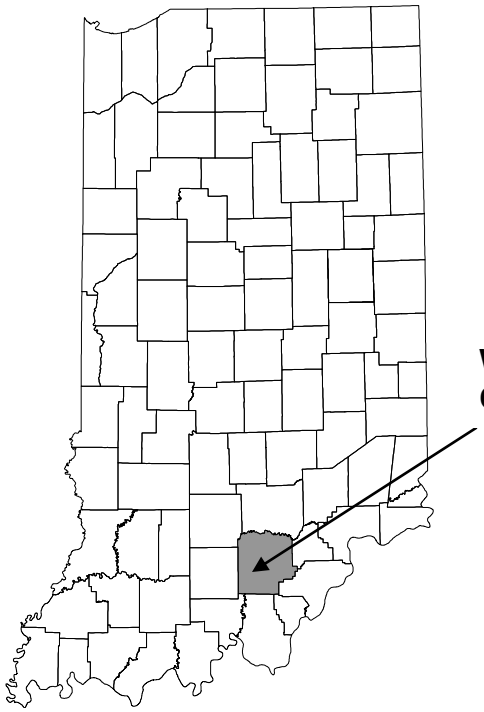
FLOOD INSURANCE STUDY

WASHINGTON COUNTY, INDIANA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CAMPBELLSBURG, TOWN OF*	185191
FREDERICKSBURG, TOWN OF	180277
HARDINSBURG, TOWN OF*	185190
LITTLE YORK, TOWN OF	180398
LIVONIA, TOWN OF*	180278
NEW PEKIN, TOWN OF	180463
SALEM, CITY OF	180279
SALTILLO, TOWN OF*	185189
WASHINGTON COUNTY (Unincorporated Areas)	180446

*No Special Flood Hazard Area



PRELIMINARY

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
18175CV000A

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) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

The Federal Emergency Management Agency (FEMA) may revise and republish part or all of this FIS report at any time. In addition, FEMA may revise part of this FIS report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

Selected Flood Insurance Rate Map panels for this community contain information that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels (e.g., floodways, cross sections). In addition, former flood hazard zone designations have been changed as follows:

Old Zone:	New Zone:
A1 through A30	AE
B	X (shaded)
C	X

Initial Countywide FIS Effective Date: To be Determined

TABLE OF CONTENTS

	Page
1.0 INTRODUCTION	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments	2
1.3 Coordination	3
2.0 AREA STUDIED	4
2.1 Scope of Study	4
2.2 Community Description	5
2.3 Principal Flood Problems	6
2.4 Flood Protection Measures	6
3.0 ENGINEERING METHODS	7
3.1 Hydrologic Analyses	7
3.2 Hydraulic Analyses	8
3.3 Vertical Datum	10
4.0 FLOODPLAIN MANAGEMENT APPLICATIONS	11
4.1 Floodplain Boundaries	11
4.2 Floodways	11
5.0 INSURANCE APPLICATION	17
6.0 FLOOD INSURANCE RATE MAP	18
7.0 OTHER STUDIES	20
8.0 LOCATION OF DATA	20
9.0 BIBLIOGRAPHY AND REFERENCES	20

FIGURES

Figure 1 - Floodway Schematic	13

TABLES

Table 1 - CCO Meeting Dates	3
Table 2 – Incorporated Letters of Map Change	4
Table 3 – Streams Studied By Detailed Methods	4
Table 4 – Streams Studied By Approximate Methods	4
Table 5 – Scope of Study	5
Table 6 – Population of Incorporated Cities and Towns in Washington County	5
Table 7 – Summary of Discharges	7
Table 8 – Channel and Overbank Roughness Factors	9
Table 9 – Floodway Data Table	14
Table 10 – Community Map History	19

EXHIBITS

Exhibit 1 - Flood Profiles	Panel #s
Blue River	Panels 01P
Brock Creek	Panels 02P-03P
Highland Creek	Panels 04P
West Fork Blue River	Panels 05P-11P

Exhibit 2 - Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

WASHINGTON COUNTY, INDIANA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and Flood Insurance Rate Maps (FIRMs) in the geographic area of Washington County, Indiana, including the City of Salem, the Towns of Campbellsburg, Fredericksburg, Hardinsburg, Little York, Livonia, New Perkin, and Saltillo and the unincorporated areas of Washington County (hereinafter referred to collectively as Washington County), and 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 and to assist the community in its efforts to promote sound floodplain management. This information will also be used by Washington 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 (NFIP) 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.

Furthermore, the Towns of Campbellsburg, Hardinsburg, Livonia, and Saltillo do not have special flood hazard areas within their incorporated limits. However, for the purpose of complete county-wide mapping of Washington County, these towns are still included in this FIS and FIRMs.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into local GIS and be accessed more easily by the community.

1.2 Authority and Acknowledgments

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

Information of the authority and acknowledgements for each of the new studies and previously printed FIS reports and Flood Insurance Rate Maps (FIRMs) for communities within Washington County was compiled and is shown below:

Washington County (Unincorporated Areas)	No previous FIS.
Salem, City of:	The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H_19-72. This work, which was completed in March 1974, covered all significant flooding sources affecting the City of Salem.
Campbellsburg, Town of:	No previous FIS.
Fredericksburg, Town of:	No previous FIS.
Hardinsburg, Town of:	No previous FIS.
New Pekin, Town of:	No previous FIS.
Saltillo, Town of:	No previous FIS.
New Studies:	The hydrologic and hydraulic analyses for approximate stream reaches of Washington County were performed by Morley and Associates, Inc., on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E060008. The Indiana Department of Natural Resources managed the production of this study as part of their Cooperating Technical Partner agreement with the Federal Emergency Management Agency dated April 29, 2004, which was defined by the Indiana DNR Mapping Activity Statement 07-22 dated July 3, 2007 and funded under agreement number EMC-2005-GR-7022.

Redelineation of the previously effective flood hazard information for this FIS report, correction to the North American Vertical Datum of 1988, and conversion of the unincorporated and incorporated areas of Washington County into the Countywide format was performed by Morley and Associates, Inc., on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E060008. The Indiana Department of Natural Resources managed the production of this study as part of their Cooperating Technical Partner agreement with the Federal Emergency Management Agency dated April 29, 2004, which was defined by the Indiana DNR Mapping Activity Statement 07-22 dated July 3, 2007 and funded under agreement number EMC-2005-GR-7022.

1.3 Coordination

The purpose of an initial Consultation Coordinated Officer's (CCOs) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study. The dates of the initial and final CCO meetings held for the previously effective FIS reports covering the geographic area of Washington County, Indiana are shown in Table 1. The initial and final CCO meetings were attended by the study contractor, FEMA (or the Federal Insurance Administration), the Indiana Department of Natural Resources (IDNR), and the affected communities.

The coordinate system used for the production of the digital FIRMs is the Transverse Mercator projection, Indiana State Plane coordinate system, East Zone, referenced to the North American Datum of 1983 and the GRS 1980 spheroid

Table 1: CCO Meeting Dates for Pre-Countywide FIS

Community Name	Initial CCO Date	Final CCO Date
Salem, City of	*	*

*No Dates or even any mention of a CCO meeting in the FIS

For this countywide FIS, an initial CCO meeting was held on November 21, 2006, and was attended by IDNR, the Washington County EMA, the Washington County Surveyor, the Washington County SEI, the City of Salem and the Town of New Pekin.

The results of the countywide study were reviewed at the final CCO meeting held on --, and attended by representatives of FEMA, IDNR and _____. All problems raised at that meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Washington County, Indiana, including the incorporated communities listed in Section 1.1.

All FIRM panels for Washington County have been revised, updated, and republished in countywide format as a part of this FIS. The FIRM panel index, provided as Exhibit 2, illustrates the revised FIRM panel layout. Flood zones not restudied in the Scope of Study (MAS) were digital conversions to the countywide format.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards as identified during the initial CCO meeting. For this study, four new stream reaches were studied using approximate methods (Table 5). The scope and methods of new approximate studies were proposed and agreed upon by FEMA, the IDNR, and Washington County.

This FIS update also incorporates the determination of letters issued by FEMA resulting in map changes (Letters of Map Change, or LOMCs). All Letters of Map Revision (LOMRs) are summarized in Table 2. Letters of Map Amendment (LOMAs) incorporated for this study are summarized in the Summary of Map Actions (SOMA) included in the Technical Support Data Notebook (TSDN) associated with this FIS update. Copies of the TSDN may be obtained from the Community Map Repository.

