



## SAFER FROM THE START

A Guide to Firewise-Friendly Developments



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## FOREWORD

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**In 1985, wildfire destroyed more than 1,400 homes throughout the U.S. Since then, private and governmental fire experts have worked to discover the roots of this problem and to bring the best available research and practices to the public.**

The Firewise Communities program teaches people how to keep homes safer from wildfire. For new developments and for residents of community associations, it's important to know how to design and build safely and to maintain wildfire safety in the long run. This guide addresses the interests of developers and people living in community associations at risk from wildfire.

Many private developers seek information about how to make their planned communities and subdivisions Firewise from the ground up – building safer from the start. This guide will help developers create safer, more vibrant new communities by keeping fire in mind.

In some existing communities governed by associations, guiding documents – their master deeds or covenants, conditions and restrictions (CC&Rs) – restrict the ability of residents to make important Firewise changes to their property. Where residents are prohibited from changing a roof from flammable to nonflammable material, or from removing any vegetation, living or dead, from around their properties, the rules are not "Firewise-friendly."

This guide provides developers of new communities and residents of existing community associations a tool they can use to integrate Firewise concepts into design and development, as well as their covenants, conditions and restrictions and architectural rules. Community associations can greatly improve their existing conditions using the information in this guide. And by building safer from the start, the communities of tomorrow have a better chance of surviving – and thriving – in a fire-prone environment.

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*"Building Firewise concepts into the community itself means that from day one, there are rules and expectations set on how to address fire safety issues within the community."*

—ANDREW FORTIN, COMMUNITY ASSOCIATIONS INSTITUTE

## INTRODUCTION

**Whether you live in a subdivision in a beautiful natural area, or you are building communities nestled in the woods, you may have to deal with the risk of wildfire.**



This guide will help you look at your community and your home in a new way – a Firewise-friendly way. Taking the natural phenomenon of wildfire into account when planning, designing and building a subdivision can help you achieve your goals in a safe and environmentally sound manner. Checking your home and its surroundings to see if Firewise improvements can be made will help you keep it safer from wildfire.

As a developer or builder, you want to create a community that provides potential buyers or renters with beautiful, private, convenient and safe places to live. As a resident, you want your home in your scenic community to be beautiful and safe from wildfire. As a member of a homeowner or community association, you want to maintain the beauty and value of your neighborhood, as well as protect the people who live there. If you are building in an area naturally prone to wildfire, there are some important factors for you to take into account to improve the safety and livability of your new community.

Firewise principles address site design, construction and landscaping, as well as property maintenance and education of residents. These principles can

be integrated seamlessly into your development design as well as a community's master deed, covenants, conditions and restrictions (CC&Rs), subdivision rules, and architectural review guidelines.

Use this guide to learn more about the nature of wildfires and how Firewise principles in the development process can make homes and communities much less vulnerable to damage and loss. If you are a resident of an older subdivision, you can use these principles to make Firewise improvements to your home and surroundings that will give you and your neighbors a much greater edge when it comes to surviving a wildfire.

This guide will help you to:

- assess your site for wildfire risk factors,
- use Firewise principles in design and construction, and



- incorporate wildfire safety into your development's guiding documents and rules.

You'll also find examples of how other communities have been built Firewise from the ground up and about the benefits they've enjoyed as a result.

Understanding how to prevent home ignitions and destruction from wildfires is essential to incorporate appro-

priate safety measures into the design, construction and landscaping of your development. This guide uses a checklist format to help you identify the items you may want to include in the community's title document or declaration, subdivision rules, and architectural review requirements. If your community documents are already in place, the checklist and examples can help identify and support possible

changes for the community to enact to increase their wildfire protection. Examples from other communities are provided to give you an idea of how your document can be best structured to ensure that wildfire safety issues are fully addressed.

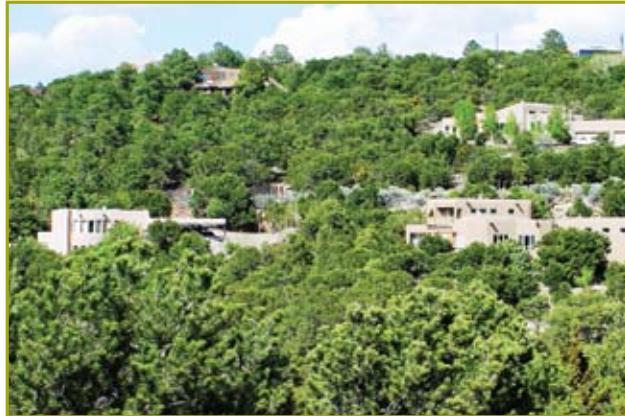
*"The idea of Firewise in pre-development for a community is that you plan before you build, which makes it cheaper to do things right. Planning ahead protects human life as well as structures."*

—CHARLIE BAUN, ENVIRONMENTAL CONSERVATION SERVICES, INC.



## WHY USE FIREWISE PRINCIPLES?

Could your planned community be vulnerable to damage from wildfires?



It's not as simple as looking at a map, and it isn't restricted to communities in the Western U.S. Fire professionals call the places where homes are built near or among lands prone to wildfire the "wildland/urban interface." It may be more helpful to think of the wildland/urban interface not as a place, but rather as a set of conditions that can exist in nearly every community. These conditions include the amount, type, and distribution of vegetation;

the flammability of the structures (homes, businesses, outbuildings, decks, fences) in the area, and their proximity to fire-prone vegetation and to other combustible structures; weather patterns and general climate conditions; topography; hydrology; average lot size; road construction; and more.

Growth patterns around the country indicate significant increases in development in rural or wildland areas. U.S. Census data from 2000 shows that nine of the 15 fastest-growing regions in the country are already considered wildland fire-prone areas – or are becoming fire-prone as a result of rapid growth. While some years are worse than others in terms of home losses, an "average" year sees some 800 to 1,000 homes lost during wildfire

events. These numbers are dwarfed by the truly catastrophic events such as the 2003 southern California fires that burned down some 3,600 homes over a few weeks.

Of course, growth and development are happening in areas that have valuable amenities, not just risks of wildfire. Home buyers increasingly are seeking privacy, natural beauty, recreational opportunities, and affordable living. There are more than 300,000 association-governed communities in the United States and more than 24 million housing units in these communities – an increase of about 40% in the past decade.<sup>1</sup> Given overall national development trends, where many formerly rural census tracts tripled in population during the 1990s<sup>2</sup>, it is likely that many of these communities are being built in wildfire-prone areas.

However, developing a new community in a fire-prone area does not necessarily spell disaster. Using Firewise



principles from the design stage to the final build-out can result in communities that retain their attractive elements and have the additional benefit of being compatible with their natural environment, which includes wildfire. Firewise principles include community infrastructure design considerations, home design and layout, home construction materials, landscaping choices, and maintenance activities all chosen and applied with wildfire in mind. These principles have been developed and tested over the past several decades in communities throughout the U.S., and are supported by physical fire science research. Using Firewise principles can help community residents manage the risk of fire the way that many commonly cope with snowstorms or flood seasons.

Firewise design and construction can begin to make new communities safer. But the long-term maintenance of Firewise conditions and the involvement of residents in their own safety are also very important elements to ensuring safer communities over time. Learning a little about how homes ignite in a wildfire and how this can be prevented sheds light on why ongoing, collaborative Firewise activity is needed.

Creating a Firewise community from the ground up not only makes for a safer community, but can also help

meet other goals and objectives for the developer and local officials or regulators. Firewise construction can contribute to a home's insurability and overall soundness. Firewise landscap-

The first consideration in reducing destruction of homes from wildfire lies in reducing the possibilities for ignition in the Home Ignition Zone – that is, the home and its immediate surroundings



ing can maintain the natural beauty of a site while avoiding future problems with unhealthy trees or plants and minimizing other problems associated with poor landscaping practices, such as soil erosion, weakened tree limbs vulnerable to wind, snow load or ice, and overuse of pesticides and chemicals. Firewise maintenance of individual properties and common areas can bring residents together to contribute to the safety and aesthetic goals of the development over time.

### **The Home Ignition Zone: The Basic Building Block of Firewise**

within 100-200 feet. The conditions within this zone largely determine the home's resistance to ignition and its survivability from wildfire.

A wildfire disaster resulting in the loss of many homes and perhaps lives is almost always the result of worst-case scenario conditions. These include lots of vegetative fuel (living and dead), hot, dry windy weather, and often topography with steep slopes or "chimneys" that carry fire quickly. The fire through this wildland area builds in intensity and spreads rapidly. When the fire burns into a community, the



homes become more fuel and sequential ignitions result in homes igniting neighboring homes – also known as a conflagration.

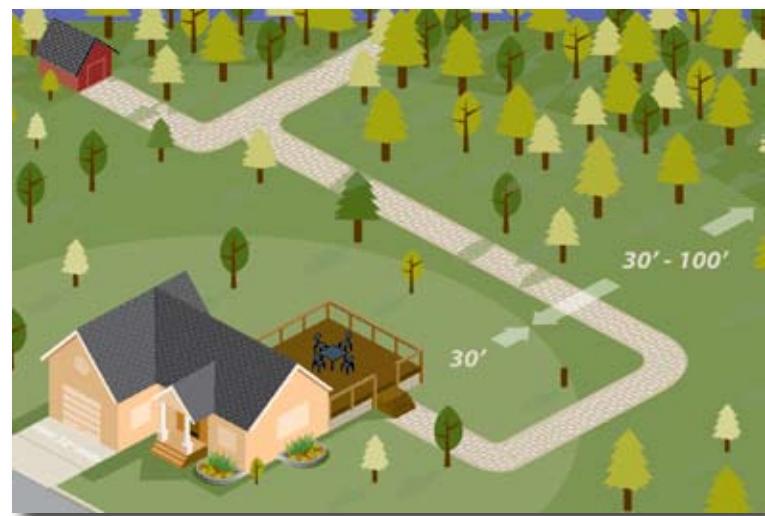
By changing the character of the Home Ignition Zone, a resident can alter the path of a fire approaching a home. Whether homes will ignite during wildfire has to do with the condition of the home itself and the area in the Home Ignition Zone. Some risk factors to look for include homes with flammable roofing, siding and decking materials; accumulations of leaves, needles, twigs, brush or tree limbs on, around or under homes; dense vegetation in the Home Ignition Zone; and flammable items (mulch, woodpiles, other materials) in direct contact with homes or attachments.

By changing the character of the community's ignition zone, developers and community associations have the opportunity to alter a wildfire's path for an entire community. Because many communities have homes that are closer than 100-200 feet to one another, the individual homes' ignition zones overlap. This means that in order to change the community's ignition zone, residents need to work together. Developers have a special opportunity to reduce the likelihood of home

ignitions in a wildfire by designing in a Firewise way "from the ground up."

### **Assessing Risks and Reducing Ignition Hazards**

Communities almost everywhere in the United States are at some risk from wildfire. Your community may have a very short fire season, but homes in your area may still be at risk to wildfire ignition. The best resource for determining your area's relative risk to wildfires is usually your State Forestry office. Local fire departments may also have historical information on wildfire occurrences in your area. Appendix A provides basic information on how fire behaves and can give you some general guidelines about risk factors for wildfire. Appendix B gives a more detailed description of how to assess individual homes for wildfire risk.

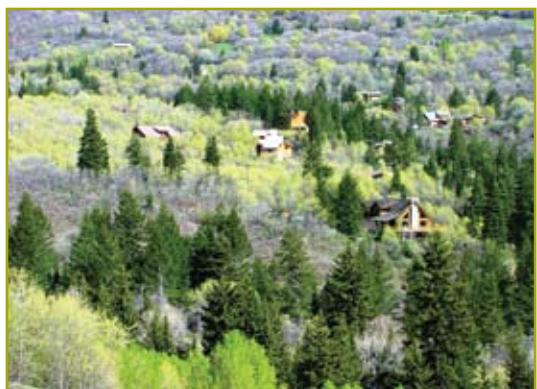


*"Investing in forest clean-up and adopting Firewise practices not only reduced the risk but enhanced the beauty and value of the on-site forests. What's more, promoting the project as a Firewise community has proven to be a beneficial marketing tool."*

—CHRIS HEFTEL, DEVELOPER, RIVER BLUFF RANCH, WASHINGTON

## FOR THE DEVELOPER, BUILDER AND DESIGNER

If you are designing a new community or subdivision, knowing about your wildfire risk can help you create a safer development from the beginning.



