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Professional Consulting Services

PRELIMINARY TREE RESOURCE ANALYSIS
111 ERRETT CIRCLE

Prepared for
Brett Packer

July 2018

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INTRODUCTION

This preliminary arboricultural resource assessment includes an evaluation of trees growing on property located at 111 Errett Circle in Santa Cruz.

The 1.6-acre site is within a residential neighborhood and has been utilized as a church and other facilities in the past. A conversion from the existing conditions to residential development is being considered. This report will aid in determining the future disposition of the existing 18 trees growing on the site.

This report is limited to evaluating the health and structural integrity of the trees to determine future suitability for incorporation into the project. In addition, "heritage" trees that are protected by City of Santa Cruz ordinances (Chapter 9.56 Municipal Code) have been identified. Once plans are finalized an additional report will be prepared to analyze potential impacts to trees, maintenance recommendations and protection measures during site conversion.

PROJECT DESCRIPTION AND LOCATION

The details of a possible residential development have not been determined. The property is located within an existing neighborhood and the site is appropriate for expanding the residential component of the area.

The existing building is located at the central portion of the 1.6-acre site and has been mainly utilized as a church. Errett Circle surrounds the property and other arterial public streets radiate from the center of the circle.

ASSIGNMENT/SCOPE OF SERVICES

In June of this year I was contacted by Brett Packer to provide an arborist evaluation of trees growing on the site in preparation for development considerations. To complete the analysis I have completed the following:

- Inventory, number and map all trees growing on the site (18 trees).
- Identify tree species and measure trunk diameter at a point 54 inches above grade (DBH) to determine "heritage" status.
- Visually inspect each tree and the surrounding growing site to determine tree health, structural integrity and suitability for incorporation into a development project.
- Provide the "Critical Root Zone" (CRZ) dimensions
- Provide recommendations for maintenance or other treatments in preparation for development

TREE INVENTORY OVERVIEW

The attached inventory includes the following information on trees growing adjacent to site changes:

Tree Species
The inventory indicates the "common" name for each protected tree. The botanical names of the trees are listed here:

Black acacia (*Acacia melanoxylon*)
Madrone (*Arbutus* 'Marina')
Yew (*Taxus baccata*)
Cork oak (*Quercus suber*)
Canary Island palm (*Phoenix canariensis*)

Trunk Diameter
The diameter of each trunk/trunks was measured at a point 54 inches above natural grade (DBH) using a diameter tape. The City of Santa Cruz defines a protected "heritage" trees as those with a trunk diameter of 14 inches when measured at 54 inches above natural grade (DBH)

Tree Health
Tree health and tree structure are evaluated separately. A "healthy" tree can be weakly structured and represent a risk, a well-structured tree can be "unhealthy" or in poor vigor.

The determination of tree health is made during a Visual Tree Inspection. This analysis includes an evaluation of the biology of each tree using procedures developed by Claus Mattheck and published in The Body Language of Trees. The health of the tree is then rated as "good", "fair", or "poor" in the inventory.

The biological assessment determines health status and includes an evaluation of the following:

- Vitality of the leaves, bark and twigs
- Presence of fungi or decay
- Percentage and size of dead branching
- Status of old wounds or cavities.

Healthy trees rated as "good" display dense full canopies with dark green foliage. Dead branching is limited to small twigs and branches less than one inch in diameter. No evidence of disease, significant decay or inspect activity is visible. Vigorous, health trees are much better able to tolerate site alteration and invasive construction impacts than less vigorous trees of the same species.

Trees in "fair" health have 10-30% foliar dieback, small areas of dead branching greater than one inch in diameter and minor evidence of disease, decay, or insect activity.

Trees in "poor" health display greater than 30% foliar dieback, dead branches greater than two inches in diameter and/or areas of decay, disease or insect activity.

Tree Structure
As with tree health, the structural integrity of each tree is determined using the Visual Tree Inspection methods. This mechanical assessment includes an evaluation of the following:

- Integrity of the framework of the tree (supporting trunk and major branches)
- External symptoms (bulges, ribs or cracks) that can indicate internal defects
- Lean of main trunk and canopy configuration
- Development of root buttress

Trees with "good" structure are well rooted with visible taper in the lower trunk leading to buttress root development. These qualities indicate that the tree is solidly rooted in its growing site. No significant structural defects such as codominant stems (two stems of similar size that emerge from the same point on the trunk), weakly attached branches, cavities or decay are present.

