



Proposed Updates to The Boulder County Building Code: Ignition Resistant Construction Requirements for Wildfire Zone 2

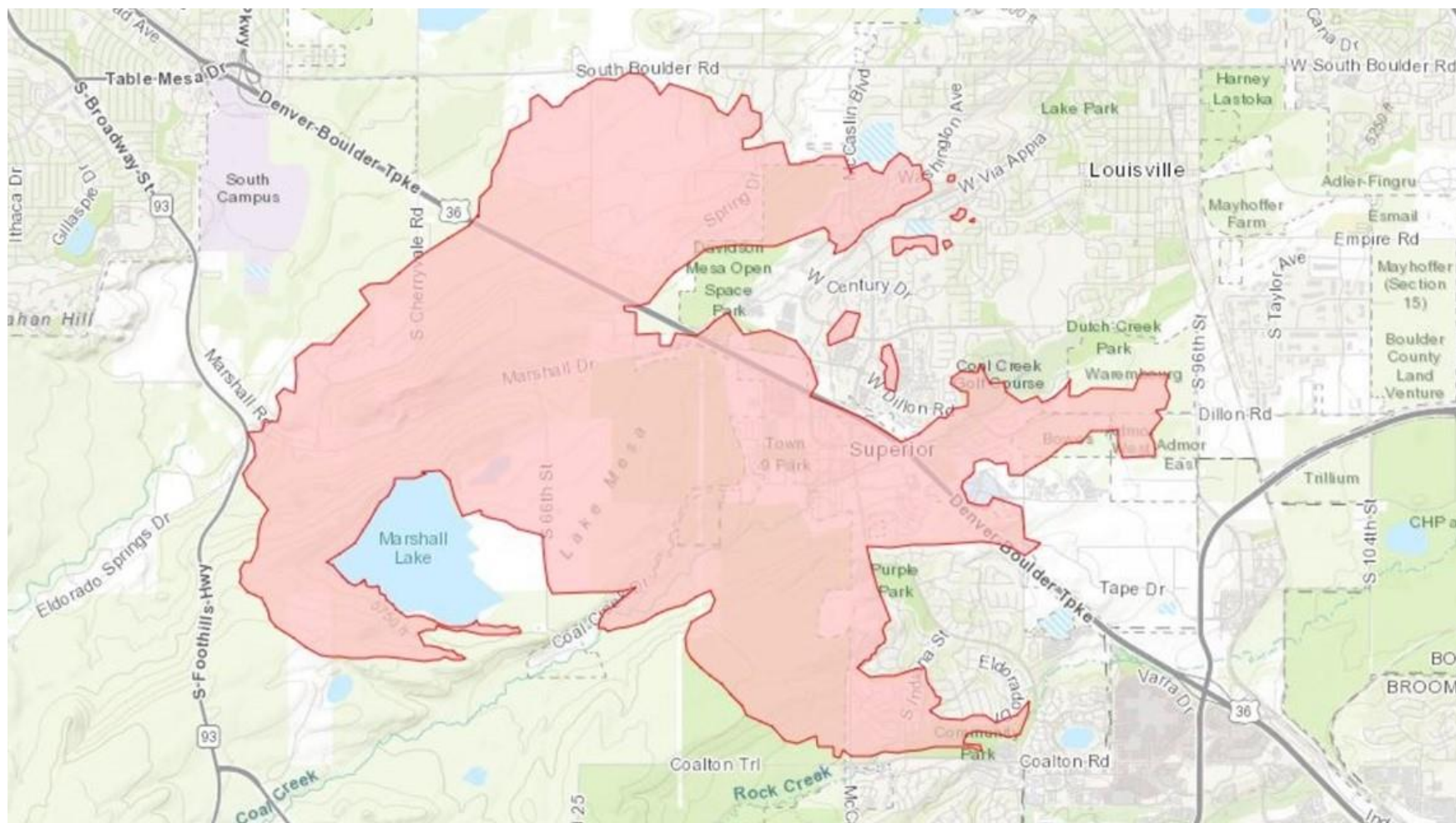
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The Marshall Fire - What Happened



