

8. WILDLAND FIRE SAFE REGULATIONS

8.1 Background

In 1986, the California Board of Forestry, supported by CDF, introduced legislation (Senate Bill 1075, Rogers) to develop *minimum* statewide standards for defensible space in State Responsibility Areas (SRA). This legislation was motivated by local government's general lack of response to wildland fire prevention and protection problems over the previous 20 years. This comprehensive wildland fire safety legislation was passed by the Legislature and signed by the Governor in 1987. SB1075 required the California Board of Forestry to establish minimum fire safety requirements that applied to SRA. Regulation development began in earnest early in 1988, and final implementation of the state and local regulation packages occurred on January 1, 1992 via PRC 4290. These requirements address emergency access and water supplies, addressing and street signing, and fuel modification relating to new construction and development.

While a large block of forestland generally experiences limited fire occurrence, the level of risk increases directly with the influx of population due to development and construction. Before roads and houses are built, there is little need for rules and regulations beyond some general forest and fire laws. However, roads and houses bring with them more fires and greater values at risk than just grass, brush and trees. As development occurs, there becomes a need to require built-in fire prevention. The developer and the homeowner are required to shoulder some of the responsibility for fire prevention. They should not just expect the fire department to solve the problem. Regulations target these areas where homes are encroaching on wildland and watershed areas and change the equation and cost of wildland fire prevention and protection. Construction and development trigger these regulations.

8.2 Administrative Elements

The implementation of these regulations occurs through the local government building permit and subdivision map approval process. Local government is still the approving authority for development. These regulations are triggered by the application for a building permit for purposes other than limited remodels, including but not limited to submittal of a subdivision map, application for a use permit, siting a mobile or manufactured home, or constructing a road. These regulations do not supersede existing local regulations that are equal to or more stringent than the state regulations.

CDF has been given the role of wildland fire protection expert and is provided the opportunity to review and comment on all proposed construction and development within the SRA. If a project or mitigation appeal is filed, CDF can present the relevant wildfire prevention issues and needs to the appeal board. The county is granted the authority to make the final ruling on the appeal, but must provide the California Board of Forestry with findings if the appeal is granted.

Locally developed rules are more responsive to the local constituency and local environmental conditions. They can be finely tuned to local wildfire suppression strategies and needs. The proposed local rules must provide for the same practical effect as the overall state regulation package. Each protection measure and activity cannot be judged alone, but must be compared to the overall protection provided by the total regulation package. Many counties have selected this option and have prepared and submitted certification packages. For more information refer to the *PRC 4290 Guidebook* at _____.

The regulations also provide for exceptions to the rules due to health, safety, environmental and physical

site limitations. In fact, the developer or owner may propose a reasonable alternative outside of the criteria listed above. If it is impossible to change the width of a road, other options must be evaluated. In this case, reduced road length, safety islands, fuel modification along the road, and turnout construction might be acceptable alternatives to allow for a narrower road.

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8.4 Infrastructure

8.4a Access

Access is a major fire prevention and protection need, whether wildland or structural. Failure to provide reasonable access for emergency equipment and evacuation exits for civilians can result in major loss of life, property and natural resources. Fire apparatus sitting at an intersection, waiting for civilians to exit on a narrow road, cannot provide the necessary fire suppression action. Safe access requires street and road networks that limit dead-end roads and provide reasonable widths, grades and curves on all roads and driveways.

Road networks should provide unobstructed traffic circulation during a wildfire emergency. CDF recommends two separate points of ingress/egress to each development. Alternate routes of escape that will safely handle evacuations and emergency equipment should be established. Road and street systems should provide maximum circulation consistent with topography to meet fire safety needs. The following standards are recommended for subdivisions:



Photograph 8.1.
Inadequate Access

- **Access Routes** - PRC 4290 requires at least two different public ingress/egress routes on all roads.
- **Road Width** - All roads shall be constructed to provide a minimum of two nine-foot traffic lanes providing two-way traffic flow. Additional requirements shall be mandated by local jurisdictions.

