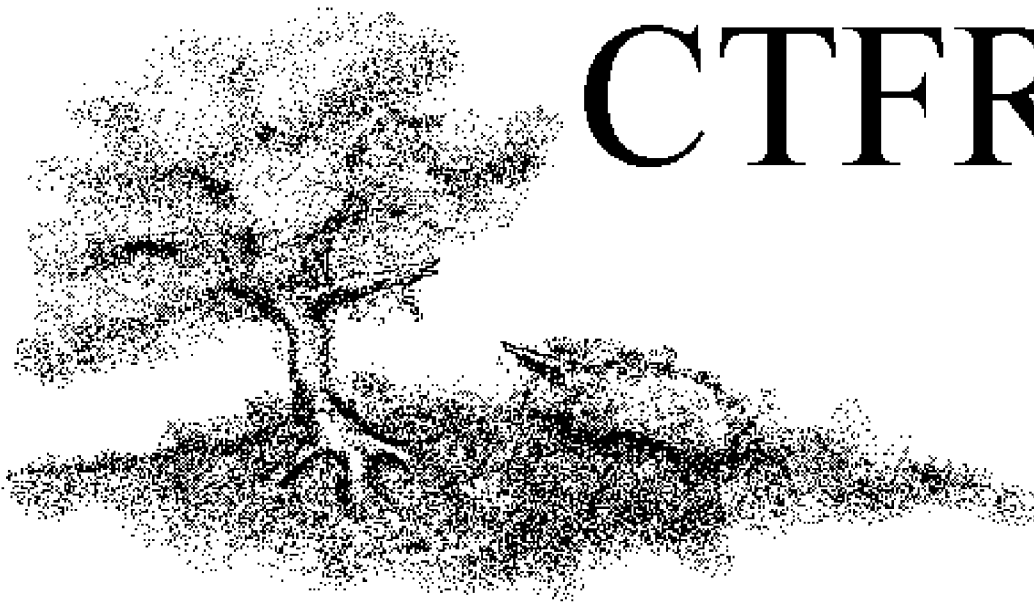


# Guide to the California Tree Failure Report Form

(form revised 9/93)

A line by line reference to using the California Tree Failure Report Form promoting  
uniformity of reporting standards.

Roger J. Edberg, Laurence R. Costello, and Alison M. Berry  
**University of California**



The definition of a tree failure as used by the CTRFP is a structural failure or breakage of a tree trunk, branch or root. A tree failure does not include the death of a tree that is still intact and standing, nor a tree that has been or will be removed due to its probability of failure.

Please include only one failure per tree per report. Where a number (age, diameter, height) is requested on the failure report form, only one may be entered in the database, so give your best estimate for this type of category.

Many definitions will be obvious, but are reviewed here for the sake of completeness. Complete information on the form generates the greatest value from each report. Definitions are in the same order as they occur on the Tree Failure Report Form.

**(Accession #:** This is for use by the CTRFP for indexing the report and any photographs.)

**Tree genus:** Example - for *Eucalyptus globulus*, *Eucalyptus* is the genus. Enter *Eucalyptus*.

**Species:** Example - for *Eucalyptus globulus*, *globulus* is the species. Enter *globulus*.

**Cultivar:** Example - for *Pyrus calleryana* 'Bradford', Bradford is the cultivar. Enter Bradford.

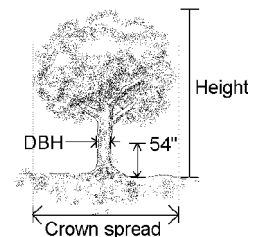
**Common name:** Example - for *Eucalyptus globulus*, Blue gum is the common name. Enter Blue gum.

**Approximate age:** Age of the tree being reported. This may be obtained from planting records, ring counts, or familiarity with stand and species. Give a single best estimate.

**Height:** Height of the tree being reported in feet.

**DBH:** Diameter (not circumference) of trunk of tree being reported in inches. Measurement made at 4 ½' above ground level.

