2012

FLOODPLAIN MANAGEMENT IN FLORIDA

Quick Guide

Florida Division of Emergency Management

Bureau of Mitigation
State Floodplain Management Office
2555 Shumard Oak Boulevard, Tallahassee, FL 32399

www.floridadisaster.org

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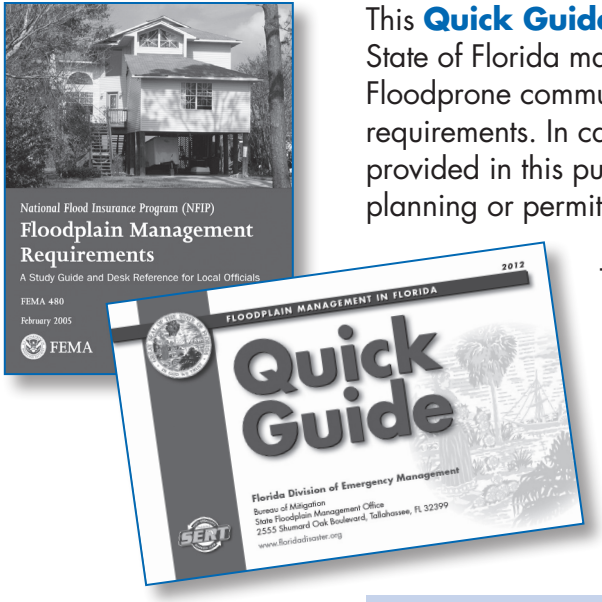
About This Guide



This **Quick Guide** will help you understand why and how communities in the State of Florida manage development in floodplains to protect people and property. Floodprone communities adopt codes and ordinances that detail the rules and requirements. In case of conflict, those codes and ordinances, not the guidance provided in this publication, must be followed. If you have questions talk with a local planning or permit official.

This **Quick Guide** was developed and funded jointly by the Florida Division of Emergency Management and the Federal Emergency Management Agency (FEMA).

Questions, comments and requests for additional copies should be directed to the Florida Division of Emergency Management, State Floodplain Management Office at (850) 413-9960.

Prepared by:

RCQuinn Consulting, Inc.

For more detail on all aspects of floodplain management, please refer to FEMA 480, *National Flood Insurance Program, Floodplain Management Requirements: A Study Guide and Desk Reference for Local Officials.*

Why Do We Regulate the Floodplain?

To protect people and property – Floodplain management is about reducing vulnerability to flood risk to our built environment. If we know low lying land will flood from time to time, we should make reasonable decisions to help protect our families, homes, and businesses.

To reduce future flood losses in Florida – Floodplain development regulations are simply a "good neighbor" policy designed to protect our citizens from future flood losses. Regulating floodplain development helps keep flooding conditions from getting worse as development continues.

To make sure that federal flood insurance is available – Your community must join the NFIP before its residents and businesses can purchase flood insurance. If not, your community may be ineligible for some types of federal assistance. In addition, residents may be unable to secure mortgages.

To save tax dollars – Every time you hear about a flood disaster, think about what it means to your community's budget. If we build smart, we'll have fewer problems the next time the water rises. Remember, federal disaster assistance is not available for all floods. Even when the President declares a disaster, your community still has to pay a portion of repair and clean-up costs, temporary housing assistance, and could also incur some evacuation expenses.

To avoid liability and lawsuits – If we know an area is mapped as a flood hazard area and is likely to flood, and if we know people could be in danger and buildings could be damaged, doesn't it make sense to take reasonable protective steps as we develop and build?

What is the National Flood Insurance Program?

The National Flood Insurance Program (NFIP) was created by Congress in 1968 to protect lives and property and to reduce the financial burden of providing disaster assistance. The NFIP is administered by the Federal Emergency Management Agency (FEMA). Nationwide, over 20,500 communities participate in the NFIP— almost 460 of Florida's counties, cities and towns participate.

The NFIP is based on a mutual agreement between the Federal Government and communities. Communities that participate agree to regulate floodplain development according to certain criteria and standards. The partnership involves:

- **Flood hazard maps.** FEMA produces flood maps, in partnership with water management districts, communities and the State, in accordance with FEMA standards. The maps are used by communities, insurance agents, and others.
- **Flood insurance.** Property owners and renters in participating communities are eligible to purchase Federal flood insurance for buildings and contents.
- **Regulations.** Communities must adopt and enforce minimum floodplain management regulations so that development, including buildings, is undertaken in ways that reduce exposure to flooding.

To learn more about the NFIP, including your potential flood risk and the approximate cost of a flood insurance policy, go to FEMA's FloodSmart website www.floodsmart.gov.

Community Responsibilities

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

- **Adopt and enforce** flood maps and a flood damage prevention ordinance.
- **Require** permits for all types of development in the floodplain (see page 22).
- **Assure** that building sites are reasonably safe from flooding.
- **Establish** Base Flood Elevations (BFE) where not determined by FEMA.
- **Require** new and substantially improved homes and manufactured homes to be elevated above the BFE.
- **Require** non-residential buildings to be elevated or floodproofed above the BFE.
- **Determine** if damaged buildings are substantially damaged.
- **Conduct** field inspections; cite and remedy violations.
- **Require and maintain** surveyed elevation information to document compliance (see pages 29, 30, and 31).
- **Carefully consider** requests for variances.
- **Resolve** non-compliance and violations.
- **Advise and work** with FEMA and the State when updates to flood maps are needed.
- **Maintain** records for review and respond to periodic requests for reports to FEMA

Flood Insurance: Property Owner's Best Protection

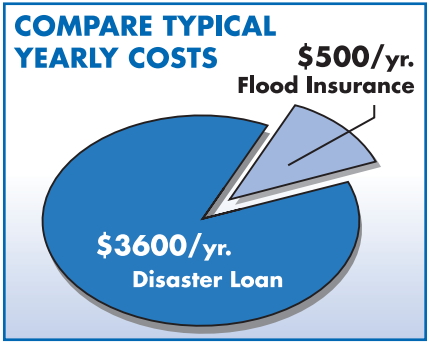
Who needs flood insurance? Federal flood insurance is required for all buildings in mapped Special Flood Hazard Areas (SFHAs) shown on FEMA's maps if they are financed by Federally-backed loans or mortgages. All homeowners, business owners, and renters in communities that participate in the NFIP may purchase Federal flood insurance on any building and its contents, even if outside of the mapped flood zone. If your home is in the mapped SFHA, you are five times more likely to be damaged by flood than by a major fire.

Not in a mapped floodplain? Unfortunately, it's often after a flood that many people discover that their home or business property insurance does NOT cover flood damage. Approximately 25% of all flood damage occurs in low risk zones, commonly described as being "outside the mapped flood zone."

Protected by a levee or dam? Even if you live in an area protected by a levee or other flood control structure, there is a residual risk that those structures will be overtopped or fail. If your community's levee provides "100-year" flood protection, there is still a chance that a higher flood will cause flooding.

What about disaster grants and loans? Federal disaster grants do not cover most losses and repayment of a disaster loan can cost many times more than the cost of a flood insurance policy.

Want to know more? Learn more at www.floodsmart.gov.
To purchase a policy, call your insurance agent. To get the name of an agent in your community, use the Agent Locator or call (888) 379-9531.



The NFIP's Community Rating System (CRS)

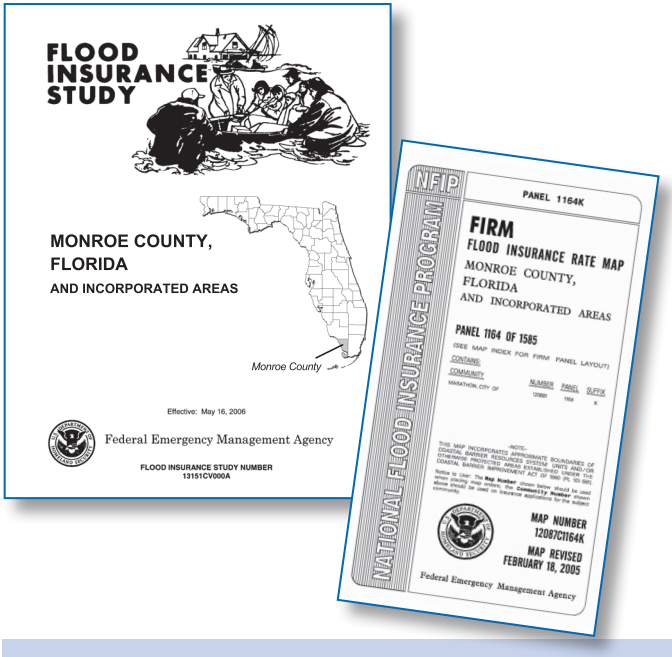
The NFIP's CRS gives "extra credit" to communities in the form of reduced flood insurance premiums. Communities must apply to the CRS and commit to implement and certify activities that contribute to reduced flood risk. Examples of actions your community can take to reduce the cost of your insurance premiums include:

- Preserve open space in the floodplain
- Enforce higher standards for safer development through zoning, stormwater, subdivision, and flood damage protection ordinances
- Develop hazard mitigation plans
- Undertake engineering studies and prepare flood maps
- Obtain grants to buy out or elevate houses or to floodproof businesses
- Maintain drainage systems
- Monitor flood conditions and issue warnings
- Inform people about flood hazards, flood insurance, and how to reduce flood damage

Community officials can request assistance from CRS specialists to help with the application process and prerequisites. Check the online CRS Resource Center (see page 60).

Property owners in over 200 Florida local jurisdictions that qualify for the CRS receive premium discounts ranging from 5% to 20% (as of 2012).

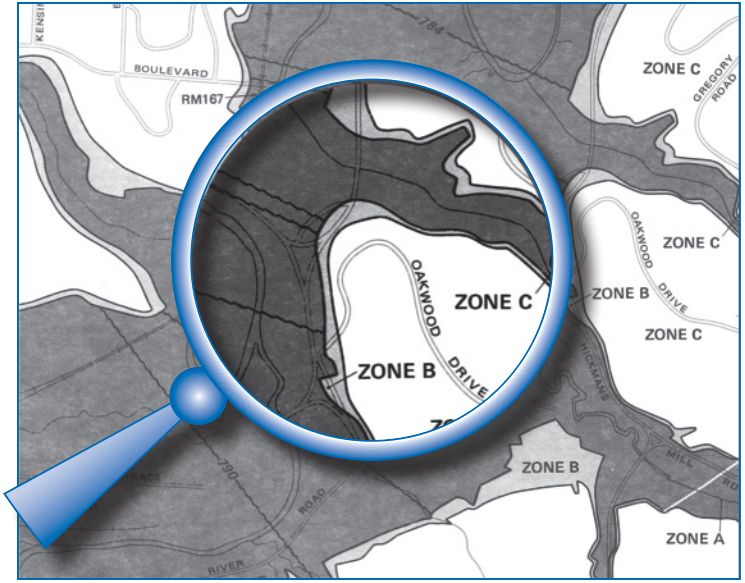
Looking for FEMA Flood Map Information?



- Flood Insurance Rate Maps (FIRM) are used to identify flood risk, to regulate flood hazard areas, and to determine where flood insurance is required.
- Use your computer to visit the FEMA Flood Map Service Center at www.msc.fema.gov. You can view current and historical flood maps online, order hardcopy maps or download digital scans of maps.
- Order hardcopies online at www.msc.fema.gov or by calling (877) 336-2627.
- Check your city or county web page. Many communities make available digital maps, including parcel data and flood hazard maps.

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

FIRMette: FEMA Flood Maps Online

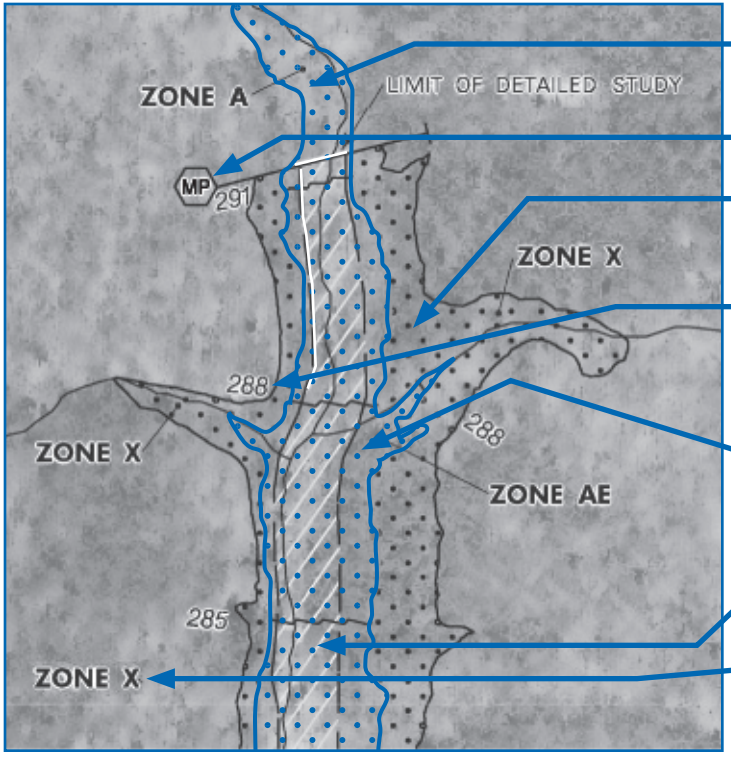


You can order paper maps or digital maps on CD-ROM from FEMA's Map Service Center (see page 61).

You can find and print a portion of a FIRM by using online tools at www.msc.fema.gov.

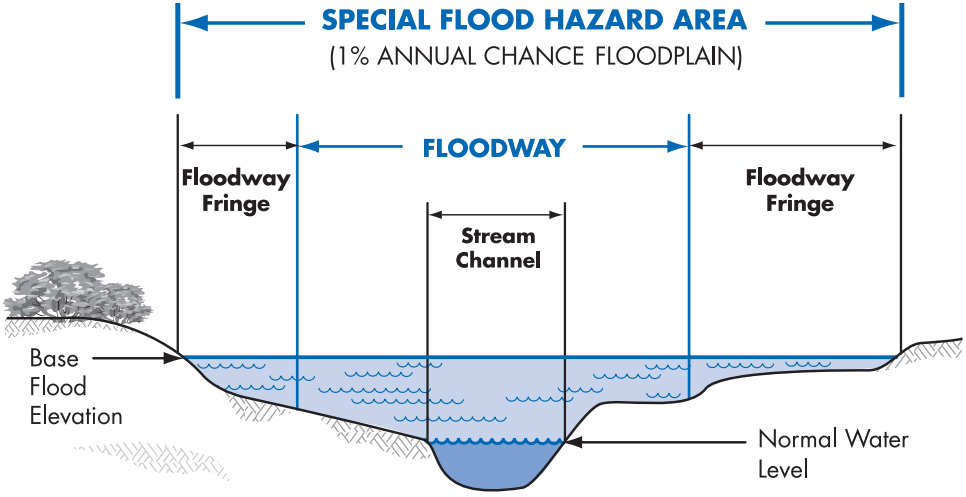
- Use "Product Search by Address" on the left OR click on "Product Catalog" at the top of the page, select "Effective FIRMs/FHBMs", select the State, county and community, then click on "Get Current FEMA Issued Flood Maps."
- Click on the index (Item ID = IND) to select the map panel, then click the "View" button to display the map panel. Use "Zoom" to enlarge the 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 to print.
- Select paper size and Adobe Acrobat (pdf) or Image File (png).

