

# **National Flood Insurance Program Handbook for Missouri Communities That Lack Detailed Studies**



## **Missouri Department of Natural Resources Division of Geology and Land Survey**

Water Resources Program  
Flood Plain Management Unit

July 1989

NFIP Handbook

The original version of this handbook, for Emergency Program Communities, was prepared by Mr. Ross Richardson, and published by the State of Missouri in March 1980. It was republished by the Federal Emergency Management Agency in November 1982. The current version, for Special Conversion Communities, was prepared by Mr. Richard Gaffney. It incorporates 1986 changes in minimum federal standards for flood plain management in non-coastal areas.

With special thanks to the staff of the Information Services Section, Division of Geology and Land Survey, Rolla, Missouri, and to Mrs. Leila Johnson, Flood Plain Management Unit, Water Resources Program, for their efforts.

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Handbook for  
Missouri Communities  
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Department of Natural Resources  
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**P.O. Box 250  
Rolla, MO 65401  
314-364-1752  
July 1989**

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P.O. Box 260  
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## I. INTRODUCTION

### The National Flood Insurance Program

The National Flood Insurance Program (NFIP) was conceived by President Harry S Truman when he visited Kansas City to view the disastrous flood of 1951. He was told that private insurance companies did not offer flood insurance, because the only people who would buy it would eventually file a claim, and the companies could not charge premiums large enough to cover claims and low enough to encourage people to purchase coverage.

"Then the government has to offer it," we are told was President Truman's response. Passage of the National Flood Insurance Act of 1968 brought to reality the Missouri President's dream of making flood insurance available to those already exposed to flood hazards.

### A Non-Structural Approach

Following a major flood of the lower Mississippi River in 1927, Congress enacted the Rivers and Harbors Act of 1928, which charged the U.S. Army, Corps of Engineers, to harness "Old Man River" and not let it repeat similar floods. The Corps built levees, dams, and relief channels to help keep flood waters away from settlements. This structural approach has cost billions of dollars, but disastrous floods still occur. Although the structures in place have prevented or reduced flood damages in protected areas, it has been shown that unsafe flood plain development continued.

The increasing costs of flood disasters, despite so much money spent on structures, convinced Congress another approach was needed. They warranted a non-structural approach to protect people from flood waters. "The other side of the coin" now is being used.

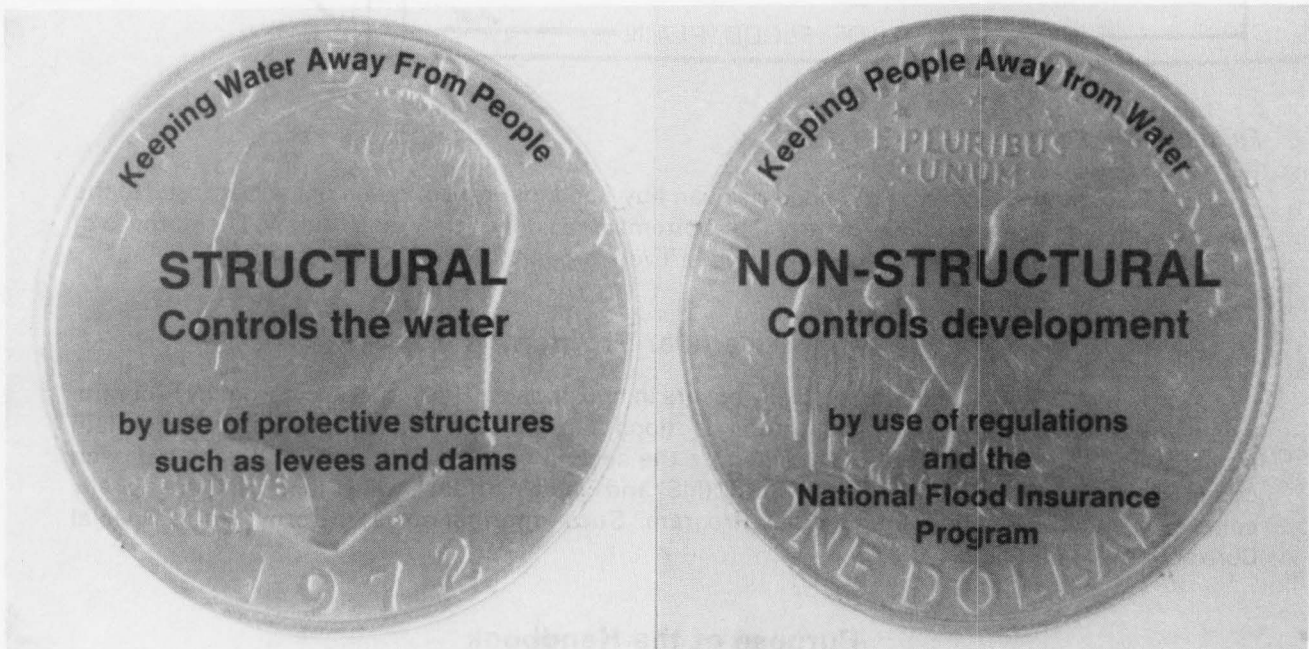
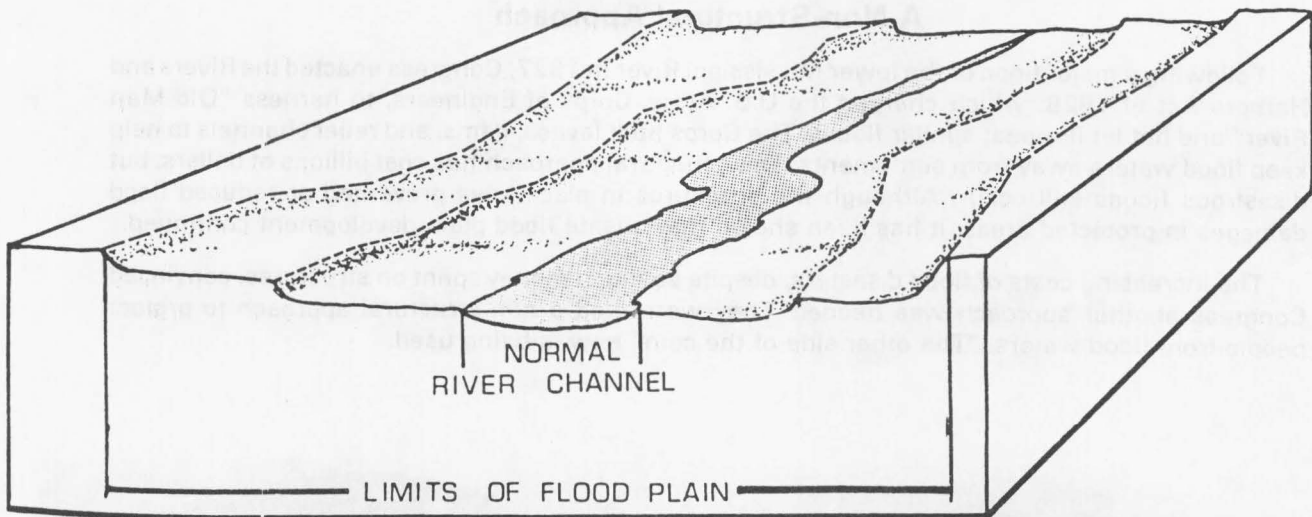


Figure 1. The two sides of the flood damage reduction coin.

Like any coin, the two sides are inseparable. No one has considered abandoning the structural approach, but the non-structural approach now is receiving deserved attention as a method of reducing flood damages and costs borne by citizens.

The NFIP was designed to accomplish two major objectives. It enables property owners and tenants to purchase federally subsidized insurance covering flood losses, and discourages future developments that may be subject to flood damage.

To accomplish these objectives, the NFIP makes availability of subsidized flood insurance contingent upon local adoption of flood-plain management regulations designed to prevent flood losses. Local regulations adopted by a participating community must meet federal requirements.



*Figure 2. The flood plain*

Those currently exposed to the flood risk can buy flood insurance; those not yet exposed to the risk are allowed to develop flood-plain (valley bottom) lands only if they do so safely. The purpose of the NFIP is to reduce flooding costs in terms of lives, property damage, and recovery.

### **The Regular Program**

Community NFIP participation typically occurs in two phases. The first, the Emergency Program, exists with identification of a community's flood hazard areas; it adopts basic flood-plain management requirements until conversion to the second phase, the Regular Program. For each community, a detailed Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) are usually completed before adopting the Regular Program. Such information is not provided to Special Conversion Communities.

### **Purpose of the Handbook**

This handbook, designed to help local Special Conversion Community administrators understand NFIP concepts, is presented in a way that explains procedures such communities should follow in administering flood-plain management ordinances.

## **How to Use the Handbook**

This handbook should be used only by Special Conversion Communities participating in the Regular Program. (Another handbook treats Regular Program Communities that have FISs and FIRMs.) Handbook text and illustrations follow the Regular Program ordinance sequence required of all Special Conversion communities participating in the NFIP.

## **Critical Concepts**

Two critical concepts must be understood: development and substantial improvement. Both require permits from the community's administrator if they relate to the flood hazard area (Zone A) shown on the Flood Insurance Rate Map (FIRM).

*Development* means any man-made change to improved or unimproved real estate, including (but not limited to) construction, mining, dredging, filling, grading, paving, excavating, or drilling. Cultivation of farmland does not fit this definition. If in doubt, be sure it is permitted.

*Substantial improvement*, which applies to buildings, includes repairs, additions, or improvements amounting to fifty percent or more of the value of a building before work began. The local administrator must review permit applications, decide to grant or deny permits, and be ready to justify such decisions. Every application made must be documented. Appeals can be made after permits are denied.

## **Other Basic Concepts**

### **Flood-Plain Management**

Flood-plain management and flood insurance are the principal components of the National Flood Insurance Program (NFIP). Flood-plain management consists of policies, regulations, and administrative procedures used by communities to minimize flood hazards. Flood insurance provides recovery from real and personal-property flood losses. Although this handbook primarily addresses NFIP flood-plain management procedures, basic concepts involving flood-plain management and flood insurance must be understood before the NFIP can be generally understood. Such basic concepts constitute the remainder of this chapter.

### **Flooding**

Flooding, defined for the purposes of the NFIP, is a temporary rise in stream flow or sudden and unusual runoff accumulation resulting in inundation of adjacent land. Large bodies of water, such as the Mississippi or Missouri Rivers, are not necessary for flooding, which can result from ponding, dam failure, or flash flooding of creeks and ditches, as well as the gradual rise of waters from large rivers.

### **The Base Flood**

The "100-year flood," hereafter referred to as the Base Flood, a measure of flooding of a certain magnitude, is used as a standard in the United States. A base flood has a one-percent chance of occurrence in any given year. (See Figure 3, The base flood - a compromise.)

### **The Flood Plain**

Areas inundated by floodwater constitute the flood plain of a river, creek, ditch or other source of flooding. In this handbook, the flood plain is that area that would be inundated by a base flood. The flood plain is also called the Special Flood Hazard Area. In the vernacular, the "bottoms" are the lowest, most frequently inundated portions of the flood plain. (See Figure 2, The Flood Plain.)



## Base Flood — A Compromise

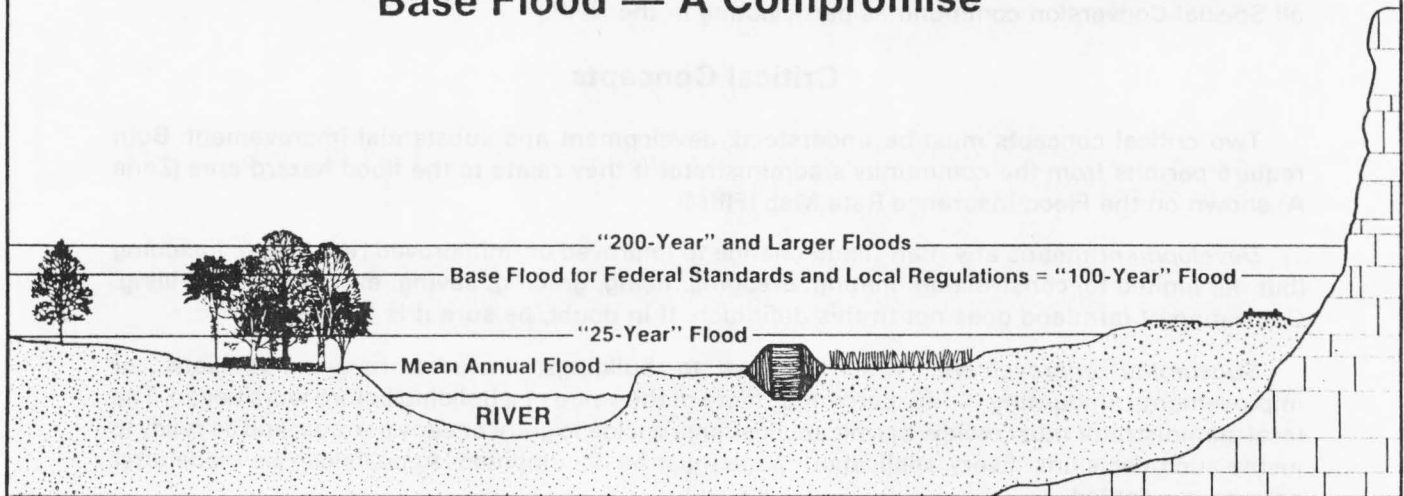


Figure 3. The base flood - a compromise.

### Base Flood Elevation (BFE)

The level of flooding from a base flood is called the Base Flood Elevation (BFE). Water-surface elevation is referenced to Mean Sea Level (MSL); for example, a 928-foot base flood elevation refers to a water-surface elevation of 928 feet above MSL. Elevations of undeveloped land or of residential and commercial buildings are also referenced to MSL; for example, if the lowest floor of a residence has an elevation of 925 feet MSL, and the base flood elevation is 928 feet MSL, the residence is exposed to a flood hazard of three feet of water during a base flood. Zone A on a FIRM does not show BFEs. MSL may also be designated NGVD: National Geodetic Vertical Datum of 1929.

### Encroachment

Development of flood plains results in restriction of natural overflow areas that are claimed by streams during flooding conditions. Each development encroaches on the natural overflow area of a stream or other source of flooding and increases base flood elevation. Development of flood plains is consequently called "encroachment."

These NFIP basic concepts are referred to throughout the remainder of this handbook.

The purpose of this handbook is to help local administrators do their jobs fairly and reasonably. For additional help, contact the Missouri Department of Natural Resources, (314) 751-2116, or the Federal Emergency Management Agency, (816) 283-7007. The DNR toll-free number is (800) 334-6946.

## **II. THE SPECIAL CONVERSION PROCESS**

The Federal Insurance Administration (FIA), created to administer the provisions of the National Flood Insurance Act, originally envisioned that every community with flood hazards would receive a detailed engineering analysis of such hazards: a Flood Insurance Study (FIS). This was when it was believed that about five thousand communities across the nation were flood prone.

When the real number of flood-prone communities approached eighteen thousand, the magnitude of the task (and the cost) was recognized. Some communities originally so identified and provided Flood Hazard Boundary Maps (FHBMs) clearly had more extreme flood hazards than others. Priority was given to performing FISs for the most flood-prone communities.

Congress demanded that FIA hasten conversion of Emergency Program communities into the Regular Program, so it was necessary that the FIA convert some communities without detailed studies. Those communities with minimal flooding hazards had their FHBMs rescinded by the FIA, at the time of conversion. Most of them remained in the NFIP, and had no special flood-hazard areas (NSFHA) to regulate.

Other communities were reviewed and visited; where warranted, their FHBMs were redesignated Flood Insurance Rate Maps (FIRMs). No FISs were undertaken, and the converted communities entered the Regular Program and benefited from more available flood-insurance coverage. This process continues.

A drawback to the Special Conversion process is that no detailed FIS means that there is limited data for local decision making. The new FIRMs lack base flood elevations (BFEs), the heights above mean sea level the water surfaces of a base flood would reach. In each case, such a shortcoming puts a considerable burden on a developer attempting to show how a proposed development would be safe from a base flood; furthermore, the local administrator has no study data to consider.

### **Best Available Information**

Where a history of flooding coincides with a long period of settlement, older residents may remember high water marks from large floods. State or federal agencies may have data that can help local administrators. For example, the U.S. Geological Survey, the U.S. Army Corps of Engineers, the National Weather Service, the Soil Conservation Service, county road superintendents, or county surveyors may have flood data that could help local administrators or builders. Lacking better data, the highest remembered flood can serve as a regulatory datum.

### **Timetable**

Several months before a special conversion, the Federal Emergency Management Agency (which includes the FIA and other offices) or the State Coordinator makes initial contact with community officials to discuss the process and review the map and any needed changes, such as to areas annexed by a city. The FEMA Regional Office submits a Special Conversion Recommendation Report (SCRR) to the FEMA headquarters office (see Figure 4: Special conversion recommendation report).

