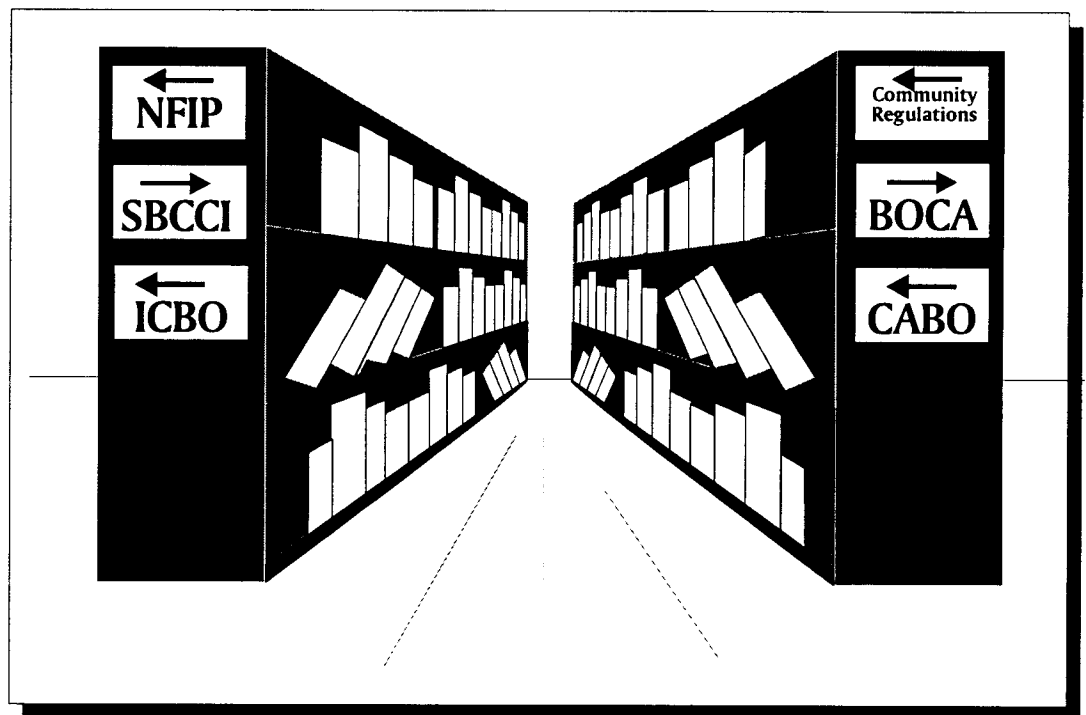


CHAPTER II

REGULATORY FRAMEWORK



Featuring:

National Flood Insurance Program (NFIP)

Community Regulations and the Permitting Process

Model Building Codes

Code Compatibility with the NFIP

REGULATORY FRAMEWORK

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

- Flood Hazard Information
- Floodplain Management Regulations
- Insurance Program
- NFIP Flood-Prone Building Performance Standards

COMMUNITY REGULATIONS AND THE PERMITTING PROCESS

MODEL BUILDING CODES

- Building Officials and Code Administrators (BOCA)
- Southern Building Code Congress International (SBCCI)
- International Council of Building Code Officials (ICBO)
- Council of American Building Officials (CABO)
- National Fire Protection Association (NFPA)

CODE COMPATIBILITY WITH THE NFIP

Chapter II: Regulatory Framework

Table of Contents

Proficiency Check.....	II - 1
Proficiency Check Answers.....	II - 4
Regulatory Framework	II - 7
National Flood Insurance Program (NFIP).....	II - 8
Flood Hazard Information	II - 13
Riverine Floodplains.....	II - 13
Coastal Floodplains	II - 17
Zone Definitions	II - 23
Floodplain Management Regulations	II - 27
Insurance Program	II - 35
NFIP Flood-Prone Building Performance Standards	II - 39
Community Regulations and The Permitting Process	II - 43
Model Building Codes	II - 47
Code Compatibility With the NFIP	II - 49
Summary Questions.....	II - 53
Summary Question Answers	II - 54

7. Into what two main categories are residential buildings classified for flood insurance rating purposes? How do these differ?

8. List the three most widely accepted model building codes and the regions where they are most commonly used.

PROFICIENCY CHECK ANSWERS

Your answers should include most of the following information.

1. In 1968, Congress passed the National Flood Insurance Act to correct some of the shortcomings of the traditional flood control and flood relief programs. The Act created the NFIP to:
 - Guide future development away from flood hazard areas;
 - Require that new and substantially improved buildings be constructed to resist flood damage;
 - Provide floodplain residents and owners with financial assistance after floods, especially after smaller floods that do not warrant federal disaster aid; and
 - Transfer some of the costs of flood losses from the taxpayers to floodplain property owners through flood insurance premiums.
2. An FIS presents flood elevation of varying intensity, including the base (100-year) flood, areas inundated by the various magnitudes of flooding, and floodway boundaries. This information is presented on the Flood Insurance Rate Map (FIRM), the Flood Boundary and Floodway Map (FBFM), and the FIS report. The FIS report describes in detail how the flood hazard information was developed for each community.
3. Information included in the Coastal FIS which is not usually covered by a Riverine FIS includes the following coastal flooding hazards:
 - storm surge stillwater elevations for the 10-, 50-, 100- and 500- year floods from tropical storms (hurricanes and typhoons), extra-tropical storms (northeasters), tsunamis, or a combination

- wave analysis including an estimate of the expected beach and dune erosion during the 100-year flood and the increased flood hazards from wave heights and wave runup, which are increases from wave heights and runup added to the stillwater elevations to yield the base flood elevation.
4. Communities that implement floodplain management aspects of the NFIP must, at a minimum, regulate development in their floodplains in accordance with the NFIP criteria and state regulations.
 5. Before any permit to develop land in a Special Flood Hazard Area is issued, the community must ensure that two basic criteria are met:
 - all new buildings and substantial improvements to existing buildings will be protected from damage by the base flood, and
 - new floodplain development will not aggravate existing flood problems or increase damage to other properties.
 6. Private companies as well as the federal government provide NFIP flood insurance to all communities that choose to participate, and everyone in a participating community can receive coverage. It provides financial relief for all floods regardless of size as long as a general condition of flooding exists.
 7. Residential buildings are considered either pre-FIRM or post-FIRM structures. For floodplain management purposes, pre-FIRM is defined as a building for which the start of construction occurred before the effective date of the community's NFIP-compliant floodplain management ordinance.
 8.
 - National Building Code: developed by the Building Officials and Code Administrators (BOCA), generally adopted by eastern and midwestern states.