Trees with "fair" structural integrity may have defects such as poor taper in the trunk, inadequate root development or growing site limitations. They may have multiple trunks, included bark (where bark turns inward at an attachment point), or suppressed canopies. Small areas of decay or evidence of small limb loss may be present in these trees. The condition of these trees can be improved using common maintenance procedures.

Poorly structured trees display one or more serious structural defects that may lead to the failure of branches, trunk or the whole tree due to uprooting. Trees in this condition may have had root loss due to decay or site conditions. The supporting trunk or large stems could be compromised by decay or structural defect (large codominant stems with included bark). Trees in this condition represent a risk. In some situations, maintenance including cable support systems, props or severe pruning can reduce, but not eliminate the potential hazard.

Critical Root Zone (CRZ)
The methods utilized determining the Critical Root Zone are varied and can be based on a number of techniques and professional guidelines or standards. The optimum radius (in feet) around each tree is listed in the inventory.

The methods commonly used by arborists to determine the CRZ is based on a number of published professional guidelines and handbooks as listed below.

The American National Standard (ANSI A300 Part 5 2012) for Tree Care Operations-

Tree, Shrub, and Other Wood Plant Management-Standard Practices (Management of Trees and Shrubs during Site Planning, Site Development, and Construction).

- Defines the Critical Root Zone or Tree Protection Zone as "The volume of roots necessary to have for tree health and stability.

Trees and Development A Technical Guide to Preservation of Trees During Land Development (Matheny and Clark 1998).

- Defines the optimum CRZ as an area where no site changes or disturbance would occur.

This optimum area is based on the British Standards Institute (BS5837: 1991 and BS 5837:2005). This method is based on ranges in tree diameter, tree age and vigor.

A modified method published in the Matheny and Clark handbook adds species tolerance, tree architecture and existing site constraints. Using this information the arborist can find the distance from the trunk that should be protected per unit of trunk diameter.

The CRZ does not always represent a radius around the tree. When necessary the area can be offset or shaped in a manner that accepts tree canopy constraints or existing conditions.

If encroachment into the CRZ or TPZ is required to retain the tree during development the arborist must provide alternative construction methods or preconstruction treatments to reduce impacts.

Comments
This section summarizes the health and structural conditions along with growing conditions (if applicable).

OBSERVATIONS

Site Description

The site is a flat 1.6-acre property located in the midst of a residential neighborhood. A large existing structure is located at the center of the site surrounded by asphalt parking areas accessed by several driveway approaches.

A large lawn is a component of the landscape and a number of existing trees are growing within the turf area around the perimeter of the property. Small landscape beds are near the building.

Tree Description

Tree growth is concentrated around the outside perimeter of the site in a circular patter that mimics the circular shape of the public roadway.

Five mature black acacia dominate the site. The trees are generally in fair to poor condition.

Tree #18 is pictured at right. The canopy displays significant thinning and faded foliar color at the top of the canopy. Several areas of decay, along with evidence of past fungal fruiting bodies are visible near the base of the trunk.

Trees #1 and #2 are pictured at right. Both have dense foliar canopies and lean toward the public street.

Decay is visible at the base of tree #1 in five separate areas. Tree #2 is decayed on the main trunk at a point six feet above the ground. The upper canopy is thinning.

Tree #5 is pictured at right. A large area of decay on the upper trunk is shown at arrow.

The main trunk has additional areas of decay along with weak branch attachments.

The tree canopy is thinning with faded foliar color.

Several mature black acacia growing on this site have failed in the past due to uprooting.

Three semi-mature black acacia growing on the site are in good health; immature madrone and cork oak are also growing around the perimeter.

Two mature palms are growing closer to the existing structure. They appear to be healthy and well maintained.

DISCUSSION

Any development planned for the site could impact trees on the site. The Critical Root Zone dimensions listed in the attached inventory represent the optimum area where construction activities should not occur.

Young, healthy trees are more tolerant of impacts and the CRZ's are generally smaller based on the diameter of the tree trunk and configuration of the canopy.

Older trees with varied defects in structure and fading and thin canopies require a much larger CRZ to accommodate the roots needed for both stability and transport of moisture and nutrients.

