

**City Of Laguna Beach  
Fire Department**

**Landscape/Fuel  
Modification Guidelines  
and  
Maintenance Program**



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# Landscape/Fuel Modification Guidelines and Maintenance

## **PURPOSE**

The purpose of these guidelines is to provide information on how landscape and fuel modification zones are to be integrated, designed, installed, and maintained in order to meet safety requirements. The many variables involved with landscape and fuel modification make specific, uniform regulations impractical. Laguna Beach Fire Department (LBFD) will not require supporting data if these guidelines are followed to the satisfaction of LBFD. Compliance with these guidelines does not guarantee that homeowner's insurance may be secured. Furthermore, compliance with these guidelines may not prevent the loss of life and or real and personal property due to fire.

## **SCOPE**

Landscape is considered to be any hardscape or softscape improvement not defined as a structure. A fuel modification zone is a strip of land where combustible vegetation has been removed and/or modified and partially or totally replaced with more adequately spaced, drought-tolerant, fire-resistant plants in order to provide a reasonable level of protection to structures from wildland. Development contiguous to or within 300' of an undeveloped vegetated area (urban wildland interface) requires modification of natural vegetation at the urban interface and an integrated landscape plan.

Properties required to follow these guidelines are identified in the City's GIS with a "FM" designation. All proposed new structures designated with an FM shall be required to follow the Landscape/Fuel Modification Guidelines. All existing structures with an FM designation which propose an addition alteration or repairs having a valuation of 50% or more of the valuation of the building prior to the additions, alterations, or repairs shall be required to follow the Landscape/Fuel Modification Guidelines. An integrated landscape and fuel modification plan varies in complexity and is dependent upon the type, quantity, and spacing of vegetation, as well as topography, degree/type of exposure, local weather conditions, and the construction, design, and placement of structures. A typical landscape/fuel modification installation consists of a 20-foot setback zone (Zone A), a minimum 50-foot zone typically irrigated (Zone B), with an additional 125-foot minimum of vegetation thinning zones (Zones C and D). The minimum width of a fuel modification area is 195 feet and in some cases the width increases due to type of terrain and/or type and mass of vegetation. The necessity of implementing a landscape/fuel modification plan does not release the owner from the responsibility to mitigate the impact of such modifications (e.g., erosion control, endangered species, etc.).

## **SUBMITTAL REQUIREMENTS**

### **1. Landscape/Fuel Modification Plans**

Landscape/fuel modification plans show the area and location of all hardscape/softscape improvements and fuel modification necessary to achieve the minimum acceptable level of risk to structures from combustible vegetation. Submit two sets of plans prepared by a licensed landscape architect or other design professional with equivalent credentials to the City of Laguna Beach Community Development Department for review.

The following shall be included on the fuel modification plan (also refer to Attachment 1):

- A. Identify the design of the proposed development, showing all property lines, contour lines, and the proposed location of all new and existing structures including all hardscape/softscape improvements and the fuel modification area.
- B. Delineation of each zone (setback, irrigated, and thinning) with a general description of each zone's dimensions and character; i.e., 50-foot - 70-foot Zone B, with existing vegetation removed, irrigated, and planted with adequately spaced plant material that is more drought-tolerant and fire-resistant (See Attachment 2).
- C. Location and detail of permanent zone markers (See Attachment 4).
- D. Identify the removal of undesirable plant species in accordance with the LBFD Fire Prone Plant Species List (See Attachment 7).
- E. Plant palette to be installed in accordance with approved guidelines. Include a plant matrix for all trees, tree-form shrubs, shrubs, and shrub-like plants in irrigated zones showing the maximum height and width of mature plants and proposed spacing. NOTE: Care should be taken to select plants that provide limited habitat to rats and other rodents that may detract from the health and safety of residents. Contact Orange County Vector Control for further information.
- F. Photographs of the area which show the type of vegetation that currently exists, including height and density, and the topography of the site.
- G. Description of the methods to be used for vegetation removal, i.e., mechanical or manual.
- H. Location of emergency and maintenance access easements within every 500 lineal feet of the fuel modification area. Access easements shall have a minimum 10-foot width; alternatively, 5-foot wide easements provided every 250 feet may be acceptable. Gates, if installed within the easement, shall be a minimum of 36 inches wide. The easements shall be maintained free of vegetation or any structures greater than 5 inches in height.
- I. General description of what exists 300 feet beyond the development property lines in all directions; i.e., reserve lands, structures, natural vegetation, roads, parks, etc. (Note: LBFD may require additional information on a project-specific basis.)

