

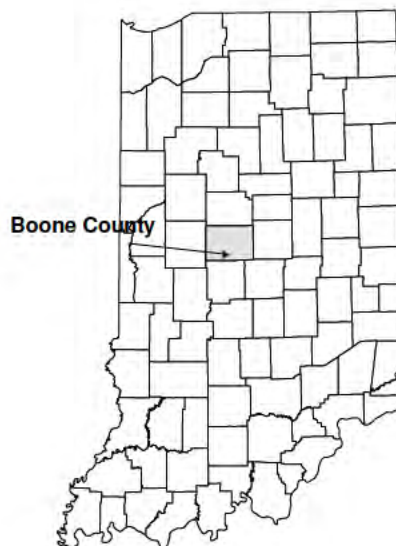
FLOOD INSURANCE STUDY



BOONE COUNTY, INDIANA AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
ADVANCE, TOWN OF*	180012
BOONE COUNTY UNINCORPORATED AREAS	180011
JAMESTOWN, TOWN OF*	180355
LEBANON, CITY OF	180013
THORNTOWN, TOWN OF	180014
ULEN, TOWN OF	180514
WHITESTOWN, TOWN OF	180015
ZIONSVILLE, TOWN OF	180016

* no special flood hazard areas identified



EFFECTIVE:

January 18, 2012



Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
18011CV000A

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:

<u>Old Zone:</u>	<u>New Zone:</u>
A1 through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date: January 18, 2012

TABLE OF CONTENTS

	Page
1.0 <u>INTRODUCTION</u>	1
1.1 Purpose of Study	1
1.2 Authority and Acknowledgments	1
1.3 Coordination	4
2.0 <u>AREA STUDIED</u>	4
2.1 Scope of Study	4
2.2 Community Description	7
2.3 Principal Flood Problems	8
2.4 Flood Protection Measures	9
3.0 <u>ENGINEERING METHODS</u>	9
3.1 Hydrologic Analyses	10
3.2 Hydraulic Analyses	12
3.3 Vertical Datum	14
4.0 <u>FLOODPLAIN MANAGEMENT APPLICATIONS</u>	15
4.1 Floodplain Boundaries	15
4.2 Floodways	16
5.0 <u>INSURANCE APPLICATION</u>	32
6.0 <u>FLOOD INSURANCE RATE MAP</u>	35
7.0 <u>OTHER STUDIES</u>	35
8.0 <u>LOCATION OF DATA</u>	35
9.0 <u>BIBLIOGRAPHY AND REFERENCES</u>	35

FIGURES

Figure 1 - Floodway Schematic	17
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TABLES

Table 1 – CCO Meeting Dates	4
Table 2 – Streams Studied By Detailed Methods	5
Table 3 – Streams Studied By Approximate Methods	5
Table 4 – Scope of Study	6
Table 5 – Population of Incorporated Cities and Towns in Boone County	8
Table 6 – Flood Crest Elevations for Prairie Creek Near Lebanon	8
Table 7 – Flood Crest Elevations for Eagle Creek Near Zionsville	9
Table 8 – Summary Discharges	10
Table 9 – Channel and Overbank Roughness Factors	14
Table 10 – Floodway Data Table	18
Table 11 – Community Map History	34

EXHIBITS

Exhibit 1 - Flood Profiles

Eagle Creek	01P – 05P
Etter Ditch	06P – 08P
Fishback Creek	09P – 13P
Green Ditch	14P
Little Eagle Creek	15P – 16P
Mann Ditch	17P
New Reynolds Ditch	18P – 20P
Prairie Creek	21P – 27P
Sugar Creek	28P – 30P
White Lick Creek	31P – 32P

Exhibit 2 - Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

BOONE 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 Boone County, Indiana, including the City of Lebanon, the Towns of Advance, Jamestown, Thorntown, Ulen, Whitestown, and Zionsville, and the unincorporated areas of Boone County (hereinafter referred to collectively as Boone 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 Boone 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. No Special Flood Hazard Areas have been identified in the Towns of Advance and Jamestown. 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.

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 Boone County was compiled and is shown below:

City of Lebanon:

The previously effective FIS for the Unincorporated areas of Lebanon is dated March 17, 1997. For the original, May 3, 1982, FIS, hydrologic and hydraulic analyses were prepared by Clyde E. Williams & Associates, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-4775. This work was completed in November 1979.

For the January 2, 1987, FIS, hydraulic analyses were obtained from the State of Indiana Department of Natural Resources (IDNR), Division of Water.

For the March 17, 1997, FIS, the hydrologic and hydraulic analyses were prepared by the U.S. Army Corps of Engineers (USACE), Louisville District, under contract to the IDNR, Division of Water, for FEMA. This work was completed in April 1994. (Reference 2).

Town of Zionsville:

The previously effective FIS for the Town of Zionsville is dated June 15, 1981. The hydrologic and hydraulic analyses for this study were performed by Clyde E. Williams & Associates, Inc., for the Federal Insurance Administration, under Contract No. H-4775. This study was completed in May 1979. (Reference 3).

Boone County
(Unincorporated Areas)

The previously effective FIS for the Unincorporated areas of Boone County is dated April 6, 1998. For the original March 16, 1982 FIS report and the September 16, 1982, FIRM (hereinafter referred to as the 1982 FIS), the hydrologic and hydraulic analyses were prepared by Clyde E. Williams and Associates, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-4775. That work was completed in February 1980.

For the April 6, 1998, FIS report, the hydrologic and hydraulic analyses were prepared by the U.S. Army Corps of Engineers (USACE), Louisville District, under contract to the Indiana Department of Natural

Resources (IDNR). This work was completed in April, 1994. (Reference 1).

New Studies:

The hydrologic and hydraulic analyses for approximate stream reaches of Boone County were performed by Earth Tech, on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E400201B. 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 06-02 dated June 22, 2006 and funded under agreement number EMC-2005-GR-7022.

The detailed study of Prairie Creek was completed by the Indiana Department of Natural Resources, through the Mapping Activity Statement 06-02 dated June 22, 2006, in conjunction with the Boone County Surveyors Office. The detailed study of Fishback Creek was completed by the Indiana Department of Natural Resources.

The detailed study of Mann Ditch was completed by Stormwater and Floodplain Engineering, LLC, and approved by the IDNR as GN-23,215 on December 5, 2008. The detailed study of Green Ditch and Etter Ditch was completed by Christopher B. Burke Engineering, Ltd., and was approved by IDNR as GN-21,328 on October 5, 2006. The detailed study of White Lick Creek is a combination of studies completed by the IDNR and by Schneider Engineering.

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 Boone County into the Countywide format was performed by Earth Tech, on behalf of the Indiana Department of Natural Resources, under Indiana Public Works Project Number E400201B. 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 06-02 dated June 22, 2006 and funded under agreement number EMC-2005-GR-7022.

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

1.3 Coordination

The purpose of an initial Consultation Coordinated Officer’s (CCO’s) 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 Boone County, Indiana are shown in Table 1 (References 1-3). 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.

Table 1: CCO Meeting Dates for Pre-Countywide FIS

<u>Community Name</u>	<u>Initial CCO Date</u>	<u>Final CCO Date</u>
Boone County	April 1978	September 18, 1981
Lebanon	April 11, 1978	March 3, 1981
Zionsville	April 1978	November 13, 1980

For this countywide FIS, an initial CCO meeting was held on July 14, 2005, and was attended by FEMA, IDNR, the Natural Resources Conservation Service (NRCS), the Boone County EMA, the Boone County SWCD, Lebanon Utilities, and representatives from the City of Lebanon, the Towns of Whitestown and Zionsville, and Boone County.

The results of the countywide study were reviewed at the final CCO meeting held on January 28, 2010 and attended by representatives of FEMA, IDNR, Lebanon, Zionsville, and Boone County. 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 Boone County, Indiana, including the incorporated communities listed in Section 1.1

All FIRM panels for Boone 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.

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, 25 new stream reaches were studied using approximate methods. The scope and methods of new approximate studies were proposed and agreed upon by FEMA, the IDNR, and Boone County.

Streams studied by detailed methods for this countywide update included Prairie Creek, Fishback Creek, Etter Ditch, Mann Ditch, Green Ditch, and White Lick Creek.

This FIS update also incorporates the determination of letters issued by FEMA resulting in map changes (Letters of Map Change, or LOMC's). Letters of Map Amendment (LOMA's) 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: Streams Studied by Detailed Methods

Eagle Creek	Etter Ditch
Fishback Creek	Green Ditch
Little Eagle Creek	Mann Ditch
New Reynolds Ditch	Prairie Creek
Sugar Creek	White Lick Creek

Table 3: Streams Studied by Approximate Methods

Sugar Creek	Browns Wonder Creek
Wolf Creek	Prairie Creek
Spring Creek	Mann Ditch
Little Sugar Creek	Walnut Fork Sugar Creek
Big Raccoon Creek	Big Walnut Creek
Edlin Ditch	Grassy Branch
White Lick Creek	Jackson Run
Lenox Ditch	Mounts Run
Finley Creek	Kreager Ditch
Dixon Branch	UNT Eagle Creek
Eagle Creek	Etter Ditch
Irishmans Run	Isenhour Ditch
Sanitary Ditch	

