



Federal Emergency Management Agency (FEMA)

National Flood Insurance Program (NFIP)

Summary of Managing Floodplain Development in Zone A Areas

The following is a summary of how to manage floodplain development in Zone A areas that do not include a Base Flood Elevation (BFE). The BFE is the height above sea level to which flood water would be expected to rise in a base, or 100-year flood event. The contents of this summary were taken from the Federal Emergency Management Agency's (FEMA) *Managing Floodplain Development in Approximate Zone A Areas: A Guide for Obtaining and Developing Base (100-Year) Flood Elevations* (FEMA 265/July 1995), which is available on-line at www.fema.gov/plan/prevent/fhm/dl_zonea.shtm. The page number references below refer to this document where more detailed information can be found. The *italic* text references the minimum National Flood Insurance Program (NFIP) requirements contained in the floodplain ordinance of a community participating in the NFIP and detailed in the Code of Federal Regulations (CFR).

What are Zone A areas and why don't they have BFE data?

Floodplain maps (Flood Hazard Boundary Maps) that were prepared in the 1970s for communities with identified flood hazard areas were based on available floodplain data contained in reports developed by a variety of Federal, State, and local sources. When no available flood information was available, approximate hydrologic and hydraulic methods or historical flood data were used to determine the extent of the special flood hazard areas. Detailed hydrologic and hydraulic analyses were used to develop BFEs and designate floodways and risk zones and were included in a community's Flood Insurance Study (FIS).

In the early 1970s, FEMA recognized that some communities did not require a detailed FIS because there were few existing buildings in the floodplain and minimal development pressure. Therefore, today, there are still communities that still do not have an FIS since FEMA only provides BFEs for the floodplains of those flooding sources that are currently subject to development pressure or are to be subject to development pressures during the immediate future. Most other communities have a combination of special flood hazard areas that both have BFE data and do not have BFE data.

Sources of Base Flood Elevations/Best Available Data

Obtain, review and reasonably utilize any base flood elevation and floodway data available from a Federal, State, or other source...[44 CFR 60.3(b)(4)]

Flood elevation and floodway data can be obtained from the sources listed in the table on the next page as long as they reasonably reflect flooding conditions expected during the base flood; are not known to be technically incorrect; and represent the best data available. (Pages IV-3 to IV-5)

Another source of BFEs is the data from a draft or preliminary flood insurance study. Until a notice of final BFEs has been provided by FEMA, communities are given the discretion in using draft or preliminary flood insurance study data only to the extent that the technical or scientific validity of the proposed flood elevation data is questioned. After the notice of final BFEs is issued by FEMA, communities are required to use the data from the preliminary flood insurance study for regulating floodplain development since the data represents the best available data. (Page III-7)

Sources of Base Flood Elevations

Agency		Source
Federal	Federal Emergency Management Agency (FEMA)	o Unpublished flooding information for an FIS or restudy
	Federal Highway Administration (FHWA)	o Bridge and road projects
	Natural Resources Conservation Service (NRCS)	o Constructs small flood-control dams o Watershed planning studies
	U.S. Army Corps of Engineers (USACOE)	o Floodplain Information Reports (prior to the mid-1970s) o Floodplain Management Services Offices o Urban area and watershed studies
	U.S. Geological Survey (USGS)	o Help maintain stream gauge stations o Analyzes and records stream flow data o Prepares Flood-Prone Quadrangle Maps
State	Department of Environmental Services	o Dam information
	Department of Fish and Game	
	Department of Transportation	o Bridge and road projects
	Office of Energy and Planning	o Floodplain management program
Local	Public Works	o Sewer and storm drainage system design
	Transportation/Highway Department	o Road design

Reasonably Safe From Flooding – No BFE Data Available from Other Sources

Review all permit applications to determine whether proposed building sites will be reasonably safe from flooding. [44 CFR 60.3(a)(3)]

Listed below are some ways that a community can ensure that building sites will be reasonably safe from flooding for proposed developments (that don't meet the subdivision 50-lot or 5-acre threshold) as required in their floodplain ordinance and in the absence of BFE data. (Page III-6)

- o Use simplified methods (on the next page) for estimating the BFE
- o Require a structure be elevated or floodproofed (non-residential only) above the highest adjacent grade by a specified number of feet based on the local official's knowledge of flood conditions in the area. One to two feet above the experienced flood event is suggested (see table on last page for sample flood insurance rates).
- o Require a structure be elevated or floodproofed (non-residential only) five feet above grade, which qualifies the structure for reduced flood insurance rates (see table on last page for sample flood insurance rates).

