

# Use of Fill in the Flood Hazard Area

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## **Floodplain Management Requirements (FEMA-480) (page 5-28)**

Where fill is the method of choice, it should be properly designed, installed in layers and compacted. Simply adding dirt to the building site may result in differential settling over time.

The fill should also be properly sloped and protected from erosion and scour during the flooding. To provide a factor of safety for the building and its residents, it is recommended that the fill extend 10-15 feet beyond the walls of the building before it drops below BFE.

## **FEMA Technical Bulletin 10-01 Ensuring that Structures Built on Fill In or Near Special Flood Hazard Areas are Reasonably Safe from Flooding, Placement of Fill (page 5)**

Properly placing fill requires an understanding of soil mechanics, local site conditions, and the specific characteristics of the soils being placed, the methods used to place and compact fill, and soil testing procedures. Standard engineering and soil mechanics texts cover these subjects in detail. The performance of these filled areas should consider, but is not limited to, the following:

- the consolidation of the fill layers and any underlying layers
- the effect of this consolidation on either excessive settlement or differential settlement
- how the permeability of the soils affects water infiltration on any structures built on the site.

## **ASCE 24-14 Flood Resistant Design and Construction**

### **2.2 Development in Floodways**

Structures and fill shall not be constructed or placed in floodways unless it is demonstrated that those structures and fill will not (1) increase the flood level during occurrence of the base flood discharge, and (2) reduce the conveyance of the floodway.

If the design flood elevation has been determined and a floodway has not been designated, structures and fill shall not be constructed or placed unless it has been demonstrated that the cumulative effect of proposed structures and fill, combined with all other existing development, will not increase the base flood elevation more than one foot.

#### **2.4.1. Structural Fill**

Structural fill shall not be used unless design and construction of the structural fill accounts for (1) consolidation of the underlying soil under the weight of the fill and the structure, (2) differential settlement due to variations in fill composition and characteristics, and (3) slope stability and erosion control during conditions of the design flood.

Fill used for structural support or protection shall be suitable for its intended use. Structural fill used to support or protect a structure shall be placed in lifts of not more than 12-inch loose thickness, with each lift compacted to at least 95% of its maximum standard proctor density (ASTM2012f) or 90% of its maximum modified proctor density (ASTM2012e), unless otherwise required by the building code or specified in a geotechnical investigation report or a soils engineering report prepared by a qualified registered design professional and approved by the authority having jurisdiction.

The side slopes of structural fill shall be no steeper than 1 on 1.5 (vertical/horizontal). Structural fill, including side slopes, shall be protected from erosion under flood conditions up to and including the design flood.

## **Coastal High Hazard Areas (V Zones) and Coastal A Zones**

### **4.5.4. Use of Fill**

Fill material used for structural support shall not be permitted in Coastal High Hazard Areas (and coastal A Zones if your community has adopted the ICC building codes). Placement of non-structural fill for minimal site grading and landscaping and to meet local drainage requirements shall be permitted. Placement of nonstructural fill under and around a structure for dune construction or reconstruction shall be permitted if an engineering reports documents that the fill will not result in wave run-up, ramping, or deflection of floodwaters that cause damage to structures.