



Quick Guide



Nevada Division of Water Resources

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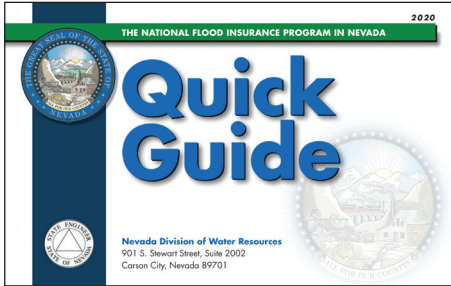
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About This Guide



This **Quick Guide** helps local officials and citizens understand why and how Nevada communities must manage development in floodplains to protect people and property.

Flood-prone communities adopt and enforce floodplain management regulations. In the event of conflict, those codes and regulations and not this Guide, must be followed.

The Nevada Division of Water Resources (NDWR), Floodplain Management Program, coordinates the National Flood Insurance Program in Nevada. Contact program staff at (775) 684-2800.

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*.



National Flood Insurance Program (NFIP)
Floodplain Management Requirements
A Study Guide and Desk Reference for Local Officials
FEMA 480
February 2005
FEMA

Prepared by:

RCQUINN
CONSULTING, INC.

Why Do We Regulate the Floodplain?

To protect people and property. Implementing floodplain management regulations reduces vulnerability to future flood risk. 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 make sure federal flood insurance is available. Communities must join the NFIP and administer floodplain management requirements before residents and businesses can purchase federal flood insurance and to be eligible for some types of federal assistance, including flood mitigation grants.

To save tax dollars. Every time communities experience flood disasters local budgets are impacted. 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, communities still must pay a portion of repair and clean-up costs, temporary housing assistance, and evacuation expenses.

To avoid liability and lawsuits. If we know an area is mapped as a flood hazard area, 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 our communities develop and redevelop?

Since 1978, federal flood insurance policy holders in Nevada have received over \$44.5 million in claim payments. Even though that represents many payments, most of the state's flood-prone property owners do not have flood insurance.

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 22,300 communities participate in the NFIP— Nevada counties and cities with FEMA flood maps, and the Fort Mojave Indian Tribe and Yerington Paiute Tribe, participate in the NFIP.

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



- **Flood hazard maps.** In partnership with water management districts, communities, and the State, FEMA produces flood maps in accordance with FEMA standards. The maps are used by communities, insurance agents, real estate professionals, 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 web site www.floodsmart.gov.

NFIP Community Responsibilities

To participate in the National Flood Insurance Program, communities agree to:

- **Recognize** flood hazards in community planning (see page 6)
- **Adopt and enforce** flood maps and a flood damage prevention ordinance
- **Require** permits for all types of development in the floodplain (see page 31)
- **Assure** that building sites are reasonably safe from flooding
- **Establish** base flood elevations (BFE) where not determined on Flood Insurance Rate Maps (FIRMs)
- **Require** new and substantially improved homes and manufactured homes to be elevated above the BFE
- **Require** non-residential buildings to be elevated above the BFE, or dry floodproofed
- **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 39, 40, and 42)
- **Carefully consider** requests for variances
- **Resolve** non-compliance and violations of floodplain management requirements
- **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 Financial Protection

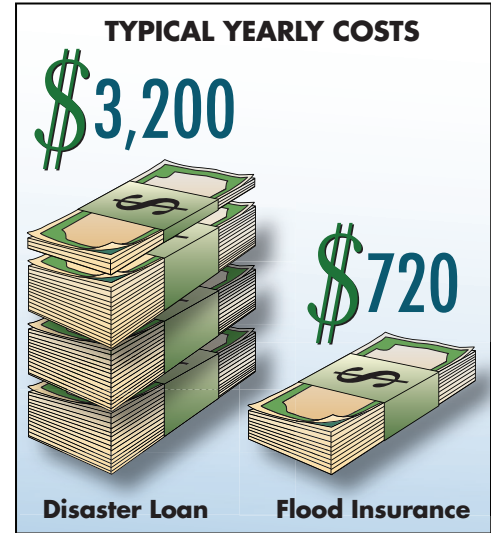
Who needs flood insurance? Federal flood insurance is required for all buildings in mapped flood zones shown on FEMA's maps if they are financed by federally-backed loans or mortgages. All homeowners, business owners, and renters in communities that participate in the NFIP may purchase federal flood insurance on any building and its contents, even if outside of the mapped flood zone. Homes in mapped flood zones are five times more likely to be damaged by flooding than by major fires.

Not in a mapped flood zone? 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 areas protected by levees or other flood control structures have some risk of flooding if the structures are overtopped or fail. Even when levees provide "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 find an insurance provider in your neighborhood, click on "How to Buy or Renew."



NFIP Recommended Planning Considerations

Nevada communities should consider incorporating planning considerations in comprehensive plans, land development codes, floodplain management regulations, and Local Mitigation Strategies to reflect the long-term goal of increasing resiliency to future flooding. NFIP regulations (Section 60.22(c)) outline 19 factors for consideration, including:

- Divert development to areas outside the SFHA to reduce flood damage
- Full public disclosure to potential buyers of properties in the SFHA
- Acknowledge that SFHA development may increase flood risk of existing development
- Improve local drainage to control increased runoff that increases the probability of flooding on other properties
- Require additional building elevation above the minimum base flood elevation (BFE)
- Require elevation methods such as pilings or columns rather than fill to maintain the storage capacity of the floodplain and to minimize environmental impacts
- Require evacuation plans for manufactured home parks and subdivisions

The NFIP's Community Rating System (CRS)

The NFIP recognizes communities that achieve better flood resiliency by providing policy holders with reduced flood insurance premiums. Communities must apply to participate in CRS and commit to implement and certify activities that contribute to reduced flood risk. Examples of actions communities can take to reduce the cost of flood 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 and watershed and stormwater management 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



Important

Information

Community officials can request assistance from CRS specialists to help with the application process and prerequisites. Check the online CRS Resource Center (see page 74).

In 2020, nine Nevada communities participated in the CRS. In those communities, property owners with buildings in mapped special flood hazard areas enjoy NFIP insurance premium discounts of 10% to 25% (and 5% to 10% in non-SFHA areas).

Flash Flooding

Flash flooding is common in watersheds with steep, hilly, or mountainous terrain where rainfall runs off rapidly because water cannot infiltrate into rocks and hard ground. Runoff accumulates in steep stream valleys, generating rushing waters that can quickly rise to considerable depth.

In some cases, flash flooding may occur well away from where heavy rain initially falls. This is especially common in the western United States where low lying areas may be very dry one minute, and filled with rushing water the next.

Urban areas also are prone to flash floods due to the large amounts of concrete and asphalt surfaces that do not allow water to penetrate into the soil.



Flash floods are exactly what the name suggests – floods that happen in a flash! See page 72 for more about the dangers of driving through flooded roads.

Terms and Definitions

Flash flooding

crests in a short length of time and is often characterized by high velocity flow that overflows a confined or narrow waterway. Heavy rainfall over a localized area is the most common cause. Flash flooding can rise from dry washes or normal water levels to several feet deep in less than an hour.

Flooding After Fire

Large-scale wildfires dramatically alter ground conditions, eliminating vegetation that absorbs rainfall and hardening the ground which means more rainfall runs off instead of soaking into the soil. These changes mean downstream flood risks are increased until vegetation grows back, which can take up to five years or more.

Flooding risks are increased not only because more water runs off the land, but because that water erodes more soil and carries more debris than when the same rainfall occurs over vegetated, unburned areas. Stream channel capacity is reduced or blocked when clogged by sediment and debris transported off of burned areas.



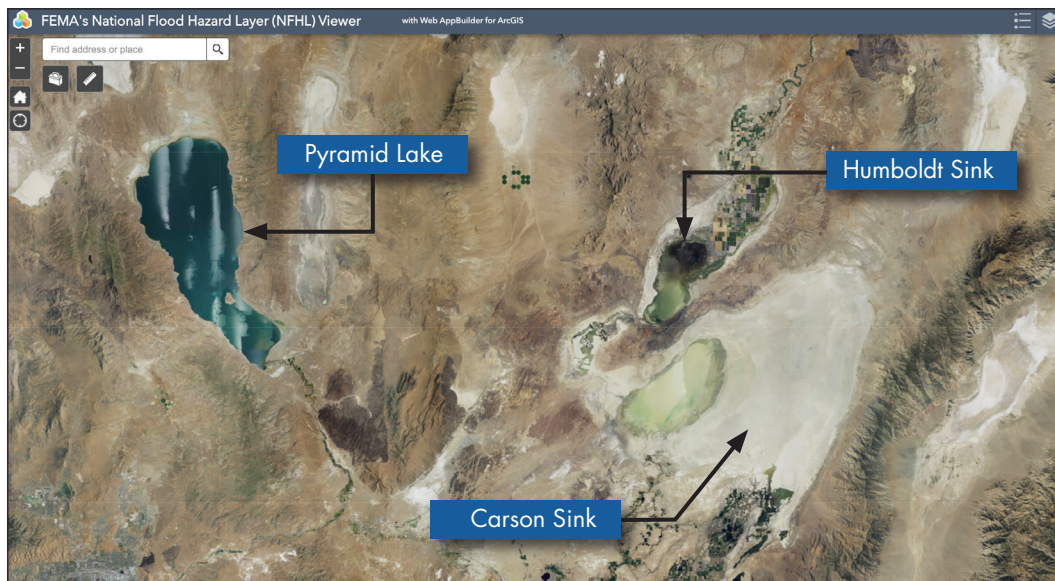
Important

Information

Property owners in and near flood zones that are located downstream of wildfire burn areas should double check their family and business safety plans and flood insurance policies. Always monitor weather and flood warnings and be prepared to evacuate.

Closed Basin Lake Flooding

A closed basin is a closed drainage system set inland geographically, whose boundary is defined by mountain ranges or features that do not allow for overflow to external bodies of water. Sometimes closed basin lakes are called terminal lakes or sink lakes. Closed basins can occur in any climate, but are most common in arid desert climates like that of the Great Basin region in northern Nevada.



Important

Information

Closed basin lake flooding occurs when annual precipitation exceeds annual evaporation and the overflow is unable to drain into another body of water.

Flood Risks Increase During...

Monsoon Season: The monsoon season in the U.S. Southwest begins in mid-June and lasts through September. In most years, more than half of Nevada's rainfall occurs during the monsoon season, which can result in flooding. During these months, local officials, residents, and motorists should be prepared and aware of their risks, as parts of Nevada may experience steady downpours of rain, flooding and flash flooding, dust storms, tornados, and high winds. Learn more on the National Weather Service Monsoon Safety webpage: <https://www.weather.gov/psr/MonsoonSafety>.

Snowpack Melting: Some of the most damaging floods in the Sierra Nevada region have happened when warm storms produce rain that melts the snowpack. Usually the snowpack stores large volumes of water and when melted by warm rains, large quantities of runoff accumulate in streams and rivers. When streams and rivers flood during the winter, snowpack along those waterways can limit overbank spreading of floodwater. This causes deeper floodwater that may cause significant erosion of stream banks, adding sediment that deposits further downstream, which can increase future flood risks.



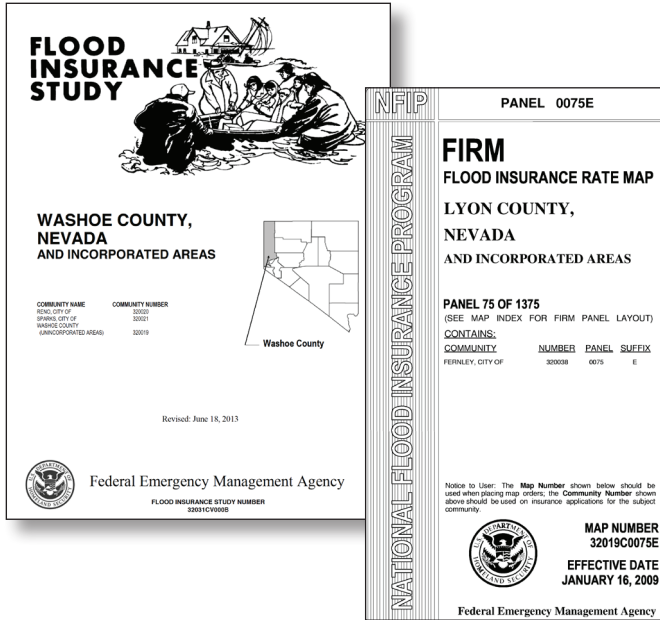
Important

Information

The **North American Monsoon** is a seasonal wind shift from dry air blowing out of the west to moist air flowing from a more southerly direction.

Usually the **snowpack** melts gradually as winter turns to spring. However, rapid melting of the snowpack can cause flooding. Rapid melting is caused by warm rainfall on the snowpack or high temperature increases in the spring.

Looking for FEMA Flood Map Information?



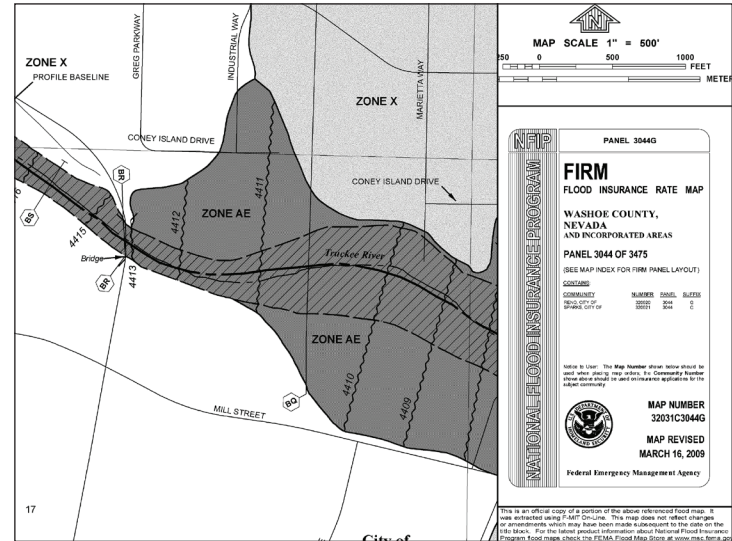
- Flood Insurance Studies (FISs) are compilations of flood risk information used for community planning and development.
- Flood Insurance Rate Maps (FIRMs) show flood zones subject to regulations and where federal flood insurance is required.
- Access FIRMs at the FEMA Flood Map Service Center at <https://msc.fema.gov>, where current and historical flood maps may be viewed and downloaded.
- Access the National Flood Hazard Layer, a geospatial database with current effective data, at <https://www.fema.gov/national-flood-hazard-layer-nfhl>.
- Some cities and counties also make digital flood maps available online, sometimes with property parcel data.

Need a fast answer? Community planning, engineering, or permit offices may also have paper flood maps available for viewing by the public.

