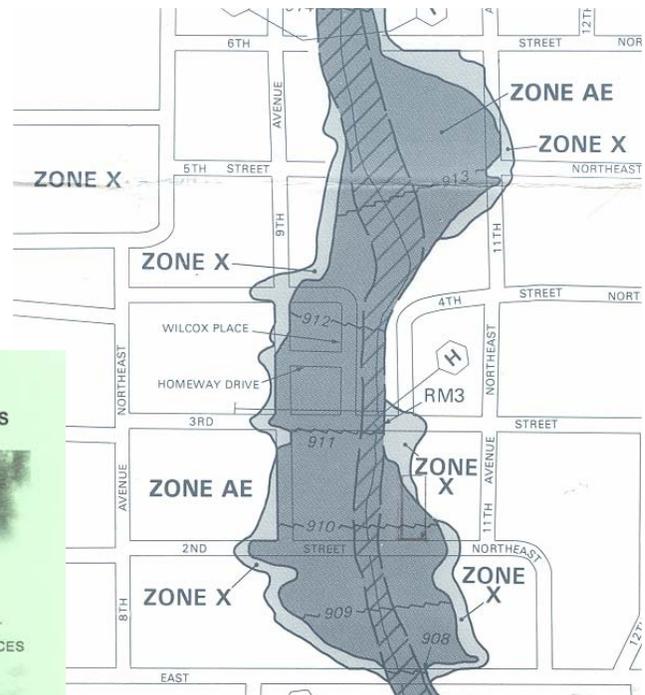
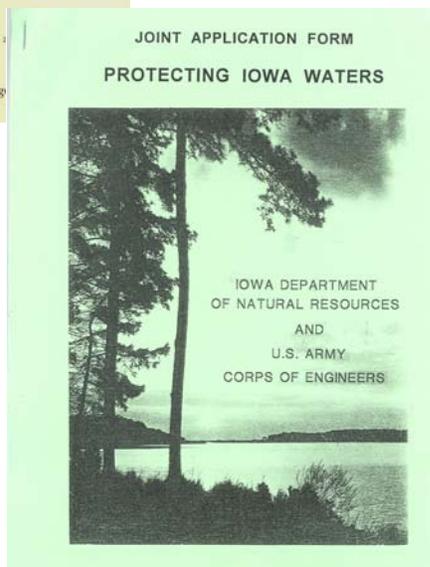
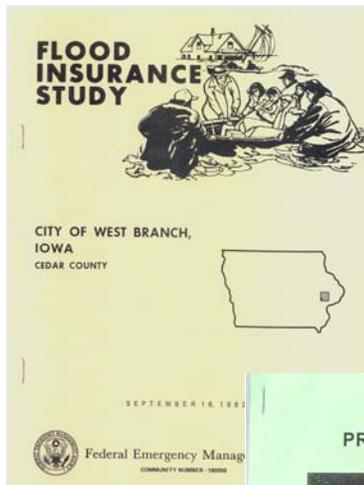


Floodplain Management Ready Reference



Iowa Department of Natural Resources



January 2008



Notes to the User

This *Ready Reference* is a companion to the *Floodplain Management Desk Reference*, which provides detailed information on administering a floodplain management ordinance at the community level. Both publications are available free from the Iowa Department of Natural Resources.

The section numbering is the same in both documents. If you want more information on a topic that you see in this *Ready Reference*, go to the first page of that section in the *Floodplain Management Desk Reference*. That first page is a table of contents for that section.

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Additional materials are provided in the *Floodplain Management Desk Reference* in Sections 20 – 29, such as disaster operations, references, and an index

Common acronyms: Here are some of the acronyms used most often in the two references.

DNR – The Iowa Department of Natural Resources

FEMA – The Federal Emergency Management Agency

FIRM – Flood Insurance Rate Map (see page 6)

LOMA – Letter of Map Amendment (see page 12)

NFIP – The National Flood Insurance Program (see page 4)

SFHA – Special Flood Hazard Area (see page 5)

Basic rules

There are five basic rules to administering a floodplain management program. They are detailed in this reference

Basic rule #1: You must use the latest maps and flood data published by FEMA. Section 8 reviews the requirements on using maps and data in an ordinance.

Basic rule #2: A permit is required for all development in the SFHA shown on your FIRM. Section 9 covers what needs a permit.

Basic rule #3: Development must not increase the flood hazard on other properties. Section 10 discusses how this is done using the floodway concept.

Basic rule #4: New buildings must be protected from damage by the base flood. Section 11 has the regulatory requirements for new buildings.

Basic rule #5: If the cost of improvements or the cost to repair the damage exceeds 50 percent of the market value of the building, it must be brought up to current floodplain management standards. Section 12 covers the rules for existing buildings.

For more information

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www.FEMA.gov



1. Flooding and People

Floodplains are part of a natural system. When there is too much water on the ground, there's a flood – that's natural.

Problems arise when people build in the path of the natural flooding process. To prevent or minimize new problems from occurring, we regulate what's built in the floodplain.

Building in floodplains exposes people to safety and health hazards

- Even slow moving floods can be life threatening
- Floodwaters destroy food and medicine.
- Flooding can shut down water and waste treatment facilities
- Flooding impacts people's mental health



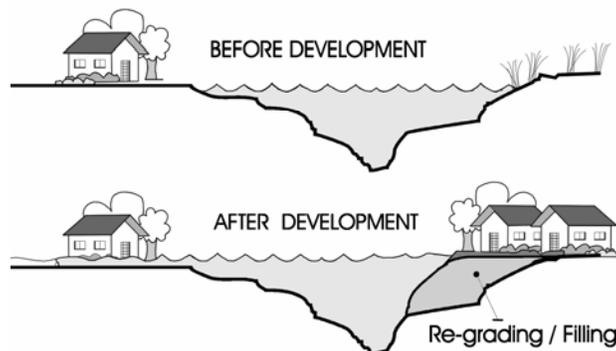
Building in floodplains exposes new development to flood damage

- Buildings can be damaged by debris, current and other moving hazards.
- Floors and walls can collapse from hydrostatic pressure
- Wallboard, insulation, wood and contents are destroyed just by being wet.



Building in floodplains increases flood problems for others

- Development anywhere in the watershed can increase the amount of stormwater runoff that goes to the rivers and streams, increasing flood heights.
- Fill and buildings in the floodplain can obstruct flood flows.
- Floodplain development reduces the amount of room available to store floodwaters, increasing flood heights.
- Floodplain development can destroy habitat and other natural floodplain functions.



2. The National Flood Insurance Program

The National Flood Insurance Program (NFIP) was created to:

- Transfer the costs of flood disaster assistance from the general taxpayers to floodplain property owners through flood insurance premiums.
- Provide floodplain residents and property owners with financial aid after floods, especially smaller floods that do not warrant federal disaster aid.
- Guide development away from flood hazard areas.

The NFIP is administered by the Federal Emergency Management Agency (FEMA). There are three basic parts to the NFIP.



FEMA

Mapping: FEMA prepares a Flood Insurance Rate Map (FIRM) for a community. Mapping is explained in more detail in Sections 3, 4, 5 and 6.

Insurance: If a city or county joins the NFIP, Federally-backed flood insurance is made available for all properties in that community. Flood insurance is covered in Section 19.



Regulations: In order to join the NFIP, a city or county has to agree to regulate future development in the floodplain shown on the FIRM. **The community has a legal obligation to the Federal government** to ensure that new buildings will be protected from the flood levels shown on the FIRM and that development will not make the flood hazard worse.

Currently there are 483 Iowa communities in the NFIP.

Sanctions

If your community fails to uphold its obligation to the NFIP, the following could happen:

- New buildings will be built subject to damage by the base flood.
- Insurance on an improperly constructed building may be very expensive.
- FEMA can put the community on probation and flood insurance premiums would go up for everyone.
- FEMA can suspend the community. This would mean an end to Federal financial aid for floodplain properties that require flood insurance, such as VA loans, EPA grants, housing subsidies, and disaster assistance.

