



# NFIP GUIDEBOOK

A Local Administrator's Guide to  
Floodplain Management and the  
National Flood Insurance Program

5th Edition





**NFIP**

**FLOODPLAIN MANAGEMENT  
GUIDEBOOK**

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5th Edition  
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**FEMA**  
REGION 10



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## FLOODING IS A NATURAL OCCURRENCE

Periodically, rivers, streams and lakes will overflow their banks and inundate adjacent land areas. These areas, known as floodplains, temporarily store this excess water. Flood damages occur only when man interferes with the natural flooding process by altering the watercourse, developing areas in the upper watershed, and/or building inappropriately in the floodplain itself.

The traditional solution to flood problems has been to build structural protection works such as dams, diversions, levees and floodwalls. Despite tremendous expenditures for these structural projects, economic flood losses have continued to increase year after year. Given this, governments at every level have begun to see the solution to avoiding flood damages lies not in keeping the water away from people, but rather in keeping people away from the water. This philosophical shift led to the creation of the National Flood Insurance Program (NFIP) in 1968, thereby codifying the concept of floodplain management.

The basic purpose of the NFIP is not to prohibit floodplain development, but to guide development in floodplain areas in such a way as to greatly lessen the economic loss and social disruption caused by

impending flood events. The purpose of this guidebook is to assist local officials in their understanding of the NFIP and the

procedures that communities should follow in administering their floodplain management ordinances.

### Fact

A recent study showed that only 2% of the claims paid for flood damages are for post-FIRM structures (structures built after the date of a community's flood map and adoption of a local floodplain management ordinance), whereas 98% of the claims paid are for older or pre-FIRM structures. This is strong evidence that the NFIP is successful at protecting new developments.

### Flooding is a natural occurrence

Floodplains are "built" by rivers (Fig. A). Flood damages result when people build on floodplains without taking the river into account (Fig. B).



Figure A



Figure B









# CHAPTER 1 - FLOODPLAIN MANAGEMENT CONCEPTS

## THE BASE FLOOD

The base flood, sometimes referred to as the 100-year flood, has a 1% chance of occurring in any given year. Although a 100-year flood sounds remote, keep in mind that over the life of an average 30-year mortgage, a home located within the 100-

year flood zone (A or V zone) has a 26% chance of being inundated by the base flood. This same home has less than a 1% chance of fire damage during the same period.

What is more significant is that the house in this example

is almost certain to see a 10-year flood (96% chance) in the same 30-year mortgage cycle. In many areas the difference in flood heights between a 10-year and a 100-year event may be as little as one foot!

## Flood Frequency Chart

Flood frequency (years)	Chance of flooding in any given year	Percent chance of flooding during 30-year mortgage
10	10 out of 100 (10%)	96%
50	2 out of 100 (2%)	46%
100	1 out of 100 (1%)	26%
500	0.2 out of 100 (0.2%)	6%

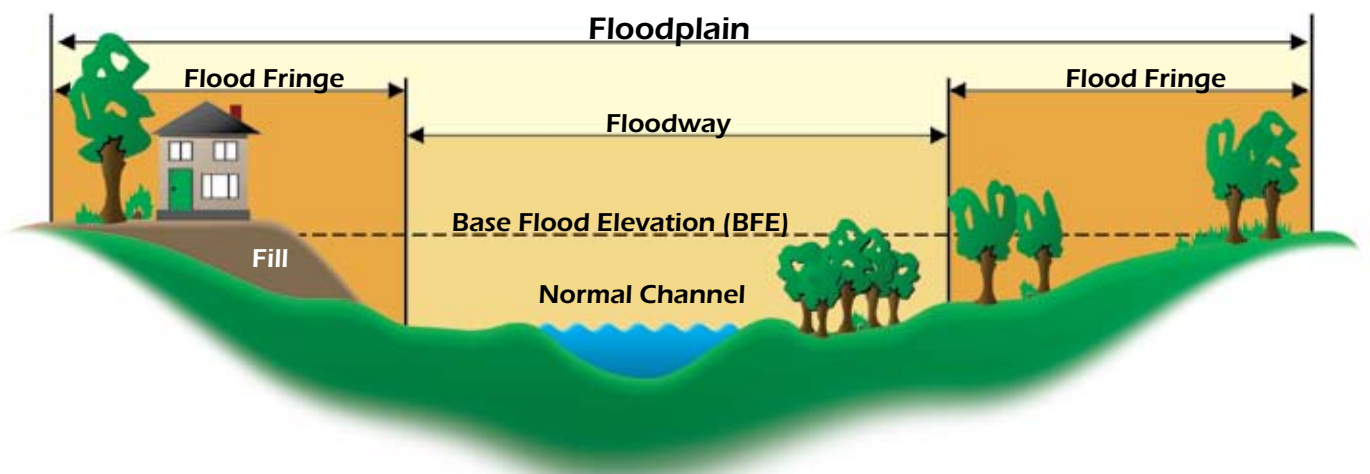
## FLOODWAY

The floodway includes the channel of a river or stream and the overbank areas adjacent to the channel. The floodway carries the bulk of the floodwater downstream and is usually the

area where water velocities and forces are the greatest and most destructive. Regulations require that the floodway be kept open so that flood flows are not obstructed or diverted onto other

properties. Such obstructions or diversions can cause increased damages within the floodway as well as in the flood fringe (see diagram below).

## Characteristics of a Floodplain



**BASE FLOOD ELEVATION (BFE)**

The BFE is the elevation (usually expressed in feet above sea level) which the base flood is expected to reach.

**SPECIAL FLOOD HAZARD AREA (SFHA)**

For purposes of the NFIP, the area that would be inundated by the base flood is also called the special flood hazard area (SFHA), or simply the floodplain.

**FLOOD FRINGE**

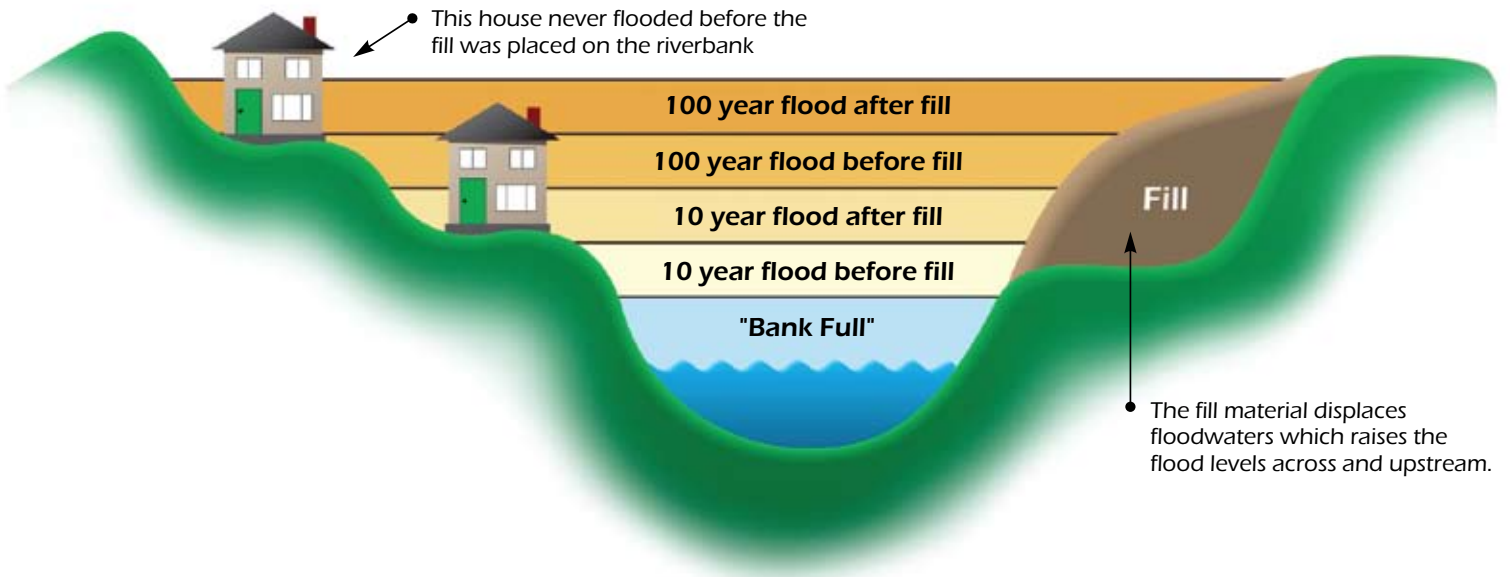
The area on either side of the floodway is called the flood fringe. This area is subject to inundation by the base flood but conveys little or no velocity flows.

**FILL**

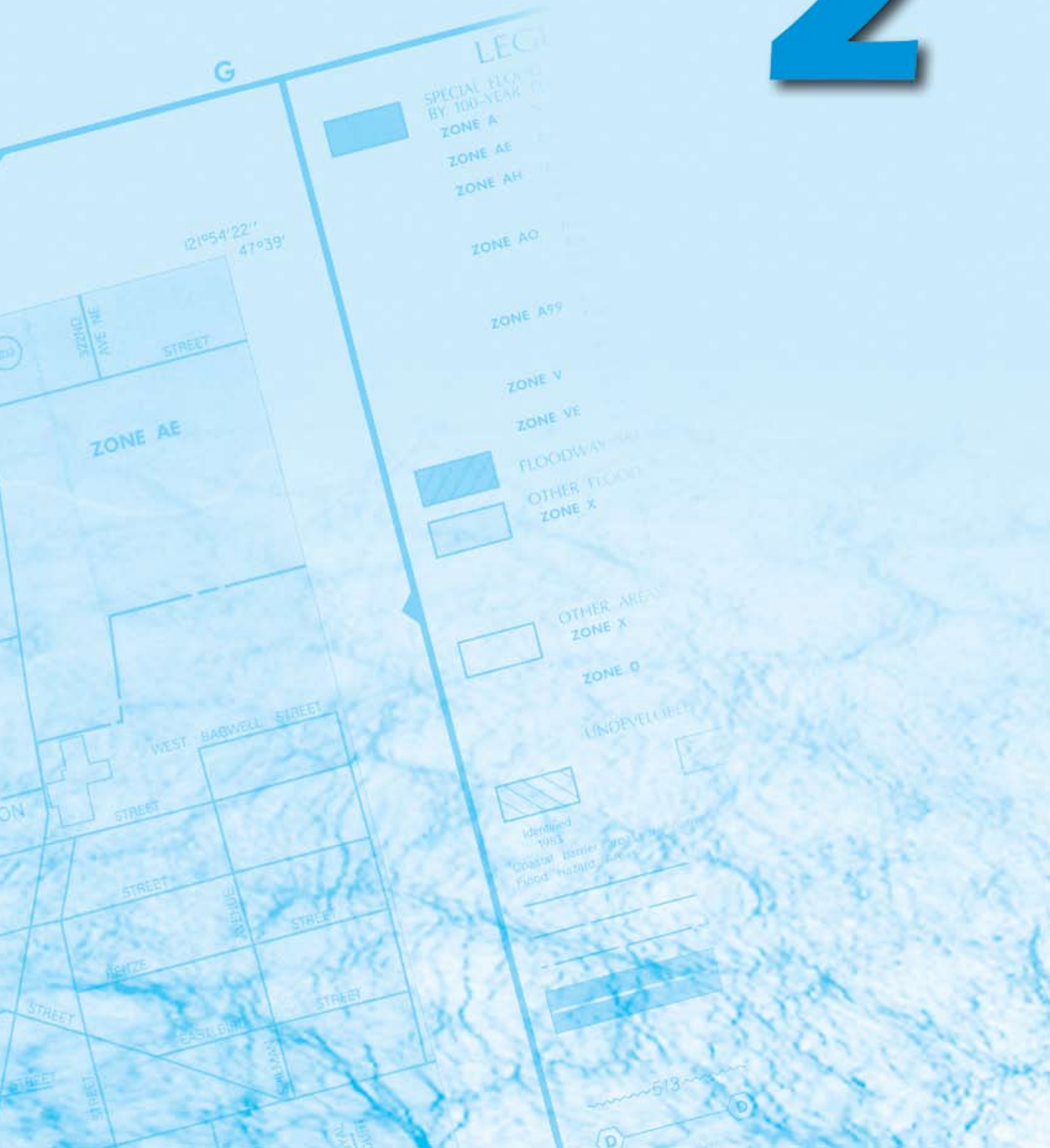
By nature, floodplains are low-lying areas that seem to invite filling activities. Filling is included under the NFIP definition of “development” and therefore requires a flood-

plain development permit. Care should be taken to ensure that the fill will not alter drainage, divert flood water to other properties or affect endangered species or their critical habitat. Filling is prohibited in the floodway.

**The Effects of Fill on a Floodplain**



# 2



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## CHAPTER 2 - MAPPING AND MAP REVISIONS

### FLOODPLAIN MAPS

Floodplain maps are the basis for implementing floodplain regulations. The maps vary in detail depending on several factors, including the amount of historical data, the detail of the base topographic maps, the flood threat, and the floodplain development potential. There are basically three types of floodplain maps:

#### Flood Hazard Boundary Map (FHBM)

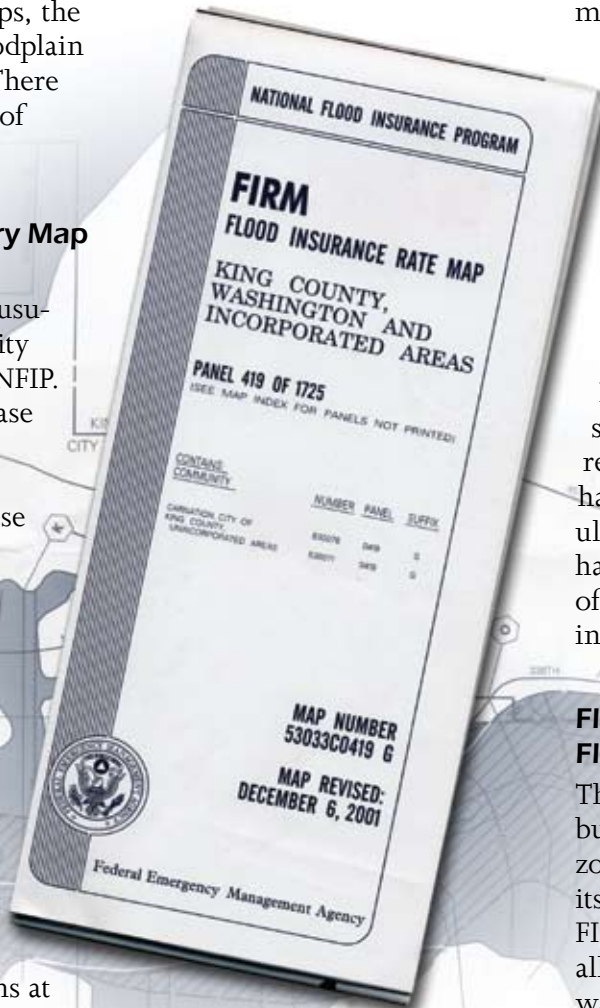
A very generalized map usually issued to a community when they first join the NFIP. FHBM's do not include Base Flood Elevations (BFEs). Only a handful of communities still possess these basic flood maps.

#### Flood Insurance Rate Map (FIRM)

Most communities have a FIRM. They generally include BFEs and show flood zones, Appendix A, and are based on a detailed study of flood potential in the community. With the FIRM, flood elevations at

any specific development site within a community can usually be determined. More recently published FIRMs include both BFEs and regulatory floodways.

