

2012

University of  
California,  
Riverside



**URBAN FOREST MANAGEMENT PLAN**

Funding provided by the  
USDA Forest Service



Through the California Department of Forestry and Fire Protection  
Urban and Community Forestry Program



**UCR**

**Urban Forest Management Plan**  
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**TABLE OF CONTENTS**

<b>1.0</b>	<b>Executive Summary</b>	<b>5</b>
<b>2.0</b>	<b>Vision and Mission</b>	
	2.1 Vision statement	
	2.2 Mission statement	
<b>3.0</b>	<b>Introduction</b>	<b>5</b>
	3.1 Historical Context	6
	3.2 Environmental Context	7
	3.3 Why we need a plan	8
	3.4 Benefits provided by trees	9
	3.5 Scope of Plan	10
	3.5.1 Planning horizon	
	3.5.2 Relationship to other planning documents	
	3.5.3 Relationship of this plan to others	
<b>4.0</b>	<b>Status of the Urban Forest</b>	<b>11</b>
	4.1 Historical context	
	4.2 Tree resource assessment and inventory	11
	4.2.1 Canopy cover	
	4.2.2 Main Campus trees	
	4.2.3 Street trees	12
	4.2.4 Heritage trees and Memorial	
	4.2.5 Parking Lot trees	13
	4.2.6 Native areas/Arroyo trees	
<b>5.0</b>	<b>Management</b>	<b>14</b>
	5.1 Summary of management responsibilities	
<b>6.0</b>	<b>Strategic Plan</b>	<b>14</b>
	6.1 Issues and needs	
	6.1.1 Tree Resources	
	6.1.2 Management	
	6.1.3 Community	
	6.2 Goals, Objectives and Action Items	15
	6.3 Monitoring plan effectiveness	20
	6.3.1 Monitoring plan matrix	
<b>7.0</b>	<b>Appendix</b>	<b>24</b>
	7.1 Policies and Standards	
	7.1.1 Contractor Standards for Tree Work	
	7.1.2 Requirements for working on University Tree Contracts	
	7.1.3 Requirements for Street Tree Permits	25
	7.1.4 General Tree Care	27
	7.1.4.1 Plant Material	
	7.1.4.2 Planting	
	7.1.4.3 Pruning	
	7.1.4.4 Pruning schedule	28
	7.1.4.5 Pruning techniques	29
	7.1.4.6 Tree Staking, cabling, bracing and guying	
	7.1.4.7 Mulching	
	7.1.4.8 Tree Removal	30
	7.1.4.9 Stump grinding	
	7.1.4.10 Hazard and Emergency tree removal	
	7.1.4.11 Managing for catastrophic events	31
	7.1.4.12 Watering new plantings	
	7.1.4.13 Selecting nursery stock	
	7.1.5 Specific Planting Policies	32
	7.1.6 Tree Species Diversity Planting Requirements	33
	7.1.7 Tree/Hardscape Conflicts Guideline	
	7.1.7.1 Inspection	
	7.1.7.2 Recommendations	

7.1.8	Tree Removal Guidelines	34
7.1.8.1	Hazard tree removal	35
7.1.8.2	"Inappropriate tree removal	
7.1.8.3	Removals because of economic conditions	
7.1.8.4	Specific removal policies	36
7.1.9	Street Tree Asset Value	37
7.1.9.1	Decrease in assessed Real Estate Value	
7.1.9.2	Replacement Cost	
7.1.9.3	Formula Computation	
7.1.9.4	Formula Examples	37
7.1.9.5	Base Value	38
7.1.9.6	Cross-section area	
7.1.9.7	Species Class	
7.1.9.8	Condition Class	39
7.1.9.9	Location Class	
7.1.10	Defining Heritage Trees	40
7.1.10.1	Definition of Heritage Tree	
7.1.11	Tree Protection Plan	41
7.1.11.1	Minimum requirements	
7.1.11.2	Repair compensation	42
7.1.12	Departments Subject to Fines	43
7.1.13	Employees Subject to Discipline	
7.2	Campus Plant material palette	44
7.3	Street Tree Plan	49
7.4	Master Street Tree List	50
7.5	Street Tree Asset Value Tables	55
7.5.1	Table 1; Diameter and Cross Section Area of Tree Trunks	55
7.5.2	Table 2; Species Class Values for some So. Cal./NV. Trees	56
7.5.3	Table 3; Condition Class for Shade and Ornamental Trees	60
7.5.4	Table 4; Site Location Values for Shade and Ornamental Trees	61
7.6	Tree Inventory Data Sheet	62
7.7	Definitions	63
7.8	Bibliography	68



A row of Alder trees line the southern walkway to Highlander Union Building (HUB).



**Gordon Samuel Watkins Memorial tree located east of Watkins Hall 1000 on the commons or HUB lawn.**

## **1.0 EXECUTIVE SUMMARY**

The 2012 Urban Forest Management Plan (UFMP) identifies the issues and values most important to the campus community, describe a vision for the future of an urban forest, and provide strategies to achieve that vision. The 2012 Urban Forest Management Plan (UFMP) consists of several tree inventories, including the main campus, street and Heritage trees to name a few. It will also contain an analysis of the entire forest canopy. Tree maintenance and planting needs will then be identified. The plan will extend beyond planting and pruning schedules to include a variety of long-term goals, strategies and priorities that address tree canopy in a comprehensive, systematic manner. It also requires that all tree works decisions have a focus on retaining and protecting the campus tree investment at all times, unless there is a strong consensus and justification for removal.

## **2.0 VISION AND MISSION STATEMENTS**

### **2.1 VISION**

Our vision for UCR's urban forest is one that provides maximum benefit while sustaining a healthy, vigorous canopy over the campus and coexisting and adapting to the expanding development of the campus.

### **2.2 MISSION**

UCR's Physical Plant supports the University mission of teaching, research, and public service by promoting, enhancing, and protecting its urban forest. By effectively managing the urban forest there will be a safe, learning, and pleasing environment for the students, faculty, and staff in which to live, work, and study.

## **3.0 INTRODUCTION**

The University of California, Riverside's urban forest is a diverse patchwork of vegetation, a mosaic of green infrastructure that contributes directly to the livability of our campus community. Our trees provide wildlife habitat, clean and reduce the amount of storm water runoff, better air quality, reduce energy and infrastructure costs, add to property values, help to heal and calm the body and spirit, and provide a sense of place and community. Ultimately an urban forest consists of people and trees. Broad participation in its stewardship is needed to insure its sustainability. In order to be successful, the stewards of the landscape will have long-range impacts on the character of UCR's campus and the sustainability of its green infrastructure. UCR's 2012 Urban Forest Management Plan (UFMP) will provide a "roadmap" to help the University of California, Riverside invest in and maintain its urban forest for the next 25 years and beyond.

### 3.1 HISTORICAL CONTENT

The University of California, Riverside, commonly known as UCR or UC Riverside, is a public research university and one of the ten general campuses of the University of California system. UCR is ranked consistently in the nation as one of the most ethnically and economically diverse universities in the United States and currently educates 21,000 students. The main campus is located in the City of Riverside, California and sits on 1,200 acres at the base of Box Springs Mountain. UCR Botanical Garden contains 40 acres of unusual plants, and over 4 miles of meandering trails which wind through many microclimates and hilly terrain. Our Agricultural Operations occupy 600 acres to the west of main campus. UCR also has a branch campus in Palm Desert.

The City of Riverside prides itself on its historic connection to the navel orange, which was introduced to North America from Brazil by the first settlers in 1873. Riverside is home to the one surviving Parent Navel Orange Tree, from which all American West Coast navel trees are descended. UCR's heritage began with the UC Citrus Experiment Station which was founded in 1907 and is now home to the A. Gary Anderson School of Business Management. The Citrus Variety Collection here constitutes 1,800 trees representing two of each of the 640 types of Citrus and 28 other related genera in the Rutaceae family, the largest such collection in the world. The Herbarium houses more than 110,000 dried plant specimens from across the Western Hemisphere and UCR Botanical Gardens contain more than 3500 plant species from around the globe. UCR's undergraduate College of Letters and Science opened in 1954. The Regents of the University of California declared UCR a general campus of the system in 1959, and graduate students were admitted in 1961.



A gathering on the lawns of the A. Gary Anderson School of Business Management, circa 1959.



Chinese Elm



Flowering Cherry



Lemon Citrus



Strawberry Tree

### 3.2 ENVIRONMENTAL CONTENT

The environment in Southern California, especially Riverside County, affects what trees should be planted, how well they will grow, and how well they will be cared for. The Urban Forest Master Plan discusses the environmental conditions which occur in our area. Some factors, such as rainfall, are clearly beyond the control of the urban forest stewards. Other factors, such as soil conditions, can be modified. Other important environmental factors to consider are noted below.

#### 3.2.1 RAINFALL

Riverside receives 10.4 inches of precipitation annually with most of it occurring in the winter and early spring, especially January through March, with February the wettest month. However, during El Nino years, Southern California can receive considerably more precipitation than average.

#### 3.2.2 TEMPERATURES

Riverside, CA climate is warm during summer when temperatures tend to be in the 70's and cool during winter when temperatures tend to be in the 50's. Temperatures in the summer can exceed 100 °F (38 °C) but with somewhat low humidity. In the winter, high temperatures average in the upper 60s (°F), but may not rise above 55 °F (13 °C) during rainy days. January, the coldest month, averages a high/low temperature of 68 °F / 43 °F (20 °C / 6 °C), while August, the hottest month, and averages a high/low temperature of 95 °F / 64 °F (35 °C / 18 °C).

#### 3.2.3 CLIMATE ZONE

The UCR campus is located in the Sunset California Climate Zone 19 (USDA Zone 9b). Riverside experiences a semi-arid Mediterranean climate with hot, dry summers and mild, relatively wet winters. Latitude: 33.95 N, Longitude: 117.38W, Elevation 840 feet above sea level. The Riverside area is referred to as a "smog belt" because of its above-average level of air pollution. In a comparison by the National Campaign against Dirty Air Power (2003), the Riverside-San Bernardino-Ontario area was found to be one of the most polluted regions based on year-round particle measurements when compared to other U.S. cities.

#### 3.2.4 PLANTING ZONE

Zone 18. Hilltops and Valley Floors of Interior Southern California. Growing season is mid-March through late November.

#### 5 3.2. NATIVE VEGETATION

**The following plant communities are present within our area.**

*COASTAL SAGE - Annual rainfall: 10 to 20 inches*

Found on southwest-facing slopes below 3000 feet, sage scrub plants frequently drop their leaves and appear withered during dry seasons. Sage and other scrub species can be fragrant; they secrete oily chemicals as part of a process that aids them in the competition for soil, space and water.

*CHAPPARAL - Annual rainfall: 15 to 25 inches*

Chaparral communities grow on slopes between 1000 and 5000 feet in elevation. Chaparral is characterized by dense shrubs and small trees sometimes called an "elfin forest". Dense root crowns formed by chaparral plants resist erosion and aid regrowth after recurring fires. The foliage of these plants is characteristically evergreen, with glossy coatings and oily resins that increase drought resistance. Wildflowers and other low annuals are more conspicuous in open, recently burned areas.

*SOUTHERN OAK WOODLAND - Annual rainfall: 15 to 25 inches*

Mountain foothills and plateaus will often support mixed stands of live oak trees and other hardwoods, usually with grasses growing beneath them. When found in canyons and on north-facing slopes, the oak woodlands may be mingled with chaparral vegetation, with chaparral plants being dominant in more open areas and on south-facing slopes.

#### 3.2.6 FIRE RISK

Much of the County of Riverside is rated as a potential wild land fire area by the State of California Department of Forestry and Fire Prevention. A significant portion of the County of Riverside is underdeveloped and consists of rugged topography with potentially highly flammable indigenous vegetation. As a result, State and County Statues apply to the development and maintenance in these regions.

### 3.3 WHY WE NEED A PLAN

The purpose of the 2012 Urban Forest Management Plan is to provide guidelines for the preservation and protection of our tree heritage and the campus urban forest. The UCR Urban Forest Management Plan will address the challenges and provide strategies to ensure the urban forest is healthy, safe and abundant in the years to come. The campus urban forest landscape trees are young to middle aged and continue to mature; stewardship of UCR's urban forest involves more than simply replacing one tree with another. Its composition includes a sustainable mix of tree species and ages, environmentally sensitive native areas, wildlife corridors, flourishing shrub beds, various groundcovers, annual color beds and open spaces that create a contiguous and healthy ecosystem that is valued and maintained by staff and widely benefits the community.

A comprehensive plan will balance development with conservation and is needed to ensure program continuity for future generations. Urban forest managers must always keep the many benefits our trees provide in mind. Only then can we equitably weigh the benefits to cost value in tree preservation. An urban forest can be appraised and quantified. These benefits can be categorized as environmental, economic and social. Benefits will take years to develop, but an absence of timely management or a combination of poor management choices will have a negative and detrimental effect on the urban forest and the campus community as a whole.

Due to the substantial development of the campus over the last 50 years, the urban forest canopy has been reduced in size (approx. 40%) due to tree removals for construction, storm damage or has succumbed to natural mortality. Trees also suffer the hardship of urban life. Trees are affected by air pollution, irrigation, vandalism, construction, compacted soils and utilities to name a few. Trees throughout the campus community must be managed to maintain the maximum benefit that an urban forest provides to the community and quality of life. An urban forest has great value and increases over time.



Canaan Provence, France.

***“When I reflect that one man, armed only with his own physical and moral resources, was able to cause this land of Canaan to spring from a wasteland, I am convinced that in spite of everything, humanity is admirable. But when I compute the unfailing greatness of spirit and the tenacity of benevolence that it must have taken to achieve this result, I am taken with an immense respect for that old and unlearned peasant who was able to complete work worthy of God”.***

***Jean Giono***

***The Man Who Planted Trees***

***A heartwarming story about the impact of one man, Elzeard Bouffier, who planted trees from 1900-1946, in an area where the Alps thrust down into Provence, France.***

### 3.4 BENEFITS OF TREES

The trees of UCR's urban forest provide numerous benefits. The locations and types of trees determine the potential benefit. Our management goals include a consideration of desired benefits. A brief summary of potential benefits trees provide follows:

There are several environmental benefits provided by trees. They produce oxygen and reduce air pollution. Each year, 100 large mature trees remove 14 tons of carbon dioxide (CO<sub>2</sub>) from the air we breathe. They also reduce air temperatures and affect air quality since many pollutants are temperature dependent. These same trees remove 351 pounds of other air pollutants such as nitrogen dioxide, sulfur dioxide, ozone, airborne particles and volatile organic compounds. Planted in the right locations around buildings, they also reduce energy bills (electricity and natural gas) by shading and cooling buildings in the summer. Trees help to reduce storm water runoff (rainfall interception). The USDA's Center for Urban Forest Research sited in the University of California, Davis has discovered that one hundred trees catch up to 210,000 gallons of ground water and can help improve the water quality of underground wells by reducing nutrients and pollutants in the soil.



It is difficult to place a monetary value on the many vital services that trees provide. However, the California Department of Forestry and Fire Protection calculate that a single tree that lives for fifty years will contribute service worth nearly \$200,000 (in 1994 dollars) to the community during its lifetime. This includes providing oxygen (\$31,250), recycling water and regulating humidity (\$37,000), controlling air pollution (\$62,500), producing protein (\$2,500), providing shelter for wildlife (\$31,250), and controlling land erosion and fertilizing the soil (\$31,250).

UCR's urban forest plays an important role and provides significant economic benefits to the community. Trees are a valuable component of a properties landscape. Many of the mature trees of UCR's urban forest have an estimated value in the tens of millions of dollars (UCR Campus Tree Inventory). Our trees and the benefits they provide also contribute to property values. Healthy mature trees can add ten percent to property value. They also encourage students, staff and guests to linger and shop at local campus business. It has been noted that sixty percent of students take into consideration the quality of a landscaped campus when making their decision to attend an educational institution of higher learning. Our trees within a beautiful landscape are one of the reasons that UCR is a desirable place to obtain an education. It makes economic sense to continue our stewardship of the urban forest.

In addition to their beauty, trees provide peaceful places for citizens to enjoy and are valuable aesthetic components of the urban landscape. Trees protect people from the weather, provide privacy, buffer sounds, and create homes for wildlife. By shading roads and parking lots, well placed trees can increase the life of asphalt. Trees have also been shown to make a community safer, with less crime and fewer traffic accidents. Trees can also provide a sense of place in the midst of constant change. Our Heritage trees can tie us to the past and our native trees can teach us the natural history of the region. People often become personally attached to trees that they or their love ones have planted; and many trees are planted as living memorials, including the Watkins Memorial Holly Oak (1954), located just west of the Bell Tower near the center of campus and the Frost Memorial Citrus tree at The A. Gary Anderson School of Management, dedicated in 1958.

*"The great French Marshall Lyautey once asked his gardener to plant a tree. The gardener objected that the tree was slow growing and would not reach maturity for 100 years. The Marshall replied, 'In that case, there is no time to lose; plant it this afternoon!'" As told by John F.*

*Kennedy***3.5 SCOPE OF THE PLAN****3.5.1 PLANNING HORIZON**

Based on the scope of the plan, the time frame that the plan will address is the next 25 years (2013 – 2038). This time frame is acceptable due to the fact that trees are long lived and their rate of growth is relatively slow. Plans of 20 to 50 years are reasonable with respect to overall plan goals. Shorter planning horizons of 5 to 10 years will include detailed operational plans to be considered within the context of broader, longer-term strategic goals and objectives. Plans should be reviewed and updated every five years and no expectations should be made that this plan will remain in place for the next 50 years.

**3.5.2 RELATIONSHIP OF PLAN TO OTHER PLANNING DOCUMENTS**

The 2012 Urban Forest Management Plan (UFMP) has been created to support the following campus documents: 1990 Long Range Development Plan (LRDP), 1996 Campus Design Guidelines, 1996 Campus Landscape Master Plan, 2003 West Campus Area Plan (WCAP), 2003 Strategic Plan for Housing (SPH) and 2007 Update, 2004 East Campus Entrance Area Study (ECEAS), 2005 Long Range Development Plan (LRDP), which expresses vision and goals related to the campus's physical development, 2006 East-Southeast Campus Area Study (ESECAS), 2007 Campus Aggregate Master Planning Study (CAMPS), 2007 Campus Design Guidelines and the 2020 Path to Preeminence.

**3.5.3 WHAT WILL BE THE RELATIONSHIP OF THIS PLAN TO OTHERS**

The 2012 Urban Forest Management Plan (UFMP) guidelines are to be used by every architect, landscape architect, civil engineer and planner hired by UCR for consulting services. This document represents a directive to these consultants to incorporate these guidelines into design work for the campus. These guidelines are purposefully not presented as regulatory restrictions or prescribed standards. They provide an informal framework within which designers who willingly commit to contribute to the campus legacy of quality and continuity, can add positively to the built environment. The UCR Campus Architect, Capital & Physical Planning, the Office of Design and Construction, the Design Review Board and Physical Plant-Landscape Services Department will utilize this document as template which all proposed tree planting, removals and dedications will be measured. This document is intended to be a dynamic work-in-progress which will evolve as UCR grows and will be adapted to future programmatic and physical challenges.



Construction of the carillon Bell Tower and Sproul Hall in 1966.

## 4.0 STATUS OF THE URBAN FOREST

### 4.1 HISTORICAL CONTEXT

The campus has grown dramatically over the past 50 years. Policies and procedures have been put in place to manage its long range development goals, including campus landscape design guidelines, infrastructure, architectural themes and student population growth. UCR is an essential environmental, economic, and community asset committed to respecting the aesthetics, continuity and natural characteristics of the landscape while serving as noble stewards of its existence. UCR has and will endeavor to maintain a sustainable urban forest that contributes to the livability of our urban community.

Significant tree canopy coverage has been lost with the ongoing development of the campus infrastructure at the University of California, Riverside. Subsequently, UCR has chosen to enhance and preserve its trees because of the benefits they provide. Small steps have been taken to slow the loss of trees through preservation and planting throughout the campus. However, many challenges still exist that have adverse effects on our tree canopy coverage. It serves as an overall indicator of urban forest quality and quantity. This 2012 Urban Forest Management Plan (UFMP) is a framework for action. This Management Plan addresses the challenges that confront our urban tree canopy and offer goals and recommendations that will help the University of California, Riverside towards its vision for our maturing urban forest.

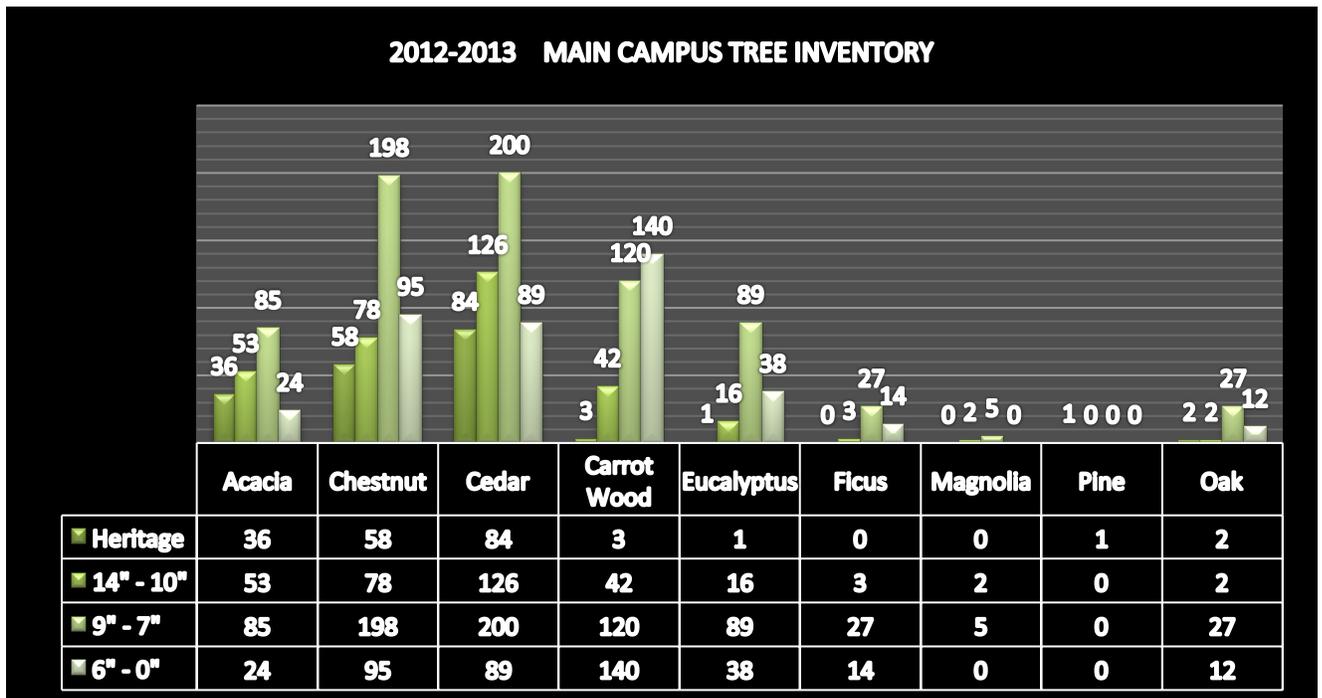
### 4.2 TREE RESOURCE ASSESSMENT AND INVENTORY (IN PROGRESS)

Every urban forest management plan should include an assessment of existing tree resources. The factors we will consider are:

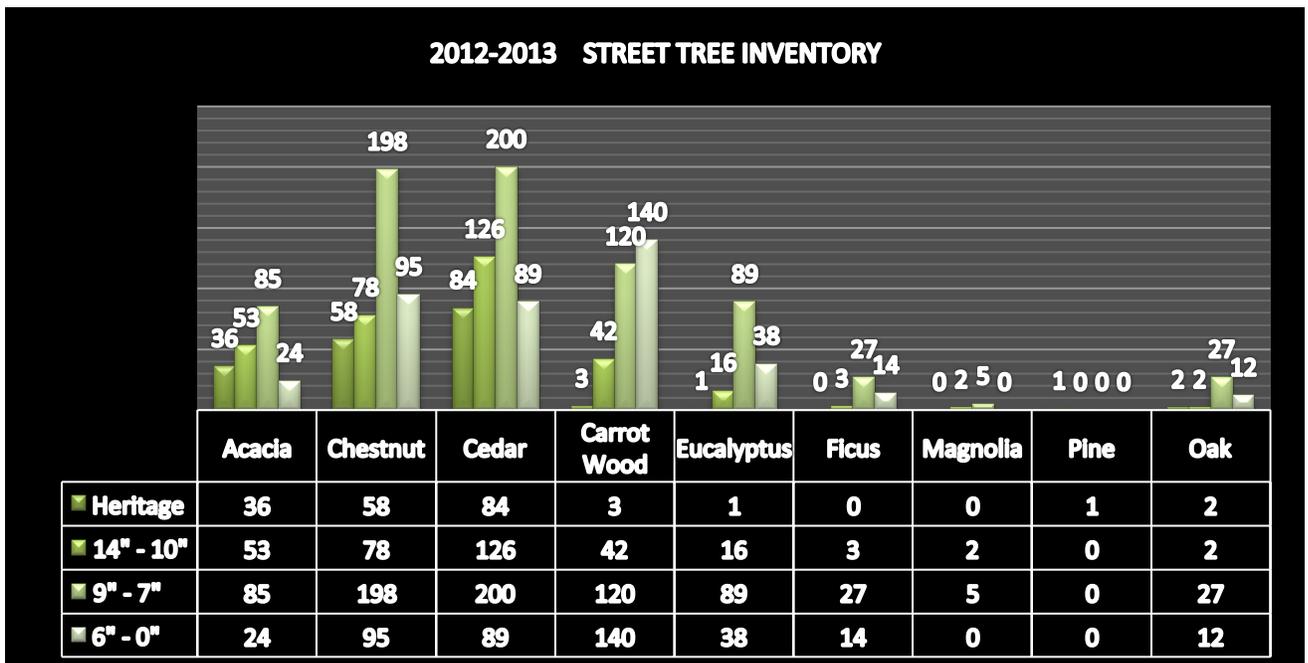
- Location (zone within the plan area, tree location relative to streets or structures).
- Extent (number, canopy cover percentage or area).
- Composition (species, size/age distribution).
- Condition (health, hazard potential, pruning needs).