3. How Flood Maps are Prepared

The 100-year flood

Floods come in many sizes — with varying degrees of magnitude and frequency. In order to have common standards, the NFIP and the State of Iowa adopted the same baseline flooding probability. The NFIP calls this standard **the base flood**. The State of Iowa calls it the **100-year flood**. These terms mean the same thing.

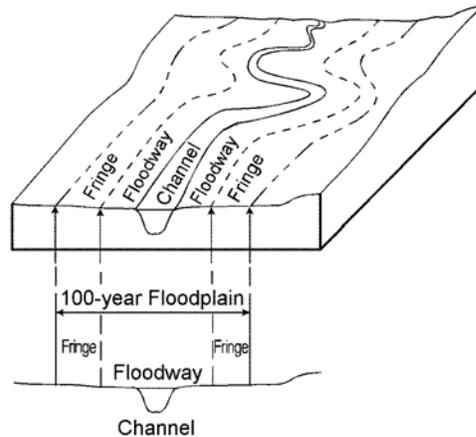
On FEMA maps, the **100-year floodplain** is called the A Zone or the Special Flood Hazard area. (**SFHA**).

The term 100-year flood is often misconstrued. Often, people interpret the 100-year flood definition to mean “once every 100-years.” This is wrong! It means that the odds are one in 100 (1% chance) that a flood that big will occur in any single year. A community could have a 100-year flood two times in the same year, two years in a row, or four times over the course of 100-years.

The other thing to keep in mind is that smaller floods occur in the floodplain more frequently. They just don’t cover as large an area.

Floodplain: floodway and fringe

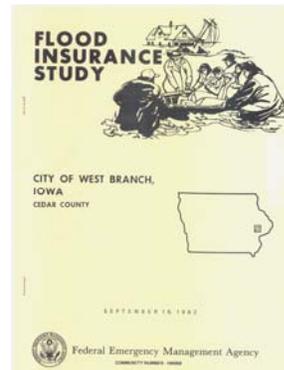
The 100-year floodplain or **Special Flood Hazard Area (SFHA)** is the area inundated by the 100-year flood. The **floodway** is the stream channel and that portion of the adjacent floodplain which must remain open to permit passage of the 100-year flood.



Floodwaters generally are deepest and swiftest in the floodway, and anything in this area is in the greatest danger during a flood. The remainder of the floodplain is called the floodway **fringe** where water may be shallower and slower.

Flood insurance study

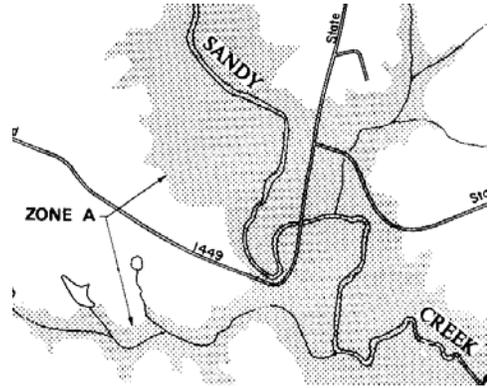
When a flood study is completed for the NFIP, the information and maps are assembled into a Flood Insurance Study, which includes a text, the Flood Insurance Rate Map (FIRM) and the Flood Boundary and Floodway Map (included in studies prepared before 1985). Since 1985, floodways have been shown on the FIRM.



4. NFIP Maps

Flood Hazard Boundary Map

Flood Hazard Boundary Maps (FHBMs) were initially prepared to provide flood maps to many communities in a short period of time. They were made in the 1970's and early 1980's without benefit of detailed studies. On the FHB, the Special Flood Hazard Area (SFHA) is designated as a shaded area labeled "**Zone A**," and no 100-year flood elevations are given.



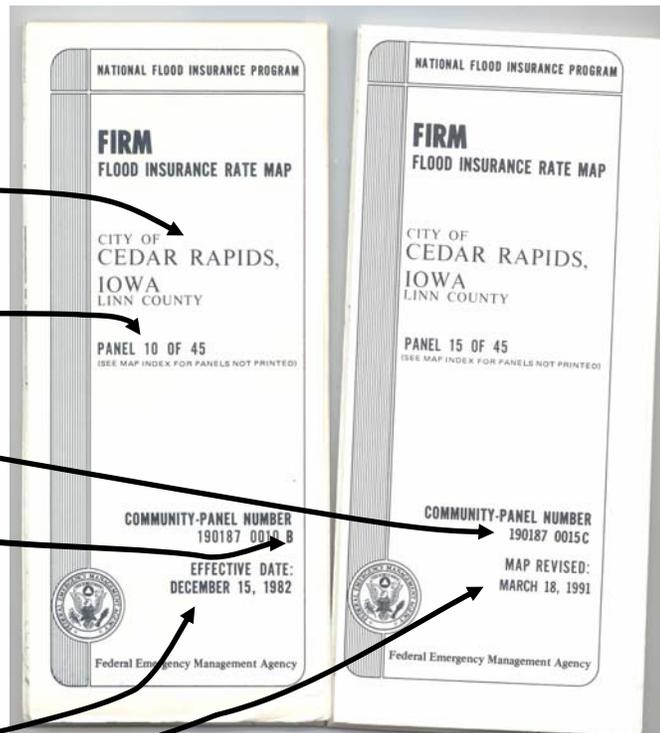
In some cases FEMA simply converted the FHB to a FIRM by issuing a letter to the community stating that the FHB shall be considered a FIRM. In those cases the community was instructed to line out "FHB" on the map's title box and write in "FIRM." In these situations, the Zone A is treated the same as an unnumbered A Zone on a FIRM.

Flood Insurance Rate Map (FIRM)

The **FIRM** is the official FEMA map for communities in the Regular Phase of the National Flood Insurance Program. Smaller cities can fit on one panel. Larger cities and counties will have several panels and a **Map Index**.

Each panel has a **title box** with important NFIP information. The title box is the lower right portion of the opened map for both the map index and the FIRM panels. In the title box are:

- the community's name
- the panel number (on the Map Index, all of the panel numbers are listed)
- the six-digit NFIP community identification number – "190187"
- map panel suffix – a letter, e.g., "B" or "C"
- map effective or map revision date – "December 15, 1992" for FIRM panel 10 and "March 18, 1991" for FIRM panel 15.



Flood Insurance Rate Map Features (old format)

Under the old format (before 1985), FEMA published a Flood Insurance Rate Map (FIRM) and a separate Flood Boundary and Floodway Map.

“Numbered” Zone A: Special Flood Hazard Area (SFHA or 100-year floodplain) – flood elevations are provided

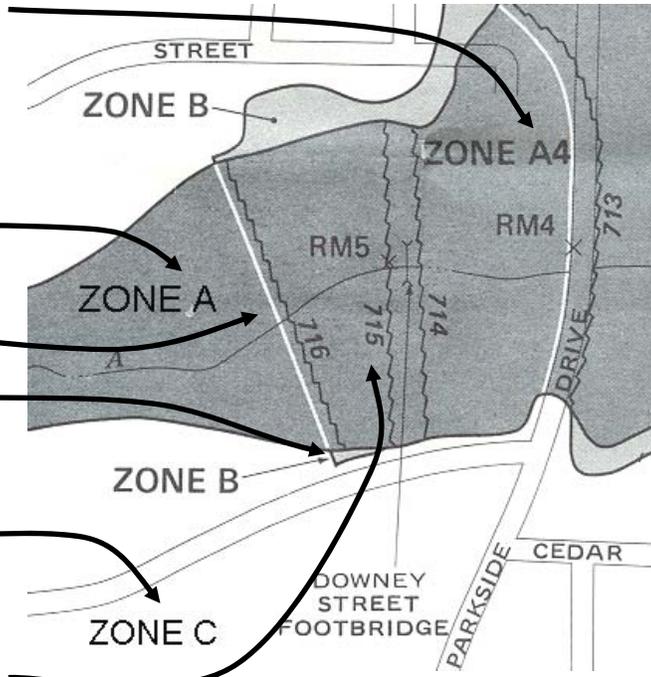
Zone A: SFHA, but no flood elevations provided

Zone break line: separates different A Zones

Zone B: 500-year floodplain

Zone C: outside the 500-year floodplain (but still may have flood or drainage problems)

100-year flood elevation (not a very accurate number to use. See the discussion on page 11)