Table 4: Scope of Study

<u>Stream</u>	<u>Limits of Detailed Study</u>
Etter Ditch	downstream of Wilson Road to upstream of Indianapolis Road
Fishback Creek	Limit of Previous detailed study to I-65
Green Ditch	Mouth to 111 th Street
Mann Ditch	Mouth to 2420' upstream
Prairie Creek	221 st Street to I-65
White Lick Creek	County Road 600 South to upstream of SR 267
<u>Stream</u>	<u>Limits of Redelineation Study</u>
Eagle Creek	Marion County Line to Limit
Little Eagle Creek	Mouth to Hendricks County Line
Prairie Creek	Mouth to Limit
Sugar Creek	Limit to I-65
<u>Stream</u>	<u>Limits of Approximate Study</u>
Big Raccoon Creek	Mouth to Limit of Zone A
Big Walnut Creek	“ ”
Browns Wonder Creek	“ ”
Dixon Branch	“ ”
Eagle Creek	Limit of Detailed to Limit of Zone A
Edlin Ditch	Mouth to Limit of Zone A
Etter Ditch	Hendricks County Line to 121 st St.
Finley Creek	Mouth to Hamilton County Line
Grassy Branch	Mouth to Limit of Zone A
Irishmans Run	Mouth to Section 27/34 Line
Isenhour Ditch	Mouth to 186 th Street
Jackson Run	Mouth to Limit of Zone A
Kreager Ditch	“ ”
Lenox Ditch	“ ”
Little Sugar Creek	“ ”
Mann Ditch	“ ”
Mounts Run	“ ”
Prairie Creek	Limit (Thorntown) to Limit (Lebanon)
Sanitary Ditch	Mouth to SR 532
Spring Creek	Mouth to Victor Avenue
Sugar Creek	Montgomery County Line to Limit
Walnut Fork Sugar Creek	Mouth to Limit of Zone A
White Lick Creek	Hendricks County Line to 111 th St.
Wolf Creek	Mouth to 171 st Street
UNT Eagle Creek	Mouth to Limit of Zone A

2.2 Community Description

Boone County is located in north-central Indiana and is bordered by Clinton County to the north, Hamilton County to the east, Hendricks and Marion Counties to the south, and Montgomery County to the west. Boone County is located approximately 15 miles northwest of Indianapolis. Boone County is served by Interstates 65, 74, 465, and 865, US routes 52, 136, and 421, and State Routes 32, 38, 39, 47, 75, 234, 267, and 334. According to U.S. Census Data from the year 2000, the population of Boone County was reported to be 46,107. Table 5 lists the population of the incorporated areas in Boone County.

The climate in Boone County is characteristically temperate continental, and temperatures range from hot and humid in the summertime to cold during the winter season. According to the National Oceanic and Atmospheric Administration (NOAA), average daily temperatures for Boone County range from 73 °F in the summer to 29.4 °F in the winter. For the period of record between 1971 and 2000, the average annual precipitation was approximately 41.4 inches.

The City of Lebanon is located in central Boone County, about 25 miles northwest of Indianapolis, and is the county seat of the government. It is served by State Routes 32 and 39. Prairie Creek flows west through the city toward its mouth at Sugar Creek near Thorntown. Its length is nearly 25 miles and it has a drainage area of 49.4 square miles. New Reynolds ditch flows westward for 2.9 miles from its headwaters through the city where it joins Prairie Creek near Interstate 65. Both Prairie Creek and Reynold's Ditch flow through areas which are primarily residential with a few small businesses.

The Town of Advance is located about 9 miles southwest of Lebanon, and is served by State Route 75.

The Town of Jamestown is located approximately 12 miles southwest of Lebanon along State Routes 75 and 234, and US Route 136. It is bordered by Big Walnut Creek on the east and south sides of the town.

The Town of Thorntown is located 9 miles northwest of Lebanon along State Routes 47 and 75.

The Town of Ulen is located about one mile north of Lebanon.

The Town of Whitestown lies approximately 7 miles southeast of the City of Lebanon.

The Town of Zionsville is located 12 miles southeast of Lebanon along State Route 334.

Table 5: Population of incorporated cities and towns in Boone County (2000 Census)

<u>Community</u>	<u>Population</u>
Advance, Town Of	562
Jamestown, Town of	886
Lebanon, City of	14,222
Thorntown, Town of	1,562
Ulen, Town of	123
Whitestown, Town of	471
Zionsville, Town of	8,775

2.3 Principal Flood Problems

Major flooding in Boone County primarily occurs along the Big Raccoon Creek, Big Walnut Creek, Eagle Creek, Prairie Creek, and Sugar Creek. 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:

- Advance, Town of: There are no principal flood problems existing at this time.
- Jamestown, Town of: Subject to flooding from Big Walnut Creek.
- Lebanon, City of: Subject to flooding due to Prairie Creek. Records of river stages and discharges on Prairie Creek are maintained in the study area from Apr. 6, 1988, by the U. S. Geological Survey. Table 6 lists the flood crest stages and discharges for the past major floods.

Table 6: Flood Crest Elevations
USGS gage for Prairie Creek Near Lebanon

<u>Year</u>	<u>Peak Discharge(cfs)</u>	<u>Elevation</u> (feet, NGVD 1929)
1990	2710	13.99
1991	2550	13.65
1994	2290	12.68
1997	2420	12.95
2003	2450	13.03

Thorntown, Town of:	Subject to flooding from Prairie Creek and Sugar Creek
Ulen, Town of:	Subject to flooding due to New Reynolds Ditch.
Whitestown, Town of:	Subject to flooding due to Etter Ditch, Green Ditch and White Lick Creek.
Zionsville, Town of:	Subject to flooding from Eagle Creek. Records of river stages and discharges on Eagle Creek are maintained in the study area from June 28, 1957 by the U.S. Geological Survey. Table 7 lists the flood crest stages and discharges for the past major floods.

Table 7: Flood Crest Elevations
USGS gage for Eagle Creek Near Zionsville

<u>Year</u>	<u>Peak Discharge(cfs)</u>	<u>Elevation (feet, NGVD 1929)</u>
1957	unknown	19.2
1958	9,100	13.22
1962	8,700	13
1964	12,400	14.64
1991	9,170	13.25

2.4 Flood Protection Measures

There are no officially recognized dikes, flood levee systems, or flood control dams in the study area, nor are any planned.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in Boone 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 Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting Boone County. Table 8 contains a summary of peak discharges for the 10%, 2%, 1%, and 0.2% annual chance floods, where applicable, for each flooding source studied in detail in Boone County.

Table 8: 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
EAGLE CREEK					
Upstream of Irishmans Run	110	9600	15000	17500	23800
Above Conrail	106	9400	14600	17200	23200
At State Route 334	103	9200	14300	17000	23000
Upstream of Little Eagle Creek	73.5	7600	12000	14000	18900
Upstream of Gem Creek	66	7100	11200	13000	17800
Upstream of Jackson Run	59.5	6600	10500	12100	16500
Upstream of tributaries upstream of 300 South Road	56	6500	10300	11900	16300
Upstream of Mounts Road	38.7	5300	8200	9500	13000
Upstream of Findley Creek	28.5	4400	6800	8000	10800
Upstream of State Route 32	23.5	3900	6100	7100	9800
ETTER DITCH					
at CR 750 South	4.39	*	*	1700	*
u/s of Green Ditch	2.49	*	*	1200	*
at CR 650 South	1.79	*	*	950	*
at Indianapolis Road	1.00	*	*	675	*
FISHBACK CREEK					
at U.S. Route 52	16.5	3200	5000	5800	8000
above Royal Run	14.5	2950	4650	5400	7400
u/s of McCord Ditch	9.88	2350	3720	4320	6100
at 126 th Street	8.92	2200	3500	4100	5700
at 116 th Street	4.76	1450	2470	2850	3950
GREEN DITCH					
at mouth	1.65	*	*	900	*

Table 8: Summary of Discharges (Continued)

LITTLE EAGLE CREEK at Mouth	29.3	4450	7000	8200	11000
MANN DITCH at Mouth	2.52	*	*	800	*
NEW REYNOLDS DITCH at mouth	2.6	415	720	845	*
at North 176th Road	2.24	415	720	845	*
at North Lebanon St.	1.72	330	530	620	*
at Golf Course Road	1.5	290	470	545	*
at Elmwood Drive	1.21	260	410	480	*
at Grant Boulevard	1.08	230	360	420	*
PRAIRIE CREEK at Mouth	49.27	3100	5310	6480	9670
u/s of Deer Creek	36.57	2530	4320	5270	7840
at USGS Gage (221 st Street)	33.21	2370	4040	4920	7330
at SR 52 (Section 15)	31.04	2260	3850	4700	6990
at SR 52 (Section 22)	28.20	2120	3610	4390	6530
u/s of New Reynolds Ditch	24.01	1840	3140	3820	5680
u/s of Sanitary Ditch	14.73	1150	1950	2380	3530
at RR Crossing	14.59	1140	1930	2350	3500
at Meridian Street	14.09	1100	1870	2270	3380
u/s of Mann Ditch (Washington St.)	10.46	822	1400	1700	2530
u/s of Isenhour Ditch	6.79	540	918	1120	1660
at 166 th Street	5.70	455	774	942	1400
at I-65 (upstream)	3.66	296	503	612	909
SUGAR CREEK u/s of Wolf Creek	241	11700	18500	21200	29000
u/s of Prairie Creek	189	10000	16000	18200	25300
u/s of Brush Creek	174	9700	15300	17800	24300
u/s of Spring Creek	160	9200	14700	16800	23200
WHITE LICK CREEK at 111 th Street	3.50	*	*	1500	*
at SR 267	2.70	*	*	1300	*

*Data not available

Standard and accepted hydrologic methods were used to develop discharge data on the study streams in Boone County. These data were 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 Louisville District of the U. S. Army Corps of Engineers, through a Memorandum of Understanding dated May 6, 1976. Discharge curves for the 10%, 2%, 1%, and 0.2% year floods were developed for each study stream using several different procedures and compared for consistency.