Approximately five months before the effective date of a community's conversion to the Regular Program, the community will receive a copy of the final, dated FIRM. The community then begins to update its flood-plain management regulations. The FEMA Regional Office and the State Coordinator's office receive copies of this FIRM in order to assist the community, if requested.

Communities lacking a compliant local ordinance regulating flood-plain development by the effective date are suspended from the NFIP. The FIRM remains effective, and federal sanctions are applied (see Chapter IV. on suspension).



# SPECIAL CONVERSION RECOMMENDATION REPORT

COMMUNITY NAME \_\_\_\_\_ STATE \_\_\_\_\_  
COUNTY \_\_\_\_\_ I.D.# \_\_\_\_\_ DATE OF CONTACT \_\_\_\_\_

FEMA REPRESENTATIVE \_\_\_\_\_

CHIEF, NTH DIVISION \_\_\_\_\_

(1) Describe contact with community (individual(s) contacted, position, type of contact, etc.)  
\_\_\_\_\_  
\_\_\_\_\_

(2) Is the community participating in the Emergency Program? YES \_\_\_\_\_ NO \_\_\_\_\_

(3) Are there mudslide (mudflow) or erosion hazards? YES \_\_\_\_\_ NO \_\_\_\_\_  
(if "YES" explain in Item 11)

(4) Describe flooding source, history and assess the degree of hazard \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(5) Describe existing development (include estimate of number of structures in floodplain, if possible)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(6) Discuss the development potential in the floodplain. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(7) Are the community's flood plain management measures compliant with 60.3(b)?  
YES \_\_\_\_\_ NO \_\_\_\_\_ If no, do community officials express an interest in remaining in  
the NFIP and adopting Section 60.3(b)? \_\_\_\_\_

(8) Name, Title, Address and Phone Number of CEO: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(9) Address of community's map repository \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(10) RECOMMENDED ACTION: A. Non-flood prone conversion  
(circle one) B. Minimal conversion with current FIRM -- No FIRM Produced (FIRM converted to FIRM by letter)  
\*C. Minimal conversion with FIRM\*  
D. Other (specify) \_\_\_\_\_

\* Attach a marked-up copy of the community's current FIRM. The criteria for production  
of a FIRM are changes affecting the community's Special Flood Hazard Areas.  
(annexations, street locations, changes in delineation, etc.)

\* If you answered "YES" to No. 7, will the ordinance continue to be compliant  
after changes are made to the maps? YES \_\_\_\_\_ NO(explain) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(11) ADDITIONAL COMMENTS \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Figure 4. Special conversion recommendation report

### **III. THE FLOOD INSURANCE RATE MAP (FIRM)**

#### **Purpose of the Map**

When the Federal Insurance Administration (FIA) began implementing the terms of the National Flood Insurance Act of 1968, one of the first decisions was that all the nation's flood hazard areas must be identified (mapped), so that landowners, developers, insurance agents, realtors, buyers, lenders, emergency preparedness planners, local officials, state officials, and federal officials would know places that flood.

Maps have been prepared for all parts of the country, including Puerto Rico, the Virgin Islands, and Guam. A community is informed by letter and a map, providing notice of identification of flood hazard areas, to the chief executive officer of that jurisdiction. The first map usually is a Flood Hazard Boundary Map (FHBM); upon conversion, a Flood Insurance Rate Map (FIRM) replaces it (see Figures 5. and 6.).

Flood-hazard areas are sections of a community that are expected to be inundated by a base flood, which is a flood-measurement standard that applies to all communities in the United States. A base flood has a one percent chance of occurrence each year. For the homeowner who purchases a 30-year mortgage in a flood-hazard area, there is a 26 percent possibility that his home will be damaged by a base flood before he repays the mortgage loan.

A FIRM, therefore, provides notice to community leaders, developers, mortgage lenders, businessmen, and homeowners that flood hazard areas exist within the community. A community's participation in the NFIP is an effective method of reducing flood damage and a community relies on its flood-plain management ordinance and FIRM to attain that goal.

#### **How to Use the Map**

The identification panel lists the Community Number, which is used when ordering additional maps. The toll-free telephone number for ordering maps is (800) 333-1363.

The panel also lists the effective date of the map, the history of its original issuance, and subsequent revisions. The North arrow and scale in feet help in orienting and scaling the map.

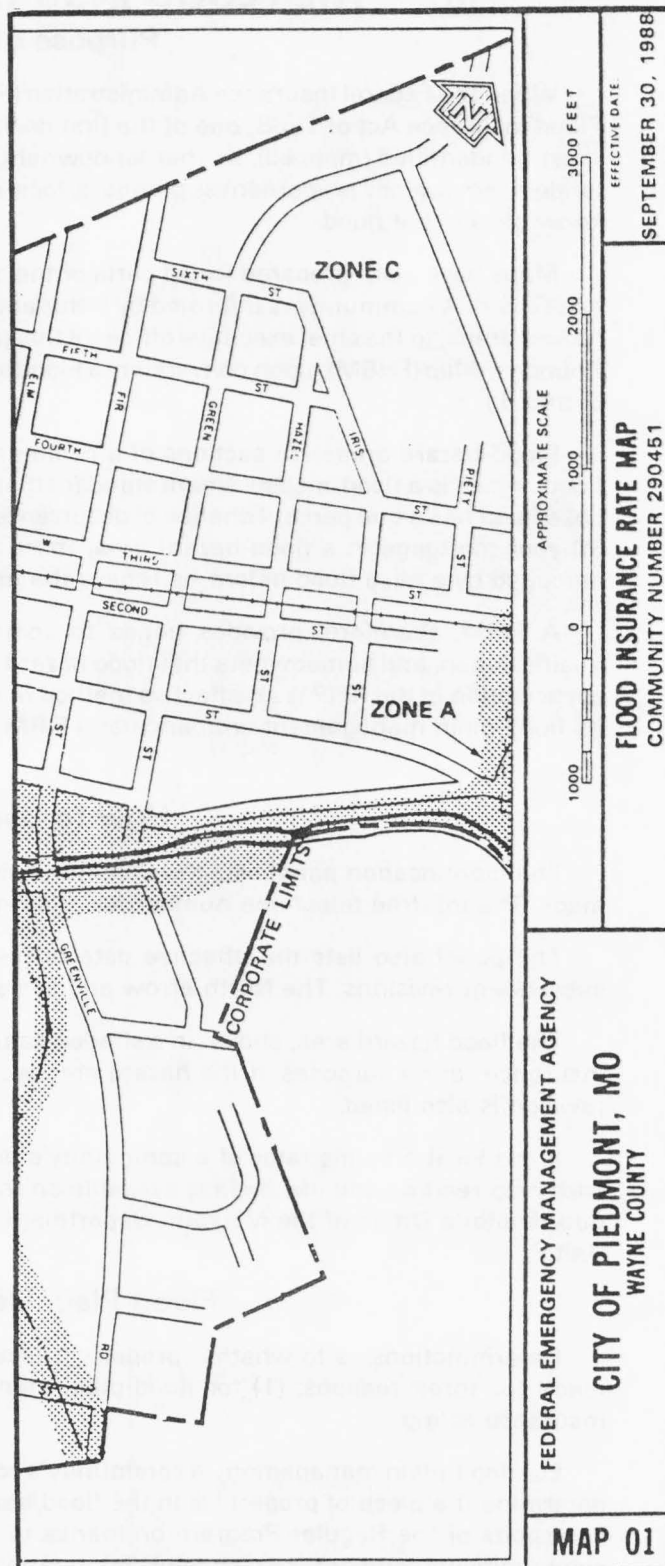
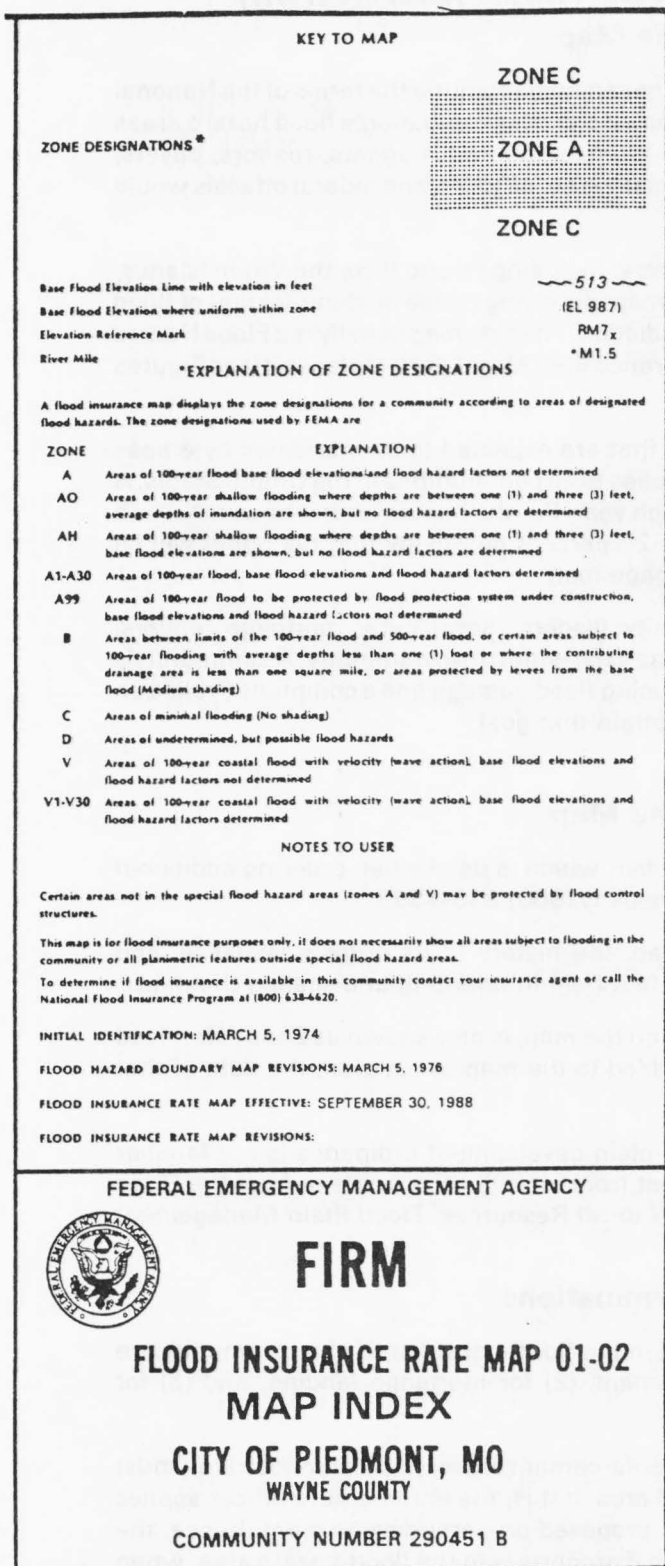
The flood hazard area, shown in a shaded pattern on the map, is also known as Zone A for flood insurance rating purposes. If the hazard area was added to the map by revision, the date of that revision is also listed.

If the local administrator of a community's flood-plain development ordinance is not familiar with map reading and use, help is available on request from other local officials or from the State Coordinator's Office of the Missouri Department of Natural Resources, Flood Plain Management Unit.

#### **Flood-Plain Determinations**

Determinations as to whether property is located in the flood-hazard area of a community are made for three reasons: (1) for flood-plain management, (2) for mortgage lending, and (3) for insurance rating.

For flood-plain management, a community's code enforcement officer (local administrator) must determine if a piece of property is in the flood hazard area. If it is, the enforcement officer applies provisions of the Regular Program ordinance to any proposed property development; hence, the community government is responsible for determining if property is in the flood-hazard area, when such determination concerns flood-plain management.



For mortgage-lending, banks, savings and loan institutions, and other lenders regulated or insured by the federal government, must determine if a piece of property is in the flood hazard area. If it is, the lender must require that the mortgager acquire flood insurance to cover the amount of the loan on insurable structures or proposed insurable structures. The mortgage-lending institution is therefore responsible for determining if property is in the flood hazard area, when such determination concerns mortgage loans. Final determination cannot be delegated to the community government or any other party, when such determination is made for mortgage lending.

For insurance rating, the proper zone must be determined in order to establish premium rates. This is the responsibility of the insurance agent or broker, regardless of any help received from others.

## **GUIDANCE FOR UNNUMBERED A ZONES**

Flood areas designated "Zone A" may be encountered on Flood Hazard Boundary Maps and Flood Insurance Rate Maps (FIRMs). This may be the only flood-zone designation for Special Conversion communities, that have received no Flood Insurance Studies (FISs). These Zones A, where "Zone A" is not immediately followed by a letter E, or a number such as A5, A2, etc., do not have base flood elevations (BFEs) provided. Lack of elevations, however, does not negate requirements for elevating structures. Federal regulations and the local flood-plain ordinance require that a community obtain, review, and reasonably use any BFE data or floodway data that are available from federal, state, or other sources. A community should use BFE data requiring that new construction and substantial improvements of residential structures have lowest floors including basements elevated to or above the BFE, and that nonresidential structures be elevated or floodproofed to or above that elevation.

If possible, every effort should be made to identify an area of the flood plain that would carry floodwaters without resulting in much greater flood heights. FEMA studies designate such an area a "floodway." Flood Insurance Studies often show them. Floodways are not delineated in unnumbered A Zones, but obviously, if new development occurs too near a channel, additional flood heights greater than the acceptable norm of one additional foot may occur. Floodway data are usually in state or federal agency flood reports. Officials are encouraged to inquire at State Flood Plain Management offices for such data. Without such reports, "common sense" or locally funded studies are the only ways to manage future flooding.

Ideas for developing BFE information, and guidance for finding flood information are listed below.

1. Preliminary, draft, or final Flood Insurance Studies for your community or adjacent communities.
2. The Flood Hazard Boundary Map or Flood Insurance Rate Map can be used to determine the closest point on the outer boundary of Zone A that is relevant to a given site. Assuming the flood-plain limit shown on the map is a result of water reaching high ground, that edge or outer boundary of the flood plain might be used as the BFE limit. A surveyor can determine the elevation of this limit or it can be determined on a topographic map, and can serve as the BFE. (If the accuracy of the configuration of Zone A is questioned on a map, this method should not be used.)
3. Research local sources of BFE information, such as public works or road and bridge department; sewer, watershed, or levee districts; historical data, such as high water marks; information from local engineering firms; past flood stories in local newspapers; or recollections of big floods by long-time residents.



4. Check the State Coordinating Office to determine if BFE information is available from the following sources: Soil Conservation Service, United States Geological Survey, Missouri Highway and Transportation Department, Federal Highway Administration, Bureau of Land Reclamation, and Corps of Engineers (Flood Plain Management Services Office).

**NOTE:**

- A. *Officials must require that BFE and floodway data be included with all subdivision proposals and other proposed new developments of more than 50 lots or 5 acres (whichever is the smaller). In such cases, a developer is required to make an engineering study to develop BFEs and floodway information. This will be considered the best information available. The developer is responsible.*
- B. *It should be emphasized that certificates indicating current building elevations are required for all new flood-plain buildings and for substantial improvements.*

When a BFE cannot be determined through any of the sources listed above, an official may issue a permit without citing a BFE. Then, the lowest floor must be above the highest natural grade adjacent to the proposed structure. The lowest floor (including basement) is recommended to be at least two feet above the highest natural adjacent grade to facilitate reasonable insurance rates. In addition, the community is recommended to write developers and direct them to consult insurance agents to determine the economical advantage of exceeding these minimum guidelines.

Officials must be thorough and persevere in their research. Most people will be courteous and helpful. It should be remembered that not all "big" floods are base floods. For example, many people who experienced the great flood of 1973 at St. Louis believed it was a base flood (a "once-in-a-hundred years flood"). It was not; the volume of Mississippi River water passing the St. Louis gauge at the crest was on the order of a "thirty year flood."

## **Appeals**

If a property owner or a developer disagrees with the map or with the local administrator's determination that property is in a flood-hazard area, there is an appeal process.

The property owner must obtain scientific or engineering data showing his property is outside the flood-hazard area, and apply to the FEMA Regional Office, for a Letter of Map Amendment (LOMA).

Required information includes the following:

1. Legal description of the property, usually a copy of the recorded plat map bearing the seal of the circuit clerk (County Clerk or Recorder of Deeds), that indicates official recording and proper citation of the property (deed or plat book volume and page numbers).
2. A topographical map that shows ground-elevation contours, property area, the location of structure or structures on the property, and an indication of the lines that enclose the area subject to inundation by a flood having a one-percent chance of occurrence in any given year. This curvilinear line must be based on information provided from an authoritative source, such as the U.S. Army Corps of Engineers; USGS; SCS; or other Federal agency; the State Department of Natural Resources; the County Water Control District; the County or City Engineer; a FEMA Flood Insurance Study; or technical data prepared by a registered engineer. FIA may coordinate information submitted by a property owner with any of the above listed sources.

