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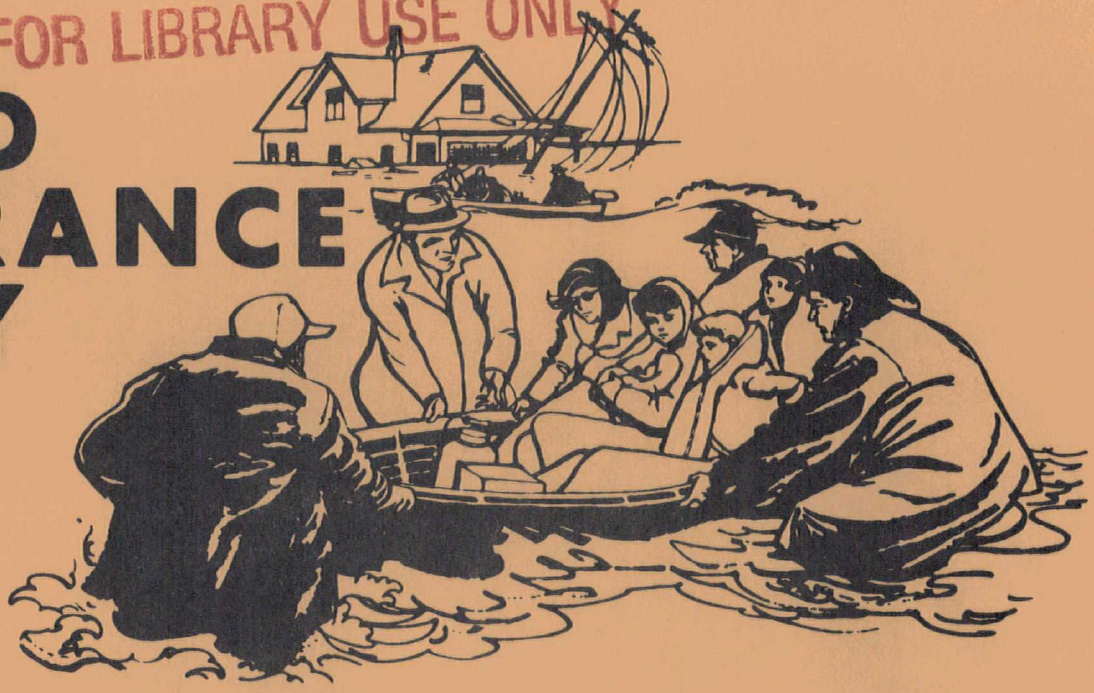
FLOOD INSURANCE STUDY



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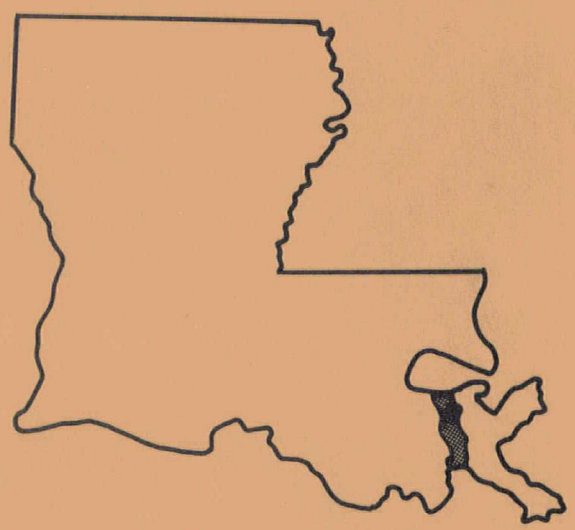
CITY OF GRETNA, LOUISIANA
JEFFERSON PARISH



NOVEMBER 1, 1985

Federal Emergency Management Agency

COMMUNITY NUMBER - 225198

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FLOOD INSURANCE STUDY
CITY OF GRETNA, LOUISIANA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Gretna, Jefferson Parish, Louisiana, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This information will allow Gretna to continue participation in the regular program of flood insurance by the Federal Emergency Management Agency (FEMA) with the most current data. Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses by the New Orleans District of the U. S. Army Corps of Engineers for the Federal Emergency Management Agency, under Inter-Agency Agreement No. IAA-H-8-70, Project Order No. 21, and Inter-Agency Agreement No. IAA-H-8-71, Project Order No. 2. The updated version was also prepared by the New Orleans District of the U. S. Army Corps of Engineers for the Federal Emergency Management Agency, under Inter-Agency Agreement No. EMW-E-0105, Project Order No. 7. This work was completed in September 1982.

A reanalysis of the pumping stations in the City of Gretna was performed by the New Orleans District of the U. S. Army Corps of Engineers. The revised portions were completed in 1984.

