

Butte County
Oak Woodlands Technical Manual
Draft



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Department of Development Services

Oak Woodlands Technical Manual

-This manual is organized as follows-

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Section 1

Introduction

1.1 Goals

Butte County has prepared this Oak Woodlands Technical Manual as a companion document to the Oak Woodlands Mitigation Ordinance. The intent of this guide is to give clear instruction to applicants, property owners, builders, arborists and foresters who are managing discretionary projects in oak woodland habitat areas.

The Oak Woodlands Technical Manual is a separate document maintained by Butte County Department of Development Services which is intended to establish specific technical regulations, standards and specifications necessary to implement the Ordinance.

Goals of this Manual

- Outline and implement the requirements of the Butte County Oak Woodlands Mitigation Ordinance.
- Specifically detail construction and environmental mitigation requirements related to discretionary projects impacting oak woodlands.

1.2 Definitions

Caliper: An instrument for measuring the distance between two opposite sides of an object. Calipers are commonly used to measure tree diameters.

Canopy Cover: The area directly under the live branches of oak trees.

Conservation Easement: a legal agreement a property owner makes to restrict the type and amount of development that may take place on his or her property.

Critical Root Zone (CRZ): A circle on the ground around a tree that generally corresponds to the drip line of the tree. An equation is used to determine the CRZ of a tree. The CRZ is especially sensitive to construction impacts such as compaction. Disturbance within the CRZ has potential to severely damage or kill oak trees and woodlands.

Crown: The totality of a plants above ground parts, including stems. Leaves, and reproductive parts.

Decision-Making Authority: The public hearing authority to make a decision on a discretionary project. This includes the Zoning Administrator, Planning Commission or Board of Supervisors.

Defensible Space: The buffer, generally 100 feet, around an existing structure, or to the property line, whichever is closer or as otherwise provided by CAL FIRE or other fire agency. Defensible space is intended to reduce the danger of fires.

Diameter at Breast Height (DBH): The diameter of the perimeter tree trunk at 54 inches (4.5feet) above natural grade level.

Diameter Tape: Measuring tape used to estimate the diameter of a tree or other cylindrical object.

Discretionary Project: A project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity.

Drilling: A method of tunneling under the sensitive roots of trees through the use of specialized drilling equipment.

Disturbance: All of the various activities from construction or development that damage trees.

Drip Line: The area directly below the branches of a tree, typically represented as a circle on the ground. It represents the location of water dripping off the end of the tree's foliage.

Foliage: The aggregate of leaves of one or more plants.

Hazardous Tree: a tree that possesses a structural defect which poses an imminent risk if the tree or part of the tree that would fall on someone or something of value. Structural defect means any structural weakness or deformity of a tree or its parts.

International Society of Arboriculture: Arborist collective and professional certification organization.

Land Trust: A private, nonprofit organization that, as all or part of its mission, actively works to conserve land by undertaking or assisting in land or conservation easement acquisitions, or by its stewardship of such land easement.

Mitigation Banking: The restoration, creation, enhancement, or preservation of a wetland, stream, or other habitat area undertaken expressly for the purpose of compensating for unavoidable resource losses in advance of development actions, when such compensation cannot be achieved at the development site or would not be as environmentally beneficial.

Natural Community Conservation Plan: A plan that is required by the Natural Community Conservation Plan act. It identifies and provides for the regional protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

Oak Tree: means a native tree species in the genus Quercus, not designated as Group A or Group B commercial species pursuant to regulations adopted by the State Board of Forestry and Fire Protection pursuant to Section 4526, and that is 5 inches or more in diameter at breast height..

Oak Woodland: For the purposes of this technical manual and the corresponding ordinance, an oak woodland is considered to be any area or group of trees that contain any oak tree or trees.

Oak Woodland Corridors: Strips of habitat that connect larger patches of oak woodland and have a high ecological value. For the purposes of this manual, the term “connections” is used interchangeably with “corridors”.

Oak Woodland Condition. A description of the condition of oak woodland prepared by a qualified professional based on a variety of factors. Methodology to determine this includes but is not limited to the University of California Oak Woodland Impact Decision Matrix. Oak Woodland Condition is further defined as follows:

1. **Oak Woodland Condition, Intact:** In this condition roads and buildings are rare across the site. Trees, both dead and alive, dominate the landscape and the site is capable of natural regeneration of oaks and other plant species. The site allows for movement of wildlife and the existing development is localized and limited to a small number of residences with service buildings or barns. The site is relatively undisturbed and is recognized as Intact. Examples of an Intact woodland may include large to moderately (even relatively small parcels may qualify) sized private ranches; expansive oak woodlands zoned for agriculture, open space, scenic corridors, etc.
2. **Oak Woodland Condition, Moderately Degraded:** The site has been changed in one or more ways that has reduced its potential for providing ecological and socially important services. For example, it may have been partially developed resulting in the net loss of trees; the canopy or understory may have been reduced or eliminated over all or part of the site; past grazing or soil disturbance may have impaired regeneration in some areas.
3. **Oak Woodland Condition, Severely Degraded:** Site has been dramatically altered and is currently in a condition that has no trees or very few remain; it is being managed in such a way that natural regeneration is not possible or practical; the soil is compacted or contaminated; and/or has been used for residential, commercial or industrial purposes. Roads and stream crossings are commonplace and fencing and other obstructions limit wildlife access and movement.