Consulting with state forestry staff and local fire professionals will help you understand not only the wildfire hazards you need to address in your design, but also any county or state regulations that guide development in wildfire-prone areas.

For specific guidelines on construction and infrastructure, refer to Appendices C (Construction checklist) and D (Infrastructure guidelines).

### Location, location, location

Knowing that terrain and weather are two of the main factors in wildfire risk, consider any major topographical features when designing the subdivision layout. These include steep slopes, ridges, bluffs, canyons, "draws", "chimneys" and "saddles". Consider that south-facing slopes will have drier vegetation from solar heating and that winds will carry fire up into chimneys and down through canyons. In addition, heavy rains after a fire may cause mudflows or soil erosion.

When considering location of home sites, think of potential fire exposure and elements related to site maintenance and fire response:

- Setbacks
- Home-to-home proximity

- Access/Egress
  - Road/driveway width and grade
- Homes sited at the top of a ridge will need to have adequate setback away from potential flames. Residents or community managers will need to have access to vegetated areas in order to maintain them in a Firewise condition. Think about site design from the point of view of fire approaching, and of the maintenance that will be needed on the landscape to keep fire-prone vegetation from accumulating. Homes with rooflines closer than 30 feet apart can become ignition sources for one another.

Depending on the size of the development, certain infrastructure for fire protection may be required. In the absence of such requirements, you may want to include these features in your plan to enhance community values. For example, since steep, nar-

**Excerpted from “Developing in the Interface” by Chris Heftel in American Perspectives on the Wildland/Urban Interface. Heftel, a developer, is president of River Bluff Ranch in Spokane, Washington.<sup>3</sup>**

There are many important and fascinating aspects to developing near wildlands and many challenges. When it comes to creating new wildland/urban interface communities, developers are critical players and should start by using Firewise planning as a part of their overall development process. I offer my recommendations for developers planning and constructing beautiful, fire resistant projects in the wildland/urban interface:

- Require each home site to be a defensible place and do the research. Invest the time to become as knowledgeable about these issues as you are with other development issues.
- Evaluate interface site conditions. Early in the process, and when you begin to study your other development issues, solicit on-site inspections and frank feedback from various stakeholders and specialists. Discuss these issues with owners of neighboring wildlands, environment groups, realtors, your marketing team and others.
- Evaluate your site from other aspects, including current and long term prospects for the health of forests or other natural vegetation, recreational space opportunities, aesthetics of open spaces and views from home sites, creating defensible space that enhances aesthetics for each building site, off-site risks from neighboring wildlands outside of your control and the prospects for cooperation and/or collaboration from those who control these off-site wildlands, existence of on-site hazardous fuels, ways to reduce them and the associated costs.
- Consider opportunities to minimize costs and generate timber harvest revenues by integrating fuel reduction, forest health and aesthetic enhancement goals with site clearing activities, market analysis to achieve increased sales prices due to aesthetics from additional fuel reductions.
- Conduct a systematic assessment of your project’s prospects for each aspect of creating a “Firewise” community. Ask interface fire experts to assess your project based on your development plans. Look for ways to improve your position by making feasible changes to your plans. Sources of wildland/urban interface financial assistance are available through a variety of grants, and many materials and specialists are available at little or no cost.
- Develop a section of your master plan for wildland fire risk management based on the specifics of your project. Consider the issues of sustainability and enforceability.
- Fuels don’t maintain themselves. Vegetation grows back; trees die. People don’t always do the right thing; homeowners come and go; some ignore or break the rules. Draft covenants so that homeowner associations, fire districts and possibly others have the legal and financial ability to perpetuate the Firewise conditions you created.
- Consider the scale of your wildland/urban interface project. If your site is large with considerable open spaces, incorporate designs that allow such elements as recreation spaces and service access roads to double as firebreaks. If your site and/or building parcels are small, incorporate ways to maintain adequate separation between structures. For example, cluster ignition resistant houses and provide the defensible space around each cluster.

Successful developers must pay attention to site conditions such as rock, highly erodible soils, and the like. Wildland fire is another equally important site condition to evaluate and intelligently incorporate into your development design, but unlike many conditions requiring mitigation, wildlands often also represent a wonderful and exciting opportunity to create something of beauty which prospective buyers value.



row, winding roads make it more difficult for fire engines to respond to fire and medical emergencies, you may want to consider minimizing road gradient where possible both for emergency egress by residents as well as access by fire trucks. A grade of ten percent or greater will significantly impact their speed and their ability to arrive and maneuver safely. For a very large community with homes that are widely spread out, a community fire station (or land set aside for one) may be an important addition.

### **The natural environment:**

The beauty of nature is what attracts many residents to live in planned developments. Trees, grasslands and other natural elements may be a major amenity for your new development. Consider the following when reviewing your site with fire in mind:

- Fire-prone species of trees, shrubs and other plants
- Density of vegetation
- Overall health of the vegetation
- Undergrowth
- Local practices for vegetation management
- Dead or downed vegetation
- Options for debris disposal

- Ornamental landscaping choices
- Availability of water for landscape maintenance and firefighting

Some types of vegetation are more fire-prone than others. Pine forests, palmetto, scrub oaks, and species with a lot of resins or oils are of concern. Broad-leaf (deciduous) trees are more fire-resistant, but also consider the overall health of the ecotype. A forestry professional will be able to help identify any unhealthy conditions of the natural vegetation in your area.

If heavy undergrowth has been allowed to spread throughout your site, or there are dense forests, these are potential fire hazards. Even in areas dominated by tall grasses or shrubs rather than forests, uninterrupted beds of flammable vegetation are a concern. Find out which agencies or organizations are currently managing the forest or rangeland conditions by thinning trees, removing undergrowth or conducting prescribed burns. If prescribed or controlled burning is practiced in your area, consider the impacts of smoke from these activities in your design and in your advice to potential buyers.

When learning about the vegetation on your site, you'll often find that forestry and fire professionals call it "fuel". If the trees or other vegetation are

very unhealthy or pose a danger of extreme fire, you may even hear terms like "stand replacement fire" and "soil-altering fire". These terms mean that significant treatment of the vegetation will be needed before you begin development. Forestry professionals may recommend that you treat the vegetation or "fuel" prior to subdividing the properties and recording the lot splits.

Consider areas where dead vegetation – downed trees or limbs, pine needles, dead leaves – may have accumulated on your site. This material can be a significant fuel for a wildfire – often more



so than live plants. A plan for removal of this material before development will go a long way toward the aesthetics and fire safety of the built community. If the area tends to accumulate a lot of dead material from heavy nee-

dle or leaf drop, consider how future property owners will dispose of this on their own and on common areas in the community.

Your site may be enhanced by ornamental plantings in common areas and on home sites. There are many options for fire-resistant plant species as well as good techniques for arrangement that can be attractive, compatible with the local environment, and safer from wildfire. Consider that one characteristic of a Firewise plant is its ability to be maintained easily, without drying out or dropping lots of leaves or needles. Will property owners have adequate water for maintaining home landscapes?

Water supply is also critical to consider for firefighting purposes. If there is not a municipal water supply available for your site, think about what other sources are available. Consult with your local fire authorities regard-

ing alternatives such as dry hydrants, ponds, water tanks or cisterns.

As the developer you may or may not be responsible for building the homes that will populate your new community. For more about building a Firewise home and designing Firewise home landscapes, see the following section, "For the Resident" in this guide.



#### An excerpt from a letter by the City of Hood River (Oregon) Fire Marshal to Prospective Property Owners<sup>4</sup>

In order for the fire department to gain access to your home or building, the access roads must meet these requirements. The road infrastructure in the east Hood River area is such that fire and EMS response is delayed. This delay is due to the fact that narrow streets and tight corners make it difficult to maneuver large fire apparatus around the area. Strict adherence to the road standard is required by all property developers. By providing adequate fire department access roads, you reduce the amount of time lost positioning apparatus.

#### A developer in southwest Colorado discusses the value of wildfire mitigation:<sup>5</sup>

Ron Tyner, a developer with the former Peregrine Creek Development Company, believes that the company was one of the first and only developers required to do fire mitigation in La Plata County.

In 1996, [his company was] involved in the Tomahawk Subdivision, a resubdivision of 72 acres of the original Rafter J in La Plata County. "We were surprised and somewhat aggravated when the county required wildfire mitigation. Quite honestly, we had no idea what 'to the standards of the Colorado State Forest Service' meant."

An on-site visit with [a] Colorado State District Forester taught him the meaning of words like slash, defensible space, ladder fuels and fuel breaks. Tyner was advised that 120 to 140 trees per acre was optimum, that the spacing between tree crowns should be 15 feet and gambel oak was to be left in clumps of 12 stems. He was also told that slash, the thinned remains of branches and leaves, was to be spread and piled no more than 18 inches high on the forest floor, and special attention should be given to the steep slopes.

"From the moment work began, Tyner said, "we not only noticed a positive aesthetic difference but our lot sales soared."

The company was able to directly measure their investment by comparing their sales prices with resales in the immediate area. The result was a net profit increase of 20 percent.

Tyner says whether a county requires it or not, he does wildfire mitigation before developing an area as a matter of course.

"It's not just that buyers are more aware of the need for protecting against wildfires, but I am able to sleep better knowing that we made a safer place to live in the forest."



## FOR THE RESIDENT

This section will help you learn what to do to make your home safer, whether you are building new or living in a residence you want to improve for wildfire resistance.



You can also use Appendix C for a quick checklist on Firewise construction.

### Building a Firewise Home

If you're living in a community where the developer has taken wildfire into account in the infrastructure and overall design of the community's layout and landscape, you are half-way there. The next step is to ensure that your home is built using Firewise

techniques. Luckily, "Firewise building materials" are commonly used and readily available. The key elements to consider when building a Firewise home are:

- Roof and Roof Elements
- Vents and Openings
- Windows
- Walls
- Attachments – Decks, Porches, Fences
- Other Structures

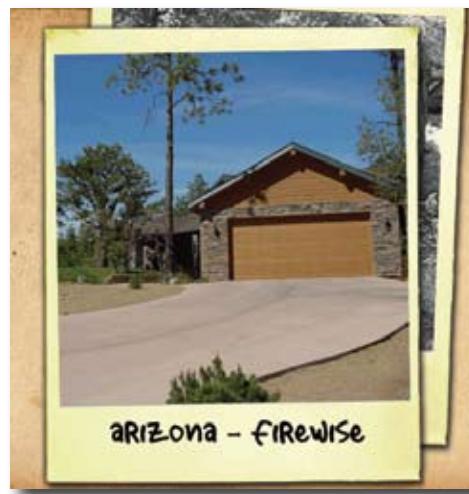
**Roof** The most important consideration is to ensure the building has a nonflammable roof. Review Appendix A, "How Homes Ignite During Wildfire" to learn more about how vulnerable flammable roofs are to ignition from flying brands and embers during a wildfire. Ensure that your home is constructed using nonflammable roofing materials and roof assembly. Good choices for roofing material in-

clude asphalt, fiber-cement, tile, concrete and metal. Simpler roofs with steep pitches limit the accumulation of needles and dead leaves that can be an "ember trap" in a wildfire. Gutters, skylights and other elements on the roof should also be made of non-flammable material.

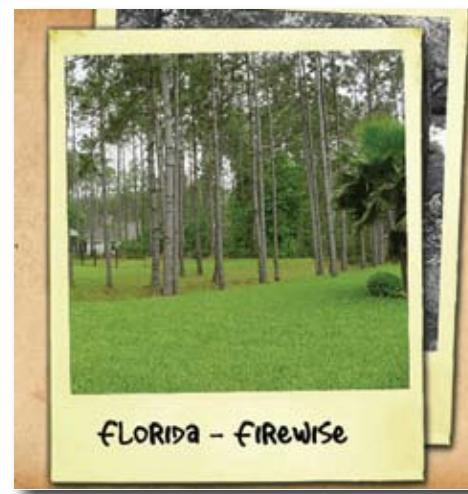
**Walls** The siding used on homes can also make a difference in how well the home will resist ignition from a wildfire. Nonflammable choices include stucco, brick and fiber-cement. Large-timber construction is also fire-resistant as it takes a long time for large timbers to ignite and burn. Vinyl siding can be vulnerable to radiant heat but will typically melt and drop away from the sheathing rather than carry fire. If there is no protection installed for the wall underneath vinyl siding, the home is more vulnerable to both radiant heat and embers. Wood siding is also vulnerable to ignition, more so if it does not have an



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interlocking lap, which means there is space between the shingles and the studs where embers could penetrate.<sup>6</sup>

**Windows** During a wildfire, windows, like the rest of the home, are exposed to radiant heat, convection and embers. Radiant heat could be severe enough to break the glass in a window or ignite the exterior siding directly below it. Flames from burning siding or vegetation burning near a window could touch the window and heat it to the breaking point. Embers can strike a window and break it, or ignite any flammable debris on a window sill. For these reasons, dual-pane or tempered glass are good Firewise choices for windows. Dual-pane windows have an added advantage of the outer layer of glass that provides a thermal shield for the inner pane, allowing it to heat more slowly and decreasing the chances it will heat enough to break. Consider extra protection for any large windows facing an area where wildfire is likely to approach, or design the home to avoid such exposures.

