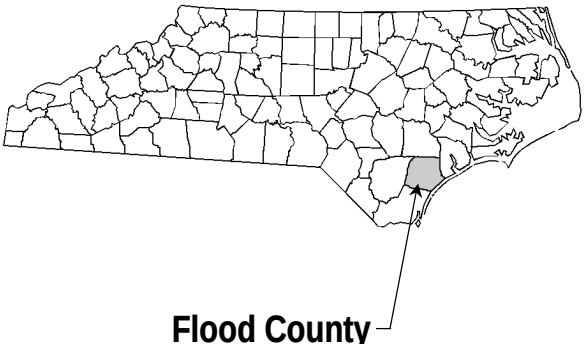
FLOOD INSURANCE STUDY

FLOOD COUNTY, USA
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
FLOOD COUNTY (UNINCORPORATED AREAS)	990099
FLOODVILLE, TOWN OF	990098

AUGUST 19, 1998

Federal Emergency Management Agency

THIS IS A SAMPLE TEXT OF A FLOOD INSURANCE STUDY

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date: August 19, 1998

Revised Countywide FIS Dates:

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FLOOD INSURANCE STUDY
FLOOD COUNTY, USA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises previous FISs/Flood Insurance Rate Maps (FIRMs) for, the geographic area of Flood County, USA, including: the Town of Floodville and the unincorporated areas of Flood County (hereinafter referred to collectively as Flood County). This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Flood County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS was prepared to include incorporated communities within Flood County in a countywide FIS. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS was compiled from their previously printed FIS reports and is shown below.

Flood County
(Unincorporated Areas): the hydrologic and hydraulic analyses for the FIS report dated April 17, 1987, were prepared by the U.S. Army Corps of Engineers (USACE), Springfield District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-84-E-1506. That work was completed in December 1985.

Floodville, Town of:	the hydrologic and hydraulic analyses for the FIS report dated April 17, 1987, were prepared by the USACE, Springfield District, for the FEMA, under Inter-Agency Agreement No. EMW-84-E-1506, Project Order No. 1, Amendment No. 4. That work was completed in December 1985.

For this countywide FIS, the hydrologic and hydraulic analyses were prepared by USACE for FEMA, under Inter-Agency Agreement No. EMW-94-C-0019. This work was completed in October 1995.

Base map files were provided by the Town of Floodville Stormwater Management Department, 126 Royal Oaks Drive, Suite 201, Floodville, USA 99150, and the Flood County Geographic Information Systems Department, 1110 South Road, Suite 205, Floodville, USA 99150. These files were photogrammetrically compiled at scales of 1"=200' (urban areas) and 1"=400' (rural areas) from aerial photographs. Additional information was derived from U.S. Geological Survey (USGS) 7.5-Minute Series Topographic Maps. The coordinate system used for the production of the digital FIRMs is Universal Transverse Mercator referenced to the North American Vertical Datum of 1927 and the Clarke 1866 spheroid.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting is held with representatives of the communities, FEMA, and the study contractors to explain the nature and purpose of the FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held with representatives of the communities, FEMA, and the study contractors to review the results of the study.

The dates of the initial and final CCO meetings held for Flood County and the incorporated communities within its boundaries are shown in the following tabulation:

Community Name	Initial CCO Date	Final CCO Date
Flood County (Unincorporated Areas)	November 2, 1983	July 22, 1986
Floodville, Town of	November 4, 1983	August 21, 1986

For this countywide FIS, an initial CCO meeting was held on September 11, 1994 and was attended by representatives of Flood County, USACE, and FEMA. A final CCO meeting was held on February 3, 1997, and was attended by representatives of Flood County, USACE, and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Flood County, USA. The area of study is shown on the Vicinity Map (Figure 1).

All or portions of the following flooding sources were studied by detailed methods: Atlantic Ocean, Cobb Brook, Rocky River, Jesco Lake, Silver Lakes, South Lake, and Stone Lake.

For this countywide FIS, Cobb Brook from the confluence with Rocky River to a point approximately 1,725 feet upstream of Raymond Diehl Road, and Rocky River from a point approximately 700 feet downstream of the confluence of Cobb Brook to a point approximately 1.85 miles upstream of Wellington Road, were newly studied by detailed methods.

Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and/or on the FIRM (Exhibit 2). 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.

All or portions of the following flooding sources were studied by approximate methods: Coleman Creek, Dean Lake, Flood Lake, Harpo Lake, Ireland Creek, Ireland Creek Tributary, Ireland Lake, Lake Cartman, Lake Morgan, Lily Foot Lake, Lynn Lake, Orchard Creek, Orchard Ponds, Rocky River, and Spark Lake. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Flood County.

2.2 Community Description

Flood County is located in the southeastern portion of USA on the Atlantic Ocean. The total land area within the county limits is approximately 1,052 square miles. The county is bordered by Anderson County to the north, the Atlantic Ocean to the southeast, Seaside County to the south, Bowen County to the east, and Chandler County to the west. Flood County had a 1997 population of 36,123.

Industry in the county is diversified, with forestry and farming serving as the most important industries. Commercial fishing is also important along the coastline. Flood County is served by U.S. Route 99, State Route 45, and CSX Transportation.

The climate of Flood County is subtropical, with a moderating influence from the Atlantic Ocean. The average daily temperature varies during the year from 55 degrees Fahrenheit (^{o}F) to 82 ^{o}F. The average annual precipitation is 57.6 inches.