FIRMette: FEMA Flood Maps Online

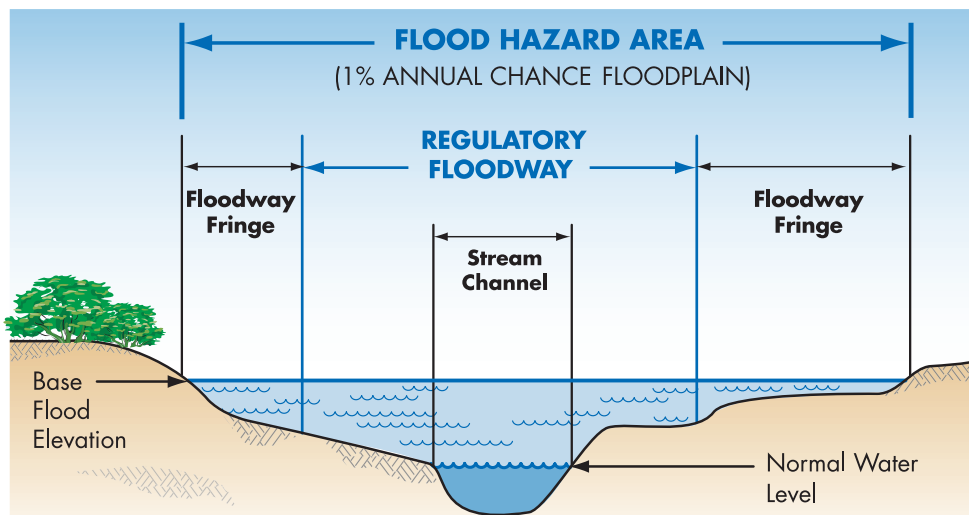
Portions of flood maps can be produced, saved, and printed by making a "FIRMette." FIRMettes are full-scale sections of FIRMs.

- A tutorial on FIRMettes and downloading FIRM panels is available at www.fema.gov/media-library/assets/documents/34930.
- Making a FIRMette is easy after a property is located. Use the <Search by Address> link or <Search All Products> to find the community and map panel of interest.
- Earlier versions of FIRMs are available for many communities, so current flood hazard information can be compared to historic data.



Go to www.msc.fema.gov and check out the "MSC Frequently Asked Questions." For step-by-step instructions on how to read flood maps, view the How to Read a Flood Insurance Rate Map Tutorial.

Understanding the Riverine Floodplain



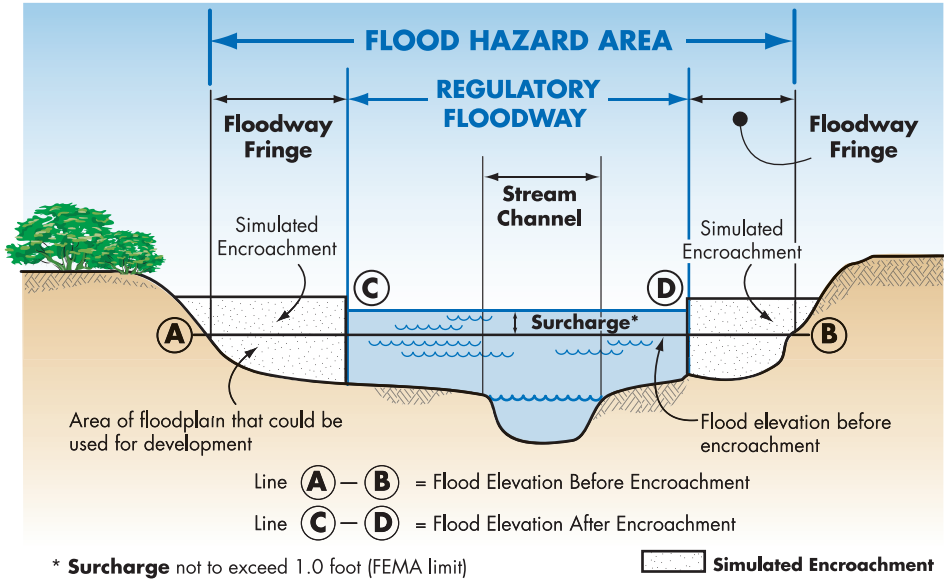
For riverine floodplains with base flood elevations (BFEs) determined by detailed flood studies, the Flood Profile in the Flood Insurance Study shows water surface elevations for different frequency floods (see page 18).

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 FIRMs as Zones A, AE, AH, AO, AR, and A99. Older FIRMs may have Zones A1-A30.

See page 15 to learn about the floodway, the area of the regulatory floodplain where flood waters usually are deeper and flow faster.

Understanding the FEMA Floodway



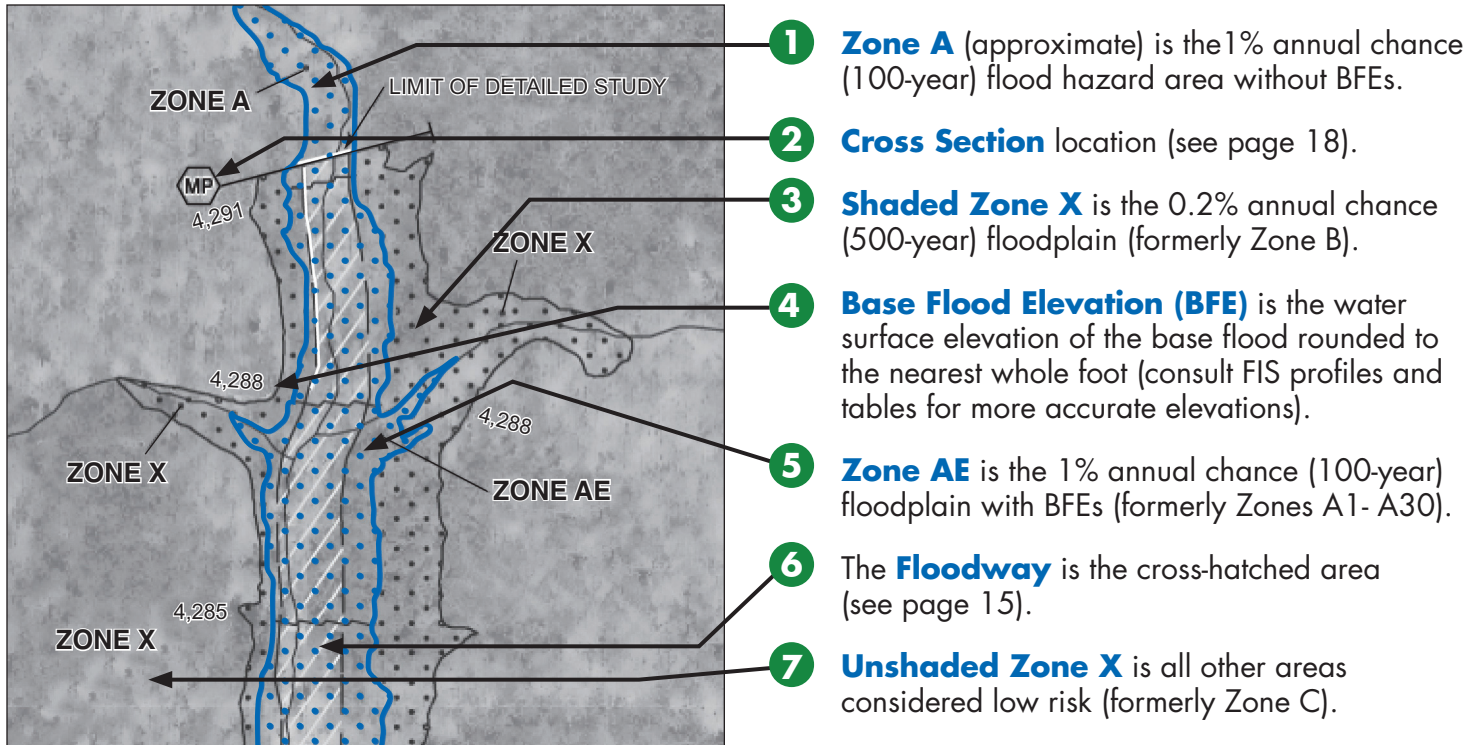
Terms and Definitions

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.

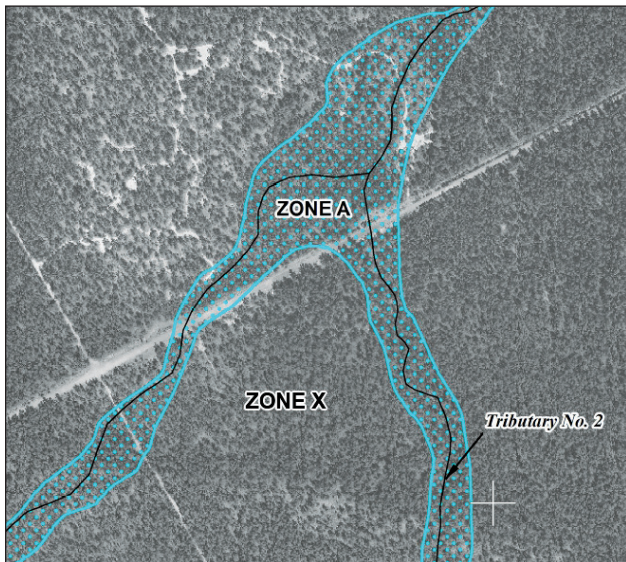
Computer models are used to simulate “encroachment” or development in the floodway fringe in order to predict where and how much the base flood elevation would increase if the floodway fringe is allowed to be developed.

For any proposed floodway development, the applicant must provide evidence that “no rise” in flood elevation will occur or obtain a Conditional Letter of Map Revision (CLOMR) before a local floodplain permit can be issued (see page 24). Experienced registered professional engineers must make sure proposed projects either won’t increase flooding or that any increases do not impact structures on other properties.

Flood Insurance Rate Map (Riverine)



Approximate Flood Zones



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

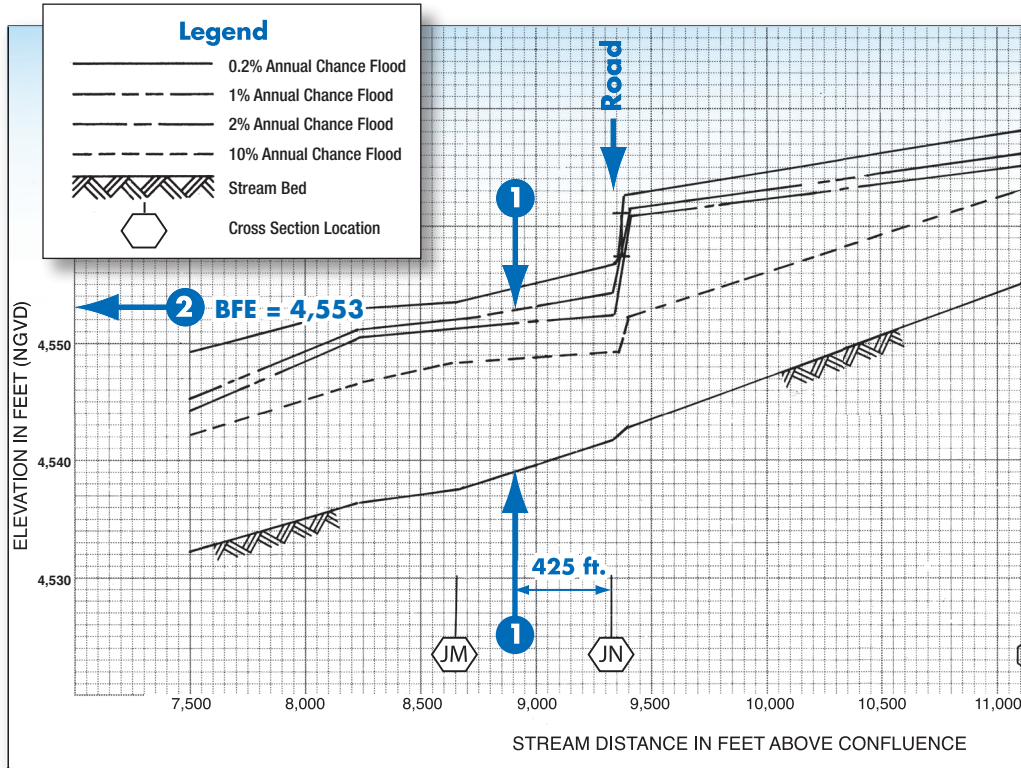
For assistance determining BFEs, contact community planning, engineering or permit offices or water management districts. Useful guidance for local officials and engineers is found in FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas*.

de 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 the BFE is two feet above the highest adjacent grade.

Using 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).

- On the effective flood map, locate the 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.
- 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: 4,553 feet).

Floodway Data Table

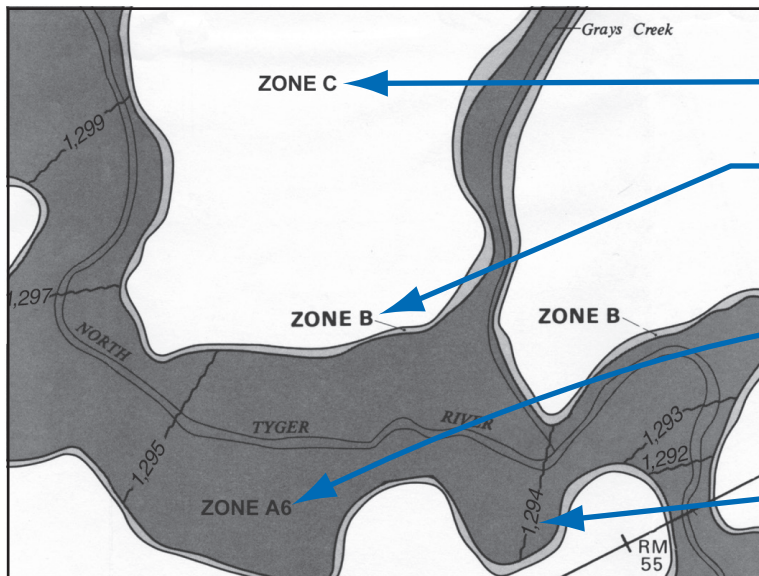
Flood Insurance Studies have Floodway Data Tables for every waterway that was studied by detailed methods for which floodways were delineated.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	21,635	176	633	7.2	4,943.6	4,943.6	4,943.9	0.3
B	21,963	182	616	7.4	4,946.8	4,946.8	4,947.0	0.2
C	22,434	178	659	6.9	4,950.7	4,950.7	4,951.3	0.6
D	23,006	240	672	6.7	4,956.3	4,956.3	4,956.3	0.0
E	23,306	160	630	7.2	4,958.8	4,958.8	4,959.0	0.2
F	23,739	91	427	10.6	4,962.6	4,962.6	4,963.5	0.9
G	23,971	100	549	8.3	4,966.2	4,966.2	4,966.5	0.3
H	24,132	138	699	6.5	4,967.2	4,967.2	4,967.9	0.7

¹Stream distance in feet above Old Virginia Canal.

- 1 Velocity estimates based on the mean velocity data may be used to compute hydrodynamic loads.
- 2 Compute BFE (rounded values are shown on FIRMs).
- 3 Elevations may not consider backwater effect from downstream river.
- 4 Amount of allowed increase – not more than 1.0 foot at any location.