Table 2: Incorporated Letters of Map Change

Flooding Source	Community and Project Id	Date Issued	Type
None	NA	NA	NA

Table 3: Streams Previously Studied by Detailed Methods

Blue River	West Fork Blue River
Brock Creek	Highland Creek

Table 4: Streams Previously Studied by Approximate Methods

Blue River	Muscatatuck River
Middle Fork Blue River	South Fork Blue River

Table 5: Scope of Study

Stream	Limits of Detailed Study
Brock Creek	Mouth to State Road 135
West Fork Blue River	Becks Mill Road to State Road 56
Stream	Limits of Redelineation Study
East Fork White River	County Boundary to Muscatatuck River
Stream	Limits of Approximate Study
Bear Creek	Mouth to Wetzel Road
Blue River	Fredericksburg Road to Becks Mill Road
Muscatatuck River	Mouth to County Boundary
South Fork Blue River	Mouth to Poplar Branch

2.2 Community Description

Washington County is located in southern Indiana and is bordered by Jackson County to the north, Lawrence County to the northwest, Orange County to the west, Crawford County to the southwest, Harrison County to the South, Floyd County to the southeast, and Clark and Scott Counties to the east. Washington County is located approximately 100 miles south of Indianapolis. Washington County is served by US route 150, and State Routes 56, 60, 39, 135, 160, and 335.

The climate in Washington County ranges from hot and humid in the summertime to cold during the winter season. Average daytime temperatures during the summer fall around 73.9ºF, while winter temperatures average at approximately 33.5ºF. Precipitation for Washington County totals an annual amount of 46.07 inches.

According to U.S. Census Data from the year 2000, the population of Washington County in 2005 was reported to be 27,223. Table 6 lists the population of the incorporated areas in Washington County.

Table 6: Population of incorporated cities and towns in Washington County (2000 Census)

Community	Population
Campbellsburg, Town of	578
Fredericksburg, Town Of	92
Hardinsburg, Town Of	244
Little York, Town Of	185
Livonia, Town Of	112
New Pekin, Town Of	1,334
Salem, City Of	6,172
Saltillo	107

2.3 Principal Flood Problems

Major floods principally occur during the winter and spring months, but can occur during any season. Generally, two types of storm events cause flooding. During the winter and spring, storms of moderate intensity and long duration, coupled with frozen ground, cause flooding to occur. During the summer, thunderstorms which have high intensities and relatively short durations can cause floods. Localized flood problems in the incorporated areas are summarized below:

Campbellsburg, Town of:	There are no principal flooding problems at this time.
Fredericksburg, Town of:	Principle flood areas are located in the northern parts of the town where the Blue River and the South Fork Blue River meet.
Hardinsburg, Town of:	There are no principal flooding problems at this time.
Little York, Town of:	Principle flood areas are the low-lying areas along Henry Creek which is a tributary of Muscatatuck River.
Livonia, Town of:	There are no principal flooding problems at this time.
New Pekin, Town of:	Principle flood areas are the low-lying areas along South Fork Blue River.
Salem, City of:	Principle flood areas are low-lying areas along the West Fork Blue River, Brock Creek, and Highland Creek. A significant flood occurred in 1959.
Saltillo, Town of:	There are no principal flooding problems at this time.

2.4 Flood Protection Measures

The City of Salem has limited protection from floods in the form of small retaining walls along West Fork Blue River in the vicinity of the fairgrounds.

The state of Indiana has also set regulations concerning development in a flood plain. The Indiana Flood Control Act of 1945, as amending, requires that the channels and that portion of the flood plain known as the floodway be kept free and clear of interference or obstructions which could restrict the flow rate in a significant manner. The Act stipulates that the Indiana Flood Plain Management Act of 1973 further requires that flood plain management regulations adopted after July 1, 1974, meet a minimum set of standards for the delineation and regulation of flood hazard areas

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in Washington County, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that 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 that equals or exceeds the 1-percent- annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); 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 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 peak discharge-frequency relationships for each flooding source studied by detailed methods affecting Washington County. Table 7 contains a summary of peak discharges for the 10-, 2-, 1-, and 0.2-percent annual chance floods, where applicable, for each flooding source studied in detail in Washington County. Peak discharges in the table were compiled from previously effective FIS reports for Washington County and incorporated areas.

Table 7: Summary of Discharges

Flooding Source And Location	Drainage Area (Square Miles)	Peak Discharge (CFS) 10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Blue River					
US 150	283	15,600	25,100	30,400	42,000
Above South Fork Blue River	157	11,200	19,000	24,600	35,500
Brock Creek					
Mouth	8.03	2,500	3,600	4,250	4,800

Highland Creek					
Mouth	9.33	2,800	4,000	4,700	5,400
West Fork Blue River					
Becks Mill Road	41.3	5,900	8,400	10,000	11,300
Above Highland Creek	28.2	5,000	7,000	8,400	9,400
At Main Street	19.4	4,100	5,800	6,800	7,700

Flood-flow frequency data were based on statistical analysis of stage-discharge records at gaging stations on West Fork Blue River at Salem (established in 1970), Blue River at Fredricksburg (established in 1968), Blue River at White Cloud (established in 1930) and Middle Fork Anderson River near Bristow (established in 1961). These gaging stations are operated by the U.S. Geological Survey.

Using the station frequency data, regional flood-frequency curves were developed, and an average skew coefficient of 0.30 was obtained. The 10%, 2%, 1%, and 0.2% annual chance peak discharges for each station were plotted against drainage area and adjusted for consistency with adjacent stations.

Discharges for the 0.2% annual chance floods of all streams were determined by straightline extrapolation of a single-log graph of flood discharges computed for frequencies up to 1% annual chance.

The equations used to determine the discharges in the majority of the cases are taken from Estimation of Peak Discharges of Indiana Streams by using log Pearson (iii) distribution. The equations presented in the report are also included in the latest version of the National Flood Frequency (NFF) program by the USGS, and are included in the USGS StreamStats application. In some cases, the discharges for a stream have been coordinated with the Indiana Department of Natural Resources, the Natural Resources Conservation Service (formally the Soil Conservation Service), the U.S. Geological Survey and the U.S. Army Corps of Engineers, through a Memorandum of Understanding dated May 6, 1976.

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. Users should be aware that flood elevations shown on the Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes,

users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

Cross sections for the backwater analyses were obtained from a variety of sources including: physical survey data, IDNR contour mapping, USGS topographic mapping and local contour mapping. 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.

Water-surface elevations for floods of the selected recurrence intervals were computed through use of the USACE HEC-RAS step-backwater computer program. HEC-RAS is an updated version of the HEC-2 program used to perform step-backwater analyses.

Flood profiles were prepared for all streams studied by detailed methods and show computed water-surface elevations to an accuracy of 0.5 feet for floods of the selected recurrence intervals. For this countywide FIS, flood profiles and approved LOMRs have been consolidated into continuous stream reaches and adjusted to reflect the current vertical datum as described in Section 3.3. New profiles have been prepared for the new detailed studies and for the purposes of incorporating the LOMRs described in Section 2.1 above.

Channel and overbank roughness factors (Manning's "n" values) used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and floodplain areas. For other streams, factors were estimated by field inspection with the aid of "n" value tables and equations. Channel and overbank roughness factors used in the detailed studies are summarized by stream in Table 8.

Table 8: Channel and Overbank Roughness Factors

	Roughness Coefficients	
Stream	Main Channel	Overbanks
Blue River	0.03 – 0.035	0.10 – 0.035
Brock Creek	0.04	0.06
Highland Creek	0.04 – 0.05	0.03 – 0.10
West Fork Blue River	0.035 – 0.045	0.03 – 0.10

For new approximate study areas, analyses were based on field inspection and modeling of the stream reaches using USACE HEC-RAS program, version 3.1.3. The approximate study structural data are based on field measurements. The cross section geometry was derived from the 2005 IDHS 2005 Digital Elevation data. The starting water surface elevations were assumed to be normal depth.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities.

