“Reducing Fire Risks as a Community”
Fire Safety Town Hall, Berkeley
May 19, 2022

Sheryl Drinkwater, Architect
Sheryl Drinkwater:

I am a registered architect, and have been practicing in the East Bay for over 25 years.

I am on the board of the Diablo Fire Safe Council -covering Alameda and Contra Costa Counties.

I am a CalOES certified Safety Assessor and have deployed to Sonoma County in 2017 and to Paradise, CA in 2018.
Wildfire risk:

If a fire is coming towards your home like this, GET OUT!

Even with a hardened home, be prepared, have situational awareness and evacuate early.

“Wildfires are inevitable. Does that mean that Wildland Urban-Interface (WUI) fire disasters are inevitable? Fire research has shown that homeowners can create ignition resistant homes to prevent community wildfire disasters. How is this possible?” - Jack Cohen

wildfirereview.com Sept 2020
Paradise: Inspections

When I was in Paradise, we saw a few different outcomes.

We saw a small number of homes that showed no damage. There was minor damage to landscape structures, but these homes fared better because they were built to newer codes and vegetation was not as established.

-Boaz Lane, image from Wash. Post.
Paradise: Inspections

Evergreen trees can survive wildfire. These trees are less vulnerable to embers, but they can ignite from the ground due to ladder fuels (vegetation under trees at the ground).

Tree spacing and the slope of your property are also factors in how fire impacts your home.
Science:

Research shows that the risk to your home is likely (90%) to come from flying embers (fire brands).

*Using science to improve wildfire outcomes – wind blown embers testing in the lab.*

“Home ignitions result from conditions local to a home. A home’s ignition vulnerabilities principally determine home ignitions. This area of the home and its immediate surroundings is called the Home Ignition Zone (HIZ).”

J. Cohen -wildfirertoday.com
The Home Ignition Zones
There are three types of exposures that lead to ignition - flame contact, radiant heat and wind-blown embers. Wind blown embers can ignite your neighbor’s home, other structures and then, in a chain reaction, increase the risk to your home. Annual inspections are important, but you must address your property year round.

Zone 1 — 0 - 5 ft “home ignition zone”
this is the edge of your home - this will be the new code requirement in 2023

Zone 2 — 5 - 30 ft “firebreak zone”

Zone 3 — 30 - 100 ft “reduced fuel zone”

Start with “Zone 1” on your own property:
Remove ladder fuels, dead, over-crowded plants, and organic mulch next to the house.

Reduce dry fuels near structures, fences, and trellises.

Replace flammable or old decks, fences, and gates.
The Home Ignition Zone

Typical Berkeley Hills conditions - most homes are close together

Image: IBHS Defensible Space

Image: Google Imagery 2022
Our homes can be an emotional topic:

Home maintenance & fire risk - How ready are you to take action?

Why doesn’t everyone do enough?

- “It costs too much"
- “I can’t do it myself”
- “I don’t have time”
- “My neighbor isn’t doing anything”
- “There is no deadline”

Can any of you relate to this?

You can take action to give your property the best chance. Reduce your risk (you cannot remove all risk) and make small to large changes to reduce hazards.

Get to know and work with your neighbors - get everyone on board - all ages and abilities have something to offer in helping to create a fire adapted neighborhood.

Check in with your neighbors especially if they are elderly, disabled, or have a medical condition, as their homes can have an impact on the work you do.
Research:
So much data is being collected by CalFire and other agencies on how to improve the survivability of a home.

Homes built after 2008 > 50% received no damage
Hardened Homes Survived Better in the Camp Fire

50% No damage
18% No damage

And the cost to build a new hardened home, according to a recent report, shows that a hardened home is similar to build in cost to a typical home.

Typical home $81k vs. Wildfire resist. $79k
Recent Laws:
California is leading the way in preventative measures:

Two new disclosure laws went into effect in 2021 - a seller must disclose a home’s vulnerability to wildfires.

1. Homes designated as in the **High Fire Severity** zone, and built before 2010, must show any of the structure’s vulnerability to wildfires.