**Vents and Openings** Openings in the home need special consideration. Chimney flues, attic vents on the roof or under the eaves, crawl space vents, even doggie doors can provide an opening for embers or flames to enter the interior of the home during a wild-

fire. These areas should be screened with metal mesh of no more than 1/4-inch (1/8-inch is preferred, but could become clogged if painted). Doggie doors, garage doors, and entry doors should have seals that prevent ember entry when closed properly.

**Attachments – Decks, Porches and Fences** When designing or installing decks, porches and fences, remember that if it is attached to the house, it is part of the house – or part of the fuel from a wildfire’s point of view. Decks in particular pose special hazards in a wildfire. If they overhang a slope, they can heat from beneath and eventually ignite from radiant or convective heat. This is exacerbated by any accumulation of flammables – stored items or leaf litter – under or around the deck. The flat deck surface can load up with embers flying from up to a mile away. Consider using non-flammable material or material that will not carry fire to the house. You can add special protection in the area where the deck meets the house to prevent the home igniting from the deck by using metal flashing.

Wooden fences are prone to ignition as they extend into vegetated areas and often have accumulated debris or leaf litter against them. If flammable fence material is being used, a simple fence fix is to ensure that the attachment to

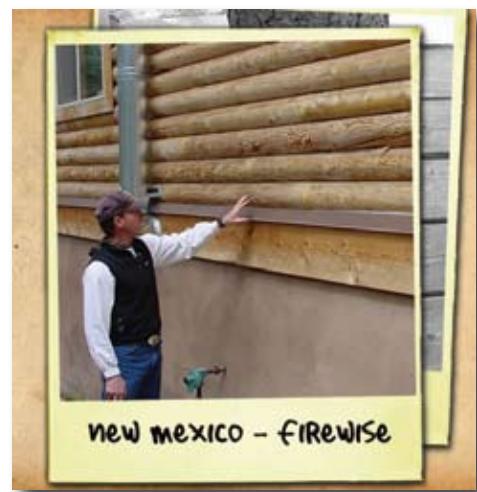
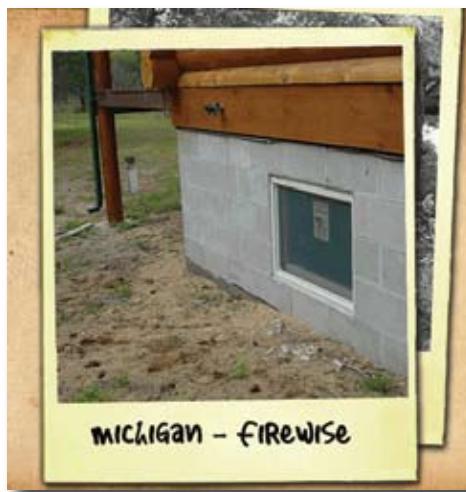
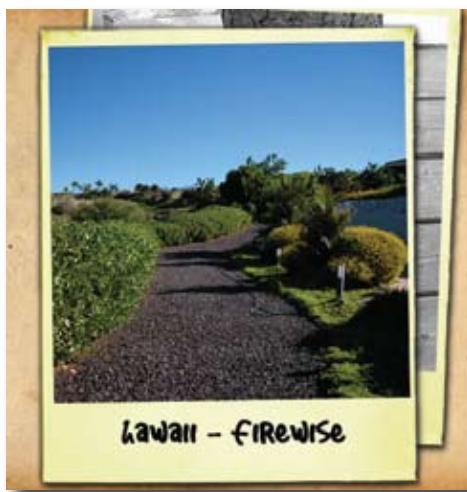
the house is made of a nonflammable material. Fences shared by neighbors that are closer than 100 feet to any part of either house will need special attention to prevent accumulation of flammable debris on either side.

**Other Structures** Other structures attached to the house or within the Home Ignition Zone should be designed to minimize ignition. These might include garages, storage sheds, worksheds, greenhouses or stables. Ensure that these structures are built from fire-resistant materials and will employ the same care around the property as for the primary structure.

### Designing a Firewise Landscape

Homes ignite because of the condition of the home itself and everything around the home within 100 to 200 feet (see Appendix A). The landscape design and material become a critical element in creating a Firewise home. The primary considerations include:

- Zone Concept
- Fuel-Free Area
- Firewise Plants
- Choosing Firewise plants
- Plant arrangement and maintenance
- Tree Spacing



You can also read more about Firewise landscaping principles in Appendix D, and review a Firewise Landscaping checklist in Appendix E.

**Zone Concept** This refers to the idea of working from your house out into the landscape in designing your Firewise surroundings (see diagram, page 6). The overall Home Ignition Zone includes the home and everything around it within 100 to 200 feet. If your home is on a steep slope you may need to design your landscaping to the 200-foot mark. But you should begin in the area closest to your home – within three to five feet of your walls and attachments.

**Fuel-Free Area** Basically, it is a bad idea to allow flames to touch your home. By creating an area free of fuel for an encroaching wildfire within three to five feet of your home, you can avoid many potential ignitions. This area should be designed to have nonflammable material such as rock or gravel, bare earth, or small, low-growing flowers or other plants that will not be able to generate enough heat to carry flames to the sides of your home or its attachments. Remember that a wood fence or deck that attaches to your home needs the same kind of attention to minimize ignition potential.

**Firewise Plants** For ornamental vegetation around the home, choose species compatible with your local environment that are also fire-resistant or that will not carry fire to adjacent grass, shrubs or your home. The Firewise website links to many plant lists created by Cooperative Extension Services around the country that can help you choose the best plants for your location.

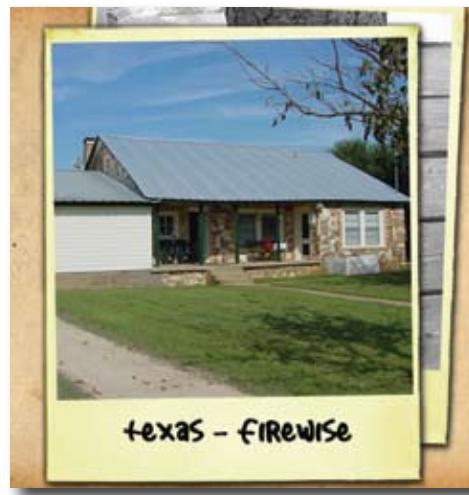
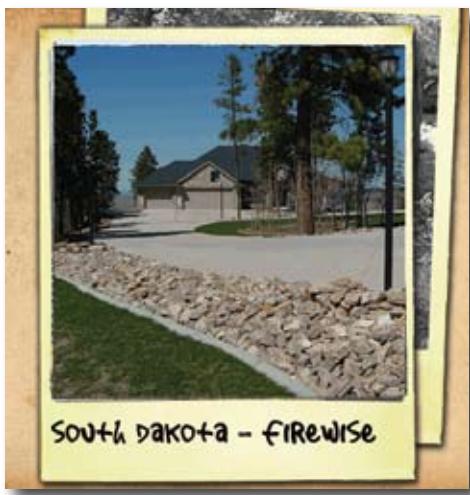
**Plant Arrangement** In keeping with the zone concept, a Firewise landscape will keep the area within 30 feet of the home “lean, clean and green,” with plantings arranged in islands to break up the continuity of potential fuel for a fire.

**Tree Spacing** It’s best to keep tree limbs and branches at least 10 feet away from the sides and roof of your house, and avoid limbs that hang over the house (besides generating needle or leaf drop onto your roof, a burning limb can come down on the roof and cause more problems). The tops or crowns of the trees should be spaced so that fire cannot make the leap from canopy to canopy. Trees should be separated from lower growing vegetation that can create a “ladder” for fire to go from the surface into the tree canopy.

## Modifying the (Existing) Home Ignition Zone

If you are living in an older home and are wondering where to begin your Firewise improvements, the recommendation is always to begin with the home and work your way out from there. The key elements are the same for the home construction and landscaping. For your home structure, consider the following improvements. These are listed roughly in order of how easy or inexpensive they are to accomplish. However, replacing a flammable roof is one of the most important things you can do to make your home safer from wildfire.

- Remove flammable material such as needles, leaves and twigs from your roof and gutters, and from under decks and porches and along fences
- Screen all vents in your eaves or on your roof, chimney openings, and crawlspaces or underneath decks with 1/8" or smaller nonflammable metal mesh screen
- Replace wood fences with metal (or install metal flashing or a metal gate on the fence portion that touches the house)
- Replace single-pane windows with dual-pane windows and ensure



Neighbors may also encounter shared wildfire risks within commonly-held areas in the community, such as open space or roadways. The homeowners association should address the mitigation and maintenance of these areas, but will still need residents to work in cooperation to reduce the fuels where these common areas border private lots. Residents of community associations with good Firewise practices and governance have a great opportunity to reduce their wildfire risks and get credit for it, too.

The Firewise Communities/USA recognition program is a national effort to encourage and acknowledge residents' actions to make their homes safer from wildfire. If you are actively involved in Firewise work with your neighbors and/or your Homeowner's Association (HOA), your community may be eligible for recognition as an outstanding example of wildfire safety in action. See Appendix F for more on becoming a Firewise Communities/USA site.

window screens are in good shape

- Replace flammable siding with non-flammable material
- Replace flammable roof with non-flammable roof assembly

For your yard and landscape, consider these improvements:

- Create a fuel-free zone within 3-5 feet of your home's perimeter as well as any attachments
- Remove any tree branches that hang over your roof or are within 10 feet of your chimney
- Remove dead or dying plants and rake up needles, leaves and other debris within 30 feet of your home.
- Replace fire-prone plants with Firewise species
- Remove vines, shrubs, scrub and other undergrowth beneath trees or large shrubs to prevent a fire "ladder"
- Thin out trees up to 100 feet from your home to keep tree canopies from touching

## Working with Your Neighbors

In a community with homes within 100 feet of each other, you may be wondering how you can improve your wildfire safety if you can't cross that Home Ignition Zone line into someone

else's back yard. In fact, if your neighbor's home isn't Firewise, you can be at greater risk from ignition during a wildfire, as a burning structure will generate a tremendous amount of heat and flying embers. Your "neighbor" might also be a national or state forest, national park, or private rangeland. Fire behavior will be the same regardless of who owns the land within your Home Ignition Zone. That's why it's critical to work with neighboring landowners to ensure the greatest degree of protection from wildfire.

**A memo from firefighter Robert Holt, with the Redding Interagency Hotshot Crew, describes the scene in a neighborhood during the Angora Fire that destroyed 254 homes near Lake Tahoe in 2007:<sup>7</sup>**

"...the house...had pine needles draped on its roof, under its wooden porch, and along its wooden fence. [We] cut a line around it, but because of the extreme wind, it jumped our line and flames involved the porch. Figuring this house was done for, I tried to get into the back yard of the house next door to the south. Because its gates were locked and I would not have an escape route, I could not find a way to protect it. I took refuge around the southwest corner of the first house and sprayed water on the side of the second house, but soon the heat was too much; I took a blast to the right side of my face and abandoned the houses. If the first house had cleaned its roof, fence, and porch of pine needles, I could have saved it. If there had been a way to access the back of the second house, I could have saved that one as well...."

"It is my expert opinion that we could have saved no less than 75% of the houses that were lost if the landowners had removed the pine needles from their roofs, porches, and fence lines. In addition, houses that had locked gates and not-easily-found spigots also burned. When one house became involved, the surrounding houses caught also due to the flying embers and direct flame impingement."

