

**Figure 4-1.** Trim cycle lengths shown in the Street Tree Inventory. Only 25 trees were assigned to the 3 year pruning cycle, so the bar is too short to show in the graph.

Operating under this system, Street Tree Services performed scheduled structural pruning on 5,152 trees in larger size classes in FY 2008-09 (Table 4-2). An additional 1,259 young trees had structural pruning. Altogether, about 17% of the street trees received scheduled maintenance in FY 2008-09. Emergency pruning was conducted on 409 trees, or approximately 1% of the street trees, due to broken branches. In addition, 52 non-inventoried trees were pruned for safety reasons identified by traffic engineering, such as line-of-site improvements at intersections or street light clearance.

Due to budget reductions, as of FY 2010-11 staffing levels were reduced to a level that it was no longer possible to follow a scheduled pruning cycle. As of July 2010, the Urban Landscape Manager implemented a priority pruning plan. Trees are prioritized according to immediate need/hazard and pruning is scheduled by priority. The primary tree species that warranted priority pruning in 2010 were Chinese Pistache, Liquidambar, and Carob.

City residents made service requests for specific street trees for a wide variety of tree care related issues, but most requests for pruning were denied. Street Tree Services received 2,036 requests for service in FY 2008-09, and pruned 148 trees in response to these requests. Prior to staff reductions that occurred in FY 2003-04, Street Tree Services performed more pruning related to service requests than it does at present.

**Table 4-2.** Pruning by Street Tree Services of trees in the ROW for fiscal year ended June 2009.

Unit	Units completed	Per unit cost	Total
tree pruned - service request	148	162.34	\$24,026
tree pruned - limb down on duty hrs.	353	76.96	\$27,167
tree pruned - limb down off duty hrs.	56	279.81	\$15,669
tree structure pruning <15 ft. tall	893	28.71	\$25,638

tree structure pruning 15-30 ft. tall	1984	72.06	\$142,967
tree structure pruning 30-60 ft. tall	2193	153.86	\$337,415
tree structure pruning >60 ft. tall	82	268.06	\$21,981
non-inventoried tree safety clearance pruned	52	120.09	\$6,245
equipment maintenance [costs associated with pruning]			\$65,536
<b>Total - pruning activities</b>	<b>5761</b>	<b>115.72</b>	<b>\$666,644</b>

Street Tree Services follows International Society of Arboriculture Best Management Practices for pruning, which is based on the ANSI A-300 Pruning Standards. Most service requests for pruning fall outside of these standards. Most trees that are pruned as a result of service requests are trees that have an elevated likelihood of limb failure if not pruned before the next scheduled pruning.

In addition to pruning of mature trees, Street Tree Services has a program to prune young trees within the first three years from planting to develop their permanent structure conforming to ISA structural integrity standards. This structural training (Table 4-3) is important for developing good primary structure in young trees that reduces future pruning cost by avoiding weak or problematic branch structure.

#### 4.2.2. Tree removal and planting

In FY 2008-09, 363 city street trees were removed. Street Tree Services most commonly removes street trees because an imminent hazard has been identified. Specific reasons for removal include:

- Catastrophic limb failure has occurred and the remaining portion of the tree poses a hazard
- Significant decay in trunk/roots
- Dead or seriously declining tree
- Declining performance of tree beneath power lines – City cooperates with PG&E for removal
- Sweetgum removal - by property owner expense + limited annual city funding

Branches and waste wood from removals and pruning operations is ground to chips if possible. Some chips may be used on site, but most waste material, including wood too large to be chipped with mobile chippers, is taken to the Sunnyvale Materials and Recovery Transfer (SMaRT) Station® for composting. Street Tree Services currently pays about \$1,300 per year for disposal of waste wood at this facility.

Street tree planting outpaced tree removal by 166 trees, with 529 trees planted in FY 2008-09 (Table 4-3). As of January 2010, the street tree inventory had at least plantable 2,200 empty sites, assuming that about half of the inventory's empty sites were priority planting sites (i.e., no serious limitations). If planting continued to outpace removal by 166 trees per year, it would take over 13 years to fill these priority planting sites.

Newly planted trees typically require several years of irrigation until they become established. Where other sources of water are not available, new trees up to 2008-09 irrigated from a water truck for three years. Although the cost of the water is insignificant, irrigation via water truck delivery is relatively intensive in terms of labor and equipment costs. Street Tree Services has historically checked to see if adjacent property owners would provide irrigation. Beginning in FY 2009-10, Street Tree Services began a more formal campaign to have the adjacent property owners water newly planted trees. Starting in FY 2010-11, a written agreement to provide irrigation will be made between the owner and the City for all new street tree planting. For FY 2010-11, Tree Services has a small amount of funds set aside to water trees in locations where the adjacent property owner is unwilling to provide irrigation or does not have responsibility over the land where the tree is planted. As of 2012-13 funding for supplement street tree watering was eliminated. If the city cannot get a commitment from the adjacent property owner to irrigate newly planted trees then trees are not planted. Citizen volunteers under the oversight of a non-profit urban forestry organization could be utilized to monitor and water trees in such situations.

### **Inspection of new plantings**

Trees planted by city staff are inspected prior to planting. Circling roots are removed or pruned prior to planting. Trees with severe root deformations are rejected and not planted. At the time of structural training pruning, trees are inspected for growth and performance.

For city street trees planted by developers, Street Tree Services is supposed to be notified so that nursery stock can be inspected before it is planted. Street Tree Services also ensures that proper planting procedures are followed. However, at the height of the most recent construction boom, Street Tree Services has not able to inspect all developer plantings. In many cases, Street Tree Services was not notified about impending plantings. The Urban Landscape Manager believes that educating other City building inspectors about Street Tree Services' requirements would help boost compliance and improve timeliness of notification.

### **Tree nursery**

Street Tree Services maintains a small nursery facility that is used to hold trees obtained from commercial nurseries until they can be planted. Most trees are ordered in advance of fall/winter planting. Orders for nursery stock are scaled to match demand to the degree possible so that material does not need to be held in the nursery beyond the planting season. A drip irrigation system on a battery/solar controller is used to keep trees watered.

**Table 4-3.** Activities of Street Tree Services related to planting and removal of trees in the ROW for fiscal year ended June 2009.

<b>Units</b>	<b>units completed</b>	<b>per unit cost</b>	<b>total</b>
tree removed down to stump	363	305.86	\$111,027
contract stump ground	470	172.17	\$80,920
contract tree planting	459	168.93	\$77,539
tree planting by staff	70	105.4	\$7,378

private tree removal permit application reviewed	442	60.49	\$26,737
project plan reviewed	16	302.84	\$4,845
tree watering	6497	6.54	\$42,490
young tree structural training	1259	15.53	\$19,552
maintain tree nursery	89.57	62.18	\$5,569
equip maintenance related to tree replacement	538	30.52	\$16,420
<b>Total - planting and removal activities</b>			<b>\$392,477</b>

### 4.2.3. Other program activities

One of the program goals of Street Tree Services is to provide a high level of customer service to city residents and other City divisions. By responding to residents' service requests, Street Tree Services provides important community outreach as well as making use of information provided by residents to more quickly locate and address maintenance issues. Street Tree Services also assists the Risk and Insurance Division in evaluating claims against the City. As shown in Table 4-3, Street Tree Services also assists Community Development by reviewing project plans.

Street Tree Services also reviewed 442 private tree removal permit applications (Table 4-4). The Planning Division has the authority to issue permits for removals of private trees that are protected under the City's Tree Preservation ordinance. Street Tree Services advises the Planning Division relative to private tree removal requests, but does not approve or deny permit requests. The Planning Division approves about 90% of the submitted requests for tree removal. The number of tree removals that occur on private properties outside of the permit process is unknown.

**Table 4-4.** Other Street Tree Services program activities for fiscal year ended June 2009.

Units	units completed	per unit cost	total
respond and investigate a service request	2036	25.3	\$51,511
structural integrity survey	3	10.24	\$31
investigate claims from Risk and Insurance	24	47.74	\$1,146
<b>Total-other program activities</b>			<b>\$52,688</b>

### Tree inventory maintenance

Street Tree Services uses the online internet-based version of Davey's TreeKeeper software to manage its tree inventory. The inventory database is maintained on computer servers belonging to Davey Tree. The Urban Landscape Manager administers access to the inventory. The fields in the inventory are shown in Table 4-4a.

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

When the street tree program operated with a scheduled pruning cycles, the inventory could be used to schedule tree work. Due to budget cutbacks scheduled pruning was essentially eliminated until funding was restored in 2013 for contract tree care (primarily pruning) services. However, the inventory database is used to record what maintenance has been done on trees and provides information about the street tree population. The current contractor, West Coast Arborists, has their own tree inventory database, Arbor Access. All of Sunnyvale’s the tree data in TreeKeeper was imported into Arbor Access. As of 2013 both systems are being used as staff become familiar with Arbor Access.

**Table 4-4a.** Fields in the Street Tree Inventory accessed Jan 2010.

Field name	Information	Notes
ID	A unique number for each planting site	Current range: 1 -41,358
Unique id	Same as ID	
Address	Street address of tree	
Suffix	X or x- indicates fictitious address	Used for trees on streets with no address
Street	Street name of tree address	
On_Str	Street on which tree is physically located	
From_Str	Cross street 1	
To_Str	Cross street 2	
Side	Location of tree relative to address parcel	Front, side, or median
Site	Planting site number if multiple trees at same address	
Spp	Species	“vacant” if empty planting space
DBH	DBH (inches) by size range	
HT	Height (ft) by size range	
Trunks	Number of trunks	Not current
MT	Maintenance	Various notes about maintenance
Tr_cycle	Trim cycle the tree is assigned to	
STK	Stake present yes or no	
Grow	Growing space available	Open for monolithic sidewalks, otherwise width (ft) of parkway strip
Curb	Distance to curb for trees outside of the right-of-way	
Staff	Mostly blank, apparently not used	
Inspect	Y/N, apparently not used	
Area	Tree management zone	1-7 (shown in figure 3-4)
Inv_Date	Date tree was added to the inventory	

Inv_time	Not used	
Inspect_DT	Date of last inspection	
Inspect_TM	Time of last inspection in 24 hour time	
Notes	Notes about the tree	
Active		All records have “1”

Like any active database, the street tree inventory needs to be updated and maintained. In our analyses, we discovered a small number of data errors, including misassigned species and erroneous tree size data. The Urban Landscape Manager reported in January 2010 that updating of the inventory is backlogged due to a lack of staff resources. He was exploring the possibility of having community volunteers assist in maintaining the inventory.

The current tree inventory is based on street addresses and does not include actual geographic coordinates needed to display tree locations in a GIS. Georeferencing of the tree inventory would need to be performed to make the database GIS compatible. This would be a significant undertaking, but could be performed by trained volunteers largely by utilizing available aerial imagery and software (e.g., Google Earth). West Coast Arborist has volunteered to update the street tree inventory database with updated tree data as well as georeferencing into Arbor Access as their crews perform block/grid pruning activities.

#### **4.2.4. Budget**

Currently, Street Tree Services is funded from the city general fund. As such, its budget is subject to fluctuation along with other general fund programs during times of decreased revenues. The budget and staffing levels of Street Tree Services have undergone several rounds of reductions over the past decade, decreasing its capabilities. However, maintenance needs of the city street trees do not decrease even if budgets decrease. Deferring tree maintenance, such as young tree training, can result in much higher future costs. Timely maintenance can prevent trees from becoming hazardous or developing structure problems and is more cost efficient than trying to correct these problems. With the restoration of funding from additional city revenues, the street tree program has a \$475,000 funding increase as of FY 2012/13. This new funding is directed to contract tree work primarily block or grid structural pruning and additional services including tree removals and planting.

### **4.3. Concrete maintenance**

#### **Key Findings**

- Concrete Maintenance has had a well-organized program with clear objectives and quality measures through FY 2010-11.

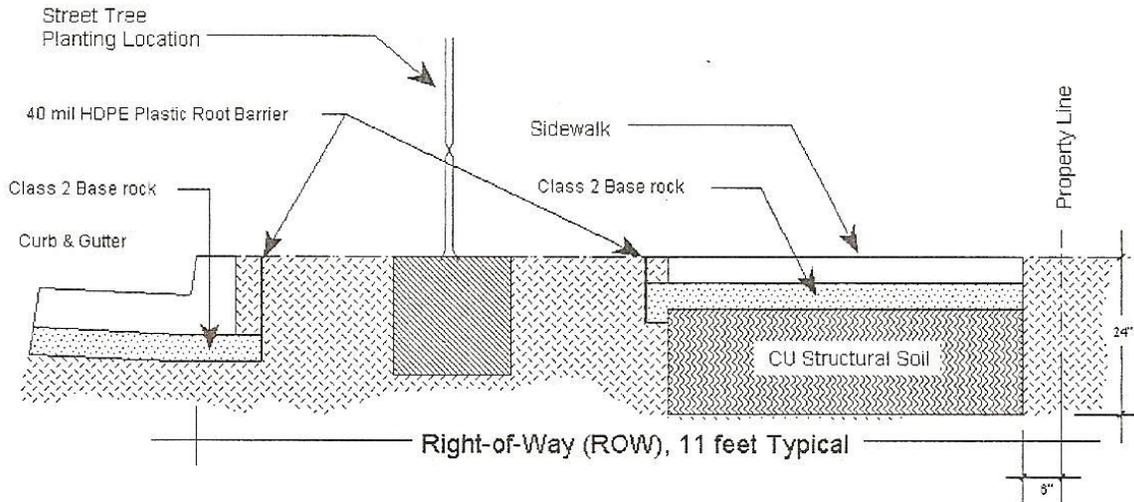
- Concrete repair around existing city trees through FY 2010-11 performed by personnel with knowledge of tree physiology and structure. This safeguards the City's investment in street trees.
- Beginning FY 2011-12 Concrete Maintenance program was transferred to Street Maintenance Operations manager. Street Tree Services and City Arborist become advisory to Public Works Project Administration.
- City Arborist called upon to advise PW inspectors regarding tree root mitigation associated with right-of-way concrete maintenance/replacement.
- Parkway planting strips were discontinued in new development in 1963, approximately 20,000 street trees occur in parkway strips 5.5 ft. or less in width. Post 1963 all sidewalks were installed monolithic to the curb [sidewalk is at the curb]
- In 2013 parkway strips were reestablished in industrial zones and in ITR [industrial to Residential] zones
- Concrete repair will be an ongoing need for hardscape near trees in narrow parkway strips.

### **4.3.1. Current status**

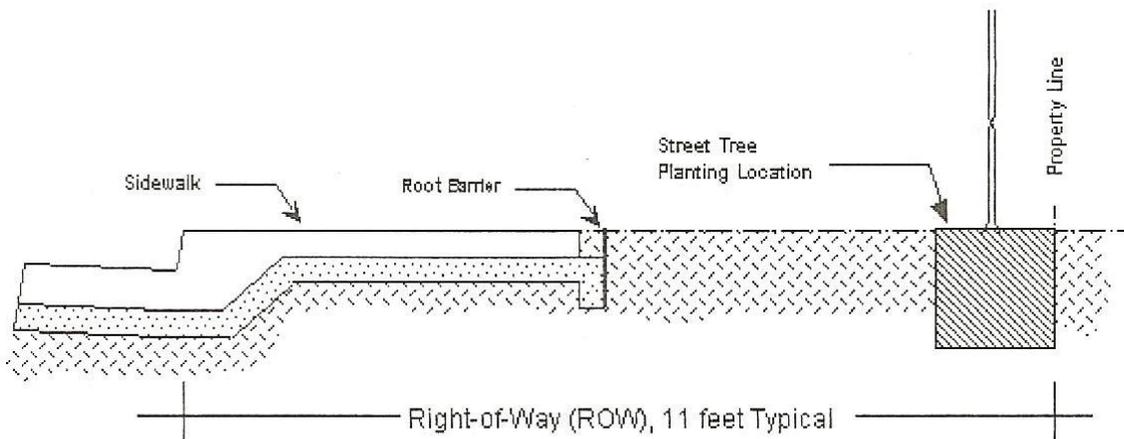
Sunnyvale has 375 miles of public streets. Based on our aerial photo analysis, approximately 20% of Sunnyvale's land area is covered by streets and highways. Almost all (98%) city streets have curbs, and 80% have sidewalks. Typical residential streets have a public right of way that extends 11 feet from the curb face. Some of the older streets have been widened over time, and as a result, the ROW became narrower as the paved portion of the street increased in width.