Chapter II: Regulatory Framework

- Standard Building Code: developed by the Southern Building Code Congress International (SBCCI), generally adopted by southern states
- Uniform Building Code: developed by the International Council of Building Officials (ICBO), generally adopted by western states

If your answers included all or most of the above points, turn to the end of this chapter and answer the Summary Questions.

If your answers did not include these points, it would be advisable for you to complete the programmed instruction for this chapter which begins on the following page.

REGULATORY FRAMEWORK

Most retrofitting projects are regulated by local floodplain, zoning, and building code ordinances. In addition to governing the extent and type of activities allowable in the regulatory floodplain, these codes set construction standards that must be met both by new construction and by substantial improvement and repair of damaged buildings. The portions of these ordinances dealing with retrofitting are generally derived from guidance issued by FEMA under the NFIP and the U.S. Army Corps of Engineers (USACE).

This chapter discusses the typical community floodplain management and building code environment, including:

- the role of local officials in a retrofitting project,
- the various tenets of the NFIP, and
- the compatibility of items covered in model building codes with the NFIP.

Because each jurisdiction may adopt standards that are more restrictive than the minimum NFIP requirements, this section will examine only the minimum federal regulations governing construction in a Special Flood Hazard Area. Local building codes and construction standards vary widely across the country.



In individual communities, local regulations are the mechanism by which NFIP requirements are enforced. The reader is encouraged to contact local floodplain management and building code officials to determine if more restrictive requirements are in place.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

The creation of the National Flood Insurance Program was a major step in the evolution of floodplain management. During the 1960s, Congress became concerned with problems related to the traditional methods of dealing with flood damage. It concluded:

- Flood protection structures are expensive and cannot protect everyone.
- People are still building in floodplains and therefore are risking disaster.
- Disaster relief is inadequate and expensive.
- The private insurance industry cannot sell affordable flood insurance because only those at significant risk will buy it.
- Federal flood control programs are funded by all taxpayers, but they primarily help only those who live in the floodplains.

In 1968, Congress passed the National Flood Insurance Act to correct some of the shortcomings of the traditional flood control and flood relief programs. The Act created the National Flood Insurance Program (NFIP) to:

- Guide future development away from flood hazard areas;
- Require that new and substantially improved buildings be constructed to resist flood damage;
- Provide floodplain residents and owners with financial assistance after floods, especially after smaller floods that do not warrant federal disaster aid; and
- Transfer some of the costs of flood losses from the taxpayers to floodplain property owners through flood insurance premiums.

National Flood Insurance Program (NFIP)

Congress originally charged the Department of Housing and Urban Development's (HUD's) Federal Insurance Administration (FIA) with responsibility for the program. In 1979, the FIA and the NFIP were transferred to the newly created Federal Emergency Management Agency (FEMA).

Currently, the floodplain management aspects of the program are administered by the Mitigation Directorate and the insurance aspects are administered by the Federal Insurance Administration, both parts of FEMA.

QUESTION II-1

Identify the goals of the 1968 National Flood Insurance Act.

1. To provide floodplain residents and owners with financial assistance after floods, especially after smaller floods that do not warrant federal disaster aid
2. To require that new and substantially improved buildings be constructed to resist flood damage
3. To transfer some of the costs of flood losses from the flood victims to the highest income bracket through luxury taxes
4. To transfer some of the costs of flood losses from the taxpayers to floodplain property owners through flood insurance premiums
5. To protect every American and every American's home from flood damage
6. To guide future development away from flood hazard areas

ANSWER II-1

The following answers are correct: 1, 2, 4, and 6.

1. To provide floodplain residents and owners with financial assistance after floods, especially after smaller floods that do not warrant federal disaster aid

2. To require that new and substantially improved buildings be constructed to resist flood damage

4. To transfer some of the costs of flood losses from the taxpayers to floodplain property owners through flood insurance premiums

6. To guide future development away from flood hazard areas

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

FLOOD HAZARD INFORMATION

Communities that participate in the NFIP's Regular Program typically have a detailed Flood Insurance Study (FIS), which presents flood elevations of varying intensity, including the base (100-year) flood, areas inundated by the various magnitudes of flooding, and floodway boundaries. This information is presented on a Flood Insurance Rate Map (FIRM) and on a Flood Boundary and Floodway Map (FBFM).



FEMA has developed an independent study course on how to use a Flood Insurance Study (FIS). Contact your local FEMA regional office (telephone number listed in Appendix C) for further information.

RIVERINE FLOODPLAINS

The FIS report for riverine floodplains describes in detail how the flood hazard information—including floodways, discharges, velocities, and flood profiles for major riverine areas—was developed for each community

The area of the 100-year riverine floodplain is often divided into a floodway and a floodway fringe. The floodway is the channel of a watercourse plus any adjacent floodplain areas that must be kept free of encroachment so that the cumulative effect of the proposed encroachment, when combined with all other existing or proposed encroachments, will not increase the 100-year flood elevation more than one foot at any point within the community.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than one foot at any point. Many states and communities limit the increase to less than one foot.