In this revision, a vertical datum conversion of -0.39 feet was calculated at the centroid of the county and used to convert all elevations in Washington county from NGVD29 to NAVD88 using the National Geologic Survey's VERTCON online utility (VERTCON, 2005).

$$(\text{NGVD29} - 0.39 = \text{NAVD88})$$

For more information on NAVD88, see the FEMA publication entitled Converting the National Flood Insurance Program to the North American Vertical Datum of 1988 (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

The horizontal coordinate system used for the production of the digital FIRMs is the Transverse Mercator projection, Indiana State Plane coordinate system, referenced to the North American Datum of 1983 and the GRS 1980 spheroid.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance flood elevations and delineations of the 1- and 0.2-percent-annual-chance floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, and the Floodway Data table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic mapping from the City of Salem and from the 2005 statewide orthophotography flight.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, V, and VE); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance 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 1-percent-annual chance 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

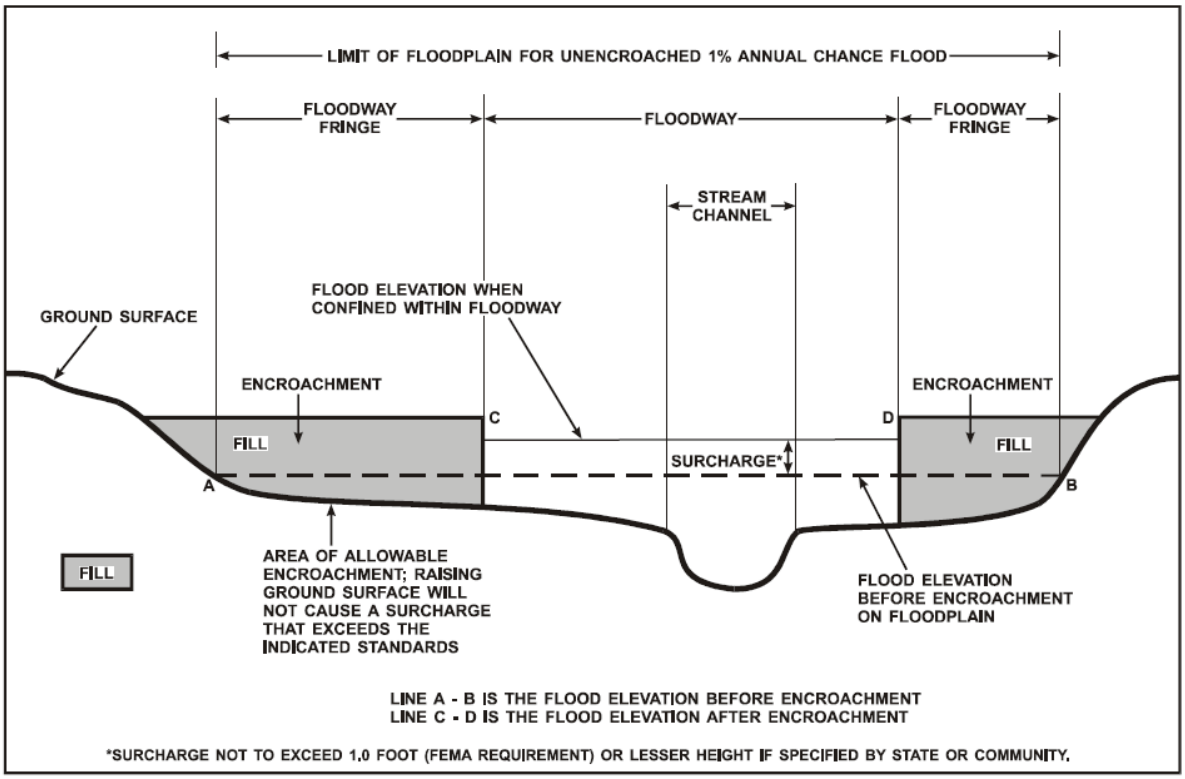
concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial 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 minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The State of Indiana, however, per Indiana Code IC 14-28-1 and Indiana Administrative Code 312 IAC 10, has designated that encroachment in the floodplain is limited to that which will cause no significant increase in flood height. As a result, floodways for this study are delineated based on a flood surcharge of less than 0.15 feet. The floodways in this study were approved by the IDNR, and are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS report and on the FIRM 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 have been tabulated for selected cross sections (Table 9). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and 1-percent-annual-chance 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 1-percent-annual-chance flood more than 0.14 feet at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

Figure 1: Floodway Schematic



FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET/SECOND)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
BLUE RIVER								
A	56.76	1,250	9,132	3.3	614.8	614.8	614.8	0.0
B	57.10	1,175	8,072	3.8	615.3	615.3	615.3	0.0
C	57.34	1,615	8,938	3.4	616.3	616.3	616.4	0.1
D	57.68	2,500	22,648	1.3	617.1	617.1	617.2	0.1
E	58.42	1,050	6,852	3.6	617.3	617.3	617.3	0.0
BROCK CREEK								
A	0.26	250	867	5.9	722.1	722.1	722.1	0.0
B	0.36	210	535	9.1	722.8	722.8	722.9	0.1
C	0.40	235	646	7.6	724.4	724.4	724.5	0.1
D	0.49	240	975	6.5	726.1	726.1	726.2	0.0
E	0.54	175	633	6.7	726.6	726.6	726.7	0.1
F	0.62	220	1,430	4.8	728.6	728.6	728.7	0.1
G	0.70	195	972	6.9	729.1	729.1	729.1	0.0
H	0.78	185	977	5.6	729.9	729.9	730.0	0.1
I	0.96	150	849	7.1	735.9	735.9	736.0	0.1
J	1.46	105	558	8.9	744.5	744.5	744.6	0.1
HIGHLAND CREEK								
A	0.40	*	*	*	713.8	713.8	*	*
B	0.47	*	*	*	715.3	715.3	*	*
C	0.57	*	*	*	717.8	717.8	*	*

[1] MILES ABOVE MOUTH
* NO FLOODWAY COMPUTED

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET/SECOND)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
WEST FORK BLUE RIVER								
A	2.54	325	2,001	5.0	693.4	693.4	693.4	0.0
B	2.74	245	1,505	6.7	697.2	697.2	697.3	0.1
C	2.90	365	2,335	4.3	699.1	699.1	699.1	0.0
D	3.01	370	2,332	4.3	699.8	699.8	699.8	0.0
E	3.20	300	1,958	5.1	701.1	701.1	701.1	0.0
F	3.29	321	2,831	3.6	701.7	701.7	701.7	0.0
G	3.50	540	3,671	4.5	702.4	702.4	702.4	0.0
H	3.64	528	3,190	5.4	702.9	702.9	703.0	0.1
I	3.77	611	3,922	4.0	703.5	703.5	703.6	0.1
J	3.86	491	2,732	4.4	703.8	703.8	703.8	0.0
K	3.98	406	2,384	5.9	704.4	704.4	704.5	0.1
L	4.17	309	2,233	6.3	706.0	706.0	706.1	0.1
M	4.34	363	2,363	7.1	707.2	707.2	707.2	0.0
N	4.49	311	2,414	4.9	708.2	708.2	708.2	0.0
O	4.61	464	3,052	5.0	708.8	708.8	708.9	0.1
P	4.80	616	1,952	7.2	711.2	711.2	711.3	0.1
Q	5.09	415	2,435	3.8	713.3	713.3	713.4	0.1
R	5.18	253	1,620	5.5	713.7	713.7	713.8	0.1
S	5.42	433	2,231	5.1	715.7	715.7	715.8	0.1
T	5.52	428	2,499	4.3	716.1	716.1	716.2	0.1
U	5.89	203	1,527	5.7	718.1	718.1	718.1	0.0
V	5.97	329	2,182	5.5	718.7	718.7	718.8	0.1
W	6.06	251	1,842	5.5	719.1	719.1	719.2	0.1
X	6.15	560	3,359	4.3	719.8	719.8	719.9	0.1
Y	6.26	692	3,702	3.8	720.4	720.4	720.5	0.1
Z	6.32	276	1,585	7.0	720.5	720.5	720.6	0.1
AA	6.56	569	3,338	3.4	724.0	724.0	724.0	0.0
AB	6.62	591	3,428	2.9	724.1	724.1	724.1	0.0
AC	6.66	544	741	9.2	723.4	723.4	723.5	0.1
AD	6.78	606	899	8.5	726.1	726.1	726.1	0.0
AE	7.02	819	4,182	2.6	728.7	728.7	728.8	0.1
AF	7.20	545	2,669	4.7	729.0	729.0	729.0	0.0

[1] MILES ABOVE MOUTH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET/SECOND)	REGULATORY (FEET, NAVD)	WITHOUT FLOODWAY (FEET, NAVD)	WITH FLOODWAY (FEET, NAVD)	INCREASE (FEET)
WEST FORK BLUE RIVER								
AG	7.61	314	1,826	4.1	732.6	732.6	732.7	0.1
AH	7.76	365	1,907	5.6	733.6	733.6	733.7	0.1
AI	7.95	548	2,556	3.9	735.0	735.0	735.1	0.1
AJ	8.04	496	1,938	5.7	735.6	735.6	735.6	0.0
AK	8.32	590	3,007	2.5	739.4	739.4	739.5	0.1
AL	8.48	405	1,043	11.1	739.6	739.6	739.6	0.0
AM	8.65	573	2,663	4.4	742.9	742.9	743.0	0.1
AN	8.78	512	1,771	4.4	743.9	743.9	744.0	0.1
AO	8.91	660	2,250	5.7	745.2	745.2	745.3	0.1
AP	9.04	607	1,841	7.7	746.6	746.6	746.7	0.1
AQ	9.21	703	2,288	6.0	748.7	748.7	748.8	0.1
AR	9.38	399	1,492	8.0	751.0	751.0	751.1	0.1
AS	9.76	345	1,451	7.5	755.5	755.5	755.6	0.1

[1] MILES ABOVE MOUTH

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. These zones are as follows:

Zone A

Zone A is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or base flood depths are shown within this zone.

Zone AE

Zone AE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS by detailed methods. In most instances, whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance risk zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, and areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or base flood depths are shown within this zone.

