M E M O R A N D U M

TO: Mayor and Council

FROM: Sue Edwards, Assistant City Manager
Bert Lumbreras, Assistant City Manager

DATE: July 16, 2014

SUBJECT: Council Resolution 20130627-070 – Care, Maintenance, and Planting of Public Trees

On June 27, 2013 Council adopted Resolution No. 20130627-070 pertaining to the care and maintenance of public trees. The resolution directs the City Manager to: 1) assess the value and benefits of public trees; 2) evaluate the adequacy of the current level of care for public trees; and 3) consider various tree-related service delivery issues. Attached is a report of findings and recommendations in response to this Council resolution. Below is a summary of key findings and recommendations.

Value and Benefits of Public Trees
An initial assessment of the value and benefits of public trees has been completed using the U.S. Forest Service iTree Eco model. Additional data collection is underway with assistance of the U.S. Forest Service and a refined modeling analysis of tree benefits will be available early in 2015. Key results of the initial analysis are:

- There are approximately 7.34 million trees in Austin in City parks and preserves and within the public right-of-way.
- The estimated replacement value of public trees in Austin is $4 billion.
- Public trees in Austin remove an estimated 803 metric tons of air pollution and produce nearly 58,000 metric tons of oxygen each year.
- Existing public trees store an estimated 458,000 metric tons of CO_2 and store an additional 38,000 metric tons annually.
- Public trees intercept an estimated 1.21 million cubic meters of rainfall annually.
- Nearly $10 in benefits is derived from every $1 invested in the care and planting of public trees.

Level of Care for Public Trees
A comparison of the current level of service provided for the care and planting of public trees with a recommended level of service reveals a current funding gap of approximately $12.5 million per year. Approximately $7.8 million/year is for tree care and maintenance while $4.4 million/year is needed for tree planting on public lands.

Tree-Related Service Delivery
Consideration was given to the potential for consolidation of some City of Austin tree-related programs and activities. It is recommended that the code-mandated functions of the Urban Forester be consolidated with the City Arborist Program within the Planning and Development Review Department. Consolidation of these functions is expected to bring significant improvements including greater focus to the implementation of *Austin's Urban Forest Plan,* a more integrated and comprehensive approach to the entire urban forest, elimination of potential conflicts of interest with regard to the preservation and protection of trees on City properties, consolidated oversight of tree planting funded through mitigation fees associated with both public and private development, and a general strengthening of the existing programs and activities by providing a larger and more professionally diverse support staff.

In addition to the recommended consolidation of some City tree programs, the full implementation of *Austin's Urban Forest Plan* will bring about improved alignment across multiple departments with tree-related service delivery responsibilities. Key implementation actions include development of an urban forest annual performance report card, development and implementation of Departmental Operating Plans, development of Austin-specific standards of care for trees and plants on public property, and regular staff training to ensure adherence with standards of care and Departmental Operating Plans.

Please feel free to contact us if you have any questions about this report or if you require additional information.

Attachment

cc: Marc A. Ott, City Manager
Greg Guernsey, Director, Planning and Development Review Department
Sara Hensley, Director, Parks and Recreation Department
Howard Lazarus, P.E., Director, Public Works Department
Victoria J. Li, P.E., Director, Watershed Protection Department

Assessment of the Care, Maintenance, and Planting of Public Trees

Report of Findings and Recommendations in Response to

City Council Resolution 20130627-070

July 2014

Participating Departments:

Parks and Recreation Department

Planning and Development Review Department

Public Works Department

Office of Sustainability

Watershed Protection Department

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1.0 Introduction

On June 27, 2014 Council adopted Resolution No. 20130627-070 pertaining to the care and maintenance of public trees. The resolution directs the City Manager to:

- Assess the value and benefits of public trees;
- Evaluate the adequacy of the current level of care for public trees; and
- Consider various tree-related service delivery issues.

The Watershed Protection Department (WPD) was assigned as the lead department for developing the staff response to this resolution. An inter-departmental working group was formed with both executive level and technical staff representation from WPD, the Parks and Recreation Department (PARD), the Planning and Development Review Department (PDRD), and the Public Works Department (PWD), as well as the Office of Sustainability. The project has also required input from other departments that have responsibilities related to the care and maintenance of public trees (e.g., Austin Energy, Austin Water Utility, Aviation Department, and others).

It is important to note that the scope of this report is limited to the public portion of the urban forest, which for this assessment is defined as trees in active use parks; trees in passive use natural areas (e.g., preserves managed by PARD); and trees within the public right-of-way. Trees within preserves managed by the Austin Water Utility (AWU) Wildlands Division (e.g., Balcones Canyonlands Preserve and Water Quality Protection Lands) are included in the assessment of public tree benefits. However, the scope of the analysis of the level of service and tree-related service delivery issues does not include trees within the preserves managed by AWU Wildlands Division; the trees along power transmission/distribution lines that are managed by Austin Energy, many of which are on private property; and trees on other City-owned properties (e.g. libraries, airport). In terms of the adequacy of public tree care and tree planting on public property, and tree-related service delivery issues, the focus of the analyses was on the urban forestry functions performed by PARD and PWD.

2.0 Benefits of Public Trees

Trees, both public, as well as those on private property, are considered important elements or components of the City's "green infrastructure", which is defined in the Imagine Austin Comprehensive Plan as:

> *"Strategically planned and managed networks of natural lands, parks, working landscapes, and other open spaces that conserve ecosystems and functions, and provide associated benefits to human populations."*

Ecosystem services commonly ascribed to green infrastructure are the benefits provided by nature to households, communities, and economies and include, but are not limited to:

- Hazard mitigation (e.g., flood and wildfire risk reduction)
- Water quality protection / improvement
- Erosion and sediment control
- Air pollution reduction
- Local and global climate regulation
- Wildlife habitat
- Food and renewable non-food products
- Social and cultural benefits (e.g., recreation)

As with "gray" infrastructure (e.g., roadways, storm drains), trees are important assets that provide services and value to the community. And, like gray infrastructure, trees and other elements of green infrastructure require active management and an ongoing commitment of resources for the care and maintenance of existing "inventories" and for the replenishment of that inventory as trees die due to age, disease, storm damage, or removal for various purposes (e.g., capital improvement projects).

2.1 i-Tree Eco Model Results

A key task in the Council resolution directing this assessment is:

> *"…to assess the value and benefits that public trees provide to the community and to various municipal functions, such as urban heat island reduction and stormwater management. This assessment should be performed using existing city resources to the greatest extent feasible and should quantify the value and benefits of both street and non-street public trees."*

To complete this task the staff working group elected to use the i-Tree Eco model, which is one module of a suite of analytical tools developed by the U.S. Department of Agriculture Forest Service and available to users at no cost. i-Tree Eco was designed as a tool to assist urban forest managers with characterizing the structure, function, and the value of urban trees and vegetation. The i-Tree Eco model requires the user to obtain and submit local data to the U.S. Forest Service, which then runs the model and generates reports that describe the structure and function of the urban forest, the replacement cost value of the local urban forest, ecosystem service benefits and the value of such benefits, health benefits to communities, and an overview of the health of the local urban forest. i-Tree Eco has been used widely by communities throughout the U.S. and internationally, including such "peer" cities as Houston, Chicago, New York, Atlanta, and Kansas City.