Oak Woodlands Evaluation Plan: A plan prepared by a qualified professional that assesses the health of Oak Woodlands on and near a project site. The Oak Woodland Evaluation Plan shall include but not be limited to the site location and plan, a description of the oak woodland, a measure of total oak canopy, an indication of any oak woodland connections, a fencing plan and any proposed mitigations.

Oak Woodland Conservation Fund: A fund, established by the Oak Woodland Conservation Program that holds and distributes funds paid as mitigation by development projects.

Oak Woodlands Technical Manual: This manual. The Oak Woodland Technical Manual is a companion document to the Butte County Oak Woodland Mitigation Ordinance that outlines the process of managing construction projects on oak woodlands in detail and implementing other portions of the Ordinance.

Premature Removal: The removal of oaks prior to development application for the purpose of avoiding regulation, which may be subject to penalties. The removal of trees up to five years prior to filing the development application is considered premature.

Project Site: A parcel or parcels of land on which a land development project is proposed.

Prune: The selective removal of parts of a plant such as branches, buds, or roots.

Qualified Professional: A qualified professional is either:

1. **Certified Arborist** is a person certified by the International Society of Arboriculture (ISA), American Society of Consulting Arborists (ASCA), or other recognized professional organization of arborists that provides professional advice and licenses professionals to do physical work on trees.
2. **Registered Professional Forester (RPF)** is a person licensed by the State of California to perform professional services that require the application of forestry principles and techniques to the management of forested landscapes. RPFs have an understanding of forest growth, development, and regeneration; forest health; wildfire; soils, geology, and hydrology; wildlife and fisheries biology, and other forest resources.

Removal: Complete tree removal such as cutting to the ground or the extraction of the tree, taking any action foreseeably leading to the death of a tree or permanent damage to its health or structural integrity, including but not limited to excessive pruning, cutting, girdling, poisoning, over watering, unauthorized relocation or transportation of a tree, or trenching, excavation, altering the grade or paving within the drip line of a tree.

Soil Compaction: The compression of soil particles that may result from the movement of heavy machinery and trucks, storage of construction materials, structures, paving, etc. Soil compaction within the Critical Root Zone can result in atrophy of roots and the potential death of the tree. Damage from root compaction can manifest years after construction activities take place.

Specimen Tree: Any tree that is selected for outstanding qualities, such as age, size, or beauty.

Trenching: Any excavation to provide irrigation, install foundations, utility lines, services, pipe, drainage, or other property improvements below grade. Trenching within the Critical Root Zone (CRZ) damages roots and tree health. Trenching within the CRZ is prohibited unless approved. Approved trenching within the CRZ must be done in compliance with the recommendations made in this manual.

1.3 Applicability

Be sure to review your project for applicability before you start. You may find that the provisions of the Oak Woodland Mitigation Ordinance and Technical Manual do not apply to your project. The Ordinance applies to discretionary projects that result in the removal of oak trees or oak woodlands including disturbance to the Critical Root Zone (CRZ). See the Ordinance for additional information on applicability.

