

Council Study Session

March 15, 2021

Agenda Item	Discussion of Oregon’s Residential Structural Specialty Code (ORSC) 327.4 – Wildfire Hazard Mitigation – Local Adoption Option	
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Item Type	Requested by Council <input type="checkbox"/> Update <input type="checkbox"/> Request for Direction <input checked="" type="checkbox"/> Presentation <input checked="" type="checkbox"/>	

SUMMARY

The Council is asked to consider directing staff to prepare amendments to Ashland Municipal Code (AMC) Chapter 15 - Buildings and Construction, which if adopted would apply Oregon’s Wildfire Hazard Mitigation code standards to new residential structures within the City of Ashland. In 2018, Oregon Building Codes Division (BCD) amended the Oregon Residential Specialty Code (ORSC) and incorporated a new section, Wildfire Hazard Mitigation - 327.4, establishing a list of fire-hardening standards for residential construction aimed at reducing threats from wildfire events. Section 327.4 is available for adoption and implementation by individual cities within designated wildfire overlays. Since the entire city limits of Ashland is contained within a designated wildfire hazard zone, adoption of the Wildfire Hazard Mitigation code would apply to all new residential construction except for specified exemptions. Compliance with the new code standards would be reviewed as part of the Building Safety Division’s standard building permit application and approval process.

POLICIES, PLANS & GOALS SUPPORTED

The project addresses a variety of City Council goals and strategies and adopted City plans.

Resolution 2019-27 adopting the City Council’s 2019-2-21 Biennial Goals:

B. Develop and/or enhance the following “Value Services” by leveraging the City’s resources.

A. **Tier 1:** Higher Priority

a. Emergency Preparedness

B. **Tier 2:** Moderate Priority

a. Reduce Wildfire and Smoke Risk

The Ashland Comprehensive Plan - 4.25 Wildfire Hazards goal:

Protect life, property, and environmental resources in Ashland’s suburban/wildland interface area from the devastating effects of wildfire. Lessen the possibility of wildfire spreading to the Ashland watershed from the urban/wildland interface area.

The City of Ashland’s Climate Energy Action Plan goal:

Prepare the city’s communities, systems, and resources to be more resilient to climate change impacts” and includes the specific strategy to “Support more climate-ready development and land use.

Strategy ULT-4 - Regulate new development in the Wildfire Lands Overlay part of the urban growth boundary

BACKGROUND AND ADDITIONAL INFORMATION

In April 2014, the City Council initiated an amendment to Ashland’s Wildfire Hazard Zone (WHZ) boundary, which had studied and developed cooperatively with the Oregon Department of Forestry. This was an evaluation using criteria for wildfire hazard zones set forth in Chapter 629 of the Oregon Administrative Rules. The analysis concluded that all areas within the city were at or above the threshold for a WHZ designation.

In September 2018, the City Council passed a wide-ranging set of amendments to the Ashland Municipal Code, which addressed key components designed to mitigate the threat of wildfire. One of those amendments included expanding the boundary of the Wildfire Hazard Zone to incorporate the entire City of Ashland.

An extensive list of changes to the City’ Wildfire Land’s Development Standards were developed in coordination with Community Development and Ashland Fire and Rescue staff, designed to mitigate and reduce the threat of wildfire through vegetation management and creation of defensible space around new construction. Highlighted below is a summary of code requirements:

- Fire Prevention and Control Plan with planning applications
- Identification of a general fuel modification area around new construction addressing:
 - Removal of all dead or dying vegetation.
 - No new planting of highly flammable, prohibited plants within 30 feet of a structure
 - Removal of existing highly flammable plants within 5 feet of the new building or addition.
 - Prohibit combustible materials, including wood mulch, from being placed within 5 feet of a structure.
 - Fences to be constructed with non-flammable material where the fence attaches to a new building, addition, or deck.
 - Existing highly flammable trees (e.g. evergreen trees such as Cypress, Pine and Fir) to be pruned to provide a minimum 10-foot clearance from a new building or addition, unless pruning the tree will compromise its health.
 - Existing fire-resistant trees (e.g. deciduous trees such as Oak and Maple) to be pruned as to not touch a structure and provide a minimum 10-foot clearance from a chimney.
 - Understory growth, vegetation below trees, to be removed or maintained to reduce the risk of the spread of wildfire
 - Roofing material must be fire resistant, with a Class B rating or better

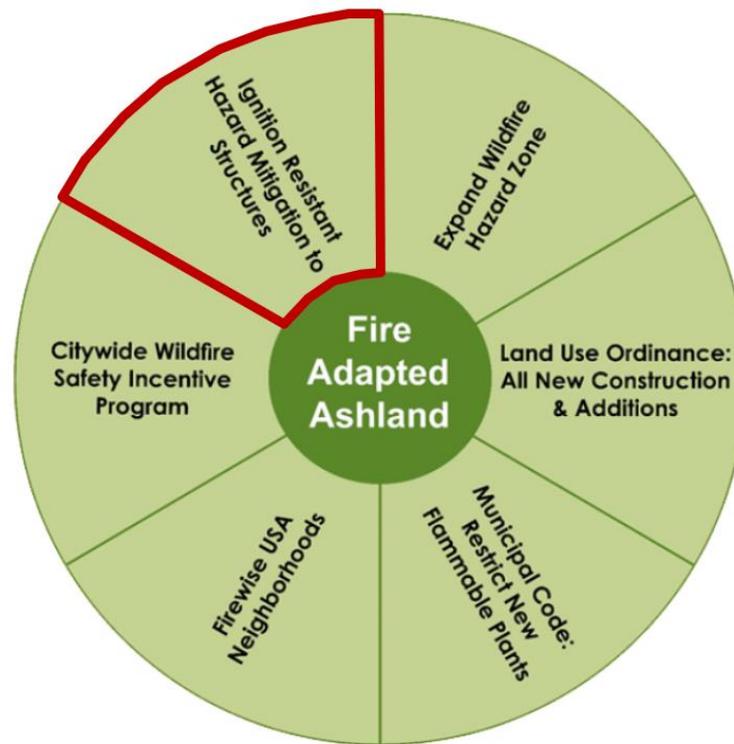
Note: The standards provide allowances to preserve vegetation for erosion control, riparian and wetland preservation

As part of the code amendment package, the City Council amended AMC chapter 9 related to nuisances, adding several new sections that addressed the prohibition of planting flammable plants within 30 feet of new construction. A list of flammable plants was adopted by resolution. The list is subject to periodic updates as additional flammable species are identified for designation. The municipal code considers a nuisance any planting of species identified on the prohibited flammable plant list within a general fuel modification area.