The year 2009 marks the end of FEMA's Map Modernization program (MapMod) and the beginning of FEMA's new Risk MAP (Mapping, Assessment and Planning) program. While the map modernization program provided digital Flood Insurance Rate Maps (dFIRMS) for approximately 97% of the population, Risk MAP will enhance the accuracy of these maps with updated, more detailed data and create new dFIRMS in areas that were not mapped or not studied during MapMod. Risk MAP encourages expansion beyond the conventional regulatory applications of flood hazard data to broader non-regulatory risk assessments for all hazards and the incorporation of Risk MAP data and products into the planning process.



#### Flood Boundary and Floodway Map

These maps delineate floodways but do not give BFEs or flood zones. A community must use its FIRM to identify BFEs. Newer FIRMs eliminate the dual maps; all information, including floodways, is on the newer FIRMs.

### THE FLOOD INSURANCE STUDY

The Flood Insurance Study (FIS) is conducted by FEMA to determine the flood hazard present in the community as well as the flood zones that will be used to write flood insurance. The data in

the FIS is used to produce the flood maps mentioned above. The FIS provides detailed and accurate flood hazard information that includes a written report containing a description of a

community's flooding conditions, and flood profiles showing the 500, 100, 50 and 10-year flood elevations for each stream reach studied in detail. The following explains the two types of study approaches used:

### Approximate

The approximate study, depicted as zone A on the FIRM, delineates the “100 Year” floodplain boundaries. The boundaries are established by reviewing existing data such as a Flood Hazard Boundary Map, USGS Flood-Prone Quadrangle Map, US Army Corps of Engineers Floodplain Information report, and other historical data, and transferring this information to the FIRM. If no existing data is available, then a rough hydrologic analysis is performed to determine the width of the floodplain. The approximate study generally involves little or no field work. The base flood elevation or depths are not determined. These areas are also referred to as unnumbered A-Zones.

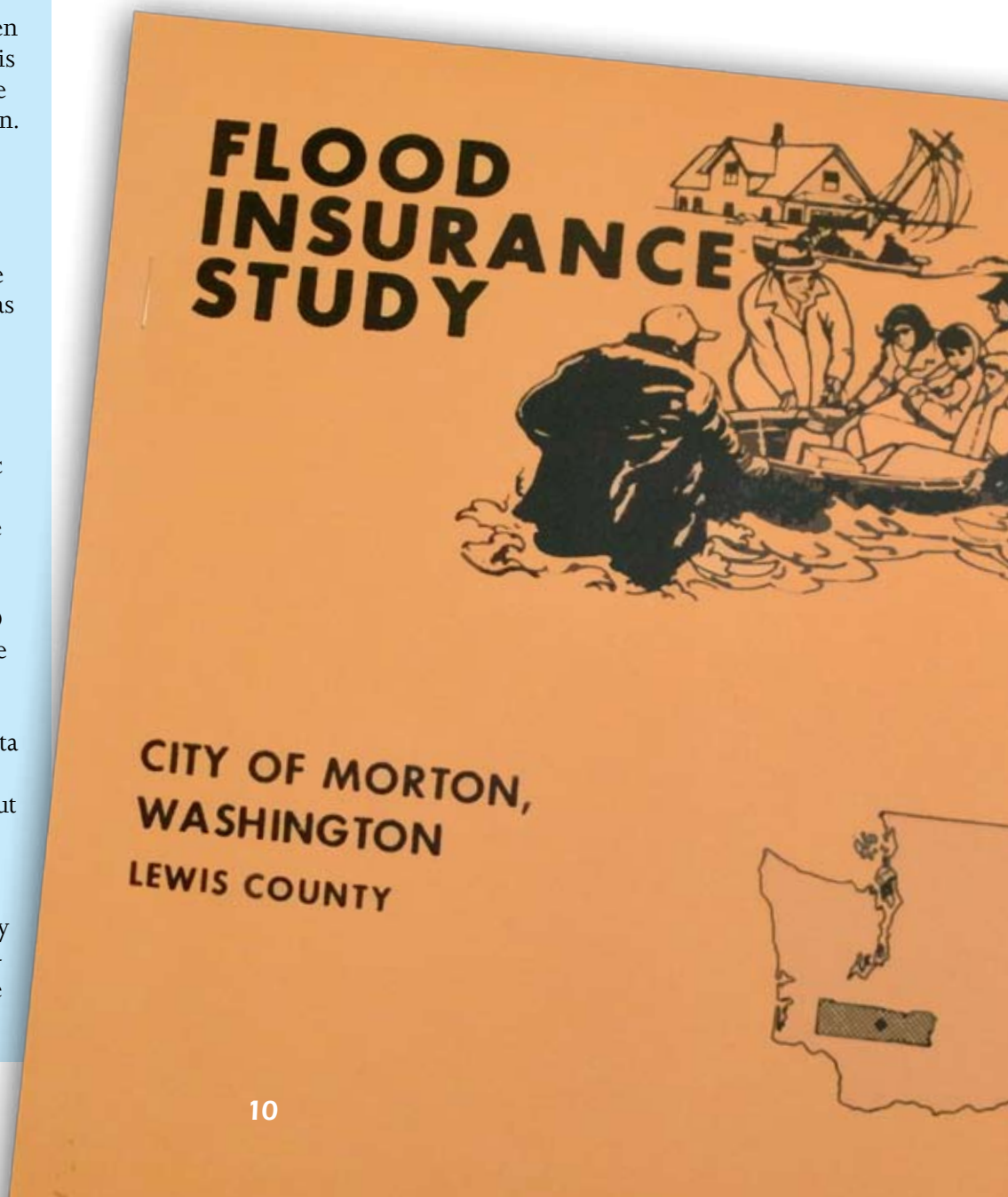
### Detailed

The detailed study uses considerably more specific hydrologic and hydraulic engineering methods. The detailed study is depicted as numbered A zones (A1-A30), AE, AH, and AO zones. Detailed surveys are conducted in the field for use in the hydrologic and hydraulic analyses. The data from cross sections of the floodplain are used as input to a mathematical model (HEC-2 or HEC-RAS) that computes the base flood elevations. A detailed study often will include delineation of a floodway and the 500-year floodplain.

## FLOODPLAIN MAP STUDIES AND RESTUDIES

Periodically, FEMA, in consultation with our State partners, conducts floodplain studies and restudies to update a community’s FIRMs. FEMA’s decision to conduct a flood study or to restudy a particular stream is based on numerous variables, including funding availability, local community desire for a study/restudy, evidence that the existing flood hazard data is inaccurate, development potential, and NFIP policies in force.

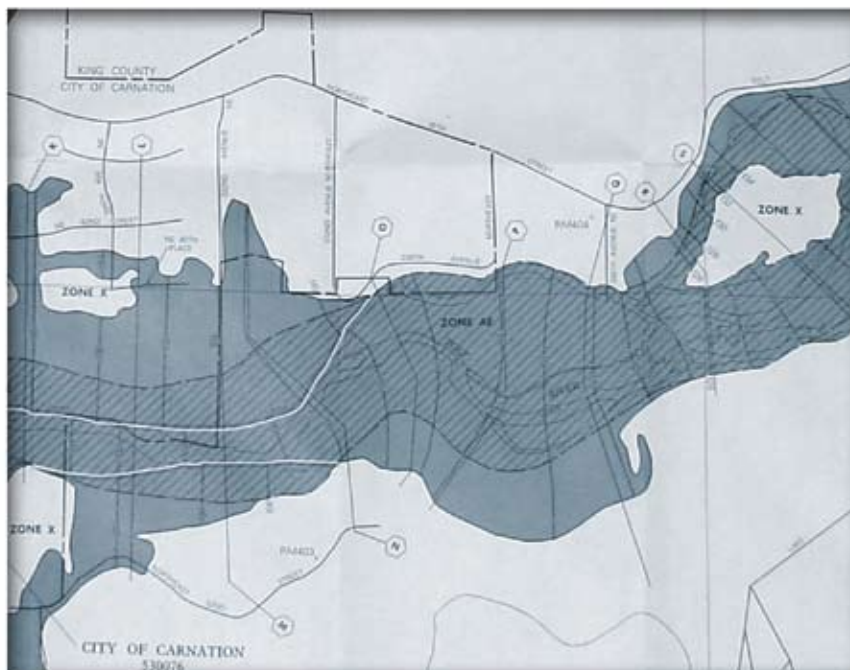
Usually following a request from local officials, FEMA will conduct a scoping meeting to determine general study/restudy needs. Then, at a Time and Cost meeting, local officials meet with FEMA staff and the FEMA study contractor to discuss specific study/restudy issues. After a study contractor completes the flood study (a process that can take from a few months to a few years), the following steps are taken, leading ultimately to





a new effective FIRM for your community:

- 1 Draft FIS/FIRM and Technical Study Data Notebook, completed by the study contractor, is delivered to FEMA
- 2 Draft data is reviewed by FEMA and Map Coordination Contractor
- 3 Preliminary FIS/FIRM is delivered to local community(ies)
- 4 Final Coordination Meeting, involving local community representatives, FEMA, and study contractor, is held with the public
- 5 Notice of Start of Appeals period appears in local newspaper
- 6 90-day Appeals Period commences
- 7 90-day Appeals Period ends
- 8 Appeals are adjudicated
- 9 Letter of Final Determination Review is sent to communities (FIRMs will be effective in 6 months)
- 10 Community must update their ordinances within the 6-month adoption period
- 11 Final "Official" FIS/FIRMs are delivered to communities, which must amend flood ordinance to reflect new maps



Typical Flood Insurance Rate Map (FIRM)

### MAP REVISIONS

Sometimes it is necessary for floodplain data to be revised. In most instances, FEMA will not republish an entire map, but will simply issue a letter that describes the revisions. Revisions to an individual flood map panel are generally made for one or more of the following reasons:

- Revisions to correct a minor error
- Revisions based on better ground elevation data
- Revisions based on authorized filling in the floodplain
- Revisions based on better flood data
- Revisions based on new flood works

There are three main types of map revisions.

#### 1. Letter of Map Amendment

A Letter of Map Amendment, or LOMA, is a procedure in which FEMA reviews technical data submitted by the property owner who believes a property or structure was incorrectly included within a designated flood hazard area (MT-1 Form). A LOMA amends the current floodplain map and establishes that the property or structure is not located within a special flood hazard area.

LOMAs are used to verify that natural ground elevations are above the base flood elevation (BFE). LOMAs can waive the flood insurance requirement for loans if accepted by the lender. An Elevation Certificate (EC) supports a LOMA but, by itself, does not remove the insurance requirement.

**2. Letter of Map Revision Based on Fill (LOMR-F)**

A LOMR-F removes land from the SFHA that has been graded or filled (physical changes) since the date the flood map was issued. (MT-1 Form). Communities must concur with requests before a LOMR-F is approved by FEMA. LOMR-Fs also can waive the flood insurance requirement for loans. LOMR-F requests have communities certify that the property or structure(s) are reasonably safe from flooding.

**3. Physical Map Revision (LOMR PMR)**

Any map revision other than one showing a simple, authorized fill, such as a new or altered bridge, culvert, channel, levee, or berm; changes in hydraulic or hydrologic conditions; or any combination thereof; requires an engineering analysis (MT-2 Form).

**How is a LOMA/LOMR-F Issued?**

Requests for LOMAs and LOMR-Fs must be submitted on forms provided by FEMA, which include the following information:

- Property Information Form - may be completed by property owner

- Elevation Information Form - must be completed by a licensed engineer or land surveyor
- Summary of Elevations (Individual Lot Breakdown Form) - must be completed by an engineer or land surveyor if more than one lot is involved
- Community Acknowledgment Form - used for LOMR-Fs completed by community
- Certification of Fill Compaction Form - used for LOMR-Fs greater than a single lot, completed by an engineer or community official

**LOMA Information**

To receive an MT-1 form packet (LOMA/LOMA-F) or to check the status of a LOMA/LOMA-F, please call the FEMA Map Assistance Center at 1-877-FEMA-MAP. You also can download the packet from FEMA's website: [www.FEMA.gov](http://www.FEMA.gov).

LOMA/LOMR-F requests for both single and multiple lots are submitted to FEMA Headquarters in Washington D.C. and take 3 to 6 weeks to process.

For questions on how to complete the forms, please call FEMA Map Assistance Center (FMAC) at 1-877-FEMA MAP (1-877-336-2627).



# 3



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## CHAPTER 3 - THE NATIONAL FLOOD INSURANCE PROGRAM

To participate in the National Flood Insurance Program (NFIP), a community must adopt and enforce a floodplain management ordinance that regulates development in the community's floodplain. The fundamental objectives of the NFIP are (1) to ensure that new buildings will be free from flood damage, (2) to prevent new developments from increasing flood damages on existing properties and (3) to ensure that natural and beneficial functions of floodplains are maintained or restored when opportunities arise. It should be noted that the NFIP is but one component of a community's floodplain management program.

### THE COMMUNITY ASSISTANCE VISIT (CAV)

Periodically, the Federal or State flood insurance coordinator(s) will visit your community to conduct a Community Assistance Visit (CAV). The purpose of the CAV is to assist the local floodplain coordinator and other local officials in enforcing the community's floodplain management ordinance.

The CAV also seeks to evaluate the local floodplain management program in relation to the regulations governing the NFIP. A CAV includes the following: a meeting with local staff to discuss procedures used in issuing development permits and to review permit files; a check of building permits and elevation documentation to see if new development is being regulated according to the requirements



## NATIONAL FLOOD INSURANCE PROGRAM

### History

The National Flood Insurance Program was created by Congress in 1968 to minimize the ever rising disaster relief costs and to reduce the loss of life and property caused by flooding. The Program has four goals:

- 1 Provide affordable flood insurance coverage not generally available in the private market.
- 2 Stimulate local floodplain management to guide future development.
- 3 Emphasize less costly nonstructural flood control regulatory measures over structural measures.
- 4 Reduce Federal disaster costs by shifting the burden from the all taxpayers to floodplain occupants.

of the local code; and a tour of the flood hazard areas. A follow-up letter is sent to the chief elected official, and a report is filed with the Federal Emergency Management Agency on the findings of the visit.

During a typical NFIP CAV, the following issues are often identified:

#### Record Keeping Systems

Record keeping systems should be adequate to ensure that elevation records and requirements are communicated prior to construction and maintained properly so that subsequent buyers will not have to pay for another

elevation survey. Floodplain development records are required to be retained in perpetuity.

