2005

FLOODPLAIN MANAGEMENT IN ARKANSAS

Quick Guide

Arkansas Natural Resources Commission*
Floodplain Management Program

http://www.anrc.arkansas.gov

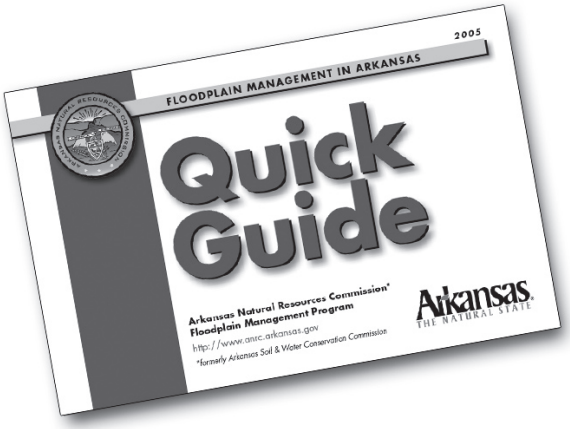
**formerly Arkansas Soil & Water Conservation Commission*

Arkansas®
THE NATURAL STATE

Table of Contents

1..... About This Guide
2..... Introduction
3..... Arkansas Disasters
4..... Flood Insurance: Property Owner's Best Protection
5..... Turn Around Don't Drown™
6..... Why Do We Regulate the Floodplain?
7..... State Accreditation of Local Floodplain Administrators
8..... Community Responsibilities
9..... Looking for Floodplain Information?
10..... FIRMette: Flood Maps Online
11..... Understanding the Riverine Floodplain
12..... Understanding the Floodway
13..... New Format Flood Insurance Rate Map
14..... Old Format Flood Insurance Rate Map
15..... Old Format Flood Boundary and Floodway Map
16..... Use the Riverine Flood Profile to Determine BFEs
17..... Digital Flood Maps
18..... Approximate Flood Zones and Unnumbered A Zones
19..... Flood Map Revisions Issued by FEMA
20..... Activities Requiring Permits
21..... Safe Uses of the Floodplain
22..... Is Your Building Site Higher than the BFE?
23..... What is Meant by Pre-FIRM and Post-FIRM?
24..... Nature Doesn't Read Maps
25..... Think Carefully Before You Seek A Variance
26..... Some Key Permit Review Steps
27..... Carefully Complete the Permit Application
28..... Freeboard: Go the Extra Foot!
29..... What is the Elevation Certificate and How is it Used?
30..... Completing the Elevation Certificate
31..... Paperwork is Important – for You and Your Community
32..... Floodplain Fill Can Make Things Worse
33..... Required Floodway "No Impact" Certification
34..... How to Elevate Your Floodplain Building
35..... Compaction of Floodplain Fill
36..... Manufactured Homes Require Special Attention
37..... Enclosures Below the BFE
38..... Crawlspace Details
39..... Basements Are Unsafe
40..... Utility Service Outside Buildings
41..... Utility Service Inside Enclosures
42..... Accessory (Appurtenant) Structures
43..... Recreational Vehicles
44..... Planning to Improve Your Floodplain Building?
45..... Non-Substantial Improvements
46..... Substantial Improvement: Renovation Only
47..... Substantial Improvement: Lateral Addition Only
48..... Substantial Improvement: Addition Plus Other Work
49..... What About After Damages?
50..... Paying for Post-Flood Compliance
51..... Elevating a Pre-FIRM Building
52..... Some Flood Protection for Older Homes is Easy and Low Cost
53..... Small Levees/Floodwalls Can Protect Some Older Homes
54..... Some Flood Mitigation Projects are More Costly
55..... Useful Resources and Common Acronyms
56..... Want to Learn More?

About This Guide



This **Quick Guide** will help you understand more about why and how communities in the State of Arkansas manage floodplains to protect people and property.

Flood-prone communities adopt ordinances that detail the rules and requirements for floodplain development. In case of conflict, that ordinance and not this publication, must be followed. If you have questions, be sure to talk with your local planning, permit, engineering, or floodplain management office.

Questions and comments on this **Quick Guide** can be directed to the Arkansas Natural Resources Comission, Floodplain Management Program, (501) 682-3830, online at http://www.anrc.arkansas.gov.

Prepared by

RCQuinn Consulting, Inc.

www.rcquinnconsulting.com

This publication is supported with funding from the Department of Homeland Security (FEMA). It does not necessarily reflect the views of that agency.

Introduction

The Arkansas Natural Resources Commission, Floodplain Management Program, is pleased to provide this **Quick Guide** to help our citizens understand what floodplain management is and why we regulate floodplain development.

Counties and local communities regulate the floodplain to:

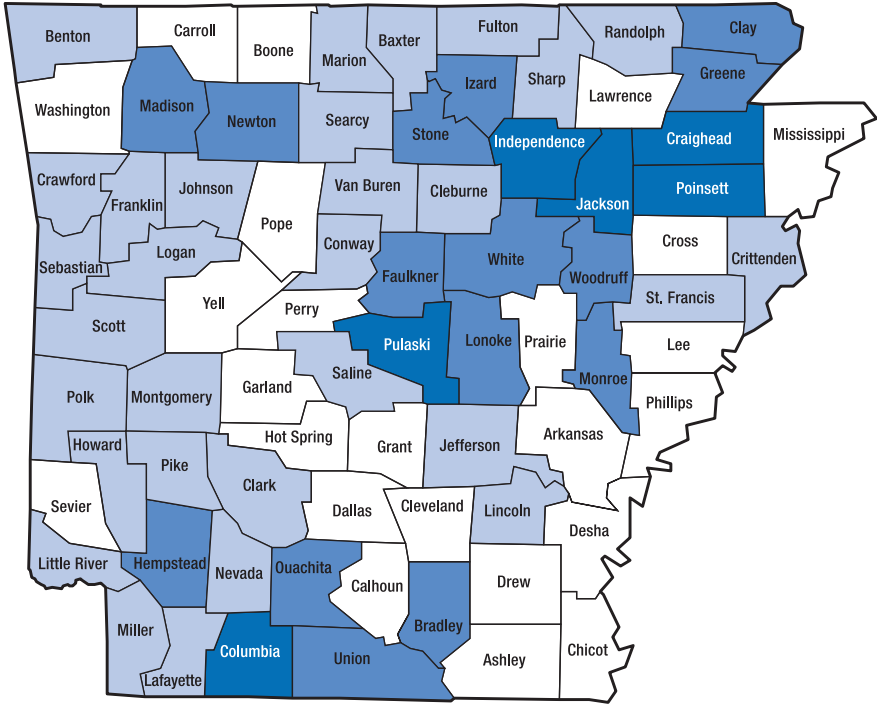
- **Protect** people and property
- **Ensure** that Federal flood insurance and disaster assistance are available
- **Save** tax dollars
- **Reduce** future flood losses

Floods have been, and continue to be, a destructive natural hazard in terms of economic loss to the citizens of Arkansas. Since 1978, flood insurance policy holders have received over $34.1 million in claim payments. Even though that represents many insurance payments, most of the State's flood-prone property owners do not have flood insurance.

State of Arkansas
Presidential Disaster Declarations

Number of Declarations by County
(1965-2004)

- 13 to 15
- 10 to 12
- 7 to 9
- 4 to 6

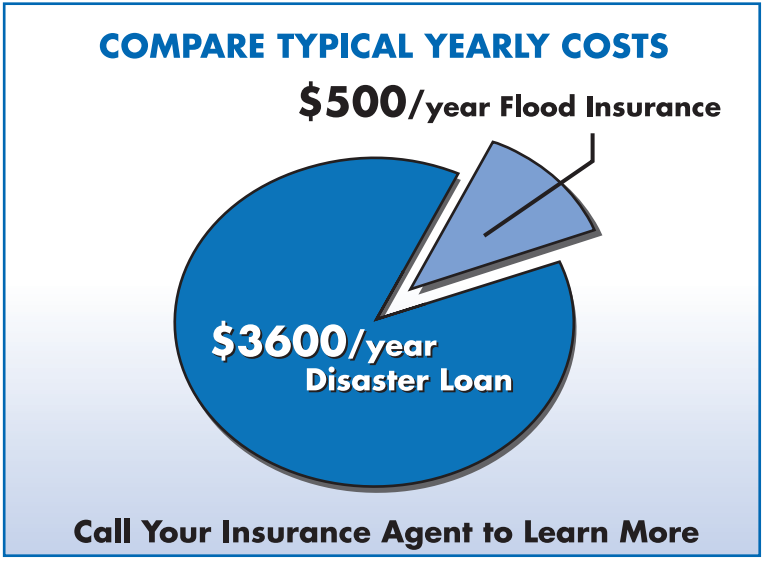


Flood-prone areas have been identified in many counties, cities, and towns in Arkansas.

Not all flood events are declared major disasters.
Many floods are local, affecting only small areas or a few watersheds.

Flood Insurance: Property Owner's Best Protection

Who needs flood insurance? Every homeowner, business owner, and renter in Arkansas communities that participate in the National Flood Insurance Program (NFIP) may purchase a flood insurance policy — regardless of the location of the building. Federal disaster grants do not cover most losses and repayment of a disaster loan can cost many times more than the price of a flood insurance policy.



Unfortunately, it's often after a flood that many people discover that their homeowner or business property insurance policies do not cover flood damages. Approximately 25% of all flood damages occur in low risk zones, commonly described as being "outside the mapped flood zone."

The Arkansas Natural Resources Commission urges **YOU** to protect your financial future by getting a flood insurance policy. Learn more at **http://www.floodsmart.gov**. To purchase a policy, call your insurance agent. To get the name of an agent in your community, call the NFIP's toll free number, (888) 356-6329.

Turn Around Don't Drown™

Follow these safety rules:

- When flooding is expected, stay away from creeks, streams, and rivers.
- NEVER drive through flooded roads – they may be washed out.
- Passenger cars may float in only 18-24 inches of water.
- Be especially cautious at night when it is harder to recognize dangers.
- Just 6 inches of fast-moving water can knock you off your feet.
- Learn more online at **http://tadd.weather.gov**.

Why Do We Regulate the Floodplain?

- **To protect people and property.** Floodplain management is about building smart. It makes good sense. If we know part of our land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.

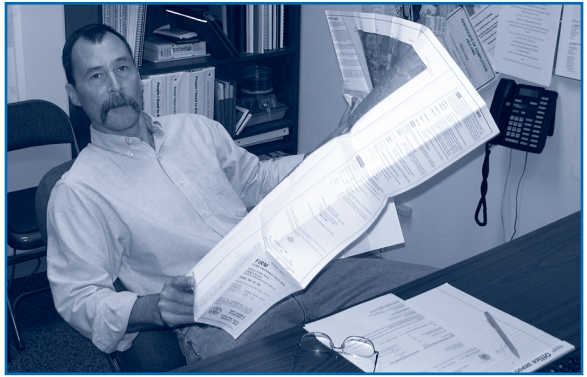
- **To make sure that Federal flood insurance and disaster assistance are available.** If your home or business is in the floodplain, and Federal flood insurance isn't available, then you can't get some types of Federal financial assistance. Home mortgages will be hard to find and you won't be able to get some types of state and Federal loans and grants.

- **To save tax dollars.** Every flood disaster affects your community's budget. If we build smarter, we'll have fewer problems the next time the water rises. Remember, Federal disaster assistance isn't available for all floods. And even when the President declares a disaster, your community still has to pay a portion of the costs of evacuation, temporary housing, repair, and clean-up.

- **To avoid liability and law suits.** If we know an area is mapped as floodplain and likely to flood, if we know people could be in danger, and if we know that buildings could be damaged, it makes sense to take reasonable protective steps when we develop and build.

- **To reduce future flood losses in Arkansas.** Development that complies with the minimum floodplain management requirements is significantly protected against major flood-related damage.

State Accreditation of Local Floodplain Administrators



- Arkansas statute requires the flood loss prevention ordinances that are adopted by each county, city, or town to include designation of "*a person to serve as the floodplain administrator to administer and implement the ordinance and any local codes and regulations relating to the management of flood-prone areas.*" [Act 745 of 2003 (A.C.A. § 14-268-106)]
- The statute also requires that "*beginning July 1, 2004, each floodplain administrator shall be accredited by the Arkansas Natural Resources Commission under the commission's authority regarding flood control under §§ 15-24-102 and 15-24-109.*"
- In determining accreditation standards for floodplain administrators, the Arkansas Natural Resources Commission may consider an applicant's knowledge, experience, skills, and training in floodplain management and in minimization and prevention of flood hazards and losses.

An integral part of the State accreditation program for local floodplain administrators is continuing education. Floodplain administrators may also want to become "nationally certified" through the Arkansas Floodplain Management Association. See website and other information on pages 55 and 56.

Community Responsibilities

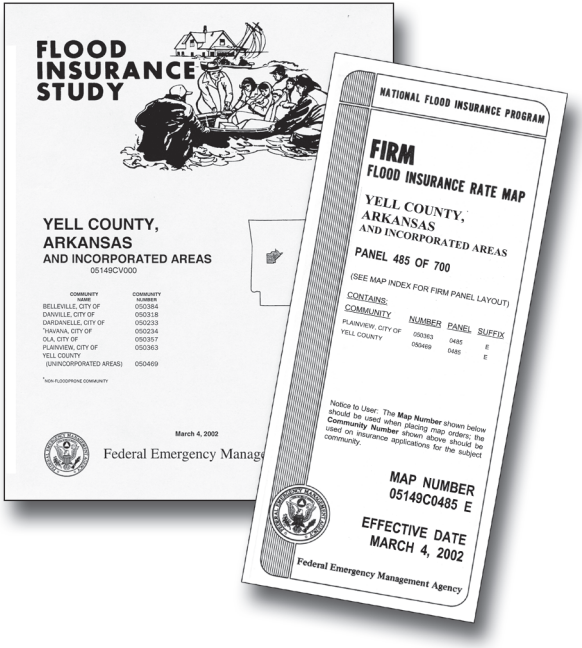
To participate in the National Flood Insurance Program, your community agrees to:

- **Adopt and enforce** a flood damage prevention ordinance.
- **Require** permits for all types of development in the floodplain (see page 20).
- **Assure** that building sites are reasonably safe from flooding.
- **Estimate** flood elevations where not determined by FEMA.
- **Require** new or substantially improved homes and manufactured homes to be elevated above the Base Flood Elevation (BFE).
- **Require** non-residential buildings to be elevated or floodproofed.
- **Determine** if damaged buildings are *substantially* damaged.
- **Conduct** field inspections and cite violations.
- **Require** Elevation Certificates to document compliance (see pages 29, 30, and 31).
- **Carefully consider** requests for variances.
- **Resolve** non-compliance and violations.
- **Advise** FEMA when updates to flood maps are needed.

National Flood Insurance Program

Looking for Floodplain Information?