3.2 Hydraulic Analysis

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. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. All topographic mapping used to determine cross sections is referenced in Section 4.1.

Precountywide Analyses

The City of Lebanon, the Town of Zionsville, and the unincorporated areas of Boone County have a previously printed FIS report. The hydraulic analyses described in those reports have been compiled and are summarized below.

For the 1982 FIS, cross sections for the flooding sources studied by detailed methods were obtained from field surveys, topographic maps with two-foot contour intervals, and aerial photographs (Reference 1).

In the original May 3, 1982, FIS for Lebanon, cross sections for the flooding sources studied by detailed methods were obtained from aerial photographs flown in April 1978, at a scale of 1:9,600 (Reference 2). In January 2, 1978, FIS, the HEC-2 step backwater computer program was used to perform the hydraulic analysis for Prairie Creek (Reference 2). As a result of the revised analysis, the base flood elevations were changed from approximately 1,000 feet upstream of Witt Road to approximately 0.68 miles upstream of East Main Street. The original roughness coefficients and starting water-surface elevation were used in the hydraulic analyses.

For the 1998 Boone County (Unincorporated Areas) FIS revision, cross sections for New Reynolds Ditch were obtained from the 1982 FIS, topographic maps at a scale of 1" = 2,000' with a contour interval of 10 feet, and aerial photographs at a scale of 1" = 200' with a contour interval of two feet, which were compiled into topographic maps (Reference 2). All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

Also for the 1998 Boone County (Unincorporated Areas) FIS revision, starting water-surface elevations were calculated using the slope/area method. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

For the 1982 FIS, roughness factors (Manning's "n") for Eagle Creek were developed through calibration with the high water of April 1964. For this revision, roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field inspection.

Countywide 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.

Water-surface elevations for floods of the selected recurrence intervals were computed through use of the USACE HEC-RAS step-backwater computer program. For the new approximate study reaches, the USACE HEC-RAS program was used.

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.

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. Channel and overbank roughness factors used in the detailed studies are summarized by stream in Table 9.

Table 9. Channel and Overbank Roughness Factors

<u>Stream</u>	Roughness Coefficients	
	<u>Channel “n”</u>	<u>Overbank “n”</u>
Eagle Creek	0.040-0.055	0.090-0.095
Etter Ditch	0.030-0.060	0.035-0.100
Fishback Creek	0.035-0.055	0.055-0.100
Green Ditch	0.045	0.070-0.100
Little Eagle Creek	0.040-0.055	0.040-0.100
Mann Ditch	0.040	0.100
New Reynolds Ditch	0.040-0.050	0.040-0.055
Prairie Creek	0.032-0.045	0.045-0.100
Sugar Creek	0.040-0.045	0.060-0.090
White Lick Creek	0.05	0.07

For new approximate study areas, analyses were based on field inspection and modeling of the stream reaches using simplified HEC-RAS models. Structural measurements or field surveying was not performed.

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 -0.33 feet was calculated at the centroid of the county and used to convert all elevations in Dubois county from NGVD29 to NAVD88 using the National Geodetic Survey’s VERTCON online utility (VERTCON, 2005).

$$(NGVD29 - 0.33 = NAVD88)$$

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.

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 maps provided by Lebanon. This topographic mapping has a 2-contour interval and was derived from an aerial survey performed in 2005.

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

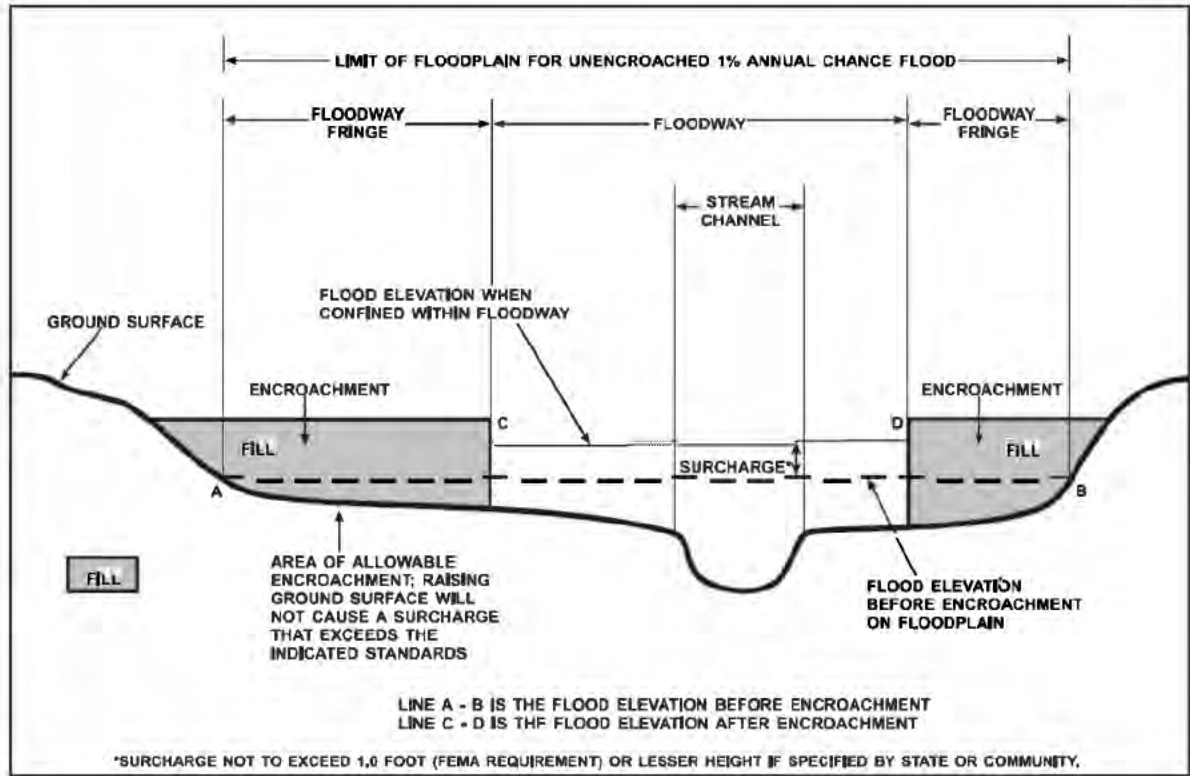
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development 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 10). 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 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 2.

Figure 1: Floodway Schematic



FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Eagle Creek								
A	22.65	2006	7810	2.2	815.4	815.4	815.5	0.1
B	23.01	1433	3480	5.0	817.9	817.9	818.0	0.1
C	23.17	1520	7355	2.4	820.5	820.5	820.6	0.1
D	23.36	990	5501	3.2	821.5	821.5	821.6	0.1
E	23.46	1340	8703	2.0	822.6	822.6	822.7	0.1
F	23.73	1680	6461	2.7	823.4	823.4	823.5	0.1
G	23.92	2280	4915	3.6	825.9	825.9	826.0	0.1
H	24.19	1212	6,614	2.6	827.1	827.1	827.2	0.1
I	24.33	1125	7,491	2.3	828.0	828.0	828.1	0.1
J	24.47	715	4700	3.7	833.0	833.0	833.1	0.1
K	24.68	1330	8842	1.9	833.9	833.9	834.0	0.1
L	24.85	1700	18,017	0.9	835.0	835.0	835.0	0.0
M	25.03	1430	10,500	1.6	835.0	835.0	835.0	0.0
N	25.22	1455	10,300	1.7	835.4	835.4	835.4	0.0
O	25.49	1760	12,683	1.3	835.9	835.9	836.0	0.1
P	25.61	1492	9,998	1.4	836.1	836.1	836.2	0.1
Q	25.72	2090	1,488	1.0	837.4	837.4	837.5	0.1
R	25.99	1350	7,588	1.8	837.6	837.6	837.7	0.1
S	26.23	875	4,384	3.2	838.5	838.5	838.6	0.1
T	26.44	945	3,881	3.6	840.5	840.5	840.6	0.1
U	26.78	1214	5,400	2.6	843.4	843.4	843.5	0.1
V	26.85	1455	6,454	2.1	844.1	844.1	844.2	0.1
W	27.05	1063	5,490	2.6	845.1	845.1	845.2	0.1
X	27.42	850	5,644	2.5	847.2	847.2	847.3	0.1
Y	27.53	950	7,410	1.9	848.4	848.4	848.5	0.1
Z	27.79	1125	5443	2.4	849.3	849.3	849.4	0.1

¹Miles above confluence with West Fork White River

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	EAGLE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Eagle Creek								
AA	28.28	910	5148	2.5	852.3	852.3	852.4	0.1
AB	28.70	665	3917	3.1	855.5	855.5	855.6	0.1
AC	29.01	990	5055	2.4	857.2	857.2	857.3	0.1
AD	29.13	1100	6903	1.8	859.1	859.1	859.2	0.1
AE	29.51	775	5051	2.4	860.1	860.1	860.2	0.1
AF	29.76	650	5287	2.3	861.4	861.4	861.5	0.1
AG	30.12	990	4430	2.7	863.4	863.4	863.5	0.1
AH	30.34	1220	6094	2.0	864.8	864.8	864.9	0.1
AI	30.46	1210	6057	2.0	866.5	866.5	866.6	0.1
AJ	30.69	995	4978	1.9	867.2	867.2	867.3	0.1
AK	31.07	1090	4260	2.2	868.5	868.5	868.6	0.1
AL	31.32	755	3047	2.6	870.2	870.2	870.3	0.1
AM	31.57	560	2463	3.2	872.9	872.9	873.0	0.1
AN	31.69	650	3437	2.3	875.3	875.3	875.4	0.1
AO	31.91	575	1998	4.0	876.8	876.8	876.9	0.1
AP	32.14	740	2893	2.8	880.4	880.4	880.5	0.1
AQ	32.38	555	2520	3.2	882.5	882.5	882.6	0.1
AR	32.62	825	3685	2.2	884.3	884.3	884.4	0.1
AS	32.75	610	2061	3.7	886.7	886.7	886.8	0.1
AT	32.82	395	2369	3.4	887.2	887.2	887.3	0.1
AU	32.94	400	2446	3.3	888.4	888.4	888.5	0.1
AV	33.18	310	1937	3.7	890.5	890.5	890.6	0.1
AW	33.56	395	2243	3.2	893.7	893.7	893.8	0.1
AX	33.63	455	1660	4.3	895.6	895.6	895.7	0.1
AY	33.75	620	9216	0.8	897.1	897.1	897.2	0.1