- J. Identify any proposed off-site fuel modification areas and provide appropriate legal agreements with adjacent property owners.
- K. Irrigation plans and specifications, as requested.
- L. All applicable maintenance requirements and assignment of responsibility (See Section 6).
- M. Tract or project conditions, CC&R and/or deed restrictions relative to fuel modifications (See Attachment 5).
- N. The integrated landscape/fuel modification plan shall be reviewed by LBFD and approved by the Design Review Board (DRB) prior to issuance of the building permit.
- O. For large developments, fuel modification zones (especially zones B, C, and D) should be located within common lettered lots owned and maintained by associations representing common ownership; e.g., homeowners' associations. The integrity and longevity of the fuel modification zones shall be maintained with sufficient tract/project conditions and CC&Rs to specifically identify the restrictions within the fuel modification areas. Likewise, when fuel modification zones are located on private property, deed restrictions are required to specifically identify the restrictions on any portion of the property subject to fuel modification. (See Sections 6 and 8 and Attachments 2 and 5)

## **2. LBFD Plant Palette Information**

The plant palette must be submitted containing both the botanical and common names of all plant materials that are to be used. In the irrigated zone areas (which commonly serve as a screening buffer between development and open space/park land), plants must be fire resistant and drought-tolerant. Plant materials used outside of the irrigated zones must be fire resistant and drought tolerant. There is no such thing as a plant that will not burn. The term fire resistant may be misleading. All plants will burn given sufficient heat and low moisture content. Vegetative fire resistance may be enhanced through adequate irrigation or precipitation.

Note: All plants in Zones A-D shall be selected from the LBFD list and specified for appropriate fuel modification zones.

The undesirable plant species approved by LBFD and various resource agencies responsible for environmental protection are provided in Attachment 7. Specific planting criteria are included for various plant materials. If alternate plant materials are proposed, the landscape architect shall provide a photograph, as well as data on the fire resistive characteristics and proposed uses (zones, number, spacing, etc.) and LBFD will make a case-by-case determination as to acceptability of the proposed material. The proposed plant must be spaced based on size and characteristics. If the plant materials are proposed to be planted within 300 feet' of reserve lands (except plants on the interior of the tract), concurrence from the applicable following agencies would be required: US Fish and Wildlife Service, California Department of Parks and Recreation, The Nature Conservancy, the Department of Fish and Game, Orange County Public Facilities and Resource Department, and the Orange County

Vector Control District. If the proposed plants have received previous resource agency approval, no concurrence letter will be required.

### 3. Zone A – Setback Irrigated Zone (See Attachments 2 & 3)

The purpose of the setback zone is to provide a defensible space for fire suppression forces and to protect structures from radiant and convective heat. **No combustible construction shall be allowed within the 20-foot setback zone (Zone A). In no case shall Zone A be less than 20-foot minimum. This measurement shall be made horizontally from the point of the structure closest to Zone A.** This zone is located between Zone B and the structure and in all directions (360°) surrounding the structure to include the front, side and rear yards.