#### 4.2.1 CANOPY COVER

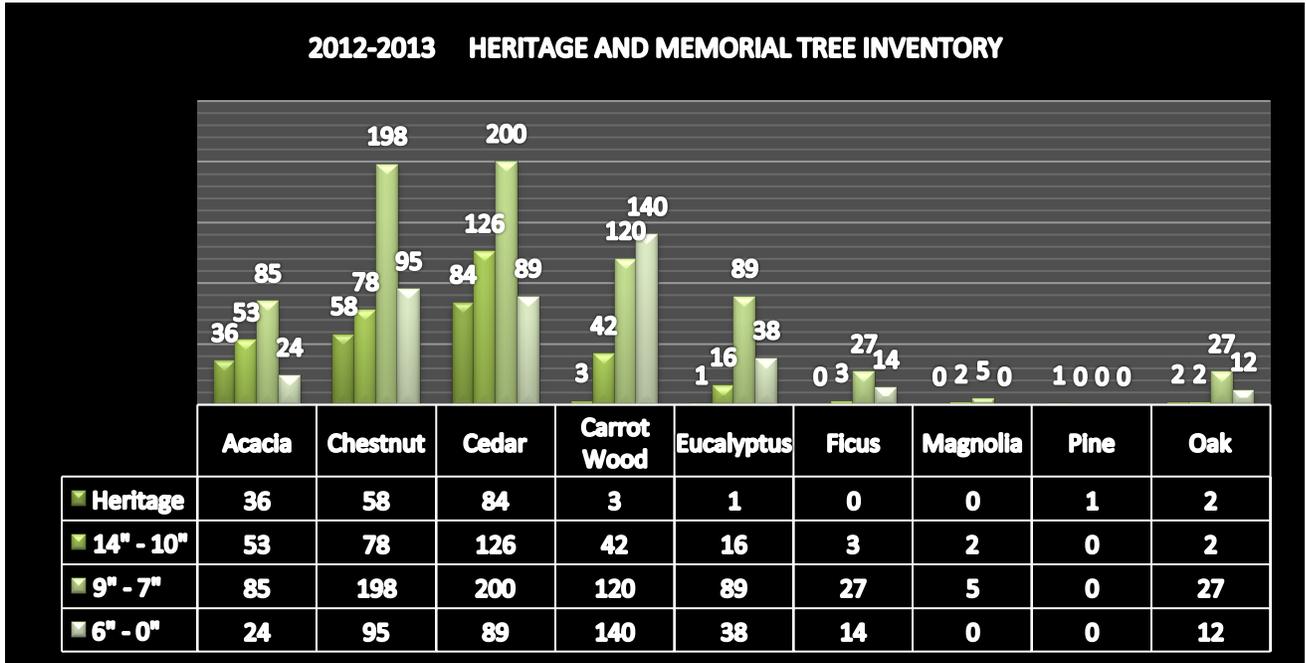
**4.2.2 MAIN CAMPUS TREES**



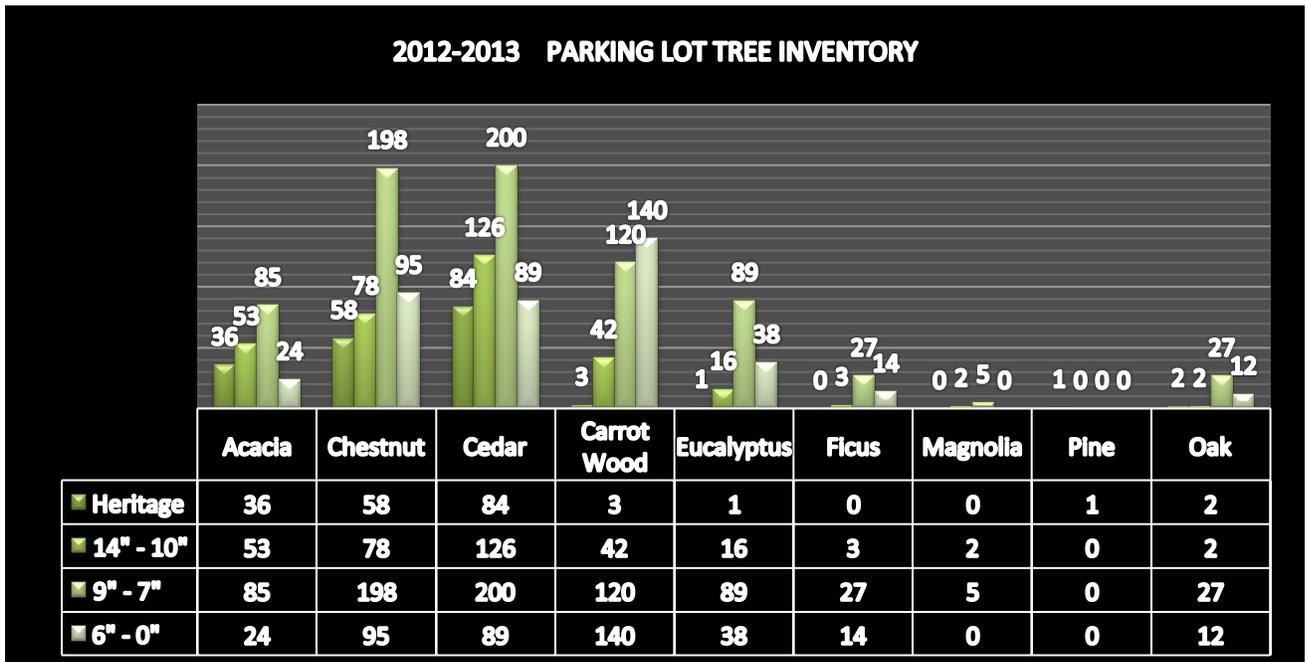
**4.2.3 STREET TREES**



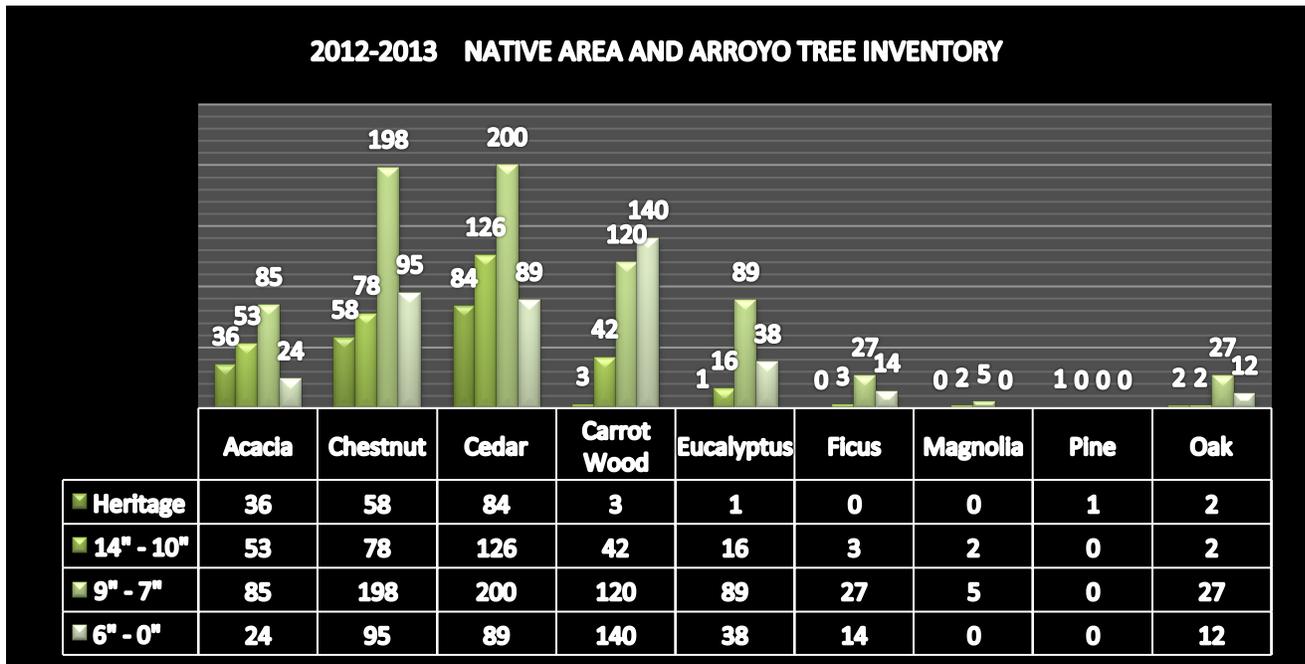
**4.2.4 HERITAGE AND MEMORIAL TREES**



**4.2.5 PARKING LOT TREES**



**4.2.6 NATIVE AREA AND ARROYO TREES**



**5.0 MANAGEMENT**

**5.1 SUMMARY OF MANAGEMENT RESPONSIBILITIES**

All processes needed to sustain the urban forest – establishment, growth, decline, death, and degradation of trees – require some level of management. The main responsibility of the campus urban forest will fall under Physical Plant-Landscape Services Department. Landscape Services responsibility include plan and implement tree plantings, maintain existing trees, manage hazards associated with declining trees, remove trees that have reached the end of their useful life span and recycle or dispose of green waste and wood from pruning and removals. Landscape Services urban forest management team must also deal with problems related to the urban environment. These may include utility line clearance, damage to sidewalks and other hardscape due to tree roots, exotic species invading natural areas and fire hazards at the urban-wild land interface. This document incorporates input from the Physical Plant-Landscape Services Department, the campus Arborist, the Inland Urban Forest Council, the UCR Campus Architect, Capital & Physical Planning, the Office of Design and Construction, the Design Review Board and Environmental, Health and Safety. This document is a reference for use by the campus staff, landscape architects, private contractors and volunteer organizations when working in and around trees within the campus community.

**6.0 STRATEGIC PLAN**

At the present time there is a need for an urban forest management plan for the University. Currently the campus urban forest contains over 6000 trees with an estimated value of \$ 75,000,000.00 to \$100,000,000.00. This plan is being developed to establish specific guidelines for the development and preservation of the urban forest resource and to support other campus documents which benefit the campus long term.



**6.1 ISSUES AND NEEDS**

**6.1.1 Tree resources** – Needs related to the tree resource itself and processes that maintain the forest, including; species and age diversity, tree planting, protection and maintenance of existing trees and compatibility of species and planting sites.

**6.1.2 Management needs** – Needs of the urban forest program and the people involved with the short and long-term care and maintenance of the urban forest. Needs might include; improved ability to schedule and track tree trimming maintenance, better coordination between departments with respect to tree issues, adequate staffing, employee training, stable source of funding, updated species selection lists or criteria and tree planting standards.

**6.1.3 Community needs** – Needs related to how the public perceives and interacts with the urban forest and the urban forest management program. These may include; better access to and/or greater use of information related to proper tree selection, placement, planting and care programs to improve tree care on our campus. Guidelines and ordinances to promote protection of existing trees, and licensing of local tree care contractors to improve compliance with approved tree care standards.



Orchid Tree



Australian Willow



Chinese Flame Tree

**6.2 GOALS**

**The primary goal is to improve UCR’s urban forest canopy coverage.**

**6.2.1. Goal: Research current tree canopy to determine percentage of coverage of the campus.**

**Objective 1:** Determine the best methodology for refining our GIS analysis of the tree canopy. The most appropriate imagery should also be determined. New higher resolution satellite imagery is becoming increasingly available for analysis of tree canopy coverage.

**Action 1:** Consult with Capital Resource Management group to current review current campus aerial photograph and GIS procedures.

**Action 2:** Review Google Earth Maps with Capital Resource Management and other outside satellite sources for aerial photograph site data, past and present.

**Action 3:** Review data to determine canopy coverage.

**Objective 2:** Begin to inventory trees on main campus within the loop roads, housing areas, natural areas or arroyos, parking lots and the botanical garden.

**Action 1:** With the assistance of the campus Arborist, staff, student population or urban forest subcontractor will collect data using the Tree Inventory Data Sheet, of all the trees within the Urban Forest. Data to include; GIS tree location, Common and Scientific name of tree, circumference of tree in feet and inches, diameter in inches, vertical height in feet, canopy spread in feet, age of tree in years if known and significance of tree, E.g.; Heritage or Landmark and general notes.

**Objective 3:** Establish realistic tree cover goals where applicable for different land use categories using American Forest benchmarks of 40% overall, 50% for suburban residential, 25% for urban residential and 15% for central business districts. Based on the proportions of the different land use categories, achieving the goals for each would result in meeting the overall canopy cover goal.

**Action 1:** Determine individual land use categories.

**Action 2:** Make an assessment of existing tree resources and current tree species percentages within each category.

**6.2.2. Goal: Ensure through education and outreach efforts that all stakeholders appreciate the value of University of California, Riverside trees and what is necessary for their stewardship.**

**Objective 1:** Continue to pursue outside training and certification opportunities for staff including the most up to date training in hazard tree identification, tree preservation and plant appraisal.

**Action 1:** Encourage staff to participate in educational training opportunities through University Extension, International Society of Arboriculture or secondary learning associations.

**Objective 2:** Continue to partner with the Inland Urban Forest Council, the State of California Department of Food and Agriculture, the California Invasive Plant Council, American Forests, the International Society of Arboriculture and the UCR Cooperative Extension in education and outreach efforts.

**Action 1:** Senior Landscape Supervision will meet with the appropriate departments to discuss and review policies and procedures within the UFMP to obtain additional educational information in support of the plan.

**Objective 3:** Develop a comprehensive web site for the campus urban forest. Students, staff and faculty could access the site to find out how the trees affect them (and how they affect the trees). Also general tree identification and genus and species of Memorial and Heritage trees located throughout the campus.

**Action 1:** Contact Computing and Communications Department for direction and assistance in developing a campus web site.

**Action 2:** Obtain approval to maintain a web site on the UC system.

**Action 3:** Gather urban forest information, tree photography and history data.

**Action 4:** Contact various campus departments or student groups to assist Physical Plant in inputting data into the Urban Forest web site.

**Objective 4:** Establish a tree fund through contributions from faculty, staff and student groups that is dedicated to planting trees and educate them about the value and stewardship of trees.

**Action 1:** Contact Director of Physical Plant for fund establishment.

**Action 2:** Open dialog with Staff Assembly and the Vice Chancellors Office for Student Affairs regarding forms of communication to staff and students regarding fund.

**Action 3:** Establish list of trees, sizes and amount of donation.

**6.2.3. Goal: Establish management policies, preservation standards, planting matrix, and budgets in order to properly manage the urban forest.**

**Objective 1:** Prepare UFMP document following the Toolkit outline provided by the California Urban Forest Council and the IUFC.

**Action 1:** Participate in workshops and webinars to gather information and documentation to include in the draft based on our campus needs.

**Objective 2:** Solicit contributions from other interdisciplinary departments to assist in developing a comprehensive management plan.

**Action 1:** Contact each of the applicable departments prior to the final draft for their input.

**Action 2:** Complete and submit final draft for review and vetting.

**Objective 3:** Establish a yearly line item budget for tree trimming and tree purchasing to enhance the campus urban forest.

**Action 1:** Provide a yearly tree trim and planting matrix to the Physical Plant Director, outlining planting and tree trimming requests for that budget year. An estimate of costs at this time will also be presented.

**Action 2:** Review with the Physical Plant Director, priorities within the matrix to develop a specific planting and trimming schedule for the year.

**Action 3:** Evaluate the tree budget based on priorities and any implications due to reductions in the original budget allocations and their future impacts on the condition of the Urban Forest.

**Action 4:** Discuss long term management budget ranges. An example would be every two to five years.

*"Trees are sanctuaries. Whoever knows how to speak to them, whoever knows how to listen to them can learn the truth. They do not preach learning and precepts, they preach undeterred by particulars, the ancient law of life."  
Hermann Hesse Wandering*

**6.2.4. Goal: Preserve existing arroyo and natural areas by removing invasive, and plant trees throughout these areas to improve the overall tree canopy.**

**Objective 1:** Continue to monitor tree health, forest structure and the occurrence of invasive in naturally forested areas and throughout the campus.

**Action 1:** The University campus is currently divided into four quadrants. The Campus Arborist will be responsible to inspect the trees within each quadrant every four months and document any tree issues within these areas.

**Action 2:** The Campus Arborist will notify the Senior Landscape Supervisor or Assistant Director of Physical Plant of his/her findings. A pest control or tree company will be contacted to access the situation, provide recommendations and treatment as directed by a University representative.

**Objective 2:** Wherever possible manage forested areas so there is adequate species diversity and size class distribution to maintain a sustainable urban forest.

**Action 1:** Refer to individual site plans to determine available planting spaces and individual site plan tree data prior to planting tree species.

**Action 2:** Review guidelines on tree selection to determine which species will be appropriate for that area.

**Objective 3:** Control and manage invasive plant species and tree pests and diseases in an environmentally responsible manner.

**Action 1:** The campus Arborist using best management practices (BMP's) will assist in the control, removal or treatment of invasive or disease.

**Objective 4:** Manage and enhance areas adjacent to existing stream beds as riparian forest buffers and native areas wherever possible and appropriate.

**Action 1:** The University campus is currently divided into four quadrants. The campus Arborist will be responsible to inspect the trees within each quadrant every four months and document any tree issues within these areas.

**Action 2:** Monitor these areas for definitive changes and enhance as budget allows.

**6.2.5. Goal: Ensure that urban forest maintenance practices continue to improve the quality of tree canopy so that potential benefits are maximized for the campus community.**

**Objective 1:** Ensure that best management practices (BMP's) are used when providing tree maintenance in critical areas such as riparian stream buffers and native areas.

**Action 1:** The University campus is currently divided into four quadrants. The campus Arborist will be responsible to inspect the trees within each quadrant every four months and document any tree issues within these areas.

**Action 2:** Refer to General Tree Care Guidelines (7.1.4, page 27) for additional specifications.

**Action 3:** Continue the partnership with the Inland Urban Forest Council as well as local environmental groups to ensure that updated best management practices (BMP's) are put in place to maximize the habitat benefits the urban forest provides.

**Objective 2:** Use the campus tree inventory to determine conflicts with the built environment (sidewalks and existing structures) and prioritize their mitigation.

**Action 1:** Review GIS aerial photographs and ground measurements to determine conflicts.

**Objective 3:** Update the GIS campus tree inventory with tree maintenance and removal data.

**Action 1:** Contact the office of Capital Resource Management and provide them with any changes in the urban forest data on a monthly basis.

**Objective 4:** Continue to systematically review potential tree hazards using the tree inventory. Consider the development of a Tree Risk Management Plan.

**Action 1:** The University campus is currently divided into four quadrants. The campus Arborist will be responsible to inspect the trees within each quadrant every four months and document any tree issues within these areas.

**Action 2:** Develop a Tree Risk Management Guideline.

**Objective 5:** Explore reviewing the Tree Replacement Guidelines to ensure that the tree replacement formula better reflect an equitable calculation for the value of trees lost. This should take into consideration the weight of alternative valuation methods such as the landscape appraised value of the tree and monetary value of the benefits the tree provides.

**Action 1:** Develop a Tree Replacement Guideline document by mid-2013.

**6.2.6. Goal: Improve coordination and communication regarding tree regulations, policies, planting and preservation standards and guidelines with other campus departments.**

**Objective 1:** Continue to refine the 2012 Urban Forest Management Plan where appropriate to optimize our stewardship.

**Action 1:** Meet with staff and appropriate departments every five years at a minimum to discuss and review policies and procedures within the UFMP to update as necessary.

**Objective 2:** Ensure that there are liaisons for each department and/or division that has any effect on our stewardship of the urban forest.

**Action 1:** Physical Plant on a yearly basis will contact each department associated with the Urban Forest Management Plan (UFMP) to determine if there are any changes in the liaison.

**Objective 3:** Ensure that staff review of development plans is early enough in the design process that trees may be preserved and considered equitably.

**Action 1:** Provide each applicable department with a copy of the Urban Forest Management Plan.

**Objective 4:** Coordinate with university departments and other entities, planting, planning and maintenance activities where appropriate to optimize our stewardship.

**Action 1:** Continue to maintain an open line of communication with campus staff and departments regarding event preparation.

**Action 2:** Open dialog with Staff Assembly, the Vice Chancellors Office for Student Affairs and Office of Sustainability regarding special events for planting such as Arbor Day and Beautification Day with the Chancellor.

**Objective 5:** Proactively share our data, standards, regulations and policies with other stewards of our urban forest.

**Action 1:** Complete the Urban Forest Management Plan and have it become policy, an integral piece of the campus long term goals and plans.

**Action 2:** Develop a comprehensive web site for the campus urban forest.

**6.2.7. Goal: Enhancement Planting Plan.**

**Objective 1:** Use the campus tree inventory to target available planting spaces within the campus community. Planting levels are based on a goal of having a full stocking level within five years.

**Action 1:** Update campus tree inventory yearly.

**Action 2:** Refer to individual site plans to determine available planting spaces and individual site plan tree data prior to planting.

**Action 3:** Consider budget implications of priorities.

**Objective 2:** Plant main campus to optimum levels. Housing, native areas and passive open space will be forested wherever appropriate.

**Action 1:** Update campus tree inventory yearly.

**Action 2:** Refer to Planting Matrix to determine quantity of trees to be planted in a budget year, target 20% of available spaces per year.

**Action 3:** Consider budget implications of priorities.

**Objective 3:** Develop opportunities and partnerships with, Staff Assembly, campus student groups, American Forests and the Inland Urban Forest Council to plant more trees with volunteers.

**Action 1:** Senior Landscape Supervision will meet with the appropriate departments to discuss and review policies and procedures within the UFMP to obtain additional educational information in support of the plan.

**Action 2:** Senior Landscape Supervision will contact American Forests and Tree Campus USA to discuss criteria for obtaining their services in procuring and planting trees throughout the campus.

**Objective 4:** Implement the planting or urban forest enhancement plan and its recommendations.

**Action 1:** Prepare individual site plans to determine available planting spaces.

**Action 2:** Prepare annual schedules for new tree plantings based on budget allowances.

*The oaks and the pines, and their brethren of the wood, have seen so many suns rise and set, so many seasons come and go, and so many generations pass into silence, that we may well wonder what "the story of the trees" would be to us if they had tongues to tell it, or we ears fine enough to understand. Anonymous*

**6.3 MONITORING PLAN EFFECTIVENESS**

Managing an urban forest is an intricate undertaking and even the most excellent plans will not take into consideration certain situations that will materialize over a 25-year period. Actions and plans will need to be adjusted during this period. While monitoring the urban forest, information will be obtained, recommendations will be made and adjustments implemented. Monitoring data will supply information needed to conclude what changes must take place. Goals will be achieved by choosing appropriate corrective actions from the information obtained. This is the defining feature of adaptive management: monitoring is regularly used to help refine management.