Flood Boundary and Floodway Map Features

Stream channel

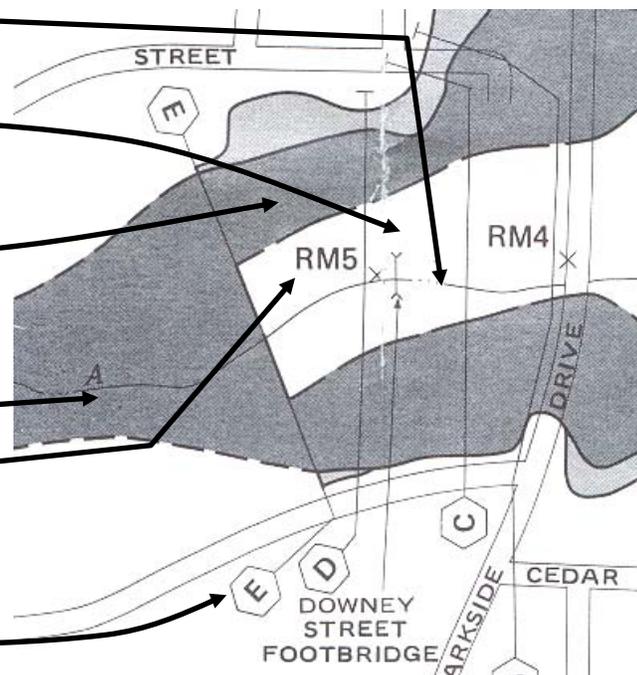
Floodway (white area on both sides of the channel)

Floodway fringe (that part of the floodplain that is not in the floodway)

Approximate mapped floodplain, floodway not determined

Elevation reference mark (bench mark that shows ground elevation)

Cross section (surveyed as part of the flood study)



Flood Insurance Rate Map Features (new format)

Since 1985, FEMA has published only one map that includes the floodway boundaries. Instead of calling the SFHAs with 100-year flood elevations “numbered” A Zones, the new format uses the term “AE” where the “E” stands for “elevation.” Instead of separate “B” and “C” Zones, all areas outside the SFHA are called “X” Zones.

Zone AE: Special Flood Hazard Area (SFHA or 100-year floodplain) – flood elevations are provided.

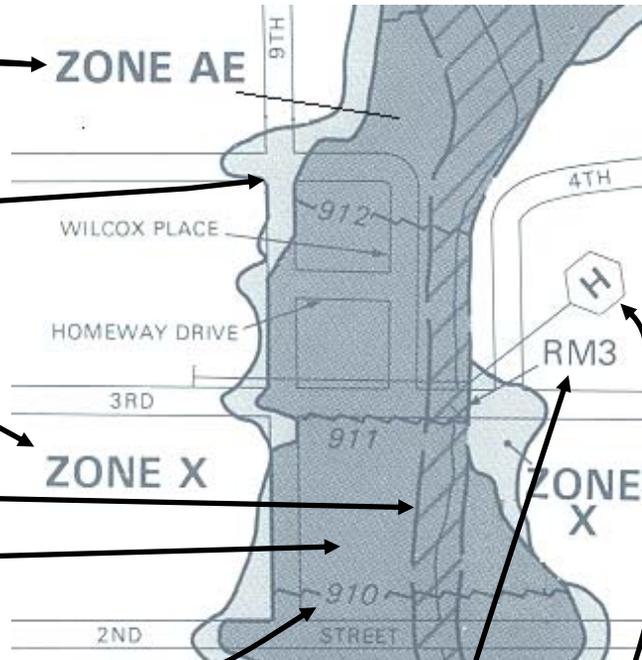
Shaded Zone X: 500-year floodplain

Unshaded Zone X: outside the 500-year floodplain (but still may have flood or drainage problems)

Floodway

Floodway fringe

100-year flood elevation (not a very accurate number to use. See the discussion on page 11)



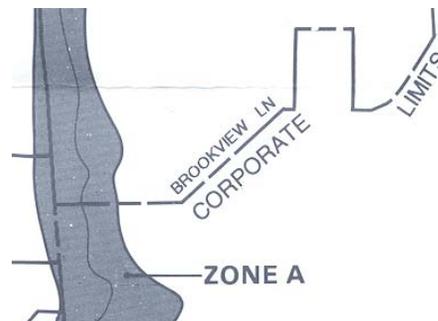
Elevation reference mark (bench mark that shows ground elevation)

Cross section (surveyed as part of the flood study)



FIRMs for **shallow flooding areas** use Zone “AO” for sheet flow or “AH” for ponding. AO Zones may show the depth of the 100-year flood (above ground level) while AH Zones show the elevation of the 100-year flood (above sea level).

The newest format for FIRMs is the **county-wide FIRM**. All floodplains in the county are shown, making it easier to deal with annexations and areas just outside a city. A county-wide FIRM has a 5 digit number – don’t confuse it with the six digit NFIP community number .



5. Using Maps and Data

Locating a site

To locate a site, follow these steps. Remember to check your north arrow. The top of the map is not always north.

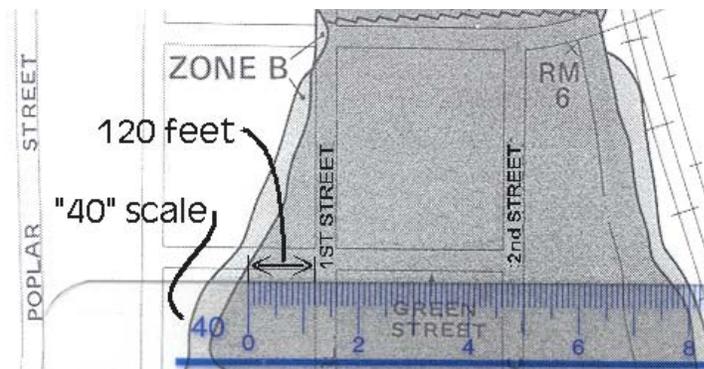
1. If your community has more than one map panel, use the Map Index to determine which panel to use. Use map landmarks — highways, streets or streams — to find the site on the index.
2. Find the map panel for the area containing the site. Be sure the map panel is the most recent one — compare its suffix letter with the suffix letter for that panel on the current map index. Remember, in many communities, panels will have different effective dates due to revisions that do not affect the whole community.

If there is an asterisk on the panel number on the Map Index, either no flood hazard has been identified in that area or it is entirely one flood zone and the panel was not printed. Most likely the panel's area is all C or X Zone, outside the SFHA.

3. Locate the site as accurately as possible. Use a detailed street or road map or the tax assessor's plat map to identify the property boundaries, if necessary.
4. For situations near the floodplain boundary, you may have to obtain the distance on the ground between the site and one or more identifiable points, such as the centerline of a road or street, a bridge, or some other feature on the map. Locate these points on the flood map.
5. Convert the distances to the map scale and plot the site on the map.

This FIRM has a scale of 1 inch = 400 feet. This means you should use the "40" scale on an engineer's scale.

To find out whether a site 120 feet west of the street is in the floodplain, measure 120 feet along Green Street west from the street right of way. This site is in the Zone A or Special Flood Hazard Area. Any construction or other development on the site must comply with the city's floodplain ordinance.

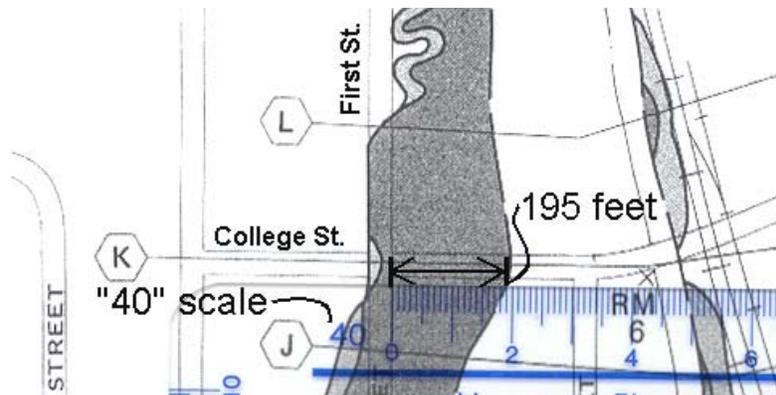


Locating the floodway boundary

1. Locate the site on the map and select the correct engineer's scale for the map scale.
2. Using an engineer's scale, measure the distance from the floodway boundary to a nearby feature on the ground. For streets, use either the right of way or the center of the street, just use the same approach on the map and on the ground.
3. Run the same measurement on the ground to locate the floodway boundary at the site.
4. If any portion of the site is determined to be within the floodway, then the floodway provisions of your ordinance apply.