#### Zone A – Specific Requirements

- A. Automatic irrigation systems to maintain healthy vegetation with high moisture content.
- B. Irrigation maintained outside the drip line of native oak trees.
- C. Pruning of foliage to reduce fuel load, vertical continuity, and removal of plant litter and dead wood.
- D. Complete removal of fire prone plant species (see Attachment 7), minimal allowance for retention of selected native vegetation.
- E. Trees and tree form shrub species are not allowed within 10 feet of combustible structures (measured from the edge of a full growth crown).
- F. Trees and tree form shrub species are not allowed to extend beyond the property line (measured from the edge of a full growth crown).
- G. Tree and tree form shrub species are not allowed within 10 feet of adjacent tree species as measured from the edge of a full growth crown (see Attachment 6).
- H. Special consideration should be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions.
- I. Maintenance including ongoing removal and/or thinning of undesirable combustible vegetation, replacement of dead/dying fire resistant plantings, maintenance of the operations integrity and programming of the irrigation system, regular trimming to prevent ladder fuels.
- J. A minimum of 36” of horizontal clearance and unlimited vertical clearance around the exterior of the structure (360°) shall be provided for Firefighter access. Firefighter access shall be made without the need for special tools (ladders) or ability and have permanent improvements installed when ascending or descending from street level (e.g., stairs).

- L. No combustible construction shall be allowed in Zone A
- M. No permanent or portable barbeques/grills, fire pits, fireplaces or other flame generating device shall be permitted within 30' of non-fire resistive plants/vegetation.
- N. No vines shall be permitted on combustible structures (e.g., Type V non-rated structure).

#### **4. Zone B – Irrigated Zone**

This portion of landscape/fuel modification should be irrigated and planted with drought – tolerant, deep-rooted, moisture retentive plants. The plans must delineate that portion of the fuel modification area that will be permanently irrigated. Plant material selection, irrigation system design, and the landscape maintenance management plan shall sensitively address water conservation practices and include methods of erosion control to protect against slope failure. All irrigation shall be kept a minimum of 20 feet from the drip line of any existing native Quercus (oak) species. This irrigated zone is 50 feet to 75 feet in width. Zone B shall be cleared of all undesirable plant species, irrigated, and planted with plants from the approved LBFD Plant List. Exceptions to save desirable species may be submitted for approval by the Fire Chief on a site-specific basis. As in Zone A, combustible construction (i.e. gazebos, trellis's, shade covers etc.) is not allowed in Zone B.

##### **Zone B – Specific Requirements**

- A. Groundcover shall be maintained at a height not to exceed 18 inches.
- B. In order to maintain proper coverage, native grasses should be allowed to go to seed. Native grasses shall be cut after annual seeding. Cut heights shall not exceed 8 inches.
- C. Irrigation shall be designed to supplement native vegetation, and establish and maintain planted natives and ornamentals.
- D. Planting will be in accordance with planting guidelines and spacing standards established in this guideline (See Attachments 6 and 7).
- E. In Zones B, C, and D, sensitive and/or protected plant species shall be identified on the landscape/fuel modification plans and dealt with per the City's Open Space/Conservation Plan.
- F. Tree and tree-form shrub pruning and spacing will be in conformance with Attachment 6. Tree form shrubs are defined as shrubs that naturally exceed 4 feet in height.
- G. Tree-form shrubs and other shrubs shall be spaced such that they do not create an excessive fuel mass and can be maintained in accordance with specified spacing as indicated on the plan.
- H. Special consideration should be given for rare and endangered species, geological hazards, tree submitted for project approval, upon further review.

- I. Removal of undesirable plant species (see Attachment 7).

## **5. Zones C & D – Thinning Zones – Non-Irrigated**

Zone C is 50 to 75 feet in width and requires 50% thinning and removal of all dead and dying vegetation and undesirable species. Zone D is 75 to 130 feet in width and requires 30% thinning with removal of all dead and dying vegetation and undesirable species. Thinning zones are utilized to reduce the fuel load of a wildland area adjacent to urban developments, thereby reducing the radiant and convective heat of wildland fires. Thinning zones are located adjacent to the irrigated zone and can extend 125 feet or more into wildland areas. All dead and dying vegetation shall also be removed from the thinning zones. Additionally, undesirable plant species shall be removed from the thinning zones due to their susceptibility to wildland fire. As in Zones A and B, combustible construction (i.e. gazebos, trellis's, shade covers etc.) is not allowed in Zones C and D.