3. A certificate from a registered professional engineer or licensed land surveyor stating (1) the type of structure, (2) whether or not it is elevated on posts, piers, or walls, (3) whether it is built on a barrier sand dune, (4) the elevation of lowest floor (including basement), and (5) the elevation of the lowest grade adjacent to the structure.

Applications for a Letter of Map Amendment (LOMA) or for changes in the Flood Hazard Boundary Map or (FIRM) can be obtained by contacting the Region VII FEMA office. Other appeals are made to the board of adjustment named in the local ordinance.

Remember that the local ordinance adopts the FEMA-issued FIRM by reference; it is the information source. A community that believes that FEMA contractors made errors in mapping community flood-hazard areas should explain matters as soon as possible to the FEMA Regional Office.

1. A preliminary map of the area around the site is shown in Figure 7. The map shows the location of the site relative to the surrounding community and the location of the site relative to the surrounding area. The map also shows the location of the site relative to the surrounding area.

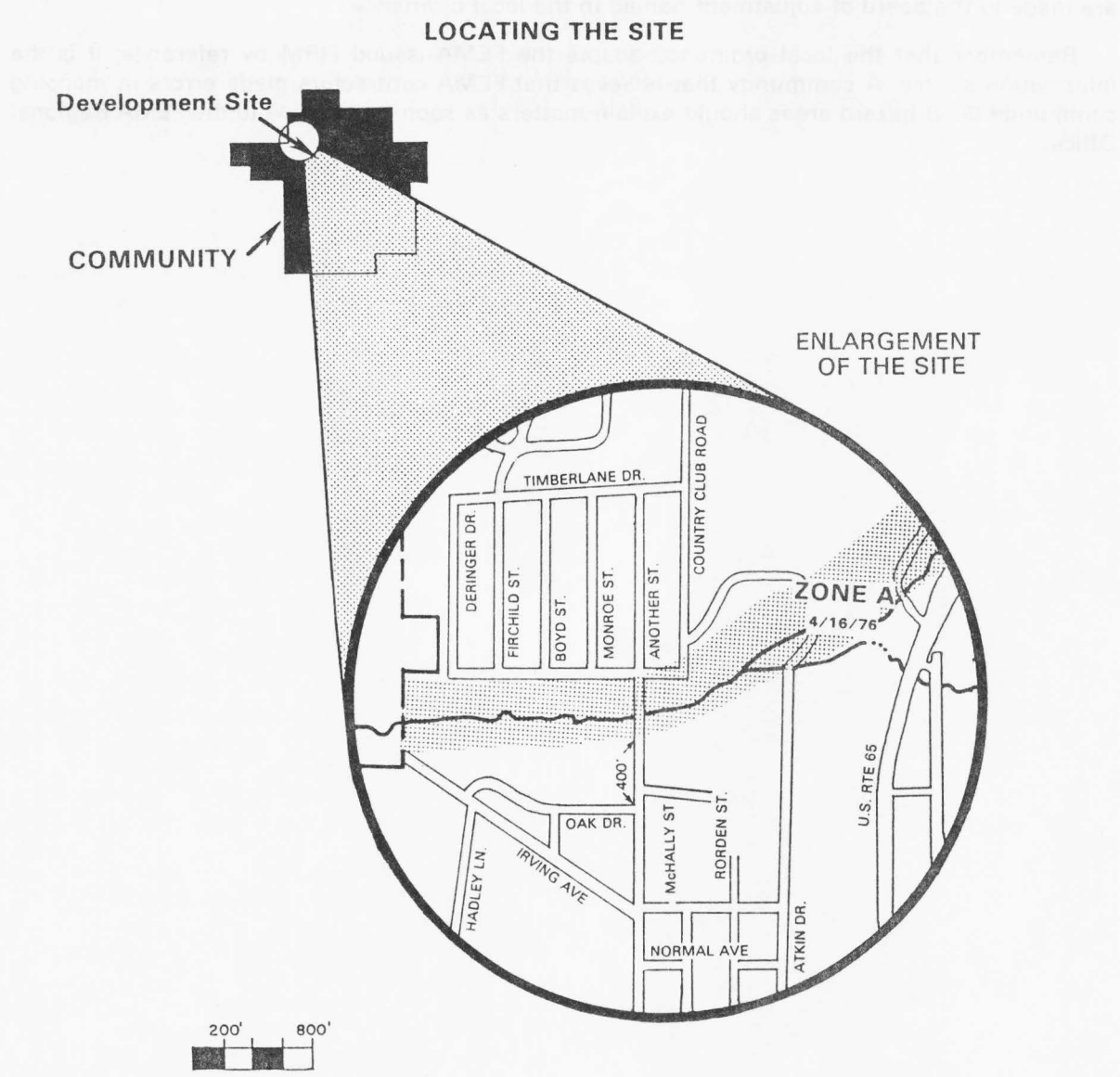


Figure 7. Locating the site



## **IV. REGULAR PROGRAM SPECIAL CONVERSION ORDINANCE**

The most important aspect of community participation in the NFIP is use of the flood-plain development ordinance. The ordinance specifies measures which must be taken to reduce flood hazards. Generally, the ordinance requires new buildings and substantial improvements be undertaken above the BFE.

The FIRM is used to identify property in a flood-hazard area; any available flood information helps establish the elevation requirement.

To clarify ordinance requirements, each section is explained in the following pages.

### **Development Permits**

Separate permits are required when erecting, constructing, repairing, or improving (over fifty percent of market value), or building a structure; placing a manufactured home; or mining, dredging, filling, grading, paving, excavating, drilling, or fencing within the flood hazard area.

Maintenance work, such as roofing, painting, and basement sealing, requires no permits. For improvement projects costing less than fifty percent of a building's fair market value, a permit can be granted that does not require the project to comply with the ordinance. All filling projects and all other development activities must have a flood-plain development permit and must comply with the ordinance.

A community's flood-plain management enforcement officer issues development permits and must also record them and maintain the records.

Section 1 of the model ordinance designates the local administrator of the ordinance provisions.

Section 2 tells how a substitute officer shall be designated by the local governing body.

Section 3 adopts the FIRM as the official map to be used in determining flood hazard areas.

Section 4 requires that development permits be obtained for all new developments in A zones. This section does not forbid developments, but they must be made safe from flood damage.

A permit applicant must complete an application form that shall include or be accompanied by the following information:

1. Identification and description of work for which the permit application is made.
2. Description of the land on which the proposed work is to be done, by lot, block, tract, house and street address, or a similar description that precisely identifies or readily locates the proposed building or work.
3. Indication of the use or occupancy for which the proposed work is intended.
4. Plans and specifications for proposed construction.
5. Signature of the permittee or his authorized agent, who may be required to submit evidence of such authority.
6. Within designated flood prone areas, designated elevations (in relation to mean sea level) of the lowest floor (including basement) or in the case of a floodproofed non-residential structure, the elevation to which it has been floodproofed. Documentation or certification of such elevations will be maintained by the local enforcement official.

7. Other information that may be reasonably required by the local enforcement official.

Such an application form can be of any design that the local government chooses, and may double as a building permit. Few model building permits are satisfactory, however, because they have no way to indicate flood-plain locations, or the need for elevation certificates. For most local governments that issue building permits, a flood-plain development permit *a/so* will be needed.

Part six, above, requires that the developer supply an elevation certificate or a floodproofing certificate to the local administrator. FEMA supplies a very useful form for such information, but these forms can be of any design that the jurisdiction chooses.

The elevation (or floodproofing) certificate is important, because it informs the local administrator that the permittee has done what he said he would do and it "closes the loop," as it were.

The local administrator keeps a copy of each permit application, whether approved or denied.

Each applicant denied a permit can appeal the denial, or can request the issuance of a variance. The administrator should note the reasons for a denial on the application form.

Each applicant issued a permit may have an imposed time limit, such as twelve months, in which to begin the permitted development; otherwise, the permit expires, a provision that protects the community from later "surprise" developments permitted by a former administrator.

When a permit is issued, the local administrator fills out the portion of the elevation certificate that identifies the FIRM panel showing the site, and the BFE, if known. When the building is finished, the owner directs his engineer or surveyor to complete the form, and thereby certify the lowest-floor elevation.



Figure 8. Closing the loop.

The elevation certificate is important to the following:

1. The owner's insurance agent, if he wants flood insurance coverage for the building;
2. The tenant's insurance agent, if he wants flood insurance coverage for the building contents;
3. The owner, if he may want to sell the property;
4. The local administrator, since the certificate shows if the building was completed in compliance with the ordinance (if not, the court will consider the certificate evidence).

The owner's lender may also find the certificate useful.

See sample development permit, elevation certificate, and floodproofing certificate (see Figures 9., 10., 11., and 12.).

**NOTE:**

*For flood insurance purposes, an insurance agent will rate a floodproofed non-residential building at one foot below the level of floodproofing. If the local ordinance requires floodproofing "to or above" the BFE, a building could be rated one foot below BFE, a factor that could double the annual premium. To save premium dollars, the administrator should therefore advise the owners to exceed the minimum requirement.*

### **The Reluctant Applicant**

What does a local administrator do when the developer does not want to comply with ordinance terms, and says that he wants no flood insurance?

Just as most municipalities have vehicle speed-limit ordinances, to ensure public safety, nearly five hundred Missouri communities have flood-plain management ordinances to ensure public safety. One might ask how a sheriff, police chief, or city marshall would react if a motorist said he did not want to obey the speed limit, and wanted no auto insurance?

An ordinance may or may not have a penalty provision; nevertheless, the ordinance is enforceable in (a) municipal court, or (b) circuit court. A community that does not actively enforce its ordinance is subject to disciplinary action by the FEMA Regional Office.

### **Probation**

When FEMA decides a community's enforcement has been lax, the FEMA Regional Office may impose probation, a formal step toward suspension from the NFIP. During the probation period, a \$25.00 surcharge is added to the premium of every flood-insurance policy purchased or renewed. To improve performance, FEMA officials work closely with such a community.

### **Suspension**

If a community is reluctant to enforce its ordinances, or efforts to improve performance fail, the FEMA Regional Office will recommend that the community be suspended from NFIP participation. The FEMA central office in Washington, D.C. will then suspend the community.

Suspension means flood insurance (new or renewed) is unavailable, and federally related grants or loans are unavailable for buildings in flood-hazard areas. Suspension means no disaster assistance, no mortgage loans, no small business loans, and no grants for sewage treatment plants.

COUNTY OF \_\_\_\_\_, MISSOURI  
APPLICATION  
FLOOD PLAIN DEVELOPMENT PERMIT

DATE \_\_\_\_\_ PERMIT NUMBER \_\_\_\_\_

NAME OF APPLICANT \_\_\_\_\_

MAILING ADDRESS \_\_\_\_\_

TELEPHONE NUMBER (home) \_\_\_\_\_ (work) \_\_\_\_\_

PERMIT IS FOR: (check one)

<input type="checkbox"/> New Construction.*	<input type="checkbox"/> Other Development:
<input type="checkbox"/> Substantial Improvement* (Greater than 50% of value)	<input type="checkbox"/> Filling
<input type="checkbox"/> Addition to Existing Building	<input type="checkbox"/> Excavating, Mining
<input type="checkbox"/> *Elevation Certificate Needed	<input type="checkbox"/> Grading
	<input type="checkbox"/> Paving
	<input type="checkbox"/> Building
	<input type="checkbox"/> Drilling
	<input type="checkbox"/> Subdivision

ADDRESS OF DEVELOPMENT \_\_\_\_\_  
(use lot, tract, or other \_\_\_\_\_  
appropriate description to \_\_\_\_\_  
allow accurate identification) \_\_\_\_\_

IS SITE IN AN IDENTIFIED FLOOD HAZARD AREA?  
\_\_\_\_\_ Yes, Zone A \_\_\_\_\_ No, Zone C

ELEVATION OF HUNDRED-YEAR FLOOD \_\_\_\_\_ FEET ABOVE SEA LEVEL.

ELEVATION OF DEVELOPMENT SITE \_\_\_\_\_ FEET ABOVE SEA LEVEL.

ELEVATION OR FLOOD PROOFING REQUIREMENT \_\_\_\_\_ FEET (difference).

IS PROPOSED USE RESIDENTIAL? \_\_\_\_\_ Yes \_\_\_\_\_ No

Other? \_\_\_\_\_ Yes, Specify: \_\_\_\_\_

(Residences must have lowest floor at or above 100-year flood elevation. Other buildings must be flood-proofed or elevated to that height.)

SUBDIVISION PROPOSALS MUST ATTACH ADDITIONAL INFORMATION:

- ☐ Original site contours, showing existing drainage and watercourses, buildings, and other development.
- ☐ Plan for grading, showing new contours, new drainage, altered watercourses, removal of buildings or other development, roads.
- ☐ Limits of flood plain.
- ☐ Hundred-year flood elevations.
- ☐ Locations and lowest floor elevations of proposed buildings.
- ☐ Other site data needed by city for evaluation: e.g., fire hydrants, sanitary sewerage.

OTHER PERMITS REQUIRED?

- ☐ CORPS OF ENGINEERS (e.g., Section 404, Clean Water Act, for dredging, filling, channel changes, in or beside rivers.)
- ☐ STATE OF MISSOURI (e.g., State Highway Curb Cut; DNR, for NPDES Permit or Section 401, CWA, Water Quality Certification.)
- ☐ LOCAL SPECIAL DISTRICT (e.g., Levee Crossing Permit.)
- ☐ OTHER: \_\_\_\_\_

ALL PROVISIONS OF THE \_\_\_\_\_ COUNTY ORDINANCE SHALL BE COMPLIED WITH.

\_\_\_\_\_  
(Signature of applicant or certified agent)

APPROVAL: \_\_\_\_\_

(Date) (Signature of authorizing official)

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

Figure 9. A sample flood-plain development permit form.

## ELEVATION CERTIFICATE

### FEDERAL EMERGENCY MANAGEMENT AGENCY NATIONAL FLOOD INSURANCE PROGRAM

OMB 3067-007  
 EXPIRES: JUNE 30 1990

This form is to be used for: 1) Post-FIRM construction only when the base flood information is available for the building site; and 2) Pre-FIRM buildings rated using Post-FIRM rules. Instructions for completing this form can be found on the reverse side.

---

BUILDING OWNER'S NAME
POLICY NUMBER

---

STREET ADDRESS

---

Apt./Unit-U Suite-S/Bldg.-B
NO.
ROUTE
BOX NUMBER

---

OTHER DESCRIPTION (Block and lot numbers, etc.)

---

CITY
STATE
ZIP CODE

---

This form is to be completed by a land surveyor, engineer, or architect who is authorized by state law to certify elevation information when the elevation information for zones A1-A30, AE, AH, A(with BFE), V1-V30, VE, and V(with BFE) is required. In the case of zone AO, the building official, the property owner, or the owner's representative should complete the information in Section I and may also complete the certification. Community officials who are authorized by local law or ordinance to provide floodplain management information may also complete this form.

**SECTION I BUILDING ELEVATION INFORMATION**

1. Using the Flood Insurance Manual or the NFIP Flood Insurance Application—Part 2 Worksheet, indicate the proper diagram number \_\_\_\_\_
2. FIRM Zones A1-A30, AE, AH, and A (with BFE). The top of the reference level floor from the selected diagram is at an elevation of \_\_\_\_\_ feet NGVD. (or other datum—see #5)
3. FIRM Zones V1-V30, VE, and V (with BFE). The bottom of the lowest horizontal structural member of the reference level floor from the selected diagram is at an elevation of \_\_\_\_\_ feet NGVD (or other datum—see #5).
4. FIRM Zone AO. The floor used as the reference level from the selected diagram is \_\_\_\_\_ feet above highest natural grade next to the building (also enter in line 8). This value must be equal to or greater than the AO Zone flood depth number listed below. If no flood depth number is available, is the building's lowest floor (or reference level) elevated in accordance with the community's floodplain management ordinances? ☐ Yes ☐ No ☐ Unknown
5. Indicate the elevation datum system used in determining the above reference level elevations: ☐ NGVD ☐ Other (describe on back)
6. Indicate the elevation datum system used on the FIRM for base flood elevations: ☐ NGVD ☐ Other (describe on back)

(ATTENTION: If the elevation datum used in measuring the elevations is different than that used on the FIRM, then the elevations provided must be converted to the datum system used on the FIRM.)