*"Keep in mind that, besides keeping a wildfire from reaching a home, Firewise landscaping can keep a fire that might start in one home from igniting adjacent homes. This is where the importance of neighborhood organization and cooperation comes in."*

—MIKE KUHNS, EXTENSION FORESTRY SPECIALIST, UTAH STATE UNIVERSITY

## FOR THE COMMUNITY ASSOCIATION

### How to use covenants to guide community Firewise practices.



#### Covenants in Context

Many newly planned developments make use of guiding documents known as covenants for the benefit of all residential owners and their neighbors. Covenants can be a very useful tool for guiding Firewise-friendly development. What's more, neighborhoods with properly drafted and enforced covenants or architectural standards have been shown to retain property value better than those with poorly enforced covenants or no standards at all,

and neighborhoods that follow their covenants and standards tend to be safer, look better, maintain better relationships with local governments, and better retain or increase the investments that homeowners have made in their properties.<sup>8</sup>

A covenant is a rule governing the use of real property, and may also refer to a promise or agreement (as formalized in a deed) concerning the use of the land. For example, a purchaser of land "covenants" to abide by certain restrictions associated with the use of the land. Essentially, such covenants are promises made by a prospective purchaser as a condition of purchasing the land in question.

When properly recorded on a deed conveying land, a covenant ("restrictive deed covenant") has the legal effect of a binding contract term, and may be so enforced. When covenants are instead signed privately among neighbors, as in a mutual compact

or agreement, they are still binding upon the signatories and may be litigated if breached.

Covenants differ from zoning ordinances in that they are between private parties rather than between a governmental entity and a private party. Thus, a neighborhood association or single homeowner may enforce a covenant as against another homeowner, rather than a city or county enforcing a zoning ordinance as against a private citizen. Another difference is that zoning ordinances are regulations recorded as local laws "on the books," whereas covenants are recorded in private deeds, either as deed restrictions or as neighborhood compacts between private parties. Because covenants are voluntary, they may be more restrictive than zoning ordinances. Covenants are also known as "the master deed," "declaration," or "CC&Rs," for "covenants, conditions and restrictions".



Community associations in almost half the states base their rule-making authority on one or another version of a set of regulations called the Uniform Acts. The Uniform Acts give associations the power to regulate common elements. It also specifies the powers of the association board. According to the Uniform Acts, association boards of directors may:

- Adopt and amend bylaws, rules, and regulations
- Regulate the use, maintenance, repair, replacement and modification, of common elements;
- Impose charges for late payments of assessments and, after notice and an opportunity to be heard, levy reasonable fines for violations

of the declaration, bylaws, and rules and regulations of the association;

- Exercise any other powers necessary and proper for the governance and operations of the association.

A sound set of CC&Rs can provide a good basis for Firewise-friendly development, and ensure that a community association maintains Firewise standards into the future. The CC&R document should address the following issues:

- An overall vision or mission statement that includes fire safety as part of the community's values
- Guidelines for design, siting and construction of homes that will ensure that wildfire ignition potential is considered

- Overall landscaping and maintenance guidelines for homes and commonly-owned areas
- Guidelines on construction and maintenance of fire protection infrastructure, including roads, bridges, driveways, water supply and other elements.
- Guidelines on signage for evacuation routes and design of community safe zones for shelter
- Education for residents about Firewise principles and wildfire safety

For more details on Firewise-friendly rules and example language, see the next section in this guide, "Firewise-Friendly Rule Elements and Examples".



*“Because we live in an area that is at high risk for wildfires, communities within the Bailey area are beginning to realize the importance of forest stewardship and endorsing the Firewise concept.”*

—BILL FOX, FIREWISE COMMITTEE CHAIRMAN, DEER CREEK VALLEY RANCHOS, COLORADO

## RULES AND EXAMPLES

The Community Associations Institute publishes guidance for drafting good rules.



While the covenant document can cover just about anything under the umbrella of land use in the community, it should function as the “constitution” for the community, and leave very detailed rules to an Architectural Review Board or similar subcommittee. Unless specified in the CC&R or Master Deed, changing a covenant restriction may require 100% agreement among residents. Some key characteristics of “good rules” are provided by the Community Associations Institute<sup>9</sup>:

1. Good rules are transparent
2. Good rules are few rules.
3. Good rules are easy to obey.
4. Good rules are efficient.
5. Efficient rules accomplish their goal without undue side effects.
6. Good rules are enforceable.
7. Good rules are flexible.
8. Good rules must be communicated to the residents.

Community associations may have a CC&R document that makes no mention of wildfire or similar issues. Rules can still be developed to incorporate Firewise considerations in a community’s Architectural Review Guidelines or Design Review Committee rules.

### **Firewise Friendly Rules Elements**

#### ***Good rules are transparent.***

Some methods to ensure that you

have transparent rules are to include wildfire safety in the Design Review Committee’s mission statement, and/or to provide specific definitions in the document that outlines the community’s design standards. Wildfire issues have their own “lingo” – such terms as “fuel,” “mitigation,” “defensible space,” “home ignition zone,” etc., are not necessarily familiar to community residents. Any such terms should be clearly defined in the rules.

A vision statement helps community residents and potential buyers to understand more of what the community stands for, and helps provide some insight into why certain rules may exist.

#### ***Good rules are few rules.***

Depending on the community, “few rules” will mean something different. In Genesee, Colorado, the ARC standards<sup>10</sup> are 24 pages long, and cross-reference to tree removal rules, local Firewise construction guides, and a



native plant list. However, Genesee is operated by a Foundation with full-time staff that serve to manage this large property. For a Firewise-friendly development, rules should cover common areas and individual lots; should describe the requirements for Firewise construction; and should describe the requirements for Firewise landscaping and maintenance. In the absence of a reference to a Firewise plant list, some communities mention the two or three most troublesome fire-prone invasive species that residents must avoid.

#### **Good rules are easy to obey.**

Education about wildfire and Firewise practices will help residents understand the reason for the rules, and using clear language in your design guidelines will help people obey the rules. HOA boards and managers are not the community “police,” so creating rules that are easy to obey increases the likelihood they will be followed. If residents have organized to achieve recognition status as a Firewise Communities/USA site, they are voluntarily complying with directives to maintain their properties in a Firewise condition.

#### **Good rules are efficient.**

Efficient rules are ones that accomplish exactly what the board intended them to accomplish. Firewise rules that are too harsh or too vague will do little to accomplish the goal of making the

community safer from wildfire. Firewise rules should relate specifically to the goal they are trying to accomplish – making homes and the areas around them less susceptible to ignition from wildfire. To do that, the rules should be based on sound fire science research and established Firewise principles.

Efficient rules accomplish their goal without undue side effects. There is always the possibility rules intended for wildfire safety could have undesirable results, such as residents removing the wrong kind of vegetation, or using poor practices in trimming trees or brush that results in unhealthy vegetation or poor aesthetic qualities. Efficient Firewise rules will provide specific references to good practices so that possible undesirable side effects can be avoided.

#### **Good rules are enforceable.**

Vague rules or rules using jargon or technical language are difficult to enforce. Rather than telling residents to “reduce fuel loads near homes,” a better rule would be to require “removal of dead or dying vegetation within the area from the foundation walls of the home to a 30-foot perimeter.” By the same token, overly specific rules can create problems with enforcement. It is more difficult to obtain voluntary compliance with rules that are extremely strict. Another important consideration for enforcement is to ensure that the Association rules are

consistent with all existing state and county laws. Some states require wildfire risks and safety measures to be recorded on the subdivision plat or in the master deed.

**River Bluff Ranch, a community developed in Spokane, Washington, built Firewise-friendly elements into the infrastructure and the covenants:<sup>11</sup>**

Among the requirements of the River Bluff Ranch covenants are paved two-lane roads, secondary evacuation roads, and a network of forest roads. Also required are underground utilities; a series of non-potable-water storage tanks with dry hydrants; fire-resistant roofing, double-paned windows, deep side yard setbacks, defensible space, and vegetation maintenance; and an on-site caretaker, equipment and shop.

The covenants further require that the community’s homeowners’ association, when formed, enforce the covenants, educate the residents, maintain the roads and water storage facilities, manage an ongoing forest stewardship program, and implement the recommended Firewise Communities budget – currently \$2 per person – to be used for future Firewise efforts.

### **Good rules are flexible.**

Flexibility on Firewise rules is a good idea, as each home lot will present different challenges for wildfire mitigation. For example, some homes will not have 30 feet of space in all directions that stays within the homeowner's lot. Some properties will be located on steep slopes where additional safety treatments extending perhaps 150 feet from the home will be necessary.

### **Good rules must be communicated to the residents.**

While the CC&R or master deed documents are part of every resident's papers, this does not necessarily mean that the Firewise rules in those documents have been read and understood by every resident. Association boards should distribute the rules in resident handbooks and redistribute copies of the rules periodically. Public area postings of rules, information in newsletters or on the association website are also effective ways of communicating the rules to residents.

### **Firewise Cleanup Recommendations and Procedures from Lake Camelot, Wisconsin<sup>13</sup>**

A good example of clear language that can easily be obeyed.

1. Eliminate fire fuels within 30 feet of any structure on the property. This includes clearing any dead wood or timber that could ignite or provide fuel for fire. Eliminating dead standing timber should be considered.
2. Maintain trees and bushes in a fire safe manner. Where possible use bushes that maintain high moisture content. Trim tree limbs to a level of 6 to 10 feet above ground to prevent them acting as ladder fuel for fire.
3. Ensure tree canopies do not overhang any structure.
4. Keep roof gutters and downspouts free of leaves and other fire fuels.
5. Enclose patios and decks to prevent fire fuel from being ignited by flying sparks, in the event of fire.
6. Build and maintain a non-flammable barrier of 3 feet or more from any structure to prevent ignition of the structure. Use rocks, stone, or other non-flammable material as much as possible.
7. Maintain a green lawn area at least 20 feet around any structure where possible. During summer months, ensure the lawn area is watered to maintain its moisture for deterrence against ignition by fire. Keep the grass mowed short.
8. Keep the area around your house raked free of fallen leaves and needles.
9. Dispose of cuttings and debris properly.
10. Make sure your driveway has sufficient width and height room for a fire truck.
11. Maintain woodpiles at least 10 feet from the house.

### **From Colorado Revised Statute 38, "Colorado Common Interest Ownership Act," 38-33.3-106.5. Prohibitions contrary to public policy - patriotic and political expression - emergency vehicles - fire prevention - definitions.<sup>14</sup>**

(1) Notwithstanding any provision in the declaration, bylaws, or rules and regulations of the association to the contrary, an association shall not prohibit any of the following:

(e) The removal by a unit owner of trees, shrubs, or other vegetation to create defensible space around a dwelling for fire mitigation purposes, so long as such removal complies with a written defensible space plan created for the property by the Colorado state forest service, an individual or company certified by a local governmental entity to create such a plan, or the fire chief, fire marshal, or fire protection district within whose jurisdiction the unit is located, and is no more extensive than necessary to comply with such plan. The plan shall be registered with the association before the commencement of work. The association may require changes to the plan if the association obtains the consent of the person, official, or agency that originally created the plan. The work shall comply with applicable association standards regarding slash removal, stump height, revegetation, and contractor regulations.

(2) Notwithstanding any provision in the declaration, bylaws, or rules and regulations of the association to the contrary, an association shall not require the use of cedar shales or other flammable roofing materials.

# **FIREWISE-FRIENDLY CHECKLIST AND RULE EXAMPLES**

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# Are Your Rules Firewise-Friendly? A Checklist

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*Use this checklist to determine if your community association's governing documents contain elements that guide development and maintenance in a Firewise manner. Sample language can be found in the examples in the next section, and in the appendices covering Firewise assessment, infrastructure and design. Your community may not need or want to cover all of the items in this checklist – it's designed to allow you to tailor your rules concerning wildfire safety.*

## ***Do your rules restrict residents from taking Firewise action?***

Two very common prohibitions found in older community association covenants and restrictions involve roofs and vegetation. A number of community associations prohibit residents from replacing flammable roofs with nonflammable alternatives. Others severely restrict residents' ability to remove flammable vegetation – dead or alive – from around their homes. If your current rules contain these prohibitions, the most Firewise-friendly action you can take is to change the rules. Work with your association's legal counsel to review and make recommendations for rule changes.

## ***Does your mission or vision statement include wildfire safety?***

The covenant language can include a mission or vision statement for the community that includes the concept of protecting the safety of life and property from damage due to wildfires and other natural or man-made hazards.

