



Tree Risk Assessment

**San Leandro Creek
Location 1 – Huff Ave.
Alameda County Flood Control**

**PREPARED FOR:
Mackay and Soms
5124 Franklin Dr., Suite B
Pleasanton, CA 94588**

**PREPARED BY:
HortScience, Inc.
2150 Rheem Dr., Suite A
Pleasanton, CA 94588**

June, 2010



Tree Risk Assessment
San Leandro Creek
Location 1, Huff Ave.
Alameda County Flood Control

HortScience, Inc. was asked to inventory and evaluate trees in Location 1 at the north end of Huff Ave. on Alameda County Flood Control property in San Leandro Creek. Mackay and Somps identified the project limits and staked property lines in the field, accurately located tree trunks, and measured tree heights. This report presents the result of our inventory.

Survey Methods

Trees were surveyed in March and May 2010. The survey included tagging, mapping, and visually inspecting trees greater than 6" in diameter. The following information was recorded for each tree:

1. Tag number
2. Species
3. Diameter class at 4.5' above grade -
 - 6-12"
 - 12-18"
 - 18-24"
 - 24-36"
 - 36-48"
 - 48-60"
 - 60-72"
 - >72"
4. Number of trunks
5. Tree health and structural condition.
6. Position in the creek -
 - lower bank
 - upper bank
 - bench
 - active channel
7. Slope aspect – north, south, east, west
8. Whether or not vines were growing up the trunk.
9. Comments regarding tree health and structure
10. Target – what would be struck if the tree failed
 - people
 - private property
 - creek

slope
road
parking
landscape, fence, deck

11. Risk rating –Based on the visual inspection, three components of the relative risk among trees inspected were rated as follows:

Failure potential (4 points) - Rates the relative likelihood that the tree will fail in the next two years. For blue gums, the failure potential rating focused on whole tree failure. Evaluation criteria included tree structural characteristics, presence of decay and other defects, weight distribution in the crown, lean, previous failures within the tree or whole tree failures nearby, exposure to wind, and slope steepness. Site and weather conditions considered included saturated soils and wind speeds exceeding 40 mph, as has occurred in the past years.

- 1 - low
- 2 - medium
- 3 - high
- 4 - severe

Size of defective part (4 points) -Rates the size of the part most likely to fail. The larger the part that fails, the greater the potential for damage. Therefore, the size of the failure affects the hazard potential.

- 1 - most likely failure less than 6" in diameter
- 2 - most likely failure 6 - 18" in diameter
- 3 - most likely failure 18 - 30" in diameter
- 4 - most likely failure greater than 30" in diameter

Target rating (4 points) - rates the use and occupancy of the area that would be struck by the defective part. By considering the range in targets along San Leandro Creek the target values were assigned as follows:

- 1 - creek bank; creek flow disruption not anticipated
- 2 – fence, landscape
- 3 – street, property such as deck, garage; creek bank that would cause flow disruption
- 4 – people, homes

The points in each category are added to obtain the overall risk rating, with 12 being the maximum value.

Risk rating = failure potential + size of defective part + target rating

12. Comments regarding tree health and structure

Rating Risk Associated with Trees

Tree risk assessment is the systematic process of assessing the potential for a tree or one of its parts to fail and, in so doing, injure people or damage property. All trees have the potential to fail. The degree of risk will vary with the size of the tree, type and location of the defect, tree species, and the nature of the target. Tree risk assessment involves three components:

1. a tree with the potential to fail,
2. an environment that may contribute to that failure, and
3. a person or object that would be injured or damaged (i.e. the target).

In developing the risk rating we considered all of these factors. The structural characteristics of each tree was assessed, the steepness of the slope, exposure to wind and rain storms, and the likelihood to fall and strike a target was rated. We followed the evaluation procedure established by the International Society of Arboriculture (Matheny and Clark, 1994¹). This procedure requires evaluating the tree failure potential (likelihood to fail), the size of the part that would strike the target, and target (what would be damaged or injured) to develop a risk rating.

Risk rating = failure potential + size of defective part + target rating

To assess the failure potential of each tree, the likelihood that the tree will fail in the next two years was evaluated. For blue gums, the failure potential rating focused on whole tree failure. Evaluation criteria included tree structural characteristics, presence of decay and other defects, weight distribution in the crown, lean, previous failures within the tree or whole tree failures nearby, exposure to wind, and slope steepness. Site and weather conditions considered included saturated soils and wind speeds exceeding 40 mph, as has occurred in the past years.

To evaluate what could be damaged or injured if each tree failed, a circular potential impact zone was plotted using the height of the tree as the radius. In addition, the most likely impact area was plotted based on our assessment of where the tree would most likely fall if it were to fail. For leaning or asymmetric trees, the tree would likely fall in the direction of the lean. In the absence of lean, because of the steep bank, trees tend to fall into the creek and may strike properties on the opposite bank. The target rating for each tree was determined from the most likely impact area.

