an analysis indicates the rates of rise and fall are less than 5 ft/h, the total net area of the required openings shall remain the same or shall be decreased to account for the lower rates of rise and fall; and

7. The minimum total net area of the required openings in non-breakaway enclosure walls shall be calculated using the equation:

$$A_o = 0.033\ (1/c)(R)(A_e)$$

where

A_o = the total net area of openings required ($in.^2$);
0.033 = coefficient ($in.^2 \cdot h/ft^3$) corresponding to a factor of safety of 5.0;
c = opening coefficient of discharge given in Table 2-2;
R = worst case rate of rise and fall (ft/h); and
A_e = the total enclosed area (ft^2).

3.0 HIGH RISK FLOOD HAZARD AREAS

3.1 SCOPE

The requirements of Section 3 shall apply to new construction and substantial improvements in High Risk Flood Hazard Areas subject to one or more of the following hazards: alluvial fan flooding, flash floods, mudslides, erosion, high velocity flows, high velocity wave action, breaking wave heights greater or equal to 1.5 ft (Coastal High Hazard Area and Coastal A Zone) and damage-causing ice or debris. In addition to the requirements of Section 3, the basic requirements of Section 2 shall apply to High Risk Flood Hazard Areas other than Coastal High Hazard Areas and Coastal A Zones.

Table 2-2. Flood Opening Coefficient of Discharge

Opening Shape and Condition	c
Circular, unobstructed during design flood	0.60
Rectangular, long axis horizontal, short axis vertical, unobstructed during design flood	0.40[a]
Square, unobstructed during design flood	0.35
Rectangular, short axis horizontal, long axis vertical, unobstructed during design flood	0.25[b]
Other shapes, unobstructed during design flood	0.30

[a] When the horizontal dimension is twice or more the vertical dimension, use 0.4; as the dimensions approach a square, interpolate from 0.4 to 0.35.

[b] When the horizontal dimension is half or less the vertical dimension, use 0.25; as the dimensions approach a square, interpolate from 0.25 to 0.35.

3.2 ALLUVIAL FAN AREAS

Structures shall not be constructed at the apex of an alluvial fan and in the fan's meandering flow paths. Construction in other areas of the alluvial fan shall meet the following requirements:

1. The elevation of the lowest floor shall be a minimum of 1 ft above the highest adjacent grade, or higher, if required on a community's flood hazard map;
2. Foundations shall be designed and constructed to resist scour caused by the actual flow velocity but not less than 5 ft/sec. Determination of actual flow velocities shall be based on a review of a community's flood hazard map and flood hazard study or on hydraulic calculations; and
3. Design and construction shall resist all load combinations specified in Section 1.6.2.

3.2.1 Protective Works in Alluvial Fan Areas

Structures shall not be allowed in alluvial fan areas unless protective works (whole alluvial fan flood damage reduction project) have been designed and constructed:

1. To safely pass the design flood at the apex, within the capacity of the constructed channel(s);
2. Such that it does not divert flood flows and debris toward other structures, nor increase flood velocities and depths elsewhere on the alluvial fan; and
3. Such construction satisfies the requirements of Section 1.4.2, and a maintenance and operations plan for the protective works is provided.

3.3 FLASH FLOOD AREAS

Structures shall not be constructed in areas subject to flash flooding equal to or less than design flood conditions.

Areas suspected of being subject to flash floods shall be investigated to obtain historical information on past events. The investigation shall also include analysis of historic rainfall and runoff data for the watershed. Results of such analyses shall be documented in an engineering report, which defines the methodology and data used to conclude whether the area in question has the potential for flash flooding.