**6.3.1 Monitoring plan matrix**

**Goal 1: Research current tree canopy to determine percentage of coverage of the campus.**

**Objective 1.1:** Determine the best methodology for refining our GIS analysis of the tree canopy. The most appropriate imagery should also be determined. New higher resolution satellite imagery is becoming increasingly available for analysis of tree canopy coverage.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Aerial Photographs		Every 5 years	Cap/Res Mgmt.	PP – Staff
GPS new trees	Site Visit	Every 1 year	Cap/Res Mgmt.	PP – Staff

**Objective 1.2:** Begin to inventory trees on main campus within the loop roads, housing areas, natural areas or arroyos, parking lots and the botanical garden.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Tree counts	Site Visit	Every 1 year for 5 years	Cap/Res Mgmt.	PP – Staff

**Objective 1.3:** Establish realistic tree cover goals where applicable for different land use categories using American Forest benchmarks of 40% overall, 50% for suburban residential, 25% for urban residential and 15% for central business districts. Based on the proportions of the different land use categories, achieving the goals for each would result in meeting the overall canopy cover goal.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Tree inventory		Every 1 year	PP – Staff	PP – Staff
New tree planting %	Site Visit	Every 1 year	PP – Staff	PP – Staff

**Goal 2: Ensure through education and outreach efforts that all stakeholders appreciate the value of University of California at Riverside trees and what is necessary for their stewardship.**

**Objective 2.1:** Continue to pursue outside training and certification opportunities for staff including the most up to date training in hazard tree identification, tree preservation and plant appraisal.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Class Schedules	R-Space/Extension	Every September 1	HR/Extension	PP – Staff
Certifications	PAPA/ISA	2 to 4 Times per year	PP - Landscape	PP – Staff/ Arborist

**Objective 2.2:** Continue to partner with the Inland Urban Forest Council, the State of California Department of Food and Agriculture, the California Invasive Plant Council, American Forests, the International Society of Arboriculture and the Cooperative Extension in education and outreach efforts.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP Data	Classes	Quarterly	PP - Landscape	PP – Staff
UFMP Data	Web sites, E-mail	Weekly	PP - Landscape	PP – Staff

**Objective 2.3:** Develop a comprehensive web site for the campus urban forest. Students, staff and faculty could access the site to find out how the trees affect them (and how they affect the trees). Also general tree identification and genus and species of Memorial and Heritage trees located throughout the campus.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Tree Photographs	Site Visit	Weekly	Comm/Comp	PP – Staff/ Supervisor
Tree Inventory	Site Visit	1 Time per year	Comm/Comp	PP – Staff/ Arborist
Tree Information	Research	As necessary to update site	Comm/Comp	PP – Staff/ Supervisor
Web site info	Research	Weekly till site is built	Comm/Comp	PP – Staff/ Supervisor

**Goal 3: Establish management policies, preservation standards, planting matrix, and budgets in order to maintain an optimal level of age and species diversity.**

**Objective 3.1:** Prepare UFMP document following the Toolkit outline provided by the California Urban Forest Council and the IUFC.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP plan info	Webinar/Workshop	Period of one year	PP - Landscape	PP – Staff/ Supervisor

**Objective 3.2:** Solicit contributions from other interdisciplinary departments to assist in developing a comprehensive management plan.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP information	meetings	For 3 month period/then 5 years	PP - Landscape	PP – Staff/ Supervisor

**Objective 3.3:** Establish a yearly line item budget for tree trimming and tree purchasing to enhance the campus urban forest.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Trees to be trimmed	Site Visit	1 Times per year	PP - Landscape	PP – Staff/ Supervisor
Trees to be purchased	Planting matrix	1 Times per year	PP - Landscape	PP – Staff/ Supervisor
Prior year tree issues	Tree data Spreadsheets	Monthly	PP - Landscape	PP – Staff/ Supervisor

**Goal 4: Preserve existing arroyo and natural areas by removing invasive, and plant trees throughout these areas to improve the overall tree canopy.**

**Objective 4.1:** Continue to monitor tree health, forest structure and the occurrence of invasive in naturally forested areas and throughout the campus.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Invasive	Site Visit	1 Times per year	PP - Landscape	PP - Staff/ Arborist

**Objective 4.2:** Wherever possible manage forested areas so there is adequate species diversity and size class distribution to maintain a sustainable urban forest.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Site plans Site History	Site Visit Photographs, historical data	Yearly Every 5 years	PP - Landscape PP - Landscape	PP - Staff/ Arborist PP - Staff/ Arborist

**Objective 4.3:** Control and manage invasive plant species and tree pests and diseases in an environmentally responsible manner.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Invasive Site History	Site Visit Treatment of disease	1 Times per year Every 6 months	PP - Landscape PP - Landscape	PP - Staff/ Arborist PCA/ Vendor, PP - Staff

**Objective 4.4:** Manage and enhance areas adjacent to existing stream beds as riparian forest buffers and native areas wherever possible and appropriate.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Site plans Site History	Site Visit Photographs, historical data	Yearly Every 3 years	PP - Landscape PP - Landscape	PP - Staff/ Arborist PP - Staff/ Arborist



Southern Live Oak



Chinese Pistache



Tipuana Tipu Tree

**Goal 5: Ensure that urban forest maintenance practices continue to improve the quality of tree canopy so that potential benefits are maximized for the campus community.**

**Objective 5.1:** Ensure that best management practices (BMP's) are used when providing tree maintenance in critical areas such as riparian stream buffers and native areas.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP Data UFMP Data BMP Information	Classes Web sites, E-mail PAPA/ISA	Quarterly Weekly 2 to 4 Times per year	PP - Landscape PP - Landscape PP - Landscape	PP - Staff PP - Staff PP - Staff/ Arborist

**Objective 5.2:** Use the campus tree inventory to determine conflicts with the built environment (sidewalks and existing structures) and prioritize their mitigation.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Site Inventory	Arbor Access Program	As needed	PP - Landscape	Tree Vendor, PP - Staff

**Objective 5.3:** Update the GIS campus tree inventory with tree maintenance and removal data.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Planting/Removals Site data	Site Visit Bi-yearly reports	As needed Every 6 months	PP - Landscape Cap/Res Mgmt.	PP - Staff/ Arborist PP - Staff/ Supervisor

**Objective 5.4:** Continue to systematically review potential tree hazards using the tree inventory. Consider the development of a Tree Risk Management Plan.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Site data	Bi-yearly reports	Every 6 months	PP - Landscape	PP - Staff/ Supervisor

**Objective 5.5:** Explore reviewing the Tree Replacement Guidelines to ensure that the tree replacement formula better reflect an equitable calculation for the value of trees lost. This should take into consideration the weight of alternative valuation methods such as the landscape appraised value of the tree and monetary value of the benefits the tree provides.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Tree values	Yearly reports	Every year	PP - Landscape	PP - Staff/ Supervisor

**Goal 6: Improve coordination and communication regarding tree regulations, policies, planting and preservation standards and guidelines.**

**Objective 6.1:** Continue to refine the 2012 Urban Forest Management Plan where appropriate to optimize our stewardship.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Updated policies	Meeting	Every 5 years	PP - Landscape	PP - Staff/ Supervisor

**Objective 6.2:** Ensure that there are liaisons for each department and/or division that has any effect on our stewardship of the urban forest.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Master Liaison List	Distribute List	1 Times per year	PP - Landscape	PP - Staff/ Supervisor

**Objective 6.3:** Ensure that staff review of development plans is early enough in the design process that trees may be preserved and considered equitably.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Mew Plans	Monthly contact with OD&C	As applicable	PP - Landscape	PP - Staff/ Supervisor

**Objective 6.4:** Coordinate with university departments and other entities, planting, planning and maintenance activities where appropriate to optimize our stewardship.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Maint. field scheduling	Web site	Monthly	PP - Landscape	PP - Staff/ Supervisor

**Objective 6.5:** Proactively share our data, standards, regulations and policies with other stewards of our urban forest.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP data	Web site	Update Monthly	PP - Landscape	PP - Staff/ Supervisor

**Goal 7: Enhancement Planting Plan.**

**Objective 7.1:** Use the campus tree inventory to target available planting spaces within the campus community. Planting levels are based on a goal of having a full stocking level within five years.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP data	Site Visit	Update UFMP data as received	PP - Landscape	PP - Staff/ Supervisor
Site plans	Site Visit	Yearly	PP - Landscape	PP - Staff/ Arborist
Planting funds	Budget	Yearly	PP - Corp	PP - Staff

**Objective 7.2:** Plant main campus to optimum levels. Housing, native areas and passive open space will be forested wherever appropriate.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
UFMP data	Site Visit	Yearly	PP - Landscape	PP - Staff/ Supervisor
Tree Data	Site Visit	As trees are trimmed/Vendor	PP - Landscape	PP - Staff/ Arborist

**Objective 7.3:** Develop opportunities and partnerships with, Staff Assembly, campus student groups, American Forests and the Inland Urban Forest Council to plant more trees with volunteers.

Data Collected	Monitoring Methods	Data Collection Frequency	Data Storage	Analysis and Reporting
Tree grants	Govt. web sites	Yearly application	PP - Landscape	PP - Staff/ Supervisor
Business services	Direct contact	Yearly	PP - Landscape	PP - Staff/ Supervisor

**Objective 7.4:** Implement the planting or urban forest enhancement plan and its recommendations.

**Data Collected**

Count Empty Spaces  
# New trees planted

**Monitoring Methods**

Site Visit  
Site Visit

**Data Collection Frequency**

Every 1 year  
Every 2 year

**Data Storage**

PP - Landscape  
PP - Landscape

**Analysis and Reporting**

PP - Staff  
PP - Staff



**A Heritage Podocarpus henkelii stands majestically on the Commencement lawn south of Pierce Hall and Science Lab 1.**

## 7.0 APPENDIX

### 7.1 Policies and Standards

The following pages are document guidelines for the planting, pruning, preservation, dedications and removal of all trees within the campus community which must be followed in maintaining the urban forest. These specifications are based on national standards for tree care established by the International Society of Arboriculture (ISA), the Tree Care Industry Association and the American National Standards Institute.

#### 7.1.1 CONTRACTOR STANDARDS FOR TREE WORK

The University shall oversee all contractor operations with the objective of ensuring contract adherence and to identify and correct problems throughout the length of each individual project. Contractors who are hired to work for the University or obtain permits (if required) to prune University trees shall be required to comply with the University contract requirements throughout the term of the contract or until the work has been completed.

#### 7.1.2 REQUIREMENTS FOR WORKING ON UNIVERSITY TREE CONTRACTS

Contractor must be in the business of providing full service urban forest maintenance programs to governmental agencies and/or municipalities that include, but are not limited to the pruning, removal, and replacement of trees for at least five (5) years. Experience should include the prevention of disease transmission between trees, protection of wildlife, and current industry standards for pruning. In addition, prospective contractors must provide five (5) references with contact information to the requesting representative of the University.

Contractor must show, through documentation by records of past performance and references, a capability that includes the ability to perform the following work, both consistently and concurrent with other required services:

1. Only trim as many as trees as awarded, with trees ranging in size from three inches (3") to more than forty inches (40") in diameter, with work occurring during regular business hours, at night or during weekends.
2. Only remove and grind the stumps of as many as trees as awarded ranging in size from three inches (3") to over forty inches (40") in diameter, with work occurring during regular business hours. Contractors must have documented experience in the safe removal of mature trees using methods of rigging, including the use of stump grinders, backhoes, bobcats and cranes. Contractor must hold valid State of California Contractor's Licenses C61/ D49 and C27 at the time of proposal submittal.
3. Contractor must meet all specified University insurance requirements and endorsements.
4. Contractors shall maintain at their own cost and expense for the duration of all contracts, insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work or services hereunder by the Contractor, their agents, representatives, employees, or subcontractors. The cost of such insurance shall be borne by the Contractor.
5. Contractor shall exhibit, by portfolio and references, the capability to respond to emergency tree incidents, ranging from limb failures on single trees to storm related damages affecting many trees, in a manner that meets the requirements of the University as contracted.
6. Contractor must have a sufficient inventory of equipment to perform the scope of work for the University.
7. Contractor must possess the capability of processing the quantities of green waste and refuse that are generated from performing the work described herein in a manner compliant with the requirements of the California Integrated Waste Management Act (AB939). Contractor when removing green waste from University property must provide the University a quantity of green waste tonnage removed. This quantity (in tons) must be listed on a separate line item on the final invoice.
8. Contractor must have on staff an adequate number of full-time permanently employed personnel that are fully trained in urban forestry Best Management Practices, and are able to speak and understand English in order to successfully complete all work.



Without in any way affecting the indemnity provided, the Contractor shall secure, before commencement of any work and be maintained throughout the contract, the following types and amounts of insurance:

9. University Insurance requirements will be verified at the time of contract.
10. Contractor shall maintain Commercial General Liability (CGL) with a limit of not less than \$2,000,000 each occurrence/\$2,000,000 annual aggregate.
11. CGL insurance shall be written on Insurance Services Office form CG 00 01 (or a substitute form providing equivalent coverage) and shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury and advertising injury liability assumed under an insured contract (including the tort liability of another assumed in a business contract), and explosion, collapse and underground hazards.
12. The University, its officers, officials, employees, students and volunteers are to be covered as additional insured's with respect to liability arising out of automobiles owned, leased, hired, or borrowed by or on behalf of the Contractor; and with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts or equipment furnished in connection with such work or operations. Under the CGL policy, using the Insurance Services Office additional insured endorsement form CG 20 26 or a substitute providing equivalent coverage. University and other additional insured's mentioned in this paragraph shall not, by reason of their inclusion as additional insured's, become liable for any payment of premiums to carriers for such coverage. (Applies to CGL and Business Auto Liability).
13. Workers' Compensation and Employer's Liability Insurance: Contractor shall maintain workers' compensation insurance as required by the State of California and Employer's Liability Insurance in the amount of \$1,000,000 per accident for bodily injury or disease.
14. Contractor's insurer shall agree to waive all rights of subrogation against the University, its officers, officials, employees, students and volunteers for losses arising from activities and operations of Contractor in the performance of services under the contract.
15. Business Automobile Liability Insurance: Contractor shall maintain business auto liability with a limit of not less than \$1,000,000 each accident.
16. Business Automobile Liability Insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos). If necessary, the policy shall be endorsed to provide contractual liability coverage equivalent to that provided in the 1990 and later editions of CA 00 01. 16. For any claims related to their projects, the Contractor's insurance coverage shall be primary as respects to the University, its officers, officials, employees, students and volunteers. Any insurance or self-insurance maintained by the University, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.
17. Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under subdivision (b) of Section 2782 of the Civil Code.

### 7.1.3 REQUIREMENTS FOR STREET TREE PERMITS

The University shall oversee all contractor operations with the objective of ensuring contract adherence and to identify and correct problems throughout the length of each individual project. Contractors hired to work for the University shall be required to comply with the Universities contract requirements throughout the term of the contract. Qualified contractors can prune University street trees to augment or complement University maintenance activities. A permit can be obtained by completing an application (if required), submitted to the University. Permits (if required) are issued directly to qualified tree care contractors through the University. Contractor is responsible for notifying adjacent neighbors of any work as part of the permit process.

Contractors shall meet the following minimum requirements:

1. Possess a C-27 or C61/D49 Contractors license in good standing with the California State Contractor's License Board.
2. Have an arborist on staff that is certified by the International Society of Arboriculture.
3. Have workers' compensation and employer's liability insurance.
4. Have commercial general liability insurance.
5. Have business automobile liability insurance.
6. Contractor must be familiar with and have a clear understanding of the University Pruning Guidelines and the most current Pruning Standards, as adopted by the International Society of Arboriculture and stated in the 2012 Urban Forest Master Plan.
7. Contractors must follow all guidelines as detailed in the most current ANSI A300 Standards for Tree Care Operations.  
- ANSI A300 Part-1 (2008) - ANSI Standard Z133.1 (2006) Safety Requirements.
8. Contractor must use the current California Manual on Uniform Traffic Control Devices (MUTCD) and the Work Area Traffic Control Handbook (WATCH) from the American Public Works Association (APWA) if the flow of traffic is to be disrupted on streets and highways. Property owner must sign a release and hold harmless agreement from the University for the Work to proceed. Permit applications (if required) may be denied for the following reasons:
  9. Contractor does not meet minimum requirements or has demonstrated poor understanding of the required standards.
  10. Pruning is requested for aesthetic pruning and does not serve to improve the health of the tree.
  11. Pruning is requested to allow for the growth of grass or other plants under the tree canopy.
  12. The requested pruning might compromise the health of the tree.
  13. The tree has been recently pruned and does not require pruning at this time.
  14. Pruning is requested to create a view that does not currently exist and would have a detrimental effect on the health, stability or future condition of the street tree.



**A pair of Heritage Holly Oaks (*Quercus ilex*) located in the turf area north of Humanities and Social Science (HASS).**

#### 7.1.4 GENERAL TREE CARE

1. All tree alterations (pruning, removals, attachments of any kind, etc.) must be approved by a University representative, Physical Plant-Landscape Services Director or Assistant Director, Senior Landscape Supervisor or campus Arborist prior to the commencement of work.

##### 7.1.4.1 Plant Material

1. Trees shall be grown in boxes, tubs, cans or pots as scheduled and shall conform to ANSI Z60.1. Plants shall have sufficient roots to hold earth intact after root ball is removed from the container without being root bound.

2. Planting stock shall be well-branched and well-formed with a single trunk leader, unless multi trunk trees are specified, sound, vigorous, healthy, and free from disease, sun-scald, windburn, abrasion, and harmful insects or insect eggs and shall have healthy, normal and unbroken root systems. Plants shall have been grown under climatic conditions similar to those in the locality of the University.

3. Plants designated as "collected", if any, shall be obtained from native stands or established plantings. To be acceptable, collected plants shall have been growing in favorable locations in a soil which ensured good fibrous root development and vigorous growing condition. The minimum root spread for collected bare root plant materials shall be one third greater than the minimum root spread of bare root, nursery grown stock; minimum ball sizes for collected plant materials obtained balled and burlapped shall be the next larger ball size than for nursery-grown stock sized in accordance with ANSI Z60.1.

##### 7.1.4.2 Planting

1. Plant pits for container grown plant material shall be excavated twice the size of the container diameter of the plant of the plant being planted, or as shown in the drawings.

2. Plant pits shall be dug to produce vertical sides and flat, compact bottoms. When pits are dug with an auger and the sides of the pits become glazed the surface shall be scarified. The size of plant pits shall also be indicated on planted details.

3. Remove tree from container without disturbing the root ball. Set the tree in the pit, cradling and supporting the root ball. Position the tree for the "best side" view and for minimum obstruction to traffic on adjacent pavement, if applicable.

4. Bare-root stock, if any, shall be planted so the roots are arranged in a natural position. Damaged roots shall be removed with a clean cut. Planting soil mixture shall be carefully worked in among the roots. Remainder of backfill of planting soil mixture shall be tamped and watered. Water basins shall then be formed around isolated plants below the final grade of the surrounding area to facilitate the passive harvesting of normal rainfall.

5. Backfill pit with a blended mixture containing 20% nitrogen stabilized wood mulch, 80% native soil, 1 lb. per cu. yard gypsum and 2 lbs. fertilizer (6-24-24 XB pre-plant) per cubic yard of backfill. When the plant is set and the backfill has been water-settled, the top of the root ball shall be slightly above finished grade, maximum 1 inch, or as shown in planting details.

6. Raised planter mix, if any, shall contain 40% sandy loam native soil, 60% approved ground mix (UCR AG mix 1 or 2), 10 pounds of superphosphate, 20 pounds of ammonium sulfate and 5 pounds of ground ferrous sulfate per 10 yards of planter mix.

7. At each planting pit provide prepared backfill mix.

8. Build 3" to 4" high earth berm at edge of root-ball and water thoroughly.

##### 7.1.4.3 Pruning

1. Trees are pruned to preserve health and appearance. They are also pruned to prevent damage to property and human life. Pruning is often desirable or necessary to remove dead, diseased, or insect-infested branches and to improve tree structure, enhance vigor, or maintain safety. Because each cut has the potential to change the growth of (or cause damage to) a tree, no branch should be removed without a reason.

2. Refer to the Best Management Practices Tree Pruning (International Society of Arboriculture).

3. Plants shall also be pruned in accordance with ANSI A300 for Definitions, Pruning Tools and Equipment, Pruning Cuts, and Wound Treatment to maintain their intended shapes and sizes. All ANSI Z133.1 safety requirements for tree care operations must be followed.

4. It is required that only qualified individuals with sufficient training and experience shall be allowed to perform major tree pruning and thinning operations. Light trimming, grooming, or minor storm damage repair may be performed by semi-skilled personnel under the guidance or direction of a certified arborist or trained personnel.
5. Pruning of newly planted trees should be limited to corrective pruning. Remove torn or broken branches, and save other pruning measures for the second or third year.
6. Proper selective pruning and thinning of major limbs should be performed as necessary to eliminate crossing and parallel wood, to remove damaged or diseased wood, to maintain open branching and to improve the overall structure of the tree. As trees mature, they will also require occasional lifting of the canopy to maintain ground clearance for pedestrian circulation, maintenance operations, and possibly vehicular access.
7. Do not use wound dressings on tree cuts.
8. Most routine pruning to remove weak, diseased, or dead limbs can be accomplished at any time during the year with little effect on the tree. As a rule, growth is maximized and wound closure is fastest if pruning takes place before the spring growth flush. Some trees, such as pines and eucalyptus, tend to "bleed" if pruned in the summer. It may be unsightly, but may or may not be of consequence to the tree. A variety of Pine Bark Beetles and Eucalyptus Beetle Bores tend to attack a weakened or stressed trees during summer months and pruning should be avoided. Heavy pruning just after the spring growth flush should be avoided. Ficus trees should be trimmed in the winter months to avoid scale type diseases.
9. Prune damaged trees or those that constitute health or safety hazards at any time of year.
10. Pruning cuts should be made just outside the branch collar. The branch collar contains trunk or parent branch tissue and should not be damaged or removed. If the trunk collar has grown out on a dead limb to be removed, make the cut just beyond the collar. Do not cut the collar.
11. Major limb removals shall be properly cut at the base of the limb and shall not include collar removal. Flush cutting or collar removal of a large limb requires longer for the wound to heal which causes the tree to be at greater risk to heartwood rot, disease, pest penetration, etc. It is more desirable to have a smaller cross-sectional area cut that will heal or callus over, in a shorter length of time.
12. Plants shall be pruned to avoid blocking walks, roads, road signs, light poles, and sight distance views for vehicular traffic.
13. Debris and trimmings produced by thinning and pruning shall be removed from the site.
14. Only remove up to 25 % maximum of the total canopy at a time to allow the tree or shrub to recover properly. (See requirements for Heritage Trees).
15. Do not cut back to fewer than six buds or leaves on branches.
16. Retain lower branches in a "tipped back" or pinched condition to promote caliper trunk growth.
17. Perform crown thinning to reduce toppling and wind damage.
18. Perform crown reduction and shaping to maintain growth within space limitations and maintain a natural appearance, as directed by the Horticultural Consultant, campus Arborist or University representative.
19. Do not top or pollard trees unless specified in maintenance operations.

#### **7.1.4.4 Pruning Schedule**

1. The maintenance pruning schedule shall be dictated by tree species, age, function, and placement.
2. Trees less than 7 years old should receive structural pruning on an annual or biennial basis.
3. Trees 7-20 years old should receive structural pruning every two to five years.
4. Trees 20 years old and older receive maintenance pruning every five to seven years to clean dead, diseased, dying, and defective branches from the crown.
5. Trees adjacent to roadways, walkways, signs, and street lights are annually inspected for safety and clearance issues and maintenance pruned as necessary.

6. Refer to (Defining Heritage Tree Guidelines) for heritage, landmark, memorial, specimen or historical tree trimming.

#### **7.1.4.5 Pruning Techniques**

Specific types of pruning may be necessary to maintain a mature tree in a healthy, safe, and attractive condition.