7. Is the reference level based on actual construction? ☐ Yes ☐ No\*  
 \* A "No" answer is only valid if the building does not have the reference level floor in place. Fill in the elevation based on construction drawings and do not complete question #8. If "No" is checked, this certification will be valid only for buildings in the course of construction. After construction of the reference level floor is completed, a post-construction elevation certificate will be required for continued flood insurance coverage.
8. Provide the following measurements using the natural grade next to the building (round to the nearest foot).
 

a. The reference level is:

☐ feet ☐ above ☐ below (check one) the highest grade.
☐ feet ☐ above ☐ below (check one) the lowest grade.

b. The garage floor (if applicable) is:

☐ feet ☐ above ☐ below (check one) the highest grade.
☐ feet ☐ above ☐ below (check one) the lowest grade.

**SECTION II FLOOD INSURANCE RATE MAP INFORMATION**

Provide the following from the proper FIRM (see Instructions on back—Date of FIRM) and accompanying insurance application:

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV. (In AO Zone, use depth)	COMMUNITY ESTIMATED BASE FLOOD ELEVATION ESTABLISHED FOR ZONE A OR ZONE V, IF AVAILABLE

Elevation reference mark used appears on FIRM ☐ Yes ☐ No (See reverse side for details)

**SECTION III CERTIFICATION**

This certification is to be signed by a land surveyor, engineer, or architect who is authorized by state law to certify elevation information when the elevation information for zones A1-A30, AE, AH, A(with BFE), V1-V30, VE, and V(with BFE) is required. In the case of zone AO, the building official, the property owner, or the owner's representative can sign the certification. Community officials who are authorized by local law or ordinance to provide floodplain management information, may also sign the certification. 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.

CERTIFIER'S NAME
LICENSE NUMBER (or Affix Seal)

---

TITLE
COMPANY NAME

---

ADDRESS
CITY
STATE
ZIP

---

SIGNATURE
DATE
PHONE

---

The insurance agent should attach the original copy of the completed form to the flood insurance policy application. The second copy should be supplied to the policyholder and the third copy retained by the agent. The fourth copy is for the local community permit office, if required.  
 THIS FORM MAY BE REPRODUCED

FOR OPTIONAL COMMUNITY USE: Is the reference level also the lowest floor under the community's floodplain management ordinances?  
☐ YES ☐ NO If no the elevation of the lowest floor is \_\_\_\_\_ feet NGVD.

FEMA FORM 81-51 (10/87)

593-117 (6/87)

Figure 10. A NFIP elevation certificate. (obverse)



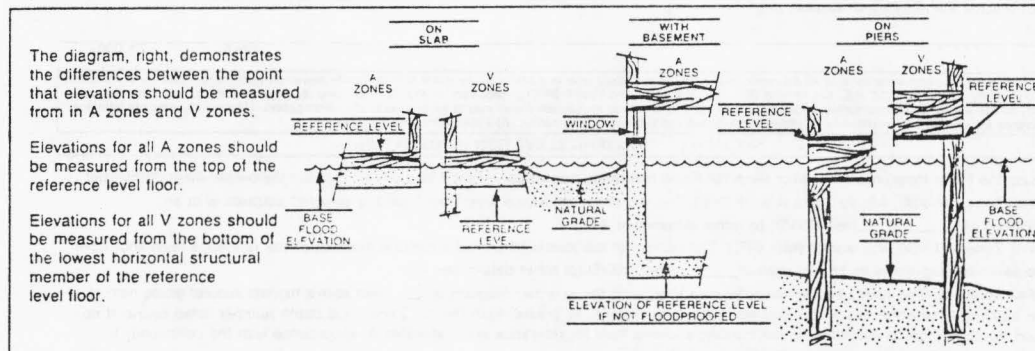
## INSTRUCTIONS FOR COMPLETING THE ELEVATION CERTIFICATE

The Flood Insurance Manual and the Flood Insurance Application—Part 2 Worksheet contains a series of diagrams that are to be used to determine the reference level for the specific structure in question. The diagrams are available through local insurance agents or the National Flood Insurance Program.

"Natural grade" is defined as the "grade unaffected by construction techniques such as fill, landscaping, or berming."

A reference level is shown in each of the worksheet diagrams of the various building types. For property locations in zones A1-A30, AE, AH, and A (with BFE), Line 2 of the Elevation Certificate indicates that the elevation should be measured from the top of the reference level floor. For property locations in zones V1-V30, VE, and V (with BFE), Line 3 of the Elevation Certificate indicates that the elevation should be measured from the bottom of the lowest horizontal structural member of the reference level floor.\*

\* The insured will determine the measurements using the "top of floor" from the Flood Insurance-Part 2 Worksheet diagrams.



The reference level elevation may be reported to the same level of precision used to report base flood elevation on the FIRM (e.g., if the base flood elevation is shown to the nearest half foot, the reference level may be reported to the nearest half foot).

Base flood elevations are shown on the community's Flood Insurance Rate Map (FIRM) for zones A1-A30, AH, AE, V1-V30, and VE. Base flood elevations may also be on file with the community for zones A and V for all subdivisions and other new developments greater than 50 lots or 5 acres, whichever is the lesser, if the start of construction was after December 31, 1974.

Base flood depth numbers are shown on the community's Flood Insurance Rate Map (FIRM) for zone AO. These depth numbers should be used to compare with the height of the reference level floor above highest natural grade in Line 8 of the Elevation Certificate.

Elevation reference marks other than those shown on the FIRM may be used for reference level elevation determinations. In areas experiencing ground subsidence, the most recently adjusted reference mark elevations available must be used for elevation determinations. If a reference mark not shown on the FIRM is used, identify the reference mark used in the comment section.

Date of FIRM used in Section II of the Elevation Certificate can be either the date of the FIRM in effect when the certification is being provided or the date of the FIRM that was in effect at the time the building was constructed.

### COMMENTS:

NOTE TO INSURANCE AGENTS AND COMMUNITY OFFICIALS: In all A zones, the reference level is the top of the lowest floor and in V zones the reference level is the bottom of the slab/horizontal support. Agents should refer to the flood insurance manual for instruction on lowest floor definition.

593-117-2 (6/87)

Figure 11. Part II of elevation certificate. (reverse)

FEDERAL EMERGENCY MANAGEMENT AGENCY  
NATIONAL FLOOD INSURANCE PROGRAM  
**FLOODPROOFING CERTIFICATE**

This form is to be used for: 1) Post-FIRM construction only when the base flood information is available for the building site;  
and 2) Pre-FIRM buildings rated using Post-FIRM rules.

BUILDING OWNER'S NAME \_\_\_\_\_ POLICY NUMBER \_\_\_\_\_

STREET ADDRESS \_\_\_\_\_

Apt./Unit-U Suite-S/Box-B \_\_\_\_\_ NO. \_\_\_\_\_ ROUTE \_\_\_\_\_ BOX NUMBER \_\_\_\_\_

OTHER DESCRIPTION (Block and lot numbers, etc.) \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP CODE \_\_\_\_\_

*This form is to be completed by a land surveyor, engineer, or architect who is authorized to certify elevation information. Community officials who are authorized by local law or ordinance to provide floodplain management information may also complete this form.*

**SECTION I FLOOD INSURANCE RATE MAP INFORMATION**

Provide the following from the proper FIRM and accompanying insurance application:

COMMUNITY NO.	PANEL NO.	SUFFIX	DATE OF FIRM	FIRM ZONE	BASE FLOOD ELEV. (in AO Zone, use depth)	COMMUNITY ESTIMATED BASE FLOOD ELEVATION ESTABLISHED FOR ZONE A OR ZONE V, IF AVAILABLE

Elevation reference mark used appears on FIRM ☐ Yes ☐ No

**SECTION II FLOODPROOFING CERTIFICATION**  
(Certification by a Registered Professional Engineer or Architect)

I certify to the best of my knowledge, information, and belief, that the building is designed so that the building is watertight, with walls substantially impermeable to the passage of water and structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy that would be caused by the flood depths, pressures velocities, impact and uplift forces associated with the base flood.

In the event of flooding, will this degree of floodproofing be achieved with human intervention? ☐ Yes ☐ No

*(Human intervention means that water will enter the building when floods up to the base flood level occur unless measures are taken prior to the flood to prevent entry of water, e.g., bolting metal shields over doors and windows.)*

Will the building be occupied as a residence? ☐ Yes ☐ No

If the answer to both questions is Yes, the floodproofing cannot be credited for rating purposes and the actual reference level floor must be completed and certified instead. Complete both the elevation and floodproofing certificates.

FIRM ZONES A, AE, A1-A30, VE, V1-V30, AO and AH: Certified Floodproofed Elevation is \_\_\_\_\_ feet, (NGVD).

**SECTION III CERTIFICATION**

*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*

CERTIFIER'S NAME \_\_\_\_\_ LICENSE NUMBER (or Affix Seal) \_\_\_\_\_

TITLE \_\_\_\_\_ COMPANY NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_ CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_ PHONE \_\_\_\_\_

The insurance agent should attach the original copy of the completed form to the flood insurance policy application. The second copy should be supplied to the policyholder and the third copy retained by the agent.  
**THIS FORM MAY BE REPRODUCED.**

Figure 12. A NFIP floodproofing certificate.



## **Reinstatement**

A community suspended from the NFIP, or a community that has never joined the program can apply any time to re-enter or enter the NFIP.

Community officials should remember that maps identifying flood hazards are effective, regardless of whether or not the community is participating in the program; therefore, flood-plain development should meet minimum standards, even if no ordinance is in force.

This is because the Federal Emergency Management Agency, reviewing a application for reinstatement, will examine development which occurred during the suspension period and may require violation corrections before reinstatement.

Several Missouri communities have been suspended and reinstated. The FEMA Regional Office in Kansas City can assist a community requesting help.

## **Reviewing Permit Applications**

Section 5 of the model ordinance says that the local official shall review all development-permit applications to determine if proposed development sites are reasonably safe from flooding and to see that all permits required by federal or state law have been received.

What is "reasonably safe from flooding"? A field examination of the development site can determine this. Typically, a riverbank location is likely to receive swift flows. Current velocities can cause damages different from those resulting from soaking in a backwater. Floodwater depths can be surmised by seeing the lay of the land. A site at the edge of a flood plain, high on the valley floor, will be less risky than an abandoned river-bed site. Consult soil surveys, long-time residents of the area, newspaper stories of prior floods, state and federal agencies, and try to determine degrees of risk for A zones in your community.

If a site is unlikely to flood, except in rare, large-flood events, it meets the test of reasonable safety. If a site is likely to flood once every five years, it probably does not.

What permits? The Clean Water Act requires a State Water Quality Certification (Section 401) and a federal Dredge-and-Fill Permit (Section 404) for projects at the water's edge (such as docks, retaining walls, rip-rap, bridges). There are wetland protection, environmental protection, flood-plain protection, and farmland preservation statutes, executive orders, and regulations. If a state or federal highway, or a levee district are involved, other permits also may be needed.

When a Section 404 permit is needed from the Corps of Engineers district office, it is best to coordinate issuance of all permits simultaneously. Six Corps districts serve Missouri (unlike New England, where one district serves six states). Each Corps district has a Flood Plain Management Services branch, which can give community assistance, such as helping with BFEs. Each district also has a regulatory branch, which issues permits.

If any drilling is proposed, please remember that the Missouri Department of Natural Resources, Division of Geology and Land Survey must permit all oil and gas wells, and that DNR licenses all water-well drillers. Water wells must be cased and certified.

If state highways are involved, often a state permit is required for a "curb cut" access. If a railroad is involved, the railroad must grant a crossing permit.

For convenience, a list of the six Corps district FPMS offices follows:

- K. Kansas City District  
700 Federal Bldg.  
Kansas City, MO 64106  
(816) 426-3955
- L. Little Rock District  
P.O. Box 867  
Little Rock, AR 72203  
(501) 378-5612
- M. Memphis District  
688 Federal Bldg.  
Memphis, TN 38103  
(901) 521-3968
- O. Omaha District  
217 N. 17th St.  
Omaha, NE 68102  
(402)221-4893
- R. Rock Island District  
Clock Tower Bldg.  
Rock Island, IL 61210  
(309) 788-6361
- S. St. Louis District  
210 Tucker Blvd., N.  
St. Louis, MO 63101  
(314) 263-5505



Figure 13. Districts of the U.S. Army, Corps of Engineers

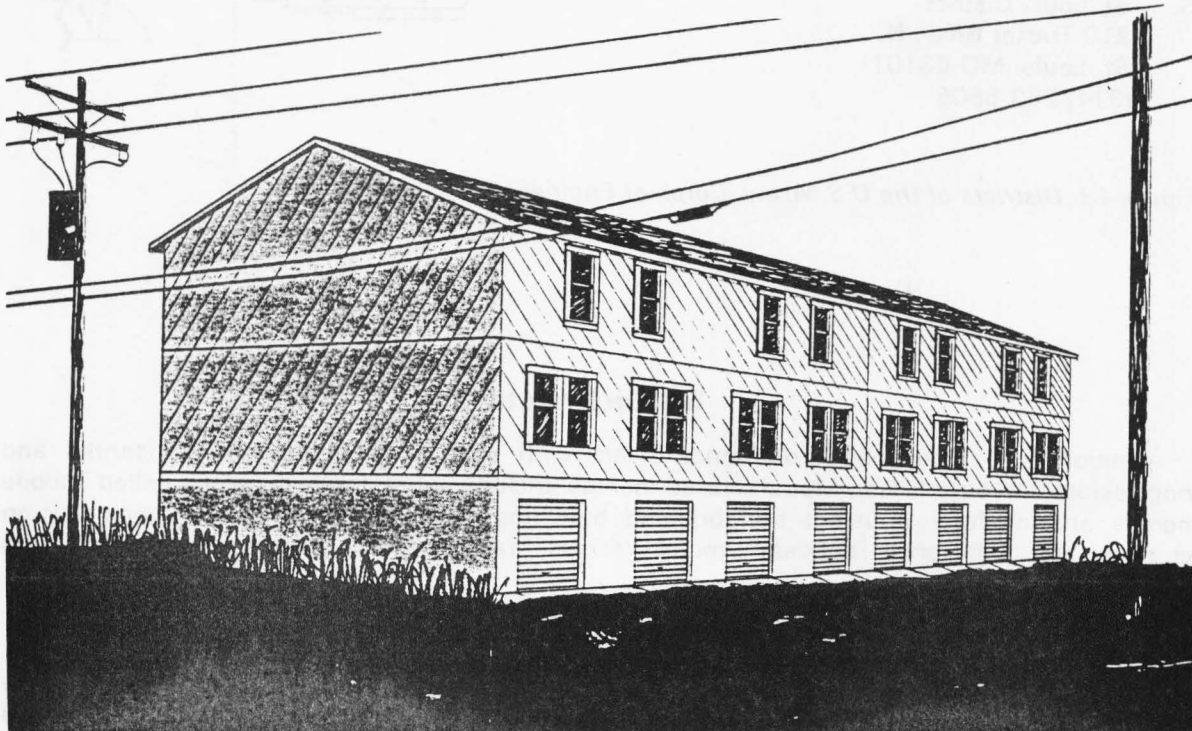
## Requirements

Section 6 of the model ordinance deals with specific standards for residential and non-residential structures. Manufactured homes include what formerly were called mobile homes and modular housing; prefabricated buildings are included. The definitions section clarifies the difference between motor homes, recreational vehicles ("campers"), and manufactured homes.

The local administrator shall do the following:

- a. Obtain, review, and reasonably use, if available, any regulatory flood-elevation data and floodway data available from federal, state, or other sources until the Federal Insurance Administration provides other data for a Flood Insurance Study. The local administrator shall also require the following performance standards be met in Zone A areas on the official map:

- (1) **Residential Construction** - New construction or substantial improvement of any residential structure shall have the lowest floor, including basement, elevated to or above the base flood elevation.
- (2) **Non-residential Construction** - New construction or substantial improvement of any commercial, industrial or other non-residential structure shall either have the lowest floor, including basement, elevated to the level of the base flood elevation or, together with attendant utility and sanitary facilities, be floodproofed, so that below lowest floor and basement levels the structure is watertight with walls substantially impermeable to water and with structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyance. A registered professional engineer or architect shall certify that this subsection standards are followed, and such certification shall be provided to the local enforcement official.
- (3) **Requirements for all new construction and substantial improvements** - fully enclosed areas below the lowest floor that are subject to flooding shall be designed to equalize hydrostatic flood forces on exterior walls, automatically, by allowing for floodwater entry and exit. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.



*Figure 14. Elevated apartment house with garage spaces beneath.*

If a building is elevated on fill dirt, there is no such "enclosed area below," but if it is elevated on extended foundation walls, or on piers, there can be a "crawl space" or larger area beneath the elevated lowest floor.

Formerly, such an area could not be "fully enclosed," but had to remain open or be screened with lattice-work or "break-away walls," but recently revised federal minimum standards allow such an area to be secured.