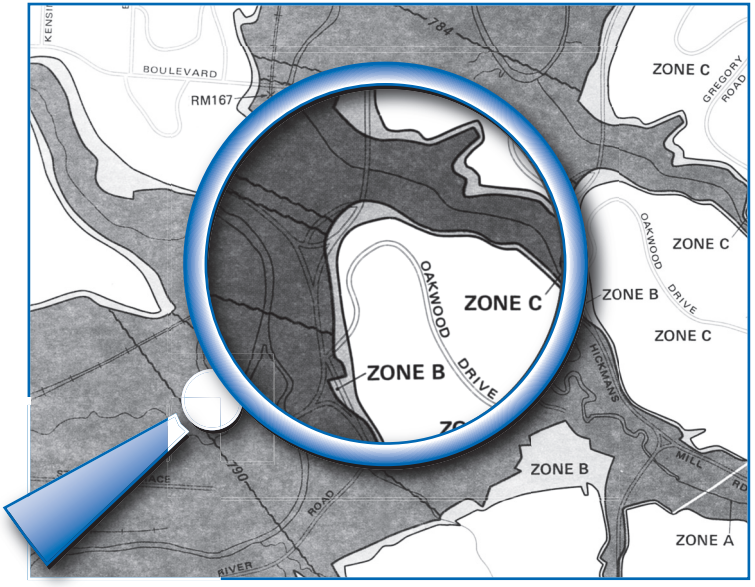
Enter the FEMA Flood Map Store at **http://store.msc.fema.gov**. Digital scans of flood maps can be downloaded or hardcopy maps can be ordered. Reach the Map Store by calling (800) 358-9616.



- FEMA prepares Flood Insurance Studies and Flood Insurance Rate Maps (FIRMs) for communities in Arkanas.
- Most FIRMs show Special Flood Hazard Areas (SFHAs) and floodways. Some FIRMs show floodplains delineated using approximation analyses (see page 18).
- Not all waterways have designated floodplains – but all waterways will flood, even though a floodplain study may not have been prepared.

Need a fast answer? Visit your community's planning, engineering, or permit office where flood maps are available for viewing by the public.

FIRMette: Flood Maps Online

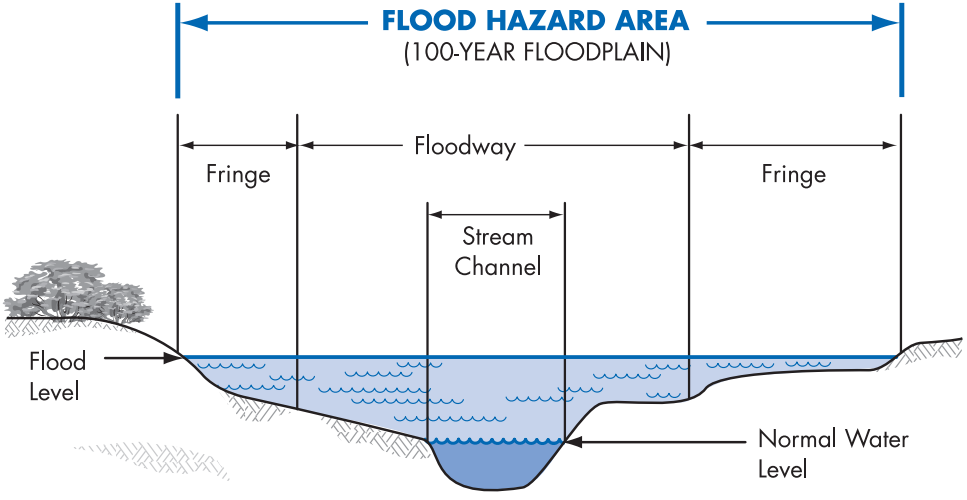


You can order paper maps or digital maps on CD-ROM.

You can find and print a FIRM by using online tools at **http://store.msc.fema.gov**

- Click "Map Catalog" (top of page) and select "FEMA Issued Flood Maps" from the product pull-down menu (or try "Map Search").
- Select the state, county, and community, then click "Find FEMA Issued Flood Maps!".
- Click the round green button to display the map panel. Hint: The "Item ID" ending in "INDO" is the index map.
- Use the pan and zoom tools to find the specific area of interest – a miniature map on the left side of the screen shows a red box around the area you are viewing.
- Click the "Make a FIRMette" button and drag the pink translucent box over the area you wish to print.
- Select paper size and Adobe Acrobat (pdf) or Image File (tif).
- Your FIRMette will be displayed and you can print or save the file to your hard drive.

Understanding the Riverine Floodplain



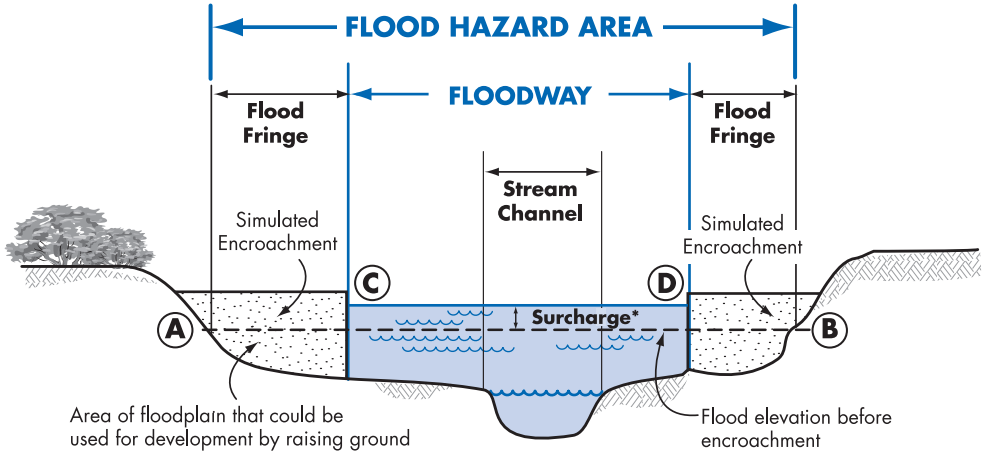
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (100-year) and/or flood-related erosion hazards. SFHAs are shown on FHBMs or FIRMs as Zones A, AE, A1-A30, AH, AO, and AR.

See page 12 to learn about the floodway, the area of the floodplain where floodwaters usually flow faster and deeper.

For floodplains with Base Flood Elevations, check the Flood Insurance Study to find the Flood Profile which shows water surface elevations for different frequency floods (see page 16).

Understanding the Floodway



Line A — B = Flood Elevation Before Encroachment

Line C — D = Flood Elevation After Encroachment

* **Surcharge** not to exceed 1.0 foot (FEMA requirement)

Simulated Encroachment

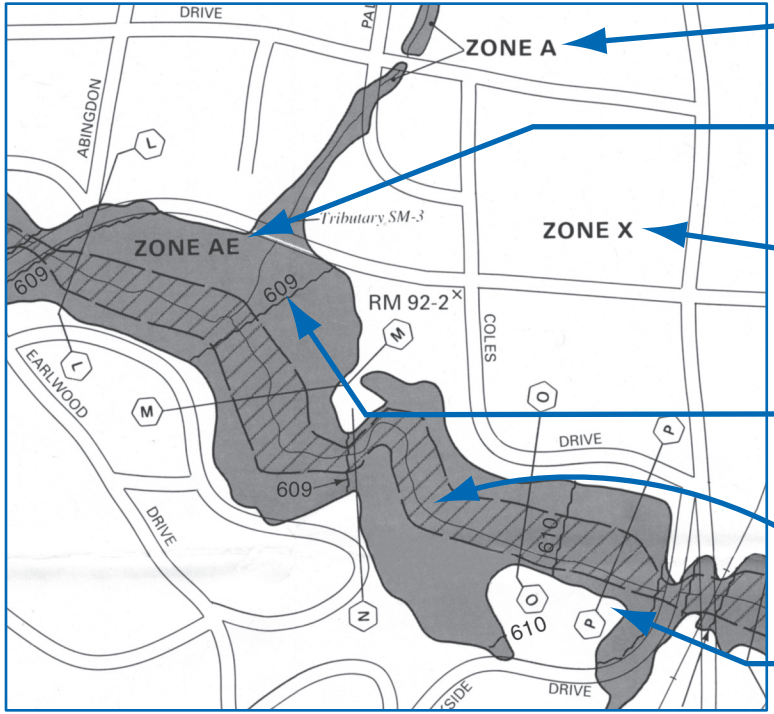
Terms and Definitions

The **Floodway** is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to pass the base flood discharge without increasing flood depths.

Computer models of the floodplain are used to simulate "encroachment" or fill in the flood fringe in order to predict where and how much the base flood elevation would increase if the floodplain is allowed to be filled.

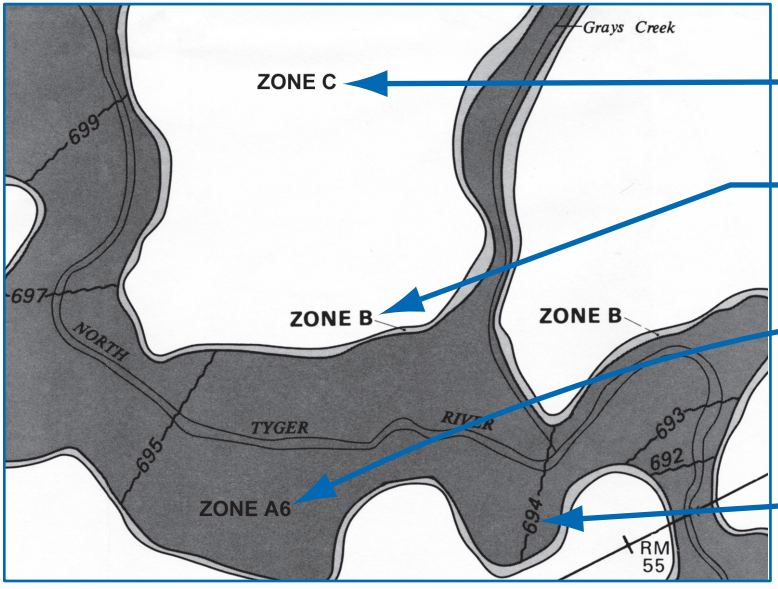
For any proposed floodway development, before a state or local floodplain permit can be issued, the applicant must provide evidence that "no impact" will occur (see page 33).
You will need an experienced registered professional engineer to make sure your proposed project won't increase flooding on other properties.

New Format Flood Insurance Rate Map



1. **Zone A** (unnumbered) is the flood hazard area without BFEs.
2. **Zone AE** is the 100-year (1% annual chance) floodplain with BFEs (also called Zone A1- A30).
3. **Zone X** (shaded or unshaded) is all other areas considered low risk (formerly Zone B or C, see page 14).
4. **Base Flood Elevation (BFE)** is the water surface elevation of the base flood atspecific locations.
5. The **Floodway** is the cross-hatched area.
6. **Cross Section** location (see page 16).

Old Format Flood Insurance Rate Map



FLOOD HAZARD ZONES

1. **Zone C** (or Zone X) is all other areas, considered to be low risk.

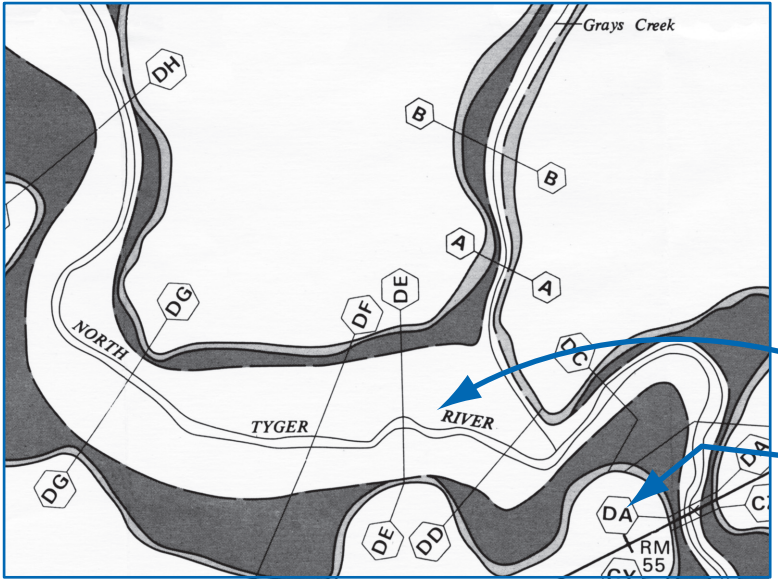
2. **Zone B** (or shaded Zone X) is subject to flooding by the 500-year flood (0.2% annual chance), and is a moderate risk area.

3. **Zone A, Zones A1-A30** and **Zone AE** are subject to flooding by the base or 100-year flood (1% annual chance), and are considered high risk areas.

4. **Base Flood Elevation (BFE).** Water surface elevation of the base flood at specific locations.

FEMA prepares Flood Insurance Rate Maps (FIRMs) to show areas that are at high risk of flooding after intense or major storms. Most FIRMs show the flood elevation (how high the water may rise), called the Base Flood Elevation.

Old Format Flood Boundary and Floodway Map



Important

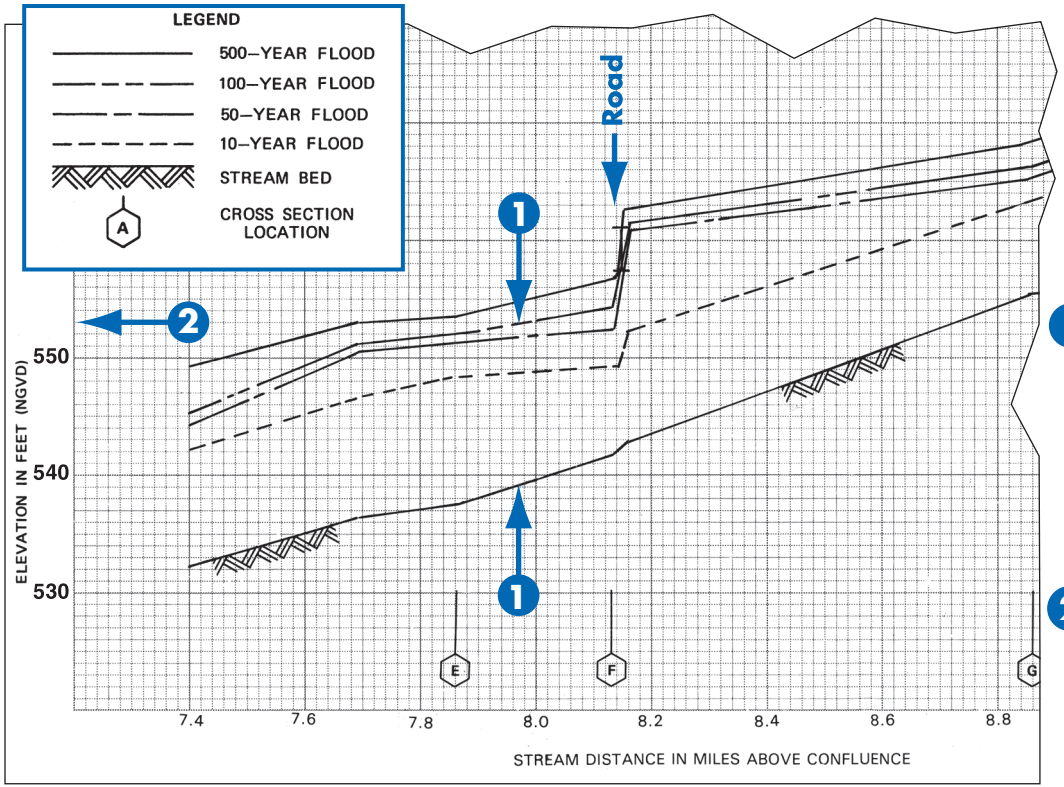
Information

Floodway maps do not show flood zones or BFEs. Check the companion FIRM for that information. Page 14 shows the FIRM that matches the map clip to the left.