1. Cleaning is the removal of dead, dying, diseased, crowded, weakly attached, and low-vigor branches from the crown of a tree.
2. Thinning is the selective removal of branches to increase light penetration and air movement through the crown. Thinning opens the foliage of a tree, reduces weight on heavy limbs, and helps retain the tree's natural shape.
3. Raising removes the lower branches from a tree in order to provide clearance for buildings, vehicle, pedestrians and vistas.
4. Reduction reduces the size of a tree, often for clearance for utility lines. Reducing the height or spread of a tree is best accomplished by pruning back the leaders and branch terminals to lateral branches that are large enough to assume the terminal roles (at least one-third the diameter of the cut stem). Compared to topping, reduction helps maintain the form and structural integrity of the tree.

#### **7.1.4.6 Tree Staking, Cabling, bracing and guying**

1. All cabling, bracing and guying of new or mature trees must be approved by the University.
  - a. Guying wires of Zinc coated iron of 9 gauge wire unless otherwise approved.
  - b. Anchors (dead men) for holding guy – 4"X4" solid redwood lumber 30" long.
  - c. Hose covering wire, 2-ply reinforced rubber hose, at least ½" dia., at least 12" long.
  - d. Flags shall consist of white polyethylene hose, ½" diameter, at least 12" long.
2. Only trees, which are not self-supporting, shall be staked or guyed. Tree guys and stakes ties shall be inspected and adjusted periodically and removed when necessary, to insure that they are adequately surrounding the tree without girdling trunks or branches and to allow tree caliper growth and prevent bark wounds.
3. Inspect stakes and tree ties monthly to check for rubbing that causes bark wounds.
4. Replace defective stakes, guys and bracing with materials to match original materials as needed.
5. Refer to and abide by the Best Management Practices Tree Support Systems: Cabling, Bracing, and Guying. (International Society of Arboriculture) and ANSI A300 (Part 3) Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices (Support Systems a. Cabling, Bracing, and Guying). International Society of Arboriculture,(ISA).

#### **7.1.4.7 Mulching**

1. Mulch should be placed 2 to 4 inches deep and cover the entire root system, which may be as far as 2 or 3 times the diameter of the branch spread of the tree. If the area and activities happening around the tree do not permit the entire area to be mulched, it is recommended that you mulch as much of the area under the drip line of the tree as possible.
2. Only mulch 2 to 4 inches deep around the base of trees, shrubs and perennials, allowing enough space for airflow to the roots. Avoid "mulch volcanoes" entirely. If mulch is piled against the stems or tree trunks, pull it back several inches so that the base of the trunk and the root crown are exposed. If there are drainage problems, a thinner layer should be used. Avoid placing mulch against the tree trunks. Place mulch out to the tree's drip line or beyond.
3. Use only organic mulches including wood chips, hardwood and softwood bark, compost mixes, and a variety of other products usually derived from plants. A zero to two inch forest floor bark is the preferred mulch in new plantings. It should be well aerated and, preferably, composted. Avoid sour-smelling mulch. No dyed mulches shall be permitted.
4. Weed barrier fabric is not permitted as an effective barrier between soil and much. Plastic also should not be used because it interferes with the exchange of gases between soil and air, which inhibits root growth.
5. Inspect plants and soil in the area to be mulched. Determine whether drainage is adequate. Determine whether there are plants that may be affected by the choice of mulch.

6. If mulch is already present, check the depth. Do not add mulch if there is a sufficient layer in place. Rake the old mulch to break up any matted layers and to refresh the appearance.
7. It is preferred that only oak mulch be placed around each variety of oaks.

#### **7.1.4.8 Tree Removal**

1. Removal is recommended when a tree:
  - Is dead, dying, or considered irreparably hazardous.
  - Is causing an obstruction or is crowding and causing harm to other trees and the situation is impossible to correct through pruning.
  - Is to be replaced by a more suitable specimen.
  - Should be removed to allow for construction (only when needed and cannot be avoided).
2. All tree removals must be approved by the University, Physical Plant-Landscape Services Department prior to the start of the work.
3. Only qualified individuals will be allowed to perform tree removals.
4. All individuals involved in tree removals must refer to and abide by ANSI Z133.1 American National Standard for Tree Care Operations (International Society of Arboriculture).
5. Refer to the 5.1.10 Defining Heritage Tree Guideline prior to any tree removal of a heritage, landmark, specimen, memorial or historic tree.
6. Tree brush, debris, chips and logs should be disposed of properly. University Landscape personnel must approve alternative disposal methods.
7. All stumps must be cut as flush to the ground as possible. If this is not possible, University personnel must be consulted.
8. All weedy trees that resprout once cut, must be cut high to allow recutting in the spring season and treated with systemic.
9. Refer to additional specifications regarding Tree Removal in 5.1.7 Tree Removal Guidelines.

#### **7.1.4.9 Stump Grinding**

1. Contract a professional-for-hire as necessary or use campus Arborist.
2. Consult Physical Plant-Landscape Services personnel on the specifications concerning whether to leave grindings in place, otherwise, remove them and fill hole with top soil, grass seed and turf and tee (seed topper).
3. Grind entire stump and surrounding roots.
4. Any damage, ruts, or disturbance to lawn or garden beds during the grinding process, must be repaired to its original condition by subcontractor.
5. Leave a safety device (safety flagging, safety cones with yellow "CAUTION" tape) and cover with  $\frac{3}{4}$ " plywood if a hole in the ground is left from the grinding process overnight.
6. All grindings must be removed, topsoil added and left slightly mounded to allow for decay and settling.

#### **7.1.4.10 Hazard and Emergency Tree Removal**

1. A tree is deemed "hazardous" based on the ISA Hazardous Evaluation. Currently trees on campus are being evaluated using this method. Contact the Physical Plant-Landscape Service or campus Arborist if you require additional information.
2. If a tree is considered "hazardous" it will be scheduled for removal. Tree removals are usually done by Physical Plant-Landscape Services staff, campus Arborist or designated subcontractor.
3. All hazardous or emergency tree removals should be cleaned up immediately.

4. If the hazardous tree has damaged any University or other property, it must be documented. Physical Plant-Landscape Services Director or Supervision must be notified, photos must be taken and University Police and EH&S notified immediately.

5. Refer to additional specifications regarding Hazard Tree Removal in 5.1.8 Tree Removal Guidelines.

#### **7.1.4.11 Managing for Catastrophic Events**

1. In the event of severe weather conditions such as tornadoes, hurricanes, ice, snow, and Santa Ana wind storms, falling trees will be removed by Physical Plant-Landscape Services, campus Arborist or designated subcontractor.

2. Roads and streets shall be cleared first, then access to critical buildings, administration, library, student center, housing, dorms, etc.

3. All trees damaged or broken will then be pruned to restore their health and structure.

4. In advance of severe weather conditions, all necessary equipment shall be checked for readiness and safety by staff.

5. All hazardous areas that cannot be cleaned up in advance car or pedestrian traffic, the area must be barricaded off with barricades, cones, caution tape, etc. for the safety and protection of the community.

6. If during the course of the event, trees damage any University or other property, it must be documented. Photos must be taken, Physical Plant-Landscape Services, University Police and Environmental Health and Safety (EH&S) must be notified.

7. If the Physical Plant-Landscape Services Department budget permits, lost trees will be replaced to restore the structure and function of the campus.

#### **7.1.4.12 Watering New Plantings**

1. Using a sampling tube, Tensiometer and soil probe, check for moisture penetration throughout the root ball zone at least twice per week.

2. Water as frequently as necessary to maintain healthy growth of ground covers.

3. Adjust frequency and length of time for watering cycles according to changing soil and weather condition.

#### **7.1.4.13 Selecting Nursery Stock**

Container material is the most common type of nursery stock in California and is preferable for use at the University of California, Riverside.

Types of Nursery Stock

- a. Container
- b. Ball and Burlap

Selecting Quality Container Nursery Stock

Trees should meet the following minimum standards. Trees that do not meet these requirements will be rejected. The University retains the right to inspect the root mass from a sample tree of each species. Extra provisions may be necessary in project contracts to notify nurseries of this requirement. Tree planting specifications for selection of quality tree stock shall be as follows:

1. All trees shall be true to type or botanical name as ordered or shown on planting plans or contract orders.
2. All trees shall have a single, relatively straight trunk with a good taper and branch distribution vertically, laterally, and radially with a live crown ratio (distance from bottom of canopy to tree top/tree height) of at least sixty percent (60%). All branches in the canopy should be less than two-third (2/3) the trunk diameter and free of included bark. The trunk and main branches shall be free of wounds except for properly made pruning cuts, damaged areas, conks, bleeding and signs of insects or disease.
3. All trees shall be healthy, have a form typical for the species or cultivar, and be well-rooted and pruned as appropriate for the species.

4. All trees shall have sufficient trunk diameter and taper so that it can remain vertical without the support of a nursery stake.
5. The root ball of all trees shall be moist throughout and the crown shall show no sign of moisture stress.
6. The tree shall be well rooted in the soil mix. The point where the topmost root in the root ball emerges from the trunk should be visible at the soil surface of the root ball. When the container is removed, the root ball shall remain intact. When the tree is lifted, the trunk and root system shall move as one.
7. All trees shall comply with federal and state laws requiring inspection for plant diseases and pest infestations.
8. No tree shall be accepted that has been severely topped, headed back or lion-tailed.
9. No tree shall be accepted with co-dominant stems or excessive weak branch attachments that cannot be correctively pruned without jeopardizing the natural form of the species.
10. No tree shall be accepted that is root bound, shows evidence of girdling or kinking roots, or has roots protruding above the soil (a.k.a. "knees").
11. No tree shall be accepted that has roots greater than one-fifth (1/5) the size of the trunk diameter growing out of the bottom of the container.

**7.1.5 SPECIFIC PLANTING POLICIES**

1. In the interest of public safety and maintenance, street trees shall be planted:
  - a. A minimum distance from the intersection, to provide adequate sight distance. Minimum distance shall be 30 feet from the beginning of curve at the curb return, except at secondary and arterial streets where the minimum shall be 50 feet.
  - b. 30' to 35' feet on center.
  - c. 30' feet from corner property line.
  - d. 20' to 25' feet on center for smaller statured trees.
  - e. Fifteen (15) feet from lamp standards.
  - f. Ten (10) feet minimum from light poles, sewer laterals, other utility service laterals, landscape mainlines, valve boxes, backflows, water meters and driveway approaches.
  - g. Five (5) feet minimum from fire hydrants, utility meter boxes, service walks and driveways.
2. When the sidewalk is located next to the curb, the trees shall be planted a minimum of one (1) foot from the right-of-way line within the public street right-of-way line or easement. Where right-of-way is not available adjacent to the sidewalk, the trees should be planted in easements behind the sidewalk whenever possible. When a tree well in the sidewalk is the only possible solution, a tree will be selected that will not cause or result in long-range curb or sidewalk damage but consideration of this type of planting should be avoided if possible.
3. All trees, other than palm trees, shall be a minimum 15-gallon size in native areas and 24" box size throughout the campus areas as determined by the American Association of Nurserymen. Smaller / larger sizes may be permitted / required by the campus Landscape Architect, OD&C, or Physical Plant-Landscape Services.
4. All trees planted in tree wells shall be installed and irrigated in a manner that promotes deep rooting. All trees in wells shall be installed with an automatic irrigation system, operated by a stand-alone, solar or battery operated controller.
5. Street trees will not be approved for planting under the following conditions:
  - a. The tree would interfere with the growth of other trees in the area.
  - b. The vacant tree well site is overshadowed by other trees nearby creating an unsuitable growing condition for the proposed new tree.
  - c. Utility meters are in the way.
  - d. The tree could block scenic views or views of oncoming traffic.
  - e. The tree is not on the Street Tree Designations List.
6. Sites for New Street Trees
  - a. Typically street trees will be planted where there is an existing vacancy that is unoccupied, as a replacement tree, or if there is a break in the established street tree pattern that should be filled.





**This Heritage Coast Live Oak (*Quercus agrifolia*) is located east of the Rivera Monument at Hinderaker Plaza.**

#### **7.1.6 TREE SPECIES DIVERSITY PLANTING REQUIREMENTS**

Physical Plant-Landscape services will review plans to ensure species diversity (i.e. to avoid creating monocultures, or areas of plantings made up of only one species of trees). Monocultures are undesirable because if a certain species is prone to a particular disease or is more susceptible to storm damage or temperature extremes, then it is likely the entire stand could die or be destroyed by a single disease or weather event. Creating planting areas of several species creates a more diverse, and therefore more resilient, urban forest.

#### **7.1.7 TREE/HARDSCAPE CONFLICTS GUIDELINES**

In keeping with UCR's 2012 Urban Forest Master Plan policy to preserve and protect healthy trees and to provide for the safety of citizens, the following guidelines have been established for correcting hazardous situations that result in tree roots disturbing hardscape in the public right-of-way.

##### **7.1.7.1 Inspection**

When tree roots are suspected of causing hardscape damage, Physical Plant-Landscape Services and the campus Arborist shall inspect the tree and assess the potential damage. The size, species, structure/condition, and (external) environmental factors will be considered before a recommendation is made.

1. Trunk size at diameter at shoulder height (DSH) and height.
2. Desirability of the species.
3. Structure, condition and health of the tree.
4. External or environmental factors such as proximity to overhead or underground utilities.
5. Its designation as a Heritage, Memorial or Landmark tree.

##### **7.1.7.2 Recommendations**

A tree will be recommended for removal or root pruning if it meets the conditions outlined in the Tree Removal Guidelines.

**7.1.8 TREE REMOVAL GUIDELINES**

**It is required that all tree works decisions have a focus on retaining and protecting trees at all times, unless there is strong consensus and justification for removal. All relevant interdisciplinary departments must be involved in the decision making process regarding any removals regarding Heritage, Landmark, and Memorial, Species or Historic trees.**

Physical Plant-Landscape Services Department is responsible for the maintenance and management of the campus urban forest. Individual trees can affect the environment of the total community. The Physical Plant-Landscape Services Director or the Director's designee in consultation with the campus Arborist shall have the authority to remove any hazardous, diseased or declining trees, providing the removal meets the existing criteria as stated in the policy. The Director or Designee shall authorize all tree removals with the authority granted in this policy. The campus arborist or designee shall provide a listing of the tree removals. The listing shall include the locations of trees and the staff's recommendations.

The following criteria are considered to provide **strong** justification for tree removal:

1. Where there is substantial evidence that the tree is structurally unstable, and therefore a high likelihood of tree failure or high degree of hazard, but not limited to, trees located in proximity to a high target area (such as a building, or regularly used external area), and remedial actions to mitigate hazards are not feasible or practical.
2. Where the tree is in poor and declining health with a Safe Useful Life Expectancy of < 5 years and there are no reasonable options to mitigate or reverse the decline in health of the tree.
3. Where the tree is causing substantial and continuing structural damage to a building or substantial structure, and remedial actions other than tree removal are not feasible or practical.
4. Where the tree is proven to be directly causing substantial personal ill health, such as severe allergies, and this is supported by specific expert medical evidence linking the health condition to the tree, and where all other reasonable medical or other solutions have been explored.

The following considerations which **may be** justification for tree removal:

These are considerations which may be sufficient reason for approval of tree removals on an assessment of the overall merit of the application, and the significance of the tree.

1. A tree assessed is declining health and has poor branch or trunk structure, is heavily suppressed by other trees, with no feasible means to reverse health or structure issues.
2. A tree which has structural defects which, while not being hazardous, may render the tree only suitable for retention in the short term, particularly where the tree is not deemed significant and replacement may result in a better environmental outcome.
3. A tree produces fruit or other matter which may be hazardous to people and opportunities for remedial actions are not feasible, practical or reasonable, dependent on the type and frequency of actions required, the significance of the tree its location and the degree of potential hazard.
4. Pruning to improve form or to alleviate a nuisance issue in a manner consistent with ANSI A300 Standards for Tree Care Operations and with other accepted horticultural practices.
5. A tree located in an improper location where, for example, predictable typical growth potential will result in major damage to a building or substantial structure and there are no practical means to mitigate such future damage.

The following criteria **are not** generally considered justification for tree removal:

These are common reasons for tree removal or tree works which would generally not be considered substantive by themselves, and would generally only be considered when they have been determined to have significant health and safety hazard or property damage implications or where trees are in poor health.

*“The tree which moves some to tears of joy is in the eyes of others only a green thing that stands in the way. Some see Nature all ridicule and deformity, and some see scarce Nature at all. But to the eyes of the man of imagination,*

*Nature is Imagination itself.”*

*William Blake.*

*1799*

*The Letters*

1. Flower, leaf or fruit fall causing nuisance.
2. To increase general natural light.
3. To enhance views.
4. To allow for a proposed development.

Note: vegetation removal would be considered under the development assessment process, and is not a valid reason for removal under the Urban Forest Management Plan.

5. To reduce shade created by a tree.
6. To reduce fruit, resin or bird/bat droppings on vehicles.
7. Insect/animal nuisance.
8. Minor lifting of driveways, paths and paving.
9. Damage to fences due to branch failure.
10. Minor damage to roof structures, outbuildings, garden structures, walls.
11. Damage to underground services (such as sewer lines, water services and the like), where there are feasible alternatives to mitigate or solve problems & retain the tree, and the tree is significant.
12. Construction of fences.
13. Tree does not suit the existing or proposed landscape.
14. Unsubstantiated fear of tree failure.
15. To allow for landscape works.
16. Tree removal for Fire hazard/ hazard reduction, where land is not within wildfire prone lands as defined by the State of California Department of Forestry.
17. Dropping of dead wood (Deadwood may be removed as an exemption under the UFMP)
18. Tree too large or high.
19. Pruning to reduce height except where a hedge.

#### **7.1.8.1 Hazard Tree Removal**

Hazard tree inspections and the ISA Hazard Tree Evaluation Form shall be completed, including photo documentation of the condition of the tree(s).

A hazard tree is one that is dying, dead or structurally weak; a traffic obstruction; or injurious to health, safety, or welfare of the general public.

When a tree is determined by authorized staff to be a hazard, the tree will be removed and a replacement tree will be planted at the next appropriate planting cycle, unless inadequate space exists or the location constitutes a hazard. Where long-term repairs can be made to sewer laterals, irrigation mainline, sidewalk or curb and gutter without endangering the stability of the tree, the tree will not be removed.

#### **7.1.8.2 "Inappropriate" Tree Removal**

An inappropriate tree possesses undesirable characteristics significant enough to have caused their elimination from future planting on campus, as determined by the Physical Plant – Grounds department, campus Architect and OD&C. Undesirable trees shall be identified and published where appropriate.

There are three (3) types of inappropriate trees;

1. Class I, Inappropriate – Tree species that cause chronic damage to infrastructure (i.e. curbs, gutters, sidewalks or other structures and trees) and are a nuisance to the campus community significant enough to necessitate removal of the tree.
2. Class II – Tree species that meet the general definition of an inappropriate tree, but the undesirable characteristics are not significant enough to necessitate removal of the tree (e.g., heavy fruit or leaf drop, susceptibility to wind damage, susceptibility to disease or insect infestation, etc.).
3. Non-conforming Trees – These are trees that may be in satisfactory health, but do not provide a benefit to the overall appearance of the campus community; trees that were started as volunteers and not removed; trees planted without permission; or trees that may cause extensive damage to surrounding hardscape areas if allowed to mature.

#### **7.1.8.3 Removals Because of Economic Conditions**

A tree considered for removal must meet Criteria #1 and two (2) of the remaining three (3) following criteria before a recommendation for removal because of economic considerations is made.

1. Cost of damage exceeds 1/3 of the value of the tree.
  - a. The problems caused by the tree must exceed at least 1/3 the dollar value of the tree as established by the International Society of Arboriculture's Tree Replacement Book. For, example, a tree valued at \$10,000 must have caused at least \$3,333. 00 in damages.



**This Heritage Italian Stone Pine exceeds 75' tall and was planted in the late 1950's. It is located north of Sproul Hall.**

2. Damages have caused potential liability issues.
3. A request made for removal that authorized staff concurs to be a legitimate request.
  - a. Recurring problems related to a tree within a 10-year period. The tree has lifted or broken a sidewalk more than once in a 10 years, has broken sewer lines more than once (etc.), or other physical damage to hardscape.
4. Comparable problems or concerns in the surrounding area would not lend themselves to removal of all the trees in that area.

**These criteria may not apply toward trees that are considered to be Historical, Heritage, Memorial, Specimen, or in a sensitive ecological, native, protected and/or historical area.**

#### **7.1.8.4 Specific Removal Policies**

1. Consideration shall be given to retain trees by means of:
  - a. Relocating sidewalk and/or any utilities.
  - b. Root pruning trees.
  - c. Installation of root barriers where it is deemed appropriate and in the best interest of the tree.
  - d. When improvements mandate that palms and wood trees be removed, if the species is adapted to replanting, every reasonable effort shall be made to relocate said trees.
  - e. Trees may require relocation and preservation at the direction on the campus Architect, OD&C and/or Physical Plant-Landscape Services Department.

### 7.1.9 STREET TREE ASSET VALUE

The Street Tree Asset Value describes the asset value of any public tree. It is the dollar amount assigned to a public tree, as determined by the International Society of Arboriculture. Landscape plants serve functional and esthetic roles in rural, urban commercial or residential landscapes. Such plants have market value much like real estate, but that value is often difficult to determine. In the case of loss of landscape plants, however, it may be necessary to establish a monetary value to validate an insurance claim or to justify a loss to the Internal Revenue Service. Appraisal of landscape plants is not a precise process. Often, the opinion of an expert horticulturist or consulting arborist is required, especially in the case of claims, which are decided through litigation. However, most landscape professionals can get some idea of the value of their landscape plants by following the procedures outlined in these pages.

An asset value will be considered for any public tree. This value will be used:

1. When a public tree must be removed because of a construction project that impacts the public right-of-way.
2. When Physical Plant-Landscape Services or any other University Department considers any tree for removal.
3. When a tree is damaged and must be removed.

Three different methods are used by landscape professionals to arrive at a value for trees. Select the simplest method, which is appropriate to the size and number of landscape plants for which a value is required.

#### 7.1.9.1 Decreased Asset Value of Real Estate

When many trees are affected on a piece of property, or when a dominant landscape element is lost, then the change in assessed valuation may be the best indicator of value. A good, recent photograph of the landscape is valuable in establishing the property status before the loss.

#### 7.1.9.2 Replacement Cost

Replacement value for "Special" trees shall be determined by utilizing the most recent edition of the Guide for Plant Appraisal, published by the Council of Tree and Landscape Appraisers. Small trees that are easily transplanted at their full size can be appraised by determining the cost of replacement. If the plant was in poor condition prior to the loss, the appraised value may be less than the full cost of replacement. For trees with diameters up to and including 6 inches, compensation shall be the actual cost of replacement with item similar in species, size, and shape, including: actual cost of item boxed out of ground, transportation or delivery of boxed item to site, planting and staking. Maintenance; including watering, fertilizing, pruning, pest control, and other care to bring replacement to same general condition of original item.

#### 7.1.9.3 Formula Computation

The formula method is in widespread use for large, individual trees, which exceed the size that is usually transplanted. It is a hybrid of the replacement cost method and a process of extending that cost to larger plants. The guidelines for this method are distributed by the Council of Tree & Landscape Appraisers and are accepted by professionals in the landscape industry and the real estate and legal disciplines. The formula is as follows:

**Tree Value = Base Value × Cross Section Area × Species Class × Condition Class × Location Class**

#### 7.1.9.4 Formula Examples

1. A 48" diameter Holly Oak, excellent health and form, Heritage, specimen tree located in housing. Local nursery estimate for a 2" diameter replacement tree, installed, is 350.

Base Value: 2" tree = 3.1 in (2) cross section area;  $\$350 \div 3.1 \text{ in}^2 = \$112.90/\text{in}^2$

Cross Section Area: 40" tree = 1256.6 in<sup>2</sup> (from table). For 48" CSA is estimated at 1736.0.

Species Class: 100 (use 1.0 in formula)

Condition Class: 100 (use 1.0 in formula)

Location Class: 60-80, Select 100 (use 1.0 in formula). Heritage tree location is always 1.0

Computation:  $\$112.90/\text{in}^2 \times 1256.6 \text{ in}^2 \times 1.0 \times 1.0 \times 1.0 = \mathbf{\$ 141,870.14}$

Computation:  $\$112.90/\text{in}^2 \times 1736.0 \text{ in}^2 \times 1.0 \times 1.0 \times 1.0 = \mathbf{\$ 195,994.40}$

2. A 10" diameter Fraxinus Ash, excellent health and street tree on East Campus Loop Road. Local nursery estimate for a 2" diameter replacement tree, installed, is 300.

