



Federal Insurance and Mitigation Administration

Critical Facilities and Higher Standards

Even a slight chance of flooding can pose too great a threat to the delivery of services offered by the maintenance and operation of a community's critical facilities. Special consideration when formulating higher regulatory standards and floodplain management plans needs to occur when critical facilities are involved.

Identifying Critical Facilities

A critical facility provides services and functions essential to a community, especially during and after a disaster. Examples of critical facilities requiring special consideration include:

- Police stations, fire stations, critical vehicle and equipment storage facilities, and emergency operations centers needed for flood response activities before, during, and after a flood
- Medical facilities, including hospitals, nursing homes, blood banks, and health care facilities (including those storing vital medical records) likely to have occupants who may not be sufficiently mobile to avoid injury or death during a flood
- Schools and day care centers, especially if designated as shelters or evacuation centers (see Figure 1 for an example of an elevated school)
- Power generating stations and other public and private utility facilities vital to maintaining or restoring normal services to flooded areas before, during, and after a flood
- Drinking water and wastewater treatment plants
- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic, and/or water-reactive materials

Protecting Critical Facilities

For a critical facility to function, building systems and equipment must remain operational. Furthermore, it must be supplied with essential utilities (typically power, water, waste disposal, and communications, but occasionally natural gas and steam). The loss of municipal utilities has prevented some critical facilities from functioning during and immediately after major floods, and in some cases, loss of municipal water and



Figure 1: School elevated on columns

waste disposal has prevented facilities from operating for weeks after an event.

If at all possible, critical facilities should be located outside all high-risk flood hazard areas, including Zones V and A. Some communities do not permit critical or hazardous facilities or uses in the Coastal High Hazard Area (Zone V), the entire Special Flood Hazard Area (SFHA, or 1-percent-annual-chance flood hazard area), or the 0.2-percent-annual-chance flood hazard area (see Figure 2). If a critical facility must be located in a high-risk flood hazard area, it should be designed to higher protection standards and have flood evacuation plans.

Fire prevention, evacuation, and rescue operations are common emergency response activities associated with flooding. The effectiveness and success of these efforts depend on readily available access for emergency vehicles. However, streets and roads are usually the first to be inundated in the event of a flood.

What is Freeboard?

"Freeboard" is a factor of safety usually expressed in feet above a certain flood level, and is often applied to critical facilities. Freeboard (commonly 1-3 additional feet) compensates for the many unknown factors that could contribute to how high flood waters can rise, such as wave action, constricted bridge openings, and the hydrological effect of urbanization in the watershed.

To ensure vehicle access, some communities require all roads and other access to critical facilities be elevated to or above the base flood elevation (BFE), which is the elevation of the 1-percent-annual-chance event. Some require elevation of access routes to 1 foot or more above the BFE so fire and rescue equipment can travel safely during floods.

Federal Regulations and Critical Facilities



Figure 2: Example of a fire station above the 0.2-percent-annual-chance flood elevation that had only minimal cleanup after a storm

According to Executive Order 11988, *Floodplain Management*, Federal agencies must conduct rigorous alternative site evaluations and meet higher design standards before funding, leasing, or building critical facilities in the 0.2-percent-annual-chance flood hazard area.

Flood Insurance Implications

The Community Rating System (CRS) provides credits to communities that prohibit critical facilities in the 0.2-percent-annual-chance flood hazard area or require them to be protected from damage by the 0.2-percent-annual-chance flood in CRS Activity 430. See the *CRS Coordinator's Manual* and the *CRS Application*. See *CRS Credit for Higher Regulatory Standards* for example regulatory language.

Recommendations

Flood effects on essential systems and equipment can destroy a facility's ability to function and can prevent the facility from serving its community when it is needed most. To improve building performance, building owners,

building operators, and key decision makers should assess critical equipment, critical systems, and critical functions of existing critical facilities to identify vulnerabilities and associated possible hazard mitigation measures. Those mitigation measures should be incorporated whenever damaged facilities are repaired or reconstructed.

New construction should abide by the most current standards and should incorporate recommended freeboard if possible. By building or creating robust critical facilities that remain operational during and after a disaster, people's lives and the community's vitality can be better preserved and protected.

FOR MORE INFORMATION

FEMA's Floodplain Management Branch

Defines floodplain management and its role in the NFIP: <http://www.fema.gov/fpm>

Design Guide for Improving Critical Facility Safety from Flooding and High Winds: Providing Protection to People and Buildings (FEMA 543)

This guide provides guidelines for implementing a variety of mitigation measures to reduce the vulnerability to damage and disruption of operations. <http://www.fema.gov/media-library/assets/documents/8811?id=2441>

Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds: Providing Protection to People and Buildings (FEMA 577)

This guide provides state-of-the-art knowledge on the variety of vulnerabilities faced by hospitals, as well as the best ways to mitigate risks. <http://www.fema.gov/media-library/assets/documents/10672?id=2739>

Reducing Flood Effects in Critical Facilities (FEMA, Recovery Advisory 2, April 2013)

http://www.fema.gov/media-library-data/1381404651877-881a2cf70a90ac63b9c067100ffccace/SandyRA2CriticalFacilities_508_FINAL2.pdf

FloodSmart

Information for consumers about flood insurance and the NFIP: www.FloodSmart.gov