Tree species differ in their tolerances to construction related impacts such as excavation, soil compaction and covering the root systems with pavement or landscape elements.

Black acacia as a species has been found to have a poor tolerance to construction impacts and cannot tolerate root injury (*Trees and Development* Matheny and Clark1998).

In some cases construction within the CRZ can be completed if alternative construction methods are employed. Alternative methods can include supplemental irrigation, hand digging or grading, root pruning or modification to traditional construction methods. This can include spanning roots, pier and above grade beams or cantilevering structures.

CONCLUSION

As plans for the site are developed tree removal and tree preservation shall be based on the existing conditions of the trees and their suitability for incorporation into a modified site.

Trees that have structural defects and declining health are not appropriate for residential areas. Past failure of mature acacia in conjunction with the current condition of several trees must be considered.

Trees #1, #2, #5 and #18 display areas of decay in the main stems and branch structures along with faded foliar canopies.

The structure of trees #1 and #2 could be improved with weight reduction pruning, trees #5 and #18 should be considered for eventual removal. There are no arboricultural treatments available to improve the health or structural stability of the trees.

Three semi-mature acacia could be incorporated into the project if the CRZ's can be maintained with the design.

Please call my office with questions or concerns regarding the trees on this site.

Respectfully submitted,
Maureen Hamb-Certified Arborist WE2280

111 Errett Circle
Preliminary Tree Inventory

Tree #	Species	Diameter @ 54"	Health	Structure	CRZ Radius In Feet	Comments
1	black acacia	37	fair	fair	28	Five small to medium areas of decay at the base of the trunk. Two areas of mechanical damage. Canopy is thinning at the tree top. Old irrigation box is embedded at the base of the tree.
2	black acacia	32.6	fair	fair	24	Area of decay on trunk at 6 feet above grade. Small diameter dead branching, thinning upper canopy.
3	black acacia	24.3	fair/poor	fair/poor	18	Area of decay at base of trunk, other areas of decay on upper trunk. Thin foliar canopy
4	madrone	5.5 & 4.2	fair	fair	4	young tree with 2 stems
5	black acacia	24.9	fair	poor	18	Areas of decay on main trunk, tree top is thin-dieback
6	palm	29.5	good	fair	15	Small burrow in upper stem

Highlighted Cells Indicate "Heritage Tree"