Our failure assessment procedures focused on trees with observable defects from a ground survey. This is not to say that trees without significant defects will not fail. Failure of apparently defect-free trees does occur, especially during storm events. Wind forces, for example, can exceed the strength of defect-free wood causing branches and trunks to break. Wind forces coupled with rain can saturate soils, reducing their ability to hold roots, and blow over defect-free trees. In addition, trees sometimes fail from defects that cannot be observed from a visual inspection. For many trees, the trunk could not be inspected because of thick covering of vines. Although we cannot predict

¹ Matheny, Nelda and James R. Clark. 1994. Photographic Guide to the Evaluation of Hazard Trees in Urban Areas. International Society of Arboriculture. Champaign, IL.

The goal of the risk evaluation process is to enhance public safety. This is accomplished by assessing the risk of damage to people or property if a tree fails and taking action to reduce that risk. Where a large number of trees are involved, risk ratings can be used to define the relative seriousness and extent of potential danger to site users. The risk rating considers the likelihood of the tree or one of its parts failing, the size of that part, and the frequency of use and occupancy below it. The greater the risk rating, the greater the risk associated with a tree.

HortScience, Inc.

A handwritten signature in black ink that reads "Nelda Matheny". The signature is written in a cursive, flowing style.

Nelda Matheny
Registered Consulting Arborist #243

Blue gum #201

Description

Diameter class	48-60"
# trunks	1
Height	114'
Position	upper bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Spreading crown heavily weighted towards W; large branch extending over driveway at 1111 Huff; trunk obscured by ivy.



Left: Tree #201; arrow indicates branch extending over parking area and driveway.

Right: Base of tree, west side




Risk Rating

Potential targets	Private property (1111, 1115, 1119, 1130 Huff Ave., 963, 965, 971 Lee); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm: tall, leaning tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Lean and heavy weight on W will likely direct failure towards 1111, 1115 Huff and parking on Huff., bank
Failure potential	3
Size of part	3
Target rating	4
Risk rating	10
Risk reduction options	To reduce risk, remove SW branch; to eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Blue gum #202

Diameter class	36-48"
# trunks	2
Height	98'
Position	upper bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Asymmetric canopy extending to S; trunk obscured by ivy.



Left: #202, south side

Below: #202, west side, trunk engulfed in ivy.






Risk Rating

Possible targets	Private property (1111, 1115, 1119, 1130, Huff Ave., 965, 971 Lee, parking at 524 Callan); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm: tall, asymmetric tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Heavy weight on S will likely direct failure towards 1130 Huff Ave, parking on Huff, bank
Failure potential	2
Size of part	2
Target rating	4
Risk rating	8
Risk reduction options	To reduce risk, prune to reduce weight on S.; to eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Blue gum #203

Description

Diameter class	36-48"
# trunks	1
Height	108'
Position	upper bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Small cavity on lower trunk; trunk obscured by ivy.



Left: Tree #203 viewed from the north

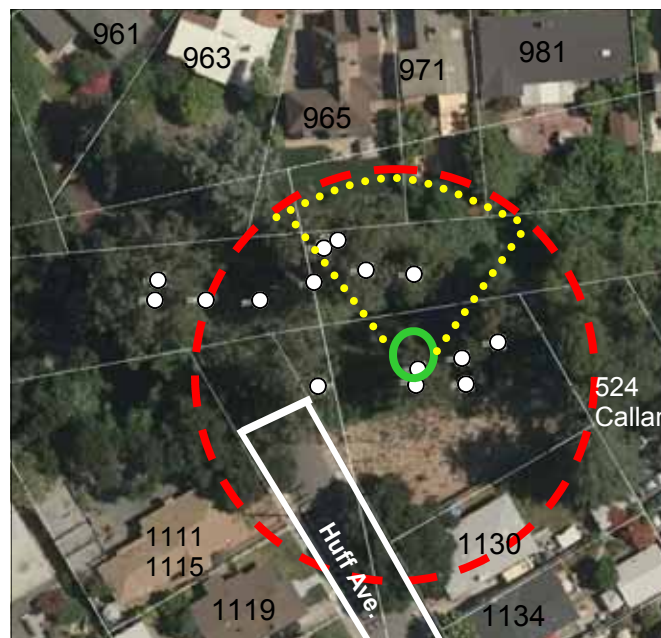
Below: #203, west side, trunk engulfed in ivy.






Risk Rating

Possible targets	Private property (1111, 1115, 1119, 1130 Huff Ave., 965, 971, 981 Lee, parking at 524 Callan); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm; tall tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Tree will most likely fall across the creek onto 965, 971, 981 Lee Ave., bank, creek
Failure potential	3
Size of part	2
Target rating	3
Risk rating	8
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Canary Island palm #204

Description

Diameter class	12-18"
# trunks	1
Height	22'
Position	upper bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Trunk approximately 4' tall.

