or similar) to establish a citywide benchmark...both public and private trees and then to monitor change in the future. Metrics should be compared to changes in order to craft policies, provide incentives, and adapt partnerships.	$95,000	**$508,000**
	5.A.iv.	Conduct an i-Tree wildlife (or similar) assessment of the existing habitat and biodiversity—to establish a baseline and help identify and prioritize needs.	$45,000	
	2.A.iii.	Develop a plan for restoring a city-wide native woodland landscape..... Specifically, • Street trees: from 7% to 10% within 10-year plan / 20% within 20 years.• Urban parks: from 11% to 25% within 10-year plan / 50% within 20 years. • OS/preserves: to at least 80% within 10-year plan....	$60,000	
	2.A.v.	Work with Canopy/stakeholders to: • Inventory the invasive tree species population as defined by the Recommended and Restricted list; • Formalize a plan for decreasing that population; • Develop procedures...;• Develop specifications…• Develop monitoring program.*	$275,000	
	4.A.ix.	Work with Santa Clara Valley Audubon Society to develop programs to familiarize residents with Palo Alto's urban forest's birds and butterflies—and ways to attract them.	$30,000	
	4.A.viii.	Partner with Santa Clara Valley Audubon Society for the Palo Alto Christmas Bird Count, Spring Bird Count, and the Backyard Bird Count.	$3,000	
Year 9 total				**$508,000**

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Year 10 July 1, 2024 thru June 30, 2025 — Yr 10

Years 8 & 10 tackle the logistics of incorporating the knowledge gained from MP efforts into the daily activities of the city and community. **Year 10 focuses on education and document updates.**

Overview of Program or Program Group		Individual Programs	Costs: Program	Costs: Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
19 These educational and outreach programs aim to share the benefits--derived from the MP programs--with the community--to enhance the urban forest and ecological environment.	4.A.ii.	Work with Canopy and stakeholders such as the California Native Plant Society, Acterra, the Santa Clara Valley Audubon Society and the community to develop outreach procedures to follow prior to making any significant changes to the urban forest —whether or not CEQA review is required.	$5,000	**$40,000**
	6.J.viii.	Work with Canopy to educate the community regarding the necessity of tree removals…	$1,000	
	6.B.ix.	Work with Santa Clara Valley Audubon Society and other organizations to educate the development community about minimizing project effects on local wildlife.	$11,000	
	4.A.x.	Educate citizens about correct pruning at the best time to protect bird habitat and nesting.	$13,000	
	2.A.vi.	Utilize public space opportunities--and encourage the use of private space opportunities--to implement management techniques that enable trees, shrubs, and compatible vegetation to coexist with the goals of producing ecosystem benefits, aesthetic interest, layered wildlife habitat, and food for people.	10000	

Year 10 continuted on next page

20	3.B.iii.	Work with the city's Office of Sustainability to educate staff about the importance of describing potentially negative—or unintended—impacts to the urban forest and ecologic balance/ resilience ...whether or not CEQA review is required.		
	6.B.v.	Provide education to DR staff about City Sustainability Plan priorities and need for staff reports to include information about the role of trees in moderating potential negative impacts... or add beneficial services related to...	$20,000	
	6.B.vi.	Educate DR staff about City priorities and need for staff reports to include information about potential opportunities to enhance: • The vibrancy of the community..; • Human health benefits ...; • Bicycle and public-transportation…		
These programs aim to ensure that staff are informed and equipped to make use of the benefits derived from the MP programs to enhance the urban forest and ecological environment.	6.B.vii.	Provide education to staff and ensure that tree maintenance practices continue to consider bird nesting seasons.		**$100,000**
	5.B.xvi.	Provide training UF staff and park rangers that includes: • Certification as arborist & pesticide application; • Education in Integrated Pest Management, .mgmt of invasive plants, and ecology and native plants; • Proficiency in relevant software; • Tree Risk Management Protocols. ...	$10,000	
	5.B.xix.	Establish written risk management protocol and training for scheduled inspections.	$50,000	
	6.A.ii.	Augment project-review standard conditions w/ • Requirements for no net canopy loss per project site; • Soil volume requirements for trees per species group; • Habitat connectivity and regeneration of an native woodland ecosystem on a landscape scale.		
	6.A.i.	Review up-to-date sources for ... possible modifications to Zoning Regss, Building Standards, Green Building Standards, Standard Conditions of Approval, Standard Details, Green Infrastructure Practices, storm water permitting procedures, etc.	$20,000	
Year 10 total				**$140,000**