## ***Do your architectural or design standards include Firewise concepts?***

Your association's architectural or design review committee can have significant influence on the safety and aesthetic value of the community, if their standards include Firewise concepts. Check to see that the following items are covered in your site design and review process, building requirements, and landscaping guidelines.

## ***Do Your Rules Address Firewise-Friendly Site Design, Preparation and Infrastructure?***

*Firewise-Friendly Site Design* – Firewise friendly rules will require that sites for new homes be assessed for wildfire risks (see Appendix B). Rules should also direct that homes should be set back from bluffs, cliffs, overhangs or steep slopes (see Appendix G).

*Firewise-Friendly Site Preparation* – Rules can direct the preparation of home sites to minimize the presence of dead, dying or diseased trees and other vegetation. In some cases, site grading should be performed to minimize the risk of fire approaching from steep slopes or other topographic features (see Appendix G).

*Setbacks* – To enable residents to more easily modify and maintain their home ignition zones, homes should not be spaced too closely together. A requirement for homes to have a minimum of 30 feet of clear space from the foundation to the property line on all sides is Firewise-friendly.

*Driveways* – Very long, narrow, steep driveways pose a serious challenge for fire and emergency responders trying to reach homes – and for residents trying to leave in an emergency. Rules that provide a maximum slope for driveways, a minimum width, and a maximum length will help alleviate emergency response concerns. For very long driveways, a turnaround for emergency vehicles should be required. See Appendix G for more about Firewise-friendly road, bridge and driveway requirements.

## **Firewise-Friendly Checklist - (Continued)**

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*Approach Signage and House Numbers* – Rules about home address marking can help assure that emergency responders can find and assist residents when every second counts See Appendix G for details.

*Firefighting water supply* – See Appendix G for guidelines about water supply needs. Even the most Firewise-friendly development will need to be designed with the assumption that fire and emergency response may be needed from time to time.

### ***Do Your Rules Address Firewise-Friendly Home Building Requirements?***

Your state or county building and fire codes may or may not address Firewise concepts for new construction. Be sure to find out what any applicable codes may require as a minimum. Your association may establish more protective rules to address your wildfire risk. Keep in mind that Firewise homes are created by addressing both the home design and construction AND the surrounding landscape within 100-200 feet. Review Appendix G for specific model language you can use for each element.

*Building Materials* – A Firewise home will include exterior surfaces of either nonflammable materials (such as brick, block, stone, concrete, stucco, fiber-cement or plaster) or fire-resistant material such as large timber construction. Since new exterior finish products are constantly being introduced into the construction industry, your association may want to allow for review of these products on a case by case basis. Any approved products should constitute a minimum 20-minute fire-rated assembly (or better, especially if homes are closer than 30 feet apart).

*Roofs* – The most important element of the home from a Firewise point of view is the roof. Firewise-friendly rules will require that all roofing material must be fire-rated for the fire risk (ratings are Class A, B, or C), and expressly prohibit the use of flammable shakes or shingles. In addition, rules can require that roof forms and slopes be designed to be as simple as practicable to minimize the potential for debris accumulating in roof valleys.

*Chimneys* - Rules should require that every fireplace and wood stove chimney and flue shall be provided with an approved spark arrester, with a non-combustible screen that prevents the passage of embers.

*Exterior Openings (Windows, Skylights and Doors)* - Firewise-friendly rules will address the safety of windows, doors and other exterior openings to wildfire risks.

*Eaves, Soffits, Vents* – Firewise construction addresses areas of the home that are vulnerable to wildfire, such as eaves, that can become a heat trap for flames, and any openings in the home such as vents, where embers could enter.

## **Firewise-Friendly Checklist - (Continued)**

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*Decks, Porches and Fences* – When building a home to resist wildfire, it's important to remember that if something is attached to the house, it is part of the house – and should be constructed to resist ignition from flames and embers. Firewise-friendly rules address not only the materials for these attachments, but also the importance of keeping flammable material, including debris and firewood piles, away.

### ***Do Your Rules Address Firewise Landscaping Design and Maintenance?***

*Landscape Plan* – Firewise-friendly rules will require submittal of a landscape plan for new development that takes into account wildfire ignition risk. Plant choice and arrangement within the home ignition zone should reflect Firewise concepts, including a fuel-free area within 3-5 feet of all sides of the home and attachments, fire-resistant plants, and arrangements that avoid massing of flammable vegetation. Rules can also require fire mitigation work before development occurs. See Appendix G regarding fuel modification rules.

*Plant Choices* - Firewise-friendly rules will refer to available lists or guides on ignition-resistant plant choices (one source is at [www.firewise.org](http://www.firewise.org); many states' Cooperative Extension Services have developed Firewise plant lists linked here). Rules may prohibit particular species or require others.

*Landscape Maintenance* – Rules should address expectations of property owners with regard to landscape maintenance. Firewise-friendly activities include regular mowing and irrigation of grass, pruning and limbing up trees and thinning out dense stands, and removal of dead or dying material. Associations should provide direction for the proper disposal or recycling of slash or green waste.

### ***Do Your Rules Address Firewise-Friendly Retrofit of Homes and Landscapes?***

What do the Association rules say about roof replacements, enlargement of homes, and additions such as decks, porches or fences? Firewise-friendly rules will ensure that roof replacements or repairs are done with nonflammable materials, and that the rules for new homes and attachments are followed for additions with regard to wildfire ignition potential. The same goes for alterations of the landscape or new plantings, as well as needed removal of vegetation for fire mitigation.

### ***Do Your Rules Address Common Areas and Buildings Governed by the Association?***

The same Firewise concepts described for development of private lots apply to common areas, including roads and bridges, open spaces, and community-wide water supplies for firefighting. Firewise-friendly rules should follow guidelines in Appendix G for building construction, infrastructure require-

## **Firewise-Friendly Checklist - (Continued)**

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ments for the design and maintenance of roads and bridges, and design of water supplies. Open spaces and other common areas meant to provide a natural look or recreational amenity should be designed to minimize wildfire risks by using fire-resistant plants where possible and mitigating for fire by thinning or removing vegetation. The rules should also designate accepted methods and locations for the disposal of slash and green waste from common areas, and address who will maintain common areas.

### ***Do Your Rules Address Firewise Education and Maintenance?***

If your community was developed with Firewise in mind, it will still need ongoing attention and care to ensure that homes are maintained in a Firewise manner and landscapes and vegetation are periodically treated to minimize fire risks. Whether you include a rule in your governing documents or not, some important elements to consider include:

- disclosing fire risk and mitigation responsibilities to new owners;
- periodic public information about wildfire risk and Firewise activities to all residents; and
- establishing an annual Firewise event in which residents can participate.

Your rules may simply establish a Firewise Committee within the Association that can manage these functions. Community websites and newsletters are excellent venues for Firewise information and education.

# Firewise-Friendly Rule Examples

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The following are a few examples of community guidelines and rules that include Firewise-friendly language. Many other covenants and restrictions include references to wildfire mitigation standards applicable in the state or county, or authorize committees to handle Firewise activity and architectural or design review. The language you choose should be tailored to your community's specific wildfire situation and your association's mission and vision.

## **EXAMPLE 1 - From Caldera Springs, Oregon, Design Review Guidelines:<sup>15</sup>**

### 5.13 WILDFIRE MANAGEMENT

The potential for wildfire is the concern of every Owner. Caldera Springs is committed to attaining and retaining status as a "Firewise Community" (see [www.firewise.org](http://www.firewise.org)). As part of that commitment, all Owners are required to adhere to the following planning and design considerations (in addition to all requirements of applicable laws and regulations, as well as other design requirements found elsewhere in this document that have Firewise criteria):

- A. All structures shall include a 30' (or to the property line if less distance) "firebreak" surrounding them, consisting of the following:
  1. Dry grasses are to be kept mown to less than 4" from 1 June to 1 October. Scattered bunchgrasses and other short or sporadic grasses are excepted.
  2. Trees overhanging structures to be essentially free of dead material.
  3. Roofs, gutters and decks shall be maintained essentially free of accumulations of pine needles and other debris from 1 June to 1 October.
  4. No trees or vegetation is allowed within 10 feet of chimney or stove outlets.
  5. Flammable mulches (bark mulch, wood chips, pine needles, etc.) or dry grasses or ground cover is not permitted within 5 feet of structures, unless adjacent to areas of the structure with non-flammable siding.
  6. Bitterbrush and manzanita shall be removed entirely.
  7. On pines and other flammable trees, branches shall be removed up to a minimum of six (6) feet and a maximum of eight (8) feet or to three times the height of flammable vegetation (dry grasses, brush) remaining within 3 feet of tree drip lines. On pines and other flammable trees shorter than twenty (20) feet, only the branches from the lower one-third 1/3 of the tree shall be removed. All trees shall be maintained substantially free of deadwood. Dead branches shall be removed to a minimum height of ten (10) feet.

B. All chimneys should be equipped with UL or I.C.B.U. approved spark arrester. No outdoor fire pits or fireplaces will be allowed. Only lidded barbecue grills will be allowed for outdoor cooking.

C. All exterior vent openings in structures and open spaces under combustible decks (if less than 12" clear above the ground) must be shielded with non-combustible, corrosion resistive screening with 1/4" maximum clear openings. Decks constructed of wood and greater than 12" above the ground must be kept clear of dead vegetative materials and other highly combustible items underneath them.

D. Vegetation on the lot shall be developed and maintained by the Owner in accordance with the requirements of other rules established by the Association for compliance with Firewise standard.

## **EXAMPLE 2 - From Roxborough Park Foundation (Colorado) Building and Landscape Design Requirements, Procedures and Regulations (DRD):<sup>16</sup>**

### 4.0 BASIC BUILDING DESIGN REQUIREMENTS

#### 4.8 Roofs

...All roofing material must meet Douglas County or quasi-municipal entity having jurisdiction over the property. Requirements for fire rating, as a minimum, should be fire rated class "A". Wooden shakes or asphalt shingles are not allowed...

### 8.0 ADDITIONS OR ALTERATIONS TO EXISTING STRUCTURES AND LANDSCAPING

#### 8.3.1 Re-Roofing of Existing Buildings

As stated in the introduction to this document, Roxborough Park is a community with dwellings of many varieties designed to complement, physically and aesthetically, their neighboring dwellings and natural surroundings. The style, quality and aesthetic attributes of the roofing are of particular importance to our community because of the dramatic visual impact of roofs, in general.

Therefore, the [Design Review Committee] DRC requires existing roofs constructed of concrete or slate tiles be replaced only with concrete or slate tiles. Existing roofs constructed of any materials other than concrete or slate

## **Firewise-Friendly Rule Examples - (Continued)**

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tiles may be replaced with a high relief steel roofing or other material that meets the general aesthetic and quality criteria described in the DRD Subsection 4.8 and is capable of meeting a class "A" roof assembly and all additional Douglas County requirements for fire rating. It is the sole responsibility of the applying resident to determine and ensure the structural integrity of the dwelling using proposed material different than the original roofing material.

### **8.7 Removal of Vegetation for Fire Mitigation**

Owner may remove natural vegetation within fifteen feet (15') of a house and may cut or trim dead or diseased trees or shrubs without approval from the DRC. Other natural vegetation or landscape plantings may be removed for the purpose of fire mitigation only with the approval of the DRC. The owner must submit to the DRC, a defensible space plan created specifically for the property by the Colorado State Forest Service, an individual or company certified by a local governmental entity to create such a plan, the fire chief, fire marshal or fire protection district within whose jurisdiction the unit is located, or other similarly qualified individual or entity. The plan must have an original signature date and title of the fire mitigation expert. Following approval of the DRC, owners must strictly comply with the plan. Any failure to obtain required approval, or any failure to strictly comply with an approved plan, is a Class 4 offense, subject to the fines listed in the DRD.

### ***EXAMPLE 3 - From Awbrey Butte (Oregon) Landscape Guidelines<sup>17</sup>***

#### **General Description of the Development and Landscape Design Philosophy**

All of the landscapes within Awbrey Butte are expected to employ high standards. High standards for design and construction will ensure landscapes that are considerate to the site and to surrounding buildings. The Landscape Standards section specifically addresses design and architectural objectives.

