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Professional Consulting Services*



TREE RESOURCE EVALUATION
PROJECT IMPACT ANALYSIS

415 NATURAL BRIDGES DRIVE

Prepared for
Housing Authority of Santa Cruz County

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ASSIGNMENT/SCOPE OF SERVICES

Development plans for a multiple residential building and associated access and parking areas are proposed for vacant land located 415 Natural Bridges Drive. The Housing Authority of Santa Cruz County retained me to evaluate the health, structural stability and suitability of the seven trees on the site.

I have completed the following scope of services to complete the impact analysis.

- Review site plans prepared by Thacher & Thompson Architects.
- Locate number and map seven trees growing on the site
- Identify trees as to species and measure trunk diameter at 54 inches above grade.
- Visually inspect each tree to evaluate health status, structural integrity and suitability for incorporation into the development project.
- Rate each tree as “good”, “fair”, or “poor” based on overall condition and species tolerances.
- Determine the Critical Root Zone areas based on trunk diameter and tree condition.
- Prepare a protection plan and provide recommendations for tree removal/retention based on construction impacts or overall condition.

SUMMARY

I have completed a visual assessment of seven individual trees growing on undeveloped property located at 415 Natural Bridges Drive. Acacia is the dominant species on the site, one coast live oak, one tulip tree and one walnut are growing on the site. A mature cedar tree is growing on the northern property boundary.

The development plans have been reviewed and impacts to the trees have been analyzed. The attached inventory includes specific impacts and recommendations for protecting the trees.

Tree removal will be necessary to develop the property as proposed. The trees are generally in poor condition and six trees will require removal. The mature cedar will be retained and protected during development.

Five of the trees meet the definition of “heritage” as stated in the City of Santa Cruz ordinance (9.56). Four “heritage” size trees are proposed for removal. I recommend planting replacement trees within the new landscape and parking areas.

TREE INVENTORY OVERVIEW

To complete the inventory and assessment of trees on this project site, I made two site visits in May and June of this year. The tree locations are documented on the attached site plan and correspond with the data in the inventory spreadsheet. The inventory includes the following information for the trees on this undeveloped site:

Tree Number

Tree locations are documented on the attached site plan prepared by Thacher & Thompson Architects.

Tree Species

The inventory indicates the “common” name for each tree. The botanical names of the trees in the project boundaries are listed here:

- Coast live oak (*Quercus agrifolia*)
- Acacia (*Acacia baileyana*)
- Deodar cedar (*Cedrus deodara*)
- Walnut (*Juglans sp.*)
- Tulip (*Liriodendron tulipifera*)

Trunk Diameter

The diameter of each trunk/trunks was measured at a point 54 inches above natural grade (DBH) using a diameter tape. Trees greater than 14 inches in diameter qualify as “heritage” trees within the City of Santa Cruz.

Tree Condition

The trees were visually inspected to evaluate health status and structural integrity. This type of assessment includes an evaluation of the biology and mechanics of each tree based on the visual analysis procedures developed by Claus Mattheck published in [The Body Language of Trees](#). The health and structure of the tree is then rated as “good”, “fair”, or “poor” in the attached 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 insect activity is visible. Vigorous, healthy 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.

Trees that contain dead branching, decayed areas or other structural defects that cannot be mitigated are not suitable for preservation on developed sites and should not be retained in areas where improvements are proposed.

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.

Impact Rating

Trees rated as having low impact potential are outside the development area, but require the protection provided by exclusionary fencing.

Trees rated as having a moderate impact potential are within 10 to 15 feet of excavation, grade changes or demolition activities. Fencing in combination with straw bale barricades are recommended to protect these trees.

Trees rated as having a high impact potential have excavation, grade changes or other site alterations proposed within the Critical Root Zone. Trees in these areas may be subjected to alternative construction methods or special treatments (manual grading or special construction methods) and require fencing and straw bale barricades to create a defined exclusion zone. Monitoring of all activities adjacent to, or within, the CRZ will be required.