The standard width for a sidewalk in most of Sunnyvale is 4.5 ft. Among streets with sidewalks, 65% are designed with parkway strips (sidewalk is separated from curb and gutter, figure 4-4) and 35% are monolithic (sidewalk, curb and gutter are in one solid slab, figure 4-5). Monolithic sidewalk construction was the standard in new development between 1965 and 2013. Industrial zones off-road ROW has a 4 ft. parkway strip with a 6 ft. sidewalk.

Parkway strips allow for planting between the sidewalk and the curb. Among tree planting sites in the Street Tree Inventory, 57% are in parkway strips. Since the sidewalk is usually 0.5 ft. inside the edge of the right of way, and the curb is about 0.5 ft. wide, the standard parkway strip is 5.5 ft. wide (i.e., 11 ft. [ROW]-4.5 ft. [sidewalk] -0.5 ft. [curb]-0.5 ft. [sidewalk setback]=5.5 ft. parkway width).



**Figure 4-4.** Tree planting diagram for parkway sidewalk construction.



**Figure 4-5.** Tree planting diagram for monolithic sidewalk construction.

The center of a tree planted in the center of a 5.5 ft. wide parkway is about 2.75 ft. from both the edge of the curb and sidewalk. Most parkway planting strips in Sunnyvale are narrower than 5.5 ft. (figure 4-6). Approximately 20,000 street trees occur in parkway strips 5.5 ft. or less in width. Although many of these trees are small, others are large statured, and the parkway configuration does not provide enough room for root expansion. As a result, lifting of sidewalks and curbs is common around mature trees in the narrower parkway strips.

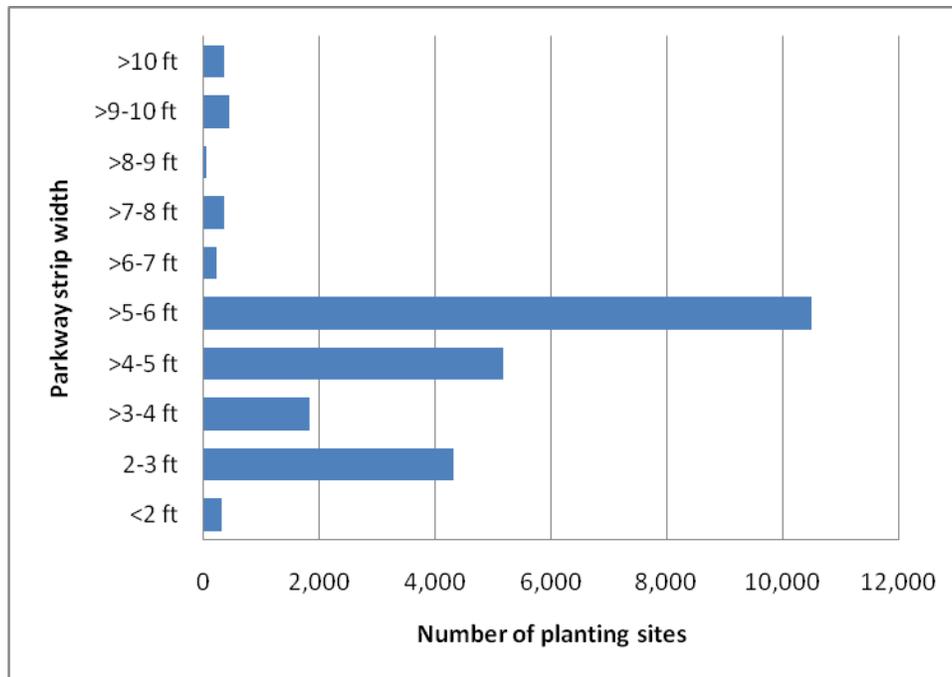


Figure 4-6. Number of planting sites by width of parkway strip. Fifty seven percent of all planting sites are parkway strip situations (source Tree inventory Jan 2010).

The Urban Landscape Manager functioned as the Concrete Maintenance Manager from 1989 to June 2011 and was responsible for concrete maintenance in the city ROW. This arrangement ensured that the needs and limitations of trees were considered when concrete repairs were conducted. Until FY 2011-12, Concrete Maintenance has had a well-organized program with clear objectives and quality measures (Appendix 6.8 page 100). Reorganization of the Public Works department in 2011 has reduced the ability of the Urban Landscape Manager to meet these objectives to insure healthy street trees in public ROW.

Concrete Maintenance and Street Tree Services worked hard to develop and implement solutions that retain as many street trees as possible while maintaining sidewalks that are pedestrian friendly and ADA compliant. Sidewalk defects are found through citizen reporting and staff reporting.

Street Tree Services is testing several innovative methods to repair sidewalks. The current technical specifications for repairing sidewalks and retaining trees are included in the Technical Practices and Standards Manual. Methods being used include:

- lag bolting steel plates to roots or around roots, and then either repouring the sidewalk or replacing the sidewalk with pavers. The root cannot expand in diameter beyond the surface of the steel.
- curving sidewalks and curbs around root flares
- Removing offending roots if it can be done without compromising the physical support structure of the tree. Roots are pruned to a maximum depth of 10 inches. Roots deeper than 10 inches generally do not fracture concrete.

- Testing alternate sidewalk construction techniques. Rubber sidewalks were installed in 10 test locations in 2008 (Appendix page <need this info from LD in a word document>).

Concrete Maintenance puts temporary asphalt ramps on sidewalks with displacements of more than 1 inch. Sidewalks with less than 1 inch of horizontal displacement are ground.

An estimated 95% of the concrete repair budget is for concrete maintenance related to tree root damage. In addition to mitigating tree root problems associated with mature trees, until 2011 the Concrete Maintenance program also installed appropriate mitigations for newly planted trees to prevent future problems. Since 2011 the Street Tree Services program installs root mitigation by staff or by contract. Concrete repair is not limited to repair adjacent to inventoried street trees. The City repairs concrete sidewalks, curbs, and gutters damaged by tree roots irrespective of tree ownership. Budgets for Concrete Maintenance are shown in Figures 4-2 and 4-7.

The Street Tree Inventory data fields do not have a direct relationship with concrete maintenance activities. Concrete Maintenance activities are tracked using spreadsheets.

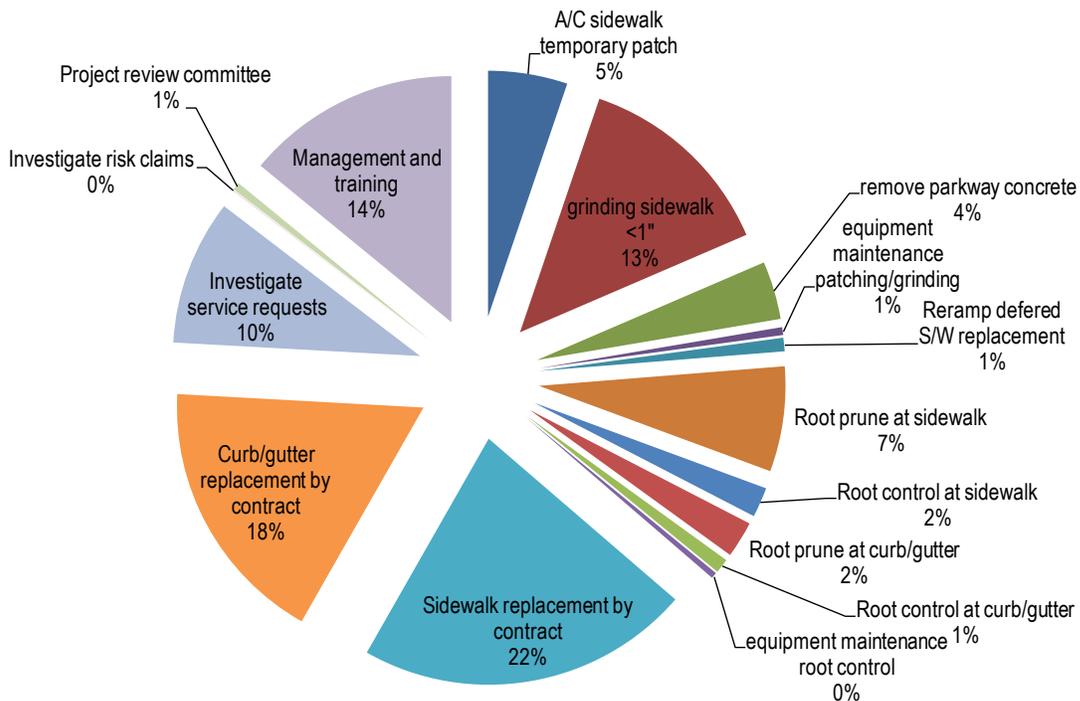


Figure 4-7. Concrete maintenance budget 2008-2009 fiscal year.

## 4.4. Park tree management

### 4.4.1. Program structure

Parks employees performed all tree planting and pruned trees from the ground with pole pruners up to a height of 14 feet. Parks staff also removed trees up to 20 feet tall. Emergency tree work

needing to be done within 72 hours was done by the Street Tree Services (Public Works) and billed to the Parks program. Street Trees Services also handled work on taller trees on boulevard medians. Based on January 2010 street tree inventory data, about 73% of all boulevard median trees are more than 15 ft. tall. Contractors pruned trees above 14 feet and removed trees taller than 20 feet. Contractors were required to have ISA certified arborists. Specifications included in the request for proposals for tree work required that contractors follow ANSI/ISA pruning standards and practices.

### **4.4.2. Tree pruning**

In FY 2009-10, approximately 1,380 of the 1,492 tree-related services performed on trees managed by parks were related to pruning. All sites managed by Parks are inspected daily for all hazards, including tree-related hazards. All hazards are logged and abated within 24 hours.

### **4.4.3. Tree removal and planting**

In FY 2009-10, 80 trees were planted and 32 trees were removed by Parks. Removed trees are replaced at the overall site where the removal occurred, but trees are not necessarily replanted in the same spot. Replacement species are selected on a case-by-case basis from the Parks Standard Plant List.

### **4.4.4. Tree inventory**

Unlike the street tree inventory database, which includes a separate record for each tree, the inventory of park and facility trees is a summary table. The inventory is maintained as a word processing document that lists the number of trees per location by species. The current inventory dates to 1999-2000 and there is no set interval for updating the inventory. Descriptive data for individual trees is not available in the inventory, so it cannot be used to schedule maintenance activities or store other management data.

### **4.4.5. Budget**

In FY 2011/12 the budget for supplies and tree work performed by city park staff was approximately \$125,000. The budget for pruning and removals by contractors was approximately \$50,000.

## **4.5. Existing ordinances, policies, and plans related to the urban forest**

### **Key Findings**

- The City of Sunnyvale's General Plan includes limited references to the city's urban forest and its importance.
- Several sections of city code regulate certain basic activities associated with the urban forest and nominally protect certain classes of trees. Some of these sections would be more effective if revised and updated.
- The city's updated General Plan should more clearly recognize the importance of the urban forest as a major part of the City's the biological infrastructure. Maintenance of

the urban forest is necessary to ensure that critical ecosystem services (e.g., urban floodwater runoff mitigation) continue to be provided.

- Section 19.38.070 (Landscaping, irrigation, and usable open space) should be revised to reference specifications for adequate soil testing and preparation prior to planting. Mechanisms for monitoring and enforcing maintenance and parking lot shading standards should be more clearly stated and implemented.
- The tree preservation ordinance (Chapter 19.94) should be revised to specify greater protection for roots of protected trees, improve the definition of protected trees relative to multi-trunked trees, and provide more objective standards for issuing tree removal permits.
- Current protection for city street trees in City code, chapter 13.16, is weak, as there is no mechanism for achieving compensation if a city street tree is damaged. Ordinance 13.16 should be strengthened to protect city-maintained trees in the public right-of way.

The City of Sunnyvale has a number of existing policies and ordinances that pertain to the urban forest. Key provisions from these are briefly summarized below. We have also noted potential limitations or other issues that may influence the effectiveness of these policies and regulations. Tree-related provisions in these documents are included in the Appendix. Note that Sunnyvale is in the process of streamlining and reorganizing its General Plan. In the re-organization process sub-elements are being eliminated, therefore citations for some of the text cited below will change.

### **4.5.1. City of Sunnyvale Consolidated General Plan (2011)**

The General Plan was consolidated in 2011 and is supportive of the urban forest although much of the language specific to the urban forest was removed. Those goals from the Community Vision section relating to trees are contained in section 7.

### **4.5.2. Sunnyvale Municipal Code**

#### **Chapter 13.16. City Trees**

This is primarily the city's street tree ordinance. Its intent includes "Ensure the preservation of the city's urban forest" and calls for planting a minimum one tree per lot when new development occurs. It also calls for the planting of city street trees (in the public ROW) where feasible. The city superintendent of trees and landscaping is designated as the enforcing authority for regulating ROW tree planting, maintenance, and removal.

The code includes a number of standard provisions regulating tree management in the ROW. Intentionally damaging trees in ROW is designated as unlawful, but no sanctions are specified for violations. Therefore, city street trees have less protection than protected trees on private property: the Tree Preservation ordinance, Chapter 19.94, does not apply to street trees. We recommend that fines be established for damaging city street trees and that city

street trees be granted a level of protection at least equal to that provided to protected trees as defined in Chapter 19.94.

The code requires a permit to plant, remove, prune, or fertilize a ROW tree. It also establishes an official tree list to guide planting in the city ROW and forbids planting by residents in the ROW of trees not on the list. In practice, it has generally not been possible to enforce these provisions completely. Unapproved plantings are common, and these "unofficial city trees" account for much of the diversity of tree species found in the public ROW (see Species diversity page 46).

As an alternative, the city could develop a list of recommended and acceptable street tree species. This list would include information on suitable planting situations and specific limitations of listed species. Such a list would be advisory and would be subject to update as new species or varieties become available, or as new problems develop among trees on the list. The City should also develop a list of prohibited trees that should not be planted due to known problems (e.g., short life, pest/disease problems, invasive spread, etc.). These lists could provide guidance for planting without unduly restricting options for species selection.

The code also requires immediate removal of damaged trees that could be hazardous and calls for replacement of removed trees. This code section also defines public nuisances in the ROW as landscape plants or other materials that may pose safety hazards or have the potential to harm city street trees. City costs to abate these nuisances can be charged to adjacent property owner.

### **Chapter 19.37. Landscaping, irrigation, and usable open space.**

### **Chapter 19.38. Required Facilities**

These sections of code call for use of water conserving plants, hydrozoning, and landscaping in new development. It includes a number of detailed planting specifications, including an outdated tree staking specification that does not match current recommendations (see <http://www.ufe.org/standards&specs.html#plant>). The planting specifications lack any reference to soil preparation prior to landscaping. Highly compacted and contaminated soils are one of the most important contributors to poor plant growth in urban landscapes.

This code also specifies that required landscaping must be maintained and replaced as needed. It is not clear how the maintenance requirement is monitored or enforced.

The code includes parking lot landscaping requirements that call for 50% parking lot shading after 15 years for surfaced areas that did not exist prior to 2002. No monitoring or means of enforcement are specified for the parking lot shading requirement. The original proposed Planning Policy called for a field review at 2, 5, 10, and 15 years to check for compliance, but funding for staff needed was never approved.