### **Zone C and D – Specific Requirements**

- A. Removal of all dead and dying vegetation, all fine fuels reduced to a maximum of 8-12 inches in height.
- B. In order to maintain proper coverage, native grasses shall be allowed to go to seed. Native grasses shall be cut after annual seeding. Cut heights shall not exceed 8 inches.
- C. Special consideration will be given for rare and endangered species, geologic hazards, tree ordinances, or other conflicting restrictions as identified in the environmental documents submitted for project approval review.
- D. Reduce fuel loading by reducing the fuel in each remaining shrub or tree without substantial decrease in the canopy cover or removal of tree holding root systems.
- E. In Zones B, C, and D, sensitive and/or protected plant species shall be identified on the fuel modification plans and tagged in the field for further disposition.
- F. Tree and tree-form shrub pruning and spacing will be in conformance with Attachment 6. (See Attachment 6.) Tree form shrubs are defined as shrubs that do not naturally exceed four feet in height.
- G. Tree-form shrubs less than 4' in height and other shrubs shall be spaced such that they do not create an excessive fuel mass and can be maintained in accordance with specified spacing as indicated on the plan.
- H. Maintain sufficient cover to prevent erosion without requiring planting.

## **6. Off-Site Fuel Modification Requirements**

Due to the variable and sometimes considerable amount of land necessary for fuel modification, development proposals often include a request to have the required fuel modification zones extend onto adjacent properties. However, off site fuel modification is not recommended due to problems inherent with enforcement of regulations on adjacent property



and the potential for confusion regarding responsibility for fuel modification on areas outside of legal ownership. Proper on-site fuel modification design should determine where development can safely be located and should be an integral part of the development proposal.

Should off-site fuel modification be deemed a necessity, appropriate legally recorded instruments must be established that clearly state the responsibilities and rights of the parties involved relative to the establishment and maintenance of the fuel modification area. Appropriate recorded documents must include a recorded agreement between all parties and a grant of easement for the establishment and maintenance of the fuel modification area. It should be understood that the allowance of off-site fuel modification by an adjacent property owner may affect the rights and/or use of the off-site property. All agreements for any off-site fuel modifications shall be integrated into fuel modification plans with a letter from adjoining property owner giving rights to maintain fuels.

The City of Laguna Beach may grant fuel modification easements on city property to property owners in need of such agreements to complete the requirements of their fuel modification plan. City financed/maintained fuel modification programs (i.e. goat grazing, hand crews) may be utilized as a component of a fuel modification plan. The City of Laguna Beach shall not guarantee the continuation of current or future City sponsored fuel modification programs. Property owners shall remain responsible for maintaining their fuel modification plan regardless of the status of the City financed/maintained fuel modification programs.

## **7. Non-Compliant Properties**

If the requirements of these guidelines cannot be met for any reason, documentation supporting the reason(s) shall be required at plan submittal. Alternate materials and methods may be considered in lieu of a complete landscape/fuel modification plan at the discretion of the Fire Chief and DRB. A Fire Protection Plan (CFC 8601) shall be submitted by a recognized fire protection engineer or individual with similar qualifications (subject to the Fire Chief's approval) when alternate materials and methods are proposed to meet the requirements of this guideline.

## **8. Fuel Modification Plan Revisions**

Revisions to previously approved fuel modification plans shall follow procedures as established by the agency having jurisdiction. Note: Revisions to plans will not be reviewed without a copy of the original stamped LBFD approved plan for reference.