#### Permits for "Other Development"

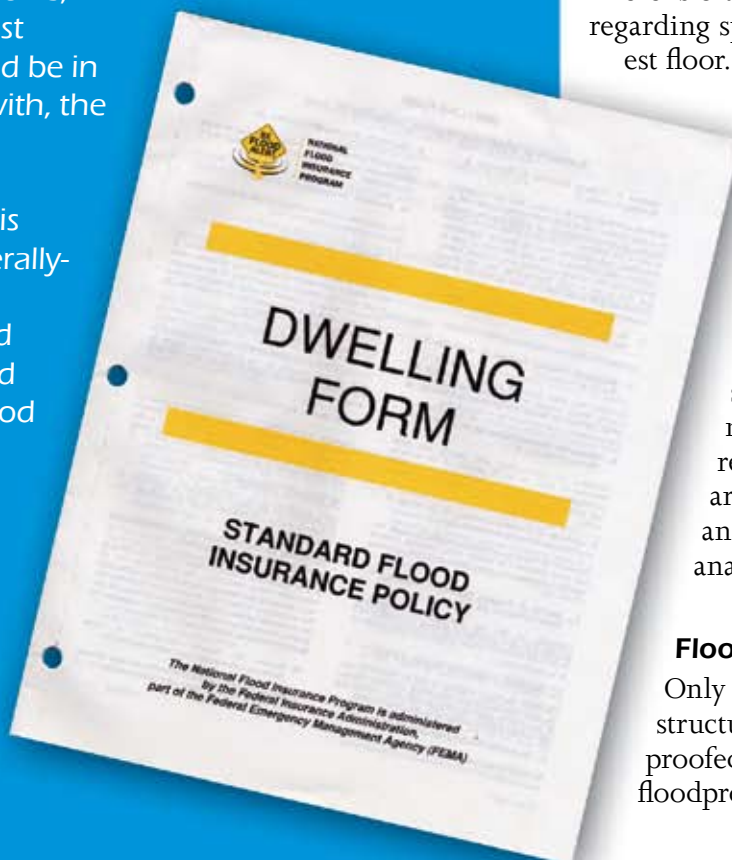
Many communities, although they have adequate floodplain management ordinances, do not have a permit process to cover all "other development", which includes activities such as mining, drilling, dredging, grading, paving, excavations, and filling in flood hazard areas.

#### As-Built Elevation Certificates

Communities often do not secure as-built certifications of

## About Flood Insurance

- Federal flood insurance is available only in those communities that participate in the National Flood Insurance Program (NFIP).
- In order to receive Federal disaster assistance in identified floodplains, communities must participate in, and be in good standing with, the NFIP.
- Flood insurance is required for federally-backed loans to purchase or build structures located in any special flood hazard area.
- Flood insurance can be purchased from any agent who is licensed to write property and casualty insurance.
- Flood insurance can be purchased for any walled or roofed building anywhere in a participating community regardless of the mapped flood zone in which the structure is located.
- The NFIP covers structural elements, essential equipment, and other basic items located in a basement.
- Rates are subsidized for Pre-FIRM buildings; they are actuarial rates for Post-FIRM structures.
- There is a waiting period of 30 days before coverage goes into effect. There is no waiting period when titles of properties are transferred to new owners.



the lowest floor elevation of a structure. Elevation documentation based on plans and drawings is insufficient to ensure that the lowest floor has indeed been built above the BFE.

### Definition of Lowest Floor

There is often misunderstanding regarding space below the lowest floor. See the definition of **Lowest Floor** in the Glossary.

### Floodway Encroachment

All encroachments, including fill, new construction, and substantial improvements within the regulatory floodway are prohibited, unless an engineering no-rise analysis is done.

### Floodproofing

Only non-residential structures can be floodproofed, and then only dry-floodproofed (water tight).

### Alteration of Watercourses

Although there is no prohibition against altering watercourses (except in a designated floodway), there is a requirement to notify adjacent communities, the State Coordinating Agency, and FEMA.

### Mobile Home Anchoring

All mobile homes placed in a flood hazard area, including those in existing mobile home parks, are required to be anchored to a permanent foundation that will resist

flotation and lateral movement.

NOTE: Chapter 5 of this Guidebook “NFIP Floodplain Development Standards” provides a detailed explanation of each of the issues listed above.

## THE COMMUNITY RATING SYSTEM (CRS)

The NFIP’s Community Rating System (CRS) recognizes community floodplain management efforts that go beyond the minimal requirements of the NFIP by reducing flood insurance premiums for the community’s property owners. Discounts to premiums range from 5% to 45%.

The new (2007) goal of CRS is to reduce flood damage to insurable property by strengthening and supporting the insurance aspects of the NFIP, and encouraging a comprehensive approach to floodplain management.

The CRS recognizes 18 floodplain management activities divided into four series:

## EFFECTS ON LENDERS

The purchase of flood insurance applies to all mortgage properties that fall under one of the following three criteria: the owner is applying for a federally backed (VA, FHA, etc.) loan; the lending institution is federally regulated; or the loan will be sold on the secondary market to a Government Sponsored Enterprise (GSE) such as Fannie Mae or Freddie Mac. This comprises well over 95% of all mortgage loans made each year.

### Public Information (300 series)

This series credits programs that advise people about the flood hazard, flood insurance, and ways to reduce flood damage.

### Mapping & Regulations

(400 series)

This series credits programs that provide increased protection to new developments. These activities include mapping areas not shown on the FIRM, preservation of open space, and restoration of natural and beneficial functions of the floodplain.

### Flood Damage Reduction

(500 series)

This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive flood mitigation plan, relocating, elevating or retrofitting flood-prone structures, and for maintaining drainage systems.

The lender must first determine whether the structure is in a Special Flood Hazard Area (SFHA). This is done using an approved Standard Flood Hazard Determination Form.

For all properties located in an SFHA, lenders must require flood insurance when making, increasing, extending, or renewing a loan. This requirement applies only when the structure is in the SFHA, not the lot. Lenders must ensure that coverage remains in effect for the life of the loan. A GSE such as Fannie Mae

### Flood Preparedness

(600 series)

This series credits flood warning, levee maintenance and dam safety programs.

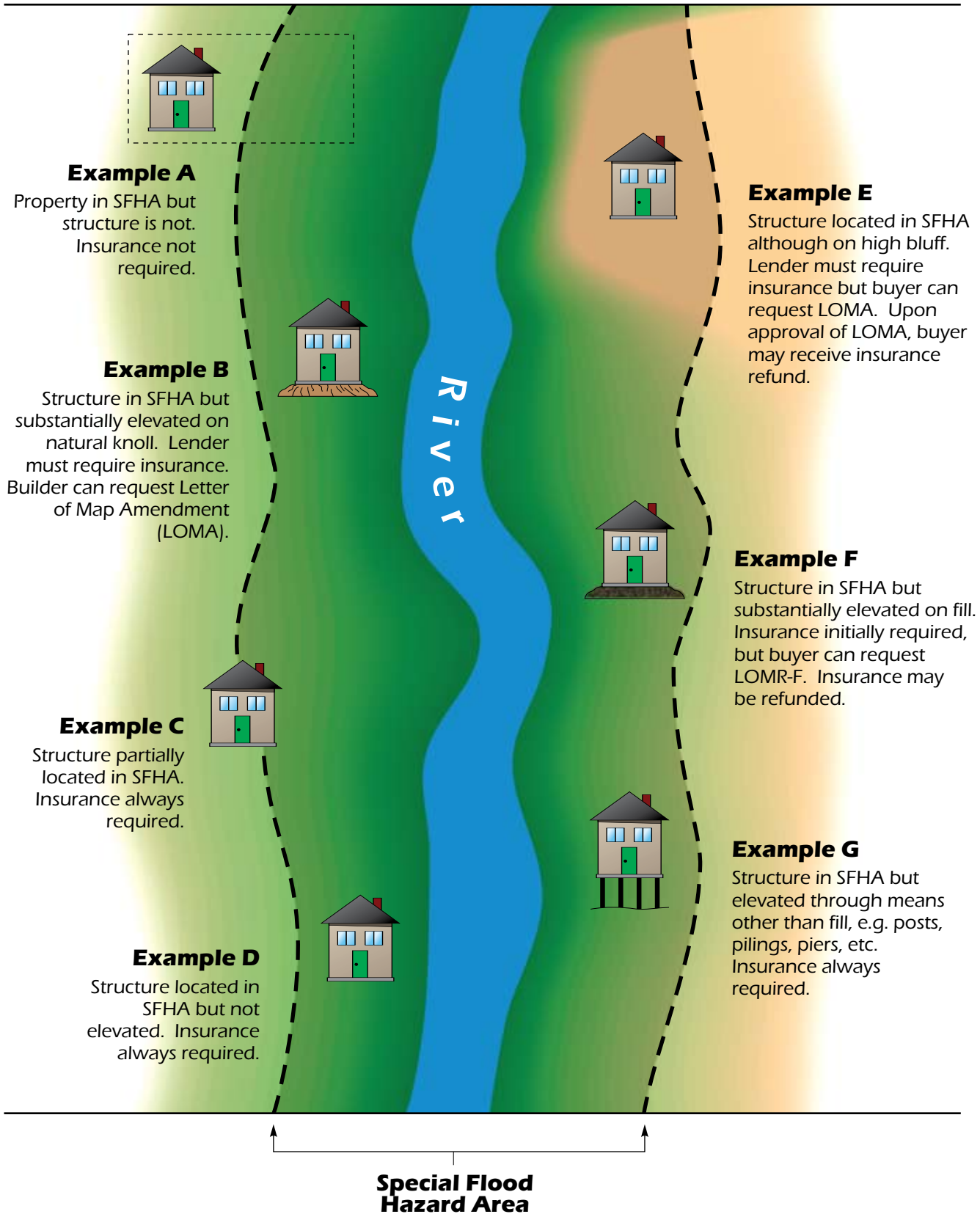
## INCREASED COST OF COMPLIANCE (ICC)

ICC coverage provides for the payment of a claim for the cost to comply with State or community floodplain management laws or ordinances after a direct physical loss by flood. When a building covered by a Standard Flood Insurance Policy under the NFIP sustains a flood loss and the community declares the building to be substantially damaged, ICC will help pay up to a maximum of \$30,000 of the cost to elevate, floodproof, demolish, or relocate the structure.

or Freddie Mac must ensure that any loans they purchase have flood insurance, if required.

If a loan has escrows for taxes, insurance, or for any other reason, the lender must also escrow for flood insurance. Lenders are required to notify borrowers if their building is in an SFHA and that they have 45 days to purchase flood insurance. After 45 days, lenders have the statutory authority to force purchase of flood insurance. If a borrower believes the flood zone determination was in error, the borrower and the lender must jointly request a review from FEMA, with appropriate supporting technical information.

## FLOOD INSURANCE REQUIREMENTS FOR RESIDENTIAL SITES IN SPECIAL FLOOD HAZARD AREAS





# 4





## CHAPTER 4 - FLOODPLAIN MANAGEMENT AT THE LOCAL LEVEL

### A COMMUNITY'S RESPONSIBILITIES UNDER THE NFIP

The management of the NFIP in a community consists of a partnership between the Federal government and the local community. The responsibilities of the local community are as follows:

- Require development permits for all proposed construction and other developments within the community's designated 100-year floodplain.
- Ensure all other permits required by local, State and Federal laws are obtained.
- Maintain records of all development permits.
- Review the permit to ensure that sites are reasonably safe from flooding.
- Review subdivision proposals to determine whether the project is safe from flooding and provides for adequate drainage.
- Require residential structures to have the lowest floor (including basement) elevated at least to or above the Base Flood Elevation (BFE).
- Require non-residential structures to have the first floor elevated or flood-proofed one foot above the BFE.
- Require manufactured homes be elevated and anchored.
- Require water supply systems be designed to eliminate infiltration of flood waters.
- Require new and replacement sanitary sewage systems be designed to minimize or eliminate infiltration of flood waters.
- Ensure flood carrying capacity of altered or relocated watercourses is maintained.
- Verify/document lowest floor elevations of new or substantially improved structures.
- Determine whether structures in the SFHA have been substantially damaged. (See Glossary for definition of **Substantial Damage**.) If a substantial damage determination is made, the repairs must include bringing the structure up to current flood-hazard area building standards.

NOTE: In Washington, damage to manufactured homes is inspected by the State Department of Labor and Industries (other states may have similar requirements) so that local officials must coordinate this effort with their regional L&I offices.

# 8

## Steps

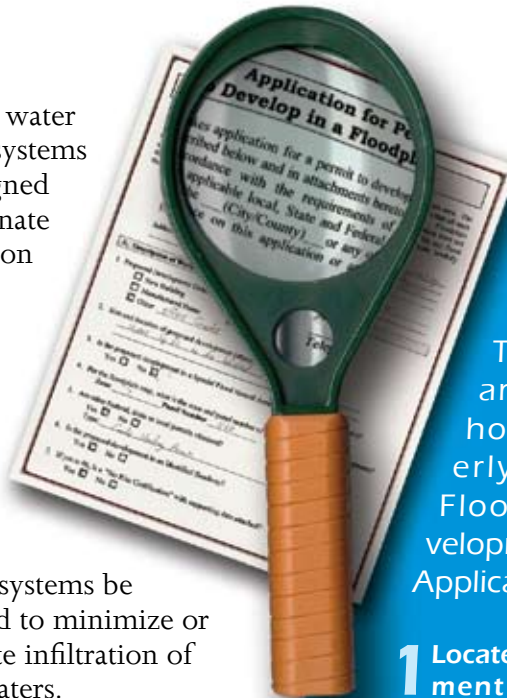
The following are steps on how to properly review a Floodplain Development Permit Application:

### 1 Locate the development site on the community's floodplain map.

If the project site is obviously outside the shaded A-Zone or V-Zone, then floodplain regulations do not apply. If the project site is in a shaded A-Zone or V-Zone (or is a borderline question), proceed to the next step.

### 2 Ensure project meets the NFIP/local ordinance definition of "development."

See the next page for the type of activity that is considered development. As a general rule, anything that alters the natural topography of the floodplain needs a permit review. Please be advised that development does not include: maintenance of existing buildings and facilities; resurfacing of roads; gardening, plowing and similar agricultural practices that do not involve filling, grading or construction of levees.



**3** Have the owner/developer fill out a local Building Permit Application. A location or plat map of the site should be attached to every application form. Plans of the proposed development, showing existing and proposed conditions including all appropriate dimensions and elevations, should also be attached. Check to see if the site is located in the regulatory floodway by measuring the floodway width on the Floodway Map and comparing this distance to the proposed project's actual ground location. Development cannot occur in any floodway without a detailed analysis from a licensed engineer and/or hydrologist proving that the development will cause no-rise in the base flood elevation.

**4** Check to see if the project includes a new building or a substantial improvement of an existing building. A "building" is a structure that is principally above ground and is enclosed by walls and a roof including manufactured homes and prefabricated buildings. The term also includes recreational vehicles and travel trailers to be installed on site for more than 180 days.

When a Pre-FIRM building is proposed to be remodeled, renovated, rehabilitated, added to or in anyway improved, the proposed modifications must be evaluated for "substantial improvement". If the total costs of the improvement are 50 percent or more of the building value, the building must be elevated above the BFE. If the project includes a new "building" or "substantial improvement," go to Step 5.

## THE DEVELOPMENT PERMIT

Communities participating in the NFIP must require development permits (Appendix B) for all proposed developments within the designated 100-year floodplain. The permit, along with all development plans, must be submitted for approval to the appropriate local authority before beginning any development activity. Usually this authority is the local floodplain administrator.