111 Errett Circle
Preliminary Tree Inventory

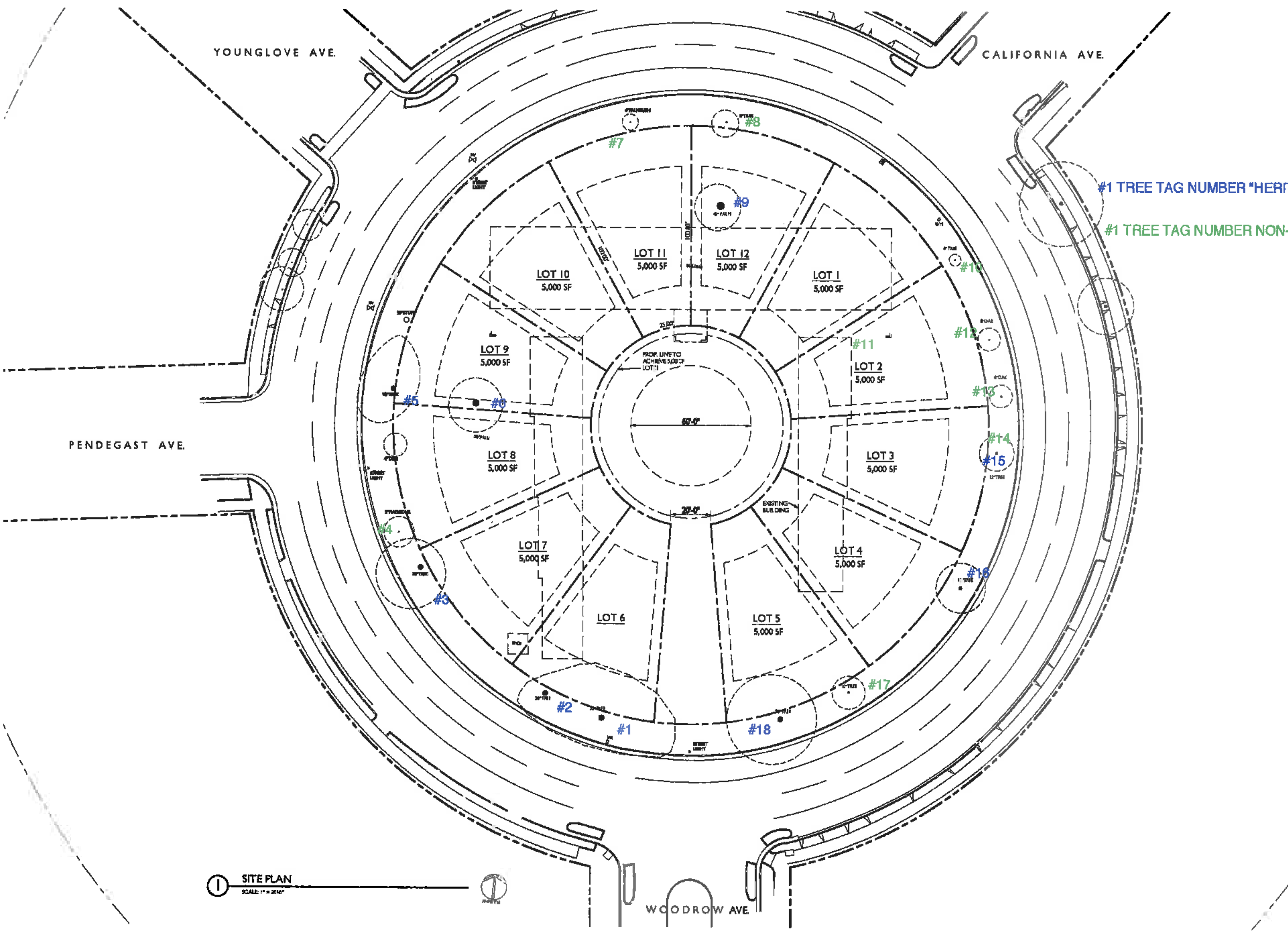
Tree #	Species	Diameter @ 54"	Health	Structure	CRZ Radius in Feet	Comments
7	palm	7.5	good	good	4	young tree
8	black acacia	8.3			N/A	standing dead
9	palm	22	fair	fair	11	
10	madrone	5.6	fair	fair	4	young tree
11	yew	multi stemmed shrubs	fair	fair	5	Mature bushes growing against building. Multiple 1 inch stems
12	cork oak	8.6	good	fair	4	Young tree with dense canopy

Highlighted Cells Indicate "Heritage Tree"

111 Errett Circle
Preliminary Tree Inventory

Tree #	Species	Diameter @ 54"	Health	Structure	CRZ Radius in Feet	Comments
13	cork oak	8.8	fair	fair	4	Young tree with leaning trunk, minor yellowing of foliage
14	cork oak	5.5 & 4.2	fair	fair	4	suppressed on one side
15	black acacia	14.3	good	fair	10	semi mature tree with codominant branch attachment, area of included bark
16	black acacia	17.6 @ 3'	good	fair	13	Dense healthy canopy
17	black acacia	11.8	good	fair	9	Young tree with dense healthy canopy
18	black acacia	30	poor	poor	30	Large, mature tree with 4 pockets of decay at base. Evidence of previous fungal infestation (*Ganoderma*) . Fracture on main trunk. Canopy is discolored (yellowing) and thin.

Highlighted Cells Indicate "Heritage Tree"