- **Grass Fire on a windy day**
- **Windborne Embers and Ignition**
- **Conflagration**

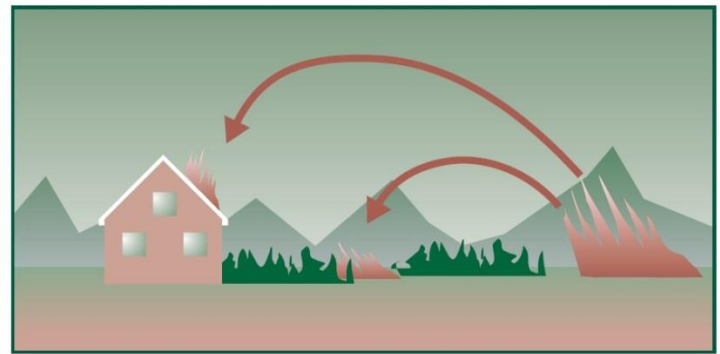
Direct Flame Contact



Radiant Heat



Embers – aka Firebrands



Wildfire Exposures – Embers (aka “Firebrands”)



Photo Credit: Living with Fire Nevada

Embers and home ignition



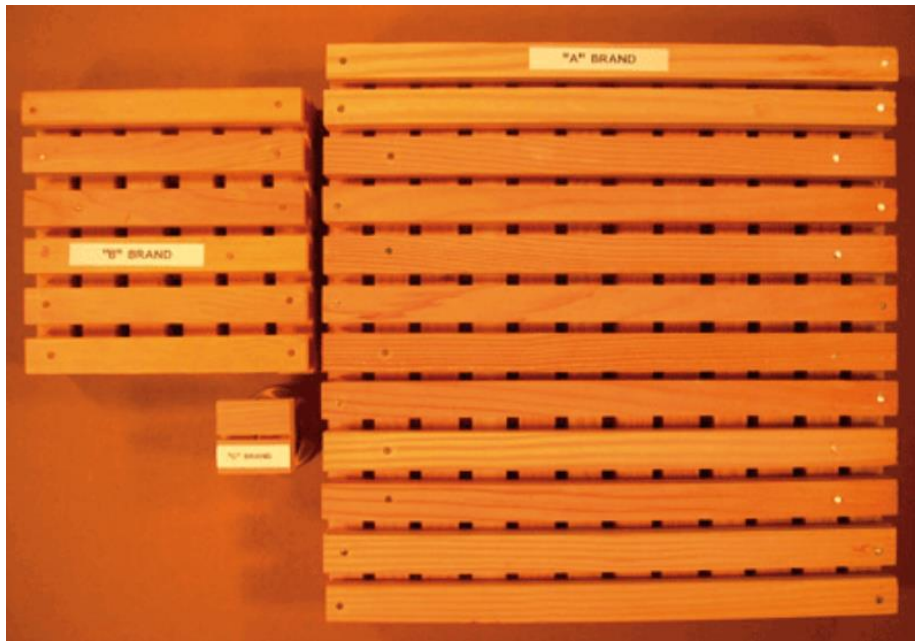
Deep appreciation for their
extensive research and
support:

Jack Cohen
US Forest Service

Steven Quarles
Insurance Institute for
Business & Home Safety

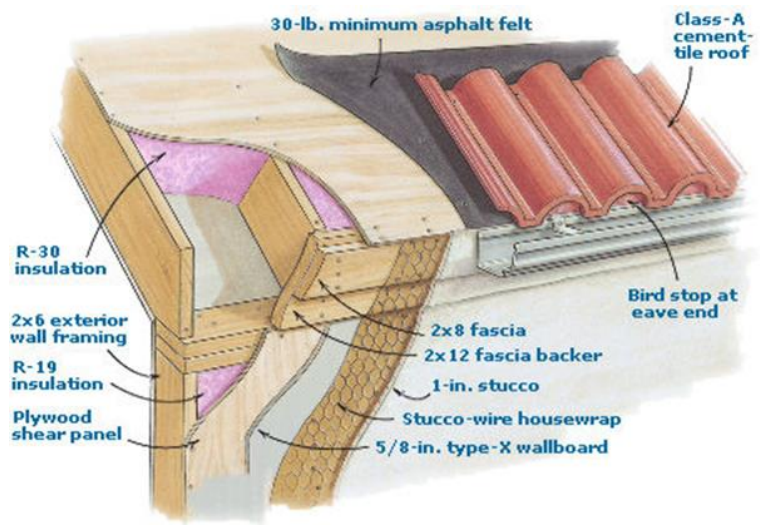