**Crown spread:** Maximum horizontal width (in feet) of tree crown - parts of tree above the trunk including branches and foliage.



**Tree owner:** Owner of the tree being reported (City Parks Department, School District or Campus, private business or individual, etc.).

**County:** County where the reported failure occurred.

**City:** City where the reported failure occurred.

**Address/Park:** Street address of property where tree failure occurred. Park and location within park where tree failure occurred. Inventory or map numbers may also be appropriate here.

**Site category (choose one)**

**1-Residential:** Reported tree occurs on private residence and is not within city or county street tree easement. Trees in an apartment complex (not occurring in the parking lot) may be included here.

**2-Street:** Reported tree occurs within city or county street tree easement and is administered by city or county tree department. Tree may be located in center median strip, sidewalk planters, or planting beds on either side of street.

**3-Park:** Reported tree occurs within the boundaries of a park.

**4-School:** Reported tree occurs within the boundaries of a school grounds or campus.

**5-Highway:** Reported tree occurs within highway easement and is the responsibility of highway tree crews. Tree may occur in center median strip or within either highway border.

**6-Parking lot:** Reported tree occurs in a planter or bed within a parking lot or directly adjacent to a parking lot. Tree is the responsibility of the parking lot owner, not street tree crews.

**7-Mall:** Reported tree occurs in a planter or bed located in a mall, and not in mall parking lot. For example, a tree in a mall bed separated from the parking lot by a sidewalk would qualify as a mall tree. Tree may be either indoors or outdoors.

**8-Other:** Not included under any of the above. If desired, indicate site location in section IV, Additional Information and Comments, p. 2 of the Failure Report Form

#### DETAILS OF TREE FAILURE

**(1)Date of failure:** Date tree failure occurred. Date may be used to correlate with weather data.

**(2)Time of failure:** Time tree failure occurred. 24 hour time, or indicate am/pm. Leave blank if uncertain.

**(3) Location of failure:** Enter appropriate code to indicate location of failure (below) and complete additional information for trunk or branch failures.

**1-Trunk:** Failure occurring on a tree trunk.

\_\_\_ **ft. above ground:**

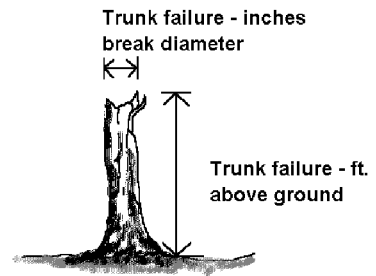
Height above the ground that the trunk failure occurred in feet. Round to whole number (i.e. 2 rather than 1.8 or 1 3/4). May be zero (trunk failure at ground level). Use midpoint between top and bottom of fracture for angled breaks. Include trunk failures due to constriction by girdling roots here.

\_\_\_ **inches break diam:**

Diameter of the trunk in inches at the point where the failure occurred. Round to whole number.

**at ground level? \_\_ (Y/N):**

Yes or no. This allows the computer to distinguish between an intentional zero - trunk failure occurring at ground level - and missing information that may be read as a zero.



**2-Branch:** Failure occurring on a branch.

\_\_\_ **ft. from attachment:**

Distance from point of branch attachment with trunk to point of branch failure in feet. Round to a whole number. Use midpoint between far and near end of fracture for angled breaks. May be zero (failure at point of branch attachment).

\_\_\_ **in. break diameter:**

Diameter of branch at point of failure in inches. Round to a whole number.

**at point of attachment? \_\_ (Y/N):**

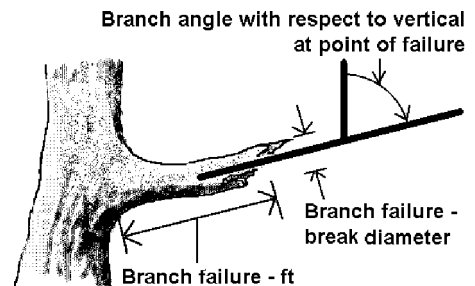
Yes or no. This helps the computer distinguish between an intentional zero - a branch failure occurring at the point of attachment - and missing information that may be read as a zero.