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 risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs 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 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current FIRM presents flooding information for the entire geographic area of Washington County. Previously, separate FIRMs were prepared for each identified flood prone incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 10.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Borden, Town of	April 18, 1980	None	None	None
*Campbellsburg, Town of	N/A	None	N/A	None
Fredericksburg, Town of	December 14, 1973	March 16, 1976	September 4, 1985	None
*Hardinsburg, Town of	N/A	None	N/A	None
Little York, Town of	N/A	None	N/A	None
*Livonia, Town of	N/A	None	N/A	None
New Pekin, Town of	March 9, 1979	None	TBD	None
Salem, City of	November 23, 1973	None	August 15, 1978	None
*Saltillo, Town of	N/A	None	N/A	None
Washington County (Unincorporated Areas)	April 21, 1978	None	TBD	None

*No Special Flood Hazard Area

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN (AND INCORPORATED AREAS)

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Flood Insurance and Mitigation Division, Federal Emergency Management Agency, Region V, 536 S. Clark Street, 6th Floor, Chicago, IL 60605

9.0 BIBLIORAPHY AND REFERENCES

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4. Indiana Administrative Code 310 IAC 10 Flood Plain Management accessed at http://www.in.gov/legislative/iac/T03120/A00100.PDF
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11. U.S. Department of the Interior, Geological Survey, Water Resources Investigation 35-75, Statistical Summaries of Indiana Streamflow Data, February 1976.

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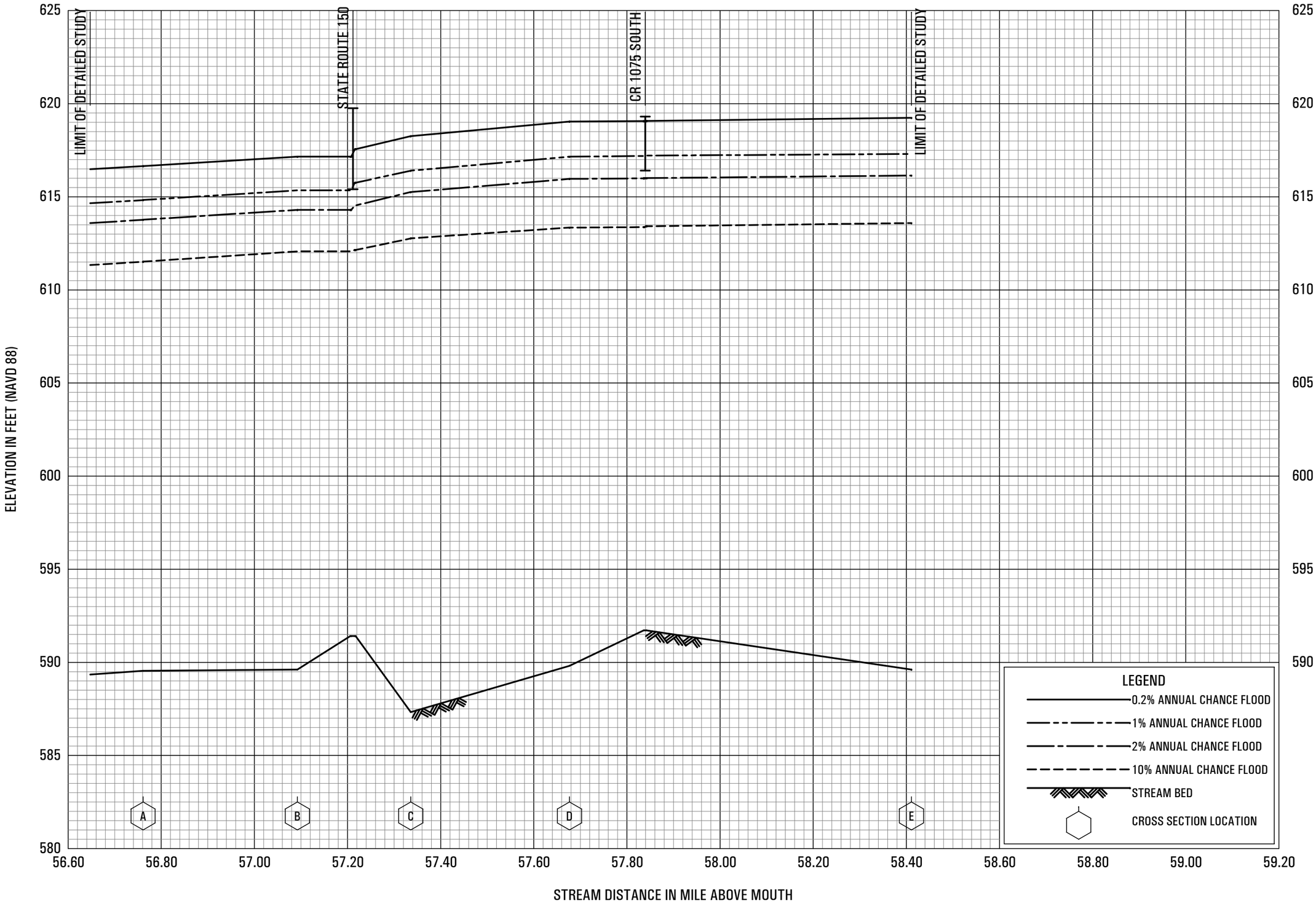


FLOOD PROFILES

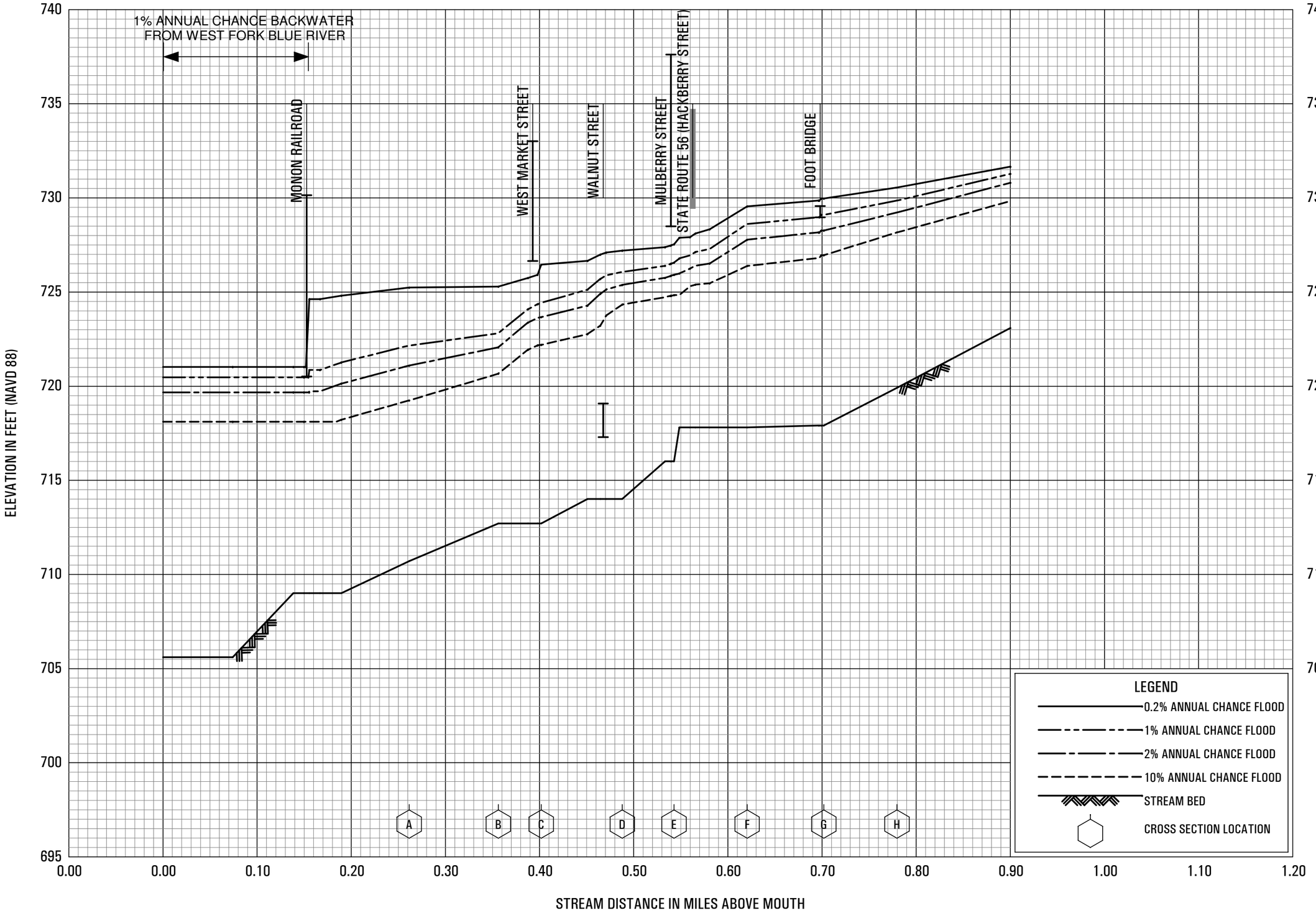
BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