Old Format Flood Insurance Rate Map

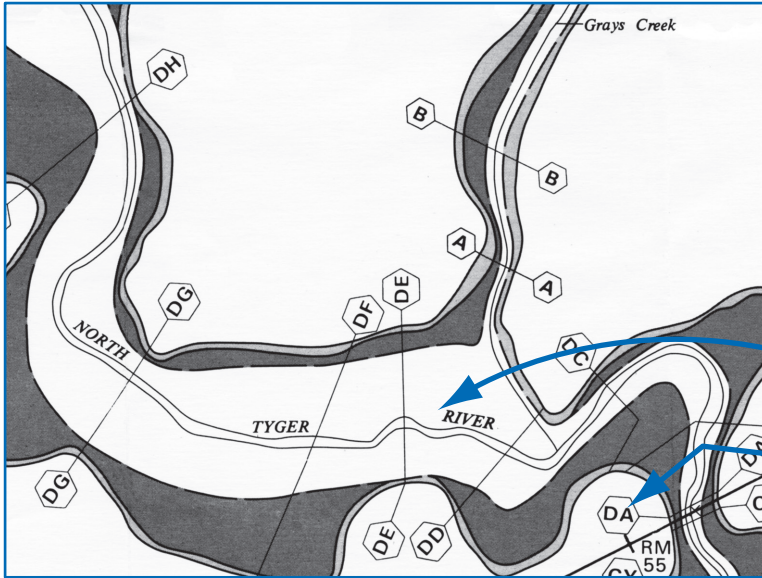


FLOOD HAZARD ZONES

- 1 Zone C** (or Zone X) is all 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 other moderate risk areas.
- 3 Zone A, Zones A1-A30 or 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. These “old format” FIRMs, and companion Flood Boundary and Floodway Maps (next page), are being revised and digitized as part of FEMA’s map revision program.

Old Format Flood Boundary and Floodway Map



Important

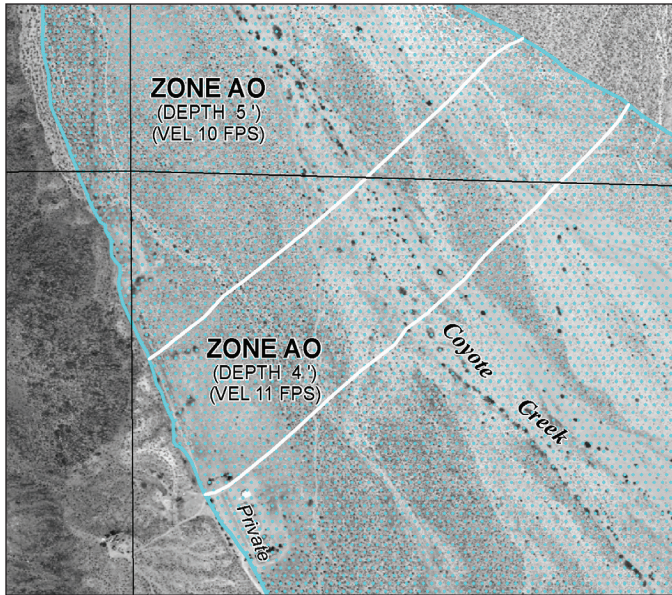
Information

Floodway maps do not show flood zones or BFEs. Check the companion FIRM for that information. Page 20 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 prepared Floodway maps as companions to many “old format” FIRMs. You should check to see if your project will be in the Floodway because additional engineering may be required (see page 30).

Alluvial Fan Flooding Requires Special Attention



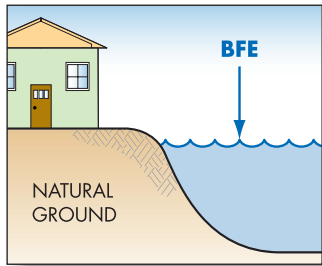
Alluvial fan flood hazard areas are shown on FIRMs as AO Zones with a “depth number” and anticipated velocity. Special attention is required if buildings are proposed in these areas:

- Lowest floors must be elevated at least as high as the depth number above the highest adjacent grade.
- Buildings may be elevated on a fill pad or a raised foundation – fills and foundations must be designed by a qualified registered professional engineer to resist the anticipated flood depths, erosion, and velocities.
- Drainage and grading must prevent directing water, sediment and debris flows onto adjacent properties.

Some of Nevada’s mountains have alluvial fans at their base. Alluvial fans are a landform created where floodwaters rushing off the steep mountains spread out and deposit sand, cobble, and rocks.

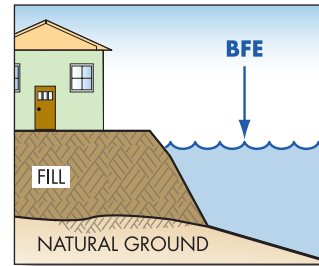
FIRM Revisions: LOMAs and LOMR-Fs

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 professional land 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 at or above the BFE.



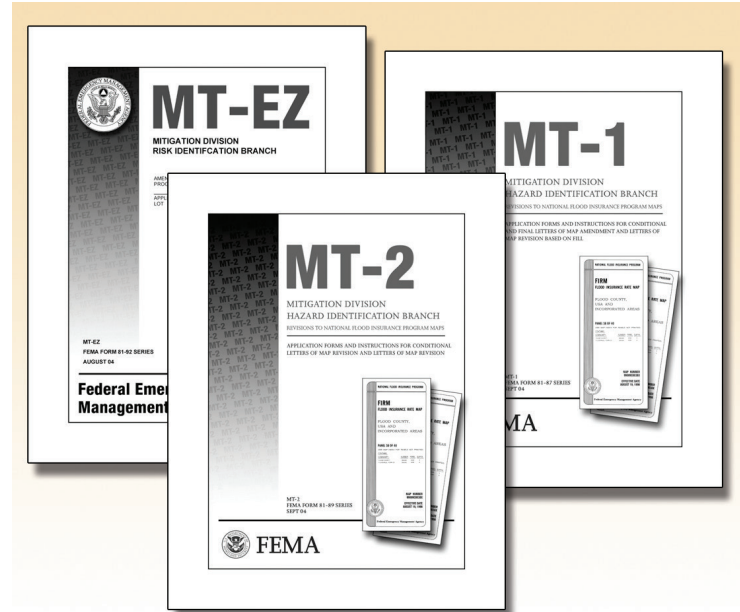
Letter of Map Revision Based on Fill (LOMR-F) is an official revision to an effective FIRM that is issued to document FEMA's determination that a structure or

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 www.fema.gov/letter-map-amendment-letter-map-revision-based-fill-process for guidance on map revisions. Access to FEMA's web-based application for professional land surveyors to submit eLOMAs is <https://hazards.fema.gov/femaportal/resources/whatiseloma.htm>.

FIRM Revisions: CLOMRs and LOMRs

- **Conditional Letter of Map Revision (CLOMR)** comments on whether a proposed project, if built as shown on the submitted documentation, would meet the standards for a map revision. Communities should require this evidence prior to issuing permits for fill or alteration of a watercourse. Certificates 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.

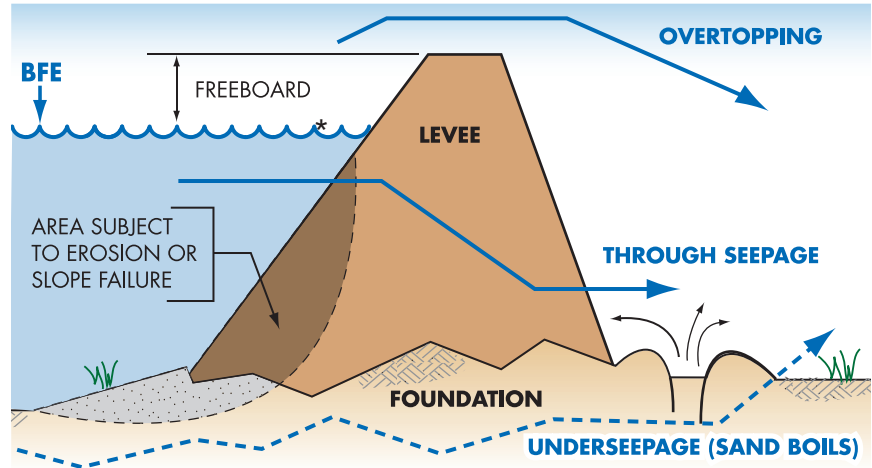


To learn more and download forms, find links by searching key words “MT-EZ,” “MT-1,” and “MT-2.”

Levee Certification for FIRMs

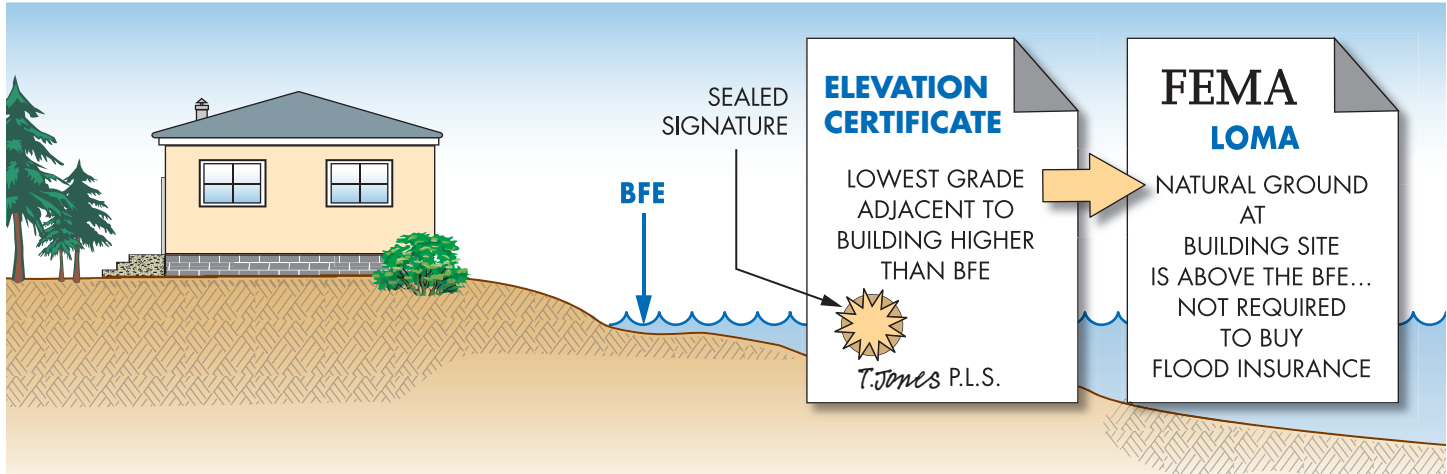
Many levees are designed to protect land against flooding from the base flood. In order for FEMA to show those areas as outside of the special flood hazard area, communities and levee owners must certify that levees meet certain design criteria. Certification will present significant challenges during the map revision process. Pursuant to FEMA's Procedural Memoranda 34 and 43, and as outlined in federal regulations at 44 CFR Section 65.10, the documentation requirements address:

- Freeboard
- Closures
- Embankment protection for erosion
- Embankment and foundation stability
- Settlement
- Interior drainage and seepage
- Operation and maintenance plans
- Other site specific criteria



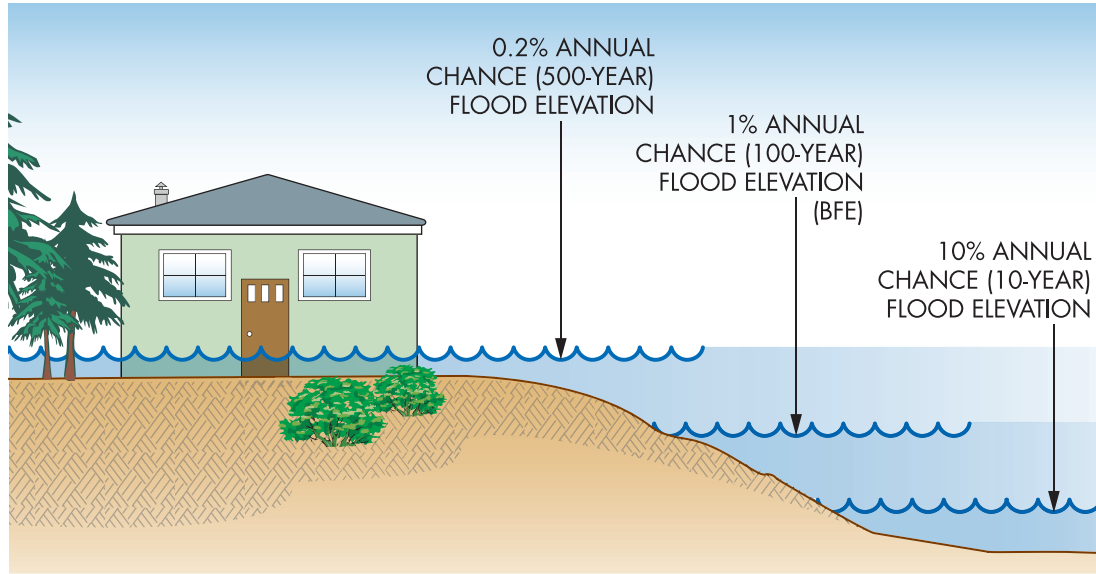
* Freeboard is the distance between the BFE and the top of the levee; for FEMA accreditation freeboard is usually 3 feet

Are Building Sites Higher than the BFE?



If land is shown on the map as “in” the SFHA, but the building site is higher than the base flood elevation (BFE)... get a Nevada licensed professional land 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 the structure is above the BFE (see page 23). If FEMA approves the request, lenders are not required to require flood insurance policies, although some may still require them. Owners should keep certificates and LOMAs with deeds— the documentation will help future buyers.

Floods Don't Always Stop at the BFE



Important

Information

Many people don't understand just how risky building in flood zones 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! 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 avoiding flood zones or building higher. See page 36 to see how this will save you money on flood insurance.

Avoid Flood Hazard Areas When Possible

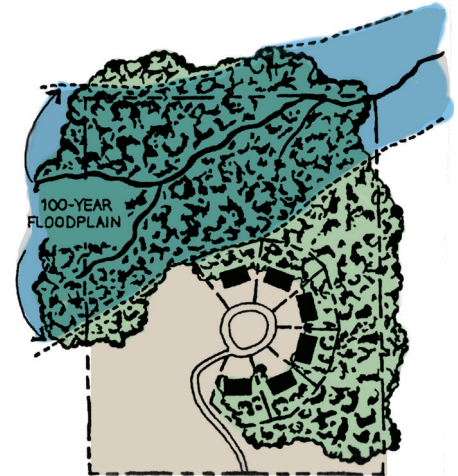


All land subdivided into lots, some homesites and lots partially or entirely in the floodplain.