The iTree Eco model has inherent limitations and its outputs are best viewed as generalized estimates. For example, tree species benefits are based on conditions in Charlotte, North Carolina and default factors for monetizing tree benefits are similarly not based on Austin

conditions. However, the model can be customized by specifying alternative location-specific benefit valuation factors.

Consistent with the scope of this analysis, an initial phase of data collection was conducted during the fall of 2013 with a focus on public trees. The ESRI ArcGIS program was used to identify 284 randomly stratified sample locations throughout the city. i-Tree Eco recommends that field data be collected for at least 200 points (1/10 acre plots) in order to minimize the degree of sampling error in the results. The typical approach is for each plot to be thoroughly surveyed with data collected for all trees occurring within plot boundaries. Data includes such information as tree species, trunk diameter at breast height, height, and canopy attributes.

Of the 284 plots identified, 80 occur on parcels owned by the City of Austin or located within the public right-of-way (ROW). During the initial survey a total of 18 wooded plots containing 573 trees were field surveyed. Data was obtained remotely using ArcGIS software data for 43 non-forested plots. Data for the remaining 19 wooded plots that were not surveyed directly was generated by WPD statisticians using data from the 18 surveyed plots.

In terms of the structure of the public portion Austin's urban forest, the results of the initial i-Tree Eco analysis show that:

- There are approximately 7.34 million trees in Austin in City parks and preserves and within the public right-of-way;
- Tree canopy cover in public areas is estimated to be 38.6 percent;
- The three most common species of public trees are ashe juniper, live oak, and cedar elm;
- An estimated 55 percent of public trees are less than 6 inches in diameter; and
- The estimated replacement value of public trees in Austin is $4.02 billion.

For the valuation of some of the ecosystem service benefits associated with public trees in Austin the staff working group specified the following factors for use in the i-Tree Eco model:

- Carbon sequestration with an estimated value of $13.12/metric ton (data from USEPA);
- Avoided electricity consumption $0.071/kWh (based on average highest Austin Energy summer and winter rates); and
- Avoided stormwater runoff value with a range of $0.0125 - $0.025 per gallon (based on an estimation of water quality benefits by WPD).

Using these factors, the results from the initial i-Tree Eco analysis are that Austin's public trees:

- Remove an estimated 803 metric tons of pollution annually with a pollution removal value of $4.87 million/year;

- Produce 57,800 metric tons/year of oxygen;
- Store an estimated 458,000 metric tons of CO_2 in existing trees, with a value of $6.01 million;
- Store additional 38,200 metric tons of CO_2 annually, valued at $501,000/year;
- Intercept an estimated 1.21 million cubic meters of rainfall annually; and
- Generate a net annual value of benefits of $10.7 million and an estimated cost-benefit ratio 1:9.87 ($9.87 of benefit for every $1 invested).

2.2 Additional Data Collection

Collection of additional data on Austin's urban forest, both public and private, is currently being conducted with assistance from the U.S. Forest Service using the Urban Forest Inventory Analysis (UFIA). Austin is the first of two cities nationally (Baltimore is the second) where the Forest Service is conducting data collection using the UFIA, which consists of both initial data collection and long-term monitoring. For this project the Forest Service has identified a set of fixed plots on both public and private properties. After the initial data collection, each plot will be re-sampled on a regular cycle, which will provide valuable time-series data for trend analysis.

Data collection for Austin's urban forest is scheduled to be completed during 2014 and the results are expected to be available by the spring/summer of 2015. The additional data acquired through the UFIA will enable the i-Tree Eco benefit analysis to be repeated with data for the entire urban forest, both public and private. Additionally, the UFIA analysis and analytical tools will enable City staff in various departments to create custom reports with estimates of area, tree numbers and species types, volume, biomass, growth rates, mortality, and removal. As called out in *Austin's Urban Forest Plan: A Master Plan for Public Property (AUFP)*, these kinds of analyses will be performed periodically to track various metrics related to the overall extent, structure, and health of the urban forest.

2.3 Other Benefits of Public Trees

Forestry researchers have also linked urban forest benefits to other economic and environmental factors and to various psychological, social, and health benefits. For example, the U.S. Forest Service has conducted research in Portland, OR and Baltimore, MD to determine if there is a relationship between tree canopy coverage and crime rates. The initial results showed a weak link in Portland but a somewhat stronger correlation in Baltimore. A similar project was recently conducted in Minneapolis, MN that reinforced the idea that increasing large tree canopy coverage is associated with lower crime rates. Similarly, researchers have also examined the relationship between tree canopy coverage and property values. The U.S Forest Service has estimated that healthy, mature trees add an average of 10 percent to the value of a property.

During the fall semester of 2013, an undergraduate class in the geography program at Texas State University undertook a GIS analysis to evaluate the relationship between tree canopy

coverage and crime rates, as well as canopy coverage and property values in Austin. The results of the analysis are consistent with the results of similar research that has been conducted elsewhere; that higher levels of canopy cover correlate positively to lower rates of violent crime and to increased property values.

3.0 Adequacy of the Current Level of Care for Public Trees

The second key task directed to City staff in the subject Council Resolution is to:

> *"…evaluate the adequacy of the current level of care by all city departments with tree-related programs and activities and…evaluate whether each program can provide the care necessary to preserve and maintain this infrastructure."*

To accomplish this directive, technical staff with the PARD Urban Forestry Program (with input from and the concurrence of technical staff in the PDRD City Arborist Program and in the PWD right-of-way forestry program) conducted a "gap analysis" consisting of:

- Characterization of the current level of service for the care, maintenance, and planting of trees on public property, again defined as City parks, natural areas managed by PARD, and trees in the public right-of-way managed by PWD; and

- Definition of a "recommended" LOS and estimation of associated funding requirements.

In conducting the level of service gap analysis staff relied on, to the extent possible and applicable, national standards, information from other municipalities, and data generated from in-house records. With the exception of currently budgeted resources, all cost figures presented in this report should be considered "first-order" rounded estimates. More detailed information and estimates are available for review in back-up documentation prepared by PARD urban forestry staff. Additionally, it should be noted that the gap analysis is based on current public tree assets and do not account for the future expansion of the City's jurisdiction or the acquisition of additional assets through annexation and acquisition of additional parkland.

PARD Urban Forestry program staff also developed an "ideal" level of service and estimate of associated funding requirements. That analysis was based on national industry standards and benchmarking with other cities. However, for this report, only the current and recommended levels of service, and the comparison of the associated costs with each, are presented. The full analysis, including this ideal level of service, is available in supporting documentation. Also, as previously noted, the analysis did not include land and tree management activities on the City's "wildlands" preserves, Austin Energy's power transmission and distribution line clearing activities, and the relatively minor and tangential tree management activities performed by other city departments (e.g. removal of trees obstructing water flows in drainage easements, tree maintenance at Austin Bergstrom International Airport).