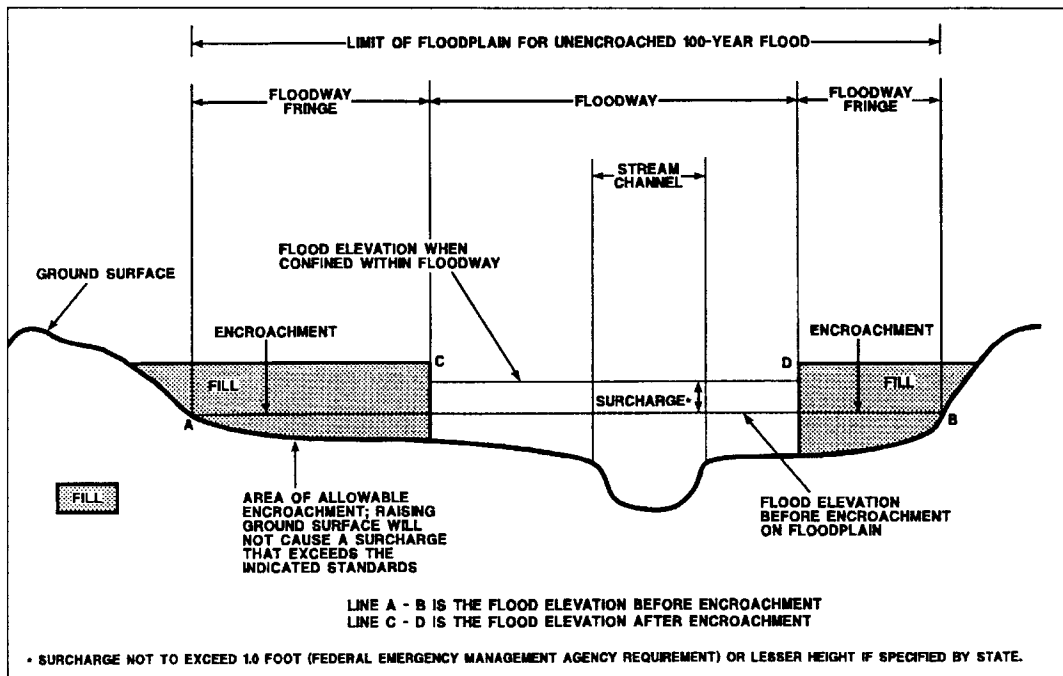


Figure II-1: Typical Floodplain Cross Section

Discharges are determined for various locations and flood frequencies along the stream and are presented in a summary table in the FIS report, as shown in Table II-1. Flood profiles depict various flood frequency and channel bottom elevations along each studied stream. Figure II-2 illustrates a flood profile included in a typical FIS. For most streams with significant flood hazards, the FIS for riverine floodplains normally contains discharges and water-surface elevations for the 10-, 50-, 100-, and 500-year floods, which have annual exceedence probabilities of 10%, 2%, 1%, and 0.2%, respectively.

Table II-1 **Typical Summary of Discharges Table**

<u>Flooding Source and Location</u>	<u>Drainage Area (Sq. Mi.)</u>	<u>Peak Discharges (CFS)</u>			
		<u>10-Yr</u>	<u>50-Yr</u>	<u>100-Yr</u>	<u>500-Yr</u>
Overpeck Creek					
• Upstream of the confluence of Flat Rock Brook	8.1	910	1,310	1,490	1,960
• Upstream of the confluence of Tributary to Overpeck Creek	5.7	760	1,090	1,200	1,600
• Upstream of the confluence of Metzlers Creek	3.0	530	750	830	1,100
Tributary to Overpeck Creek					
• At its confluence with Overpeck Creek	1.0	275	445	545	810
Metzlers Creek					
• At its confluence with Overpeck Creek	2.4	453	625	704	995
Flat Rock Brook					
• At its confluence with Overpeck Creek	2.5	665	1,075	1,315	1,980

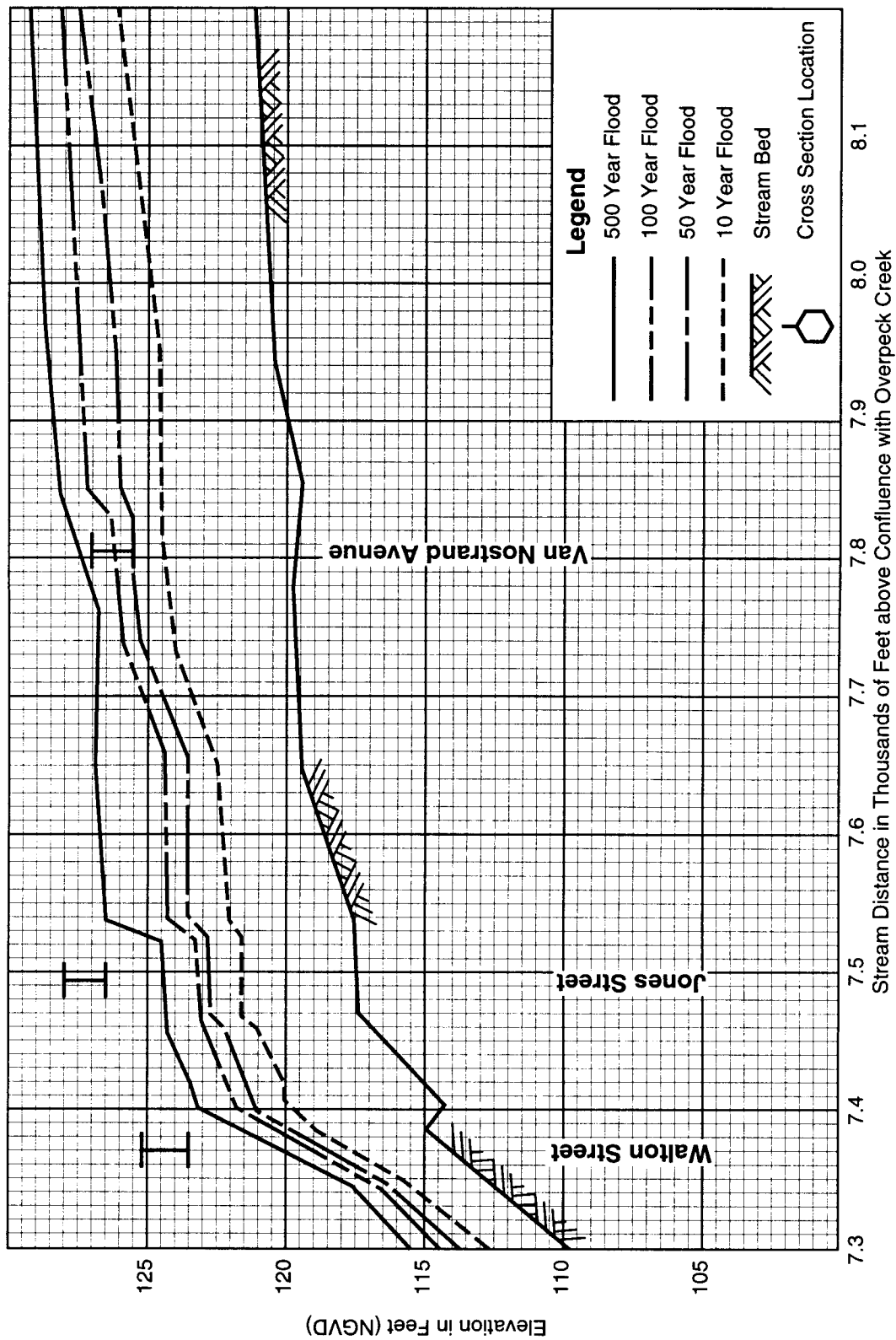


Figure II-2: Typical Flood Profile for Riverine Floodplains

COASTAL FLOODPLAINS

In coastal communities that contain both riverine and coastal floodplains, the FIS may contain information on both coastal and riverine hazards. These analyses include the determination of the storm surge stillwater elevations for the 10-, 50-, 100-, and 500-year floods as shown in Table II-2.

<u>Flooding Source and Location</u>	<u>Elevation (feet) Above NGVD</u>			
	<u>10-Yr</u>	<u>50-Yr</u>	<u>100-Yr</u>	<u>500-Yr</u>
ATLANTIC OCEAN				
Entire shoreline within Floodport	8.2	8.9	9.2	9.8
MERRIMACK RIVER				
Entire shoreline within Floodport	5.9	7.2	8.2	8.9



This course does not cover design issues in coastal high hazard areas (V Zones).