Year 11 July 1, 2025 thru June 30, 2026 — Yr 11

The dominant programs in Year 11 are the Comprehensive Conservation Plan and updating of the individual park plans although the status of this programs and precise needs are not predictable as this project is lead by the Community Services Department and already in progress. Year 11 also contains programs for expanding the GIS database.

Overview of Program or Program Group		Individual Programs	Costs: Program	Costs: Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….	$0	**$0**
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.		
21 The specific tasks and budget needs of these programs to be further defined through future collaboration with the Parks Division. ** Note: Comprehensive Conservation Plan (Program 6.J.iv.) to be coordinated with Parks & Open Spaces Division--and funded by Parks & Open Spaces CIP.*	6.J.iv.	Develop a Comprehensive Conservation Plan *	$0	**$20,000**
	6.J.v.	Update existing park plans and/or develop new plans to ensure that tree issues are addressed.	$20,000	
22 Having this information in the GIS is a lofty goal that would provide unprecedented guidance towards species selection and other choices relevant to the urban forest.	5.B.vii.	Develop or obtain a more up-to-date and accurate soils map and add it into the GIS.	$25,000	**$40,000**
	5.B.viii.	Develop a map showing the depth of available water within the urban forest.	$15,000	
Year 11 total				**$60,000**

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Year 12 July 1, 2026 thru June 30, 2027 — Yr 12

The programs of Year 12 are exciting and aim towards new levels of operation; however, they are scheduled at the end of the Implementation Plan so as not to compete with more fundamental needs.

Overview of Program or Program Group		Individual Programs	Costs: Program	Costs: Group
1 This MP priority is long range and recurs in each remaing year of the plan. Based on the analysis done in Yrs 1 & 2 (Program 6.D.i.), these programs aim to ensure the addition of at least 1000 trees per year. Work commences in Year 3--even without specific funding by shifting existing funds within the UF budget. Progress inYears 4 through 12 will rely on partnership funding beyond the budget shown.	6.D.ii.	Develop strategies to end the trend of decreasing canopy in South Palo Alto….		
	6.D.iii.	Ensure that staff and contractors performing maintenance tasks in South Palo Alto know that preserving and increasing the canopy—and focus on native and introduced climate adaptive species—in South Palo Alto is a City priority.	$0	**$0**
23 The needs of this program will be informed by the success of the site-specific species selection protocols (Program 1.A.iii. - in Year 4).	5.B.xi.	Complete the update of the *Street Tree Management Plan* ….	$70,000	**$70,000**
24 These valuable programs may happen sooner; however, as mentioned, they're scheduled at the end of the Implementation Plan so as not to compete with more fundamental needs.	3.A.ii.	Work with the city's *Office of Sustainability* to evaluate future participation in carbon credit programs.	$0	**$10,000**
	5.B.xv.	Explore a collaboration between relevant local fire protection districts and CAL FIRE regarding an educational campaign...about vegetation management in appropriate areas of the city. Incorporate into Sustainability Plan as well as the *T&LTM*..	$10,000	

Year 12 continuted on next page

25	If exploration of these possibilities indicates feasibity, they could become unique enhancements to both the city and community.	1.B.ii.	Consider feasibility of a city-owned nursery or partnership with California Native Plant Society, Acterra, or other local non-profits.	$10,000	**$30,000**
		6.G.iii.	Explore the feasibility of a tree adoption program—possibly to be modeled after programs offered by the Sacramento Municipal Utility District (SMUD) which has been operating successfully for 15 years.	$2,500	
		3.D.iv.	Explore an expansion of the existing urban-wood recycling program to include higher end products that do not break the wood down…	$15,000	
		2.A.iv.	Initiate “tree giveaway” events that provide residents with free fruit trees, native trees and introduced climate adaptive trees.	$2,500	
Year 12 total					**$110,000**