Flood Insurance Rate Map (Riverine)



1. **Zone A** (approximate) is the flood hazard area without BFEs.
2. **Cross Section** location (see page 12).
3. **Shaded Zone X** is the 0.2% annual chance (500-year) floodplain (formerly Zone B).
4. **Base Flood Elevation (BFE)** is the water surface elevation of the base flood rounded to the nearest whole foot (consult FIS profiles and tables for more accurate elevations).
5. **Zone AE** is the 1% annual chance (100-year) floodplain with BFEs (formerly Zones A1- A30).
6. The **Floodway** is the cross-hatched area (see page 11).
7. **Unshaded Zone X** is all other areas considered low risk (formerly Zone C).

Understanding the Riverine Floodplain



For floodplains with Base Flood Elevations (BFEs) determined by detailed flood studies, the Flood Profile in the Flood Insurance Study shows water surface elevations for different frequency floods (see page 12).

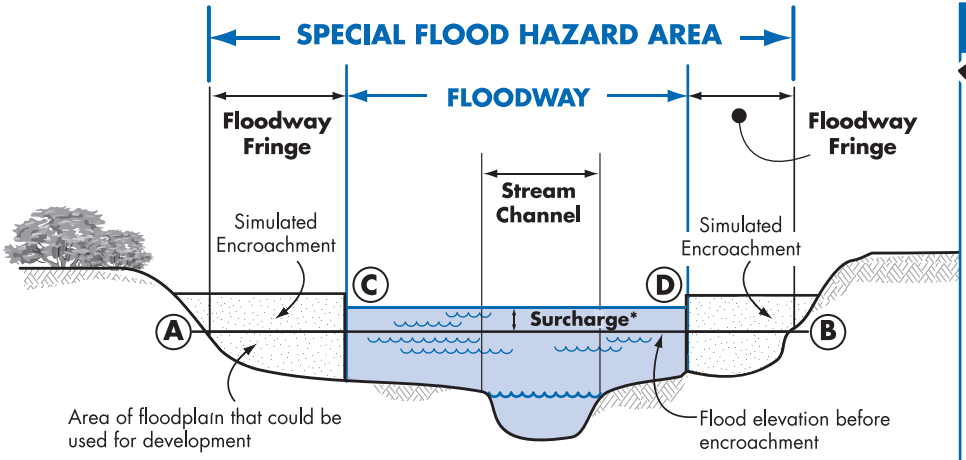
Terms and Definitions

The **Special Flood Hazard Area (SFHA)** is that portion of the floodplain subject to inundation by the base flood (1% annual chance) and/or flood-related erosion hazards. Riverine SFHAs are shown on new format FIRMs as Zones A, AE, AH, AO, AR, and A99. Older FIRMs may have numbered Zone A (A1-A30).

See page 11 to learn about the floodway, the area of the floodplain where flood waters usually are deeper and flow faster.

See page 5 to learn about flood insurance requirements in SFHAs.

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

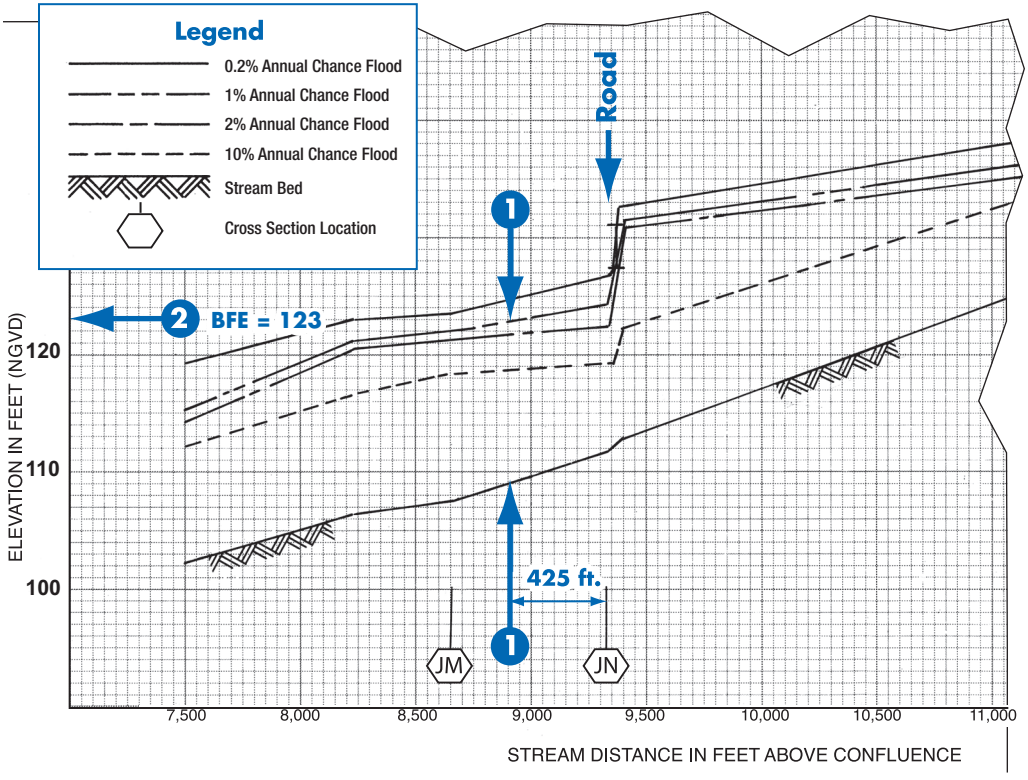
Terms and Definitions

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 cumulatively increasing flood elevations.

Computer models of the floodplain are used to simulate "encroachment" or development 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 developed.

For any proposed floodway development, the applicant must provide evidence that "no rise" will occur or obtain a Conditional Letter of Map Revision (CLOMR) before a local floodplain permit can be issued (see page 33). You will need an experienced registered professional engineer to make sure your proposed project either won't increase flooding or that any increases do not impact structures on other properties.

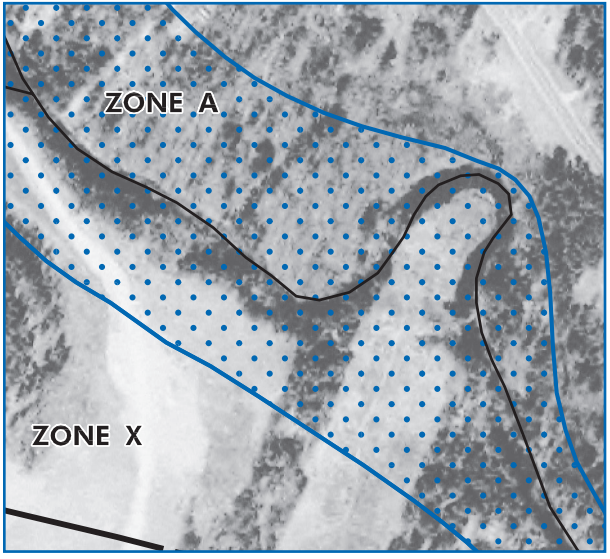
Use the Riverine Flood Profile to Determine Riverine BFEs



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 profile baseline of the stream channel, from a known point such as a road or cross section, for example, JM or JN.
2. Scale that distance on the Flood Profile and read up to the profile of interest, then across to determine the BFE, to the nearest 1/10 of a foot. (Answer: 123 feet).

Approximate Flood Zones



FEMA uses existing information – not engineering studies – to draw Approximate Zone A boundaries. Information may have been provided by the U.S. Army Corps of Engineers, other federal agencies, State and local agencies, and historic records.

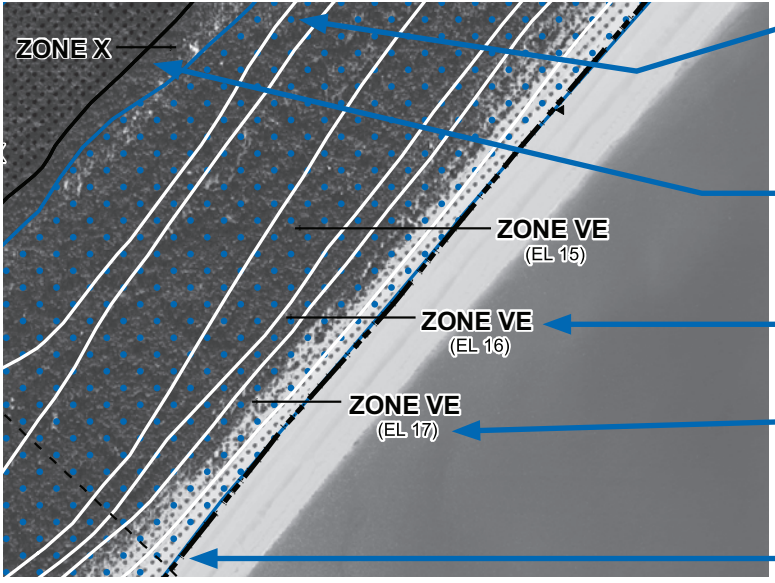
For assistance determining BFEs, contact your community's planning, engineering or permit office. Useful guidance for local officials and engineers is found in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas*.

Terms and Definitions

An **Approximate Zone A** is a special flood hazard area where BFE information is not provided.

If data are not available from another source, and provided there is no evidence indicating flood depths have been or may be greater than two-feet deep, local officials may specify that the BFE is two feet above the highest adjacent grade.

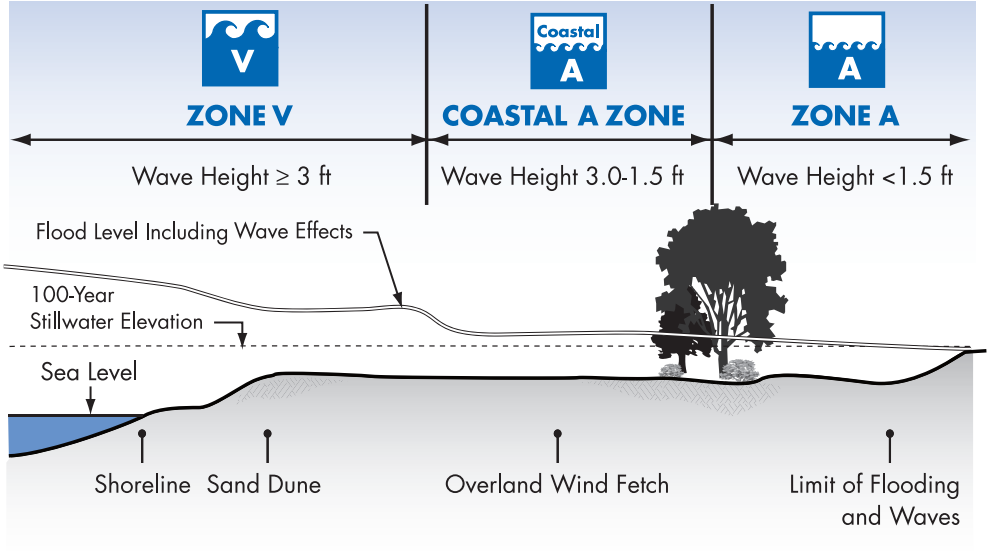
Flood Insurance Rate Map (Coastal)



1. **Zone AE** is subject to flooding by the base or 1% annual chance (100-year) flood, and waves less than 3 feet high, (formerly called Zones A1-A30).
2. **Unshaded Zone X** is the area of minimal flood risk outside the 500-year floodplain, formerly called Zone C.
3. **Zone VE** is where wave heights are expected to be 3 feet or more.
4. **Base Flood Elevation (BFE)** is the water surface elevation (in feet above the vertical datum shown on the map).
5. **Shoreline**

Some FIRMs published after 2009 may show the Limit of Moderate Wave Action (LiMWA). The LiMWA delineates where wave heights are less than 1.5 feet. The area between the LiMWA and the Zone V boundary is called the Coastal A Zone (see pages 15 and 16).

Understanding the Coastal Floodplain



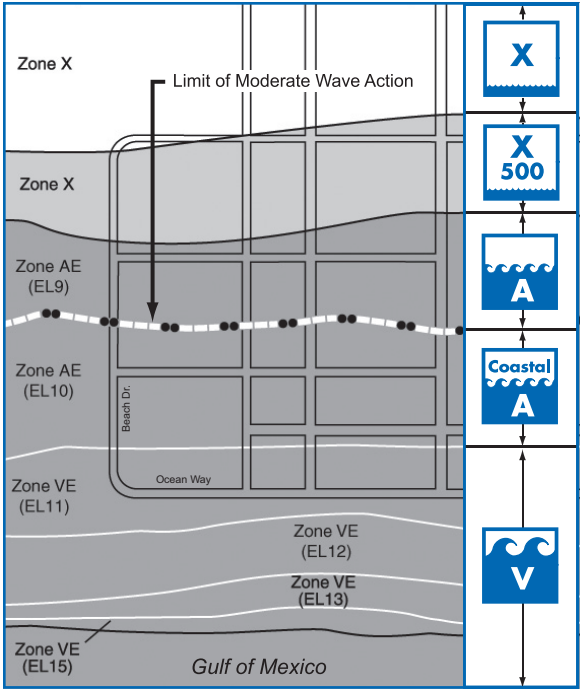
Areas subject to Coastal A Zone conditions (wave heights between 3 feet and 1.5 feet) may not be shown on FIRMs (see page 16). Some communities may treat the CAZ area as a Zone V and require development to comply with the Zone V requirements.

Terms and Definitions

The **Coastal High Hazard Area (Zone V)** is the Special Flood Hazard Area that extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action. The area is designated on the FIRM as Zone VE.

The term **Coastal A Zone (CAZ)** refers to the portion of the SFHA landward of the Zone V or landward of a shoreline that does not have a mapped Zone V. The principal sources of flooding are associated with astronomical tides, storm surges, seiches or tsunamis. Coastal A Zone may be subject to wave effects, velocity flows, erosion, scour or combinations of these forces.