In order to increase canopy cover citywide, more canopy cover will be needed in parking lots. To increase the number of existing parking lots that fall under the 50% parking lot shading standard, the city would need to expand the scope of discretionary permits that trigger this requirement. The city could also explore the use of incentives to offset costs associated with retrofitting parking lots to increase tree canopy cover.

## **Chapter 19.94. Tree Preservation**

This chapter is the city's tree preservation ordinance, which was enacted in 1991 and subsequently reviewed in 2005 and amended in 2006. The chapter applies to trees above a minimum trunk size on private property and within the city and city-owned golf courses and parks. It does not include trees in the public ROW, which are regulated under Chapter 13.16.

The code defines a tree as having a minimum circumference of 13 inches at 4.5 ft. above ground (=4.1 inches DBH). Trees of "significant size", i.e., "protected trees" have a circumference of at least 38 inches (=12 inch DBH). Multi-stemmed trees are not protected unless at least one stem is 12 inches DBH or the aggregate circumference is at least 113 inches. This corresponds to an effective aggregate diameter of 36 inches DBH. A tree with three 11.5 inch DBH trunks would not be protected under this standard, even though its canopy size and biomass would likely be greater than a single 12 inch DBH stem.

One way to deal with this disparity would be to use aggregate trunk cross-sectional area rather than aggregate circumference as the basis for defining protected trees. The 12 inch DBH trunk diameter of a protected tree has a cross-sectional area of 113 square inches. In the example above, a tree with three 11.5 inch DBH stems would have an aggregate cross-sectional area of 312 square inches and would therefore be protected, A tree with two stems 8.5 inches DBH each (aggregate cross sectional area= 113.5 square inches) would be the smallest protected two-stemmed tree using this criterion.

The code specifies that it is unlawful to damage or kill a protected tree, but protected trees can be removed if the owner obtains a permit from the Department of Community Development. Tree removal permits can be obtained for a wide variety of reasons, some of which are quite vague and/or subjective. Replacement trees may be required as a condition of a removal permit at the discretion of the Director of Community Development. Tree removal permit applications did not require a fee until FY 2009-10, when a fee of \$233 was instituted. Tree removals conducted by PG&E for line clearance purposes are exempt from this fee.

The ordinance also includes standards designed to protect retained trees during development. As written, these standards are not likely to provide adequate protection for all trees. This section also includes an erroneous statement indicating "the root system generally extends to the outermost edges of the branches". In fact, tree root systems typical extend out from the trunk a distance that is twice to three times that of the canopy. The inclusion of this statement in the code may result in the approval of plans that do not protect enough tree roots to ensure the health of retained trees.

Enforcement of this chapter is the responsibility of the Director of Community Development or their designee. The director has the option to issue a stop work order for a lack of compliance with approved plans or permits. The director (or designee) may also impose fines and "reasonable expenses and landscaping" in response to violations following an administrative hearing. Violators are also subject to civil monetary penalties, which require the prosecution of a civil action by the city attorney. To date, civil action has been taken in one case, involving unauthorized removal of a row of trees. The settlement in the case was \$112,000.

Review of tree removal applications has commonly been assigned to the least senior members of planning staff. This has led to a lack of continuity and uniformity in the application of the ordinance.

### **Chapter 19.96. Heritage Preservation**

Sunnyvale's original Heritage Resources Inventory was adopted in 1979, recognizing properties that have architectural or historic significance. Trees may be designated as heritage resources following the provisions in this chapter (see appendix O1). Roughly eight of the 13 criteria used to nominate heritage resources (§19.96.050) could apply to trees. These criteria are related to historical significance, rarity, visual impact, and relationship to other heritage resources. A 'Heritage' tree is therefore quite different from a "protected" tree, which is designated by size as described above (Chapter 19.94 Tree Preservation page 75).

Only a few trees in Sunnyvale have been designated as Heritage trees. In January 2009, trees at 14 addresses were listed in the Heritage Resources Inventory. Most of these were individual trees, but some small groups of trees are listed as landmarks (Table 3-8). Trees at one additional address were listed in the Local Landmark inventory. To obtain permission to remove trees that are designated as heritage resources, an applicant must obtain both a Resource Alteration Permit approved by the Heritage Preservation Commission and a tree removal permit.

### **California Solar Shade Control Act**

The California Solar Shade Control Act (Public Resources Code section 25980-25986) regulates potential shading of solar collectors by trees located on another property.

This code, originally adopted in 1979, was revised in 2009, as a result of the first and only prosecution that occurred under the 1979 act, which involved a property in Sunnyvale (*California v. Bissett*, No. BB727255, Cal. Sup. Ct. Santa Clara County March 28, 2008). The 2009 revision clarified and greatly restricted the scope of the original Act to reduce negative impacts to trees. The revised 2009 Act does not apply to:

- (a) Trees or shrubs planted before the solar collector was installed
- (b) Trees planted, grown, or harvested on timberland or on land devoted to the production of commercial agricultural crops
- (c) the replacement of a tree or shrub that had been growing prior to the installation of a solar collector and that, subsequent to the installation of the solar collector, dies, or is removed for the protection of public health, safety, or the environment.
- (d) Trees or shrubs that are subject to a city or county ordinance (such as a tree protection ordinance).

In addition, solar collectors that are designed and intended to offset more than the building's electricity demand (i.e., providing a profit to the solar collector owner) are not covered in the act. In addition, violations of the Act are classified as private nuisances (as defined in Section 3481 of the Civil Code), rather than public nuisances.

The 2009 Act also indicates that local (city or county) ordinances specifying requirements for tree preservation or solar shade control have precedence within the jurisdiction. As in the original Act, a city or county can pass an ordinance to exempt the jurisdiction from the Act. The City of Sunnyvale has not exempted itself. Given that the 2009 revision has eliminated the previous shortcomings of the Act, we do not recommend that the City take action to exempt itself.

## 5. Community

### Key Findings

- The urban forest is considered an important contributor to the attractiveness and livability of Sunnyvale.
- There is strong interest on the part of some Sunnyvale residents in forming a citizens group to advocate and care for the urban forest.
- Citizens of Sunnyvale tend to be well educated and relatively affluent, compared to residents of many other California communities.
- A large majority of the population has lived in Sunnyvale less than 10 years.
- Forty-seven percent of homes in Sunnyvale are occupied by renters.
- The City will need to maintain an ongoing program of outreach and education to ensure that residents and landowners have the information they need to make good tree care decisions. These efforts need to resonate with Sunnyvale's diverse population.
- An active urban forest volunteer group in Sunnyvale could assist with public education and outreach and provide direct assistance with planting, establishment and of City trees.

### 5.1. Values

As indicated by the general plan, the city council views the City of Sunnyvale as a special place. Maintaining Sunnyvale as an attractive and safe community is a general priority of elected officials, city staff, and residents. As indicated in the general plan, the council, boards, commissions and staff consider the urban forest to be an important component of making Sunnyvale a livable and attractive city.

### 5.2. Demographics

Citizens of Sunnyvale tend to be well educated and relatively affluent, compared to people in other California communities. For example, based on data from the 2000 census (source:

Statjump.com), Sunnyvale ranked eighth in percent of residents with graduate or professional degrees among California cities over 50,000 population. In 2000, 6% of Sunnyvale residents had household income more than \$200,000 per year, 19th on the list of California cities over 50,000 populations. [Data accessed Jan 12, 2011, <http://www.statjump.com/lists/college-graduates-dp2c27tc.html> and <http://www.statjump.com/lists/household-income-dp3c111tc.html>]. The population is relatively mobile. A large majority of the population has lived in Sunnyvale less than 10 years. A high percentage of residents are renters. Sunnyvale also has a large percentage of residents from non-English speaking ethnic backgrounds.

The following information about Sunnyvale's population is from the 2008 American Community Survey report (source: City of Sunnyvale website accessed Jan 2010).

### **5.2.1. Social characteristics**

Selected highlights from the 2008 American Community Survey reports include:

- 55.1% of the population was born in the United States, and of those 67.1% were born in California
- Of the foreign-born population, 37.9% are naturalized citizens, and 62.1% are not U.S. citizens
- Sunnyvale residents have a high level of educational attainment with 90.4% of the population 25 years and over achieving high school graduation or higher and 55.1% holding a bachelor's degree or higher
- Only 9.6% of the population 25 years and over have no high school diploma, compared with 14.4% in Santa Clara County and 19.8% in California
- 48.3% of the population 5 years and over speak English only at home, while 51.7% speak a language other than English
- Of the non-English speaking population, 20.8% report speaking English less than 'very well.'

### **5.2.2. Economics**

- 60.1% of the community reported management, professional and related occupations, while 21.3% reported sales and office occupations and 7.8% reported service occupations
- Per capita income is \$45,455, compared to \$40,752 in Santa Clara County and \$29,388 in California
- Median family income is \$107,441, compared to \$104,022 in Santa Clara County and \$70,029 in California
- 4.3% of all people in Sunnyvale live below poverty level, compared to 7.4% in Santa Clara County and 13.3% in California

- 4.4% of people under 18 years of age and 4.6% of people 65 years and older live below poverty level

### **5.2.3. Housing**

- Very few homes are unoccupied in Sunnyvale
- 81.7% of community members came to Sunnyvale after the year 1990; 64% of community members came to Sunnyvale after 2000
- 52.3% of all homes are owner-occupied, with an average household size of 2.68
- 47.7% of all homes are renter-occupied, with an average household size of 2.39
- The number of rented homes is 8.1% greater than the Santa Clara County average and 4.7% greater than the California average
- Median value for owner-occupied units is \$726,000, compared to \$729,000 for Santa Clara County and \$467,000 for California
- 40.9% of the total housing units are 1-unit, detached, compared to 55.3% in Santa Clara County and 58.3% in California

### **5.3. Nonprofit volunteer urban forest support group**

In association with the development of the UFMP, the Urban Landscape Manager organized a focus group consisting of citizens who have expressed an interest in trees in various forums. A number of these group members and other community members have expressed interest in forming a non-profit group to support urban forestry in the community.

The Urban Landscape Manager has approached tree groups in neighboring communities for help in getting a group started in Sunnyvale.

The process of establishing and running a 501(c)3 non-profit organization can be somewhat involved. Partnering with an existing tree group from a neighboring community provides a means to accelerate the process and helps the new group avoid having to "reinvent the wheel". Our City Forest is an established nonprofit community urban forest group based in San Jose that has indicated a willingness to act as the umbrella group for Sunnyvale's new group. Our City Forest (OCF) has a variety of established programs related to tree planting, tree care, and community education and outreach. OCF has a paid Executive Director, a position that provides necessary overall program direction and continuity that is critical for a largely volunteer organization.

OCF is also a member of California ReLeaf, a statewide urban forestry organization. California ReLeaf promotes alliances among community-based tree groups, individuals, industry, and government agencies. Whether it organizes under OCF or as a separate entity, the Sunnyvale group would be able to join the California ReLeaf network and take advantages of the services they provide.

#### **5.4. Tree management on private properties**

Large, well-maintained trees are found in many residential neighborhoods and commercial properties. Improper pruning practices such as topping are relatively uncommon in Sunnyvale, compared to many other California communities. Many residents and commercial property owners appear to appreciate the contribution that trees make to property values, community image, and overall quality of life.

However, given Sunnyvale's diverse population, it is not surprising that Sunnyvale residents hold diverse views about trees. Street Tree Services annually receives and denies many requests for city street tree removals from residents that do not understand or appreciate the importance of urban trees. Attendees at the March 2010 focus meeting reported that removal of healthy trees by residents is not uncommon. Although many tree removals on private properties are nominally subject to city's tree preservation ordinance (Chapter 19.94), many residents may be unaware of this ordinance or simply choose to ignore it. Likewise, some tree service firms perform such removals without checking to see whether they comply with the tree preservation ordinance.

Other than through the tree preservation ordinance and city code related to landscaping requirements (section 4.5 above), the City of Sunnyvale has no direct influence on tree planting or tree care on private lands. The continued existence of much of Sunnyvale's urban forest depends on good tree planting and tree care decisions by its residents. Although Sunnyvale's residents are well educated, many may know little about tree care. In addition, many Sunnyvale residents have lived in the community for a relatively short time, and may not own the house they live in. To provide the information that residents and landowners will need to make good tree care decisions, the City will need to maintain an ongoing program of outreach and education, either on its own or in cooperation with a local non-profit organization.

In addition, the City may wish to explore ways to encourage proper tree planting and care by individuals and businesses. Other communities have used various types of incentive programs, such as providing free or reduced-cost trees. On commercial properties, the City may want to consider how to provide incentives for increasing parking lot shading. Polling commercial landowners may provide information on the types of incentives that would be most effective.

Some regulatory approaches may also be considered. For example, the City could explore the possibility of developing a local licensing requirement for businesses or individuals that provide certain tree care services (primarily pruning and removal) for hire within the City of Sunnyvale. Such a license would be required whether the business was based in Sunnyvale or not. To obtain a license, the tree care contractor would need to meet specific requirements. For example:

- Have adequate professional certification (e.g., International Society of Arboriculture);
- provide evidence of adequate liability insurance coverage;
- agree to comply with all City of Sunnyvale ordinances and standards related to tree care work.

Code Enforcement staff would have the ability to cite violators and issue stop work orders. Because poor quality tree work can pose a risk to public safety, reduce property values, and result in the loss of tree-related benefits, it is in the City's interest to reduce or eliminate the activity of unqualified contractors that conduct poor pruning or illegal tree removals.



Figure A1. Soil map of Sunnyvale from Gardner and others (1958) with current city limit (red line) and current streets (gray lines) superimposed. Soil type codes are listed in Table A1.

Table A1. Soils of Sunnyvale, based on Gardner and others (1958). Soil codes are the same shown in Figure A1. General soil groups are indicated by color shading (green=basin soils, yellow=recent alluvial fans and floodplains, blue =older alluvial fans. Soils and corresponding properties shown in **bold** may constrain tree growth and performance.

Soil code	Soil series	Depth of soil readily penetrated by roots	Permeability of surface soil <sup>1</sup>	Permeability of subsoil	Water holding capacity <sup>2</sup>	Occurrence of salinity <sup>2</sup>
<b>An</b>	<b>Alviso clay 0-1% slopes</b>	<b>20-36"</b>	<b>Very slow</b>	<b>Very slow</b>	High	<b>General</b>
Bb	Bayshore clay loam 1-3% slopes	>60 inches	Rapid	Moderate	Moderate	None
Ba	Bayshore clay loam 3-5% slopes	>60 inches	Rapid	Moderate	Moderate	None
Ca	Campbell clay loam, 0-1% slopes	>60 inches	Moderate	Moderate	High	Rare
<b>Cb</b>	<b>Campbell silty clay, 0-1% slopes</b>	<b>&gt;60 inches</b>	<b>Slow</b>	<b>Slow</b>	High	None
Cd	Castro clay 0-1% slopes	20-36"	Slow	Slow	Moderate	<b>Occasional</b>
Ce	Castro silty clay 1-3% slopes	20-36"	Slow	Slow	Moderate	<b>Occasional</b>
Ec	Pits	Excavated areas				
Ka	Kitchen middens	Former Native American settlement				
Po	Pleasanton gravelly loam, 1-3% slopes	>60 inches	Moderate	Moderate	Moderate	None
Ps	Pleasanton loam, 1-3% slopes	>60 inches	Moderate	Moderate	Moderate	None
Pf	Pleasanton clay loam, 1-3% slopes	>60 inches	Moderate	Slow	Moderate	None
<b>Sb</b>	<b>San Ysidro</b>	<b>variable 20</b>	Moderate	<b>Very slow</b>	<b>Low</b>	None

Soil code	Soil series	Depth of soil readily penetrated by roots	Permeability of surface soil <sup>1</sup>	Permeability of subsoil	Water holding capacity <sup>2</sup>	Occurrence of salinity <sup>2</sup>
	<b>loam, 1-2% slopes</b>	<b>to 36 inches</b>				
Sr	Sorrento clay loam, 1-3% slopes	>60 inches	Moderate	Moderate	High	None
St	Sorrento gravelly loam, 1-3% slopes	>60 inches	Moderate	Moderate	Moderate	None
Su	Sorrento loam, 1-3% slopes	>60 inches	Moderate	Moderate	High	None
<b>Sx</b>	<b>Sunnyvale clay 0-1% slopes</b>	<b>36"-60"</b>	<b>Slow</b>	<b>Slow</b>	<b>High</b>	<b>Occasional</b>
Sy	Sunnyvale clay loam 0-1% slopes	36"-60"	Moderate	Moderate	Moderate	None
Zb	Zamora clay loam, 1-3% slopes	>60 inches	Moderate	Moderate	High	None
Ze	Zamora gravelly clay loam, 1-3% slopes	>60 inches	Moderate	Moderate	High	None
Zf	Zamora silty clay loam, 1-3% slopes	>60 inches	Moderate	Slow	High	None

<sup>1</sup>Permeability refers to the rate at which water can pass downward through the soil after wetting. Permeability is a general indication of the ease of root penetration. Soils with slow permeability will absorb less than 3 inches of surface water per day. Soils with rapid permeability can absorb more than 20 inches of surface water per day.