The gap analysis was conducted with an eye toward alignment with the management goals specified in *Austin's Urban Forest Plan* (AUFP), which was recently adopted by the City Council, and with the vision in the plan for the City's urban forest:

> *"Austin's urban forest is a healthy and sustainable mix of trees, vegetation, and other components that comprise a contiguous and thriving ecosystem valued, protected, and cared for by the City and its citizens as an essential environmental, economic, and community asset."*

Based on this vision, the following management goals were used to guide the evaluation of the adequacy of the current level of service for public trees and the recommended level of service:

- Ensure the safety and welfare of citizens;
- Improve the overall health and increase longevity of the urban forest; and
- Maximize benefits provided to the community by the urban forest.

3.1 Current Level of Service

The staff analysis of the current level of service for the care, maintenance and planting of public trees examined activities and budgeted expenditures for "high use areas", defined as street trees and trees in the developed areas of City parks, as well as for lower use areas such as trees along trails and trees within undeveloped park and natural areas. Estimates were also developed for implementation of the AUFP and standards of care for public trees and vegetation and for activities related to public tree preservation, including the review of City capital improvement projects and private development that may impact public trees. Each element of the analysis is briefly described below.

Street Tree Maintenance - Routine and emergency tree care operations along City of Austin streets (i.e., the public right-of-way, or ROW) is currently reactionary, meaning that work is performed mostly in response to events and requests from the community. Tree care operations include pruning for street clearance and public safety, removal of high risk trees, and storm/emergency response. Storm/emergency response activities are focused on maintaining free and clear roadways and involve woody debris removal, pruning of broken limbs, and removal of failed trees. At present, the estimated average number of days to complete routine maintenance requests is 50 days and at current funding levels street tree maintenance occurs approximately once every 45 years for individual trees.

Estimates of current costs (see Table 1) associated with street tree maintenance include the entire annual budget for PWD forestry operations, less approximately $125,000 for tree planting activities, and roughly 40 percent of the PARD tree maintenance budget, which is based on an analysis of work orders completed in FY13, which shows that approximately 40 percent of the total number of trees pruned or removed by PARD Urban Forestry were in the public ROW and were typically an emergency response. Also, other costs are incurred by the City in relation to

street tree maintenance but are not included in the analysis due to a lack of information. For example, it has been anecdotally reported that Austin Resource Recovery vehicles sustain $500,000 to $1.0 million in damages each year due to low growing tree limbs over roadways.

Street Tree Planting – A significant portion of the street trees that are planted with City funding is through the NeighborWoods program, with approximately 3,600 trees planted annually. The estimated costs (see Table 1) for tree planting activities in the public ROW includes both the NeighborWoods program budget of approximately $166,000 per year and funding drawn from the Urban Forest Replenishment Fund (approximately $185,000 per year). The NeighborWoods program is administered by the local non-profit Tree Folks under contract with the City. Additionally, PWD estimates that approximately $125,000 of its current operating budget plus $60,000 from the Urban Forest Replenishment Fund is directed toward street tree planting. The PARD Forestry Program also performs some street tree planting activities, but this contribution is relatively minor and was not calculated for this analysis.

Maintenance of Trees in City Parks – As with street trees, routine and emergency tree care operations in developed, high-intensity recreation areas in City parks are largely reactionary and response driven and include the same types of activities described above for street trees. At present, the average number of days to complete routine maintenance requests is 50 days and at current funding levels, maintenance occurs approximately once every 51 years for individual trees.

For fiscal year 2013-14 the PARD Urban Forestry Program received a budget increase of $1.0 million, which is reflected in the cost estimates presented in Table 1. With the increased funding, a transition has begun to achieve a level of service that will ensure that trees on approximately 10 percent of active use parkland receive proactive care and maintenance each year. Proactive care involves inspecting and prioritizing sites such that maintenance can be scheduled in advance of problems occurring that would otherwise require a reactionary or emergency response. To achieve this objective PARD Urban Forestry program staff has developed and are using a park maintenance level of service tool to assist with the prioritization of parks for proactive maintenance. High priority parks are being inspected to screen for high-risk tree issues and maintenance is then scheduled to address these issues. At present with current resources, proactive maintenance will only address immediate safety concerns, as staffing resources are not presently available to address tree health and longevity issues.

The estimate of current expenditures for tree maintenance within parks, as shown in Table 1, is based on an estimate that 50 percent of the PARD Urban Forestry tree maintenance budget is expended for this purpose. An analysis of work orders completed during FY13 shows that approximately 50 percent of the total number of trees that were pruned or removed by PARD Urban Forestry during that period are located in City parks and that approximately 10 percent of tree pruning and removal operations occurred along trails. As noted previously, approximately 40 percent of PARD Urban Forestry tree maintenance work orders are expended on street tree maintenance activities.

Tree Planting in City Parks - The PARD Urban Forestry Program also performs tree planting activities in City parks, with approximately 400 to 1,000 container trees planted annually. Tree

planting activities, which typically span a three year period, include planning, tree procurement, volunteer coordination, planting, installation of irrigation equipment, periodic maintenance checks, and pruning for structure and form.

The estimated current budget for tree planting in City parks (see Table 1) is based on an assumption that 90 percent of the current funding for the PARD tree planting program is directed toward planting of container trees, with approximately 10 percent going toward the planting of seedlings. As previously noted, PARD does plant some trees in the public ROW, however, analyses on the breakdown of these operations have not been conducted, therefore for this report, all establishment costs are shown associated with tree planting in developed areas of City parks.

Maintenance of Trees Along Trails – Currently, little or no proactive tree maintenance occurs along trails within City parkland. The majority of tree care and maintenance is reactionary and response driven. Tree care operations include pruning for clearance and public safety, removal of high risk trees, and storm/emergency response. Storm/emergency response activities are focused on maintaining a safe park environment for trail users and involve woody debris removal, pruning of broken limbs, and removal of failed trees. At present, there is no overall plan for the planting of trees to improve the usability of trails, for example, by ensuring that there is adequate canopy cover and shade for trail users.

As noted above, based on an analysis of work orders approximately 10 percent of the PARD Urban Forestry tree maintenance budget is directed toward maintenance along trails. As shown in Table 1, this estimated to be $146,000 per year.

Maintenance of Trees in Natural Areas **-** Little proactive land management occurs in undeveloped or natural areas within City parks. Natural areas receive only minimal active maintenance, often through partnerships with other City departments, community groups, and volunteers.

Tree Planting in Natural Areas - Tree planting activities currently occur in undeveloped areas of City parks and natural areas, typically in proximity to creeks with degraded riparian ecosystems. This is part of a partnership between PARD and WPD to establish “grow zones” as part of WPD’s Riparian Zone Restoration (RZR) Program. Approximately 6,000-13,000 seedlings have been planted since 2012. Seedlings are typically planted en masse, often with volunteer labor and with little follow-up care and no supplemental irrigation. PARD and WPD are monitoring the establishment of trees from seedlings to determine survival rates and to evaluate the overall effectiveness of this approach.

Estimated costs associated with tree maintenance in natural areas are unknown at this time. Current expenditures associated with tree planting in natural areas is estimated to be 10 percent of the current PARD Urban Forestry funding for tree planting. As shown in Table 1, the estimated annual expenditure is $72,000. Additional funding that is not accounted for in this analysis is provided by WPD through capital improvement project appropriations.