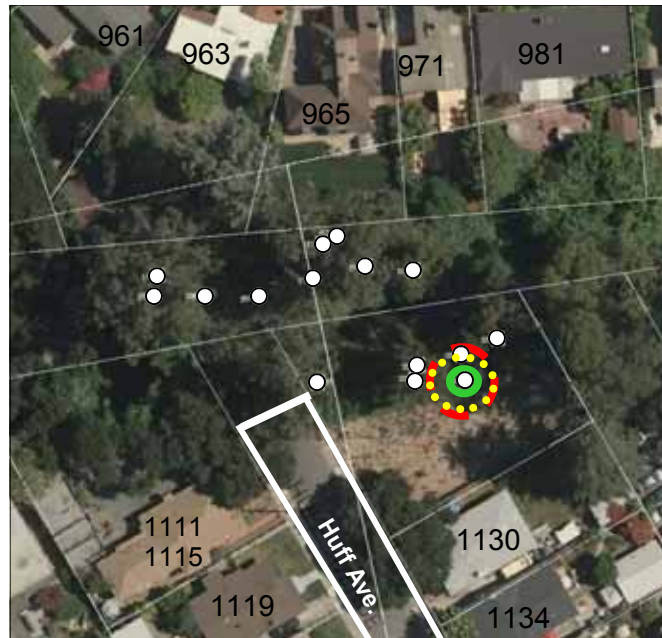


Above: Tree #204 (only fronds visible)




Risk Rating

Possible targets	Creek bank
Most likely failure mode and target	Dead frond falling onto bank
Failure potential	1
Size of part	1
Target rating	1
Risk rating	3
Risk reduction options	none

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

Blue gum #205

Description

Diameter class	18-24"
# trunks	2
Height	106'
Position	upper bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Slight lean; codominant trunks arise at 3'; trunks obscured by ivy.

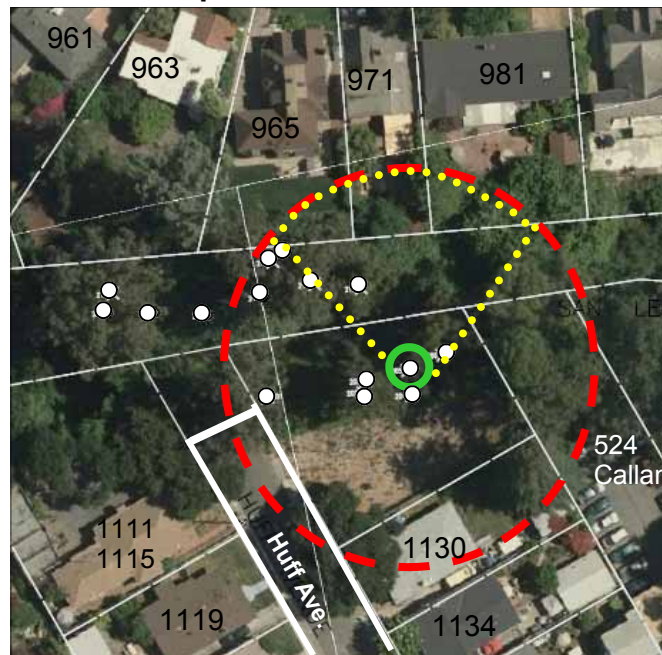


Left: Tree #205, north side

Risk Rating

Possible targets	Private property (1130 Huff Ave., 965, 971, 981 Lee; parking at 524 Callan); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm: tall, tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Tree will most likely fall across the creek onto 965, 971, 981 Lee Ave., bank, creek
Failure potential	3
Size of part	2
Target rating	3
Risk rating	8
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Blue gum #206

Description

Diameter class	18-24"
# trunks	1
Height	94'
Position	lower bank
Bank; slope	south, 1:1
Vines on trunk?	yes
Comments	Asymmetric trunk; leaning NW.



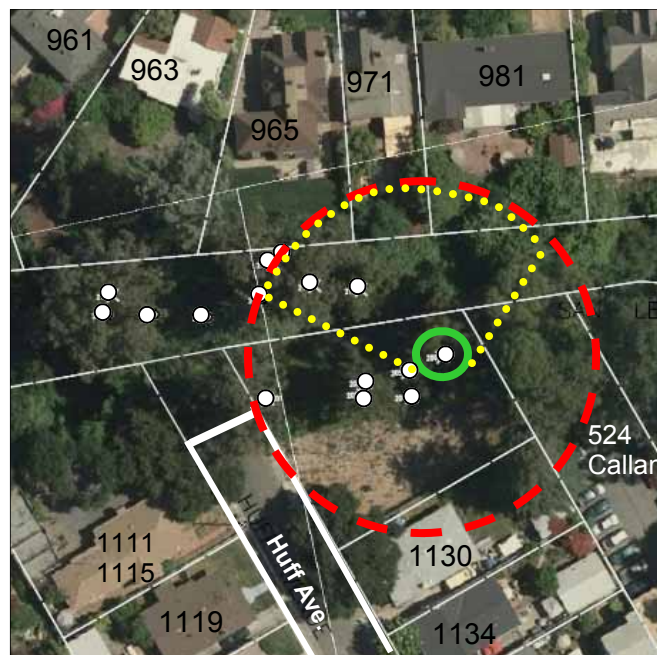
Left: Tree #206

Right: Base of tree #206




Risk Rating

Possible targets	Private property (1130 Huff Ave., 965, 971, 981 Lee, parking at 524 Callan); creek, bank
Most likely failure mode	Whole tree failure during storm: tall, tree exposed to strong winds on steep slope with wet soil.
Most likely target	Tree will most likely fall across the creek on 965, 971, 981 Lee Ave., bank, creek
Failure potential	4
Size of part	2
Target rating	3
Risk rating	9
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Arroyo willow #207