¹Miles above confluence with West Fork White River

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	EAGLE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Etter Ditch								
A	1.13	364	1514	1.1	915.8	915.8	915.9	0.1
B	1.23	430	1673	1.0	915.9	915.9	916.0	0.1
C	1.30	496	1451	1.2	916.0	916.0	916.1	0.1
D	1.42	397	1346	1.3	916.1	916.1	916.2	0.1
E	1.74	258	932	1.3	916.8	916.8	916.9	0.1
F	1.91	428	999	1.2	916.9	916.9	917.0	0.1
G	1.97	314	727	1.7	917.2	917.2	917.3	0.1
H	2.11	255	617	2.0	918.0	918.0	918.1	0.1
I	2.29	165	511	2.4	920.6	920.6	920.7	0.1
J	2.55	320	853	1.1	921.4	921.4	921.5	0.1
K	2.74	245	498	1.9	922.0	922.0	922.1	0.1
L	2.94	325	579	1.6	923.7	923.7	923.8	0.1
M	3.10	194	451	2.1	924.8	924.8	924.9	0.1
N	3.25	275	601	1.6	925.9	925.9	925.9	0.0
O	3.44	405	501	1.4	927.0	927.0	927.0	0.0

¹Miles above confluence with White Lick Creek

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

FLOODWAY DATA

ETTER DITCH

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishback Creek								
A	25200	498	2,245	2.6	863.3	863.3	863.3	0.0
B	26480	380	3,003	1.9	864.3	864.3	864.3	0.0
C	28160	590	3,312	1.8	865.2	865.2	865.2	0.0
D	29640	550	1,998	2.9	866.6	866.6	866.6	0.0
E	31285	440	1,096	5.3	871.5	871.5	871.5	0.0
F	32125	470	2,493	2.3	873.1	873.1	873.1	0.0
G	34465	390	2,542	2.1	874.7	874.7	874.7	0.0
H	35316	510	2,758	2.0	880.8	880.8	880.8	0.0
I	36322	1060	3,255	1.8	881.2	881.2	881.2	0.0
J	37720	710	1,873	2.9	882.3	882.3	882.3	0.0
K	39720	600	1,902	2.8	885.9	885.9	885.9	0.0
L	41260	415	1,451	3.7	888.7	888.7	888.7	0.0
M	41940	630	1,659	3.3	892.7	892.7	892.7	0.0
N	43240	595	2,106	2.6	894.8	894.8	894.8	0.0
O	45540	655	2874	1.7	896.1	896.1	896.2	0.1
P	46643	340	1892	2.6	896.8	896.8	896.8	0.0
Q	47821	423	2222	2.3	897.9	897.9	897.9	0.0
R	50426	353	2038	2.1	902.3	902.3	902.4	0.1
S	51859	371	1848	2.3	904.4	904.4	904.4	0.0
T	52879	308	1725	2.5	906.2	906.2	906.2	0.0
U	55100	243	1237	3.4	910.9	910.9	911.0	0.1
V	56272	346	1849	2.3	913.1	913.1	913.2	0.1
W	57235	225	1264	3.4	914.7	914.7	914.8	0.1
X	58239	330	2017	2.3	917.6	917.6	917.7	0.1
Y	58591	296	1908	2.2	918.0	918.0	918.1	0.1
Z	59619	329	2284	1.8	920.0	920.0	920.1	0.1

¹Feet above confluence with Eagle Creek

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	FISHBACK CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fishback Creek (Continued)								
AA	60070	282	1820	2.2	920.3	920.3	920.4	0.1
AB	60525	328	2090	2.0	920.8	920.8	920.8	0.0
AC	61129	237	1268	3.0	921.3	921.3	921.4	0.1
AD	61564	323	1710	2.2	922.2	922.2	922.3	0.1
AE	62386	493	1926	2.0	923.2	923.2	923.3	0.1
AF	63005	295	1317	2.9	923.9	923.9	924.0	0.1
AG	63432	278	1251	3.0	924.5	924.5	924.6	0.1
AH	63759	315	1291	3.0	925.0	925.0	925.1	0.1
AI	64272	239	1199	3.2	926.0	926.0	926.1	0.1
AJ	64639	268	1376	2.8	926.6	926.6	926.7	0.1
AK	65540	485	1879	2.0	928.7	928.7	928.8	0.1
AL	66346	415	1807	2.0	929.9	929.9	929.9	0.0
AM	67224	564	2041	1.8	930.7	930.7	930.7	0.0
AN	68379	259	1114	3.3	931.7	931.7	931.8	0.1
AO	69862	646	2078	1.6	933.1	933.1	933.2	0.1
AP	72857	405	880	3.2	935.1	935.1	935.2	0.1
AQ	73662	367	1035	2.8	936.7	936.7	936.8	0.1
AR	76457	763	2197	1.0	940.1	940.1	940.1	0.0
AS	77164	933	1666	1.3	940.3	940.3	940.3	0.0
AT	79956	920	1744	1.2	943.2	943.2	943.2	0.0
AU	82818	569	1160	1.6	948.4	948.4	948.5	0.1

¹Feet above confluence with Eagle Creek

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	
		FISHBACK CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Green Ditch								
A	1858	578	1291	0.7	918.2	918.2	918.3	0.1
B	2028	563	1004	0.8	918.2	918.2	918.3	0.1
C	2522	266	448	3.0	918.5	918.5	918.6	0.1
D	2762	532	1236	1.1	919.2	919.2	919.3	0.1
E	3541	883	931	0.9	919.6	919.6	919.7	0.1
F	3830	845	1006	0.8	919.9	919.9	920.0	0.1
G	4110	878	1028	0.8	920.1	920.1	920.2	0.1
H	4580	524	572	1.4	920.5	920.5	920.6	0.1
I	4777	789	924	0.9	920.8	920.8	920.9	0.1
J	5150	166	169	4.8	921.1	921.1	921.2	0.1

¹Feet above confluence with Etter Ditch

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	GREEN DITCH

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Little Eagle Creek								
A	1600	990	3,165	2.6	836.7	834.3 ²	834.3	0.0
B	2290	690	4,168	2.0	838.4	838.4	838.4	0.0
C	3935	680	2,985	2.7	839.9	839.9	839.9	0.0
D	4975	580	3,249	2.5	841.8	841.8	841.8	0.0
E	6612	815	4,449	1.8	845.8	845.8	845.8	0.0
F	7842	485	2,459	3.3	847.3	847.3	847.3	0.0
G	8907	461	2,758	3.0	850.2	850.2	850.2	0.0
H	10072	543	3,392	2.4	852.5	852.5	852.5	0.0
I	11147	569	3,905	2.1	853.9	853.9	853.9	0.0
J	12497	845	4,250	1.9	855.2	855.2	855.2	0.0
K	14846	450	3,047	2.7	859.2	859.2	859.2	0.0
L	15795	463	3,638	2.3	864.1	864.1	864.1	0.0
M	17045	550	4,312	1.9	864.4	864.4	864.4	0.0

¹Feet above confluence with Eagle Creek

²Elevations without considering the backwater effect from Eagle Creek

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

FLOODWAY DATA

LITTLE EAGLE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Mann Ditch								
A	0.07	48	293	2.7	932.2	931.2 ²	931.3	0.1
B	0.13	42	252	3.2	932.2	931.3 ²	931.4	0.1
C	0.18	43	269	3.0	932.2	931.6 ²	931.7	0.1
D	0.22	51	314	2.6	932.2	931.8 ²	931.8	0.0
E	0.30	43	239	3.3	932.2	932.0 ²	932.0	0.0
F	0.45	41	232	3.5	932.7	932.7	932.8	0.1
G	0.53	39	227	3.5	933.1	933.1	933.2	0.1

¹Feet above confluence with Prairie Creek

²Elevations without considering the backwater effect from Prairie Creek

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

FLOODWAY DATA

MANN DITCH

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
New Reynolds Ditch								
A	1682	42	208	4.1	918.4	918.4	918.4	0.0
B	2465	151	542	1.6	922.5	922.5	922.6	0.1
C	3285	45	238	3.4	922.8	922.8	922.9	0.1
D	4765	44	234	3.2	924.9	924.9	924.9	0.0
E	6065	42	220	3.0	926.4	926.4	926.5	0.1
F	7239	68	344	1.8	927.6	927.6	927.7	0.1
G	7975	151	323	1.9	929.1	929.1	929.2	0.1
H	8995	234	272	2.0	931.7	931.7	931.7	0.0
I	9079	223	250	2.2	931.8	931.8	931.9	0.1
J	9859	78	160	3.2	932.8	932.8	932.9	0.1
K	10729	54	110	4.4	934.5	934.5	934.5	0.0
L	11199	63	106	4.5	935.8	935.8	935.8	0.0
M	11358	79	214	2.2	937.0	937.0	937.1	0.1
N	11464	71	133	3.3	937.1	937.1	937.2	0.1
O	11624	92	282	1.6	938.5	938.5	938.5	0.0
P	12402	160	333	1.3	939.3	939.3	939.4	0.1
Q	13562	281	660	0.6	939.5	939.5	939.6	0.1