1. **The Floodway** is the white area around the waterway centerline.
2. **Cross Section** location, where ground surveys determined the shape of the land and how constrictions such as bridges and culverts affect the flow of floodwater.

FEMA prepares Floodway maps as companions to many FIRMs. You should check to see if your project will be in the Floodway because additional engineering may be required (see page 33).

Use the Riverine Flood Profile to Determine BFEs

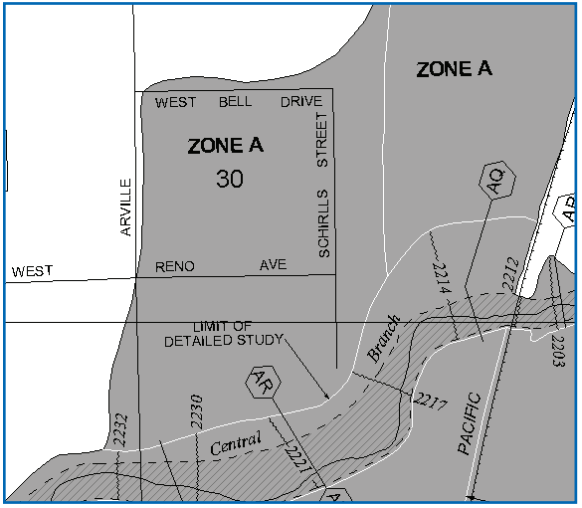


Flood profiles from Flood Insurance Study reports can be used to determine the BFE at a specific site. Profiles also show estimated water surface elevations for floods other than the 1% annual chance flood (100-year).

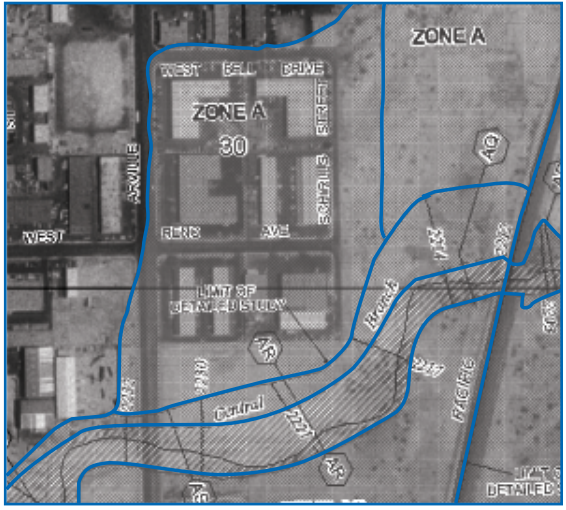
1. On the effective flood map, locate your site by measuring the distance, along the center-line of the stream channel, from a known point such as a road or cross section, for example, E or F.
2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the elevation.

Digital Flood Maps

All new and revised flood map will be designed to view digitally on a computer within a Geographic Information System (GIS) or as paper maps. Flood maps will be composite of base data, topographic data, and flood layers which can be overlain with parcel information or other data to more easily determine if a house or other property is or will be located in a designated flood hazard area or Floodway.



This map uses street and stream data
Vector Base Map

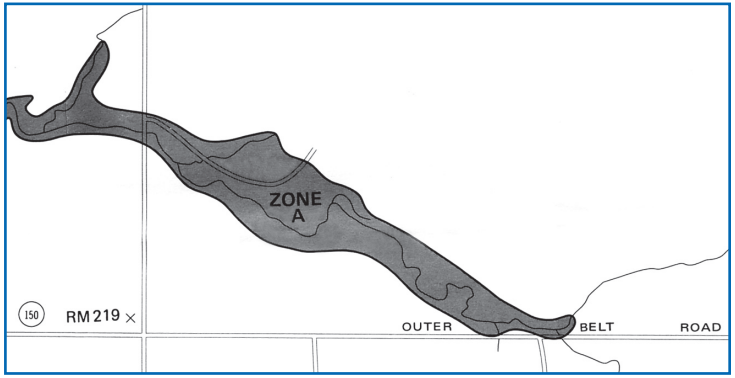


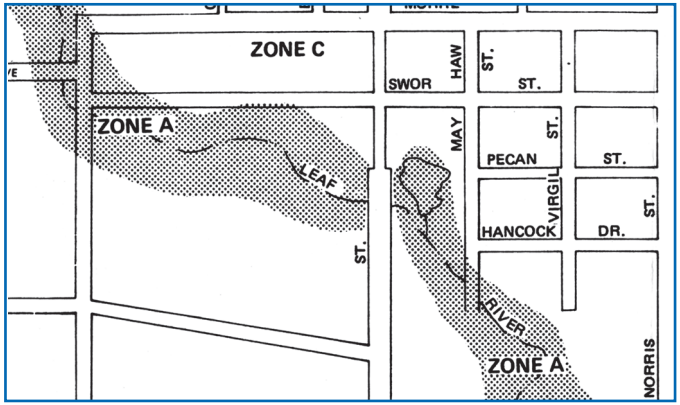
This map uses aerial photography
(topographic layer not shown)
Raster Base Map

Approximate Flood Zones and Unnumbered A Zones

Topographic maps can be used to estimate the Base Flood Elevation if the FIRM shows approximate or unnumbered A Zones.

Note: Even if the estimated BFE indicates flooding might be only a foot or two deep, it is recommended that the lowest floor be at least 2 feet above the highest adjacent grade. Not only does this improve flood protection, but lower flood insurance premiums may apply.





If you need help determining the BFE, check with your community's planning, engineering, or permit office, or the Arkansas Natural Resources Commission.

The FEMA publication *Managing Floodplain Development in Approximate Zone A Areas* (FEMA 265) is useful for engineers.

Flood Map Revisions Issued by FEMA

1. **Letter of Map Amendment (LOMA)** is an official amendment to an effective FIRM that may be issued when a property owner provides additional technical information from a surveyor, such as ground elevation relative to the BFE, SFHA, and the building. Lenders may waive the flood insurance requirement if the LOMA documents indicate that a building is on ground above the mapped floodplain.

2. **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, floodplain and floodway boundary delineations, BFEs, and/or other map features. Lenders may waive the insurance requirement if the approved map revision shows buildings to be outside of the SFHA.

3. **Letter of Map Revision Based on Fill (LOMR-F)** is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if the LOMR-F shows that a building on fill is above the BFE.

4. **Physical Map Revision (LOMR PMR)** may be issued for major floodplain changes that require engineering analyses, such as bridges, culverts, channel changes, flood control measures, and large fills that change the BFE or floodway. Physical map revisions are also issued when a new study updates or improves the FIRM.

Important Information

Check FEMA's Flood Hazard Mapping Web Site for more information about map revisions concerning Homeowners

and Engineers/ Surveyors.

www.fema.gov/fhm

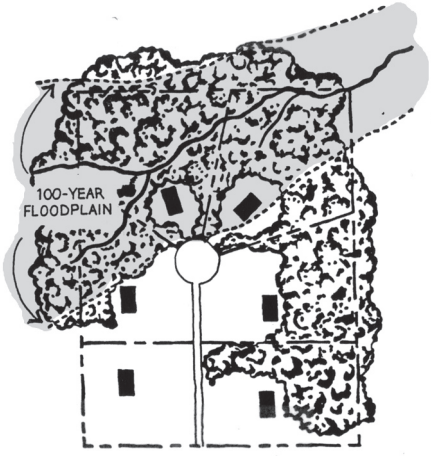
Requests for map revisions must be coordinated through your community.

Activities Requiring Permits

- Construction of new buildings
- Additions to existing buildings
- Substantial improvements of existing buildings
- Renovation of existing building interiors
- Repair of substaintially damaged buildings
- Placement of manufactured (mobile) homes
- Subdivision of land
- Construction or placement of temporary buildings and accessory structures
- Construction of agricultural buildings
- Construction of roads, bridges, and culverts
- Placement of fill, grading, excavation, mining, and dredging
- Alteration of stream channels

YOU NEED PERMITS FOR **ALL** OF THESE ACTIVITIES.

Safe Uses of the Floodplain

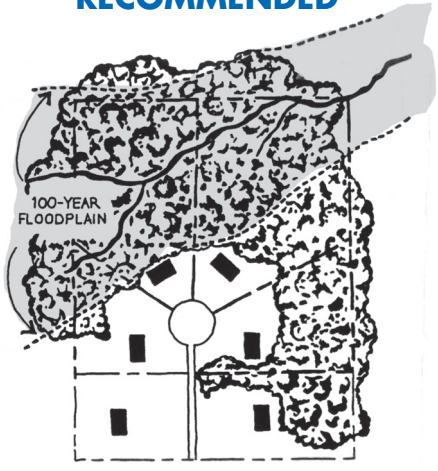


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

All land subdivided into lots, some lots partially in the floodplain, setbacks modified to keep homesites on high ground.

RECOMMENDED

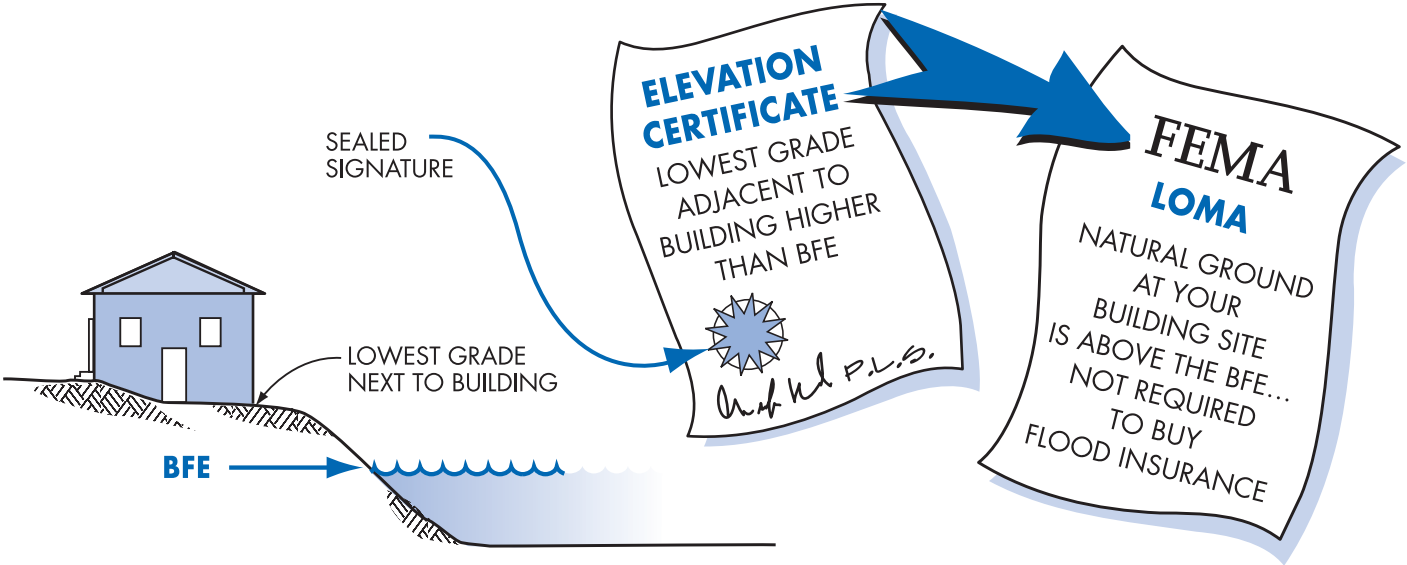


Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

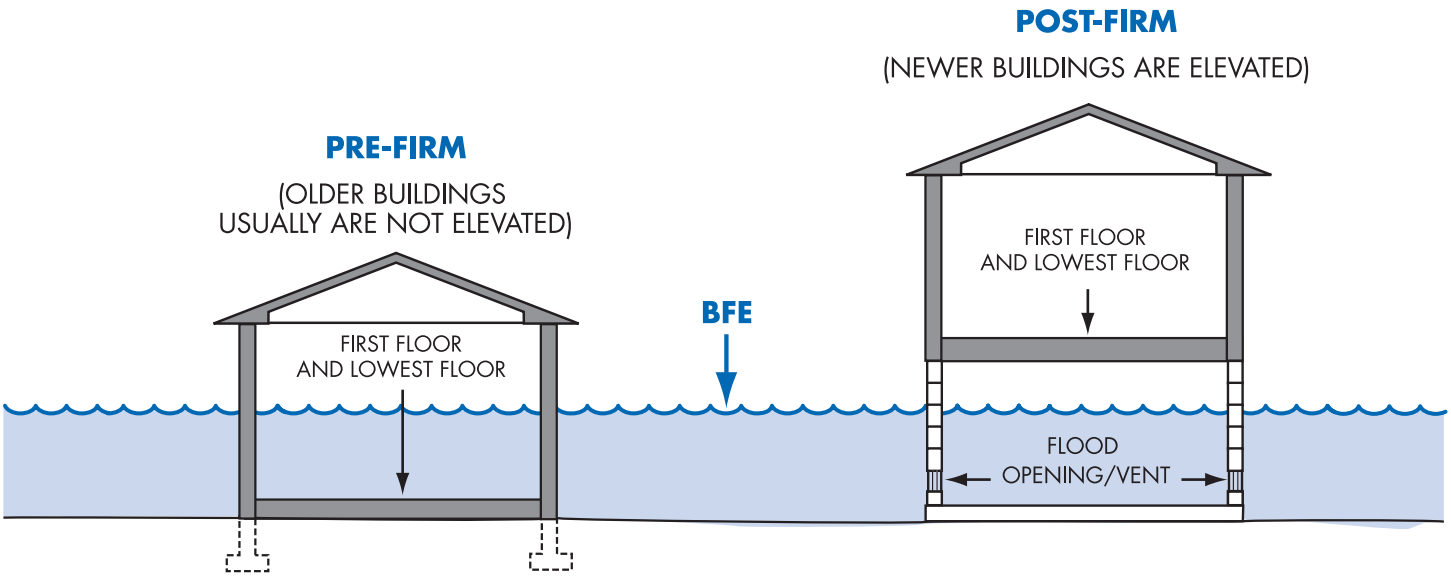
Let the floodplain do its job – if possible, keep it as natural open space. Other compatible uses: recreational areas, playgrounds, reforestation, parking, gardens, pasture, accessory structures, created wetlands.

Is Your Building Site Higher than the BFE?



If your land is shown on the map as "in" the floodplain, but your building site is higher than the Base Flood Elevation (BFE)... get a surveyor or engineer to complete a FEMA Elevation Certificate (EC). Submit the EC with an application to FEMA and a Letter of Map Amendment may be issued (page 19). This is the **ONLY** way to remove the mandatory requirement to buy flood insurance. Keep the certificate with your deed, it will help future buyers.