NOT RECOMMENDED

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

RECOMMENDED



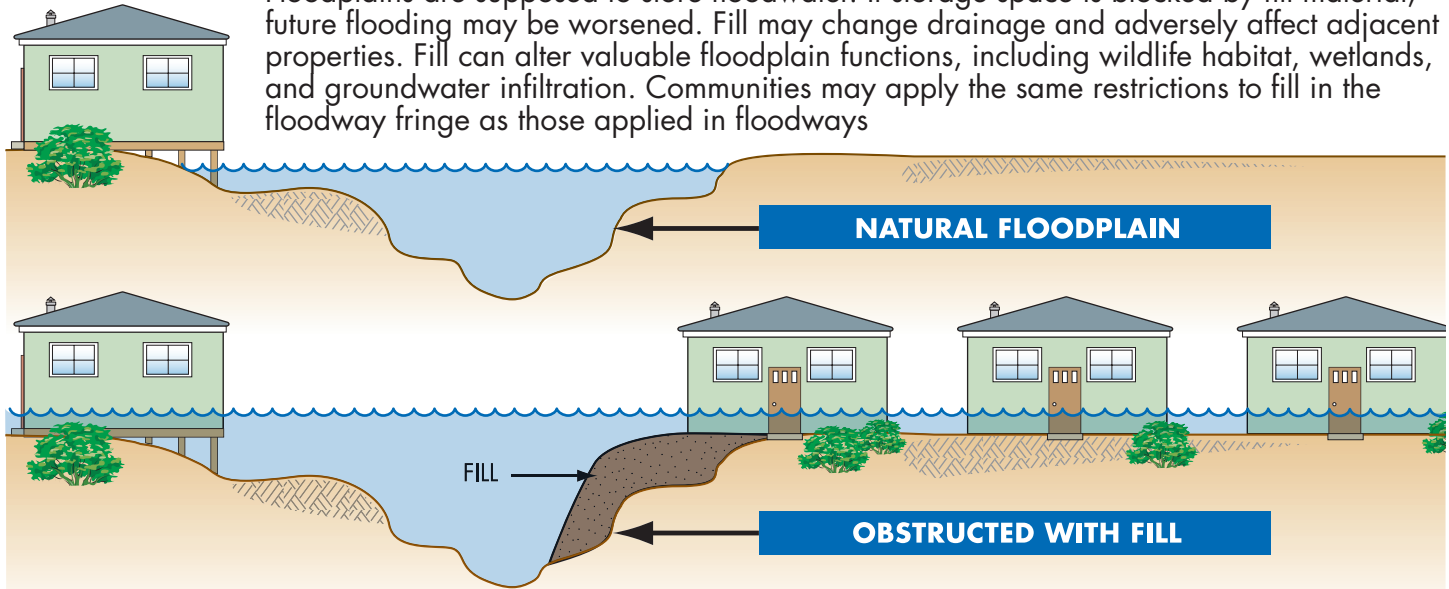
Floodplain land put into public/common open space, net density remains, lot sizes reduced and setbacks modified to keep homesites on high ground.

RECOMMENDED

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

Fill Can Adversely Affect Floodplain Functions

Floodplains are supposed to store floodwater. If storage space is blocked by fill material, future flooding may be worsened. Fill may change drainage and adversely affect adjacent properties. Fill can alter valuable floodplain functions, including wildlife habitat, wetlands, and groundwater infiltration. Communities may apply the same restrictions to fill in the floodway fringe as those applied in floodways



Communities should make sure fill in flood zones won't harm neighboring properties. Before deciding to use fill, property owners should check with local planning, engineering, or permit offices. Engineering analyses may be required to demonstrate that fill will cause "no rise" (see page 30).

The Regulatory Floodway "No Rise" Certification

- Floodways convey the largest volume of water and may have high velocities.
- Some communities restrict development in regulatory floodways.
- Engineers must prepare floodway encroachment analyses to evaluate the hydraulic impact of proposed development.
- Development is not allowed unless certified to cause "no rise" (no increase) in base flood elevations.
- "No rise" certifications must be signed, sealed, and dated by a Professional Engineer licensed in Nevada and qualified to conduct hydraulic analyses.

**XYZ Engineering, Inc.,
Anytown, Nevada**

Mr. Floodplain Manager
1000 Main Street
Anytown, NV

Re: 1200 Jackson Street
Anytown, NV

This is to certify that I am a duly qualified Professional Engineer licensed to practice in the State of Nevada. It is to further certify that the attached technical data supports the fact that the proposed (Name of Development) will not increase Base Flood Elevations, 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).

A.J. Smith P.E.



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

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

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



Floodplain development or building permits must be obtained before these and **ANY** land-disturbing activities occur in flood zones.

Some Key Floodplain Permit Review Steps

The permit reviewer must check many things. Some of the key questions are:

- Is the site near a watercourse or shoreline?
- Is the site in a FEMA mapped SFHA or floodway?
- Are applicants advised that other state or federal permits must be 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 or repair of substantial damage 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?
- Are all required design certifications submitted?
- Will the owner/builder have to submit an as-built Elevation Certificate?

REVIEW CHECKLIST

- FLOODPLAIN
- FLOODWAY
- BFE
- NEW CONSTRUCTION
- IMPROVED EXISTING BUILDING
- ELEVATED
- ELEVATION CERTIFICATE
- ISSUE PERMIT

Roberto Reviewer C.F.M.

Fundamentals of Flood Resistant Construction

The flood resistant construction requirements of the NFIP and the model International Codes share the common objective of increasing resistance to flooding. Although there are some differences between specific requirements, they include the following fundamentals. Buildings should have:

- **Foundations** capable of resisting flood loads (including dry floodproofed nonresidential buildings)
- **Structurally sound walls and roofs** capable of minimizing penetration by wind, rain, and debris
- **Lowest floors elevated** high enough to prevent floodwaters from entering during the design event
- **Equipment and utilities** elevated or designed to remain intact and be restored easily
- **Enclosures below elevated floors** limited to parking, limited storage, and building access and are designed to minimize damage
- **Flood damage-resistant materials** used below elevated lowest floors

In short ... flood resistant buildings!

Flood Provisions in the Model International Code

The International Codes (I-Codes) published by the International Code Council form the basis for building codes adopted by most Nevada communities. The model codes include flood provisions that are more stringent than the NFIP minimums.

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



Excerpts of the flood provisions of the International Code, “Highlights of ASCE 24,” and other building code resource materials are available online <https://www.fema.gov/building-code-resources>.

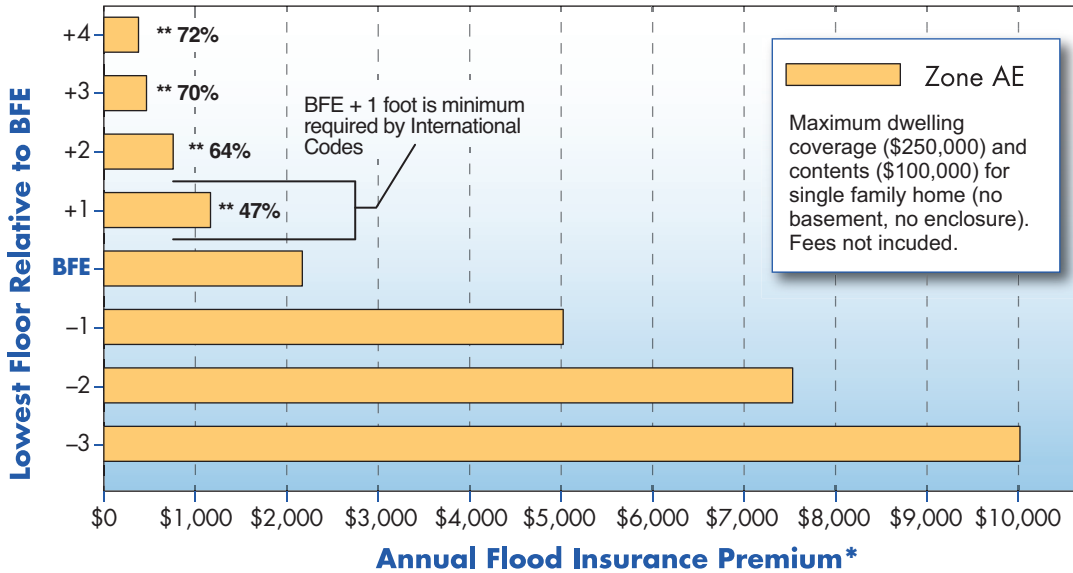
Specific Requirements in the Model International Codes

The International Codes include requirements that may differ from NFIP and local floodplain management regulations – the more restrictive prevail. The I-Codes:

- **Require Freeboard.** Minimum BFE plus 1 foot for buildings in SFHAs
- **Critical Facilities.** Elevated or protected to the higher of BFE plus 2 feet or 500-year flood elevation
- **Flood Openings.** Required in at least two walls of all enclosures below elevated buildings; performance of engineered flood openings emphasized
- **Dry Floodproofing.** Permitted only for nonresidential buildings and must be designed in accordance with ASCE 24.
- **Mixed Use.** Defined in ASCE 24 commentary for limitations on dry floodproofing nonresidential portions of mixed use buildings

Freeboard: Build Higher, Reduce Damage, Save on Insurance

Freeboard is additional height – a factor of safety – above the BFE. Buildings that are higher than the BFE experience less damage. Owners of buildings elevated above the BFE also save on federal flood insurance.



* Unofficial estimates using 2019 rates; use only for comparison purposes

** Savings over at-BFE premium



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! Builders must submit floor elevations as part of foundation inspections. An error of just 6 or 12 inches could more than double the cost of federal flood insurance.

A 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 nearly \$10,000 a year!

Variations From Elevation Requirements

Very specific conditions related to the property (not the owner's actions or preferences) must be satisfied to justify a variance:

- Compliance would result in exceptional noneconomic hardship due to the unique conditions not common with adjacent properties
- Variance does not result in threats to public safety or extraordinary public expense
- Variance does not create a nuisance, cause fraud and victimization of the public, or conflict with other laws and regulations
- If in floodway, no increase in flood levels would result
- Applicant has shown good and sufficient cause
- Variance is the minimum necessary to provide relief



Variance means a grant of relief from the floodplain management requirements which permits construction in a manner that would otherwise be prohibited and where specific enforcement would result in exceptional hardship.

Property owners and communities must carefully consider the impacts of variances to allow buildings below the BFE. Not only will buildings be more likely to sustain flood damage, but federal flood insurance will be very costly (see page 36). Communities with a pattern of granting variances may be subject to NFIP sanctions, costing all insurance policyholders even more. For guidance, see *Variations and the National Flood Insurance Program* (FEMA P-993).

Carefully Complete the Permit Application

Owner's Name <i>David & Sally Jones</i>
Site Address, Tax#, Parcel # <i>781 Orange Blossom Ct., 400-99A-002</i>
A. Description of Work
1. Proposed Development Description:
<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Dredging
<input type="checkbox"/> Alteration or Repair <input type="checkbox"/> Manufactured/Modular
<input checked="" type="checkbox"/> Filling <input type="checkbox"/> Logging
<input type="checkbox"/> Grading <input type="checkbox"/> Other
2. Size and Location of Development:
<i>single family (2,000 cu yds. fill); flood</i>
<i>fringe of Dry River</i>
3. Type of Construction
<input checked="" type="checkbox"/> New Residential <input type="checkbox"/> Improvement
<input type="checkbox"/> New Non-Residential <input type="checkbox"/> Renovation
<input type="checkbox"/> Addition <input type="checkbox"/> Accessory Structure
<input type="checkbox"/> Temporary
Applicant's Signature <i>David M. Jones</i>

Part of a sample Flood Zone Permit Application

(may vary by community)

Community Map and Elevation Data:

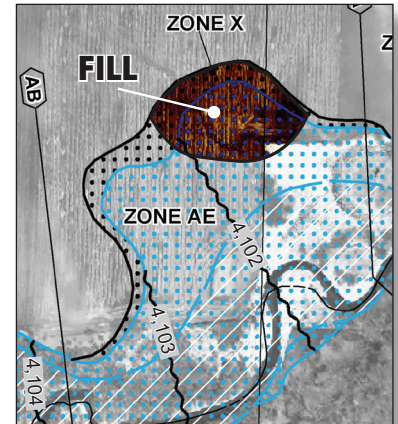
- Community No. 320000
- Panel No. 125C
- Zone AE
- Base Flood Elevation 4,102
- Floodway Yes No
- Required Lowest Floor Elevation (including basement) 4,104
- Elevation to which all attendant utilities, including all heating, duct work, and electrical equipment will be installed or floodproofed 4,104



Important

Information

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



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

Communities Must Retain Flood Records Permanently

Communities that participate in the NFIP agree to maintain certain documentation for all development in flood zones, including:

- Permits issued and variances granted
- Floodway encroachment (no rise) and watercourse alteration
- Design certifications for dry floodproofed nonresidential buildings
- Design certifications for engineered flood openings
- Determinations of whether work on existing buildings is substantial improvement or repair of substantial damage
- Surveyed “as-built” building elevations (Elevation Certificates)



Important

Information

Maintaining permanent records allows communities to respond to citizen inquiries and to provide documentation to FEMA and the Nevada Division of Water Resources as part of Community Assistance Visits.

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 Nevada professional land surveyor.
- Community officials 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 lowest grades adjacent to planned or existing building sites are above the base flood elevation and to support map changes (see page 26).
- It is used to verify building and equipment elevations.
- Insurance agents use the EC to write and rate NFIP flood insurance policies.
- See page 75 for online Elevation Certificate training information

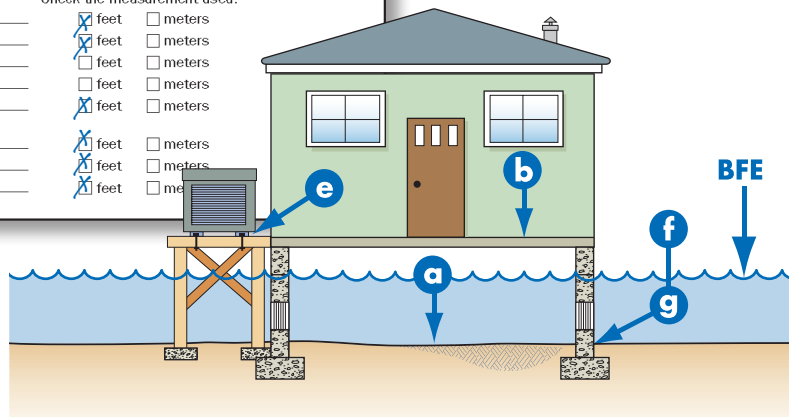
By itself, the EC cannot be used to waive the mortgage lender requirements to obtain flood insurance. See page 30 to learn about FEMA’s Letter of Map Amendment process.