## **9. Fuel Modification Implementation & Required Inspections**

This following information shall be placed on precise fuel modification plans, verbatim:

- A. **After Permit Issuance and Before Foundation Inspection:** A Rough Fuel Modification Inspection shall be conducted. The developer/builder shall implement those portions of the approved landscape/fuel modification plan determined to be necessary by LBFD prior to the introduction of any combustible materials into the area (removal of undesirable species may meet this requirement). This generally involves removal and thinning of

plant materials indicated on the approved plan. An inspection and/or release letter to the building department is required.

- B. **Prior to Issuance of Utility Release:** The landscape and fuel modification zones adjacent to structures must be installed, irrigated, and inspected. This includes physical installation of features identified in the approved landscape/fuel modification plan (including, but not limited to, hardscape, softscape, plant establishment, thinning, irrigation, zone markers, access easements, etc). An LBFD Fire Inspector or designee will provide written approval to the Building Division after completion after this final inspection. The CC&R language for maintenance must also be provided and approved by LBFD.
- C. **Prior to Home Owner Association (HOA) Acceptance (if applicable):** This activity must include an LBFD Fire Inspector and the following representatives:
- Landscape design professional
  - Installing landscape contractor
  - HOA management representative
  - HOA landscape maintenance contractor

The fuel modification shall be maintained as originally installed and approved. A copy of the approved plans must be provided to the HOA representatives at this time. Landscape professionals must convey ongoing maintenance requirements to HOA representatives.

- D. **Annual Inspection and Maintenance:** The property owner is responsible for all maintenance of the fuel modification. All areas must be maintained in accordance with approved fuel modification plans. This generally includes a minimum of two growth reduction maintenance activities throughout the fuel modification areas each year (spring and fall). Other activities include maintenance of irrigation systems, replacement of dead or dying vegetation with approved materials, removal of dead plant material, and removal of undesirable species. The LBFD conducts regular inspections of established fuel modification areas. Ongoing maintenance shall be conducted regardless of the date of these inspections. Disclosure of all landscape/fuel modification requirements shall be the responsibility of the property owner and or their agent upon transfer of ownership.

## 10. Fees

No additional fees are charged for plan reviews and site inspections.

No fees are currently charged for maintenance inspections of existing fuel modification areas. However, non-compliance fees are applied if identified deficiencies are not corrected within required time frames.

## 11. Glossary

**CHARACTERISTICS OF FIRE-RESISTIVE VEGETATION** – Growth with little or no accumulation of dead vegetation (either on ground or upright); non-resinous plants; low volume of total vegetation (e.g. grass vs. forest or shrub covered land); high live fuel moisture; drought tolerant; stands without ladder fuels (small limbs/branches between ground and canopy); low maintenance (slow-growing, require little care when maintained); plants with woody stems and branches that require prolonged heating to ignite.

**CONDUCTION** - Direct transfer of heat by objects touching each other.

**CONVECTION HEAT** - Transfer of heat by atmospheric currents, and is most critical under windy conditions and in steep terrain.

**CROWN** - Upper part of tree or other woody plant carrying the main branch system and foliage.

**CANOPY** - More or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees or other woody growth.

**DEFENSIBLE SPACE** - An area around the perimeter of structures or developments in the wildland which are key points of defense/attack against encroaching wildfires or escaping structure fires.

**DESIRABLE PLANT LIST** - List of plants exhibiting characteristics of low fuel volume, fire resistance, and drought tolerance which make them desirable for planting in areas of high fire danger.

**DRIPLINE** - Ground area at the outside edge of the canopy.

**DROUGHT TOLERANCE** - The ability of a plant or tree to survive on little water.

**FINE FUELS** - Fuels such as grass, leaves, and draped pine needles which, when dry, ignite readily and are consumed rapidly (also called flash fuels).

**FIRE BREAK** - Removal of growth, usually in strips, around housing developments to prevent a fire from spreading to the structures from open land or vice versa.