¹Feet above confluence with Prairie Creek

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

FLOODWAY DATA

NEW REYONLDS DITCH

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Prairie Creek								
A	0.05	1563 ²	6166	2.6	813.8	810.2 ³	810.3	0.1
B	0.25	1415	5428	1.6	813.8	812.2 ³	812.3	0.1
C	0.44	950	2125	4.0	813.8	813.0 ³	813.1	0.1
D	0.46	950	3750	2.3	815.5	815.5	815.6	0.1
E	0.65	770	2829	2.9	816.2	816.2	816.3	0.1
F	0.90	620	2120	4.0	817.3	817.3	817.4	0.1
G	0.99	604	1975	4.3	819.1	819.1	819.2	0.1
H	1.18	460	2060	3.9	820.6	820.6	820.7	0.1
I	1.39	500	1490	5.4	822.2	822.2	822.3	0.1
J	1.66	540	2140	3.8	825.7	825.7	825.8	0.1
K	1.83	547	2536	3.2	827.1	827.1	827.2	0.1
L	7.27	264	1019	5.2	873.9	873.9	874.0	0.1
M	7.62	268	1028	4.8	877.5	877.5	877.5	0.0
N	7.75	591	2110	2.3	878.6	878.6	878.6	0.0
O	7.81	407	1622	3.0	878.8	878.8	878.8	0.0
P	7.94	253	968	5.1	879.4	879.4	879.4	0.0
Q	8.08	177	856	5.8	881.4	881.4	881.5	0.1
R	8.21	300	1071	4.6	883.3	883.3	883.4	0.1
S	8.30	436	1460	3.4	884.2	884.2	884.3	0.1
T	8.37	455	1818	2.7	884.6	884.6	884.7	0.1
U	8.45	360	1686	2.9	884.9	884.9	885.0	0.1
V	8.50	382	1500	3.3	885.1	885.1	885.1	0.0
W	8.55	329	1461	3.4	885.4	885.4	885.4	0.0
X	8.60	393	1338	3.7	885.6	885.6	885.6	0.0
Y	8.64	277	1567	3.1	886.0	886.0	886.0	0.0
Z	9.38	223	1063	4.4	889.7	889.7	889.8	0.1

¹Miles above confluence with Sugar Creek

²Combined Floodway Width of Sugar Creek and Prairie Creek

³Elevations Without Considering Backwater from Sugar Creek

TABLE 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

FLOODWAY DATA

PRAIRIE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Prairie Creek								
AA	9.55	230	988	4.8	891.3	891.3	891.4	0.1
AB	10.06	633	1069	4.4	894.6	894.6	894.6	0.0
AC	10.32	475	2240	2.1	897.0	897.0	897.1	0.1
AD	10.63	461	1766	2.7	898.4	898.4	898.4	0.0
AE	10.78	488	2144	2.2	899.1	899.1	899.1	0.0
AF	11.04	505	1713	2.7	900.0	900.0	900.1	0.1
AG	11.33	656	2036	2.3	901.9	901.9	902.0	0.1
AH	11.77	243	1401	3.4	904.4	904.4	904.4	0.0
AI	11.93	390	1649	2.8	905.1	905.1	905.2	0.1
AJ	12.11	439	883	2.5	905.9	905.9	905.9	0.0
AK	12.60	713	1722	2.6	909.1	909.1	909.2	0.1
AL	13.56	334	1004	4.2	912.4	912.4	912.4	0.0
AM	13.83	305	1276	3.3	913.8	913.8	913.8	0.0
AN	13.96	197	1428	2.9	914.2	914.2	914.3	0.1
AO	14.14	86	734	5.7	914.6	914.6	914.7	0.1
AP	14.32	306	1210	3.5	916.3	916.3	916.3	0.0
AQ	14.89	1079	4245	0.9	920.0	920.0	920.0	0.0
AR	15.12	793	1925	1.9	920.2	920.2	920.3	0.1
AS	15.64	142	716	3.3	922.2	922.2	922.2	0.0
AT	16.19	79	594	3.8	924.2	924.2	924.2	0.0
AU	16.61	466	947	2.4	927.5	927.5	927.5	0.0
AV	16.83	556	908	2.5	928.4	928.4	928.5	0.1
AW	16.98	448	842	2.7	930.2	930.2	930.3	0.1
AX	17.08	491	1087	2.1	930.8	930.8	930.8	0.0
AY	17.19	437	1680	1.3	931.1	931.1	931.2	0.1
AZ	17.37	268	1063	2.0	931.5	931.5	931.5	0.0

¹Miles above confluence with Sugar Creek

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	PRAIRIE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Prairie Creek								
BA	17.49	734	2173	1.0	931.7	931.7	931.8	0.1
BB	17.65	363	772	2.8	931.9	931.9	931.9	0.0
BC	17.85	699	1993	0.8	933.1	933.1	933.2	0.1
BD	18.03	623	1205	1.2	933.4	933.4	933.4	0.0
BE	18.36	124	462	3.2	933.7	933.7	933.7	0.0
BF	18.51	307	551	2.7	934.5	934.5	934.6	0.1
BG	18.88	63	445	3.3	935.9	935.9	936.0	0.1
BH	19.10	65	433	2.6	936.7	936.7	936.8	0.1
BI	19.29	137	460	2.4	937.3	937.3	937.3	0.0
BJ	19.75	111	344	3.3	939.1	939.1	939.1	0.0
BK	19.97	269	640	1.7	940.1	940.1	940.1	0.0
BL	20.29	301	602	1.6	941.3	941.3	941.3	0.0
BM	20.68	56	320	1.9	942.0	942.0	942.0	0.0
BN	21.12	41	214	2.9	943.0	943.0	943.1	0.1
BO	21.41	43	232	2.6	944.5	944.5	944.5	0.0

¹Miles above confluence with Sugar Creek

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	PRAIRIE CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Sugar Creek								
A	62.70	1438	9401	1.8	805.2	805.2	805.3	0.1
B	63.04	1625	8242	2.1	806.3	806.3	806.4	0.1
C	63.49	1194	4490	3.8	809.7	809.7	809.8	0.1
D	63.56	1250	1543	11.1	810.1	810.1	810.2	0.1
E	63.69	1440	9,024	1.9	812.9	812.9	813.0	0.1
F	63.84	1791	11383	1.5	813.1	813.1	813.2	0.1
G	64.06	1563	6,166	2.6	813.9	813.9	814.0	0.1
H	64.29	1500	10613	2.1	814.4	814.4	814.5	0.1
I	64.35	1500	5,175	3.1	815.1	815.1	815.2	0.1
J	64.76	2600	9,880	1.8	816.5	816.5	816.6	0.1
K	65.15	1700	8,460	2.1	817.5	817.5	817.6	0.1
L	65.72	2000	14940	1.0	821.4	821.4	821.5	0.1
M	66.28	2000	7570	2.0	822.0	822.0	822.1	0.1
N	67.07	2491	10610	1.4	824.6	824.6	824.7	0.1
O	67.47	1813	5959	2.5	827.1	827.1	827.2	0.1
P	68.17	859	4586	3.2	829.7	829.7	829.8	0.1
Q	68.76	859	4671	3.1	833.7	833.7	833.8	0.1
R	69.09	1072	4943	3.0	835.8	835.8	835.9	0.1
S	69.47	781	5891	2.5	837.4	837.4	837.5	0.1
T	69.68	828	6498	2.3	838.0	838.0	838.1	0.1

¹Miles above confluence with the Wabash River

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	SUGAR CREEK

FLOODING SOURCE		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
White Lick Creek								
A	43.22	315	1277	1.2	931.1	931.1	931.2	0.1
B	43.42	307	912	1.7	931.6	931.6	931.7	0.1
C	43.58	290	914	1.6	932.3	932.3	932.3	0.0
D	43.70	438	1482	1.0	932.7	932.7	932.7	0.0
E	43.79	411	1145	1.3	932.9	932.9	932.9	0.0
F	43.89	570	1124	1.3	933.2	933.2	933.3	0.1
G	44.03	850	1891	0.8	933.7	933.7	933.8	0.1
H	44.12	920	2149	0.7	933.9	933.9	934.0	0.1
I	44.24	880	1249	1.2	934.3	934.3	934.4	0.1
J	44.49	614	1063	1.2	936.8	936.8	936.8	0.0
K	44.58	193	451	2.9	937.3	937.3	937.3	0.0
L	44.73	103	227	5.7	938.6	938.6	938.6	0.0
M	44.80	195	619	2.1	940.0	940.0	940.1	0.1
N	44.94	314	967	1.3	940.7	940.7	940.8	0.1
O	45.06	351	814	1.6	941.1	941.1	941.1	0.0
P	45.17	85	421	3.1	941.5	941.5	941.6	0.1
Q	45.38	660	1804	0.6	943.0	943.0	943.1	0.1
R	45.46	475	782	1.4	943.1	943.1	943.2	0.1
S	45.56	235	345	3.2	943.9	943.9	944.0	0.1
T	45.62	121	302	3.7	945.1	945.1	945.2	0.1
U	45.69	74	339	3.3	945.9	945.9	946.0	0.1
V	45.76	107	408	2.7	946.6	946.6	946.6	0.0

¹Miles above confluence with West Fork White River

TABLE 10	FEDERAL EMERGENCY MANAGEMENT AGENCY	FLOODWAY DATA
	BOONE COUNTY, IN AND INCORPORATED AREAS	WHITE LICK CREEK

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 AH

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

Zone AO

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

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the 1-percent-annual-chance flood event by a flood-control system that was subsequently decertified. Zone AR indicates that the former flood-control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance risk zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system

where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

Zone V is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.