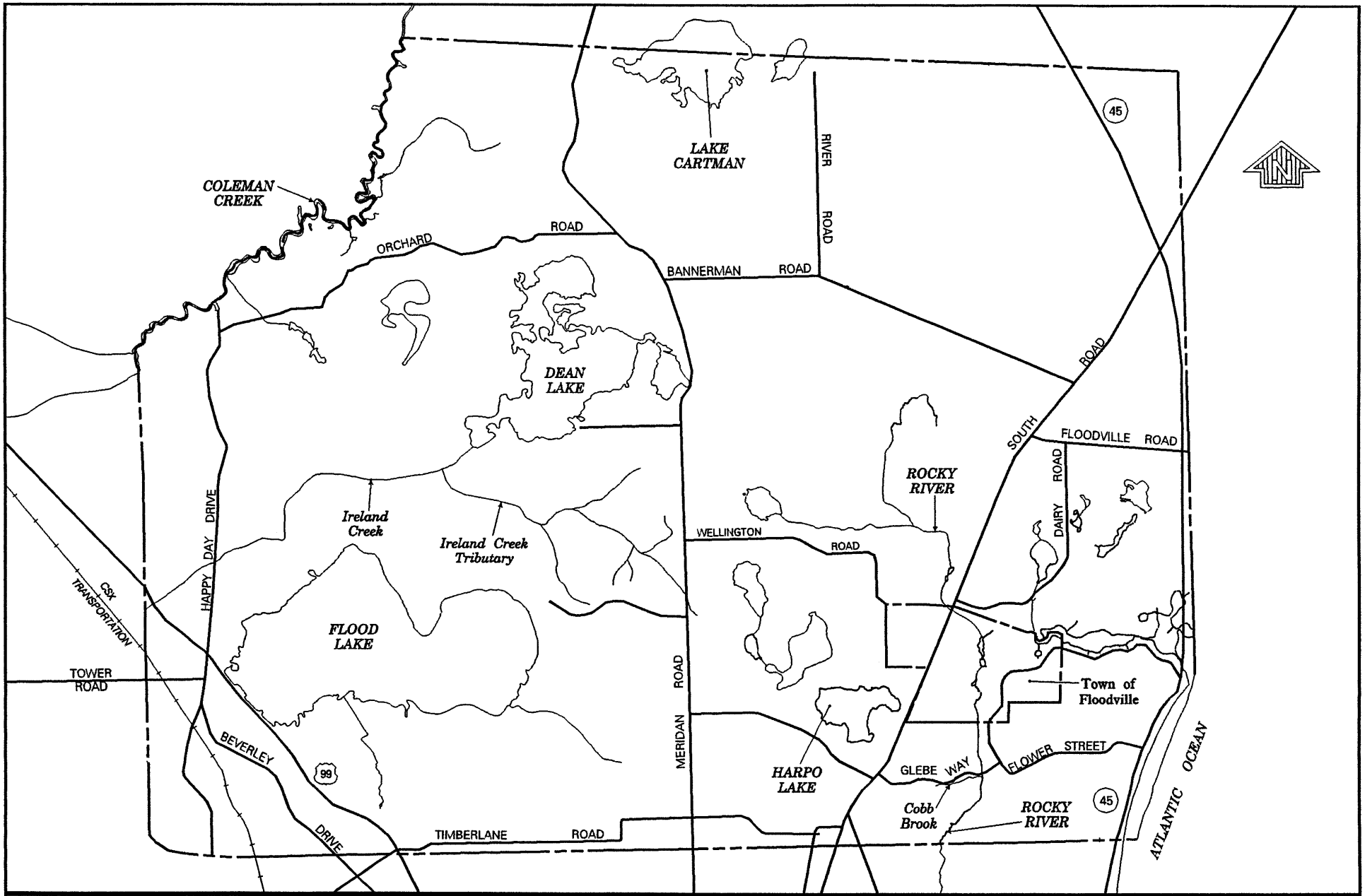


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA
AND INCORPORATED AREAS

APPROXIMATE SCALE

1.4 0 1.4 2.8 4.2 MILES

VICINITY MAP

2.3 Principal Flood Problems

Flood problems in the county can be attributed to both riverine flooding and tidal surge. Riverine flooding occurs as a result of both naturally occurring storm patterns and severe precipitation due to hurricanes.

Normal rainfall patterns are greatest during two distinct periods: 1) during summer, due to afternoon and evening thunderstorms, and 2) during late winter and early spring, due to frontal systems.

The Rocky River, Coleman Creek and several lakes within the county are major contributors to much of the flooding in the county. Major floods to date include the 1929 flood and the 1975 flood. The 1929 flood was the largest flood ever recorded. At the gaging station near Bruce, USA, the Rocky River reached an elevation of 28.94 feet mean sea level (msl), 7.46 feet higher than the next largest flood. The 1975 flood was the second largest flood recorded; it reached an elevation of 21.48 feet msl. The recurrence interval of this 1975 flood is once every 19 years while the 1929 flood interval would be less than once in 500 years.

Cobb Brook experiences flooding from extensive rainfall. Even though no severe flooding problems have been recorded, Cobb Brook poses a threat to the area's residential housing and also to future development along the brook.

The coastal areas of Flood County are subject to flooding from tidal surges associated with hurricanes along the Atlantic Ocean.

2.4 Flood Protection Measures

FEMA specifies that all levees must have a minimum of three foot freeboard against the 100-year flooding to be considered a safe flood protection structure. Levees that are shown within Flood County meet the FEMA requirement.

Federal and State funded protection measures are being employed in Flood County with the construction of Dean Lake Dam. Another levee along the leftside of the downstream bank of the Rocky River is under construction and will be finished in the year 2000.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled 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 floodplain management and for flood insurance 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 equaled 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 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the county 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 and peak elevation-frequency relationships for each flooding source studied in detail affecting the county.

Precountywide Analyses

Each jurisdiction within Flood County had a previously printed FIS report describing each community's hydrologic analyses. Those analyses have been compiled from the FIS reports and are summarized below.

For the unincorporated areas of Flood County and the Town of Floodville, inundation from the Atlantic Ocean caused by passage of storms (storm surge) was determined by the joint probability method (Reference 1). The storm populations were described by probability distributions of five parameters that influence surge heights. These parameters were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of observed storms in the vicinity of Flood County. Primary sources of data for this analysis were obtained from two reports made by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) reports (References 2 and 3). A summary of the parameters used for the area is presented in Table 1, "Parameter Values for Surge Elevations."

For areas subject to flooding directly from the Atlantic Ocean, the FEMA standard storm surge model was used to simulate the coastal surge generated by any chosen storm (that is, any combination of the five storm parameters defined previously). By performing such simulations for a large number of storms, each of known total probability, the frequency distribution of surge height can be established as a function of coastal location. Those distributions incorporate the large-scale surge behavior, but do not include an analysis of the added effects associated with much finer scale wave phenomena, such as wave height or runup. As the final step in the calculations, the astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level (Reference 4).

Central Pressure Depression (Millibars)	51.2	24.2	33.2	38.2	49.2	60.2	75.2	79.2
Assigned Probabilities	0.32	0.27	0.06	0.11	0.09	0.08	0.05	0.02
Storm Radius to Maximum Winds (nautical miles)	12			24			36	
Probability	0.23			0.50			0.27	
Forward Speed (knots)	7			13			19	
Probabilities: Entering	0.46			0.36			0.18	
Direction of storm path (degrees from true north)		138		ENTERING 167		196		225
Probability		0.25		0.23		0.27		0.25
Frequency of Storm Occurrence (Storm/Nautical mile/year)				0.002213				

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA
AND INCORPORATED AREAS

PARAMETER VALUES FOR SURGE ELEVATIONS

Wave set-up was determined to significantly contribute to the total stillwater flood levels along the Atlantic Ocean coastline. The amount of wave setup was calculated using the methodology outlined in the USACE publication Coastal Engineering Research Center, Shore Protection Manual (Reference 5). The 100-year stillwater elevations for Transects 1 to 3 along the Atlantic Ocean presented in Table 2, "Summary of Stillwater Elevations," include wave setup.