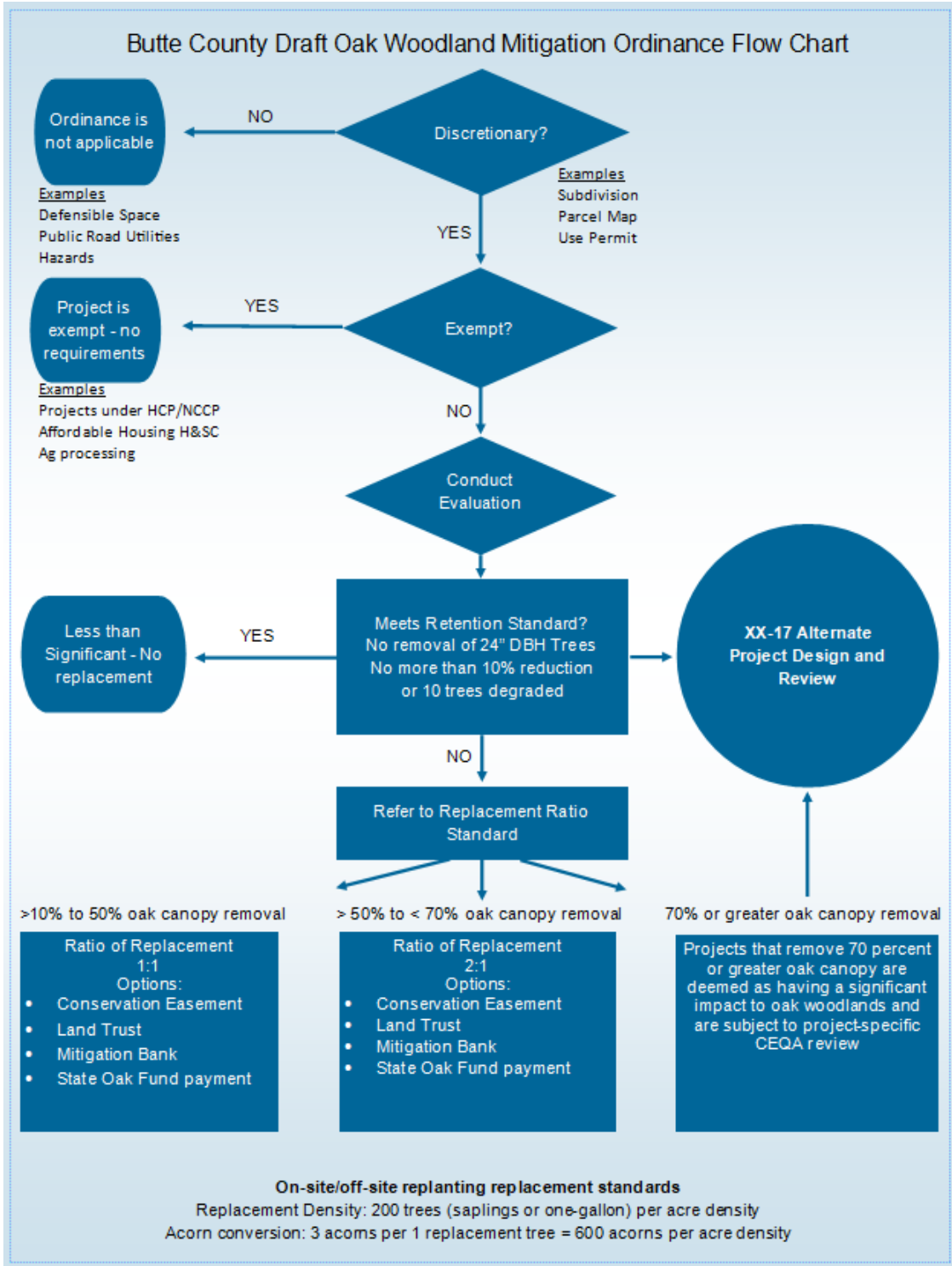
1.4 Exemptions

Your project may be exempt from the requirements of the Oak Woodland Ordinance and the provisions of this manual. Take a moment to review the possible exemptions. The following types of actions are exempt from this ordinance:

- ❑ Projects undertaken pursuant to an approved Natural Community Conservation Plan or approved subarea plan within an approved Natural Community Conservation Plan that includes oaks as a covered species or that conserves oak habitat through natural community conservation preserve designation and implementation and mitigation measures that are consistent with Public Resource Code, Section 21083.4.
- ❑ Affordable housing projects for lower income households, as defined pursuant to Section 50079.5 of the Health and Safety Code, that are located within an urbanized area, or within a sphere of influence as defined pursuant to Section 56076 of the Government Code.
- ❑ Conversion of oak woodlands on agricultural land, with a zoning designation of Agriculture (AG) or Agriculture Services (AS), that includes land that is used to produce or process plant and animal products for commercial purposes.
- ❑ Projects undertaken pursuant to Section 21080.5 of the Public Resources Code as a State Secretary of Resources Agency certified regulatory program.

1.5 Flow Chart

Use this flow chart to help figure out where you are in the process of your oak-related discretionary project.



Section 2

Before Your Project

Review the provisions in this section to plan your construction activities carefully. Thorough planning can reduce the likelihood of damaging the health of oaks and oak woodlands during construction.

2.1 Premature Removal of Trees

If sufficient evidence exists that oaks were removed prior to development application approval, a penalty may be applied to the responsible party. If a premature removal is determined to have happened, the requirements of the Butte County Oak Woodlands Mitigation Ordinance shall be applied for those trees that were removed prior to development application approval. The decision-making authority may also choose to implement a replacement tree penalty of up to 10:1 in addition to the ratios outlined in the Oak Woodland Ordinance. The removal of trees up to five years prior to filing the development application shall be considered premature. In determining the penalty, the decision-making authority shall consider the following factors:

- The seriousness and scope of the premature removal of trees
- The relationship to project site design
- The impact of the removal on the health of the oak woodland habitat
- Any other factors deemed relevant

2.2 Contacting an Expert

An arborist or registered professional forester should be called in as a consultant to the construction site before any work is started. The qualified professional will recommend the removal of trees that are unlikely to survive construction activities, regardless of the scope of work. Your qualified professional will be your expert opinion and point of contact for any tree related construction activity, such as tree pruning, tree removal, root cutting, mitigation options and any other questions related to tree health. In general, the contractor is responsible for preventing trees from damage. It is the responsibility of the contractor to ensure that any person working on the project be aware of their impact on oaks or groups of oaks on the project site. The construction and maintenance staff must make the best effort to avoid unnecessary activities within the drip line of trees. Contact the Department regarding exceptions to this requirement.

2.3 Oak Woodland Evaluation Plan

An Oak Woodlands Evaluation Plan is required as part of your project application. The Oak Woodlands Evaluation Plan helps to gather and present critical information about the status of an oak woodland. The Evaluation Plan should be prepared with coordination from a qualified professional. This plan is necessary to determine the extent of any impact to oak woodlands in the project area as well as to put

protections in place and plan for environmental mitigations. The plan will be reviewed and approved by the Butte County Zoning Administrator. An Oak Woodlands Evaluation Plan must include the following elements:

- 2.3.1 -- Site location and site plan
- 2.3.2 -- Description of oak woodland
- 2.3.3 -- Measure of total oak canopy area
- 2.3.4 -- Oak woodlands to remain
- 2.3.5 -- Fencing plan
- 2.3.6 -- Proposed replacement