Zone VE

Zone VE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. 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, 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.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

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

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Advance, Town of*	N/A	none	N/A	none
Boone County (unincorporated areas)	November 29, 1974	July 1, 1977	September 16, 1982	April 6, 1998
Jamestown, Town of*	N/A	none	N/A	none
Lebanon, City of	May 3, 1974	January 16, 1976	May 3, 1982	January 2, 1987 March 17, 1997
Thorntown, Town of	January 18, 2012	none	January 18, 2012	none
Ulen, Town of	November 29, 1974	July 1, 1977	September 16, 1982	April 6, 1998
Whitestown, Town of	January 18, 2012	none	January 18, 2012	none
Zionsville, Town of	April 12, 1974	August 6, 1976	December 15, 1981	none

*No Special Flood Hazard Areas Identified

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

**BOONE COUNTY, IN
AND INCORPORATED AREAS**

COMMUNITY MAP HISTORY

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 Boone County. Previously, separate FIRMs were prepared for each identified floodprone incorporated community and for the unincorporated areas of the county. Historical data relating to the maps prepared for each community are presented in Table 11.

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.

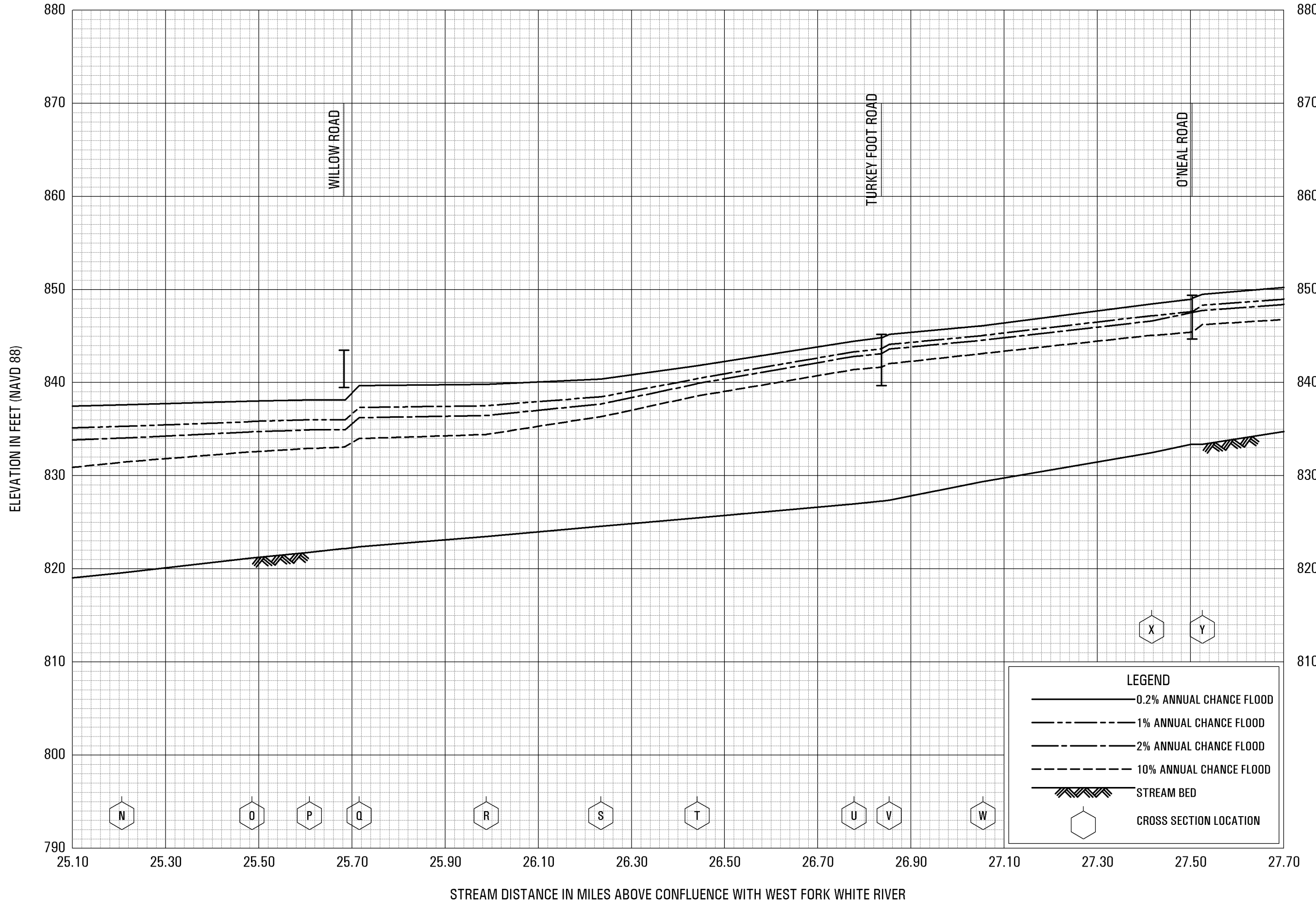
8.0 LOCATION OF DATA

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 BIBLIOGRAPHY AND REFERENCES

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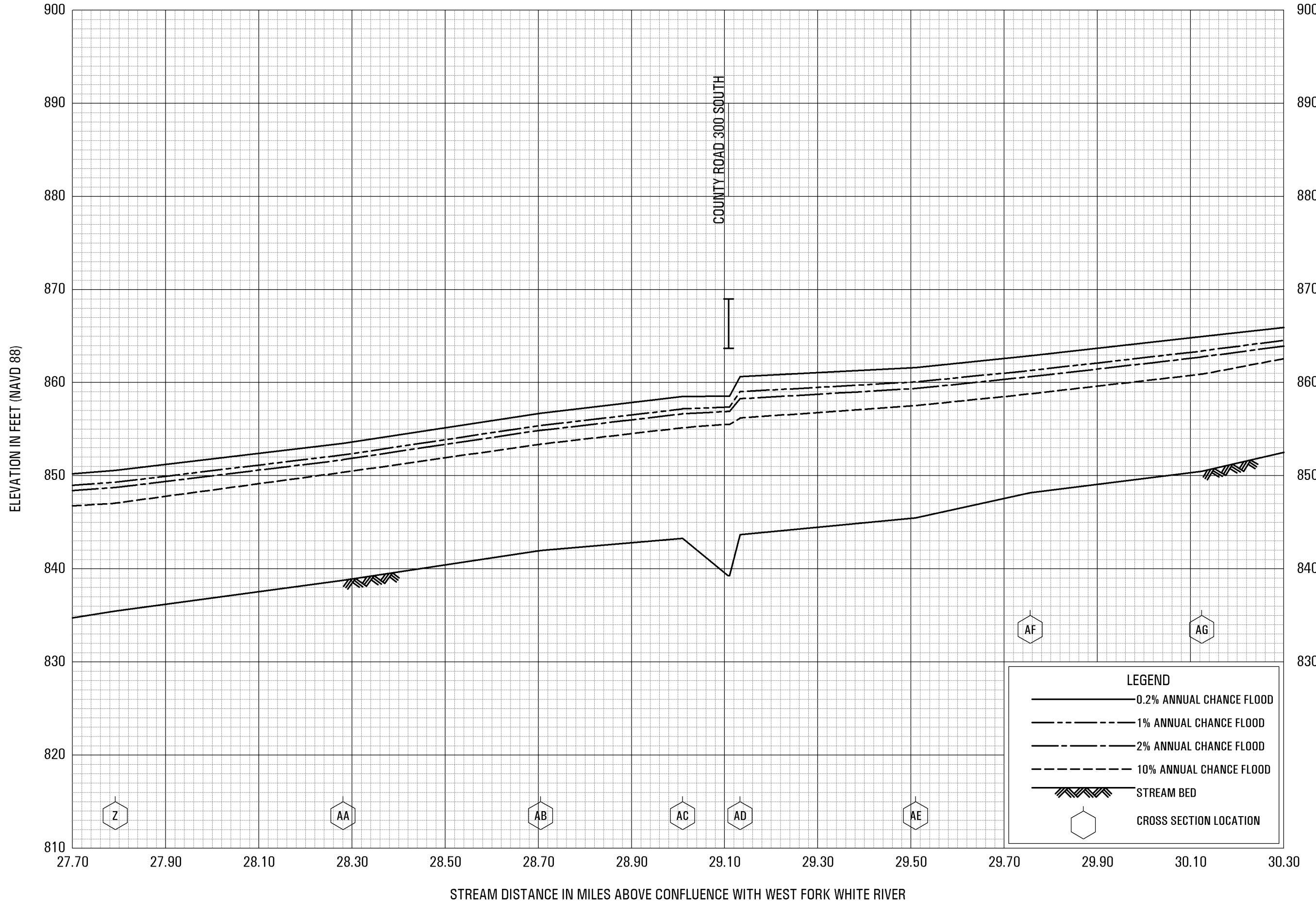