These stillwater elevations represent the potential flood elevations from tropical storms (hurricanes and typhoons), extra-tropical storms (northeasters), tsunamis, or a combination of any of these events. The FIS wave analysis includes an estimate of the expected beach and dune erosion during the 100-year flood and the increased flood hazards from wave heights and wave runup.

The increases from wave heights and runup are added to the stillwater elevations to yield the regulatory base flood elevation. Figure II-3 illustrates the typical wave height transect showing the effects of physical features on the wave heights and corresponding base flood elevation.

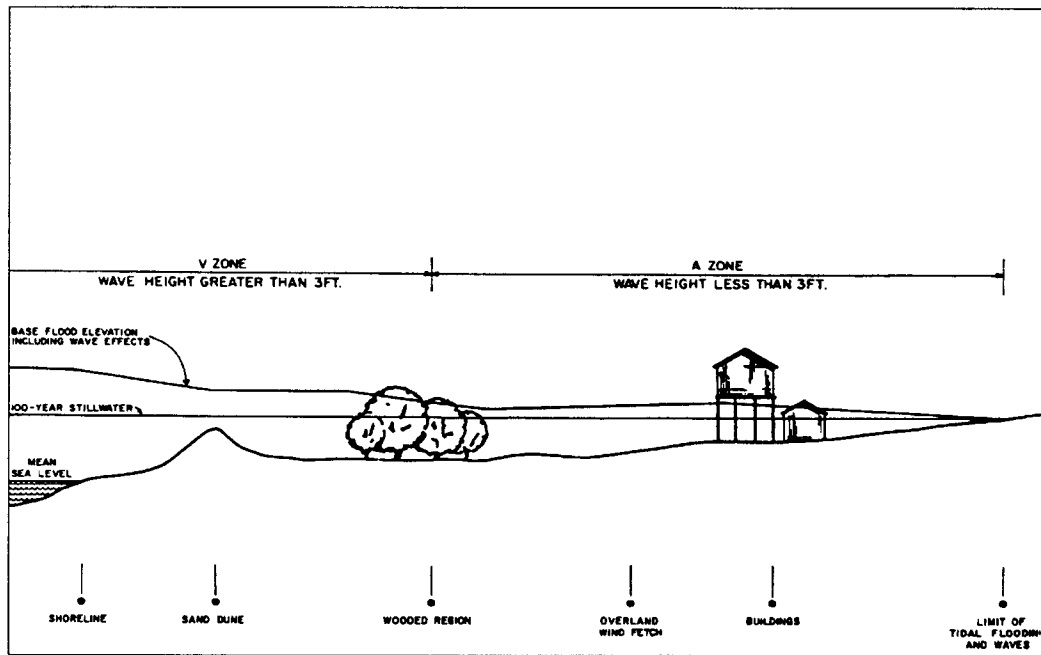


Figure II-3: Typical Wave Height Transect

A FIRM generally shows areas inundated during a 100-year flood as either A Zones or V Zones. An example of a FIRM for riverine flooding is shown in Figure II-4, while a FIRM for coastal flooding is shown in Figure II-5. Retrofitting designers may use data from these FIS materials to determine flood depth, flood elevation and flood frequency.