- **Roadway Surface** - The surface shall provide unobstructed access to conventional drive vehicles, including sedans and fire engines. Surfaces should be established in conformance with local ordinances and be capable of supporting a minimum 40,000-pound load.
- **Roadway Grades** - The grade for all roads, streets, private lanes and driveways shall not exceed 16 percent.
- **Roadway Radius** - No roadway shall have a horizontal inside radius curvature of less than 50 feet. Additional surface width of 4 feet shall be added to curves of 50-100 feet radius--2 feet to those from 100-200 feet. The length of vertical curves in roadways, exclusive of gutters, ditches and drainage structures designed to hold or divert water, shall not be less than 100 feet.



Photograph 8.2.
Roadway to Rural Structure

- **Roadway Turnarounds** - Turnarounds are required on driveways and dead-end roads as specified. The minimum turning radius for a turnaround shall be 40 feet from the centerline of the road. If a hammerhead “T” is used, the top of the “T” shall be a minimum of 60 feet in length.



Photograph 8.3.
Turnaround

- **Roadway Turnouts** - Turnouts shall be a minimum 25-foot taper on each end.
- **Roadway Structures** - All driveway, street and private lane roadway structures shall be constructed to carry at least the maximum load and provide the minimum vertical clearance as required by Vehicle Code Sections 35550, 35760 and 35250. A bridge with only one traffic lane may be authorized by the local jurisdiction; however, it shall provide for unobstructed visibility from one end to the other and turnouts at both ends.
- **One-Way Roads** - All one-way roads shall be constructed to provide a minimum of one 10-foot traffic lane. The local jurisdiction may approve one-way roads. All one-way roads shall connect to a two-lane roadway at both ends and shall provide access to an area currently zoned for no more than 10 dwelling units. In no case shall it exceed 2640 feet in length. A turnout shall be placed and constructed at approximately the midpoint of each one-way road.

- **Dead-End Roads** - The maximum length of a dead-end road shall not exceed cumulative lengths, regardless of the number of parcels served.

PARCELS ZONED FOR LESS THAN ONE ACRE	800 ft
PARCELS ZONED FOR 1 ACRE TO 4.99 ACRES	1320 ft
PARCELS ZONED FOR 5 ACRES TO 19.99 ACRES	2640 ft
PARCELS ZONED FOR 20 ACRES OR LARGER	5280 ft

All lengths shall be measured from the edge of the roadway surfaces at the intersection that begins the road. Where parcels are zoned 5 acres or larger, turnouts shall be provided at a maximum of 1320 foot intervals. Each dead-end road shall have a turnaround constructed at its terminus.

- **Driveways** - All driveways shall provide a minimum 10-foot traffic lane and unobstructed vertical clearance of 15 feet along its entire length. Driveways exceeding 150 feet in length, but less than 800 feet in length, shall provide a turnout near the midpoint of the driveway. A turnaround shall be provided at all building sites on driveways over 300 feet in length and shall be within 50 feet of the building.
- **Gate Entrances** - Gate entrances shall be at least two feet wider than the width of the traffic lane serving that gate. All gates providing access from a road to a driveway shall be located at least 30 feet from the roadway and open to allow a vehicle to stop without obstructing traffic. Where a one-way road with a single traffic lane provides access to a gated entrance, a 40-foot-turning radius shall be used.



Photograph 8.4.
Gate

- **Bridges** - Bridges should have a minimum load of 40,000 pounds (20 tons) and be no narrower than the driving portion of road serving each end. Major ingress/egress roads in subdivisions should have a minimum load limit on bridges of 80,000 pounds (40 tons).

8.4b Addressing and Street Signing

The difficulty of locating an unnamed or poorly signed road during an emergency, especially under smoky conditions, is a major problem to wildland and structural firefighters. Beyond this, many jurisdictions have allowed duplicate numbering and naming for roads and access, further compounding the location problem. The potential losses of resources, property and life are greater without an adequately visible and consistent addressing and numbering system.