### When Is a Development Permit Required?

All development within the regulatory floodplain requires a permit. Development includes:

- New construction or a substantially improved structure
- Placing a manufactured (mobile) home
- Mining, dredging, filling, grading or excavating
- Roads, bridges and culverts
- Altering or relocating stream channels
- Travel trailers placed on site for more than 180 days
- Storage of materials including gas or liquid storage tanks

### DUTIES OF THE FLOODPLAIN ADMINISTRATOR

The duties of the local floodplain administrator (FPA) are quite varied. One task is the review and evaluation of development permit applications. Reviewing and evaluating permits involves several steps, including:

- Making permit applications available to prospective developers

### What Information Should the Permit Contain?

In addition to obvious information, such as the applicant's name, address, and phone number, a development permit should also contain the following information:

- The location of the proposed development
- A site map
- Description of proposed activity
- Elevation of ground site prior to development
- Elevation to which lowest floor of the structure must be built
- Elevation to which structure will be flood-proofed (non-residential only)
- Base flood elevation (BFE) data for subdivisions
- Description of water course alterations
- A space for approving or denying the permit
- A space for signature and date

- Checking applications for completeness
- Checking development locations on floodplain maps
- Determining if development affects the floodway
- Determining BFE for the proposed development site
- Establishing first floor elevations

- Requiring additional Federal/State/Local permits
- Determining if watercourse alterations will reduce carrying capacity
- Using best available data when FEMA has not provided BFEs

Another duty of the local FPA is to issue permits. This involves assuring that each application meets NFIP criteria and involves issuing conditions permits for lowest floor elevation and construction standards. In the event that the application does not meet NFIP criteria the FPA must also deny the permit.

Once the project has begun it is also the duty of the FPA to check the progress of development. This includes field checking the location and the lowest

floor elevation. The lowest floor elevation must be checked before framing of the development structures begins. The FPA must also ensure that construction occurs in conformance with approved plans.

An Elevation Certificate will also need to be issued by the FPA, who must check the elevation of the lowest floor to see if it is above or below BFE. The Elevation Certificate is then issued, establishing the status of the elevation.

The FPA must also maintain records of floodplain development. This involves keeping track of the number of floodplain development permits that he/she issues, and retaining copies of those permits and elevation certificates as well.

## RECORD KEEPING

One of the jobs of the local floodplain manager is to maintain the required records according to NFIP regulations. The following records must be kept on file in perpetuity and open for public inspection:

- A complete and up-to-date copy of the floodplain ordinance
- The current flood map (FIRM, Floodway, and FIS)
- A copy of the NFIP regulations
- A project file for each development permit issued. The project file should contain the following:



## 5 Obtain the Base Flood Elevation at the site:

- From the profiles found in the Flood Insurance Study (FIS).
- From the Flood Insurance Rate Map (FIRM).
- From any other Federal, State or local source - commonly called "best available data".
- If there is no base flood elevation (BFE) data available, you may want to require the applicant to determine the BFE. A determination of the BFE is required if the development site is at least 5 acres or has 50 or more lots platted.

## 6 Review the construction plans to make sure that the lowest floor of the building is built to, or above, the base flood elevation (BFE).

Some states and communities require the lowest floor to be built one or two feet above the BFE. Check your local floodplain ordinance. Building protection can be done by one of three methods:

- Elevate on fill. Check the plans to ensure that: the top of the fill is at or above the BFE; the fill is protected from erosion and scour; the fill is properly compacted; and, the fill does not cause drainage or flow on to neighboring properties. Consult Technical Bulletin (TB) 10-01 for information determining if a site or structure is reasonably safe from flooding.
- Elevate on piers, posts, columns or walls. Check the plans to ensure that materials used below the lowest floor are resistant to flood

damage (TB 3-93). Check that all electrical, heating, ventilating, plumbing, air conditioning equipment, and utility meters are located above the BFE. Ensure all water and sewer pipes, and electrical and telephone lines located below the BFE are waterproofed. If walls are used they must have permanent openings no more than one foot above grade. (TB 1-93)

- Floodproofing for non-residential buildings only: The plans for a floodproofed building must be prepared by a registered engineer who must sign and seal a floodproofing certificate. The certified flood-proofed elevation must be at least one foot above BFE. (TB 3-93)

Once you have verified that the building complies with all floodplain management measures, issue the permit. Make sure that the plans and any other assurances are made part of the application and maintained in your records. Also, keep in mind that permits may be required from state and federal agencies as well. Proceed to Step 7.

**7** Make site inspections to ensure that the project is built according to the permitted plans. Document the as-built lowest floor elevations on the elevation certificate.

**8** Keep all pertinent records. Retain in perpetuity all records, even for completed projects and denied permits.

- a copy of the permit application
- a copy of the permit review checklist
- a copy of all the engineering data (plans, specifications, hydraulic and hydrologic analyses) used to document a development's compliance with the NFIP floodway (no rise) and encroachment standards
- a copy of the engineering analyses submitted for a watercourse alteration project along with correspondence to neighboring communities and the State Water Resources Department
- copies of all correspondence relating to the project
- any variance or appeals proceedings
- documentation of the inspections of the development
- base flood elevation data for subdivisions of at least 5 acres or 50 lots
- elevation certificates for documenting lowest floor elevations, or floodproofing certificates
- a copy of the certificate of occupancy
- Certification of lowest floor elevations (including basement) of all new and substantially improved structures located in the designated floodplain
- Certification of the elevation to which non-residential structures have been flood-proofed
- A file should be kept for the Biennial Reports that are submitted to FEMA. The floodplain manager also may wish to keep the following information in this file: (1) copies of previous years' annual and biennial reports; (2) a running total of permits and/or variances granted in the flood hazard area; (3) maps of new annexations or other boundary changes; and, (4) records of any man-made changes that affect flooding

### THE ELEVATION CERTIFICATE

One of the requirements for participation in the National Flood Insurance Program (NFIP) is that communities “obtain the elevation of the lowest floor (including basement) of all new and substantially improved structures, and maintain a record of all such information.”



The Elevation Certificate form published by FEMA (Appendix C), is a way for communities to comply with this requirement.

## Purpose of an Elevation Certificate

An Elevation Certificate is used for recording the elevation of the lowest floor, the crawlspace floor (if applicable), and the elevation of the mechanical/electrical components of all newly constructed buildings located in the floodplain. It is also used in determining the proper rate when purchasing flood insurance and for supporting a request for a Letter of Map Amendment (LOMA) or a Letter of Map Revision (LOMR).

## Elevation Certificate form

The Elevation Certificate is not required for use by all NFIP participating communities, but only those participating in the CRS program. However, the certificate is often the easiest way to comply with the requirement to document and maintain the elevation of the structure's lowest floor. For structures in flood zones AE, A1-A30, AH, VE, and coastal zones V1-V30, the Elevation Certificate must be completed, stamped, and signed by a licensed engineer or surveyor.\* For flood zones without BFEs (AO and A), a building official or property owner may complete the certificate.

A complete, stamped, and signed Elevation Certificate does not waive the requirement to purchase flood insurance. It is used, along with other documentation, as the basis for receiving a LOMA or LOMR-F. Only a LOMA or LOMR-F can amend the FIRM and thereby remove the

Federal requirement for a lending institution to require the purchase of flood insurance.

\* Washington State requires certification of elevation be performed only by a licensed surveyor.

**ELEVATION CERTIFICATE**  
 Important: Read the instructions on pages 1-8.

U.S. DEPARTMENT OF HOMELAND SECURITY  
 Federal Emergency Management Agency  
 National Flood Insurance Program

**SECTION A - PROPERTY INFORMATION**

A1. Building Owner's Name \_\_\_\_\_ State \_\_\_\_\_

A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No. \_\_\_\_\_

City \_\_\_\_\_

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. \_\_\_\_\_

A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.

A7. Building Diagram Number \_\_\_\_\_ sq ft

A8. For a building with a crawl space or enclosure(s), provide:  
 a) Square footage of crawl space or enclosure(s) \_\_\_\_\_ sq ft  
 b) No. of permanent flood openings in the crawl space or enclosure(s) walls within 1.0 foot above adjacent grade \_\_\_\_\_ sq in  
 c) Total net area of flood openings in A8.b \_\_\_\_\_

A9. For a building with:  
 a) Square footage of walls within \_\_\_\_\_  
 b) No. of permanent walls within \_\_\_\_\_  
 c) Total net area of walls within \_\_\_\_\_

**SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION**

B1. NFIP Community Name & Community Number \_\_\_\_\_ B2. County Name \_\_\_\_\_

B4. Map/Panel Number \_\_\_\_\_ B5. Suffix \_\_\_\_\_ B6. FIRM Index Date \_\_\_\_\_ B7. FIRM Panel Effective/Revised Date \_\_\_\_\_

B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9:  
 FIS Profile  FIRM  Community Determined  Other (Describe) \_\_\_\_\_

B11. Indicate elevation datum used for BFE in Item B9:  NGVD 1929  NAVD 1988  Otherwise Protected

B12. Is the building located in a Coastal Barrier Resources System (CBRS) area or Otherwise Protected Area?  CBRS  OPA

**SECTION C - BUILDING ELEVATION INFORMATION**

C1. Building elevations are based on:  Construction Drawings\*  Building Under 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/VE, AO, and A below according to the building diagram specified in Item A7.  
 Benchmark Utilized \_\_\_\_\_ Vertical Datum \_\_\_\_\_

Conversion/Comments \_\_\_\_\_

a) Top of bottom floor (including basement, crawl space, or enclosure floor) \_\_\_\_\_  
 b) Top of the next higher floor \_\_\_\_\_  
 c) Bottom of the lowest horizontal structural member (V Zones only) \_\_\_\_\_  
 d) Attached garage (top of slab) \_\_\_\_\_  
 e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments) \_\_\_\_\_  
 f) Lowest adjacent (finished) grade (LAG) \_\_\_\_\_  
 g) Highest adjacent (finished) grade (HAG) \_\_\_\_\_

**SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT INFORMATION**

This Certificate is to be signed and sealed by a land surveyor, engineer, or architect. The information on this Certificate represents my best efforts to the best of my knowledge and belief. I am not liable for any information that may be punishable by fine or imprisonment under the laws of the United States.





# 5





### LEGEND

- ZONE AO
- ZONE AH
- ZONE AE
- ZONE A
- SPECIAL FLOOD BY 100-YEAR FLOOD
- FLOODWAY
- OTHER FLOOD
- ZONE X
- OTHER ALLEY
- ZONE D
- UNDEVELOPED
- Flood Hazard Areas
  - Flood Hazard
  - Flood Hazard - Floodway
  - Flood Hazard - Floodway/Channel
  - Flood Hazard - Floodway/Channel/Overbank
- Flood Hazard - Floodway/Channel/Overbank

G

41-23  
151024155

WEST ONE STREET  
WEST TWO STREET

ZONE AE

WEST BARWELL STREET

WEST THREE STREET  
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## CHAPTER 5 - NFIP FLOODPLAIN DEVELOPMENT STANDARDS

### FLOODWAY STANDARDS

#### Floodways

No development is permitted in the floodway unless a licensed engineer can certify through a scientific analysis that the development will cause no rise to the BFE(s). This generally should include two studies: a step-back-water analysis and a conveyance compensation computation.

The “no rise” standard is to be interpreted exactly and strictly; that is, no rise above the BFE will be permitted. Communities are encouraged to secure the services of an independent, third party, engineer to review the no-rise analysis.

### GENERAL STANDARDS

#### Anchoring

All structures are to be anchored to prevent hydrodynamic and hydrostatic forces from moving the structures from their foundations.

- Water supply systems and sanitary sewer systems must be designed or located to minimize or eliminate infiltration of floodwaters.

#### Construction

##### Materials & Methods

The area below the lowest floor must be unfinished and remain free of water damage. This requires that new buildings and substantial improvements must be constructed with materials and by methods to resist or minimize flood damage.

#### Subdivisions

All subdivisions must be designed to minimize flood damage and to not increase flood levels. Developers must provide BFE data for all subdivisions of at least 50 lots or at least 5 acres. Other considerations:

### Note

The floodplain development standards described in this section are the minimum required for a community to participate and maintain eligibility in the NFIP. Many local communities and States have adopted higher floodplain regulatory standards.

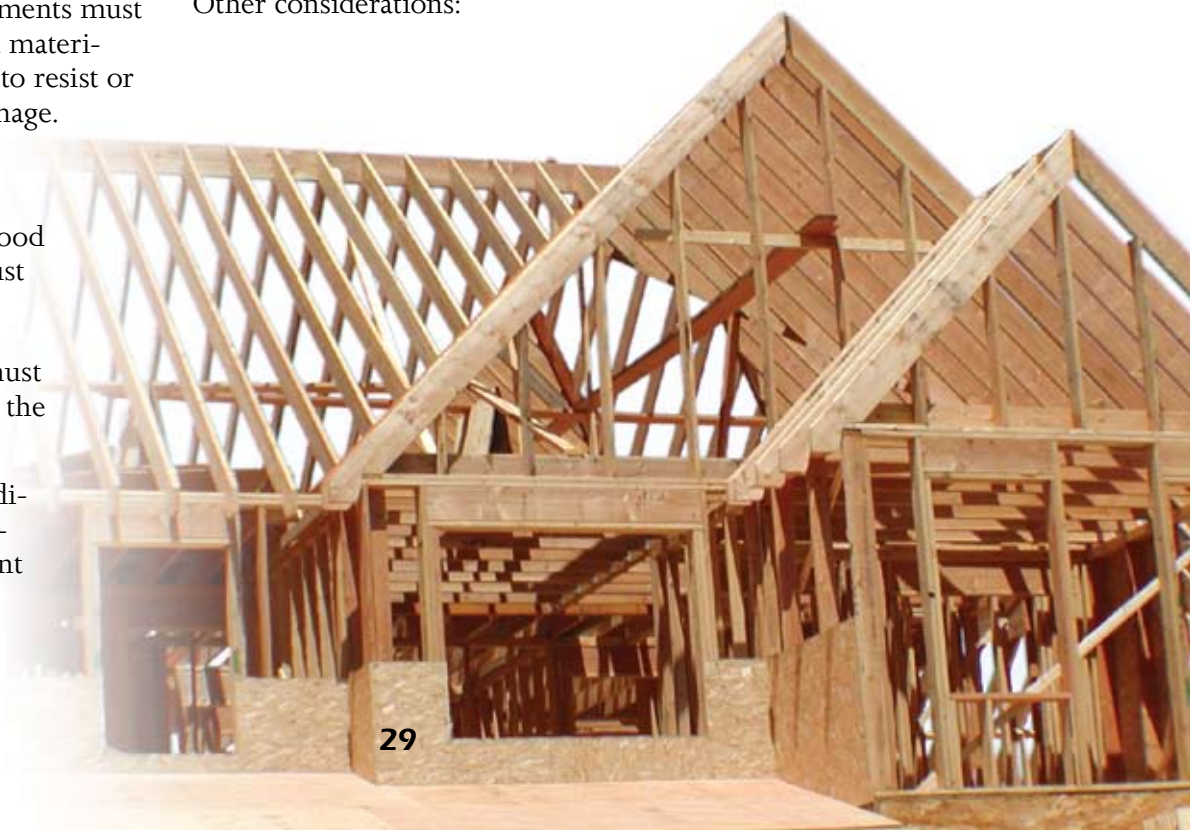
In Washington, State law prohibits construction of new or substantially improved residential structures in the designated floodway, with certain exceptions for farmhouses and homes damaged by causes other than flooding.

Always consult your local flood damage prevention ordinance for your particular community’s floodplain development requirements.

#### Utilities

Utilities servicing flood prone structures must be floodproofed:

- Control panels must be located above the BFE.
- Heating, air conditioning, and ventilation equipment must be placed above the BFE.