2.3.1. Site location and site plan

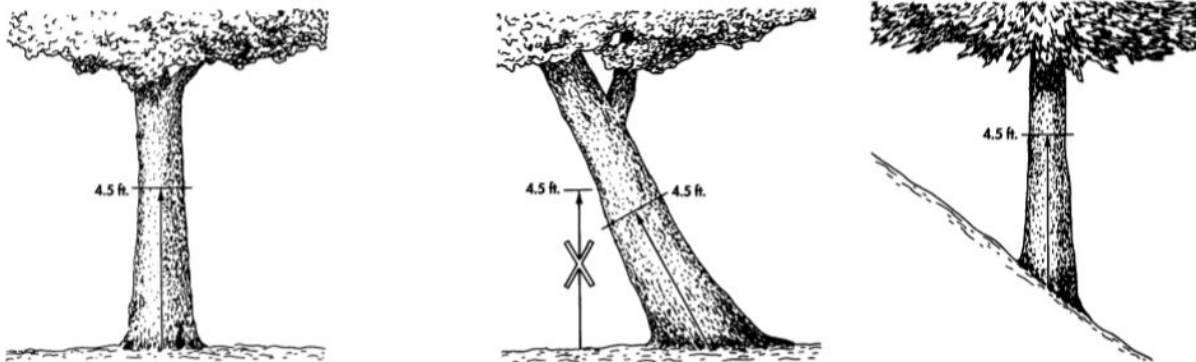
- The site location should indicate the address or parcel number of the project site, as well as total acreage.
- Site plans should show the project area and indicate where trees, vegetation and soils are going to be disturbed during the construction and operational phases of the project. This includes trees on adjacent properties that would be impacted by construction or operational activities.
- Trees or groups of trees in the disturbed area must have their locations, botanical name, Diameter at Breast Height and Critical Root Zone (see section 2.4) clearly indicated.
- Site plans should show where oak trees with a DBH of 5" or greater are going to be disturbed or removed by construction/operation of the project site.

2.3.2 Description of oak woodland

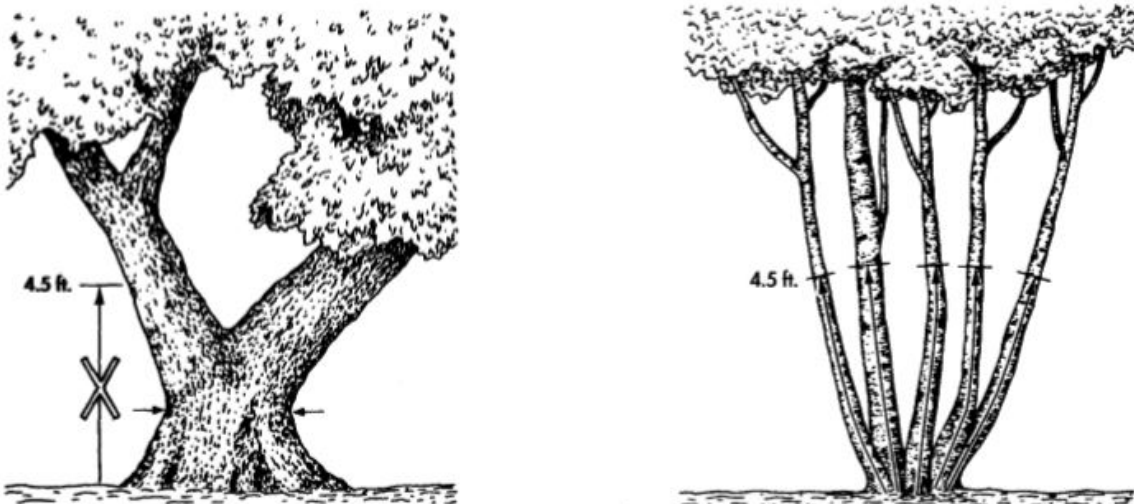
- A description of representative samples of the species and sizes of all oaks larger than 5" DBH on the project site.
- An evaluation of the health and structural stability of the woodlands on the project site and an assessment of their ability to provide long-term benefits after construction.
- Diameter at Breast Height should be recorded to the nearest inch. Trees may be measured with a caliper, cruise stick, standard tape measure or diameter tape.

Illustration 2-1: DBH measurement areas

From: *Guide for Plant Appraisals, 9th ed.*



- ❑ **Trunk branching lower than 4 ½' from the ground:** When branching begins less than four and a half (4.5) feet from the ground, measure the smallest circumference below the lowest branch. In this example, an alternative would be to add the sum of the cross-sectional areas of the two stems measured about 12 inches above the crotch. Then average the sum of these two branch areas and the smallest cross-sectional area below the branches. This may give a better estimate of the tree size. See illustration below.
- ❑ **Multi-stemmed tree:** To determine the diameter of a multi-trunk tree, measure all the trunks; add the total diameter of the largest trunk to one-half (1/2) the diameter of each additional trunk. A multi-trunked tree is differentiated from individual trees growing from a common root stock if there is a visible connection between the trunks above ground. See illustration below.