Street signs and building addresses are necessary to facilitate the location of a fire and to avoid delays in response. All existing and newly constructed or approved roads, streets and buildings shall be designated by names or numbers posted on signs clearly visible and legible from the roadway.



Photograph 8.5.
Street Signs

- **Street and Road Identification Sign** - Street sign numbers must be not less than 3 inches high and not less than 3/8 inch in stroke. All numbers and/or names required must be located or positioned not less than 3 feet, or more than 6 feet above the ground level, so as to be visible to emergency equipment for a distance of not less than 100 feet from either direction on the traveled road. Numbers and/or names must also be reflectorized, with contrasting background.
- **Buildings and Structures** - Every building or structure must be provided with an appropriate noncombustible marker, located with respect to the nearest public highway, street or road, servicing such building or structure so as to be clearly visible at all times to an approaching vehicle for a distance of not less than 100 feet.



Photograph 8.6.
Structure Identification

- **Structure Identification Numbers** - Structure identification numbers should be at least 3 inches in height, with a 3/8-inch stroke. In lieu of providing a separate marker and a separate building or close grouping of several buildings or a structure identification number, the fire protection agency may recommend that a cluster of buildings comprising a single occupancy use one marker and one identification number as a location identifier.

8.4c Water Supplies

The application of water and the construction of a fire line are the primary tools used by wildland firefighters to contain and control a wildfire. The siting and availability of sufficient quantities of water are essential to fire suppression and firefighter safety. While a single system of water delivery and/or storage is adequate, the effectiveness of any suppression system increases with diversity.

Emergency water supplies are necessary to provide available and accessible emergency water for wildfire protection, in sufficient quantities and locations to attack a wildfire or defend property from a wildfire. Such emergency water may be provided in a fire agency mobile water tender, or naturally occurring or manmade containment structure, as long as the specified quantity is immediately available. Water should be available on-site prior to the completion of road construction where a community water system is approved, or prior to the completion of building construction where an individual system is approved.

Water systems that meet or exceed the standards specified in the Public Utilities Commission of California (PUC) revised *General Order #103*, Section VIII, *Fire Protection Standards* and other sections relating to fire protection water delivery systems; static water systems equaling or exceeding the National Fire Protection Association (NFPA) Standard 1231, *Standard on Water Supplies for Suburban and Rural*

Fire Fighting; or mobile water systems that meet the Insurance Services Office **Rural Class 8 Standard**, shall be considered as meeting the requirements of wildland fire protection. On-site emergency storage where a community system exists should be considered supplemental to the required fire flow provided through the community system.

Water is the most important single factor in fighting structural fires and is vital in suppressing wildland fires. Therefore, to assure adequate and reliable water supplies for community fire prevention and protection in hazardous areas, the following minimum requirements shall be met:

- **Water Mains** - The minimum size of water distribution mains on which fire hydrants are located should be 8 inches in a system designed to permit circulating water flow.
- **Fire Hydrants** - The size, type and location of fire hydrants should meet the approval of the responsible fire authority and of applicable state and county regulations, with a minimum size of waterway not smaller than the size of the street main, up to a nominal 8-inch size. A 6-inch lateral to the hydrant is permitted. Dry barrel hydrants should conform to American Water Works Association (AWWA) **Standard C-502**. Wet barrel hydrants should conform to AWWA **Standard C-503**. All hydrants should be designed for a working pressure of 150 psi. A gate valve should be placed on the connection between main and hydrants. Hydrant spacing should not exceed 660 feet, with minimum fire flow of 750 gpm required for population densities of two or less single family residences per acre. For population densities of more than two dwellings per acre, hydrant spacing should not exceed 330 feet, with a minimum fire flow of 1000 gpm, and more where structural conditions require. Fire flow quantities should be available at 30-psi residual pressure in extreme fire hazard areas and 20-psi residual in low, moderate or high areas. Water source facilities should have the capacity to support the required fire flow for a minimum duration of two hours, in addition to the maximum daily flow requirements for other consumptive uses.