**branch attachment \_\_\_ ft. high on trunk:**

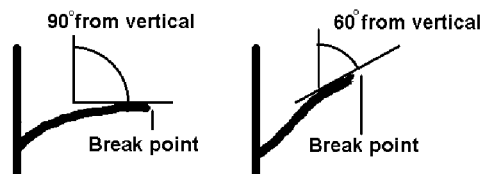
Estimate the distance from ground to point of branch attachment with trunk in feet.

**estimated branch angle at point of failure \_\_\_:**

Angle of the branch with respect to vertical at the point of failure. This category may be used to indicate angle of branch attachment for failures at the point of attachment, or the angle of the branch at the point of failure for failures out on the limb (see diagram). Angle may have to be estimated from broken pieces for failures at the point of attachment, since attachment will be destroyed. If failure is located on a horizontal section of the branch, this would be 90° with the vertical. If the failure occurred on an upright section of a limb, this would be between 0 (vertical) and 90°. A quick diagram on p.2 may be helpful.



Branch angle at point of failure examples



**weight concentrated at end of branch? \_\_ (Y/N)**

Weight of branch laterals and foliage largely or unusually concentrated at distal or terminal end. May be the result of pruning, interior shading, or terminal growth flush.

**3-Root(including uprooting):**

Structural failures occurring in the root system and also uprooting. Include kinked root associated failures in this category. Include girdling root failures here if structural roots have been girdled.

**(4) Site use (choose one)(Explain on p.2 Additional Info)**

**1-Undeveloped:** No structures (picnic benches, sheds, etc.). No paths or roads, rarely visited.

**2-Low use (intermittent vehicles and/or people):**

Pathways or access roads may be present, but not regularly used. No permanent structures.

**3-Medium use (permanent structures, intermittent vehicles and/or people):**

Permanent structures are present (sheds, picnic tables, houses, garages, etc.), roads and/or pathways are not major access routes with regular high traffic.

**4-High use (permanent structures, frequent vehicles and/or people):**

Permanent structures are present, roads and/or pathways are major access routes with high regular traffic (during operational hours, if regulated facility).

#### **(5)Stand type**

**1-Natural:** Trees have been sown and developed through natural mechanisms.

**2-Planted:** Trees have been sown or planted by human intent.

**3-Mixed:** Some naturally occurring trees and some planted trees.

#### **(6)Tree occurring**

**1-Alone (at least one crown diameter apart):**

A specimen tree. Far enough apart (at least 1 crown diameter) to reduce weather shielding effect of adjacent trees, if any.

**2-In a group (less than one crown diameter apart):**

Occurring in a group or grove (crowns touching or less than one diameter apart) so that individual trees are protected from the weather by adjacent trees.

**3-Altered stand (trees removed from stand):**

Stand that has developed as a group and then has been selectively thinned of trees - for example, a cleared building lot in a forest stand.

### **TREE STRUCTURAL DEFECTS**

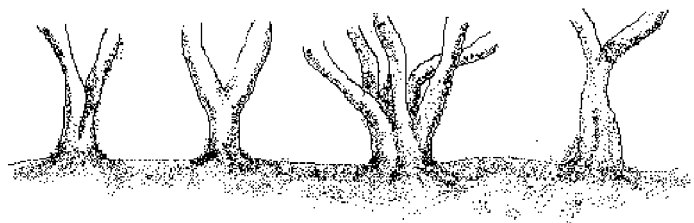
#### **(7)Chose up to three in order of importance**

**1-Failed portion dead:**

Portion of tree that is being reported as failed was dead before failure occurred.

**2-Multiple trunks/codominant stems:**

Trunks of equal size and/or relative importance arising from the base of tree, the lower trunk, or two large stems of similar diameter arising in the crown of the tree.