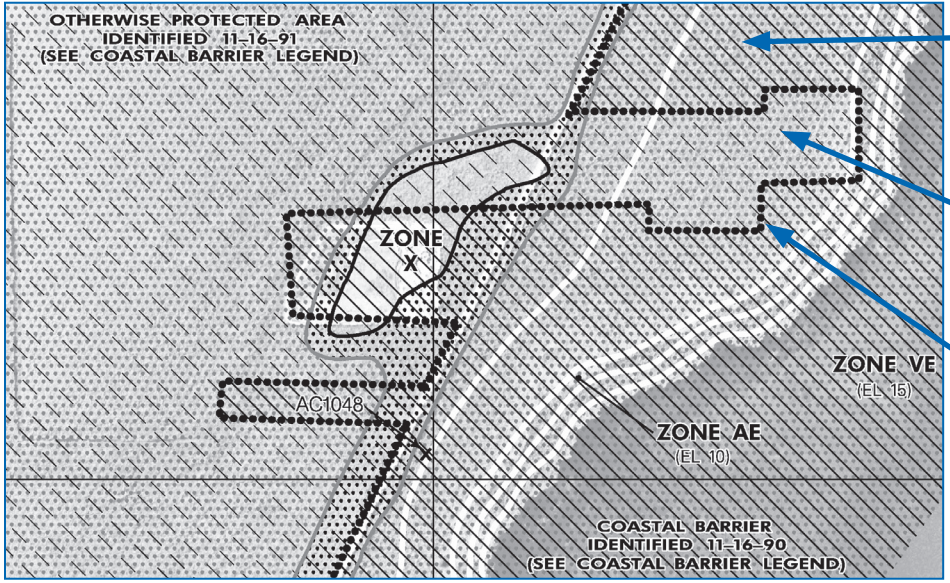
The Coastal A Zone (CAZ)



For illustration purposes only. Some FIRMs published after 2009 may show the Limit of Moderate Wave Action.

- Post-flood evaluations and laboratory tests confirm that breaking waves as small as 1.5 feet high cause damage to walls and scour around foundations.
- The Limit of Moderate Wave Action may be shown on revised FIRMs.
- CAZ conditions are found inland of Zone V and along shorelines without Zone V.
- CAZ conditions occur where stillwater depths are between 2 and 4 feet, which can support 1.5 to 3-foot waves.
- By reference to ASCE 24, the Florida Building Code requires Zone V construction methods in CAZs. If the CAZ is delineated, the FBC requires dwellings to be elevated at least one-foot above the BFE.
- Scour and erosion should be considered in CAZ if soils are sandy and erodible.
- Federal flood insurance in CAZs is rated using Zone A rates (lower than Zone V rates).

Coastal Barrier Resource System (CBRS)



1 Coastal Barrier Resources System (CBRS) Areas

2 Otherwise Protected Areas (OPAs)

3 CBRS and OPA Boundary

CBRS areas and OPA are normally located within or adjacent to Special Flood Hazard areas.

In undeveloped Coastal Barrier Resource System Areas (CBRS), NFIP insurance is not available for new and substantially improved structures built after October 1, 1983 or after the date the CBRS area and OPAs were designated.

Florida's Coastal Construction Control Line (CCCL)

The Department of Environmental Protection's Coastal Construction Control Line (CCCL) program is an essential element of Florida's coastal management program. The CCCL:

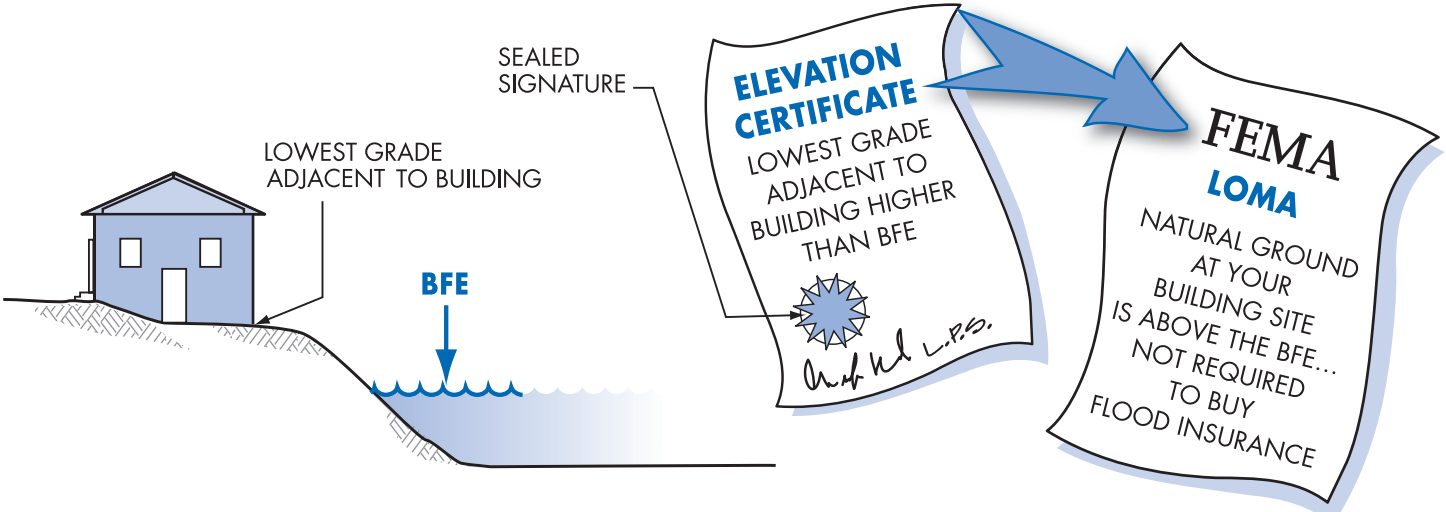
- **Provides protection** for Florida's beaches and dunes while assuring reasonable use of private property
- **Establishes areas in which special siting and design criteria** are applied for construction and related activities
- **Allows activities** that will not cause significant adverse impacts to the beach and dune system – local permits generally required.

The Florida Building Code Section 3109 contains CCCL requirements for the design and construction of buildings. Those requirements are similar to the code requirements for buildings in coastal high hazard areas (Zone V).

Alert! Code officials and design professionals are required to comply with the building code requirement for both the CCCL and flood hazard areas and must ensure that the more restrictive provisions prevail.

www.dep.state.fl.us/beaches/programs/ccclprog.htm

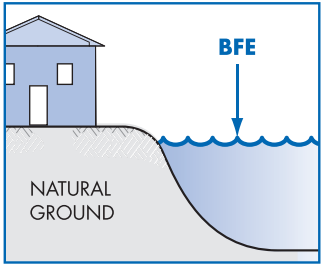
Is Your Building Site Higher than the BFE?



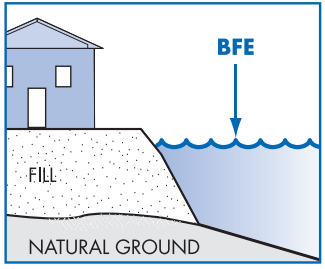
If your land is shown on the map as "in" the SFHA, but your building site is higher than the Base Flood Elevation (BFE)... get a Florida licensed professional surveyor to complete a FEMA Elevation Certificate (EC). Submit a request for a Letter of Map Amendment to FEMA along with the EC to verify that your structure is above the BFE (see page 20). If FEMA approves your request, lenders are not required to have you get a flood insurance policy, although some lenders may still require it. Keep the certificate and the LOMA with your deed— they will help future buyers.

Flood Map Revisions: LOMAs and LOMR-Fs

The most accurate information available is used to make flood maps, including topographic base maps and detailed engineering methods or methods of approximation. FEMA issues map revisions if technical data are submitted to support the changes.



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 Florida licensed professional surveyor, such as ground elevation relative to the BFE. Lenders may waive the flood insurance requirement if the LOMA removes a building site from the SFHA because natural ground at the site is above the BFE.



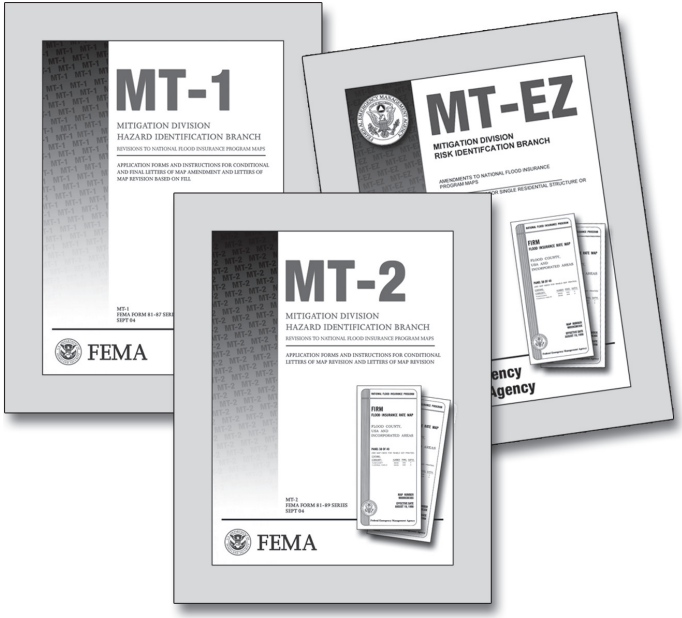
Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or parcel of land has been elevated by fill above the BFE, and therefore is no longer in the SFHA. Lenders may waive the insurance requirement if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

Check online at
www.fema.gov/national-flood-insurance-program-2/revision-national-flood-insurance-program-nfip-maps
for guidance about map revisions. Information and access to FEMA's web-based application for surveyors to submit eLOMAs is available at hazards.fema.gov.

Flood Map Revisions: CLOMRs and LOMRs

- **Conditional Letter of Map Revision (CLOMR)** is a letter commenting on whether a proposed project, if built as shown on the submitted documentation, would meet the standards for a map revision. Communities may require this evidence prior to issuing a permit, and the Certificate of Occupancy/Compliance should be withheld until receipt of the final LOMR based on "as-built" documentation and certification.

- **Letter of Map Revision (LOMR)** is an official revision to an effective FIRM that may be issued to change flood insurance risk zones, special flood hazard areas 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.



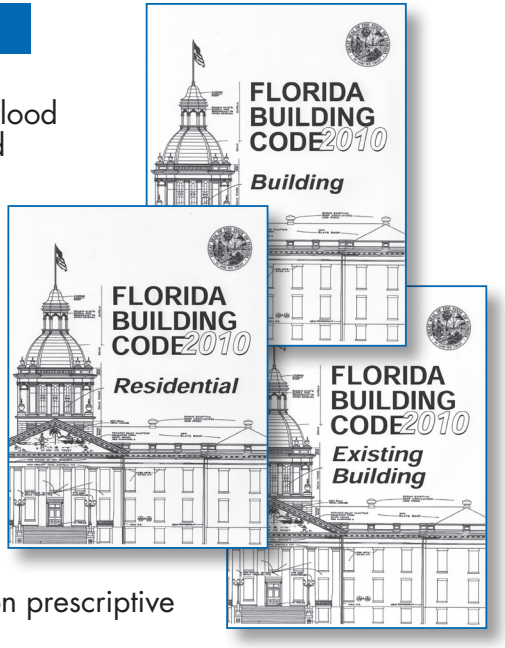
To download the forms used to submit map revisions, go to www.fema.gov/library, click on "Search by Resource Title," and search on "MT-EZ", "MT-1", and "MT-2".

Activities in SFHAs that Require Local Permits and Approvals

- Construction of new buildings
- Additions to buildings
- Substantial improvements of buildings
- Renovation of building interiors
- Repair of substantially 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 floodplain development or building permits for these and **ANY** land-disturbing activities in SFHAs.

Flood Provisions of the Florida Building Code



Starting with the 2010 edition, the Florida Building Code (FBC) includes flood provisions that are consistent with the NFIP requirements for buildings and structures. All counties, cities and towns are required to enforce the FBC. Many Florida communities enforce some "higher standards" than those required by the FBC.

- **FBC, Building:** Flood provisions are primarily in Section 1612 Flood Loads, which refers to the standard Flood Resistant Design and Construction (ASCE 24). Table 1612.1 shows cross references to all of the flood provisions in all of the Florida codes.
- **FBC, Residential:** Flood provisions are primarily in Section R322 Flood-Resistant Construction, although there are requirements in several other sections.
- **FBC, Existing Building:** Flood provisions are found in sections on repairs, alterations, additions, and historic structures and in sections on prescriptive and performance compliance methods.
- **FBC, Plumbing, Mechanical, Fuel Gas:** Flood provisions are in a number of sections.

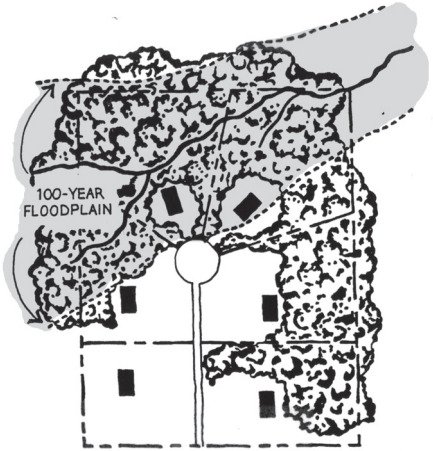
Excerpts of the flood provisions of the FBC, "Highlights of ASCE 24," and other resource materials are available online www.floridadisaster.org/Mitigation/SFMP/lobc_resources.htm.

Some Key Floodplain Development 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 FEMA floodplain or floodway?
- Are other state and federal permits obtained before work starts?
- Is the site reasonably safe from flooding?
- Does the site plan show the flood zone, Base Flood Elevation and building location?
- Is substantial improvement of an existing 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?
- Will the owner/builder have to submit an as-built Elevation Certificate?