Photograph 8.7.
Alternate Water Supply

- **Water Storage** - Water storage may be required to assure the required minimum duration fire flow of two hours. Built-up areas served by pumping units with nonexistent or limited gravity storage may require certain other features of reliability such as alternate power sources, duplicate pumps or additional gravity storage in case of main breaks, mechanical failure of pumping units or loss of primary power source. The local fire authority may adjust the water quantities and duration set forth on the basis of local conditions, exposure, congestion, and construction of buildings.
- **Lakes, Ponds, Swimming Pools, Streams or Other Water Sources** - Establish access for fire equipment. Emergency equipment must be able to get within 12 feet of these water sources to effectively obtain the water. All subdivision and development plans should have these water fill or drafting sources noted or identified on the development map.
- **Private Water Supply** - Separately developed dwellings with an individual private water supply should provide an acceptable guaranteed minimum supply of water, in addition to the amount required for domestic needs. The amount of water available for structure protection will vary. The local fire authority should be consulted to establish specific water requirements. Water storage capacity should not be less than 2,500 gallons, with supply mains of at least 2 1/2 inches, preferably a 4-inch diameter standpipe, located for fire engine filling, and at least two hose outlets no less than 50 feet from the building. If the water supply is dependent on an electrical pump, it should be installed with an independent electrical system or backup generator.

8.4d Fuel Modification Considerations

The establishment of physical barriers between a structure and the wildland is recognized as a major deterrent and loss reduction measure. Such barriers should be considered key to individual and community defensible space. While fuel breaks have strategic application over large geographical areas, they are expensive to construct and maintain. Other measures, such as the strategic siting of roads, recreational parks, irrigated landscaping, setback from property lines and fuel modification around structures are more suitable around homes and subdivisions. For information on fire resistant landscape plants, go to <http://www.prefire.ucfpl.ucop.edu/vegetati.htm>.



Photograph 8.9.
Shaded Fuel Break

Fuel modification is necessary to reduce the intensity of a wildfire by reducing the volume and density of flammable vegetation. Fuel modification will provide: 1) increased safety for emergency fire equipment and evacuating civilians, 2) a point of attack or defense from a wildfire, and 3) strategic siting of fuel modification and greenbelts. CEQA review of projects and site-specific mitigation at the permit and map review stage shall be conducted to secure perimeter and interior fuel modification zones, including building setback to apply PRC 4291 fuel modification zones along roads and to the strategic siting of greenbelts.

8.4e Roadside Vegetation Management

Roadside vegetation should be removed for a distance of 10 feet on each side of the traveled section. In order to protect escape routes from radiant heat caused by wildfires, the native vegetation should be thinned and dead material removed on each side of roads or highways to reduce radiant heat from wildfire to a tolerable level.



**Photograph 8.10.
Roadside Vegetation**

8.4f Right-of-Way Fuel Modification

The clearance distances and type or amount of fuel management needed depends on local conditions. Fuel modification areas should extend at least 100 feet, and up to 300 feet if needed, from the edge of the roadway to be beneficial as a fire defense system. Fire protection agencies can provide fuel treatment directions for planning purposes. Other methods of treatment include pruning the lower limbs of trees over 12 feet tall and planting fire resistive ornamental shrubbery and cultivated ground cover such as green grass, ivy, succulents or similar plants in forms that do not readily transmit fire.

8.4g Planting Under and Near Power Lines

Trees planted under utility lines should reach a maximum height of 20-25 feet at maturity. Trees taller than 25 feet at maturity should be planted far enough away that branches do not come within 10 feet of the conductors. Proper selection of trees under or near power lines can reduce hazards, limit the need for pruning on a regular basis and add to the beauty of the landscape. Christmas tree farms under active management may be authorized.

8.4h Power Utility Systems

All new electrical distribution lines and extensions of existing lines in fire hazardous areas should be constructed using the latest approved methods that minimize fire hazards.