This Floodway Map has a scale of 1 inch = 400 feet. This means you should use the "40" scale on an engineer's scale.

To find the floodway boundary, use the scale to determine the distance from a ground feature, like the corner of First Street and College Street.



In this case, the floodway boundary on the south side of College Street is 195 feet east of First Street. When a project is proposed in this area, measure 195 feet from the corner and mark the site with stakes to show where the floodway boundary is on the ground.

Note: You may be called on by a bank or lender to determine if a property is in or out of the SFHA. Communities should be aware that lenders are legally responsible for determining if a flood insurance policy is required for a loan.

Under the recently enacted National Flood Insurance Reform Act, if someone other than a lender provides map information to decide if a flood insurance policy is required for a loan, the information must be guaranteed. This information is usually provided on FEMA's Standard Flood Hazard Determination Form which can be downloaded from:

<http://www.fema.gov/business/nfip/sfhdform.shtm>

Note that if you are asked to sign such a form, you are guaranteeing the accuracy of the determination so you may assume some liability for your action.

Determining 100-year flood elevations

There are three ways to find the base flood elevation when a detailed flood study has been conducted. The most accurate is to use the **Floodway Data Table** in the Flood Insurance Study if the site is at or very close to a cross section.

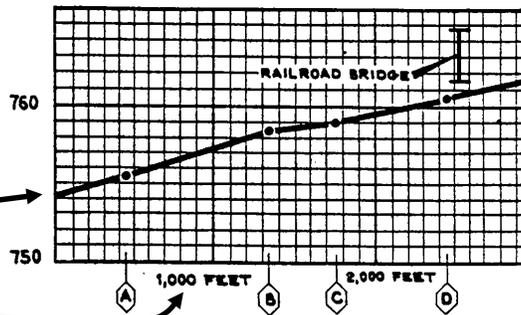
The least accurate way is to read the wavy lines on the **FIRM**. This approach should only be used to verify that you did not make a one foot or ten foot error when you read the profile.

The most common approach, and the most accurate if the site is not near a cross section, is to use the **flood profile**. The profiles are graphs that are found in the back of the Flood Insurance Study.

On the left edge is the elevation above sea level. →

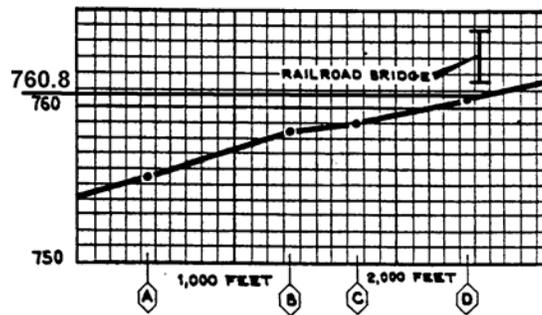
Lines on the graph represent various flood levels. →

On the bottom of the graph is the distance along the stream. →



Example: On this profile, each vertical square represents one foot in elevation. At the railroad bridge, the flood is 760.8 feet above sea level.

Each horizontal square represents 100 feet. Cross section C is 4 squares or 400 feet up-stream of cross section B.

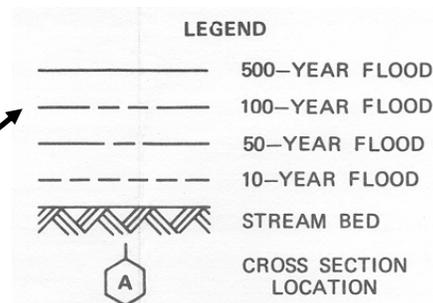


Example: 300 feet downstream of the railroad bridge, the flood level is 760 feet above sea level.

A profile in the **Flood Insurance Study** may show more than one flood. Make sure you read the right line. The 100-year flood is shown as a long dash with two short dashes.

Approximate A Zones

In areas without detailed studies, the applicant for a permit must submit data to DNR. DNR will determine the flood elevation.



6. Maintaining and Revising NFIP Maps

No map is perfect and no flood situation is static. From time to time, FEMA, communities or individuals may find it necessary for a FIRM or Floodway Map to be updated, corrected or changed.

FEMA uses two methods to make flood map changes. The first is to actually change the map and publish new copies. The other more common method is to issue a letter that describes the map change. This is called a letter of map change.

Types of letter of map changes

Letter of Map Amendment (LOMA): The map can be changed if the building is shown to be on ground higher than the 100-year flood elevation. The lowest adjacent grade is compared to the 100-year flood elevation for *buildings* built before the first FIRM was published (pre-FIRM buildings). For newer structures (post-FIRM buildings), the lowest floor (including basement) is also compared to the 100-year flood elevation.

For vacant lots, it must be shown that the lowest elevation within the boundaries of the property is above the 100-year flood elevation. Otherwise, a Conditional Letter of Map Amendment or CLOMA can be requested. A CLOMA informs the builder and others (such as the bank financing the project) that when the project is completed, it will qualify for a LOMA.

Letter of Map Revision Based on Fill (LOMR-F): A LOMR-F removes a structure or property from 100-year floodplain based on the placement and proper compaction of fill outside the floodway. For *buildings*: the lowest adjacent grade and the lowest floor (including basement) must be above the 100-year flood elevation. For *undeveloped properties*: the lowest lot elevation must be above 100-year flood elevation.

Letter of Map Revision (LOMR): A LOMR is normally based on revised hydraulic modeling and usually will not involve specific lots, properties or structures. Because it will revise official regulatory elevations or floodways a request for a LOMR must have the approval of the community.

Conditional Letter of Map Revision (CLOMR): Under this process, engineering data may be submitted for a proposed project or future condition. FEMA requires a CLOMR for proposed revisions involving the floodway.

Forms: FEMA forms can be downloaded from http://www.fema.gov/plan/prevent/fhm/frm_form.shtm

MT-1: LOMA, CLOMA, LOMR-F, CLOMR-F

MT-2: LOMR, CLOMR, Physical Map Revision

MT-EZ: LOMA for a single lot, LOMR-F for a single lot (also in Section 27 of the *Floodplain Management Desk Reference*)

7. Regulatory Framework

The state grants communities the police powers to adopt, administer and enforce local codes and regulations, including floodplain regulations under zoning authority (Chapter 414 for cities, Chapter 335 for counties) or home rule authority (Chapter 372 for cities, Chapter 331 for counties). Some notes on your authority to regulate development under Iowa state law:

- Counties have limited authority to regulate agricultural activities, but Section 335.2 clearly states that there are no limits on development in the floodplain.
- Cities have certain zoning and subdivision authorities over areas outside their corporate limits (extraterritorial jurisdiction). Floodplain regulations should be enforced in these areas, too.
- Even if some activities are beyond local legal authority, projects will still need a permit from DNR (discussed in Section 9).

State delegation

FEMA must approve the local floodplain management ordinances for communities in the NFIP. Certain communities that have maps with flood elevations have been delegated permit authority by DNR. Draft ordinances and ordinance amendments in delegated communities must also get DNR approval.