Base Value: 2" tree = 3.1 in (2) cross section area;  $\$300 \div 3.1 \text{ in (2)} = \$96.77/\text{in}^2$   
 Cross Section Area: 10" tree = 201.1 in<sup>2</sup> (from table)  
 Species Class: 60-80, Select 80 (use 0.8 in formula)  
 Condition Class: 100 (use 1.0 in formula)  
 Location Class: 60-80, Select 70 (use 0.7 in formula)  
 Computation:  $\$96.77/\text{in}^2 \times 201.1 \text{ in (2)} \times 0.8 \times 1.0 \times 0.7 = \mathbf{\$4,254.00}$

3. A 4" Sycamore, good health and form, tree in a native/arroyo area. Local nursery estimate for a 1.5" diameter replacement tree, installed, is \$280.

Base Value: 1.5" tree = 1.77 in (2) cross section area;  $\$280 \div 1.77 \text{ in}^2 = \$158.19/\text{in}^2$   
 Cross Section Area: 4" tree = 12.6 in (2) (from table)  
 Species Class: 20-40, Select 40 (use .4 in formula)  
 Condition Class: 8, Select .9-.7 (use .8 in formula)  
 Location Class: 80, Select 80 (use 0.8 in formula)  
 Computation:  $\$158.19/\text{in}^2 \times 12.6 \text{ in (2)} \times 0.8 \times 1.0 \times 0.7 = \mathbf{\$1,116.18}$

#### 7.1.9.5 Base Value

**Base Value** is the dollar amount assigned to one cross-section unit (square inch or square centimeter) of a tree's trunk cross-section area. It is based on the cost of the largest available replacement plant of similar species. To compute the base value, find the cost (usually the installed price) of a replacement-size tree from a local nursery or landscape company. Then, divide that amount by the trunk cross-sectional area of the replacement tree. That amount is the base value for that cross-sectional unit. For example, if a 2 inch trunk diameter replacement tree will cost \$150 installed, then divide \$150 by 3.1 sq.in. Refer to 7.5.1 Table 1 on page 55 to determine that one square inch of cross-sectional area is valued at \$48.40 (rounded to the nearest dime).

#### 7.1.9.6 Cross-Section Area

**Cross-Section Area** is used to express tree size. It is the cross-sectional area of the tree trunk measured about one foot (30 cm) above ground level for trees with trunk size up to 12 inches (30 cm) in diameter, or at about 4 1/2 feet (140 cm) above ground level for trees with greater than 12 inch (30 cm) trunk diameter. Cross-section area can be calculated from trunk diameter by using the formula  $\text{diameter}^2 \times 0.7854$ . It can be computed in either square inches or square centimeters. Cross-section areas for trunk diameters ranging from 2 inches to 40 inches and 5 cm to 100 cm are listed in Table 1.

Abnormal trunk structures such as low-branch crotches or forked trunks, burls, or wound scars at the prescribed location for diameter measurement require that the measurement be taken at a different location. Typically, such measurements are made 6 to 12 inches (15 to 30 cm) below the abnormality.

A multi-stemmed tree is measured as separate trunks and then a combined size value is computed. Compute the cross-section areas for all but the largest stem, add them together, and multiply that total by 0.50. Add that value to the cross-section area of the largest stem. The result is a multi-stemmed cross section area value.

#### 7.1.9.7 Species Class

**Species Class** is an assigned value based on all the landscape merits of a landscape tree species and its accompanying potential for problems. Criteria used in determining species class include form, color, growth habit, flowering and fruiting characteristics, structural strength, longevity, insect and disease resistance or susceptibility, and maintenance requirements. Each tree species can be assigned any value from 1% to 100% but for practical simplicity, species are usually placed in one of five percentage classes (100, 80, 60, 40, and 20). Refer to 7.5.2 Table 2 on page 56, a listing of species class values for many common landscape trees of California. Express the class as a decimal for use in the formula. Thus, 80 become 0.80, 100 becomes 1.00, etc.

#### 7.1.9.8 Condition Class

**Condition Class** is a factor indicating the health, vigor and life expectancy of a tree, as well as its quality of form relative to a "perfect specimen" of that species. This value can be any percentage from 1% to 100%, but is commonly expressed as one of five percentage categories (100, 80, 60 to 40, 20, and 0). The rating is based on such defects as wounds, decay, storm damage, insect or disease damage, and poor form. Very few trees are perfect specimens. However, it is possible to improve condition class if proper cultural treatments are given.

The accuracy of the value assigned for tree condition is dependent on the expertise of the appraiser. It is this judgment which may be most difficult for the nonprofessional to make. Damage to the trunk, for example, may significantly reduce a tree's life expectancy, or the damage may be superficial; and while unsightly, it may not indicate a poorer condition and shortened life span. Professional consultation may be necessary to determine this factor. Reference 7.5.3 Table 3 on page 60. It serves as a guide in assigning condition class values.

#### 7.1.9.9 Location Class

**Location Class** is based on the functional and aesthetic contribution, which the tree makes to the site, the placement of the tree on the site, and the importance of the location in the landscape context of the community. This factor can be rated at any percentage from 1% to 100 %. Refer to 7.5.4 Table 4 on page 61. It can be used as a beginning point by assigning a value based on location. Judgment will be required to incorporate functional, aesthetic, and placement quality into the value. Use these considerations to determine a specific value from the ranges presented in the table. The elements of location class are:

1. Site location. Identical trees on two different sites may be valued quite differently. For example, a large, healthy tree in a remote location on a golf course fairway would not rate as highly as the same tree at a University campus.
2. Functional and aesthetic value. Trees function as visual screens, windbreaks, climate moderating elements, architectural elements, sculpture, background, framing and unifying elements, in air purification, and can provide cover for wildlife. An evaluation of the tree's role in the landscape is essential to accurately assign a location value.
3. Plant placement. A plant's value may be diminished by a location, which interferes with utility lines, is deleterious to other trees, or is a safety hazard or public nuisance.

*"A tree, young or old, if admired, remains a definite vision, and when after long absence it is visited again, the meeting place is approached with feelings of pleasure and curiosity as to how one's friend had fared, even with thoughts as to what changes may come to tree or visitor since first they met; this may seem like a foolish sentiment - perhaps it is. But, after all, sentiment is mingled with most that's best in life." - Charles Eley.*

*Gardening for the Twentieth Century, 1923***7.1.10 DEFINING HERITAGE TREES**

The University of California, Riverside desires to protect its urban forest. Trees defined as Heritage, Landmark, Memorial, and Specimen or Historic are considered important due to noteworthy characteristics or value. The following criteria are used to define special trees within the campus community.

**7.1.10.1 Definition of Heritage Tree**

1. Any tree having a trunk with a circumference of 47.1 inches (diameter of 15 inches) or more measured at 54 inches above natural grade.
2. Any oak (*Quercus* spp.), bay (*Umbellularia californica*), buckeye (*Aesculus* spp.), cedar (*Cedrus*), or redwood (*Sequoia*) with a circumference of 31.4 inches (diameter of 10 inches) or more measured at 54 inches above natural grade.
3. Any tree or group of trees specifically designated by the University for protection because of historic significance, special character or community benefit.
4. Any tree with more than one trunk measured at the point where the trunks divide, with a circumference of 47.1 inches (diameter of 15 inches) or more, with the exception of trees that are less than twelve (12) feet in height, which are exempt.

**Size** – Diameter at Breast Height or (DBH) is typically used to measure the size of a tree. This measurement is taken at 54 inches or four foot six inches above natural grade. Since diameter threshold is arbitrary based on who is taking the measurement and the location of measurement on the trunk, a plus – minus of 3 inches will be used to minimize measurement problems.

**Species** – Special consideration may be given to certain species of trees. The Coast Live Oak is an example of a protected California native species. The Valley Oak is also being considered. Certain species that are relatively rare in an area, whether native or not, may also be granted special status.

**Age** – Old trees link us to the past. The Parent Navel Tree, one of two original Navel Orange trees planted in 1873 that spawned California's entire citrus industry is located on Magnolia Avenue in Riverside, comes to mind. Age is hard to determine unless documentation is available from photographs, associations with historical buildings or historical accounts. Tree age can be inferred from tree size using the DBH as a calculation. However, DBH and age vary with species, management, site quality and other factors.

**Historic Significance** – A tree may be associated with a notable or historic event, landscape, structure or person. Most trees of considerable age have some historical significance, whether it is recognized or not. Determining historical significance is a subjective matter. The University may assign special status to trees dedicated or planted as public memorials.

**Ecological Value** - Trees have a variety of ecological functions. Certain groups may have high value due to their species, size, location or condition. Trees help to stabilize soil, provide shade for other plants or animal species. Birds nest or roost in their canopies and some species also provide a food source for wildlife.

**Aesthetics** – Aesthetics is always subjective as “beauty is in the eye of the beholder”. A tree may have aesthetic value due to its size, shape, branch structure, form or grouping within the landscape. Special status may be given to a tree which serves a function; for example, the landmark Italian Stone Pines that frame the entrance to the A. Gary Anderson School of Business Management.

**Location** - Certain trees located throughout the campus may be granted special status due to their beauty or ecological function. Trees lining a street can be classified as “Street Trees” and may be given special status whether in the right-of-way or under private or public care.

**Required plantings and retained trees** – If trees have been preserved or planted as a requirement of the development of the campus urban forest, then the University has a vested interest to ensure that the trees are protected. The purpose of planting and tree retention is to develop a mature tree canopy, and this cannot occur if trees are eliminated, improperly maintained or replaced frequently with young trees. By specifically providing special status to such trees, greater discretion must be exercised regarding their care.

**Pruning** – Heritage Oak (*Quercus*) trees shall have no more than 15% of their canopy or existing foliage, or more than one third of the root system removed in any one year. All other Heritage trees shall have no more than 20% of their canopy or existing foliage, or more than one third of the root system removed in any one year. Trees 7 to 20 years old should receive structural pruning every 2 (two) to 5 (five) years. Trees 20 years and older receive maintenance pruning every 5 (five) to 7 (seven) years to clean dead, diseased, dying and defective branching from the crown.

**Tree protection and preservation** - Any person(s) who maintains, controls, has custody or possession of any real property for development purposes within the University shall use reasonable efforts to preserve and maintain all Heritage trees located thereon in a state of good health.

- a. Any application for discretionary development approval for real property or any other Development Project shall be accompanied by a signed statement by the University authorized agent which discloses whether any Heritage trees exist in the area of development and described on the plans associated with the application the location of each such tree, its species, trunk size and drip line area. In addition, the location of any tree within thirty feet of the area proposed for construction that is within the public right-of-way shall be shown on the plans and identified by species.
- b. With regard to any tree required to be identified under section (a) above, (Hereafter “protected tree”), any exterior construction work associated with any Development Project preformed within a radius measured from the trunk center equal to ten (10) times the diameter of the tree trunk measured at 4’ above grade shall require the preparation and submittal of a Tree Protection Plan for review and approval by the Office of Design and Construction (OD&C) and Physical Plant–Landscape Services prior to the commencement of any work on the site.

#### 7.1.11 TREE PROTECTION PLAN

##### 7.1.11.1 Tree Protection minimum requirements:

1. Prior to the commencement of any Development Project, a chain link fence shall be installed at the drip line of any protected tree which will be affected by the construction and shall prohibit the storage of construction materials, equipment or other materials inside the fence. The drip line shall not be altered in any way so as to increase the encroachment of the construction.
2. Prohibit excavation, grading, soil deposit, drainage and leveling within the drip line unless approved by Physical Plant–Landscape Services Department or the campus Arborist.
3. Prohibit disposal or depositing of oil, gasoline, chemicals, paints, solvents or other materials within the drip line or in drainage channels, swales or areas that may lead to the drip line.
4. Prohibit the attachment of wires, signs and ropes to any protected tree.
5. Utility service and irrigation lines shall be located outside of the drip line when feasible.
6. Include provision for the retention of the services of a certified arborist for periodic monitoring of the project site and the health of the protected trees. The arborist shall be present whenever activities occur which will pose a potential threat to the health of the protected trees or whenever any work need to be done within the drip line of the tree.
7. Include other provisions as deemed necessary by OD&C, Physical Plant–Landscape Services and the campus Arborist to preserve the protected tree and insure compliance with those provisions.
8. Require that the department of Physical Plant–Landscape Services, OD&C and the campus Arborist be notified whenever any damage or injury occurs to a protected tree during construction so that proper treatment may be administered.
9. Contain the signature of the property owner representative and building permit applicant.
10. Tree Protection Plan Review. The Tree Protection Plan described above by OD&C, Physical Plant–Landscape Services and the campus Arborist. If the plan is sufficient to prevent harm to protected trees from reasonably foreseeable construction activities, it shall be approved.

*"Someone's sitting in the shade today because someone planted a tree a long time ago." - Warren Buffett*

**7.1.11.2 Repair Compensation**

1. Damage to existing tree crowns or roots over 1-inch in diameter shall be immediately reported to University's Representative in writing and at the direction of the University's Representative, repaired immediately at the Contractor's expense by an approved certified arborist.
2. A certified arborist shall direct repair of trees damaged by construction operations. Repairs shall be made promptly after damage occurs to prevent progressive deterioration of damaged trees.
3. Any tree to remain which is damaged or destroyed owing to the Contractor's negligence or failure to provide adequate protection shall be compensated for in accordance with the following schedule of values using "tree caliper" method (greatest trunk diameter, measured 18 inches above ground):
4. For trees and shrubs with diameters up to and including 6 inches, compensation shall be the actual cost of replacement with item similar in species, size, and shape, including:
  - a. Actual cost of item boxed out of ground.
  - b. Transportation or delivery of boxed item to site.
  - c. Planting and staking.
  - d. Maintenance, including watering, fertilizing, pruning, pest control, and other care to bring replacement to same general condition of original item.
  - e. For trunks up to: (2012 prices; update yearly)

7".....	\$3,800
8".....	\$5,100
9".....	\$6,000
10".....	\$7,300
11".....	\$8,900
12".....	\$9,700
13".....	\$10,900
14".....	\$10,000

15".....	\$12,000
16".....	\$14,500
17".....	\$16,000
18" and over, add for each	
Caliper inch.....	\$ 1,500

5. Damaged tree limbs or trees which have died as a result of injury during construction shall remain the property of the Regents and shall remain or be removed by the Contractor as directed by the University's Representative.
6. A penalty will be assessed for tree limb damage at **\$200** (Two Hundred Dollars) per inch of limb diameter for any limb larger than 1½ inches in diameter, measured where the limb should be pruned to make a proper thinning cut.
7. Additionally, a liable Contractor shall replace any vegetation (other than trees) that died or sustained injury from the result of the Contractor's negligence to provide adequate required vegetation protection, pruning, or maintenance during the course of construction operations, as evaluated by the University's Representative. Compensation shall be awarded to the University as follows:
  - a. Contractor shall thoroughly remove damaged vegetation at no cost to the University, and at the direction of the University's Representative.
  - b. Contractor shall furnish and install five (5) gallon container stock minimum (as applicable) of the same form, species, and in the same quantity as vegetation that was damaged, at the direction of the University's Representative.
8. The University's Representative shall make the final judgment on whether trees and/or vegetation have been damaged by the Contractor during the execution of the Work, and their decision is final.
9. Warranty of Replacement Plant Material: Contractor shall warrant that all replacement plant materials shall be healthy and in flourishing condition of active growth at the end of the warranty period of 1 calendar year from the date of final acceptance.

**Fines are doubled when a Historical, Heritage, Specimen or Memorial tree meant to be retained or protected is damaged or removed without the University's representative knowledge.**

**Please refer to the UCR Grounds Department Landscape-Irrigation Guidelines, Section 4; Tree Protection and Relocation Specifications for additional tree protection information.**



**California Redwoods**

**7.1.12 Departments Subject to Fines**

In the event of damage to above- or below-ground parts of urban forest trees at any time, the University Representative shall conduct an investigation to determine the cause of the damage. If it is found that damage was caused due to the error, negligence, or willfulness of a University department, then that University department will be required to pay the same damages imposed on Contractor Subject to Penalties.

**7.1.13 Employees Subject to Discipline**

In the event of damage to above- or below-ground parts of urban forest trees at any time, the campus Arborist shall conduct an investigation to determine the cause of the damage. If it is found that damage was caused due to the error, negligence, or willfulness of a University employee, then that employee will be subject to appropriate disciplinary action.

**7.2 Campus Plant Material Palette**

The following plant material has been approved for use at UC Riverside:

		D/T	H/T	CA/N	Comments
<b>Evergreen Trees</b>					
<i>Acacia baileyana</i>	Bailey Acacia	X	X	X	Beautiful color but often need Iron at UCR.
<i>Acacia pendula</i>	Weeping Acacia	X	X		
<i>Acacia podalyriifolia</i>	Pearl Acacia	X	X		
<i>Acacia retinoides</i>	Acacia Floribunda	X	X		
<i>Agonis flexuosa</i>	Western Australia				Peppermint Gorgeous small tree; worth trying especially as accent.
<i>Alnus rhombifolia</i>	White Alder		X		True climax tree, medieval forest look; best in natural, riparian areas.
<i>Arbutus unedo</i>	Strawberry Tree	X			"Marina" cultivar is a great tree. Plant big. Do not use near lawns or paved areas. Edible fruit/dense canopy often sooty mold a problem if too humid.
<i>Brachychiton acerifolius</i>	Flame Tree				
<i>Brachychiton populneus</i>	Bottle Tree				Great shade tree. Good windbreak. Susceptible to Texax root rot.
<i>Callistemon lanceolatus</i>	Red Bottlebrush		X		
<i>Callistemon viminalis</i>	Weeping Bottlebrush		X		
<i>Calocedrus decurrens</i>	Incense Cedar	X	X		Underused local forest tree w/ great fragrance; good drainage, ample cool season water.
<i>Calodendrum capense</i>	Cape Chestnut		X		Statement tree w/ bold lilac flowers; requires rich loamy soil.
<i>Cedrus atlantica</i>	Atlas Cedar	X	X		Tough urban conifer; needs lots of room/best not in lawns can windthrow if shallow rooted. Also Blue Atlas (glauca) variety.
<i>Cedrus deodara</i>	Deodor Cedar		X		Somewhat larger than Atlas Cedar. These cedars are all beautiful; prune to avoid windsail.
<i>Chorisia speciosa</i>	Floss Silk Tree				"Majestic Beauty" is thornless variety. Lovely pink flower, Green trunk/great flower.
<i>Cinnamomum camphora</i>	Camphor Tree				Great evergreen shade tree, prototypical tree, slow-growing. Very nice bark and trunk color and texture w/contrasting shiny leaves.
<i>Citrus species</i>	Citrus varieties				UCR's heritage. Hedges, groves, specimens all very ornamental.
<i>Cupaniopsis anacardioides</i>	Carrot Wood		X		Females drop messy, sticky seed pods; specify Male varieties. Nice small tree with brittle wood.
<i>Cupressus sempervirens</i>	Italian Cypress				"Exclamation point" trees good in groves, borders; tough tree.
<i>Eriobotrya deflexa</i>	Bronze Loquat	X	X		Non-fruiting loquat. Red-bronze foliage.
<i>Eucalyptus citriodora</i>	Lemon Scented Gum	X	X		Susceptible to spotted-gum eucalyptus psyllid. Striking Architecturally (plant away from buildings).

<i>Eucalyptus erythrocorys</i>	Red Cap Gum	X	X		Rangy small tree but outstanding floral and seed cap display.
<b>Evergreen Trees</b>					
<i>Eucalyptus ficifolia</i>	Scarlet-Flowering	X	X		Gum Good canopy tree. Use sparingly.
<i>Eucalyptus lehmanni</i>	Lehman Eucalyptus	X	X		Good canopy tree. Subject to frost damage in Sunset Zones 17-18.
<i>Eucalyptus leucoxylon</i> against blank	White Ironbark	X	X		Striking cream-colored bark. Good silhouette tall building façade.
<i>Eucalyptus polyanthemos</i>	Silver Dollar Gum	X	X		Smallest of eucalyptus species.
<i>Feijoa sellowiana</i>	Pineapple Guava	X			Edible fruit and flower. Avoid use in paved and lawn areas/moderate frost sensitivity.
<i>Ficus microcarpa nitida</i>	Indian Laurel Fig				Striking, robust "jungle tree". Avoid use near paving, surface roots heave sidewalks.
<i>Geijera parviflora</i>	Australian Willow	X			Small-medium sized weeping willow-like tree/always attractive, drought tolerant, carefree tree.
<i>Heteromeles arbutifolia</i>	Toyon			X	Subject to fire blight. Plant in well-drained soils. Absolutely gorgeous local native (hates summer water).
<i>Lophostemon conferta</i>	Brisbane Box				Eucalyptus relative. Very formal structure. Good lawn and street tree.
<i>Magnolia grandiflora</i>	Southern Magnolia			X	Great shade tree but excessive flower drop. Excellent accent tree (leaves & flowers) buttressing roots break hardscape.
<i>Melaleuca quinquenervia</i>	Cajeput Tree	X	X		Very nice small tree; street tree or multi-trunk tree. Upright form. Good drainage appreciated.
<i>Metasequoia glyptostroboides</i>	Dawn Redwood				Deciduous conifer; novelty tree, striking. Good fall and spring leaf color, accepts lawn water. great in groves.
<i>Olea europaea</i>	Fruitless Olive	X			Bulletproof; 'Swan Hill' fruitless variety; great in containers.
<i>Pinus canariensis</i> best--but	Canary Island Pine			X	Easy-growing to 50'. Good avenue tree--the watch for psyllid, mite infestations.
<i>Pinus coulteri</i>	Coulter Pine	X			Indigenous to local mountains. Watch summer water. Nice tree but big dangerous cones.
<i>Pinus eldarica</i> Mondell	Pine Great	X			Surdy avenue tree.
<i>Pinus halepensis</i>	Desert (Aleppo)	X			Pine Tough, loves heat but rangy habit and messy needle drop.
<i>Pinus nigra</i>	Austrian Black Pine	X	X		
<i>Pinus pinea</i>	Italian Stone Pine	X	X		Classic umbrella shape pine. Great avenue tree. If deep roots not encouraged, this beautiful tree can be an effective wind throw.

<i>Pittosporum phillyraeoides</i>	Willow Pitt		X		Nice accent tree.
<i>Pittosporum rhombifolium</i>	Queensland Pitt		X		Great patio tree. Do not install over hardscape.

		D/T	H/T	CA/N	Comments
<b>Evergreen Trees</b>					
<i>Pittosporum undulatum</i>	Victorian Box		X		
<i>Podocarpus elongates</i>	Fern Podocarpus		X		
<i>Podocarpus gracilior</i>	Fern Pine	X	X		Tough, fast growing evergreen; can be gangly in youth; good street tree.
<i>Podocarpus henkelii</i>	Long-leaf Yellow Wood				Erect tree with slender drooping leaves in youth.
<i>Podocarpus macrophyllus</i>	Yew Pine	X	X	X	Good street tree
<i>Prosopis glandulosa</i>	Honey Mesquite				Desert tree, spreads. Nice structure w/ age.
<i>Prunus caroliniana</i>	Carolina Cherry		X		Great shrub/ good screen shiny evergreen. Tough w/ arid forest look.
<i>Prunus lusitanica</i>	Portugal Laurel		X		Good, tough shrub.
<i>Prunus ilicifolia ilicifolia</i>	Holly-Leaf Cherry		X	X	Often used as giant shrub - needs good drainage.
<i>Prunus ilicifolia lyonii</i>	Catalina Cherry			X	Good, carefree, attractive w/ little water.
<i>Quercus agrifolia</i>	California Live Oak	X		X	Great; native grown, needs minimal summer water; do not use with regular irrigation. Most common local oak; use more in wild areas.
<i>Quercus chrysolepis</i>	Golden Cup Oak		X		Great structure (needs room) needs good Drainage.
<i>Quercus ilex</i>	Holly Oak	X			Good evergreen tree. Good small-scale street tree/ thrives in lawns, extremely fertile acorns are nuisance in shrub beds.
<i>Quercus suber</i>	Cork Oak		X		Good avenue tree/ more need to be planted so people can feel its bark.
<i>Quercus virginiana</i>	Southern Live Oak				Best oak for lawn planting- takes regular irrigation/ look great on campus lawns.
<i>Tipuana tipu</i>	Tipu Tree	X		X	Bold structure.
<i>Ulmus parvifolia 'Drake'</i>	Chinese Elm		X		Drake' has small leaves, weeping habit; 'True Green' varietal is most evergreen of species.
<i>Umbellularia californica</i>	California Laurel Bay		X	X	None on campus now. Extremely aromatic leaf, nice shape. Small tree in southern California.