1.3 Coordination

City officials were contacted numerous times throughout the preparation of this study to keep them informed, obtain and exchange information, and minimize possible conflicts. In January 1979, the study was discussed and pertinent information was exchanged at an initial Consultation and Coordination Officer's (CCO) meeting attended by representatives of the FEMA, the City of Gretna, and the U. S. Army Corps of Engineers (COE - the study contractor).

Basic data for the study areas located within levee systems were collected from pertinent studies and reports prepared by the New Orleans District of the COE, the FEMA, URS/Forest and Cotton, Inc., Barnard and Thomas Consulting Engineers, Inc., the National Weather Service, and Jefferson Parish officials.

On August 2, 1983, the results of the study were reviewed at a final CCO meeting held with representatives of the FEMA, the city, and the COE.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Gretna, Jefferson Parish, Louisiana. The area of study is shown on the Vicinity Map (Figure 1).

The areas within the existing levee systems affected by rainfall ponding were analyzed in detail for this study. This study represents a revision of leveed ponding areas due to improved capacity of pumps. The portion of the Mississippi River affecting Gretna was also studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through September 1987.

2.2 Community Description

The City of Gretna is located in the northern portion of Jefferson Parish in southeastern Louisiana. It is bordered by the unincorporated areas of Orleans Parish to the north and east and the unincorporated areas of Jefferson Parish to the west and south. Gretna is situated on the west bank of the Mississippi River. The total land area contained within Gretna is 3.5 square miles. According to the U. S. Bureau of the Census, the population of the city decreased from 24,875 in 1970 to 20,615 in 1980 (Reference 1).