Safer Uses of the Floodplain

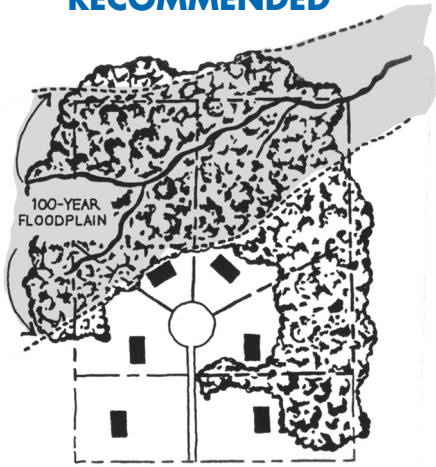


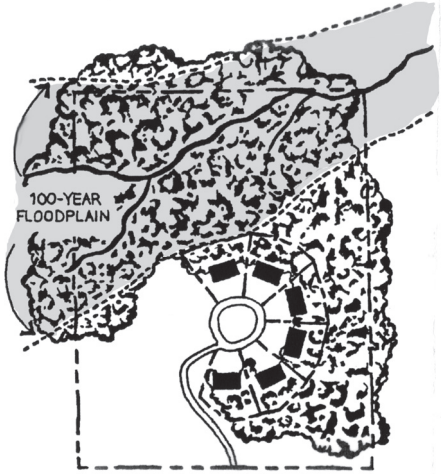
All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

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

RECOMMENDED



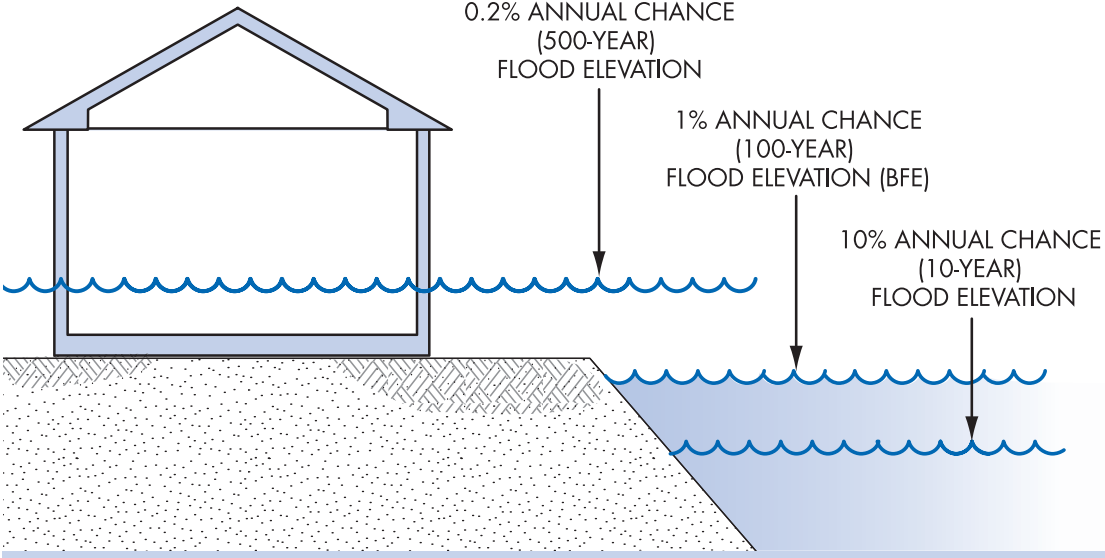


Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

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

Nature Doesn't Read Flood Maps



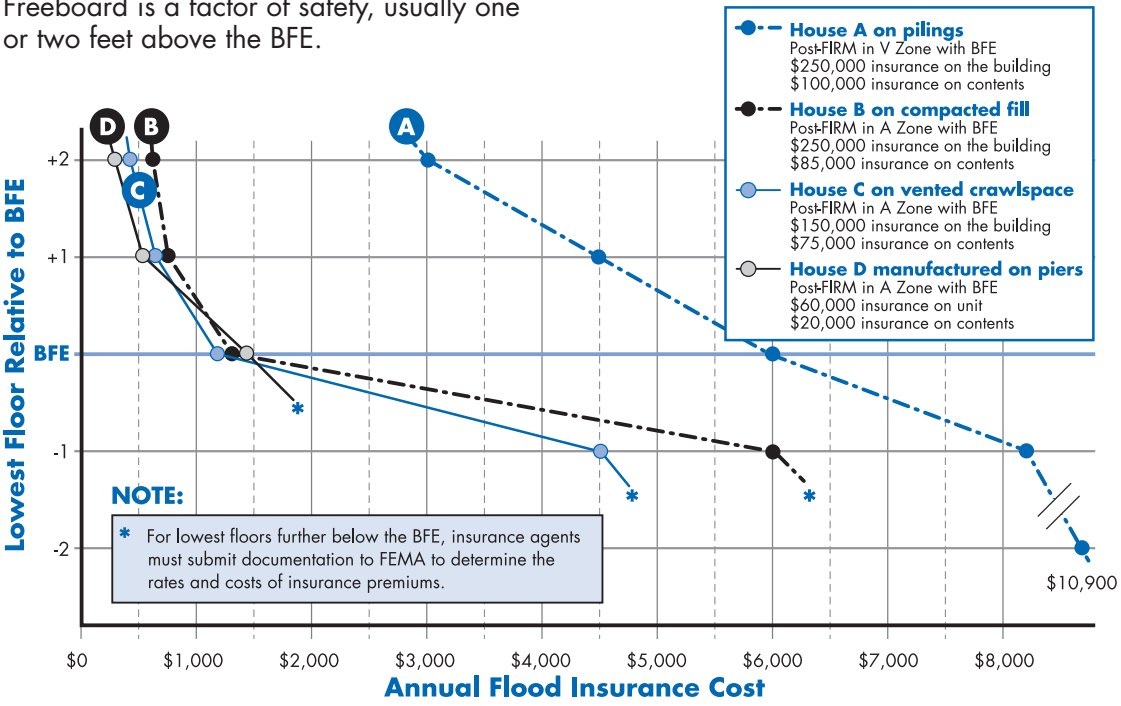
Important Information

Many people don't understand just how risky the floodplain can be. There is a greater than 26% chance that a non-elevated home in the SFHA will be flooded 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). Be safer – protect your home or business by building higher. See page 27 to see how this will save you money on flood insurance.

Freeboard: Build Higher, Reduce Damage, Save on Insurance

Want to save some money and have peace of mind at the same time? Then add freeboard to build higher than the minimum elevation requirement! Freeboard is a factor of safety, usually one or two feet above the BFE.



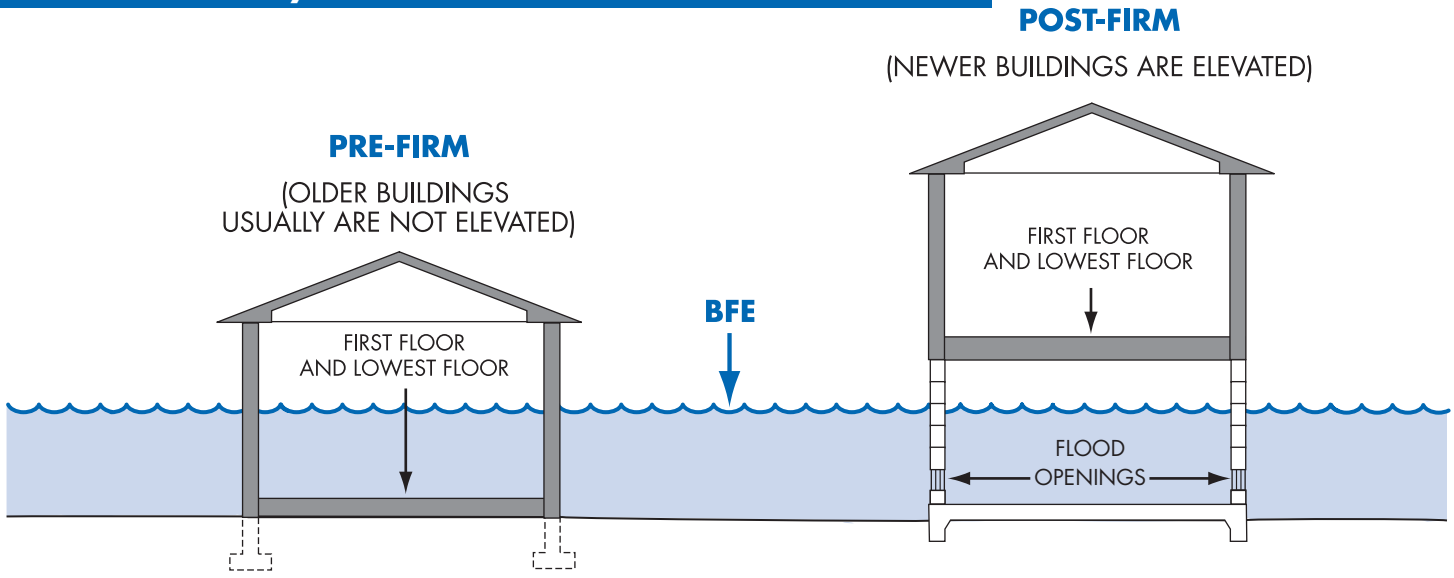
Important Information

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

Remember! When building a new home, be sure the builder checks the floor elevation as part of the foundation inspection. An error of just 6 to 12 inches could more than double what you have to pay for NFIP flood insurance.

The community may be able to grant a variance, but the owner will probably be required to buy insurance. Imagine trying to sell a house if the bank requires insurance that costs more than $5,000 a year!

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



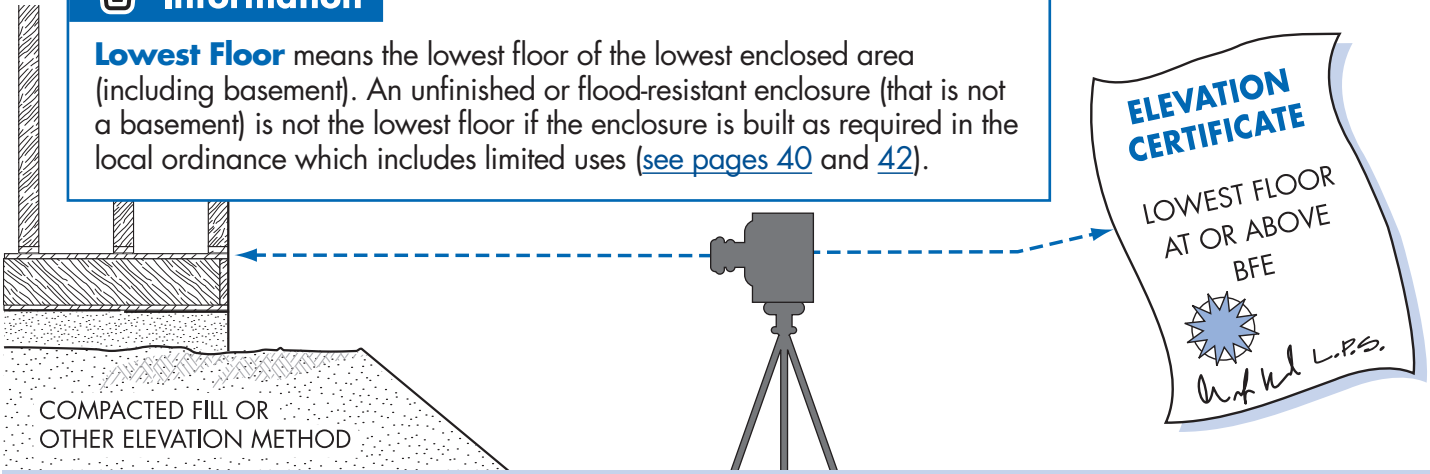
A building is **Pre-FIRM** if it was built **before** the date of your community's first FIRM. If built or substantially improved **after** that date, a building is **Post-FIRM**. Find the initial FIRM's date online at www.fema.gov/cis/FL.pdf or call your community's planning, engineering, or permit office.

Permits are required for improvements or repairs to Pre-FIRM buildings, which may have to be elevated to the current BFE and flood zone requirements (see pages 49 through 54).

Paperwork is Important – for You and Your Community

Important Information

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 which includes limited uses (see pages 40 and 42).

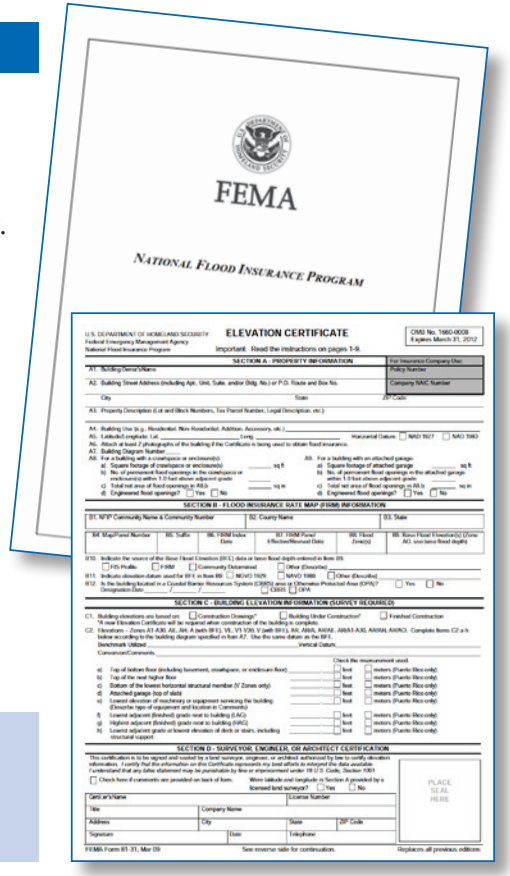


If you get a permit to build in a flood hazard area, a FEMA Elevation Certificate or a similar documentation will be required as soon as your lowest floor is set. An "as-built" survey and Elevation Certificate will be required when construction is completed.
This form is important! It proves that you built correctly.
It can be used to obtain the correct insurance rating.

What is the Elevation Certificate and How is it Used?

- The Elevation Certificate (EC) is a FEMA form. Go to www.fema.gov and search for "Elevation Certificate."
- The EC must be completed and sealed by a Florida licensed surveyor.
- The property owner, owner's representative or the community official may complete the EC for sites in Approximate Zone A and Zone AO (see Section G of the EC).
- It can be used to show that the grades of building sites are above the Base Flood Elevation (see page 19).
- It is used to verify building and equipment elevations (see page 29).
- Insurance agents use the EC to write and rate flood insurance policies.
- See page 61 for online EC training and State workshop information.

By itself, the EC cannot be used to waive the requirement to obtain flood insurance. See page 20 to learn about FEMA's Letter of Map Amendment process



Completing the Elevation Certificate

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)

C1. Building elevations are based on: ☐ Construction Drawings* ☐ Building Under Construction* ☒ Finished Construction
*A new Elevation Certificate will be required when construction of the building is complete.

C2. Elevations – Zones A1-A30, AE, AH, A (with BFE), VE, V1-V30, V (with BFE), AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO. Complete Items C2.a-h below according to the building diagram specified in Item A7. Use the same datum as the BFE.

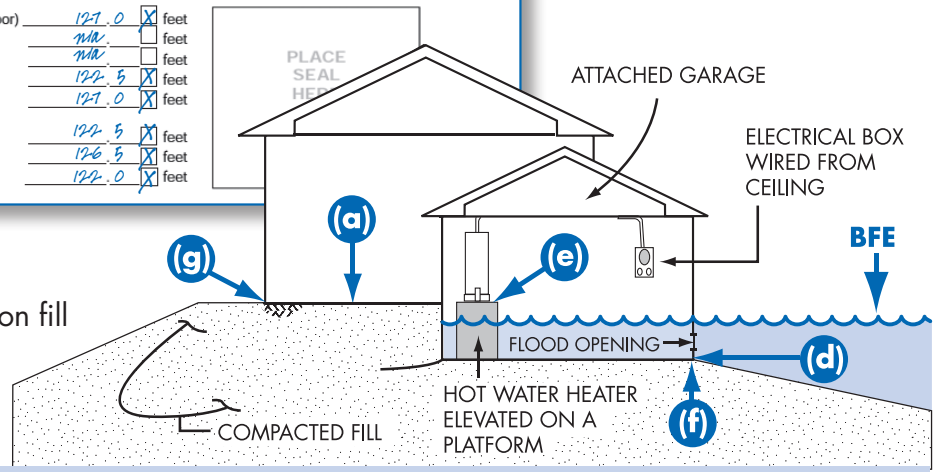
Benchmark Utilized _____ Vertical Datum _____

Conversion/Comments PA0075 NAVD 1988

a)	Top of bottom floor (including basement, crawlspace, or enclosure floor)	127.0	☒ feet
b)	Top of the next higher floor	NA	☐ feet
c)	Bottom of the lowest horizontal structural member (V Zones only)	NA	☐ feet
d)	Attached garage (top of slab)	122.5	☒ feet
e)	Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	127.0	☒ feet
f)	Lowest adjacent (finished) grade next to building (LAG)	122.5	☒ feet
g)	Highest adjacent (finished) grade next to building (HAG)	126.5	☒ feet
h)	Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	122.0	☒ feet

PLACE SEAL HERE

ELEVATION CERTIFICATE (partial)

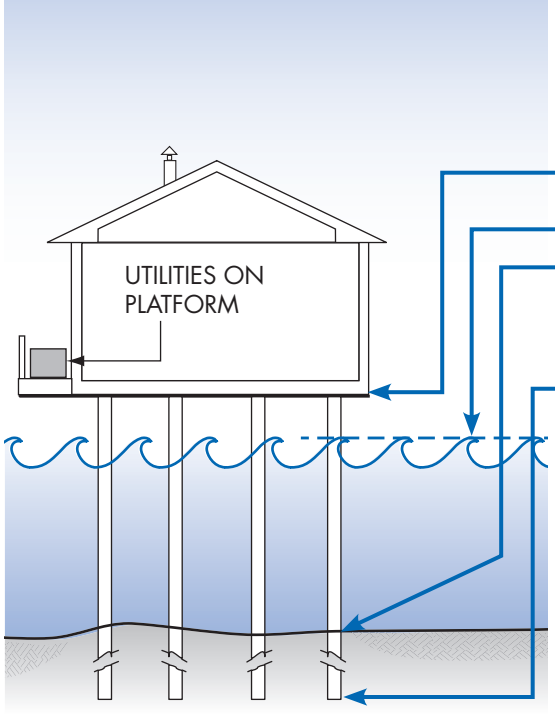


In this example, the BFE is 125.0 feet.