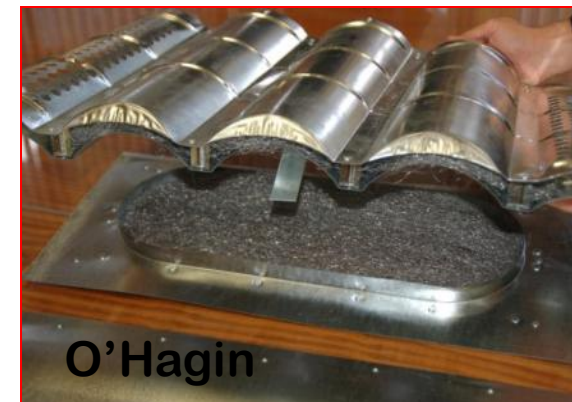
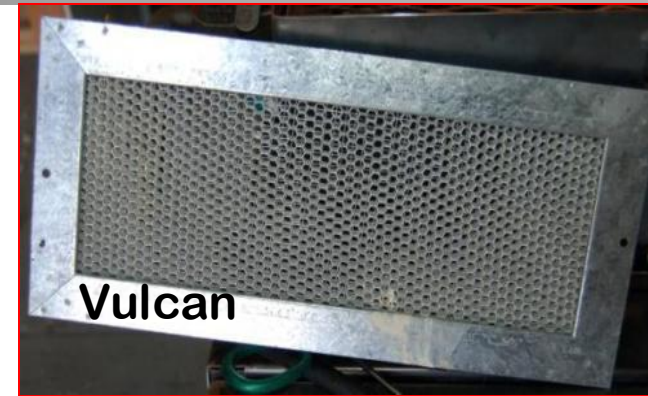
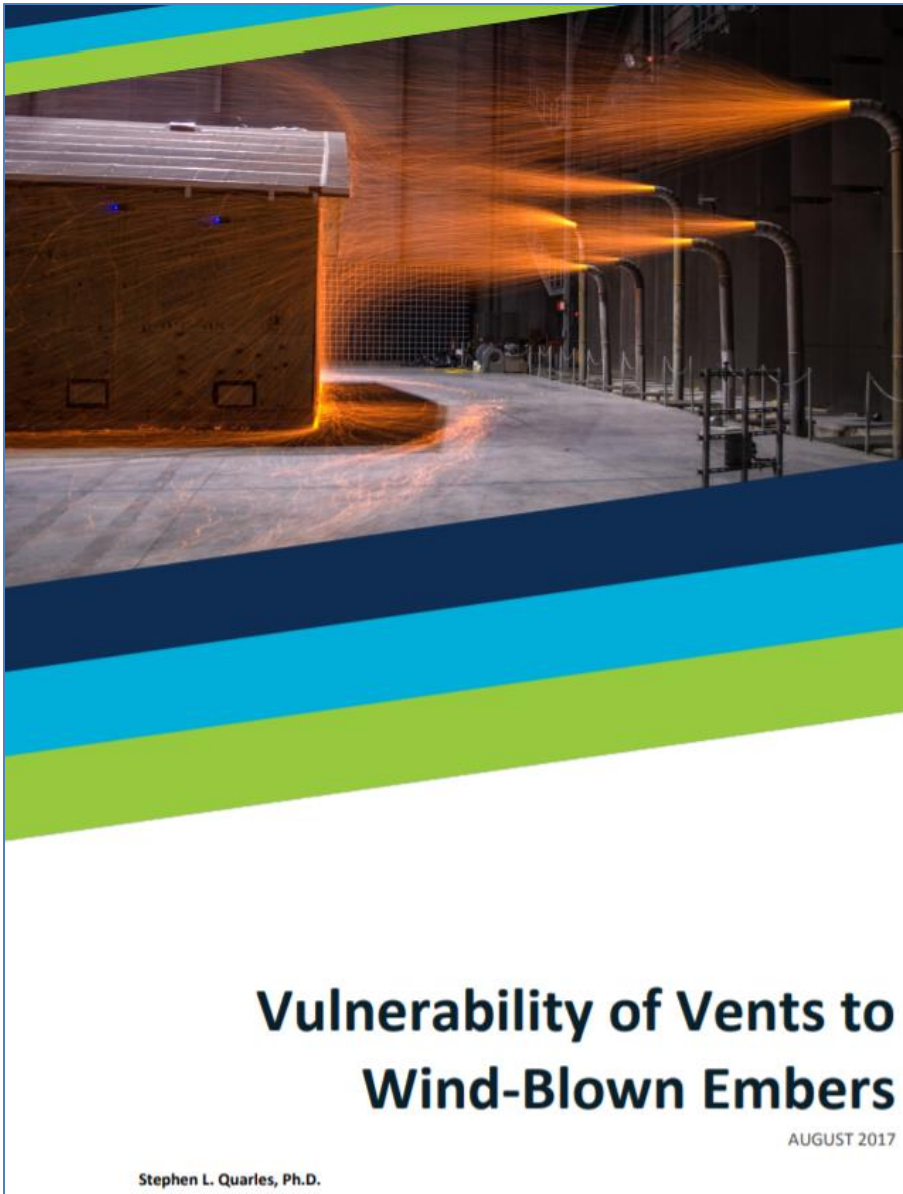
Class A Roofing – ASTM Standard Test Method E-108