Wildfire Hazard Mitigation Code – 327.4

Local adoption of ORSC 327.4 is an important element of the City’s approach to creating a fire adapted Ashland. The National Wildfire Coordinating Group defines a fire adapted community as a community consisting of informed and prepared citizens collaboratively planning and acting to safely

coexist with wildland fire. The graphic below illustrates the components of the City's Fire Adapted Ashland.



Key objectives of Fire Adapted Ashland include 1) Expand the City's wildfire hazard zone; 2) Adopt vegetation management standards for all new construction; 3) Maintain by City resolution a prohibited flammable plant list; 4) Support Firewise USA Neighborhood certification; 5) Offer incentives to assist property owners with wildfire safety actions; and 6) Adopt fire resistant building codes for new residential building construction to reduce or eliminate hazards presented by wildfires.

Virtual Stakeholder Meeting

On February 18, a virtual stakeholder meeting was held for members of the local construction and development community. Approximately 35 invitations were sent to local stakeholders, encouraging attendance by contractors, builders, developers, and design professionals. A presentation on the proposal was given, and both Community Development and Fire and Rescue staff were on hand to offer additional background and answers questions.

FISCAL IMPACTS

No additional cost to the Community Development Department is anticipated because of adoption and implementation of ORSC 327.4. Required use of non-combustible and fire-resistant materials for primary features of a residential structure will be reviewed and approved as part of the Building Safety Division's existing, standard plans review and inspection process.

Oregon Revised Statutes required that a housing cost impact analysis be carried out prior to the final adoption of ORSC 327.4 by the Oregon Building Codes Division. In 2018, the housing cost analysis estimated a \$2,500 - \$3,000 increase in overall home price when incorporating the requirements of the Wildfire Hazard Mitigation Code. The cost analysis was based upon an example of a 1,200 square foot home on a 6,000 square foot lot within the Portland-Metro area. Ashland Building Safety Division and Fire and Rescue staff do not expect a similar increase in cost as identified in the 2018 cost impact analysis, largely

due to the fact that materials such as cement fiber siding, Class B or greater roofing products and mesh venting are cost-effective and commonly used in Southern Oregon and throughout housing developments within the City of Ashland.

Headwaters Economics, an independent, nonprofit research group based in Montana, conducted a similar analysis in 2018 of costs associated with “building a wildfire-resistant home”. The summary findings concluded that a new home built to wildfire-resistant codes can be constructed for roughly the same cost as a typical home. For the study, the analysts used a three-bedroom, 2,500 square foot, single-story home representative of a typical style in southwest Montana.

DISCUSSION QUESTIONS

Does the City Council have any general questions regarding installation, availability or cost of non-combustible and fire-resistant products specified in ORSC 327.4?

Does the City Council have any questions about the process to inform the development community about the potential new fire-resistant code requirements prior to and after enactment?

SUGGESTED NEXT STEPS

It is recommended that Council direct staff to prepare an ordinance amending Ashland Municipal Code Chapter 15, adopting Oregon Residential Specialty Code 327.4 – Wildfire Hazard Mitigation for implementation throughout Ashland’s Wildfire Lands Overlay. Once prepared, a public hearing would be scheduled before Council to review the proposed ordinance.

REFERENCES & ATTACHMENTS

Attachment 1: Stakeholder meeting announcement & minutes

Attachment 2: Construction Guide

Attachment 3: Oregon Residential Specialty Code (ORSC) 327.4

Attachment 4: Oregon Building Codes Division – Housing Cost Impact Statement; Headwaters Economics – Executive Summary - Oregon Building a Wildfire-Resistant Home: Codes and Costs

WILDFIRE MITIGATION BUILDING CODE

VIRTUAL STAKEHOLDER MEETING

FEBRUARY 18, 2021

Proposed Adoption of Wildfire Mitigation Building Code R327.4

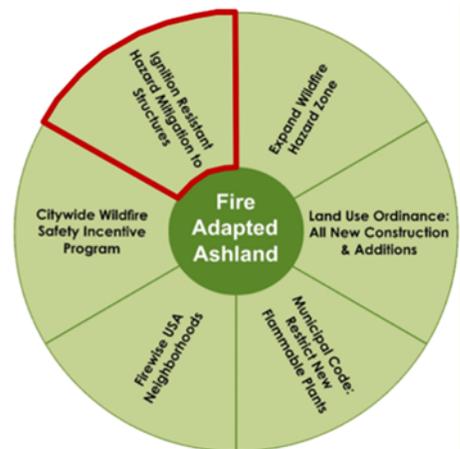
In 2018, the Oregon Building Codes Division (BCD) engaged stakeholders from the fire service, local government, and homebuilders to develop wildfire mitigation code standards that have a consistent and predictable application. The City of Ashland participated in this process at the state level and in January 2019, BCD amended Oregon Residential Specialty Code section R327 (Wildfire Hazard Mitigation) and made it available for local adoption.

A Community Stakeholder Meeting will be held on Thursday, February 18, 2021 at 1 PM.

<https://zoom.us/j/99498149804>

Local contractors, builders, developers, and design professionals are encouraged to attend.

Staff will be providing an overview of the code requirements and holding a Q&A session.



The City of Ashland has a comprehensive approach to addressing the threat and potential consequences of wildfire, including public education, a city-wide wildfire hazard zone designation, comprehensive vegetation/fuels management, and individual neighborhood FireWise certifications. The final piece of the City's Fire Adapted Strategy is to adopt Wildfire Mitigation Building Code R327.4 as permitted by the State of Oregon.



WILDFIRE MITIGATION BUILDING CODE

The intent of R327.4 is to provide minimum standards that reduce or eliminate ignition potential of new homes built within wildfire hazard zones. This is accomplished using exterior products that resist ignition and protect specific vulnerable areas including rain gutters, roofing, ventilation, exterior walls, and eaves from ember ignition threat.

The 2020 Alameda Fire caused significant destruction to the Rogue Valley. Building and fire departments have a responsibility to their communities to ensure that new and existing structures in wildfire hazard areas are protected against wildfires. One of the best ways to accomplish this is through adoption and enforcement of building codes and standards that aim to reduce the potential ignition of homes through the use of ignition-resistant building materials, screens to prevent embers from penetrating into eaves and under foundations, and creating and maintaining defensible space around structures within the community. The City of Medford recently embraced a similar effort and implemented R327.4 within their jurisdiction in October 2019.

The Ashland Fire & Rescue and Community Development departments are seeking community input from stakeholders in preparation for local adoption of R327.4. by the City of Ashland.

VIRTUAL STAKEHOLDER MEETING

●
FEBRUARY 18, 2021

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Additional Information is available at:

www.ashland.or.us/R327

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R327.4 Wildfire Hazard Mitigation Construction Guide for Wildfire Hazard Zones



Underfloor and Attic Vents

ORSC Section R327.4.4

All Vents:

All vents shall have screening made of corrosion-resistant metal mesh with minimum 1/16" and maximum 1/8" grid **or** be designed to resist flame and ember intrusion (ASTM E2886).