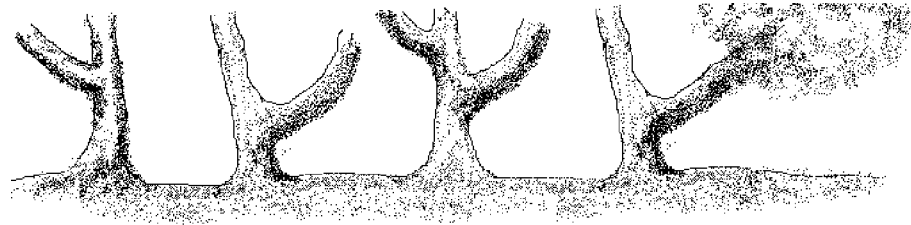


**3-Dense crown:**

Crown which has become relatively heavy or poses high wind resistance due to an excess of major scaffolds and/or minor branches and shoots. Also may be result of an abundance of vigorous growth.

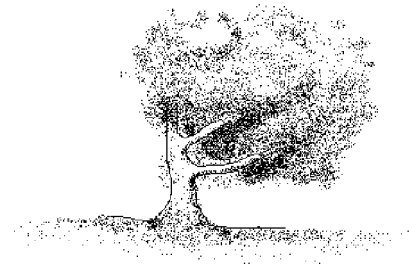


**4-Heavy lateral limbs:** Limbs of large diameter in relation to the trunk, long length, and/or foliage load.



**5-Uneven branch distribution, onesidedness:**

Branches or the bulk of the branch load occur mainly on one side of the tree.



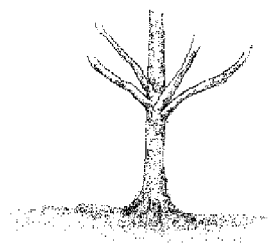
**6-Uneven branch distribution, top heavy:**

Branches or the bulk of the branch load occur mainly in the upper third of the total tree height. This can be a result of "limbing up" for roadway or other clearance, previous limb failure, or canopy competition at an earlier stage of growth.



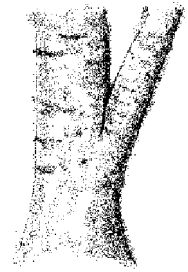
**7-Multiple branches at same point:**

More than two branches originating at the same height on the trunk. Branches are usually of smaller diameter than the trunk.



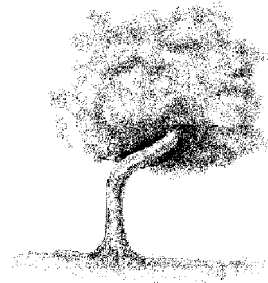
**8-Embedded bark in crotch:**

Pattern of development at branch junctions where bark is turned inward between the branch and trunk rather than pushed out.



**9-Crook or sweep:**

An abrupt or broad bend in the branch or trunk. A crook may be the result of thinning to a lateral. A sweep may result from a change in trunk or branch angle to reach sunlight, for example, or as a result of wind stress.



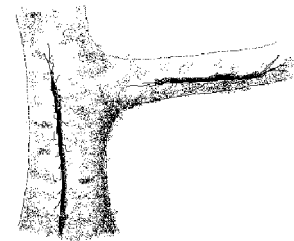
**10-Leaning trunk:**

Trunk departs from vertical from the base. Trunk did not grow away from vertical position (as in sweep). Some soil cracking and/or uprooting may be observed.



**11-Cracks or splits:**

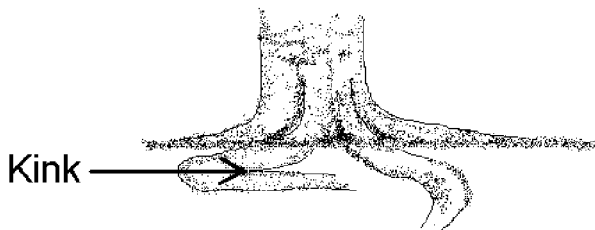
Longitudinal split in the stem or branch, involving bark, cambium, and xylem.