Extensive formal landscaping is not required on Awbrey Butte homesites; however, all landscaping shall be organized in a casual, fluid manner so as to integrate into the natural setting of Awbrey Butte. All homesites must be maintained as follows:

- a. Present a neat and pleasing appearance to all off-property vantage points (roadways and other homesites)
- b. Minimize fire danger in the area

- c. Maximize weed control

- d. Moderate the problem of wind-blown dust

#### **Fire Control**

General precautions shall be taken against potential fire danger as enforced by the City of Bend Fire Prevention Officer. Specific rules of the Uniform Fire Code (Article 11) and rules for outdoor burning are available for review at the City of Bend Fire Department. Article 11 includes information regarding open burning, combustible and flammable materials, fire reporting, false alarms and use of equipment, appliances and devices.

Homeowners should consider precautions such as the following in the development of landscaping plans:

- a. New plantings of evergreen trees in the Interior Zone should be placed to avoid collections of needles on roofs
- b. Grasses or succulent ground covers surrounding structures can provide some protection from the advancement of ground fires.
- c. Irrigation systems ringing the building site can assist in diverting an oncoming fire and protecting the encircled structure.
- d. Non-combustible roof materials may help prevent or limit fire damage.
- e. Roof sprinklers can protect combustible roofs from burning due to airborne material traveling from off-site sources.
- f. A combination of hose bibs/stand pipes and easily accessible lengths of hose which allow access to all sides of the exterior of the home and other on-site structures can be of great value in dealing with a threatening fire.
- g. Spring maintenance should include removal of all homesite accumulations of pine needles, leaves and other dead plant materials that could serve as fuel for fire. Dead branches within living trees and shrubs should be removed, particularly within 5 feet of the ground. Burning is not permitted in Awbrey Butte, all material must be removed from the site.
- h. Thinning of some thick stands of pine trees may be appropriate under certain conditions (stand is directly adjacent to residence, trees are unhealthy, etc.). Approval for such thinning must be received from the ARC.
- i. All weeds on the homesite should be controlled early in the spring to prevent the potential of fires during the dry summer season.

*"We whole-heartedly recommend the Firewise Communities/USA Program to any community with a probable wildfire hazard."*

—BILL DETER, CRYSTAL LAKE CLUB, WISCONSIN

## MORE RESOURCES

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### **Resources and documents referenced in this guide include:**

1. National Statistics/Industry Data, Community Associations Institute website, [www.caionline.org](http://www.caionline.org)
2. Mapping Census 2000: The Geography of U.S. Diversity, Brewer & Suchan, ESRI Press, 2001.
3. Heftel, Chris, "Developing in the Interface," in American Perspectives on the Wildland/Urban Interface, Firewise Communities, 2003.
4. Wells, Devon, City of Hood River Fire Marshal, memo to potential property owners in the East Hood River area regarding fire department requirements for building.
5. Tyner, Ron and Laura Lewis, "Wildfire Mitigation, A Developer's Perspective," Community Wildfire Information Series, [www.southwestcoloradofires.org](http://www.southwestcoloradofires.org).
6. University of California Homeowner's Wildfire Mitigation Guide <http://groups.ucanr.org/HWMG/>
7. Holt, Robert, Superintendent, Redding Interagency Hotshot Crew Leadership Development Program, in a memo to Tim Sexton on July 6, 2007, regarding fuel conditions during the initial attack of the Angora Fire.
8. "CC&R Basics", Real Estate Center, FindLaw ([www.findlaw.com](http://www.findlaw.com)), 2008.
9. Buck, Gurdon H., Drafting Rules: How Community Associations Maintain Peace and Harmony, Community Associations Press, Alexandria, VA. 2004.
10. Architectural Review Committee Revised Standards, 2007, Genesee Foundation Architectural Review Committee, <http://genesefoundation.org/arc.html>
11. Flynn, Bill, "Remote Control," NFPA Journal, March/April 2003
12. "Initiation Draft, Mission Canyon Community Plan," May 2008, Santa Barbara (California) County Planning and Development Office of Long Range Planning
13. Lake Camelot Property Owner's Association Community Firewise Protection Plan, September 2007, Lake Camelot, Wisconsin.
14. Colorado Revised Statute 38, "Colorado Common Interest Ownership Act."
15. Caldera Springs (Oregon) Design Review Guidelines
16. Roxborough Park Foundation (Colorado) Building and Landscape Design Requirements, Procedures and Regulations

## **Resources and Documents - (Continued)**

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17. Awbrey Butte (Oregon) Landscape Guidelines
18. Firewise Guide to Landscape and Construction, Firewise Communities, 2008.
19. Ismay, Randall, "Landscapes in the Wildland/Urban Interface," in American Perspectives on the Wildland/Urban Interface, Firewise Communities, 2003.
20. NFPA 1144, Standard for Reducing Structure Ignition Hazards from Wildland Fire, 2008 Edition, National Fire Protection Association, Quincy, Mass.
21. NFPA 1144, Standard for the Protection of Life and Property from Wildfire, 2002 Edition, National Fire Protection Association, Quincy, Mass.

### **Additional Resources Include:**

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- Firewise website – [www.firewise.org](http://www.firewise.org)
  - Firewise Communities/USA Recognition Program – [www.firewise.org/usa](http://www.firewise.org/usa)
  - Firewise product catalog – [www.firewise.org/catalog](http://www.firewise.org/catalog)
  - Firewise Online Learning Center – [http://www.firewise.org/fw\\_youcanuse/learningcenter/index.htm](http://www.firewise.org/fw_youcanuse/learningcenter/index.htm)
- National Fire Protection Association codes and standards – [www.nfpa.org](http://www.nfpa.org)
- Cohen, Jack D., "The Wildland/Urban Interface Fire Problem," Fall 2008; "Wildland - Urban Fire: Beware the Home Ignition Zone," Public Entity Risk Institute Symposium, October 2001; "What is the Wildland Fire Threat to Homes?" Thompson Memorial Lecture, Flagstaff, AZ, April 2000.
- Community Associations Institute – [www.caionline.org](http://www.caionline.org)
- Federal Emergency Management Agency, "How Homes Ignite: Building a Better Defense Against Wildfire," in At Home in the Woods, 2004 [http://www.fema.gov/hazard/fire/pubs/athome\\_woods.shtm](http://www.fema.gov/hazard/fire/pubs/athome_woods.shtm)
- Institute for Business & Home Safety wildfire resources – [www.disastersafety.org](http://www.disastersafety.org)
- International Code Council, International Wildland/Urban Interface Code, 2006, [www.iccsafe.org](http://www.iccsafe.org)
- University of California at Berkeley Fire Information Engine Toolkit –  
<http://firecenter.berkeley.edu/toolkit/homeowners.html>

## **Appendix Material**

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## Appendix A - How Homes Ignite During Wildfire

A wildfire disaster resulting in the loss of many homes and perhaps lives is almost always the result of worst-case scenario conditions. These include lots of vegetative fuel (living and dead), hot, dry windy weather, and often steep slopes that carry fire quickly. The fire builds in intensity and spreads rapidly through wildland areas of trees and grasses. When the fire burns into a community, the homes become more fuel and simultaneous ignitions result in many homes burning at once – also known as a conflagration.

With a limited number of trucks, fire fighters, limited water supplies, and dozens or hundreds of homes burning, fire service personnel try to respond but are often overwhelmed. Fire protection effectiveness is reduced as firefighters try to use their limited resources to protect structures. The frequent result is many destroyed and damaged homes.

A house burns during a wildfire because of its interrelationship with everything in its immediate surroundings – within 100 to 200 feet. What happens within this zone is critical to structure survival. Potential ignitions from wildfire can be prevented or minimized in this zone.

In its simplest terms, a wildland/urban interface fire is one where the fuel feeding the fire changes from vegetation to homes. For this to happen, wildland fire must be close enough to the home for its flames and/or flying brands to contact the flammable parts of the structure.

The “Fire Triangle” describes the three elements that must be present for fire to exist. The three parts of the fire triangle are **fuel**, **heat** and **oxygen**. When one element is removed, there can be no combustion, so the fire goes out. This same basic concept applies for all kinds of fire, from a camp fire to a wildfire that could ignite homes. In a wildfire, the fuel is vegetation – grasses, leaves, needles, shrubs and trees. In a real-life wildfire scenario, the fuel-heat-oxygen triangle is complicated by factors including the type, amount and arrangement of vegetative fuel, the weather – temperature,

humidity, precipitation and wind – and the local topography – steep slopes versus flat areas. These factors all affect the wildfire’s rate of spread and intensity.

The risk factors include the type, amount and arrangement of fuel for the fire. Grasses and needles are “fine fuels” – they ignite easily and burn quickly. While these fine fuels don’t create a lot of heat or large flames, they can ignite heavier fuels, like tree branches and large shrubs, which take longer to start burning but then burn intensely. When you are considering how risky your area is, take a look at what kinds of vegetation – living or dead – are in your community.

The general climate and temporary weather conditions play an important role in wildfire risk. Generally speaking, areas subject to long periods of hot, dry, windy weather are more at risk from wildfire. However, short periods of this kind of weather during your area’s “dry season” mean that your wildfire risk increases. Temperature, humidity, precipitation and wind are all factors affecting the intensity and spread of fire. Strong winds can push fire up or down slopes, and can loft burning embers up to a mile from the main body of the fire.

Finally, the lay of the land plays a part in wildfire risk. Steep slopes carry fire uphill at an increased rate of spread, and canyons act as channels for wind to spread fire. Slopes that face south will get more sun exposure and thus more heat which dries vegetation in those areas and makes it more flammable. If your community is in a very hilly area or features cliffs, ridges or bluffs, you may have higher risk of loss in these areas when a wildfire occurs.

The three ways that heat is transferred to combustible material – such as the wall of a home – are **Radiation**, **Convection**, and **Conduction**. Radiation occurs when there is enough heat close enough to a flammable object to ignite it. Convection describes flames contacting the surface of the object. Conduction is when there is sufficient heat for a long

enough time to conduct heat from the surface of a wall to the interior.

Three ways that wildfire commonly ignites homes are:

1. Burning embers (burning needles, leaves, branches and cones create embers or brands in a “blizzard” during a wildfire) land on combustible materials on the home or enter the home through vents and other openings.
2. Radiated heat from burning vegetation or structures ignites the home’s roof, siding, decks or porches, or breaks windows, allowing ignition of the interior of the home.
3. Combustible fuels (e.g., grass, pine needles, dry leaves, woodpiles, furniture, doormats) on or immediately adjacent to the home ignite and spread the fire to the home itself.

Knowing how fire can ignite homes provides important implications for preventing ignition. To reduce ignition by radiation, property owners can reduce the volume of heavy vegetation within 30 to 100 feet of their homes, which will reduce the size and intensity of the flames that can get near the house. To reduce the likelihood of ignition by convection, residents can make sure there is no flammable material touching the house, such as tall grasses, tree branches, dead leaves or needles, mulch or firewood piles. Having non-flammable roofs and decking, screened openings, and keeping leaf and needle litter out of gutters can minimize the likelihood of ignition by conduction by firebrands and embers.

Preventing the homes from igniting means our fire protection resources could be applied to **containing** the wildfire rather than attempting to douse dozens of structure fires **and** containing the wildfire. In that way, fire protection can be more effective and focus on a few problems instead of many. If we can prevent home ignitions, we can prevent the mass destruction of homes.

## Appendix B – Firewise Assessment Guidelines

The following is an excerpt from NFPA 1144, Standard for Reducing Structure Ignition Hazards from Wildland Fire, 2008 edition. The concept is to review individual properties and sites for ignition potential of the home and its surroundings within 100-200 feet.