The administrator's duties

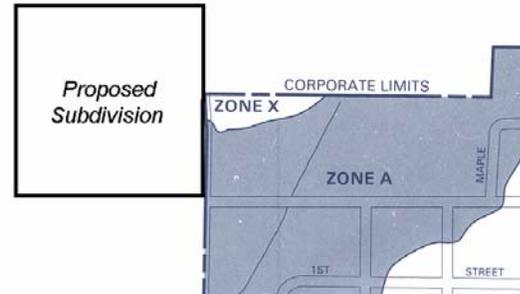
Duties of the administrator of the floodplain regulations vary depending on the kind, size and characteristics of the community. However, certain responsibilities are common to all ordinance administrators. Here is a list of such duties and the section in this Ready Reference (and the *Floodplain Management Desk Reference*) where these topics are covered:

- Understand the regulations (Sections 8 – 12)
- Ensure that permits are applied for (Sections 9 and 14)
- Correct violations (Sections 15 and 17)
- Process permit applications (Section 14)
- Coordinate with other programs (Section 9)
- Ensure projects are built according to approved permits (Section 14 and 15)
- Take enforcement actions (Section 17)
- Keep records (Section 18)
- Maintain and update flood data and maps (Section 6)
- Update the ordinance
- Deal with the public (Section 7)

8. Regulatory Requirements: Maps and Data

Basic rule #1: You must use the latest maps and flood data published by FEMA.

This rule applies to areas outside your corporate limits that are within your jurisdiction, such as new subdivisions that petition for annexation and need the city's approval. If you don't have a county-wide FIRM, you should formally adopt the county's FIRM in your ordinance to strengthen your basis for regulating areas not currently shown on your FIRM.



When FIRM and ground data disagree

When ground surveys show that a development site is above the 100-year flood elevation, you should record the data and issue the permit. Then, if the developer or owner wants the property removed from the Special Flood Hazard Area designation (e.g., in order to remove the Federal mandate to purchase flood insurance), he or she can request a Letter of Map Amendment (LOMA).

Conversely, you are not bound to regulate areas outside your mapped floodplain even though site surveys show that they are in fact below the 100-year flood elevation. It would be good to advise the owner of the flood hazard and that a DNR permit will still be needed for new development.

Approximate A Zones

As noted in Section 4, these are mapped floodplains where FEMA did not provide flood elevations or floodways. **DNR has jurisdiction** over the following areas

- Incorporated areas where the drainage area is 2 square miles and
- Unincorporated areas where the drainage area is 10 square miles or greater.

The applicant for a permit in an approximate A Zone in these areas is required to provide the data necessary for DNR staff to calculate the 100-year flood elevation. This process can take up to a year. An applicant can submit an engineering study for DNR review and approval to speed up the permit process.

In areas **outside DNR's jurisdiction**, communities are required to use the best data available. Section 8.4 of the *Floodplain Management Desk Reference* provides details on how to do this. If a development is greater than 50 lots or 5 acres, the permit applicant must conduct a flood study.

9. Regulatory Requirements: What needs a permit?

Basic rule #2: A permit is required for all development in the SFHA shown on your FIRM.

Development permit

The NFIP requirements are keyed to “development” in the floodplain. “Development” means “any man-made change to improved or unimproved real estate.” This includes, but is not limited to:

- Construction of new structures
- Modifications or improvements to existing structures
- Fencing
- Land clearing, excavation
- Filling, grading, paving
- Drilling, driving of piles
- Mining, dredging
- Permanent storage of materials and/or equipment

Make sure your regulatory program requires permits for all of these activities in the floodplain.

The floodplain regulations must also be enforced for the following projects:

- Projects implemented by a government agency, including your community
- Street and highway work (see Section 9.1.6 for the rules for Iowa DOT)
- Water and sewer systems
- Storage of hazardous material
- Subdivisions
- Other large developments, such as apartments, shopping centers, schools, factory-built home parks and planned unit developments.

Permits from other agencies

The state and NFIP rules require the community to ensure that other federal and state permits have been obtained for each development project. You should not issue your local permit until you are certain that the other agencies’ requirements are met.

First, check with other local offices to see where and when they need to review a planned project. Check with the building, planning, zoning, sanitation, public works, streets or highways departments, the fire marshal, and the engineer.

Other local governments may have jurisdiction over some aspects of floodplain development. Check with the county, adjacent municipalities, drainage districts, county health or sanitation department, soil and water conservation districts, etc..

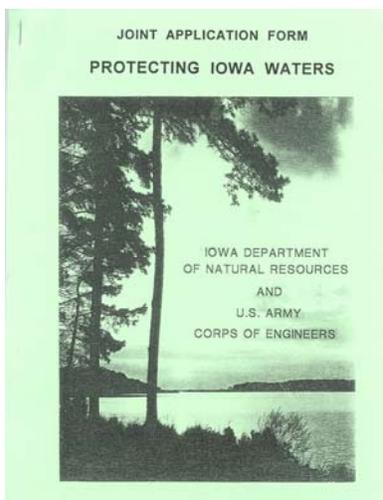
Iowa Department of Natural Resources

There are additional agencies and programs that need permits, but the main ones are DNR and the U.S. Army Corps of Engineers. To facilitate their permit review process, they have developed a joint permit application form.

Flood data and delegation status	Incorporated areas		Unincorporated areas	
	Drainage area \geq 2 sq. miles	Drainage area < 2 sq. miles	Drainage area \geq 10 sq. miles	Drainage area < 10 sq. miles
No detailed study (AO & approximate A Zones)				
No delegation of DNR floodplain authority	Permit application and flood data needed	No DNR floodplain permit required	Permit application and flood data needed	No DNR floodplain permit required
DNR floodplain authority delegated to community	DNR approves flood data	No DNR floodplain permit required	DNR approves flood data	No DNR floodplain permit required
Detailed data available (AE, AO#, and AH Zones)				
No delegation of DNR floodplain authority	Permit application needed	No DNR floodplain permit required	Permit application needed	No DNR floodplain permit required
DNR floodplain authority delegated to community	Permit needed only for bridges and flood protection systems	No DNR floodplain permit required	Permit needed only for bridges and flood protection systems	No DNR floodplain permit required

DNR floodplain permit and flood data approval requirements

Note: While there may be no requirement for a DNR *floodplain* permit, other DNR, State and Federal Permits may be required.



Communities should have copies of this form on hand for applicants. The latest version can be downloaded from the DNR website at:

<http://www.iowadnr.com/water/floodplain/fpforms.html>

Copies of the joint application form and attachments are sent to the two agencies. Approvals may be required by both agencies. Applications filed simultaneously with them are processed concurrently. If a permit is not required by one of the agencies, they will inform the applicant and the other agency. This joint application form process also assures that other State and Federal agencies with a possible interest in the project will be advised, including the U.S. Fish and Wildlife Service.

Regulatory Requirements: Floodways

Basic rule #3: Development must not increase the flood hazard on other properties.

If you have a floodway map (see Section 4), then the floodway rules apply only in the mapped floodway. If you don't have a floodway map, then these rules apply throughout your floodplain.

DNR jurisdiction

The Department of Natural Resources' jurisdiction over floodplain development is shown in the table on the previous page. If DNR has not delegated permit authority to your community, the easiest way to comply with basic rule #3 is to ensure that all development projects in the floodplain be submitted to DNR. If you have a mapped floodway, make sure that all floodway projects are sent to DNR.

Applications for DNR permits use the joint application form that is discussed on the previous page. *Note: Just because a project receives a DNR permit, it does not mean that ALL the requirements of your ordinance have been met.*

Exemptions: Some projects are too small to warrant an engineering study and the work to apply for, review and issue a DNR permit. These include things like a sign post, driveway, road or parking lot at grade (without any filling) and buried pipeline crossings

Community responsibility

It is the community's responsibility to ensure that the NFIP floodway rules are met in the following situations:

- Communities with detailed studied floodplains that have received DNR delegation are responsible for permitting development in the mapped floodways.
- Communities with approximate floodplain maps that have received DNR delegation need to contact DNR for help in delineating a floodway at the time of a permit application. These communities are responsible for permitting development in the newly mapped floodway.
- Non-delegated communities are responsible in areas that are outside DNR's jurisdiction (see the chart on page 16).

It is recommended that the developer provide a **“no-rise” certification** to certify that the development project will not affect flood heights.

10. Regulatory Requirements: New Buildings

Basic rule #4: New buildings must be protected from damage by the 100-year flood.

Building: The term “building” is the same as the term “structure” in the NFIP regulations. Your ordinance may use either term. It means “a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured [factory-built] home.”