<sup>2</sup>Water holding capacity refers to the total amount of water available to plants to the depth readily penetrated by roots when the soil is at normal field moisture capacity (the point at which water stops draining from the soil). The amount is expressed as the height of a column of water on the soil surface. Soils with low soil water holding capacity hold less than 4 inches of water at field capacity. Soils with high soil water holding capacity hold more than 9 inches of water at field capacity.

<sup>3</sup>Salinity refers to soluble salts, either neutral or alkaline in reaction, that occur in soils in sufficient quantities to have a toxic or retarding effect on the growth of cultivated plants. The term "alkali" is used in the 1958 Soil Survey.

**References**

Gardner, R.A.; Harradine, F.F.; Hargreaves, H.J.; Retzer, J.L.; Bartholomew, O.F.; Glassey, T. W. June 1958. Soil survey, Santa Clara Area, California. Series 1941, No. 17. U.S.D.A. and California Agricultural Experiment Station.

## 6.2. Canopy cover assessment

Phytosphere Research used a random dot grid and 2007 aerial photography in Google Earth to estimate tree canopy cover in the land area of Sunnyvale.

We generated 2,500 random coordinates that were distributed across a rectangular area that included the City's land area. The random coordinates were created using a random uniform distribution function in JMP<sup>®</sup> 7.0.1 (SAS Institute) software. These random coordinates were imported into an ESRI ArcMap<sup>®</sup> layer file. The city boundary GIS layer (provided by the City of Sunnyvale) was used to select only those points within the city limits. The points were overlaid on an aerial image of the city. Points that were located in ponds near the bay were removed from the random sample set. The resulting sample included 2210 random points distributed over approximately 19.25 square miles.

We used the zoning GIS layers supplied by the city to assign a land use designation to each point. Points were grouped into the following classes:

- residential (including single and multiple-unit zonings),
- commercial/industrial,
- city parks,
- schools,
- other city-owned properties.

The sample provided a sufficient number of points to provide good canopy cover estimates citywide and in major land uses, but the number of points falling in uncommon land uses was low. To provide a more accurate estimate of canopy cover in city parks, we created a denser set of random coordinates and selected those fell within city parks. This provided a sample of 472 random dots that we used to estimate canopy cover in parks.

We created separate files for the points in each land use category and exported the points to Google Earth kml files. Layers for the city limits and polygons for parks, schools, and city properties were also exported to Google Earth kml files. To assess canopy cover, we used the most recent available (October 2007) Google Earth imagery (Figure 3-5). We recorded whether each dot was on tree canopy. We also noted within each land use whether points were within the paved portions (curb to curb) of public streets or if they fell on trees growing within the apparent street right of way (ROW). Sidewalk placement and width were used to help estimate the width of the ROW at a given sample point.

We also used the random dots to select a sample for estimating average tree canopy area, which was needed to estimate tree numbers from canopy cover data (number of trees= total canopy area/ average tree canopy area). For the tree nearest to each random sample point, we measured the canopy diameter to the nearest 0.1 m using the Google Earth distance measuring tool. Areas were calculated from diameters assuming a circular canopy shape. We used an initial sample of 100 random coordinates each from residential and commercial land uses. To increase the number of street trees represented in the sample, we added an additional 100 random points that were located on streets.

### 6.3. Tree inventory tabulation

Species listed in the City Street Tree inventory as of December 2010.

Species	Number	Percent
<i>Acacia baileyana</i>	2	0.01%
<i>Acacia melanoxylon</i>	39	0.09%
<i>Acacia spp.</i>	1	0.00%
<i>Acer japonicum</i>	1	0.00%
<i>Acer macrophyllum</i>	1	0.00%
<i>Acer negundo</i>	5	0.01%
<i>Acer palmatum</i>	39	0.09%
<i>Acer platanoides</i>	6	0.02%
<i>Acer pseudoplatanus</i> 'Atropurpureum'	6	0.02%
<i>Acer rubrum</i>	267	0.65%
<i>Acer saccharinum</i>	49	0.12%
<i>Acer spp.</i>	2	0.01%
<i>Acer x freemanii</i>	2	0.01%
<i>Aesculus carnea</i>	8	0.02%
<i>Aesculus hippocastanum</i>	3	0.01%
<i>Ailanthus altissima</i>	2	0.01%
<i>Albizia julibrissin</i>	32	0.08%
<i>Alnus cordata</i>	22	0.05%
<i>Alnus oregona</i>	4	0.01%
<i>Alnus rhombifolia</i>	61	0.15%
<i>Araucaria araucana</i>	1	0.00%
<i>Araucaria spp.</i>	2	0.01%
<i>Arbutus unedo</i>	2	0.01%
<i>Arecastrum</i> <i>romanzoffianum</i>	12	0.03%
<i>Betula nigra</i>	102	0.25%
<i>Betula pendula</i>	230	0.56%
<i>Betula platyphylla</i> <i>japonica</i>	3	0.01%
<i>Butia capitata</i>	1	0.00%
<i>Callistemon citrinus</i>	162	0.39%
<i>Callistemon viminalis</i>	32	0.08%
<i>Calocedrus decurrens</i>	15	0.04%
<i>Carpinus betulus</i> <i>fastigiata</i>	184	0.45%
<i>Casimiroa edulis</i>	1	0.00%
<i>Castanea sativa</i>	2	0.01%
<i>Casuarina</i> <i>cunninghamiana</i>	112	0.27%
<i>Casuarina equisetifolia</i>	124	0.30%
<i>Casuarina stricta</i>	4	0.01%
<i>Catalpa speciosa</i>	2	0.01%
<i>Cedrus atlantica</i>	15	0.04%
<i>Cedrus deodara</i>	230	0.56%
<i>Celtis australis</i>	408	0.99%

Species	Number	Percent
<i>Celtis sinensis</i>	617	1.49%
<i>Celtis spp.</i>	1	0.00%
<i>Ceratonia siliqua</i>	744	1.80%
<i>Cercis occidentalis</i>	16	0.04%
<i>Chamaerops humilis</i>	11	0.03%
<i>Chitalpa X tashkentensis</i>	35	0.09%
<i>Chorisia speciosa</i>	3	0.01%
<i>Cinnamomum camphora</i>	744	1.80%
<i>Citrus limon</i>	11	0.03%
<i>Citrus sinensis</i>	7	0.02%
<i>Citrus X paradisi</i>	1	0.00%
<i>Cordyline australis</i>	35	0.09%
<i>Cornus spp.</i>	1	0.00%
<i>Crataegus laevigata</i>	39	0.09%
<i>Cupaniopsis</i> <i>anacardioides</i>	2	0.01%
<i>Cupressocyparis</i> <i>leylandii</i>	2	0.01%
<i>Cupressus macrocarpa</i>	20	0.05%
<i>Cupressus sempervirens</i>	431	1.04%
<i>Diospyros kaki</i>	3	0.01%
<i>Dodonaea viscosa</i>	4	0.01%
<i>Eriobotrya deflexa</i>	31	0.08%
<i>Eriobotrya japonica</i>	24	0.06%
<i>Erythea armata</i>	2	0.01%
<i>Erythrina caffra</i>	3	0.01%
<i>Eucalyptus cinerea</i>	4	0.01%
<i>Eucalyptus cladocalyx</i>	17	0.04%
<i>Eucalyptus ficifolia</i>	2	0.01%
<i>Eucalyptus globulus</i>	407	0.98%
<i>Eucalyptus</i> <i>lansdowneana</i>	18	0.04%
<i>Eucalyptus leucoxyton</i>	1	0.00%
<i>Eucalyptus nicholii</i>	5	0.01%
<i>Eucalyptus parvifolia</i>	64	0.16%
<i>Eucalyptus</i> <i>polyanthemos</i>	55	0.13%
<i>Eucalyptus robusta</i>	1	0.00%
<i>Eucalyptus sideroxyton</i>	52	0.13%
<i>Eucalyptus spp.</i>	6	0.02%
<i>Eucalyptus viminalis</i>	11	0.03%
<i>Eugenia paniculata</i>	3	0.01%
<i>Fagus sylvatica</i> "Atropunicea"	13	0.03%
<i>Feijoa sellowiana</i>	1	0.00%
<i>Ficus carica</i>	4	0.01%

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

Species	Number	Percent
<i>Fortunella margarita</i>	1	0.00%
<i>Fraxinus american</i>	139	0.34%
<i>Fraxinus oxycarpa</i>	497	1.20%
<i>Fraxinus pennsylvanica</i>	49	0.12%
<i>Fraxinus uhdei</i>	518	1.25%
<i>Fraxinus v. 'Rio Grande'</i>	525	1.27%
<i>Fraxinus velutina</i>	300	0.73%
<i>Geijera parviflora</i>	515	1.25%
<i>Ginkgo biloba</i>	1478	3.57%
<i>Gleditsia triacanthos</i>	36	0.09%
<i>Grevillea robusta</i>	11	0.03%
<i>Heteromeles arbutifolia</i>	6	0.02%
<i>Hibiscus rosa-sinensis</i>	2	0.01%
<i>Ilex altaclarensis Wilsonii</i>	7	0.02%
<i>Jacaranda mimosifolia</i>	13	0.03%
<i>Juglans hindsii</i>	17	0.04%
<i>Juglans regia</i>	18	0.04%
<i>Juglans spp.</i>	1	0.00%
<i>Juniperus californica</i>	9	0.02%
<i>Juniperus chinensis</i>	2	0.01%
<i>Juniperus chinensis Torulosa</i>	76	0.18%
<i>Juniperus scopulorum</i>	1	0.00%
<i>Juniperus spp.</i>	1	0.00%
<i>Koelreuteria bipinnata</i>	2	0.01%
<i>Koelreuteria paniculata</i>	3	0.01%
<i>Lagerstroemia indica</i>	120	0.29%
<i>Lagerstroemia x faurii</i>	614	1.49%
<i>Lagerstromia x faurii(lavend</i>	123	0.30%
<i>Lagerstromia x faurii(red)</i>	572	1.38%
<i>Lagunaria patersonii</i>	2	0.01%
<i>Laurus nobilis</i>	227	0.55%
<i>Leptospermum spp.</i>	2	0.01%
<i>Ligustrum lucidum</i>	401	0.97%
<i>Liquidambar 'ROTUNDILOBA'</i>	4	0.01%
<i>Liquidambar styraciflua</i>	3525	8.52%
<i>Liriodendron tulipifera</i>	800	1.93%
<i>Lyonothamnus floribundus asp</i>	2	0.01%
<i>Magnolia grandiflora</i>	4633	11.20%
<i>Magnolia x. soulangiana</i>	12	0.03%
<i>Malus spp.</i>	5	0.01%
<i>Malus syvestris</i>	19	0.05%
<i>Maytenus boaria</i>	119	0.29%
<i>Melaleuca linariifolia</i>	195	0.47%
<i>Melaleuca nesophila</i>	10	0.02%
<i>Melaleuca quinquenervia</i>	2	0.01%

Species	Number	Percent
<i>Metasequoia glyptostroboides</i>	1	0.00%
<i>Morus alba</i>	15	0.04%
<i>Myoporum laetum</i>	8	0.02%
<i>Nerium oleander</i>	67	0.16%
<i>Olea europaea</i>	154	0.37%
<i>Other</i>	15	0.04%
<i>Paulownia tomentosa</i>	4	0.01%
<i>Persea americana</i>	16	0.04%
<i>Phoenix canariensis</i>	25	0.06%
<i>Photinia fraseri</i>	522	1.26%
<i>Picea engelmannii</i>	2	0.01%
<i>Picea pungens</i>	8	0.02%
<i>Pinus canariensis</i>	550	1.33%
<i>Pinus coulteri</i>	1	0.00%
<i>Pinus edulis</i>	5	0.01%
<i>Pinus halepensis</i>	50	0.12%
<i>Pinus pinea</i>	76	0.18%
<i>Pinus radiata</i>	195	0.47%
<i>Pinus spp.</i>	1	0.00%
<i>Pinus thunbergiana</i>	83	0.20%
<i>Pistacia chinensis</i>	2868	6.94%
<i>Pittosporum crassifolium</i>	1	0.00%
<i>Pittosporum eugenioides</i>	17	0.04%
<i>Pittosporum undulatum</i>	7	0.02%
<i>Platanus acerifolia</i>	1124	2.72%
<i>Platanus racemosa</i>	3	0.01%
<i>Podocarpus gracillior</i>	726	1.76%
<i>Podocarpus macrophyllus</i>	8	0.02%
<i>Populus canadensis</i>	3	0.01%
<i>Populus nigra 'Italica'</i>	17	0.04%
<i>Prunus amygdalus</i>	41	0.10%
<i>Prunus armeniaca</i>	25	0.06%
<i>Prunus blireiana</i>	130	0.31%
<i>Prunus caroliniana</i>	16	0.04%
<i>Prunus cerasifera</i>	717	1.73%
<i>Prunus domestica</i>	36	0.09%
<i>Prunus lyonii</i>	21	0.05%
<i>Prunus persica</i>	43	0.10%
<i>Prunus serrulata</i>	106	0.26%
<i>Pseudotsuga menziesii</i>	5	0.01%
<i>Punica granatum</i>	1	0.00%
<i>Pyrus calleryana</i>	701	1.70%
<i>Pyrus kawakamii</i>	142	0.34%
<i>Quercus agrifolia</i>	236	0.57%
<i>Quercus coccinea</i>	210	0.51%
<i>Quercus franetto</i>	8	0.02%
<i>Quercus ilex</i>	1363	3.30%
<i>Quercus kelloggii</i>	17	0.04%

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

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<b>Species</b>	<b>Number</b>	<b>Percent</b>
<i>Quercus lobata</i>	142	0.34%
<i>Quercus palustris</i>	4	0.01%
<i>Quercus shumardi</i>	483	1.17%
<i>Quercus spp.</i>	7	0.02%
<i>Quercus suber</i>	539	1.30%
<i>Quercus virginiana</i>	380	0.92%
<i>Quercus wislizeni</i>	54	0.13%
<i>Quillaja saponaria</i>	3	0.01%
<i>Rhamnus alaternus</i>	4	0.01%
<i>Rhus lancea</i>	347	0.84%
<i>Robinia pseudoacacia</i>	134	0.32%
<i>Sapium sebiferum</i>	185	0.45%
<i>Schinus molle</i>	75	0.18%
<i>Schinus terebinthifolius</i>	29	0.07%
<i>Sequoia sempervirens</i>	1024	2.48%
<i>Sequoiadendron giganteum</i>	5	0.01%
<i>Solanum rantonnetii</i>	5	0.01%
<i>Sophora japonica</i>	2	0.01%
Stump	141	0.34%
<i>Thuja occidentalis</i>	19	0.05%
<i>Tillia cordata</i>	19	0.05%
<i>Tipuana tipu</i>	2	0.01%
<i>Trachycarpus fortunei</i>	25	0.06%
<i>Tristania conferta</i>	14	0.03%
<i>Tristania laurina</i>	899	2.17%
<i>Ulmus americana</i>	1	0.00%
<i>Ulmus campestris</i>	1	0.00%
<i>Ulmus parvifolia</i>	296	0.72%
<i>Ulmus pumila</i>	10	0.02%
Vacant site (Large)	441	1.07%
Vacant site (Medium)	2775	6.71%
Vacant site (Small)	1091	2.64%
<i>Viburnum japonicum</i>	4	0.01%
<i>Washingtonia filifera</i>	14	0.03%
<i>Washingtonia robusta</i>	56	0.14%
<i>Xylosma congestum</i>	5	0.01%
<i>Yucca gloriosa</i>	71	0.17%
<i>Zelkova serrata</i>	400	0.97%

#### **6.4. List of trees whose numbers are being increased**

Street Tree Services was planting the following species in increasing numbers in certain planting situations along streets as of December 2010. These species have been targeted for increased planting because local experience suggests that they will perform well in specific situations (see discussion in section 3.3.2).