- Recommend building sites be at least two feet above streets
- Lowest floor of all structures must be above BFE
- Protect utilities
- Ensure adequate drainage
- Streets should drain rapidly
- Require evacuation plan

**Encroachments**

Proposed developments cumulatively may not increase base

flood heights more than one foot anywhere in the identified floodplain. (Applies only to floodplains with BFEs but without identified floodways)

**Watercourse Alterations**

All watercourse alterations or modifications must not reduce the carrying capacity of the stream or increase BFEs:

- Applicant must provide a thorough description of activity

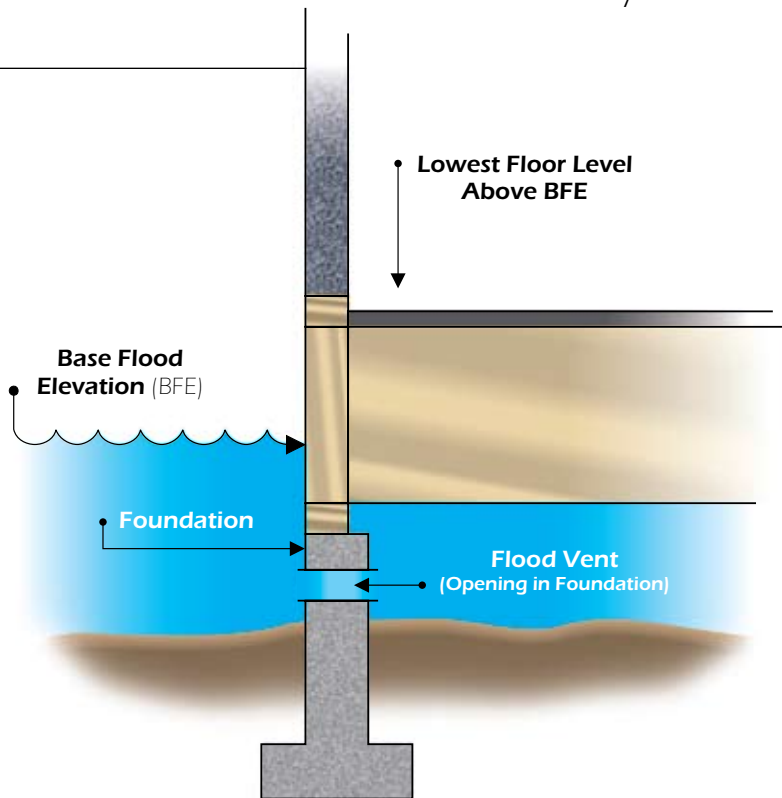
- Compare existing channel capacity with proposed capacity and assess changes
- Alteration or modification must maintain carrying capacity of the watercourse
- Notify State Coordinating Office and adjacent communities of proposal
- Notify FEMA of any significant changes to watercourse
- Floodway regulations apply to alterations within a designated floodway

**RESIDENTIAL STRUCTURES**

Residential structures must have the lowest floor, including the basement, elevated at least to or above the BFE. This elevation requirement can be accomplished by any of the following three methods:

**Foundation Stem Walls**

Foundation stem walls extend the height of your current foundation. (See **Figure A** on the next page.) The foundation must have as a minimum two permanent openings in each wall no more than one foot above grade. The total area of the openings must be no less than 1 square inch for every square foot of enclosed space. This helps to relieve hydrostatic pressure on the foundation during a flood. Any cover placed over the openings must be able to open automatically during flood flows without human intervention. Screens are acceptable if they permit entry and exit of floodwater. (TB 1-93)



**Fill Material**

A poured slab placed over compacted fill can also be used to elevate the lowest floor of a structure above BFE. (See **Figure B** on the next page.) Please note that when fill is placed on a building site, it is still in the floodplain and no basements are permitted.

**Piers, Piles & Posts**

This method is commonly used to avoid large fills and when flood heights are extreme. It is also the only acceptable means of construction in a coastal V-Zone. (See **Figure C** on this page.) The supporting members must be designed to resist hydrostatic and hydrodynamic forces.

Fully enclosed areas below BFE can be used only for limited storage, parking and access. In addition, the following conditions must be met for any enclosed area below the BFE:

- Service equipment (e.g. furnaces, water heaters, washers/dryers, etc.) are NOT permitted below BFE.
- All walls, floors, and ceiling materials located below BFE must be unfinished and constructed of materials resistant to flood damage.
- The walls of any enclosed area below BFE must be designed by a registered professional engineer or architect in a manner to prevent lateral movement, collapse, or flotation of the structure. There must be at least two openings on each wall and the bottom of all openings must be no higher than one foot above grade.

**Basements**

Any structure in a regulatory floodplain having its lowest level (either finished or unfinished) below ground level (subgrade) on all four sides is

not permissible under local flood damage prevention ordinance requirements and the regulations governing the NFIP. Therefore, neither basements nor excavated (subgrade) crawlspaces can be constructed in the regulatory floodplain.

**Crawlspaces**

**At-Grade crawlspace**

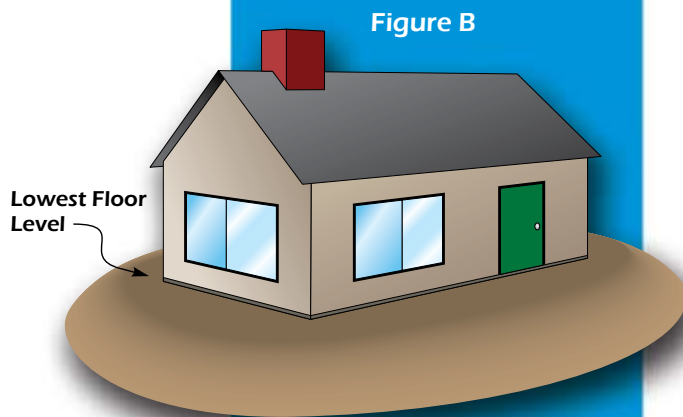
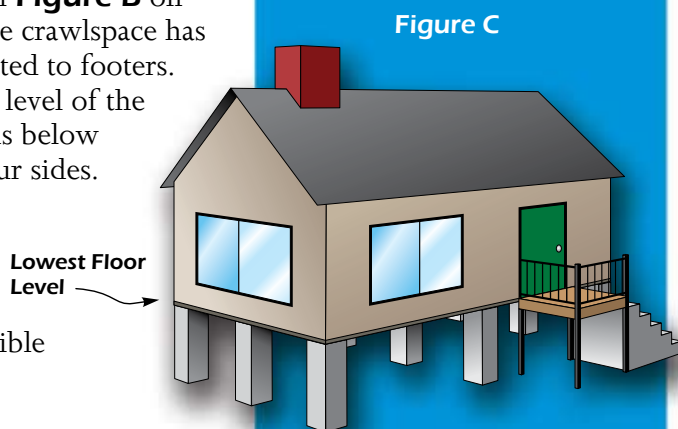
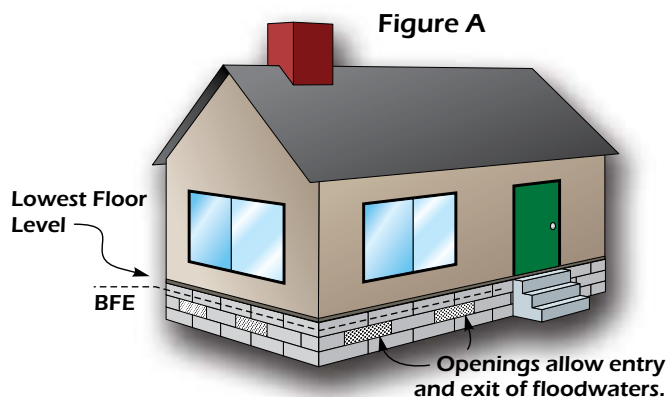
This type of crawlspace is illustrated in **Figure A** on page 32. The interior and exterior grade of the crawlspace are at the same level. This is the proper and permissible method of construction

**Excavated crawlspace**

This type of crawlspace is illustrated in **Figure B** on page 32. The crawlspace has been excavated to footers. The bottom level of the crawlspace is below grade on four sides. This type of crawlspace is generally not-permissible

**Meeting the Elevation Requirement**

Below are three houses that display some ways to bring your new home into compliance with NFIP standards when building in a floodplain. **Figure A** shows a home on an elevated foundation. **Figure B** shows a home elevated on fill. **Figure C** shows a home that has been elevated on pylons.



unless it meets the subgrade crawlspace requirements outlined in Technical Bulletin 11-01 and is permitted by the local ordinance. Insurance rates will be significantly higher for structures with this type of crawlspace.

### NONRESIDENTIAL STRUCTURES

Nonresidential structures must have the lowest floor, including basement, elevated to or above the BFE, or floodproofed at least one foot above BFE. If flood-

proofed, structures must be dry-floodproofed, which means keeping the water out. Nonresidential (commercial) structures, together with attendant utility and sanitary facilities, are designed so that the structure is watertight below the base flood level. The walls are impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effects of buoyancy. Additionally, the structure must be designed to:

- Prevent seepage, collapse or cracking of basement walls
- Prevent buckling of basement floors
- Prevent backup of water from sewer lines
- Have all openings located one foot above BFE (TB 3-93)
- All protective features must operate automatically without human intervention

NOTE: Dry floodproofing measures must be certified by a licensed engineer and only apply to nonresidential structures.

### ADDITIONAL PERMITS

Ensure applicants obtain any additional state or federal permits prior to issuing your local floodplain development permits. Some examples include “404” wetland permits from the U.S. Army Corps of Engineers or “Section 10” permits from the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS) for compliance with the Endangered Species Act (ESA).

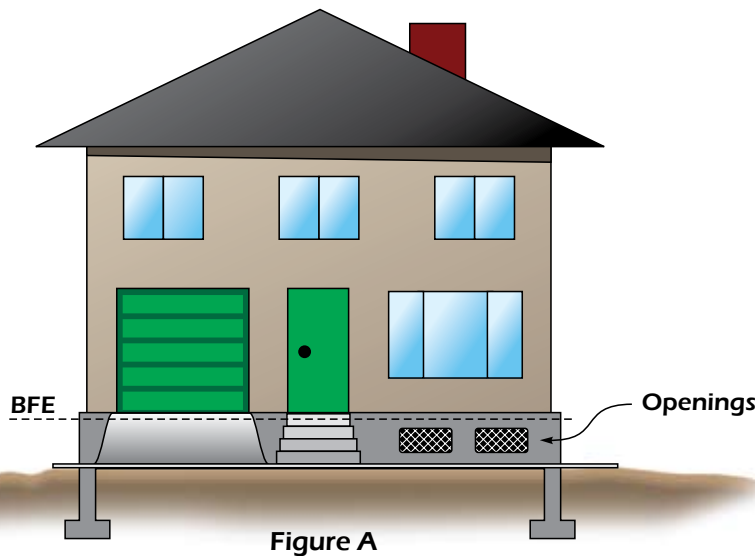


Figure A

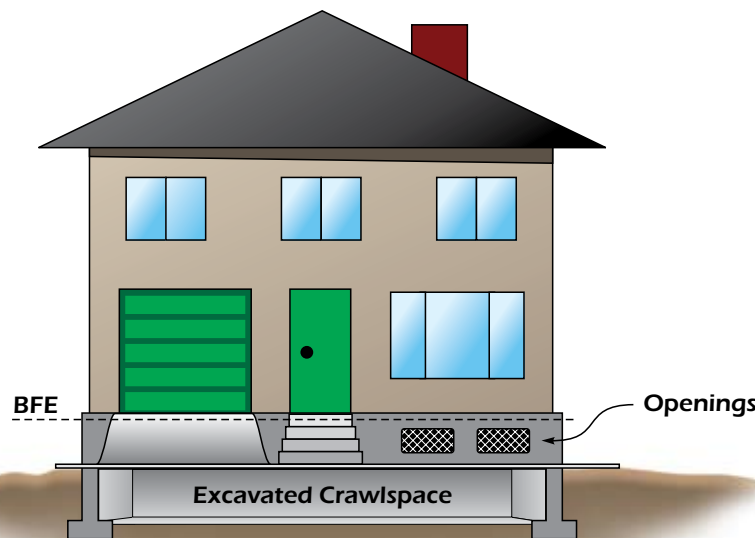


Figure B

## MANUFACTURED HOUSING

As with standard homes, manufactured homes, also commonly referred to as mobile homes, must adhere to NFIP standards. These standards are as follows:

- Homes on single lots must be elevated on permanent foundations to or above the base flood elevation (BFE).
- Homes in existing mobile home parks or subdivisions must be elevated on a permanent foundation and have either their chassis elevated on foundations at least 36 inches above grade, or have their lowest floor at or above BFE.
- For a mobile home park site or subdivision that has received substantial damage (defined in the Glossary), elevation must be to or above BFE.
- All mobile homes in flood hazard areas must be anchored to a permanent foundation.

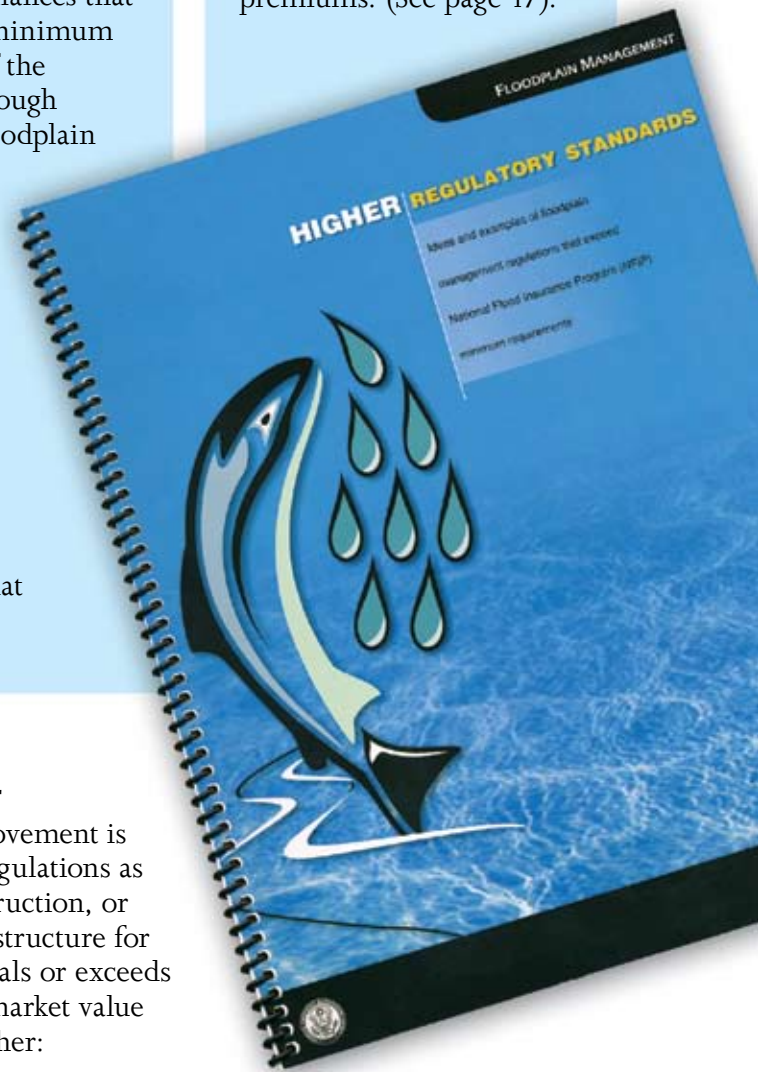
### Recreational Vehicles

If a recreational vehicle (RV) is parked in a flood hazard area for less than 180 consecutive days, it must be fully licensed and ready for highway use. If the RV will be on site for 180 or more consecutive days, it must be elevated to or above the BFE and meet anchoring standards for manufactured homes.