**Please note: the *Schinus molle*; California Pepper and the *Schinus terebinthifolius*; Brazilian Pepper have been removed from the recommended list. These species of tree are classified as "invasive" in the State of California by the Department of Forestry.**



**Pittosporum – Victorian Box**

**Southern Live Oak**

**California Laurel Bay**

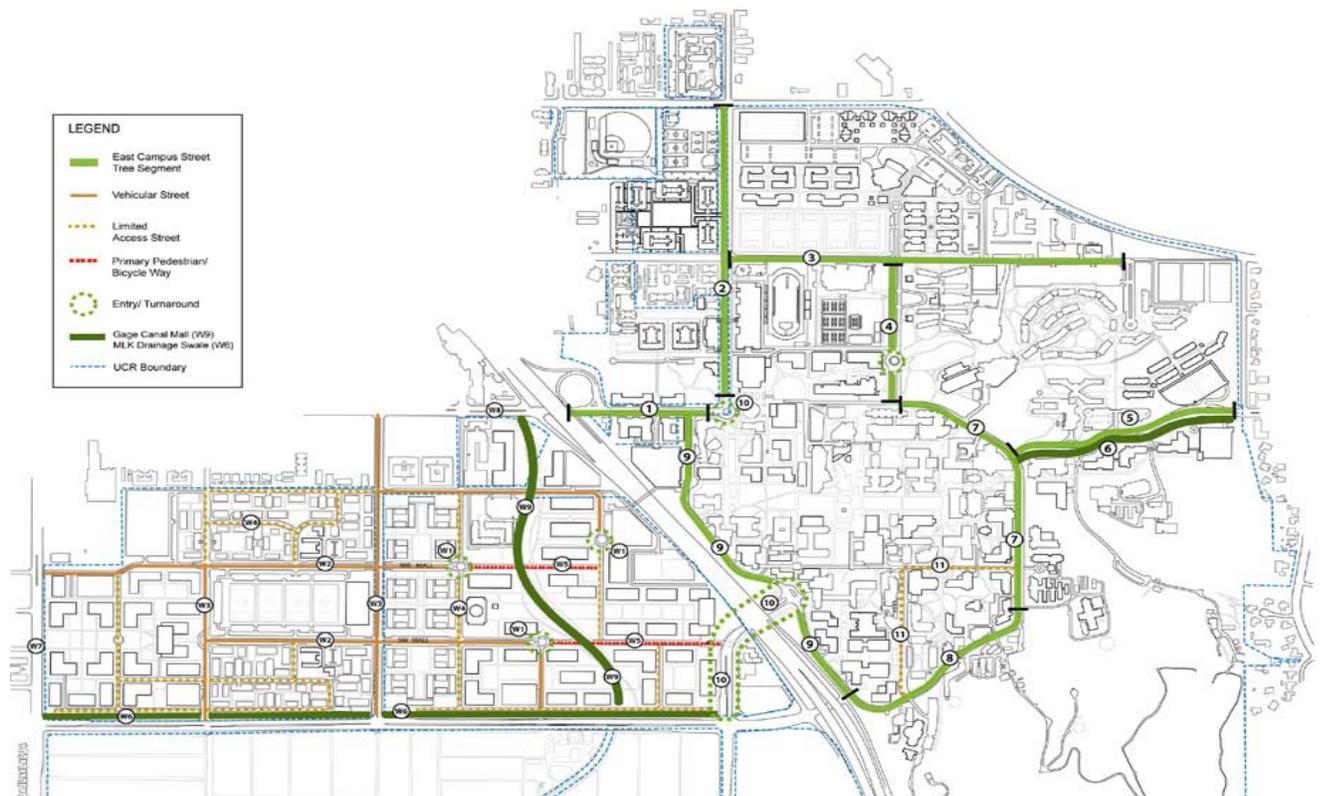
**Deciduous Trees**

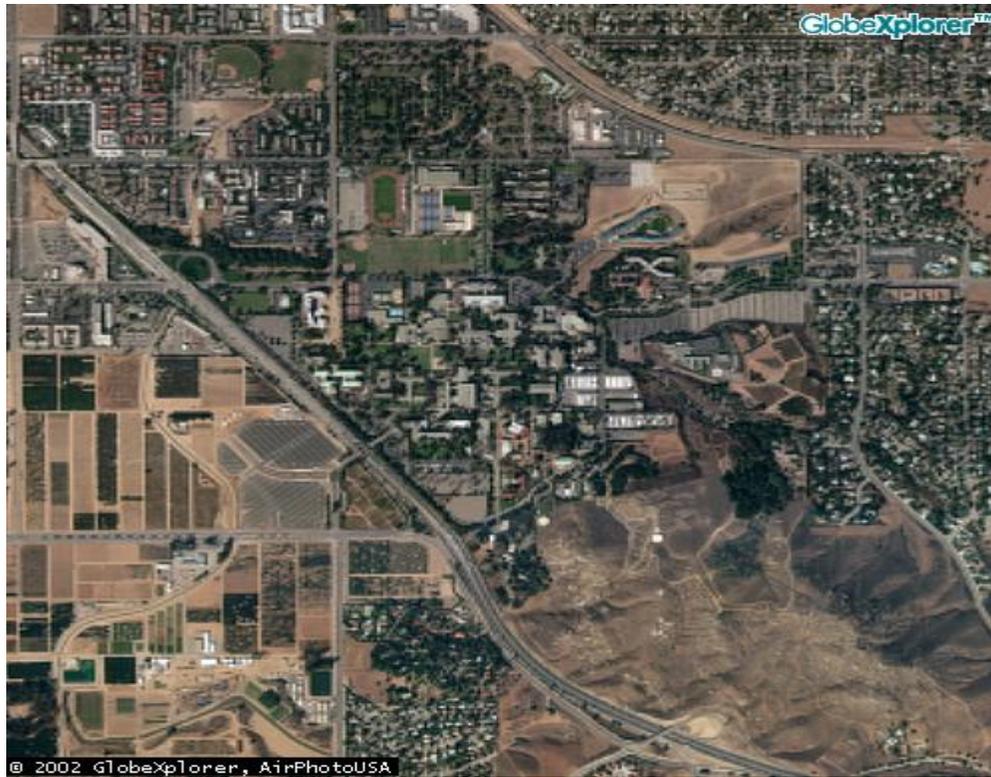
		D/T	H/T	CA/N	Comments
<i>Acer macrophyllum</i>	Bigleaf Maple				Native to stream banks, moist canyons. Resists oak root fungus. Large shade tree.
<i>Acer palmatum</i>					Japanese Maple Does well in patios, as accents or large pots; nice mini-forests.
<i>Aesculus californica</i>	California Buckeye	X		X	Good for native plantings; produces chestnuts.
<i>Albizia julibrissin</i>	Mimosa Tree/Silk	X			Tree Tough, colorful and fast.
<i>Alnus cordata</i>	Italian Alder				
<i>Alnus rhombifolia</i>	White Alder		X	X	Good wind break.
<i>Bauhinea variegata</i>	Purple Orchid Tree	X			Semi-evergreen. Ungainly shape but great flowers and excellent for color -- at a distance.
<i>Brachychiton acerifolius</i>	Flame Tree				Red-flowering tree. Briefly deciduous. Eye-catching flower display is the best. Tough tree.
<i>Cercis occidentalis</i>	Redbud	X			Good small flowering tree, drought tolerant and really colorful.
<i>Chitalpa tashkentensis</i>	Chitalpa	X			Good street tree, compact white-pink showy flowers, no seed pods, 20-30'.
<i>Cupaniopsis anacardioides</i>	Carrotwood Tree				
<i>Fraxinus velutina</i>	'Modesto' Modesto Ash				Good option; good large street tree. Great fall Color.
<i>Fraxinus uhdei</i>	'Majestic Beauty' Evergreen Ash				
<i>Fraxinus velutina</i>	Arizona Ash				
<i>Fraxinus angustifolia</i>	'Raywood' Raywood Ash				
<i>Ginkgo biloba</i>	'Autumn Gold' Maidenhair Tree				Great; slow growing; specify variety to make sure it is a male plant. Great vertical fall color.
<i>Gleditsia triacanthos</i>	'Shademaster' Honey Locust				Nice color flowers, but junky tree, esp. for traffic Areas.
<i>Jacaranda acutifolia (mimosifolia)</i>	Jacaranda	X			Great purple flowers; can be brittle and prone to wind damage, semi evergreen. Messy over pavement.
<i>Juglans californica</i>	California Black Walnut				
<i>Koelreuteria bipinnata</i>	Chinese Flame Tree	X			Good street trees. Stains hardscape w/ tannic acid.
<i>Koelreuteria paniculata</i>	Golden Rain Tree	X			Good street trees. Good fall color. Stains hardscape w/ tannic acid.
<i>Lagerstroemia indica</i>	'Indian Tribe' Crape Myrtle	X			Good medium flowering. Many varieties. Select for hardiness and mildew resistance. The best summer color tree in the area.
<i>Liquidambar formosana</i>	'Afterglow' Sweet Gum		X		Needs large tree well. Not great street tree

<i>Liquidambar styraciflua</i> 'Palo Alto'	American Sweet Gum				because of spikey seed pods; great fall color.
					Needs large tree well. Many varieties to choose from. See above.
<i>Liriodendron tulipifera</i>	Tulip Tree		X		Needs deep, well-drained, slightly acidic soils.
<i>Magnolia soulangeana</i>	Saucer Magnolia		X		Good large shrub/ small tree. Many varieties.
<i>Magnolia stellata</i>	Star Magnolia		X		Large shrub/small tree. Many varieties.
<i>Pistacia chinensis</i>	Chinese Pistache		X		Slow growing. Good street tree, great fall color.
		D/T	H/T	CA/N	Comments
<b>Deciduous Trees</b>					
<i>Platanus acerifolia</i> 'spp.'	London Plane Tree				"Bloodgood" is resistant to anthracnose. "Yarwood" is resistant to oak root fungus; "Columbia" is resistant to both.
<i>Platanus racemosa</i>	California Sycamore		X		Good native. Anthracnose causes irregular form. Great trunk color.
<i>Populus nigra</i> 'Italica'	Lombardy Poplar		X	X	Needs room to grow. Good tall windbreak. Roots can be disruptive.
<i>Prunus persica</i>	Flowering Peach			X	
<i>Pyrus calleryana</i> 'spp.'	Ornamental Pear		X		'Bradford' is poor variety with weak crotch; select alternate variety such as 'Aristocrat' or 'Chanticleer'.
<i>Quercus coccinea</i>	Scarlet Oak			X	Not recommended for turf areas.
<i>Quercus douglasii</i>	Blue Oak			X	
<i>Quercus kelloggii</i>	California Black Oak			X	Striking upright oak, good fall color (woody look).
<i>Quercus lobata</i>	California White Oak			X	Large tree in maturity.
<i>Quercus virginiana</i>	Southern Live Oak			X	Superior in turf areas.
<i>Sapium sebiferum</i>	Chinese Tallow Tree			X	
<i>Tipuana tipu</i>	Tipu Tree			X	Semi-evergreen; good street tree if flower litter is tolerable. Needs plenty of space.
<i>Zelkova serrata</i> 'spp.'	Sawleaf Zelkova		X	X	Good street tree. 'Green Vase'.
<b>Palms</b>					
<i>Syagrus romanzoffianum</i> (aka <i>Cocos plumosa</i> )	Queen Palm		X		Formerly <i>Arecastrum romanzoffianum</i> 'Feather Frond'.
<i>Brahea armata</i>	Mexican Blue Palm		X		Slow growth, compact fronds with nice color.
<i>Brahea edulis</i>	Guadalupe Palm		X		Great small fan palm. Slow-growing, creamy-colored fronds.
<i>Butia capitata</i>	Pindo Palm				Graceful arching fronds; slow growing.
<i>Chamaerops humilis</i>	Mediterranean Fan				Natural multi-trunk, small-med. sized palm. Attractive at maturity.
<i>Phoenix canariensis</i>	Canary Island Date		X		Elegant but hard to find. Fronds heavy.
<i>Phoenix dactylifera</i>	Date Palm		X		Classic date palm of desert lore.

<i>Phoenix reclinata</i>	Senegal Date Palm	X	Beautiful, stately natural multi-trunk palm.
<i>Phoenix roebelenii</i>	Pygmy Date Palm		Subject to frost damage. Afternoon shade advised.
<i>Trachycarpus fortune</i>	Windmill Palm	X	Tight and compact. Good for small areas.
<i>Washingtonia filifera</i>	California Fan Palm	X	Needs room, subject to fungal disease.
<i>Washingtonia robusta</i>	Mexican Fan Palm	X	Grows extremely fast, reaches 100 feet tall.
<i>Washingtonia robusta</i>	Hybrid Mexican Fan	X	Hybrid between robusta and filifera is smaller than species.

**7.3 Street Tree Plan**





Chinese Tallow Tree



Camphor Tree



Modesto Ash

#### 7.4 Master Street Tree List

##### East Campus Loop Road and Entries

<b>1</b>	<b><u>UNIVERSITY AVENUE</u></b>		
<b>D/M</b>	<b>Main Structure Tree</b>	Washingtonia robusta 'Hybrid'	Hybrid Mexican Fan Palm
		Washingtonia filifera	California Fan Palm
<b>D/I</b>	<b>Flowering Accent Between Palms</b>	Koelreuteria bipinnata	Chinese Flame Tree
<b>A</b>	<b>Small Accent Tree</b>	Lagerstroemia indica 'Hybrids'	Crape Myrtle
<b>2</b>	<b><u>CANYON CREST DRIVE</u></b>		
<b>EX/D/M</b>	<b>Large Semi-evergreen Tree</b>	Fraxinus velutina 'Modesto'	Modesto Ash
<b>M</b>		Fraxinus uhdei 'Majestic Beauty'	Evergreen Ash
<b>M</b>		Fraxinus velutina	Arizona Ash
<b>M</b>		Fraxinus angustifolia 'Raywood'	Raywood Ash
<b>3</b>	<b><u>LINDEN STREET</u></b>		
<b>EX/D/M</b>	<b>Tall Accent Palm</b>	Washingtonia robusta 'Hybrid'	Hybrid Mexican Fan Palm
<b>D/I</b>	<b>Large Evergreen Tree</b>	Schinus molle	California Pepper Tree
<b>I</b>	<b>Semi-evergreen Flowering</b>	Jacaranda mimosifolia	Jacaranda
<b>I</b>	<b>Between Palms</b>	Tipuana tipu	Tipu Tree

<b>4</b>	<b>ABERDEEN DRIVE</b>		
<b>EX/D/M</b>	<b>Large Evergreen Tree</b>	Cinnamomum camphora	Camphor Tree
<b>M</b>		Brachychiton populneus	Bottle Tree
<b>M</b>	<b>Deciduous Canopy Tree</b>	Brachychiton acerifolius	Flame Tree
<b>M</b>		Sapium sebiferum	Chinese Tallow Tree
<b>5</b>	<b>BIG SPRINGS ROAD</b>		
<b>D/M</b>		Fraxinus velutina 'Modesto'	Modesto Ash
<b>D/M</b>		Pinus canariensis	Canary Island Pine
<b>6</b>	<b>ARROYO @ BIG SPRINGS ROAD</b>		
<b>EX/G WRT</b>	<b>Planting Plan</b>	Fraxinus velutina 'Modesto'	Modesto Ash
<b>G</b>		Juglans californica	California Black Walnut
<b>EX/G</b>		Platanus racemosa	California Sycamore
<b>EX/G</b>		Quercus agrifolia	Coast Live Oak
<b>EX/G</b>		Heteromeles arbutifolia	Toyon
<b>7</b>	<b>EAST CAMPUS DRIVE</b>		
<b>M</b>	<b>Main Structure Tree</b>	Platanus acerifolia 'Columbia'	London Plane Tree
<b>M</b>		Fraxinus spp.	Ash
<b>EX/D/I</b>	<b>In-fill Tree</b>	Schinus molle	California Pepper Tree
<b>EX/D/I</b>	<b>In-fill Tree</b>	Acer saccharum	Sugar Maple
<b>8</b>	<b>SOUTH CAMPUS DRIVE</b>		
<b>M</b>	<b>Main Structure Tree</b>	Pinus pinea	Italian Stone Pine
<b>M</b>		Podocarpus gracilior	Fern Pine
<b>M</b>		Zelkova serrata 'Green Vase'	Sawleaf Zelkova
<b>I</b>	<b>In-fill Tree</b>	Platanus acerifolia 'Columbia'	London Plane Tree
<b>A</b>	<b>Small Accent Tree</b>	Lagerstroemia indica 'Hybrids'	Crape Myrtle
<b>9</b>	<b>WEST CAMPUS DRIVE</b>		
<b>EX/D/M</b>	<b>Main Structure Tree</b>	Fraxinus velutina 'Modesto'	Modesto Ash
<b>M</b>		Pinus halepensis	Aleppo Pine
<b>EX/I</b>		Platanus acerifolia 'Columbia'	London Plane Tree
<b>EX/A</b>	<b>Small Accent Tree</b>	Prunus cerasifera spp.	Purple-leaf Plum
<b>10</b>	<b>ENTRY</b>		
<b>M</b>	<i>Monumental Palms</i>	Phoenix canariensis	Canary Island Date Palm
<b>M</b>		Phoenix dactylifera	Date Palm
<b>M</b>		Washingtonia felifera	California Fan Palm
<b>11</b>	<b>SERVICE WALK</b>		
<b>M</b>		Koelreuteria bipinnata	Chinese Flame Tree
<b>M</b>		Tipuana tipu	Tipu Tree
<b>M</b>		Cinnamomum camphora	Camphor Tree
<b>M</b>		Platanus acerifolia 'Columbia'	London Plane Tree
<b>M</b>		Quercus suber	Cork Oak
<b>M</b>		Quercus agrifolia	Coast Live Oak
<b>M</b>		Quercus virginiana	Southern Live Oak
<b>M</b>		Ginkgo biloba 'Fastigata'	Maidenhair Tree
<b>M</b>		Pistache chinensis	Chinese Pistache
<b>M</b>		Jacaranda mimosifolia	Jacaranda
<b>M</b>		Magnolia grandiflora	Southern Magnolia
<b>M</b>		Pinus pinea	Italian Stone Pin
<b>M</b>		Podocarpus gracilior	Fern Pine
<b>M</b>		Citrus oroblanco	Oroblanco Grapefruit
<b>M</b>		Citrus washington	Washington Navel Orange
<b>M</b>		Citrus 'Improved Meyer'	Meyer Lemon

**EX = Existing Street Tree**

**D = Designated Campus Street Tree**

**M = Main Structure Tree (Single tree species to be used as the dominant street tree).**

**I = In-fill Tree (Tree species to be used as a back-drop tree to the main structure tree).**

**G = Group Planting (Trees to be mixed in group planting with other species on list).**

**A = Small accent tree**

**W1 WEST CAMPUS DROP-OFF**

<b>M</b>	<i>California Signature Tree</i>	Quercus lobata	White Oak
<b>M</b>	<i>Circle</i>	Quercus agrifolia	Coast Live Oak
<b>M</b>		Platanus racemosa	California Sycamore
	<i>Grove Tree</i>	Phoenix dactylifera	Date Palm
		Washingtonia felifera	California Fan Palm

**W2 NW MALL / SW MALL**

<b>G</b>	<b>Ornamental Arroyo Swale</b>	Platanus racemosa	California Sycamore
<b>G</b>		Quercus agrifolia	Coast Live Oak
<b>G</b>		Alnus rhombifolia	White Alder
<b>G</b>		Juglans californica	California Black Walnut
<b>G</b>		Acer macrophyllum	Big-leaf Maple
<b>G</b>		Heteromeles arbutifolia	Toyon
<b>G</b>		Myrica californica	Pacific Wax Myrtle
<b>M</b>	<i>Large Scale Street Trees</i>	Fraxinus velutina 'Modesto'	Modesto Ash
<b>M</b>		Washingtonia robusta 'Hybrid'	Hybrid Mexican Fan Palm
<b>M</b>		Chorisia speciosa 'Majestic Beauty'	Floss Silk Tree
<b>M</b>		Pinus canariensis	Canary Island Pine
<b>M</b>		Pinus pinea	Italian Stone Pine
		Quercus kelloggii	California Black Oak
<b>I</b>	<i>Medium Scale Back-drop Tree</i>	Jacaranda mimosifolia	Jacaranda
<b>I</b>		Agonis flexuosa	Peppermint Tree
<b>I</b>		Magnolia grandiflora	Southern Magnolia
	<i>Grove Tree</i>	Washingtonia felifera	California Fan Palm
		Citrinus oroblanco	Oroblanco Grapefruit
		Citrinus washington	Washington Navel Orange
		Citrinus 'Improved Meyer'	Meyer Lemon

**WEST CAMPUS**

**W3 TYPICAL VEHICULAR STREET**

<b>M</b>	<i>Med/Lg Scale Street Tree</i>	Koelreuteria bipinnata	Chinese Flame Tree
<b>M</b>		Tipuana tipu	Tipu Tree
<b>M</b>		Cinnamomum camphora	Camphor Tree
<b>M</b>		Platanus acerifolia 'Columbia'	London Plane Tree
<b>M</b>		Quercus suber	Cork Oak
<b>M</b>		Quercus agrifolia	Coast Live Oak
<b>M</b>		Quercus virginiana	Southern Live Oak
<b>M</b>		Ginkgo biloba 'Fastigata'	Maidenhair Tree
<b>M</b>		Pistache chinensis	Chinese Pistache
<b>M</b>		Jacaranda mimosifolia	Jacaranda
<b>M</b>		Magnolia grandiflora	Southern Magnolia
<b>M</b>		Pinus pinea	Italian Stone Pine
<b>M</b>		Podocarpus gracilior	Fern Pine

**W4 LIMITED ACCESS STREET**

<b>M</b>	<i>Medium Scale Street Tree</i>	Quercus virginiana	Southern Live Oak
<b>M</b>		Ulmus parvifolia 'Drake'	Chinese Evergreen Elm
<b>M</b>		Koelreuteria bipinnata	Chinese Flame Tree
<b>M</b>		Koelreuteria paniculata	Golden Rain Tree
<b>M</b>		Tipuana tipu	Tipu Tree
<b>M</b>		Cinnamomum camphora	Camphor Tree
<b>M</b>		Jacaranda mimosifolia	Jacaranda
<b>M</b>		Magnolia grandiflora	Southern Magnolia
<b>M</b>		Pistache chinensis	Chinese Pistache

**W5 PRIMARY PEDESTRIAN/BICYCLE**

<b>M</b>	<i>Large scale street tree</i>	Fraxinus velutina 'Modesto'	Modesto Ash
<b>M</b>		Washingtonia robusta 'Hybrid'	Hybrid Mexican Fan Palm
<b>M</b>		Chorisia speciosa 'Majestic Beauty'	Floss Silk Tree
<b>M</b>		Pinus canariensis	Canary Island Pine
<b>M</b>		Pinus pinea	Italian Stone Pine
<b>M</b>		Quercus kelloggii	California Black Oak