Austin Urban Forest Plan and Standards of Care – In 1992 City of Austin code section 6-3-5 was amended to include a mandate for development of a plan for the management of the public portion of the City’s urban forest. In March 2014, the *Austin’s Urban Forest Plan* (AUFP) was

adopted by City Council. Development of the AUFP occurred over a three year period and was largely the work of existing PARD Urban Forestry staff and one temporary employee, members of the City's Urban Forestry Board, and City personnel in other departments with tree-related responsibilities.

City code section 6-3-6 also directs the Urban Forester to develop and implement standards of care for trees and vegetation. As an interim step, in 2012, the Urban Forestry Board adopted the American National Standards Institute (ANSI) section Z133: Standards for Arboricultural Operations and section A300: Tree Care Practices. As described in the AUFP, the ANSI standards were adopted as a "placeholder" pending the development of Austin-specific standards of care, which are to be in place by 2016.

Currently, only 0.3 FTE is available for development of the standards of care and for future update of the AUFP, representing an estimated annual expenditure of $23,000.

Table 1 – Current Level of Service for the Care, Maintenance, and Planting of Public Trees

Activity	Tree Care & Maintenance	Tree Planting	AUFP & Standards of Care	Public Tree Preservation	Total
Streets	*$1,649,000	**$351,000	-	-	$2,000,000
Parks	$731,000	$646,000	-	-	$1,377,000
Trails	$146,000	-	-	-	$146,000
Natural Areas	-	$72,000		-	$ 72,000
	-	-	$23,000	-	$23,000
	-	-	-	$191,000	$191,000
Total	$2,526,000	$1,069,000	$23,000	$191,000	$3,809,000

*Estimate based on current PWD budget for tree maintenance in the ROW plus approximately 40 percent of the PARD urban forestry tree maintenance budget.

**Current budget for the NeighborWoods tree planting program. Also includes an estimated $125,000 from the overall PWD forestry budget for tree planting plus an estimated $60,000 per year to be used by PWD forestry operations from the Urban Forest Replenishment Fund.

Public Tree Preservation - The PARD Urban Forestry Program received new funding in FY14 to hire two additional full-time equivalent (FTE) staff positions to work on activities relating to the preservation of public trees. Previously, one individual devoted approximately 75 percent of their time to public tree preservation. Current staffing levels and estimated expenditures (see Table 1) allow for collaboration with PDRD on reviews of site plans for capital improvement

projects and private developments that impact public trees, both in parks and the public ROW. Currently available resources also provide for a more systematic approach for integration of public tree preservation into capital projects.

3.2 Recommended Level of Service

The technical staff that participated on the working group for this project was also tasked with development of a recommended level of service and an estimate of associated funding levels. Comparison of the recommended level of service with the current level of service provides an estimate of the funding "gap", which is presented at the conclusion of this section in Table 10.

The "drivers" for development of the recommended level of service are the following goals:

- Improve public safety through proactive inspection and timely maintenance of public trees along streets and trails and within active use park areas. The desired result is an overall decrease in the number of emergencies related to public trees, leading to safer roadways and parks and reduced costs for reactive maintenance.

- Provide adequate resources to fully implement the AUFP and the urban forest elements of the Imagine Austin Comprehensive Plan.

- Develop and implement a city-wide plan to guide City-funded tree planting programs. The plan would identify and prioritize areas of the City considered deficient in canopy cover, or where additional canopy cover will provide significant community benefits, such as enhanced trail usability with greater shade provided by trees.

- Improve operational efficiencies through proactive, planned, and scheduled maintenance of public trees.

- Maximize the social, economic, and environmental benefits provided by the public portion of the urban forest as the overall health and function of public trees improve.

Care and Maintenance of Trees in High Use Areas – For street trees managed by PWD and for trees in active use parks managed by PARD, the key elements of the recommended level of service for public tree care and maintenance are:

- Proactive safety sweeps. For street trees this would be a "windshield survey" to identify trees that pose an imminent risk to public safety, followed by scheduled maintenance (e.g., pruning, removal) before an actual emergency occurs. For trees in active use parks the aforementioned park maintenance level of service tool will be used to prioritize parks for assessments, which is the equivalent of a "safety sweep". As with street trees, park trees identified as high risk will be scheduled to receive the required maintenance.

- Development and maintenance of a tree inventory and asset management system.

- Routine pruning for street clearance and public safety on an approximately 20-year cycle. During and after the first 20-year proactive maintenance cycle the frequency of reactionary and emergency maintenance should decline significantly, resulting in avoided costs over time. However, at this time, those avoided cost savings are difficult to predict or calculate. The recommended performance standard for completion of routine maintenance requests is 30 days or less.

- Routine pruning for tree health and longevity, also on a 20-year cycle.

- Timely response to tree-related emergencies. The average time to respond to emergency maintenance requests should not exceed two (2) hours.

Extrapolation of data acquired from a 2008 tree inventory indicates that there are approximately 123,000 existing street trees. For purposes of estimating the cost of required annual maintenance under the recommended level of service, a mortality rate of five percent per year is assumed. Based on this assumption, it is estimated that 6,200 street trees should be pruned annually and approximately 300 trees should be removed annually. For purposes of estimating the annual cost to maintain street trees (see Table 2) it is assumed that the average cost to prune a street tree is $110, and the average cost to remove a street tree is $300.

Table 2 - Recommended Street Tree Maintenance

Activity	Estimated Annual Cost	No. of Trees Addressed
Windshield survey	$150,000	123,000
Windshield survey risk abatement	$2,100,000	6,200
Routine maintenance (year 1)	$740,000	6,200
Reactionary maintenance (annual)	$1,800,000	unknown
Total	**$4,790,000**	

Extrapolation of data from the 2008 tree inventory also indicates that there are approximately 125,000 existing trees in the developed areas of City parks. As with street trees, a mortality of five percent is assumed and based on this assumption it is estimated that approximately 6,200 park trees should be pruned annually and that approximately 300 park trees should be removed annually. For this analysis, it is assumed that the average cost to prune a tree located in a City park is $130, and the average cost to remove a tree is $375. The estimated annual cost for the recommended level of service for maintenance of trees in City parks is shown in Table 3.

Table 3 - Recommended Park Tree Maintenance

Activity	Estimated Annual Cost	No. of Trees Addressed
Safety sweep	$150,000	125,000
Safety sweep risk abatement	$2,100,000	6,200
Routine maintenance (year 1)	$886,000	6,200
Reactionary maintenance	$730,000	Unknown
Total	**$3,866,000**	

Planting of Public Trees in High Use Areas **-** Staff recommends that tree planting within the public ROW and in developed City parks be implemented at a level to allow:

- One-for-one replacement of trees that are removed (estimated to be 5 percent per year of existing stock).

- Population of roughly half of available and suitable planting sites within the public ROW over 20 years. Based on the 2008 tree inventory, it is estimated that there are approximately 167,000 vacant planting sites within the public ROW. Under the recommended level of service, approximately 4,500 trees would be planted annually over the next 20 years, including replacement of trees removed, for total of approximately 90,000 street trees.

