



## Flood Hazard Elevation and Siting Criteria for Community Safe Rooms

*It is critical to consider flood hazards when designing a safe room. FEMA cannot fund and does not support placing safe rooms where floodwaters could endanger occupants.*

Safe rooms should be located in areas at low risk of flooding. Floodwater pressures acting on a structure are strongly influenced by the location of the structure relative to the flood source. The information provided in this Quick Guide is based on criteria from FEMA P-361<sup>1</sup>

### Community Safe Room Elevation

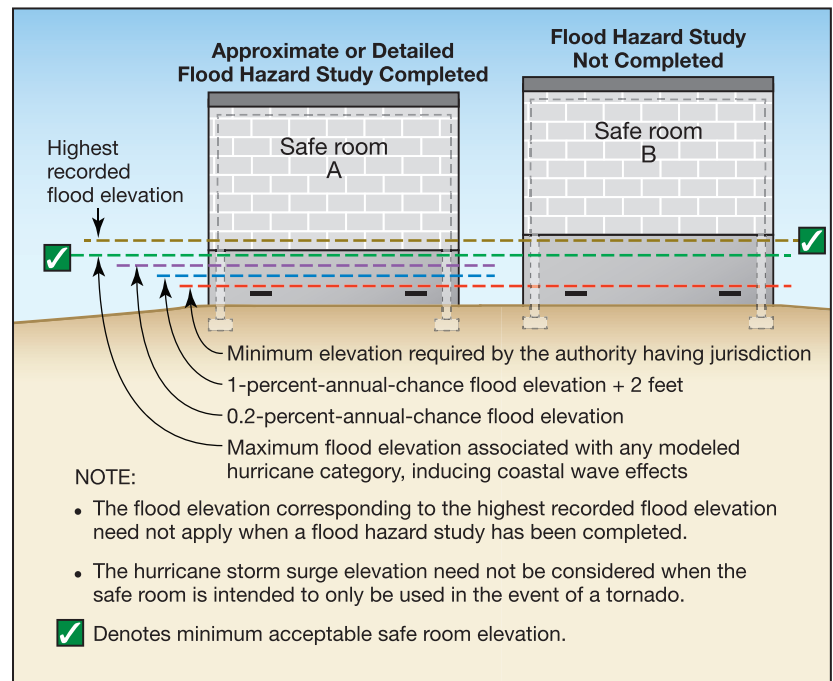
The lowest floor used for the occupied safe room and occupant support areas of a community safe room should be elevated to or above the higher of the elevations determined by:

1. The flood elevation, including coastal wave effects, having a 0.2-percent-annual chance of being equaled or exceeded in any given year;<sup>2</sup> or
2. The flood elevation corresponding to the highest recorded flood elevation if a flood hazard study has not been conducted for the area; or
3. The maximum flood elevation associated with any modeled hurricane category, including coastal wave effects; or
4. The minimum elevation of the lowest floor required by the authority having jurisdiction for the location where the safe room is installed; or
5. Two feet above the flood elevation having a 1-percent-annual chance of being equaled or exceeded in any given year.<sup>2</sup>

Community safe rooms designed, constructed, and designated solely for use as a tornado safe room do not need to consider Item 3 when determining the minimum required elevation. Figure 1 shows examples of how to determine the minimum elevation for a safe room floor. The difference between the two safe rooms is that the one on the left (A) is in an area where a flood hazard study has been completed and the one on the right (B) is not.

For safe room A, the maximum flood elevation associated with any modeled hurricane category, including coastal wave effects, will be the minimum elevation used because Item 2 does not apply when a flood hazard study has been completed. Therefore, the lowest floor of safe room A should be at or above the maximum flood elevation associated with any modeled hurricane category, including coastal wave effects.

The lowest floor of safe room B should be at or above the higher of a) the highest recorded flood elevation, or b) the elevation associated with any modeled hurricane category. In this example, the highest recorded flood elevation is higher so the safe room should be elevated to or above that elevation. In another situation, however, the modeled hurricane category elevation could be higher and would therefore be the minimum elevation.



**Figure 1. The elevation of a safe room floor should be at or above the highest applicable flood elevation**

**COMMUNITY SAFE ROOM:** Any safe room not defined as residential.

**RESIDENTIAL SAFE ROOM:** A safe room serving occupants of dwelling units and having an occupant load not exceeding 16 persons.

<sup>1</sup> FEMA P-361, *Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms*. FEMA Building Science publications provide criteria based on code recommendations and post-disaster field observations, but do not regulate or set standards in building codes. A link to the most current version is provided at the end of this Quick Guide.

<sup>2</sup> Where an approximate or detailed flood hazard study has been completed but the 1-percent- and/or 0.2-percent-annual-chance flood elevations have not been determined, those elevations should be obtained from the authority having jurisdiction or determined in accordance with accepted hydrologic and hydraulic engineering practices used to define Special Flood Hazard Areas.