Description

Diameter class	12-18"
# trunks	1
Height	45'
Position	bench
Bank; slope	north; 2:1
Vines on trunk?	yes
Comments	leaning south; stump sprout

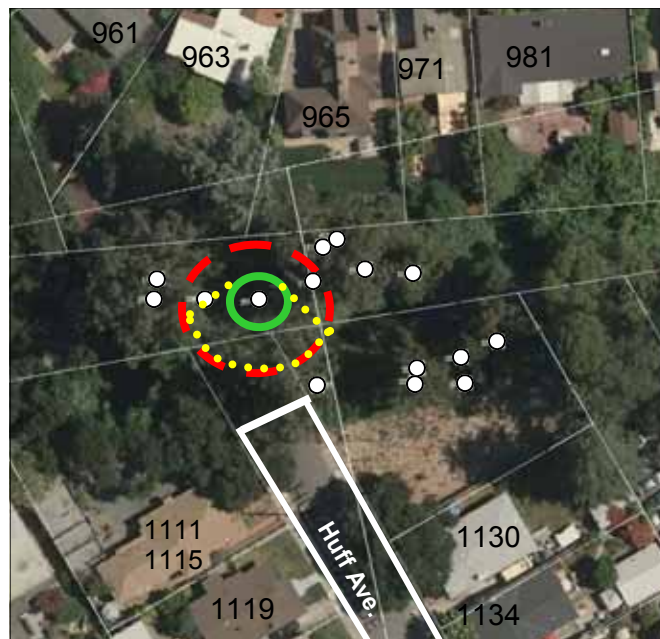


Above: Tree #207




Risk Rating

Possible targets	bank, creek
Most likely failure mode	Decayed trunk break at weakest point
Most likely targets	Trunk falling into creek, bank
Failure potential	3
Size of part	2
Target rating	1
Risk rating	6
Risk reduction options	Coppice tree to reduce risk

Potential Impact Zone



Key

	Tree #201
	Possible impact zone
	Most likely impact area

Boxelder #208

Description

Diameter class	6-12"
# trunks	1
Height	34'
Position	bench
Bank; slope	north; 2:1
Vines on trunk?	yes
Comments	Leaning south; stump sprout; extensive decay

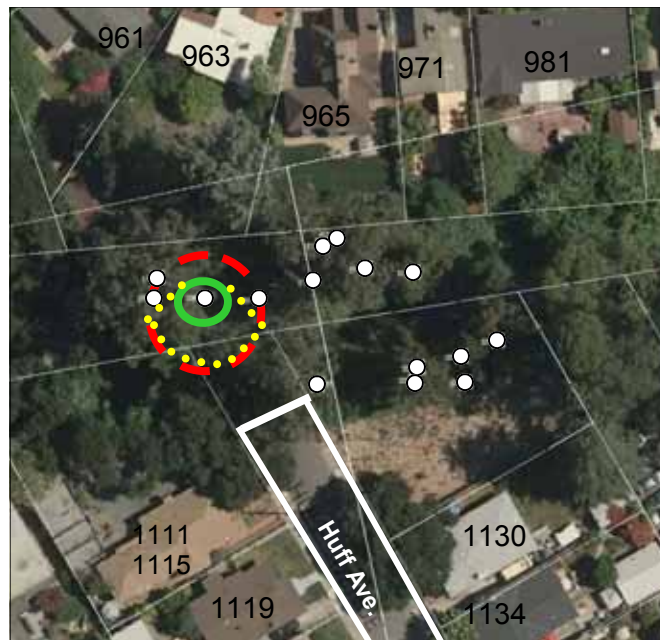


Above: Tree #208




Risk Rating

Possible targets	bank, creek
Most likely failure mode	Decayed trunk break at weakest point
Most likely targets	Trunk falling into creek, bank
Failure potential	3
Size of part	2
Target rating	1
Risk rating	6
Risk reduction options	Coppice tree to reduce risk.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

Boxelder #209

Description

Diameter class	6-12"
# trunks	1
Height	27'
Position	lower bank
Bank; slope	north; 1.5:1
Vines on trunk?	yes
Comments	Leaning south over creek; stump sprout; extensive decay