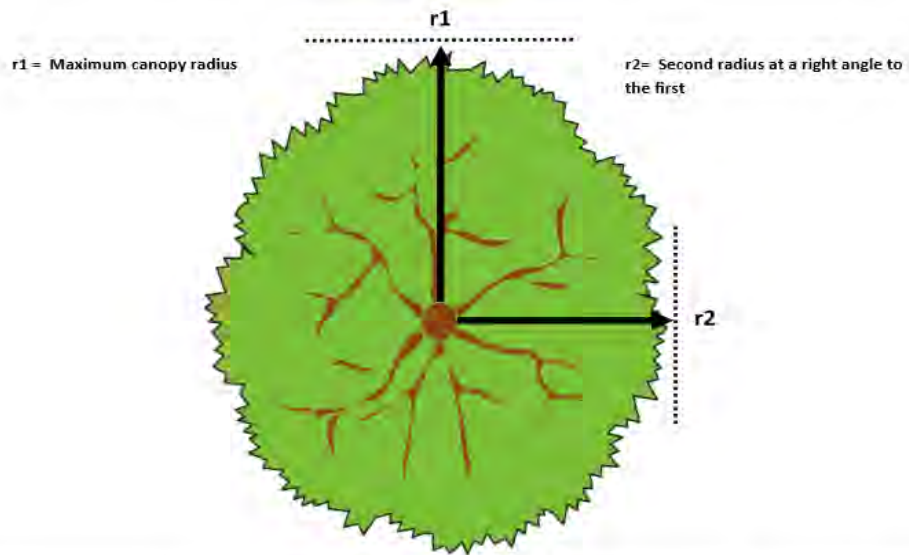
2.3.3 Measure of total oak canopy area

Oak canopies shall be measured using the International Society of Arboriculture recommendations. Canopy cover can be measured directly, through photogrammetry (measurement from aerial photographs or digitized aerial images), ground surveys, or a method approved by a qualified professional and accepted by the Department of Development Services. Your project's qualified expert can exercise his or her discretion when determining the appropriate method of canopy measurement.

- ❑ **Individual Tree method:** Canopy cover provided by individual trees can be estimated by measuring the maximum canopy radius and a second radius at a right angle to the first. Canopy area can then be calculated using the formula for the area of an ellipse, i.e.,

$$\text{Area} = \pi * r1 * r2$$

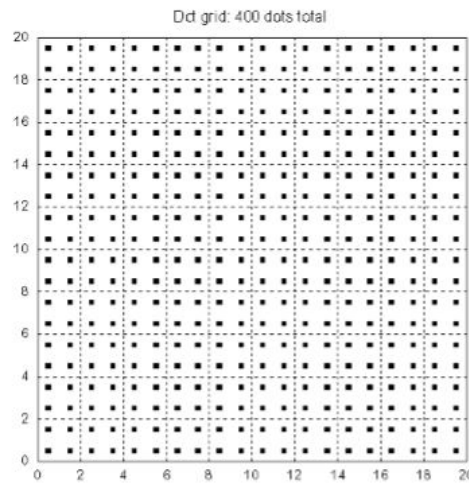
Where $\pi=3.14159$, and $r1$ and $r2$ are the two radii (i.e., half the diameters). If tree canopies are symmetrical, a single diameter can be measured and the formula for the area of a circle ($\pi*r*r$) is used. The total area covered by tree canopy can be divided by the area of the site to obtain percent canopy cover. This methodology works best for areas with non-overlapping tree canopies, such as parking lots or other relatively open areas.



Calculating Individual Tree Canopy Cover		Inches to feet conversion table	
1.	Measure the maximum canopy radius in feet	1"	0.0833 ft.
2.	Measure a second radius at a right angle to the first in feet	2"	0.1667 ft.
3.	Canopy area can then be calculated using the formula for the area of an ellipse = $\pi \times r1 \times r2$	3"	0.2500 ft.
For Example, if (r1) is 20 feet and 8 inches and (r2) is 18 feet and 4 inches, then:		4"	0.3333 ft.
3.14 × 20.667 × 18.3333 = 1,189 square feet (remove decimal numbers but round appropriately)		5"	0.4167 ft.
Example Workspace...		6"	0.5000 ft.
1.	r1 = _____ ft.	7"	0.5833 ft.
2.	r2 = _____ ft.	8"	0.6667 ft.
3.	3.14 × r1 _____ × r2 _____ = _____ square feet (remove decimal numbers but round appropriately)	9"	0.7500 ft.
		10"	0.8333 ft.
		11"	0.9167 ft.

- ❑ **Dot grid method:** A dot grid is simply a set of dots, symbols, or intersecting grid lines that is superimposed over an image. Tree canopy cover is estimated by counting the number of dots that fall on tree crowns compared with the total number of dots in the area sampled. Tree canopy cover can then be calculated from the following formula:

$$\% \text{ canopy cover} = 100 \times (\text{dots falling on tree canopy} / \text{total number of dots within sampled area})$$



2.3.4 Oak woodlands to remain

The project shall be designed such that the oak woodlands that are to remain are of intact condition; along waterways and/or wildlife corridors including deer migration corridors; are connected with oak woodlands on adjacent lands including public lands; and, other factors determined by the Department of Development Services. A qualified professional shall determine and label the presence of any woodland corridors that connect larger oak woodlands to each other. Corridors of oak woodland are important to animals moving from woodland to woodland and for the overall health of the oak woodland habitat. The removal of Oak Woodland Corridors negatively impacts overall woodland health in Butte County and impairs the movement of many species that rely on woodland habitat. The project shall be designed such that the oak woodlands that are to remain are:

- ❑ of intact condition, as described in the UC Integrated Hardwood Range Management Programs' 2008 Oak Woodland Decision Matrix
- ❑ along waterways and/or wildlife corridors including deer migration corridors
- ❑ are connected with oak woodlands on adjacent lands including public lands
- ❑ other factors determined by the Department of Development Services

2.3.5 Fencing plan

A protective fence or brightly colored staked boundary will be placed 5 feet beyond the established CRZ of the tree or group of trees being protected. A warning sign shall be prominently displayed on each fence. The Sign should be a minimum of 16 x 24 inches, brightly colored and be clearly visible, even from vehicles. The sign must clearly indicate that the CRZ is a restricted area. Orange safety triangles may suffice if other signage cannot be constructed. The fencing of protected trees or groups of trees helps achieve several important goals:

- ❑ Keep foliage, branches and crown clear from contact with equipment, materials and activities.
- ❑ Preserve roots and soil conditions in an intact and non-compacted state
- ❑ Visually identify the Critical Root Zone (CRZ) in which no soil disturbance is permitted and activities are restricted, unless otherwise approved

High visibility plastic mesh fence is recommended to maximize the visibility of protected tree areas. Wire with bright-colored flags placed at equal intervals can also be a suitable barrier so long as it maintains high visibility. Tree fencing shall be erected before any demolition, grading or other construction begins and shall remain in place until the final inspection by a qualified professional.

Illustration 2-2: Example of protective fencing

From: "conserving Wooded Areas in Developing Communities"



2.3.6 Proposed Replacement

Clearly list your proposed mitigations for the project. This section should have mitigations proposed at the set county rate. If an alternative mitigation is proposed than listed in this manual, it must be done so by a qualified professional. Any alternative mitigation proposals must be likely to preserve as much or more total canopy area, within Butte County, as the mitigation strategies listed in this manual. All mitigation proposals and alternative mitigation proposals are subject to approval by the County.

REMOVAL & REPLACEMENT RATIOS

	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Replacement	None	1:1 Replacement Ratio				2:1 Replacement Ratio		See Section XX-17		
Percent Range	0-10%	10.1% to 50%				50.1% to 70%		70.1% to 100%		

(Refer to Ordinance for specific requirements and limitations, for example, 24" DBH trees.)

2.4 Critical Root Zone

Each tree or group of trees in an oak woodland shall have a designated Critical Root Zone (CRZ) identifying an area sufficiently large enough to protect the trees and roots from disturbance. The CRZ is a radius equal in feet to the number of inches of a tree's trunk diameter at Breast Height (DBH), with a minimum of 8 feet. The CRZ shall be shown on all tree surveys, tree protection plans, tree replacement plans, and construction plans. Improvements or activities such as paving, utility and irrigation trenching and other activities shall occur outside the CRZ, unless authorized by a qualified professional or administrator. Unless otherwise specified, protective fencing shall be placed 5 feet beyond the CRZ. Fencing may be placed closer to a tree or group of trees at the discretion of a qualified professional.

Restricted Activities within the CRZ

- Grade changes within the CRZ are not permitted
- Drainage changes within the CRZ are not permitted
- The severing of roots over 2" in diameter must be done only with approval from a qualified professional
- heavy equipment use, vehicular traffic, parking of vehicles
- The use of tree trunks as winch support, anchorage, as a temporary power pole, sign post or other similar function
- Storage or dumping of construction materials, waste or tools is not permitted within the CRZ
- Cutting of tree roots by utility trenching, foundation digging, placement of curbs or trenches and other miscellaneous excavation is not permitted unless approved by a qualified professional.

- ❑ Dumping of poisonous materials such as paint, petroleum, concrete, stucco, dirty water, or any other material that can affect the health of the tree or trees.

Required or permitted Activities within the CRZ

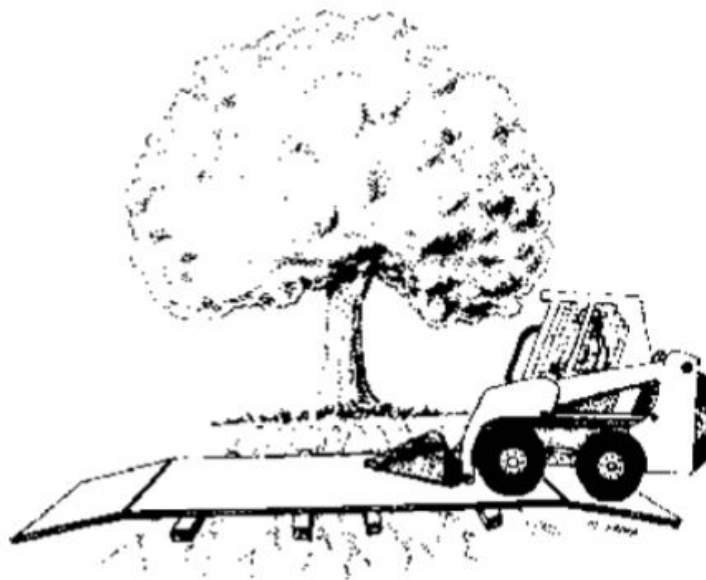
- ❑ Spread mulch, 4-6" in depth, in the CRZ, leaving the trunk clear of mulch. The application of mulch helps reduce inadvertent compaction and moisture loss from occurring. Mulch material should be 2", untreated wood chip mulch or an approved equal. Mulching should only be applied to trees or groups of trees directly adjacent to construction activities.