##### **Species**

*Acer rubrum*

*Betula nigra*

*Carpinus betulus fastigiata*

*Cedrus atlantica*

*Cedrus deodara*

*Chitalpa X tashkentensis*

*Cinnamomum camphora*

*Eucalyptus sideroxylon*

*Fraxinus american*

*Fraxinus v. 'Rio Grande'*

*Ginkgo biloba*

*Lagerstroemia x fauria*

*Lagerstromia x fauria(lavend*

*Lagerstromia x fauria(red)*

*Laurus nobilis*

*Persea americana*

*Photinia fraseri*

*Pinus canariensis*

*Platanus acerifolia*

*Podocarpus gracilior*

*Podocarpus macrophyllus*

*Prunus cerasifera*

*Pyrus calleryana*

*Quercus franetto*

*Quercus ilex*

*Quercus lobata*

*Quercus shumardi*

*Quercus suber*

*Quercus virginiana*

*Sapium sebiferum*

*Tristania laurina*

## 6.5. List of trees whose numbers are being decreased

Street Tree Services was decreasing the use of the following species along streets or in certain planting situations as of December 2010. These species have been targeted for reduced planting or have been discontinued because of problems that have developed in specific situations (see discussion in section 3.3.2).

<i>Acacia baileyana</i>	<i>Juniperus scopulorum</i>	<i>Quercus ilex</i>
<i>Acacia melanoxydon</i>	<i>Lagerstroemia indica</i>	<i>Quercus virginiana</i>
<i>Acer macrophyllum</i>	<i>Laurus nobilis</i>	<i>Quercus wislizenii</i>
<i>Acer negundo</i>	<i>Ligustrum lucidum</i>	<i>Rhus lancea</i>
<i>Acer palmatum</i>	<i>Liquidambar styraciflua</i>	<i>Sapium sebiferum</i>
<i>Callistemon citrinus</i>	<i>Liriodendron tulipifera</i>	<i>Schinus molle</i>
<i>Casuarina cunninghamiana</i>	<i>Lyonothamnus floribundus asp</i>	<i>Schinus terebinthifolius</i>
<i>Casuarina stricta</i>	<i>Magnolia grandiflora</i>	<i>Sequoia sempervirens</i>
<i>Cedrus deodara</i>	<i>Malus spp.</i>	<i>Thuja occidentalis</i>
<i>Celtis australis</i>	<i>Malus sylvestris</i>	<i>Tristania conferta</i>
<i>Celtis sinensis</i>	<i>Melaleuca linariifolia</i>	<i>Ulmus campestris</i>
<i>Ceratonia siliqua</i>	<i>Melaleuca quinquenervia</i>	<i>Ulmus parvifolia</i>
<i>Cinnamomum camphora</i>	<i>Metasequoia glyptostroboides</i>	<i>Washingtonia filifera</i>
<i>Cordyline australis</i>	<i>Olea europaea</i>	<i>Washingtonia robusta</i>
<i>Cornus spp.</i>	<i>Persea americana</i>	<i>Zelkova serrata</i>
<i>Cupaniopsis anacardioides</i>	<i>Phoenix canariensis</i>	
<i>Eriobotrya deflexa</i>	<i>Picea engelmannii</i>	
<i>Eriobotrya japonica</i>	<i>Picea pungens</i>	
<i>Erythrina caffra</i>	<i>Pinus canariensis</i>	
<i>Eucalyptus globulus</i>	<i>Pinus coulteri</i>	
<i>Eucalyptus lansdowneana</i>	<i>Pinus halepensis</i>	
<i>Eucalyptus polyanthemos</i>	<i>Pinus pinea</i>	
<i>Eucalyptus spp.</i>	<i>Pinus thunbergiana</i>	
<i>Eugenia paniculata</i>	<i>Pistacia chinensis</i>	
<i>Ficus carica</i>	<i>Podocarpus gracilior</i>	
<i>Fraxinus american</i>	<i>Populus canadensis</i>	
<i>Fraxinus oxycarpa</i>	<i>Prunus amygdalus</i>	
<i>Fraxinus pennsylvanica</i>	<i>Prunus armeniaca</i>	
<i>Fraxinus uhdei</i>	<i>Prunus caroliniana</i>	
<i>Fraxinus velutina</i>	<i>Prunus cerasifera</i>	
<i>Geijera parviflora</i>	<i>Prunus lyonii</i>	
<i>Ginkgo biloba</i>	<i>Prunus serrulata</i>	
<i>Jacaranda mimosifolia</i>	<i>Pseudotsuga menziesii</i>	
<i>Juglans hindsii</i>	<i>Pyrus calleryana</i>	
<i>Juglans regia</i>	<i>Pyrus kawakamii</i>	
<i>Juniperus californica</i>	<i>Quercus coccinea</i>	

## 6.6. Street tree species composition by block face

As an adjunct to this report, Phytosphere Research used a copy of the street tree inventory database (downloaded 1/17/10) to develop a new database related to tree species distribution for street trees by block face. A block face is defined here as a length of street between two successive intersections that includes trees on both sides of the street. Designation of block faces was based on the "on street", "from street" and "to street" fields in the tree inventory. We used JMP® 9.0.0 (SAS Institute) software to cross tabulate the data and summarize tree occurrence on each block face. In addition to totaling the three most common trees on each block face, a formula was used to determine whether one to three trees were dominant on the block, based on their occurrence relative to the total number of species present. The data were converted to a Microsoft Excel worksheet with the fields listed below. The worksheet contains 3,688 block face records. The spreadsheet was provided to the Urban Landscape Manager in electronic format. (Filename "Copy of Sunnyvale block face trees 3-9-10.xls" transmitted via e-mail 3/9/10).

Field	Description
Address number	Address of one tree on block face
Street	Street of Address number field
Address-Street	Address Number field concatenated to Street field
OnStr	Street the trees located on- this is the block face
block-on/from/to of block face trees	Block face plus cross streets that delimit the block face
Total sites	Number of inventoried planting sites on block face
Num live trees	Number of live inventoried trees on block face
Num(SPP)	Number of species on block face
SPP1	Most common tree on block face
N of spp1	Number of trees of species 1
Percent for spp1	Percent of trees on block face represented by species 1
SPP2	Second most common tree on block face
N of spp2	Number of trees of species 2
Percent for spp2	Percent of trees on block face represented by species 2
SPP3	Third most common species on block face
N of spp3	Number of trees of species 3
Percent for spp3	Percent of trees on block face represented by species 3
Top 2 trees % of all trees	Percent of all trees on block made up by the top 2 most common trees
Top 3 trees % of all trees	Percent of all trees on block made up by the top 3 most common trees
Main species1	Primary dominant species on block based on the following formula: SPP1 if (Percent for spp1 > 60%) or (Top 2 trees % of all trees) > 66% or (Top 3 trees % of all trees) > 75%. Otherwise listed as "none"
Main species2	Secondary dominant species on block based on following formula: SPP2 if (Top 2 trees % of all trees) > 66% and (Percent for spp1) ≤ 60% and (Percent for spp2) > 33%. Otherwise listed as "none".
Main species3	Tertiary dominant species on block based on following formula: SPP3 if (Main species2) is not "none" and (Top 3 trees % of all trees) > 75% and (Percent for spp3) ≥ 25%. Otherwise listed as "none".

## **7. Planning documents, policies, and city code related to trees**

### **City of Sunnyvale Consolidated General Plan (2011)**

General plan goals pertaining to the urban forest:

#### **Chapter 2 Community Vision**

##### **City-wide Vision Goals**

II. Attractive Community: To maintain and enhance the appearance of Sunnyvale, and to distinguish it from surrounding communities, through the promotion of high quality architecture, the preservation of historic districts and structures, the maintenance of a healthy urban forest, and the provision of abundant and attractive open space.

III. Environmental Sustainability: To promote environmental sustainability and remediation in the planning and development of the City, in the design and operation of public and private buildings, in the transportation system, in the use of potable water and in the recycling of water.

##### **Goal LT-2 An Attractive Community**

Preserve and enhance an attractive community, with a positive image and a sense of place that consists of distinctive neighborhoods, pockets of interest and human-scale development.

##### **Policy LT-8.4**

Maintain existing park and open space tree inventory through the replacement of trees with an equal or greater number of trees when trees are removed due to disease, park development or other reasons.

##### **Policy LT-8.5**

Maintain Parks and open space tree inventory on a system wide basis rather than a site-by-site basis with an understanding that there is no single optimum number of trees for a particular site.

##### **Policy LT-8.6**

Maintain a working fruit orchard throughout the largest portion of Orchard Heritage Park for as long as practical.

##### **Policy CC-2.1**

Maintain and provide attractive landscaping in the public right-of-way to identify the different types of roadways and districts, make motorists more comfortable and improve the enjoyment of residential neighborhoods.

##### **Policy CC-5.4**

Seek out, catalog and evaluate heritage resources which may be significant.

### **Sunnyvale Municipal Code**

## Chapter 13.16. City Trees

### 13.16.010. Intent.

The intent of this chapter is to:

- (a) Ensure the preservation of the city's urban forest;
- (b) Regulate the maintenance, removal and planting of trees, shrubbery and plantings within the public rights-of-way.
- (c) Regulate the installation and maintenance of any structure, fencing, trees, shrubbery, planting or growth interfering with the safety and welfare of persons utilizing the public rights-of-way.
- (d) Encourage the protection of trees to provide shade, beauty, wind protection, air filtration, mitigation of noise, soil protection, habitat for birds and small animals, screening between buildings, camouflage of blighted areas and enhancement of property values.
- (e) Encourage and maintain the healthy growth of trees to make the city more attractive to visitors and potential new residents. (Ord. 2374-91 § 2 (part)).

### 13.16.020. New city trees.

Whenever new development occurs, a minimum of one tree per lot shall be installed. In existing developments, if it is determined to be feasible, city trees shall be installed. The number of trees and types of trees to be installed, their location and the method of installation shall be in accordance with standards approved by the city council. (Ord. 2374-91 § 2 (part)).

### 13.16.030. Definitions.

- (1) "City tree" means any woody plant which is growing within the public right-of-way along a city street and has a trunk four inches or more in diameter at four and one-half feet above normal ground level.
- (2) "Official city tree" means a species of tree designated by the superintendent and on the official tree list.
- (3) "Official tree list" means a list of species of trees designated as official city trees by the superintendent.
- (4) "Owner of the property" means the record owner or contract purchaser of any parcel of land fronting on any city street.
- (5) "Parkway strip" means the public area between the curbing and the sidewalk.
- (6) "Superintendent" means the superintendent of trees and landscaping, or any person designated by the superintendent to perform the duties set forth in this chapter.
- (7) "Tree easement" means the public area either between the curb and sidewalk (parkway strip), or between a monolithically constructed sidewalk and the property line along a city street right-of-way.

(8) “Unofficial city tree” means a tree planted or growing within the public right-of-way which is not on the official tree list, or has not been approved by the superintendent. (Ord. 2374-91 § 2 (part)).

### 13.16.040. Official tree list.

(a) The superintendent shall maintain and periodically review the official tree list, and may add to, delete from or otherwise modify the list. The official tree list shall be on file for public inspection at the office of the department of public works.

(b) No tree shall be planted in the public right-of-way or overhang any city street unless the tree is on the official tree list, unless a written permit from the superintendent has been obtained to plant a tree not on the list. (Ord. 2374-91 § 2 (part)).

### 13.16.050. Enforcing authority.

The superintendent or designated representative shall have the authority to regulate the maintenance, planting and removal of trees on streets and property within the public rights-of-way, and on other property under the ownership and control of the city (with the exception of parks and golf courses), to ensure safety or preserve aesthetics. (Ord. 2374-91 § 2 (part)).

### 13.16.060. Permits required.

(a) Planting. It is unlawful for any person to plant or set out any tree within the public right-of-way without first procuring a permit from the superintendent.

(b) Maintenance and Removal. It is unlawful for any person to trim, prune, spray, fertilize, remove, cut above ground, or otherwise disturb any city tree without first procuring a permit from the superintendent. The permit shall be issued when the superintendent determines that the required work is necessary and that the proposed method is in accordance with generally accepted arboricultural specifications and standards of practice.

(c) Construction. It is unlawful for any person to make any excavation, place any fill, compact the soil, or construct any structure, walkway, driveway, pavement or public utility within fifteen feet of any city tree without first obtaining a permit for such work from the superintendent and conducting such work in accordance with such permit. As a condition of issuing such permit, the superintendent shall require that the work be done in accordance with such generally accepted arboricultural specifications and standards of practice necessary to protect the vitality of the tree.

#### (d) Permits.

(1) Applications for permits must be made at least forty-eight hours in advance of the time the work is to be started.

(2) The application shall contain, but shall not be limited to, the following:

(A) The number of trees to be planted or set out, the location, grade, size, quality, species, cultivar or variety of each tree, the method of planting, and such other information as the superintendent may require;

(B) The number and kinds of trees to be sprayed, fertilized, trimmed/pruned, removed, relocated or otherwise preserved, the kind of treatment to be administered, the composition of the

spray or fertilizer material to be applied, and such other information as the superintendent may require;

(C) The written agreement of each applicant for a permit that the applicant will comply with the requirements, regulations and standards of this chapter;

(D) The time schedule for the proposed work; and

(E) Such other information as the superintendent deems necessary. (Ord. 2374-91 § 2 (part)).

### 13.16.070. Unofficial city trees.

(a) Planting. It is unlawful for any person to plant an unofficial city tree within the public right-of-way along a city street.

(b) Maintenance or Removal Permit. Unofficial city trees may be maintained or removed by property owners at their expense only upon obtaining a permit. (Ord. 2374-91 § 2 (part)).

### 13.16.080. Removal of damaged trees.

(a) Official or unofficial city trees shall be removed immediately by the city in the event such a tree is damaged or destroyed from any cause which in the opinion of the superintendent results in such a tree becoming an immediate threat to the safety of life or property.

(b) City trees shall be ordered removed when the superintendent finds such action necessary to prevent a hazard to public safety or to prevent the spread of disease or insects to public trees and places.

(1) The property owner who is notified of such order shall have the right within five days from the service of the order to file a written appeal with the director of public works.

(2) The director may revoke or modify the order if the director finds that the removal of the tree is not necessary to prevent a hazard to public safety or to prevent the spread of disease or insects to public trees and places.

(3) The total cost of the removal of city trees shall be borne by the city. An official city tree shall be planted, when practical, as a replacement in a location approved by the superintendent. The cost of the official city tree replacement shall be borne by the city.

(c) Unofficial city trees ordered removed shall be allowed to remain if each of the following conditions is complied with:

(1) The property owner obtains a permit to prune the tree above and below ground; the property owner provides the city a signed written statement satisfactory to the city indemnifying and holding harmless the city from any liability or loss from the continued maintenance of the tree.