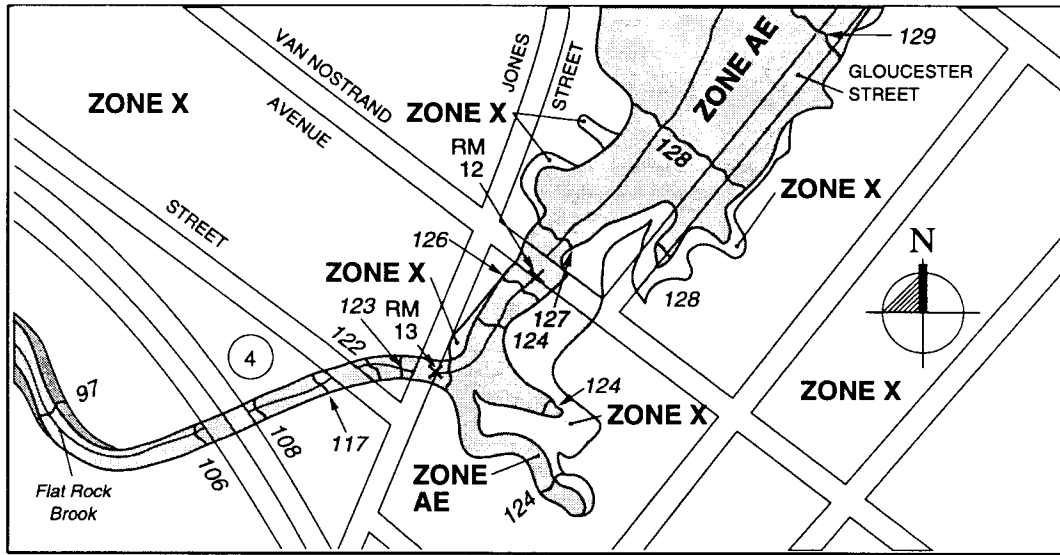


Figure II-4: Typical FIRM for Riverine Flooding

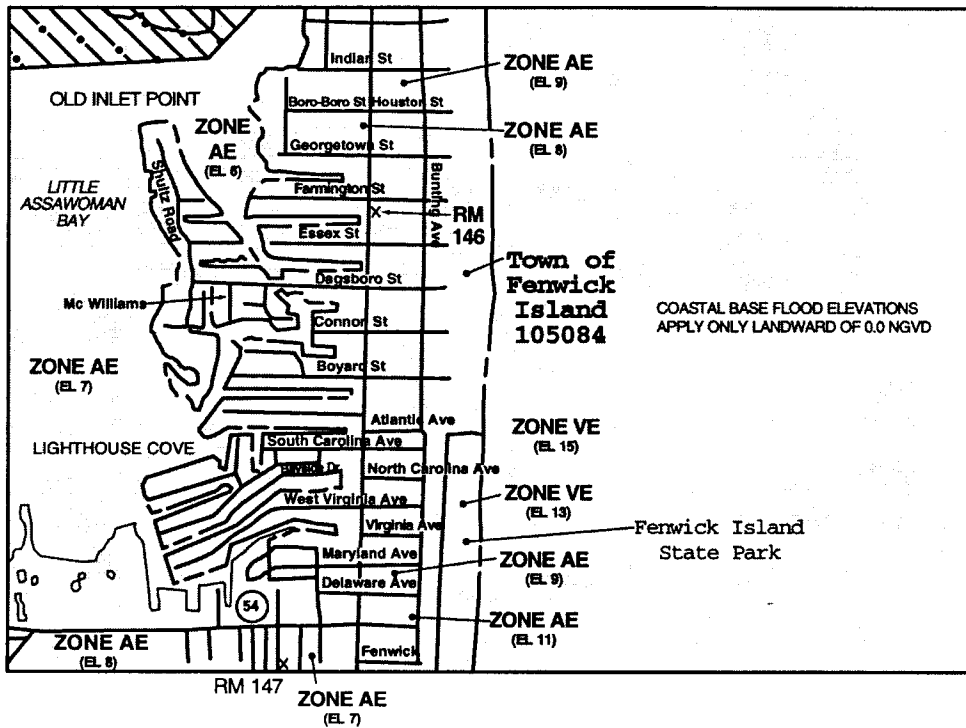


Figure II-5: Typical FIRM for Coastal Flooding

QUESTION II-2

1. Identify which of the following statements are true for riverine floodplains.
 - a. A floodway is the channel of a watercourse as well as any adjacent floodplain areas that must be kept free of encroachment.
 - b. As long as the cumulative effect of encroachment does not increase by more than two inches every five years, the 100-year flood elevation can be increased by up to three feet.
 - c. The floodway fringe is the area around a floodplain that states and communities cannot legally regulate.

2. Identify which items are found in a Coastal FIS, including the accompanying FIRM.
 - a. flood frequency
 - b. potential flood elevations from tropical storms
 - c. flood velocity
 - d. flood depth
 - e. potential flood elevations from tsunamis
 - f. areas inundated during a 100-year flood which are generally shown as either A Zones or V Zones
 - g. potential flood elevations from extra-tropical storms
 - h. wave height and wave runup estimates
 - i. stillwater elevations

ANSWER II-2

1. The following answers are true:
 - a. True

2. All of these items can be found on a Coastal FIS or an accompanying FIRM.

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

Zone Definitions



FEMA is in the process of converting from use of the National Geodetic Vertical Datum (NGVD) to the North American Vertical Datum (NAVD). Both datum references will be in use until the transition is completed.

A Zones: Special Flood Hazard Areas (SFHA) (except coastal V Zones) shown on a community's FIRM. There are five types of A Zones:

A: SFHA where no base flood elevation is provided.

A#: Numbered A Zones (e.g., A7 or A14), SFHA where the FIRM shows a base flood elevation in relation to National Geodetic Vertical Datum (NGVD) or North American Vertical Datum (NAVD).

AE: SFHA where base flood elevations are provided. AE Zone delineations are used on new FIRMS instead of A# Zones.

AO: SFHA with sheet flow, ponding, or shallow flooding. Base flood depths (feet above grade) are provided.

AH: Shallow flooding SFHA. Base flood elevations in relation to NGVD or NAVD are provided.

AR: Areas of special flood hazard that result from the certification of a previously accredited flood protection system that is determined to be in the process of being restored to provide a 100-year or greater level of flood protection.

B Zones: Areas of moderate flood hazard, usually depicted on FIRMs as between the limits of the base and 500-year floods. B Zones are also used to designate base floodplains of little hazard, such as those with average depths of less than one foot.

C Zones: Areas of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. B and C Zones may have flooding that does not

meet the criteria to be mapped as a Special Flood Hazard Area, especially ponding and local drainage problems.

D Zones: Areas of undetermined but possible flood hazard.

V Zones: Special Flood Hazard Areas subject to coastal high hazard flooding. There are three types of V Zones, which correspond to the A Zone designations:

V: SFHA where no base flood elevation is provided.

V#: (Numbered V Zones; e.g., V7 or V14) SFHA where the FIRM shows a base flood elevation in relation to NGVD or NAVD.

VE: SFHA where base flood elevations are provided. VE Zone delineations are now used on new FIRMS instead of V# Zones.

X Zones: Appear on newer FIRMs and incorporate areas previously shown as B and C Zones.

QUESTION II-3

Match the zones with each one's description.

- | | |
|-------------|---|
| 1. AH Zones | a. Special Flood Hazard Areas subject to coastal high hazard flooding. |
| 2. D Zones | b. Special Flood Hazard Areas (except coastal V Zones) shown on a community's FIRM. |
| 3. V Zones | c. SFHA where no Base Flood Elevation is provided. |
| 4. X Zones | d. Areas of moderate flood hazard, usually depicted on FIRMs as between the limits of the base and 500-year floods. |
| 5. A Zones | e. SFHA with sheet flow, ponding, or shallow flooding. Base flood depths (feet above grade) are provided. |
| 6. AO Zone | f. Appear on newer FIRMs and incorporate areas previously shown as B and C Zones. |
| 7. B Zones | g. Shallow flooding SFHA. Base Flood Elevations in relation to NGVD or NAVD are provided. |
| | h. Areas of undetermined but possible flood hazard. |

ANSWER II-3

1. g

2. h

3. a

4. f

5. b

6. e

7. d

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

FLOODPLAIN MANAGEMENT REGULATIONS

The floodplain management aspects of the NFIP are implemented by communities. A “community” is a governmental body with the statutory authority to enact and enforce and development regulations. The authority of each unit of government varies by state. Eligible communities can include cities, villages, towns, townships, counties, parishes, states, and Indian tribes. In 1994, more than 18,350 communities participated in the NFIP.

To participate in the NFIP, communities must, at a minimum, regulate development in their floodplains in accordance with the NFIP criteria and state regulations. To do this, communities must require a permit before any development proceeds in the regulatory floodplain. Before the permit is issued, the community must ensure that two basic criteria are met:

- All new buildings and substantial improvements to existing buildings will be protected from damage by the base flood, and
- New floodplain development will not aggravate existing flood problems or increase damage to other properties.

QUESTION II-4

1. Floodplain management aspects of the NFIP are implemented by
 - a. The federal government
 - b. Insurance companies
 - c. Communities
 - d. b & c

2. The communities participating in the NFIP must regulate development in floodplains in accordance with any state regulations and the minimum criteria of the
 - a. NFIP
 - b. FIRM
 - c. NGVD

3. To fulfill the criteria, development cannot start without a permit which in turn cannot be issued without ensuring that new and/or substantially improved buildings will be
 - a. Protected from damage from the 100-year-flood
 - b. Follow pre-FIRM regulations
 - c. Protected from damage from the Base Flood

ANSWER II-4

1. c. Communities
2. a. NFIP
3. c. Protected from damage from the Base Flood

Several definitions are needed to guide the designer through floodplain management regulations. The NFIP definition of key terms is provided below:

Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

Basement: Any area of the structure having its floor subgrade (below ground level) on all sides.

Lowest Floor: The lowest floor of the lowest enclosed area (including basement). An unfinished or flood-resistant enclosure, usable solely for parking, building access, or storage in an area other than a basement area is not considered a building's lowest floor, provided that such enclosure is not built so as to render the structure in violation of the applicable non-elevation design requirement of 44 Code of Federal Regulations (CFR) Ch. 1 (60.3).