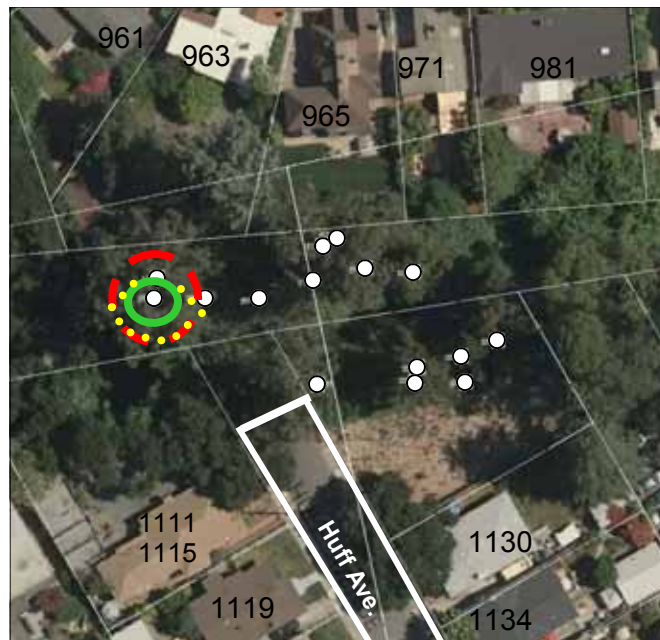


Above: Tree #209




Risk Rating

Possible targets	bank, creek
Most likely failure mode	Decayed trunk break at weakest point
Most likely targets	Trunk falling into creek, bank
Failure potential	3
Size of part	2
Target rating	1
Risk rating	6
Risk reduction options	Coppice tree to reduce risk.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

Blue gum #210

Description

Diameter class	48-60"
# trunks	1
Height	138'
Position	upper bank
Bank; slope	north, 1.5:1
Vines on trunk?	yes
Comments	Wide-spreading crown with many large branches arising from old pruning cuts; previously topped; trunk obscured by ivy; small pocket trunk decay.



Top: Crown of #210

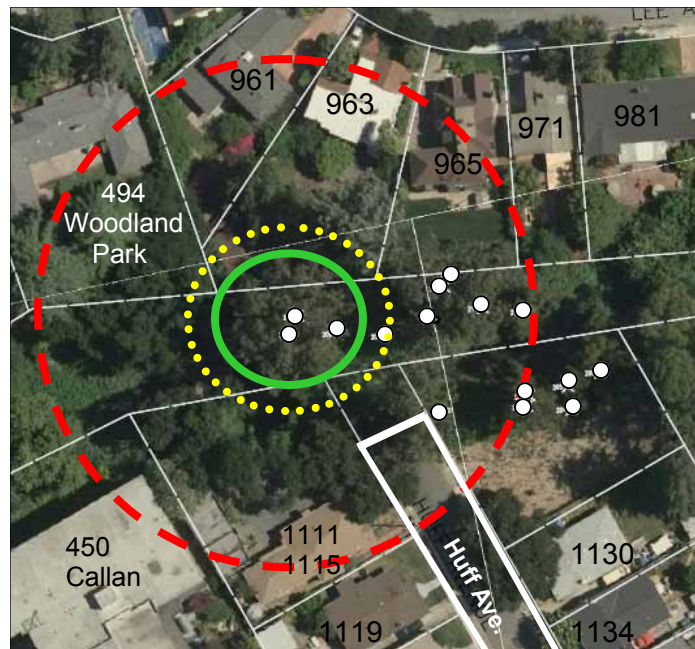


Right: Base of tree #210, engulfed in ivy




Risk Rating

Possible targets	Private property (1111, 1115 Huff Ave., 961, 963, 965, Lee, 450 Callan, 494 Woodland Park); parking on Huff Ave., creek, bank.
Most likely failure mode	Failure of one or more large scaffold branches arising at old topping cut, under strong winds.
Most likely targets	Large scaffold branch falling onto 963 Lee, bank, creek.
Failure potential	3
Size of part	3
Target rating	3
Risk rating	9
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

	Tree #201
	Possible impact zone
	Most likely impact area

May 2010

Western sycamore #211

Description

Diameter class	24-36"
# trunks	1
Height	123'
Position	lower bank
Bank; slope	north, 1.5:1
Vines on trunk?	yes
Comments	Engulfed in ivy; not much canopy showing; defoliated by anthracnose.