FLOOD PROFILES

EAGLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

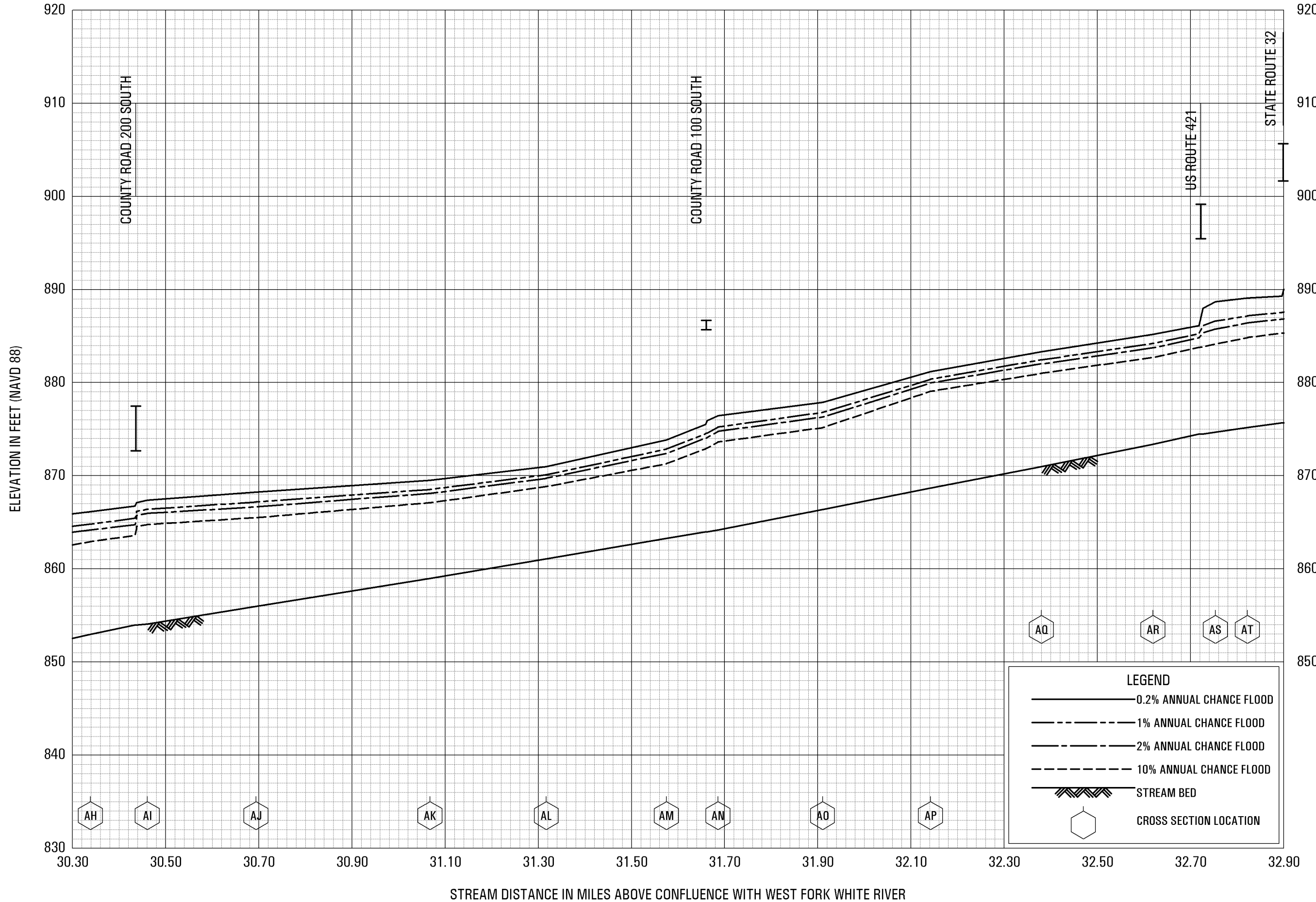
BOONE COUNTY, IN
AND INCORPORATED AREAS



FLOOD PROFILES

EAGLE CREEK

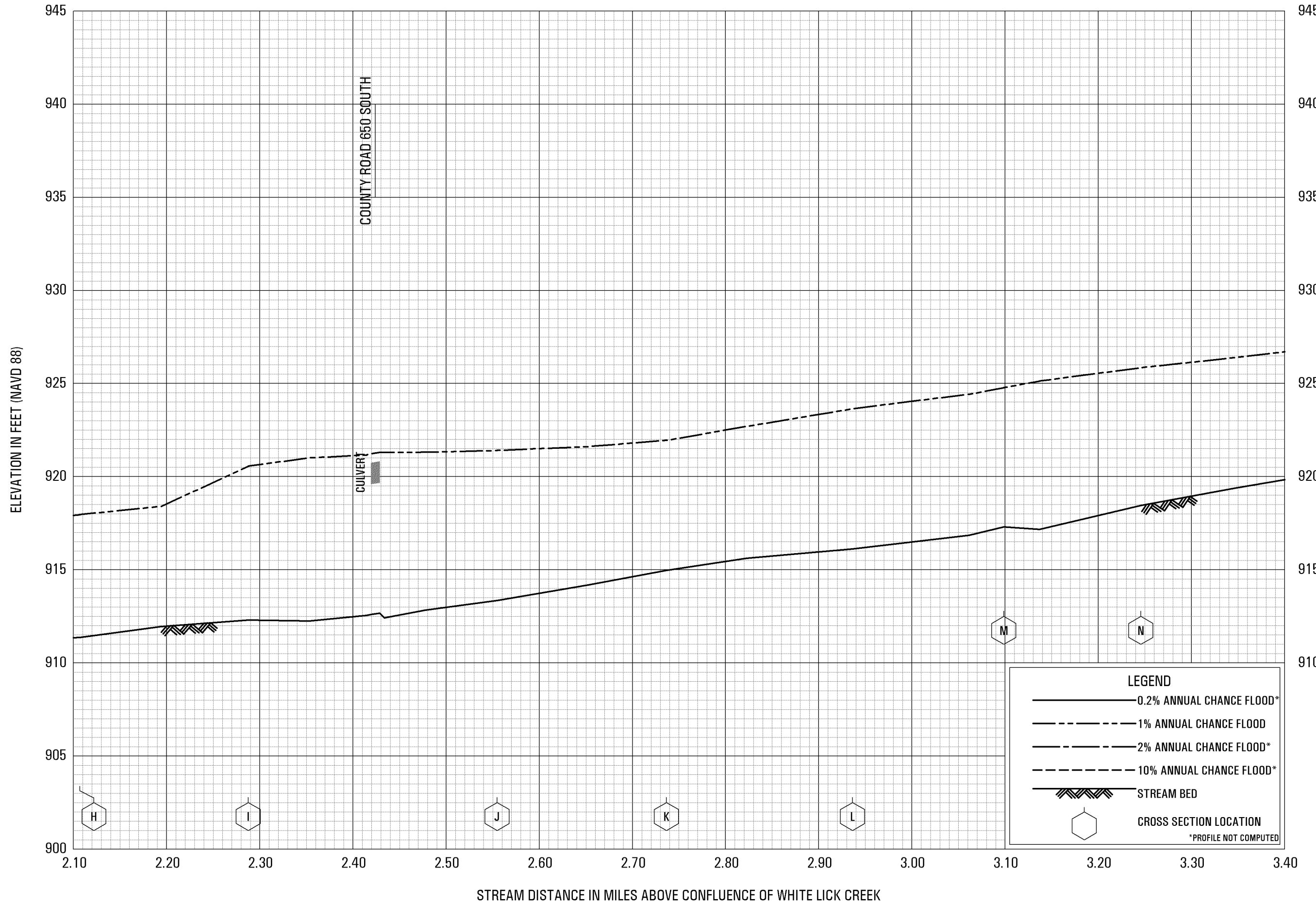
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BOONE COUNTY, IN
 AND INCORPORATED AREAS



FLOOD PROFILES

EAGLE CREEK

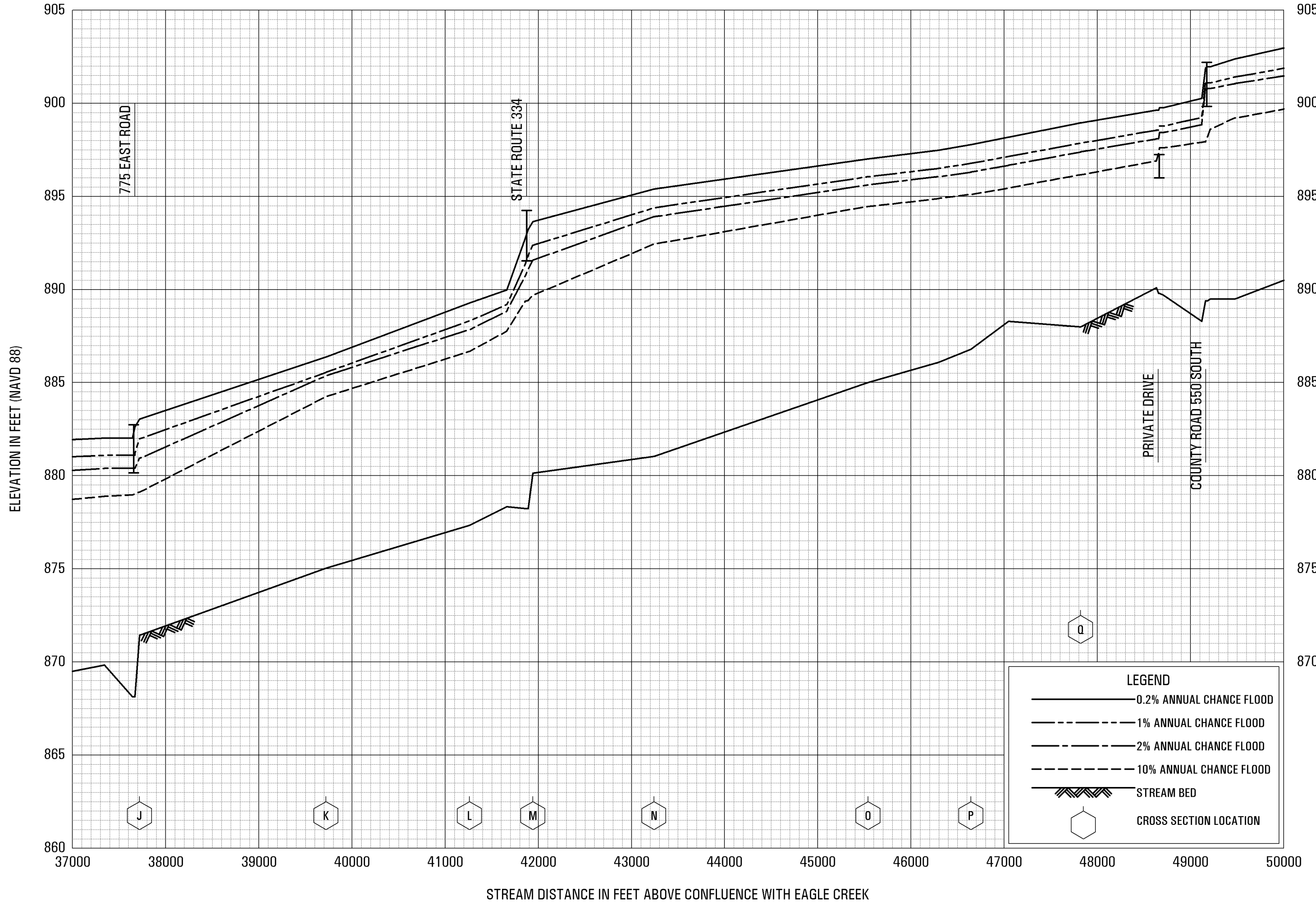
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BOONE COUNTY, IN
 AND INCORPORATED AREAS