**12-Kinked or girdling root:**

Kinked root: Structural root with sharp bend of 90 degrees or more.

Girdling root: Root which circles and constricts the growth of stem or roots.



**13-None apparent:** No apparent structural defects.

**14-Other (describe p.2):** Structural defects not covered above, describe on page 2 section IV.- Additional information and comments.

### TREE DECAY OR INJURY

**(8)Type of decay at failure location:** Decay specifically at failure location.

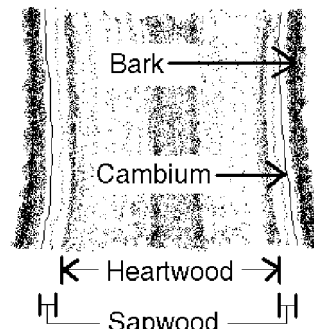
**1-Root rot:** Decay occurs in root tissue.

**2-Heart rot:** Decay occurs in the heart wood (xylem in the center of the stem providing structural strength, but no longer involved in water or nutrient transport - may or may not be different color than sapwood)

**3-Sap rot:** Decay occurs in the sapwood.

**4-Heart rot and sap rot:** Decay in both heart and sap wood.

**5-No decay noted:** No evidence of decay is present at failure location.



**(9)Extent of decay or cavity (%of cross sectional area)**  
**(for root failure estimate %of structural roots decayed)**

**1- 25% or less.**

**2- 26-50%**

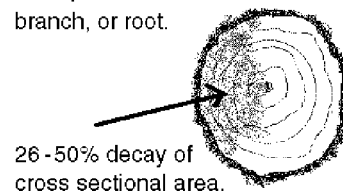
**3- 51-75%**

**4- 76-100%**

**5-Unknown:**It is not possible to determine the extent of decay at the failure location.

**6-None:**There is no decay at the failure location. Use with #5, question (8), Type of decay.

Example: Cross section of trunk, branch, or root.



**(10)Fungal sporophores or conks found near failure location?:** Yes or no.

Conk, sporophore: Fruiting or spore producing body of wood decay fungi, forming on the external surface of the trunk or branch at the site of failure.

**(11)Other injury at failure location:** Injury specifically at failure location.

**1-Mechanical:** Injury at failure location caused by impact or abrasion from mowing equipment, string trimmers, vandalism, etc. For vehicle (other than mower) induced damage, use #6 below.

**2-Lightning:** Injury at failure location caused by lightning.

**3-Insect:** Injury at failure location caused by the activity of insects.

**4-Animal:** Injury at failure location caused by the activity of an animal.

**5-Chemical:** Injury at failure location caused by a chemical - pesticide, paint, gasoline, oil, etc.

**6-Vehicle:** Injury at failure location caused by a vehicle (other than mower, covered in #1) such as a low branch hit by a truck, a car backing up into a trunk, etc.

**7-Fire:** Injury at failure location a result of fire.

**8-None:** No injury noted at failure location.

**9-Other (p.2):** Injury at failure location not described above. Describe in section IV, page 2, additional information and comments.

**(12)Other injury, entire tree (same choices as 11) (Choose up to three, in order of importance):**

Injuries caused by the same elements described in question 11, not occurring at the failure location.

## MAINTENANCE HISTORY

(13) **Pruning at failure location:** Evidence of previous pruning at failure location. Choose up to three, in order of importance.

**1-Heading cuts - moderate - cut diameter \_\_\_\_\_ in.**

Heading cut - Cutting a currently growing or one year old shoot back to a bud, or cutting an older branch or stem back to a stub.