2.5 Compaction

Compaction of soil around tree roots can impair tree development by restricting drainage and inhibiting new root growth. Damage from soil compaction can manifest years after construction activities take place. Avoid driving vehicles over the CRZ and drip line of trees. If driving over these areas is unavoidable, deflate tires slightly to redistribute the weight over a larger area. If several crossings are required, place up to 6" of mulch over the CRZ to prevent compaction. Plywood can also be used to construct a temporary crossing bridge that distributes vehicle weight over the CRZ. Consult with a qualified professional to determine the best mitigation for your project and to review your soil compaction mitigations before beginning construction.

Illustration 2-3: Example of plywood crossing bridge

From: Conserving Wooded Areas in Developing Communities



2.6 Erosion Control

If a tree or group of trees is adjacent to or in the immediate proximity to a grade slope of 8% (23 degrees) or more, then erosion control or silt barriers shall be installed outside the CRZ to prevent siltation and/or erosion within the CRZ. Erosion and sedimentation control barriers shall be installed or maintained in a manner which does not result in soil build-up within tree drip lines or CRZs.

2.7 Verification of Tree Protections

The project contractor, consultant or manager will collaborate with a qualified professional to verify, in writing, that all pre-construction oak woodlands preservation conditions have been met as follows:

- Tree fencing installed on any trees or tree areas that are to be preserved
- Erosion control secured on trees or tree areas that are to be preserved
- Tree pruning completed if necessary
- Preventative measure for soil compaction have been installed
- Tree maintenance schedule established if needed

Written verification must be submitted to and approved by the Department of Development Services prior to the removal of oak trees.

2.8 Pre-Construction Meeting

Contractors or employees who will be interacting with trees or operating within the CRZ must attend a pre-construction meeting with a qualified professional. The meeting is meant to ensure that all involved parties are aware of the tree protection measures and procedures that will be employed. The meeting will also review procedures, tree protections, hauling routes, staging areas and any other procedures deemed important by a qualified professional. The pre-construction meeting is an important step towards having a cohesive understanding of your impacts on oak woodlands and gives all parties an opportunity to interact with your qualified professional.

Section 3

After Project is Approval

3.1 Approved Conditions

Butte County has several available options to mitigate for the removal or damage of oak woodlands. Your project qualified professional shall choose the mitigation option or combination of mitigation options that are most suitable for your project.

3.1.1 Conservation easements

Conservation easements allow developers to set aside areas of land for preservation. Conserved lands become part of the chain of title for the property, with future buyers agreeing to uphold the easement. Proposed conservation easements may be on or off-site and should primarily conserve Intact oak woodland habitat. Conservation easements must conserve equivalent canopy area to that proposed for removal. Proposed conservation easements are subject to approval by DDS.

3.1.2 Payment to mitigation bank

Mitigation banks preserve habitats and ecosystems which can offset adverse environmental impacts to similar nearby ecosystems. The intent of using a mitigation banks is to replace the exact function and value of specific habitats that would be adversely affected by a proposed activity or project. Mitigation banks sell “credits” that are representative of the ecological value associated with the conversion of certain ecosystem types. Purchasing mitigation credits from a mitigation bank can be a preferable option to some developers because it may be faster than other mitigation options.

- Mitigation banks in Butte County with Oak Woodland Habitat**
 - Restoration Resources Company:** Silvergate Mitigation bank, Porter Ranch Mitigation bank
 - Link: <http://www.restoration-resources.net/index.php>
 - Phone: 916-408-2990
 - Email: Email contact available on website

3.1.3 Payment to an accredited land trust

A land trust is a charitable organization that acquires land or conservation easements, or that stewards land or easements, to achieve conservation purposes. Land trusts work with landowners to complete real estate transactions, purchasing property interests, or accepting the donation of property interests.

- Land Trusts in Butte County with oak woodland habitat**
 - Northern California Regional Land Trust
 - Link: <http://landconservation.org/>
 - Phone: 530-894-7738
 - Email: info@landconservation.org

3.1.4 Payment to State Oak Woodlands Conservation Fund

Payment to the State Oak Woodlands Conservation fund is an option in-lieu of replacement. An appraisal of the land value for the oak woodland canopy proposed for removal is required to identify the amount. Alternatively, for up to 100 trees, an in-lieu payment may be made to the State Oak Woodlands Conservation Fund. Money from this fund is used to conserve oak woodland habitat in Butte County. The calculation of payment shall be completed by a qualified professional and submitted to the Department of Development Services for acceptance. Oak woodlands valuation can also be done by consulting the International Society of Arboriculture standards for valuing trees of different sizes. Proof of payment shall be provided within six months of the Department acceptance of the payment amount calculation. Funds in the State Oak Woodlands Conservation Fund can only be used within Butte County.