Eave, Soffit, and Cornice Vents less than 12' above grade or surface:

All vents shall have screening made of corrosion-resistant metal mesh with minimum 1/16" and maximum 1/8" grid **and** be designed to resist flame and ember intrusion (ASTM E2886).

Roofing

ORSC Section R327.4.3

Roofing shall be asphalt, slate, metal, tile, clay, concrete, or equivalent minimum Class B. **Wood shingle or shake materials are prohibited.** Cap off or fire block spaces between roofing and roof deck to prevent flame and ember intrusion and provide galvanized valley flashing where valley flashing is installed.

Walking Surfaces

ORSC Section R327.4.7

Deck, porch, and balcony walking surfaces greater than 30" and less than 12' above grade or the surface below shall be constructed of minimum 2" nominal lumber for decks <= 200 sq. ft., non-combustible, ignition-resistant conforming to ASTM E84 or UL 723, exterior fire retardant treated wood, meets ASTM E2632 and ASTM 2726 criteria, or meets ASTM E2632 with ignition-resistant wall covering.

Rain Gutters

ORSC Section R327.4.3.1

Non-combustible materials with provisions to prevent the accumulation of leaves and debris in the gutters (Non-combustible corrosion resistant metal screening).

Underfloor Protection

ORSC Section R327.4.6.4

Underfloor area of elevated structures shall be enclosed or meet non-combustible material, ignition-resistant material, ASTM E2957 compliant, one layer of minimum 5/8" exterior grade Type X applied behind the exterior covering of the underside, or 1-hour fire resistive exterior wall assembly.

Windows, Doors, Skylights Glazing

ORSC Section R327.4.8

Exterior windows, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels (typical dual pane), glass block, or have a minimum fire-resistant rating of 20 minutes.



Overhanging Projections

ORSC R327.4.6.1; R327.4.6.2; R327.4.6.3

All enclosed roof eaves, soffits, cornices, exterior patio/porch ceilings and floor projections less than 12' above grade or the surface below shall be covered with either non-combustible material, ignition-resistant material, ASTM E2957 compliant, one layer of minimum 5/8" ext. Type X applied behind the exterior covering, or 1-hour fire resistive exterior wall assembly (Gable end overhangs are exempt).

Exterior Wall Covering

ORSC Section R327.4.5

Wall covering materials shall be noncombustible, ignition-resistant, heavy timber, log wall, or wall assemblies tested in accordance with ASTM E2707. Alternatively, one layer of minimum 5/8" exterior grade Type X applied behind the exterior wall covering or cladding or 1-hour fire resistive exterior wall assembly. Exterior wall coverings shall extend from the top of the foundation to the roof, and terminate at 2" nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves or soffits, shall terminate at the underside of the enclosure.



**Amendments to the
2017 Oregon Residential Specialty Code**

Code amendment summary:

Section R327 Wildfire hazard mitigation

These amendments provide additional wildfire hazard mitigation provisions in Section R327 that are available for local adoption.

Effective: Jan. 24, 2019

Insert page instructions:

These amendments have been formatted as insert pages for the 2017 ORSC.

When inserted into the code, amendments will face the page containing the existing code language. Some pages have been left blank for this purpose.

1. Print these pages **double-sided** in “book” format.
2. Insert the pages facing the page number in the bottom corner.
3. The amended language is depicted as follows:

~~Strikethrough~~ text represents deleted language.

Underlined text represents added language.



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SECTION R327 WILDFIRE HAZARD MITIGATION

R327.1 Purpose. The purpose of this section is to provide minimum standards for dwellings and their accessory structures located in or adjacent to vegetated areas subject to wildfires, to reduce or eliminate hazards presented by such fires.

R327.2 Scope. The provisions of this section shall apply to all dwellings required to be protected against wildfire by a jurisdiction which has adopted wildfire zoning regulations. The additional provisions of Section R327.4 shall apply when a local municipality has adopted a local ordinance specifically recognizing Section R327.4 and consistent with Sections R327.4 through R327.4.8.

R327.3 Determination. ~~Wildfire hazard zone.~~ A wild fire hazard zone is an area legally determined by a jurisdiction to have special hazards caused by a combination of combustible natural fuels, topography and climatic conditions that result in a significant hazard of catastrophic fire over relatively long periods each year. Wildfire hazard zones shall be determined using criteria established by the Oregon Department of Forestry.

R327.3.1 Wildfire hazard zone requirements. Dwellings and their accessory structures shall be protected against wildfire by the following requirement in addition to other requirements of this code. The provisions of Section R327.4 apply only to qualifying lots identified in Section R327.4.1.

Exception: Nonhabitable detached accessory structures, with an area of not greater than 400 square feet, located at least 50 feet from all other structures on the lot.

R327.3.1.1 Roofing. Roofing shall be asphalt shingles in accordance with Section R905.2, slate shingles in accordance with Section R905.6, metal roofing in accordance with Section R905.4, tile, clay or concrete shingles in accordance with Section R905.3 and other approved roofing which is deemed to be equivalent to a minimum Class C rated roof covering. Untreated wood shingle and shake roofs are not permitted when the construction site is in a wildfire hazard zone as determined by Section R327.3.

R327.3.1.2 Reroofing or repair of roofing of existing buildings. When 50 percent or more of the roof covering of any building is repaired or replaced within one year, the roof covering shall be made to comply with this section and attic ventilation shall be made to comply with this code. Ventilation openings shall be protected with corrosion-resistant wire mesh, not greater than $\frac{1}{2}$ -inch (12.7 mm) or less than $\frac{1}{8}$ -inch (3.2 mm) in any dimension.

R327.4 Scope of additional wildfire hazard mitigation requirements. The provisions of Section R327.4 shall apply to new dwellings and their accessory structures located in a wildfire hazard zone on a qualifying lot of record created on or after the effective date in the local adopting ordinance.

R327.4.1 Qualifying lots of record. Qualifying lots of record shall meet all the following:

1. Be located in a wildfire hazard zone as identified by the local municipality using criteria established by the Oregon Department of Forestry. The local municipality is not required to include all areas identified by the Oregon Department of Forestry as wildfire hazard zones. The zone shall be detailed in the local adopting ordinance.
2. The local municipality shall determine in the adopting ordinance whether qualifying lots of record shall consist of individual lots or whether qualifying lots must be part of a development that contains a minimum number of lots.
3. The local municipality shall make a determination that the lot of record is either located within the identified wildfire hazard zone as determined by the jurisdiction or that it is located outside of the wildfire hazard zone as determined by the jurisdiction. Notification shall be provided in conjunction with the land use approval under ORS 197.522.
4. Application:
 - 4.1 Lots created prior to the effective date of the local ordinance, that would otherwise qualify under the local adopting ordinance, are exempt from the requirements of the ordinance for a period of three years from the creation date of the land use approval under ORS 197.522.
 - 4.2 For a lot created after the effective date of the local ordinance that receives notification under this section, the determination in the notification shall be valid for three years from the date of the land use approval under ORS 197.522. At the expiration of the three years, a lot of record shall be re-evaluated under the current version of the adopting ordinance prior to the issuance of a building permit.