The slab-on-grade house was elevated on fill 2 feet above the BFE; the vented garage is 2.5 feet below the BFE.

When you get your building permit you will be informed about when in the construction process you **must** submit Elevation Certificates. You must have a Florida licensed professional surveyor fill out and seal the EC form. The EC includes diagrams for eight building types. Several points must be surveyed.

The Zone V Design Certificate



FLORIDA ZONE V DESIGN CERTIFICATE (Partial)

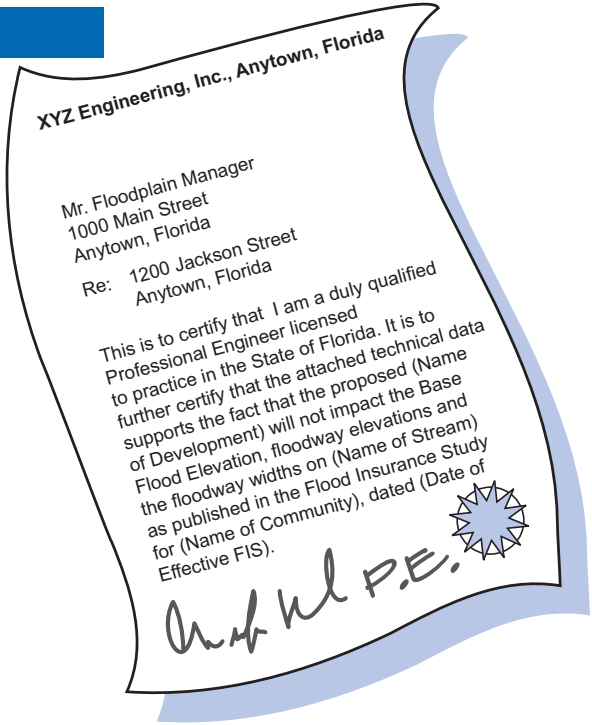
SECTION II: Elevation Information Used for Design

1. Datum..... ☐ NGVD ☒ NAVD ☐ Other
2. Elevation of the Bottom of Lowest Horizontal Structural Member ..... 14 feet above datum
3. Base Flood Elevation (BFE)..... 12 feet above datum
4. Elevation of Lowest Adjacent Grade ..... 6 feet above datum
5. Approximate Depth of Anticipated Scour/Erosion used for Foundation Design..... 3 feet above datum
6. Embedment Depth of Pilings or Foundation Below Lowest Adjacent Grade..... 16 feet above datum

A Florida licensed engineer or architect must review and/or prepare the building design and complete the Zone V Design Certificate for any new construction, substantial improvement, or the repair of a substantially damaged structure. This form is on the State Floodplain Management Office webpage (see page 60).

The Floodway "No Rise" Certification

- Floodways can be dangerous because water may flow very fast.
- Development is not allowed unless “no rise” (no increase) in the base flood elevation is certified.
- An engineer must evaluate the hydraulic impact of proposed development.
- A “no rise” certification must be signed, sealed, and dated by a Professional Engineer licensed in Florida.
- Check with your community for guidance before you decide to work in a floodway.


XYZ Engineering, Inc., Anytown, Florida

Mr. Floodplain Manager
1000 Main Street
Anytown, Florida

Re: 1200 Jackson Street
Anytown, Florida

This is to certify that I am a duly qualified Professional Engineer licensed to practice in the State of Florida. 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 Elevation, floodway elevations and the floodway widths on (Name of Stream) as published in the Flood Insurance Study for (Name of Community), dated (Date of Effective FIS).

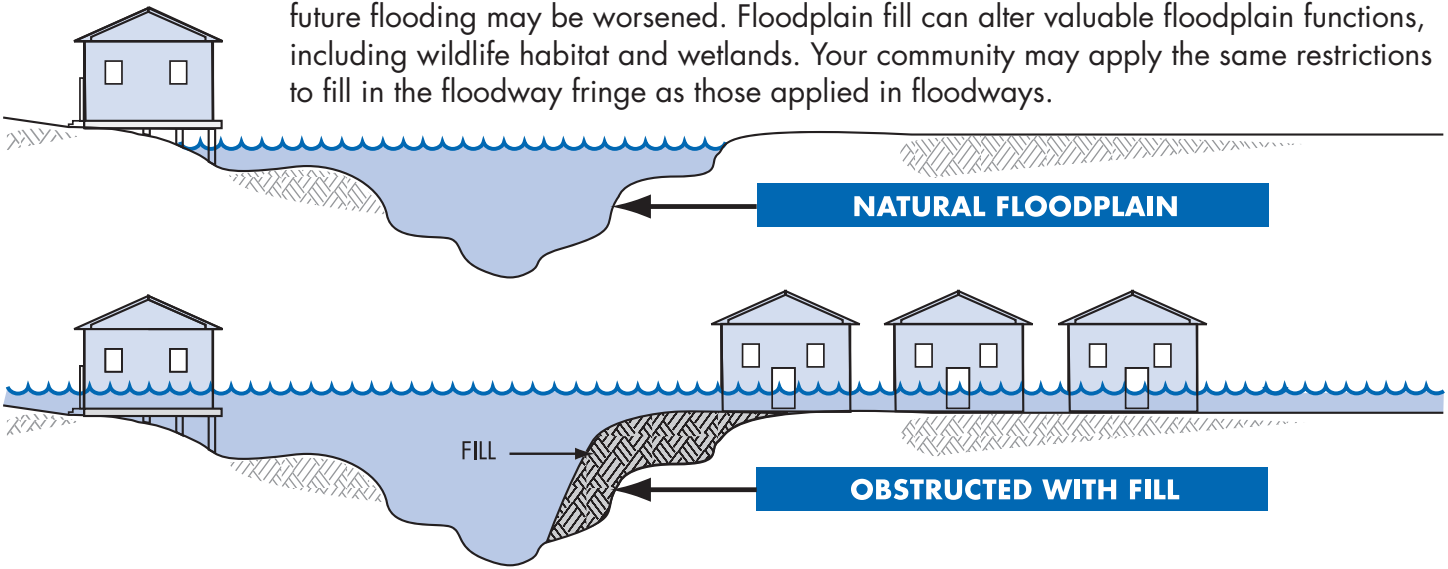
P.E.

The engineering analysis must be based on technical data obtained from FEMA.

Reduce flood risk – don’t build in the Floodway!

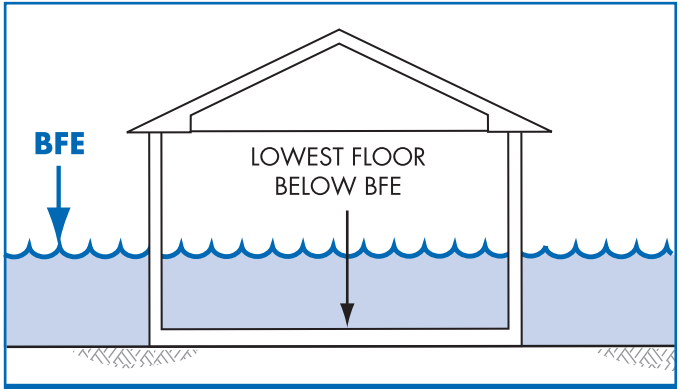
Floodplain Fill Can Make Things Worse

Floodplains are supposed to store floodwater. If storage space is blocked by fill material, future flooding may be worsened. Floodplain fill can alter valuable floodplain functions, including wildlife habitat and wetlands. Your community may apply the same restrictions to fill in the floodway fringe as those applied in floodways.



Make sure your floodplain fill project won't harm your neighbors. Before deciding that your project requires the placement of fill, check with your community's planning, engineering, or permit office. You may be required to demonstrate that fill will cause "no rise" (see page 33).

Think Carefully Before You Seek A Floodplain Variance



POST-FIRM BUILDING, NOT ELEVATED

INSURANCE $5,000+ PER YEAR

Very specific conditions related to the property (not the owner's actions or preferences) 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 $5,000 per year (see page 27)!

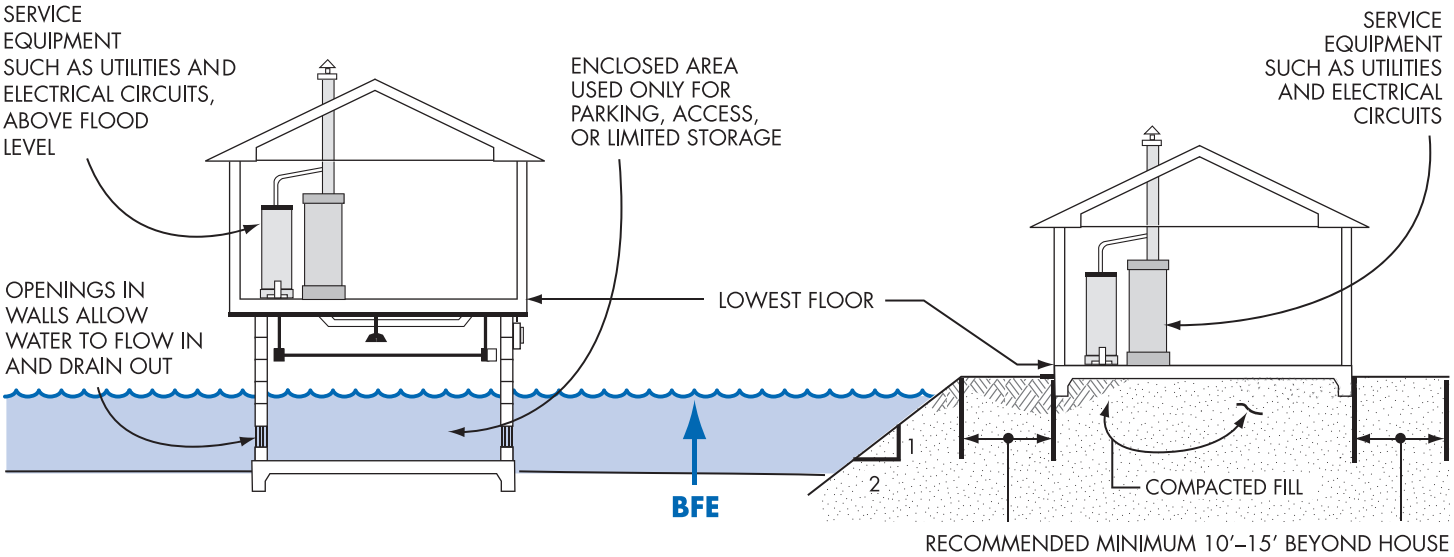
Think carefully before seeking a variance to build below the Base Flood Elevation.
Not only will your property be more likely to suffer damage, but insurance will be very costly.

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

How to Elevate Your Floodplain Building (Zone A)

ELEVATE ON FOUNDATION WALLS

ELEVATE ON FILL

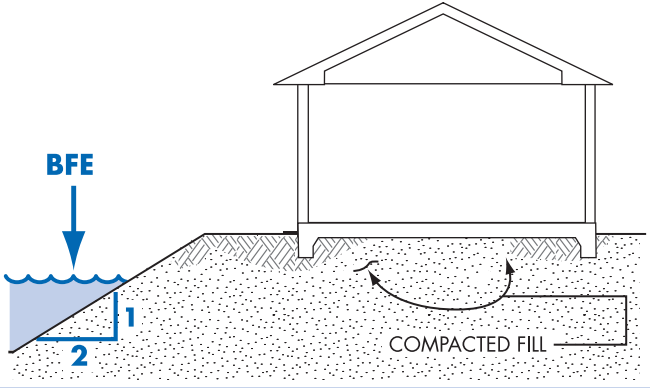


CAUTION! Enclosures (including crawlspaces) have some special requirements (see pages 40 and 41). Note: When the walking surface of the lowest floor is at the BFE, under-floor utilities are not allowed. Fill used to elevate buildings must be placed properly (see page 37).

Compaction of Floodplain Fill (Zone A)

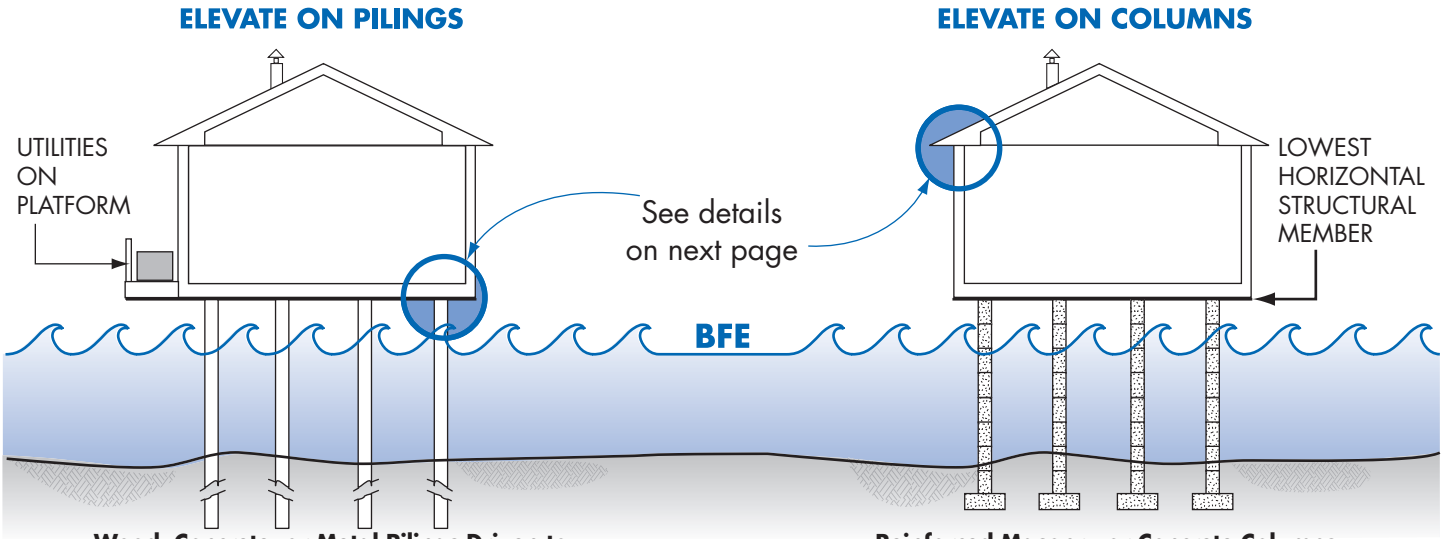
Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet floodplain requirements, floodplain fill should:

- 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); 3:1 flatter slopes are recommended
- Have slopes protected against erosion (vegetation for "low" velocities, durable materials for "high" velocities – determined by a design professional)



Your engineer can find more information in FEMA's instructions for Letters of Map Revision based on Fill (FEMA Form MT-1) and NFIP Technical Bulletin #10.