The storm-surge elevations for the 10-, 50-, 100-, and 500-year floods have been determined for the Atlantic Ocean, Jesco Lake, Silver Lakes, South Lake, and Stone Lake and are shown in Table 2, "Summary of Stillwater Elevations." The analyses reported herein reflect the stillwater elevations due to tidal and wind setup effects and include the contributions from wave action effects.

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet NGVD)			
	10-YEAR	50-YEAR	100-YEAR	500-YEAR
ATLANTIC OCEAN				
Entire open coast shoreline within Flood County	6.7	8.7	10.0[1]	12.6
JESCO LAKE				
Entire shoreline within Flood County	6.9	8.9	10.3	12.8
SILVER LAKES				
Entire shoreline within Flood County	8.6	9.6	10.4	13.5
SOUTH LAKE				
Entire shoreline within Flood County	6.9	8.9	10.3	12.8
STONE LAKE				
Entire shoreline within Flood County	7.0	9.0	10.2	12.8
RETENTION POND NO. 1				
Entire shoreline within Flood County	N/A	N/A	10.0	N/A

[1] Includes wave set-up of 0.5 foot

Countywide Analyses

The hydrologic analyses for the Cobb Brook watershed were performed using the USACE HEC-1 Flood Hydrograph Package (Reference 6). The Soil Conservation Service Dimensionless Unit Hydrograph (DUH) was used as the method to calculate the hydrograph for each subbasin. The storage method was used for the routing methodology with the DUH. The raw data for the drainage areas, curve numbers, and the lag and routing times was obtained from USGS 7.5-Minute Series Topographic Maps (Reference 7). The hypothetical storm information was obtained from Technical Paper No. 40 (Reference 8). The analyses were based on historical high watermarks obtained from interviews of county residents.

Discharges for the Rocky River were determined from a log-Pearson Type III frequency analysis, using data from a 50-year record of two USGS continuous-record stations at Mayberry and Bruce (Gage Nos. 02174000 and 02175000, respectively). The Mayberry gage was transposed downstream to more accurately reflect discharges in the upstream reach of the detailed study. The gage at Bruce was transposed to the downstream limit of the study.

A summary of the drainage area-peak discharge relationships for the flooding sources studied by detailed methods is shown in Table 3, "Summary of Discharges."

TABLE 3 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs)			
		10-YEAR	50-YEAR	100-YEAR	500-YEAR
COBB BROOK					
At the confluence with the Rocky River	4.2	560	910	1,080	1,550
ROCKY RIVER					
Approximately 0.7 mile upstream of county boundary	23.7	2,030	3,310	3,950	5,650
Just upstream of Wellington Road	13.5	1,150	2,000	2,610	4,050

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Precountywide Analyses

Each jurisdiction within Flood County had a previously printed FIS report describing each community's hydraulic analyses. Those analyses have been compiled from the FIS reports and are summarized below.

The FEMA storm surge model was used to simulate the hydrodynamic behavior of the surge generated by the various synthetic storms. This model utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 5 by 5 nautical miles and 10 by 10 miles, depending on the resolution required. Underwater depths and land heights for the model grid systems were obtained from the NOAA project and USGS topographic maps (References 3 and 7).

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the National Academy of Sciences (NAS) (Reference 9). This method is based on the following major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in Reference 9. The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

The wave height analysis along the Atlantic Ocean shoreline was computed using FEMA's standard coastal surge model, WHAFIS 3.0. Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 2, Transect Location Map, in accordance with the Users' Manual for Wave Height Analysis (Reference 10). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions of their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at large intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Table 4 provides a listing of the transect locations and stillwater starting elevations, as well as maximum wave crest elevations.