Infill exception: Dwellings or accessory structures constructed on a lot in a subdivision, do not need to comply with Section R327.4 when at least 50 percent of the lots in the subdivision have existing dwellings that were not constructed in accordance with Section R327.4.

Infill exception: Dwellings or accessory structures constructed on a lot in a subdivision, do not need to comply with Section R327.4 when at least 50 percent of the lots in the subdivision have existing dwellings that were not constructed in accordance with Section R327.4.

Nothing in the code or adopting ordinance prevents a local municipality from waiving the requirements of Section R327.4 for any lot, property or dwelling, or the remodel, replacement or reconstruction of a dwelling within the jurisdiction.

The local municipality must include a process for resolving disputes related to the applicability of the local ordinance and this section.

R327.4.2 Definitions. The following words and terms shall, for purposes of Section R327.4, have the meanings shown herein. Refer to Chapter 2 for general definitions.

Heavy Timber. For the use in this section, *heavy timber* shall be sawn lumber or glue laminated wood with the smallest minimum nominal dimension of 4 inches (102 mm). *Heavy timber* walls or floors shall be sawn or glue-laminated planks splined, tongue- and-groove, or set close together and well spiked.

Ignition-Resistant Material. A type of building material that resists ignition or sustained flaming combustion sufficiently so as to reduce losses from wildland-urban interface conflagrations under worst-case weather and fuel conditions with *wildfire exposure* of burning embers and small flames. Such materials include any product designed for exterior exposure that, when tested in accordance with ASTM E84 or UL 723 for surface burning characteristics of building materials, extended to a 30-minute duration, exhibits a flame spread index of not more than 25, shows no evidence of significant progressive combustion, and whose flame front does not progress more than 10½ feet (3.2 m) beyond the centerline of the burner at any time during the test.

Noncombustible Material. Any material that in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat in accordance with ASTM E136.

Wildfire. Any uncontrolled fire spreading through vegetative fuels that threatens to destroy life, property, or resources.

Wildfire Exposure. One or a combination of circumstances exposing a structure to ignition, including radiant heat, convective heat, direct flame contact and burning embers being projected by a vegetation fire to a structure and its immediate environment.

R327.4.3 Roofing. Roofing shall be asphalt shingles in accordance with Section R905.2, slate shingles in accordance with Section R905.6, metal roofing in accordance with Section R905.4, tile, clay or concrete shingles in accordance with Section R905.3 or other *approved* roofing which is deemed to be equivalent to a minimum Class B rated roof assembly. Wood shingle and shake roofs are not permitted in a wildfire hazard zone.

Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be fire-blocked with *approved* materials, or have one layer of minimum 72 pound (32.4 kg) mineral-surfaced nonperforated cap sheet complying with ASTM D3909 installed over the combustible decking.

Where valley flashing is installed, the flashing shall be not less than 0.019-inch (0.48 mm) No. 26 gage galvanized sheet corrosion-resistant metal installed over not less than one layer of minimum 72 pound (32.4 kg) mineral-surfaced non-perforated cap sheet complying with ASTM D3909 at least 36-inch-wide (914 mm) running the full length of the valley.

R327.4.3.1 Gutters. When required, roof gutters shall be constructed of *noncombustible materials* and be provided with a means to prevent accumulation of leaves and debris in the gutter.

R327.4.4 Ventilation. Where provided, the minimum net area of ventilation openings for enclosed attics, enclosed soffit spaces, enclosed rafter spaces, and under-floor spaces shall be in accordance with Sections R806 and R408.

All ventilation openings shall be covered with non-combustible corrosion-resistant metal wire mesh, vents designed to resist the intrusion of burning embers and flame, or other *approved* materials or devices.

Ventilation mesh and screening shall be a minimum of 1/16-inch (1.6mm) and a maximum of 1/8-inch (3.2mm) in any dimension.

R327.4.4.1 Eaves, soffits, and cornices. Ventilation openings shall not be installed on the underside of eaves, soffits, or cornices.

Exceptions:

1. The *building official* may *approve* special eave, soffit, or cornice vents that are manufactured to resist the intrusion of flame and burning embers.
2. Ventilation openings complying with the requirements of Section R327.4.4 may be installed on the underside of eaves, soffits, or cornices where the opening is located 12 feet or greater above *grade* or the surface below.

R327.4.5 Exterior walls. The *exterior wall covering* or wall assembly shall comply with one of the following requirements:

1. *Noncombustible material.*
2. *Ignition-resistant material.*
3. *Heavy timber assembly.*
4. Log wall construction assembly.
5. Wall assemblies that have been tested in accordance with the test procedures for a 10-minute direct flame contact exposure test set forth in ASTM E2707, complying with the conditions of acceptance listed in Section R327.4.5.2.

Exception: Any of the following shall be deemed to meet the assembly performance criteria and intent of this section:

1. One layer of 5/8-inch Type X exterior gypsum sheathing applied behind the *exterior wall covering* or cladding on the exterior side of the framing.
2. The exterior portion of a 1-hour fire resistive *exterior wall assembly* designed for exterior fire exposure including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.

R327.4.5.1 Extent of exterior wall covering. *Exterior wall coverings* shall extend from the top of the foundation to the roof, and terminate at 2 inch (50.8 mm) nominal solid wood blocking between rafters at all roof overhangs, or in the case of enclosed eaves or soffits, shall terminate at the underside of the enclosure.

R327.4.5.2 Conditions of acceptance. ASTM E2707 tests shall be conducted in triplicate and the conditions of acceptance below shall be met. If any one of the three replicates does not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Absence of flame penetration through the wall assembly at any time during the test.
2. Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-minute test.

R327.4.6 Overhanging projections. All exterior projections (exterior balconies, carports, decks, patio covers, porch ceilings, unenclosed roofs and floors, overhanging buildings and similar architectural appendages and projections) shall be protected as specified in this section.

R327.4.6.1 Enclosed roof eaves, soffits, and cornices. The exposed underside of rafter or truss eaves and enclosed soffits, where any portion of the framing is less than 12 feet above grade or similar surface below, shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 5/8-inch Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the rafter tails, truss tails, or soffit.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the rafter tails or soffit including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. Soffit assemblies with an underside surface that meets the performance criteria in Section R327.4.6.5 when tested in accordance ASTM E2957.

