



Tree Preservation Standards

Purpose

Tree Preservation Standards shall be utilized for the protection of trees located on public property including street right of ways, public easements; or on private property where trees have been designated City of Napa Significant Trees; as required by the City of Napa Parks & Recreation Services Department where said trees may be subjected to construction impacts or activity on either public or private land. Construction activity shall include but is not limited to: grading, trenching, excavating, and operation of construction equipment or vehicles in the vicinity of the public or Significant Tree which has the potential to harm or affect the health or vigor of the tree.

Construction Inspection and Supervision

1. All arboricultural and related soil work shall be performed under the supervision of International Society of Arboriculture (ISA) Certified Arborist (Project Arborist) or the City Engineer or designated representative.
2. All specified arboricultural work shall be completed prior to site grading (hand trenching, pruning, fencing, etc.)

Protection Within Dripline of Individual Trees

1. Prior to initiating any construction activity in the area, including demolition or grading, temporary protective fencing shall be installed at each site tree in the immediate vicinity of construction. Fencing is to be located a minimum of one foot beyond the canopy dripline. If available space and logistics follow, fence shall be placed at a greater distance or up to twice the diameter of the dripline.
2. Fencing shall be minimum 5' height at all locations, and shall form a continuous barrier without entry points around all individual trees, or groups of trees. Barrier type fencing such as chain link or Tensar plastic fencing is suggested, but any fencing system which adequately prevents the entry of equipment and activity will be acceptable. The use of simple post and cable fencing is not permitted as this provides minimal protection and is easily removed or moved by construction personnel. Fencing shall be installed in a professional manner with adequate uprights and appropriate attachments. Concrete footings are not required due to the temporary nature of the fencing. Any encroachment into the dripline for fencing or construction purposed requires the permission of the City inspector.
3. This fencing shall serve as a barrier to prevent dripline encroachment of any type by construction activities, equipment, materials storage, and personnel.

4. Contractors and subcontractors shall direct all equipment and personnel to remain outside the fenced area at all times until project is complete, and shall instruct personnel and subcontractors as to the purpose and importance of fencing and preservation.
5. Fencing shall remain in place and not be removed until all construction activities are completed. This shall include grading and compaction activities, installation of underground construction activities, and any other construction or activity, which may be scheduled prior to landscapes installation. There may be occasion when access is required, and fencing may temporarily be moved to facilitate the work.
6. Roots of single standing trees often extend two to three times the distance of the actual dripline and function primarily in the uptake of nutrients and water. The dripline is arbitrarily established as the minimum root area generally required to preserve tree health. As much area around the circumference of tree beyond the dripline should have minimum intrusion to further ensure tree survival and health.

Grade Changes

1. Grade changes within a tree dripline are to be minimized wherever possible. Grade should not change from that which existed prior to grading activities without approval from the project arborist.
2. Maximum cut or fill within actual or estimated dripline not to exceed 6 inches. All cut activities should be done in conjunction with the project arborist, even those under 6", to minimize root damage.
3. Estimated dripline is defined as the widest distance from main trunk to furthest branch tip applied around the entire circumference of each individual tree. This definition specifically applies to all trees where a one-sided or unbalanced structure exists and the actual dripline is not truly representative of the area of the root zone requiring protection. Cut and fill activities apply to this definition.
4. No more than 6' of fill soil shall occur without specifically developed mitigation measures. Removal of soil within tree dripline is also limited to 6 inches, or a lesser amount which can be removed without contacting major roots. Detailed mitigation is required to remove a greater amount. The amount of cut and fill is to be determined by actual tree species, rooting characteristics, soil conditions, and purpose of grade change.
5. All cut and fill activities within tree dripline increases percentage of short and long term tree decline and loss, and approval of these activities, or compromise in this area, shall be done with full knowledge of the negative potential that is incurred.
6. Original grade shall be maintained in immediate area of the root crown, where the soil contacts tree bole, at all times. No increase in grade shall be allowed under any circumstances in this area.
7. Physical retaining structures are required where any fill operation is approved and exceeds 6 inches above original grade. Retaining structures function to prevent soil grade from being raised in the root crown area.