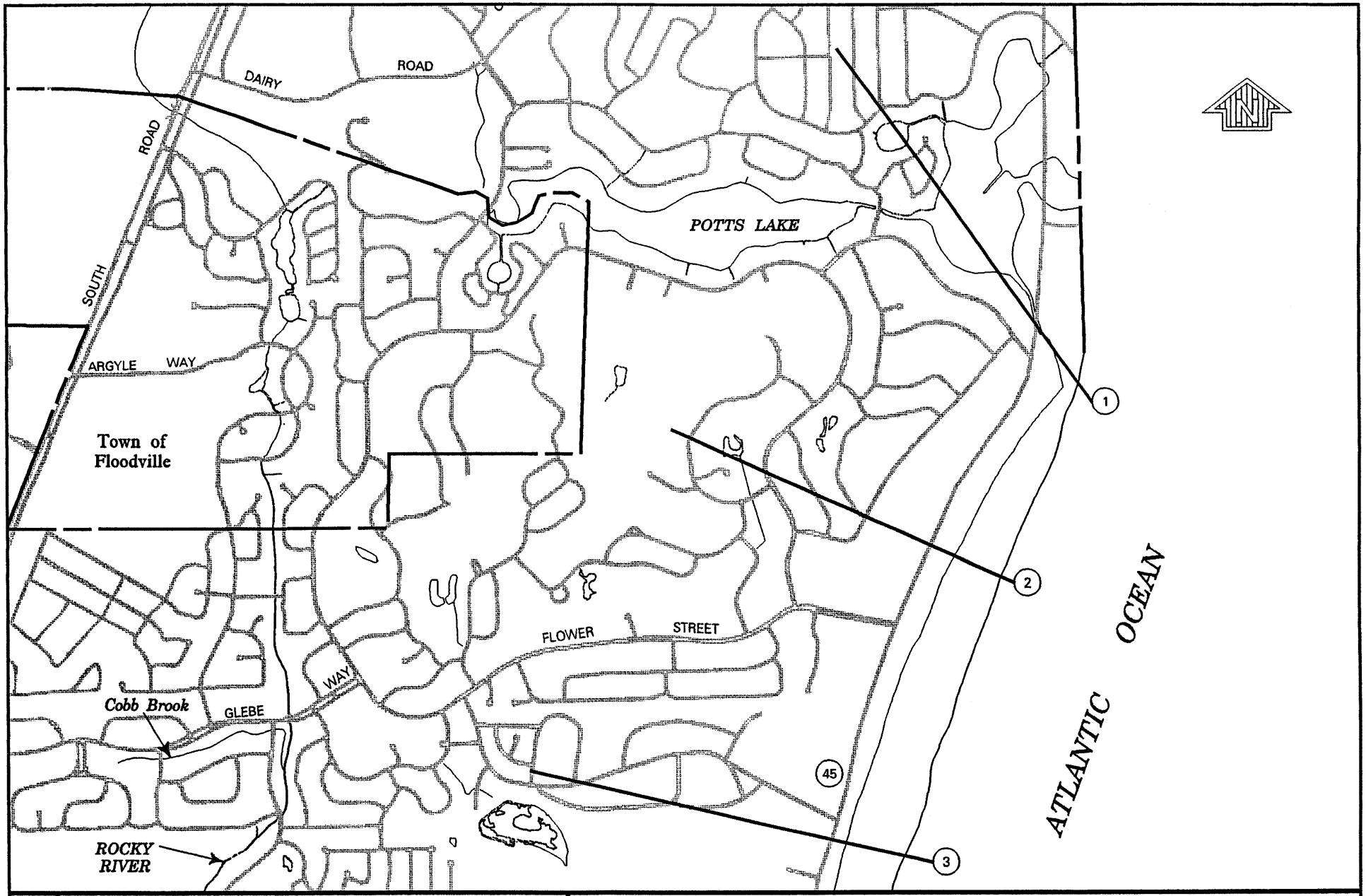


FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

APPROXIMATE SCALE

.4 0 .4 .8 1.2 MILES

TRANSECT LOCATION MAP

TABLE 4 - TRANSECT DESCRIPTIONS

TRANSECT	LOCATION	ELEVATION (feet NGVD) 100-YEAR STILLWATER	MAXIMUM 100-YEAR WAVE CREST[2]
1	Shoreline of Flood County, approximately 1,000 feet southeast of the intersection of Tralee Road and McLaughlin Drive, extending inland approximately 5,400 feet to Old Ventura.	10.0[1]	14.2
2	Shoreline of Flood County, between McLaughlin Drive and Flower Street, extending inland approximately 4,300 feet to Palmeri Drive.	10.0[1]	14.2
3	Shoreline of Flood County approximately 300 feet southwest of the intersection of State Route 45 and View Way, extending inland approximately 4,700 feet to Stone Trail.	10.0[1]	14.2

[1] Includes wave setup of 0.5 foot
[2] Because of map scale limitations, the maximum wave elevation may not be shown on the FIRM

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and elevations were computed considering effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for the 100-year flood were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the 3-foot breaking wave for determining the terminus of the V Zone (area with velocity wave action) was also computed at each transect.

Table 5, "Transect Data," shows the Atlantic Ocean stillwater elevations and the maximum and minimum VE and AE zone elevations at each transect.

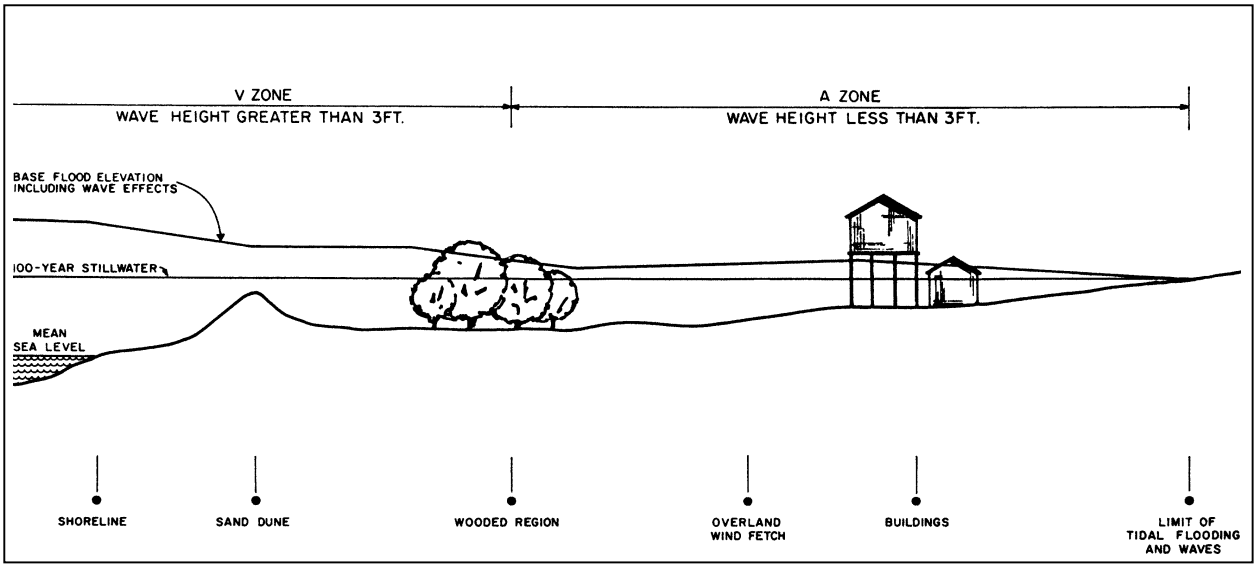
TABLE 5 - TRANSECT DATA

FLOODING SOURCE	STILLWATER ELEVATION (feet NGVD) 10-YEAR	50-YEAR	100-YEAR	500-YEAR	ZONE	BASE FLOOD ELEVATION (feet NGVD)[2]
ATLANTIC OCEAN						
Transect 1	6.7	8.7	10.0[1]	12.6	VE	12-14
					AE	10-12
Transect 2	6.7	8.7	10.0[1]	12.6	VE	13-14
					AE	10-12
					AO	Depth 2'
Transect 3	6.7	8.7	10.0[1]	12.6	VE	12-14
					AE	10-12

[1]Includes wave set-up of 0.5 foot
[2]Because of map scale limitations, base flood elevations shown on the FIRM represent average elevations for the zones depicted.

Along the Flood County shoreline, existing dunes were found to be insufficient in size to sustain wave attack. Therefore, using standard erosion analysis procedures as outlined in the Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping, the protection afforded by the dunes was removed from the coastal analysis, resulting in a low beach profile slope (Reference 11). This does not allow for the development of wave runup. As a result, wave runup was not considered in the coastal base flood elevations.

Figure 3 represents a sample transect that illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the A/V Zone boundary.



TRANSECT SCHEMATIC Figure 3

After analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic maps and engineering judgment (Reference 7). Controlling features affecting the elevations were identified and considered in relation to their positions at particular transect and their variation between transects.

Countywide Analyses

Cross sections for the flooding sources studied by detailed methods were obtained from field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. The channel sections were located at close intervals upstream and downstream of structures. The overbank cross section data were obtained from topographic maps at a scale of 1:2,400 with a contour interval of 2 feet, provided by the USACE (Reference 12).