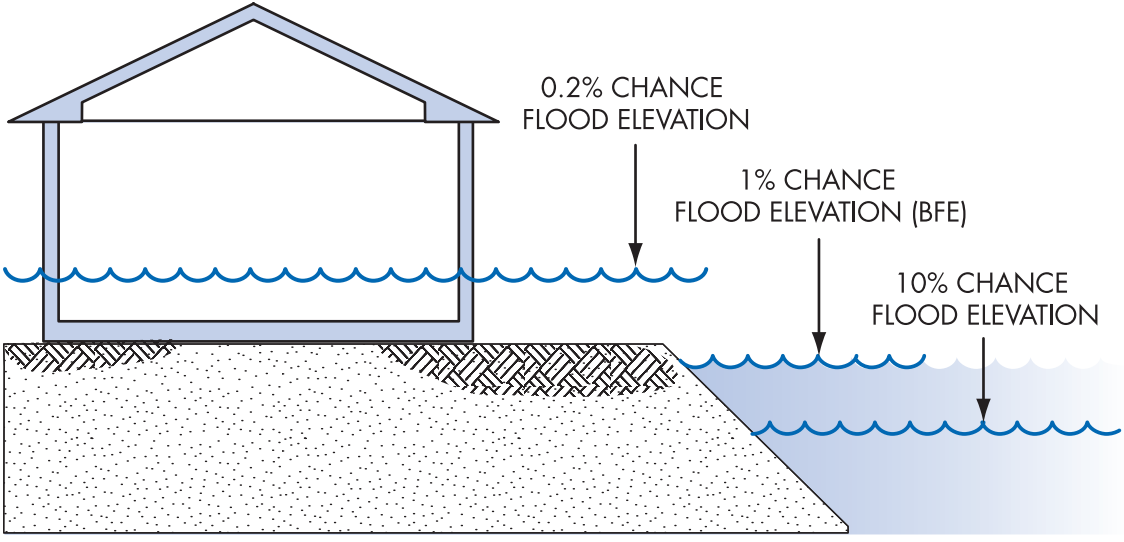
What is Meant by Pre-FIRM and Post-FIRM?



A building is **Pre-FIRM** if it was built **before** the date of your community's first FIRM.
If built **after** that date, a building is **Post-FIRM**.

Improvements or repairs to Pre-FIRM buildings may require permits (see pages 45 through 49).

Nature Doesn't Read Maps

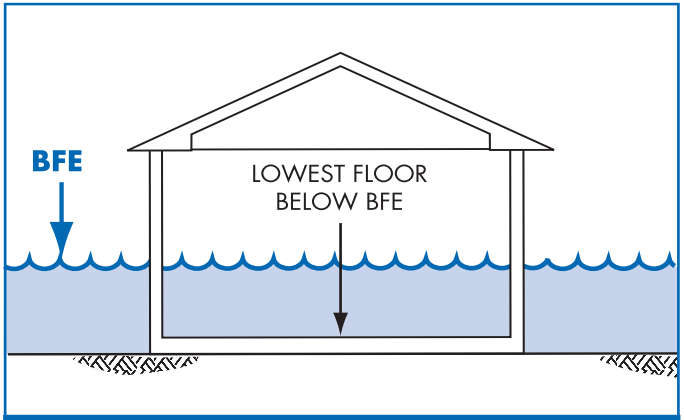


Important Information

Many people don't understand just how risky the floodplain can be. There is a 26% chance that a non-elevated home in the floodplain will be damaged during a 30-year mortgage period. The chance that a major fire will occur during the same period is less than 5%!

CAUTION! Nature doesn't read the flood map! Major storms and flash floods can cause flooding that rises higher than the Base Flood Elevation (BFE). Consider safety – protect your home or business by building higher. See page 28 to see how this will save you money on insurance.

Think Carefully Before You Seek A Variance



POST-FIRM BUILDING, NOT ELEVATED

INSURANCE $2,000+/YEAR

Very specific conditions related to the property (not the owner) must be satisfied to justify a variance:

- Good and sufficient cause
- Unique site conditions
- Non-economic hardship
- If in the floodway, no increase in flood level

A variance that allows construction below the BFE does not waive your lender's flood insurance requirement. Flood insurance will be very expensive – perhaps more than $2,000 per year (see page 28)!

Think carefully before seeking a variance to build below the Base Flood Elevation.
Not only will your property be more likely to suffer damage, but insurance will be very costly.

If your community has a pattern of issuing variances, sanctions could be imposed – costing you even more!

Some Key Permit Review Steps

The Permit Reviewer has to Check Many Things. Some of the Key Questions are:

- Is the site near a watercourse?
- Is the site in the mapped floodplain or floodway?
- Have other state and Federal permits been obtained?
- Is the site reasonably safe from flooding?
- Does the site plan show topography, Base Flood Elevation, and building location?
- Is substantial improvement of an older building proposed?
- Is an addition proposed?
- Will new buildings and utilities be elevated properly?
- Will manufactured homes be properly elevated and anchored?
- Do the plans show an appropriate and safe foundation?
- Has the owner submitted an Elevation Certificate?

Carefully Complete the Permit Application

Application for a Permit to Develop in a Flood Hazard Area (partial)

Owner's Name:
DAVID & SALLY JONES

Site Address, Tax #, Parcel #:
781 REED STREET, 400-35A-002

A. Description of Work

1. Proposed Development Description:

- ☒ New Construction
- ☐ Alteration or Repair
- ☒ Filling
- ☐ Grading
- ☐ Dredging
- ☐ Manufactured/Modular
- ☐ Logging
- ☐ Other

2. Size and Location of Development

SINGLE FAMILY (2,000 CY FILL);
FLOOD FRINGE OF DRY RIVER

3. Type of Construction

- ☒ New Residential
- ☐ New Non-Residential
- ☐ Addition
- ☐ Improvement
- ☐ Renovation
- ☒ Accessory structure
- ☐ Temporary

Community, Map, and Elevation Data:

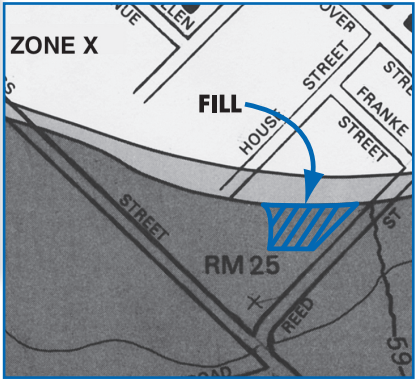
1. Community No: 450299
2. Panel No: 125C
3. Zone AE
4. Base Flood Elevation 659.2
5. Required Lowest Floor Elevation (including basement) 660.2
6. If floodproofed, required floodproofing elevation N/A
7. Elevation to which all attendant utilities, including all heating, duct work, and electrical equipment will be installed or floodproofed: 660.2

Applicant's Signature: David M. Jones

Good information will lead to better construction and less exposure to future flood damage.

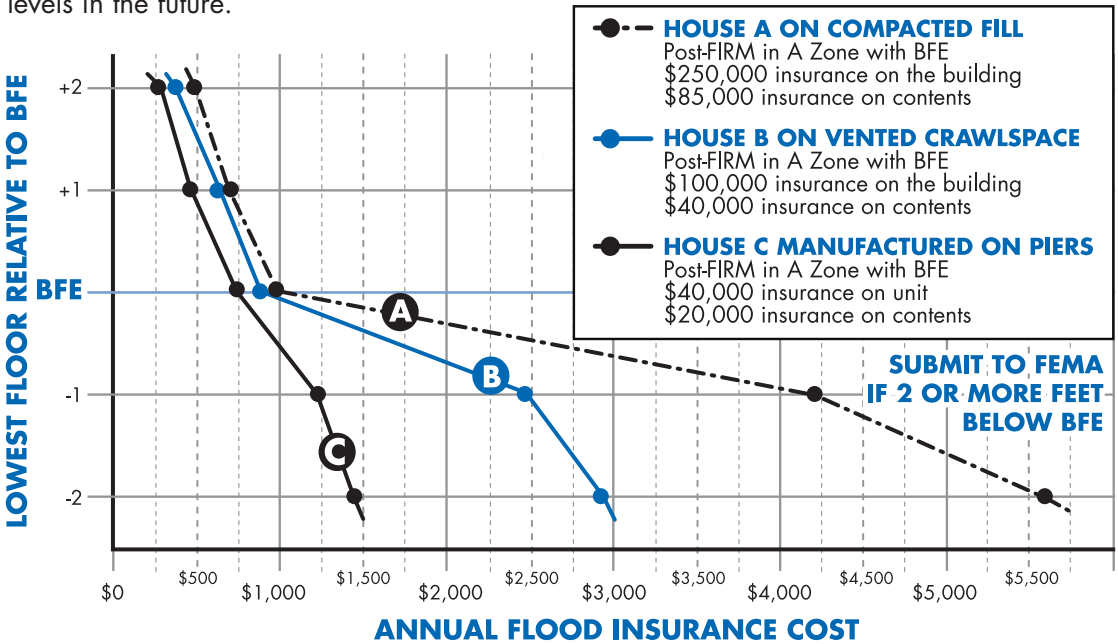
Important Information

You must get all permits **before** you do work in a floodplain.



Freeboard: Go the Extra Foot!

The Arkansas Natural Resources Commission recommends that the lowest floor of all new buildings and substantially improved buildings be elevated at least one foot above the BFE. Remember, upstream developments as well as uncertainty may result in higher flood levels in the future.



Important Information

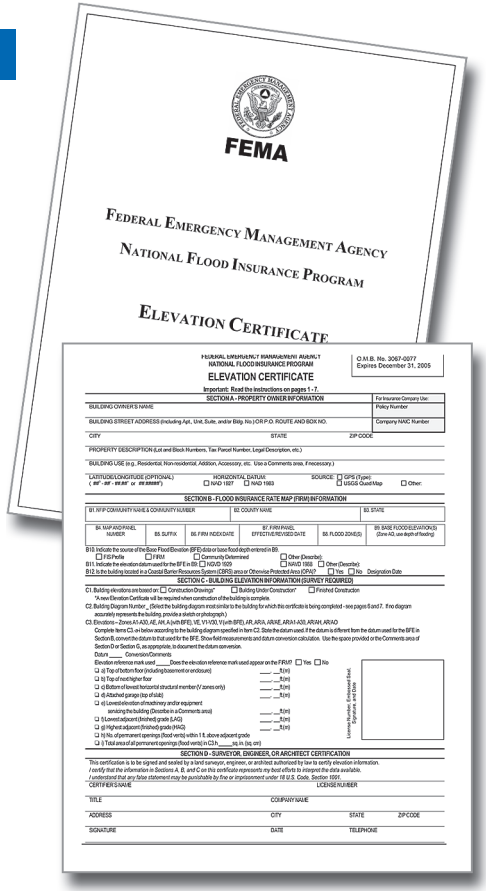
NOTE: Flood insurance rates and various fees change from time to time. Rather than specific costs for insurance, this figure gives a feel for how much difference just a foot or two can make.

Building owners will save insurance money if they elevate above the BFE. But more impressive is how the cost of insurance can more than double if the building is only one foot below the BFE.

Remember!
The community may be able to grant a variance, but the owner will probably still be required to buy insurance. Imagine trying to sell a house if the bank requires insurance that costs over $2,000 a year!

What is the Elevation Certificate and How is it Used?

- The Elevation Certificate (EC) is a FEMA form. Go to **http://www.fema.gov/** and search on "Elevation Certificate."
- The EC must be completed and sealed by a licensed surveyor or registered engineer.
- It can be used to show that the grades of building sites are above the Base Flood Elevation (see page 22).
- It is used to verify that buildings are elevated properly (see page 31).
- Insurance agents use the EC to write and rate flood insurance policies.



By itself, the EC cannot be used to waive the requirement to obtain flood insurance. See page 19 to learn about FEMA's Letter of Map Amendment.

ELEVATION CERTIFICATE (partial)

ELEVATION CERTIFICATE (partial)

Important: Read the instructions on pages 1-7

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

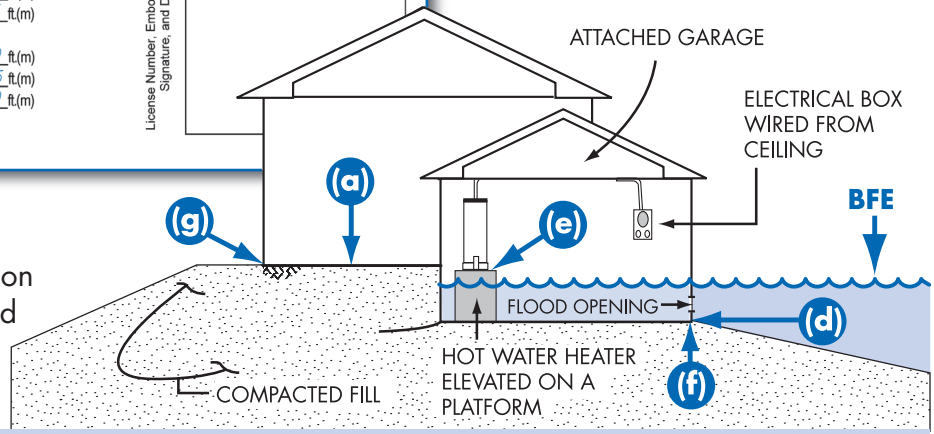
Elevation reference mark used RM55 Does the elevation reference mark used appear on the FIRM? ☒ Yes ☐ No

- ❑ a) Top of bottom floor (including basement or enclosure) 626.0 ft.(m)
- ❑ b) Top of next higher floor n/a . ft.(m)
- ❑ c) Bottom of lowest horizontal structural member (V zones only) n/a . ft.(m)
- ❑ d) Attached garage (top of slab) 622.5 ft.(m)
- ❑ e) Lowest elevation of machinery and/or equipment servicing the building (Describe in a Comments area) 626.0 ft.(m)
- ❑ f) Lowest adjacent (finished) grade (LAG) 622.5 ft.(m)
- ❑ g) Highest adjacent (finished) grade (HAG) 626.0 ft.(m)
- ❑ h) No. of permanent openings (flood vents) within 1 ft. above adjacent grade TWELVE
- ❑ i) Total area of all permanent openings (flood vents) in C3.h 1,280 sq. in. (sq. cm)

License Number, Embossed Seal, Signature, and Date

In this example, the BFE is 625.

The slab-on-grade house was elevated on fill 1 foot above the BFE, and the vented garage is 2.5 feet below the BFE.