2. Owners must provide documentation stating that the property is in compliance with local laws pertaining to defensible space.
More: wildfiretoday.com/2021/01/07

Proposed new legislation and amendments to existing laws are continuing for new buildings in the Wildland Urban Interface.
Safer from Wildfires in California

1 Protecting the structure
- Class-A Fire rated roof
- Maintain a 5 foot ember resistant zone around a home (including fencing within 5 feet)
- Noncombustible 6 inches at the bottom of exterior walls
- Ember and fire resistant vents (See Low-Cost Retrofit List, and Chapter 7A)
- Upgraded windows (Double paneled or added shutters)
- Enclosed eaves

2 Protecting the immediate surroundings
- Cleared vegetation and debris from under deck
  - Removal of combustible sheds and other outbuildings
  - Material used is cleared of vegetation overgrowth, and evacuation plan contingencies;
  - A distance of 30 feet
- Defensible space compliance (including trimming trees, removal of brush and debris from yard, and compliance with state law and local ordinance)

3 Working together as a community
- A community should have a clearly defined boundary and a local risk assessment in consultation with the local fire district or state fire agency.
- Identified evacuation routes, cleared of vegetative overgrowth, and defensible space zones; with state law and local ordinance.
- A shelter-in-place strategy to ensure all residents are aware of the potential for wildfire, with state law and local ordinance.
- Current examples include the Fire Risk Reduction Community designation under development by the Board of Forestry.
- Firewise USA communities in good standing, and identified evacuation routes, cleared of vegetative overgrowth, and defensible space zones; with state law and local ordinance.

Grant Funds:
California State pilot program for home hardening retrofits

The Wildfire Mitigation Program is a CalOES, Cal Fire and FEMA partnered initiative aimed at strengthening communities by developing a home hardening grant program for property owners to retrofit homes that are in high fire risk areas.

The pilot is currently operating in two California counties.

Insurance Industry:
A new regulation would require insurance companies to factor in all wildfire safety actions taken by a property owner when pricing residential (and commercial) coverage. The regulations also aim to give consumers transparency about their "wildfire risk score" that insurance companies assign to properties.
How to Work with your neighbors

Next are some ideas on how to get started.

“To build a culture of preparedness it’s important to work with the whole community”
-FEMA website

DO-IT-YOURSELF
WILDFIRE PREP
PROJECTS

TALK WITH NEIGHBORS

Wildfire preparedness is a community effort. Get neighbors involved, as their risk is your risk.

disastersafety.org/wildfire
Firewise USA® program

The Firewise program provides a collaborative framework to help neighbors get organized, perform an assessment, and take action to increase the ignition resistance of their homes & community.

FIREWISE USA® SITE OBSERVATIONS AND RECOMMENDATIONS

Use this section to record observations from within your site and recommendations for action that can be included in the site’s action plan. Consider taking photos to keep in your site’s files that illustrate successful risk reduction efforts and areas that need improvement.

Remember, this is a community-wide view and should report on the overall conditions of the entire site. Although individual home risk assessments are not required in this section, they may end up being a recommendation for the Action Plan.

Observations

The observation section is broken down by the characteristics of homes and the vegetation management within the home ignition zones and common areas. Mark the appropriate box for each category that best represents the conditions within your site.

HOME IGGITION ZONES

Home: General building construction. Are the homes made of ignition resistant building materials?

Roofing materials: composite shingles, metal, cement tile and clay

- Greater than 75% of homes have metal, tile, or Class A asphalt or fiberglass shingles
- 50–74% of homes have metal, tile, or Class A asphalt or fiberglass shingles
- 25–50% of homes have metal, tile, or Class A asphalt or fiberglass shingles
- Less than 25% of homes have metal, tile, or Class A asphalt or fiberglass shingles

Soffit vents: a screened vent on the underside component of the eaves that allows air to flow to the attic or the space below roof sheathing

- Greater than 75% of homes have non-combustible soffit vents with mesh or screening
- 50–74% of homes have non-combustible soffit vents with mesh or screening
- 25–50% of homes have non-combustible soffit vents with mesh or screening
- Less than 25% of homes have non-combustible soffit vents with mesh or screening
- Unknown

Siding: stucco, masonry products, plaster, and cement

- Greater than 75% of homes have non-combustible siding
- 50–74% of homes have non-combustible siding
- 25–50% of homes have non-combustible siding
- Less than 25% of homes have non-combustible siding

Skirting: material used around the bottom of homes and sometimes decks to protect the underside from exposure

- Greater than 75% of homes have skirting underneath raised floors/decks
- 50–74% of homes have skirting underneath
- 25–50% of homes have skirting underneath
- Less than 25% of homes have skirting underneath
### Skills Inventory for my Neighborhood