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the FIRM (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (Reference 13). Starting water-surface elevations for Cobb Brook were calculated using the slope/area method. The starting water-surface elevations for the Rocky River were obtained by using the mean high tide elevation because starting conditions produced water-surface elevations below mean high tide. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Along certain portions of the Rocky River, a profile base line is shown on the maps to represent channel distances as indicated on the flood profiles and floodway data tables.

Roughness factors (Manning's "n") used in the hydraulic computations were based on field observations. The channel "n" values for Cobb Brook ranged from 0.040 to 0.048 and the overbank "n" values ranged from 0.095 to 0.143. The Channel "n" values for the Rocky River ranged from 0.042 to 0.050 and the overbank "n" values ranged from 0.105 to 0.210.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study, and their descriptions, are shown on the FIRM.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS generally provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 100- and 500-year floodplains have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 2 feet (Reference 12). For the lacustrine and coastal floodplains, the USGS 7.5-Minute Series Topographic Maps at a scale of 1:24,000 with a contour interval of 5 feet were used (Reference 7).

For the streams studied by approximate methods, the 100-year floodplain boundaries were taken from the Flood Hazard Boundary Map for the unincorporated areas of Flood County (Reference 14).

The 100- and 500-year floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones VE, AO, AH, A99, A, and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary is shown on the FIRM (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS was computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections (Table 6, "Floodway Data"). The computed floodway is shown on the FIRM (Exhibit 2). In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. No floodway was computed for Cobb Brook.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NGVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Rocky River								
A	4.395	115	1.233	6.1	9.9	9.9	10.0	0.1
B	5.537	13	142	9.2	10.4	10.4	10.5	0.1
C	9.610	100	323	8.4	10.9	10.9	11.1	0.2
D	10.995	85	861	7.2	11.2	11.2	11.3	0.1
E	12.695	245	1.887	5.1	11.3	11.3	11.4	0.1
F	13.845	270	2.403	4.5	11.5	11.5	11.5	0.0
G	14.513	230	2.553	3.7	11.6	11.6	11.6	0.0
H	16.625	180	2.000	4.2	11.7	11.7	11.7	0.0
I	18.209	415	2.566	3.9	12.5	12.5	12.7	0.2
J	20.849	230	2.381	4.0	13.0	13.0	13.2	0.2
K	25.360	340	2.924	3.6	14.0	14.0	14.2	0.2

[1]Feet above county boundary

TABLE 6

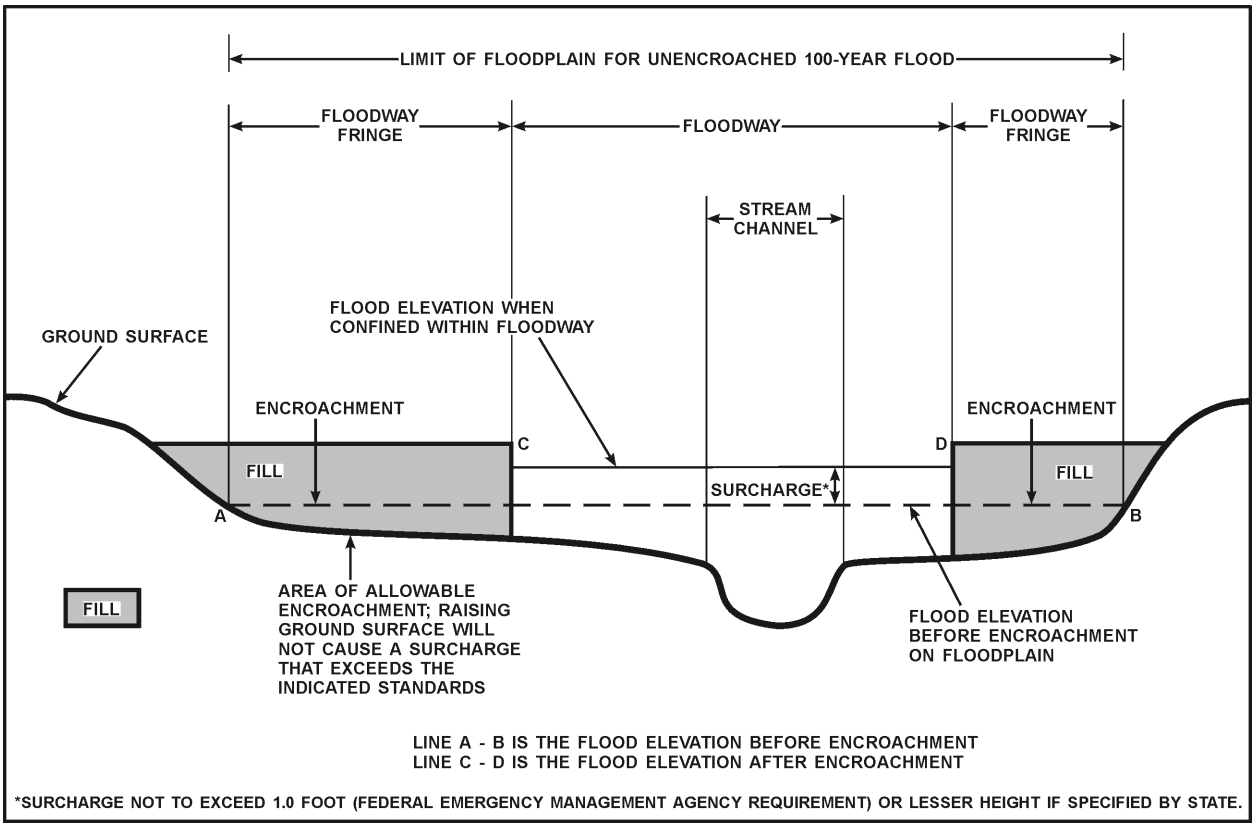
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA
AND INCORPORATED AREAS

FLOODWAY DATA

ROCKY RIVER

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.



FLOODWAY SCHEMATIC Figure 4

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Flood County. Previously, separate Flood Hazard Boundary Maps and/or FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. This countywide FIRM also includes flood hazard information that was presented separately on Flood Boundary and Floodway Maps, where applicable. Historical data relating to the maps prepared for each community up to and including this countywide FIS are presented in Table 7, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Flood County (Unincorporated Areas)	May 19, 1974	NONE	April 17, 1987	August 19, 1998
Floodville, Town of	June 18, 1978	NONE	April 17, 1987	

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

FISs have been prepared for the unincorporated areas of Anderson, Bowen, Chandler and Seaside Counties (References 15, 16, 17, and 18).