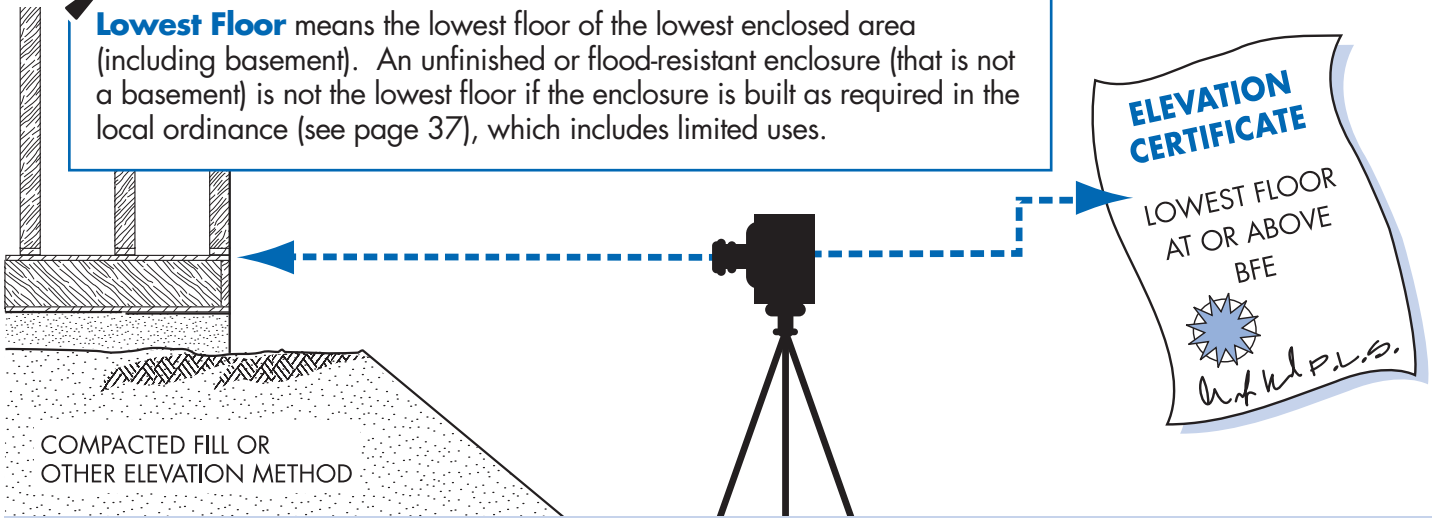


You will get a blank Elevation Certificate form when you get your permit. You **must** have a surveyor or engineer fill it out and seal it. The Elevation Certificate includes diagrams for eight building types. Several points must be surveyed.

Paperwork is Important – for You and Your Community

Terms and Definitions

Lowest Floor means the lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure (that is not a basement) is not the lowest floor if the enclosure is built as required in the local ordinance (see page 37), which includes limited uses.



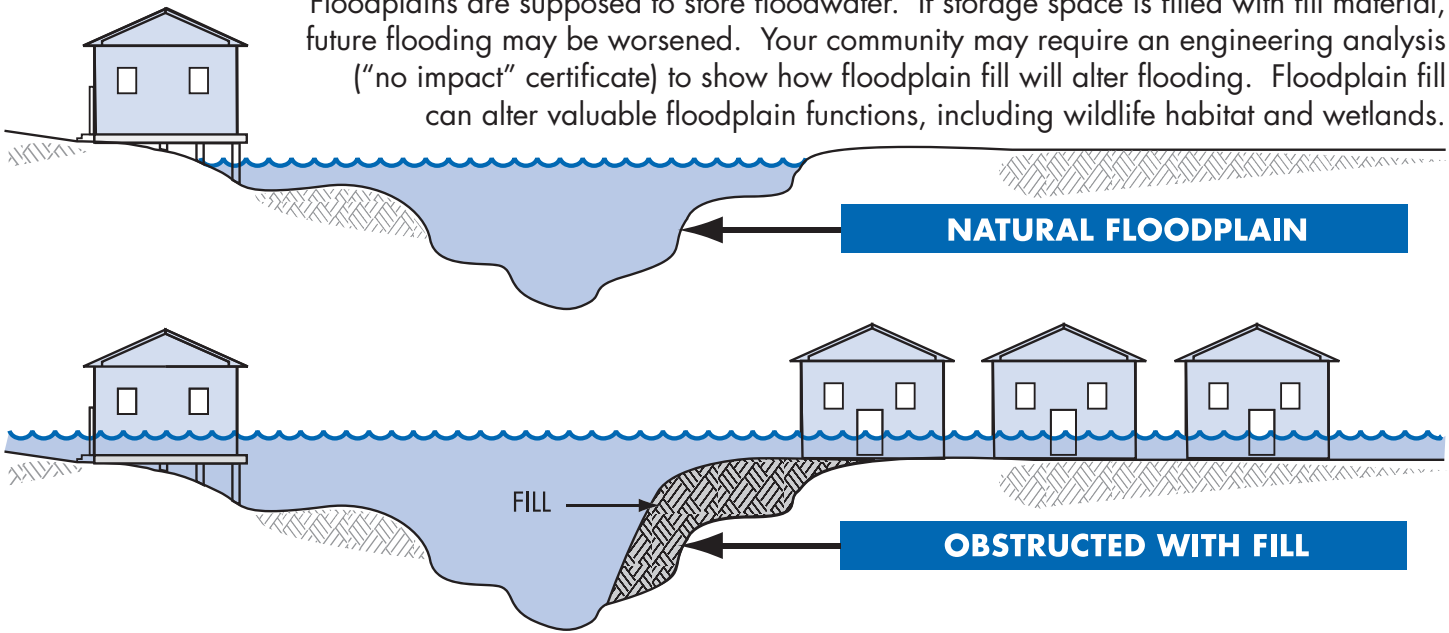
If you get a permit to build in the floodplain, you will be given an Elevation Certificate form. As soon as your lowest floor is set, get the form filled out and sealed by a surveyor or engineer.

This form is important!

It proves that you built correctly, and it can be used to obtain the correct insurance rating.

Floodplain Fill Can Make Things Worse

Floodplains are supposed to store floodwater. If storage space is filled with fill material, future flooding may be worsened. Your community may require an engineering analysis ("no impact" certificate) to show how floodplain fill will alter flooding. Floodplain fill can alter valuable floodplain functions, including wildlife habitat and wetlands.



Make sure your floodplain fill project won't harm your neighbors. Floodway fill is allowed **only** if an engineering evaluation demonstrates that "no impact" or "no rise" in flood level will occur (see page 33).

Required Floodway "No Impact" Certification

- Floodways can be dangerous because water may flow very fast.
- Development is not allowed unless "no impact" ("no rise") in flood elevations, floodway elevations, and floodway widths is certified.
- An engineer must evaluate the hydraulic impact of proposed development.

ENGINEERING "NO IMPACT" CERTIFICATION *(example)*

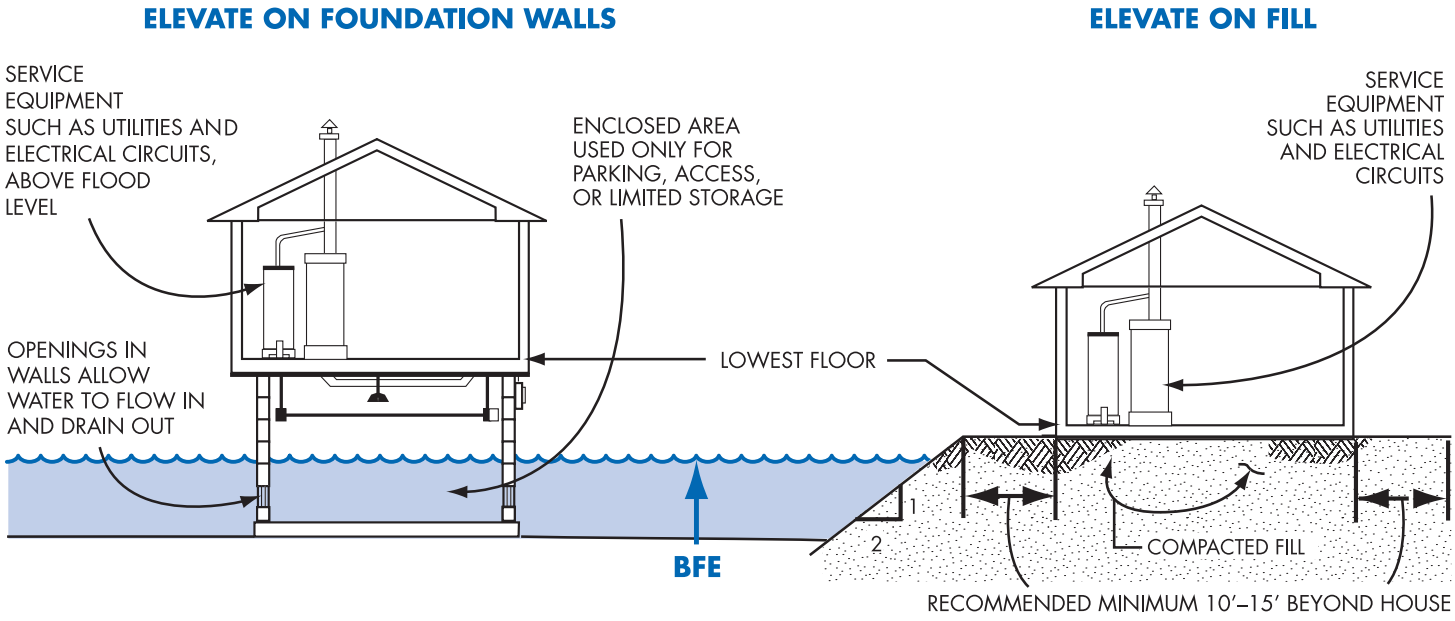
BE FLOOD ALERT — NATIONAL FLOOD INSURANCE PROGRAM

This is to certify that I am a duly qualified engineer licensed to practice in the State of Arkansas.
It is to further certify that the attached technical data supports the fact that the proposed ***(Name of Development)*** will not impact the Base Flood Elevations (100-year flood), floodway elevations and the floodway widths on ***(Name of Stream).***

Signature _____ *Seal* _____

- A "no impact" or "no rise" certification is required and must be signed, sealed, and dated by a registered professional engineer.
- Check with your community for guidance **before** you decide to work in a floodway.

The engineering analysis must be based on technical data approved by FEMA.
Save time and money – don't build in the floodway!

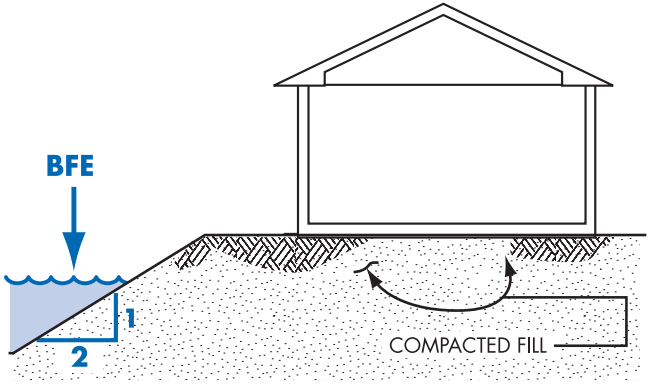


CAUTION! Enclosures (including crawlspaces) have some special requirements (see pages 37 and 38). Note: When the walking surface of the lowest floor is at the minimum elevation, under-floor utilities are not allowed. Fill used to elevate buildings must be placed properly (see page 35).

Compaction of Floodplain Fill

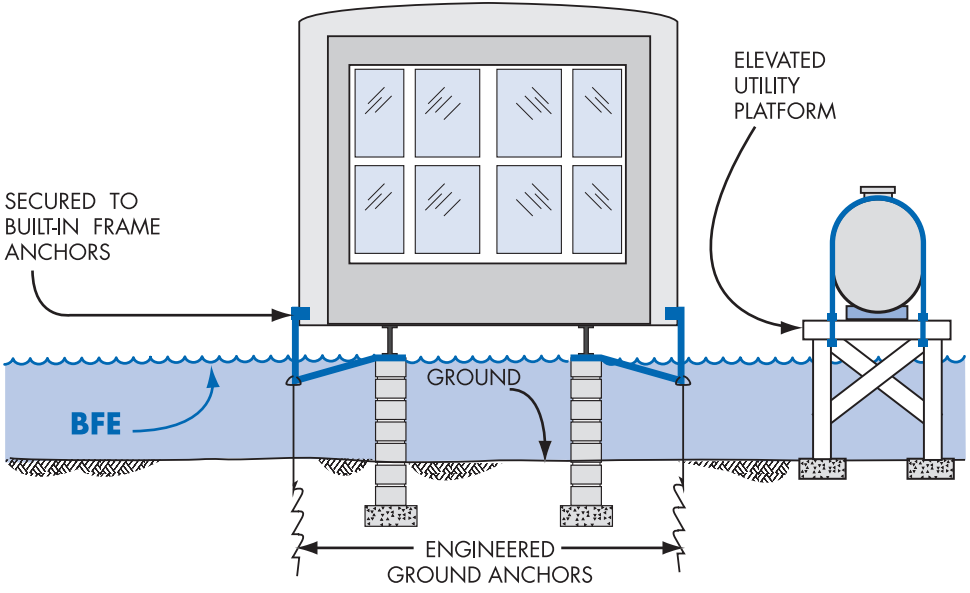
Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet floodplain requirements, floodplain fill should:

- Be good clean soil, free of large rocks, construction debris, and woody material (stumps, roots).
- Be machine-compacted to 95 percent of the maximum density (determined by a design professional).
- Have graded side slopes that are not steeper than 2:1 (one foot vertical rise for every 2 feet horizontal extent); flatter slopes are recommended.
- Have slopes protected against erosion (vegetation for "low" velocities, durable materials for "high" velocities – determined by a design professional).



Your community may ask for certification of the elevation, compaction, slope, and slope protection materials. Your engineer or design professional can find more information in FEMA's technical guidance (MT-1).

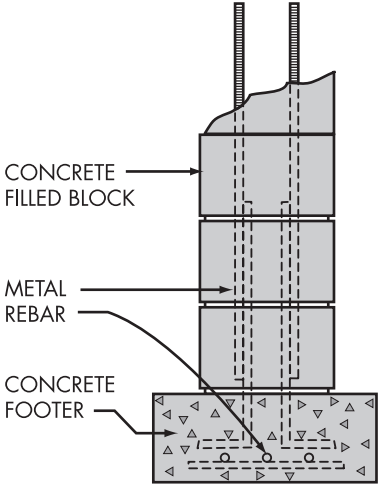
Manufactured Homes Require Special Attention



Manufactured homes must be anchored to resist flotation, collapse, or lateral movement by being tied down in accordance with your community's ordinance or the manufacturers' installation specifications.

Experience shows that manufactured homes are easily damaged. As little as 1 foot of water can cause substantial damage.

Dry stacked blocks are not acceptable — they will **NOT** withstand a flood.