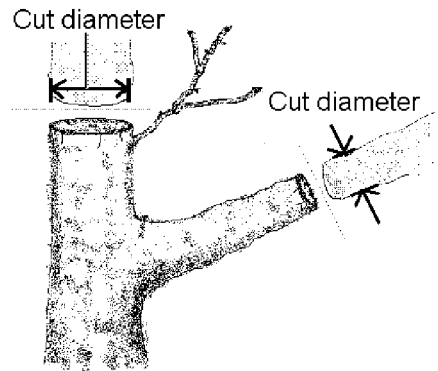
Failure occurred at the site of a moderate heading cut. Heading cut is judged to be moderate if close to terminal of branch or trunk, or if callus closure probably required(es) two years or less.

Indicate diameter of heading cut in inches.

**2-Heading cuts - severe - cut diameter \_\_\_\_\_ in.**

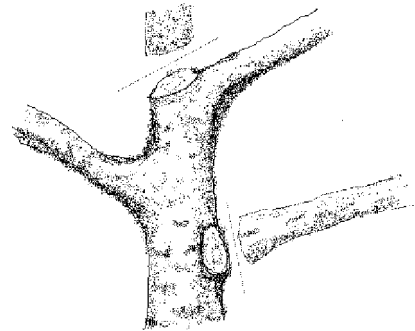
Failure occurred at site of a severe heading cut. Heading cut is judged to be severe if shoot or branch has substantial heartwood development or if callus closure probably required(es) more than two years.

Indicate diameter of heading cut in inches.

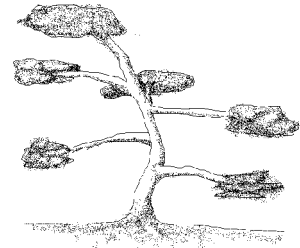


**3-Thinning cuts (or drop crotching):**

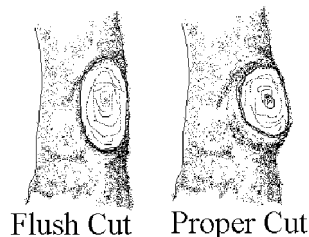
Thinning - The removal of a lateral branch at its point of origin or the shortening of a branch by cutting to lateral larger enough to assume the terminal role.



**4-Lion-tailing:** Pruning technique where internal or lower lateral branches are removed, leaving the foliage concentrated at branch ends.



**5-Flush cuts:** Pruning technique where branch is removed as well as the stem tissue at the point of attachment.



**6-Root pruning:** Roots have been pruned for the installation or repair of irrigation, other utilities, sidewalks, foundations, or other reasons.

**7-No pruning:** No previous pruning is evident at failure location.

**8-Other (p. 2):** Pruning at failure location not described above. Describe in section IV, Additional



**(14) Pruning on entire tree (same choices as 13)(Choose up to three):**

Evidence of pruning on tree not at failure location. Use same choices as above. Omit diameters of heading cuts.

**(15) Other maintenance (Choose up to two)**

**1-Cable/hardware failure:** Presence and/or failure of cabling, bracing, or bolting hardware.

**2-Staking/props:** Presence and/or failure of tree support stakes or props (more permanent support of branches or trunks unable to support themselves).

**3-Girdling wire, rope, etc:** Tree trunk or branch growth has been constricted by the presence of fence wire, rope, nursery tag, or other encircling materials.

**4-Cavity treatment:** Partial or complete cavity filling (foam, concrete, tar, etc.); cavity painting, installation of drains, metal or wood covers.

**5-Injections:** Evidence or record of injection treatment

**6-None:** No previous cabling, bolting, staking, propping, girdling, cavity treatment, or injection.

**SOIL AND ROOT CONDITIONS AT SITE**

**(16) Restricted roots (Choose up to two)**

**1-Raised planter or bed:** Reported tree is located in an enclosed planter or an open bottomed planter where the majority of the root system is located in the planter and not in the soil below the planter structure.

**2-Container or boxed tree:** Reported tree was held in a container or a box for planting, or was planted in such a structure, and developed circling roots that limit development into surrounding soil volume.