- Increases in the density of trees in the developed portions of City parks from approximately 34.5 trees per acre to 50 trees per acre over 20 years. This benchmark is based on a comparison of the density of trees in parks in other cities. Including replacement of trees removed, this would require planting an estimated 3,100 trees per year or approximately 62,000 trees over 20 years.

The estimated cost to achieve the recommended level of service for tree planting is shown in Table 4. This estimate is based in an average cost of $650 to procure, plant, and irrigate a new tree over a three-year establishment period.

Table 4- Recommended Tree Planting in the Public ROW and in City Parks

Activity	Estimated Annual Cost	Trees Planted/Year
Street Tree Planting	$ 2,925,000	4,500
Tree Planting in City Parks	$ 2,015,000	3,100
Total	**$ 4,940,000**	**7,600**

Tree Maintenance and Planting along Trails – The recommended level of service for maintenance of public trees along trails is similar to that recommended for street trees and parks. This would include proactive safety sweeps, maintenance of a tree inventory, pruning for

clearance and public safety, pruning for tree health and longevity, removal of high risk trees, and storm/emergency response. Trees growing along trails should also receive routine inspections and maintenance on a 20 year cycle.

There is an estimated 203 miles of authorized trails within City parks. For purposes of estimating maintenance costs, it is assumed that there are 40 trees per mile of trail that will require some level of routine annual maintenance and that an additional 13 trees will be identified as high-risk and require reactive maintenance or removal. To achieve a recommended tree density of 50 trees per acre, approximately 650 trees should be planted annually.

Table 5 - Recommended Tree Maintenance and Planting along Trails

Activity	Estimated Annual Cost	# / unit
Inspection sweep	$ 100,000	203 miles
Inspection sweep risk abatement	$ 900,000	2,600 trees
Routine maintenance (year 1)	$ 58,000	400 trees
Reactionary maintenance (annual)	$ 146,000	Unknown
Tree Planting	$ 423,000	650 trees
Total	**$ 1,627,000**	

Natural Areas – It is recommended that natural areas within City parks be managed in a manner consistent with current land management practices for the Balcones Canyonland Preserve (BCP) and the City's Water Quality Protection Lands (WQPL). Management plans should be developed and implemented for all preserves and greenbelts by 2024 to provide proactive management for public safety, wildfire risk mitigation, protection of critical environmental features and habitat, and management of invasive species. There are an estimated 5,472 acres of natural areas in developed parkland, and an additional 6,247 acres of undeveloped parkland, totaling 11,719 acres. Based on land management costs for the BCP and WQPL, annual costs are estimated to be $53 per acre. Estimated annual costs are shown in Table 6.

Table 6 - Recommended Undeveloped & Natural Area Management

Activity	Estimated Annual Cost (rounded to nearest $1,000)	No. of Acres under Management
Management Plan Implementation	$621,000	11,719

Austin Urban Forest Plan and Standards of Care – Implementation of the AUFP is considered a high priority and is underway. An implementation plan is being developed that will provide the roadmap for PARD Urban Forestry staff to assist other City departments with the development of Department Operational Plans (DOPs), which are to include performance metrics based upon individual department needs. The implementation plan should be developed within one year, Departmental Operational Plans should be completed within 10 years, and

Austin-specific standards of care should be completed within three years. The recommended level of service associated with this function requires the addition of one full-time equivalent position. Estimated annual costs are shown in Table 7.

Table 7 - Recommended Implementation of Austin Urban Forest Plan & Standards of Care

Activity	Estimated Annual Cost
Maintain Current Staff (0.3 FTE)	$23,000
Additional Staff 1.0 FTE	$78,000
Contractuals	$100,000
Total	**$201,000**

Public Tree Preservation – The recommended level of service for public tree preservation is based on the provision of consultation services for all development projects, public and private, that are proposed to occur on or adjacent to City of Austin property. Such services include identification of significant species and individual trees on project sites, health assessments for all trees on each site, development of site-specific plans to minimize and/or mitigate impacts to public trees, and advice on proper tree preservation protocols and procedures. To achieve the recommended level of service, two additional full-time equivalent staff positions are required. Estimated annual costs are presented in Table 8.

Table 8 - Recommended Development Review & Public Tree Preservation Staffing

Activity	Estimated Annual Cost
Maintain Current Staff (2.75 FTE)	$191,000
Additional Staff (2.0 FTE)	$136,000
Total	**$327,000**

Recommended Level of Service Summary **-** Table 9 below provides a summary of the estimated annual costs to implement the recommended level of service for the care, maintenance, and planting of public trees.

Table 9 – Recommended Level of Service for the Care, Maintenance, and Planting of Public Trees

Activity	Tree Care & Maintenance	Tree Planting	AUFP & Standards of Care	Public Tree Preservation	Total
Streets	$4,790,000	$2,925,000	-	-	$7,715,000
Parks	$3,866,000	$2,015,000	-	-	$5,881,000
Trails	$1,204,000	$423,000	-	-	$1,627,000
Natural Areas	$621,000	-	-	-	$621,000
	-	-	$201,000	-	$201,000
	-	-		$327,000	$327,000
Total	$10,481,000	$5,363,000	$201,000	$327,000	$16,372,000

3.3 Level of Service Gap Analysis

A comparison of the recommended level of service for the maintenance and planting of public trees, for preservation of public trees, and for implementation of the AUFP and Standards of Care, as shown in Table 10, indicates that there is an overall funding gap of approximately $12.6 million per year. Nearly 64 percent of the estimated funding gap is associated with the care and maintenance of existing trees on parkland and within the public ROW and approximately 34 percent of the gap is for tree planting in parks and in the public ROW. As previously noted, staff also prepared an analysis for an “ideal” level of service, which indicates an overall funding gap of roughly $25 million per year.

Table 10 – Comparison of Current Level of Service to Recommended Level of Service

	Current Level of Service	Recommended Level of Service	
		Estimated Cost	Gap
Tree Care	$2,526,000	$10,481,000	**$7,955,000**
Tree Planting	$1,069,000	$5,363,000	**$4,294,000**
AUFP & Standards of Care	$23,000	$201,000	**$178,000**
Development Review & Tree Preservation	$191,000	$327,000	**$136,000**
Total	**$3,809,000**	**$16,372,000**	**$12,563,000**

4.0 Tree-Related Service Delivery Issues

The third element of Council Resolution 20130627-070 directs the City Manager to consider:

> *"…adjustments to tree-related service delivery that could prove more efficient and cost effective, including potential consolidation and/or repositioning of tree-related programs as well as expanded funding opportunities such as the use of enterprise funds, existing environmental fees and assessments, and multi-departmental cost sharing."*

In addressing this element of the resolution, the staff working group completed four tasks:

1. Compilation of an inventory of City of Austin tree-related programs and activities;
2. Evaluation of options for the consolidation of some tree-related programs and activities;
3. Consideration of measures to improve the "alignment" of tree-related programs and activities; and
4. Identification of potential sources of funding for the care, maintenance, and planting of public trees.