<p><b>I</b> <i>Medium scale back-drop tree</i></p> <p><b>I</b> <i>Grove tree</i></p>	<p>Jacaranda mimosifolia Agonis flexuosa Citrinus oroblanco Citrinus washington Citrinus 'Improved Meyer'</p>	<p>Jacaranda Peppermint Tree Oroblanco Grapefruit Washington Navel Orange Meyer Lemon</p>
<p><b>W6</b> <b><u>MLK BLVD. DRAINAGE SWALE</u></b></p>		
<p><i>Grove tree</i></p> <p><i>Grove tree</i></p> <p><i>Grove tree</i></p> <p><i>Grove tree</i></p> <p><i>Grove tree</i></p> <p><i>Grove tree</i></p> <p><i>Grove tree / wind break</i></p> <p><i>Grove tree / wind break</i></p> <p><i>Grove tree / wind break</i></p>	<p>Platanus acerifolia 'Columbia' Quercus ilex Washingtonia robusta 'Hybrid' Washingtonia felifera Phoenix dactylifera Citrinus spp. Olea europea 'Swan Hill' Eucalyptus spp. Populus nigra 'Italica' Cupressus arizonica 'Pyramidalis'</p>	<p>London Plane Tree Holly Oak Hybrid Mexican Fan Palm California Fan Palm Date Palm Citrus Fruitless Olive Gum Tree Lombardy Poplar Arizona Cypress</p>
<p><b>W7</b> <b><u>CHICAGO AVENUE</u></b></p>		
<p><b>M</b></p> <p><b>M</b></p> <p><b>I</b> <i>Semi-evergreen flowering</i></p> <p><b>I</b> <i>Between palms</i></p>	<p>Washingtonia felifera Washingtonia robusta 'Hybrid' Jacaranda mimosifolia Tipuana tipu</p>	<p>California Fan Palm Hybrid Mexican Fan Palm Jacaranda Tipu Tree</p>
<p><b>W8</b> <b><u>UNIVERSITY AVE. (WEST OF I-215)</u></b></p>		
<p><b>M</b></p> <p><b>M</b></p> <p><b>I</b> <i>Semi-evergreen flowering</i></p> <p><b>A</b> <i>Small accent tree</i></p>	<p>Washingtonia felifera Washingtonia robusta 'Hybrid' Koelreuteria bipinnata Lagerstroemia indica 'Hybrids'</p>	<p>California Fan Palm Hybrid Mexican Fan Palm Chinese Flame Tree Crape Myrtle</p>
<p><b>W9</b> <b><u>WEST CAMPUS GAGE CANAL MALL</u></b></p>		
<p><b><i>Mediterranean Trees</i></b></p>	<p>Alnus cordata Pinus pinea Pinus halepensis Pinus canariensis Cupressus sempervirens Populus nigra italica Chamaerops humilis Phoenix canariensis Phoenix dactylifera Myrtus communis Nerium oleander Olea europea 'Swan Hill' Citrinus spp. Quercus suber Quercus ilex Arbutus unedo Cedrus atlantica glauca Cedrus atlantica glauca 'pendula' Cedrus libani Punica granatum Ceratonja siliqua</p>	<p>Italian Alder Italian Stone Pine Aleppo Pine Canary Island Pine Italian Cypress Lombardy Poplar Mediterranean Fan Palm Canary Island Date Palm Date Palm Myrtle Oleander Fruitless Olive Citrus Cork Oak Holly Oak Strawberry Guava Atlas Cedar Weeping Atlas Cedar Cedar Of Lebanon Pomegranate Carob Tree</p>
<p><b><i>California / Mexican Desert Trees</i></b></p>	<p>Olneya tesota Prosopis glandulosa Parkinsonia aculeatea Washingtonia felifera Washingtonia robusta 'hybrid' Hybrid Caesalpinia mexicana Dalea spinosa Cercidium 'desert museum' Cercidium floridum Cercidium microphyllum Eriobotrya deflexa Chilopsis linearis</p>	<p>Desert Ironwood Honey Mesquite Mexican Palo Verde California Fan Palm Mexican Fan Palm Mexican Bird-of-paradise Smoke Tree Hybrid Palo Verde Blue Palo Verde Little Leaf Palo Verde Bronze Loquat Desert Willow</p>

**Australian Trees**

Eucalyptus spp.  
 Melaleuca quinquenervia  
 Melaleuca linariifolia  
 Melaleuca styphelioides  
 Geijera parvifolia  
 Acacia spp.  
 Agonis flexuosa  
 Callistemon viminalis  
 Callistemon citrinus  
 Leptospermum laevigatum  
 Pittosporum spp.  
 Cupaniopsis anacardioides  
 Casuarina equisetifolia

Gum Tree  
 Cajeput Tree  
 Flaxleaf Paperbark  
 Black Tea Tree  
 Australian Willow  
 Acacia  
 Australian Peppermint  
 Weeping Bottlebrush  
 Lemon-scented Bottlebrush  
 Australian Tea Tree  
 Pittosporum  
 Carrot Wood  
 Horsetail Tree

**Asian Trees**

Zelkova serrata  
 Koelreuteria bipinnata  
 Pistache chinensis  
 Magnolia kobus stellata  
 Magnolia soulangiana  
 Melia azedarach  
 Ficus microcarpa  
 Gingko biloba  
 Cedrus deodara  
 Paulownia tomentosa  
 Pyrus calleryana 'chanticleer'  
 Eriobotrya japonica  
 Chionanthus retusus  
 Tracycarpus fortunei

Sawleaf Zelkova  
 Chinese Flame Tree  
 Chinese Pistache  
 Star Magnolia  
 Saucer Magnolia  
 Chinaberry  
 Indian Laurel Fig  
 Maidenhair Tree  
 Deodar Cedar  
 Empress Tree  
 Chanticleer Pear  
 Japanese Loquat  
 Chinese Fringe Tree  
 Windmill Palm

**Central/South American Trees**

Luma apiculata  
 Maytenus boaria  
 Feijoa sellowiana  
 Prosopis chilensis  
 Cedrela fissilis  
 Schinus terebinthefolius  
 Schinus molle  
 Brahea edulis

Chilean Myrtle  
 Mayten Tree  
 Pineapple Guava  
 Chilean Mesquite  
 Brazilian Cedar Wood  
 Brazilian Pepper Tree  
 California (Peruvian) Pepper  
 Guadalupe Palm

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The dedication of the carillon and tower took place on October 2, 1966. The dedication concert was played by University Carillonneur Lowell Smith. Copyright UCR.

**7.5 Street Tree Asset Value Tables**

**7.5.1 Table 1. Diameter and Cross Section Area of Tree Trunks**

<b>Inches</b>		<b>Centimeters</b>	
Trunk Diameter	Cross-Section Area	Trunk Diameter	Cross-Section Area
2	3.1	5	19.6
4	12.6	10	78.5
6	20.3	15	176.7

8	50.3	20	314.2
10	78.5	25	490.9
12	113.1	30	706.9
14	153.9	35	962.1
16	201.1	40	1256.6
18	254.5	45	1590.4
20	314.2	50	1963.5
22	380.1	55	2375.8
24	452.4	60	2827.4
26	530.9	65	3318.3
28	615.8	70	3848.5
30	706.9	75	4417.9
32	804.3	80	5026.6
34	907.9	85	5674.5
36	1017.9	90	6361.7
38	1134.1	95	7088.2
40	1256.6	100	7854.0

7.5.2 Table 2. SPECIES CLASS VALUES for SOUTHERN CALIFORNIA/NEVADA LANDSCAPE TREES

BOTANICAL	CULTIVAR	COMMON NAME	RATING %
Abies concolor		White Fir	60-80
Acacia aneura		Mulga	80-100
Acacia baileyana		Acacia, Bailey	40-60
Acacia constricta		White Thorn Acacia	60-80
Acacia greggii		Catsclaw Acacia	60-80
Acacia pendula		Weeping Acacia	60-80
Acacia podalyriifolia		Pearl Acacia	60-80
Acacia retinoides		Acacia Floribunda	60-80
Acacia schaffneri		Twisted Acacia	60-80
Acacia smallii'	Farnesiana'	Acacia, Sweet	80-100
Acacia stenophylla		Acacia, Shoestring	80-100
Acer macrophyllum		Bigleaf Maple	80-100
Acer palmatum		Japanese Maple	80-100
Aesculus californica		California Buckeye	40-60

<i>Albizia julibrissin</i>		Silk tree or Mimosa	40-60
<i>Agonis flexuosa</i>		Western Australian Peppermint	20-40
<i>Alnus cordata</i>		Italian Alder	40-60
<i>Alnus rhombifolia</i>		White Alder	40-60
<i>Aracastrium romanzoffianum</i>		Palm, Queen	40-60
<i>Arbutus unedo</i>		Strawberry Tree	60-80
<i>Bauhinea variegata</i>		Purple Orchid Tree	20-40
<i>Brachychiton acerifolius</i>		Flame Tree	40-60
<i>Brachychiton populneus</i>		BottleTree	60-80
<i>Brahea armata</i>		Palm,Mexican Blue	60-80
<i>Brahea edulis</i>		Palm,Guadalupe	60-80
<i>Butia capitata</i>		Palm, Pindo	60-80
<i>Callistemon citrinus</i>		Bottlebrush, Lemon	40-60
<i>Callistemon lanceolatus</i> (Tree)		Red Bottlebrush	40-60
<i>Callistemon viminalis</i>		Bottlebrush,Brilliant	40-60
<i>Calocedrus decurrens</i>		Incense Cedar	40-60
<i>Calodendrum capense</i>		Cape Chestnut	60-80
<i>Carya linoensis</i>		Pecan	40-60
<i>Casuarina equisetifolia</i>		Beefwood,Horsetail	20-40
<i>Casuarina stricta</i>		Beefwood, Coast	20-40
<i>Catalpa bignonioides</i>		Catalpa, Common	20-40
<i>Cedrus atlantica</i>	'Glauca'	Cedar, Blue Atlas	40-60
<i>Cedrus deodara</i>		Cedar, Deodar	40-60
<i>Celtis occidentalis</i>		Hackberry, Common	60-80
<i>Celtis reticulata</i> (douglasii)		Hackberry,Western	60-80
<i>Ceratonia siliqua</i>		Carob	40-60
<i>Cercidium X 'DesertMuseum'</i>		Palo Verde	80-100
<i>Cercidium floridum</i>		Palo Verde, Blue	80-100
<i>Cercidium microphyllum</i>		Palo Verde,Littleleaf	60-80
<i>Cercis canadensis</i>		Redbud, Eastern	60-80
<i>Cercis occidentalis</i>		Redbud, Western	60-80
<i>Cercocarpus ledifolius</i>		Mahogany, Mountain	40-60
<i>Chamaerops humilis</i>		Palm,Mediterranean Fan	80-100
<i>x Chitalpa tashkentensis</i>		Chitalpa	40-60
<i>Chilopsis linearis</i>		Willow, Desert	80-100
<i>Chorisia speciosa</i>	"Majestic Beauty"	Floss Silk Tree	40-60
<i>Cinnamoniun camphora</i>		Camphor Tree	60-80
<i>Citrus aurantiifolia</i>	tree-sized	Lime	40-60
<i>Citrus limon</i>		Lemon	60-80
<i>Citrus meyeri</i>	tree-sized	Meyer Lemon	60-80
<i>Cordi boissieri</i>		Texas Olive	60-80
<i>Cotinus coggygria</i>		Smoke Tree	40-60
<i>Cupaniopsis anacardiodes</i>		Carrotwood	40-60
<i>Cupressocyparis leylandii</i>		Cypress, Leyland	05-20
<i>Cupressus arizonica</i>		Cypress, Arizona	20-40
<i>Cupressus glabra</i>		Cypress, Smooth Arizona	20-40
<i>Cupressus sempervirens</i>		Cypress, Italian	60-80
<b>BOTANICAL</b>	<b>CULTIVAR</b>	<b>COMMON NAME</b>	<b>RATING %</b>
<i>Cycas revoluta</i>		Sago Palm	60-80
<i>Dalbergia sissoo</i>		Sissoo	40-60
<i>Elaeagnus angustifolia</i>		Olive, Russian	05-20
<i>Eriobotrya deflexa</i>		Loquat, Bronze	60-80
<i>Eriobotrya japonica</i>		Loquat, Japanese	60-80
<i>Eucalyptus erythrocorys</i>		Red Cap Gum	40-60
<i>Eucalyptus ficifolia</i>		Scarlet Flowering Gum	40-60
<i>Eucalyptus lehmanni</i>		Lehman Eucalyptus	40-60
<i>Eucalyptus leucoxyton</i>		White Ironbark	40-60
<i>Eucalyptus microtheca</i>		Coolibah Tree	60-80
<i>Eucalyptus polyanthemus</i>		Gum, Silver Dollar	40-60
<i>Eucalyptus rudis</i>		Gum, Swamp	40-60
<i>Eucalyptus sideroxyton</i>		Ironbark, Pink or Red	20-40
<i>Eucalyptus spathulata</i>		Narrow-leaved Gimlet	20-40
<i>Eysenhardtia orthocarpa</i>		Kidneywood	60-80
<i>Feijoa sellowiana</i>		Guava, Pineapple	60-80

Ficus carica		Fig, Common, Edible	60-80
Fraxinus greggii		Littleleaf Ash	60-80
Fraxinus oxycarpa	'Raywood'	Ash, Raywood	60-80
Fraxinus uhdei		Ash,Shamel	40-60
Fraxinus velutina		Ash, Arizona	80-100
Fraxinus velutina	'Rio Grande'	Ash, Fan Tex	80-100
Fraxinus velutina glabra		Ash, Modesto	80-100
Geijera parviflora		Willow, Australian	20-40
Ginkgo biloba	"Autumn Gold"	Maidenhair tree	40-60
Gleditsia triacanthos	cultivars	Locust, CommonHoney	80-100
Heteromeles arbutifolia		Toyon	20-40
Ilex x altaclarensis	'Wilsonii'	Holly, Wilson	60-80
Jacaranda mimosifolia		Jacaranda	05-20
Juniperus chinensis	'Kaizuka'	Juniper, Hollywood	20-40
Juglans californica		California Black Walnut	20-40
Koelreuteria bipinnata		Flame tree, Chinese	40-60
Koelreuteria paniculata		Rain Tree, Golden	60-80
Lagerstroemia hybrids		Crape Myrtle Hybrids	60-80
Lagerstroemia indica		Crape Myrtle	60-80
Laurus nobillis		Laurel, Grecian	60-80
Ligustrum japonicum		Privet, Japanese	40-60
Ligustrum lucidum		Privet, Glossy	60-80
Liquidambar formosana	"Afterglow"	Chinese Sweet Gum"	20-40
Liquidambar styraciflua	"Palo Alto"	American Sweet Gum"	20-40
Lirodendron tulipifera		Tulip Tree	20-40
Lophostemon conferta	Tristania	Brisbane Box	20-40
Magnolia grandiflora		Magnolia, Southern	40-60
Magnolia soulangeana		Magnolia, Saucer	40-60
Magnolia stellata		Magnolia, Star	40-60
Malus species		Crabapple	40-60
Melaleuca quinquenervia		Cajeput Tree	40-60
Melia azedarach	'Umbraculiformis'	Chinaberry (Umbrella tree)	40-60
Morus alba	'Fruitless'	Mulberry, White, Fruitless	60-80
Metasequoia glyptostroboides		Dawn Redwood	40-60
Nerium oleander		'Standard' Oleander	40-60
Olea europae		Olive, Common	80-100
Olea europae	'Swan Hill'	Swan Hill Fruitless Olive	80-100
Olea europae	'Wilson'	Wilson Fruitless Olive	80-100
Parkinsonia aculeata		Palo Verde, Texas	40-60
Paulownia tomentosa		Empress Tree	05-20
Phoenix canariensis		Palm, Date, CanaryIsland	60-80
Phoenix dactylifera		Palm, Date	60-80
Phoenix reclinata		Palm, Date, Senegal	20-40
Phoenix roebellini		Palm, Pygmy Date	40-60
Photinia fraseri		Photina, Redleaf	20-40
Photinia serrulata		Photinia, Chinese	40-60
Pinus aristata		Pine, bristlecone	60-80
Pinus canariensis		Pine, Canary Island	40-60
Pinus coulteri		Pine, Coulter Pine	40-60
<b>BOTANICAL</b>	<b>CULTIVAR</b>	<b>COMMON NAME</b>	<b>RATING %</b>
Pinus edulis		Pine, Pinon	60-80
Pinus eldarica		Pine, Mondel	80-100
Pinus halepensis		Pine, Aleppo	60-80
Pinus monophylla		Pine, Single Leaf Pinon	60-80
Pinus mugo		Pine, Mugo	40-60
Pinus nigra		Pine, Australian Black	60-80
Pinus pinea		Pine, Italian Stone	80-100
Pinus ponderosa		Pine, Ponderosa	60-80
Pinus thunbergiana		Pine, Japanese Black	40-60
Pistachia atlantica		Pistache, Mt. Atlas	40-60
Pistacia chinensis		Pistache, Chinese	80-100
Pistacia vera		Pistacho Nut Tree	40-60
Pithecellobium flexicaule		Ebony, Texas	60-80
Pittosporum phillyraeoides		Pittosporum, Willow	60-80
Pittosporum rhombifolium		Pittosporum, Queensland	60-80
Pittosporum undulatum		Pittosporum, Victorian Box	60-80

Platanus x acerifolia	'Bloodgood'	Sycamore, LondonPlane	20-40
Platanus racemosa		Sycamore, California	20-40
Platanus wrightii		Sycamore, Arizona	40-60
Podocarpus elongatus		Fern Podocarpus	40-60
Podocarpus gracillor		Pine, Fern	40-60
Podocarpus henkelii		Long-leaf Yellow Wood	40-60
Podocarpus macrophyllus		Pine, Yew Podocarpus	40-60
Populus alba		Poplar, White	40-60
Populus fremontii		Cottonwood, Fremont	40-60
		Western Populus nigra	
		'Italica' Poplar, Lombardy	05-20
Prosopis alba		Argentine Mesquite	40-60
Prosopis hybrid		Hybrid Mesquite	40-60
Prosopis glandulosa		Honey Mesquite	40-60
Prosopis pubescens		Screwbean Mesquite	60-80
Prosopis torryana		Native Mesquite	60-80
Prosopis velutina		Native Mesquite	60-80
Prunus amygdalus		Almond, Edible	60-80
Prunus caroliniana		Cherry Laurel, Carolina	40-60
Prunus cerasifera	'Pissardii'	Plum, Purple Leaf Plum	40-60
Prunus cerasifera	'Krauter's 'vesuviu	Purple Leaf Plum	40-60
Prunus cerasifera	'Thundercloud'	Purple Leaf Plum	40-60
Prunus dulcis		Apricot, Edible	40-60
Prunus dulcis		Almond, Edible	40-60
Prunus ilicifolia	'Illicifolia'	Holly-leaf Cherry	40-60
Prunus ilicifolia	'Lyonii'	Catalina Cherry	40-60
Prunus lusitanica		Portugal Laurel	40-60
Prunus persica		Flowering Peach	40-60
Prunus x blireiana		Plum, Blirelana Purple	40-60
Punica granatum		Pomegranate	80-100
Pyrus calleryana	cultivars	Pear, Callery	40-60
Pyrus calleryana	Bradford	Bradford Ornamental Pear	40-60
Pyrus communis		Pear	40-60
Pyrus kawakamii		Pear, Evergreen	40-60
Quercus agrifolia		California Live Oak	80-100
Quercus coccinea		Scarlet Live Oak	60-80
Quercus chrysolepis		Oak, Golden Cup	80-100
Quercus douglasii		Oak, Blue	60-80
Quercus fusiformis		Oak, Escarpment	80-100
Quercus ilex		Oak, Holly	80-100
Quercus kelloggii		Oak, California Black	80-100
Quercus lobata		Oak, Valley	80-100
Quercus macrocarpa		Oak, Mossy Cup Bur	80-100
Quercus muehlenbergii		Oak, Chinkapin	80-100
Quercus suber		Oak, Cork	80-100
Quercus texana (buckleyi)		Oak, Texas Red	80-100
Quercus virginiana		Oak, Southern Live	80-100

<b>BOTANICAL</b>	<b>CULTIVAR</b>	<b>COMMON NAME</b>	<b>RATING %</b>
Raphiolepis	'Majestic Beauty'	Majestic Beauty Indian Hawthorn	40-60
Rhus lancea		Sumac, African	60-80
Robinia pseudoacacia		Locust, Black	40-60
Robinia x ambigua	'Idahoensis'	Locust, Idaho	40-60
Salix babylonica		Willow, Weeping	05-20
Salix goodingii		Gooding's Willow	60-80
Salix matsudana	'Navajo'	Willow, Navajo Globe	20-40
Sambucus sp.		Elderberry	40-60
Sapium sebiferum		Tallow Tree, Chinese	40-60
Schinus molle		Pepper Tree, California	40-60
Schinus terebinthefolius		Brazilian Pepper	40-60
Sophora secundiflora		Texas Mountain Laurel	60-80
Tamarix aphylla		Tamarisk	05-20
Thuja occidentalis		Arborvitae	40-60
Thuja orientalis		Arborvitae, Oriental	40-60

Tipuana tipu		Tipu Tree	60-80
Trachycarpus fortunei		Palm, Windmill	60-80
Ulmus parvifolia	"Drake"	Elm, Chinese Evergreen	80-100
Ulmus pumila		Elm, Siberian	05-20
Umbellularia californica		California Laurel Bay	60-80
Vitex agnus-castus		Chaste Tree	80-100
Washingtonia filifera		Palm, California Fan	60-80
Washingtonia robusta	"Hybrid"	Palm, Mexican Fan	60-80
Xylosma congestum		Xylosma	60-80
Yucca brevifolia		Joshua Tree	60-80
Zelkova serrata		Zelkova, Japanese Sawleaf	60-80
Ziziphus jujuba		Chinese Date, Jujube	60-80



Construction of the Bell Tower and Sproul Hall in 1966.

7.5.3 Table 3. Condition Class for Shade and Ornamental Trees.

Condition	Description	Condition Class	Values for use in formula
<b>Excellent</b>	Perfect specimen. Excellent form and vigor for species. No pest problems or mechanical injuries. No corrective work required. Minimum life expectancy 30 years beyond the time of inspection.	100	1.0 range 1.0-0.9

<b>Good</b>	Healthy and vigorous. No apparent signs of insect, disease, or mechanical injury. Little or no corrective work required. Form representative of species. Minimum life expectancy 20 years.	80	0.8 range 0.9-0.7
<b>Fair</b>	Average condition and vigor for area. May be in need of some corrective pruning or repair. May lack desirable form characteristics of species. May show minor insect, disease, or physiological problems. Minimum life expectancy 10 years.	60 or 40	0.6 or 0.4 range 0.7-0.3
<b>Poor</b>	General state of decline. May show severe mechanical, insect, or disease injury, but death not imminent. May require major repair or renovation. Minimum life expectancy 5 years.	20	0.2 range 0.3-0.1
<b>Dead or Dying</b>	Dead, or death imminent within 5 years	0	0.0 range 0.1-0.0

**7.5.4 Table 4. Site Location Values for Shade and Ornamental Trees.**

<b>Site Location</b>	<b>Location Class</b>	<b>Values for use in Formula*</b>
Specimen, Heritage or Historical trees	100	0.9-1.0
Average residential, landscape trees	80-90	0.8-0.9
Malls and public area trees	70-80	0.7-0.8
Arboretum, park and University trees	60-80	0.6-0.8
Golf course trees	60-80	0.6-0.8
University street trees	60-80	0.6-0.8



Circumference \_\_\_\_\_ feet/inches                      Diameter \_\_\_\_\_ inches  
 Vertical height of tree measured to nearest foot.                      Height \_\_\_\_\_ feet  
 Average tree canopy spread measured to the nearest foot.                      Spread \_\_\_\_\_ feet

Age of tree if known. \_\_\_\_\_ years  
 Critical Root Zone. \_\_\_\_\_ (to be determined based on PFM)

Significance: Heritage    Memorial    Specimen    Street    Parking    Arroyo    (circle one)

General Description:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Outstanding Problems:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Tree Value Calculation:**

Base Value    X    Cross Section Area    X    Species Class    X    Condition Class    X    Location Class  
 \_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_                      \_\_\_\_\_

= **Tree Value:** \_\_\_\_\_

Report Date: \_\_\_\_\_ Inspector: \_\_\_\_\_  
 Date Last Trimmed \_\_\_\_\_ Photo ID Number: \_\_\_\_\_

02/2012 Tree Doc Form/Physical Plant/Grounds/R.Bolles

## 7.7 Definitions

**Aesthetic**, pertaining to the appreciation of beauty or good taste, "aesthetic" (adjective) means visually pleasing. The corresponding noun is "aesthetics," which means the study of the appreciation of beauty or how we perceive beauty. This study is considered important enough to constitute a branch of philosophy.

**Amendment**, soil amendments are elements added to the soil, such as compost, peat moss, or fertilizer, to improve its capacity to support plant life. While fertilizer improves soil by adding nutrients only, soil amendments such as peat moss improve soil by making its texture or drainage more conducive to plant health. Peat moss adds no nutrients to soil. Meanwhile, compost enhances soil both through adding nutrients and through improving texture and drainage. Amendments can also change soil Ph.

**American Forests**, the oldest national nonprofit conservation organization in the country, advocates for the protection and expansion of America's forests. Since 1990, we have planted nearly 40 million trees. We restore watersheds to help provide clean drinking water. We replant forests destroyed by human action and natural disasters. A world leader in planting trees for environmental restoration, a pioneer in the science and practice of urban forestry and a primary communicator of the benefits of trees and forests.