Enclosed Area Below BFE: An unfinished or flood resistant enclosure, usable solely for parking, building access, or storage in an area other than a basement which has an elevation below the BFE.

Substantial Damage: Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the 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 value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the

actual repair work performed. The term does not, however, include either:

1. any project to correct existing violations of state or local health, sanitary, or safety code specifications which have been previously identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions, or
2. any alteration of an “historic structure,” provided that the alteration will not preclude the structure’s continued designation as an “historic structure.”



The definition of pre-FIRM and post-FIRM are different for insurance and floodplain management purposes.

Pre FIRM: Pre-FIRM building (for floodplain management purposes) is a building for which the start of construction occurred before the effective date of the community’s NFIP-compliant floodplain management ordinance.

Post-FIRM: A post-FIRM building (for floodplain management purposes) is a building for which the start of construction post-dates the effective date of the community’s NFIP-compliant floodplain management ordinance.

Under NFIP criteria, all new (post-FIRM) and substantially damaged/substantially improved construction of residential structures located within zones A1 - A30, AE and AH must have the lowest floor at or above the BFE. Therefore, elevation and relocation are the retrofitting alternatives that enable a post-FIRM or substantially damaged/substantially improved structure to be brought into compliance with the NFIP.

Utilizing the aforementioned definitions and local codes, the designer can begin to determine which retrofitting measures are allowable for each specific retrofitting project.

QUESTION II-5

Indicate which one among the following definitions is correct. For the other statements, underline the section of the definition which is incorrect.

1. Lowest Floor: The lowest floor of the lowest enclosed area, such as a basement, including crawl spaces for building access.
2. Post-FIRM: A post-FIRM building (for floodplain management purposes) is a building for which the start of construction postdates the effective date of the community's NFIP compliant floodplain management ordinance.
3. Structure: For floodplain management purposes, a walled and roofed building, including a gas or liquid storage tank, principally above ground. However, the foundation of the structure must be at least three feet under ground.
4. Substantial Damage: Flood damage sustained by a structure whereby the cost of restoring the structure in accordance with post-FIRM regulations would equal or exceed 50 percent of the structure's value before the damage occurred.
5. Enclosed Area Below BFE: An unfinished and non-flood-resistant enclosure used for parking vehicles, building access or storage in an area which is below the BFE.

ANSWER II-5

Only number 2, the Post-FIRM definition is correct.

Lowest Floor: The Lowest Level does not include crawl spaces for building access as long as it has proper openings to allow for the automatic entry of floodwater.

Structure: The foundation of the structure does not have to be "three feet under ground." Manufactured homes qualify as structures as long as the other criteria are met.

Substantial Damage: The damage may be of any origin, not just flooding, and the restoring of the structure is based on pre-damaged condition, not post-FIRM regulations.

Enclosed Area Below BFE: It must be an unfinished, flood-resistant enclosure, usable for parking vehicles, building access, and storage.

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

INSURANCE PROGRAM

Federally-backed flood insurance is made available in those communities that agree to implement NFIP-compliant floodplain management programs that regulate future floodplain development. Communities apply to participate in order to make flood insurance and certain forms of federal disaster assistance available in their community.

Everyone in a participating community can purchase flood insurance coverage, even for properties not located in mapped floodplains. Insurance provides relief for all floods, including those that are not big enough to warrant federal disaster aid as long as a general condition of flooding exists.

The federal government has agreed to make flood insurance available only in communities that adopt and enforce floodplain regulations that meet or exceed NFIP criteria. Because the communities will ensure that future development will be resistant to flood damage, the federal government is willing to support insurance and help make it affordable.

The Flood Disaster Protection Act of 1973 expanded the program to require flood insurance coverage as a condition of federal aid or loans from federally-insured banks and savings and loans for buildings located in identified flood hazard areas. Most communities joined the NFIP after 1973 in order to make this assistance available for their flood-prone properties.

NFIP flood insurance is available through many private flood insurance companies and independent agents, as well as directly from the federal government. All companies offer identical coverage and rates as prescribed by the NFIP.

Pre-FIRM Versus Post-FIRM (Insurance Purposes)



Please refer to Appendix A—*The National Flood Insurance Program*— for general information and an example of the costs of insurance coverage for structures subject to various flooding scenarios.

For flood insurance rating purposes, residential buildings are classified as being either pre-FIRM or post-FIRM.

Pre-FIRM construction is defined as construction or substantial improvement begun on or before December 31, 1974, or before the effective date of the community's initial FIRM, whichever is later.

Post-FIRM construction includes construction or substantial improvement that began after December 31, 1974, or on or after the effective date of the community's initial FIRM, whichever is later.

Insurance rates for pre-FIRM buildings are set on a subsidized basis; while insurance rates for post-FIRM structures are set actuarially on the basis of designated flood hazard zones on the community's FIRMs and the elevation of the lowest floor of the building or structure in relation to the BFE. This rate structure provides owners an incentive to elevate buildings in exchange for receiving the financial benefits of lower insurance rates. Subsequent to substantial improvements, a pre-FIRM building may retain its pre-FIRM rate or become a post-FIRM building for flood insurance rating purposes. Only elevation or relocation techniques may result in reduced flood insurance premiums or in eliminating the need for flood insurance.

QUESTION II-6

Indicate whether the following statements are true or false. Explain why false statements are false.

1. Federally-backed flood insurance is made available in those communities that agree to implement floodplain management programs that regulate future floodplain development in accordance with the NFIP regulations.
2. Everyone in a participating community can have flood insurance coverage except for those properties not located in mapped floodplains.
3. In response to the high costs associated with the 1968 National Flood Insurance Act, Congress enacted the Flood Disaster Protection Act of 1973.
4. More communities entered the NFIP after heavy flooding in 1972 and 1973 than had entered the program up to that point.
5. NFIP flood insurance is available only through certain private companies regulated by the federal government.

ANSWER II-6

1. True.
2. False. Properties not located in mapped floodplains are eligible as long as their community participates in the NFIP.
3. False. Congress enacted the Flood Disaster Protection Act of 1973 as a result of the low participation in the NFIP that became evident after the heavy flooding in 1972 and 1973.
4. True. (This was predominantly due to the Congressional Act discussed in the previous question.)
5. False. NFIP flood insurance is also available through the federal government itself.

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

NFIP FLOOD-PRONE BUILDING PERFORMANCE STANDARDS



Communities often adopt flood-plain regulations that exceed the NFIP minimum requirements.

The NFIP has established minimum criteria and design performance standards that communities participating in the NFIP must enforce for structures located in Special Flood Hazard Areas. These standards specify how a structure should be constructed in order to minimize or eliminate the potential for flood damage.