U.S. DEPARTMENT OF HOMELAND SECURITY Federal Emergency Management Agency National Flood Insurance Program		OMB No. 1660-0008 Expiration Date: November 30, 2022	
ELEVATION CERTIFICATE Important: Follow the instructions on pages 1-9.			
Copy all pages of this Elevation Certificate and all attachments for (1) community official, (2) insurance agent/company, and (3) building owner.			
SECTION A - PROPERTY INFORMATION			FOR INSURANCE COMPANY USE
A1. Building Owner's Name			Policy Number:
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Company NAIC Number:
City	State	ZIP Code	
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)			
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)			
A5. Latitude/Longitude: Lat: _____ Long: _____ Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983			
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.			
A7. Building Diagram Number _____			
A8. For a building with a crawlspace or enclosure(s):			
a) Square footage of crawlspace or enclosure(s) _____ sq ft			
b) Number of permanent flood openings in the crawlspace or enclosure(s) within 1.0 foot above adjacent grade _____			
c) Total net area of flood openings in A8.b _____ sq in			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No			
A9. For a building with an attached garage:			
a) Square footage of attached garage _____ sq ft			
b) Number of permanent flood openings in the attached garage within 1.0 foot above adjacent grade _____			
c) Total net area of flood openings in A9.b _____ sq in			
d) Engineered flood openings? <input type="checkbox"/> Yes <input type="checkbox"/> No			
SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION			
B1. NFIP Community Name & Community Number		B2. County Name	B3. State
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/ Revised Date
		B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use Base Flood Depth)
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9: <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other/Source: _____			
B11. Indicate elevation datum used for BFE in Item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____			
B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area (OPA)? <input type="checkbox"/> Yes <input type="checkbox"/> No Designation Date: _____ <input type="checkbox"/> CBRS <input type="checkbox"/> OPA			
FEMA Form 086-0-33 (12/19)		Replaces all previous editions.	
		Form Page 1 of 6	

Completing the Elevation Certificate

ELEVATION CERTIFICATE (partial)

SECTION C – BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on:	<input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input checked="" type="checkbox"/> 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. In Puerto Rico only, enter meters.	
Benchmark Utilized: _____	Vertical Datum: _____
Indicate elevation datum used for the elevations in items a) through h) below. <input type="checkbox"/> NGVD 1929 <input checked="" type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other/Source: _____	
Datum used for building elevations must be the same as that used for the BFE.	
	Check the measurement used.
a) Top of bottom floor (including basement, crawlspace, or enclosure floor)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
b) Top of the next higher floor	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
c) Bottom of the lowest horizontal structural member (V Zones only)	<input type="checkbox"/> feet <input type="checkbox"/> meters
d) Attached garage (top of slab)	<input type="checkbox"/> feet <input type="checkbox"/> meters
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment and location in Comments)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
f) Lowest adjacent (finished) grade next to building (LAG)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
g) Highest adjacent (finished) grade next to building (HAG)	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters
h) Lowest adjacent grade at lowest elevation of deck or stairs, including structural support	<input checked="" type="checkbox"/> feet <input type="checkbox"/> meters

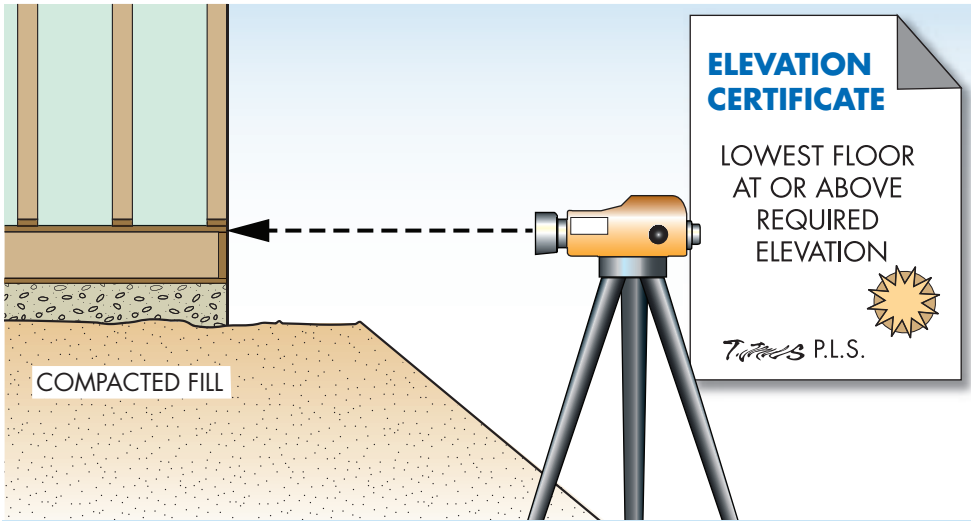


In this example, the BFE is 4,129.0 feet.

The house on crawlspace foundation (with flood openings) is elevated 2.5 feet above the BFE.

Building codes require submission of elevation documentation two times, when the lowest floor is set and prior to further vertical construction and again prior to the final inspection. A licensed professional land surveyor must fill out and seal the EC form (except in zones without BFEs). The EC includes diagrams for different building types. Several points must be surveyed.

Paperwork is Important for Owners



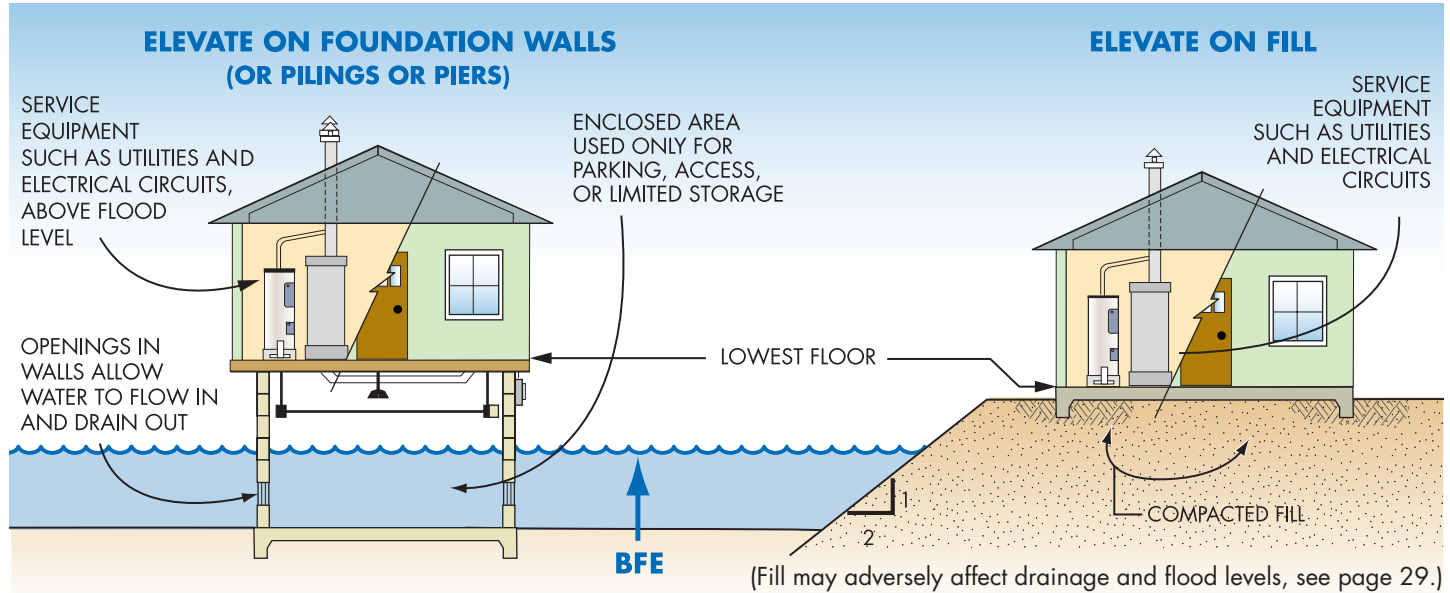
Information

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 limited to parking, limited storage, and building access (see page 44) and it is built as required in floodplain management regulations.

Permittees must submit Elevation Certificates after the lowest floor (or lowest horizontal structural member) is placed and prior to further vertical construction. When construction is finished, another Elevation Certificate ("as-built") must be submitted prior to the final inspection.

Owners should keep Elevation Certificates in a safe place. They can be used to demonstrate buildings were compliant at the time of construction. Also, Elevation Certificates may be required to obtain federal flood insurance policies.

How to Elevate Buildings in Flood Zone A/AE



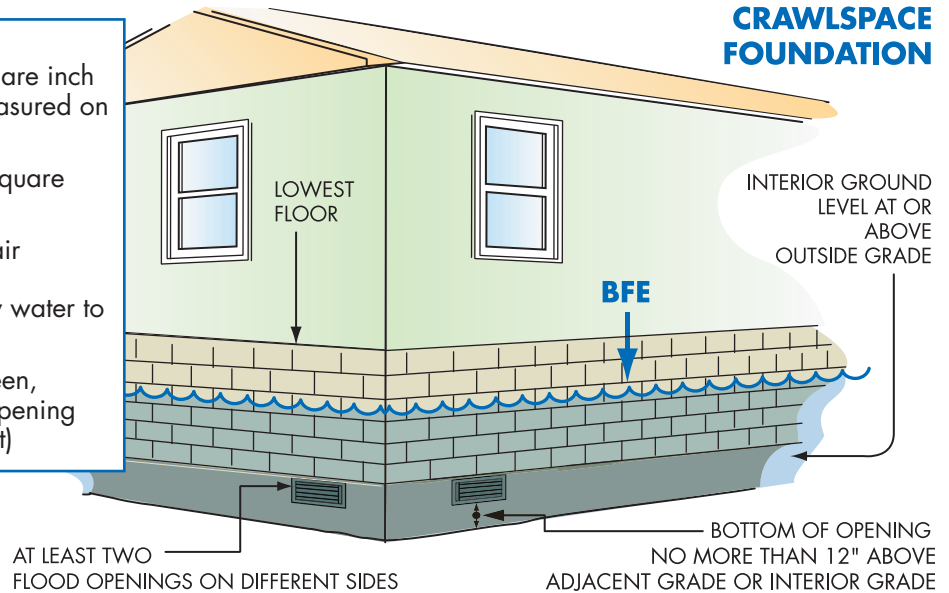
CAUTION! Enclosures (including crawlspaces) have some special requirements (see pages 44 and 45).
Note: When the walking surface of the lowest floor is at the BFE, under-floor utilities are not allowed.
Fill used to elevate buildings must be placed properly (see pages 29 and 46).

Enclosures Below the Lowest Floor (Zone A/AE)

NOTE:

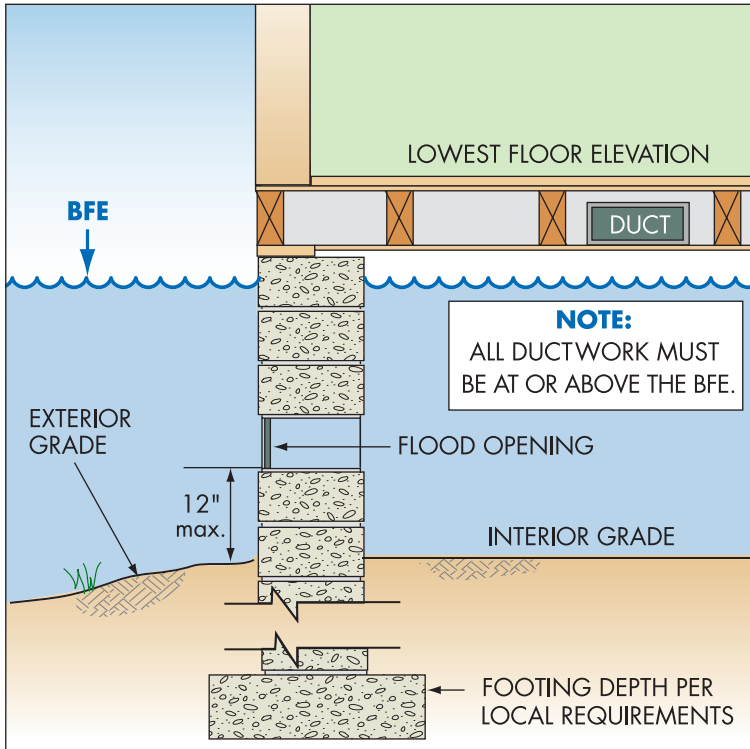
- Total net area of all openings is 1 square inch per square foot of enclosed area (measured on the outside)
- A 30' x 40' enclosure needs 1,200 square inches of openings
- If inserted in flood openings, typical air ventilation units must be permanently disabled in the open position to allow water to flow in and out
- A typical air ventilation unit, with screen, provides 42 to 65 square 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 floodwater.



Solid perimeter wall foundations can enclose flood-prone space. A crawlspace is a good way to elevate just a couple of feet. The following are required: flood openings, elevated utilities, flood-resistant materials, and limitations on use. See NFIP Technical Bulletin #1 *Requirements for Flood Openings in Foundation Walls and Walls of Enclosures*.

Enclosure Details (Zone A/AE)

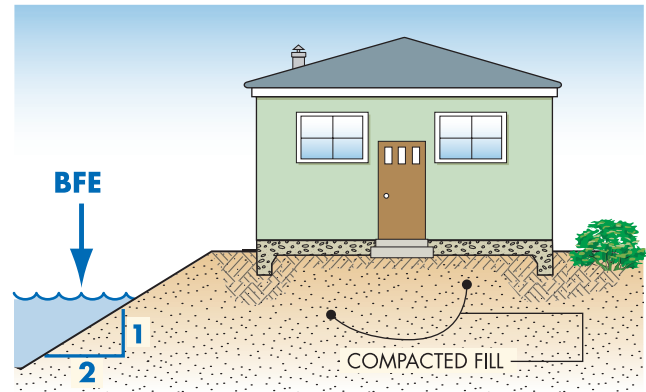


- Lowest Floors must be at or above BFE. The Nevada Division of Water Resources recommends another foot or more for greater protection.
- All materials below the lowest floor must be flood resistant.
- Flood openings must provide 1 square inch of net open area for every square foot of area enclosed by the perimeter walls – or certified engineered openings may be used.
- A 30' x 40' building needs 1,200 square inches of net opening (non-engineered).
- The bottom of flood openings must be no more than 12 inches above the higher of the interior or exterior grades.
- 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.

Placement and Compaction of Fill in Zone A/AE

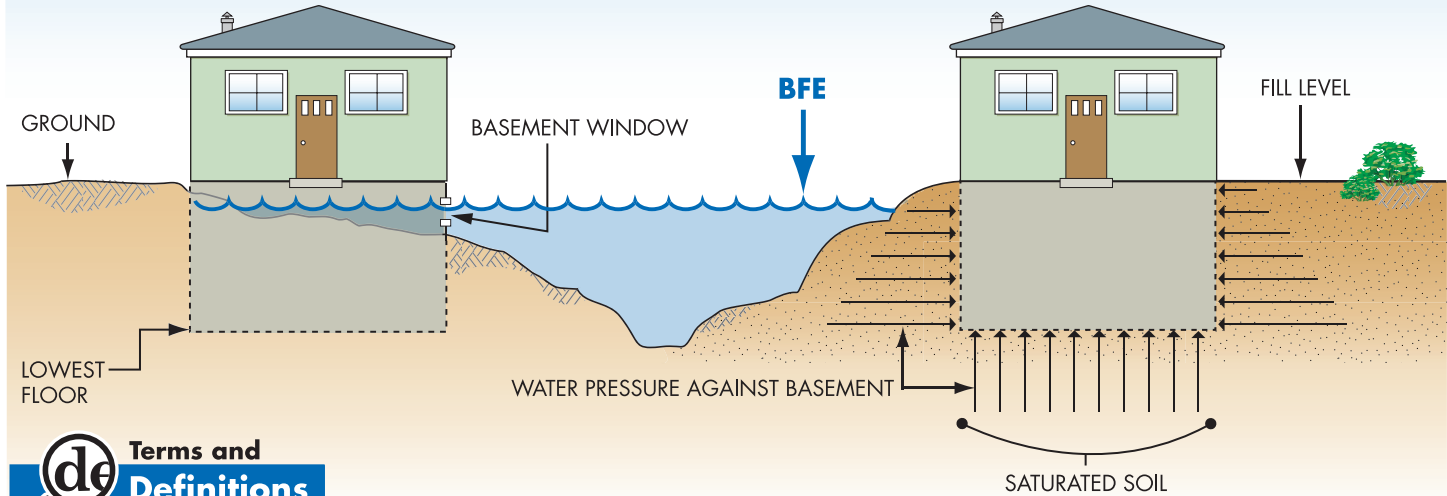
Earthen fill used to raise the ground above the flood elevation must be placed properly so that it does not erode or slump when water rises. For safety and to meet requirements, fill should:

- Not be placed in areas with poor drainage or where the fill may divert water onto adjacent properties. Instead, use perimeter walls, piers or pilings to minimize drainage problems.
- 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)
- Avoid the floodway (see page 30)



Engineers 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.