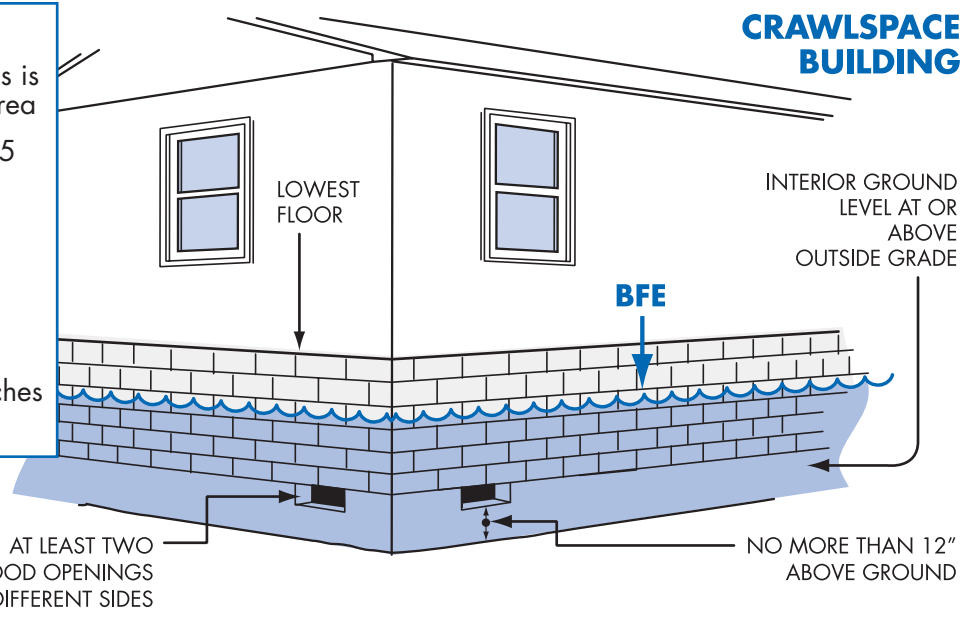


Enclosures Below the BFE

NOTE:

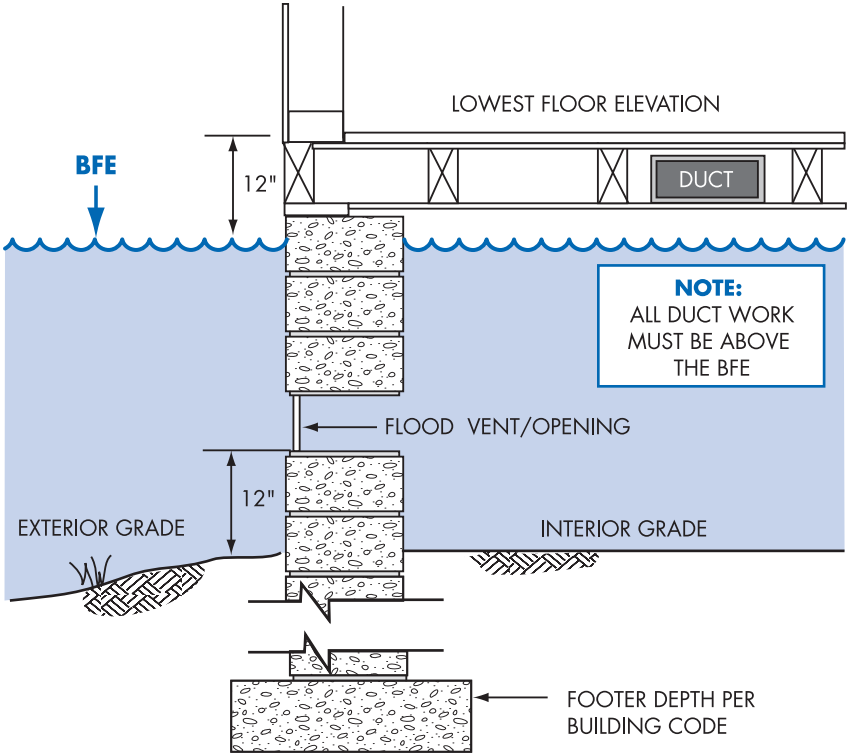
- Total net area of all total openings is 1 sq. in. per sq. ft. of enclosed area
- A 25′ x 45′ building needs 1,125 sq. inches of openings
- Standard ventilation units used in block foundation walls must be disabled in the open position to allow water to flow in and out
- A standard ventilation unit, with screen, provides 42 to 65 sq. inches of opening

ALTERNATIVE: Engineered openings are acceptable if certified to allow adequate automatic inflow and outflow of floodwaters.



Solid perimeter wall foundations can enclose flood-prone space. A crawlspace is a good way to elevate just a couple of feet. In all cases, the following are required: vents/openings, elevated utilities, flood-resistant materials, and limitations on use.

Crawlspace Details

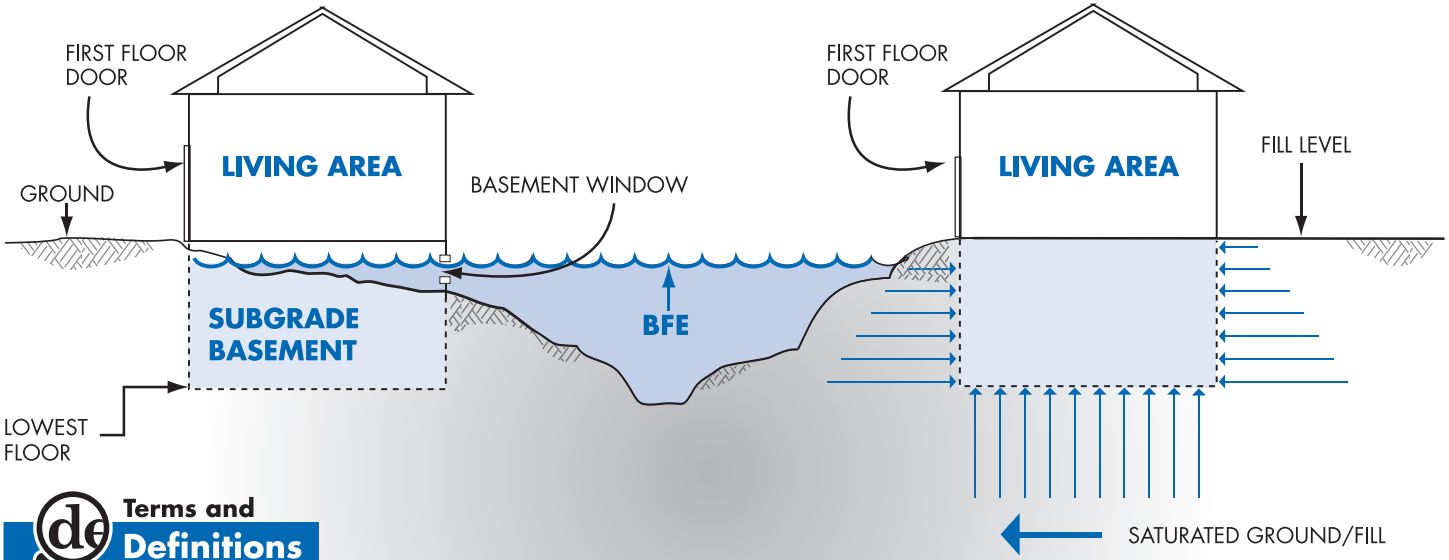


- The Lowest Floor Elevation must be at or above the BFE.
- The bottom of flood vents/openings must be no more than 1 foot above grade.
- Standard ventilation units must be disabled in the "open" position to allow water to flow in and out.
- Interior grade must be equal to or higher than exterior grade on at least one side.

Calculate Net Flood Opening:

A building that measures 25′ x 45′ has 1,125 square feet of enclosed crawlspace. Flood vents must provide 1,125 sq. in. of net open area (or have certified engineered openings). If a standard air vent unit provides 60 sq. in. of net open area, then to satisfy the flood opening requirement 19 vent units are required (1,125 divided by 60).

Basements Are Unsafe



Terms and Definitions

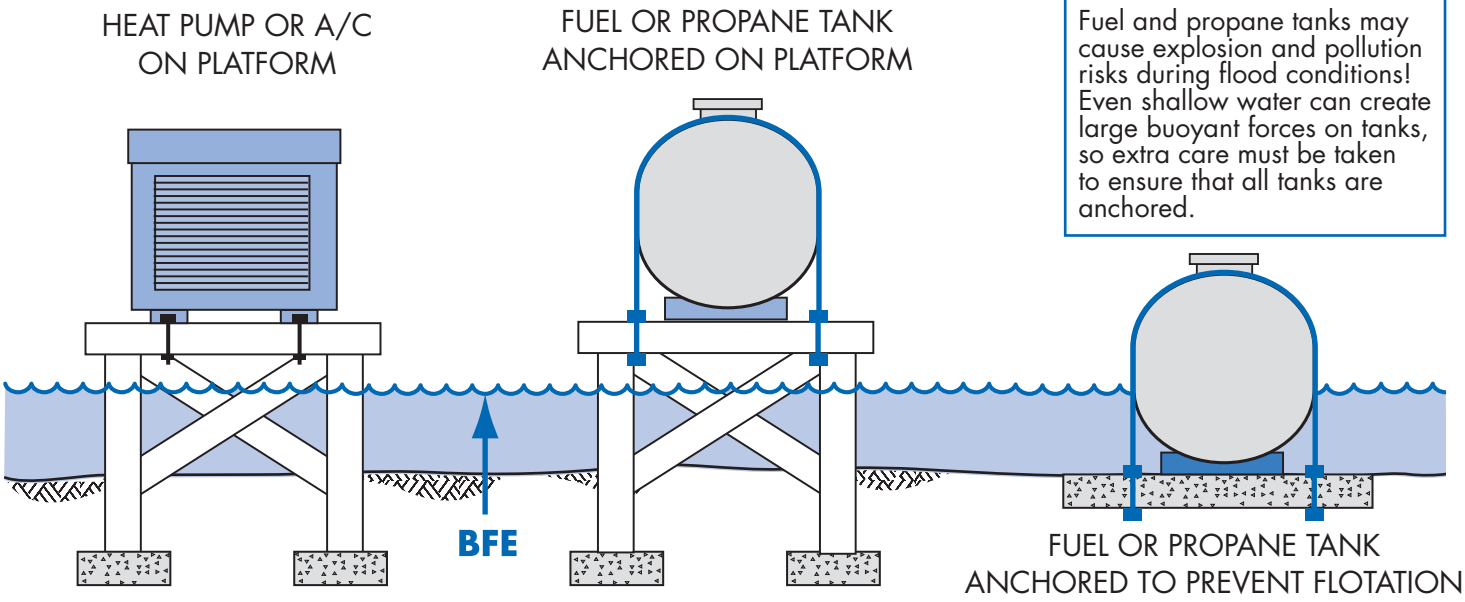
A **basement** is any portion of a building that has its floor sub-grade (below ground level) on all sides.

Basements below the BFE **are not** allowed in new development and flood insurance coverage is very limited in existing basements for a very good reason. It only takes an inch of water over the sill and the entire basement fills up! Excavating a basement into fill doesn't always make it safe because saturated groundwater can damage the walls.

Utility Service Outside Buildings

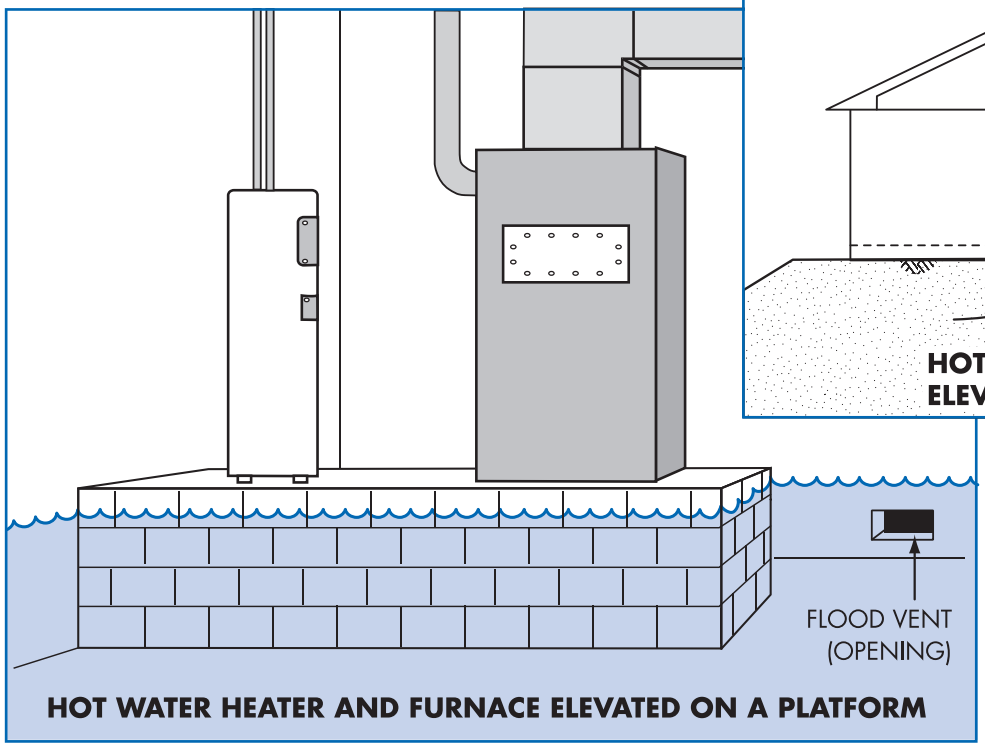
Important Information

Fuel and propane tanks may cause explosion and pollution risks during flood conditions! Even shallow water can create large buoyant forces on tanks, so extra care must be taken to ensure that all tanks are anchored.

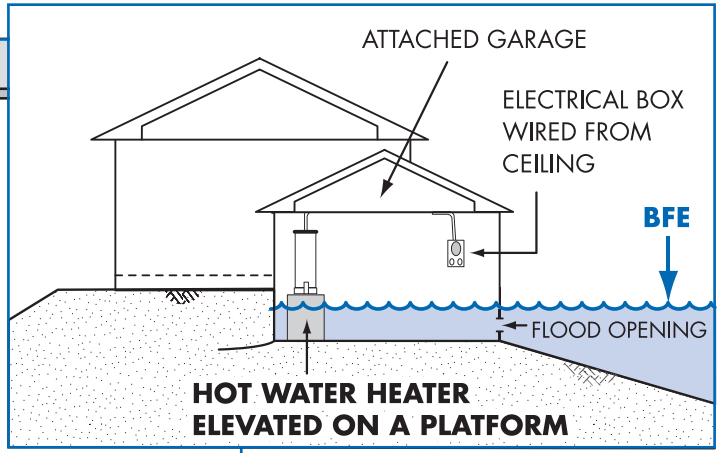


Whether inside an attached garage or outside the building, all utilities, appliances and equipment must be elevated above the BFE or protected against flood damage. Utilities include plumbing, electrical components, gas lines, fuel tanks, and heating and air conditioning equipment.