## Community Safe Room Siting

Community safe rooms should be located outside of the following high-risk flood hazard areas:

1. Flood hazard areas subject to high velocity wave action (Zone V) and Coastal A Zones;<sup>3</sup>
2. Floodways.

Community safe rooms may be located within Zone V and Coastal A Zones<sup>4</sup> where permitted by the Board of Appeals in accordance with the provisions of the International Building Code and after completing the 8-step Decision Process for Executive Order (EO) 11988, as amended, and as provided by Title 44 of the Code of Federal Regulations Part 9.6, Decision-Making Process. Figure 2 shows examples of community safe room locations that FEMA considers acceptable or unacceptable. This figure illustrates high risk flood zones as reflected on a typical Flood Insurance Rate Map. A typical riverine cross section and shoreline transect shown in Figure 3 denote the stillwater and wave crest elevations associated with the flood zones shown in Figure 2.



Figure 2. Acceptable community safe room locations, assuming that elevation requirements are met

### FLOOD FREQUENCIES/ELEVATIONS:

0.2-percent-annual-chance flood event = 500-year flood event  
 1-percent-annual-chance flood event = 100-year flood event →  
 base flood elevation (BFE)

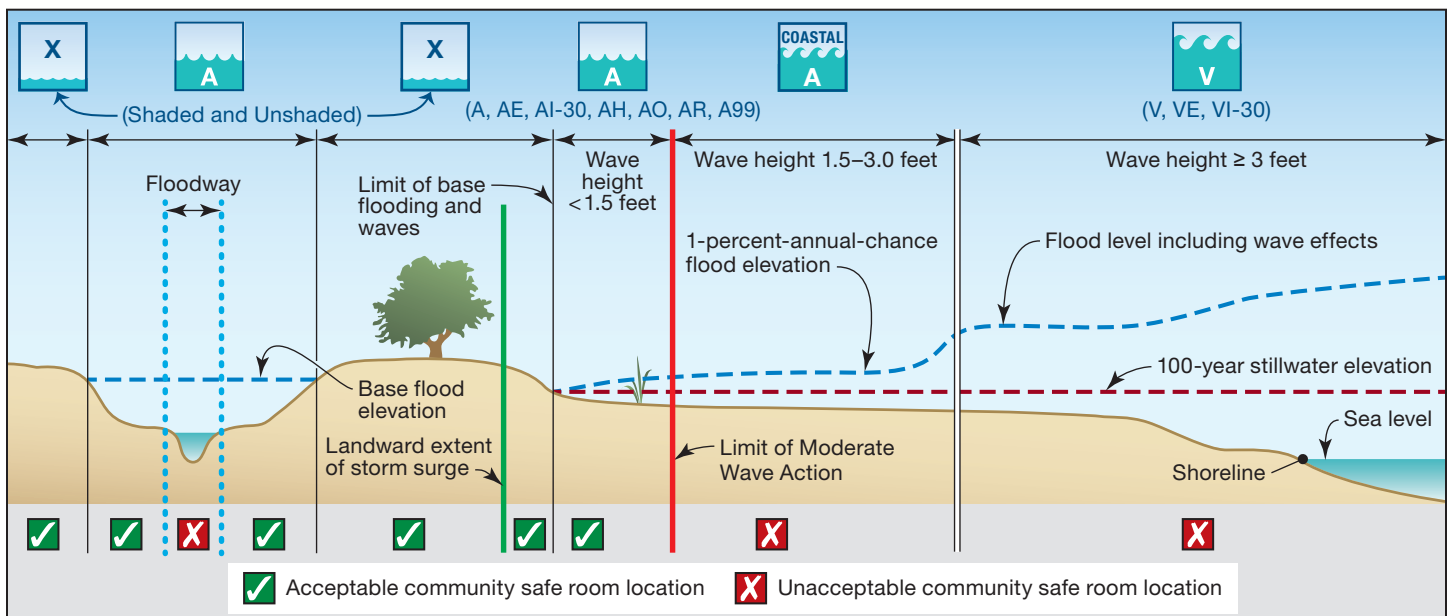


Figure 3. Typical riverine cross section and shoreline transect showing stillwater and wave crest elevations and associated flood zones

## Resources

- A free copy of FEMA P-361 can be downloaded or ordered from <http://www.fema.gov/media-library/assets/documents/3140>.
- A free copy of FEMA P-320 can be downloaded or ordered from <http://www.fema.gov/media-library/assets/documents/2009>.
- A copy of International Code Council (ICC) 500, *Standard for the Design and Construction of Storm Shelters*, can be purchased and subsequently downloaded from <http://shop.iccsafe.org/standards/icc-standards.html?p=1>.
- If you have additional questions pertaining to FEMA safe room guidance publications, please email the Safe Room Helpline at [Saferoom@fema.dhs.gov](mailto:Saferoom@fema.dhs.gov).
- More information on the National Flood Insurance Program and flood hazard mapping can be found at <https://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping>.

<sup>3</sup> Coastal A Zones are defined as the area landward of a Zone V or landward of an open coast without mapped Zone Vs. The inland limit of the Coastal A Zone is the Limit of Moderate Wave Action if delineated on a Flood Insurance Rate Map, or designated by the authority having jurisdiction.