**3-Root barriers:** Barriers intended to force root development below paving or for other purposes have been installed at some time.

**4-Root cutting:** Tree roots have been cut for pavement installation or repair, utility installation or repair, or for some other purpose.

**5-Not applicable:** There is no indication that root growth has been restricted.

**6-Other (p. 2):** Root growth has been restricted, but by other means than listed above. Describe in section IV, p.2, Additional Information and Comments.

**(17) Irrigation:** Irrigation frequency for tree being reported from records, owner statement, or estimate.

**1-None**

**2-Less than once per month**

**3-More than once per month**

**4-More than 3X per month**

**(18) Ground cover under tree (Choose up to two)**

**1-Bare soil:** Soil under tree is mainly free of vegetation or other covering.

**2-Mulch:** Soil under tree is covered by a mulch (wood or bark chips, leaves, plastic, rocks, gravel).

**3-Turf:** Vegetation under tree is a planted and maintained lawn.

**4-Native cover:** Vegetation under tree is native, not maintained.

**5-Herbaceous plants:** Vegetation under tree is mainly a planted and maintained herbaceous cover (above ground plant parts may die annually or in severe winters, with annual regrowth from roots or hardy above ground parts).

**6-Shrubs:** Vegetation under tree is mainly planted and maintained shrubbery (woody perennial plants smaller than trees).

**7-Mixed planting:** Vegetation under tree is a mix of turf, native cover, herbaceous plants, and/or shrubs in any combination.

**8-Paving:** Soil under tree is covered by asphalt, concrete, or other paving.

**9-Other:** Soil under tree is covered by something not described above. Describe in section IV, Additional Information and Comments, p.2.

**(19)Soil in tree vicinity (Choose up to two, in order of importance)**

- 1-Good condition:** The soil is reasonably loose, moist, and of sufficient depth for root development.
- 2-Compacted:** Soil has been compacted by construction equipment, vehicular or foot traffic. Gas, water, or physical penetration of the soil is slow or difficult.
- 3-Saturated:** The pore space in the soil is nearly or completely filled with water.
- 4-Dry:** The soil appears dry at the surface and down into the root zone.
- 5-Shallow:** Hardpan, bedrock, cement, water table, or some other condition limits effective rooting depth of soil.
- 6-Other (p.2):** Soil condition not described above. Describe in section IV, page 2, Additional information and comments.

**(20)Site topography/soil changes (Choose up to two)**

- 1-Excavation-depth \_\_\_\_\_ft:** An excavation such as that for a foundation, swimming pool, or basement has been made in the vicinity of the tree. Estimate the depth of the excavation in feet.  
**distance from trunk \_\_\_\_\_ft:** Distance from trunk base to closest edge of excavation in feet.
- 2-Grade change-cut:** The grade around the tree has been lowered by scraping below the original soil level.
- 3-Grade change-fill:** The grade around the tree has been raised by fill soil above the original soil level.
- 4-Slope erosion:** Tree is located on a slope (except a streambank) experiencing erosion.
- 5-Streambank erosion:** Tree is located on a streambank experiencing erosion.
- 6-Not applicable:** There is no evidence of any topographic or soil changes.

**WEATHER AT TIME OF FAILURE**

**(21)Wind speed:**

- 1-Low (less than 5 mph)**
- 2-Moderate (5-25 mph):**
- 3-High (25+ mph):**

A simple guide for wind speed estimation (condensed from the Beaufort scale):

<b>Windspeed Range (mph)</b>	<b>Phenomenon</b>	<b>Description</b>
Less than 5	Smoke rises vertically. Direction of wind shown by drift of smoke, but not by wind vane. Wind felt in face.	Calm to light air
5 to 25	Leaves of trees rustle, wind vane moves easily, wind extends a light flag, raises dust and loose paper, small branches are moved, small trees in leaf begin to sway, crested wavelets form on lakes and ponds.	Light to strong breeze
25 +	Large branches in motion, telephone wires whistle, whole trees move in wind, walking difficult, twigs and branches break in wind, tiles and shingles are blown off roof.	Strong breeze to strong gale

**(22)Wind**

- 1-Gusty:** High wind speeds occur briefly, constant windspeed is more moderate.
- 2-Steady:** Indicated wind speed is constant, not gusty.