## HIGHER REGULATORY STANDARDS

In order to better meet their floodplain management goals, many communities have adopted flood damage prevention ordinances that go beyond the minimum requirements of the NFIP. For a thorough discussion of floodplain management provisions that exceed minimum NFIP requirements, see FEMA Region 10's publication "Higher Regulatory Standards". Communities that implement such

provisions are credited with points under the Community Rating System (CRS) that result in reduced flood insurance premiums. (See page 17).



## SUBSTANTIAL IMPROVEMENT

A substantial improvement is defined by NFIP regulations as any repair, reconstruction, or improvement of a structure for which the cost equals or exceeds 50 percent of the market value of the structure either:

- before the improvement or repair started, or
- if the structure has been damaged and is being restored, before the damage occurred.

Any substantially improved structure must be brought into compliance with the NFIP requirements for new construc-

tion; in other words, it must be elevated (or floodproofed if it is a nonresidential structure) to the required flood protection elevation.

When a structure is substantially improved, it is considered a new "post-FIRM" structure, and actuarial flood insurance rates would apply based on the lowest floor elevation of the structure.

**SUBSTANTIAL DAMAGE**

Substantially damaged buildings fall under the substantial improvement criteria. Substantial damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition equals or exceeds 50 percent of the market value of the structure before the damage occurred. ICC coverage (page 17) is available for structures damaged by flood and declared substantially damaged by the community.

**UNNUMBERED A-ZONES**

In approximate study areas or unnumbered A-Zones (flood zones in which the BFEs have

not been determined), structures can be built with the lowest floor at grade. Again, no residential basements are allowed. However, it is recommended that the lowest floor be elevated at least two (2) feet above the highest adjacent grade, which will result in significantly lower flood insurance premiums than for structures built at existing ground level. Remember that BFEs must be generated for all subdivisions of at least 50 lots or at least 5 acres. Many communities require that BFEs be generated for all developments in unnumbered A-zones either using FEMA's Quick-2 program, a complete step-backwater hydraulic analysis, or by using documented historical flood data.

**ALLOWABLE USES BELOW THE BFE**

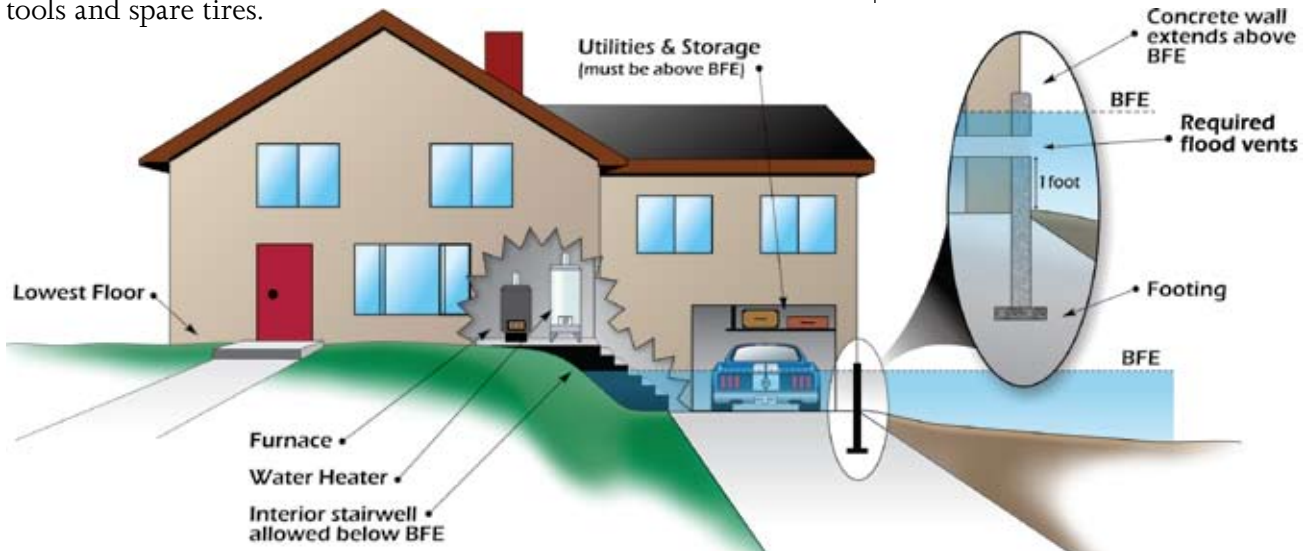
Garages, as well as small storage sheds, may be constructed within the flood fringe with their lowest floor at grade, provided that the "enclosure below BFE" rules are met. The use of such structures is limited, however, to parking of vehicles and storage of low damage potential items such as gardening tools and spare tires.

All mechanical and electrical systems and appliances must be elevated above BFE, hydrostatic (flood vent) openings must be installed, and flood-resistant materials must be used in areas below the BFE. For exact specifications see Technical Bulletin 7-93, "Wet Floodproofing Requirements."

**COASTAL VELOCITY ZONE (V-ZONES)**

In addition to A-Zone development standards, some additional construction specifications apply in coastal V-zones:

- The bottom surface of the lowest horizontal structural member of the lowest floor must be elevated at least to or above the BFE using only piers, posts or piles.
- Fill is prohibited in V-zones.
- New or substantially improved structures cannot be constructed seaward of mean high tide.
- Each building and foundation system must be certified, by a registered professional engineer, that it can withstand 100-year wind and water load forces.
- Enclosed areas below the BFE must be no greater than 300 square feet and have "break-away" walls.









## CHAPTER 6 - FLOOD HAZARD MITIGATION

### FLOODING IS A NATURAL OCCURRENCE

Flood damages occur only when man interferes with the natural flooding process by altering the watercourse, developing areas in the upper watershed, and/or building inappropriately within the floodplain. Approximately 90 percent of all federal disaster assistance payments to local governments and private citizens are a result of flood damages.

Flooding in the Northwest can be separated into several types including: overbank riverine floods, flash floods, alluvial fan floods, ice-jam floods, local drainage floods, groundwater floods, dam-break floods, coastal flooding, including storm surges and tsunamis, and fluctuating lake level floods. The traditional solution to flood problems has been to build

structural protection works such as dams, diversions, levees, and floodwalls. Despite tremendous expenditures for these structural projects, flood losses have continued to increase year after year. Given this, communities have begun to see the solution to avoiding flood damages lies not in keeping the water away from people, but rather in keeping people away from the water.

### BUILDING-PROTECTION MEASURES

#### Acquisition

In some instances, it is more cost-effective for governments to purchase repetitively flooded houses and demolish or move them than it is to constantly pay out disaster assistance and flood insurance claims. After the houses are demolished or moved, the now cleared land is deed restricted as open-space and may be converted to a park, or allowed to revert back to its natural state. Since 1993, FEMA

has funded the acquisition of more than 20,000 homes and businesses located in frequently flooded areas throughout the country.

#### Relocation

Relocation involves physically moving a house from the floodplain and placing it out of harm's way.

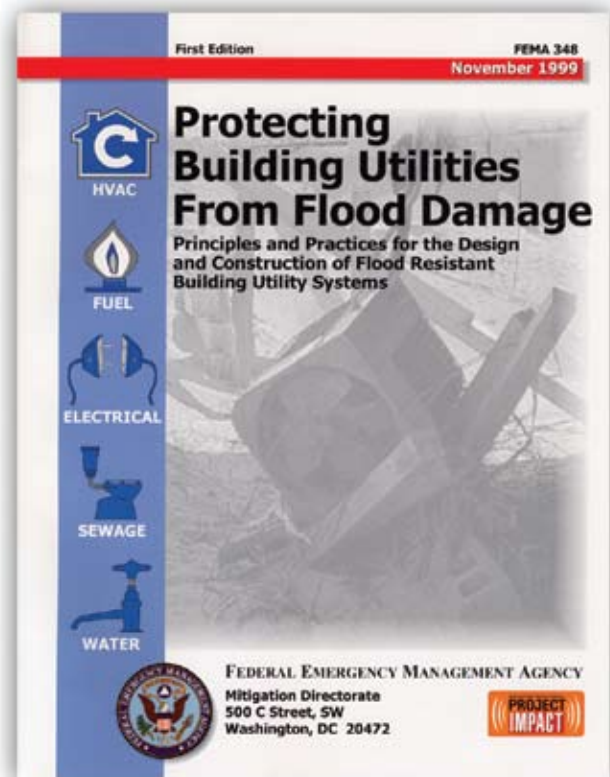
#### Elevation

Next to acquisition or relocation, raising an existing structure above the flood level is the next best solution to protecting a structure from flood damage. Structures can

be elevated on posts or piles so that the water can flow under the building, causing little or no damage to the structure and its contents.



**Elevated home in Douglas County, OR**



**This publication is available from FEMA.**

**Dry-floodproofing**

(Nonresidential)

A dry floodproofed building is sealed against floodwaters. All areas located below the flood level are made watertight. Openings like doors, vents, and sewer lines are either closed permanently, or constructed with automatically closing valves/vents or removable shields. (TB 3-93 and FEMA 102)

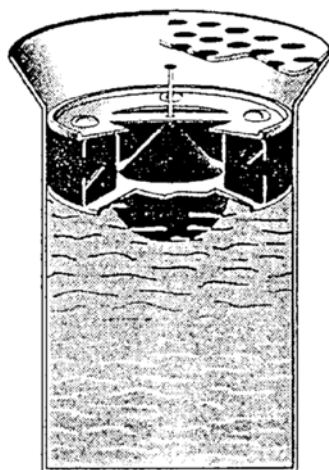
**Wet-floodproofing**

(Nonresidential)

With wet floodproofing, floodwaters are intentionally allowed into the building to minimize water pressure on a structure's foundation. Damage is avoided by taking simple measures such as elevating vulnerable equipment, electrical controls, furnaces and water heaters. (TB 1-93 and FEMA 102)

**Sewer-backup Protection**

Overloaded sewers can be prevented from backing up into a home or business by using a variety of plumbing alterations such as a floor drain plug or a backflow valve.



**Typical anti-backflow valve**

**PLANNING**

**Comprehensive Land-Use Plans**

These plans specify where different types of development should and should not occur in a community. Through these plans, use of the land can be tailored to take into account any natural hazard threats. For instance, flood-prone areas can be reserved for parks, golf courses, backyards, or natural areas. Though these plans may have limited authority, they often drive other local measures such as zoning and subdivision ordinances.

**Capital Improvement Plans**

These plans detail where major public expenditures are to be made over the next 5 to 20 years and include funding decisions for such things as acquiring parkland, and improving roads, bridges, and utilities. These publicly funded projects should be geared, first and foremost, to avoiding any natural hazard threats. If a hazard cannot be avoided, then projects should be constructed in such a way as to minimize the damage that will occur when disaster strikes.

**OPEN SPACE USES**

**Land Acquisition**

The best way to prevent flood damage is to keep the floodplain free of development. Local governments or community groups can purchase flood-prone lands

**Hazard Mitigation Plans**

Many communities have developed a stand-alone hazard mitigation plan that identifies the hazard threat and then tailors a range of non-structural, structural, and land-use regulatory activities to remove or significantly decrease the damage and economic loss that would be caused by a future flood or other disaster.



**Snake River Jefferson County, ID**

The Disaster Mitigation Act of 2000 (DMA-2K) requires that local governments have a FEMA approved comprehensive Hazard Mitigation Plan (HMP) in place to maintain their eligibility for certain pre- and post-disaster funding for projects to protect their communities from future disaster damages.

and set the areas aside for open-space uses such as recreational or wildlife habitat. Large points are awarded under CRS for this activity.

**Purchase Easements/  
Development Rights**

Easements are another method of keeping development out of sensitive flood areas. With an easement, a private owner is free to use the property, but agrees not to build on the flood-prone side of the property that has been set aside in the easement. In exchange, either a payment is made to the owner, or property taxes are lowered.

Many communities have purchased development rights to agricultural areas located in the floodplain in sprawling, near-urban areas. In this way, farmers and ranchers can continue to produce their product while precluding the most flood-prone land from being subdivided and developed.



**Developers are required to build on-site detention basins to handle increased runoff.**

**REGULATORY / LOCAL ORDINANCE MEASURES**

**Zoning Ordinances**

In a zoning ordinance, floodplains can be designated as one or more zoning districts in which development is prohibited or allowed only if it is constructed to minimize flood damage (per the requirements of the NFIP and local Floodplain Management Ordinances). Some flood districts are dedicated for recreation, public use, conservation, or cluster developments that keep houses out of floodplains.

**Subdivision Ordinances**

These regulations determine how land will be divided into individual lots. They also state how homes should be sited in relation to the floodplain (preferably outside), and they establish construction and location standards for the infrastructure that will service the subdivision.

**Building Codes**

Flood protection standards should be incorporated into the local building code. At a minimum they should ensure that the lowest floor of the structure is built above the base flood eleva-

tion (BFE), and that the foundation will withstand flood forces. Certain minimum standards are specified in the International Building Code, and compliance with this code is either required or recommended in all Northwestern states.

**Floodplain Management Ordinances**

Most communities participate in the National Flood Insurance Program (NFIP) and therefore have adopted floodplain management ordinances. However, many communities go beyond the minimum requirements of the NFIP and adopt higher regulatory standards in their flood ordinances (e.g., more restrictive floodways, freeboard above the BFE, riparian setbacks, compensatory storage, etc.) (See discussion of the Community Rating System, or CRS, on page 17)

**Stormwater Management Regulations**

These regulations require developers to build on-site detention basins to handle the increased runoff caused by new developments with large impervious

areas (subdivisions, shopping malls, etc.). Stormwater is not allowed to leave the property at a rate higher than under pre-developed condition. In addition, stormwater regulations can address the problem of sedimentation, which can fill in channels and lakes, reducing their ability to carry or store floodwaters. One way to keep sediment from entering nearby streams and rivers is to require sediment traps at new construction sites. A recommended stormwater management practice is to use Low Impact Development (LID) methods. For more information on LID, please refer to the website: [www.epa.gov/nps/lid](http://www.epa.gov/nps/lid)

**Post-Disaster Recovery Ordinance**

This ordinance establishes a recovery organization that authorizes a variety of pre- and post-event planning and regulatory powers and procedures related to disaster recovery and reconstruction.

**Wetlands Protection**

Wetlands can store large amounts of floodwaters, slow

## ENDANGERED SPECIES ACT (ESA)

The Endangered Species Act of 1973 (ESA) provides for the conservation of species that are endangered or threatened in all or a significant part of their range. Any proposed project or action within a floodplain that might affect endangered or threatened species or their habitat must comply with the requirements of the ESA, and it may be necessary to obtain certain permits before proceeding with the project (see Appendix D).

and reduce downstream flows, and protect shorelines from erosion. Efforts to preserve wetlands, especially smaller ones not covered by a Corps of Engineers 404 (wetlands) permit, can aid a community's efforts in decreasing flood damages. Some states, like Washington, have created model local wetlands ordinances.

## OTHER MITIGATION IDEAS

### Floodplain Mapping

FEMA has mapped floodplain areas in more than 12,000 communities across the country. However, many of these maps are more than a decade old. In addition, many areas, especially smaller watersheds, have never been mapped. In response to this situation, many local governments have conducted their own flood studies, and based on this data, regulate development accordingly.

### Comprehensive Watershed Tax

In order to raise funds to carry out flood mitigation projects, some communities have passed levies to tax property owners in a particular watershed. The amount of the tax can be based on the sub-watershed where one lives, the value of one's property, or the amount of impervious area on each parcel.