(2) The total cost of removing the unofficial city trees, when it becomes necessary in the future, shall be paid by the property owner or successor in title, which obligation shall be evidenced by a written document satisfactory to the city and recorded in the office of the county recorder.

(d) The superintendent shall initiate a tree replacement program in those areas of the city in which city trees are required to be removed. (Ord. 2374-91 § 2 (part)).

13.16.090. Abuse or mutilation.

Unless specifically authorized by the superintendent, it is unlawful for any person to:

- (a) Intentionally damage, break, cut, carve, mutilate, kill, injure or destroy any city tree;
- (b) Transplant or remove any city tree;
- (c) Attach any rope, wire, nails, advertising posters, sign or other contrivance to any city tree;
- (d) Allow to come in contact with the roots, leaves, bark or any part of any city tree any gaseous liquid or solid substance harmful to such tree; or
- (e) Cause or permit any wire charged with electricity to come in contact with any city tree. (Ord. 2374-91 § 2 (part)).

13.16.100. Public nuisance.

The following are hereby declared public nuisances:

- (a) Any diseased, infested, dead or dying tree, shrub or other plant on private property so near to any city tree as to constitute a danger to such tree, or to any street or portion thereof.
- (b) Any tree, shrub or groundcover on any private property or within the tree easement of a type of species apt to destroy, impair or otherwise interfere with any approved city tree, street improvement, sidewalk, curb, gutter, sewer or other public improvement, including any main or service;
- (c) Any vines, climbing plants, trees or shrubs growing into or over any city trees or any public hydrant, pole or electrolier;
- (d) The existence of any tree on private property within the city limits that is infested, infected or in danger of becoming infested or infected with objectionable insects, scales, fungus or growth injurious to trees;
- (e) The existence of any branches or foliage on private property which interferes with the visibility on, or free use of, or access to, any portion of any street improved for vehicular, bicycle or pedestrian travel;
- (f) Any hedges or thorny plants of any kind on any tree easement or part thereof;
- (g) Any shrubs or plants more than twenty-four inches in height in the tree easement, or portion thereof, measured above top of curb grade;
- (h) Any tree, shrub or other plant on private property which dangerously obstructs the view in the triangular area described in Chapter 19.44, commonly known as the “visibility triangle.”
- (i) The construction or maintenance of any type of wall or fence around or within any tree easement or portion thereof;
- (j) The placing or maintenance within any tree easement, or portion thereof, of any solid landscaping, decorative materials or plants, including but not limited to large rocks, driftwood or

planters made of tile or concrete pipe sections, which protrude more than twenty-four inches above the level of curb and sidewalk and which are continuous with the length of the tree easement, or otherwise tend to block the free movement of pedestrians across the width of the parkway strip;

(k) The placing or maintenance of any type of ground cover or plant materials within three feet of the base of any tree planted in a tree easement;

(l) Any concrete, asphalt, tar paper or plastic membranes or other types of impervious materials placed in the tree easement in such close proximity to a city tree as to impede the movement of soil, air and water which are necessary to sustain tree growth and development. (Ord. 2721-03 § 7, 2003; Ord. 2374-91 § 2 (part)).

### 13.16.110. Abatement of public nuisance.

When any public nuisance as defined herein exists, it shall be subject to abatement as provided for in Chapter 9.26. (Ord. 2374-91 § 2 (part)).

### 13.16.120. Abatement costs debt to city.

The amount of the cost of abatement of a public nuisance, and any of the charges required to be paid by a property owner or any other person in this chapter, shall be deemed a debt due and owing to the city. The debt shall be collectible in the same manner as any other civil debt owing to the city. Such civil action shall not be a bar to any criminal action provided for by law. (Ord. 2374-91 § 2 (part)).

## **Chapter 19.37 Landscaping, irrigation, and usable open space.**

### [19.37.010. Purpose.](#)

The purpose of this chapter is to ensure that adequate landscaped areas and useable open space are provided where applicable for all zoning districts; to promote the conservation and efficient use of water and to prevent the waste of this valuable resource; and to promote water conservation as one component of sustainable building practices. This chapter shall be construed to assure consistency with the requirements of the Water Conservation in Landscaping Act of the California Government Code, or any successor statute, and any applicable implementing regulations, as they exist at the time of enactment or as later amended. In addition to compliance with the provisions in this chapter, projects shall comply with stormwater management requirements set forth in Chapter 12.60. (Ord. 2918-10 § 3).

### [19.37.020. Applicability.](#)

All provisions of this chapter shall apply to the following landscaping projects:

(a) Individual Single-Family or Duplex Residential Projects. New landscaping installations equal to or greater than one thousand square feet in connection with construction of a new dwelling unit.

(b) All Other Projects. New landscaping installations or landscaping rehabilitation projects equal to or greater than one thousand square feet.

(c) Exemptions. Landscaping and irrigation requirements shall not apply to:

(1) Projects that fall below the square footage thresholds stated in subsections (a) and (b);

(2) Individual single-family or duplex residential projects that are not in connection with construction of a new dwelling unit;

(3) Registered local, state or federal historical sites where landscaping establishes a historical landscaping style, as determined by the Heritage Preservation Commission, planning commission, or by any applicable public board or commission responsible for architectural review or historic preservation;

(4) Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system; or

(5) Community gardens, plant collections (as part of botanical gardens and arboreta open to the public), non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation), agricultural uses, commercial nurseries and sod farms. (Ord. 2918-10 § 3).

### 19.37.030. Definitions.

The following terms and definitions pertain to the water efficiency sections of this chapter:

(a) “Applied water” means the portion of water supplied by the irrigation system to the landscaped area.

(b) “Automatic irrigation controller” means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) “Certified professional” means a licensed landscape architect, a licensed landscape contractor, a licensed professional engineer, certified irrigation designer, or any other person authorized by the state to design a landscape or irrigation system, or a certified landscape irrigation auditor.

(d) “Conversion factor (0.62)” means the number that converts acre-inches per acre per year to gallons per square foot per year.

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

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(e) “Drip irrigation” means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(f) “Estimated total water use” (ETWU) means the total water used for the landscaped area as described in Section 19.37.050.

(g) “ET adjustment factor” (ETAF) means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscaped area. ETAF for a special landscaped area shall not exceed 1.0.

(h) “Evapotranspiration rate” means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(i) “Hardscape” means any durable material (pervious and non-pervious) in a landscaped area, such as decks, patios or pedestrian walkways, and other non-irrigated elements which may include art work, benches, and bicycle parking.

(j) “Hydrozone” means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

(k) “Irrigation audit” means an in depth evaluation of the performance of an irrigation system. An irrigation audit includes, but is not limited to: inspection, system tune up, system test with distribution uniformity or emission uniformity, correction of any overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

(l) “Irrigation efficiency” (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. Required irrigation efficiency is described in Section 19.37.110.

(m) “Low water use plant” means a plant species whose water needs are compatible with local climate and soil conditions. Species classified as “very low water use” and “low water use” by WUCOLS, having a regionally adjusted plant factor of 0.0 through 0.3, shall be considered low water use plants.

(n) “Maximum applied water allowance” (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 19.37.050.

(o) “Mulch” means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(p) “Native plant” means a plant indigenous to a specific area of consideration. For the purposes of these guidelines, the term shall refer to plants indigenous to the coastal ranges of central and northern California, and more specifically to such plants that are suited to the ecology of the present or historic natural community(ies) of the project’s vicinity.

(q) “No water using plant” means a plant species with water needs that are compatible with local climate and soil conditions such that regular supplemental irrigation is not required to sustain the plant after it has become established.

(r) “Plant factor” or “plant water use factor” is a factor, when multiplied by ETo (reference evapotranspiration), estimates the amount of water needed by plants. For purpose of calculation of the ETWU, use values from WUCOLS, or equivalent reference subject to approval by the director of community development.

(s) “Precipitation rate” means the rate of application of water measured in inches per hour.

(t) “Recreational area” means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.

(u) “Reference evapotranspiration” or “ETo” means a standard measurement of environmental parameters which affect the water use of plants. For purposes of calculation of the MAWA and ETWU, as described in Section 19.37.050, use current reference evapotranspiration data, such as from the California Irrigation Management Information System (CIMIS), or other equivalent data, or soil moisture sensor data.

(v) “Runoff” means water which is not absorbed by the soil or landscaping to which it is applied and flows from the landscaped area.

(w) “Soil moisture sensing device” or “soil moisture sensor” means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(x) “Special landscaped area” (SLA) means an area of the landscaping dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water, and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

(y) “Turf” means a ground cover surface of mowed grass.

(z) “Water feature” means a design element where open water performs an aesthetic or recreational function. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied).

(aa) “WUCOLS” means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000. (Ord. 2918-10 § 3).

### 19.37.040. Minimum landscaped area and useable open space.

(a) Minimum Landscaped Area. Table 19.37.040 describes the minimum landscaped area and useable open space required by zoning district. In addition to the minimum landscaped area, areas not used for buildings, parking lot areas, driveways or pedestrian walkways shall be landscaped unless the review authority determines that landscaping is not necessary to achieve the purposes of this chapter. For requirements specific to single family uses, see subsection (f).

(b) Landscaped Buffer Required. A landscaped buffer is required for any property with a nonresidential use in a residential zoning district that abuts a residential use. It is also required for properties of any use in a nonresidential zoning district which abuts a residential zoning district. See Section 19.37.080 for buffer landscaping design requirements.

(c) Landscaped Frontage Strip Required. A fifteen-foot wide landscaped frontage strip is required for all properties except those noted below in subsection (f). The frontage strip is measured from the inside edge of the public sidewalk, or if no sidewalk exists, from the curb. See Section 19.37.090 for frontage strip landscaping design requirements.

(d) Useable Open Space Required. Useable open space is required for all duplex and multifamily residential properties as described in Table 19.37.040. Useable open space areas that meet the definition of landscaping may contribute towards the minimum landscaped area of the site. See Section 19.37.100 for useable open space design requirements.

(e) Specific Plan, Precise Plan and Other Specialized Plan Areas. Minimum landscaped area and useable open space for properties within a specialized plan’s prescribed area are described in their individual plans.

(f) Allowances and Limitations for Single-Family Uses and Single-Family Zoning Districts.

(1) Allowances for Single-Family Zoning Districts. Yards are not required to be landscaped in single-family zoning districts; however other provisions in Title 19 may apply.

(2) Limitation on Paved Areas in the R-0 and R-1 Zoning Districts. Not more than fifty percent of the required front yard of any lot within an R-0 or R-1 zoning district shall be paved with asphalt, concrete cement, or any other impervious surface, except as may be required to meet off-street parking and access requirements of Chapter 19.46.

(3) Landscaped Frontage Strip for Single-Family Uses. A landscaped frontage strip is not required in any zoning district for single-family residential uses which have a frontage on a public street.



**Table 19.37.040**

**Minimum Landscaped Area and Useable Open Space by Zoning District**

<b>Zoning District</b>	<b>Useable Open Space</b>	<b>Other Landscaped Area</b>	<b>Parking Lot Landscaped Area</b>	<b>Total Landscaped Area</b>
R-0	N/A	N/A	N/A	N/A
R-1	N/A	N/A	N/A	N/A
R-1.5	N/A	N/A	N/A	N/A
R-1.7/PD	N/A	N/A	N/A	N/A
R-2	500 sq. ft./unit <sup>1</sup>	850 sq. ft./ unit	20% of the parking lot area	Total minimum landscaped area is the combination of the minimum parking lot landscaped area and other landscaped area. In no case shall this total be less than 20% of the lot area.
R-3	400 sq. ft./unit	425 sq. ft./unit		
R-4	380 sq. ft./unit	375 sq. ft./unit		
R-5	380 sq. ft./unit	375 sq. ft./ unit		
C-1	N/A	12.5% of floor area		
C-2	N/A	12.5% of floor area		
C-3	N/A	12.5% of floor area		
C-4	N/A	12.5% of floor area		
O	N/A	10% of lot area		
P-F	N/A	10% of lot area		
M-S	N/A	10% of floor area		
M-3	N/A	10% of floor area		

<sup>1</sup> One thousand square feet of useable open space is required for a property with an accessory living unit.

(Ord. 2918-10 § 3).

[19.37.050. Water efficiency design requirements.](#)

Water Efficiency in Design. Landscaped areas shall be designed to achieve water efficiency. Landscaping design and plant selection may be based on one of two options. Regardless of which option is selected, all other criteria described in this chapter shall apply. The options include:

(a) Option 1—Turf Limitation and Minimum Area with Water Conserving Plants. Turf area shall not be more than twenty-five percent of the landscaped area, and native, low water use or no water use plants shall be installed in at least eighty percent of all non-turf landscaped areas.

(b) Option 2—Water Budget Calculations. If the turf limitation option is not selected, a water budget calculation shall be prepared and shall adhere to the following requirements:

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

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(1) The plant factor shall be obtained from WUCOLS or an equivalent reference subject to approval by the director of community development. For areas that mix plants with different water uses, the plant factor calculation is based on the proportion of the respective plant factors, or based on the plant factor of the higher water using plant. The plant factor ranges from 0.0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.

(2) All water features shall be included in the high water use hydrozone.

(3) All special landscaped areas (SLA) shall be identified and their water use included in the water budget calculations.

(4) The reference evapotranspiration adjustment factor (ETAF) for SLAs shall not exceed 1.0. The ETAF for all other landscaped areas shall not exceed 0.7.

(5) Maximum applied water allowance (MAWA) shall be calculated using the following equation:

$$MAWA = (ETo) (0.62) [(0.7 \times LA) + (0.3 \times SLA)]$$

Where:

MAWA = Maximum applied water allowance (gallons per year)

ETo = Reference evapotranspiration (inches per year)

0.62 = Conversion factor (to gallons)

0.7 = Reference evapotranspiration adjustment factor (ETAF)

LA = Planted landscaped area including SLA and not including hardscapes (square feet)

0.3 = Additional water allowance for SLA

SLA = Special landscaped area (square feet)

(6) Estimated total water use (ETWU) will be calculated using the equation below. The sum of the ETWU calculated for all hydrozones shall not exceed the MAWA.

$$ETWU = (ETo)(0.62) \left( \frac{PF \times HA}{IE} + SLA \right)$$

Where:

ETWU = Estimated total water use per year (gallons)

ETo = Reference evapotranspiration (inches)

PF = Plant factor from WUCOLS

HA = Hydrozone area [high, medium, and low water use areas] (square feet)

SLA = Special landscaped area (square feet)

0.62 = Conversion factor

IE = Irrigation efficiency (minimum 0.70)

(Ord. 2918-10 § 3).

### 19.37.060. General planting, soil management and water feature design requirements.

(a) Plant Material. In addition to the requirements below, plant selection and installation shall be done in accordance with accepted horticultural industry practices.

(1) Variety. Landscaping shall include trees, shrubs, vines, flowers, ground covers or a combination thereof.

(2) Size at Time of Planting. Plant materials shall be sized and spaced to achieve immediate effect, in accordance with horticultural industry practices and at the discretion of the director of community development. Trees shall be of minimum fifteen gallon size. Twenty-four or thirty-six inch box trees may be required at the discretion of the director of community development.

(3) Number of Trees. There shall be one tree per one thousand square feet of required landscaped area in addition to required street trees and parking lot trees.

(4) Turf. All turf areas shall be planted with tall fescue or similar turf requiring less water. Turf shall not be planted on slopes greater than ten percent where the toe of the slope is adjacent to an impermeable hardscape.

(b) Grouping of Plants. Plants with similar water needs shall be grouped (also described as a hydrozone). Areas that mix plants with different water uses may be allowed if a water budget is performed.

(c) Soil Management.

(1) Mulch. A minimum two-inch layer of mulch shall be applied on all non-turf soil areas.

(2) Soil Amendments. Soil amendments, such as compost, shall be incorporated according to the soil conditions at the project site and based on what is appropriate for selected plans.