Typical Elevation Methods for Coastal Construction

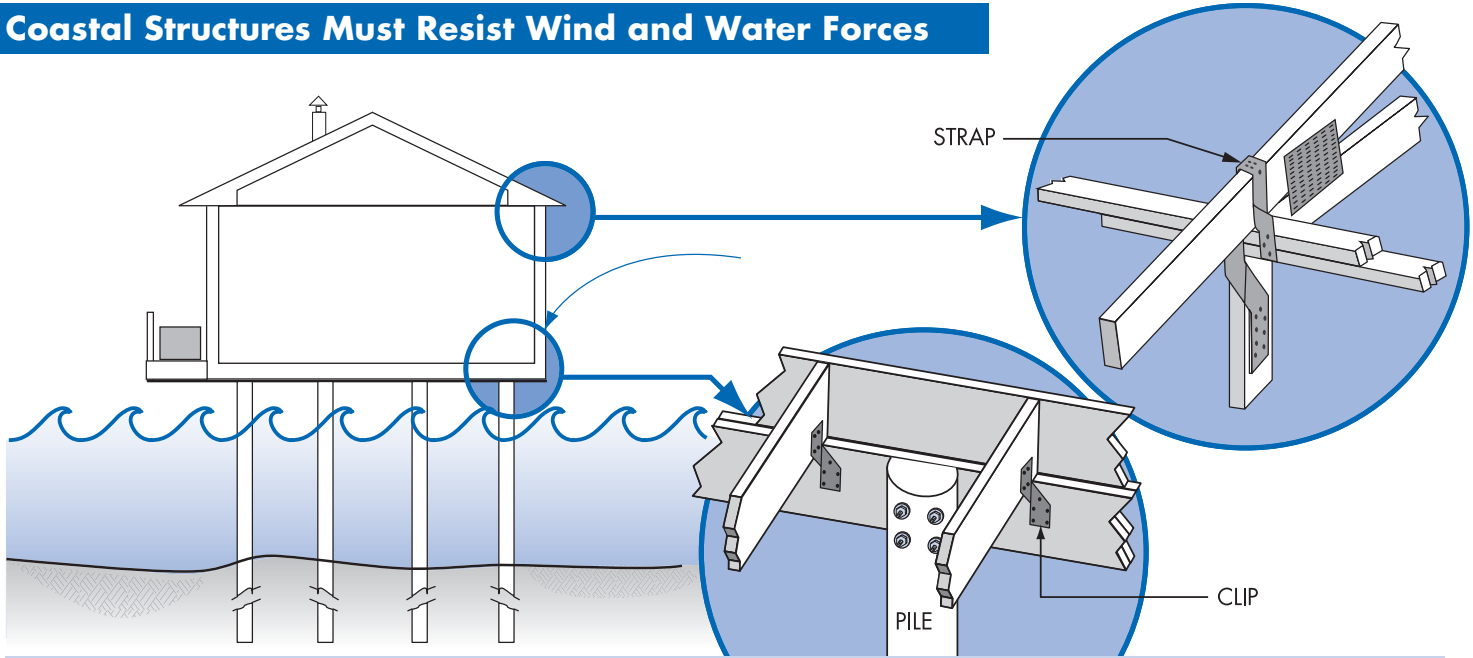


Wood, Concrete, or Metal Pilings Driven to Proper Depth Offer More Protection Against Scour

Reinforced Masonry or Concrete Columns on Spread Footers

In Zone V, the design specifics will be determined by an architect or engineer based on the site, including how the building will be elevated and how deep the foundation elements will be in the ground. A Zone V Design Certificate or statement will be required (see page 32). For more information, see FEMA P-55, *Coastal Construction Manual*.

Coastal Structures Must Resist Wind and Water Forces



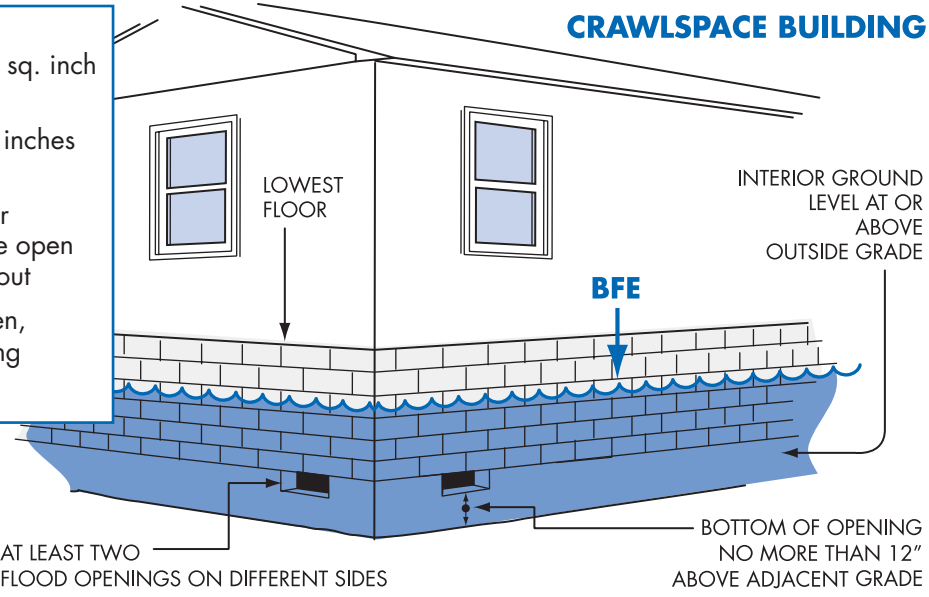
Coastal buildings may be exposed to hurricane winds, waves, and floodwaters. Structural building components must be connected together to transfer forces in a continuous load path from the roof to the foundation. The details above are some examples of how this is done. An architect or engineer must determine the types of connections required for the roof, building, and foundation.

Enclosures Below the Lowest Floor (Zone A)

NOTE:

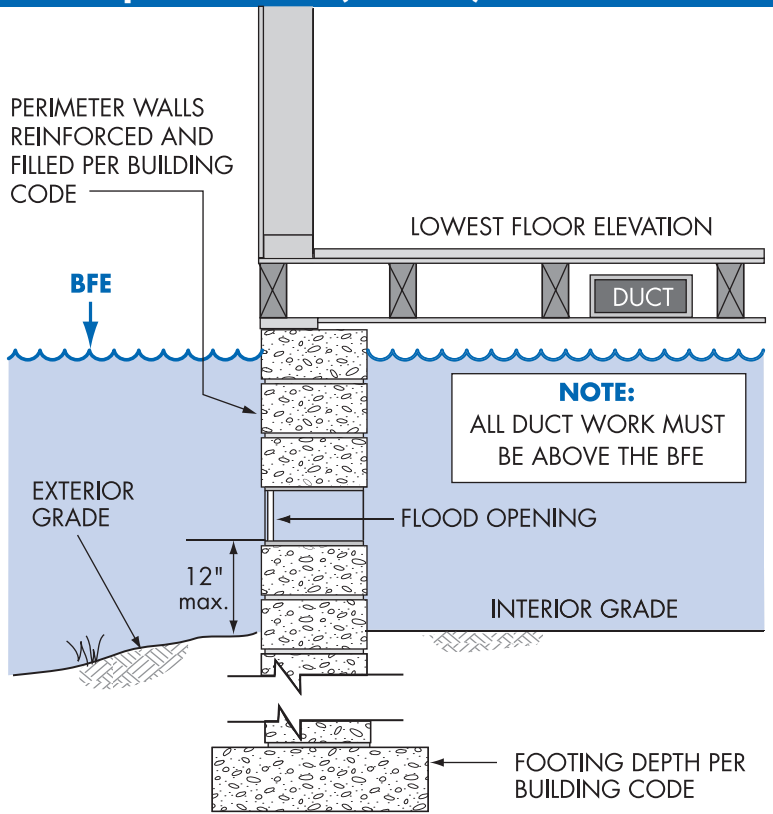
- Total net area of all total openings is 1 sq. inch per sq. foot of enclosed area
- A 30′ x 40′ building needs 1,200 sq. inches of openings
- If inserted in flood openings, typical air ventilation units must be disabled in the open position to allow water to flow in and out
- A typical air ventilation unit, with screen, provides 42 to 65 sq. inches of opening (look for "net free area" stamp on unit)

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



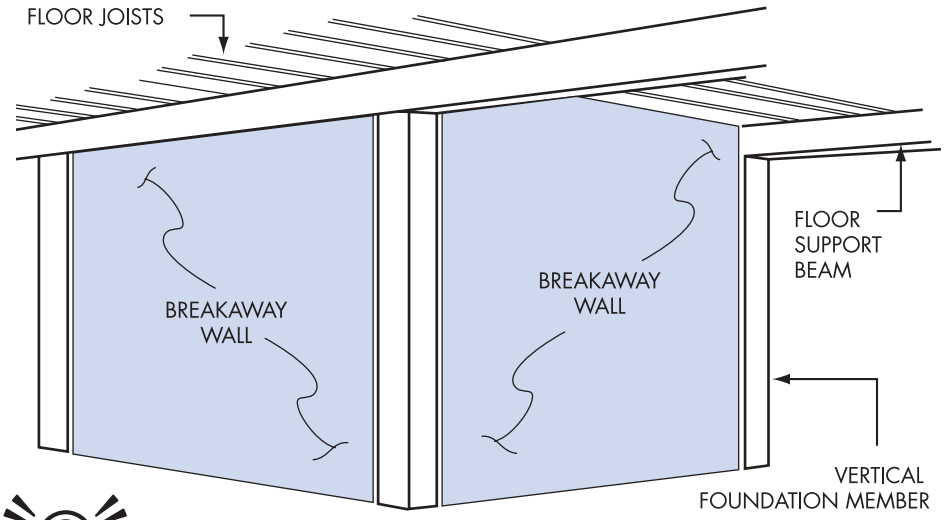
Solid perimeter wall foundations can enclose flood-prone space. A crawlspace is a good way to elevate just a couple of feet. In all cases, the following are required: flood openings, elevated utilities, flood-resistant materials, and limitations on use.

Crawlspace Details (Zone A)



- The Lowest Floor Elevation must be at or above the BFE. Florida recommends and additional 2 feet or more for greater protection.
- All materials below the BFE must be flood resistant.
- Flood openings must provide 1 sq. in. of net open area for every sq. ft. of area enclosed by the perimeter walls – or certified engineered openings may be used.
- A 30′ x 40′ building needs 1,200 sq. in. of net opening.
- The bottom of flood openings must be no more than 12 inches above grade.
- Standard air ventilation units must be permanently 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.

Enclosures Below Zone V Buildings



Avoid building an enclosure under your Zone V building. If you must enclose a small area, your community will require:

- Walls must be designed to collapse or "breakaway" under storm and flood conditions
- Must be unfinished and use flood resistant materials
- Utility wires and pipes should not go through or be attached to the breakaway walls
- Enclosed area is to be used only for parking, building access, and limited storage
- No bathrooms, utility rooms, or electric service below BFE

Enclosures larger than 299 sq. ft. may have higher insurance premiums.

Important Information

Do not modify an enclosure below an elevated Zone V building (or any zone for that matter)! It is a violation of your community's regulations, and you may have increased damage when it floods. Plus, your flood insurance policy will cost a lot more!

Pools in Flood Hazard Areas

How pools are handled depends on the flood zone and whether the pool is in-ground, above-ground, or a combination (perhaps with associated grading and fill). The 2010 Florida Building Code has specific provisions:

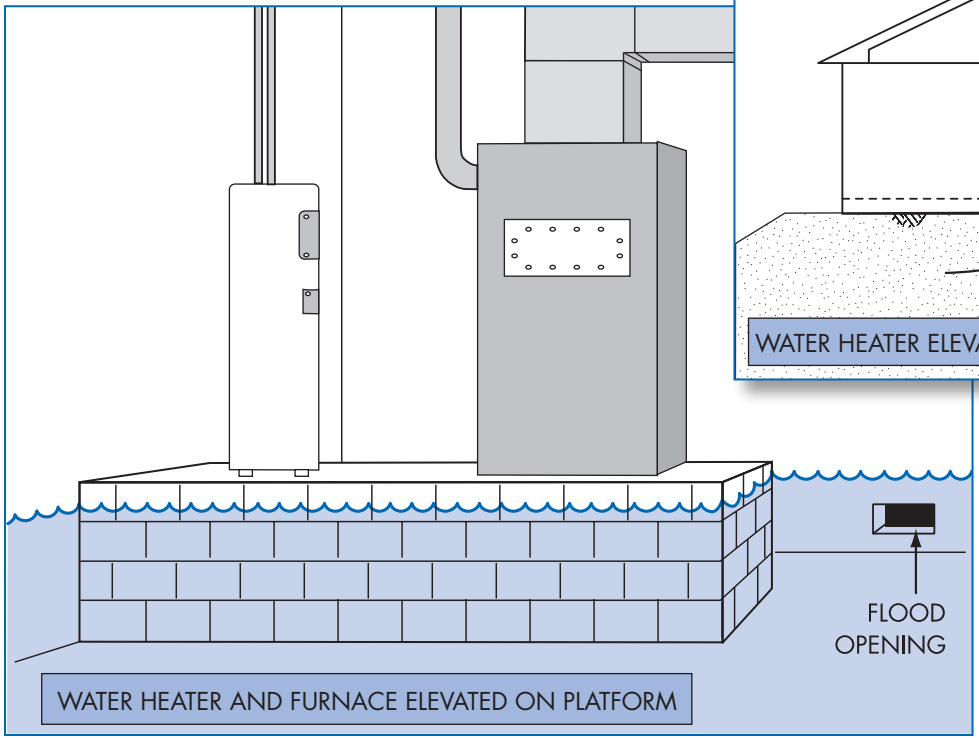
- Public swimming pools, certain private pools, and pools in coastal high hazard areas (Zone V) shall be designed to withstand all flood-related loads and load combinations. [FBC Sections 424 and 1612, which references ASCE 24]

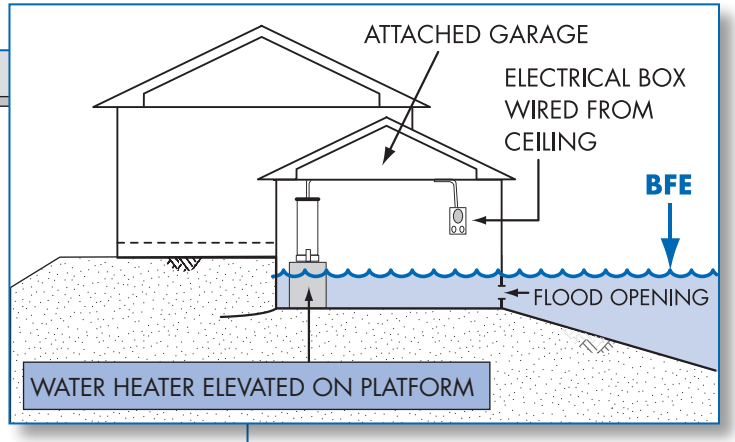
- Pools at private dwellings that are in flood Zone A have requirements only if the pool location is in a floodway or a riverine flood hazard area where BFEs are specified but floodways have not be designated. [FBC Section R322.2.4]

- Pool controls and equipment have to meet the requirements for utility service (see page 45).