Windborne Embers

Protecting your Home- Eaves and Gutters





Protecting your Home- Attachments



Overview of Requirements for Wildfire Zone 2

- Roof coverings
- Gutters and downspouts
- Exterior wall materials
- Deck surfaces
- Three-foot defensible space

(These regulations will supersede / replace the ignition resistant requirements contained in Article 19)

Existing Requirements for Wildfire Zone 1 that are not being proposed for Wildfire Zone 2

- Prohibition of unreinforced vinyl windows
- Full defensible space



Home Innovation
RESEARCH LABS™

COST IMPACT OF BUILDING
A HOUSE IN COMPLIANCE
WITH IWUIC

Prepared For

**National Association of
Home Builders**

DECEMBER 2020

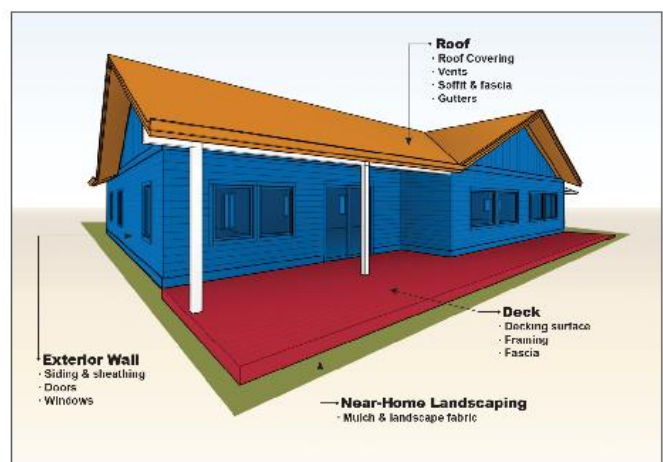
Report No. CR1328-2 12302020

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A Research Paper by



Building a Wildfire-Resistant Home: Codes and Costs



November 2018

Home Innovation Research Lab Study

- The Home Innovation Research Labs study provides cost information for several house components using different materials, and different reference houses in different locations (including Denver).
- In Denver, the study found an increased cost of \$4,274 for the low-cost house components, deck, and defensible space for IWUIC Code compliance on a single-story house.
- Cost increase was even less for their two-story home example at \$1,938 for the low-cost house components, deck, and defensible space.
- The study presents data but does not draw a final conclusion about the cost difference between a typical home and a home that complies with the IWUIC Code.

Table 5 Cost Impact Summary, Single-Story House

Component*	Southern California (L.A, 0.99)		Colorado (Denver, 1.05)		Eastern Texas (Dallas, 0.98)	
	Low Cost	High Cost	Low Cost	High Cost	Low Cost	High Cost
Roof covering	\$0	\$0	\$0	\$0	\$0	\$0
Soffit and Fascia	\$1,839	\$1,839	\$1,950	\$1,950	\$1,820	\$1,820
Gutters and Downspouts	\$860	\$860	\$912	\$912	\$852	\$852
Exterior wall (siding)	(\$3,839)	\$21,391	(\$4,071)	\$22,688	(\$3,800)	\$21,175
Windows	\$2,509	\$2,678	\$2,661	\$2,840	\$2,483	\$2,651
Door	\$0	\$0	\$0	\$0	\$0	\$0
Vents	\$484	\$484	\$514	\$514	\$479	\$479
Total impact for house components	\$1853	\$27,253	\$1966	\$28,905	\$1,835	\$26,978
Exterior Deck	\$1,293	\$1,293	\$1,371	\$1,371	\$1,280	\$1,280
Defensible space	\$883	\$883	\$937	\$937	\$874	\$874
Automatic Sprinklers	NA ⁷	NA	\$4,311	\$6,743	\$4,024	\$6,294
Total	\$4,029	\$29,429	\$8,584	\$37,955	\$8,012	\$35,425

$$\begin{aligned}
 & \$1,966 \\
 & + \$1,371 \\
 & + \$ 937 \\
 \hline
 & = \$4,274
 \end{aligned}$$

Headwaters Economics Study

New Construction Cost Comparison



- The study compared 2,500 square-foot, single-family homes representative of building styles in southwest Montana.
- Their conclusion:
 - This study demonstrates that a new home can be constructed to such standards for approximately the same cost as a typical home.
 - The long-term benefits may include longer lifecycle and reduced maintenance.

Boulder County Staff Research on Local Building Materials Costs

Component	Source	Source	Total Cost - based on 3600 SF house rectangular, simple 2 stories with 300 sf deck		Notes
GUTTERS & DOWNSPOUTS	Precision Seamless Gutters	Home Depot			200 ft gutter & 145 ft downspout (75x2)+(24x2)&(18x6)+(6x6 for runout) using 2"x3" material
Vinyl gutter		0.53/ft	\$106.00		Per Precision Seamless Gutters, professionals will not install or provide vinyl gutters. Homeowners can purchase and install themselves from Home Depot, Lowes, etc.
vinyl downspout		\$0.98/ft	\$142.10		
			\$248.10	TOTAL	
metal gutter	\$7/ft		\$1,400.00		LeafTek gutter guard 200ft on Amazon for \$300
metal downspout	\$7.80/ft		\$1,131.00		
			\$2531.00	TOTAL	
SIDING	Boulder Lumber	Home Depot			3350 sf of siding
cedar	\$3.55/sf	\$3.59/sf	\$11,893.00	TOTAL	compared typical non-IR (cedar) with lowest-cost or typical IR (fiber cementboard)
fiber cement	\$1.65/sf	\$1.80/sf	\$ 5,527.50	TOTAL	
DECKING MATERIAL					300 sf of decking material
non IR redwood	\$10.85/sf		\$3,255.00	TOTAL	low end Trex brand (Boulder Lumber) ASTME84 flame spread index rating less than 200 (Boulder Lumber)
non IR composite (least exp.)	\$6.10/sf		\$1,830.00	TOTAL	
IR composite (least exp)	\$11.15/sf		\$3,345.00	TOTAL	
NONCOMBUSTIBLE ZONE	Colorado Materials				2 cubic yards = 3 feet wide around the entire house. In my sample case, the area under deck is covered by a concrete pad but zone extends around the outside of the deck.
3/4" gravel	\$64/cuyd		\$128.00	TOTAL	middle grade materials for both -- cover the same amount of ground
wood mulch	\$54/cuyd		\$108.00	TOTAL	