8. Physical retaining structures shall be permanent in nature and may be constructed from any material that is appropriate in function to hold raised grade away from root crown on a long term basis. Engineering may be required in some instances.
9. Tree retaining structures shall be installed a minimum distance of four feet from any tree trunk and may completely or partially surround the tree depending on the location of grade change. If grade is raised on 50% of the dripline, then retaining structures must be installed to prevent that soil from moving to the immediate root crown in that area. If 100% of the grade is raised, structure must surround the tree entirely. It is the responsibility of the project designer to develop an appropriate structure for this purpose with the approval of the project arborist.
10. If site conditions exist which necessitate installation of retaining structures closer than four feet to tree trunk, the project arborist shall be consulted for details of this installation.
11. No part of the dry well structure shall be placed below original grade to minimize impact on root system. If necessary, structural posts may be installed to hold walls in place, providing that care is taken during the installation to minimize damage to the root system, and that post hole size is minimized. The excavation and pouring of footings and other structural support is not compatible with tree preservation.
12. Grade changes outside the retaining structures shall be such that drainage water of any type or source is not diverted toward or around the root crown in any manner. Grade shall drain away from root crown at a minimum of 2%.
13. If grading toward root crown is required, appropriate surface and/or subsurface drain facilities shall be installed so that water is effectively diverted away from root crown area. The project arborist shall be consulted for details and approval of installation.
14. Where fill is approved and/or where paving of any type is planned within the dripline, aeration tubes shall be installed from the dry well or retaining structure to the limit of the dripline and placed at a depth corresponding to slightly below original grade. A description of aeration tube use and construction follows:

In all areas where paving, impermeable or semi-permeable surfaces, or fill over 6 inches is to be installed within any tree dripline, aeration tubes shall be required to the limit of the dripline or beyond where possible. Tubes shall radiate horizontally from each dry well to the root crown area to the limit of the dripline, and shall be located on 4-foot centers. Ends of tubes shall be connected to one another. A proportional number of tubes shall be installed when partial paving or filling within dripline is required.

Aeration tubes shall consist of rigid and perforated PVC pipe, minimum class 200, styrene plastic, or molded ABS, minimum 3 inch diameter, 10 perforations per foot. Pipe shall be placed slightly below original grade. Each tube shall be wrapped in suitable filter fabric securely fastened with waterproof tape. Aeration tubes shall daylight within the retaining structure around tree trunk, and a grate shall be attached, but not glued, to the end of each daylighted tube to prevent the entry of debris. Aeration tubes shall also daylight near the outer perimeter of the dripline with a fitted metal grate properly installed such that water of any type or source back drains into dry well.

15. The installation of aeration tubes is meant to facilitate the normal exchange of atmospheric gasses with the soil and root system. When impermeable or semi-permeable paving is installed, or when soil grade is raised, this normal exchange is limited and commonly becomes a source of root damage and potential disease.
16. Tree roots will be expected to grow into areas of soil fill, and quality of imported soil should be considered. Ideally, fill soil should be site soil that closely matches that present within tree dripline. If import soil is utilized, it should be the same or slightly coarser texture than existing site soil, should have a pH range comparable to site soils, and generally should have acceptable chemical properties for appropriate plant growth. A soil analysis is required prior to importation to evaluate import soil for these criteria.
17. All approved soil cuts should be made outside the immediate dripline for minimal negative impact on trees. If approved within dripline, crown foliage shall be reduced accordingly to balance the estimated root loss. Any construction activity which necessitates soil excavation in the vicinity of preserved trees should be avoided where possible, or mitigated under the guidance of the project arborist. Roots are to be hand cut and sealed wherever possible when major structural roots are encountered over one inch in diameter. The tearing of roots by equipment of any type within the dripline shall not be allowed.

Underground Construction and Rootzone Protection

1. All underground work within tree driplines shall be avoided wherever possible to reduce negative impact on trees. The location of underground utilities well outside dripline is recommended as part of tree preservation.
2. Weakened anchorage, root system integrity, and the ability to acquire moisture from the root soil areas are the most critical issues when considering any type of root impact or removal.
3. Underground work in the area of site trees has a potentially serious impact on tree health and tree stability. Underground trenching for a variety of utilities will sever large structural roots reducing nutrient and water uptake and more seriously affecting the ability of each tree to remain appropriately anchored.
4. The existing root system within the dripline should not be severed by construction activities of any type. If undergrounding within the dripline is required for unavoidable logistical reasons, the project arborist shall be consulted to determine the impact on tree health.
5. For roots that extend beyond the dripline the project arborist shall be consulted to for any root over 2" in diameter to determine the impact on tree health.
6. All underground work required within the dripline of the trees and below original grade shall be previewed by the project arborist to determine potential impact on trees and to prepare mitigation measures. The project arborist shall be present during the actual underground work.