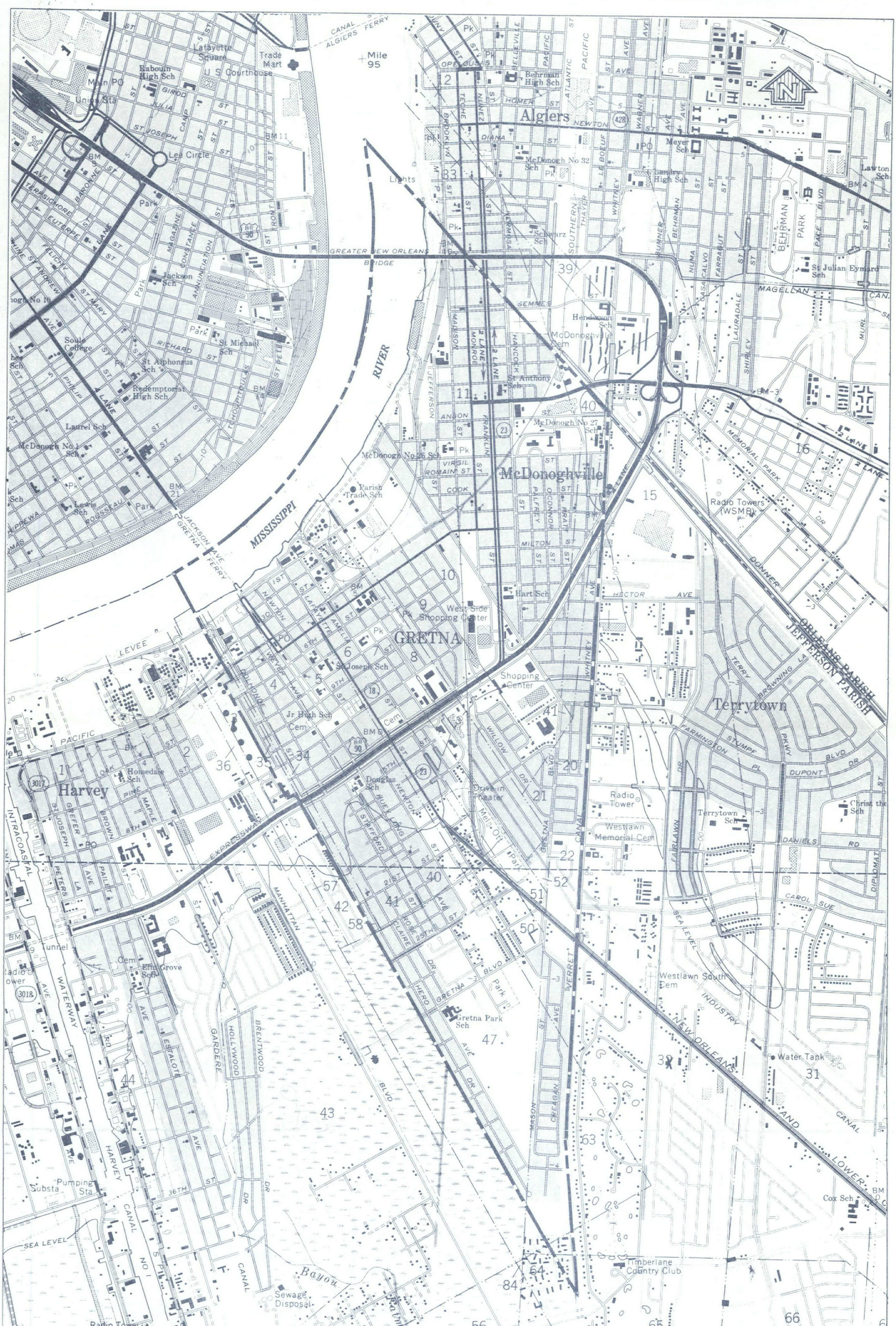

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GRETNA, LA
(JEFFERSON PARISH)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

Major transportation routes traversing the study area include State Highways 18 and 23 and U. S. Route 90. Gretna is also served by the Texas and Pacific and Southern Pacific Railroads. Development in the city consists mainly of residential and commercial improvements.

Gretna is located in a portion of the Mississippi River deltaic plain now occupied by the present course of the river. Principal physiographic features of the area include the river channel, natural levee ridges along its banks and along the banks of abandoned distributing channels, and low marshlands situated between and bordering channels. Land elevations vary in the city from approximately 10 feet near the Mississippi River to less than -5 feet. The crest of the natural levee is the highest ground in the city.

Gretna is situated in a subtropical latitude, with a climate characterized by mild winters and hot, humid summers. During the summer, prevailing southerly winds produce conditions favorable for thunderstorms. In cooler seasons, the area experiences frontal passages which produce squalls and sudden decreases in temperature. The mean annual temperature is approximately 70 degrees Fahrenheit (°F); the average temperature in the summer and winter is 82°F and 56°F, respectively. The average annual rainfall is 57 inches.

2.3 Principal Flood Problems

The history of flooding within Gretna indicates that flooding can occur during any season of the year. In the cooler months, the area is subject to heavy rainfall resulting from frontal passages; in the summer months, heavy rainfall results from convective thundershowers.

The principal source of flooding is rainfall ponding. Rainfall data are available at the nearby gage (107 years of record) in Audubon Park in Orleans Parish. The largest 24-hour rainfall to occur during the 107-year period was 14 inches on April 15-16, 1927. Other significant floods occurred in 1909, 1915, 1947, 1956, 1965, 1969, 1978, and April 1980.

The drainage of floodwaters in Gretna is accomplished by a system of structures and canals which outflow to pumping stations. Historically, these pump stations have been inadequate in capacity to handle the volume of floodwaters reaching the stations and have operated at less than full capacity during flood events. In addition, drainage structures through manmade barriers, such as highway and railroad embankments, have proven inadequate during recent rainfall events.

2.4 Flood Protection Measures

Gretna is protected from flooding by levees, drainage canals, and stormwater pumps. The city is served by the Hero and Planters pumping stations which are located in Jefferson Parish along Bayou Barataria.

Gretna is protected from flooding due to high stages in the Mississippi River by the Mississippi River and Tributaries Levees. The major canal within Gretna is Verret Canal.

Federally-built levees were assumed to be able to withstand the flooding and hurricane surge effects (if any) without erosion or sliding failures. The stability of federal levees was based on the observation of levees which have been overtopped in the past and on engineering judgment. Stability analyses may not be available for all of the privately-built levees within the study area; however, these local levees were assumed to remain intact. Proper maintenance of the levees is critical in maintaining the level of protection shown on the map. An inspection program should be established and undertaken by the local agencies responsible for maintaining the levees as a means of identifying any degradation in the level of protection.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

The federally-maintained Mississippi River and Tributaries Levees, in conjunction with the Old River Structure, Morganza Spillway, and Bonnet Carre Spillway, provide protection from all anticipated flows in the Mississippi River up to and including the 500-year flow.

Although rainfall records are available in Jefferson Parish, their periods of record are not long enough to allow development of particular frequencies and distributions with an adequate degree of confidence. Therefore, rainfall frequency and duration data were derived from the Rainfall Frequency Atlas of the United States for the 10-, 50-, 100-, and 500-year recurrence intervals (Reference 2). A synthetic 24-hour storm distribution was computed utilizing the rainfall frequency and duration data. No rainfall runoff monitoring is performed in Gretna; therefore, rainfall runoff hydrographs were developed for individual drainage areas from the synthetic rainfall distributions and synthetic unit hydrographs.

All hydrologic data for the Mississippi River were obtained from the original Flood Insurance Study for the City of Gretna (Reference 3).