Exceptions: The following materials do not require protection required by this section:

1. Eaves and soffits where all portions of the framing members are 12 feet or greater above grade, and 2-inch nominal eave fireblocking is provided between roof framing members from the wall top plate to the underside of the roof sheathing.
2. Gable end overhangs and roof assembly projections beyond an exterior wall other than at the lower end of the rafter tails.
3. Fascia and other architectural trim boards.

R327.4.6.2 Exterior patio and porch ceilings. The exposed underside of exterior patio and porch ceilings greater than 200 square feet in area and less than 12 feet above grade shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 5/8-inch Type X exterior gypsum sheathing applied behind the exterior covering on the underside of the ceiling.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the ceiling assembly including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. Porch ceiling assemblies with a horizontal underside that meet the performance criteria in Section R327.4.6.5 when tested in accordance with the test procedures set forth in ASTM E2957.

Exception: Architectural trim boards.

R327.4.6.3 Floor projections. The exposed underside of cantilevered floor projections less than 12 feet above grade or the surface below shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 5/8-inch Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the floor projection.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor projection, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. An assembly that meets the performance criteria in Section R327.4.6.5 when tested in accordance with ASTM E2957.

Exception: Architectural trim boards.

R327.4.6.4 Underfloor protection. The underfloor area of elevated structures shall be enclosed to grade in accordance with the requirements of Section R327.4, or the underside of the exposed underfloor shall be protected by one of the following:

1. Noncombustible material.
2. Ignition-resistant material.
3. One layer of 5/8-inch Type X exterior gypsum sheathing applied behind an exterior covering on the underside of the floor assembly.
4. The exterior portion of a 1-hour fire resistive exterior wall assembly applied to the underside of the floor, including assemblies using exterior gypsum panel and sheathing products listed in the Gypsum Association Fire Resistance Design Manual.
5. An assembly that meets the performance criteria in Section R327.4.6.5 when tested in accordance with ASTM E2957.

Exception: Heavy timber structural columns and beams do not require protection.

R327.4.6.5 Conditions of acceptance. ASTM E2957 tests shall be conducted in triplicate, and the conditions of acceptance below shall be met. If any one of the three replicates does not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Absence of flame penetration of the eaves or horizontal projection assembly at any time during the test.
2. Absence of structural failure of the eaves or horizontal projection subassembly at any time during the test.
3. Absence of sustained combustion of any kind at the conclusion of the 40 minute test.

R327.4.7 Walking surfaces. Deck, porch and balcony walking surfaces located greater than 30 inches and less than 12 feet above *grade* or the surface below shall be constructed with one of the materials listed below.

Exception: Walking surfaces of decks, porches and balconies not greater than 200 square feet in area, where the surface is constructed of nominal 2-inch lumber.

1. Materials that comply with the performance requirements of Section R327.4.7.1 when tested in accordance with both ASTM E2632 and ASTM E2726.
2. Ignition resistant materials that comply with the performance requirements of Section R327.4.2 when tested in accordance with ASTM E84 or UL 723.
3. Exterior fire retardant treated wood.
4. Noncombustible material.
5. Any material that complies with the performance requirements of Section R327.4.7.2 where tested in accordance with ASTM E2632, where the exterior wall covering of the structure is noncombustible or ignition-resistant material.
6. Any material that complies with the performance requirements of ASTM E2632, where the exterior wall covering of the structure is noncombustible or ignition-resistant material.

Exception: Wall covering material may be of any material that otherwise complies with this chapter when the decking surface material complies with the performance requirements ASTM E84 with a Class B flame spread rating.

R327.4.7.1 Requirements for R327.4.7, item 1. The material shall be tested in accordance with ASTM E2632 and ASTM E2726, and shall comply with the conditions of acceptance below. The material shall also comply with the performance requirements of Section R327.4.2 for ignition resistant material when tested in accordance with ASTM E84 or UL 723.

R327.4.7.1.1 Conditions of acceptance. ASTM E2632 tests shall be conducted in triplicate and the conditions of acceptance below shall be met. If any one of the three replicates does not meet the conditions of acceptance, three additional tests shall be conducted. All additional tests shall meet the following conditions of acceptance:

1. Peak heat release rate of less than or equal to 25 kW/ft² (269 kW/m²)
2. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
3. Absence of falling particles that are still burning when reaching the burner or floor.

R327.4.7.1.2 Conditions of acceptance. ASTM E2762 tests shall be conducted in triplicate and the conditions of acceptance below shall be met. If any one of the three replicates does not meet the conditions of acceptance, three additional tests shall be conducted. All of the additional tests shall meet the following conditions of acceptance:

1. Absence of sustained flaming or glowing combustion of any kind at the conclusion of the 40-minute observation period.
2. Absence of falling particles that are still burning when reaching the burner or floor.

R327.4.7.2 Requirements for R327.4.7, item 6. The material shall be tested in accordance with ASTM E2632 and shall comply with the following condition of acceptance. The test shall be conducted in triplicate and the peak heat release rate shall be less than or equal to 25 kW/ft² (269 kW/m²). If any one of the three replicates does not meet the conditions of acceptance, three additional tests shall be conducted. All of the additional tests shall meet the conditions of acceptance.

R327.4.8 Glazing. Exterior windows, windows within exterior doors, and skylights shall be tempered glass, multilayered glazed panels, glass block, or have a fire resistance rating of not less than 20 minutes.

HOUSING COST IMPACT STATEMENT

FOR ESTIMATING THE EFFECT OF A PROPOSED RULE OR ORDINANCE ON THE COST OF DEVELOPING
A *TYPICAL 1,200 SQ FT DETACHED SINGLE FAMILY DWELLING ON A 6,000 SQ FT PARCEL OF LAND.
(ORS 183.534)
FOR ADMINISTRATIVE RULES

AGENCY NAME: Consumer & Business Services
Building Codes Division

PERMANENT:

HEARING DATE: December 18, 2018

ADDRESS: 1535 Edgewater Street NW

CITY/STATE: Salem, OR

PHONE: 503-378-4133

TEMPORARY:

EFFECTIVE DATE: January 15, 2019

BELOW PLEASE PROVIDE A DESCRIPTION OF THE ESTIMATED SAVINGS OR ADDITIONAL COSTS THAT WILL RESULT FROM THIS PROPOSED CHANGE.

PROVIDE A BRIEF EXPLANATION OF HOW THE COST OR SAVINGS ESTIMATE WAS DETERMINED.
IDENTIFY HOW CHANGE IMPACTS COSTS IN CATEGORIES SPECIFIED

Description of proposed change: (Please attach any draft or permanent rule or ordinance)

This proposed rule adds additional provisions for wildfire hazard mitigation to the 2017 Oregon Residential Specialty Code (ORSC) in Section R327 that will be available for local adoption.