Bolded components are IR (Ignition Resistant)

Costs sourced from local materials suppliers week of February 14, 2022

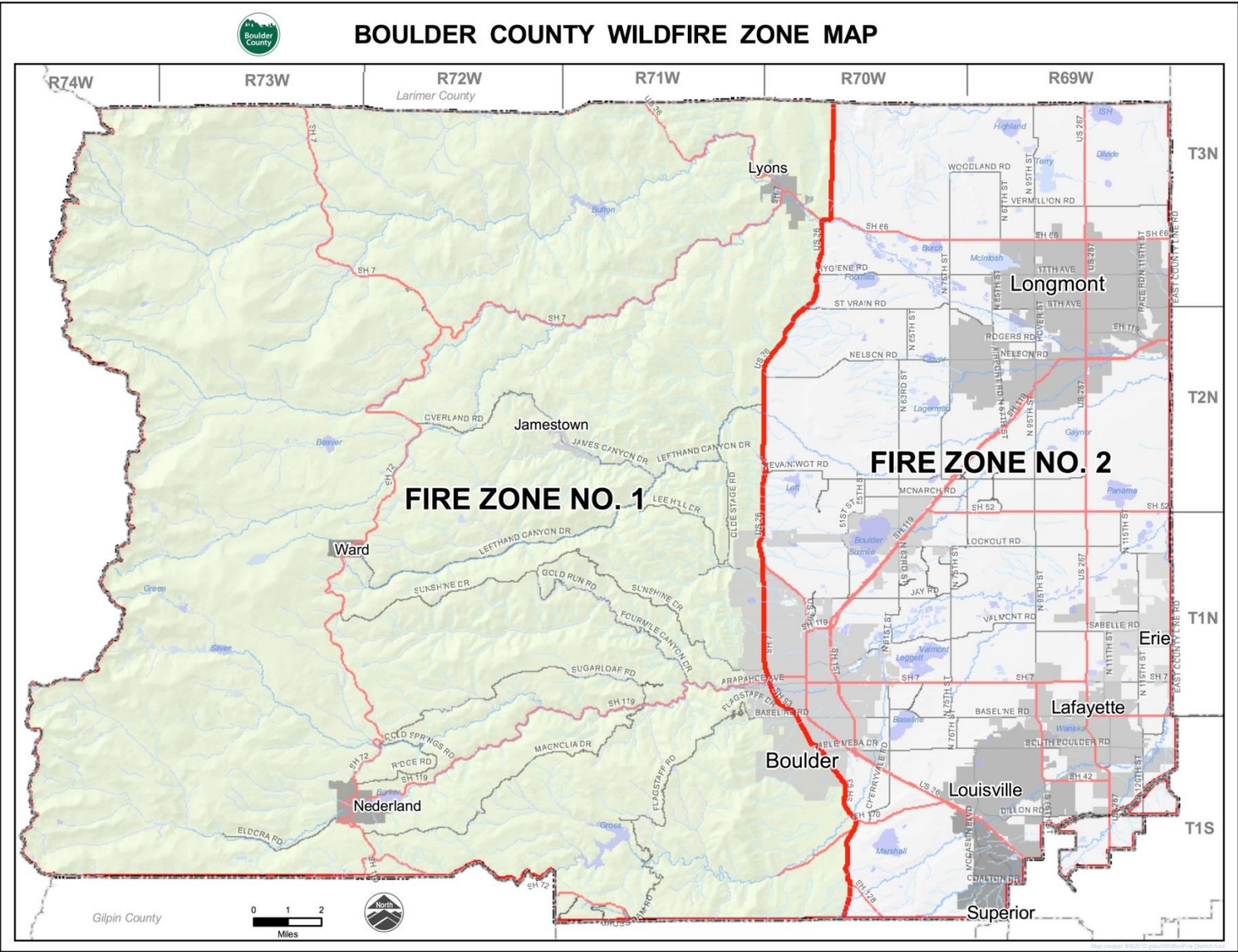
Short-term (assumes proposal is approved)