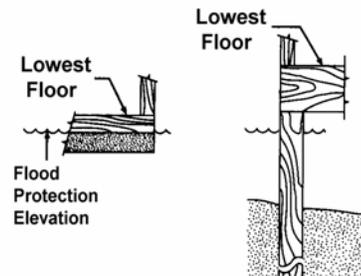
Flood protection elevation: The flood protection elevation is a term used in this reference for the minimum protection level your ordinance requires for new buildings in the floodplain. The level must be at least one foot above the 100-year flood elevation.

Elevating buildings

Elevating a building above the flood protection elevation is the most common and secure way to protect a building from flood damage. It is the *only way allowed for residential buildings*. There are three approaches:

- Elevating on fill
- Elevating on piles, posts, piers or columns
- Elevation on walls or a crawspace.

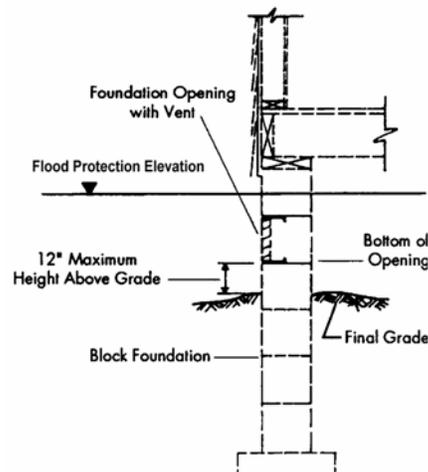
No matter which approach is used, the **lowest floor** (which includes a basement) must be above the flood protection level.



Enclosures

Enclosures are areas created by a crawspace or solid walls below the flood protection elevation. Enclosures below the flood protection level must be floodable. That means:

- They must be built of flood-resistant materials
- They must have adequate openings to let water in (see Section 11.3.2 for the specifications)
- They can only be used for building access, vehicle parking and storage of materials that have low damage potential.



Floodproofing

Non residential buildings can be elevated or floodproofed. A floodproofed building means the walls are watertight, the structural components can resist hydrostatic and hydrodynamic loads and effects of buoyancy, and utilities are protected from flood damage. A licensed professional engineer or architect must prepare the building plans and certify the floodproofing measures, preferably using the FEMA Floodproofing Certificate form:

<http://www.floodbarriers.net/FloodCertificateApplication.pdf>

Other provisions

AO Zones: AO Zones are shallow flooding areas where FEMA provides a 100-year flood depth (not a 100-year flood elevation). In AO Zones, new buildings must be protected to at least one foot above the depth number specified in feet on the community's FIRM *OR* at least two feet above grade, if no depth number is specified.

Basements: The definition of the "lowest floor" includes basements and the definition of "basement" includes any floor level below grade. Note that "walkout basements," "daylight basements" or "terrace levels" are usually sub grade on only three sides, with the downhill side at or above grade. Thus, they are not considered basements for either floodplain management or flood insurance rating purposes (but they are still the lowest floor of a building for floodplain management and insurance rating purposes).

Anchoring: Both elevated and floodproofed buildings must be properly anchored to stabilize them against flood forces. This means anchoring the building to its foundation and ensuring that the foundation won't move.

Flood resistant materials: All parts of a building exposed to floodwaters must be made of flood resistant materials. A list of these is in Section 11.5.4.

Accessory structures

In certain cases, agricultural buildings and detached residential garages and sheds in the floodway fringe may be exempted from the building protection standards. There are specifications for this approach in Section 11.6.2 of the *Floodplain Management Desk Reference*.

Factory-built homes

A factory-built home includes a building that is transportable, a mobile home or a "double wide." Factory-built homes must meet the same flood protection requirement as "stick built" or conventional housing. Because they are usually residential buildings, they must be elevated so the lowest floor is above the flood protection elevation. Recreational vehicles that are placed on a site for more than 180 days and are not "ready for highway use" must meet the same flood protection requirements as buildings.

11. Regulatory Requirements: Existing Buildings

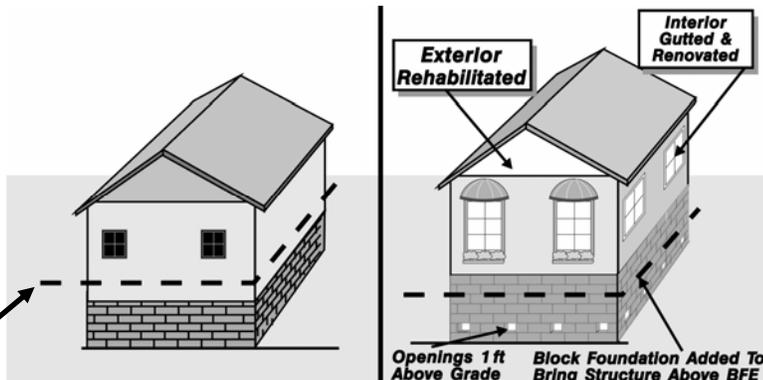
Basic Rule #5: If the cost of improvements or the cost to repair the damage equals or exceeds 50 percent of the market value of the building, it must be brought up to current floodplain management standards. This requirement also applies to when the original floor area of a building is increased by 25 percent.

Substantial improvement

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

Under the Iowa model ordinance, the definition of substantial improvement also includes any **addition** which increases the original floor area of a building by 25 percent or more. All additions constructed after the FIRM date shall be added to any proposed addition in determining whether the total increase in original floor space would exceed 25 percent.

Projects that meet either of these two *criteria* must be treated as new buildings and protected to the flood protection elevation.



Substantial damage

“Substantial damage” means damage of any origin sustained by a structure whereby the cost to restore the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. The damage can be from any cause — flood, fire, earthquake, wind, rain, or other natural or human-induced hazard.

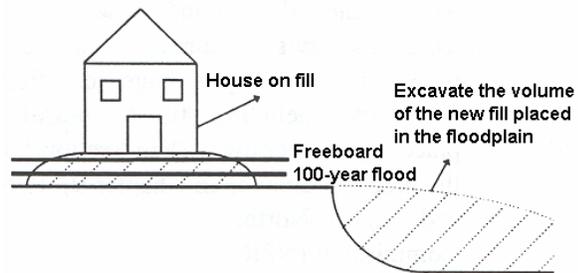
The substantial damage rule applies to all buildings in a flood hazard area, regardless of whether the building was covered by flood insurance. Note that the rule uses “cost to restore,” not “cost of repairs.” The cost to restore the structure must be calculated for full repair to the building’s *BEFORE-DAMAGE* condition, even if the owner elects to do less. It must also include the cost of any improvements that the owner has opted to include during the repair project.

Exceptions can be made for **historic structures** and code violations.

12. Additional Regulatory Standards

DNR and FEMA establish *minimum* floodplain management requirements. Communities are encouraged to adopt additional or more restrictive requirements that will better protect development under your local flooding conditions. The following are identified in Section 13 of the *Floodplain Management Desk Reference*.

- Prohibiting development in high hazard areas, such as areas prone to ice jams or flash flooding.
- Encouraging or requiring subdivisions to avoid the floodplain or cluster their buildings on high ground.
- Establishing minimum distances that structures must be positioned — set back — from river channels to protect them from flooding and erosion and to protect the channel banks and riparian habitat.
- Preserving natural areas, such as those that are habitat for rare or endangered species, from development.
- Zoning floodprone areas for lower density uses.
- Requiring a flood protection elevation that is more than one foot above the 100-year flood elevation (owners will see substantial flood insurance premiums savings, too).
- More specific standards for foundations to protect buildings from erosion, scour and settling.
- Prohibiting critical facilities from the floodplain or floodway
- Requiring buildings or critical facilities to have dry land access during a flood.
- Special rules in areas subject to flooding by a dam breach or ice jam.
- Requiring developers to remove an equal or greater amount of fill than they put in the floodplain to compensate for the lost floodwater storage (“compensatory storage”).
- Require developers to restrict the rate at which the increased runoff created by the development leaves the property. The developer must build a facility to store stormwater runoff on the site (“stormwater management”).
- Preventing filling or draining of wetlands.
- Preventing on-site sewage disposal in areas with high ground water.
- Protecting streams from runoff that causes nonpoint source pollution.



13. Permit Review

Section 9 discusses when a permit is required. This section can be used as a checklist to review the application for a permit. DNR has model permit forms which are included in this section in the *Floodplain Management Desk Reference*.