Because it is based on more up-to-date analyses, this countywide FIS supersedes the previously printed FISs for the unincorporated areas of Flood County and the Town of Floodville (References 19 and 20).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting FEMA, Mitigation Division, Roger Center - Koger Building, 6006 South Road, Floodville, USA 99150.

9.0 BIBLIOGRAPHY AND REFERENCES

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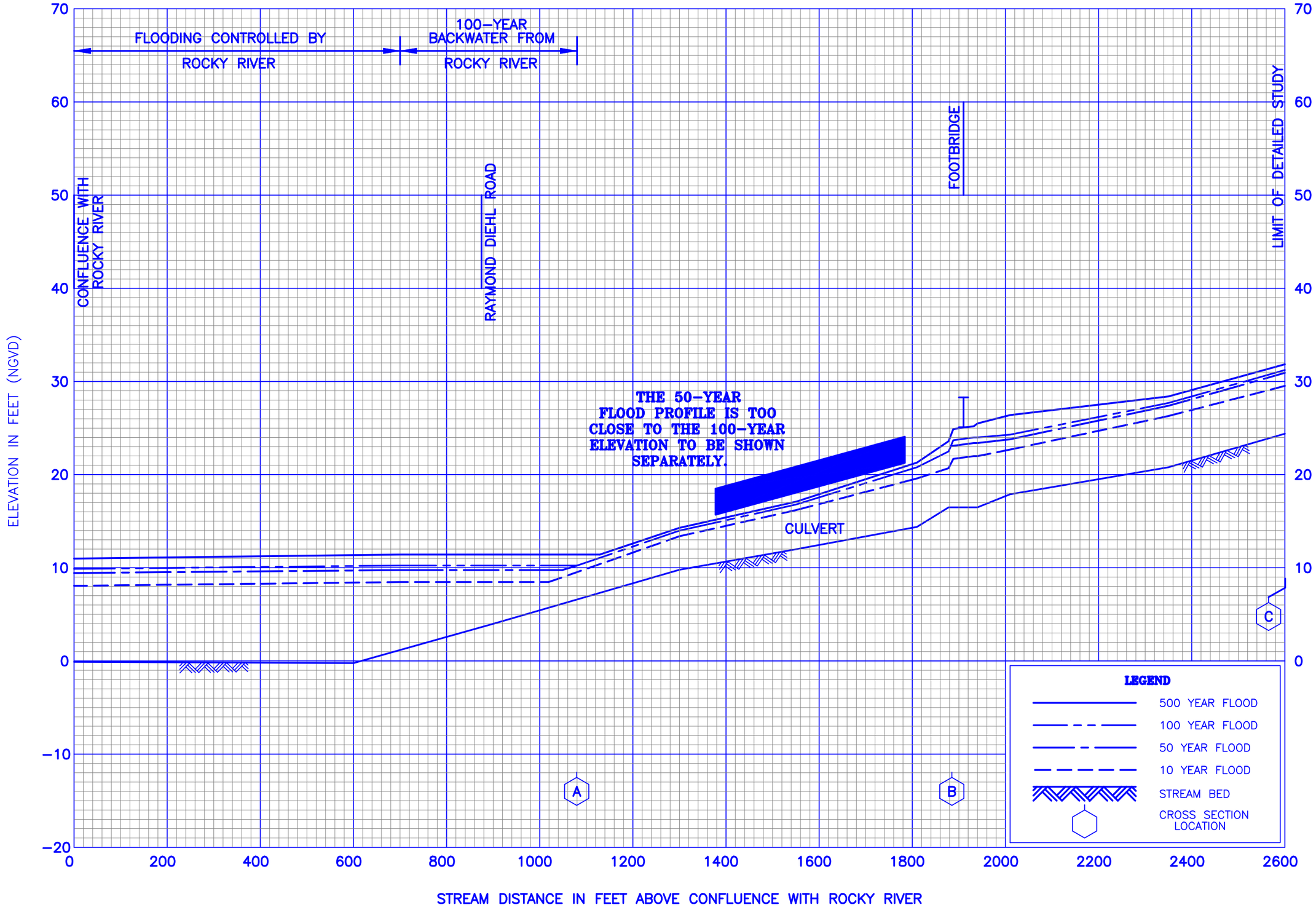


FLOOD PROFILES

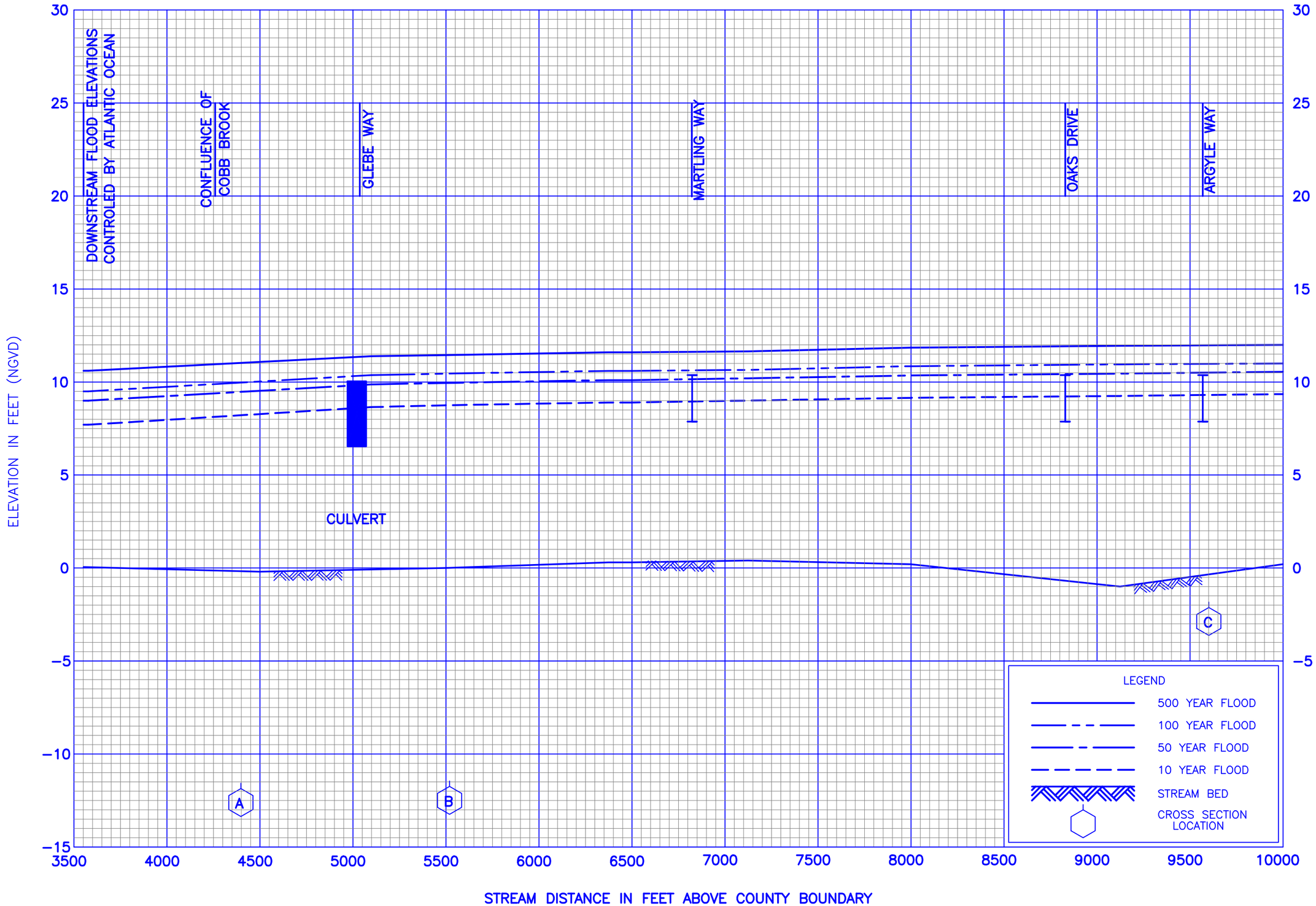
COBB BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