#1 TREE TAG NUMBER "HERITAGE" TREE

#1 TREE TAG NUMBER NON-HERITAGE

THACHER & THOMPSON ARCHITECTS

CIRCLE OF FRIENDS

ERRITT CIRCLE, SANTA CRUZ, CA 95060

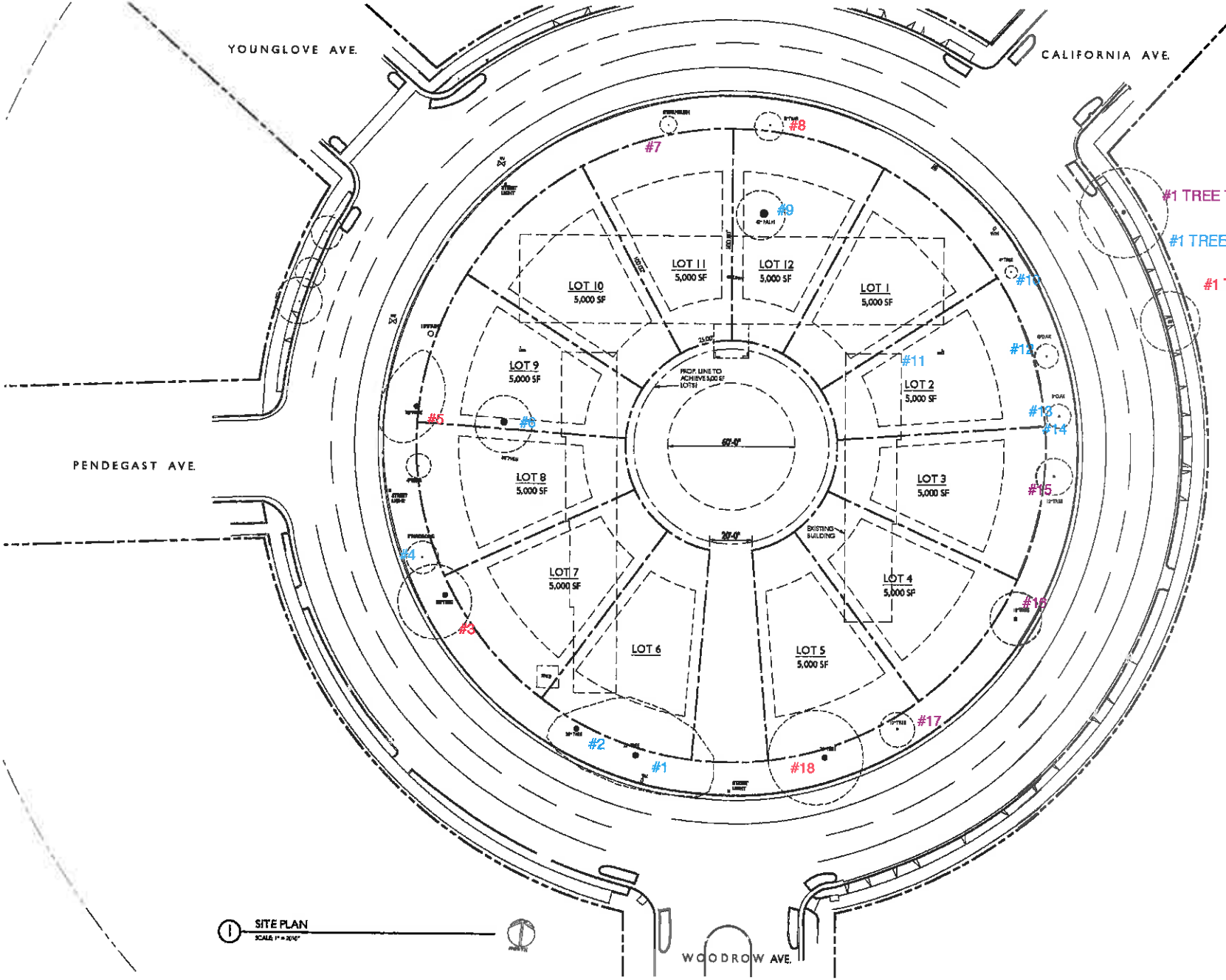
DRAWING DATE
JANUARY 2, 2018

ISSUED TO FACILITATE CONSTRUCTION
DATE PENDING

PROJECT FILE NAME:
CIRCLE OF FRIENDS

PRELIMINARY NOT FOR CONSTRUCTION

LICENSED ARCHITECT
THOMAS THACHER
C 12725
DECEMBER 31, 2019
EXPIRATION
STATE OF CALIFORNIA



SITE PLAN
SCALE: 1" = 20'-0"

#1 TREE TAG NUMBER GOOD CONDITION

#1 TREE TAG NUMBER FAIR CONDITION

#1 TREE TAG NUMBER POOR CONDITION

THACHER & THOMPSON ARCHITECTS
[illegible] CHACE STREET SUITE 240
SANTA CRUZ, CA 95060
(831) 423-7700 V
(831) 423-7707 F
[illegible]