01P



FLOOD PROFILES

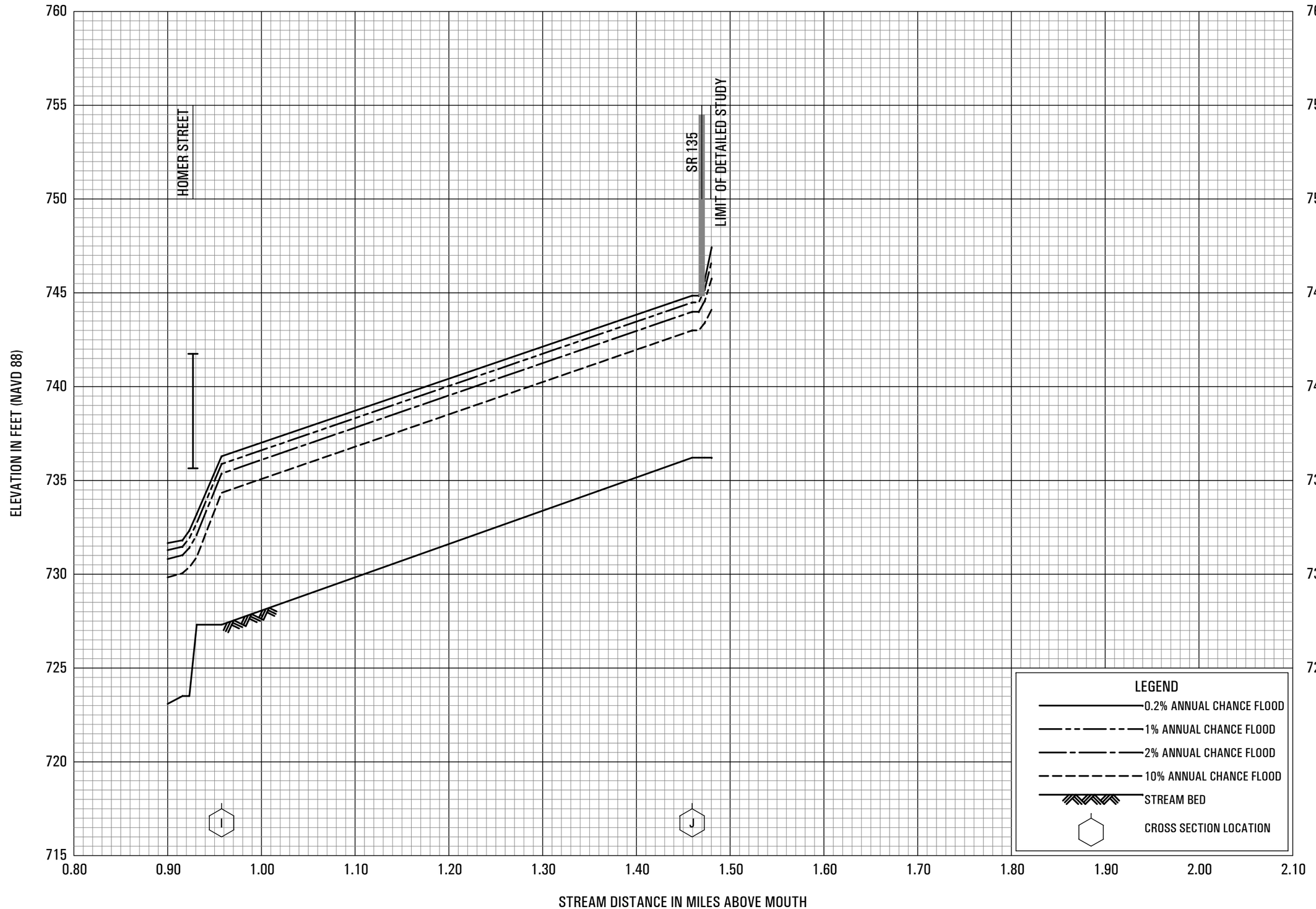
BROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

02P



FLOOD PROFILES

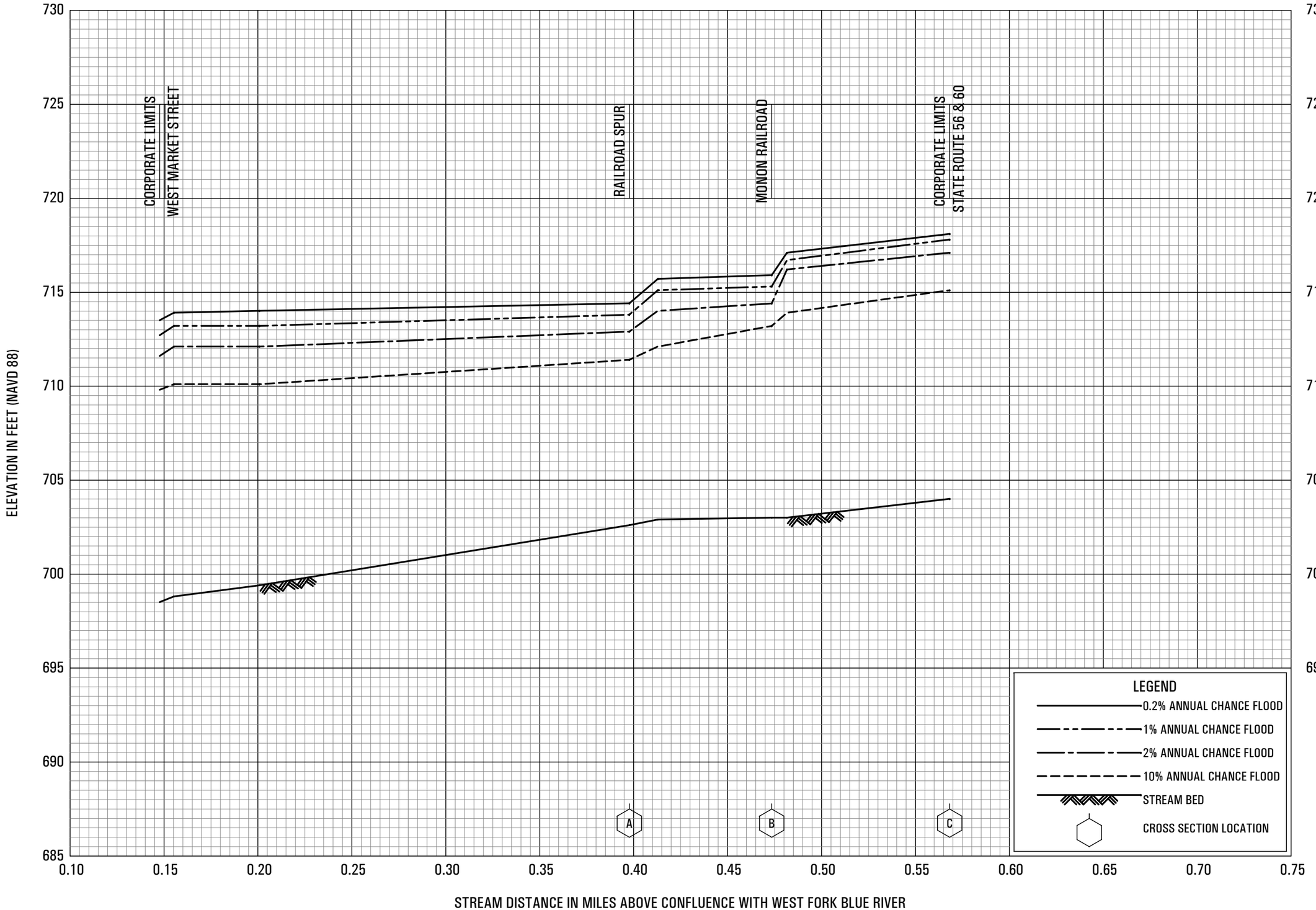
BROCK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