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Storage-elevation curves were established from topographic maps developed for Jefferson Parish in the Master Drainage Plan for Drainage District No. 9 (Reference 4). Flood elevations were determined by computing peak water storage volumes resulting from rainfall runoff and hurricane surge or wave overtopping where appropriate. Storage volumes for rainfall runoff were computed by routing rainfall-runoff hydrographs through drainage structures and over roadways into the individual drainage units. The rainfall-runoff hydrographs were routed to the outfall canal pumping stations, and the volume of floodwaters was reduced by pumping. The pump stations in this study were assumed to operate at 75 percent of the capacity, given in Table 1, since this capacity reflects historic operating conditions.

TABLE 1 - PUMP CAPACITY DATA

Location and Drainage District	Pumping Station	Capacity (cfs)
West Bank; 9th Drainage District	Hero	3,800
	Planters	2,500

The resulting flood storage volumes were compared to the appropriate storage-elevation curve to obtain peak flood elevations for each drainage unit.

The elevation-frequency relationships for rainfall-runoff ponding areas within the City of Gretna are shown in Table 2, "Summary of Elevations."

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
North of Westbank Expressway	0.7	1.0	1.5	2.0
South of Westbank Expressway - western city limits to Belle Chase Highway	-3.3	-3.1	-2.8	-2.6
South of Westbank Expressway - Belle Chase Highway to eastern city limits	-2.8	-2.4	-1.9	-1.6

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), September 1982 adjustment, formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

3.3 Land Subsidence

Structures within the study area may be subject to flooding from rainfall-runoff ponding or levee overtopping. The identification of flood hazards for these flooding conditions poses a problem solved using generally accepted techniques. However, the prevalence of land subsidence in the study area complicates the application of the flood hazard data to flood insurance purposes. The elevation reference marks used in this study are shown on the maps to assist in determining the elevations of the structures within the flood plains. Caution must be exercised when using these and other elevation reference marks to ensure that the most up-to-date and accurate elevation data are used. Local officials should be aware of the land subsidence problem and should require the use of accurate elevation reference marks and reasonable construction techniques in compensating for land subsidence as it relates to the hazard from flooding.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. The 100- and 500-year boundaries were delineated using topographic maps of the study area at a scale of 1:2,400 reduced to a scale of 1:6,000, with a contour interval of 1 foot (Reference 4). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights.

The concept of a floodway is not applicable in the City of Gretna since areas within the detailed study limits are not subject to flooding from flowing streams. Flooding on the entire length of the Mississippi River within Gretna is controlled, therefore, no floodway was delineated for the river.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source affecting the City of Gretna.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

In areas of rainfall-runoff ponding, reaches are limited to the distance for which the difference between the 10- and 100-year flood elevations does not vary more than 1.0 foot.

The locations of the reaches determined for the Mississippi River and the areas of rainfall-runoff ponding in the City of Gretna are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is the FEMA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the City of Gretna was divided into zones, each

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[2] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Mississippi River Reach 1	01	*	*	*	005	A1	18

[1]Flood Insurance Rate Map Panel
[2]Rounded to nearest foot - see map
*Controlled flooding; Data not computed

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GRETNA, LA

(JEFFERSON PARISH)

FLOOD INSURANCE ZONE DATA

MISSISSIPPI RIVER

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[2] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
PONDING							
North of U. S. Route 90	01,02	-0.8	-0.5	+0.5	010	A2	1.5
South of U. S. Route 90 Western corporate limits to Belle Chasse Highway	02	-0.5	-0.3	+0.4	005	A1	-3.0
South of U. S. Route 90 Belle Chasse Highway to eastern corporate limits	01,02	-0.9	-0.5	+0.3	010	A2	-2.0

[1]Flood Insurance Rate Map Panel

[2]Rounded to nearest 0.5 foot - see map

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GRETNA, LA

(JEFFERSON PARISH)

FLOOD INSURANCE ZONE DATA

RAINFALL - RUNOFF PONDING

having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zones A1 and A2: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the City of Gretna.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Gretna is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. Base flood elevations for ponding areas are rounded to the nearest half-foot. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FEMA.

6.0 OTHER STUDIES

Flood Insurance Studies for Jefferson Parish and Orleans Parish are currently being prepared (References 5 and 6). The results of those studies will be in exact agreement with the results of this study.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting the Natural and Technological Hazards Division,

Federal Emergency Management Agency, Regional Director, Region VI, Federal Center, Denton, Texas 76201.

8.0 BIBLIOGRAPHY AND REFERENCES

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5. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Jefferson Parish, Louisiana (Unpublished).

6. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Orleans Parish, Louisiana (Unpublished).