In addition, pools in coastal high hazard areas (Zone V) and Coastal A Zones have to either be elevated, designed to breakaway without producing damaging debris, or sited to remain in the ground during design flood conditions without obstructing flow that damages any structures. [ASCE 24 Section 9.5]

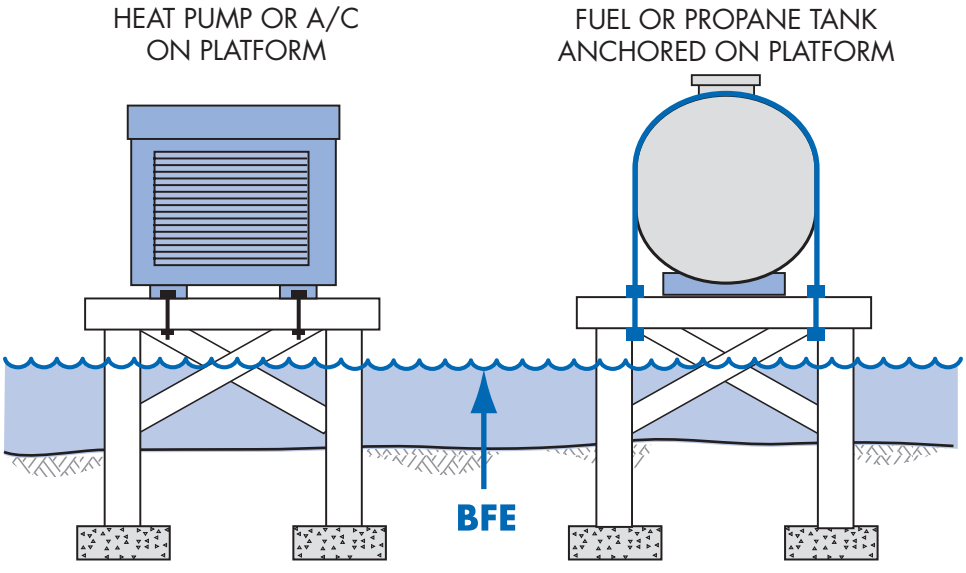
Utility Service and Equipment Inside Enclosures





Appliances and equipment (including duct work) must be elevated to or above the BFE. Utilities (plumbing, electrical, gas lines, heating, ventilating and air conditioning) must be elevated or designed and installed to prevent intrusion of floodwaters into their components.

Utility Service, Equipment, and Fuel Tanks

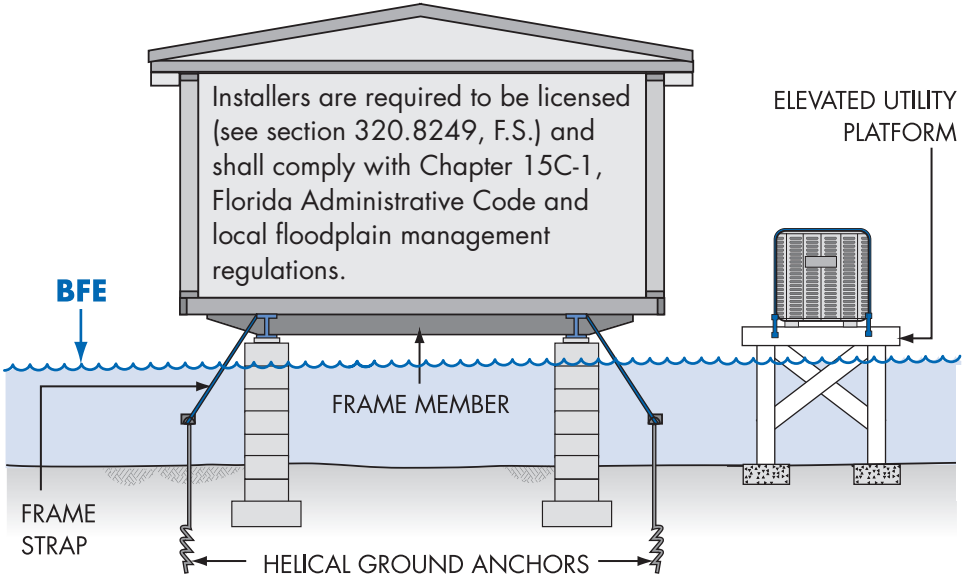


Important Information

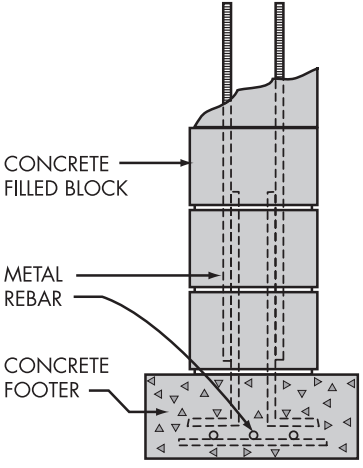
Fuel and propane tanks may cause explosion and pollution risks during flood conditions. Even shallow water can create large buoyant forces on tanks, so extra care must be taken to ensure that all tanks are elevated (all flood hazard areas) or anchored to resist flood forces (Zone A only). See FEMA 348, *Protecting Building Utilities from Flood Damage.*

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.

Manufactured Homes Require Special Attention



Experience shows that manufactured homes are easily damaged. Just a few inches of water above the floor can cause substantial damage.

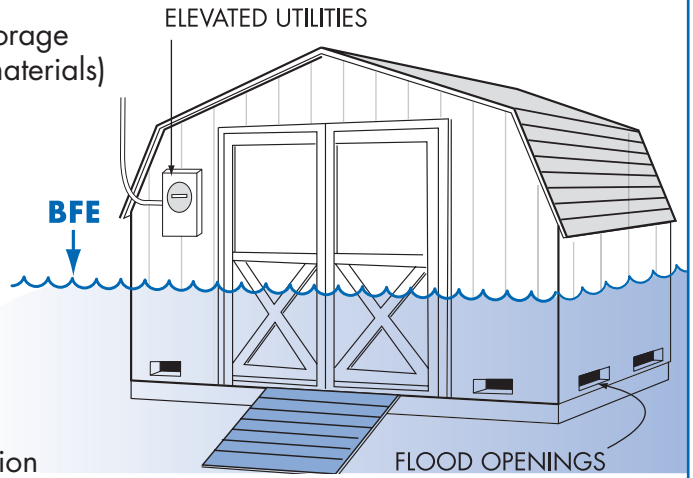


Homes must be anchored to resist flotation, collapse, and lateral movement by being tied down in accordance with your community's ordinance or the manufacturers' installation specifications for SFHAs. See guidance and some pre-engineered designs in FEMA P-85, *Protecting Manufactured Homes from Floods and Other Hazards*.

Accessory Structures

In Special Flood Hazard Areas, accessory structures must:

- Not be habitable
- Be used only for parking or storage (not pollutants or hazardous materials)
- Be anchored to resist floating
- Have flood openings
- Be built of flood-resistant materials
- Have elevated utilities
- Not be modified for different use in the future
- Have 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 will get wet when flooding occurs.

Terms and Definitions

Accessory 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, gazebos, pole barns, and hay sheds.

Recreational Vehicles

In Special Flood Hazard Areas, RVs must:

- Be licensed and titled as an RV or park model (not as a permanent residence)
- Be built on a single chassis
- Must measure 400 sq.ft. or less (measured at largest horizontal projection)
- Have inflated wheels and be self-propelled or towable by a light-duty truck
- Have no attached deck, porch or shed
- Be used for temporary recreational, camping, travel or seasonal use (no more than 180 consecutive 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 46).

Planning to Improve Your Floodplain Building?

To obtain a permit to improve a building in a floodplain:

- 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 licensed appraiser.
- If the cost of the improvement equals or exceeds 50% of the market value of the building, it is considered a Substantial Improvement and you must bring the building into full compliance – this may involve raising the foundation or other measures.
- If the costs do not trigger Substantial Improvement requirements, then you should still consider ways to reduce future damage (see page 50).

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 from any cause (flood, fire, earthquake, hurricanes, tornadoes, etc.), regardless of the actual repair work performed (see page 55). Some Florida communities track improvements over a period of time

Important Information

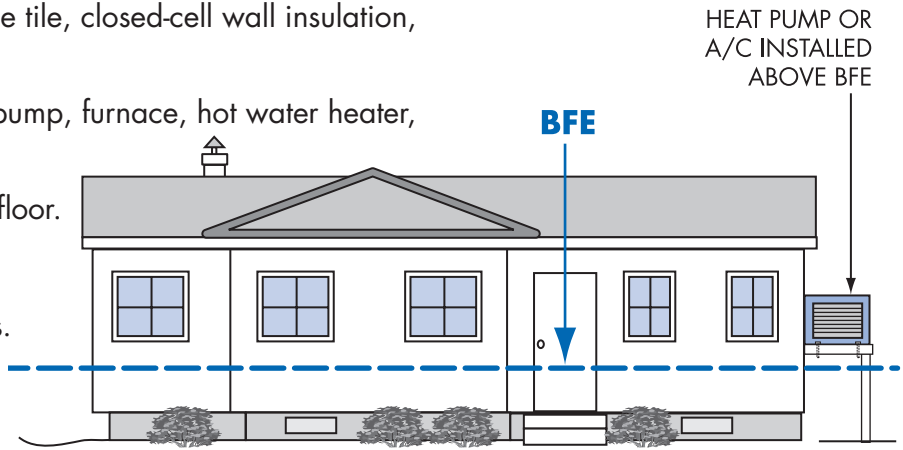
Improvements include:

- Renovation/ rehabilitation of the interior of the existing building (see page 51)
- Lateral addition, without renovation or structural alteration of the existing building (see page 52)
- Lateral addition, with renovation or structural alteration of the existing building (see page 53)
- Vertical addition (add new story)

Non-Substantial Improvements

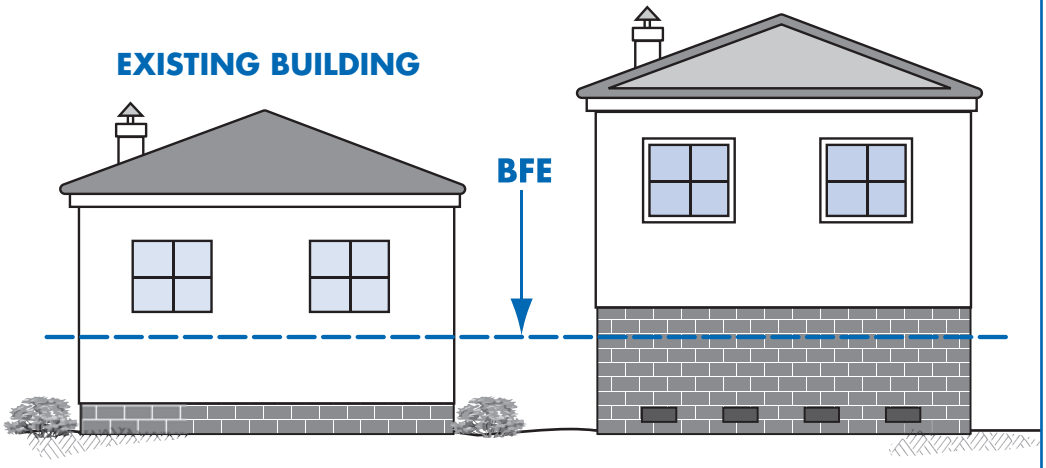
Your proposed improvements are "non-substantial" if the costs of all improvements are less than 50% of the market value of the building. Although you are not required to bring the existing building into compliance, there are many things you can do to reduce future flood damage. Find out the BFE at your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



SHALLOW CRAWLSPACE FOUNDATION

RAISED FULLY-COMPLIANT CRAWLSPACE FOUNDATION

(SEE PAGE 53)

Important Information

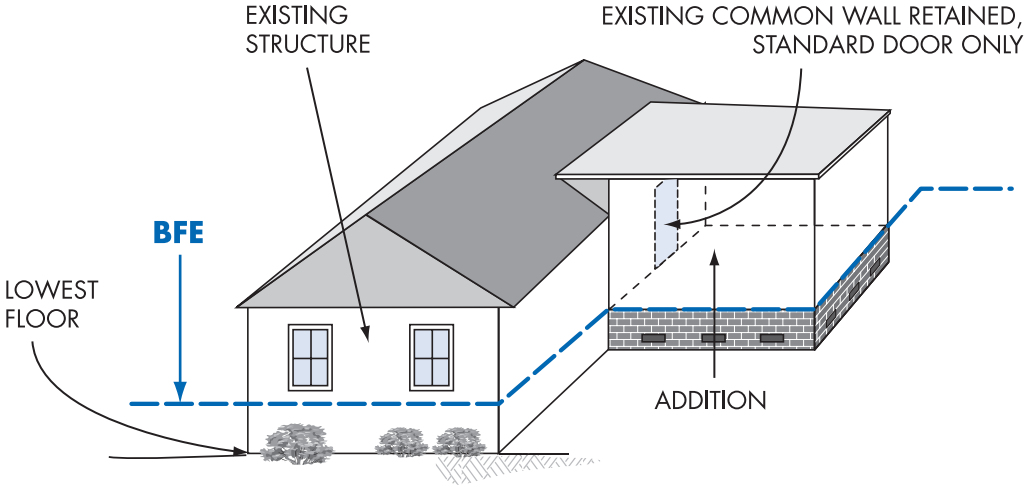
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Check with your local permit office 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, by variance, as long as it will continue to meet the criteria for listing as a historic structure.