FEMA, the U.S. Army Corps of Engineers (USACE), the Tennessee Valley Authority (TVA), the Natural Resources Conservation Service (NRCS), and several states and local government entities have developed technical guidance manuals and information for public distribution to assist in the application of these requirements by the building community (i.e., building code and zoning officials, engineers, architects, builders, developers, and the general public). These publications, which are listed in Appendix C *Glossary of Resources*, contain guidelines specifying the use of certain techniques and materials for design and construction that meet the intent of the NFIP's general design criteria. These publications also contain information on the generally accepted practices for flood-resistant design and construction.

FEMA has also undertaken a multi-year effort to incorporate the NFIP flood-damage-resistant design standards into the nation's model building codes and standards, which are then adopted by either states or local communities. This effort has yielded a document titled *Code Compatibility Report*, which examines the compatibility of NFIP regulations, technical standards, and guidance with the model building codes/standards.

QUESTION II-7

The NFIP has established minimum criteria and design performance standards for structures located in the Special Flood Hazard Areas.

1. List at least four entities that have published technical guidance manuals and informational materials about these standards.
2. What information do the NFIP regulations cover?
3. What steps has FEMA taken to assure compatibility of the different publications?

ANSWER II-7

1.
 - FEMA
 - U.S. Army Corps of Engineers (USACE)
 - Tennessee Valley Authority (TVA)
 - Natural Resources Conservation Service (NRCS), and several state and local government entities

2. NFIP regulations cover how to construct a structure in order to minimize or eliminate the potential for flood damage.

3. FEMA has undertaken a multi-year effort to incorporate the NFIP flood damage-resistant design standards into the nation's model building codes and standards.

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

COMMUNITY REGULATIONS AND THE PERMITTING PROCESS



The floodway is the channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height.

Regulation of the use of floodplain lands is a responsibility of state and local governments, and in limited applications, the federal government (wetlands, navigable waterways, federal lands, etc.). It can be accomplished by a variety of procedures, such as establishment of designated floodways and encroachment lines, zoning ordinances, subdivision regulations, special use permits, floodplain ordinances and building codes. These land-use controls are intended to reduce or eliminate flood damage by guiding and regulating floodplain development.

As was explained in Chapter I, flood-prone communities that participate in the NFIP are required to adopt and enforce, at a minimum, NFIP-compliant floodplain regulations to qualify for many forms of federal disaster assistance and for the availability of flood insurance.

Many states and communities have more restrictive requirements than those established by the NFIP. In fact, state and community officials, using knowledge of local conditions and in the interest of safety, may set higher standards, the most common of which are listed below.

- Freeboard is the elevation difference between the flood protection elevation and the anticipated flood elevation. Freeboard requirements provide an extra measure of flood protection above the design flood elevation to account for waves, debris, hydraulic surge, or insufficient flooding data.
- Restrictive standards prohibit building in certain areas, such as the floodplain, conservation zones, and the floodway.
- The use of building materials and practices that have previously proven ineffective during flooding may be prohibited.

Before committing a significant investment of time and money in retrofitting, the design professional should contact the local building official or city engineer for building code and floodplain management requirements and information on obtaining necessary permits.

QUESTION II-8

1. Who is responsible for regulating the use of floodplain land?
2. Identify five ways in which floodplain land can be regulated.
3. What are the three most common areas where state and community officials set higher floodplain management requirements.

ANSWER II-8

1. The state and local governments and the federal government (for wetlands, navigable waterways, federal lands, and in other limited applications) are responsible for regulating the use of floodplain land.
2. Five ways in which to accomplish floodplain regulation include:
 - a. establishment of designated floodways and encroachment lines
 - b. zoning ordinances
 - c. subdivision regulations
 - d. special use permits
 - e. floodplain ordinances and building codes
3. The three areas where state and community officials set higher standards are:
 - a. Freeboard requirements
 - b. Restrictive requirements
 - c. Prohibiting certain building materials and practices

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

MODEL BUILDING CODES

Several model codes and standards have been developed over a period of years under the auspices of various organizations. The most widely accepted model codes are:

National Building Code: developed by the Building Officials and Code Administrators (BOCA), generally adopted by eastern and midwestern states;

Standard Building Code: developed by the Southern Building Code Congress International (SBCCI), generally adopted by southern states;


Uniform Building Code: developed by the International Council of Building Officials (ICBO), generally adopted by western states;

One- and Two-Family Dwelling Codes: developed by the Council of American Building Officials (CABO), used for residential structures in various parts of the country; and

NFPA Life Safety Codes: developed by the National Fire Protection Association (NFPA), used as a standard for fire protection in various parts of the country.

Documents for each of the above codes follow standardized formats for content and references. Most model code groups also maintain product material evaluation reports, which contain specific testing information on a variety of building products.

Table II-3 Model Code Groups	
National Codes (BOCA):	<ul style="list-style-type: none"> • BOCA National Building Code • BOCA National Fire Prevention Code • BOCA National Mechanical Code • BOCA National Plumbing Code • BOCA Property Maintenance Code
Standard Codes (SBCCI):	<ul style="list-style-type: none"> • Standard Building Code • Standard for Floodplain Management • Standard Mechanical Code • Standard Gas Code • Standard Plumbing Code • Standard Existing Building Code • Standard Housing Code • Standard Fire Prevention Code
Uniform Codes (ICBO):	<ul style="list-style-type: none"> • Uniform Building Code • Uniform Mechanical Code • International Plumbing Code • Uniform Fire Code • Uniform Housing Code
NFPA Standards:	<ul style="list-style-type: none"> • NFPA 101 - Life Safety Code • NFPA 70 - National Electrical Code • NFPA 54 - National Fuel Gas Code • NFPA 58 - Standard for the Storage and Handling of Liquefied Petroleum Gases
CABO One- and Two-Family Dwelling Code:	<ul style="list-style-type: none"> • CABO One- and Two- Family Dwelling Code



States and local governments often make their own amendments to the above codes.

Most communities have adopted model codes from one of these model code groups. Many of these codes have incorporated provisions of the NFIP floodplain management regulations pertaining to building standards.

FEMA is working closely with the model building code groups to ensure that NFIP requirements will be accessible, credible, and easier to use and enforce by the building community. This ongoing effort is aimed at placing as many of the NFIP floodplain management requirements as possible into the model building codes. For more information on the model building codes, contact the local building and permitting officials or refer to the model code groups.

CODE COMPATIBILITY WITH THE NFIP



Given the variation in standards between model building codes, it is very important that the designer contact a local building official to ascertain any building code and/or floodplain management requirements that would be unique to the specific retrofitting project or local jurisdiction.