Basements in Flood Hazard Areas Are Unsafe

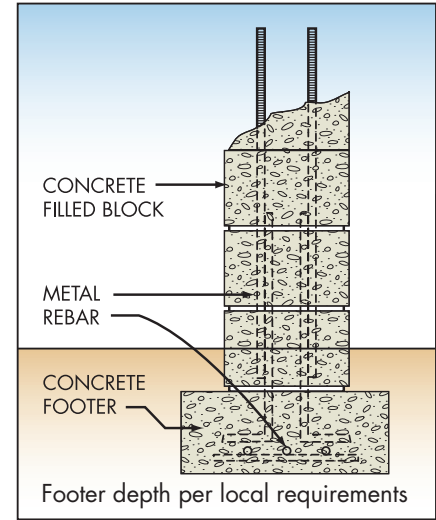
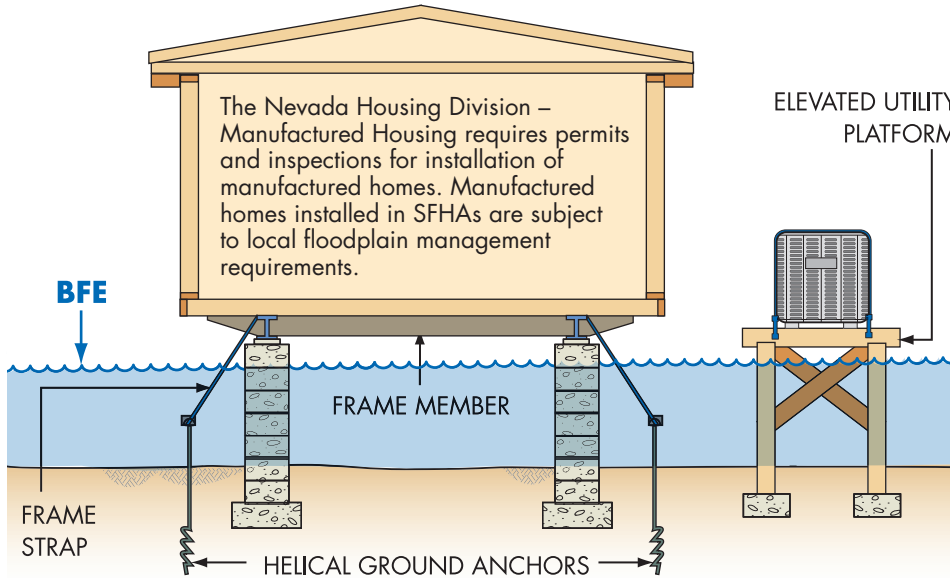


Terms and Definitions

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

New buildings are not allowed to have basements below the BFE and federal flood insurance coverage is very limited in existing basements for a very good reason. It only takes an inch of water over a door threshold or window 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.

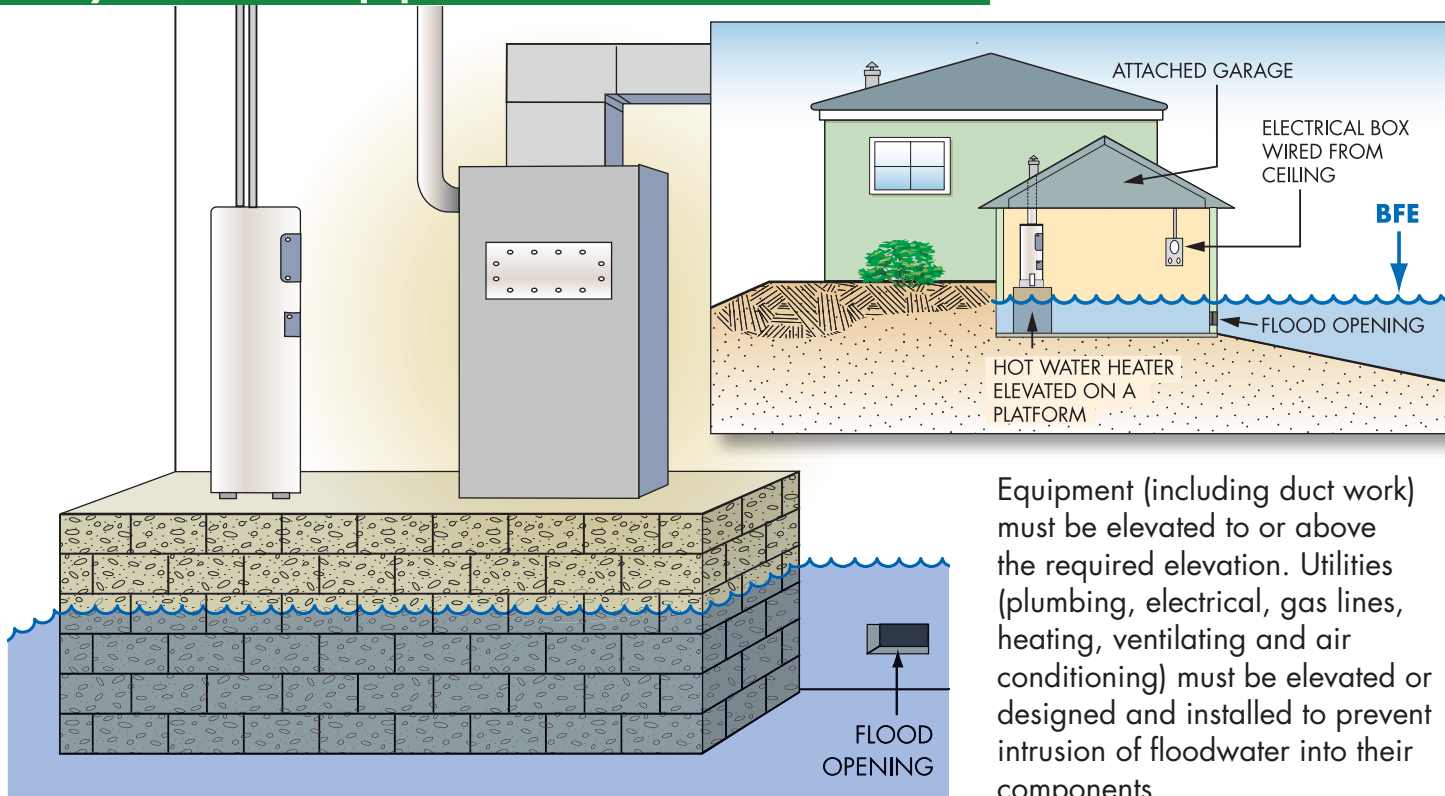
Manufactured Homes Require Special Attention



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

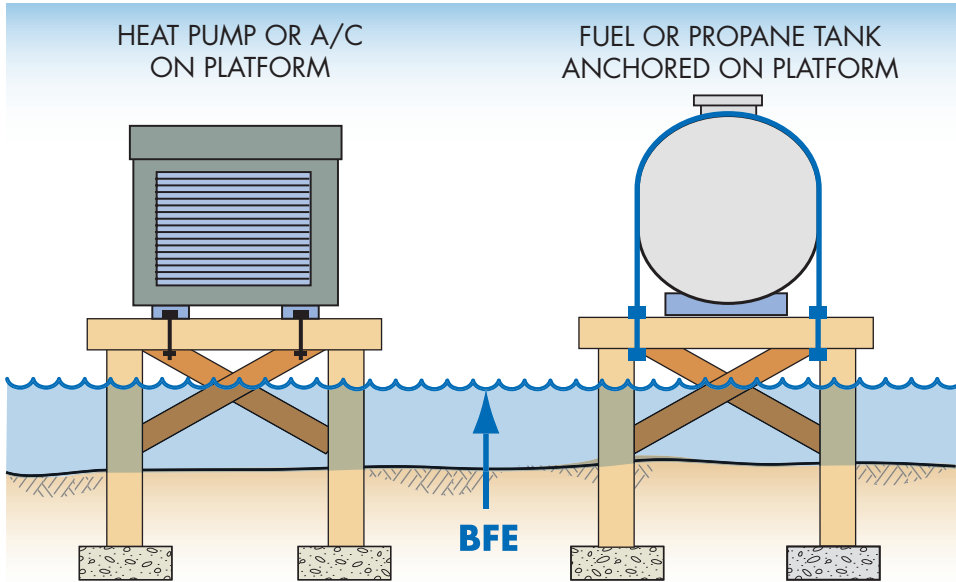
Homes must be anchored to reinforced foundations to resist flotation, collapse, and lateral movement and must be tied down in accordance with community ordinances or the manufacturers' installation specifications for SFHAs. See guidance and some pre-engineered designs in FEMA P-85, *Protecting Manufactured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

Utility Service and Equipment Inside Enclosures



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

Utility Service, Equipment, and Tanks



Important

Information

Fuel and propane tanks may explode or release contents during flooding. Even shallow water can create large buoyant forces on tanks. Tanks may be installed on raised platforms, underground, or at-grade. All tanks should be anchored to resist buoyancy. At-grade fuel and chemical tanks should be protected against debris impact.

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

Pools in Flood Hazard Areas

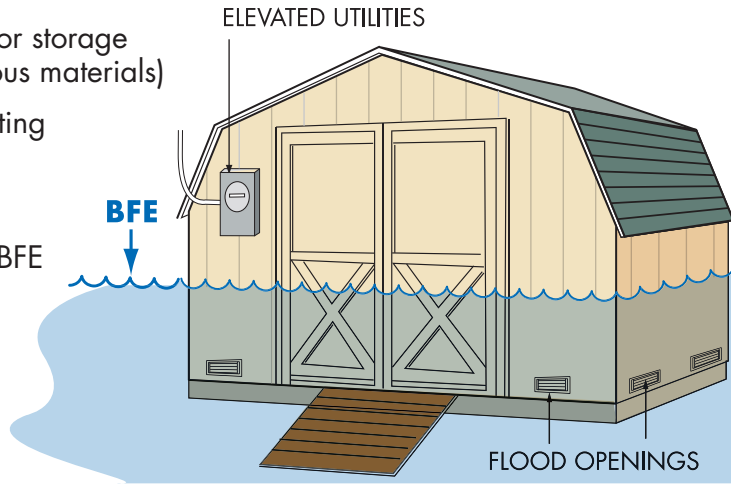
The type of flood zone and whether a pool is in-ground, above-ground, or a combination (perhaps with associated grading and fill) determine which requirements apply. All pools should be installed to be stable under flood conditions, including scour and erosion.

- **Pools in SFHAs.** When above-ground pools and pools installed with fill are located in floodways and in riverine flood hazard areas where BFEs are specified but floodways have not been designated, the floodway encroachment requirements apply (see page 30).
- **Public swimming pools and other private pools.** Pools located under buildings must not be enclosed by walls (enclosures under elevated buildings must be used only for parking, storage, and building access. Free-standing pools may be installed in dry floodproofed buildings.
- **Pool controls and equipment.** Requirements for utility service apply (see page 50).

Accessory Structures

If not elevated, accessory structures in flood zones must:

- Not for human habitation
- Be used only for parking or storage (not pollutants or hazardous materials)
- Be anchored to resist floating
- Have flood openings
- Be built of flood damage-resistant materials below BFE
- Have elevated utilities above BFE
- Not be modified for different use in the future



Terms and Definitions

Accessory Structure

is a structure that is accessory to and incidental to that of a primary structure located on the same lot, and that is one-story and not larger than 600 square feet.

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.

Agricultural Structures

Communities may adopt regulations to grant variances to allow certain agricultural structures to be “wet floodproofed” rather than elevated or dry floodproofed. FEMA specifies:

- Variances must be granted for individual agricultural structures
- Applicants must justify variances, including low damage potential and the anticipated hardship if variances are not granted
- Except for size limits, the accessory structure requirements also apply to agricultural structures (see page 52)

As an alternative to handling individual agricultural structures by variance, communities may seek a “community-wide exception” from FEMA. If approved, the exception allows communities to issue permits under specified conditions.

FEMA issued a policy on agricultural structures and accessory structures in early 2020. The policy, a floodplain management bulletin, and fact sheets are available on FEMA's web site. Contact NDWR Floodplain Management Program staff at (775) 684-2800 with questions.



Important

Information

Agricultural Structure is defined by FEMA policy as a structure that is used exclusively in connection with the production, harvesting, storage, raising, or drying of agricultural commodities and livestock. Aquaculture is farming conducted in or over water. Structures used for human habitation are not agricultural structures, even when located on agricultural land.

Recreational Vehicles and Park Trailers

In flood hazard areas, RVs and park trailers must:

- Be licensed and titled as an RV or park trailer (not as a permanent residence)
- Be built on a single chassis
- Must measure 400 square feet or less (measured at largest horizontal projection)
- Have inflated tires and be self-propelled or towable by a light-duty truck
- Have no attached deck, porch, shed, or utilities
- 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 and park trailers that do not meet these conditions must be installed and elevated like manufactured homes, including permanent foundations and tie-downs (see page 48).

Improvements and Repairs of Buildings in Flood Zones

Permits to improve and repair buildings are required. Local officials must:

- Review costs estimated in construction contracts or other cost estimates (including estimate market value of owner labor and donated labor and materials).
- Estimate the market value using property assessment records or use an independent assessment of market value performed by a licensed appraiser.
- Compare the cost of improvements and repairs to the market value of the building.
- Require buildings to be brought into full compliance if the improvement costs equal or exceed 50% of the market value, called Substantial Improvement.
- Require damaged buildings to be brought into full compliance if the costs to repair to pre-damage condition equal or exceed 50% of the market value, called Substantial Damage
- Encourage owners to consider other ways to reduce future damage if the comparison is less than 50% (see page 68).



Important

Information

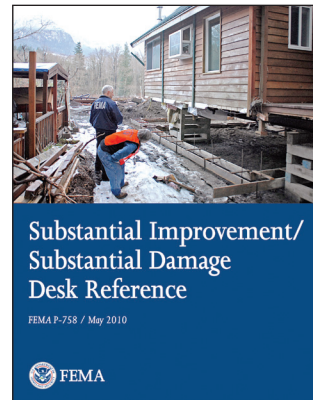
Improvements include:

- Renovation/rehabilitation of the interior of the existing building (see page 61)
- Lateral addition, without renovation or structural alteration of the existing building (see page 62)
- Lateral addition, with renovation or structural alteration of the existing building (see page 63)
- Vertical addition (add new story)

Substantial Improvement/Substantial Damage Desk Reference

FEMA's SI/SD Desk Reference (FEMA P-758) provides guidance and suggested procedures for:

- Estimating costs of improvements and costs of repairs (see page 58)
- Estimating market values
- Community and property owner responsibilities
- Administrative requirements
- Key aspects of bringing buildings into compliance
- Suggestions for preparing for disasters



<https://www.fema.gov/media-library/assets/documents/18562>

Terms and Definitions

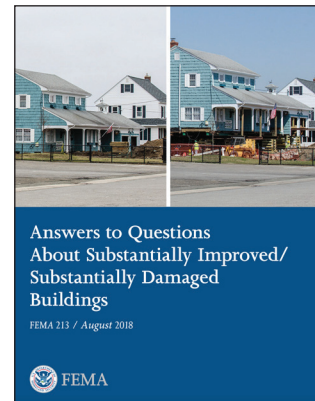
Substantial Improvement means any reconstruction, rehabilitation, alteration, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of construction of the improvement. This term includes structures which have incurred “substantial damage” from any cause (flood, fire, hurricanes, tornadoes, etc.), regardless of the actual repair work performed (see page 66).