**American National Standards Institute (ANSI)** is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates US standards with international standards so that American products can be used worldwide.

**Balled and burlapped**, balled and burlapped plants are transplants shipped to the consumer after having been planted, dug up and wrapped. "Balled" refers to the root ball which has been dug up, while "burlapped" refers to the wrapping material traditionally used for transporting tree and shrub deliveries. The burlap is secured with string, wire or twine.

**Bare root**, bare-root plants are shipped with no soil "clothing" their roots.

**Benchmark**, standard by which something can be measured or judged.

**Biodegradable**, means capable of being decomposed back into the soil by biological agents, especially bacteria. "Biodegradable" is often used to refer to items that are to be disposed of.

**Biosequestration**, is the capture and storage of the atmospheric greenhouse gas carbon dioxide by biological processes.

**Branch collar**, is the attachment structure in woody plants that connects a branch to its parent branch or to the trunk. The branch collar consists of overlapping wood fibers.

**C-27 Landscaping License**, A landscape contractor constructs, maintains, repairs, installs, or subcontracts the development of landscape systems and facilities for public and private gardens and other areas which are designed to aesthetically, architecturally, horticultural, or functionally improve the grounds within or surrounding a structure or a tract or plot of land. In connection therewith, a landscape contractor prepares and grades plots and areas of land for the installation of any architectural, horticultural and decorative treatment or arrangement.

**Cabling**, cabling refers to the use of cables to stabilize an established tree growing in a manner that is not sustainable, if left uncorrected.

**California Integrated Waste Management Act (AB939)**, the California Integrated Waste Management Act (AB939) was signed into law by the Governor of the State of California on September 29, 1989. AB939 requires each city and counties in the State of California to divert 25% of its waste stream by 1995 and 50 % by the year 2000.

**Carbon dioxide (CO<sub>2</sub>)**, a colorless, odorless, incombustible gas, CO<sub>2</sub>, formed during respiration, combustion, and organic decomposition and used in food refrigeration, carbonated beverages inert atmospheres, fire extinguishers and aerosols.

**Carbon footprint**, this footprint is the amount of Carbon Dioxide (CO<sub>2</sub>) produced by an individual or household, through vehicle emissions, electricity use, and fuel consumption.

**Certified Arborist**, is an individual who has demonstrated knowledge and competency through obtainment of the current International Society of Arboriculture arborist certification, or who is a member of the American Society of Consulting Arborists.

**Compaction**, means compression of the soil structure or texture by any means that creates an upper layer that is impermeable. Compaction is injurious to roots and the health of a tree.

**Complete fertilizer**, complete fertilizers are so called because they contain nitrogen, phosphorus and potassium, the Big 3 in fertilizer ingredients. A fertilizer listed as "10-10-10," for instance, would be a complete fertilizer. But a fertilizer listed as "10-0-10" would not be a complete fertilizer, the middle zero indicating the absence of phosphorus in the fertilizer.

**Conifer**, "Conifer" is an arboricultural term meaning, literally, a cone-bearer (such English words as "refer" and "aquifer" also use the FER Latin root). Trees that fall into this category reproduce by forming a cone rather than a flower as a container for their seeds.

**Cultivar**, cultivars (short for cultivated varieties) are plants you buy that have been propagated not from seed, but rather vegetative (e.g., via stem cuttings). With this method of propagation, you can be sure that the offspring will retain the characteristics of the parents for just the one generation.

**DBH**, diameter at breast height, typically used to measure a tree taken at 4.5 feet from natural grade.

**Dead Tree**, means a tree that is dead or that has been damaged beyond repair or is in an advanced state of decline (where an insufficient amount of live tissue, green leaves, limbs or branches, exists to sustain life) and has been determined to be such by a the Campus Urban Forester or a Certified Arborist. If the tree has been certified dead, removal is permitted as defined in the Management Plan.

**Deciduous**, "Deciduous" is a designation indicating a plant sheds its foliage at the end of the growing season. The term is used primarily in reference to trees and shrubs, in contrast with those that are "evergreen."

**Deforestation**, is the removing or clearing of a forest to include the cutting of all trees, mostly for agricultural or urban use. The remaining land, as per definition, is not reforested but is usually converted to a non-forest classification.

**Disturbance**, refers to all of the various activities from construction or development that may damage trees.

**Ecological value**, Values that each species has as part of an ecosystem.

**Excessive Pruning**, means removing in excess, one-fourth (25 percent) or greater, of the functioning leaf, stem or root area. Pruning in excess of 25 percent is injurious to the tree and is a prohibited act. Excessive pruning typically results in the tree appearing as a 'bonsai', 'lion's-tailed', 'lolly-popped' or overly thinned.

*Unbalanced Crown*. Excessive pruning also includes removal of the leaf or stem area predominantly on one side, topping, or excessive tree canopy or crown raising. Exceptions are when clearance from overhead utilities or public improvements is required or to abate a hazardous condition or a public nuisance.

*Roots*. Excessive pruning may include the cutting of any root 1½ inches or greater in diameter and/or severing in excess of 25 percent of the roots.

**Evidence of Tree hazard**, Including but not restricted to: obvious instability of root plate, such as evidence of soil heave, loss of structural roots, root decay, poor structural integrity of trunk due to significant wood decay, large cavities, internal cracking, poor large branch attachments such as severe bark inclusions, poor attachment of regrowth after lopping or storm damage.

**Evidence of Tree decline,**

Including but not restricted to: large areas of dieback of canopy, and poor live crown ratio (eg:<30%), dead and decaying wood in trunk, sparse live canopy, substantial epicormic growth on branches and trunk, substantial insect attack, multiple areas of wood decay lesions in branches and trunk.

**Environmental impact**, this is any change, positive or negative, to land, ecosystems, and human health as a result of any action.

**Evergreen**, the term "evergreen" means having foliage that persists and retains its color throughout the year, rather than changing color according to the seasons. The term is something of a misnomer, as the color in question needn't be green. For instance, Colorado blue spruce trees are evergreens, but the color they retain throughout the year is a silvery blue.

**Fertilizer**, any of a large number of natural and synthetic materials, including manure and nitrogen, phosphorus, and potassium compounds, spread on or worked into the soil to increase its fertility.

**Geographic Information System (GIS)**, is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The acronym GIS is sometimes used for geographical information science or geospatial information studies to refer to the academic discipline or career of working with geographic information systems.

**Girdling**, in tree-care terminology, girdling is the choking of a tree branch either accidentally through a material applied by a human, such as a wrap used in grafting, or through a vine that has vigorously enwrapped a tree, such as bittersweet.

**Green infrastructure**, is a concept originating in the United States in the mid-1990s that highlights the importance of the natural environment in decisions about land use planning. In particular there is an emphasis on the "life support" functions provided by a network of natural ecosystems, with an emphasis on interconnectivity to support long-term sustainability. Examples include clean water and healthy soils, as well as the more anthropocentric functions such as recreation and providing shade and shelter in and around towns and cities.

**Hazardous Tree**, refers to a tree that possesses a structural defect which poses an imminent risk if the tree or part of the tree that would fall on someone or something of value (target).

*Structural defect* means any structural weakness or deformity of a tree or its parts. A tree with a structural defect can be verified to be hazardous by a certified Arborist. The Physical Plant-Landscape Services in conjunction with the campus Arborist retains discretionary right to approve or amend a hazardous rating, in writing, and recommends any action that may reduce the condition to a less-than significant level of hazard. If the tree has been determined to be hazardous, removal of the tree is permitted as provided for in the Management Plan.

**Herbaceous**, herbaceous plants are plants with non-woody stems. Their above-ground growth usually dies back in winter in the temperate zone, even in cases where the plants in question are perennials.

**Heritage tree**, trees defined as Heritage are considered important due to noteworthy characteristics or value. The following criteria are used to define heritage trees within the campus community.

Any tree having a trunk with a circumference of 47.1 inches (diameter of 15 inches) or more measured at 54 inches above natural grade. Any **oak** (*Quercus* spp.), **bay** (*Umbellularia californica*), **buckeye** (*Aesculus* spp.), **cedar** (*Cedrus*), or **redwood** (*Sequoia*) with a circumference of 31.4 inches (diameter of 10 inches) or more measured at 54 inches above natural grade. Any tree or group of trees specifically designated by the University for protection because of historic significance, special character or community benefit. Any tree with more than one trunk measured at the point where the trunks divide, with a circumference of 47.1 inches (diameter of 15 inches) or more, with the exception of trees that are less than twelve (12) feet in height, which are exempt.

**Horticulture**, Horticulture is the science or art of cultivating fruits, vegetables, flowers, or ornamental plants. Etymologically, the term can be broken down into two Latin words: *hortus* (garden) and *cultus* (tilling).

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

**Inland Urban Forest Council (IUFC)** is a network of tree advocates to advance the sustainable management of trees in the urban ecosystems of inland Southern California, including portions of Riverside and San Bernardino Counties and eastern Los Angeles County.

**Integrated pest management (IPM)** stands for Integrated Pest Management. At bottom, it is about approaching pest control in a comprehensive manner that shows forethought and organization, and that minimizes negative impacts on the environment.

**International Society of Arboriculture (ISA)** is an international non-profit organization headquartered in Champaign, Illinois USA. Its mission statement: "Through research, technology, and education promote the professional practice of arboriculture and foster a greater public awareness of the benefits of trees."

**Invasive plant**, Invasive plants are alien species that show a tendency to spread out of control. Although not synonymous with "exotic plants," the "invasive" label is now typically reserved for plants that have been introduced from other regions and spread like wildfire in their new habitats.

**Indigenous plants**, Indigenous plants are those native to the locale in question. They are sometimes allowed to co-exist with lawn grass, exotic ground covers or garden vegetation, especially if they are not aggressive growers.

**Landscape Architecture**, Landscape architecture is the profession that practices the art of arranging or modifying the features of a landscape, an urban area, etc., for aesthetic and/or practical purposes.

**Landscape Design**, Landscape design is the art of arranging or modifying the features of a yard, an urban area, etc., for aesthetic or practical purposes. It is often divided into two major parts softscape and hardscape. Both landscape designers and landscape architects practice landscape design.

**Leader branch**, the "leader" is the primary stem of a plant, usually the top stem. Where multiple candidates present themselves as the potential leader, you can select one by pruning away the rest, channeling energy into the selected branch. The term, "leader" is used primarily to refer to trees, where it can be thought of as an extension of the trunk.

**Living mulch,** Living mulches can be cover crop plants that are planted around and between the primary plants in a garden to control weeds, prevent erosion, facilitate water penetration and improve the soil. "Living mulch" can also refer to groundcovers planted for weed control.

**Management Plan,** means this Urban Forest Management Plan.

**Mulch,** Mulch is a covering placed around plants (or covering the ground in lieu of plants), to prevent the growth of weeds. If placed around plants, mulch provides additional benefits, including the diminution of erosion and water loss, and the regulation of soil temperature. In addition, upon decomposition (for organic mulches), mulches serve as soil amendments. Mulch selection is usually based on appearance, as well as on all the practical considerations mentioned above.

**Native vegetation,** Native vegetation refers to grasses, wildflowers, and other plant life that grows naturally in a certain region and climate, as opposed to those that are forced to exist where they don't belong. Cultivating and encouraging native vegetation is an eco-friendly move; it doesn't require the watering, fertilizers, or pesticides that non-native plants do, so it's better for the environment. Native vegetation is also good for native wildlife.

**NPK,** NPK stands for nitrogen, phosphorus and potassium, the three nutrients that compose complete fertilizer. You'll encounter NPK when reading the contents printed on bags of fertilizer. The description of the fertilizer may not expressly say "NPK" (it may simply be implied), but you will at least see a series of three numbers, which correspond, respectively, to the nitrogen content, phosphorus content and potassium content of that fertilizer.

**Protective Tree Fencing,** means a temporary enclosure erected around a tree to be protected at the boundary of the tree protection zone. The fence serves three primary functions: 1) to keep the foliage, crown, branch structure and trunk clear from direct contact and damage by equipment, materials or disturbances; 2) to preserve roots and soil in an intact and non-compacted state; and 3) to identify the tree protection zone in which no soil disturbance is permitted and activities are restricted. (Covered in Urban Forest Management Plan)

**Reforestation,** is the natural or intentional restocking of existing forests and woodlands that have been depleted, usually through deforestation. Reforestation can be used to improve the quality of human life by soaking up pollution and dust from the air, rebuild natural habitats and ecosystems, mitigate global warming since forests facilitate biosequestration of atmospheric carbon dioxide, and harvest for resources, particularly timber.

**Root Buffer,** means a temporary layer of material to protect the soil texture and roots. The buffer shall consist of a base course of tree chips or mulch spread over the root area to a minimum of 6-inch depth.

**Santa Ana Winds,** the Santa Ana winds are strong, extremely dry offshore winds that affect coastal Southern California and northern Baja California in autumn and winter. They can range from hot to cold, depending on the prevailing temperatures in the source regions, the Great Basin and upper Mojave Desert. The winds are known for the hot dry weather (often the hottest of the year) that they bring in the fall, and are infamous for fanning regional wildfires.

**Scaffold branch,** a scaffold branch is one of the primary limbs radiating from the trunk of a tree. All subordinate limbs stem from the scaffold branches. By establishing what the latter will be for a particular specimen early on, you can prune accordingly and shape it so as to achieve optimal form. This is one of the most important aspects of early tree care.

**Site Plan,** means a set of drawings (e.g. preliminary drawings, site plan, grading, demolition, building, utilities, landscape, irrigation, tree survey, etc.) that show existing site conditions and proposed landscape improvements, including trees to be removed, relocated or to be retained. Site plans shall include the following minimum information that may impact trees

- Surveyed tree location, species, size, drip line area (including trees located on adjacent area that overhang the project site) and protected trees within 30-feet of the project site.
- Paving, concrete, trenching or grade change located within the tree protection zone.
- Existing and proposed utility pathways.
- Surface and subsurface drainage and aeration systems to be used.
- Walls, tree wells, retaining walls and grade change barriers, both temporary and permanent.
- Landscaping, irrigation and lighting within drip line of trees, including all lines, valves, etc.
- Location of other landscaping and significant features.
- All of the final approved site plan sheets shall reference tree protection instructions.

**Specimen plant,** Specimen plants are plants grown by themselves in a lawn or garden for ornamental effect, rather than being massed with others as are bedding plants or edging plants. Specimen plants can thus serve as focal point in a landscape design.

**Sustainability,** Sustainability is the ability to use a resource without depleting or permanently damaging it. A broader, commonly accepted definition, as set out by the World Commission on Environment and Development (WCED), is "meeting the needs of the present without compromising the ability of future generations to meet their own needs."

**Target,** is a term used to include people, vehicles, structures or something subject to damage by a tree.

**Note:** A tree may not be a hazard if a "target" is absent within the falling distance of a tree or its parts (e.g., a defective tree in a non-populated area away from pathways may not be considered a hazard).

**Tensometer,** Instrument to determine matric water potential.

**Topping,** it means cutting older trees down almost to the top of the trunk. Topping trees is sometimes used as a less expensive alternative to their full removal, which can be quite costly in the case of large old trees. Under no circumstance should a tree be "topped" on campus.

**Tree caliper,** a device consisting of two parallel arms one of which is fixed and the other able to slide along a scale. Calipers are held at right-angles to the trunk with the arms on either side of the trunk. Precision can be improved on non-circular stems by averaging two caliper measurements taken at right-angles.

**Tree canopy,** Layer of leaves, branches, and stems of trees that cover the ground when viewed from above.

**Tree Care Industry Association,** Founded in 1938, the Tree Care Industry Association, formerly the National Arborist Association, is a US public and professional resource organization on trees and arboriculture. TCIA has more than 2,000 member companies who recognize stringent safety and performance standards. TCIA also has the nation's only Accreditation program that helps consumers find tree care companies that have been inspected and accredited based on: adherence to industry standards for quality and safety; maintenance of trained, professional staff; and dedication to ethics and quality in business practices. In addition, they provide safety and educational programs, guidelines for tree service operations, ANSI A300 tree pruning standards, and act as a consumer resource.

**Tree surgery,** the repair of damaged trees, as by the removal of diseased parts, filling of cavities, and prevention of further decay, and by strengthening branches with braces.

**Trenching,** means any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage or other property improvements below grade. Trenching within the Critical Root Zone (CRZ) is injurious to roots and tree health and is prohibited and only approved. If trenching is approved within the CRZ, it must be in accordance with instructions and table outlined in this Management Plan.

**Urban Forest,** Trees and plants within a city or a densely wooded area within a city.

**Verification of Tree Protection,** means the development Project Manager shall verify to the Campus Urban Forester, in writing, that all preconstruction conditions have been met (tree fencing, erosion control, pruning, etc.) and are in place. An initial inspection of protective fencing and written verification must be submitted to the Physical Plant-Landscape Services or appropriate University Department **prior** to demolition, grading or any construction work.

**Wildlife corridor,** this term refers to a stretch of land (and/or water) across which animals travel to feed, seek refuge, and migrate between seasons. These corridors have been encroached upon by human development, leaving animal populations hemmed in and at risk. Conservationists are making efforts to preserve, and, in some cases, regenerate wildlife corridors in order to protect the creatures that depend on them.

**Xeriscaping,** is landscaping designed specifically for areas that are susceptible to drought or for properties where water conservation is practiced. Derived from the Greek *xeros* meaning "dry," the term means literally "dry landscape."

**Zones (USDA)** there are 11 planting zones, or "USDA Plant Hardiness Zones," in the contiguous United States and southern Canada. The USDA planting zones are regions defined by a 10 degree Fahrenheit difference in the average annual minimum temperature. To put the definition in layman's terms, the higher the numbers, the warmer the temperatures for gardening in those areas.





## 7.8 BIBLIOGRAPHY

**Altman, N., 2000.** Sacred Trees: Spirituality, Wisdom & Well-Being. Brooklyn, NY. Sterling

**Council of Tree and Landscape Appraisers, 2000.** Guide for Plant Appraisal. 9th ed. Champaign, IL: International Society of Arboriculture.

**Neely, D., ed. 1998.** Valuation of landscape trees, shrubs, and other plants. 7<sup>th</sup> ed. Urbana, IL: International Society of Arboriculture. 50 p.

**TreeFolks, 2000.** Tree Planting Guide. Austin, Texas: Tree Folks.

### Additional Resources

**American Forests and National Association of Home Builders, 1998.** Building Greener Neighborhoods. 2nd ed. Washington, DC: American Forests.

**Anderson, L.M.; Cordell, H.K. 1998.** Residential property values improve by landscaping with trees. Southern Journal of Applied Forestry. 9: 162-166.

**ANZI A300-1995.** American National Standards Institute Standard for Tree Care Operations— Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush— Standard Practice.

**Burden, D., University of Montana November, 2008.** 22 Benefits of Urban Street Trees. 1-6.

**City of Arlington, VA 2004.** Urban Forest Master Plan. Department of Parks, Recreation and Cultural Resources. 3-7, 15-24, 33-36.

**City of Brea, CA 2007.** Planting Maintenance Section 02935. 2-3.

**City of San Mateo, CA.** Heritage Tree Ordinance. 1-2.

**City of Menlo Park, CA 2011.** Summary of the Heritage Tree Ordinance. 1 p.

**City of Novi, CA.** Landscape and Tree Inspection Checklist. 1 p.

**City of San Diego, CA 2012.** Street Tree Selection Guide. 2-4.

**City of San Dimas, CA,** Community Forest Management Plan. 1 p.

**City of San Francisco, CA.** Better Streets, 3.0 The Path to Better Streets. 35-37.

**City of Riverside, CA. 2007.** Urban Forest Policy Manual, Public Works Department. 17-18, 20-21, 22, 28, 30.

**City of Victoria, Canada.** Trees for the Future. Parks, Recreation and Community Development. 1-2.

**Dana, M.N. 2006.** Landscape Tree Appraisal; Department of Horticulture, Purdue University Cooperative Extension Service, West Lafayette, IN. 1-4

**Gilman, Edward F. 2002.** An Illustrated Guide to Pruning. 2nd ed. Albany, NY: Delmar

**Laverty, M.; Sterling, E. 2004.** Ecological Value. Connexions. 1 p.

**McPherson, E.G.; Simpson, J.R.; Peper, P.J.; Xiao, Q.; Pittenger, D.R.; Hodel, D.R. 2001.** Tree guidelines for Inland Empire Communities. Sacramento, CA: Local Government Commission. 116 p.

**Miller, Nancy L., David M. Rathke, and Gary R. Johnson. 1993.** Protecting Trees from Construction Damage, A Homeowner's Guide. St. Paul, MN: University of Minnesota, Minnesota Extension Service.

**Oludunfe, S.O. 2011.** Urban Forest Management Plan. La Jolla, CA. University of California, San Diego.

**Sullivan, W.C.; Kwo, F.E. 1996.** Do trees strengthen urban communities, reduce domestic violence? *Arborist News*. 5: 33-34. Wolf, K.I. 1999. Nature and commerce: human ecology in business districts. In Kollin, C., ed. *Building cities of green: proceedings of the 1999 national urban forest conference*. Washington, DC: American Forests: 56-59.

**Tarcher, 1990.** TreePeople. *The Simple Act of Planting a Tree: A Citizen Forester's Guide to Healing Your Neighborhood, Your City, and Your World*. Los Angeles, CA. 15 p.

**Walker Macy Landscape Architects and Planners, Thomas Hacker Architects 2007.** UCR Campus Design Guidelines. Appendix A, 1-8; Appendix B, 1-6.

**Urban Forest Management Plan Toolkit, 2012.** Data Synthesis, assessment and monitoring plan. 1 p.

#### WEB SITES

**1. City of Palo Alto, Ca.:**

[http://www.cityofpaloalto.org/depts/ped/trees/management\\_plans/urban\\_forest\\_master\\_plan](http://www.cityofpaloalto.org/depts/ped/trees/management_plans/urban_forest_master_plan)

Located 35 miles south of San Francisco and 14 miles north of San Jose, Palo Alto is a community of approximately 61,200 residents. The City of Palo Alto is more than 100 years old, and is named after a majestic 1000 (not 250) year old coastal redwood tree along San Francisquito Creek, where early Spanish explorers settled. The blend of business and residential areas anchored by a vibrant downtown defines Palo Alto's unique character.

**2. American Forests:** <http://www.americanforests.org/productsandpubs/citygreen/>

"American Forests is a world leader in planting trees for environmental restoration, a pioneer in the science and practice of urban forestry, and a primary communication of the benefit of trees and forests. American Forests ([www.americanforests.org](http://www.americanforests.org)) is the nation's oldest non-profit citizen's conservation organization".

**3. City of San Dimas, Ca.:** <http://www.cityofsandimas.com/ps.parksrecreation.cfm?ID=2377>

Located in the heart of the San Gabriel Valley - 25 miles east of Los Angeles along the foothills of the San Gabriel Mountains, San Dimas is a blend of community amenities, wonderful parks and open space, great recreational and community facilities. Our greatest asset is our small town feel and the volunteerism of our residents as they contribute to our great quality of life.

**4. Guidelines for Developing and Evaluating Tree Ordinances:**

<http://www.phytosphere.com/treeord/heritage.htm>

**5. City of Arlington, Va.:**

<http://www.arlingtonva.us/Departments/ParksRecreation/forums/forest/ParksRecreationForest/>

Arlington is an urban county of about 26 square miles located directly across the Potomac River from Washington DC. Arlington's central location in the Washington DC metropolitan area, its ease of access by car and public transportation, and its highly skilled labor force have attracted an increasingly varied residential and commercial mix.

**6. Urban Tree Foundation – Street Tree Lists:** [http://www.urbantree.org/list\\_trees.asp?t=street](http://www.urbantree.org/list_trees.asp?t=street)

The Urban Tree Foundation provides services and programs to benefit the urban forest. Founded in 1999, UTF is dedicated to promoting and preserving the urban forest through education, planting and tree care. In collaboration with public and private agencies, UTF assists communities in becoming active partners in the planting and maintenance of the urban forest.

**7. Species Ratings for Landscape Tree Appraisal in Southern California/Nevada:** <http://www.1vsnag.org/>

This document establishes species ratings to be used by tree appraisal experts with the trunk formula method for appraising the monetary value of trees in Southern California and Nevada.



Students enjoy the shade of several Heritage trees during Orientation Week on the Commencement lawn.

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