### Real Estate Disclosure

Often homebuyers are already committed to purchasing a property before their lending institution informs them, under

Federal law, that the home they are interested in is in a floodplain.

Real estate listings stating whether a property is located in a regulatory floodplain and whether a structure has suffered past flooding or sewer backup problems

could help the consumer make a better-informed decision.

### Drainage System Maintenance

Regular maintenance is needed to clean out channels and detention basins blocked by debris. A proper drainage system maintenance plan should do more than

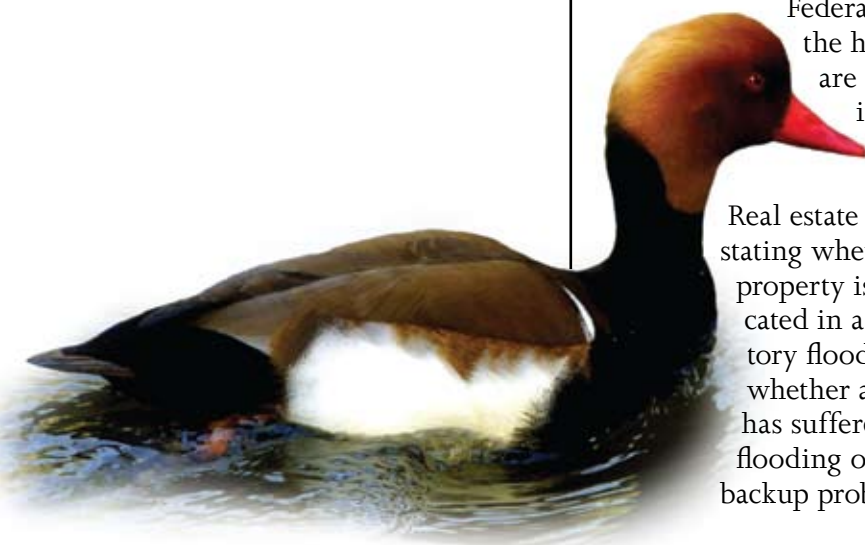


**Culverts also require regular maintenance to keep floodwaters flowing freely**

remove detritus from ditches. It should also include regulations to prevent dumping, filling or altering of a watercourse.

### Community Outreach

Some communities have provided low-interest loans, tax breaks, or grants to individual property owners to flood-retrofit their homes. Also, local governments can inform citizens of the flood threat through a myriad of means, and can also provide technical assistance on



such things as improving local drainage and floodproofing options.

**Flood Warning**

A flood threat recognition system provides early warning of an impending flood. The warning can be disseminated via sirens, a mobile public address system, radio or television. However, a flood warning system does not provide long-term damage reduction otherwise provided by a comprehensive flood mitigation program.

**Fish Enhancement Projects**

Due to declining fishery stocks in the Northwest, numerous structures to enhance fish habitat are being placed in streams and rivers. These various barbs and drop structures should be designed so that they do not increase flood heights. FEMA Region 10 has issued a policy

statement on fish enhancement structures in the floodway (Appendix E).

**Hazardous Materials**

Petroleum products, chemicals and other toxic substances located in the floodplain should be identified, and where possible, relocated out of the floodplain. At a minimum, drums and gasoline and other liquid storage tanks containing toxic substances should be elevated and properly anchored, as these items can become floating debris that may strike buildings or plug bridge openings, causing increased flood heights and damages.

**Dam Failure**

Several thousand regulated dams nationwide are categorized as high-hazard, that is, their failure would likely cause significant loss of life and

property. Many dams have been built with improper spillways, and downstream development is increasing. To avoid failure, dams should be inspected on a regular basis. Spillway capacities should be increased if deemed necessary.

**Structural Measures**

Various types of structures, such as levees, floodwalls, and reservoirs, can be built, or actions taken, such as minor dredging and channel modification, to protect properties from flooding. But history has proven that reliance on structural flood control measures can create a false sense of security that often leads to even greater destruction when these structures fail during a large flood. However, local structural measures are often necessary to protect existing critical facilities that are water dependent, such as water and waste-water treatment plants.





## GLOSSARY

### **Anchoring**

Special connections made to ensure that a building will not float or be pushed off its foundation during a flood.

### **Appeal**

A request to higher authority such as a Board of Appeals or a City Council to overrule a permit denial because the applicant claims that the ordinance has been incorrectly interpreted.

### **BFE (Base Flood Elevation)**

The elevation of the crest of the base flood.

### **Base Flood**

The flood having a one percent chance of being equaled or exceeded in any given year (often called the 100-year flood or one percent chance flood).

### **Basement**

Any area of a building having its floor below ground level on all sides.

### **Best Available Data**

Most recent hydraulic and hydrologic information that shows the 100-year flood elevations and floodplain boundaries in a particular area.

### **Building**

A structure that is principally above ground and enclosed by walls and a roof. Includes manufactured mobile homes, prefabricated buildings, as well as recreational vehicles or travel

trailers installed on a site for more than 180 consecutive days.

### **Floodplain Manager**

Individual who administers and enforces a community's floodplain ordinance. Depending on the local ordinance, this person could be a city engineer, building inspector, mayor, clerk, zoning administrator, or other official.

### **Coastal High Hazard Area**

An area of special flood hazard extending 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 from storms or seismic sources. The area is designated on the FIRM as Zone V1, V30, VE, or V.

### **Cross section**

Survey information that records the dimensions of a channel and floodplain at right angles to flow.

### **CRS (Community Rating System)**

A program of the FIA whereby communities who reduce damages and flood losses by regulating floodplain areas above and beyond minimum NFIP requirements are rewarded for their efforts through reduced flood insurance premiums for the citizens of that community.

### **Datum**

Reference point used to insure all elevation records are prop-

erly related. Many communities had their own datum developed before there was a national standard. Most existing (as of 2009) flood insurance studies use National Geodetic Vertical Datum of 1929 (NGVD 29). As FIRMs are updated, they are being converted, or referenced to, the North American Vertical Datum of 1988 (NAVD 88).

### **Development**

Any man-made change to the ground that may affect flood flows. Development includes buildings, filling, channel changes, dredging, grading, excavating and storage of materials.

### **Discharge**

The amount of water passing a point. Discharge is usually measured in cubic feet per second. For flood studies, the peak flood discharge is the greatest amount of water that will pass a point at the crest of the flood.

### **Elevation Certificate**

A form supplied by the Federal Emergency Management Agency (FEMA) and used to document the lowest floor elevation of a building.

### **FEMA**

Federal Emergency Management Agency. Administers the NFIP.

### **FHBM**

See: "Flood Hazard Boundary Map"

**FIA**

Federal Insurance Administration. Part of FEMA responsible for the NFIP.

**FIRM**

See “Flood Insurance Rate Map”.

**FIS**

Flood Insurance Study. A booklet that provides detailed information on a community’s flood hazard areas. The FIS normally includes topographic information, floodplain and floodway data charts, study information, and stream profiles.

**Flood Boundary & Floodway Map**

Floodplain management map issued by FEMA that shows, based on detailed and approximate analyses, the boundaries of the 100-year and 500-year floodplains and the 100-year floodway. Incorporated into FIRMs dated after 1988.

**Flood Hazard Boundary Map (FHBM)**

An approximate NFIP map produced for communities that are not in the regular phase of the NFIP or communities that have limited development potential.

**Flood Insurance Rate Map (FIRM)**

The map provided to communities in the regular phase of the NFIP. It delineates a Special Flood Hazard Area or floodplain in which regulations apply. FIRMs often include base flood elevations and floodways.

**Floodplain**

Land area subject to flooding.

**Floodproofing**

Protection measures made to a building that is not elevated above the flood level to ensure that floodwaters do not damage it. Dry floodproofing consists of ensuring that the walls and floor are watertight and capable of withstanding hydrostatic pressures and hydrodynamic forces. Wet floodproofing permits water to enter the building and seek its own level to alleviate hydrostatic pressure.

**Floodway**

The channel of a river and the portion of the floodplain that carries most of the floodwaters. Regulations require that the floodway be kept open so that flood flows are not obstructed or diverted onto other properties.

**Floodway Data Table**

The table provided in the flood insurance study that provides detailed information for each cross section on streams studied in detail.

**404 Permit**

A permit required by Section 404 of the Clean Water Act to protect rivers and adjacent wetlands from being filled. The U.S. Army Corps of Engineers administers this permit program.

**Freeboard**

An extra margin of safety added to the base flood elevation to

protect structures from waves, debris, or other unpredictable hazards that accompany the base flood.

**Hydraulics**

The study of moving water. The hydraulic analysis in a flood insurance study calculates how high and how fast the floodwaters flow.

**Hydrodynamic Forces**

The forces on a structure from moving water, waves, ice, etc.

**Hydrology**

The science dealing with the waters of the earth. A hydrologic study calculates flood discharges.

**Hydrostatic Pressure**

The pressure that standing water places on the walls and floor of a structure. Hydrostatic pressure of 3-4 feet of standing water can collapse walls or buckle basement floors.

**LOMA**

Letter of Map Amendment that FEMA issues for a structure or parcel of land that was inadvertently included in the floodplain, thereby waiving the Federal mandatory flood insurance purchase requirements.

**LOMR**

Letter of Map Revision. FEMA issues a LOMR when changes to the effective floodplain map are made, such as floodway/floodplain boundaries, base flood elevations, or authorized fill.

**Lowest Floor**

The lowest floor of the lowest enclosed area (including basement) of a building. Note: An unfinished or flood resistant enclosure other than a basement area used solely for parking vehicles, building access or storage, is not considered a building's lowest floor provided that such an enclosure is built in accordance with the applicable floodplain ordinance.

**Manufactured Home**

Transportable structure of one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. Commonly called a "mobile home." The term "manufactured home" does not include a "recreational vehicle."

**NFIP**

National Flood Insurance Program

**NAVD 88**

North American Vertical Datum of 1988, a vertical control datum used for surveying in the United States that replaces NGVD 29 (See definition below).

**NGVD 29**

National Geodetic Vertical Datum of 1929, a reference datum used by the National Flood Insurance Program. NGVD 29 is based on mean sea level and has also been called "1929 Mean Sea Level."

**NMFS**

National Marine Fisheries Service.

**Ponding**

Flooding condition caused when rain runoff pools in a location that has no ready outlet. Pondered water usually stands until it is able to seep into the ground. It is a common problem in levee areas, flat areas, and in communities where construction of streets and other development has blocked the natural outlets.

**Profile**

A graph showing the water surface elevations of a flood at any particular location along the stream.

**"Q"**

An abbreviation used by engineers to stand for discharge, usually expressed in cubic feet per second (cfs).

**Recreational Vehicle**

A vehicle that is:

- Built on a single chassis;
- 400 square feet or less when measured at the largest horizontal projection;
- Designed to be self-propelled or permanently towable by a light duty truck; and
- Designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

**Riverine**

Produced by a river. Riverine floodplains have readily identifiable channels and are regulated differently than floodplains caused by ponding, sheet flow, or lake shore flooding.

**Roughness**

In flood studies, a factor that accounts for surface conditions that affect flood flows. A floodplain with a lot of trees and brush will have a high roughness factor, whereas open spaces and paved areas will have low roughness factors.

**SFHA**

Special Flood Hazard Area. The term used by the National Flood Insurance Program for the floodplain identified on the flood insurance maps to represent the area that would be inundated by the Base Flood.

**Structure**

A walled and roofed building including a gas or liquid storage tank, that is principally above ground.

**Substantial Damage**

Damage of any origin sustained by a building 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.

**Substantial Improvement**

Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the “start of construction” of the improvement.

NOTE: If a building is substantially improved or substantially damaged, it must be brought into compliance with applicable floodplain ordinances, i.e., protected from the base flood (elevated to or above the BFE).

**Topographic Map**

A map showing elevation contour lines.

**Uplift**

Hydrostatic pressure placed on a floor as water below the floor tries to rise.

**Use Permit**

A permit issued after a development project is complete and the property has passed all the necessary inspections. Depending on the local ordinance

provisions, a building cannot be occupied nor can a site be used unless a use permit or a certificate of use and occupancy is issued by the building official.

**USFWS**

United States Fish and Wildlife Service

**Variance**

A request to be relieved of one or more ordinance requirements because the ordinance affects the property in a unique and special way.

## RESOURCES

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The information in this book was obtained from many sources, mostly from other FEMA publications. These publications can be obtained by contacting FEMA's Publication Warehouse at 1-800-480-2520. The list of sources are as follows:

### Chapter 1

- FEMA Publication, Protecting Floodplain Resources, A Guidebook for Communities

### Chapter 2

- FEMA Publication 258, How to Use a Flood Map to Protect Your Property
- FEMA Publication 265, Mapping Floodplain Development in Approximate Zone Areas, A Guide for Obtaining and Developing Base (100-year) Flood Elevations
- FEMA Publication 311, Substantial Damage Estimator

### Chapter 3

- FEMA Publication 186, Mandatory Purchase of Flood Insurance Guidelines.

### Chapter 4

- FEMA Publication 213, Answers to Questions About Substantially Damaged Buildings

### Chapter 5

- FEMA Publication 311, Substantial Damage Estimator
- FEMA Publication 85, Manufactured Home Installation in Flood Hazard Areas
- FEMA Publication 54, Elevated Residential Structures
- FEMA Publication 348, Protecting Building Utilities From Flood Damage

### Chapter 6

- FEMA Publication 102, Floodproofing for Non-Residential Structures
- FEMA Publication 114, Retrofitting Flood-prone Residential Structures
- FEMA Publication 348, Protecting Building Utilities From Flood Damage
- FEMA Publication, Subdivision Design in Flood Hazard Areas

### Code of Federal Regulations (CFR)

A master coding system to identify the federal agency regulations that have been published in the Federal Register. 44 CFR includes all the regulations pertaining to the Federal Emergency Management Agency (FEMA).

### Technical Bulletins

- The technical Bulletin series, issued by FEMA's Mitigation Directorate, provides guidance to building performance standards of the NFIP. Individual Bulletins are referred to at several places within this guidebook, for example: (TB 3-93)



## APPENDIX A - DEFINITIONS OF FEMA FLOOD ZONE DESIGNATIONS

Flood zones are geographic areas that the FEMA has defined according to varying levels of flood risk. These zones are depicted on a community’s Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

### MODERATE TO LOW RISK AREAS

In communities that participate in the NFIP, flood insurance is available to all property owners and renters in these zones:

Zone	Description
B, C, and X	Areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

### HIGH RISK AREAS

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

Zone	Description
A	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas; no depths or base flood elevations are shown within these zones.
AE, A1-A30	Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AH	Areas with a 1% annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas, and areas with a 1% or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
AR	Areas with a temporarily increased flood risk due to the building or restoration of a flood control system (such as a levee or a dam). Mandatory flood insurance purchase requirements will apply, but rates will not exceed the rates for unnumbered A zones if the structure is built or restored in compliance with Zone AR floodplain management regulations.
A99	Areas with a 1% annual chance of flooding that will be protected by a Federal flood control system where construction has reached specified legal requirements. No depths or base flood elevations are shown within these zones.

## HIGH RISK - COASTAL AREAS

In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all of these zones:

Zone	Description
V	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. No base flood elevations are shown within these zones.
VE, V1 - 30	Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.

## UNDETERMINED RISK AREAS

Zone	Description
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.