Regulations adopted in 1986 allow enclosures, provided they meet the cited standards. This means the following:

- No utilities below the BFE.
- Not suitable for human habitation.
- Openings sufficiently large to allow interior flooding to equalize water pressure on the building walls.
- Certified by architect or engineer (another document to be filed).

What uses are envisioned for such an open area? Usually, it means a garage or an area where things may be stored that are of minimal value, are easily moved, or are not likely to be damaged by flood waters.

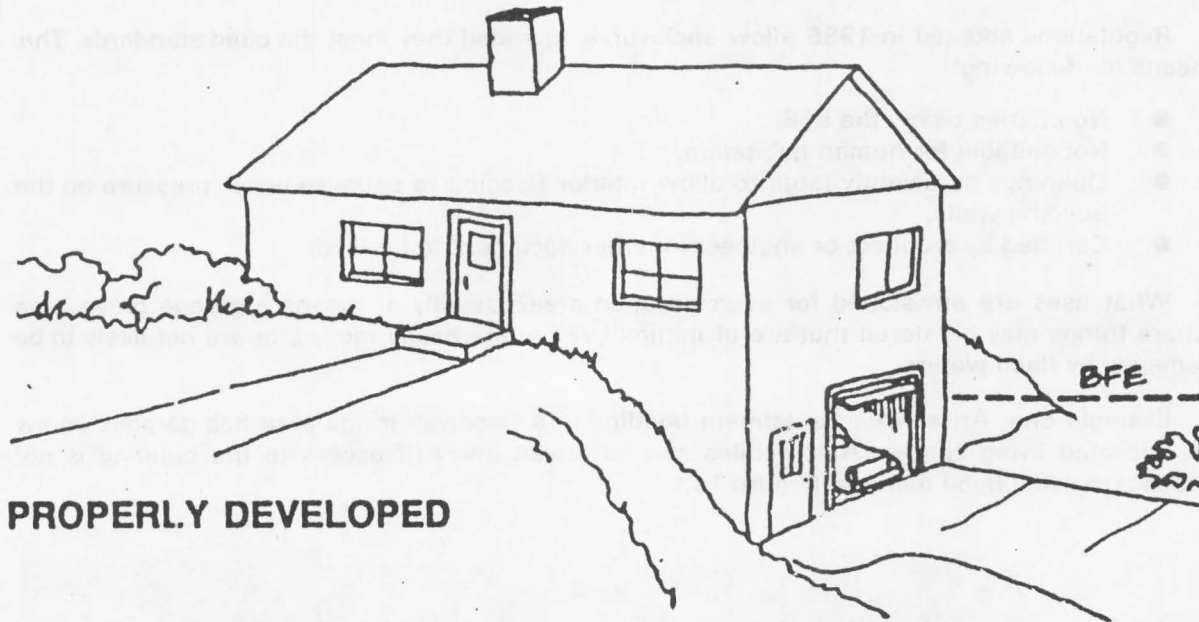
Example one: An elevated apartment building in a floodway fringe area has garages below the elevated living spaces. Automobiles can be driven away (if access to the building is not flooded) to avoid flood damage. (Figure 14.)



*Figure 15. Steel flood door partly closed at garage entrance. (photo by Nick Decker)*



Example two: An elevated commercial building containing a hotel and restaurant in a floodway fringe area has surface and subsurface parking beneath the building. A flood door is installed for security. An inflatable neoprene gasket seals the closed door against leakage. This is a flood-proofing element for non-residential buildings that must be certified by the building architect or engineer. The walls and the floors of such a building must be reinforced to resist water pressure.



*Figure 16. An acceptable flood plain construction practice. (Construction of tuck-under garages is an acceptable flood plain construction practice, if used exclusively for storage and parking of vehicles related to the residence).*

## **Requirements for Residential Structures**

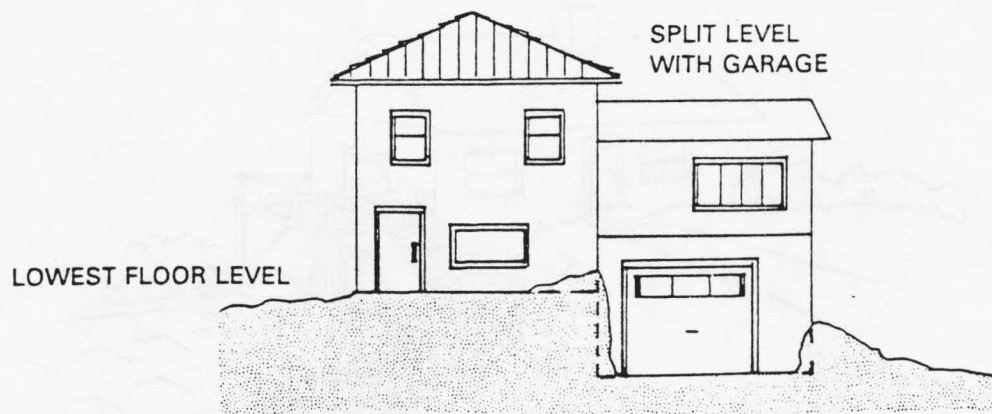
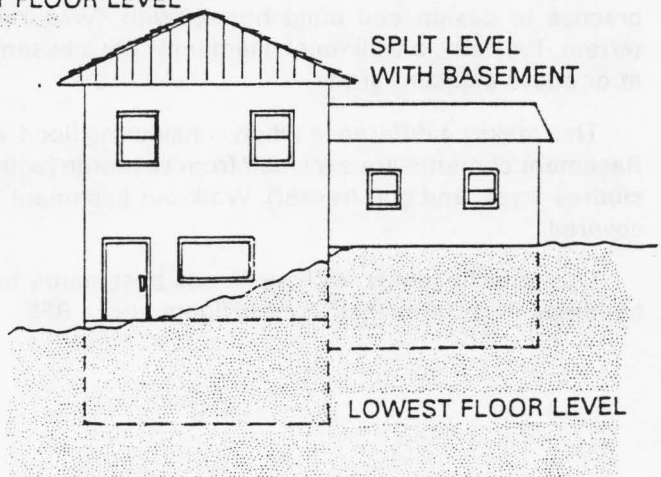
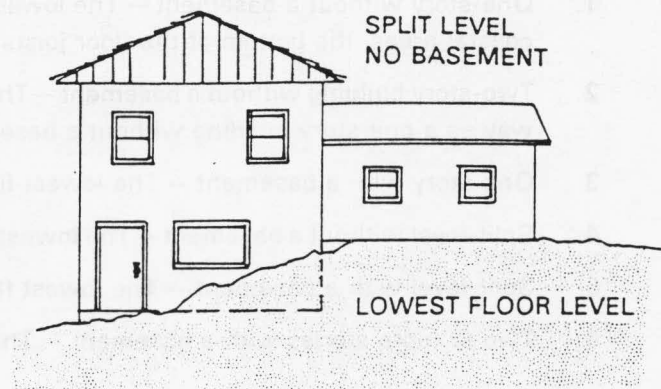
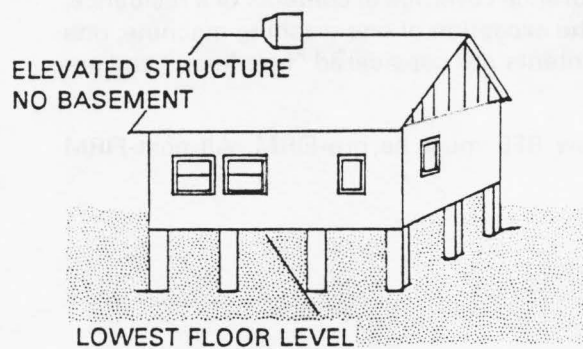
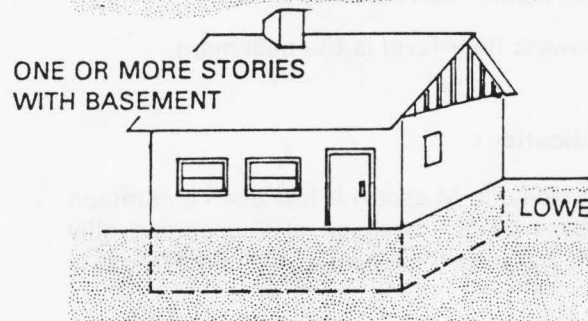
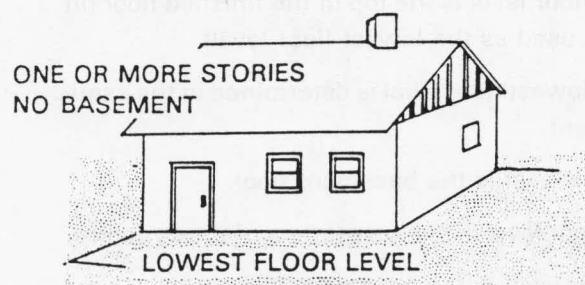
### **General Requirements**

Generally, the Special Conversion Regular Program ordinance specifies that new residences (built after the date of the FIRM) must be elevated above the base flood elevation (BFE). This means that the lowest floor, including the basement, if there is one, must be above the BFE. To do this, the enforcement officer must determine what the lowest floor will be, and then establish the elevation requirement. The developer must then determine which method to use to elevate the residence.

### **Determining the Lowest Floor**

Flood insurance rates are partly based on the lowest floor level of a structure. If that lowest floor level is equal to the 100-year flood elevation, there is an annual one-percent chance of flood loss to the lowest floor. For new construction, it is therefore very important that the lowest floor level be at *least equal* to the 100-year flood elevation. Several examples of lowest floor levels of various residence types are illustrated in figure 17.





UTILITIES SUCH AS ELECTRICAL AND HEATING  
FACILITIES MUST BE AT OR ABOVE BFE

Figure 17. Determining the lowest floor.

1. One-story without a basement -- The lowest floor level is the top of the finished floor (in coastal areas, the bottom of the floor joists is used as the lowest floor level).
2. Two-story building without a basement -- The lowest floor level is determined in the same way as a one-story building without a basement.
3. One-story with a basement -- The lowest floor level is the basement floor.
4. Split-level without a basement -- The lowest floor level is the lowest floor of the structure.
5. Split-level with a basement -- The lowest floor level is the basement floor.
6. Two or more stories with a basement -- The lowest floor level is the basement.

### Flood Insurance Ramifications

A basement is defined as being below grade on all sides. In Missouri it has been a common practice to design and build homes with "walk-out basements," because of widespread hilly terrain. Typically, a walk-out basement is not a basement, because the walkout side of the house is at or above adjacent grade.

This makes a difference when considering flood insurance coverage of *contents* of a residence. Basement contents are *excluded* from coverage (with the exception of one washing machine, one clothes dryer, and one freezer). Walk-out basement contents are considered "first floor," and are covered.

The only buildings with walk-out basements below BFE must be pre-FIRM. All post-FIRM buildings must have their lowest floors above BFE.

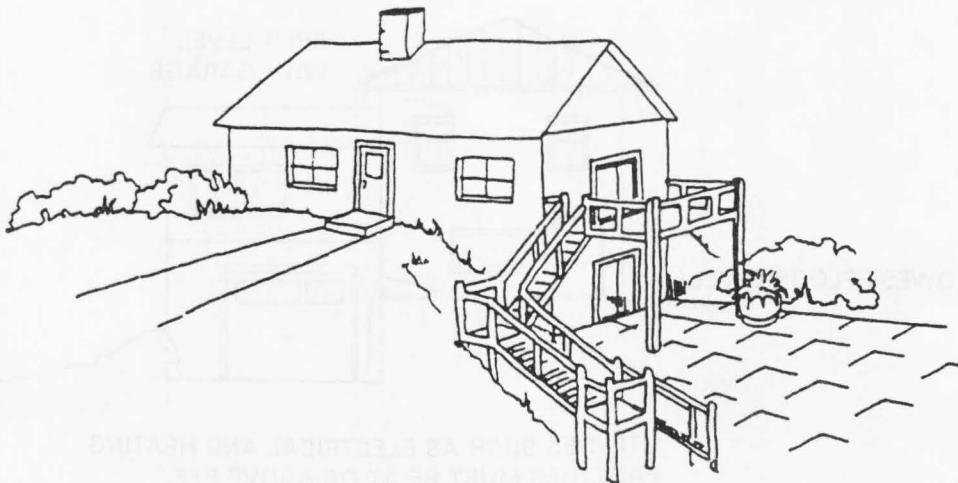


Figure 18. The "walk-out basement."

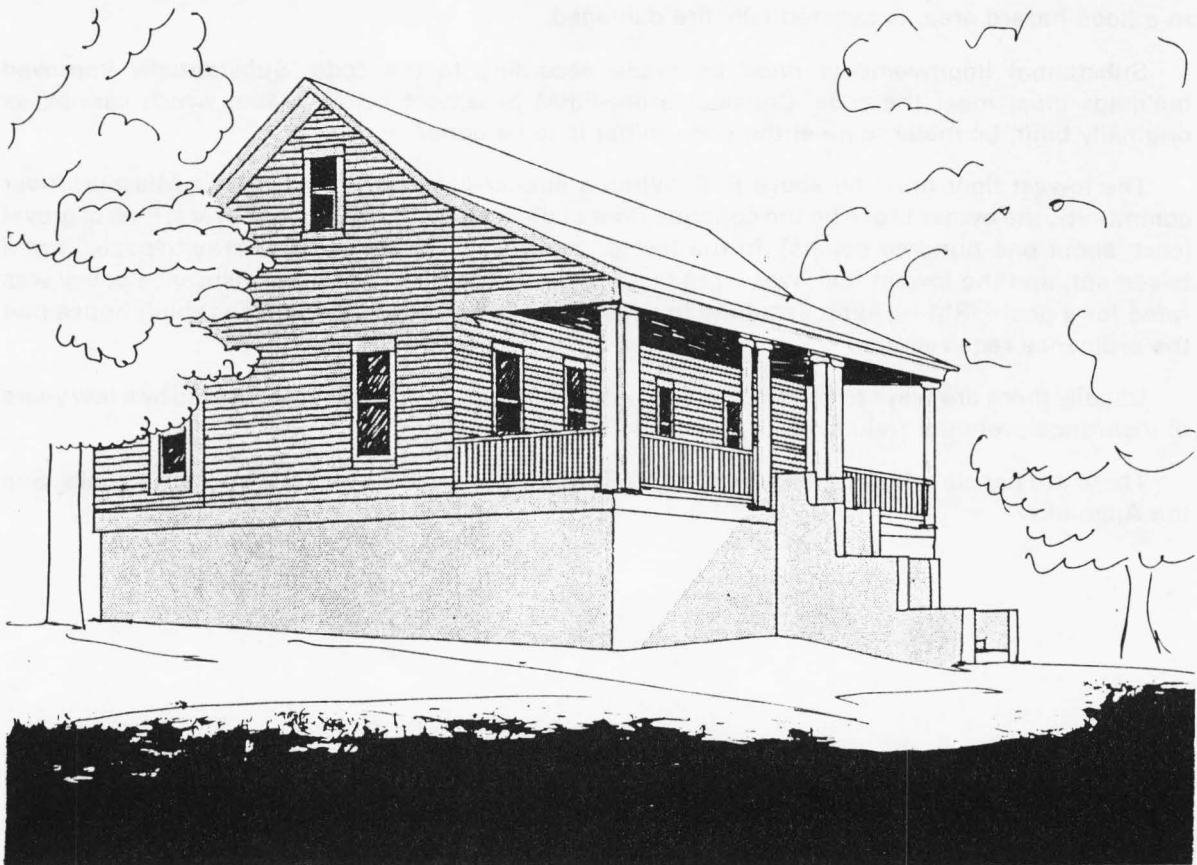
### Establishing the Minimum Elevation Requirements

After determining the lowest floor level, the enforcement officer can inform the developer in writing which residence level must be elevated to the BFE. The enforcement officer would use the BFE, if available, or any other available flood elevation, in setting this requirement.

### Methods Of Elevating Residential Structures

Residences can be elevated by increasing the foundation height, adding fill, or constructing the residence on posts or piers. These methods are described in more detail below, and are illustrated on the following pages.

1. Increasing the height of the foundation - It is sometimes a practice in communities, to construct residential foundations using 8x8x16-inch concrete blocks. Foundations are therefore described as being "two-blocks-high," "three-blocks-high," and so on. Using this as a gauge, a developer could use a three-block-high foundation to meet a two-foot elevation requirement; likewise, a five-block-high foundation could be used to meet a three-foot elevation requirement. The same technique could be used when pouring a concrete foundation and having a crawl space beneath a residence. As previously mentioned, the floor joists could also be used to meet the elevation requirement; therefore, a four-foot elevation requirement could be met by using five blocks and a 10-inch floor joist. These techniques can be used to design a foundation that will protect the first floor level from a base flood:



*Figure 19. Elevating method: extended foundation walls.*

2. Using earth fill - Fill dirt may also be used to meet the residential elevation requirement. It may, of course, be used in combination with the foundation to meet the elevation requirement. Any filling project in a flood-hazard area requires a development permit. Fill should extend 15 feet from all sides of the structure so as to increase fill stability during floods. Of course, the fill must be properly compacted.
3. Using posts or piers - Posts or piers as structural supports may also meet elevation requirements. This method of elevating residential structures is common in areas adjacent to the Missouri and Mississippi Rivers, where elevation requirements may exceed 10 feet.