03P



FLOOD PROFILES

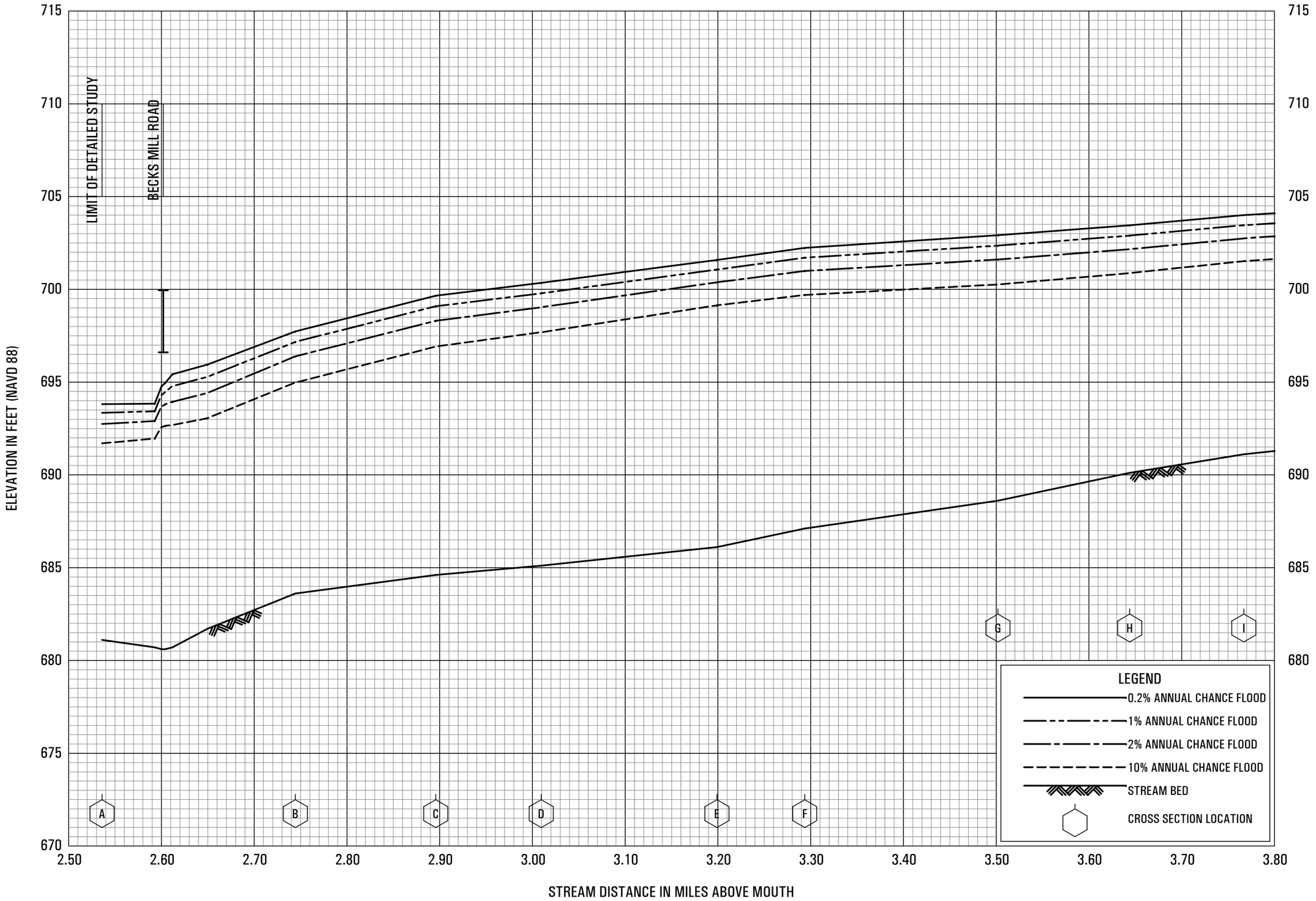
HIGHLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