CIRCLE OF FRIENDS
ERRITT CIRCLE, SANTA CRUZ, CA 95060

DRAWING DATE
JANUARY 2, 2016

ISSUED TO FACILITATE CONSTRUCTION:
DATE PENDING

PROJECT FILE NAME:
CIRCLE OF FRIENDS

PRELIMINARY
NOT FOR
CONSTRUCTION

LICENSED ARCHITECT
THOMAS THACHER
C 12735
DECEMBER 31, 2016
EXPIRATION
STATE OF CALIFORNIA

Maureen Hamb-WCISA Certified Arborist WE2280
Professional Consulting Services

PROJECT IMPACT ANALYSIS
111 ERRETT CIRCLE, SANTA CRUZ

Prepared for
Brett Packer

January 2019

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ASSIGNMENT/SCOPE OF SERVICES

Plans that propose a residential planned development have been completed for a 1.6-acre property located at 111 Errett Circle in the City of Santa Cruz. The site is currently used as a church along with other community-based activities.

In July of 2018, Brett Packer, a member of a group of property owners requested that I provide an analysis of the 18 existing trees on the site to determine the future disposition of the trees related to the residential development.

I provided an inventory and assessment of each tree along with a tree location plan. In addition, the Critical Root Zone of each tree was determined. Trees meeting the City of Santa Cruz "Heritage" tree description were noted in the inventory.

Recently I visited the site to inspect the trees to note any changes in condition. I have reviewed the following plans to analyze the potential impacts to trees:

- Site plans (two versions) prepared by C2G Civil Consultants Group Inc.
- Landscape plans prepared by Verde Design.

SUMMARY

Since June of 2018 I have visited the site on a number of occasions. In July of 2018 I completed an evaluation of 18 trees concentrated around the perimeter of the church buildings and parking lots. Nine of the trees are "heritage" as described in the City of Santa Cruz Ordinances.

In general, the mature trees (dominated by black acacia) were found to be in generally poor condition. Areas of decay, with evidence of decay causing fungus and thinning foliar canopies.

Two plan options have been prepared for the site following the demolition of existing structures and paved areas. One plan proposes 10 residential lots with a large common area, the other proposes 12 residential lots with a smaller central common area.

Both options require the removal of 16 trees currently growing around the perimeter of the site. The proposed curb and gutter, six-foot planting strip and sidewalk cannot be constructed without tree removal. The available space for continued tree development is not available. Two palm trees could be relocated to another area.

BACKGROUND/TREE INVENTORY OVERVIEW

In July of 2018 I completed a visual assessment of 18 trees to evaluate their health status, structural integrity and suitability for incorporation into the development project. My findings, along with a tree location map were documented in a Tree Resource Evaluation.

I recently visited the site to note any changes in tree condition and evaluate potential impacts related to the completed development plans. The inventory included in this report includes tree species, trunk diameter, current tree condition, CRZ radius, level of potential impacts and recommendations for tree removal.

Tree Species
Each tree was inspected to determine species, the inventory includes the "common" name for each tree. The botanical names are listed here:

- Black acacia (*Acacia melanoxylon*)
- Madrone (*Arbutus* 'Marina')
- Yew (*Taxus baccata*)
- Cork oak (*Quercus suber*)
- Canary Island palm (*Phoenix canariensis*)

Trunk Diameter
The diameter of each trunk/trunks was measured at a point 54 inches above natural grade (DBH) using a diameter tape. The City of Santa Cruz defines a protected "heritage" tree as those with a trunk diameter of 14 inches or greater when measured at a point 54 inches above natural grade.

Ratings for Tree Condition
Initial ratings were determined using the visual tree assessment methods developed by Clause Mattheck and described in The Body Language of Trees. Trees are rated as "good", "fair", or "poor" based on both biological and mechanical analysis.

Impact Ratings
This rating system evaluates the level of cumulative impacts related to the proposed construction as low, moderate or high.

- **Low** impacts are minimal, the optimum protection zone has been allowed.
- **Moderate** indicates impacts to either the absorbing or structural root systems. Special construction methods such as manual grading or reducing excavation depths may be required to reduce impacts to a low level.

- **High** impacts generally require tree removal. In many cases minor modifications to proposed excavation, grading or reduction of intense landscaping and reduce the impacts to a lower level. Monitoring of construction activities can aid in documenting the actual level of impacts rather than the anticipated impacts evaluated using development plans.