**APPENDIX B - MODEL FLOODPLAIN DEVELOPMENT PERMIT**

**EXAMPLE**

**APPLICATION FOR PERMIT TO DEVELOP IN A FLOODPLAIN AREA**

The undersigned hereby makes application for a permit to develop in a designated floodplain area. The work to be performed is described below and in attachments hereto. The undersigned agrees that all such work shall be done in accordance the requirements of the \_\_\_\_\_ (City/County) \_\_\_\_\_ Floodplain Ordinance and with all other applicable local, State, and Federal regulations. This application does not create liability on the part of the \_\_\_\_\_ (City/County) \_\_\_\_\_ or any officer or employee thereof for any flood damage that results from reliance on this application or any administrative decision made lawfully thereunder.

Owner: \_\_\_\_\_ Builder: \_\_\_\_\_  
 Address: \_\_\_\_\_ Address: \_\_\_\_\_  
 \_\_\_\_\_  
 Telephone: \_\_\_\_\_ Telephone: \_\_\_\_\_  
 Address of Property: \_\_\_\_\_  
 \_\_\_\_\_

**A. Description of Work (Complete for All Work):**

1. Proposed Development Description:

- New Building
- Improvement to Existing Building
- Manufactured Home
- Filling
- Other \_\_\_\_\_

2. Size and location of proposed development (attach site plan):

\_\_\_\_\_  
 \_\_\_\_\_

3. Is the proposed development in a Special Flood Hazard Area (Zones A, AE, A1-A30, AH or AO)?

- Yes
- No

4. Per the floodplain map, what is the zone and panel number of the area of the proposed development?

Zone \_\_\_\_\_ Parcel Number \_\_\_\_\_

5. Are other Federal, State or local permits obtained?

- Yes
- No

Type \_\_\_\_\_

6. Is the proposed development in an identified floodway?

- Yes
- No

7. If yes to #6, is a "No Rise Certification" with supporting data attached?

- Yes
- No

**EXAMPLE**

**B. Complete for New Structures and Building Site:**

1. Base Flood Elevation at the site: \_\_\_\_\_ feet  NGVD 29  NAVD 88
2. Required lowest floor elevation (including basement): \_\_\_\_\_ feet  NGVD 29  NAVD 88
3. If the cost of the proposed construction equals or exceeds 50 percent of the market value of the structure, then the substantial improvement provisions shall apply.
4. Number of flood openings (vents) \_\_\_\_\_ and enclosed area \_\_\_\_\_ sq. ft. below BFE.

**C. Complete for Alterations, Additions, or Improvements to Existing Structures:**

1. What is the estimated market value of the existing structure? \$ \_\_\_\_\_
2. What is the cost of the proposed construction? \$ \_\_\_\_\_
3. If the cost of the proposed construction equals or exceeds 50 percent of the market value of the structure, then the substantial improvement provisions shall apply.

**D. Complete for Non-Residential Floodproofed Construction:**

1. Type of floodproofing method: \_\_\_\_\_
2. The required floodproofing elevation is: \_\_\_\_\_ feet  NGVD 29  NAVD 88
3. Floodproofing certification by a registered engineer is attached:  Yes  No

**E. Complete for Subdivisions and Planned Unit Development:**

1. Will the subdivision or other development contain 50 lots or 5 acres?  Yes  No
2. If yes, does the plat or proposal clearly identify base flood elevations?  Yes  No
3. Are the 100 Year Floodplain and Floodway delineated on the site plan?  Yes  No

**ADMINISTRATIVE**

1. Permit approved  Permit denied  (Statement attached)
2. Elevation Certificate attached  Yes  No
3. As-Built lowest floor elevation: \_\_\_\_\_ feet  NGVD 29  NAVD 88
4. Work inspected by: \_\_\_\_\_
5. Local Administrator Signature: \_\_\_\_\_ Date \_\_\_\_\_
6. Applicant's Signature: \_\_\_\_\_ Date \_\_\_\_\_

CONDITIONS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

# APPENDIX C - ELEVATION CERTIFICATE FORM

The current version of the elevation certificate can be obtained by contacting FEMA Region 10 at (425) 487-4600 or by visiting the FEMA website at [www.fema.gov](http://www.fema.gov) and search on "Elevation Certificate."

U.S. DEPARTMENT OF HOMELAND SECURITY Federal Emergency Management Agency National Flood Insurance Program		<h2 style="margin: 0;">ELEVATION CERTIFICATE</h2>		OMB No. 1680-0008 Expires February 28, 2009
Important: Read the instructions on pages 1-8.				
<b>SECTION A - PROPERTY INFORMATION</b>				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 crawl space or enclosure(s), provide:		A9. For a building with an attached garage, provide:		
a) Square footage of crawl space or enclosure(s) _____ sq ft		a) Square footage of attached garage _____ sq ft		
b) No. of permanent flood openings in the crawl space or enclosure(s) walls within 1.0 foot above adjacent grade _____		b) No. of permanent flood openings in the attached garage walls within 1.0 foot above adjacent grade _____		
c) Total net area of flood openings in A8.b _____ sq in		c) Total net area of flood openings in A9.b _____ sq in		
<b>SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION</b>				
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 (Describe) _____				
B11. Indicate elevation datum used for BFE in item B9: <input type="checkbox"/> NGVD 1929 <input type="checkbox"/> NAVD 1988 <input type="checkbox"/> Other (Describe) _____				
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				
<b>SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)</b>				
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input 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-g below according to the building diagram specified in item A7.				
Benchmark Utilized _____		Vertical Datum _____		
Conversion/Comments _____		Check the measurement used.		
a) Top of bottom floor (including basement, crawl space, or enclosure floor)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
b) Top of the next higher floor	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
c) Bottom of the lowest horizontal structural member (V Zones only)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
d) Attached garage (top of slab)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
f) Lowest adjacent (finished) grade (LAG)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
g) Highest adjacent (finished) grade (HAG)	_____ feet	<input type="checkbox"/> meters (Puerto Rico only)		
<b>SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION</b>				
This certification is to be signed and sealed by a land surveyor, engineer, or architect authorized by law to certify elevation information. I certify that the information on this Certificate represents my best efforts to interpret the data available. I understand that any false statement may be punishable by fine or imprisonment under 18 U.S. Code, Section 1001.				
<input type="checkbox"/> Check here if comments are provided on back of form.				
Certifier's Name _____		License Number _____		
Title _____	Company Name _____			
Address _____	City _____	State _____	ZIP Code _____	
Signature _____	Date _____	Telephone _____		
				PLACE SEAL HERE
FEMA Form 81-31, February 2006		See reverse side for continuation.		Replaces all previous editions

Front side

<b>IMPORTANT: In these spaces, copy the corresponding information from Section A.</b>			For Insurance Company Use:
Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.			Policy Number
City	State	ZIP Code	Company NAIC Number

**SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION (CONTINUED)**

Copy both sides of this Elevation Certificate for (1) community official, (2) insurance agent/company, and (3) building owner.

Comments \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_  Check here if attachments

**SECTION E - BUILDING ELEVATION INFORMATION (SURVEY NOT REQUIRED) FOR ZONE AO AND ZONE A (WITHOUT BFE)**

For Zones AO and A (without BFE), complete Items E1-E5. If the Certificate is intended to support a LOMA or LOMR-F request, complete Sections A, B, and C. For Items E1-E4, use natural grade, if available. Check the measurement used. In Puerto Rico only, enter meters.

- E1. Provide elevation information for the following and check the appropriate boxes to show whether the elevation is above or below the highest adjacent grade (HAG) and the lowest adjacent grade (LAG).
- a) Top of bottom floor (including basement, crawl space, or enclosure) is \_\_\_\_\_  feet  meters  above or  below the HAG.
- b) Top of bottom floor (including basement, crawl space, or enclosure) is \_\_\_\_\_  feet  meters  above or  below the LAG.
- E2. For Building Diagrams 6-8 with permanent flood openings provided in Section A Items 8 and/or 9 (see page 8 of Instructions), the next higher floor (elevation C2.b in the diagrams) of the building is \_\_\_\_\_  feet  meters  above or  below the HAG.
- E3. Attached garage (top of slab) is \_\_\_\_\_  feet  meters  above or  below the HAG.
- E4. Top of platform of machinery and/or equipment servicing the building is \_\_\_\_\_  feet  meters  above or  below the HAG.
- E5. Zone AO only: If no flood depth number is available, is the top of the bottom floor elevated in accordance with the community's floodplain management ordinance?  Yes  No  Unknown. The local official must certify this information in Section G.

**SECTION F - PROPERTY OWNER (OR OWNER'S REPRESENTATIVE) CERTIFICATION**

The property owner or owner's authorized representative who completes Sections A, B, and E for Zone A (without a FEMA-issued or community-issued BFE) or Zone AO must sign here. *The statements in Sections A, B, and E are correct to the best of my knowledge.*

Property Owner's or Owner's Authorized Representative's Name \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ ZIP Code \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_ Telephone \_\_\_\_\_

Comments \_\_\_\_\_

Check here if attachments

**SECTION G - COMMUNITY INFORMATION (OPTIONAL)**

The local official who is authorized by law or ordinance to administer the community's floodplain management ordinance can complete Sections A, B, C (or E), and G of this Elevation Certificate. Complete the applicable item(s) and sign below. Check the measurement used in Items G8. and G9.

- G1.  The information in Section C was taken from other documentation that has been signed and sealed by a licensed surveyor, engineer, or architect who is authorized by law to certify elevation information. (Indicate the source and date of the elevation data in the Comments area below.)
- G2.  A community official completed Section E for a building located in Zone A (without a FEMA-issued or community-issued BFE) or Zone AO.
- G3.  The following information (Items G4.-G9.) is provided for community floodplain management purposes.

G4. Permit Number _____	G5. Date Permit Issued _____	G6. Date Certificate Of Compliance/Occupancy Issued _____
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- G7. This permit has been issued for:  New Construction  Substantial Improvement
- G8. Elevation of as-built lowest floor (including basement) of the building: \_\_\_\_\_  feet  meters (PR) Datum \_\_\_\_\_
- G9. BFE or (in Zone AO) depth of flooding at the building site: \_\_\_\_\_  feet  meters (PR) Datum \_\_\_\_\_

Local Official's Name \_\_\_\_\_ Title \_\_\_\_\_

Community Name \_\_\_\_\_ Telephone \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Comments \_\_\_\_\_

Check here if attachments

## APPENDIX D - COMPLIANCE WITH THE ENDANGERED SPECIES ACT

Everyone, not just Federal agencies, must comply with the Endangered Species Act (ESA). Implementing the provisions of the National Flood Insurance Program (NFIP) and complying with the ESA are not mutually exclusive actions. Communities can preserve an endangered species while at the same time reducing risk to life and property from flooding.

In a Biological Opinion issued by the National Marine Fisheries Service (NMFS) in September 2008, NMFS provided a Reasonable and Prudent Alternative (RPA) for implementing the provisions of the NFIP. Element 3 of the RPA requires FEMA to ensure that communities enact biological performance standards to avoid a violation of the ESA.

Under current (2009) NFIP regulations, 44CFR 60.3(a)(2), a community must ensure that all necessary permits have been received from Federal, State, and local agencies before a floodplain development permit is issued. Under the ESA, a Section 10 Incidental Take Permit may be a necessary permit. In order to determine if a Section 10 permit is necessary, a community must assess the fisheries impact of that development to determine the effect that it may have on listed species or critical habitat. This assessment is usually done in some type of report, such as a Biological Assessment or Evaluation. If a potential “take” has been determined, then a habitat conservation plan must be prepared and consulted on with the NMFS and(or) the U.S. Fish and Wildlife Service (USFWS). A Section 10 Incidental Take Permit is issued once a consultation is completed.

FEMA Region 10 proposed 2 programmatic alternatives that a community may choose instead of requiring a section 10 Incidental Take Permit from NMFS for each floodplain development permit:

1. Model Ordinance – The model ordinance, containing the NFIP minimum criteria, and the biological performance standards of the NFIP Biological Opinion, will be consulted between FEMA and the services (NMFS and USFWS) for compliance with the ESA. If a community chooses to adopt and enforce the provisions of the model ordinance, then a section 10 Incidental Take Permit is not a necessary permit for each floodplain development permit.
2. Programmatic NFIP/ESA Checklist – If a community feels that their existing ordinances and processes adequately address the prohibitions of “take” under the ESA, the community may request that FEMA use a programmatic checklist to determine if the community’s current ordinances and processes comply with the biological performance standards of the NFIP Biological Opinion. If the community’s ordinances and processes are determined to be compliant with the ESA, then a Section 10 Incidental Take Permit is not required for each floodplain development permit as long as the ordinance is enforced and the processes are followed.

**For more information regarding the model ordinance and the Programmatic NFIP/ESA checklist please contact the FEMA Region 10 office:**

Federal Emergency Management Agency  
Attn: Mitigation Division  
Federal Regional Center, Region 10  
130 228th St. SW  
Bothell, WA 98021-9796  
(425) 487-4600



## APPENDIX E - POLICY ON FISH ENHANCEMENT STRUCTURES IN THE FLOODWAY

U.S. Department of Homeland Security  
Region X  
130 228th Street, SW  
Bothell, WA 98021-9796



# FEMA

### Policy on Fish Enhancement Structures in the Floodway

The balance required between anadromous fish and the human environment is unique to the Northwest. Maintaining that balance often makes implementing regulations a challenge. Sometimes the local, State and Federal regulations contradict each other. This is the case with fish enhancement structures.

FEMA's regulations require communities to prohibit encroachments in regulated floodways unless provided with a no-rise analysis. The current listing and proposed listing of certain anadromous fish species as Threatened or Endangered requires the restoration of their habitat to ensure their survivability. Restoring that habitat often entails encroaching in the floodway. A strict interpretation of this standard could require a relatively expensive analysis that might exceed the cost of the enhancement project.

FEMA recognizes this. While we believe the best course of action is to preserve the floodway encroachment standard as it exists, an informed judgment regarding fish enhancement structures can be made as to exceptions for which less than the maximum hydraulic analyses are required. The community official often does not have the qualifications to make an informed judgment regarding the impacts of these structures on flood hazards. Therefore, FEMA will allow the community to defer to the "judgment" of a qualified professional regarding such impacts. Such qualified hydraulic or hydrology professionals would include staff of Rural Conservation and Development and the Natural Resource Conservation Service. It would also include similarly qualified staff of fisheries, natural resource, or water resources agencies.

The qualified professional should, as a minimum, provide a feasibility analysis and certification that the project was designed to keep any rise in 100-year flood levels as close to zero as practically possible and that no structures would be impacted by a potential rise. Additionally, routine maintenance of any project would be necessary to sustain conveyance over time and the community should commit to a long-term maintenance program in their acceptance of the project. FEMA also recommends a condition be placed on the projects emphasizing the dynamics of a river and, if the community deems necessary, further analysis be required.

We believe this is preferable to trying to specify in the ordinance language all the different types of "development" that need not comply with the "no rise" standard. Typically, any rise caused would require some offsetting action such as compensatory storage, channel alteration, or removal of existing encroachment. One of these alternatives would be appropriate to compensate for any rise and still preserve the integrity of the floodplain standards.

FEMA Region 10 feels this policy is in keeping with the concept of wise floodplain management which means enjoying the benefits of floodplain lands and waters while still minimizing the loss of life and damage from flooding and at the same time preserving and restoring the natural resources of floodplains as much as possible. If you have any questions regarding this policy, please contact the Mitigation Division at (425) 487-4737.

[www.fema.gov](http://www.fema.gov)