3.1.5 On-site replanting

On-site replanting does not count toward replacement requirements under the Ordinance. Projects pursuing an alternative Project Review and Design, as described in XX-17 of the Butte County Oak Woodland Mitigation Ordinance, may consider on-site replanting as a form of mitigation. Your qualified professional shall consider the unique attributes of the property in question to assess its viability for replanting. Factors such as woodland density, woodland health, habitat viability, soil types, potential as habitat corridor connection, proximity to riparian areas and other environmental factors may apply to the assessment of viability for onsite replanting. The project qualified professional shall construct a replanting plan that adheres to the following requirements:

- Plant the prescribed number of trees, including maintaining plantings and replacing dead or diseased trees.
- Replacement trees shall be regularly monitored and maintained and shall survive for a period of 7 years, calculated from the day of planting.
- 200 1 gallon replacement trees for every 1 acre of oak canopy removed or 600 acorns for every 1 acre of canopy removed
- Focus on planting in areas that create connections to other, nearby, oak woodlands and wildlife corridors or that create potential wildlife corridors

Any alternative mitigation strategies or project proposals are subject to staff recommendation and approval by the decision-making authority.

3.2 Follow-Up Management

Depending on the scope of your project and your chosen mitigations, you may be required to monitor tree health and survivability. Follow-up actions may be required for projects that pursue alternative mitigation strategies. Mitigation strategies that use on-site replanting will require monitoring by a qualified professional.

Section 4

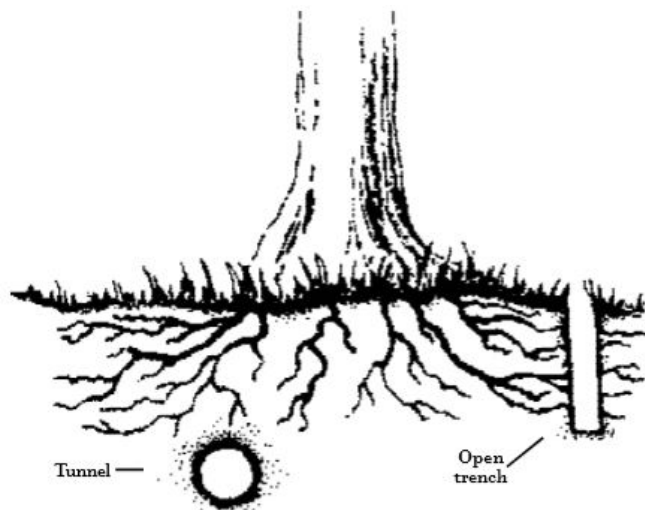
Site Construction

4.1 Tunneling and Drilling

Trenching, pipe or conduit installation within the CRZ must either be cut by hand, air spade, by mechanically boring a tunnel under the roots with a horizontal directional drill (hydraulic or pneumatic air excavation) or any other method approved by a qualified professional. Tunneling under a root system can greatly reduce damage to both the tree as well as minimizing the cost of replacing landscaping or other features. Tunneling may be restricted by sloped areas or rocky soils. Once piping has been installed, backfill with excavated soil and irrigate the disturbed area the same day. Consult with your qualified professional to determine an appropriate depth and distance when drilling or tunneling.

Illustration 4-1: visualization of trench and tunnel

From: Conserving Wooded Area in Developing Communities



4.1.1 Root cutting and pruning related to equipment use and excavation

The cutting of tree roots may be necessary during construction. If root cutting is necessary, require clean cuts that are perpendicular to the direction of the root's growth. Backfill within an hour of cutting the roots. Water the tree within 24 hours of cutting the roots. A qualified professional may recommend other techniques to preserve damaged or cut roots. Damage to tree roots can have a significant impact on tree survivability. Keep the following restrictions in mind as you advance your project:

- Roots no greater than 2 inches in diameter may be cut without approval of a qualified professional or DDS representative. Your qualified expert must give approval for the cutting of larger roots.
- Excavation of any sort within the CRZ must be approved by a qualified professional.
- Excavation within the CRZ must be hand-digging, hydraulic or pneumatic.
- Heavy equipment use within the CRZ is only allowable if it is stationed outside of the CRZ or prior approval has been given by a qualified professional or the DDS.

4.2 Grading

Grading can cause serious impacts to the health of individual trees and groups of trees. Keep the following restrictions in mind as you advance your project.

- Grade changes within the Critical Root Zone (CRZ) are not permitted.
- Grade changes outside of the CRZ must not significantly alter existing grade or drainage of the CRZ.
- Grade changes under specifically approved circumstances allow for no more than 4 inches of cut or fill within the CRZ and will incorporate appropriate mitigation. Mitigations may include but aren't limited to aeration systems, permeable surface for fill and retaining wall. Mitigations for grade changes may be recommended at the discretion of a qualified professional.

4.3 Irrigation

During construction, irrigation is very important to the health of oak woodlands but must be carefully monitored. Irrigation should be administered to replace soil moisture lost due to site excavation. A tree should receive the amount of irrigation similar to its normal or natural allocation. Frequent light watering should be avoided. Naturally occurring oak woodlands are less likely to need changes to irrigation than "landscaped" trees. The removal of topsoil can cause moisture loss in trees. Be cautious and consult your qualified professional if topsoil is removed in or near the CRZ of trees on your project site. A qualified professional can help determine when watering is needed.

4.4 Dust Control

Dust can reduce a tree's ability to photosynthesize and negatively impact its health. Spray tree trunks, limbs and foliage periodically to remove accumulated construction dust. You may need to spray for dust more or less frequently depending on the project. Consult your qualified professional to determine how frequently you should spray for dust.