(3) Grading. If the project includes grading, the grading shall be designed to minimize soil erosion, runoff and water waste. The grading shall avoid soil compaction in planted landscaped areas.

(d) Water Features. Recirculating water systems shall be used for water features. Where available, recycled water shall be used for water features. (Ord. 2918-10 § 3).

### [19.37.070. Parking lot landscaping design requirements.](#)

(a) Parking Lot Shading. Trees shall be planted and maintained throughout the lot to ensure that at least fifty percent of the parking area will be shaded within fifteen years after the establishment of the lot.

(1) Solar Energy Systems as Shading. Up to twenty-five percent of the fifty percent parking lot shading requirement (twelve and one-half percent of the total parking lot area) may be met with installation of solar energy systems rather than trees.

(2) Calculation of Shading. Shading shall be calculated by using the diameter of the tree crown at fifteen years or the dimensions of any roofed area supporting the solar energy system within the parking lot area.

(3) Surfaces Subject to Shading Calculation. All surfacing on which a vehicle can drive is subject to shade calculation, including all parking stalls, vehicular drives within the property regardless of length, drive-through lanes, and all maneuvering areas regardless of depth. The following surface areas are exempt from shading requirements: truck loading areas in front of overhead doors, truck maneuvering and parking areas unconnected to and exclusive of any vehicle parking, surfaced areas not to be used for vehicle parking, driving or maneuvering, provided they are made inaccessible to vehicles by a barrier such as bollards or fencing, display, sales, service, or vehicular storage areas for automobile dealerships (required parking for auto dealerships is still subject to shading requirements), or surfaced areas existing prior to January 1, 2002.

(b) Ground Cover and Shrubs on Parking Islands. Parking islands shall contain living ground cover or shrubs with the trees, unless it can be shown that ground cover is incompatible with the tree. Where living ground cover is unsuitable, the director of community development may allow porous, nonliving ground cover such as pebbles or tanbark.

(c) Drainage Design. Landscaping islands and parking islands shall be designed to integrate parking lot and site drainage in order to reduce storm water runoff velocities and minimize non-point source pollution. When six-inch concrete curbs are installed, they shall have drainage “weep holes.”

(d) Wheel Stops. Concrete wheel stops shall be installed when landscaped areas are not adequately protected. (Ord. 2918-10 § 3).

### 19.37.080. Buffer landscaping design requirements.

The following is a list of design requirements for buffer landscaping.

(a) Width. The buffer shall maintain a width of at least ten feet.

(b) Landscaping. The buffer shall include a planted screen of approved trees and shrubs which shall be placed along the length of the buffer at intervals not to exceed twenty feet, provided, however, that the director of community development may grant exceptions through a miscellaneous plan permit when warranted by conditions on the property.

(c) Wall Design. The buffer shall include a decorative masonry wall six feet in height measured from the highest adjoining grade. When the adjacent nonresidential building is two stories or more in height, the decorative masonry wall shall be eight feet measured from the highest adjoining grade. Where a residential use is permitted in a nonresidential zoning district, the wall shall be required on the residential property, unless a wall already exists.

(d) Specific Plan, Precise Plan and other specialized plan areas. Properties within a specialized plan’s prescribed area may be subject to additional buffer landscaping design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

### 19.37.090. Frontage strip landscaping design requirements.

(a) Width. The frontage strip shall be fifteen feet wide along the entire street frontage measured from the inside edge of the public sidewalk, or if no sidewalk exists, from the curb.

(b) Landscaping Allowances. Frontage strip landscaping may be crossed by walkways and access drives.

(c) Specific Plan, Precise Plan and Other Specialized Plan Areas. Properties within a specialized plan’s prescribed area may vary from these frontage strip design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

### 19.37.100. Useable open space design requirements.

(a) Function. Useable open space must be designed to be accessible to, and useable for outdoor living, recreation or utility use.

(b) Location. Useable open space may not be located in any required front yard area.

(c) Minimum Useable Open Space Dimensions and Area. Each useable open space area shall have at least a twelve foot dimension in any direction and a minimum area of two hundred square feet except for:

(1) Private balconies must have a minimum of seven feet in any direction and a minimum area of eighty square feet.

(2) Roofs, decks or porches must have a minimum of ten feet in any direction and a total of one hundred twenty square feet.

(d) Private Useable Open Space Required. In the R-4 and R-5 zoning districts, a minimum of eighty square feet per unit shall be designed as private useable open space.

(e) Specific Plan, Precise Plan and Other Specialized Plan Areas. Properties within a specialized plan's prescribed area may vary from these useable open space design requirements, as described in their individual plans. (Ord. 2918-10 § 3).

### [19.37.110. Irrigation system design requirements.](#)

(a) Irrigation System Required. All landscaped areas shall have a permanent irrigation system, except for single-family detached and duplex dwellings.

(b) Irrigation Efficiency. Irrigation systems shall be designed and maintained to meet or exceed an average landscaping irrigation efficiency of seventy percent.

(c) Water Waste Prohibited. Water waste resulting from an inefficient irrigation system leading to runoff, low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas such as walkways, roadways or structures is prohibited.

(d) Hydrozone Irrigation. Systems shall be designed to meet the individual needs of each plant group. Valves and control circuits shall be separated based on the required rate and quantity of water used.

(1) Valves. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions and plant materials with similar water use. Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.

(2) Sprinkler Heads. Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone. Sprinkler heads must have matched precipitation rates within each circuit.

(e) Low Volume Irrigation. Bubbler or drip-type irrigation, or other low-flow, non-spray technology shall be provided for:

(1) Trees and shrubs.

(2) Mulched areas.

(3) Areas with slope greater than ten percent, unless it can be demonstrated that no runoff or erosion will occur if other types of irrigation is used.

(4) Areas that are less than eight feet wide in any direction.

(f) Overhead Sprinkler Irrigation. Overhead irrigation systems may be used for clustered shrub plantings. Areas within two feet of a non-permeable surface may not be irrigated using overhead sprinkler irrigation unless it can be demonstrated that no runoff would occur, or the adjacent non-permeable surface is designed and constructed to drain entirely to landscaping.

(g) Irrigation Controllers and Sensors. All irrigation controllers must utilize either evapotranspiration or soil moisture sensor data and be capable of dual or multiple programming. Irrigation systems shall also incorporate sensors (rain, freeze, wind, etc.) that suspend or alter irrigation operation during unfavorable weather conditions.

(h) Screening of Devices. Irrigation controllers and backflow devices shall be screened from public view.

(i) Scheduling. Irrigation must be scheduled between eight p.m. and ten a.m. (Ord. 2918-10 § 3).

### [19.37.120. Landscaping and irrigation approval.](#)

(a) Permit Required. Except as otherwise provided in this chapter, no person shall install or modify any landscaped area described in Section 19.37.020 without first obtaining a miscellaneous plan permit for each such action, in accordance with the procedure described in Chapter 19.82.

(b) Landscaping and Irrigation Plans Required. Landscaping and irrigation plans shall be required for any modification or installation of new landscaping that falls within the thresholds stated in this chapter. The plans shall meet the information requirements determined by the director of community development to comply with the provisions of this chapter.

(1) Preparation by Certified Professional. Landscaping and irrigation plans shall be prepared by, and bear the signature of, a certified professional, except for new landscaping installations or landscaping rehabilitation projects with less than two thousand five hundred square feet of landscaped area. (Ord. 2918-10 § 3).

### 19.37.130. Landscaping irrigation audit and maintenance.

(a) Irrigation Audit Required. Prior to approval of occupancy by a building official, a landscaping irrigation audit shall be conducted and an irrigation audit report shall be submitted for projects with landscaping and irrigation plans approved after June 10, 2010.

(1) Audit by Certified Professional. The landscaping irrigation audit shall be conducted and the report shall be prepared by a certified professional, except for new landscaping installations or landscaping rehabilitation projects with less than two thousand five hundred square feet of landscaped area.

(2) Audit Report Content. The irrigation audit report shall include, but not be limited to: inspection, system tune-up, system test with distribution uniformity, correction of any overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

(b) Submittal of Landscaping Maintenance Schedule. Prior to the final inspection by the building official, a regular maintenance schedule shall be submitted to the director of community development for review and approval. The maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscaped areas; and removing obstructions to irrigation spray heads or other emission devices. Landscaping shall be maintained in accordance with the approved maintenance schedule.

(c) General Maintenance. Landscaping shall be maintained in compliance with the approved landscaping plan, and shall be maintained in a neat, clean and healthful condition. Removed landscaping shall be replaced with specimen plants to match the approved landscaping plan. (Ord. 2918-10 § 3).

## **Chapter 19.94. TREE PRESERVATION**

### 19.94.010. Findings.

The city council finds that:

(a) The city of Sunnyvale has a great diversity of trees that are of economic value to the city and make it a desirable place for residents, business owners and visitors;

(b) The appearance of Sunnyvale contributes to the economic prosperity of the city;

(c) Trees contribute to the scenic beauty of Sunnyvale;

(d) Trees help to naturally control flooding and erosion, moderate noise pollution, climate, dust and other airborne pollutants, remove carbon dioxide from the atmosphere and produce oxygen, and shelter and feed birds and other wildlife;

(e) The development and redevelopment of the city often necessitates the removal of trees, thereby contributing to their depletion; and

(f) It is necessary to protect and manage these valuable assets and their habitat to protect the health, safety and welfare of the citizens of Sunnyvale. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.010).

### 19.94.020. Purpose.

The purpose of this chapter is to regulate the protection, installation, removal and long term management of significantly sized trees on private property within the city and city owned golf courses and parks; encourage the proper protection and maintenance of significantly sized trees which are located on such property; establish a review and permit procedure to assure the correct planting, maintenance, protection and removal of significant trees on such property; and establish penalties for violation of its provisions. This chapter is not intended to regulate trees on public rights-of-way, which are regulated pursuant to Chapter 13.16. The provisions of this chapter identify and prescribe specific procedures and requirements for the filing, processing and consideration of the removal and preservation of trees. These provisions shall be used in conjunction with the general requirements and procedures identified in Chapter 19.98 including requirements and procedures for applications, fees, notification, appeals, conditions of approval, modifications, expiration, extensions, revocation and infractions, as applicable. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.020).

### 19.94.030. Definitions.

For the purpose of this chapter the following definitions apply:

(1) “Damage” means any intentional action or gross negligence which causes injury, death or disfigurement of a tree. Actions include, but are not limited to, cutting, girdling, poisoning, overwatering, unauthorized relocation or transportation of a tree or trenching, excavating, altering the grade or paving within the dripline of a tree.

(2) “Dripline” means the outermost line of the tree’s canopy projected straight down to the ground surface. As depicted in a plan view, the dripline appears as an irregularly shaped circle.

(3) “Protected tree” means a tree of significant size.

(4) “Significant size” means a tree thirty-eight inches or greater in circumference measured four and one-half feet above ground for single-trunk trees. For multi-trunk trees “significant size” means a tree which has at least one trunk with a circumference thirty-eight inches or greater measured four and one-half feet above ground level, or in which the measurements of the circumferences of each of the multi-trunks, when measured four and one-half feet above the ground level, added together equal an overall circumference one hundred thirteen inches or greater.

(5) “Tree” means any woody plant which has a trunk thirteen inches or more in circumference at four and one-half feet above ground level.

(6) “Tree removal” means the physical removal of a tree or causing the death of a tree through damaging, poisoning, or other direct or indirect action, including excessive trimming, pruning, or mutilation that sacrifices the health, destroys, or diminishes the aesthetic quality, or diminishes the life expectancy of the tree. (Ord. 2808-06 § 2: Ord. 2623-99 § 1 (part): prior zoning code § 19.81.030 (part)).

\* Editor’s Note: The definitions in Section 19.94.030 also appear in Ch. 19.12.

19.94.040. Actions prohibited.

(a) It is unlawful to damage or kill any protected tree.

(b) It is unlawful to remove any protected tree from private property in any zoning district or from any city owned golf course or park, without a protected tree removal permit. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.040).

19.94.050. Permits required.

(a) In order to remove any protected tree from private property in any zoning district, or from any city owned golf course or park, it is necessary to obtain a protected tree removal permit from the department of community development. Any tree which has been designated as a heritage landmark, pursuant to the provisions of Chapter 19.96, shall not be removed without obtaining a tree removal permit in addition to a landmark alteration permit in accord with Chapter 19.96.

(b) Tree removal permits shall be filed at least ten working days prior to the proposed date of tree removal.

(c) Removal of orchard trees as part of farming operations or upon order of the county agricultural inspector are exempt from the provisions of this chapter. (Ord. 2808-06 § 3: Ord. 2623-99 § 1 (part): prior zoning code §§ 19.81.050, 19.81.080 (a)).

19.94.060. Standards and criteria.

One or more of the following standards must be met before a protected tree removal permit may be approved:

(a) The tree is diseased or damaged;

(b) The tree represents a potential hazard to people, structures or other trees;

(c) The tree is in basically sound condition, but restricts the owner’s ability to enjoy the reasonable use or economic potential of the property, or unreasonably restricts an adjoining property owner’s use or economic potential of the adjoining property. In the event this is the sole basis for the application, the following criteria shall be used to evaluate the application under this subsection:

(1) The necessity of the requested removal to allow construction of improvements such as additions to existing buildings or incidental site amenities or to otherwise allow economic or reasonable enjoyment of property;

(2) The topography of the land and the effect of the requested action on water retention and diversion or increased flow of surface water;

(3) The approximate age of the tree relative to its average life span;

(4) The potential effect of removal on soil erosion and stability where the tree is located;

(5) Current and future visual screening potential;

(6) The property has become over landscaped with trees so that they are too numerous, crowded, and unreasonably restricts the property owner's ability to use their land. In this event, selective removal can be approved in conjunction with acceptable arborist's practices;

(7) The tree has outgrown its useful landscape value due to its inappropriate species, size and location, relative to the existing structures on the property;

(8) Any other information the director of community development finds pertinent to the application. (Ord. 2808-06 § 4; Ord. 2623-99 § 1 (part); prior zoning code § 19.81.060).

19.94.070. Display of permit.

All permits issued for tree removal shall be so displayed as to be clearly visible from a public right-of-way. (Ord. 2623-99 § 1 (part); prior zoning code § 19.81.070).

19.94.080. Replacement trees.

(a) At the discretion of the director of community development, replacement trees may be required as a condition of issuance of a protected tree removal permit, or as a condition of any discretionary permit for development or redevelopment. The need for replacement trees shall be evaluated based on the following criteria:

(1) The number, species, size and location of existing trees on the site; and

(2) Good forestry practices such as, but not limited to, the number of healthy trees a given parcel of land will support.

(b) At the discretion of the director of community development, other mitigation measures may be required, where either it is not feasible to plant any replacement trees on the site, or where the replacement trees to be planted are deemed inadequate by the director to sufficiently mitigate the effects of the removal of the tree(s). Mitigation measures could include, but would not be limited to, paying for the planting of additional trees in parks or other public areas of the city. (Ord. 2623-99 § 1 (part); prior zoning code § 19.81.090).

19.94.090. Requirements for replanting programs.

The following items shall be included in replanting programs when protected trees must be removed:

(a) Minimum distances between trees and between trees and buildings shall be provided such that the health of the replacement trees shall be ensured;

(b) Replanting shall occur within a specified time period;

(c) Mixed species shall be used in large replantings whenever possible to reduce the likelihood of disease and infestations;

(d) Tree care procedures shall be included in all replanting plans and shall include, but not be limited to, the following items: mulching; straightening; new staking or restaking; fertilizing; and any other procedures deemed necessary by the city;

(e) Minimum size for the replacement of a protected tree shall be a California Association of Nurserymen's standard twenty-four inch box size tree. The director of community development shall have the authority to require larger or smaller replacement trees upon review of specific cases. Smaller trees may be approved if the applicant can document the long term advantages of using the smaller tree size. (Ord. 2623-99 § 1 (part); prior zoning code § 19.81.100).