Description of the need for, and objectives of the rule:

ORS 455.610 requires the division to adopt, and amend as necessary, a low-rise code “that contains all the requirements, including structural design provisions, related to the construction of residential dwellings three stories or less above grade.” Furthermore, ORS 455.020 and 455.110 require the division to adopt a uniform state building code that conforms to model building codes generally accepted and in use to govern the “construction, reconstruction, alteration and repair of buildings and other structures” and the “installation and use of mechanical, heating and ventilating devices and equipment” in buildings and other structures.

The 2017 ORSC, which became effective October 1, 2017, did not include Appendix W. On July 11, 2018, the Residential and Manufactured Structures Board reviewed and approved Appendix W – Wildfire Hazard Mitigation to be added to the ORSC and for the division to proceed to rulemaking.

The division worked with stakeholders, including representatives from the fire service and homebuilders, to adopt wild fire hazard standards that are workable for Oregon. This rule would make the increased wildfire hazard mitigation provisions in Section R327 available for local adoption.

List of rules adopted or amended:

Amend 918-480-0010.

Materials and labor costs increase or savings:

The division estimates that municipalities adopting the increased provisions in Section R327 will add approximately \$2,500-\$3,000 to the existing costs of a typical 1,200 square foot detached single family dwelling. This increase includes the costs of labor and materials to comply with the increased provisions.

The Residential and Manufactured Structures Board made the specific finding that the added cost is necessary for the health and safety of the occupants and the public, or necessary to conserve scarce resources.

Estimated administrative construction or other costs increase or savings:

The proposed rules do not impose any additional administrative requirements.

Land costs increase or savings: N/A

Other costs increase or savings: None.

*Typical-Single story 3 bedrooms, 1 ½ bathrooms, attached garage (calculated separately) on land with good soil conditions with no unusual geological hazards.

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Building a Wildfire-Resistant Home: Codes and Costs Executive Summary

Headwaters Economics | November 2018

Introduction

This study finds negligible cost differences between a typical home and a home constructed using wildfire-resistant materials and design features. Decades of research and post-fire assessments have provided clear evidence that building materials and design, coupled with landscaping on the property, are the most important factors influencing home survivability during a wildfire. With one-third of all U.S. homes in the wildland-urban interface^{1,2} and more than 35,000 structures lost to wildfire in the last decade,³ more communities should consider adopting building codes that require new home construction to meet wildfire-resistant standards.

While codes and standards have been developed for building in wildfire-prone lands, the perceived cost of implementing such regulations is a commonly cited barrier to consideration and adoption by some communities. However, little research has previously examined how much it would actually cost the homeowner or builder to comply with such regulations.

The full report and detailed data tables are available at <https://headwaterseconomics.org/wildfire/homes-risk/building-costs-codes>.

Summary Findings

- Wildfire disasters will be more common if unmitigated home development continues in the wildland-urban interface.
- A new home built to wildfire-resistant codes can be constructed for roughly the same cost as a typical home.
- Costs vary for retrofitting an existing home to be wildfire-resistant, with some components such as the roof and walls having significant expense. Some of these costs can be divided and prioritized into smaller projects.
- Technology and standards exist today that will make communities safer. Cities, counties, and other jurisdictions can implement wildfire-resistant building codes to reduce their vulnerability to wildfire.

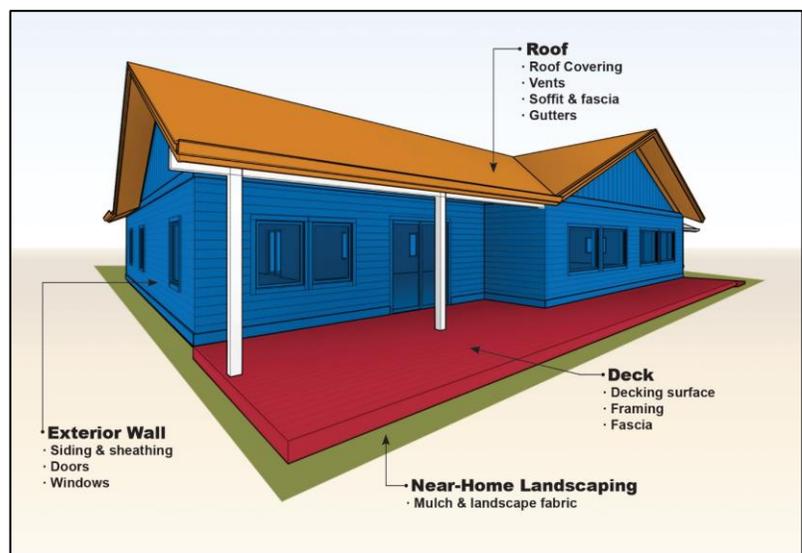


Figure 1. Model home used for cost analysis in this study. It is a three-bedroom, 2,500-square-foot, single-story home representative of wildland-urban interface building styles in southwest Montana.

Wildfire-Resistant Codes and Standards

While certain jurisdictional codes have been established, three existing statewide or national building codes and standards guide wildfire-resistant construction. They are:

- the International Code Council’s International Wildland Urban Interface Code (IWUIC),⁴
- the National Fire Protection Association’s Standard for Reducing Structure Ignition Hazards from Wildland Fire (Standard 1144),⁵ and
- the California Building Code Chapter 7A—Materials and Construction Methods for Exterior Wildfire Exposure.⁶

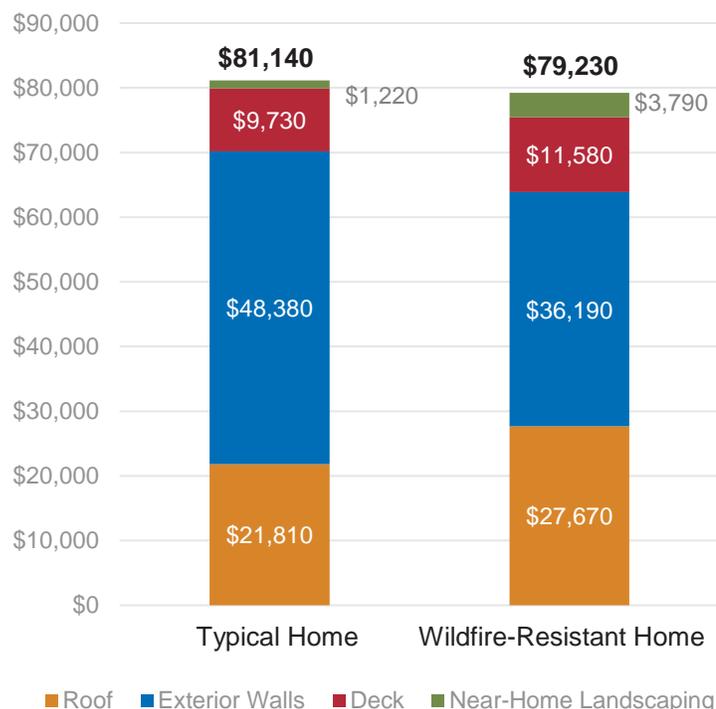
These three documents address construction requirements of the home by component parts (e.g., roof, walls, etc.) and often provide multiple options for complying with the provision. Many of the requirements in these documents are based on standard laboratory testing methods that evaluate the ability of a material or assembly to resist ignition or fire spread. California is one of only a few states to have adopted a wildfire-related building code at the state level for areas of high hazard, but many cities and counties have adopted portions of the IWUIC or other wildfire-related codes. In some communities, the inaccurately assumed cost of constructing a home to comply with a wildfire-resistant building code is a barrier to implementing such codes.