Designers should consult FEMA's *Code Compatibility Report* to gain a thorough understanding of how differences in NFIP standards and other codes affect the model code in use in a given community. The designer is responsible for determining a feasible resolution to these differences; it is recommended that designers obtain concurrence from local officials.

Under contract to FEMA, in 1992 the National Institute of Building Sciences (NIBS) consulted on an examination of the compatibilities between the NFIP regulations and technical guidance to the model codes. A report of this study—FEMA's *Code Compatibility Report*—provided a basis for coordinating NFIP documents with the model codes. It also represents a starting point for the preparation of a consensus flood-resistant construction standard.

Table II-4 presents the general items that need to be reconciled between the model codes and NFIP requirements. Refer to the *Code Compatibility Report* for conflict resolution or the individual code documents for additional information.

Chapter II: Regulatory Framework

Table II-4 MODEL CODES/NFIP REQUIREMENTS: Items to be Reconciled					
ITEMS TO BE RECONCILED WITH THE NFIP	BOCO	SBCCI	ICBO	NFPA	CABO
Use of Registered Professionals	X		X		
Wind, Seismic & Snow Loads	X	X	X		X
Footing & Slab Design	X	X	X		
Standards for Use of Wood Materials	X	X	X		X
Geotechnical Reports and Requirements for Open Foundations	X	X	X		X
Corrosion Protection	X		X	X	
Hydrostatic and Hydrodynamic Load Considerations and Computations	X				
Occupancy in Basements Below the BFE	X	X	X		
Consistency of Criteria for Residential and Non-Residential Buildings		X			
Anchorage Requirements		X			
Exposed Ductwork		X			
Utility Clearances		X			
Standards for Sealants			X		
Standards for Breakaway Walls			X		
Design Tables Based on Materials			X		
Design Considerations for Floodwalls			X		
Protection of Electrical Systems Below the BFE				X	
Grounded and Labeled Power Outlets for Pumps and Motors				X	
Maintenance of Interior Finishes for Different Occupancies				X	
Complete Flood Design Criteria		X			X
Alternate Forms or Means of Construction					X
Site Preparation Requirements					X
Vapor Barrier Requirements					X
Walls, Floor & Roof Sheathing Design	X	X	X	X	X

X = Items not in agreement between model codes and NFIP.

QUESTION II-9

1. Write the name of the model building code that is most common in the region described.
 - a. _____ generally adopted by western states
 - b. _____ used as a standard for fire protection in various parts of the country
 - c. _____ generally adopted by southern states
 - d. _____ generally adopted by eastern and mid-western states
 - e. _____ used for residential structures in various parts of the country

2. What document can a designer consult to gain a thorough understanding of the differences between NFIP regulations and the model codes?

ANSWER II-9

1.
 - a. Uniform Building Code
 - b. NFPA Life Safety Codes
 - c. Standard Building Code
 - d. BOCA National Building Code
 - e. One- and Two-Family Dwelling Codes
2. The *Code Compatibility Report* done for FEMA by the National Institute of Building Sciences.

If you answered correctly, please move on to the next section. If you answered incorrectly, please review this section before moving on.

SUMMARY QUESTIONS

Congratulations! You have completed the text review of Chapter II, Regulatory Framework. All that remains to complete this segment of the Independent Study Course is to answer and check the Summary Questions that follow.

1. What sort of problems resulted from the floodplain management prior to the National Flood Insurance Act of 1968?
2. Differentiate between the main regions of the riverine floodplain. If you were a designer looking at a typical FIRM for riverine flooding, how might you expect the flood hazard areas to be categorized?
3. Would a neighborhood homeowners' association be considered a "community" for the NFIP's purposes? Why or why not?

Chapter II: Regulatory Framework

4. Note whether the items in the following list indicate structures that are pre-FIRM, only post-FIRM, both, or it depends. Explain why for any “it depends” responses. (The community's NFIP-compliant floodplain management ordinance became effective in 1976.)
 - a. An intact house built in 1964 with no major improvements.
 - b. A house built in 1964 which burned down in 1978 and was rebuilt.
 - c. A house built in 1964 with an added room finished in 1975.
 - d. Rates set on an actuarial basis.
 - e. An incentive to elevate buildings in exchange for lower insurance rates.
 - f. The ability to change the insurance rating for a given house.

5. How might a state establish requirements for construction which are more restrictive than the NFIP? Why might it choose to do so?

SUMMARY QUESTION ANSWERS

Your answers should contain the key points in the answers below.

1. The following are some of the reasons that motivated Congress to pass the 1968 National Flood Insurance Act:
 - high cost
 - limited protection
 - continued risk
 - inadequate relief
 - unaffordable or unavailable flood insurance
 - disproportionately high cost to unaffected taxpayers

2. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. The floodway fringe is the area between the floodway and 100-year floodplain boundaries. It encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1 foot at any point. The most common flood hazards areas on riverine FIRMs are A-Zones of which there are five subcategories.

A: SFHA where no base flood elevation is provided.

A#: Numbered A Zones (e.g., A7 or A14), SFHA where the FIRM shows a base flood elevation in relation to NGVD.

AE: SFHA where base flood elevations are provided. AE-Zone delineations are now used on new FIRMS instead of A# Zones.

AO: SFHA with sheet flow, ponding, or shallow flooding. Base flood depths (feet above grade) are provided.

AH: Shallow flooding SFHA. Base flood elevations in relation to NGVD are provided.

AR: A riverine flood control restoration area, where a flood protection system is temporarily no longer providing the 100-year flood protection it was designed to provide.

Other flood hazard areas are B Zones (moderate hazard), C Zones (minimal hazard), D Zones (undetermined hazard), V Zones (coastal high hazard), and X Zones (B and C Zones combined).

3. A neighborhood homeowners' association probably, although not necessarily, would not be considered a community in the sense required by the NFIP. Any governmental body with the statutory authority to enact and to enforce development regulations can be considered a community, and most homeowners' associations do not have that authority.
4.
 - a. Pre-FIRM
 - b. Post-FIRM
 - c. Pre-FIRM
 - d. Post-FIRM
 - e. Elevation is encouraged by Post-FIRM rates.
 - f. Pre-FIRM. A post-FIRM structure will always have a post-FIRM rate. A pre-FIRM rate will be altered to a post-FIRM rating at the request of the owner or if the structure is substantially improved or damaged.
5. Given the characteristics particular to certain regions, a state might determine that the requirements of the NFIP are not sufficient to guarantee a desired heightened level of protection for the structures. It can adopt any of several methods to try to ensure the safety of its residents. One is to restrict construction within areas which present a greater chance of injury,

Chapter II: Regulatory Framework

death, or damage. The state can also require that a certain height be added on top of the design flood elevation to minimize the risk of the floodwaters reaching the structure. Third, the state can issue requirements for building materials and practices so that any which have not worked well in the past will not be used again.