### **Certification**

A licensed surveyor or engineer must certify that the elevation requirement has been met. Certification requirements are explained in more detail elsewhere in this handbook. Sample certification forms are provided.

Additional information about elevating residential structures may be obtained by ordering the *Elevated Residential Structures* manual listed in the Appendix.

### **Special Case**

A building constructed before the effective date of a community's Flood Insurance Rate Map (FIRM) is called a "pre-FIRM" building. In this special case, a pre-FIRM residence with basement, in a flood hazard area, is substantially fire damaged.

Substantial improvements *must* be made according to the code. Substantially improved buildings *must* meet the code. Consider a pre-FIRM basement below grade, which cannot, as originally built, be made to meet the code. What is to be done?

The lowest floor *must* be above BFE. When a similar case was handled in a Missouri River community, the owner broke up the concrete floor of the basement and placed several tons of gravel (cost: about one hundred dollars), in the former basement. He then had a "crawl-space," not a basement, and the lowest floor was eight feet higher than before. The flood insurance policy was rated for a post-FIRM building, resulting in substantial premium reduction. The rebuilt house met the ordinance requirements.

Usually there are ways to comply. Sometimes compliance costs are compensated by a few years of insurance-premium reductions. When in doubt, ask questions.

There are people who can help. In addition, FEMA has prepared several informative books. See the Appendix.

## Requirements for Commercial Structures

### General Requirements

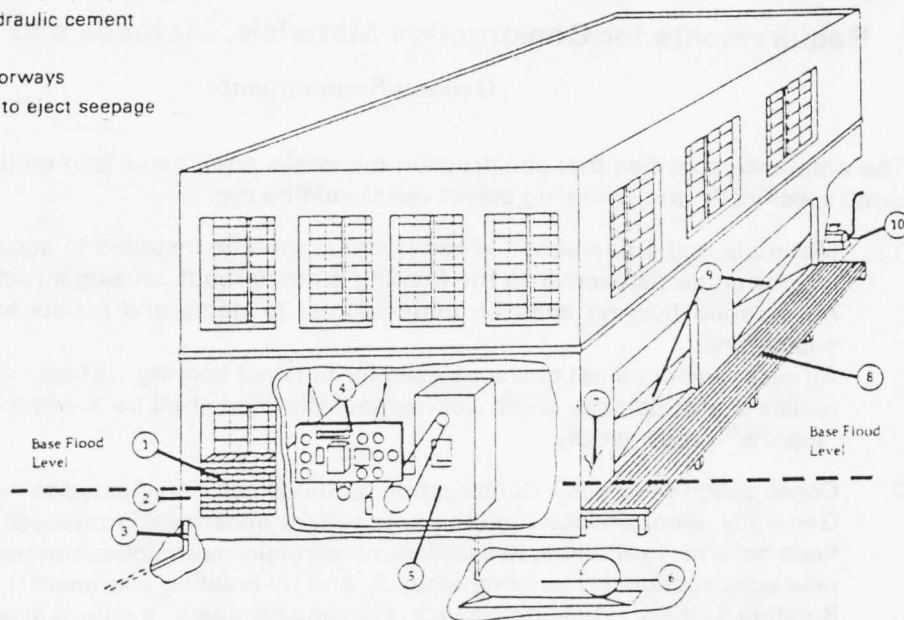
Generally, the requirements of the Special Conversion Regular Program ordinance concerning commercial (non-residential) structures are not different from those of residential structures. As in the latter, the enforcement officer must determine the first-floor level, establish the BFE, and the developer must design the structure to meet the elevation requirement. For information about these procedures, refer to the preceding section on residential structures.

### Floodproofing Commercial Structures

For non-residential structures, there is the choice of floodproofing, elevating, or a combination of the two to protect a base flood. Floodproofing is designing a structure so that all parts of the structure below the 100-year flood elevation are water-tight and resistant to flood damage. Approved floodproofing methods require dry floodproofing and may involve human intervention. These methods are described in detail below and illustrated in Figure 20.

#### EXPLANATION

1. Permanent closure of opening with masonry
2. Thoroseal coating to reduce seepage
3. Valve on sewer line
4. Utilities raised above base flood level
5. Machinery protected with polyethylene covering
6. Underground storage tank properly anchored
7. Cracks sealed with hydraulic cement
8. Elevated loading dock
9. Steel bulkheads for doorways
10. Sump pump and drain to eject seepage



SOURCE: Missouri Department of Public Safety, Disaster Planning and Operations Office, *National Flood Insurance Program Handbook for Missouri Communities*, March 1980.

Figure 20. Methods to floodproof a commercial building.



1. **Dry Floodproofing** - Dry floodproofing is designing a structure to protect it from a base flood. The structure must be designed to prevent seepage, collapse, or cracking of basement walls, buckling of basement floors and back-up of water from sewer lines. Walls must withstand hydrostatic pressure and all openings must be one-foot above the BFE. Waterproof seals and paints should be used on exterior surfaces exposed to a base flood. These techniques are illustrated in Figure 20. Additional information concerning floodproofing techniques may be obtained by ordering the *Introduction to Floodproofing* manual listed in the Appendix to this handbook.
2. **Human Intervention** - Human intervention is using door and window shields as temporary protection from a base flood. Door and window shields may be of wood, metal, or other materials, but must be designed so that they can securely cover all openings exposed to a base Flood. This method should be used only where there are adequate flood-warning time or devices. Shields and other temporary floodproofing devices should be stored near the openings, and employees should be familiar with their location and use.

### **Certification**

An engineer or architect must certify that all floodproofing will give specified flood protection. Certification requirements are explained in more detail elsewhere in this handbook, and sample certification forms are provided.

## **Requirements for Construction Materials, Methods and Equipment**

### **General Requirements**

The ordinance specifies that construction materials, equipment, and methods must minimize flooding; specifically, the following objectives should be met:

1. **Materials and Equipment** - Wood flooring shall be installed to accommodate its lateral expansion perpendicular to the flooring grain without causing structural damage. All finished flooring shall be material that is stable and resists water damage when submerged. All carpeting or carpet cushions used for finished flooring surfaces shall be material that resists water damage when submerged. Plywood shall be a water-proof "exterior"- or "marine"-grade variety.
2. **Construction Methods** - Construction methods can be adjusted to reduce flood hazards. Generally, all ordinance requirements call for construction methods designed to reduce flood hazards. In addition, two specific construction techniques can reduce flood hazards to new construction: (1) building setback, and (2) building alignment.  
**Building Setback** - Building setback is placing fill, posts, or pilings at least 50 feet from the central portion of the creek, ditch, or other flooding source. Property within 50 feet of the flooding source can be used for access, parking, recreation, or other non-structural uses that will not impede flood waters or increase the BFE. The Setback assures a minimum section of the flood plain will remain obstruction free.  
**Building Alignment** - Building alignment is placing structures so that they offer the least obstruction to flood flows, e.g., buildings aligned horizontally to flood or stream flows. Alignment is shown in Figure 21.



*Figure 21. An example of building alignment.*

### **Anchoring Requirements**

New structures in flood-hazard areas must be anchored to prevent their collapse, flotation, or lateral movement. It is, of course, a standard construction procedure to anchor residential or commercial structures to their foundations. Anchoring other structures such as sheds, detached garages, manufactured homes and liquid storage tanks may not be as obvious a need, but it must be addressed when such structures are in flood-prone areas. Anchoring details are given below. Manufactured home-anchoring requirements are discussed in detail in the Manufactured Home Requirements section of this handbook.

#### **Anchoring Sheds, Detached Garages, and Other Accessory Buildings**

Methods of anchoring larger buildings may also be used for smaller ones. To meet anchoring requirements, sheds, detached garages, and accessory buildings may be bolted to their foundations.

#### **Anchoring Liquid Storage Tanks**

Liquid storage tanks can be anchored with straps or, if practical, they can be elevated above the BFE.

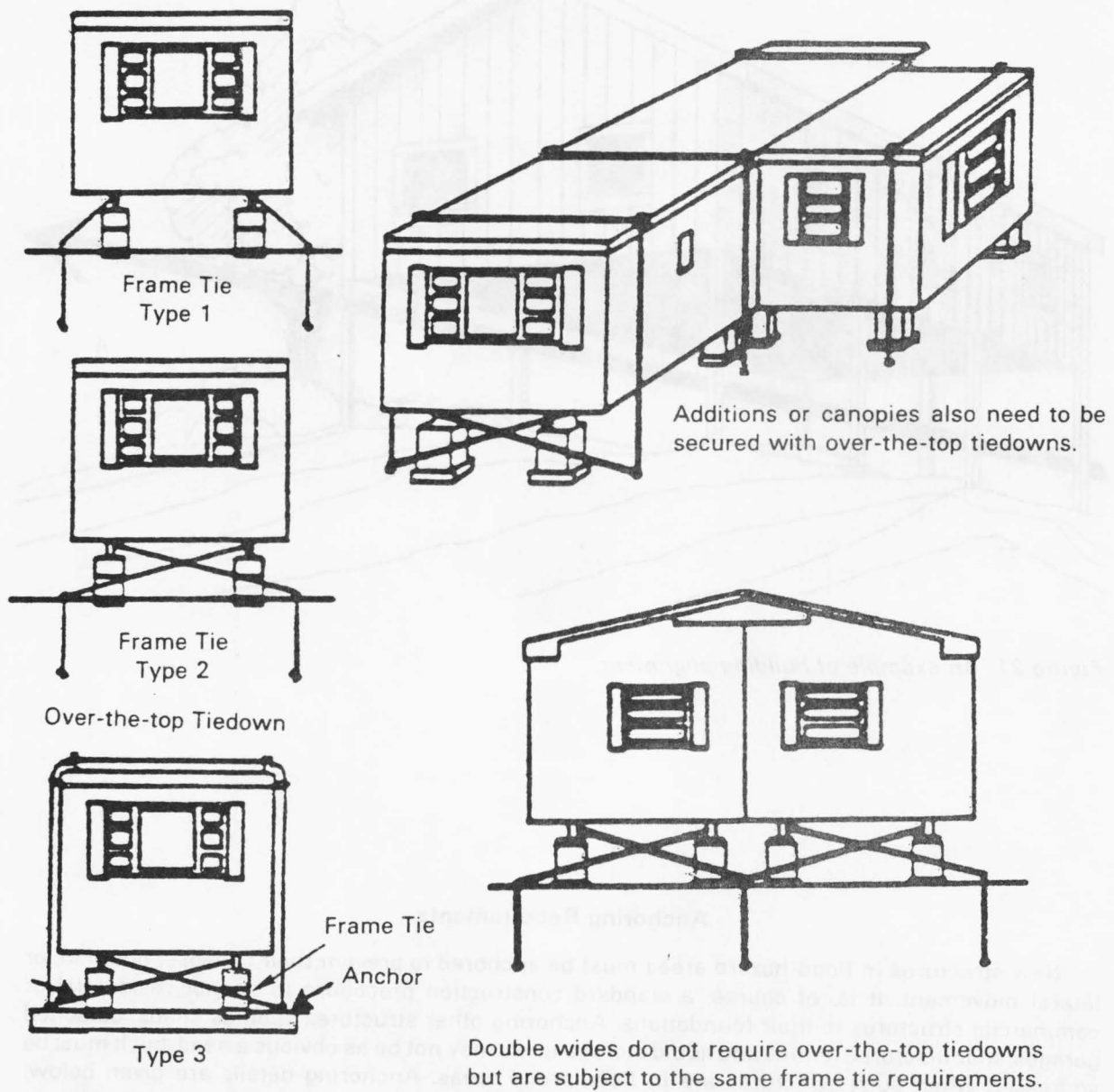


Figure 22. Anchoring methods.

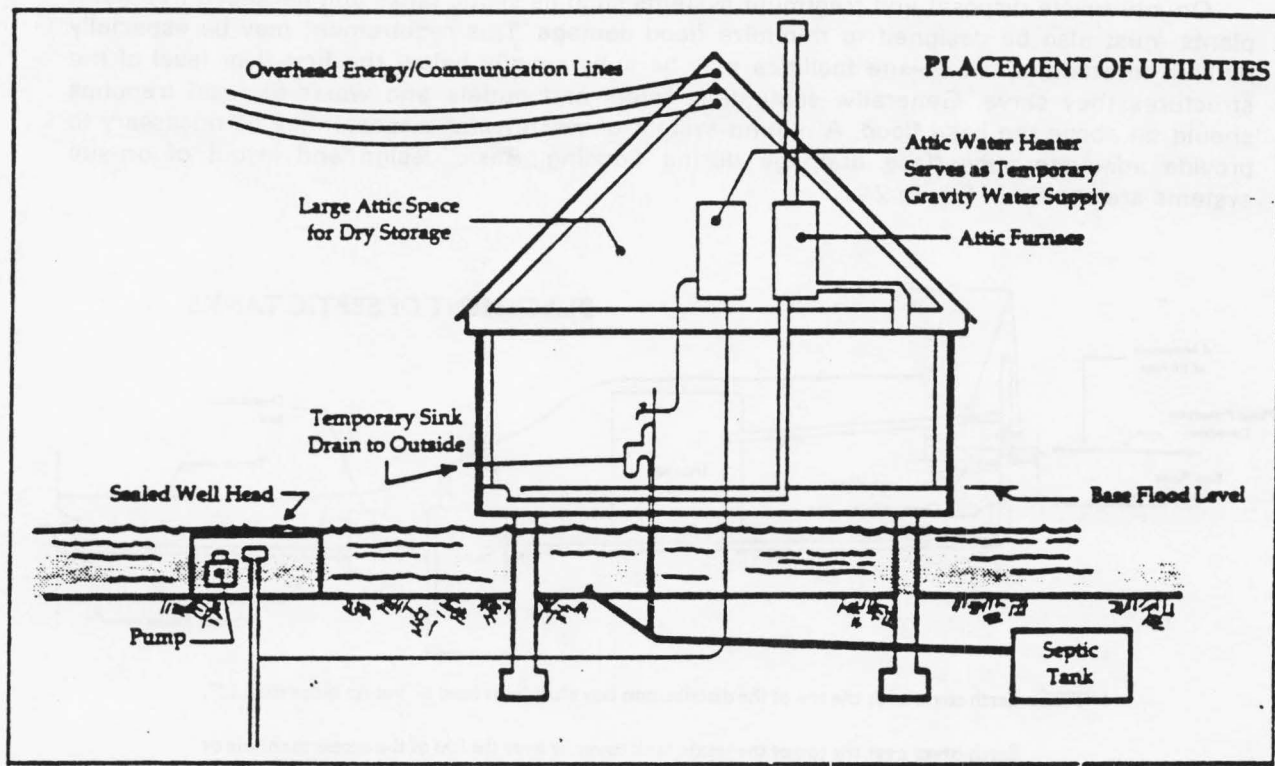


Figure 23. Electrical and plumbing techniques.

## Utility Requirements

Electrical and plumbing facilities must be designed and placed to minimize flood damage. This can be done by using techniques described below and illustrated in Figure 23.

### Electrical Systems

All electrical water heaters, electric furnaces, and other critical electrical installations must be located above the BFE.

### Plumbing

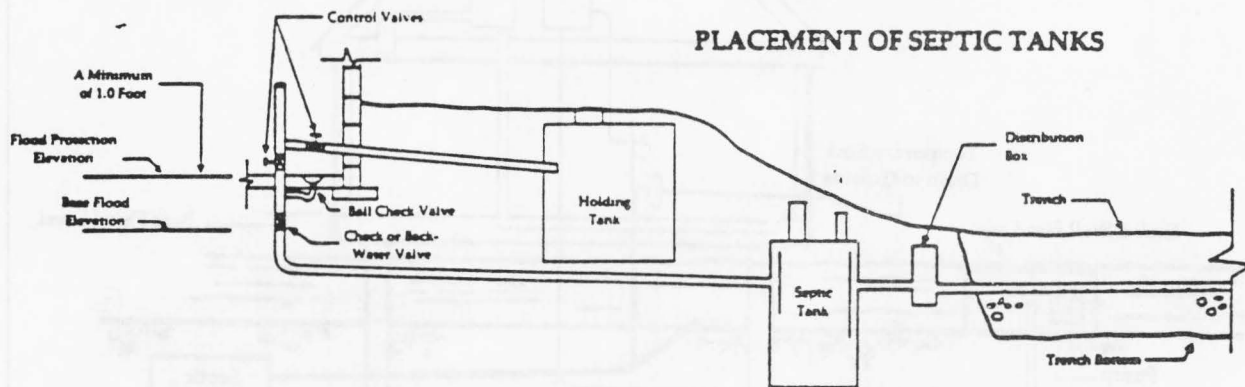
No water heaters, furnaces, or other critical mechanical installations shall be below one (1) foot above the established BFE.