Pruning Requirements

1. The removal of dead wood, damaged branches, structurally unsound wood including bark, narrow crotches, and crossing branches shall be the priority for any pruning work. Co-dominant leaders or lateral branches shall be removed and pruned to retard growth if possible.
2. Pruning shall be as minimal as possible, removing dead or damaged branches, crossing or rubbing branches, or correcting other structural deficiencies which may be present. Removal of lower branches may be required to allow for access and clearance following construction. Minimal pruning is the desired approach to all trees.

The following general guidelines shall be used during all pruning procedures:

Lateral Branch Removal

- All laterals shall be removed immediately beyond the branch bark ridge, always preserving the branch collar.
- No stub cuts should be made which leave an inch or more beyond the branch collar.
- No flush cuts through the branch collar shall occur.

Triple Cuts

All branches too large to be hand held shall be removed by means of the triple cut; undercutting branch 4 to 8 inches beyond base, removing branch beyond undercut, and removing remaining stub utilizing a shoulder cut.

Terminal Pruning

Thinning

Cut back terminal portions of branches by cutting back to laterals with a basal diameter $\frac{1}{3}$ the size of the terminal being removed. Removal of many smaller terminals is preferred over removal of a few large ones.

Size reduction

Remove portions of the crown for reducing height by removing terminals back to laterals. Each lateral remaining should be located to serve as a new terminal. This will establish the crown at a lower level. The diameter at the base of a remaining lateral should be $\frac{1}{3}$ the diameter of the terminal being removed.

3. Pruning may also be required to create appropriate access for construction equipment where low limb presence may obstruct access. This pruning is to be done by a qualified arborist, and shall by no means be done by construction personnel under any circumstances.
4. Pruning shall occur prior to initiation of any/all approved underground trenching. No ground shall be broken within the dripline of street trees without having pruning completed.

5. Project arborist shall be consulted prior to initiation of any pruning procedures to coordinate activities with the working arborist.

Additional Recommended Procedures

1. Continued discussion and coordination between project arborist, owners, contractors, and City engineer shall occur to further discuss and define these guidelines based on the actual work planned in the vicinity of these trees.

Fertilization

1. Following completion of construction, all native trees shall be fertilized with a complete fertilizer which shall supply a minimum of one and one half pounds of actual nitrogen per 1000 square feet of dripline area, per year. A thorough irrigation shall immediately follow. This application shall be completed twice during the growing season following completion of construction. Ideally, application shall be by high pressure soil injection or drenching.
2. Following completion of construction activities a determination of tree health should be conducted to visually evaluate tree performance and to recommend additional mitigation if it should be required. Owners additionally should monitor visible tree appearance and contact the project arborist should the tree exhibit unusual growth or characteristics.

Mulching

1. Two to four inches of wood chip mulch is recommended for placement under the dripline of the tree following completion of construction.

Pest Control

1. A close visual examination for tree pests shall be conducted by the project arborist and/or the tree worker as he completes pruning procedures. If a serious infestation is present which was not apparent from ground observation then pesticide application should be considered at that time. However, the simple presence of tree pests does not warrant the use of chemical pesticides, and it should be clear that a serious infestation capable of causing tree decline must be present to warrant their use. The use of organic sprays or pesticidal soaps is the preferred method for treating any serious pest infestation. If infestations should occur, discussion with the project arborist is recommended.

Disease Control

1. No specific measures are recommended for disease control unless otherwise noted in the Individual Tree Evaluations. The tree pruning specialist should note any serious problem during his climbing procedures if they become evident.

Reference

The use of asphalt or concrete as a primary paving surface within the canopy dripline is generally discouraged. Utilization of a permeable substance which does not impede the natural percolation of water or limit the nature of gaseous exchange is recommended. Materials such as decomposed gravel or cobble are ideal for this purpose, however, generally do not function satisfactorily as a parking or driving surface.

Interlocking pavers come in a variety of shapes, colors and sizes and provide a suitable surface for driving, parking and walking. At the same time they will allow some infiltration of water and air to the original soil level. Functionally and aesthetically they are appropriate for consideration at many projects. Utilization of an installation method which excludes fine sand joints must be used however, to maintain infiltration. A coarse sand leveling bed and coarse sand joints are recommended to increase water infiltration and aeration.

Planting Under Existing Trees

The installation of lawn beneath established native trees is strongly discouraged. The ideal treatment under natives is the use of an organic or inert mulch. Redwood chips, gravel, or stone cobble are all excellent materials. If planting is required for aesthetic or functional purposes, the use of drought tolerant, woody species is most appropriate. Species should be selected for their ability to survive with minimal or no water through the summer months after initial establishment period. Only drip irrigation should be utilized within the canopy dripline to minimize summer water in the root zone.