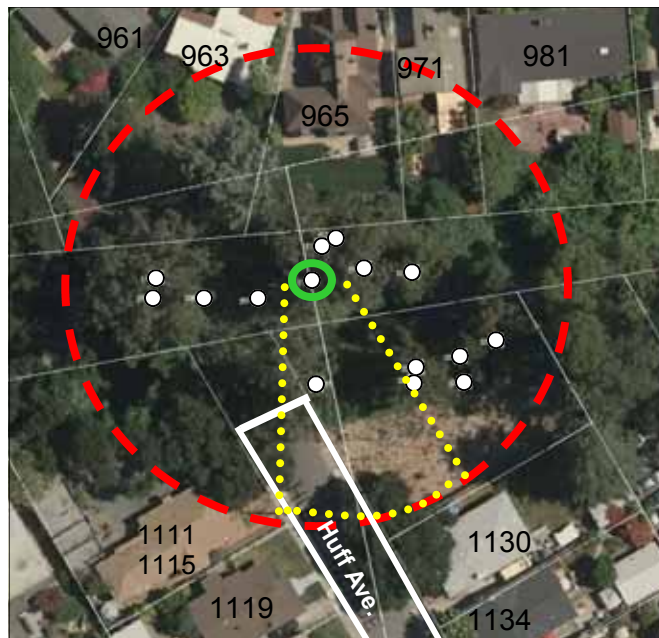
Left: Tree #211

Right: Base of Tree #211




Risk Rating

Possible targets	Private property (1111, 1115 Huff Ave., 963, 965, 971, 981 Lee); parking on Huff Ave., creek, bank.
Most likely failure mode	Trunk failure due to decay that is common present in old sycamores (trunk obscured by vines) and/or soil failure in storm.
Most likely targets	Whole tree failure onto parking on Huff, bank, creek.
Failure potential	2
Size of part	1
Target rating	3
Risk rating	6
Risk reduction options	Coppice tree to reduce risk.

Potential Impact Zone



Key

	Tree #201
	Possible impact zone
	Most likely impact area

May 2010

Blue gum #212

Description

Diameter class	48-60"
# trunks	1
Height	105'
Position	upper bank
Bank; slope	north, 1.5:1
Vines on trunk?	yes
Comments	Leaning north; trunk decay; trunk obscured by ivy.



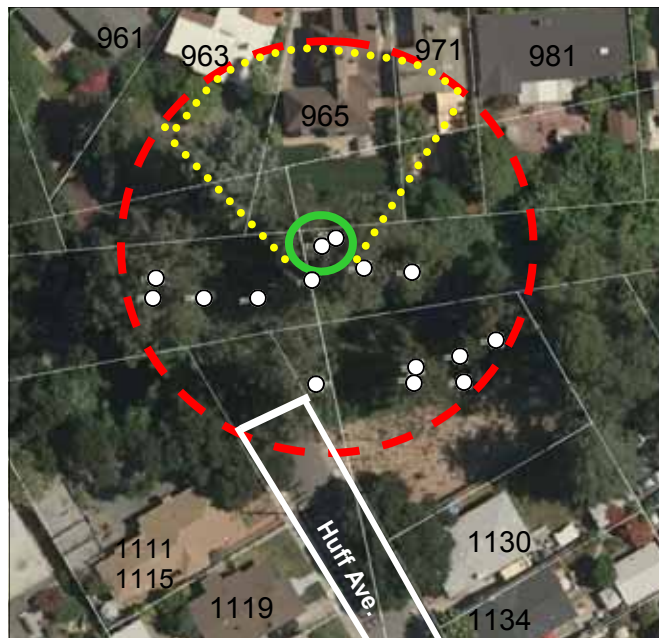
Left: #212 viewed from the southeast.

Right: #212 viewed from the east.




Risk Rating

Possible targets	Private property (1111 Huff Ave., 963, 965, 971, 981 Lee); parking on Huff Ave., creek, bank.
Most likely failure mode	Whole tree failure during storm; aggravated by lean; tall, tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Because of N lean, whole tree is most likely to fail onto 963, 659, 971 Lee Ave., bank.
Failure potential	4
Size of part	3
Target rating	4
Risk rating	11
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Boxelder #213

Description

Diameter class	18-24"
# trunks	2
Height	32'
Position	upper bank
Bank; slope	north, 1.5:1
Vines on trunk?	yes
Comments	Extensive decay; completely over-grown with ivy.



Tree #213 hidden from view by dense ivy.




Risk Rating

Possible targets	bank, creek
Most likely failure mode	Decayed trunk break at weakest point
Most likely targets.	Trunk falling onto bank
Failure potential	4
Size of part	2
Target rating	1
Risk rating	7
Risk reduction options	Coppice tree to eliminate risk

Potential Impact Zone



Key

	Tree #201
	Possible impact zone
	Most likely impact area

Blue gum #214

Description

Diameter class	>72
# trunks	2
Height	134'
Position	bench
Bank; slope	North, 1.5:1
Vines on trunk?	yes
Comments	Massive tree with dense ivy growth.