### 19.94.100. Relocation of trees.

At the discretion of the director of community development, the tree(s) to be removed may be required to be relocated on or off the subject site. The need for relocation shall be evaluated based on the criteria found in Section 19.94.080 plus the ease with which the removed tree can be replanted. (Ord. 2623-99 § 1 (part); prior zoning code § 19.81.110).

### 19.94.110. Requirements concerning protected trees during site development or modification.

When site development or modification is occurring and a discretionary permit and a public hearing are required, the developer or owner shall meet the following requirements:

(a) Tree Survey. A tree survey conducted by an arborist who has been certified by the International Society of Arboriculture shall be submitted as part of the required application materials for all use, design or special development permits on developing or redeveloping property. The survey shall show the location, size, and species (both common and Latin names required) of all trees (protected and unprotected) on the site, and shall include a calculation of the value of each tree. A written letter shall be included when a protected tree(s) is proposed to be removed explaining why the tree(s) cannot be relocated or the design of the structures altered to maintain the trees.

#### (b) Plan Modifications.

(1) The approving body shall have the ability to require the reasonable alteration of a proposed building in order to retain protected trees.

(2) The approving body shall have the ability to require relocation (on or off site) of protected trees which the applicant proposes to remove.

(c) Replanting Plans. When protected trees must be removed, replanting plans shall be submitted as part of the landscaping plan for the proposed project. The replanting plan shall be subject to the requirements of Section 19.94.090, but actual number and sizes of replacement trees shall be reviewed on a case by case basis.

(d) Tree Protection Plan. The developer shall submit a tree protection plan which shall demonstrate how tree protection shall be provided during and after construction and shall include, where appropriate, a description of any of the protective measures set forth in Section 19.94.120.

## Sunnyvale Urban Forest Management Plan 2014– Sunnyvale CA

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(e) Tree Bonds. The approving body shall have the authority to require a developer to post a bond with the City for the value of any tree required to remain as a condition of permit approval during development activities on a site.

(1) The bond may be for a maximum period of five years.

(2) The value of the tree shall be determined by the director of community development.

(3) The bond will be released back to the developer if the tree remains in good health through the end of the bond period.

(4) In the event the tree dies or begins to decline in poor health, the bond will be used by the City to replace the aesthetic value of the tree that was lost.

(f) Soil Mitigation. The approving body shall have the authority to require underground soil or planting measures, such as structural soils, in any location deemed appropriate for future or existing tree growth. (Ord. 2808-06 § 5; Ord. 2623-99 § 1 (part): prior zoning code § 19.81.120).  
19.94.120. Tree protection during construction.

Protected trees designated for preservation shall be protected during construction of a project by use of the following methods:

(a) Protective fencing shall be installed no closer to the trunk than the dripline, and far enough from the trunk to protect the integrity of the tree. The fence shall be a minimum of four feet in height and shall be set securely in place. The fence shall be of a sturdy but open material (i.e., chain link) to allow visibility to the trunk for inspections and safety.

(b) The existing grade level around a tree shall normally be maintained out to the dripline of the tree. Alternate grade levels, as described in the tree protection plan, may be approved by the director of community development.

(c) Drain wells shall be installed whenever impervious surfaces will be placed over the root system of a tree (the root system generally extends to the outermost edges of the branches).

(d) Pruning that is necessary to accommodate a project feature, such as a building, road or walkway shall be reviewed and approved by the department of community development and the department of public works.

(e) New landscaping installed within the dripline of an existing tree shall be designed to reproduce a similar environment to that which existed prior to construction. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.130).

19.94.130. Project review committee.

All tree surveys, replanting plans and tree protection plans submitted with discretionary permit applications made pursuant to Title 19, shall be reviewed at a project review committee meeting at which the applicant shall be present. Discretionary permits shall not be issued until such time as the tree survey, replanting plan and tree protection plans are deemed complete and have been approved by the director of community development. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.140).

19.94.140. On-site inspections.

Appropriate city staff shall be authorized to conduct on-site inspections during construction to ensure that tree preservation procedures are being followed and replanting plans implemented. Failure to abide by an approved plan or permit may result in a stop work order to be issued by the director of community development. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.150).

19.94.150. Emergency waivers and exemptions.

The provisions of this chapter are waived if compliance would hamper the rescue of life or property from immediate danger or the repair of utilities in the event of emergencies such as wind storms, ice storms or other natural disasters. (Ord. 2623-99 § 1 (part): prior zoning code § 19.81.160).

19.94.160. Penalties for violation.

(a) Any person, property owner, firm or corporation who intentionally or negligently violates any of the provisions of this chapter or any permit issued pursuant to it, or who fails to comply with any condition of any discretionary permit which relates to protected tree preservation, shall be liable for a civil penalty assessed and recovered in a civil action brought by the city attorney.

(1) In the event that the violation results in any substantial injury or damage to a protected tree, the civil penalty shall be not less than five thousand dollars nor more than twenty-five thousand dollars. In the event that the violation results in the destruction or improper removal of a protected tree, the civil penalty shall be not less than ten thousand dollars nor more than fifty thousand dollars. The appropriate penalty shall apply separately to each tree affected by the improper action.

(2) In any civil action brought to seek such civil penalties, and/or to obtain injunctive relief for violation of any provision of this chapter, in which the city prevails, the court shall determine and impose reasonable expenses, including attorneys' fees incurred by the city in the investigation and prosecution of the action.

(b) The director of community development or his designee shall have the authority to require an administrative hearing for any violations of the provisions of this chapter, including but not limited to, illegal tree removal.

(1) The administrative hearing shall be set for a date that is not less than fifteen calendar days and not more than thirty calendar days from the date the "Notice of Violation" is served in accordance with Section 1.08.100.

(2) The hearing officer may impose such fines, reasonable expenses and landscaping deemed necessary to replace the aesthetic value of the tree based on generally accepted arborist's practices.

(3) The hearing officer may consider any relevant evidence and the decision must be supported by the weight of the evidence. Strict rules of evidence shall not apply.

(4) The hearing officer shall issue a written decision within fifteen days of the hearing date. The hearing officer may continue the hearing and request additional information from city staff or the recipient of the "Notice of Violation" before issuing a written decision.

(5) If the hearing officer imposes a fine for a violation of this chapter and the fine has not been satisfied within ninety days or has not been appealed, then the obligation shall become a lien against the real property on which the obligation occurred.

(6) The failure of any recipient of a “Notice of Violation” to appear at the administrative hearing shall constitute a waiver of any objections to the imposition of a fine or other appropriate remedy imposed by the hearing officer and constitutes a failure to exhaust administrative remedies.

(7) The decision of the hearing officer may be appealed to the planning commission within fifteen days of the date of service of the written decision. The decision of the planning commission shall be final.

(c) The remedies provided for in this section are in addition to and do not supersede or limit any and all other remedies, civil or criminal. (Ord. 2808-06 § 6: Ord. 2623-99 § 1 (part): prior zoning code § 19.81.190).

### **Chapter 19.96. Heritage Preservation**

#### 19.96.010. Findings and purpose.

(a) The city council finds that the character and history of the city are reflected in its cultural, historical, and architectural heritage, that these historical and cultural foundations should be preserved as living parts of community life and development to build an understanding of the city’s past so that future generations may have a genuine opportunity to appreciate, enjoy, and understand the rich heritage of the city, that with ever increasing pressures of modernization and urbanization, city landmarks, neighborhoods, and other areas of historical and cultural interest are threatened with demolition, and that pursuant to the provisions of the National Historic Preservation Act of 1966, as amended, the city of Sunnyvale joins with private concerns, the state of California, and the United States Congress to develop preservation programs and activities to give maximum encouragement to agencies and individuals undertaking preservation of the city’s unique architectural, historical, aesthetic, and cultural heritage. The provisions of this chapter identify and prescribe specific procedures and requirements for the filing, processing and consideration by the heritage preservation commission. These provisions shall be used in conjunction with the general requirements and procedures identified in Chapter 19.98 including requirements and procedures for applications, fees, notification, appeals, conditions of approval, modifications, expiration, extensions, revocation and infractions.

(b) The purpose of this chapter is to promote the public health, safety, and general welfare, and

(1) To safeguard the city’s unique cultural heritage as embodied and reflected in the city’s architectural history and patterns of cultural development;

(2) To encourage and facilitate public knowledge, understanding, and appreciation of the city’s historic past and unique sense of place and to encourage public participation in identifying heritage resources;

(3) To promote the enjoyment, celebration, and use of heritage resources appropriate for the educational, cultural, recreational as well as material needs of people;

(4) To preserve diverse architectural styles, patterns of development, and design preferences reflecting phases of the city’s history and to encourage complementary contemporary design and construction and inspire a more livable urban environment;

(5) To enhance property values and to increase economic and financial benefits to the city and its inhabitants through incentives for preservation;

(6) To protect and enhance the city’s attraction to tourists and visitors thereby stimulating business and industry;

(7) To identify as early as possible and resolve conflicts between the preservation of heritage resources and alternative land uses by integrating the preservation of heritage resources into the comprehensive planning, management and development processes for both public and private property;

(8) To conserve valuable material and energy resources by ongoing use and maintenance of the existing built environment;

(9) To stabilize neighborhoods through the preservation of heritage resources and establishment of heritage resource districts; and

(10) To develop and maintain appropriate settings and environments for heritage resources. (Ord. 2623-99 § 1 (part); prior zoning code § 19.80.005).

19.96.040. Definitions.

For the purpose of this chapter, the following definitions apply:

(a) “Alteration” means any exterior change or modification to an improvement or site which affects the exterior architectural features of property.

(b) “Designated heritage resource” means a heritage resource which has specific elements which are expressly found to meet one or more of the Criteria of the National Register of Historic Places as established by the Secretary of the Interior and incorporated by reference into this code and which has been designated and determined to be appropriate for preservation by the city council, and has been recognized by the state or the nation to be historically significant.

(c) “Designated heritage resource district” means a heritage resources district which has specific elements which are expressly found to meet one or more of the Criteria of the National Register of Historic Places as established by the Secretary of the Interior and incorporated by reference into this code and which has been designated and determined to be appropriate for preservation by the city council, and has been recognized by the state or the nation to be historically significant.

(d) “Exterior architectural feature” means the architectural elements embodying style, design, general arrangement and components of all of the outer surfaces of an improvement. This includes such visual characteristics as paint, color, surface texture, grading, surface paving, materials, accessory structures, trees and other natural features, and exterior objects such as signs, plaques, light fixtures, street furniture, walls, fences, steps, plantings and landscape accessories.

(e) “Heritage housing combining district” means a heritage resource district consisting of residential properties which has been zoned as a heritage housing combining district for the purposes of preserving, protecting, enhancing and perpetuating the appearance of the district which contributes to the cultural or aesthetic heritage of the city.

(f) “Heritage resource” means improvements, buildings, portions of buildings, structures, signs, features, sites, scenic areas, views and vistas, places, areas, landscapes, trees, or other natural objects or objects of scientific, aesthetic, educational, political, social, cultural, architectural, or historical significance to the citizens of the city, the Santa Clara Valley region, the state, or the nation, which are designated and determined to be appropriate for preservation by the city council.

(g) “Heritage resource district” means any geographically definable area containing a concentration or continuity of heritage resources which are thematically related, or which contribute to each other and are unified by a special character, historical interest, aesthetic value, or which represents one or more architectural periods or styles typical to the city, and that has been designated and determined to be appropriate for preservation by the city council, pursuant to provisions of this chapter.

(h) “Improvement” means any building, structure, place, parking facility, fence, gate, wall, work of art, or other object constituting a physical betterment of real property, or any part of such betterment.

(i) “Local landmark” means a heritage resource which is significant in that the resource materially benefits the historical character of a neighborhood or area, or the resource in its location represents an established and familiar visual feature of the community or city, and has been designated and determined to be appropriate for preservation by the city council.

(j) “Local landmark district” means a heritage resources district which demonstrates a higher collective integrity of location, design, setting, materials, workmanship, feeling, and association which is essential to the sustained value of the separate individual resources and which has been designated and determined to be appropriate for preservation by the city council. A local landmark district possesses a significant concentration or continuity of heritage resources unified by past events, or aesthetically by plan or physical development; or the collective value of the local landmark district as a whole may be greater than the value of each individual heritage resource within it.

(k) “Local register of heritage resources” means a list of heritage resources officially designated or recognized by the city.

(l) “Preservation” means the identification, protection, conservation, enhancement, perpetuation or rehabilitation of any heritage resource that prevents the deterioration, alteration, destruction or removal of such resource. (Ord. 2780-05 § 1 (part); Ord. 2623-99 § 1 (part); prior zoning code § 19.80.050 (part)).

19.96.050. Criteria for evaluation and nomination of heritage resources.

Any improvement, building, portion of buildings, structures, signs, features, sites, scenic areas, views, vistas, places, areas, landscapes, trees, or other natural objects or objects of scientific,

aesthetic, educational, political, social, cultural, architectural, or historical significance can be designated a heritage resource by the city council and any area within the city may be designated a heritage resource district by the city council pursuant to provisions of this chapter if it meets the Criteria of the National Register of Historic Places, or one or more of the following:

- (a) It exemplifies or reflects special elements of the city’s cultural, social, economic, political, aesthetic engineering, architectural, or natural history;
- (b) It is identified with persons or events significant in local, state, or national history;
- (c) It embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship;
- (d) It is representative of the work of a notable builder, designer, or architect;
- (e) It contributes to the significance of an historic area, being a geographically definable area possessing a concentration of historic or scenic properties or thematically related grouping of properties which contribute to each other and are unified aesthetically or by plan or physical development;
- (f) It has a unique location or singular physical characteristic or is a view or vista representing an established and familiar visual feature of a neighborhood, community, or the city of Sunnyvale;
- (g) It embodies elements of architectural design, detail, materials, or craftsmanship that represents a significant structural or architectural achievement or innovation;
- (h) It is similar to other distinctive properties, sites, areas, or objects based on a historic, cultural, or architectural motif;
- (i) It reflects significant geographical patterns, including those associated with different eras of settlement and growth, particular transportation modes, or distinctive examples of park or community planning;
- (j) It is one of the few remaining examples in the city, region, state, or nation possessing distinguishing characteristics of an architectural or historic type or specimen;
- (k) With respect to a local landmark, it is significant in that the resource materially benefits the historical character of a neighborhood or area, or the resource in its location represents an established and familiar visual feature of the community or city.
- (l) With respect to a local landmark district, a collective high integrity of the district is essential to the sustained value of the separate individual resources;
- (m) With respect to a designated landmark and designated landmark district, the heritage resource shall meet Criteria of the National Register of Historical Places, which are incorporated by reference into this chapter. (Ord. 2623-99 §1 (part): prior zoning code §19.80.060).

### **Recent code changes related to trees**

On April 4, 2006, the City Council adopted new regulations related to tree preservation. The changes affect three Title 19 sections including, Tree Preservation, Solar Access, and General

Procedures. The bullet below summarizes the change that has been made to the City's Zoning Code. These changes took effect on May 9, 2006

- Two New Required Findings:
  1. A property has sufficient landscaping or is over landscaped;
  2. Allow removal of overgrown, but healthy, trees.
- New Penalty Process for Illegal Tree Removals:
  1. New administrative procedure that creates an administrative penalty process rather than the existing civil process.
- Tree Removal Permit (TRP) Appeals:
  1. Clarifies that only applicants can appeal a TRP decision.
- New Conditions of Approval for Development of Property:
  1. Can require a bond for protecting trees during construction;
  2. Can require underground mitigation measures for new trees.
- Solar Access Clarification:
  1. Solar access rights clarified for protection of significant sized trees.
- Additional Ordinance Clarification Issues:
  1. Adds the definition of “tree removal” to code;
  2. Increases tree measurement location to 4½ feet above ground;
  3. TRP permit now valid for only one year;
  4. Requires Latin names to be used in tree surveys;
  5. Changes TRP timeline to at least 10 days.