Wildfire-Resistant Construction Costs Are Similar to Typical Costs

To identify whether the cost of constructing to a wildfire-resistant building code differs from typical construction, this study priced new construction and retrofitting expenses for a three-bedroom, 2,500-square-foot, single-story, single-family home representative of wildland-urban interface building styles in southwest Montana (Figure 1), one of the fastest-growing regions in the country. The typical home was assumed to have an asphalt shingle roof, wood siding, dual-pane windows, and a wood deck. Wildfire-resistant materials were selected for similar aesthetics but also comply with wildfire-resistant building codes. Costs were primarily derived from *RSMMeans*,⁷ a database that averages material and labor pricing from hundreds of U.S. cities and includes materials, labor, and contractor overhead and profit.

We examined costs in four vulnerable components of the home: the roof (including gutters, vents, and eaves), exterior walls (including windows and doors), decks, and near-home landscaping. Overall, the wildfire-resistant construction cost 2% less than the typical construction (Figure 2), with the greatest cost savings resulting from using wildfire-resistant fiber cement siding on exterior walls, in lieu of typical cedar plank siding. While cedar plank siding is typical in the wildland-urban interface of western Montana, fiber cement siding is already a

Figure 2. New construction costs by component in typical and wildfire-resistant home.



common choice in many regions because of its relative affordability, durability and low maintenance needs. Wildfire-resistant changes to the roof resulted in the largest cost increase, with a 27% increase in gutters, vents, and soffits. The following sections describe the wildfire-resistant mitigations for each component.

Roof

The roof is arguably the most vulnerable area of the home because of its large surface area. Embers can ignite vegetative debris that has accumulated on the roof surface or in gutters. Embers also can enter the attic through roof and under-eave vents. Also, unenclosed eaves and overhangs can trap embers and heat.

Wildfire-resistant modifications to roofing, vents, fascia, soffits, and gutters added \$5,860 (27%) to the cost of the typical roof (Figure 3), assuming both homes use Class A (fire-rated) asphalt composition shingles. Retrofitting an existing roof to be wildfire-resistant approached the cost of new construction, totaling \$22,010 for the model home. However, many of the wildfire-resistant roof materials have longer lifespan and reduced maintenance needs as compared to typical materials.

Figure 3. Roof subcomponents and new construction cost.



Exterior Walls

Exterior walls are especially vulnerable from exposure to flames or prolonged exposure to radiant heat, such as from burning vegetation or a neighboring home. These exposures can potentially ignite combustible siding products. Some plastic siding products (e.g., vinyl) can also melt, exposing underlying sheathing. Wind-blown embers can accumulate in gaps or pass through openings around windows and doors. Glass in a window or door can break from radiant heat or flame contact, exposing the interior of the home. Wildfire-resistant siding and installation design features, tempered glass in windows, wildfire-resistant doors, and weather-stripping can reduce home vulnerability. The relative importance of each of these items varies depending on home-to-home spacing and location of vegetation on the property. Siting on the property relative to topography and typical wind directions can also be important factors in determining necessary external wall mitigations.

Wildfire-resistant construction for exterior walls was \$12,190 (25%) less expensive than the typical home, with the cost savings resulting from the difference in using wildfire-resistant fiber-cement siding as compared to

cedar plank siding (Figure 4). Fiber cement siding is already a common siding option in many regions and several styles mimic the look of wood siding. While the change in siding reduced the cost of the wildfire-resistant home, cost increases for other exterior wall features are \$5,370 (29%) more than typical exterior wall features. Retrofitting the exterior walls (including windows and doors) on the model home totaled \$40,750. Depending on neighboring home spacing, not all retrofitting activities may be necessary, but several of these activities will have added benefits such as improved energy efficiency (e.g., multi-pane windows) and reduced maintenance.

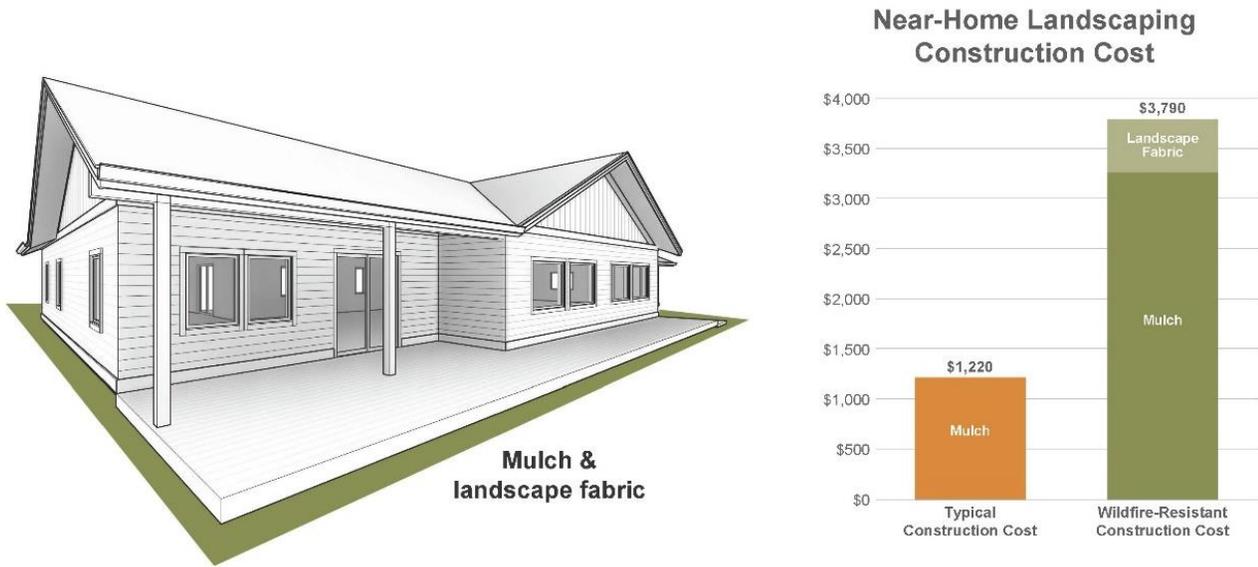
Figure 4. Exterior walls subcomponents and new construction cost.