01P



FLOOD PROFILES

ROCKY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

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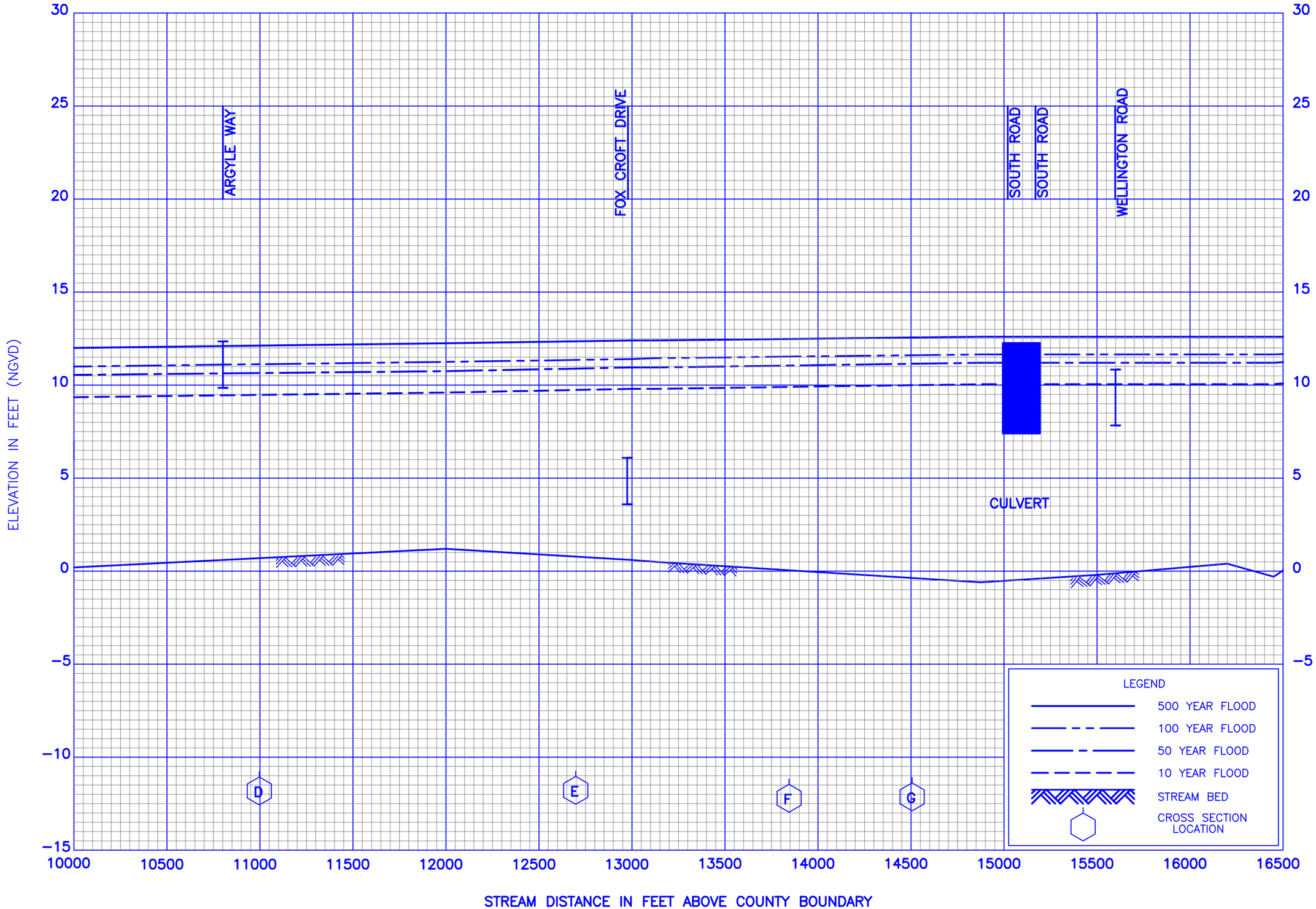