Utility Service Inside Enclosures



HOT WATER HEATER AND FURNACE ELEVATED ON A PLATFORM

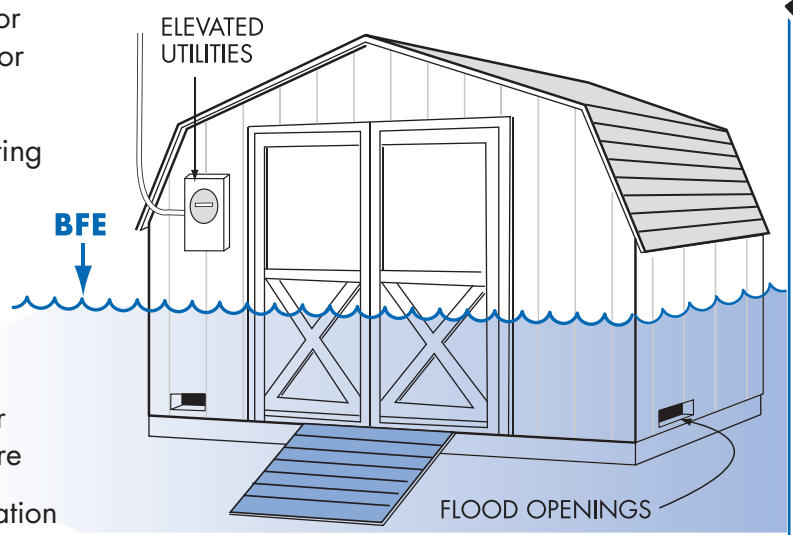


**HOT WATER HEATER
ELEVATED ON A PLATFORM**

All utilities, appliances, and equipment must be elevated above the BFE or protected. Utilities include plumbing, electrical components, gas lines, and heating and air conditioning equipment.

Accessory (Appurtenant) Structures

- Not habitable
- Used only for parking or storage (not pollutants or hazardous materials)
- Anchored to resist floating
- Flood vents/openings
- Built of flood-resistant materials
- Elevated utilities
- Cannot be modified for different use in the future
- Documented floor elevation



Even small buildings are "development" and permits or variances with noted conditions are required. They must be elevated or anchored and built to withstand flood damage.
Caution! Remember, everything inside is likely to get wet when flooding occurs.

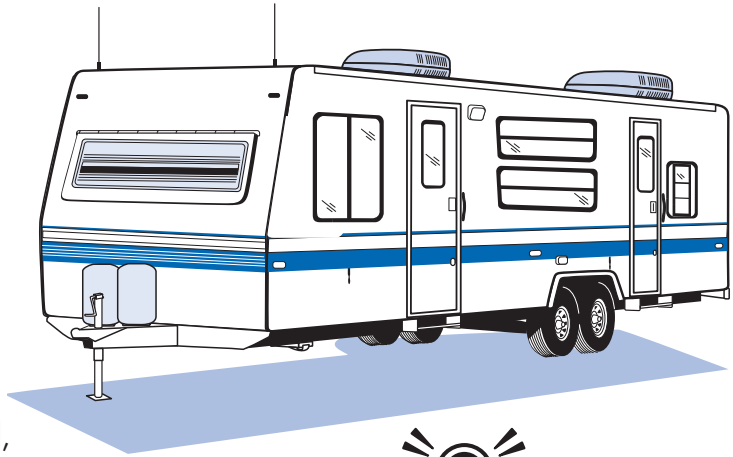
Terms and Definitions

Accessory (Appurtenant) Structure means a structure that is located on the same parcel of land as a principal structure and whose use is incidental to the use of the principal structure. Accessory structures may not be used for human habitation and must be designed to minimize flood damage. Examples: detached garages, carports, storage sheds, pole barns, and hay sheds.

Recreational Vehicles

In a flood hazard area, an RV must:

- Be licensed and titled as an RV or park model (not as a permanent residence)
- Be built on a single chassis
- Have inflated wheels and be self-propelled or towable by light truck
- Have no attached deck, porch, or shed
- Be used for temporary recreational, camping, travel, or seasonal use (no more than 180 days)
- Have quick-disconnect sewage, water, and electrical connectors



Important Information

Camping near the water?
Ask the campground or RV park operator about flood warnings and plans for safe evacuations.

RVs that do not meet these conditions must be installed and elevated like Manufactured Homes, including permanent foundations and tie-downs (see page 36).

Planning to Improve Your Floodplain Building?

To obtain a permit to improve an existing building:

- You must provide a copy of your construction contract or a cost estimate (including estimated market value of your own or donated labor and materials).
- Your community will compare the cost of the proposed work to the market value of your building and check the value of improvements.
- You may submit an independent assessment of the market value of the building, if performed by a qualified professional.
- If the cost of the improvement (or if the proposed work plus improvements) equals or exceeds 50% of the market value of the building, you must comply with the Substantial Improvement requirements.
- If the costs do not trigger Substantial Improvement requirements, then you should still consider ways to reduce future damage (see page 45).

Terms and Definitions

Substantial improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This term includes structures which have incurred substantial damage, regardless of the actual repair work performed (see page 49).

Important Information

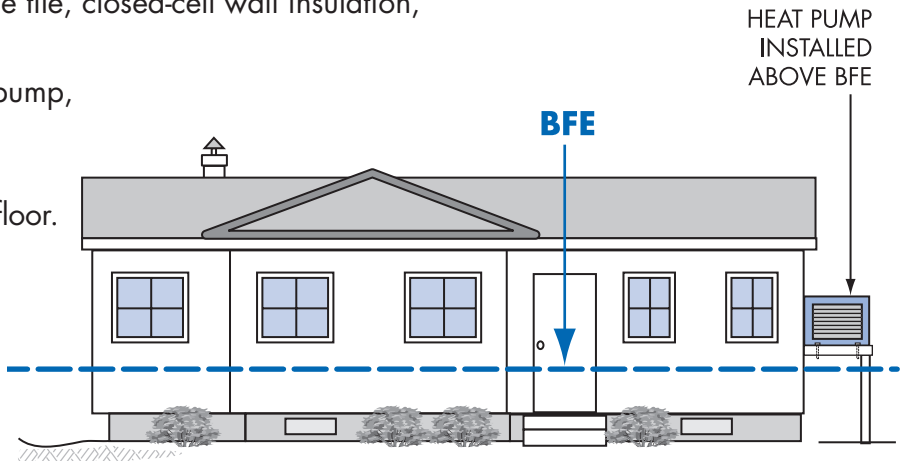
Improvements include:

- Renovation/ rehabilitation of the interior of the existing building (see page 46)
- Lateral addition, without renovation or structural alteration of the existing building (see page 47)
- Lateral addition, with renovation or structural alteration of the existing building (see page 48)
- Vertical addition (add new story).

Non-Substantial Improvements

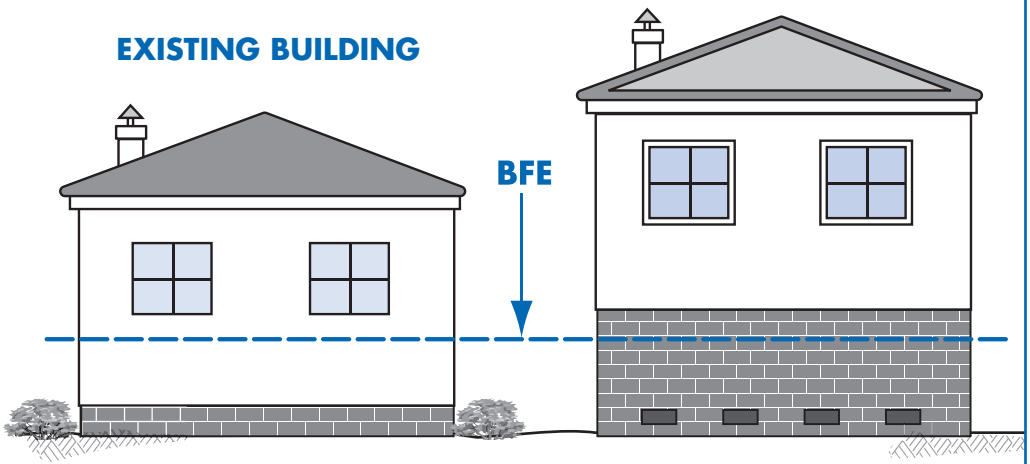
Your proposed improvements are "non-substantial" if the costs of all improvements are less than 50% of the market value of the building. Although you are not required to bring the existing building into compliance, there are many things you can do to reduce future flood damage. Find out the BFE at your location and consider the following:

- Use flood resistant materials, for example tile, closed-cell wall insulation, and polyvinyl wall coverings.
- Raise air conditioning equipment, heat pump, furnace, hot water heater, and other appliances on platforms.
- Install electrical outlets higher above the floor.
- Move ductwork out of crawlspaces.
- Retrofit crawlspaces with flood openings.
- Fill in below-grade crawlspaces/ utility space.



Note! Be sure to include ALL proposed work in your initial permit application. If you add more work after the permit is issued, your community will make another evaluation for Substantial Improvement.

Substantial Improvement: Renovation Only



Important Information

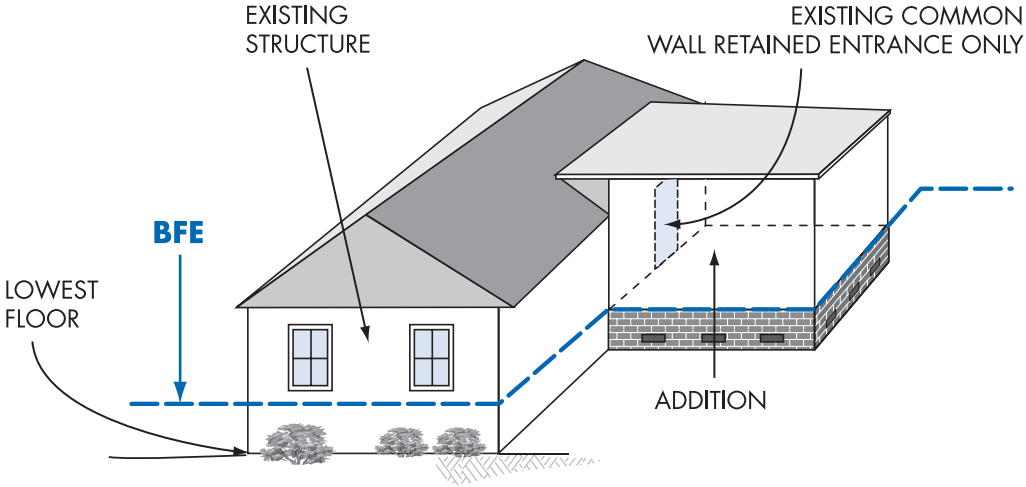
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Check with your local permit office and the Arkansas Natural Resources Commission before you begin. It will be easier to do it right the first time.

The cost to correct previously cited violations of state or local health, sanitary, or safety codes to provide safe living conditions can be excluded from the cost of renovations.

Alteration of a registered historic structure is allowed, as long as it will continue to meet the criteria for listing as a historic structure.

Substantial Improvement: Lateral Addition Only



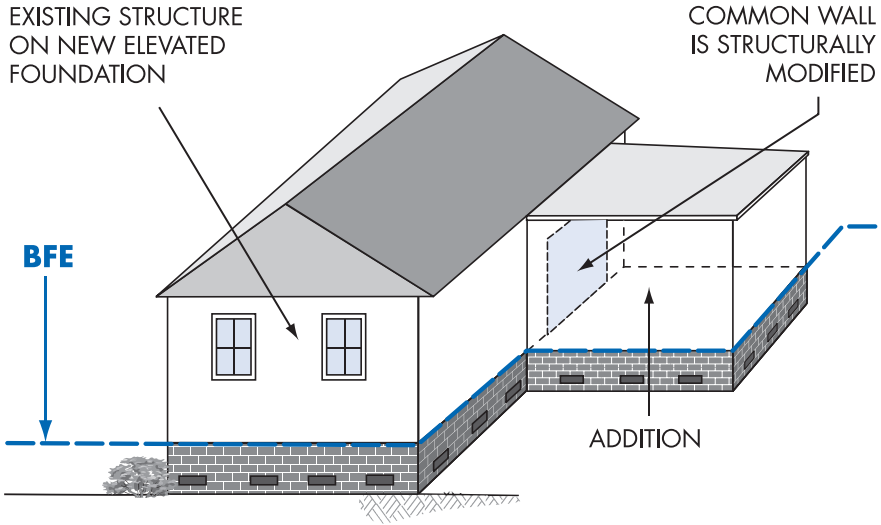
Important Information

See page 48 if your project to add a lateral addition also includes modifying the interior of the existing building or making structural modifications to the existing common wall.

You must get a permit from your community to build an addition to your floodplain building. If the existing building is not already properly elevated, then only the addition must be built with the lowest floor at or above the Base Flood Elevation provided:

- You make no interior modifications to the existing building; and
- You make no structural modifications to the existing common wall other than adding a connecting doorway.

Substantial Improvement: Addition Plus Other Work

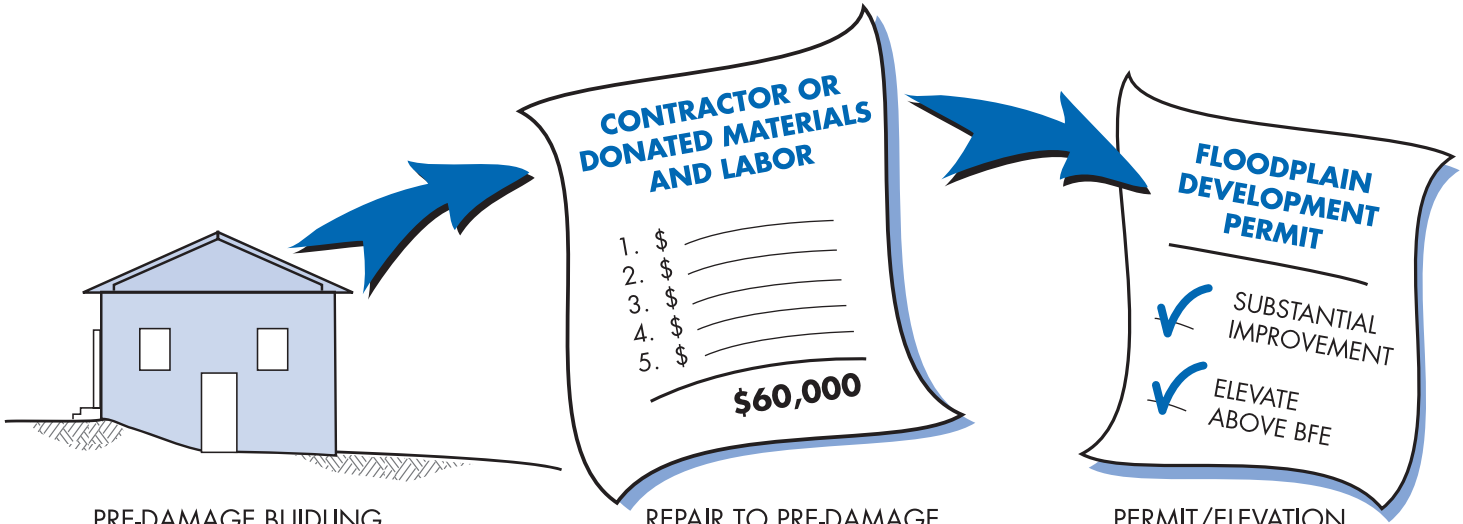


Your community must prepare an evaluation to determine if all of your proposed work will trigger the Substantial Improvement requirement. Substantial Improvement is triggered if:

- The work involves adding a new top floor, modifying the interior of the existing building, or structural modifications to the existing common wall (for lateral addition); and
- The cost of all proposed work plus the cost of improvements equals or exceeds 50% of the market value of the existing building.