04P



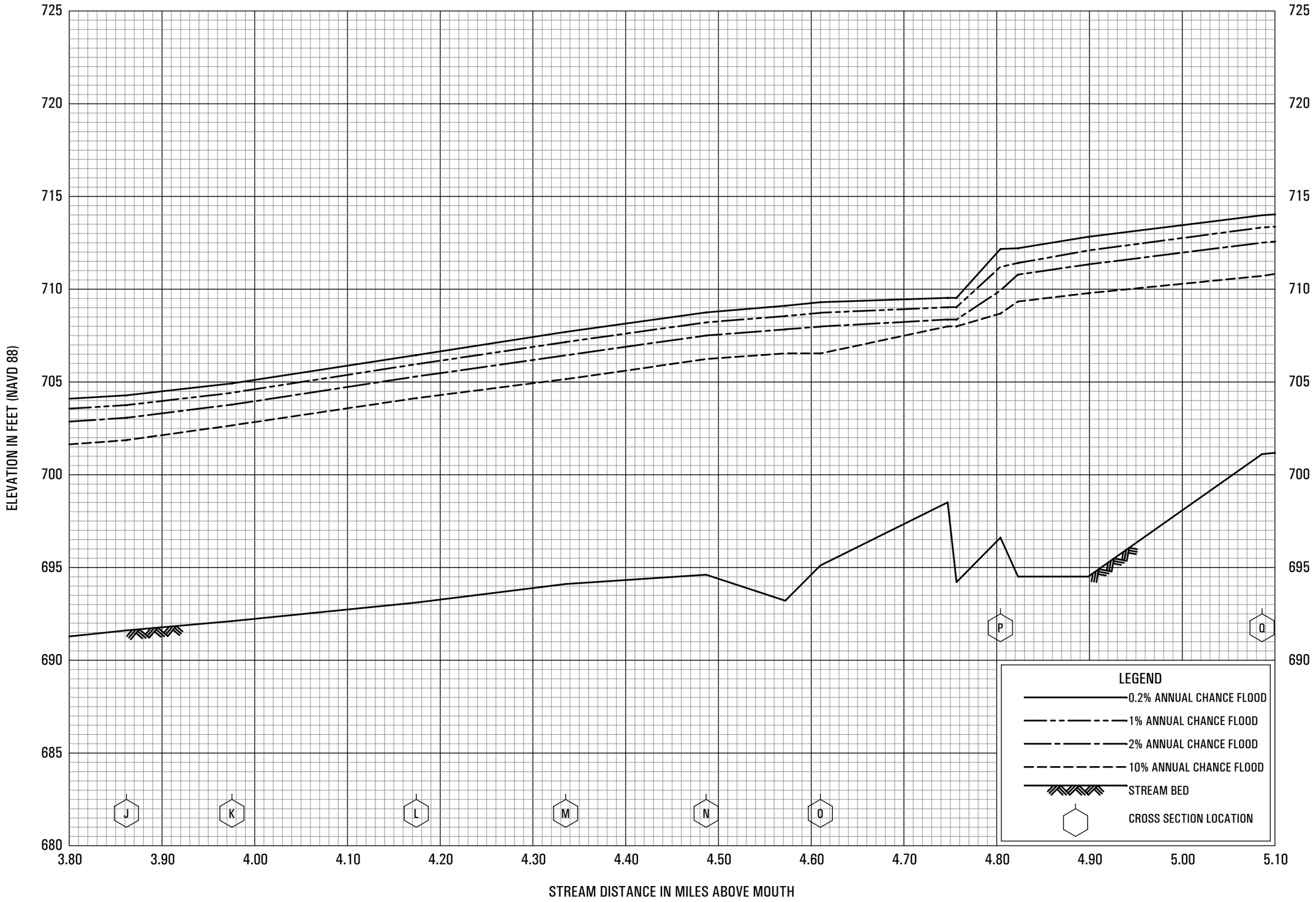
FLOOD PROFILES

WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

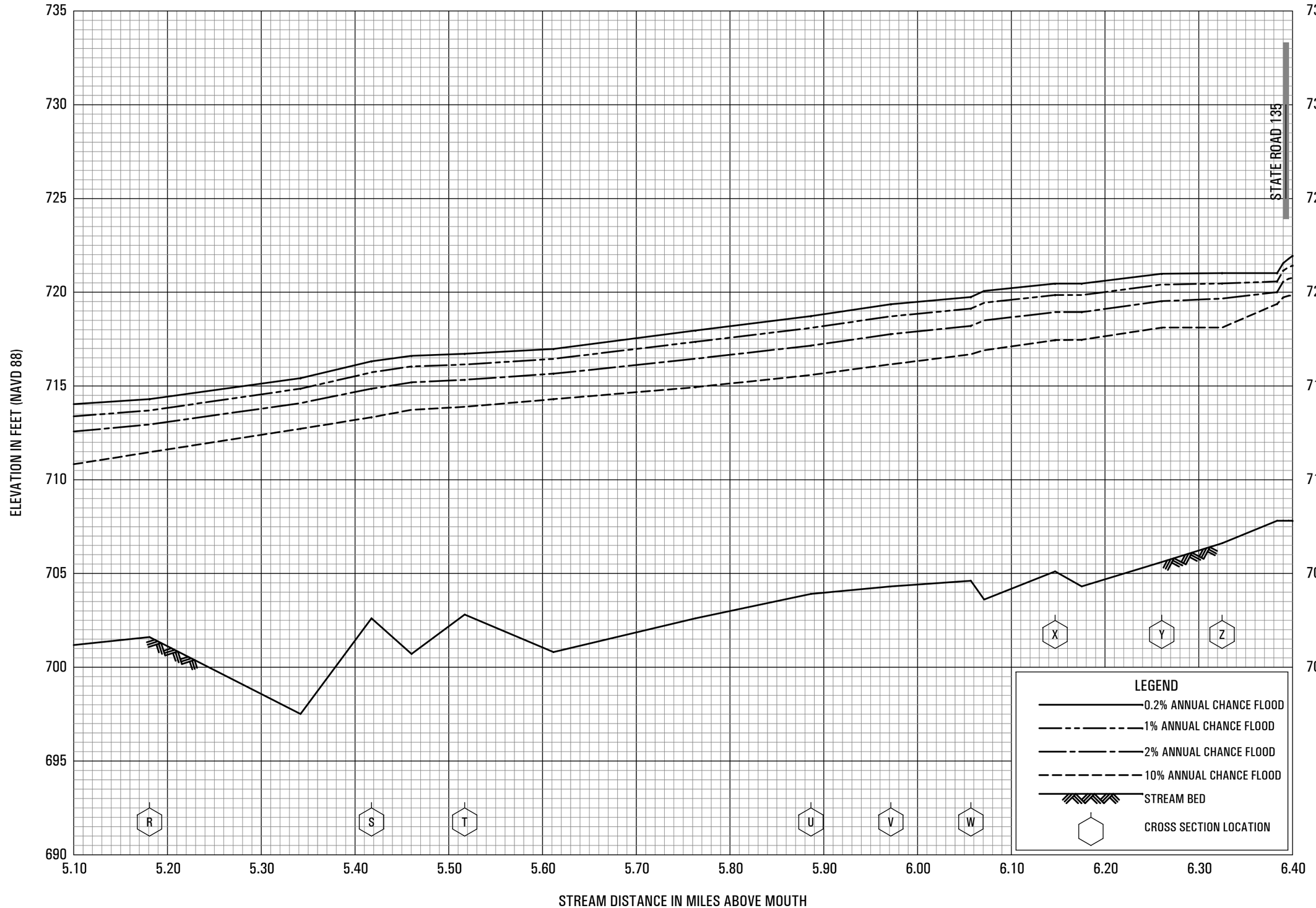
WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

06P



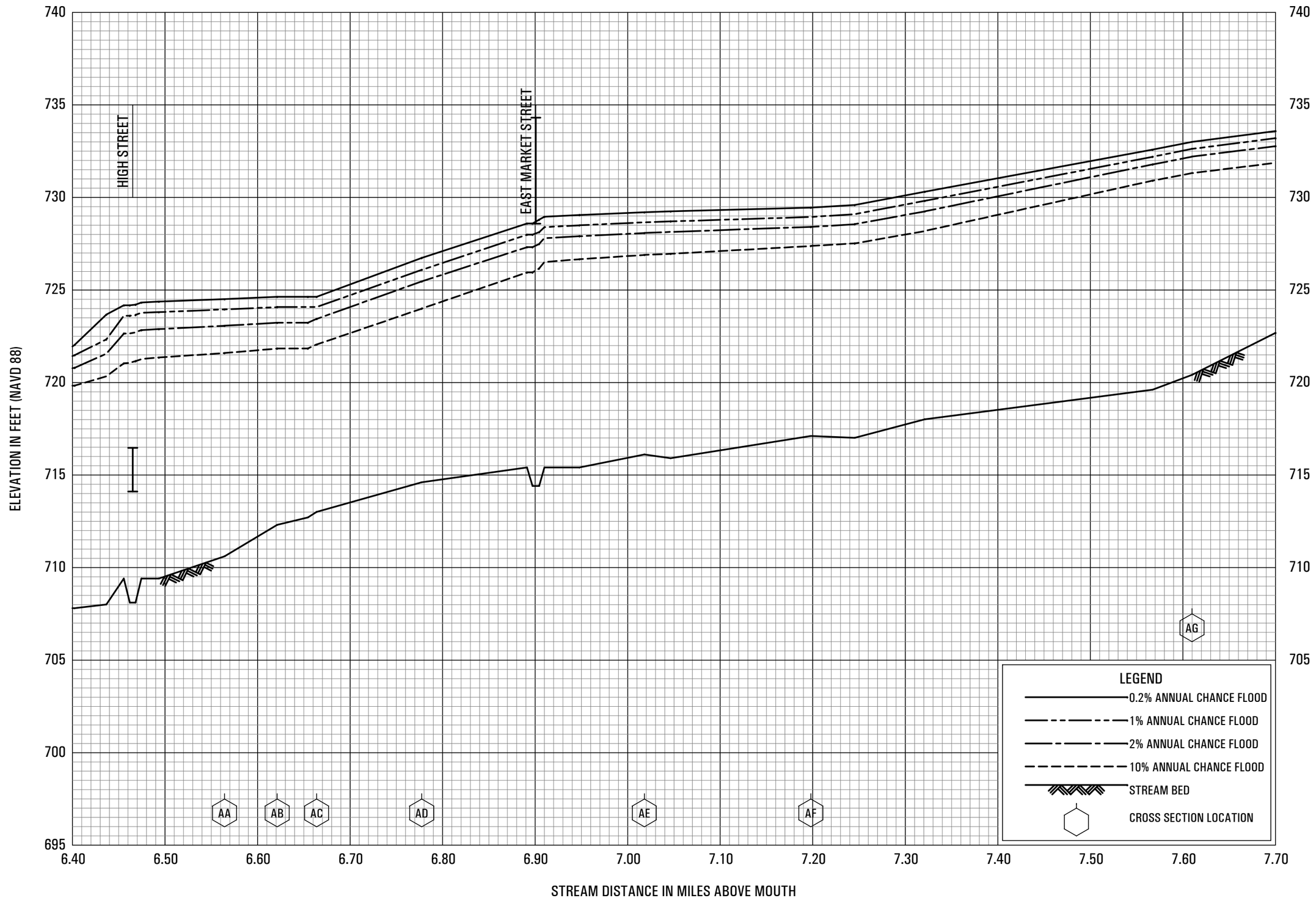
FLOOD PROFILES

WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS



FLOOD PROFILES

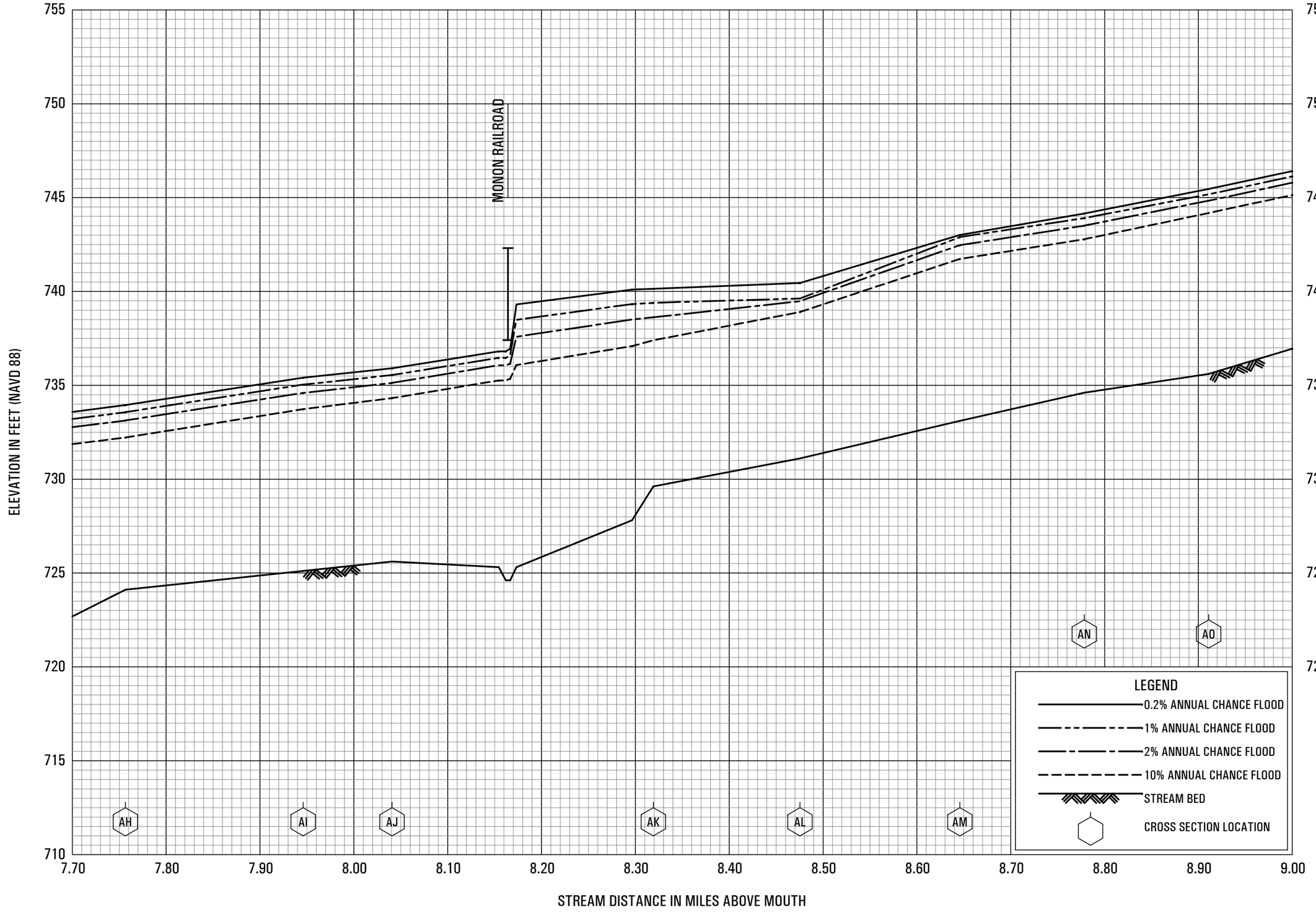
WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