1. Review for completeness

- Check all forms
- Check the site plan for completeness
- Check the building plan for completeness
- Check certifications
- Check for needed federal and state permits
- Circulate for others to review

2. Review for compliance

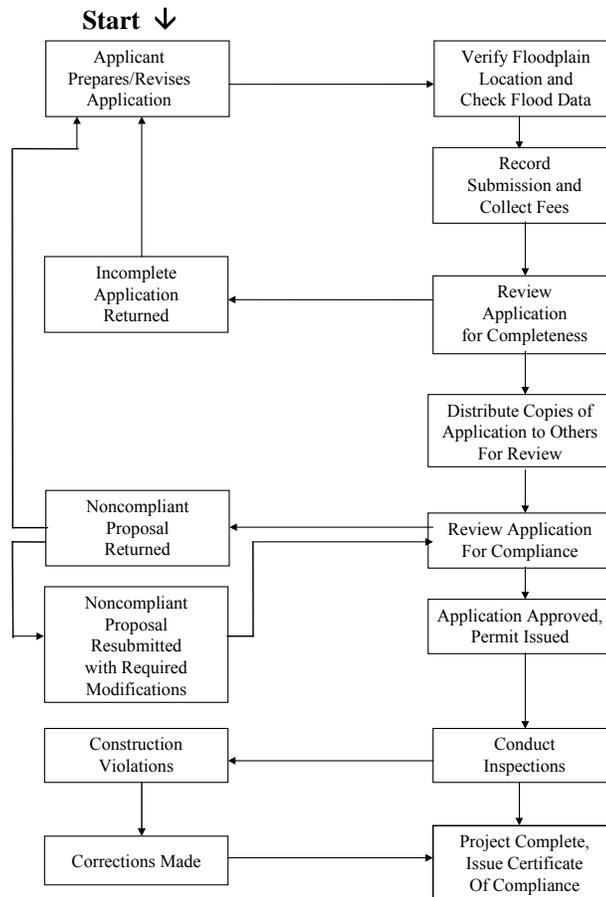
- Examine site information
- Review building plans
- Review engineering documents.

3. Approve or deny

If the project meets all the requirements, issue a permit. If not, it must be denied. Give the reasons for denial in writing. The applicant then can choose to:

- Withdraw the permit application.
- Redesign the project to bring it into compliance with regulations.
- Appeal to the Board of Adjustments or Board of Supervisors.
- Ask for a variance to the regulations.

Appeals and variances are discussed in Section 16.



FLOODPLAIN DEVELOPMENT PERMIT

Specify for what purpose the permit is issued—
New construction, alterations, fill, excavation, other

ISSUED TO: _____

ADDRESS: _____

PROJECT ADDRESS: _____
(if different from permittee's address)

ISSUED BY: _____
Floodplain Management Administrator

DATE: _____
(This permit expires 180 days from this date)

THIS PERMIT MUST BE POSTED ON THE PREMISES IN A CONSPICUOUS PLACE SO AS TO BE CLEARLY VISIBLE FROM THE STREET.

14. Inspections

The most effective way to ensure compliance is to inspect the site frequently during construction. This is particularly important in the early phases of work on a building because that's when errors in the location or elevation of the lowest floor can be found and corrected. An inspection program also puts builders, developers and property owners on notice that the community will insist that projects are completed in compliance with regulations.

Pre-construction inspection

Do this inspection before ground is broken. Ideally, this site visit should be after the site is staked out to allow you to check the plans in relation to the ground and lot boundaries. With plans in hand, you should check the following:

- The location of the floodplain and floodway boundaries.
- Setbacks from lot lines, channel banks, etc.
- Floodway encroachments, if applicable.

If you find a violation, you should take photographs, document the problem in writing, and issue a stop work order to the builder until the problem has been corrected.

Elevation inspection

Schedule this inspection just before installation of the lowest floor.

- Make sure the floor will be at or above the flood protection elevation
- Check whether any fill meets the necessary compaction, slope and protection standards contained in your regulations.
- Check that the building's location matches the permit application's plans.
- Check the number and size of crawlspace or enclosure openings.
- Check whether any part of the project encroaches into the floodway.

Final inspection

- Ensure that the foundation and floor elevation have not been altered since the elevation inspection.
- Obtain an as-built elevation or floodproofing certificate.
- Ensure that nothing subject to flood damage, such as a furnace, air conditioning unit, or ductwork, has been located below the lowest floor.
- Check for floodway encroachments. If a DNR permit was issued make sure the construction is in compliance with the permit.
- Check the anchoring system used in securing factory-built homes.
- Issue a certificate of occupancy if the project passes the final inspection.

15. Appeals and Variances

Appeals

Ambiguous language or differing interpretations can lead the applicant and permit office to disagree. Your ordinance should have a process for referring these disagreements to a board which will interpret the ordinance and settle the dispute.

Conditional or Special uses

Some regulations use the conditional use, special use, or special exception process to allow some use of the floodplain. This process allows a community to review the project completely and place special conditions on the permit. Before using this method of permitting, check with DNR to determine when their approval is also required.

Variances

Floodplain management regulations cannot be written to anticipate every imaginable situation. A process for issuing variances gives a builder a way to seek permission to vary from the letter of the rules because of a special situation.

In general, a variance is granted for a parcel with physical characteristics so unusual that complying with the ordinance would create an exceptional hardship to the applicant or surrounding property owners. Those characteristics must:

- Be unique to that property and not shared by adjacent parcels.
- Pertain to the land, not to any structure, its inhabitants or the property owners.

DNR approval: All variance requests considered by your community must be reviewed and approved by DNR prior to becoming effective.

Hardship: The concept of unnecessary hardship is the cornerstone of all variance standards. *The applicant has the burden of proving unnecessary hardship.* The claimed hardship must be exceptional, unusual and peculiar to the property involved. Financial hardship, inconvenience, aesthetic considerations, physical handicaps, personal preferences or the disapproval of one's neighbors do *NOT* qualify as exceptional hardships. Nor do problems caused by previous action of the applicant or property owner.

Insurance: The applicant for a variance to protect a building to a level lower than the flood protection elevation must be told in writing that granting the variance will result in increased flood insurance premium rates.

Exceptions can be made for **historic structures** and functionally dependent uses.

16. Enforcement

In order to ensure that development meets the requirements of your regulations, you must monitor the floodplain, and where necessary, conduct an inspection of a property.

Voluntary compliance

The best approach is to convince the developer that complying with the ordinance is in his or her own best interest. Explain the flood hazard and how the rules protect the property (or neighboring properties) from that hazard. If this doesn't work, give written notice, talk to the attorney and pursue legal recourses.

1. Contact the property owner or building contractor in person or by telephone to explain your concerns. Give them a deadline to respond to your concerns.
2. Follow up with a written notice.
3. Notify the property owner (in writing, preferably via certified mail) of the nature of the violations, what to do to correct them and a deadline. This is commonly called a "stop work order."
4. Post a violation notice on the property.

Legal recourses

Fine: The DNR model ordinances provide for the use of fines as a means of enforcement. Your ordinance should establish a maximum fine per offense.

Recordation: Depending on your ordinance's authority, you may be able to record the violation in the property's deed records. This will inform potential purchasers as well as "cloud the deed."

Restraining order: This is an order to stop further non-compliant conduct. It is issued by a County Board of Supervisors or through the courts.

Tickets: With the right legal authority, an officer authorized by the community may issue a civil citation for an infraction.

Section 1316

Section 1316 of the National Flood Insurance Act authorizes FEMA to deny flood insurance to a property declared in violation of the community's ordinance. It is used when all other legal means to remedy the violation have been exhausted. Denial of flood insurance means the owner (or prospective purchaser) will not be able to obtain most types of mortgages or loans for the property.

Ask DNR or the FEMA Regional Office for help in enforcement issues.

17. Records

Records show what you approved and what you told the developer, forming a “paper trail” needed for administrative or legal proceedings related to development projects. Such records are vital in case the project is built in violation of your ordinance or the conditions of a permit. They also give future owners information about the property.