**FIRE PROTECTION PLAN** - A Fire Protection Plan (FPP) shall include mitigation measures consistent with the unique problems resulting from the location, topography, geology, flammable vegetation, and climate of proposed site. The FPP shall address water supply, access, building ignition and fire resistance, fire protection systems and equipment, defensible space and vegetation management.

**FIRE RESISTANT** - All plants will burn under extreme fire weather conditions such as drought. However, plants burn at different intensities and rate of consumption. Fire-resistive plants burn at a relatively low intensity, slow rates of spread and with short flame lengths.

**FIRE RETARDANCE** - Relative comparison of plant species related to differences in fuel volume, inherent flammability characteristics, and ease of fire spread.

**FUEL BREAK** - A wide strip or block of land on which the native or pre-existing vegetation has been permanently modified so that fires burning into it can be more readily extinguished.

**FUEL LOAD** - The weight of fuels in a given areas, usually expressed in tons per acre.

**FUEL MODIFICATION ZONE** - A strip of land where combustible native or ornamental vegetation has been modified and partially or totally replaced with drought tolerant, fire retardant, plants.

**FUEL MOISTURE CONTENT** - The amount of water in a fuel, expressed as a percentage of the oven dry weight of that fuel.

**FUEL VOLUME** - The amount of fuel in a plant in a given area of measurement. Generally an open-spaced plant will be low in volume.

**HORIZONTAL CONTINUITY** - The extent or horizontal distribution of fuels at various levels or planes.

**LADDER FUELS** - Fuels which provide vertical continuity between strata. Fire is able to carry from surface fuels by convection into the crowns with relative ease.

**LANDSCAPE** – Any improvement made to the property not classified as a structure.

**LITTER** - The uppermost layer of loose debris composed of freshly fallen or slightly decomposed organic material such as dead sticks, branches, twigs, leaves or needles.

**LONG TERM** - In perpetuity of the fuel modification plan requirement.

**PROBABILITY OF IGNITION** - A rating of the probability that a firebrand (glowing or flaming) will cause a fire, providing it lands on receptive fuels. It is calculated from air temperature, fuel shading, and fuel moisture.

**RADIANT HEAT** - Transfer of heat by electromagnetic waves and can, therefore, travel against the wind. For example, it can preheat the opposite side of a burning slope in a steep canyon or a neighboring home to the ignition point.

**RESERVE LANDS** – As defined by the Central Coastal and Southern Natural Communities Conservation Plan.

**SUBDIVISION** - A parcel of land that is subdivided to create multiple individual lots in accordance with the State of California Subdivision Map Act.

**SPECIAL FIRE PROTECTION AREA** – See Very High Fire Hazard Severity Zone

**STRUCTURE** – That which is built or constructed, an edifice or building of any kind or any piece of work artificially built up or composed of parts joined together in some manner.

**TARGET SPECIES** - Undesirable species that are generally removed as part of the fuel modification plan (see undesirable species).

**TREE FORM SHRUB** – Those shrub species exceeding 4’ in height.

**UNDESIRABLE SPECIES** - Those species of plants with inherent characteristics which make them highly flammable. These characteristics can be either physical or chemical. Physical properties include large amounts of dead material retained within the plant, rough or peeling bark, and the production of large amounts of litter. Chemical properties include the presence of volatile substances such as oils, resins, wax, and pitch. These plants are sometimes referred to as target species.

**URBAN INTERFACE** - That line, area, or zone where structures and other human development meet or intermingles.

**VERTICAL CONTINUITY** - The proximity of fuels to each other that governs the fire’s capability to sustain itself. Vertical continuity applies to the relationship of aerial fuels to surface fuels or fuels low to the ground.

**VERY HIGH FIRE HAZARD SEVERITY ZONE** - Any geographic area designated pursuant to Government Code Section 51178 and/or local ordinance to contain the type and condition of vegetation, topography, weather, and structure density due to increased possibility of conflagration fires. See 2001 UFC Section 1101.1, Appendix II-A.