Answers to Questions about Substantial Improvement and Substantial Damage

FEMA's *Answers to Questions about Substantially Improved/Substantially Damaged Buildings* (FEMA 213) is a good resources for citizens, elected officials, members of appointed boards, contractors, and real estate and insurance professionals. Each question refers the reader to sections in the *SI/SD Desk Reference* (FEMA P-758) for more details.

FEMA 213 uses the FAQ format to:

- Explain the NFIP definitions and regulations
- Answer general questions about the SI/SD requirements
- Explain how to estimate costs and market values
- Answer common questions that arise in the post-disaster period



<https://www.fema.gov/media-library/assets/documents/169099>

Terms and Definitions

Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred.

Estimating Costs of Improvements and Repairs

The costs of improvements (or the costs to repair damaged buildings to pre-damage condition) must be estimated before determining whether proposed work constitutes Substantial Improvement or repair of Substantial Damage.

- **Include** costs of all structural elements, all interior and exterior finishes, built-in appliances, all utility and service equipment
- **Include** site preparation related to the improvement or repair (e.g., foundation excavation or filling in basements)
- **Include** costs of demolition, construction management, contractor overhead and profit
- **Exclude** costs of plans and specifications, land survey, permit and inspection fees, and debris removal
- **Exclude** costs of outside improvements (landscaping, irrigation, sidewalks, driveways, fences, yard lights, pools, detached accessory structures, etc.)



Important

Information

Written estimates prepared by contractors provide the best cost information.

Owners performing work must include estimates of the value of their own labor.

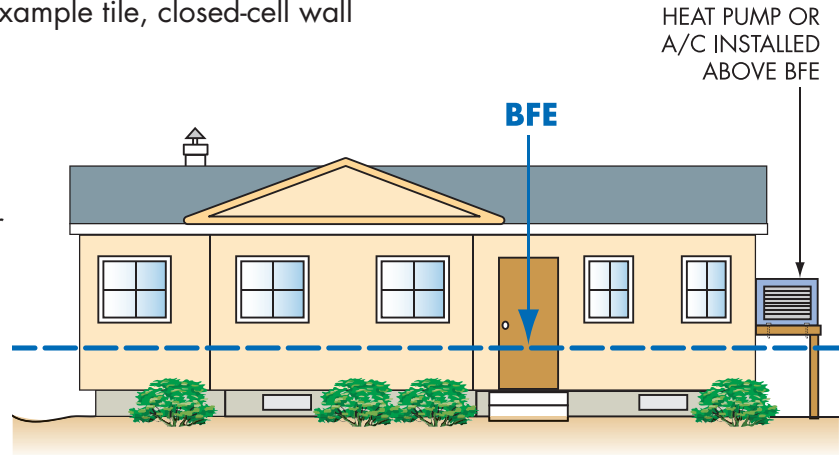
Equivalent costs must be estimated when materials are donated or volunteers help with construction.

For more details on cost items that must be included and those that are excluded, see the *SI/SD Desk Reference* (see page 56).

Non-Substantial Improvements Other than Additions

Proposed improvements are “non-substantial” if the costs are less than 50% of the market value of the building. In these cases, buildings are not required to be brought into compliance. However, there are many things owners can do to reduce exposure to future flooding. Owners should consider the following:

- Use flood damage-resistant materials, for example tile, closed-cell wall insulation, and polyvinyl wall coverings
- Raise air conditioning equipment, heat pumps, furnaces, water heaters, and other appliances on platforms
- Move electric outlets higher above the floor
- Add flood openings to crawlspace foundations
- Move ductwork out of crawlspaces
- Fill in below-grade crawlspace

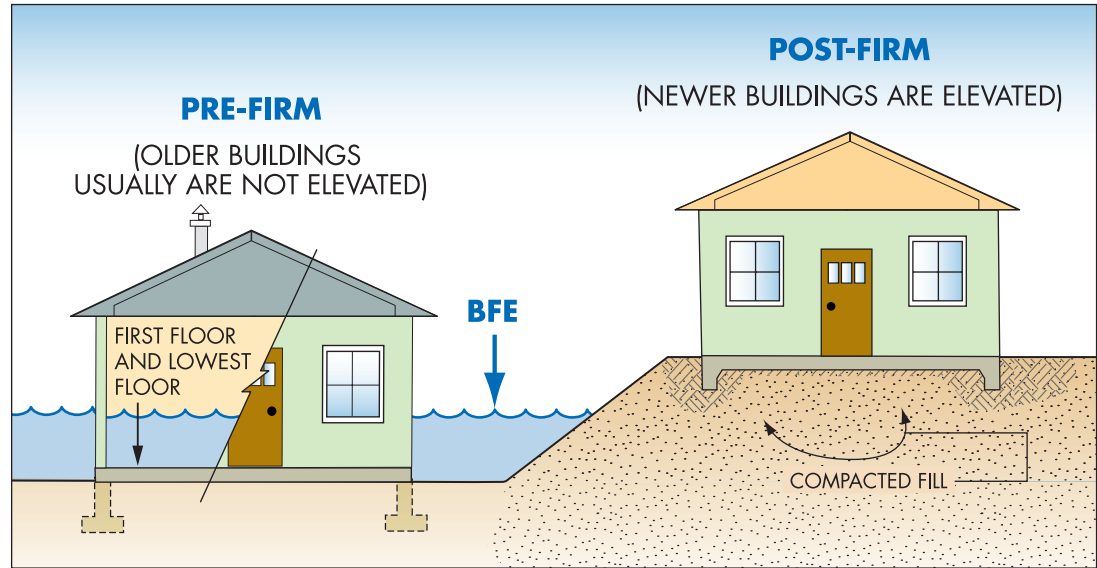


Note! ALL proposed work must be included in permit applications. If more work is proposed or undertaken after a permit is issued, community officials must determine whether the additional work changes the substantial improvement determination.

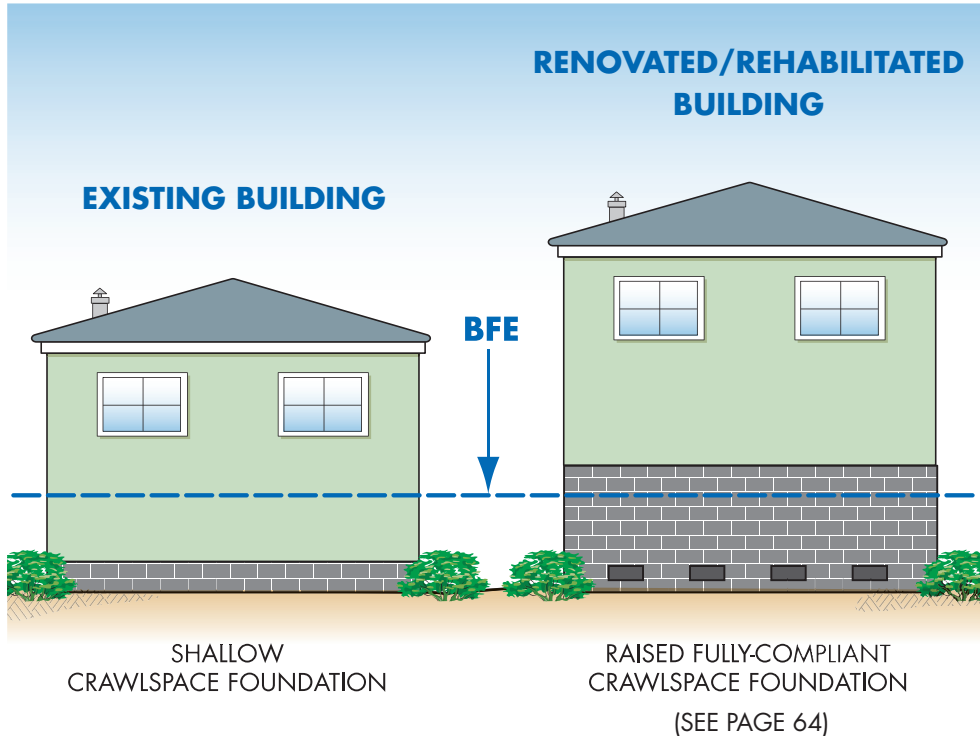
What is Meant by Pre-FIRM and Post-FIRM?

Pre-FIRM and **Post-FIRM** are insurance terms tied to a community's initial FIRM. The terms are used to determine NFIP flood insurance rates. Although common, the terms should not be used to distinguish between new construction built before a community joined the NFIP and those built after, especially in communities where the FIRMs have been revised.

Buildings in SFHAs must be brought into compliance when work is determined to be substantial improvement or repair of substantial damage.



Substantial Improvement: Renovation Only



Important

Information

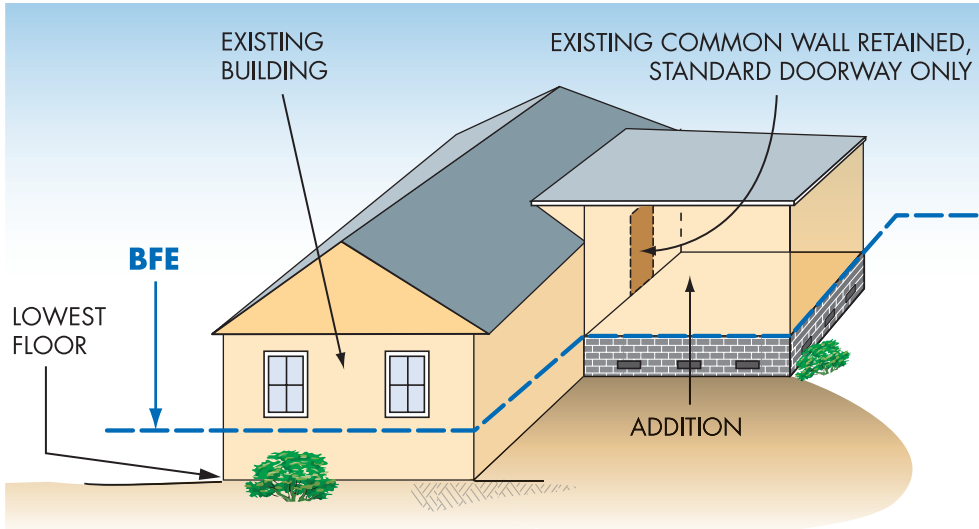
Floodplain buildings can be improved, renovated, rehabilitated or altered, but special rules apply.

Consult local permit offices before beginning work. Provide complete information about all proposed work.

If local code officials have cited violations of State or local health, sanitary, or safety codes, minimum costs to correct violations to provide safe living conditions can be excluded from the cost of renovations.

Alteration of registered historic structures are allowed, by variance, as long as the structures continue to meet the criteria for listing as historic structures.

Substantial Improvement: Lateral Addition Only



Important

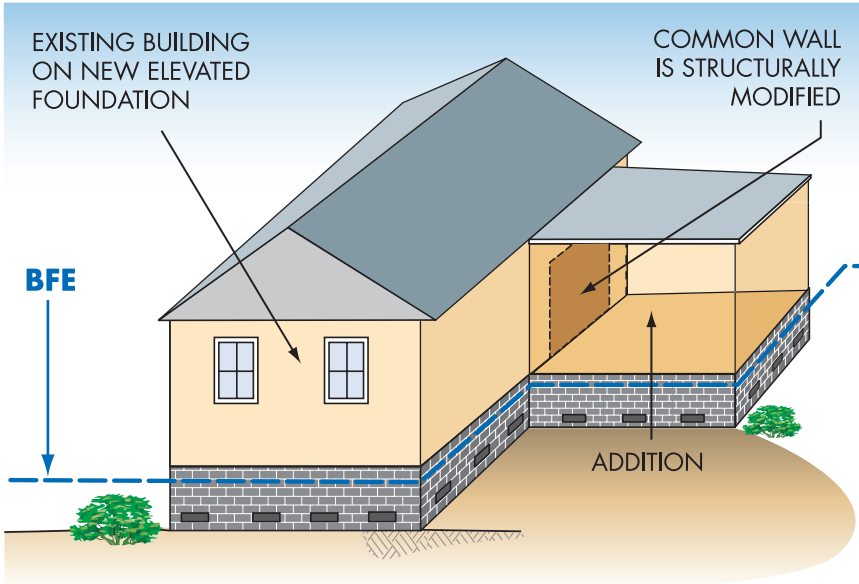
Information

See page 63 for projects to add lateral additions that also modify the interior of the existing building or make structural modifications to the existing common wall.

Permits are required to build additions to buildings in flood zones. Only the addition must be elevated and comply with the building code and floodplain management requirements, provided:

- There are no other modifications to the existing building, and
- There are no structural modifications to the existing common wall other than adding a standard 36" doorway

Substantial Improvement: Addition Plus Other Work

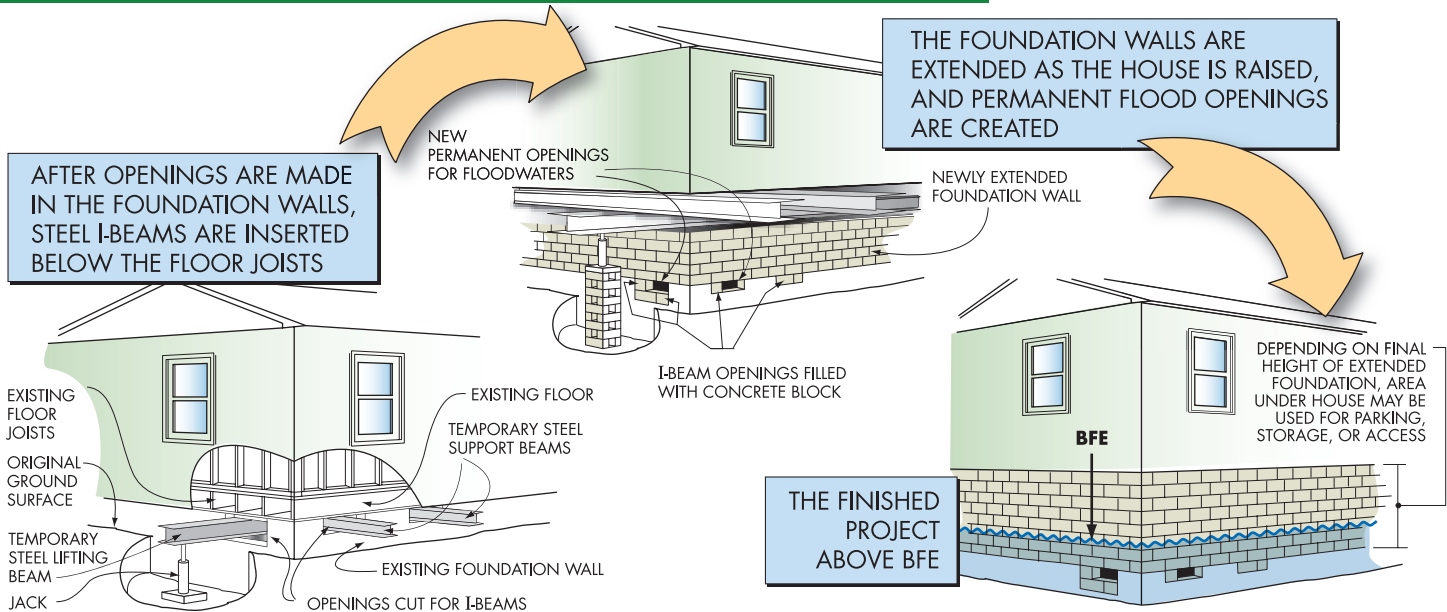


Communities must prepare evaluations to determine if all proposed work will trigger the substantial improvement requirement. Substantial improvement is triggered if:

- 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.