<table>
<thead>
<tr>
<th>Family</th>
<th>Skills</th>
<th>Equipment</th>
<th>CERT classes</th>
<th>Special Need</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>sample</td>
<td>(contractor, nurse)</td>
<td>(i.e. generator, two way radios, tools)</td>
<td>0</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>Mathews</td>
<td>architect, construction, computer skills, basic motor mechanics, animals</td>
<td>camping, tools, emergency prep, water dispenser, 10’ sun shade/tent, emergency radio, wheelbarrow</td>
<td>2</td>
<td>none</td>
<td>2019 CERT Light Search and Rescue, 2020 CERT Disaster Mental Health</td>
</tr>
<tr>
<td>Parker</td>
<td>emergency preparedness training</td>
<td>access to a pickup truck, emergency radio, preparedness supplies</td>
<td>0</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td>Smith</td>
<td>retired, computer skills, Ham radio</td>
<td>windup radio</td>
<td>0</td>
<td>wheelchair</td>
<td></td>
</tr>
<tr>
<td>Hartman</td>
<td>medical, computer skills</td>
<td>basic camping equipment/tools</td>
<td>1</td>
<td>none</td>
<td>1 child, 2018 CERT disaster medical</td>
</tr>
<tr>
<td>Zachary</td>
<td>pet care</td>
<td>wind up radio, ladder, water purifying straw &amp; tablets</td>
<td>1</td>
<td>none</td>
<td>1 dog, 1 cat</td>
</tr>
<tr>
<td>Vedro</td>
<td>carpenter</td>
<td>ladder, tools, camp stove, basic camping gear</td>
<td>0</td>
<td>none</td>
<td>2 indoor cats</td>
</tr>
<tr>
<td>Berman</td>
<td>project management and leadership skills; basic computer skills</td>
<td>ladder, camp stove, basic camping gear, water purifier, wind up radio</td>
<td>0</td>
<td>none</td>
<td>2 children (ages 5 &amp; 8)</td>
</tr>
</tbody>
</table>
Neighbors working together

Group smaller retrofit projects together to create a larger project that is more attractive to a contractor or handyman.

An example would be replacing crawlspace vents and/or attic vents with recommended home-hardened vents or screening.

Vulcan Vent
Neighbors working together

The DFSC Cost Share Assistance Program helps you to work with your neighbors to create a defensible space project for Alameda and Contra Costa County residents.

DFSC receives funding from a variety of sources, so get your application in so you can be added to the list.

www.diablofiresafe.org/veg_removal.html
Home Hardening

New homes vs. retrofitting your home
Home Hardening

Home Components

List:

- Property Maintenance
- Roof Maintenance
- Roof Modifications
- Foundation vents
- Eave vents
- Wall to ground or deck
- Fences
- Windows & Skylights
- Roof Replacement
- Siding
- Decks

Home in the Berkeley Hills
Home Hardening

The EASY stuff!

Cost Tier 1

- Have situational awareness & be aware of Red Flag Warnings
- Sign up for AC Alerts in Alameda County
- Clear items around your home & remove debris from your property
- Make your property inviting to firefighters, by keeping paths clear
- Install new 4” high-visibility address signage
- Make small repairs to your home & garage
- Connect long hoses to hose spigots around the home
Home Hardening

The DIY or hire a helper stuff!

Cost Tier 2

- Make repairs to your roof, fence and deck before “fire season”
- Seal small cracks or openings in walls
- Screen foundation vents
- Screen or replace your roof eaves
- Replace vulnerably located siding with ignition resistant material
- Trim tree branches away from your roof
If your home is in Fire Zone 2 & 3, you may be required to make some of these changes if you apply for a building permit.

Home Hardening

The larger retrofit projects that harden your home!

Cost Tier 3

• Replace windows and skylights with dual-paned and tempered glass
• Replace the entire roof with an approved ‘Class A’ roof
• Replace siding with ignition resistant materials
• Replace your deck with ignition resistant materials
• Install a fire suppression system
You will become an expert in home inspection. Clear vegetation and other flammable materials away from your home, fix windows, make vent repairs.

“Some owners in Paradise even ripped the gutters off their houses to remove leaf litter before they evacuated.”

EMBERS are insidious, consider how they can enter your home.
Roof Maintenance

Remove debris from your roof.
Clean gutters and clear skylights.
Make repairs to roofing materials.
Cut back tree canopies.

This dry material can be ignited by window-blown embers.
Roof Modifications

Remove debris from roof valleys. If fuel is exposed long enough, it can burn through to the attic.

Add sheet metal flashing or replace with a fiber cement siding at roof to wall connection.

“Replacing siding ‘locally,’ in areas where it meets the roof, such as that shown here (a complex roof), would be more affordable than ‘global’ replacement.”