- Implementation starting June 6, 2022
- Wildfire Partners pilot program (almost ready to launch)
- Revisit with Board of Review:
 - 1) Approved materials for eave protection
 - 2) Requirements for detached accessory structures

Longer-term (as part of comprehensive Building Code update)

- Revisit Wildfire requirements county-wide
- Review and propose adoption of best-practices and best available fire prevention and green construction science
 - High performance wall systems
 - Evaluate use of exterior plastic foam insulation
 - Work towards lower upfront emission solutions
- Incorporate Geographic Information System (GIS) information to expand and refine wildfire zones county-wide
- Explore expansion of Wildfire Partners program

Current & Future Needs for Home Retrofits



Thank You

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Insurance Institute for
Business & Home Safety
www.disastersafety.org/video/





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Building Safety & Inspection Services Team

**BOULDER COUNTY
BOARD OF COUNTY COMMISSIONERS
DOCKET # BORC-22-0001
PUBLIC HEARING
BOULDER COUNTY BUILDING CODE AMENDMENTS
WILDFIRE ZONE 2 UPDATE
May 12, 2022 at 11:30am
Boulder County Community Planning & Permitting
Virtual meeting via Zoom
Attendee Link: <https://boco.org/BOCC-BORC-22-0001>
REGISTRATION REQUIRED Call-in information:
1-833-568-8864, Webinar ID: 160 358 6830**

STAFF:

Ron Flax, Deputy Director of Community Planning and Permitting / Chief Building Official
/ Secretary to the Boulder County Board of Review Committee

Jim Webster, Wildfire Partners Program Coordinator

Abby Silver, Wildfire Mitigation Specialist

Kyle McCatty, Wildfire Mitigation Specialist

OVERVIEW:

Boulder County is currently divided into two Wildfire Zones. Wildfire Zone 1, which is the mountains / forested portion of Boulder County, and Wildfire Zone 2, which is the plains / grasslands of Boulder County (see Figure R 327.2 below). In response to the many wildfire events in the history of the mountainous/forested portion of Boulder County, the Boulder County Building Code requires comprehensive ignition resistant construction requirements in Wildfire Zone 1. Prior to December 2021, Wildfire Zone 2 historically had relatively few fire events that have resulted in widespread structure losses.

However, the Marshall Fire, which started December 30, 2021 and destroyed and damaged structures on over 200 parcels in Unincorporated Boulder County, compels us to acknowledge that the changing climate, continuing development, and fire becoming a greater risk requires us to update the code to help mitigate some of that risk. The intention of this update is to revise the Boulder County Building Code to ensure a minimum level of ignition resistance for all structures in Wildfire Zone 2.

This update is an urgent matter, which is why it is being addressed as a stand-alone update. Staff are currently engaged in a more in-depth evaluation and examination of this topic as part of the larger code update that involves moving from the 2015 Codes, to the 2021 Codes. This larger update and review will consider requirements for all wildfire zones as well as the