In some circumstances using alternative methods cannot reduce impacts and tree removal becomes necessary. Excavation that removes structural roots can destabilize the tree and lead to failure.

Critical Root Zone (CRZ)

The “**Critical Root Zone**” is the optimum rooting area around a single tree or group of trees in which no grading or construction activity should occur. The zone should be large enough to retain sufficient root and crown area to maintain tree health and stability. The size of this zone depends on a number of factors (Matheny, Clark & Harris 1999).

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.

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.

Comments/Recommendations

Recommendations for tree removal/retention are listed here.

PROJECT DESCRIPTION

The project includes the development of a single structure with multiple dwellings, associated landscape, paved access and parking areas.

OBSERVATIONS

Site Description

The site is an undeveloped property bordering a public street with commercial structures and rail road access.

Tree Description

The cedar tree is healthy and well structured. It is standing at the northern property boundary, straddling the property boundaries (pictured at right).

Tree #2, a coast live oak is growing near the center of the vacant property. Although the canopy appears healthy, the tree has been under attack by oak bark beetles for a long period of time. In addition, the main trunk is decayed in several areas (pictured below).



The three acacia are in various stages of decline with thinning canopies. Acacia as a species have been defined as “invasive” by the Invasive Plant Council. The negative species characteristics have been documented as the following:

- Copious seed spread
- Displacement of native plants
- Increased fuel loads

Construction Impacts

The impacts to trees on this site have been rated from moderate (tree #1) to high. The six remaining trees are growing within the footprint of the proposed residential structure of access roadway and will require removal.

CONCLUSION

I recommend the installation of replacement trees within the proposed landscape and parking areas (if possible).

The project will require the removal of six trees that are generally in poor condition. Tree #1, the cedar will be retained and protected by exclusionary fencing and straw bale barricades.

Any questions regarding the trees on this site or the content of this report can be directed to my office.

Respectfully submitted,
Maureen Hamb- Certified Arborist WE2280

Housing Authority
415 Natural Bridges Drive

Tree #	Species	Diameter @ 54"	Condition	Impact Description	Impacts: High Moderate Low	Critical Root Zone Radius in feet	Comments/Recommendations
1	cedar	24.9	good	landscaping area	moderate	12	Healthy, well structured tree growing on the northern property/Limit plantings within the CRZ. Protect root zone with fencing and straw bale barricades
2	coast live oak	21.8	poor	within building footprint	high	11	Damage and oak bark beetles have infested the trunk. Growing within the proposed building footprint/Remove due to impacts
3	tulip	37.5	poor	within building footprint	high	18	Foliar canopy is 80% dead. Growing within proposed building footprint./Remove due to tree condition and impacts.
4	acacia	14.4	poor	within proposed driveway	high	7	Leaning structure, thinning lower canopy. Growing within proposed driveway access/Remove due to impacts
5	acacia	15	poor	within proposed driveway	high	8	Significant decay at base of trunk. Growing within proposed driveway/Remove due to condition and impacts
6	acacia	double	poor	within proposed driveway	high	8	Two main trunks with weak structural attachments and thinning canopy. Growing within proposed driveway/Remove due to impacts
7	walnut	13	poor	at edge of proposed driveway	high	12	Sensitive species that cannot tolerate impacts/Remove due to impacts