Deck

Embers can ignite vegetative debris or other combustible material stored or accumulated on top of the deck. If ignited, the burning deck could expose walls, windows, and doors to radiant heat. Embers can ignite decking materials directly when they accumulate on the surface of vulnerable decking, typically occurring in the gaps between deck boards. Decks can also ignite from below when vegetation or stored materials ignite beneath the deck. Mitigations to make a deck wildfire-resistant include using wildfire-resistant materials for walking surface (e.g., composite boards), using foil-faced bitumen tape on the top surface of the support joists, and creating a noncombustible zone underneath the deck. The wildfire-resistant deck added \$1,850 (19%) to the cost of the typical deck (Figure 5). Some wildfire-resistant decking materials can have a longer lifespan and require less maintenance than typical materials.

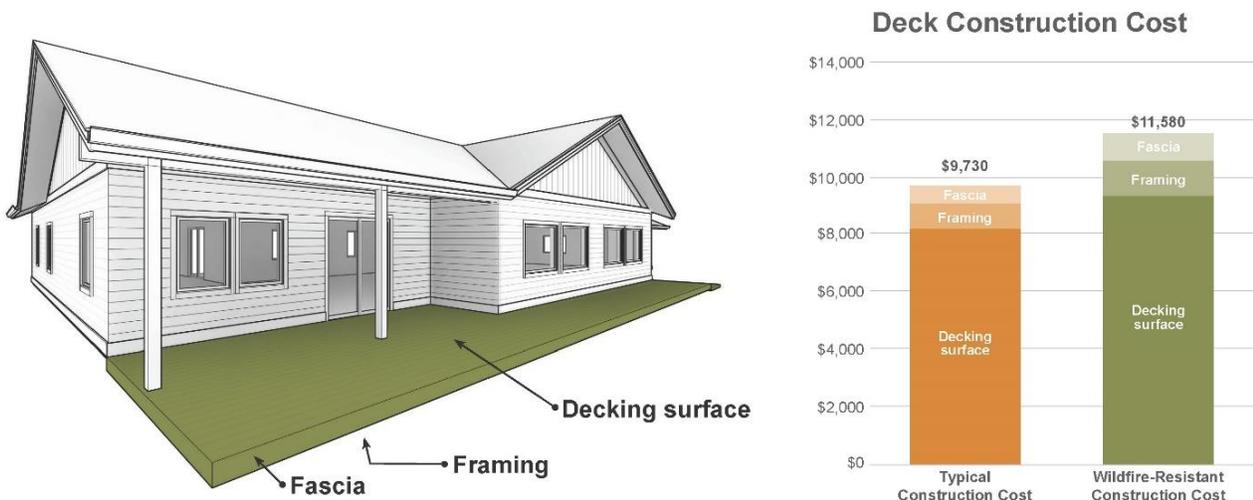
Figure 5. Deck subcomponents and new construction cost.



Near-Home Landscaping

If ignited by wind-blown embers, burning vegetation and other combustible materials near the home can allow flames to touch the home or subject it to an extended radiant heat exposure, potentially igniting siding or breaking glass in windows. Maintaining a noncombustible zone of five feet around the entire perimeter of the house and outer edges of the deck can significantly reduce the vulnerability of the home. Mitigations include using rock instead of bark mulch on top of landscape fabric. Placing landscape fabric underneath the area can reduce the growth of weeds, thereby minimizing the maintenance needed by the homeowner. These modifications increased the cost of near-home landscaping by \$2,570 (210%) (Figure 6). Rock has a longer lifespan than bark mulch and landscape fabric will reduce the maintenance required in the near-home landscaping area.

Figure 6. Near-home landscaping subcomponents and new construction cost.



Costs Should Not Be a Barrier to Constructing Wildfire Resistant Homes

Laboratory research and post-fire analysis have determined that local ignitability of the home itself, largely determined by the building materials and design features, is an important factor in determining survivability during a wildfire. Existing codes and standards provide ample guidance for how to construct a wildfire-resistant home and reduce vulnerability. This study demonstrates that a new home can be constructed to such standards for approximately the same cost as a typical home, and some of these materials have added benefits such as longer lifespan and reduced maintenance.

City, county, and state governments must weigh many issues when considering new regulations, but the cost of constructing a home to meet wildfire-resistant building codes need not be a barrier. If communities continue to allow growth in wildfire-prone lands, adopting wildfire-resistant building codes may be one of the most effective tools for reducing home loss. Absent such requirements, homeowners and builders can take steps to protect the home by carefully designing and constructing (or retrofitting) the most vulnerable components—the roof, walls, deck, and landscaping—to be wildfire-resistant. The long-term benefits may include longer lifecycle and reduced maintenance.

As recent wildfire disasters have demonstrated, the converging trends of rapid growth in the wildland-urban interface, fuel accumulation after a century of fire suppression, and a warming climate will make wildfires more costly and dangerous in years to come. Just as the cause of this problem is multipronged, there is no single solution to protecting lives and property, and we must employ a suite of solutions that include land use planning, vegetation management, and emergency preparedness. Constructing homes to be wildfire-resistant is a critical and cost-effective piece of the puzzle.

Contact

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About Headwaters Economics

Headwaters Economics is an independent, nonprofit research group that assists the public and elected officials in making informed choices about land management and community development decisions in the West, <https://headwaterseconomics.org/>.

This study was completed in partnership with [The Insurance Institute for Business & Home Safety](#) (IBHS) and was prepared at the request of Park County, Montana, as part of the [Community Planning Assistance for Wildfire](#) (CPAW) program. CPAW is a program of Headwaters Economics and is funded by the U.S. Forest Service, the LOR Foundation, and other private foundations.

¹ Wildland-urban interface is defined here as the area where flammable vegetation and homes meet or intermingle.

² Radeloff, V.C., D. P. Helmers, H. A. Kramer, M. H. Mockrin, P.M. Alexandre, A. Bar-Massada, V. Butsic, T.J. Hawbaker, s. Martinuzzi, A. D. Syphard, and S. I. Stewart. 2018. Rapid growth of the US wildland-urban interface raises wildfire risk. PNAS. <http://www.pnas.org/content/early/2018/03/06/1718850115.short>

³ Derived from National Incident Coordination Center Annual Reports. <https://www.predictiveservices.nifc.gov/intelligence/intelligence.htm>

⁴ 2018 International Wildland-Urban Interface Code. 2017. International Code Council, Inc.

⁵ National Fire Protection Association. 2018. NFPA 1144. Standard for Reducing Structure Ignition Hazards from Wildland Fire. 2018 Edition.

⁶ 2016 California State Building Code, Part 2, Volume 1, Chapter 7A. Available at: <https://codes.iccsafe.org/public/chapter/content/9997/>

⁷ RSMean Online. 2018. Version 8.7. Gordian. <https://www.rsmeans.com/>