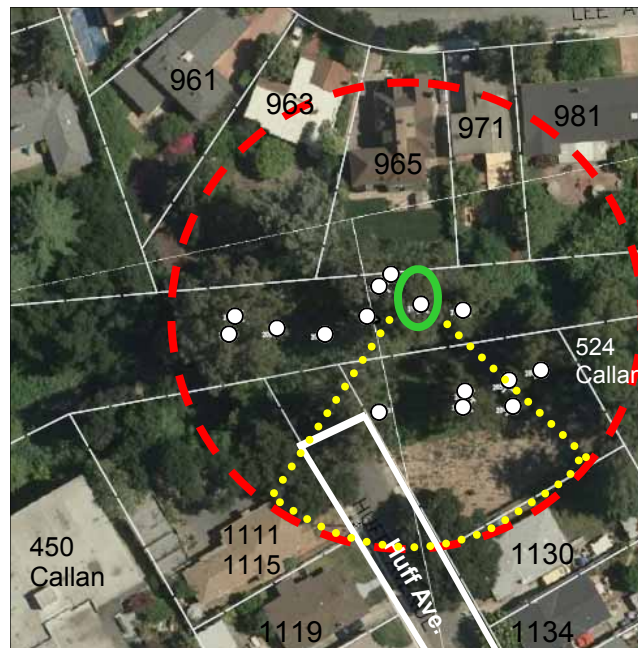
Left: Tree #214

Right: Base of tree #214




Risk Rating

Possible targets	Private property (1111, 1115, 1130 Huff Ave., 963, 965, 971, 981 Lee, parking at 524 Callan); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm: tall, tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Tree will most likely fall across the creek onto 1111, 1115, 1130 Huff Ave., bank, creek
Failure potential	2
Size of part	2
Target rating	3
Risk rating	7
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

-  Tree #201
-  Possible impact zone
-  Most likely impact area

May 2010

Blue gum #215

Diameter class	36-48"
# trunks	1
Height	119'
Position	bench
Bank; slope	north, 1.5:1
Vines on trunk?	yes
Comments	Codominant with tree #214; trunk obscured by ivy.

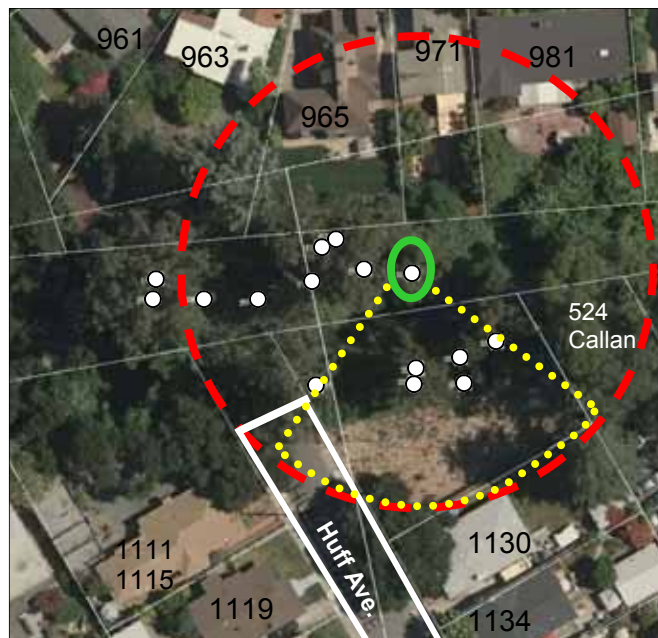


Tree # 215




Risk Rating

Possible targets	Private property (1130 Huff Ave., 963, 965, 971, 981 Lee, parking at 524 Callan); parking on Huff Ave., creek, bank
Most likely failure mode	Whole tree failure during storm: tall, tree exposed to strong winds on steep slope with wet soil.
Most likely targets	Tree will most likely fall across the creek onto Huff Ave., parking, bank, creek
Failure potential	2
Size of part	2
Target rating	3
Risk rating	7
Risk reduction options	To eliminate risk, remove tree.

Potential Impact Zone



Key

	Tree #201
	Possible impact zone
	Most likely impact area

May 2010

Glossary of Terms

- Anthracnose** A fungal disease causing dead areas on leaves, buds, stems, or fruit, commonly caused by *Cryptocline*, *Discula*, *Glomerella* and *Gnomonia* sp.
- Aspect** The direction that a slope faces with respect to the sun.
- Asymmetric form.** A crown having an uneven weight distribution so that most of the canopy is on one side of the tree; unbalanced.
- Branch attachment** The structural union of lateral to the trunk or another branch.
- Buttress** Support of branch, stem or root; usually associated with exaggerated growth.
- Buttress root** A large woody root located at the base of the trunk (the root crown).
- Cavity** An open wound, characterized by the presence of decay and resulting in a hollow.
- Central leader** The main stem or bole of the tree.
- CODIT** Compartmentalization of decay in trees. Model of tree response to wounding.
- Codominant** 1. Equal in size and relative importance, usually associated with either the trunks/stems or scaffold limbs/branches in the crown; in the context of crown class, trees whose crowns form the bulk of the upper layer of the canopy but which are crowded by adjacent trees.
- Collar** The ring of trunk tissue that surrounds a lateral branch at its point of attachment to the stem.
- Compartmentalization** Physiological process which creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms.
- Compression wood** Type of reaction wood that develops on the underside of branches and leaning trunks in coniferous trees which tends to maintain branch angle of growth or straighten the trunk.
- Conk** Fruiting or spore producing body of wood decay fungi, forming on the external surface of branches and trunks.
- Coppice** Trees that are cut to near the ground level and allowed to resprout to form a new tree.
- Crown** The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree.
- Crown class** Category of tree based on its crown position relative to those of adjacent trees; usually designated as dominant, codominant, intermediate, suppressed. (Helms, 1998)
- DBH** Diameter of the trunk, measured at breast height (1.4 m [54 in.] above the ground. Contrast with caliper.
- Decay** Process of degradation of woody tissues by fungi and bacteria through the decomposition of cellulose and lignin.
- Decline** Progressive decrease in health of organs or the entire plant, usually caused by a series of interacting factors.
- Decurrent** Referring to crowns which are made up of a system of codominant scaffold branches; lacking a central leader. Contrast with excurrent.