4.1 Overview of City Tree-Related Programs

The starting point for consideration of service delivery issues related to public trees was to develop an inventory of City of Austin programs and activities that directly or indirectly involve trees, particularly those related to public trees. To accomplish this task the working group

surveyed City departments with identifiable programs and activities related to "land management", broadly speaking, and to trees specifically. A total of 20 programs and activities were identified and described in summaries that include a description of the program or activity, identification of the lead department, and performance measure and budgetary information. These summaries have been compiled into a document entitled, *City of Austin Programs and Activities related to the Management of Public Lands*, which is available on request.

Of the 20 land management programs and activities included in the inventory, eight (8) have particular relevance to tree care and tree planting and for purposes of this analysis are considered "core" programs. These programs/activities are shown in Table 11 along with basic information regarding budget, personnel, and funding sources.

Table 11 – City of Austin Tree-Related Programs and Activities

Program/Activity	Lead Department	Budget	FTEs	Funding Source
Parks Forestry Program	PARD	$ 2,713,445	33.00	- General Fund - Planting for the Future Fund
NeighborWoods	PARD	$ 166,080	0.25	- Electric Utility Revenue
COA Tree Contract	PARD	$ 144,905	0.05	- Electric Utility Revenue
City Arborist Program	PDRD	$ 820,000	5.50	- General Fund - Drainage Utility Fund
Oak Wilt Program	PDRD	$ 105,985	1.00	- Drainage Utility Fund
Austin Community Tree Program	PDRD	$ 30,000	0.05	- General Fund - Electric Utility Revenue
Right-of-Way Forestry Program	PWD	$ 1,037,315	9.50	- Public Works Transportation Fund - Austin Resource Recovery
Riparian Zone Restoration	WPD	$ 771,000	3.50	- Drainage Utility Fund

Other City of Austin land management programs and activities are not considered core programs in that they are somewhat tangential to various departmental missions that are not specifically related to tree care and planting. For example, the Austin Wildfire Division is implementing vegetation management projects with an objective of reducing wildfire "fuel" hazards in the urban-wildland interface. These projects are typically focused on removing understory "ladder fuels", which is a best management practice to reduce wildfire intensity and to minimize the risk to trees. Similarly, Austin Energy expends nearly $12 million annually on its power line clearing program, which is focused on tree trimming and removal along electric transmission and distribution lines, much of which is on easements on private property. The primary purpose of this program is to maintain electric transmission and distribution reliability in accordance with regulatory standards.

4.2 Consolidation and/or Repositioning of Tree-Related Programs

Six of the "core" tree-related programs and activities identified in Table 11 were considered potential candidates for consolidation or organizational repositioning because each is focused principally on the care, maintenance, and planting of trees. The WPD riparian zone restoration program, which is largely a collaborative effort with PARD is focused on restoration of riparian function rather than on tree care or planting per se. The primary responsibility for the care and planting of trees in the public right-of-way was recently moved from PARD to PWD and there is consensus that this activity should remain integrated with ROW maintenance.

Three of the remaining six programs are within PDRD and are primarily focused on private, rather than public trees – the City Arborist Program, the Oak Wilt Program, and the Austin Community Tree program. These are considered "core" programs in that their purpose is protection and enhancement of the urban forest. Also, each of these programs may directly impact public trees. For example, there is often an interface between public and private tree preservation where private development occurs adjacent to public property or where a private development includes areas within the public right-of-way. Also, tree mitigation fees assessed on private development may be directed toward the planting of trees on public property.

For this analysis, a group of executives from the participating departments and the Office of Sustainability examined the potential for consolidation or repositioning of all or portions of programs/activities currently positioned within PARD and PDRD. In the evaluation of these programs, one issue emerged as particularly relevant and became the focus of the analysis, that being the organizational placement of the "code-mandated" functions of the Urban Forester.

The Urban Forester is a position appointed by the City Manager that embodies a set of functions prescribed in various provisions of City code Chapter 6-3, which addresses "Trees and Vegetation". In both general and specific terms, the Urban Forester is the keeper of the City's public trees. The duties of the Urban Forester as defined in City code Section 6-3-4 are:

(1) Manage the city's urban forest;

(2) Administer the plan (i.e., *Austin's Urban Forest Plan*);

(3) Supervise and coordinate with responsible city departments to plant, maintain, or remove trees on public property;

(4) Grant or deny administrative approval to maintain or remove a public tree, and establish conditions of performance;

(5) Supervise and inspect work performed under an administrative approval granted under this article; and

(6) Remove a tree or plant planted in violation of this chapter.

Chapter 6-3 also provides that the Urban Forester will:

- Support the Urban Forestry Board with the development and periodic update of an urban forest plan (City code Section 6-3-5);

- Develop and implement Standards of Care for Trees and Plants on Public Property (City code Section 6-3-6); and

- Inspect trees on private property for potential lethal communicable disease and compel or provide abatement (i.e., removal) if the tree is determined to be a public nuisance; and

- Preservation and protection of public trees (City code Section 6-3-61), including the assessment of mitigation fees for the loss of value of public trees and any costs associated with the treatment or removal of public trees (City code Section 6-3-63).

At present, the position of Urban Forester is located within the PARD Urban Forestry Program, where in addition to the code-mandated functions described above, the incumbent is also responsible for the care, maintenance, and planting of trees within City parks. The current duties of the Urban Forester, which are depicted below in Figure 1, as well as the organizational placement of code-mandated functions, are seen as problematic for several reasons:

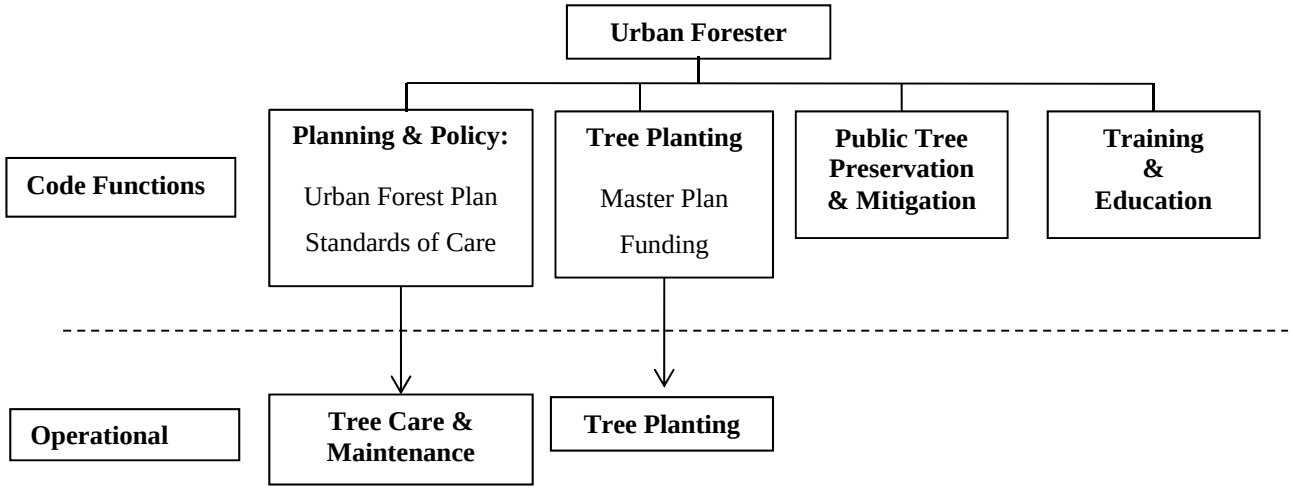
- **Policy and Planning vs. Operations -** At present the Urban Forester splits time and attention between two very different functions, the policy, planning, and regulatory functions mandated by City code and the day-to-day management of PARD forestry operations.

