

Fire Free Five Code Adoption



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Reducing Structural Ignitability in High Density Areas



2019 the Institute for Business and Home Safety (IBHS) did a side-by-side comparison of structural ignitability. Photo on the left shows ignition of organic mulch which ignites structure vs. structure with Fire Free Five and ignition resistant construction.

Photo showing structure to structure fire loss.



Reducing Structural Ignitability in High Density Areas

- March 2022 the National Institute of Standards and Technology (NIST) released “**WUI Structure/Parcel/Community Fire Hazard Mitigation Methodology**” which provides detailed mythology to reduce structure loss from wildfire in the WUI
- Report clearly identifies shared risk between structures in high density development (less than 30 feet separation) and provides specific recommendations for mitigations to reduce the shared risk
- 62% of all structures within Vail are built within 30 feet of the nearest structure. This measurement is exclusive of all flammable attachments and landscaping between buildings.

Table 3. Structure and parcel hardening effectiveness.

#	WUI Type	Probability of Structure Survivability if Neighboring Structure Ignites	Potential Fire ^a Exposure from Burning Neighboring Structure	Exposure from Other Parcel Fuels	Exposure ^b from Wildlands	Impact of Structure Ignition on Fire spread in Community	Likely Effectiveness of Partial Structure/ Parcel Hardening	Community/ Neighborhood Participation
1	HD Interface – Perimeter	Low	High	$f(\text{fuels, dist.})^c$	Variable	High	Low	Necessary
2	HD Interface – Interior	Low	High	$f(\text{fuels, dist.})^c$	Low	High	Low	Necessary
3	MD Interface – Perimeter	$f(\text{hardening})$	Moderate	$f(\text{fuels, dist.})^e$	Variable	Moderate	$f(\text{wildland fuels, parcel fuels})$	Desired
4	MD Interface – Interior	$f(\text{hardening})$	Moderate	$f(\text{fuels, dist.})^e$	Low	Moderate	$f(\text{parcel fuels})^d$	Desired
5	MD Intermix	$f(\text{hardening})$	Moderate	$f(\text{fuels, dist.})^e$	Variable	Moderate	$f(\text{wildland fuels, parcel fuels})$	Desired
6	LD Interface	$f(\text{hardening})$	Low	$f(\text{fuels, dist.})^e$	Variable	Low ^f	$f(\text{parcel fuels})$	Desired
7	LD Intermix	$f(\text{hardening})$	Low	$f(\text{fuels, dist.})^e$	Variable	Low ^f	$f(\text{parcel fuels})$	Desired

HD = high density, MD = medium density, LD = low density

$f(X)$ indicates “a function of X ” (e.g., the level of exposure from other parcel fuels is a function of the fuels and distance from the target structure)

^a flames and radiation

^b based on fire history, fuel loading, wind, and topography/aspect; wildland fuel treatments may not be at the control of the community

^c parcel-level mitigation will have limited impact if nearby upwind structures catch on fire

^d would be a function of wildland fuel treatment AND hardening of most/all perimeter structures and parcels

^e parcel-level mitigation, including wildland fuel treatment, together with home hardening, will enhance structure ignition resistance

^f ignitions due to embers from burning residential structures have been observed as far as 200 ft to 300 ft downwind

Mandatory 5' non-combustible zone around all buildings- Fire Free Five

- Each building shall create a zone of non-combustible materials that extends from the foundation wall or attachment out five feet.
- Within this area allowable landscaping would include:
 - Hardscaping such as on-grade patios, walkways, driveways, etc.
 - Non-combustible mulch
 - Well maintained and irrigated lawn
 - Perennial flower beds
 - Perennial ground cover
- Trees planted outside the 5' zone that hang over into the zone must be limbed up to a height of 6' or 1/3 the total height whichever is less and must be trimmed to leave at least a 2' gap between the nearest branch and the building.
- Code amendments since last presentation
 - Heritage trees, evergreens >12" DBH and 40' tall and aspens >8" DBH, regardless of location may be exempted from the requirements of this code.
 - Emphasis has been placed on avoiding the removal of trees during nesting periods of migratory birds. If necessary, abatement action will be deferred until after the nesting period to protect bird populations.

Fire Free Five Implementation

- Between 2017 and 2021 every property in Vail had a curbside wildfire evaluation completed
 - Results were shared with each individual property owner
 - 79% of properties evaluated did not meet recommendations for the Fire Free Five
- Adoption of fire free five ordinance in 2022 and begin enforcement in 2025
- Re-evaluate every property over the next 3 years using same process previously used
 - Educational information describing compliance options will be provided to each owner
 - Time will also be used to further develop resources to assist property owners comply with ordinance
- Beginning in 2025 properties will be inspected on a rotating basis.
 - Properties not in compliance will be provided with written notice. The emphasis will be to gain voluntary compliance.
 - In cases where voluntary compliance is not achieved, the case may be referred to the Vail Municipal Court.
 - Mitigation actions may be mandated by the municipal court.

Conclusions

- Community participation is necessary in high-density communities. This is due to the disproportionate impact of a single structure ignition on the community.
- Fire Free Five is the most critical component of a properties defensible space and can be implemented by affecting the smallest area of the parcel
- Conclusive evidence demonstrates the importance of community wide implementation of defensible space and structure hardening
 - Successes such as the lack of structure loss or damage during the 2021 Caldor Fire in the Lake Tahoe Basin show that even in the face of extreme wildfire conditions community wide implementation can have positive impacts.

Why Now?

- Altered fire environment-climate change-persistent drought
- Community-wide risk requires community-wide solution
- Low acceptance of voluntary recommendations



Actions Since Introduction of Ordinance No. 2

- Received community input and continued to interact with community members regarding the Fire Free Five
- Creation of Fire Free Five Community Assistance Program (pending TC approval)
- Modifications made to Ordinance No. 2 based upon Town Council and public input:
 - Expands potential “heritage tree” exemption to areas outside Village areas and specifically identifies the ability of aspen trees to be considered “heritage trees”
 - Provides accommodation for nesting birds
 - Specifies that Ordinance No. 2 is not effective until 2025

Questions for Staff?