Permit file

You should have a file for each permit application which includes:

- The permit application form and all attachments, including the site plan.
- All correspondence pertinent to the project.
- Flood and floodway data prepared by the developer.
- Engineering analyses of floodway encroachments and watercourse alterations.
- Special engineering designs for enclosures below the 100-year flood.
- Any variances or appeals proceedings.
- Records of inspections of the project while under construction.
- Documentation of the “as-built” lowest floor elevation of all new and substantially improved buildings.
- Certification of the elevation to which any nonresidential building has been floodproofed.
- Certificates of compliance or occupancy.

Keeping these records is a requirement to participate in the NFIP. There is no statute of limitations as to how long they should be kept.

Elevation Certificate

You need an official record that shows how high new buildings and substantial improvements were elevated. This is needed both to show compliance with the ordinance and for the owner to obtain a flood insurance policy. The best way to do this is to get the builder to have a surveyor give you a completed and signed FEMA Elevation Certificate before you issue a certificate of occupancy.

The FEMA Elevation Certificate form:

<http://www.fema.gov/business/nfip/elvinst.shtm> is self-explanatory. Data for Section B come from your Flood Insurance Rate Map (see Section 4).

One problem arises when a city annexes Special Flood Hazard Areas in the unincorporated areas of the county. If the subject property is located within areas annexed from the county, use the community’s NFIP number in item B1, but use the county’s FIRM for items B4 – B9.

ELEVATION CERTIFICATE

OMB No. 1660-0008
Expires February 28, 2009

Important: Read the instructions on pages 1-8.

SECTION A - PROPERTY INFORMATION		For Insurance Company Use:
A1. Building Owner's Name		Policy Number
A2. Building Street Address (including Apt., Unit, Suite, and/or Bldg. No.) or P.O. Route and Box No.		Company NAIC Number
City	State	ZIP Code
A3. Property Description (Lot and Block Numbers, Tax Parcel Number, Legal Description, etc.)		
A4. Building Use (e.g., Residential, Non-Residential, Addition, Accessory, etc.)		
A5. Latitude/Longitude: Lat. _____ Long. _____ Horizontal Datum: <input type="checkbox"/> NAD 1927 <input type="checkbox"/> NAD 1983		
A6. Attach at least 2 photographs of the building if the Certificate is being used to obtain flood insurance.		
A7. Building Diagram Number _____		
A8. For a building with a 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

SECTION B - FLOOD INSURANCE RATE MAP (FIRM) INFORMATION					
B1. NFIP Community Name & Community Number		B2. County Name		B3. State	
B4. Map/Panel Number	B5. Suffix	B6. FIRM Index Date	B7. FIRM Panel Effective/Revised Date	B8. Flood Zone(s)	B9. Base Flood Elevation(s) (Zone AO, use base flood depth)
B10. Indicate the source of the Base Flood Elevation (BFE) data or base flood depth entered in Item B9. <input type="checkbox"/> FIS Profile <input type="checkbox"/> FIRM <input type="checkbox"/> Community Determined <input type="checkbox"/> Other (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					

SECTION C - BUILDING ELEVATION INFORMATION (SURVEY REQUIRED)	
C1. Building elevations are based on: <input type="checkbox"/> Construction Drawings* <input type="checkbox"/> Building Under Construction* <input 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) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
b) Top of the next higher floor _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
c) Bottom of the lowest horizontal structural member (V Zones only) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
d) Attached garage (top of slab) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
e) Lowest elevation of machinery or equipment servicing the building (Describe type of equipment in Comments) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
f) Lowest adjacent (finished) grade (LAG) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)
g) Highest adjacent (finished) grade (HAG) _____	<input type="checkbox"/> feet <input type="checkbox"/> meters (Puerto Rico only)

SECTION D - SURVEYOR, ENGINEER, OR ARCHITECT CERTIFICATION			
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

The FEMA form is an 11-page packet. It includes the two-page FEMA Form 81-31, Elevation Certificate, and instructions on how to complete it. A complete copy is in Section 27 of the *Floodplain Management Desk Reference*. Additional copies are available at no cost from the FEMA Distribution Center at 800-480-2520 (ask for FEMA Form 81-31). It can also be downloaded from FEMA's web site at: <http://www.fema.gov/business/nfip/elvinst.shtm>

18. Flood Insurance

One of the main reasons for your floodplain management program is to make insurance available for people who want to protect themselves financially from flood hazards. This section reviews how the insurance aspect of the NFIP works and how rates and coverage are dependant on how well buildings comply with your ordinance.



There are misconceptions that insurance is not available for properties in a mapped floodplain or for properties that are not in a floodplain. *ANY* property in your community can be covered by flood insurance –Property owners always work through their insurance agents for buying the policy and settling claims – they do not need to deal with FEMA.

Coverage

Flood insurance coverage is provided for insurable buildings and their contents. **Building coverage** is for the structure (see the definition of building in Section 11). This includes all things that typically stay with the building when it changes ownership, including the furnace, wall-to-wall carpeting and built-in appliances.

Contents coverage is for the removable items inside an insurable building. A renter can take out a policy with contents coverage, even if there is no structural coverage.

Basements and enclosures: There is limited coverage in basements and enclosures below the lowest floor of an elevated post-FIRM building (including a manufactured home). It therefore behooves the permit official to ensure that furnaces and other items that can be damaged by floodwater are not allowed in a crawlspace or other enclosure below an elevated lowest floor.

Waiting period: In most cases, a 30-day waiting period follows the purchase of a flood insurance policy before it goes into effect. This is to encourage people to keep a policy at all times and not gamble that they won't flood.

Rating buildings

The premiums on new (post-FIRM) buildings are based on the risk of flooding and flood damage. The two aspects of the NFIP – insurance and regulations – reinforce each other. How well local floodplain management regulations are enforced affects the flood insurance rates paid by the citizens of your community.

Pre-FIRM buildings (those built before the initial effective date of your Flood Insurance Rate Map) can be insured using flat “subsidized” rates. They are designed to help people afford flood insurance even though their buildings were not built with flood protection in mind.

The mandatory purchase requirement

The mandatory flood insurance purchase requirement is a Federal law that applies to all forms of federal or federally related financial assistance for buildings located in the floodplain. This requirement affects loans and grants for the purchase, construction, repair, or improvement of any building in the floodplain. It also applies to disaster assistance and all mortgage loans purchased by Fannie Mae or Freddie Mac in the secondary mortgage market.

How it works: Before a person can receive a loan or other financial assistance, there must be a check to see if the building is in the base floodplain that is shown on a Flood Insurance Rate Map (FIRM). The base, or 100-year, floodplain is shown as one or more zones that begin with the letter "A."

Copies of the FIRM are available for review in most building or planning departments. Many lenders and insurance agents also have copies. It is the lender's responsibility to check the FIRM to determine if the building is in a floodplain, although the community may provide assistance.

If the building is in a floodplain, the agency or lender is required by law to require the recipient to purchase a flood insurance policy on the building. The requirement is for structural coverage equal to the amount of the loan (or other financial assistance) or the maximum amount available, whichever is less. The maximum amount available for a single-family house is \$250,000.

The mandatory purchase requirement does not affect loans or financial assistance for items that are not covered by a flood insurance policy, such as vehicles, business expenses, landscaping, and vacant lots. It does not affect loans for buildings that are not in the floodplain, even though a portion of the lot may be floodprone. While not mandated by law, a lender may require a flood insurance policy as a condition of a loan for a property in any location.

What you can do about it: If your property is in the floodplain, get the insurance. You might not have seen a flood recently, but the odds that you'll be flooded are *five times greater* than having a fire. You don't want to be without fire insurance, do you?

If your property is not in a mapped floodplain, you should still consider flood insurance – there may be local drainage problems that don't show up on the map (the rates are lower, too).

If you're sure you're not in a floodplain, but the bank insists, check the map yourself. If your ground is higher than the published base flood elevation, you can submit survey data and a request for a "Letter of Map Amendment." For more information on this approach, see Section 6 of the *Ready Reference*.

Note: Many people who were required to get building coverage do not realize that their contents are not covered unless they voluntarily purchase contents coverage.

Floodplain Permit Quick Check