- **Potential Conflicts of Interest** - The quasi-regulatory functions associated with preservation of public trees presents a potential conflict of interest inasmuch as the Urban Forester has code authority to take enforcement action against his or her home department, including the assessment of mitigation fees for damage to or destruction of trees within City parks. This is seen as creating the potential for a conflict of interest.

- **Organizational Authority** - The level of authority of the Urban Forester within PARD and also in relation to other City departments is a concern that was identified in the *Forestry Management Audit* conducted by the City Auditor's Office in 2012.

- **Organizational Positioning** - The current organizational placement of the code-mandated functions of the Urban Forester creates a separation of public tree and private tree policies and programs within City government. While the Urban Forester and City Arborist collaborate regularly on a variety of issues and activities, this separation may contribute to a perception voiced by some outside stakeholders that the City lacks a comprehensive approach to management of the urban forest.

Figure 1 - Current Duties of the PARD Urban Forester Positions



In terms of the organizational placement of the code-mandated functions of the Urban Forester, the executive-level working group considered several alternatives to the status quo:

- Maintain the Urban Forester functions within PARD with "enhancements" in organizational placement and authority;
- Move Urban Forester functions to WPD;
- Move Urban Forester functions to Public Works; and
- Consolidate the Urban Forester and City Arborist functions within PDRD.

Moving the Urban Forester functions to the Office of Sustainability or establishment of an independent office were also identified as options.

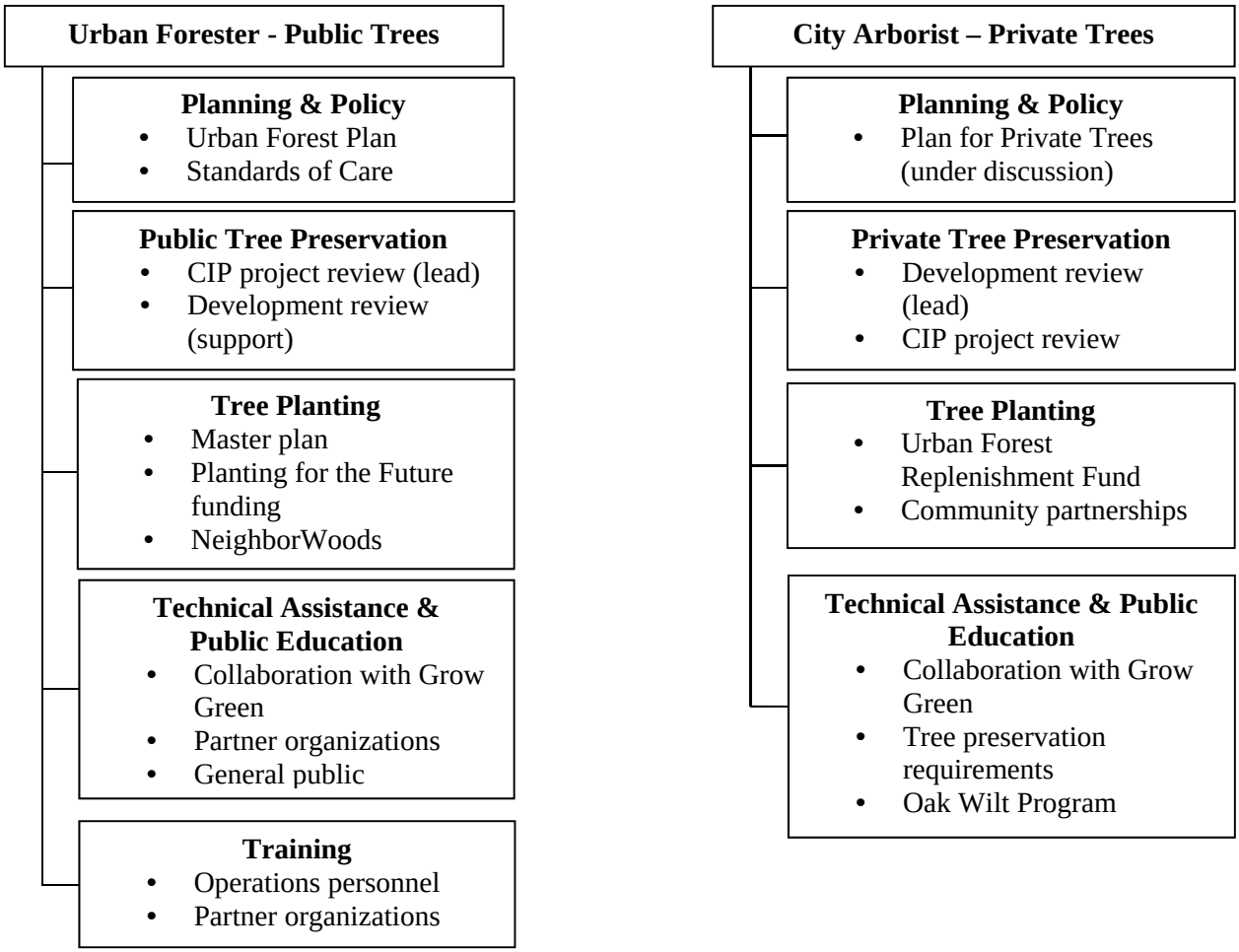
For each of the alternatives considered, the working group weighed the pros and cons and arrived at a consensus that the code-mandated functions of the Urban Forester should be consolidated with the City Arborist Program in PDRD. As depicted in Figure 2, many of the key elements of each of these functions/programs are comparable to one another. Advantages of this alternative include:

- Moving the code-mandated Urban Forester functions out of PARD separates those functions from PARD operations, which is seen as beneficial in terms of bringing greater focus to the code-mandated functions.

- Moving the code-mandated functions eliminates potential conflicts of interest, both in regard to forestry operations and particularly in regard to the planning and implementation of capital improvement projects in City parks.

- Combining the Urban Forestry functions and the City Arborist Program into a single and larger organizational unit will improve the capacity and capabilities of both programs by providing a larger and more diverse talent pool, opportunities for cross-training, sharing of duties, and career advancement.

Figure 2 – Comparison of Key Functions of the Urban Forester and City Arborist



- Consolidation of the functions of the Urban Forester with the City Arborist program will provide a more comprehensive and integrated approach to urban forest management. During the development of *Austin's Urban Forest Plan* a number of external stakeholders expressed dissatisfaction with the limited scope of the plan and suggested it be expanded to include trees on private property. Recently, the City's Environmental Board adopted a resolution that has been forwarded to the City Council recommending development of a

plan for private trees. As depicted in Figure 2, consolidation of the Urban Forester functions with the City Arborist Program should create a more integrated and comprehensive approach to urban forest management. Importantly, this includes consolidation of the management of two sources of funding for tree planting – the Planting for the Future Fund, which would transfer to PDRD with the code functions of the Urban Forester, and the Urban Forest Replenishment Fund. Integrated oversight of these funds is seen as strengthening the City's tree planting activities by ensuring that available funds are directed to areas of the City identified as having a high priority for increased tree canopy.