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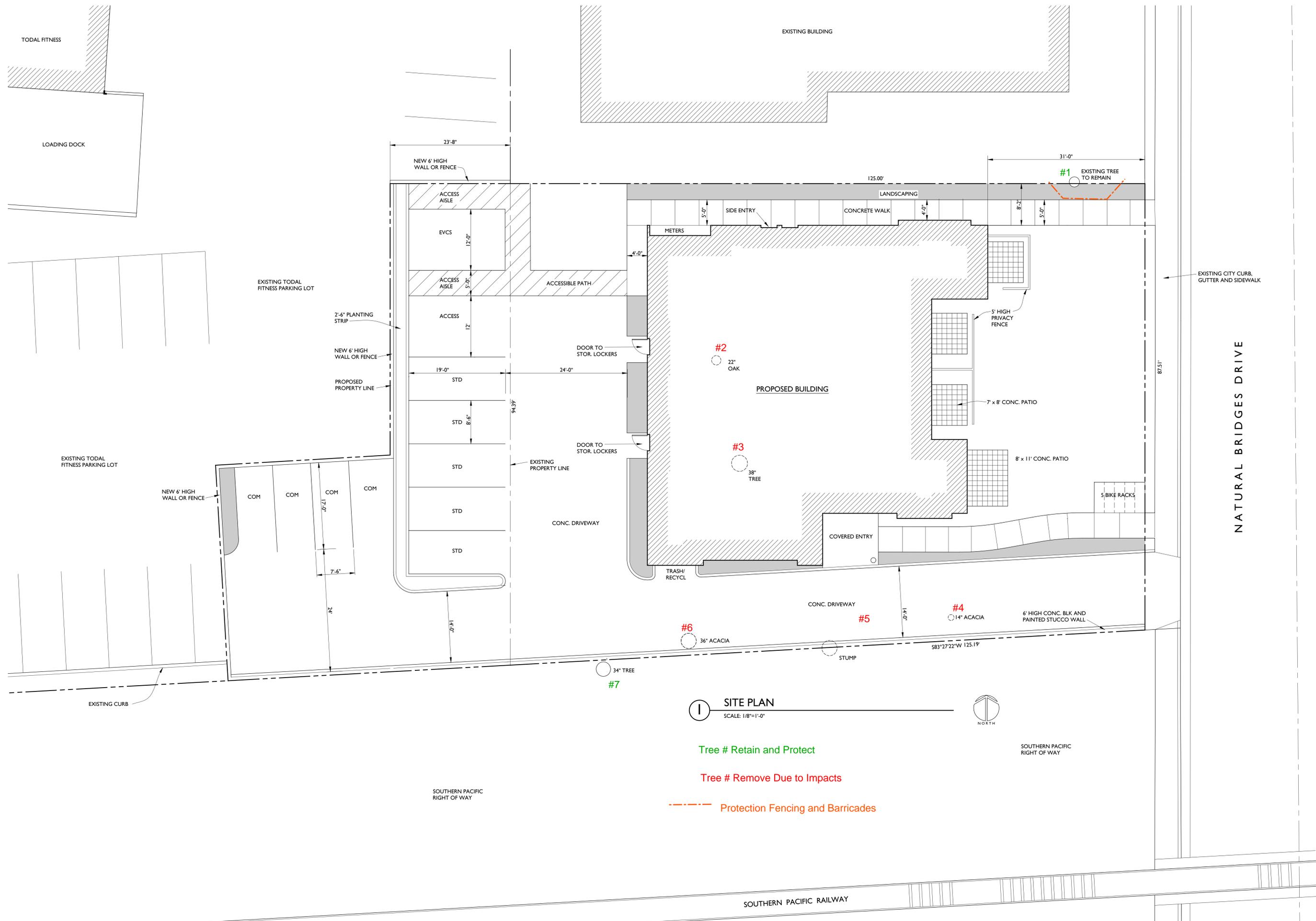
HOUSING AUTHORITY OF SANTA CRUZ COUNTY
 415 NATURAL BRIDGES DRIVE, SANTA CRUZ, CA 95060

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PRELIMINARY NOT FOR CONSTRUCTION



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1 SITE PLAN
 SCALE: 1/8"=1'-0"
 NORTH
 SOUTHERN PACIFIC RIGHT OF WAY

Tree # Retain and Protect
 Tree # Remove Due to Impacts
 Protection Fencing and Barricades