STRUCTURE ASSESSMENT GUIDE	
PRIMARY INFORMATION	
Assessment Items	Mitigation Recommendations
<b>1. OVERVIEW OF SURROUNDINGS</b>	
How is the structure positioned in relationship to severe fire behavior?  The house is located near peak of a ridge at local map reference Q-4-12. The setbacks from the lot lines are approximately 15–20 ft. There is a slight sloping of the lot away from the house within 50 ft of the lot line on the north.	Since prevailing winds during fire season are most likely from the west-southwest, keep pine needles and leaf litter cleaned up on roadside berm.
Type of construction:  Wood frame construction with brick façade on the front. Vinyl siding on back and two sides.	
<b>2. CHIMNEY TO EAVES</b>	
Inspect the roof — noncombustible? shingles missing? shingles flat with no gaps?  Noncombustible roofing in good shape.	Inspect roof each spring for damage, especially after a hard winter or wind storm.
Gutters — present? Noncombustible?  Aluminum gutters at all eaves. No overhanging limbs nearby. Pine needles and leaf litter not likely to collect in deep quantities.	Keep gutters free of pine needles and leaves. Check early spring and fall.
Litter on roof, in gutters, and crevices?  Fairly clean. Not much of a concern. Easy to maintain.	
<b>3. TOP OF THE EXTERIOR WALL TO FOUNDATION</b>	
Attic, eave, soffit vents, and crawl spaces:  Not much of a concern.	
Inspect windows and screens — metal screens? Multi-paned windows? Picture windows facing vegetation?  Metal screens on all windows. Some windows on west side are double-paned. Some high vegetation near front windows. Low vegetation in rear.	Keep front bushes pruned and watered during fire season. Replace any missing or torn screens immediately, especially the front.
Walls and attachments — noncombustible? Will they collect litter?  Not much of a concern.	
Decks — combustible materials?  Wooden deck and privacy fence on south side. No skirting or screening beneath deck. Deck in good condition. Small vegetation around deck but overhanging tree limbs. Some collection of leaves and needles near deck and wooden stairs.	Prune trees closest to deck and privacy fence. Remove the pine needles and leaves. Store combustibles elsewhere — perhaps the shed in the backyard — especially during high fire danger periods. Put skirting or 1/4" wire mesh around deck openings.

FIGURE A.4.1.2 Structure Assessment Guide — Example with Notations.

<b>STRUCTURE ASSESSMENT GUIDE (continued)</b>	
<b>Assessment Items</b>	<b>Mitigation Recommendations</b>
<b>3. TOP OF THE EXTERIOR WALL TO FOUNDATION (continued)</b>	
Fences. Wooden stockade fence joins house on north side. Wooden fencing also on south side. Chain link in rear along lot line. Neighbor's wooden fence is less than 2–3 ft from their wooden fence — will allow leaves and embers to accumulate.	Keep wooden fence perimeter clear of dry leaves and other combustible materials like chairs, wood, etc. If the chance presents itself to use noncombustible materials to separate fence from house, you should consider it.
Flammable material next to or under the structure. None observed.	
Combustible materials near or on the structure where walls meet roof or decking surfaces. Plastic outdoor furniture pads on deck might pose problem from ember shower.	Keep combustible chair pads put away except when in use.
Crawl space, attic vents, soffits. All appear to be in excellent condition and protected.	
Nooks and crannies and other small spaces. All appear to be in excellent condition and protected.	
<b>4. FOUNDATION TO IMMEDIATE LANDSCAPED AREA</b>	
Landscaped (managed) vegetation — separation distances, maintenance, plant selection? Firewise Landscaping Zones?  Lawn well cared for. Leaf and needle accumulation along east side (rear of property) with small stand of trees. Front and south side have mix of pine and other vegetation.	Be sure to keep these areas well tended, pine needles cleared and limbs pruned. Lawn needs to be kept green and mowed. Plants irrigated, pruned and raked — especially during high fire danger periods.
Propane tanks. No large ones. Outdoor grill small tank.	Make sure this area is kept clear of any combustibles — especially when using the grill.
Vehicle and RV use and parking, including lawn mowers, etc.  Parking in front. Mower storage in shed which is 40–50 ft from NE corner of house. Plastic children's play house etc. near wooden fence along north side but over 30 ft from house.	
<b>5. IMMEDIATE LANDSCAPED AREA TO EXTENT OF THE HOME IGNITION ZONE</b>	
Inspect vegetation clearance and crown separation.  Lot is rather small and the neighboring properties' vegetation is more dense than this one. Trees in back should pose little concern as prevailing winds will not communicate fire towards house.	Work with neighbors to improve all three lots to reduce the hazards on this corner. The neighbors behind this address and those on either side might benefit from some clearance that might take place but the separation of those properties appears to be sufficient.

FIGURE A.4.1.2 *Continued*

## **Appendix C – Firewise Construction Checklist<sup>18</sup>**

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"When considering improvements to reduce wildfire vulnerability, the key is to consider the home in relation to its immediate surroundings. The home's vulnerability is determined by the exposure of its external materials and design to flames and firebrands during extreme wildfires. The higher the fire intensities near the home, the greater the need for nonflammable construction materials and a resistant building design." – Jack Cohen, USDA-Forest Service

### **Use Rated Roofing Material.**

Roofing material with a Class A, B or C rating is fire resistant and will help keep the flame from spreading. Examples:

- Composition shingle
- Metal
- Clay
- Cement tile

### **Use Fire-Resistant Building Materials on Exterior Walls.**

Examples include:

- Cement
- Plaster
- Stucco
- Masonry (concrete, stone, brick or block)

While vinyl is difficult to ignite, it can fall away or melt when exposed to extreme heat.

### **Use Double-Paned or Tempered Glass.**

Double-pane glass can help reduce the risk of fracture or collapse during an extreme wildfire. Tempered glass is the most effective. For skylights, glass is a better choice than plastic or fiberglass.

### **Enclose Eaves, Fascias, Soffits and Vents.**

'Box' eaves, fascias, soffits and vents, or enclose them with metal screens. Vent openings should be covered with 1/8" metal screen.

### **Protect Overhangs and Other Attachments.**

Remove all vegetation and other fuels from around overhangs and other attachments (room additions, bay windows, decks, porches, carports and fences). Box in the undersides of overhangs, decks and balconies with non-combustible or fire-resistant materials. Fences constructed of flammable materials like wood should not be attached directly to the house.

Anything attached to the house (decks, porches, fences and outbuildings) should be considered part of the house. These act as fuel bridges, particularly if constructed from flammable materials.

1. If a wood fence is attached to the house, separate the fence from the house with a masonry or metal barrier.
2. Decks and elevated porches should be kept free of combustible materials and debris.
3. Elevated wooden decks should not be located at the top of a hill. Consider a terrace.

## Appendix D – Firewise Landscaping Principles<sup>19</sup>

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Excerpted from “Landscapes in the Wildland/Urban Interface,” by Randall Ismay in American Perspectives on the Wildland/Urban Interface. Randall Ismay is a landscape/waterscape consultant from Laguna Niguel, California

Well conceived and executed Firewise landscaping adds wonderful aspects to the immediate world around us. It can help us become more compatible with Nature and safer in the event of a wildfire. The success of a landscape depends on how well some basic principles are incorporated into its design. The Xeriscape principals of landscaping (a landscaping method that employs use of native and water-thrifty plants to help to conserve resources) afford perhaps the best choice to provide beauty and compatibility while improving safety in natural settings.

**Function** – Typical functions of a landscape include enjoyment, privacy, highlighting an area or entry, enhancing architecture, blending with surroundings, growing vegetables or cut flowers, providing play, exercise or entertainment space. To follow this first and critical principle, ask: “What do I want to create and do around my home?” “What do I want from the garden?” and most importantly: “How will my garden function in my life?”

**Fit** – This principle refers to how well or poorly the landscape and its plants fit into their environment. In a wildland/urban interface setting, the traditional tree-and-turf approach can be water and maintenance intensive and can invite trouble from native critters. Let nature provide food for her critters, not your landscape. It is wonderful to be with nature, but sacrificing the landscaping to the local wildlife does not ‘fit’ a wildland environment.

**Finance** – If it won’t fit the pocketbook, then it won’t function correctly. The vast majority of costs associated with the landscape will be devoted to maintenance, not to design and installation. Careful planning and use of plants that need less water, less fertilizer, less pruning and less care will save money and will greatly enhance enjoyment.

**Fun** – Now we can talk about beauty and aesthetics along with fragrances, sounds, birds, bunnies, and anything else that makes the garden an enjoyable and fulfilling place. If it is fun, then it will just naturally receive the attention and care it needs. However, the garden cannot be fun if it does not first: ‘function’ in our lives in the way that we want; ‘fit’ the environment in which it must survive; and survive without excessive strain on ‘finances’.

**Follow-through** – This is the most important principle of all. Without proper maintenance and care, any garden or landscape becomes a liability. In the natural setting of the wildland/urban interface, problems will grow exponentially if there is no follow-through. Be a good steward of both the garden and of the natural forests and lands that surround the home.

### **Firewise Landscaping**

Remember that the intent of the Firewise landscape is to create a beautiful setting while reducing the flammability and the quantity of fuel that a fire could consume while attempting to burn its way to your home. This approach applies to the surrounding environs as well. A coordinated effort of residents and professionals can bring about healthier forests and natural systems that are more Firewise.

Learn about the ‘natural’ cycle of fire in your environment. Nearly every environment in the world has its own fire regimen or cycle - strong winds that tend to push intense fires through the canopy of the trees or slower winds likely to burn only the shrubs and grasses under the trees? Historically, fires tend to burn in the region in the same time of year with similar conditions. Some regional plants actively burn and some do not. It’s a good idea to know how long it has been since the area burned and when it is likely to burn again?

### **The Zone Approach**

Start with the house and the area within about 30 feet of it. Keep fire from traveling to the house by ground or air. In the garden, use openly spaced and low flammability plants that are properly watered. Pathways, walks and open spaces create interest and help break up direct routes for fire to reach the home.

From 50-100 feet beyond the house, vegetation (both native and introduced) can increase in size and numbers. Islands and groupings of plants can be created that will enhance eye appeal and interest but will not carry fire.

Beyond 100 feet, thinned shrubs and trees will not carry fire through their canopies. If trimmed up from the ground, they do not provide ladders for surface fires to climb into tree tops. Dead brush and debris should be removed and disposed safely off-site in legally designated dump sites.

### **Good Practices**

It is important to keep the landscape running smoothly. Some good practices include: maintain an irrigation system to keep plants healthy year round; use barbecues and other fire carefully in your surroundings; keep trees and shrubs pruned up and thinned; remove dead leaves and litter to reduce fuels and keep the garden healthy; keep firewood well away from the house; keep at least a few feet of open space between house foundations and plants, and use good cultural practices, good plant selection and natural methods to prevent plant diseases and control pests. Healthy plants are less likely to burn.

By learning to live with Nature, not in spite of her, we can enjoy the wonders of the wildlands beyond the sidewalks. Only by recognizing the risks and accepting the responsibilities that go hand-in-hand with having Nature and fire as our neighbor can we create personal safety.

## **Appendix E – Firewise Landscaping Checklist<sup>18</sup>**

The primary goal for Firewise landscaping is fuel reduction — limiting the level of flammable vegetation and materials surrounding the home and increasing the moisture content of remaining vegetation. This includes the entire ‘home ignition zone’ which extends up to 200 feet in high hazard areas.

### **Use the Zone Concept**

Zone 1 is the 30 feet adjacent to the home and its attachments; Zone 2 is 30 to 100 feet from the home; Zone 3 is 100 to 200 feet from the home.

### **Zone 1 (All Hazard Areas)**

This well-irrigated area encircles the structure and all its attachments (wooden decks, fences, and boardwalks) for at least 30 feet on all sides.

1. Plants should be carefully spaced, low-growing and free of resins, oils and waxes that burn easily.
2. Mow the lawn regularly. Prune trees up six to ten feet from the ground.
3. Space conifer trees 30 feet between crowns. Trim back trees that overhang the house.
4. Create a ‘fire-free’ area within five feet of the home, using non-flammable landscaping materials and/or high-moisture-content annuals and perennials.
5. Remove dead vegetation from under deck and within 10 feet of house.
6. Consider fire-resistant material for patio furniture, swing sets, etc.
7. Firewood stacks and propane tanks should not be located in this zone.
8. Water plants, trees and mulch regularly.
9. Consider xeriscaping if you are affected by water-use restrictions.

### **Zone 2 (Moderate and High Hazard Areas)**

Plants in this zone should be low-growing, well-irrigated, and less flammable.

1. Leave 30 feet between clusters of two to three trees, or 20 feet between individual trees.
2. Encourage a mixture of deciduous and coniferous trees.
3. Create ‘fuel breaks’, like driveways, gravel walkways and lawns.
4. Prune trees up six to ten feet from the ground.

### **Zone 3 (High Hazard Areas)**

Thin this area, although less space is required than in Zone 2. Remove smaller conifers that are growing between taller trees. Remove heavy accumulation of woody debris. Reduce the density of tall trees so canopies are not touching. Maintaining the Firewise Landscape

- Keep trees and shrubs pruned six to ten feet from the ground.
- Remove leaf clutter and dead and overhanging branches.
- Mow the lawn regularly and dispose of cutting and debris promptly.
- Store firewood away from the house.
- Maintain the irrigation system regularly.
- Familiarize yourself with local regulations regarding vegetative clearance, debris disposal, and fire safety requirements for equipment.