Substantial Improvement: Lateral Addition Only



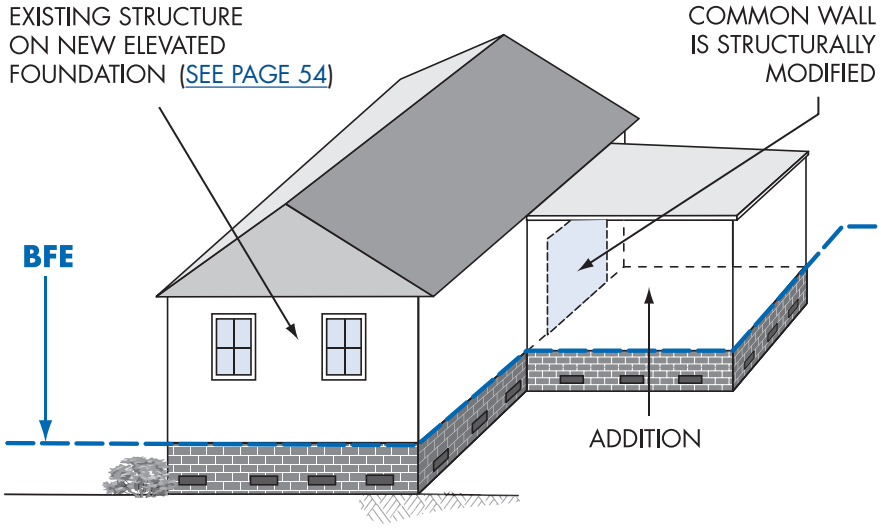
Important Information

See page 53 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. 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 standard 36" door.

Substantial Improvement: Addition Plus Other Work

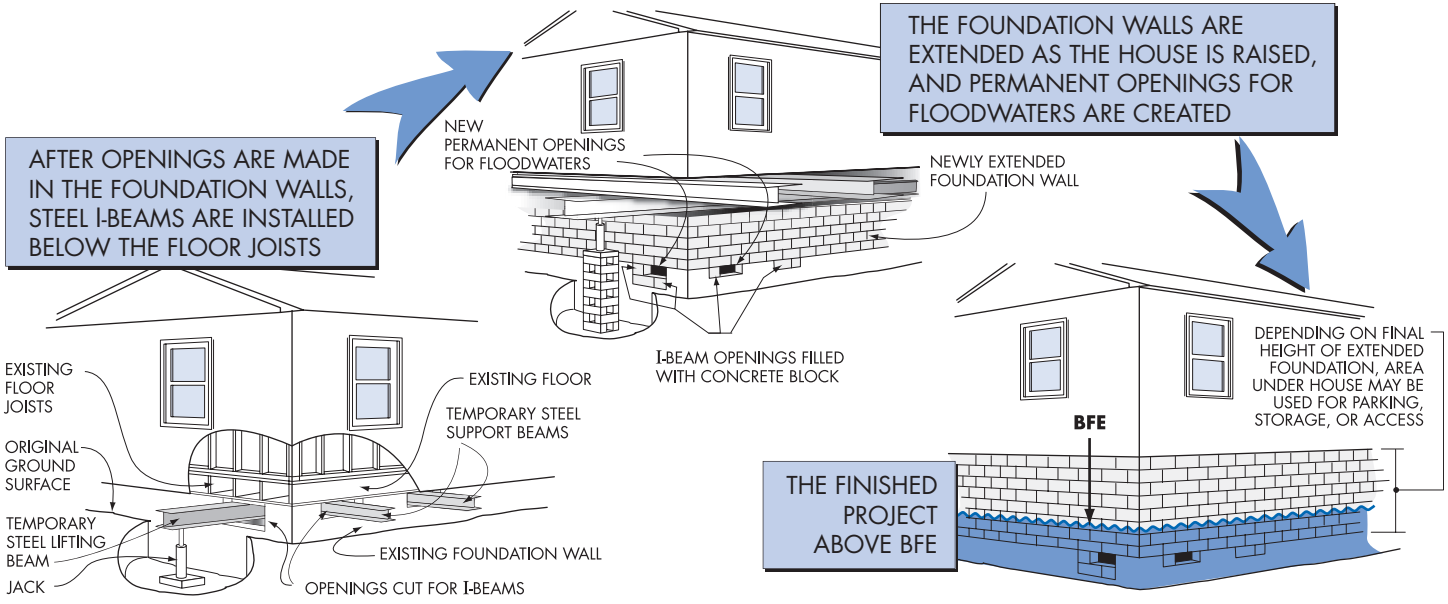


Your community must prepare an evaluation to determine if all of your proposed work will trigger the Substantial Improvement requirement. Substantial Improvement is triggered if:

- 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.

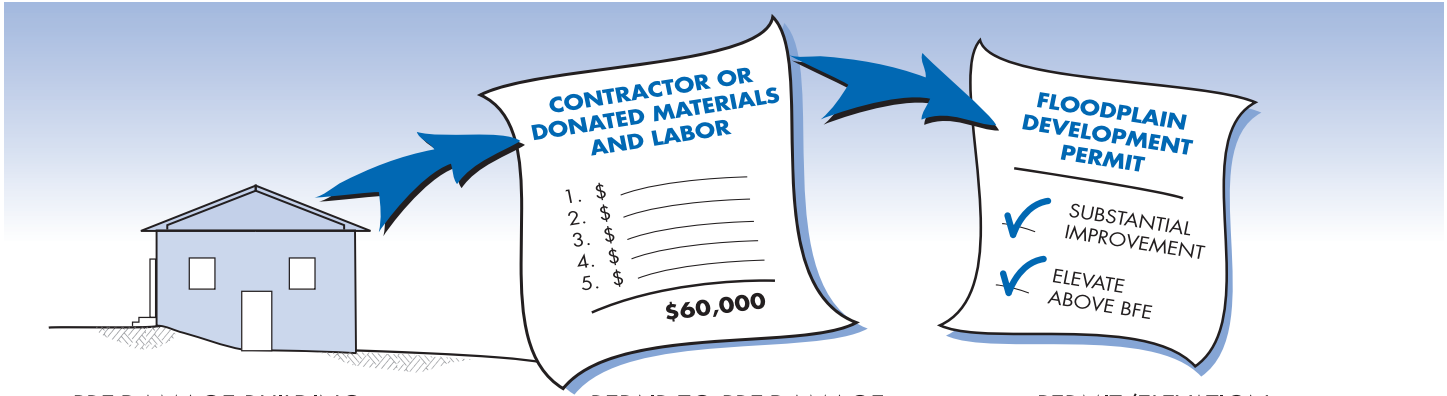
Your community's permit office can help you determine which requirements apply. It is always a good idea to request a preliminary review before you get too far along with your plans.

Elevating an Existing Structure



This is one way to elevate an existing building to comply with building code and floodplain regulations (also see FEMA P-312, *Homeowner's Guide to Retrofitting*). If an NFIP insured building is damaged by flood and the community determines it is substantially damaged, the owner may be eligible for an **Increased Cost of Compliance** payment (see page 56).

What About After Damage?



PRE-DAMAGE BUILDING MARKET VALUE = $100,000

REPAIR TO PRE-DAMAGE CONDITION = 60%

PERMIT/ELEVATION REQUIRED

A permit is required to repair a damaged floodplain structure, regardless of cause — fire, flood, wind, or even vehicle impact. You will be asked to provide a detailed cost estimate to repair it to its pre-damaged condition. If the repair costs are 50% or more of the pre-damage market value of the building, then the building is substantially damaged and must be brought into compliance, which may involve raising the foundation or other measures. Check with your community before you begin repairs.

See page 54 for more information about elevating an existing building above a crawlspace.

Paying for Post-Flood Compliance

Owners may be eligible for up to $30,000 to help pay to bring buildings into compliance with building code and community requirements – if all of the following apply:

- If they have NFIP flood insurance – it includes Increased Cost of Compliance (ICC) coverage.
- If the building is in the mapped Special Flood Hazard Area.
- If the building's lowest floor is below the elevation required by code..
- If the community has made an official determination that the building was substantially damaged by flooding.
- If the owner acts quickly with the claims adjuster and community official to process all the required paperwork.
- See FEMA 301, *Increased Cost of Compliance: Guidance for State and Local Officials*.

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.

USE THE ICC CLAIM TO:

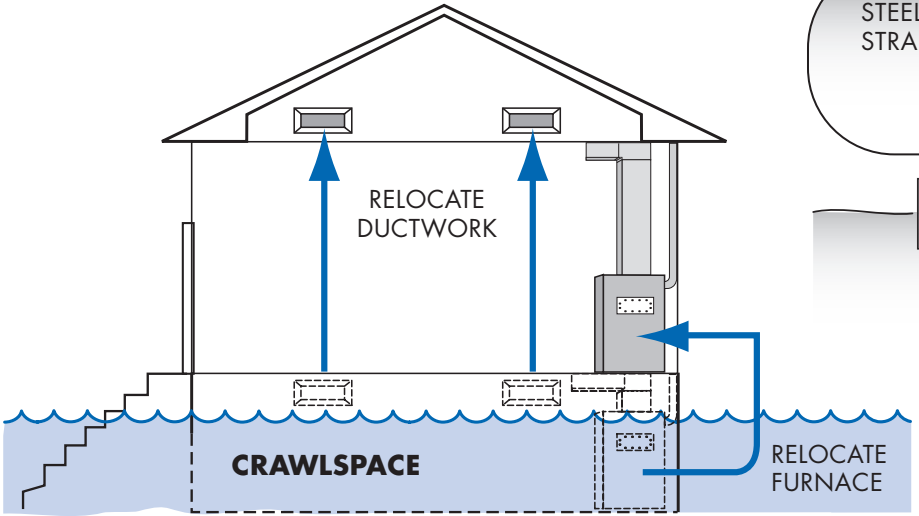
ELEVATE-IN-PLACE

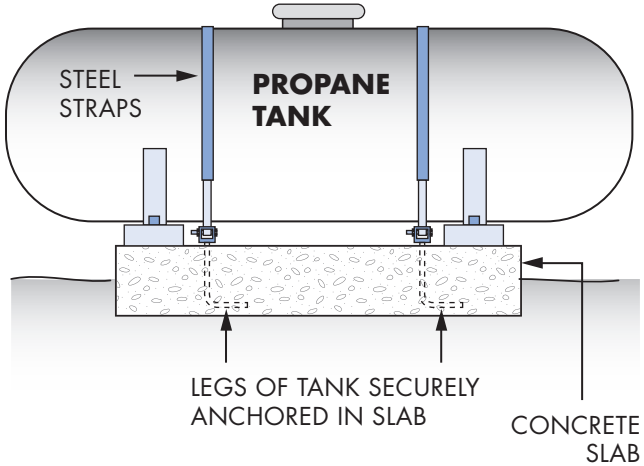
RELOCATE TO HIGH GROUND

DEMOLISH

FLOODPROOF (NON-RESIDENTIAL ONLY)

Some Flood Protection for Older Homes is Easy and Low Cost





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

Small Berms and Floodwalls Can Protect Older Buildings

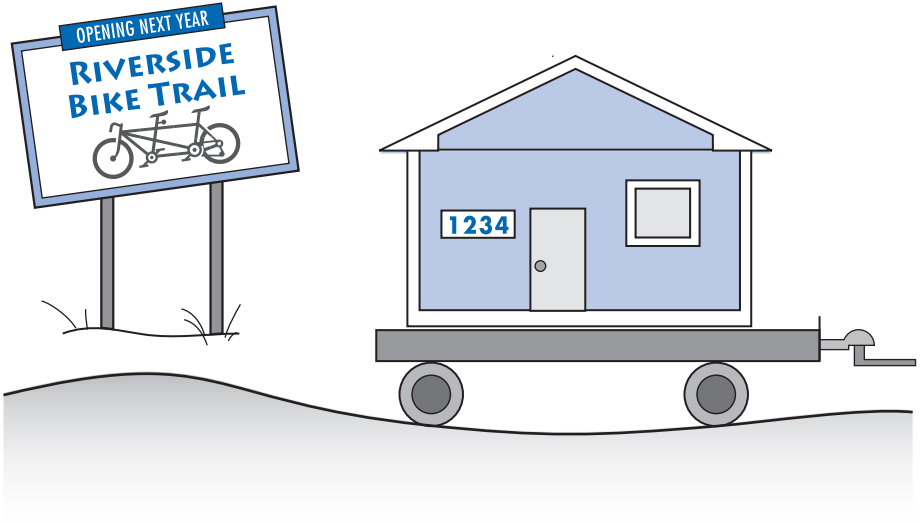
In areas where floodwaters aren't expected to be deep, sometimes individual buildings can be protected by earthen berms or concrete floodwalls. Permits are required for these protection measures and extra care must be taken if the site is in a floodway (see page 33). A small berm or floodwall does not remove elevation requirements and cannot be use to achieve compliance for 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. Some homes have been raised up on higher foundations, and others have been moved to safer high ground outside of the floodplain.



The Florida Division of Emergency Management administers FEMA mitigation grant programs.
Learn more at www.floridadisaster.org/Mitigation/index.htm.
Communities interested in applying for grants can call (850) 413-9960.

Useful Resources and Common Acronyms

- Florida's State Floodplain Management Office and resources for local officials: www.floridadisaster.org/Mitigation/SFMP/Index.htm
- Excerpts of the flood provisions of the Florida Building Code and local floodplain management ordinance materials: www.floridadisaster.org/Mitigation/SFMP/lobc_resources.htm
- NFIP regulations, Title 44 CFR: www.fema.gov/national-flood-insurance-program/laws-and-regulations
- CRS Resource Center: www.training.fema.gov/EMIWeb/CRS
- Florida Floodplain Management Association
- Building Officials Association of Florida: www.boaf.net
- Get a Plan! www.floridadisaster.org/family/

Common Acronyms

- BFE = Base Flood Elevation
- EC = Elevation Certificate
- FBC = Florida Building Code
- FIRM = Flood Insurance Rate Map
- ICC = Increased Cost of Compliance
- NFIP = National Flood Insurance Program
- SFHA = Special Flood Hazard Area (100-year floodplain)

Want to Learn More?

- For information and advice on permits, call your community's building permit office or planning department.
- For advice on permitting and managing floodplains, contact the State Floodplain Management Office at (850) 413-9960.
- For information about workshops, training and conferences, contact the State Floodplain Management Office at (850) 413-9960.
- To order FEMA flood maps, call FEMA's Map Service Center at (877) 336-2627 or order online at www.msc.fema.gov.
- To learn more about flood maps and check the status of map change requests, go to www.fema.gov/national-flood-insurance-program-flood-hazard-mapping.
- FEMA's on-line publications can be found in the FEMA Library (www.fema.gov/library/) or by using an Internet search engine to search on the publication number or title. You can order printed copies of FEMA publications from FEMA Publications at (800) 480-2520.
- To learn about flood insurance, call your insurance agent. Most insurance companies can write an NFIP policy for you. Call the National Flood Insurance Program at (888) 379-9531 to get the name of an agent in your area who writes flood insurance.
- To learn the importance of taking steps to financially protect homes and businesses from flood damage go to www.floodsmart.gov.
- Find out about Elevation Certificate training for surveyors by searching for Elevation Certificate at www.fema.gov.

This **Quick Guide** may be downloaded from the
Florida Division of Emergency Management web site at:
www.floridadisaster.org/Mitigation/SFMP/Index.htm

or

the **Florida Floodplain Managers Association** website