-Stephen L. Quarles

Insurance Institute for Business & Home Safety (IBHS)
**Home Hardening 2**

**Foundation vents**

Screen foundation vents or use approved venting products designed to catch embers before they enter your crawlspace.

Brandguard fire safety vent

Vulcan products have a baffle with an intumescent coating (expands when exposed to heat) to further prevent embers from entering.

Typical screened foundation vent

Fire screened foundation vent
**Home Hardening 2**

Eave Vents can make your home vulnerable to wind blown embers. Screen open eave vents with wire mesh. Or retrofit your eave with a closed soffit to prevent embers from entering your attic.

1/16"-1/8" is the current recommendation (1/4" was to prevent critters from entering)

Vents are designed to create air flow and remove moisture above and below your living space, but they can draw airborne embers inside and ignite combustible material.

Walk around your home & garage and repair or fill any openings with waterproof caulk - Look at the trim, siding, vents, utility penetrations and hose bibs for gaps.
**Home Hardening 2**

Wall/horizontal connection

Add sheet metal flashing or replace with a fiber cement siding at the lowest course (row) of siding.

New foundations are required to have a 6” exposed height of concrete at the bottom.

Treat this first 6” as a vertical part of the non-combustible zone.

This can be an attractive upgrade when painted to match combustible siding. Can you see the difference?
**Home Hardening 2**

Fences

The best practice is to use non-combustible fence materials.

A more open design makes it difficult for wind-blown embers to accumulate at the bottom of the panels and posts.

Keep fence clear of debris.

https://www.firesafemarin.org/home-hardening/fences
Another option is to separate your fence from your house, or make the last 5-feet of the fence a noncombustible material to reduce the chance of the fence bringing fire to your home.

For gates, use non-wood gate posts and hinge the gate on the opposite side of your home. When you evacuate, leave the gate open. It creates a disconnect from your home and also makes it safer for firefighters to enter your property.
Home Hardening 2
Dual Pane windows & skylights

Vinyl windows and single pane glass are the most vulnerable and can fail.

Options:
Good: dual pane windows
Better: dual pane and tempered glass or laminated glass
Extra: exterior metal window shutters

Many window products are now clad on the outside with metal or fiberglass.

These window upgrades all buy you time (and also save on energy costs).

New skylights in the WUI are required to have 1/8” metal mesh screens.
Home Hardening 2
Roof Replacement

A ‘Class A’ rated roof is required for new roofs in the WUI. There are many options depending on the style of your home or your budget.

Examples of ‘Class A’ roofs:
Concrete and clay roof tiles, approved metal roofs, fiberglass asphalt composition shingles (aka comp shingle roof).

A wood shake or shingle roof (even if treated) is not allowed for new roofs in many CA communities.
Home Hardening 2
Siding

Fiber Cement Siding resists moisture, pests and will not ignite when exposed to direct flame. Fire can burn (untreated) wood and melt vinyl siding products. It is the ability of the wall assembly to confine a fire, so siding material is an important factor in the protection of you and your home. Again this buys you time.

Post-fire effect on siding.

Boral - True Exterior is a newer product made from fly-ash & polymer composites.

Both of these siding materials can still transfer heat or burn if exposed to direct flame.
A **stucco** clad home, if maintained, will not ignite. It can provide a one-hour fire rating if applied in three layers over a reinforcing mesh, to create a 1-inch thick wall assembly.
Decks should be clear of debris and dead vegetation.

A deck is vulnerable from above and below. Long term exposure to embers can risk ignition of the siding of the home, and can spread to other areas of the structure.

Do not store flammable materials under a deck or porch.
Home Hardening 2
Deck Materials

Most deck boards are combustible. Here are some examples of ember resistant decks and approved decking products.

- Moso Bamboo X-treme
- Fire retardant, waterproof membrane decking (w/ metal lath) - Class A rating
- Built-up Deck
  - fire retardant plywood
  - waterproof membrane
  - drainage mat
- Trex decking
Home Hardening
Now it’s time to make a plan - start with the small stuff!

Fire hardening IS about making the right choices

Talk with your neighbors.
Try to work together.
Home Hardening

Resources

Oakland Community Preparedness & Response

ASSESSMENT CHECKLIST & RESPONSE
HOME HARDENING FOR WILDFIRE

Take a walk around the outsides of your home and answer all of the questions below that apply. Determine what needs work and prioritize projects around preparing your home to be more fire-resistant. "Remember the Ember" – top priorities should be near-home vegetation, roof, vents and gutters.