Water-supply systems, wells, and sanitary sewage systems must be designed to preclude flood-water infiltration into the systems and discharges from the systems into flood water.

Manhole covers must be above the "100-year flood" elevation or otherwise designed to minimize flood damage. Waste-treatment facilities, including pumping stations, lagoons, and treatment plants must be floodproofed or otherwise protected to the BFE. Ring levees may be necessary to protect waste-treatment facilities below the BFE.

All gas and oil supply systems must be designed to preclude flood-water infiltration into the systems and discharges from the systems into flood waters.

On-site waste disposal and treatment systems such as septic tanks and packaged treatment plants must also be designed to minimize flood damage. This requirement may be especially difficult to attain, since on-site facilities may be substantially below the first-floor level of the structures they serve. Generally, septic-tank inlets and outlets and waste-disposal trenches should be above the base flood. A mound system of wastewater disposal may be necessary to provide adequate subsurface drainage during flooding. Basic design and layout of on-site systems are shown in Figure 24.



NOTES: Earth cover over the top of the distribution box shall be at least 6" but no more than 12".

Earth cover over the top of the septic tank cover or over the top of the access manhole or the inspection pipe shall be at least 6" but no more than 12".

The elevation of the inlet invert to the holding tank shall be at or above the regional flood elevation.

SOURCE: *On-Site Sewage Disposal in Flood Plain Areas*, Minnesota Department of Natural Resources Technical Report 5 (December, 1974).

Figure 24. On-site wastewater disposal system.



## **Manufactured Home Requirements**

Manufactured homes generally are more susceptible to flood damage than conventional homes and businesses, mostly because they will likely be dislodged from their foundations, collapse, or move laterally during serious flooding. Flood damage prevention requirements for manufactured homes are therefore treated extensively in the ordinance.

### **General Requirements**

In several instances, manufactured homes are treated differently from other structures when applying flood-plain regulations:

1. For manufactured homes, flood-plain management regulations (elevation and tie down requirements) must be enforced whenever a new pad is constructed or a new manufactured home is moved to an existing pad. Pads are defined as concrete or gravel parking spaces with attendant utility hook-ups.
2. Manufactured homes may be anchored by using over-the-top ties or straps. The anchoring system must be capable of carrying a force of 4,800 pounds. An anchoring system that withstands a wind force of 90 miles per hour meets this requirement.

Over-the-top ties should be on four corners of a manufactured home; additional ties should be on each side if a manufactured home is longer than 50 feet. Manufactured homes elevated on a foundation, posts, or piers must be anchored. Methods of anchoring manufactured homes are shown below.

To be insured under the NFIP, a manufactured home must be certified that it is properly anchored. The "Elevation Certificate" contained in the appendix includes manufactured home anchoring certification.

### **Elevating Manufactured Homes**

Dirt fill, posts, or pilings may elevate manufactured homes to the "100-year flood" elevation. Elevation techniques are similar to those used for residential and commercial structures; therefore, those techniques will not be redescribed here. Preceding sections of this handbook should be reviewed.

### **Manufactured Home Evacuation Plans**

In spite of precautionary measures, manufactured homes may still be susceptible to severe flood damage. Removing manufactured homes from imminent flooding may be practical in some locations subject to gradual flood-water rises. It is more important, however, to evacuate people and readily removable personal property from manufactured home parks; flood insurance covers certain removal expenses in such cases. For these reasons, establishing a manufactured home evacuation route is encouraged.

The manufactured home evacuation plan shown in Figure 25 provides at least two escape routes, identifies needed evacuation equipment and personnel, and identifies the staging area.

# MANUFACTURED HOME EVACUATION PLAN RIVERVIEW TRAILER PARK EVACUATION PLAN

People to be relocated: 105  
 Relocation Points: West Valley Shopping Center (1)  
 East Valley Shopping Center (2)  
 Contact Person: Jim Travis (Phone: 236-8799)  
 Equipment Needed: 6 buses (Pubic Works/School District)-Police-Fire  
 4 trucks  
 Evacuation Routes: Northland Drive West  
 Northland Drive East  
 Comments: People living west of Central Ave. will evacuate to West Valley Shopping Center;  
 those living east of Central Ave. will evacuate to East Valley Shopping Center.

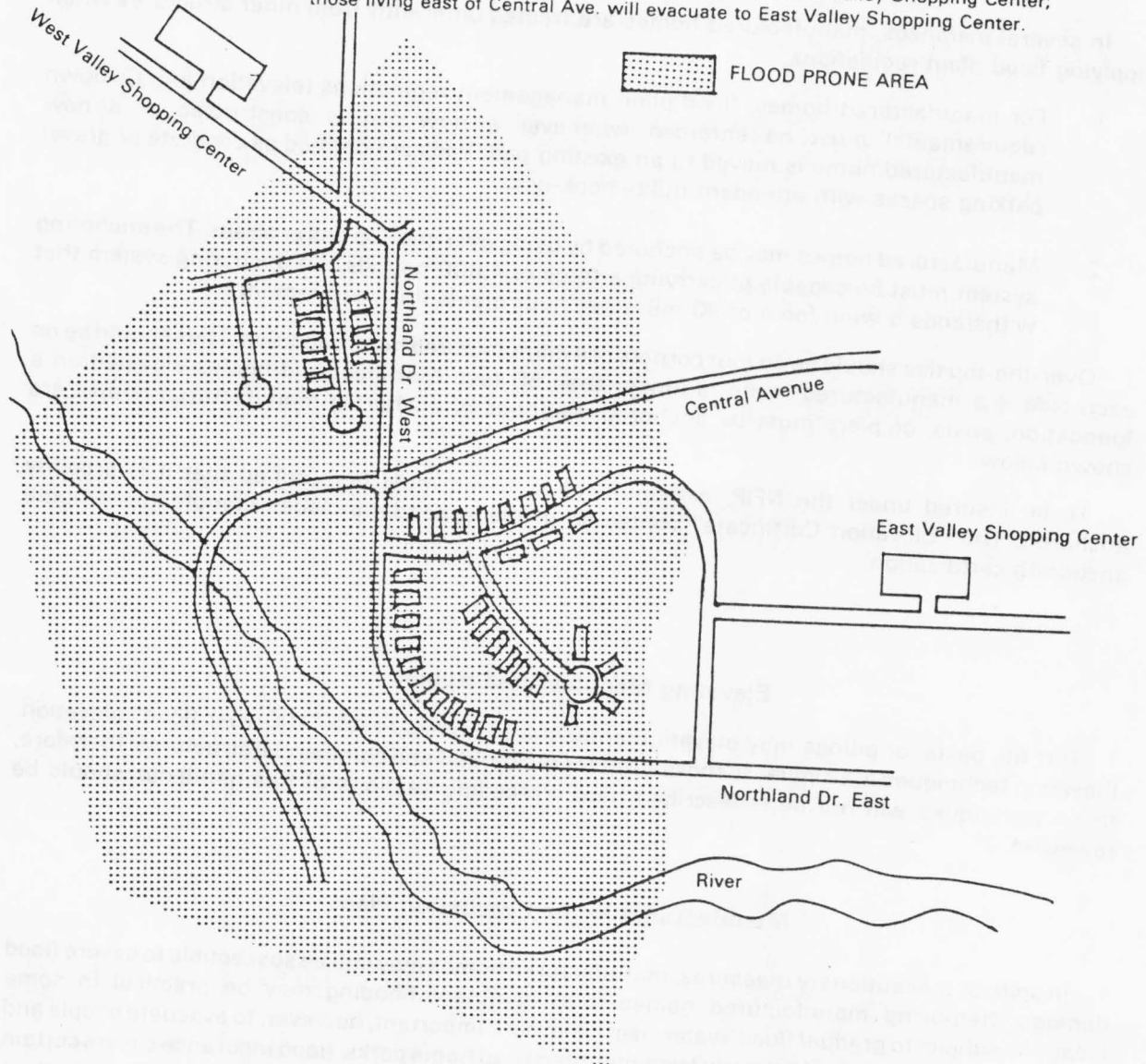
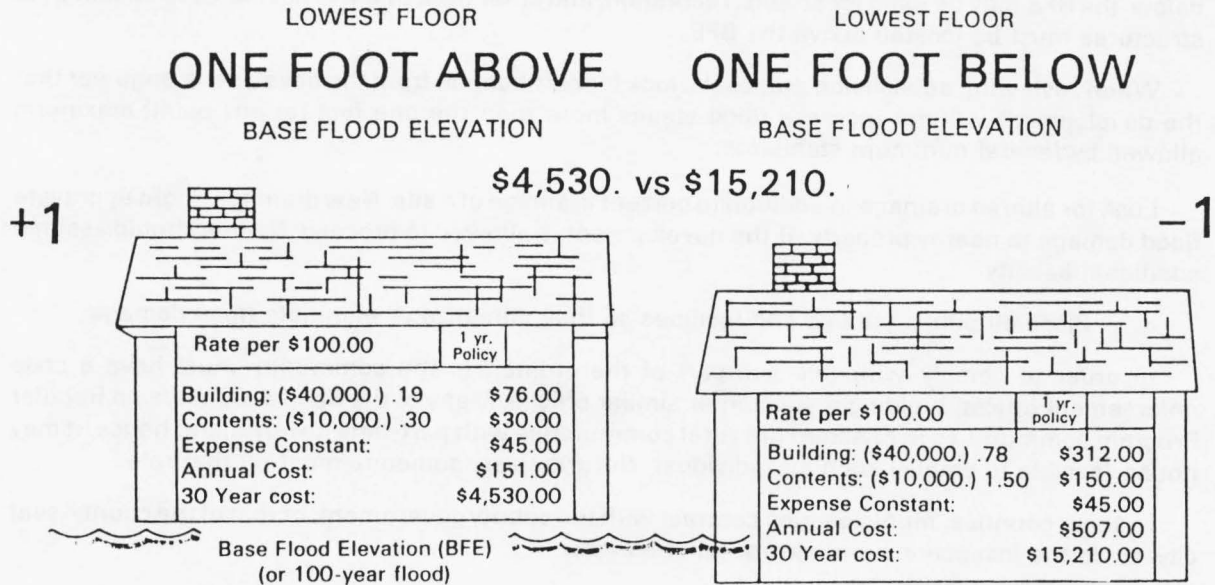


Figure 25. Evacuation plan.

## ACTUARIAL RATES TWO EXAMPLES

One story, no basement; basic layer of insurance, only.



FOR THIRTY YEARS OF COVERAGE

*Figure 26. Comparison of actuarial rates.*

### Subdivision Requirements

**SECTION 7** - The governing body of the city or county shall review subdivision applications and other proposed new developments, including manufactured home parks or subdivisions, and they shall assure the following:

- a. All proposed developments are consistent with the need to minimize flood damage.
- b. Subdivision proposals and other proposed new developments (including proposals for manufactured home parks and subdivisions) greater than five (5) acres or fifty (50) lots, whichever is smaller, include within such proposals regulatory flood-elevation data in areas designated Zone A.
- c. Adequate drainage is provided so as to reduce exposure to flood hazards.

The community is expected to require that of new subdivisions plats be filed with the flood-plain management local administrator, unless there is already an ordinance that provides for subdivision-plat review.

*All* residential development must be elevated, and have adequate drainage to reduce flood damages.

Building sites should be at least two feet above the street elevation. Streets should be designed to provide drainage for building sites and to prevent street ponding. Stream crossings should be designed to accommodate a base flood.

Stormwater management, design of storm sewers and inlets, and flood-plain management are related.

The developer is responsible for indicating the (BFE) and delineating the flood-plain boundary on a subdivision proposal. A grading plan showing the proposed finished elevation of streets and building sites should be included in the proposal. Portions of the grading plan referring to locations below the BFE may be used for streets, recreation, and other uses that will not increase flooding. All structures must be located above the BFE.

When reviewing subdivision proposals, look for certification from the developer's engineer that the development will not increase flood stages more than the one foot (at any point) maximum allowed by federal minimum standards.

Look for altered drainage in addition to current drainage of a site. New drainage might aggravate flood damage to nearby property, if the development is allowed to proceed. No one should assume additional liability.

- d. Place all public utilities and facilities so they minimize or eliminate flood damage.

In order to comply with this sub-part of the ordinance, the community must have a code enforcement officer, building inspector, or similar official. Many of the Special Conversion Regular Program communities in Missouri are rural communities with part-time government; hence, it may not be feasible to employ such an individual. Nevertheless, someone must fill that role.

In some counties, municipalities contract with the county government, or that of the county-seat city, to do the inspections and assure enforcement.

In other instances, a local jurisdiction may select the Regional Planning Commission, the Council of Governments, or an engineering consulting firm as the contract agent for flood-plain development permits or inspections. It should not be necessary to organize a new government agency. Applicant fees cover the contract costs.

**SECTION 8 - New Water and Sewer, etc. -** New and replacement water and sewer systems shall be constructed to eliminate or minimize infiltration or discharge into floodwaters. In addition, on-site waste disposal systems must be designed to avoid impairment or contamination during flooding.

Missouri statutes regulate water well drillers and pump installers. The Department of Natural Resources licenses drillers and certifies properly drilled and installed wells. Officials are urged to work with the Division of Geology and Land Survey in Rolla, and exchange information with the Water Resources Program, Groundwater Unit. New wells must be certified by DNR.

On-site sewage disposal is also regulated by the Department of Natural Resources. Officials are urged to work with the Division of Environmental Quality in one of the six Missouri regional offices. Non-flushing (composting, dry) toilets are an acceptable alternative in flood plain areas. The standard septic tank and leach field system is not an acceptable alternative in regularly flooded areas.

**SECTION 9 -** The Governing Body of the City or County will insure that the flood carrying capacity within the altered or relocated portion of any watercourse is maintained. The City or County will notify, in riverine situations, adjacent communities and the State Coordinating Office prior to any alteration or relocation of a watercourse, and submit copies of such notifications to the Federal Emergency Management Agency. Moreover, the City or County will work with appropriate State and Federal agencies in every way possible in complying with the National Flood Insurance Program, in accordance with the National Flood Disaster Protection Act of 1973.



The State Coordinating Office is the Flood Plain Management office of the Department of Natural Resources, in Jefferson City. The National Flood Disaster Protection Act of 1973 partly amends the National Flood Insurance Act of 1968.

This section of the ordinance says that if an official allows someone to bulldoze a stream channel, the former agrees in advance that the jurisdiction will maintain the flood carrying capacity of that stream. The official may pass that on to the property owner(s), but that does not relieve the local government of any resulting liabilities or responsibilities.

In addition to notifications mentioned in Section 9, the action may also need permits from the Corps of Engineers and others.

**SECTION 10** - This Ordinance shall take precedence over conflicting Ordinances or parts of Ordinances. The Governing Body of the City or County of \_\_\_\_\_ may, from time to time, amend this Ordinance to reflect any and all changes in the National Flood Disaster Protection Act of 1973. The regulations of this Ordinance are in compliance with the National Flood Insurance Program Regulations as published in Title 44 of the *Code of Federal Regulations* (44 CFR).

Advertising and holding a public hearing before taking action may be necessary to amend the ordinance. Consult the community legal counsel so that a flood plain development ordinance is amended correctly.

**SECTION 11** - Definitions: Unless specifically defined below, words or phrases used in this Ordinance shall be interpreted so as to give them the same meaning as they have in common usage and so as to give this Ordinance its most reasonable application.

**DEVELOPMENT** - Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations.

**FLOOD** - A general and temporary condition of partial or complete inundation of normally dry land areas from (1) The overflow of inland or tidal waters. (2) The unusual and rapid accumulation or runoff of surface waters from any source.

**FLOODPROOFING** - Any combination of structural and non-structural additions, changes or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

**MANUFACTURED HOME** - A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when connected to the required utilities. For flood-plain management purposes the term "manufactured home" also includes park trailers, travel trailers, and other similar vehicles placed on a site for greater than 180 consecutive days. For insurance purposes the term "manufactured home" does not include park trailers, travel trailers, and other similar vehicles.

**MANUFACTURED HOME PARK OR SUBDIVISION** - A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

**REGULATORY FLOOD** - The water surface elevation of the 100-year flood.

**SPECIAL FLOOD-HAZARD AREA** - The land within a community, subject to a one percent or greater chance of flooding in any given year. This land is identified as Zone A on the official map.