## **Appendix F – Becoming a Recognized Firewise Communities/USA Site**

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To qualify as a Firewise Communities/USA recognition site, a community must have met five standards:

1. Complete a community assessment and create a plan
2. Form a Firewise Board
3. Hold a Firewise Day event
4. Invest a minimum of \$2/capita in local wildfire mitigation projects. (Volunteer hours, equipment use, time contributed by agency fire staff, and grant funding can be included)
5. Submit an application via your State Forestry agency to the Firewise program

Firewise Communities/USA provides up-to-date, take-action information to homeowners and communities that help them change their wildfire risk situation. Residents who participate in the Firewise process create an action plan that commits them to a sustained program of wildfire mitigation that is generally both physically doable and cost-effective. Residents learn about home ignitability so they can create their own, unique solutions to their wildfire mitigation chal-

lenges. When people understand there is something they can do, they are more apt to act. They search out more information to validate what they have already learned. One of the most important things Firewise Communities/ USA participants learn is that neighbors can help neighbors---and that they are often inextricably linked together in their mitigation solutions. With little or no preparation before a wildfire event, communities lose much. One of the benefits of participating in the Firewise Communities/USA program is that communities receive continuing support because of the communication that occurs among the Firewise Board, the local fire department and state or federal wildfire agency representatives. The action plan created by each community is implemented via annual Firewise Day events (local mitigation activities) and, thus, wildfire readiness improves in the long term. See [www.firewise.org/usa](http://www.firewise.org/usa) for more information and application forms.

## **Appendix G<sup>20,21</sup>**

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### **Sample Language for Firewise Standards on Infrastructure, Construction and Landscaping**

The National Fire Protection Association standard on reducing structure ignition risk from wildland fire is NFPA 1144. The following language is excerpted from both the 2002 and 2008 editions to demonstrate how the standard language could be used in community rules and requirements. This language represents minimum standards; your state or local building or fire code and other regulations may be more stringent.

### **Access, Ingress, Egress, and Evacuation**

#### **Roads**

Access for emergency responders, ingress, egress, and evacuation shall be provided for all buildings.

Roads shall be designed and constructed to allow evacuation simultaneously with emergency response operations.

Roads shall be not less than 20 feet of unobstructed width with a 13 and ½-foot vertical clearance.

Parking shall be allowed only where an additional 9 feet of improved road width is provided and only within that improved road width.

Roads shall be designed, constructed, and maintained to accommodate the load and turning radius of the largest apparatus typically used to respond to that location.

Roads shall have no grade in excess of 10 percent, unless mitigation measures can be agreed upon jointly by the fire department and the developer.

Dead-end roads in excess of 300 feet in length shall be provided with turnouts and turnarounds.

Every dead-end fire service access road more than 300 feet in length shall be provided with a turnaround at the terminus having a minimum radius of 50 feet to the center line, or alternatively shall have a "hammerhead T" turnaround to provide emergency vehicles with a three-point turnaround ability.

#### **Driveways**

Where any point of a building is greater than 150 feet from a road, a driveway shall be provided to within 150 feet of the building.

Where the driveway is greater than 150 feet in length, it shall not be less than 12 feet in unobstructed width with 13 and ½ feet in vertical clearance.

Where the driveway is greater than 300 feet, it shall be provided with turnouts or turnarounds at locations approved by local fire authorities.

Required driveways shall have a grade not to exceed 10 percent, unless mitigation measures can be agreed on jointly by the fire department and developer or owner.

#### **Bridges**

Any bridge on a road or required driveway shall be designed to accommodate the load of the largest apparatus typically used to respond to that location. The load limit shall be clearly posted at the approaches to the bridge.

Any gate on a required road or driveway shall be located a minimum of 30 feet from the intersection of the road or driveway.

The gate opening shall swing inward and shall provide a clear opening of no less than two feet wider than the gated road or driveway.

Emergency responders shall have ready access to locking mechanisms on any gate that restricts access.

#### **Signs**

Roads, fire service access, dwellings, and commercial structures shall be identified by a consistent identification system that provides for sequenced or patterned numbering and nonduplicated naming within each jurisdiction, in consultation with the fire department.

All letters, numbers and symbols shall be a minimum of 4 inches in height with a ½-inch stroke, and shall be reflectorized and contrasting with the background color of the sign.

Signs shall be visible from the road and mounted no less than 6 feet nor more than 8 feet above the surface of the road, unless local conditions or existing standards prescribe otherwise.

Street and road name signs and supporting structures shall be of noncombustible materials.

#### **Water Supply**

At a minimum, every building shall be provided with a water supply meeting the requirements of NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting, for the purpose of fire fighting.

Private fire service mains and hydrants shall be installed to meet the requirements of NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

Threads on all fire hydrant outlets shall be American National Fire Hose Connection Screw Threads and shall be equipped with thread adapters where local fire department thread is different.

Fire hydrants shall meet the requirements of AWWA Standards C-502, Dry Barrel Fire Hydrants, or C-503, Wet Barrel Fire Hydrants.

Dry fire hydrants shall meet the requirements of NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting.

The contractor or installer of water supply systems shall demonstrate by actual test that the capacity of the water supply system will meet fire protection design requirements.

### ***Building Design, Location, and Construction in Wildland Areas***

#### *Design*

Construction documents shall clearly indicate the methods, materials, and processes employed to meet the requirements of this standard and the location of each structure or feature drawn to scale.

Construction documents shall include a vicinity map that provides details regarding the vicinity within 300 ft (91 m) of property lines, including other structures, slope, vegetation, fuel breaks, water supply systems, and access roads.

#### *Location*

Separation distances between primary and accessory structures on each lot and structures on adjacent lots shall not be less than 30 ft (9 m).

Buildings located closer than 30 ft (9 m) to a vegetated slope shall require special mitigation measures as determined by the community Architectural Review Committee (ARC).

The ARC shall be permitted to require a noncombustible wall or barrier where sufficient space is unavailable between the structure and undisturbed native vegetation or slopes.

Vegetation shall be modified to mitigate hazardous conditions within 30 ft (9 m) of the foundations prior to the start of construction.

All slash from vegetation modification and construction debris shall be treated or removed prior to or immediately upon completion of construction.

#### *Roof Design and Materials*

The requirements for roof covering assemblies shall be as follows:

1. Only listed roof covering, tested and rated in accordance with NFPA 256, Standard Methods of Fire Tests of Roof Coverings; ASTM E 108, Standard Test Methods for Fire Tests of Roof Coverings; or equivalent, shall be used.

2. The specific class shall be consistent with the wildland fire hazard assessment conducted prior to construction.

Vents shall be screened with a corrosion-resistant, noncombustible wire mesh with the mesh opening not to exceed nominal 1/4 in. (6.3 mm) in size.

Eaves shall be boxed in with five-eighths-inch (15.5 mm) nominal sheathing or noncombustible materials or meet the requirements of other vents.

Where the roof profile allows space between the roof covering and the roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire-stopped with approved materials, or have additional assembly components of noncombustible materials to prevent ignition.

Attic or foundation ventilation louvers or ventilation openings in vertical walls shall be covered with nominal one-quarter-inch (6.3 mm) mesh corrosion-resistant metal screen or other noncombustible and approved material that offers equivalent protection.

No attic ventilation openings or ventilation louvers shall be permitted in soffits, in eave overhangs, between rafters at eaves, or in other overhanging areas on those exposures facing hazardous vegetation.

Attic spaces shall be ventilated as approved for the building configuration, the climatological conditions of the site, and the moisture and temperature conditions associated with the occupancy and use of the building.

#### *Overhanging Projections*

All projections (exterior balconies, carports, decks, patio covers, unenclosed roofs and floors, and similar architectural appendages and projections) shall be of heavy timber construction; be constructed of noncombustible material, fire-retardant-treated wood, or other ignition-resistant materials; or be a 1-hour fire-rated assembly.

#### *Overhanging Buildings*

The underside of overhanging buildings and supporting structural elements shall be of heavy timber construction; be constructed of noncombustible material, fire-retardant-treated wood, or other ignition-resistant materials; or be a 1-hour fire-rated assembly.

#### *Exterior Vertical Walls*

Exterior vertical walls shall meet the requirements for heavy timber construction, ignition-resistive material, fire-retardant-treated wood, or be a minimum 20-minute fire-rated assembly where walls are potentially exposed to a wildland fire, unless the ARC determines that the wildland fire risk and structure assessment requires greater protection.

All exterior walls shall be protected with 2 in. (50 mm) nominal solid blocking between exposed rafters at all roof over-

hangs, under the exterior wall covering on all sides exposed to native vegetation.

When appendages and projections are attached to exterior fire-resistive walls, they shall be constructed to maintain the fire-resistive integrity of the wall.

Structural elements that result in or could result in the collection of combustible materials proximal to the structure shall be protected.

#### *Exterior Openings*

Exterior windows, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block, or have a fire-resistance rating of no less than 20 minutes.

Window screening shall be noncombustible mesh and installed to prevent the collection of firebrands and embers or their entry into open windows.

Exterior doors shall be solid-core wood no less than 13/4 in. (45 mm) thick, approved noncombustible construction, or have a fire protection rating of no less than 20 minutes.

Vents for attic and subfloor ventilation shall be screened with a corrosion-resistant wire mesh, with the mesh opening not exceeding nominal 1/4 in. (6.3 mm) in size.

Attic and subfloor vents shall not be installed in a location that faces heavy vegetative fuels.

Vents shall not be installed in walls that face heavy vegetative fuels.

#### *Chimneys and Flues*

Every fireplace and wood stove chimney and flue shall be provided with an approved spark arrester constructed of a minimum 12-gauge welded wire or woven wire mesh, with openings not exceeding one-half-inch (12.7 mm).

Vegetation shall not be allowed within 10 ft (3 m) of a chimney outlet.

#### *Accessory Structures*

Accessory structures shall be constructed to meet the requirements of this chapter or shall be separated from the main structure by a minimum of 30 ft (9 m).

#### *Mobile and Manufactured Homes*

Permanently located mobile and manufactured homes with an open space beneath shall have a skirt of noncombustible material or material that has a minimum fire-resistive rating of 20 minutes.

Any enclosed space beneath the mobile or manufactured home shall be vented and screened with noncombustible mesh with openings no larger than one-quarter inch.

#### *Vehicle Parking Areas*

Vehicle parking areas within the immediate landscaped zone shall be maintained free of dry grasses and fine fuels that could be ignited by hot exhaust systems or firebrands.

#### *Exterior Exposure Hazards*

Heat and flame sources that are unprotected or unsupervised shall not be permitted within 30 ft (9 m) of the primary structure.

Incinerators, outdoor fireplaces, permanent barbecues, and grills shall not be built, installed, or maintained in hazardous fire areas without prior approval of the ARC.

Openings in incinerators, outdoor fireplaces, permanent barbecues, and grills shall be provided with an approved spark arrester, screen, or door.

Propane tanks and other flammable or combustible liquids storage shall conform to NFPA 58, Liquefied Petroleum Gas Code, and the community's wildland fire hazard mitigation plan.

Other combustible materials within 30 ft (9 m) of any structure shall be removed or stored in conformance with the community's wildland fire hazard mitigation plan.

#### *Fuel Modification Area Requirements (Landscaping in the Home Ignition Zone)*

Where the wildland fire hazard mitigation plan requires establishment of a fuel modification area, the modifications shall extend to the limits of the structure ignition zone.

#### *Fuels Modification and Treatment*

Ground fuels, including native vegetation and plants used for landscaping within the defined landscaping zones, shall be treated or removed.

Live vegetation within the fuel modification area shall have dead material removed and shall be thinned and pruned in conformance with the community's wildland fire mitigation plan.

Dead and downed fuels within 30 ft (9 m) of all buildings shall be removed or treated to maintain the fuel modification area in conformance with the wildland fire mitigation plan, as approved by the AHJ.

Vegetation under trees within the fuel modification area shall be maintained at a height that will preclude ground fire from spreading in the tree crown.

Tree crowns within the structure ignition zone shall be spaced to prevent structure ignition from radiant heat.

The community's fuel modification plan shall include a maintenance element identifying and defining the responsibility for continued and periodic maintenance.

## NOTES





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