Some communities go beyond the minimum requirements by requiring that BFE data be developed for all subdivisions and/or floodplain development in Zone A (without BFE), not just those subdivision which meet the 50-lot or 5-acre threshold.

Advantages of Developing Base Flood Elevations

While BFE data is not required for proposed developments that are below the 50-lot or 5-acre threshold, there are significant advantages and financial benefits for communities and individual property owners to develop BFE data. Below is a summary of these advantages. See page III-8 for more detail.

- o Minimize and reduce future flood losses, resulting in long-term savings for all involved
- o Significant reduction in flood insurance rates
- o Less burden on community permit official(s)
- o Eligible for sizable credits under the Community Rating System
- o Potentially eligible for structure or property to be removed from floodplain by FEMA through the Letter of Map Change process thereby potentially eliminating mandatory flood insurance requirements.

Subdivision Proposals

The Planning Board shall require that all proposals for development greater than 50 lots or 5 acres, whichever is the lesser, include Base Flood Elevation (BFE) data within such proposals (i.e. floodplain boundary and 100-year flood elevation). [44 CFR 60.3(b)(3)]

If a proposed development meets the criteria above, it must be evaluated to determine if the proposal is affected by a Zone A area and whether BFE data is required.

BFE data is required for those lots affected by a Zone A area. Circumstances in which it may not be necessary to develop detailed BFE data include the following (Page III-3). However, it is up to the community to ensure that these do not conflict with any of their other regulations and that it is in the best interest of their community.

- If the planned subdivision shows the Zone A area is contained entirely within an open space lot.
- If the actual building sites are clearly outside of the Zone A area and the topography of the area clearly indicates that the floodplain could not extend further than what is depicted on the map.

Developing Base Flood Elevations (BFEs)

If sufficient BFE information cannot be obtained from the sources described earlier, the community should consider conducting, or requiring the applicant to conduct, a site-specific engineering analysis to estimate or determine a BFE. Below is a description of several simplified and detailed methods for estimating or developing BFE data and when each method can and should be used. For detailed information about these methods, please see Section V on pages V-1 to V-34.

Simplified Methods to Estimate a BFE

- Contour Interpolation – superimposing a Zone A boundary onto a topographic map in order to estimate the BFE.
- Data Extrapolation – can be used if a site is within 500 feet upstream of a stream reach, which a 100-year flood profile has been computed by detailed methods (in a flood insurance study), and the floodplain and channel bottom slope characteristics are relatively similar to the downstream reaches.

When is a simple analysis allowed?

- To ensure building sites (less than the 50-lot or 5 acre threshold) are reasonably safe from flooding

Detailed Analysis to Determine a BFE

The three essential factors that must be determined by a hydrologist, professional engineer, or registered surveyor either by hand calculations or by computer model to determine a BFE by detailed methods include:

- Floodplain geometry (topography) – the measurement of the geometry of a cross section(s) of the floodplain, which includes horizontal and vertical coordinates.
- Flood discharge and/or volume (hydrology) – the determination of the peak rate of stream flow [usually measured in cubic feet per second (cfs)] that will occur during a flood (100-year). When determining lake or pond elevations, a 100-year flood hydrograph is required to determine the BFE.
- Flood height (hydraulics) – the determination of the water-surface elevation that will occur during a flood (100-year), the selection of a method to relate the flood discharge to a flood depth, and the selection of Manning’s roughness coefficients or “n” values.

When is a detailed analysis required?

- To revise or amend a map or study [i.e. Letter of Map Changes (Letter of Map Amendment, Letter of Map Revision, etc.)]
- For a subdivision proposal that is greater than the 50-lot or 5-acre threshold
- Elevation Certificate used for flood insurance rating

The table below illustrates how the cost of flood insurance can vary based on the location of a structure's lowest floor (including basements) in relation to the highest adjacent grade in a Zone A area. The example below shows the estimated annual costs for a Post-FIRM single-family residential structure located in Zone A with no base flood elevation and for \$100,000 building coverage and \$25,000 contents coverage using October 1, 2011 rates.

Lowest Floor location in relation to the Highest Adjacent Grade (HAG)	Estimated Flood Insurance Annual Premium
5 feet or more above HAG	\$418
2 to 4 feet above HAG	\$1,045
1 foot above HAG	\$2,148
0 feet or below HAG (includes basements and all other enclosed areas below HAG)	Submit for Rate*

*Submit for Rate is a term used for those flood insurance policies that are submitted to FEMA for a special rating, which usually means a very high premium, due to the structure's high risk of flooding.