4.3 Improved Alignment of Programs and Activities

In addition to considering the potential for consolidation or re-positioning of City tree programs and activities, the working group also broadly considered the potential for improved "alignment" of other programs and activities. For the most part it is believed that full implementation of the goals and actions set forth in *Austin's Urban Forest Plan* will bring about a significant transformation in the delivery of tree-related services across the multiple departments with operational responsibilities for tree care. Specifically, significant improvements in the delivery of tree-related services can be expected as a result of the implementation of the following actions included in the AUFP:

- **Urban Forest Annual Performance Report Card** - Implementation of this action will require improved ongoing data collection and reporting on the overall health of the urban forest (public and private) and provide time-series data for trend analysis to track. Importantly, the Urban Forester will provide forest data to other City departments to guide the development of Departmental Operating Plans and will coordinate with other City departments to standardize forestry data collection and performance measures.

- **Departmental Operational Plans** - Every City department with land management responsibilities that include some level of tree-related service delivery will be required to develop and implement a plan to guide those operations. Departmental Operating Plans will be tailored to the specific needs of each department, in recognition of their differing missions. Alignment will be achieved within and between City departments through the appropriate implementation of Standards of Care for Trees and Plants.

- **Austin Standards of Care for Trees and Plants on Public Property** - Austin-specific standards for tree care, maintenance, and planting are to be developed and adopted by 2016 to replace the current ANSI standards that were adopted as a placeholder by the Urban Forestry Board in 2013. As noted above, the standards will provide common guidance to all City departments with tree-related service delivery responsibilities. Importantly, the standards of care will also provide a repository of science-based and Austin-specific "best management practices" (BMPs) for use by citizens, developers, and community groups. It is envisioned that the standards of care will include BMPs for tree pruning and other preventative maintenance practices; Integrated Pest Management; vegetation management for invasive species control and to reduce wildfire hazard; and

soil volume and quality criteria for street tree planting. The standards of care will also provide guidance for tree species selection in recognition of climate trends and the species suitability for differing micro-climates.

- **Training -** Staff engaged in the delivery of tree-related services are to receive regular training to maintain qualifications at or above recognized standards and to ensure that tree care and planting is in accordance with the standards of care.

In addition to the implementation of actions set forth in the AUFP, there are several existing mechanisms for regular ongoing inter-departmental coordination and collaboration on tree-related issues and to otherwise improve alignment among City departments with tree-related service delivery responsibilities. These are:

- **Public Lands Management (PLM) Sub-Team** – The PLM Sub-Team is part of the Imagine Austin Green Infrastructure Priority Program Implementation Team (GIPPIT). The mission of this inter-departmental group is to develop and implement *"…unified, comprehensive management of all City of Austin lands for public access, connectivity, and integrated environmental sustainability, including carbon sequestration, wildlife habitat, water quality and quantity, and education." (Imagine Austin Priority Action CE A16)*

- **Inter-Departmental Tree Working Group (iTWG) -** The iTWG, originally known as the Tree Oversight Committee, was formed in October 2006 to provide staff support for the "Tree Task Force". The Task Force was formed in early 2006 by City Council Resolution to review, develop, and recommend policies and procedures related to the City of Austin's tree trimming and removal program. While the task force completed its work in May 2008, the iTWiG has continued to meet monthly and includes regular participation by management and technical staff from seven City departments (AE, AFD, AWU, PARD, PWD, PDRD, and WPD). In addition to providing a forum for information exchange, the iTWiG also serves as a standing committee to provide assistance with various initiatives (e.g., Urban Forest Plan, tree purchasing master agreement, tree planting prioritization, etc.).

- **Memorandum of Understanding (MOU) with Public Works re: street tree care and maintenance** - As noted previously, lead responsibility for the care and planting of trees in the public ROW has recently been placed within PWD. As PWD builds the required capabilities and capacity the degree of involvement of the PARD Forestry Program will decrease. However, the Urban Forester will continue to provide oversight and support pursuant to code-mandated functions related to preservation of public trees and development of a Departmental Operating Plan the incorporates the Standards of Care for Trees and Plants on Public Property. At present, PARD and PWD are negotiating a MOU that will define roles and responsibilities with respect to public street trees.

- **Tree Purchasing Master Agreement -** Under the leadership of the PARD Urban Forestry Program a multi-year master agreement is being put in place for tree purchasing. The contract will be available for use by all City departments. The expected benefits of

this approach, in addition to promoting improved interdepartmental alignment, are to ensure that a diverse selection of species, that are healthy and appropriate for Austin conditions, are available to the City in various planting sizes. It is hoped that this will also result in cost-savings and improved quality as growers are encouraged to produce larger quantities of the specified tree species.

4.4 Funding for Public Tree Care and Planting

As presented in Section 3 of this report, there is a large "gap" of approximately $12.5 million per year in available funding to support a recommended level of service for the care, maintenance, and planting of public trees. Current source of funds for tree-related programs and activities are:

- General fund
- Tree mitigation funds – Planting for the Future Fund and the Urban Forest Replenishment Fund
- Capital Improvement Project funding
- Transportation User Fee
- Enterprise Funds – Electric, Water/Wastewater, Drainage
- Donations (e.g., funds and volunteer labor provided by individuals and community organizations)

Austin's Urban Forest Plan includes the following policy recommendation (UF-4) regarding funding sources for urban forest maintenance:

> *"Utilize existing funds or develop new funding sources such as assessment districts, new user fees, funding raising, private donations, grants, tax benefit financing, and/or an urban forest utility fee to fund urban forest management".*

5.0 Recommendations

Below are the recommendations of the staff working group. These recommendations have been reviewed by and are supported by the City Manager and affected Assistant City Managers and department directors.

Consolidation of Tree-Related Programs:

- Consolidate the code-mandated functions of the Urban Forester with the City Arborist Program in PDRD. If approved by the City Council as part of the FY14-15 budget, the consolidation would become effective on October 1, 2014.

Inter-Departmental Alignment:

- Proceed with implementation of *Austin's Urban Forest Plan*, particularly the development and implementation of Austin-specific Standards of Care for Public Trees and Vegetation and the development of Departmental Operational Plans.

- Complete the development of the city-wide public tree planting plan and use the plan to guide City tree planting programs and activities.

- Strengthen the role of the Inter-Departmental Tree Working Group (iTWIG) as an ongoing forum for information sharing, collaboration, and coordination.

- Improve the tracking of tree planting activities and expenditures, particularly those related to City of Austin sponsored capital improvement projects.

- Align tree-related performance measures, as appropriate, among various departments with tree-related responsibilities (e.g., metrics for planting of trees on public property).

Funding Needs and Sources:

- Refine the level of service "gap analysis" for PARD and PWD urban forestry operations and develop a recommended plan to close the gap in stages over a five-year period.
- Continue to explore options to increase funding for urban forestry activities, including potential new sources funding, as recommended in the AUFP. Recommendations should be developed in conjunction with development of an implementation plan to close the gap in the level of service.