**STRUCTURE** - A walled and roofed building that is principally above ground.

**SUBSTANTIAL IMPROVEMENT** - Any repair, reconstruction or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either (a) before the improvement is started, or (b) if the structure has been damaged and is being restored before the damage occurred. For the purposes of this definition "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor or other structural part of the building commences whether or not that alteration affects the external dimensions of the structure. The term does not, however, include any alteration to comply with existing state or local health, sanitary, building or safety codes or regulations as well as structures listed in national or state registers of historic places.

**100-YEAR FLOOD** - The condition of flooding having a one percent chance of annual occurrence.

These are the definitions commonly found in most Special Conversion Regular Program ordinances. Others that may be useful may be added. "Start of construction," a term that may help avoid unpleasant disagreements, means the date a permit was issued, provided work began within 180 days. The term refers to the principal building requiring a permit, not accessory outbuildings.

Many communities add a penalty provision, a severability clause, and an effective date before a statement on the date of adoption, and the signatures of the chief executive officer (CEO) and the clerk.

## **Requirements for Record-keeping and Certification**

### **General Requirements**

It should be apparent from the preceding ordinance requirements explanation, that records of activities the ordinance regulates must be maintained. These records include permits issuance, certification of compliance with ordinance requirements, and maintenance of maps and other flood hazard information.

### **Maintaining Records of Permits**

The enforcement officer must maintain records of permits issued for development in flood-prone areas. Where applicable, a record of permits required from local, state, and federal agencies should be maintained as well. When variances are granted, documentation of the proceedings, conditions, and justifications also must be kept on file.

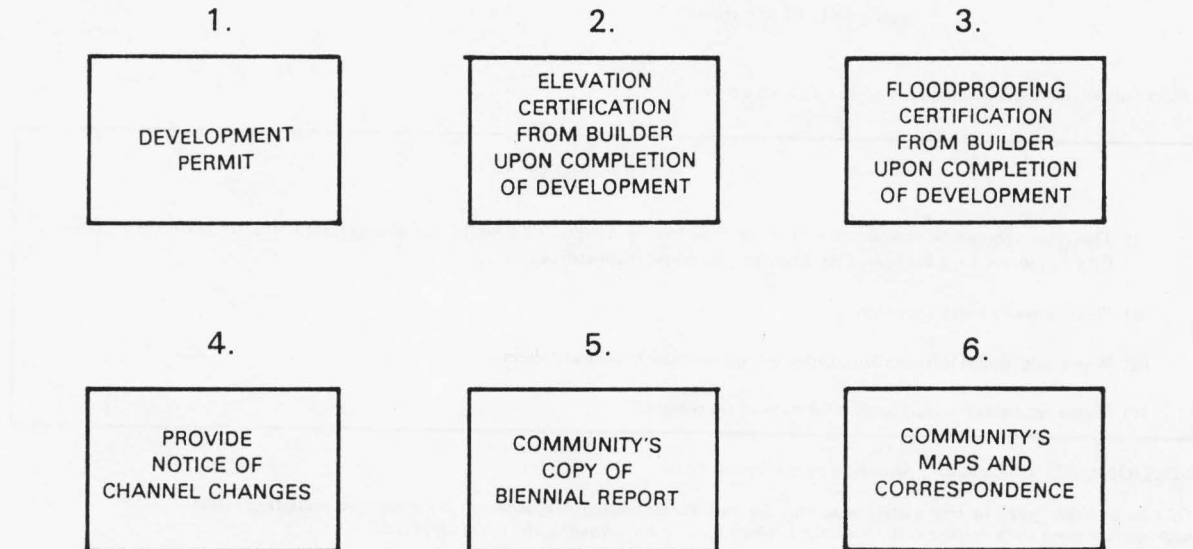
### **Obtaining Certification of Compliance With Ordinance Requirements**

Developers of structures built after the effective date of the ordinance must certify the following:

1. Elevation of the lowest floor levels of structures.
2. Elevation to which commercial structures may have been floodproofed.
3. Elevations contained in grading plans for subdivision proposals of 5 acres or 50 lots.
4. Specifications that new stream crossings will accommodate a base flood flow.

Sample development permit and certification forms are included in this handbook. Items included in record-keeping and certification are illustrated in Figure 27.

### RECORD-KEEPING AND CERTIFICATION PROCEDURES



*Figure 27. Record-keeping and certification procedures*

FEDERAL EMERGENCY MANAGEMENT AGENCY  
WASHINGTON, D.C. 20472

NATIONAL FLOOD INSURANCE PROGRAM

BIENNIAL REPORT for  
Calendar Year \_\_\_\_\_  
EMERGENCY PROGRAM AND  
REGULAR PROGRAM  
(Minimally Floodprone)

RETURN TO  
Federal Emergency Management Agency  
P.O. Box 70274  
Washington, D.C. 20024

(Please make necessary corrections to the address above.)

INSTRUCTIONS

- i) This report should be completed by you or your locally designated Flood Plain Management Administrator (e.g., your City Engineer, City Planner, City Manager, Building Inspector, etc.).
- ii) Please answer every question.
- iii) Where additional information is needed, please attach separate sheets.
- iv) Please return the report within 30 days of its receipt.

SECTION ONE: Changes and Activities in the Flood Plain

(If you answer "yes" to any question in this section, please provide explanatory information, including when appropriate your own map or a copy of the official flood map, showing the areas affected.)

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| A. Was there a change last year of your community's territorial or extraterritorial boundaries?  | <input type="checkbox"/> | <input type="checkbox"/> |
| B. Was there a significant natural change of topography — e.g., by land erosion or subsidence, sedimentation or seismic activity — in or near local flood hazard areas?                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| C. Was there a significant man-made change of topography, such as levees or bridges, extensive excavation, or filling and paving in or near local flood hazard areas?                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| D. Is your community in need of assistance in improving local flood plain management techniques, such as planning in the flood plain, regulation interpretation, enforcement procedures, or floodproofing? | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION TWO: Program Data

- A. Please tell us the number of building permits granted in the last calendar year for new construction, including substantial repairs or additions to existing structures, in the flood hazard areas shown on your community's flood map.
- B. The numbers printed below were given to FEMA when your community last reported to the National Flood Insurance Program. (If the numbers are inaccurate, please correct them. Provide precise information from your records. If records are unavailable, please give us your best estimates.

	Permanent Year-round Population	1-4 Family Structures	All Other Structures
1) In your entire community, including flood hazard areas			
2) In your community's flood hazard areas only			

Name, Title, and Signature	Telephone No. (Include Area Code) (    )	Date
----------------------------	--	------

(Keep the last copy. Return the other 4 copies to the address listed above.)

FEMA Form 81-28, JAN 88

REPLACES EDITION OF NOV 84, WHICH IS OBSOLETE

1 COMPUTER CENTER

Figure 28. An example of a biennial report.

## **V. The Biennial Report**

Each NFIP participating community must file a Biennial Report with the Federal Emergency Management Agency (FEMA). The report form to be completed is sent each community by March and when filled in should be returned to the FEMA Regional Office within three months. Figure 28 is an example of a Biennial Report is shown in this section. The Biennial Report contains information concerning changes to the flood hazard area and program administration. FEMA requests this information to obtain a general idea of changes in the flood-prone areas of the United States, and to determine communities are having difficulty in using flood hazard information prepared by FEMA. Clarification of questions asked in the Biennial Report is given in the following pages:

**Address Changes** - Note address changes at the top of the form.

**Boundary Changes** - If a community has annexed areas adjacent to streams, lakes, or other sources of flooding, indicate this on the form and attach a copy of the new community map.

**Natural Changes** - Only large-scale changes that obviously affect flooding need be reported.

**Man-made Changes** - Projects built in compliance with the ordinance should not be listed. Replacement of culverts, bridges, or other structures which previously contributed to serious flooding should be reported. Non-private dam and levee construction should be reported. Individual localized projects such as parking lots, small retention basins, and minor storm-drainage improvements should be excluded. Large projects designed to decrease flooding should not be reported unless they are 100 percent funded and 50 percent completed.

**Recent Flooding** - Flood damage to residences, business structures, and other structures should be reported. Non-structural damage and minor flooding should be omitted.

**Amendments to existing laws** - If changes have been made in a community's flood-plain management ordinance and the Federal Emergency Management Agency (FEMA) has not been notified, attach descriptions of the changes to the Biennial Report.

**Coordination** - Include only those problems that affect your community's flood hazards.

### **Statistics**

- a. **Construction permits** - Indicate how many development permits were requested and how many were granted.
- b. **Variances** - Indicate how many were requested and how many were granted.
- c. **Other variances**
- d. **General data** - Estimate the population, and the number 1-4 family structures, small business structures, and other structures (schools, churches, public buildings) in the flood hazard area. On the second line, estimate the population, the number of 1-4 family structures, small business structures, and other structures in the entire community.

The Chief Executive Officer (Mayor, Chairman of the Board, County Executive, or Presiding Commission) should sign the Biennial Report. The last copy should be retained in the community file; the remaining copies should be sent to the FEMA office, as directed on the report.

## VI. Other Considerations

The information above explains minimum federal standards for participation in the Special Conversion Regular NFIP if a Flood Insurance Study is lacking. Because a community's purpose in entering the NFIP is reduction of flood damages, the community may wish to take additional steps to protect future and existing developments from flood hazards. Disaster or emergency preparedness planning and technical assistance are two such hazard mitigation activities with which communities may wish to be involved.

### Emergency Preparedness Planning

Chapter 44, Revised Statutes of Missouri (RSMo), states that each government entity (municipality and county) shall have an emergency preparedness plan and an emergency preparedness director. The State Emergency Management Agency in Jefferson City will provide community assistance upon request. Plans made *before* a disaster help community officials and citizens prepare for a crisis.

### Technical Assistance

Numerous books are available from the U.S. Army Corps of Engineers; Federal Insurance Administration, FEMA; National Weather Service, NOAA; U.S. Geological Survey, and others that relate to flooding, flash flooding, retrofitting existing buildings, designing new elevated buildings, designing new floodproof building. Community officials and citizens can contact the Flood Plain Management Unit of the Missouri Department of Natural Resources for technical assistance. Some book titles are listed in the appendix.



## VII. Appendix.

### Permits Or Approvals

	Air* Pollution	Waste Water	Drinking Water	Solid Waste	Hazardous Waste	Water** Wells	Dams
Amusement Park		•	•			•	
Apartment Complex		•	•			•	
Bar or Lounge		•	•			•	
Campground		•	•			•	
Car Wash		•	•			•	
Condominium		•	•			•	
Dam		•					•
Dry Cleaners/Laundromat	•	•	•		•	•	
Gas Station	•	•	•		•	•	
Grocery Store		•	•			•	
Health Care Facility		•	•			•	
Light Industry***	•	•	•	•	•	•	
Mobile Home Park		•	•			•	
Motel		•	•			•	
Musical Theater		•	•			•	
Printing or Photographic Businesses	•	•	•		•	•	
Restaurant/Snack Shop/Deli		•	•			•	
Resort		•	•			•	
Retail Shop/Shopping Center		•	•			•	
Retirement Center		•	•			•	
Subdivision		•	•			•	
Water Slide		•	•			•	

\* An air pollution permit is required if an incinerator will be present, or if the open burning of construction wastes is planned. Gas stations in St. Louis City and St. Louis County also must get a local permit.

\*\* Oil and gas wells also require permits.

\*\*\* Heavy industry, including mining and quarry operations, are required to obtain department permits. Contact the department for details.

## NFIP SUPPLIES ORDER FORM

### PROGRAM FORMS AND MATERIALS

Please send me the flood insurance forms, literature, and/or material indicated below which are available at no charge.  
(The maximum amount that can be ordered at one time is 200 units.)

Producers placing business with WYO companies should follow their company's instructions on ordering supplies.

FORM NUMBER	TITLE	QUANTITY	
		Circle One	Quantity Over 100
593-112	Notice of Loss Form	5 15 50 100	_____
593-114	Flood Insurance Application, Part 1 & Part 2	5 15 50 100	_____
593-115	Flood Insurance General Change Endorsement	5 15 50 100	_____
593-116	Flood Insurance Cancellation/Nullification Request Form	5 15 50 100	_____
593-117	Elevation Certificate	5 15 50 100	_____
593-180	Map Order Form	5 15 50 100	_____
593-213	Certificate of Redetermination of a Property's Location Relative to Special Flood Hazard Areas	5 15 50 100	_____
593-215A	Agent's Premium Calculation Pad	5 15 50 100	_____
593-224	How to Read a Flood Insurance Rate Map	5 15 50 100	_____
593-225	How to Read a Flood Hazard Boundary Map	5 15 50 100	_____
593-226	Suggested Lender's Notice	5 15 50 100	_____
593-9046	Flood Insurance Application-Part 2 Worksheet	5 15 50 100	_____
593-9049	Floodproofing Certificate	5 15 50 100	_____
700-9003	Flood Insurance Rate Table	5 15	_____
900-255C	Flood Insurance Manual Order Form	5 15 50 100	_____

### PUBLIC AWARENESS MATERIALS

593-190	NOTICE: This Policy Does Not Cover Flood Loss (Stuffer)	5 15 50 100	_____
593-192	NOTICE: This Policy Does Not Cover Flood Loss (Sticker)	5 15 50 100	_____
593-222	Questions and Answers on the NFIP (Booklet)	5 15 50 100	_____
593-235	Announcing Better Flood Protection (Stuffer)	5 15 50 100	_____
593-236	Flood . . . Are You Protected from the Next Disaster? (Brochure)	5 15 50 100	_____
593-237	In The Event of a Flood (Brochure)	5 15 50 100	_____
593-238B	Worst Guest List (Hurricane Stuffer)	5 15 50 100	_____
593-248	Season's Warnings (Winter Stuffer)	5 15 50 100	_____
593-501	If You Are Flooded Out (Mini-Poster)	5 15 50 100	_____
900-075	Camera-ready Newspaper Advertisements	5 15 50 100	_____
900-090	Is There a Leak in Your Protection? (Stuffer)	5 15 50 100	_____
900-113	Spring Floods. . . More Than Just a Threat (Mini-Poster)	5 15 50 100	_____
900-114	Spring Floods. . . More Than Just a Threat (Stuffer)	5 15 50 100	_____
900-148	Hurricanes & Summer Storms (Stuffer)	5 15 50 100	_____
900-149	In the Calm Before the Storm (Mini-Poster)	5 15 50 100	_____
900-153	Summer Storms, Summer Floods (Stuffer)	5 15 50 100	_____

Fill out your name, company, address, city, state, and zip code. If you are ordering for an agent/agency, you must include an agent identification number on your order. Please identify yourself by checking the appropriate box. Fold, seal, and return to the NFIP.

☐ AGENT

☐ LENDER

☐ COMMUNITY OFFICIAL

☐ MEDIA

☐ OTHER

NAME \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

ZIP CODE \_\_\_\_\_

**AGENT ID NUMBER**

*Please allow 2 to 3 weeks for delivery.*

## **FLOOD MAPS**

For future reference, if you want additional copies of the FIRM, you may write the following:

The National Flood Insurance Program  
P.O. Box 449  
Lanham, MD 20706

or telephone, toll-free (800)333-1363. You must be able to provide your community number.

If you want additional copies of the FIS (which includes the Flood Boundary Floodway Map), you may write the following:

The National Flood Insurance Program  
6930 (A/F) San Thomas Road  
Baltimore, MD 21227

or telephone, toll-free (800)333-1363. Again, you must give the community number.

## **FEDERAL EMERGENCY MANAGEMENT AGENCY FEDERAL INSURANCE ADMINISTRATION**

**PUBLICATIONS AVAILABLE AT NO COST:**

*Design Guidelines for Flood Damage Reduction* FEMA-15

General information on flooding and how to properly design and build in floodprone areas.

*Elevated Residential Structures* FEMA-54

Proper design and construction of an elevated building.

*Coastal Construction Manual* FEMA-55

Details design and construction techniques for construction in coastal high hazard areas.

*Manufactured Home Installation in Flood Hazard Areas* FEMA-85

How to properly site a manufactured home in a floodprone area, with emphasis on proper design of elevated foundations.

*Floodproofing Non-Residential Structures* FEMA-102

Describes a variety of floodproofing strategies for commercial and industrial structures.

*Flood Emergency and Residential Repair Handbook* FIA-13

Outlines for the homeowner action to be taken before and after a flood to help reduce flood damage and speed repairs.

*Design Manual for Retrofitting Floodprone Residential Structures* FEMA-114

Presents floodproofing steps that can be used for existing residential construction.

*A Unified National Program for Floodplain Management* FEMA-100

Updates a 1979 report which sets forth a conceptual framework and identifies strategies fundamental to implementing a balanced approach to floodplain management.

To order publications write to the following address:

Federal Emergency Management Agency  
P.O. Box 70274  
Washington, D.C. 20024

ATTN: Publications