FLOOD PROFILES

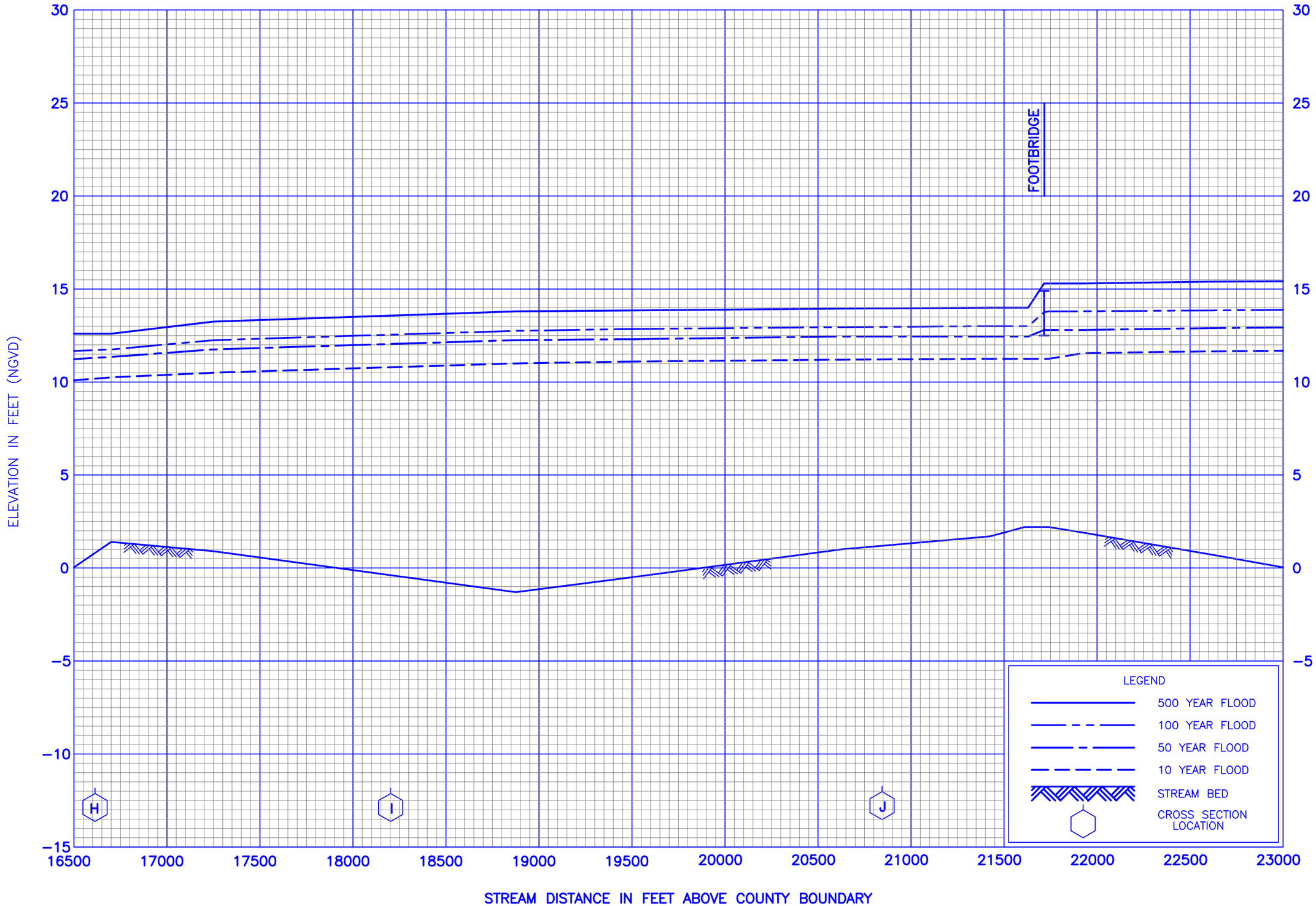
ROCKY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

03P



FLOOD PROFILES

ROCKY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

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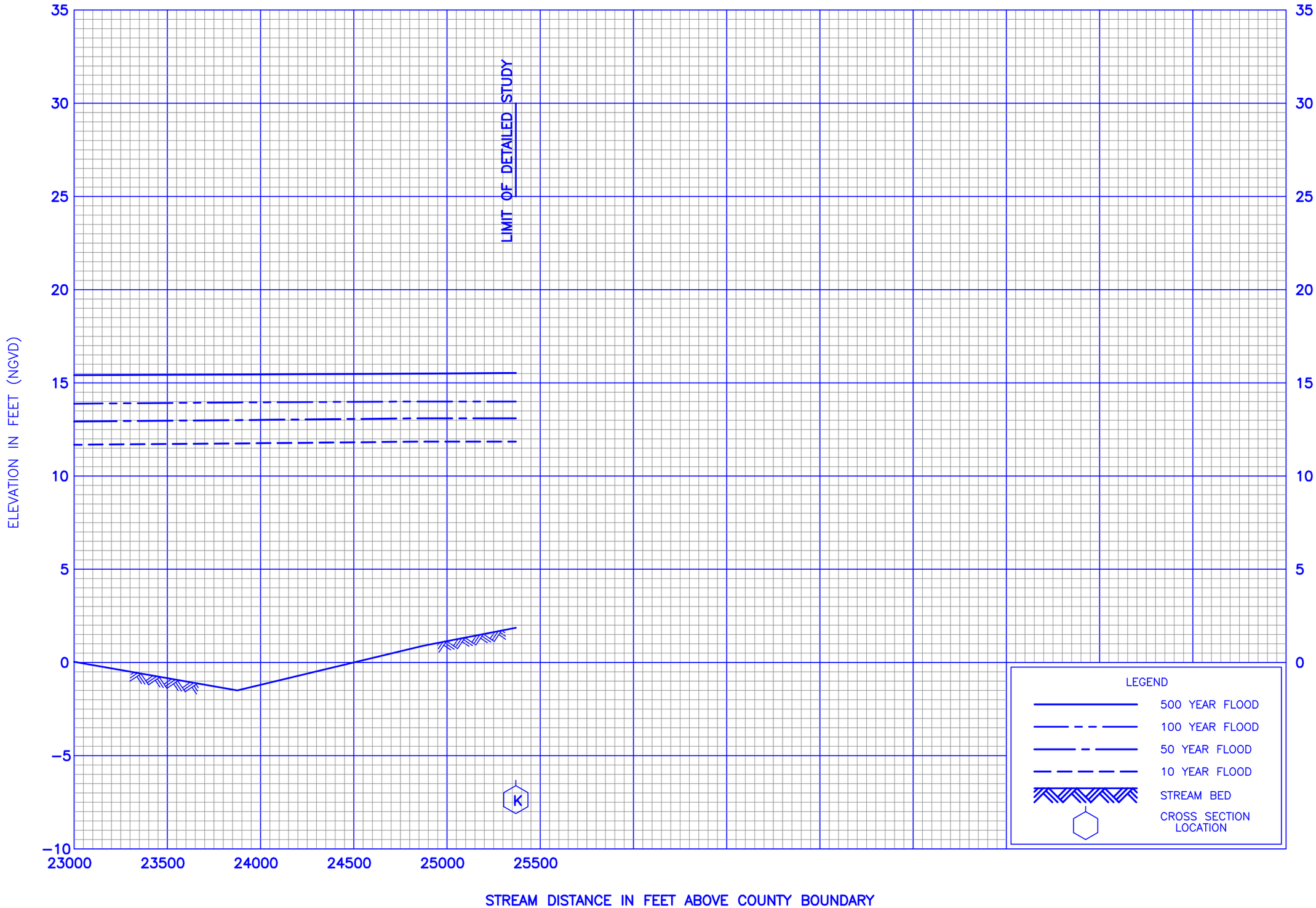

FLOOD PROFILES

ROCKY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD COUNTY, USA

AND INCORPORATED AREAS

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