Glossary

Page 2

HortScience, Inc.

Dieback Progressive death of twigs and small branches, generally from tip to base.

Dominant One of four types of crown class; tree whose crown extends above the height of nearby trees in the stand, receiving light from above and the side.

Dripline The width of the crown, as measured by the lateral extent of the foliage.

Embedded bark Pattern of development at branch junctions where bark is turned inward rather than pushed out. Syn. included bark.

Epicormic shoot Shoot that arises from latent or adventitious buds that occur on stems and branches and on suckers produced from the base of trees.

Excurrent Crown form in which a strong central leader is present to the top of the tree. Contrast with decurrent.

Failure potential Likelihood that tree or tree part will fail.

Fibrous root system System composed of profusely branched roots with many lateral rootlets, and often with no main or taproot development.

Hazard. Situation, condition, or thing that may be dangerous.

Hazard tree. A tree or tree part that is likely to fail and cause damage or injury, and the likelihood exceeds an acceptable level of risk.

Heading cut Cutting a currently growing or one-year old shoot back to a bud, or cutting an branch to a stub or a branch that is not large enough to assume the terminal role.

Heart rot Decay in the center of the tree (heartwood).

Impact zone Area into which tree may fail.

Included bark Pattern of development at branch junctions where bark is turned inward rather than pushed out; contrast with branch bark ridge. Syn. embedded bark.

Intermediate One of four types of crown class; trees whose crowns extend into the main canopy but lower than those of codominant trees, receiving little direct light from above and none from the sides.

Invasive exotic species Non-native organisms likely to spread, disrupting the natural balance of an ecosystem.

Leader. The topmost portion of the tree trunk (stem) that is able to grow more than the laterals below.

Live crown ratio (LCR) The size of the canopy of coniferous trees relative to their overall height.

Mortality spiral The sequence of events describing a change in tree health from vigorous to stressed to declining to death.

Reaction wood Specialized secondary xylem which develops in response to lean or similar mechanical stress, to restore the stem to the vertical. Occurs as *compression* wood in conifers and *tension* wood in angiosperms.

Reduction cut (drop-crotch cut, lateral cut). Reduces the length of a branch or stem back to a lateral branch large enough to assume the terminal role. Syn. thin to a lateral.

Risk. Likelihood or probability that something will happen. Usually associated with negative consequences. In tree management, the likelihood that a tree or tree part will fail and cause injury or damage.

Glossary

Page 3

HortScience, Inc.

Risk assessment. Process of evaluating what unexpected things could happen, how likely it is, and what the likely outcomes are. In tree management, the systematic process to determine the level of risk posed by a tree, tree part, or group of trees.

Risk rating A qualitative assessment of the relative risk posed by individual trees within a population of trees.

Risk reduction. Treatment applied to tree or target to reduce risk.

Stump sprout. Shoots arising from the base part of a tree that remains standing after the tree has failed or been felled.

Tree risk assessment - Removal cut. Removes branch from the trunk or parent limb. Syn. thinning cut, to thin.

Root collar. The junction of root and stem

Root collar inspection Examination of the junction of root and stem, aimed at determining stability, presence of disease, decay and other defects.

Saprot Type of decay where fungi attack those parts of the xylem functioning in water, mineral element and carbohydrate transport and storage.

Scaffold In decurrent trees, the large branches that form the main structure of the crown.

Seam The characteristic vertical line that appears where two edges of woundwood or callus ridge meet. Commonly found at branch junctions where bark is included and between the two edges of callus/woundwood at the center of a cavity or wound

Slope The degree or deviation of a surface from horizontal, measured in a numerical ratio, percent or degrees.

Species A group of plants that resemble each other closely and that interbreed freely.

Stem. The main trunk of a tree or other plant.

Suppressed One of four types of crown class; trees that have been overtopped by adjacent trees.

Target. Person, object, or structure that could be harmed by a tree or tree part in the event of failure.

Topping Pruning technique to reduce height by heading of large branches. Generally considered poor practice. Syn. dehorning, lopping, hat-racking.

Vigor Overall health; the capacity to grow and resist physiological stress.

Windthrow Type of tree failure associated with uplifting of the entire root plate, often occurring in high wind.

Wound Any injury which induces a compartmentalization response.

Woundwood Lignified, partially differentiated tissue which develops from callus associated with wounds.