08P



FLOOD PROFILES

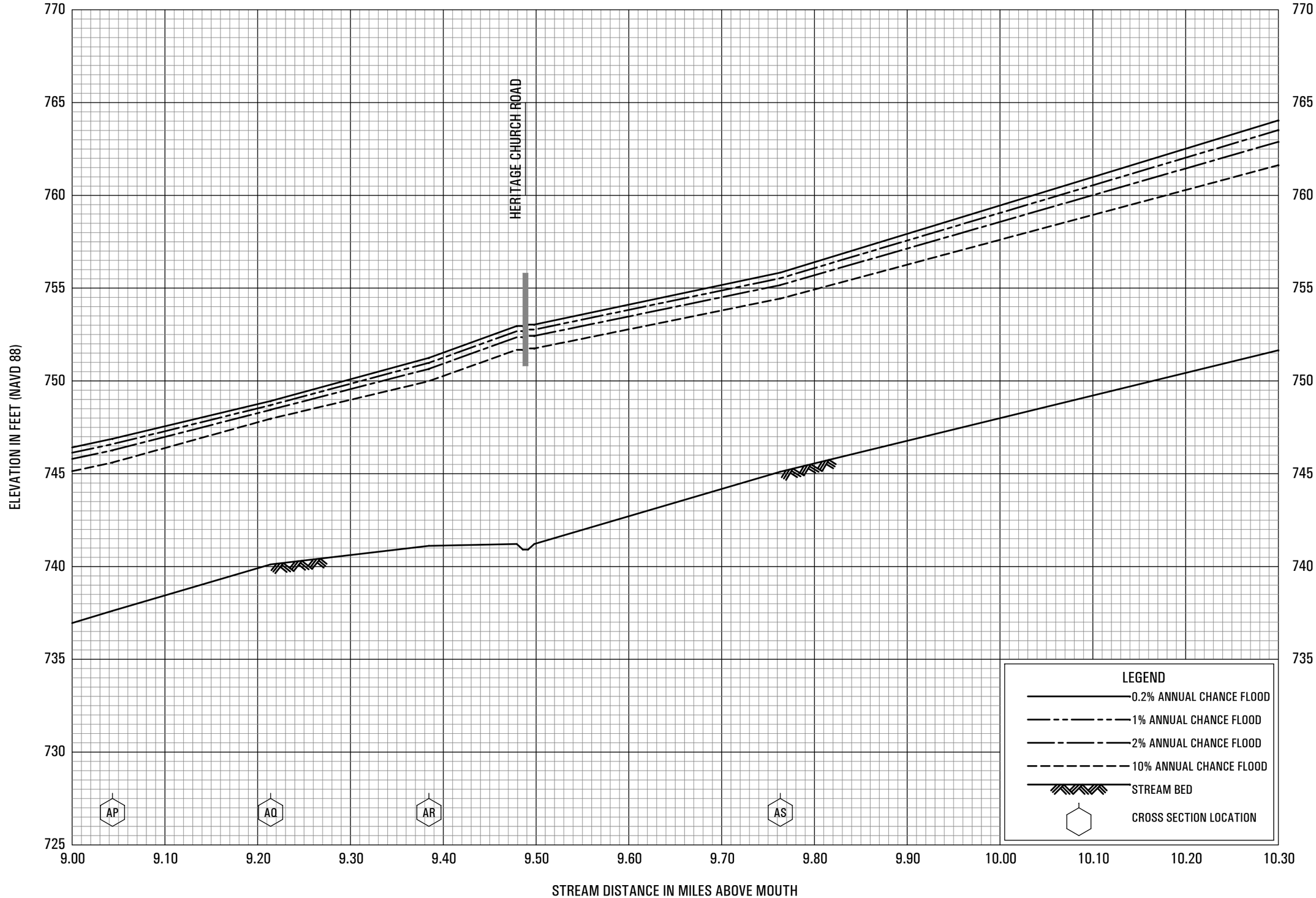
WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

09P



FLOOD PROFILES

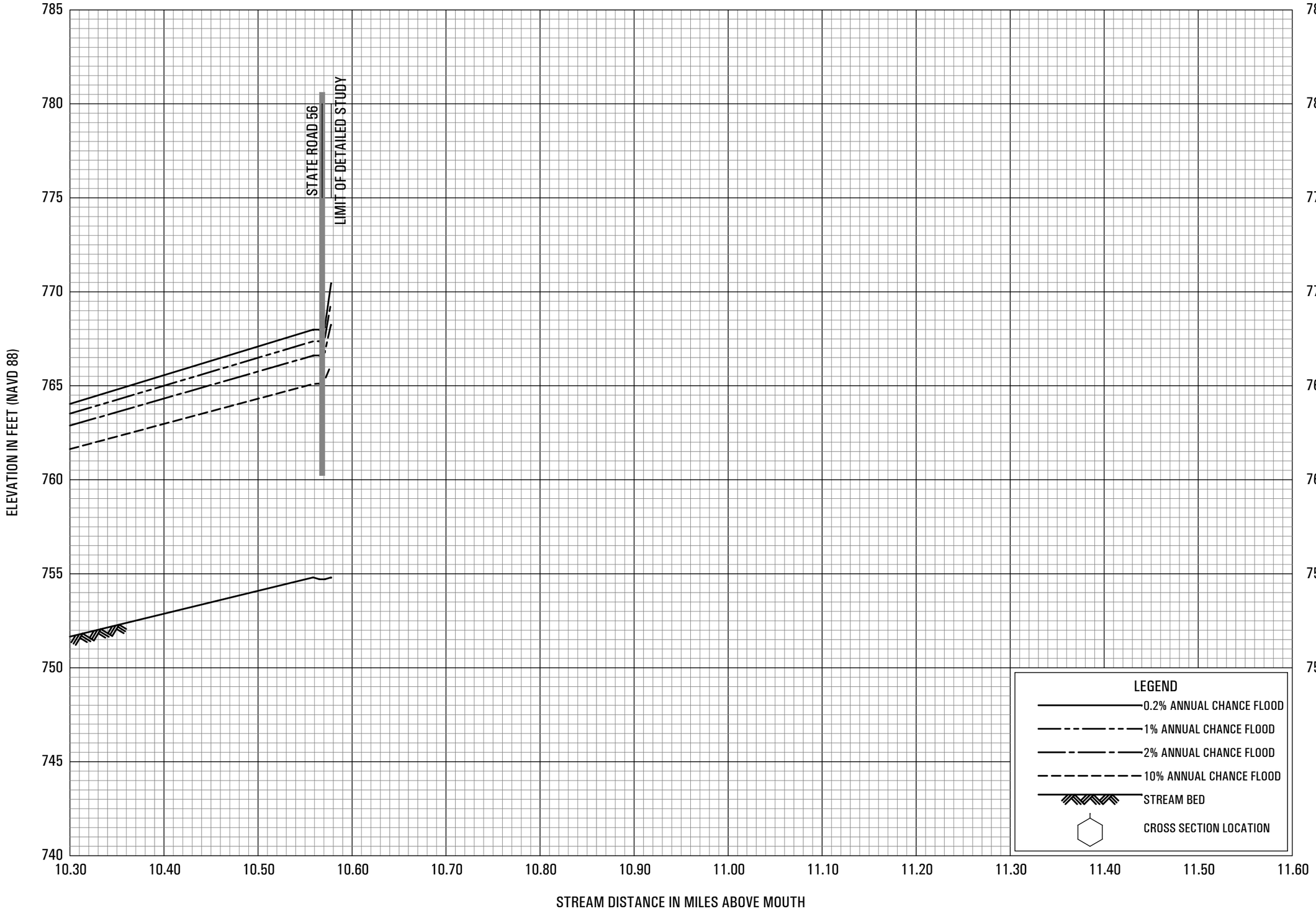
WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS

10P



FLOOD PROFILES

WEST FORK BLUE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, IN

AND INCORPORATED AREAS