NEAR-HOME VEGETATION and combustible mulch immediately around your home and under windows, eaves, and vents can ignite and provide a way for fire to enter the home:

- Is the 5-foot zone around your home and deck free of flammable vegetation and all combustibles such as much, juniperus, floor door mats, dry leaves, pine needles, firewood, etc.? □ good □ needs work
- In order to break up fuel, is there recommended space between plants and between the ground and the lower branches of trees? □ good □ needs work
- Are grasses kept to a height of 4 inches or less? □ good □ needs work

THE ROOF has the greatest exposure to embers and is the most vulnerable part of a home:

- Is the roof covering composed of approved fire-rated material, such as metal, tile or asphalt composition shingles? □ good □ needs work
- Are there any damaged areas needing repair or replacement? □ good □ needs work
- Is the roof, especially crevices around chimneys, skylights and architectural elements, clear of flammable debris? □ good □ needs work
- Are there any gaps at the edges of the roofing that can be filed? □ good □ needs work
- Are end tiles blocked (with metal mesh or steel wool, for example) to prevent bird nesting? □ good □ needs work

VENTS can allow embers to enter to a crawl space or the attic:

- Are all vents covered with 1/8-inch metal mesh, or are special vents approved to resist embers and flames installed? □ good □ needs work

RAIN GUTTERS should be cleared of leaves and needles that embers can easily ignite:

- Are the gutters clear of all flammable debris? □ good □ needs work
- Do the gutters have metal screens/covers in good condition? □ good □ needs work

EAVES & SOFFITS with open-eave construction should be inspected:

- Wherever possible, are open eaves enclosed? □ good □ needs work
- Have gaps around exposed rafters and blocking been caulked and plugged? □ good □ needs work

CHIMNEY:

- Are all chimney and stovepipe outlets covered with non-combustible metal screens/spark arresters in good condition? □ good □ needs work

WINDOWS can break from heat, even before a home ignites, allowing embers or floods to enter:

- Are all windows double-pane, tempered glass? □ good □ needs work
- Is outside flammable vegetation or other combustible materials cleared from within 5 feet of windows and glass doors? □ good □ needs work

SIDING is vulnerable if exposed to flames or radiant heat for periods of time:

- Have all gaps and joints been caulked and plugged? □ good □ needs work
- Is there 6 inches or more of vertical noncombustible material maintained between the ground and the start of the siding? □ good □ needs work
- Has stingle or shake siding been replaced with ignition-resistant materials such as fiber cement or stucco? □ good □ needs work
- Is the dryer vent cover noncombustible and either louvered or self-closing? □ good □ needs work

DECKS are vulnerable to fires from embers igniting nearby vegetation or materials above/below:

- Are all combustible items removed from underneath, on top of and next to all decks and porches? □ good □ needs work
- Is there a noncombustible layer between wood decks and siding? □ good □ needs work
- Are under-deck and porch areas screened in with wire mesh? □ good □ needs work

GARAGES are especially vulnerable to embers as they can enter a garage as easily as dust, and attached garages can potentially ignite a house from the inside:

- Is there weather stripping or gaskets around and under the garage door to limit ember entry? □ good □ needs work
- Are all combustible and flammable liquids stored in approved containers and away from ignition sources? □ good □ needs work
- Can you easily open the garage door when there’s no power? □ good □ needs work

FENCES can burn right up to a structure and quickly ignite:

- Do fences or gates that connect to structures have noncombustible materials such as brick or metal within 5 feet of the building? □ good □ needs work
- As specified in Oakland's Fire Code, is all hazardous vegetation maintained within 10 feet from any combustible fences? □ good □ needs work

OCP&R is a program of the Oakland Fire Safe Council

Contact OCP&R for more information and assistance with assessing your home for wildfire hardening:

www.oaklandcpandr.org | 510.575.0916 | info@oaklandcpandr.org

www.oaklandcpandr.org/guides/
Home Hardening

Here are links to some good resources:

Insurance Business & Home Safety-
www.iafc.org/topics-and-tools/resources/resource/ibhs-wildfire-checklist

CalFire Prepare for Wildfire-
www.readyforwildfire.org/prepare-for-wildfire/get-ready/

University of CA Cooperative Extension-
www.ucanr.edu/sites/fire/Prepare/Building/

USDA Forest Service-
www.wildfirerisk.org/reduce-risk/home-hardening/

Sustainable Defensible Space (Eco)-
www.defensiblespace.org/house/

Questions or home visit?
Please email me

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