Your community's permit office can help you determine which requirements apply. It is always a good idea to request a preliminary review before you get too far along with your plans.

What About After Damages?



PRE-DAMAGE BUIDLING
MARKET VALUE=$100,000

REPAIR TO PRE-DAMAGE
CONDITION = 60%

PERMIT/ELEVATION
REQUIRED

A permit is required to repair substantial damage from any cause — fire, flood, wind, or even a truck running into a building. Check with your community permit office to be sure. You will be asked to provide a detailed cost estimate for repairs. See page 51 for more information about elevating an existing building above a crawlspace.

Paying for Post-Flood Compliance

You may be eligible for up to $30,000 to help pay to protect your building from future flood damage – to bring it into compliance with your community's floodplain requirements – if:

USE THE ICC CLAIM TO:

ELEVATE ON YOUR LOT

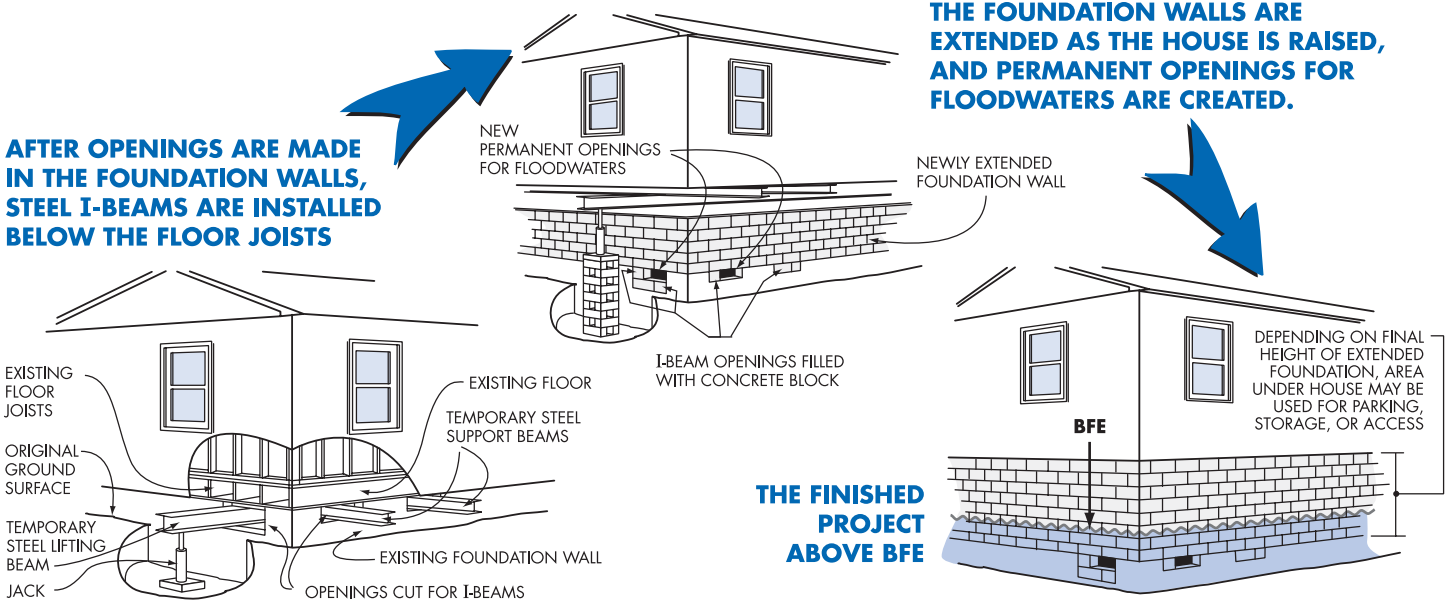
DEMOLISH AND REBUILD THE HOUSE

MOVE THE HOUSE TO HIGH GROUND

- You have NFIP flood insurance – it includes Increased Cost of Compliance (ICC), coverage.
- Your building is in the mapped Special Flood Hazard Area.
- Your community has made an official determination that the building was substantially damaged by flooding.
- You act quickly to process all the required paperwork.

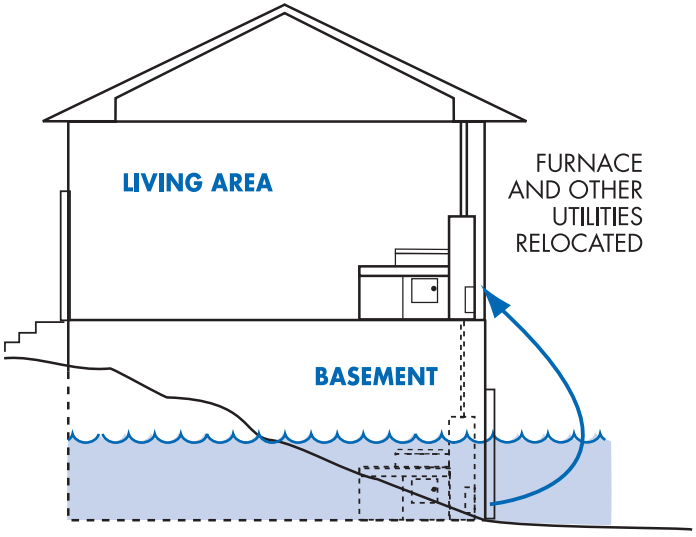
Owners whose buildings are substantially damaged are required to "bring the building into compliance" with floodplain requirements. Substantial damage is a special case of substantial improvement (see pages 44 and 49).

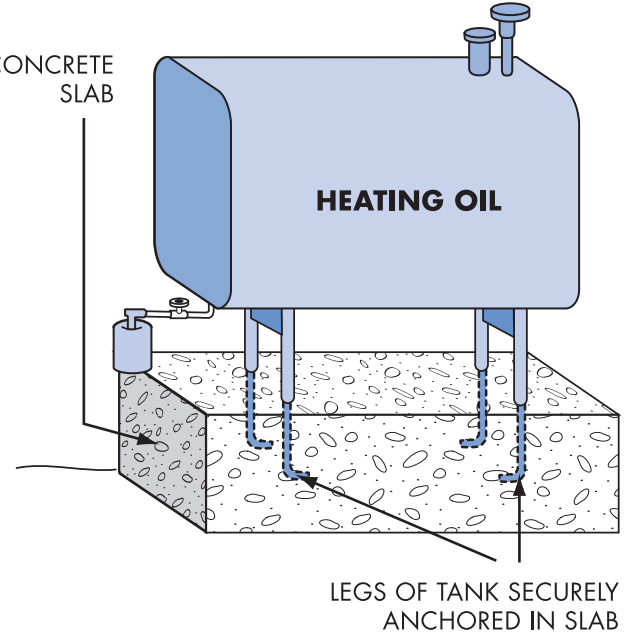
Elevating a Pre-FIRM Building



This is one way to elevate an existing building to comply with floodplain regulations. If your insured building is damaged by flood and your community determines it is substantially damaged, you may be eligible for an **Increased Cost of Construction** payment (see page 50).
The state and FEMA can help with more information and options.

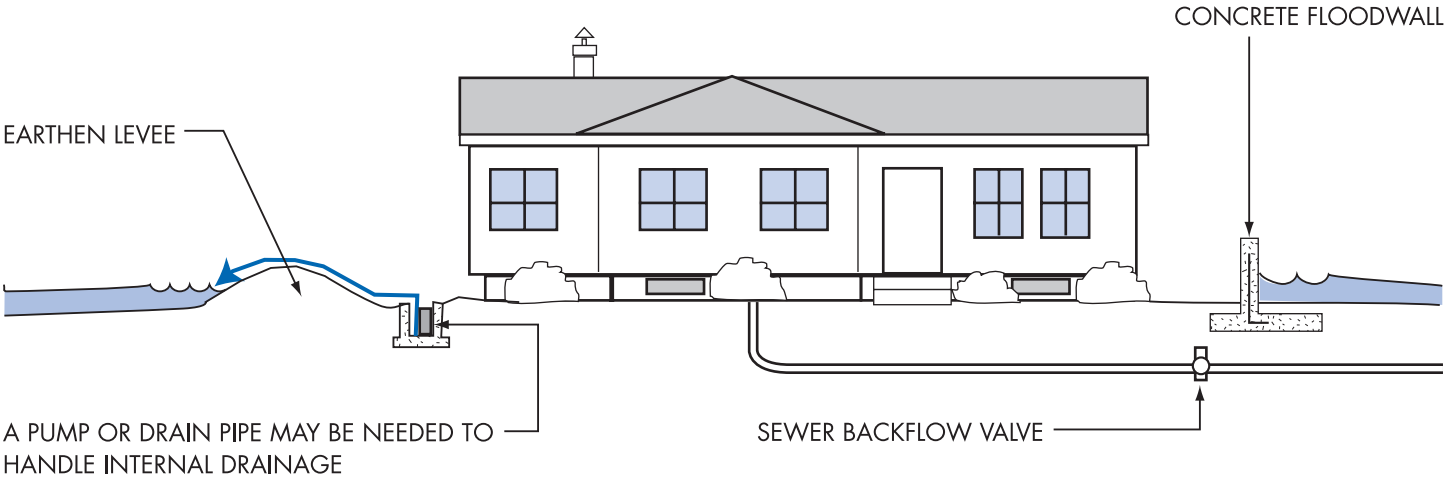
Some Flood Protection for Older Homes is Easy and Low Cost





Move water heaters, furnaces, and ductwork out of basements. Anchor heating oil and propane gas tanks to prevent flotation. **Do not** store valuables in a flood-prone crawlspace or basement. Use water-resistant materials when you repair.

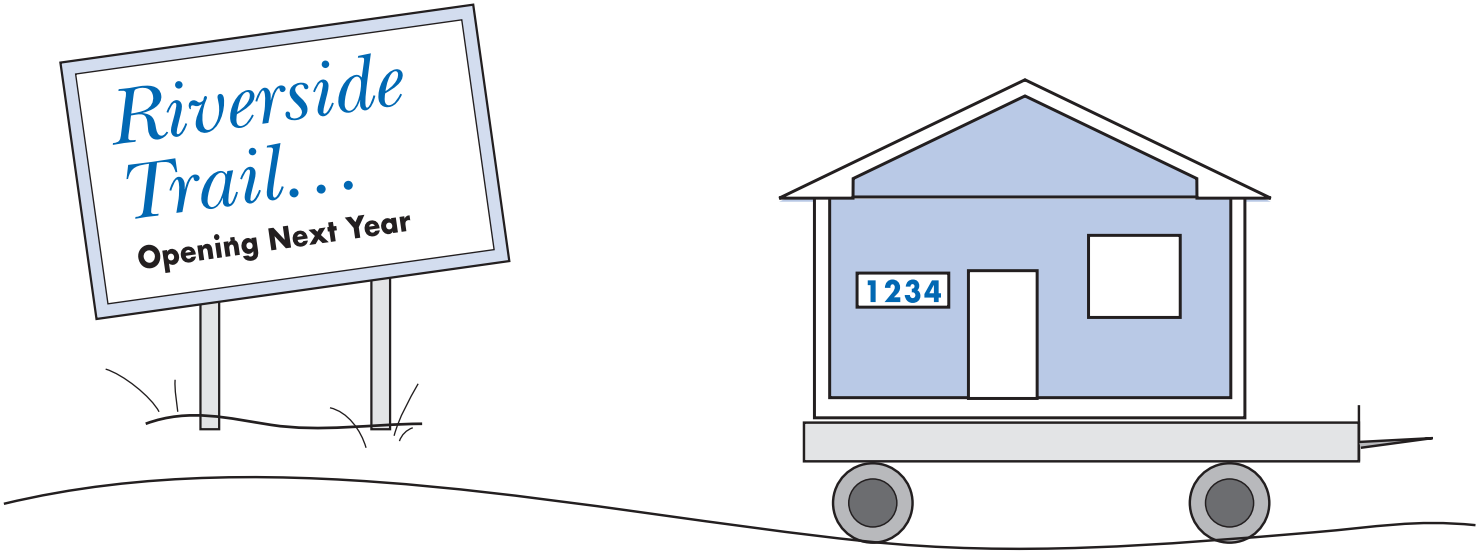
Small Levees and Floodwalls Can Protect Some Older Homes



In areas where floodwaters aren't expected to be deep, sometimes individual buildings can be protected by earthen levees or concrete floodwalls. You must get a permit for those protection measures, and extra care must be taken if the site is in a Floodway (see pages 12, 32 and 33). A levee or floodwall cannot be used to protect a new or substantially improved building, or one that is repaired after substantial damage. **Important!** These protective measures will not reduce your flood insurance premium!

Some Flood Mitigation Projects are More Costly

But Give You More Protection



After floods, some communities buy out and demolish homes that were severely damaged. The acquired land is dedicated to open space and can be used for recreation or to help restore wildlife habitat and wetlands. Homes have been raised up on higher foundations, and others have been moved to safer high ground.

Useful Resources and Common Acronyms

Useful Resources

- For information on disaster safety, being prepared, and repairing homes, click on Disaster Services when you visit the American Red Cross webpage at **http://www.redcross.org**.
- FEMA has developed materials to help families and businesses learn more about preparing for floods and recovering from disasters at **http://www.fema.gov/library**.
- **Arkansas Natural Resources Commission:** **http://www.anrc.arkansas.gov**
- **Arkansas Department of Emergency Management:** **http://www.adem.state.ar.us**
- **Arkansas Department of Environmental Quality:** **http://www.adeq.state.ar.us**
- **Arkansas Department of Insurance:** **http://insurance.arkansas.gov**
- **Arkansas Floodplain Management Association:** **http://www.arkansasflood.com**

Common Acronyms

- BFE = Base Flood Elevation
- EC = Elevation Certificate
- FEMA = Federal Emergency Management Agency
- FIRM = Flood Insurance Rate Map
- ICC = Increased Cost of Compliance
- NFIP = National Flood Insurance Program
- SFHA = Special Flood Hazard Area

Want to Learn More?

- For advice on flood information and permits, call your community's building permit office, engineering, or planning department.
- To order flood maps, call FEMA's Map Service Center – (800) 358-9616 or enter the FEMA Map Store to order online at **http://store.msc.fema.gov**.
- To learn more about flood maps and to check the Status of Map Change Requests, click on "Flood Hazard Mapping" at **http://www.fema.gov**.
- FEMA's online publications can be found in the FEMA Virtual Library. Many are posted in the Portable Document Format (PDF). Go to **http://www.fema.gov** for more information. You can order printed copies of FEMA publications from the FEMA Distribution Center, at **(800) 480-2520**.
- To learn about flood insurance, call your insurance agent. Most insurance companies can write an NFIP policy for you. If you need more help, call the National Flood Insurance Program's toll free number to get the name of an agent in your area who does write flood insurance. The number is **(888) 356-6329**.
- To get the best rates for flood insurance, call a local surveyor to complete an Elevation Certificate.
- Find out about online Elevation Certificate training for surveyors by going to **http://www.fema.gov** and searching on "Elevation Certificate."