Comments/Recommendations
This section of the inventory summarizes the condition of the tree, construction impacts and recommendations for protection or the final disposition of the tree.

Critical Root Zone
The radius of the CRZ is determined following the evaluation of tree condition and tolerances. This exclusionary zone is an area of root or canopy development that, if possible, is left undisturbed.

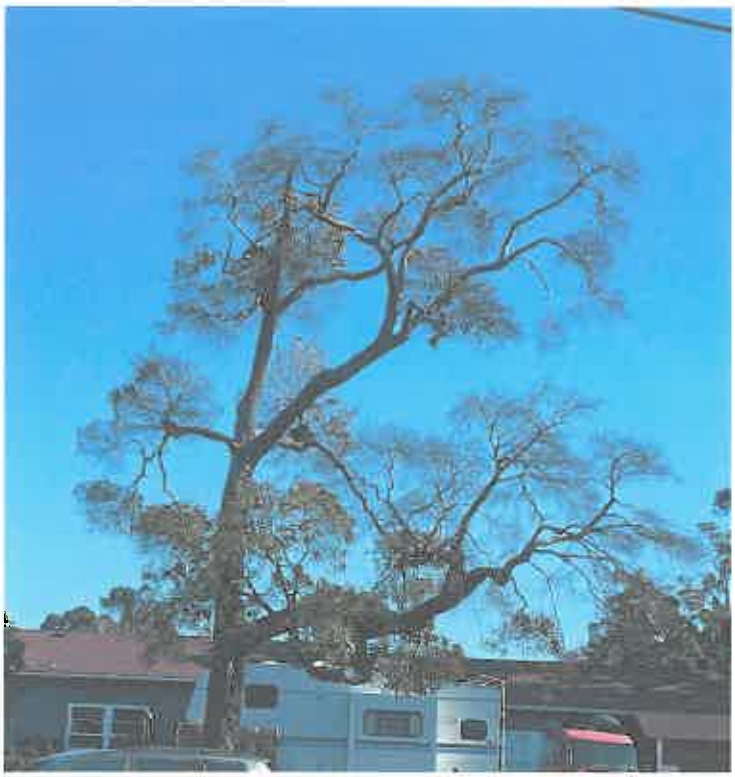
The method that has been successfully utilized to define the "optimum" critical root zone is based on the British Standards Institute (BSI) method developed in 2012. It uses ranges in trunk diameter, tree age and vigor to calculate the exclusionary zone. This method can be modified to include species tolerances and tree architecture.

OBSERVATIONS

The property is a level, circular 1.6-acre site that is currently used as a church and other community activities. The structure is located at the central portion of the property surrounded by asphalt parking areas. The trees surround the perimeter of the property behind the existing curb. There is no public sidewalk around the property.

The mature acacia are in various stages of decline. All have areas of decay in both the large diameter branches and main supporting trunks.

Trees #18 and #5 have significant decline in the foliar canopies. The condition of tree #5 has declined considerably since the initial inspection in July (pictured at right).



DEVELOPMENT IMPACTS

The impacts to trees on this site have been rated as "high". The requirements for curb, gutter and sidewalk does not allow for the retention of the trees. The mature acacia require large areas for root protection (CRZ).

The preservation of mature trees requires considerable space to ensure the long-term health and structural stability of the trees. Trees in a declining condition or those with significant structural defects that could lead to large branch or whole tree failure are not suitable for incorporation into development projects.

Black acacia as a species have been found to have a poor tolerance to construction impacts and cannot tolerate root injury (*Trees and Development* Matheny and Clark 1998).

REPLACEMENT TREES

The landscape plan includes several species of trees around the perimeter of the site as replacements. A six-foot planting area is proposed to accept the new trees.

CONCLUSION

The proposed development at 111 Errett Circle will require the removal of 16 existing trees. Nine of the trees meet the "heritage" tree description and are therefore protected and removal will require review and approvals by the City of Santa Cruz.

Although two options are proposed for the site, tree removal is not reduced by the either option.

The relocation of two mature palm trees is under consideration by the property owners.