**(23) Wind in prevailing direction for season? 1-Yes: 2-No:**

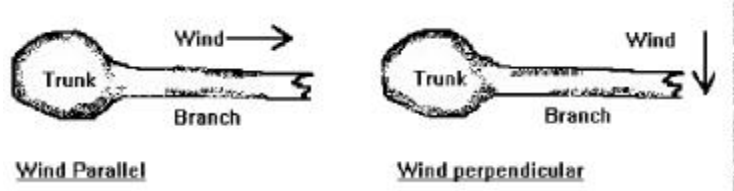
Prevailing winds vary according to location and season. Based on your knowledge of local weather patterns or on weather records.

**(24) If branch failure, was wind direction**

**1-Parallel to:**

**or**

**2-At right angles to wind direction:**



**(25) Temperature: \_\_\_\_\_ degrees F:** Indicate temperature at time of failure if possible.

**(26) Precipitation (Choose one):** Indicate precipitation condition at time of failure if possible.

- 1-Rain
- 2-Snow
- 3-Ice
- 4-Fog or mist
- 5-None

**I. Briefly, in your own words, why did this tree failure occur?**

Outline the most probable contributing factors to this failure. In this section, you can clarify selections in the multiple choice section, if needed. A drawing or diagram may be useful.

**II. Results of this tree failure (i.e., property damage, personal injury, etc.):**

Note road blockage, property damage, injury, emergency response, etc. incurred by tree failure.

**III. Damage estimate (costs for clean-up; indicate other costs if known):**

Indicate all known and estimated costs incurred by tree failure. For tree crews, hours labor, hours of equipment use, hauling costs, etc. can be listed. If possible, please include hourly rates (at least once, if possible) for tree crew labor and equipment.

**IV. Additional information and comments:**

Use this section to clarify "other" selections on page 1 or for additional room to answer I, II, or III.

**Person or persons reporting:** Names of those involved reporting the tree failure.

**Date:** Date report form was completed.

**Title:** Title of reporter(s). Gardener, Tree assessor, Foreman, Owner, etc.

**Agency:** Agency / business employing reporter.

**Address:** Address where mail, California Tree Failure Report Program newsletter may reach you.

**Telephone:** Telephone number where you may be reached most easily for questions regarding failure report.

**For questions regarding the use of the California Tree Failure Report Form, you may contact:**

Dr. Alison Berry / Roger Edberg  
California Tree Failure Report Program  
Department of Environmental Horticulture  
University of California

or: Dr. Larry Costello  
U.C. Cooperative Extension  
San Mateo County  
625 Miramontes St., Ste 200

Davis, CA 95616-8587  
Phone: (916) 752-0130  
FAX: (916) 752-1819

Half Moon Bay, CA 94019  
Phone: (415) 726-9059  
FAX: (415) 726-9267

**Acknowledgments:**

The California Tree Failure Report Program would like to thank Dr. James Clark (HortScience) and John Britton (John Britton Tree Service) for review and suggestions in the preparation of the Guide to the Tree Failure Report Form.

**Additional Reading:**

Harris, Richard W. *Arboriculture - Integrated Management of Landscape Trees, Shrubs, and Vines, 2nd ed.* 1992 Prentice-Hall, Inc.

Matheny, Nelda P. and James R. Clark. *A Photographic Guide to the Evaluation of Hazard Trees in Urban Areas, 2nd ed.* 1992 International Society of Arboriculture

Shigo, A.L. *A New Tree Biology Dictionary.* 1986. Shigo and Trees, Associates. Durham, N.H.

**Thank You for Cooperating in the California Tree  
Failure Report Program**