Community permit offices can help determine which requirements apply when buildings must be brought into compliance. A preliminary review of proposed improvements is recommended before projects are designed and before permit applications are submitted.

Elevating an Existing Building



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 67).

Estimating Substantial Damage



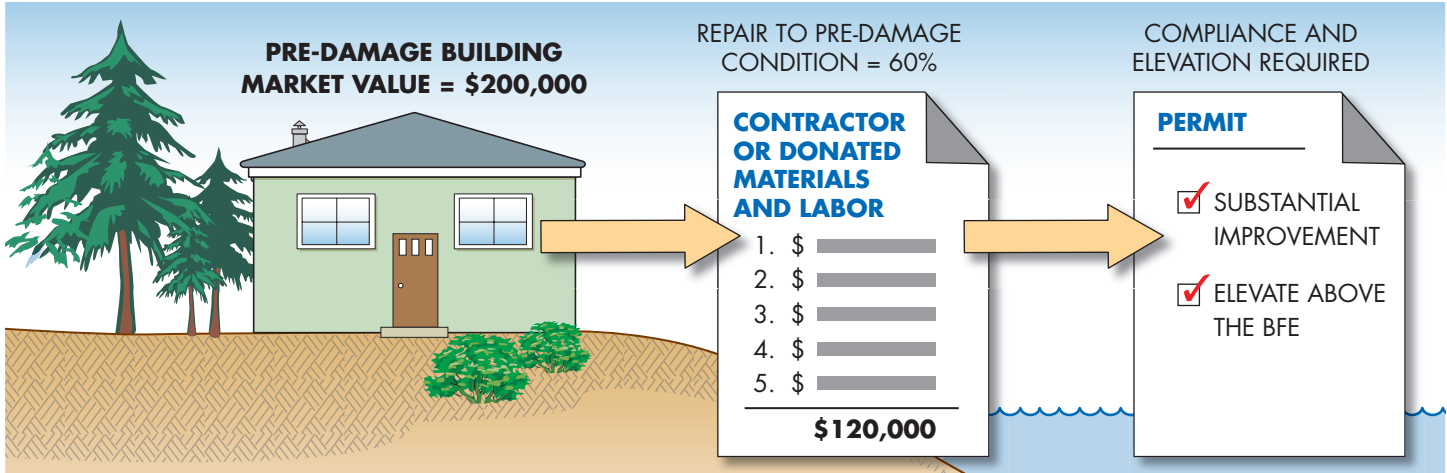
FEMA's Substantial Damage Estimator tool (SDE) was developed to help state and local officials in collecting uniform information needed to make substantial damage determinations for residential and non-residential structures in accordance with local floodplain management requirements.

The SDE tool:

- Can be used to assess flood, wind, wildfire, seismic, and other forms of damage
- Helps provide timely substantial damage determinations so that reconstruction can begin following events that damage buildings
- Is used in conjunction with industry-accepted construction cost-estimating guides

Download the SDE software installation package, *User Manual and Field Workbook*, forms, worksheets and other materials at <https://www.fema.gov/media-library/assets/documents/18692>.

Repair of Damaged Buildings



Permits are required to repair damaged buildings, regardless of the cause – fire, flood, wind, or even vehicle impact. Detailed estimates of the cost to repair a building to pre-damage condition are required. If the costs are 50% or more of the pre-damage market value of the building, then it is “substantially damaged” and must be brought into compliance, which may involve raising the foundation and other measures. Consult with local permit offices before repairs are started.

See page 64 for an example of elevating an existing building above a crawlspace.

Paying for Post-Flood Compliance

Owners may be eligible for up to \$30,000 (as of 2020) to help pay to bring buildings into compliance with building code and community requirements – if all of the following apply:

- Buildings are located in a special flood hazard area
- Buildings are covered by federal flood insurance, which includes Increased Cost of Compliance (ICC) coverage
- Buildings have lowest floors below the community's required elevation
- The community determined buildings were substantially damaged
- Insurance claims adjusters confirm substantial damage caused by flooding
- Owners act quickly with their claims adjusters and community officials to process all required paperwork

Learn more at www.fema.gov/increased-cost-compliance-coverage.

Owners whose buildings are substantially damaged are required to “bring the building into compliance” with flood zone requirements. Substantial damage is a special case of substantial improvement.

USE THE ICC CLAIM TO:



ELEVATE-IN-PLACE



RELOCATE TO
HIGH GROUND

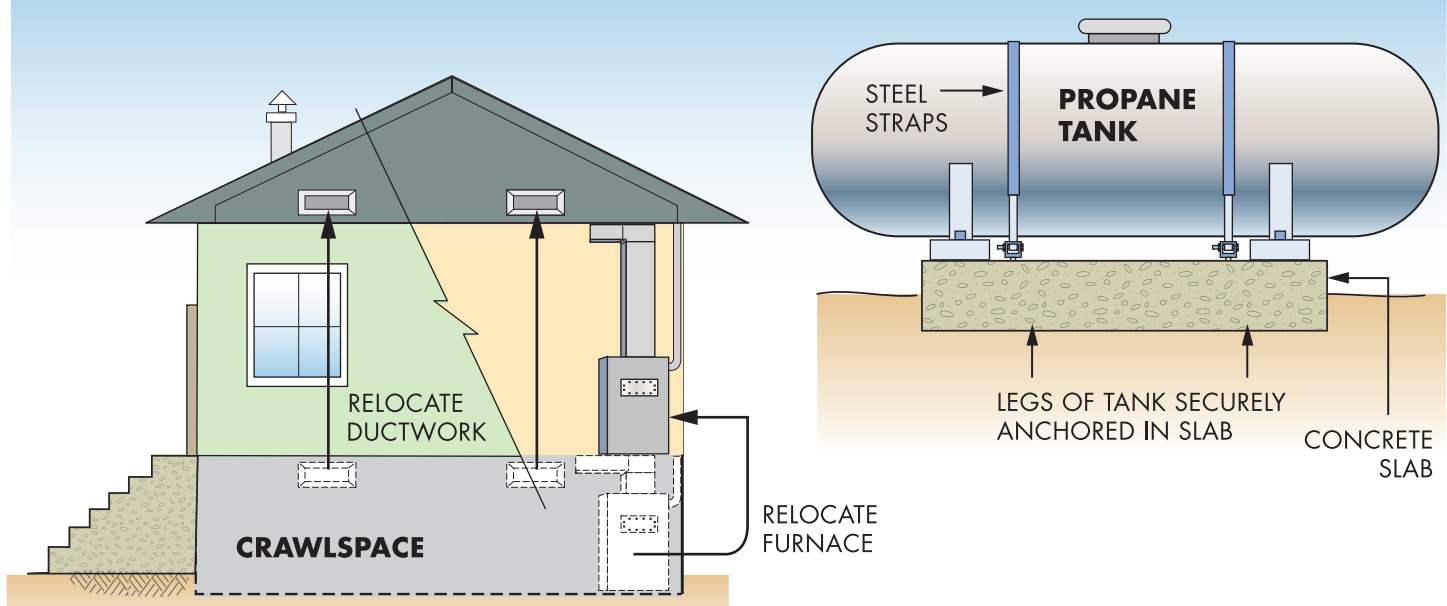


DEMOLISH



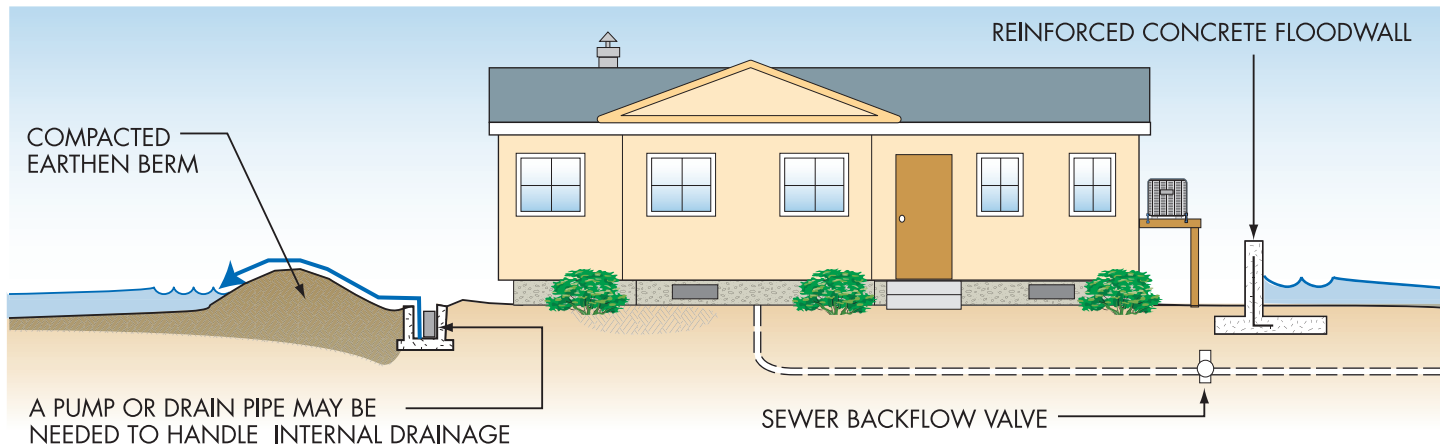
FLOODPROOF
(NON-
RESIDENTIAL
ONLY)

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 repairs are made.

Small Berms or Floodwalls May Protect Older Buildings



In areas where floodwater isn'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 sites are in floodways (see page 30). Small berms or floodwalls cannot be used to achieve compliance for new construction, substantially improved buildings, or substantially damaged buildings.

Important! These protective measures will not reduce your flood insurance premium!

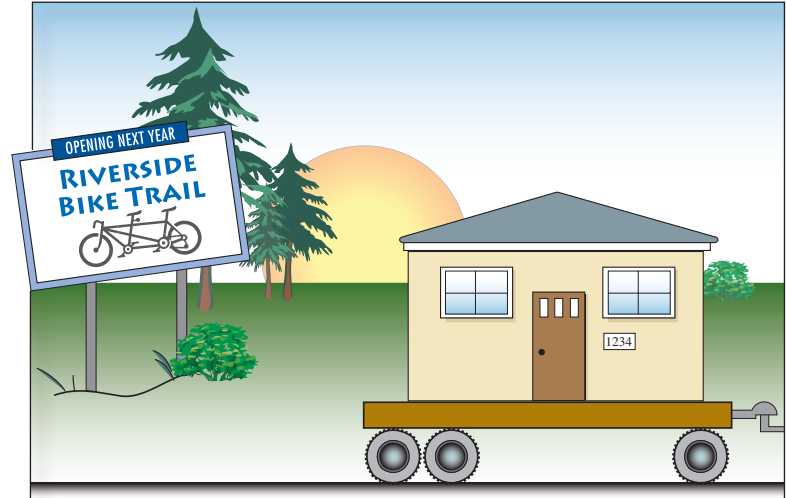
Some Flood Mitigation Projects are More Costly Up Front

But Give More Protection and a Positive Return on Investment

Following floods, some communities purchase and remove damaged homes. The acquired land is dedicated to public open space or stormwater storage and can be used for recreation or to help restore wildlife habitat and wetlands.

Some homes have been elevated on new, higher foundations, and others have been moved to safer high ground outside of high risk flood hazard areas.

Studies indicate these types of projects have a 7:1 return on investment.



The Department of Public Safety, Division of Emergency Management - Homeland Security administers pre- and post-disaster mitigation grants and works with communities to develop hazard mitigation plans: <https://dem.nv.gov/About/RandM/>

Flood Fighter: Nevada

The Nevada Silver Jackets Team developed a fun and educational video game to teach children about emergency planning and different flooding scenarios. In addition to teaching students about water resources, the hands-on game enriches learning about science, technology, engineering, and mathematics (STEM).

Download the game at
http://nevadafloods.org/flood_fighter.htm



Silver Jackets is an innovative program that brings together state, federal, and sometimes tribal and local agencies to learn and apply resources to reduce flood risk. Learn more about the Nevada Silver Jackets Team at <https://silverjackets.nfrmp.us/State-Teams/Nevada>.

Turn Around Don't Drown®

Learn about flood risks and 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 12-24 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.
- <https://www.weather.gov/safety/flood-turn-around-dont-drown>.



Be Prepared for Flood Emergencies

Everyone should be prepared for floods and other emergencies. Preparation begins at home, at work places, at schools, and in communities.

Sometimes floods and other disasters can strike quickly and without warning and evacuation may be required. Basic services (water, gas, electricity and telephones) may be interrupted, perhaps for several days. Local officials and emergency relief workers will be on the scene after disasters, but they cannot reach everyone right away. Communities, families, and businesses should prepare before disasters occur by:

- Learning about natural hazards (Nevada communities participate in developing hazard mitigation plans)
- Making family and workplace emergency plans
- Knowing where to go if evacuations are required
- Putting together disaster kits with supplies to last a few days



To learn more about preparing for disasters, visit <http://nevadafloods.org> and contact local emergency management agencies.

Useful Resources and Common Acronyms

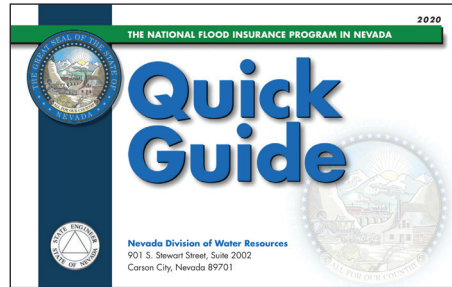
- NDWR NFIP assistance: (775) 684-2800
- NDWR Floodplain Management Program: <http://water.nv.gov> (Programs)
- DPS Division of Emergency Management – Homeland Security (coordinates hazard mitigation grants): <https://dem.nv.gov/About/RandM/>
- Floodplain Management Association (CA, HI, NV): www.floodplain.org
- NFIP regulations, Title 44 CFR: www.fema.gov/national-flood-insurance-program/laws-and-regulations
- NFIP Technical Bulletins: <https://www.fema.gov/nfip-technical-bulletins>
- CRS Resources: www.fema.gov/national-flood-insurance-program-community-rating-system
- American Red Cross www.redcross.org/get-help/how-to-prepare-for-emergencies/make-a-plan

Common Acronyms

- BFE = base flood elevation
- NDWR = Nevada Division of Water Resources
- EC = Elevation Certificate
- FIRM = Flood Insurance Rate Map
- NFIP = National Flood Insurance Program
- SFHA = special flood hazard area (100-year floodplain)

Want to Learn More?

- For flood information and advice on permits, contact local building, engineering, or planning departments.
- For information about upcoming workshops and training, go to <http://water.nv.gov> (Programs, Floodplain Management, Training).
- Learn about flood preparedness at <http://nevadafloods.org>.
- To learn more about flood maps, 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.
- To learn about federal flood insurance, call an insurance agent or visit www.floodsmart.gov. Most insurance companies can write NFIP policies.
- 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 Certificates and training for surveyors by searching for Elevation Certificate at www.fema.gov.



This **Quick Guide** may be downloaded from the **Nevada Division of Water Resources** web site at:

<http://water.nv.gov>