Respectfully submitted,

Maureen Hamb- Certified Arborist WE2280

111 E. ott Circle
Final Tree Inventory
January 2019

Tree #	Species	Diameter @ 54"	Condition	Impacts: High Moderate Low	Impact Description	CRZ Radius in Feet	Comments/Recommendations
1	black acacia	37	fair	high	sidewalk, curb, gutter construction	28	Five small to medium areas of decay at the base of the trunk. Two areas of mechanical damage. Canopy is thinning at the tree top. Old irrigation box is embedded at the base of the tree. Growing within proposed curb, gutter and sidewalk. Tree requires a 28 foot radius of undisturbed area for retention/Remove and replace.
2	black acacia	32.6	fair	high	sidewalk, curb, gutter construction	24	Area of decay on trunk at 6 feet above grade. Small diameter dead branching, thinning upper canopy. Growing within proposed curb, gutter and sidewalk. Tree requires a 24 foot radius of undisturbed area for retention/Remove and replace
3	black acacia	24.3	fair/poor	high	sidewalk, curb, gutter construction	18	Area of decay beginning at base of trunk that extends along main stem into the upper canopy. Foliar canopy is thinning. Growing within proposed curb, gutter and sidewalk. Tree requires a 18 foot radius of undisturbed area for retention. Remove and replace
4	madrone	5.5 & 4.2	fair	high	sidewalk, curb, gutter construction	4	young tree with 2 stems, growing within proposed curb, gutter and sidewalk/Remove due to impacts
5	black acacia	24.9	poor	high	sidewalk, curb, gutter construction	18	Areas of decay on main trunk, canopy is 90% dead. Within proposed curb, gutter and sidewalk. Tree is not suitable for preservation/Remove and replace

Highlighted Cells Indicate "Heritage Tree"

Tree #	Species	Diameter @ 54"	Condition	Impacts: High Moderate Low	Impact Description	CRZ Radius in Feet	Comments/Recommendations
6	palm	29.5	fair	high	building envelope development	15	Small burrow in upper stem. Property owners may relocate
7	palm	7.5	good	high	sidewalk, curb, gutter construction	4	young tree growing within proposed curb, gutter and sidewalk/Remove
8	black acacia	8.3			sidewalk, curb, gutter construction	N/A	standing dead/Remove
9	palm	22	fair	high	building envelope development	11	Property owners may relocate
10	madrone	5.6	fair	high	sidewalk, curb, gutter construction	4	young tree growing within proposed curb, gutter and sidewalk/Remove

Highlighted Cells Indicate "Heritage Tree"

Tree #	Species	Diameter @ 54"	Condition	Impacts: High Moderate Low	Impact Description	CRZ Radius in Feet	Comments/Recommendations
11	yew	multi stemmed shrubs	fair	high	demolition of existing structures	5	Mature bushes growing against building. Multiple 1 inch stems/Remove
12	cork oak	8.6	fair	high	sidewalk, curb, gutter construction	4	Young tree with dense canopy. Growing within proposed curb, gutter and sidewalk/Remove
13	cork oak	8.8	fair	high	sidewalk, curb, gutter construction	4	Young tree with leaning trunk, minor yellowing of foliage. Growing within proposed curb, gutter and sidewalk/Remove
14	cork oak	5.5 & 4.2	fair	high	sidewalk, curb, gutter construction	4	Young tree suppressed on one side. Growing in proposed curb, gutter and sidewalk/Remove
15	black acacia	14.3	fair	high	sidewalk, curb, gutter construction	10	semi mature tree with codominant branch attachment, area of included bark. Growing in proposed curb, gutter and sidewalk/Remove and replace

Highlighted Cells Indicate "Heritage Tree"

Tree #	Species	Diameter @ 54"	Condition	Impacts: High Moderate Low	Impact Description	CRZ Radius in Feet	Comments/Recommendations
16	black acacia	17.6 @ 3'	fair	high	sidewalk, curb, gutter construction	13	Dense healthy canopy with minor structrual defects. Growing within proposed curb, gutter and sidewalk/Remove and replace
17	black acacia	11.8	fair	high	sidewalk, curb, gutter construction	9	Young tree with dense healthy canopy. Growing within proposed curb, gutter and sidewalk/Remove
18	black acacia	30	poor	high	sidewalk, curb, gutter construction	30	Large, mature tree with 4 pockets of decay at base. Evidence of previous fungal infestation (*Ganoderma*). Fracture on main trunk. Canopy is discolored (yellowing) and thin. Tree is not suitable for preservation/Remove and replace

Highlighted Cells Indicate "Heritage Tree"