FLOOD PROFILES

ETTER DITCH

FEDERAL EMERGENCY MANAGEMENT AGENCY
BOONE COUNTY, IN
 AND INCORPORATED AREAS

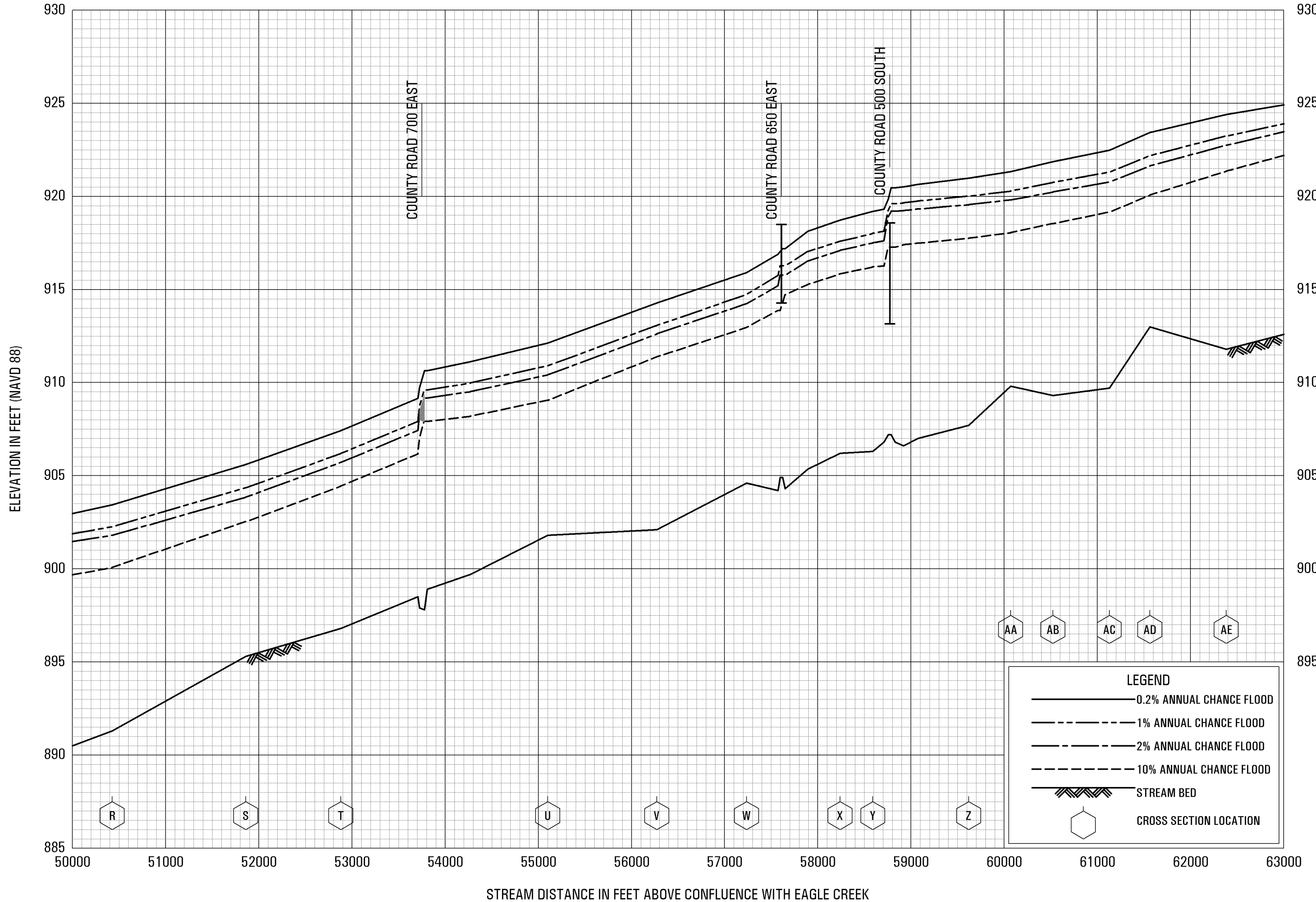


FLOOD PROFILES

FISHBACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS

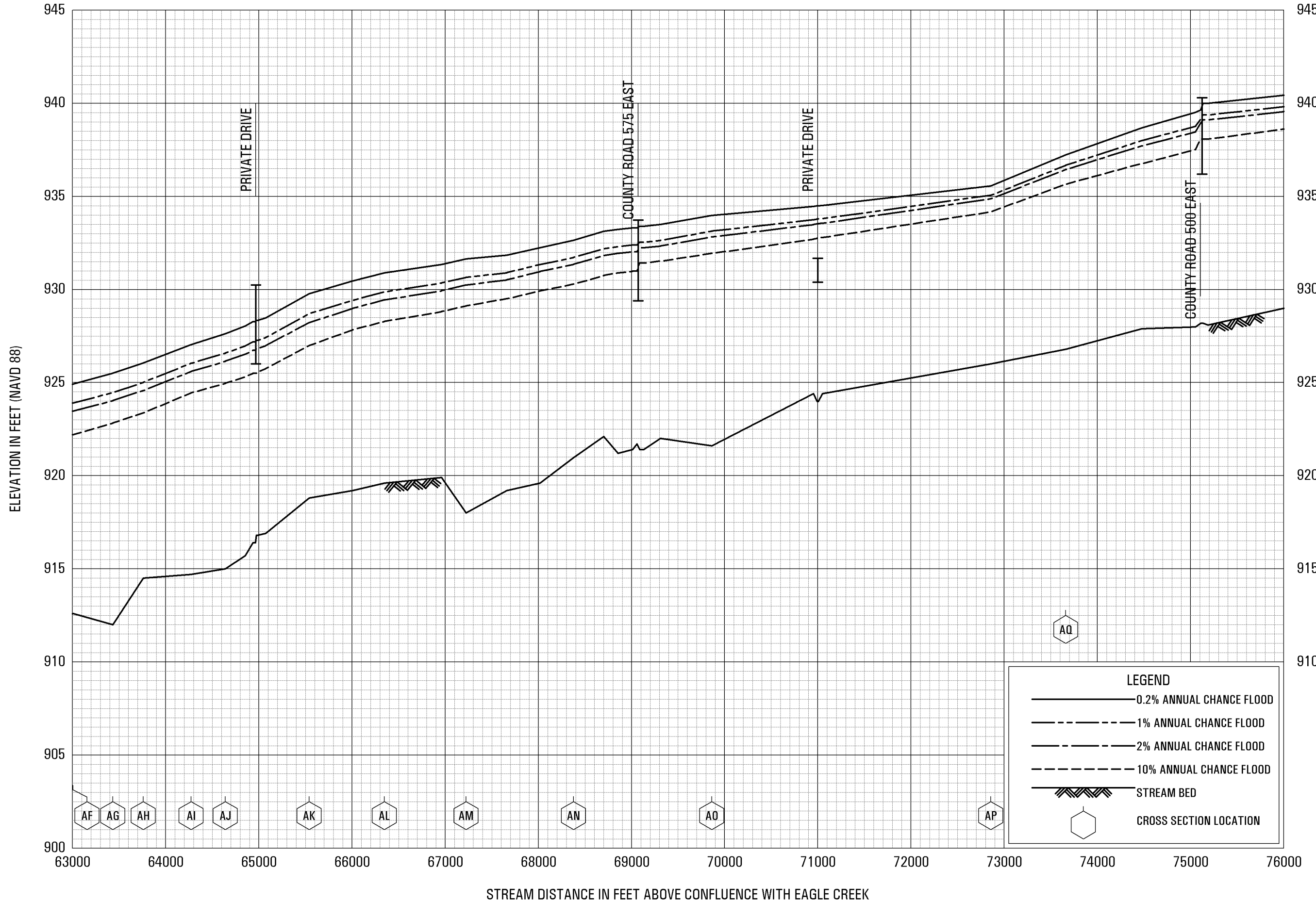


FLOOD PROFILES

FISHBACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS

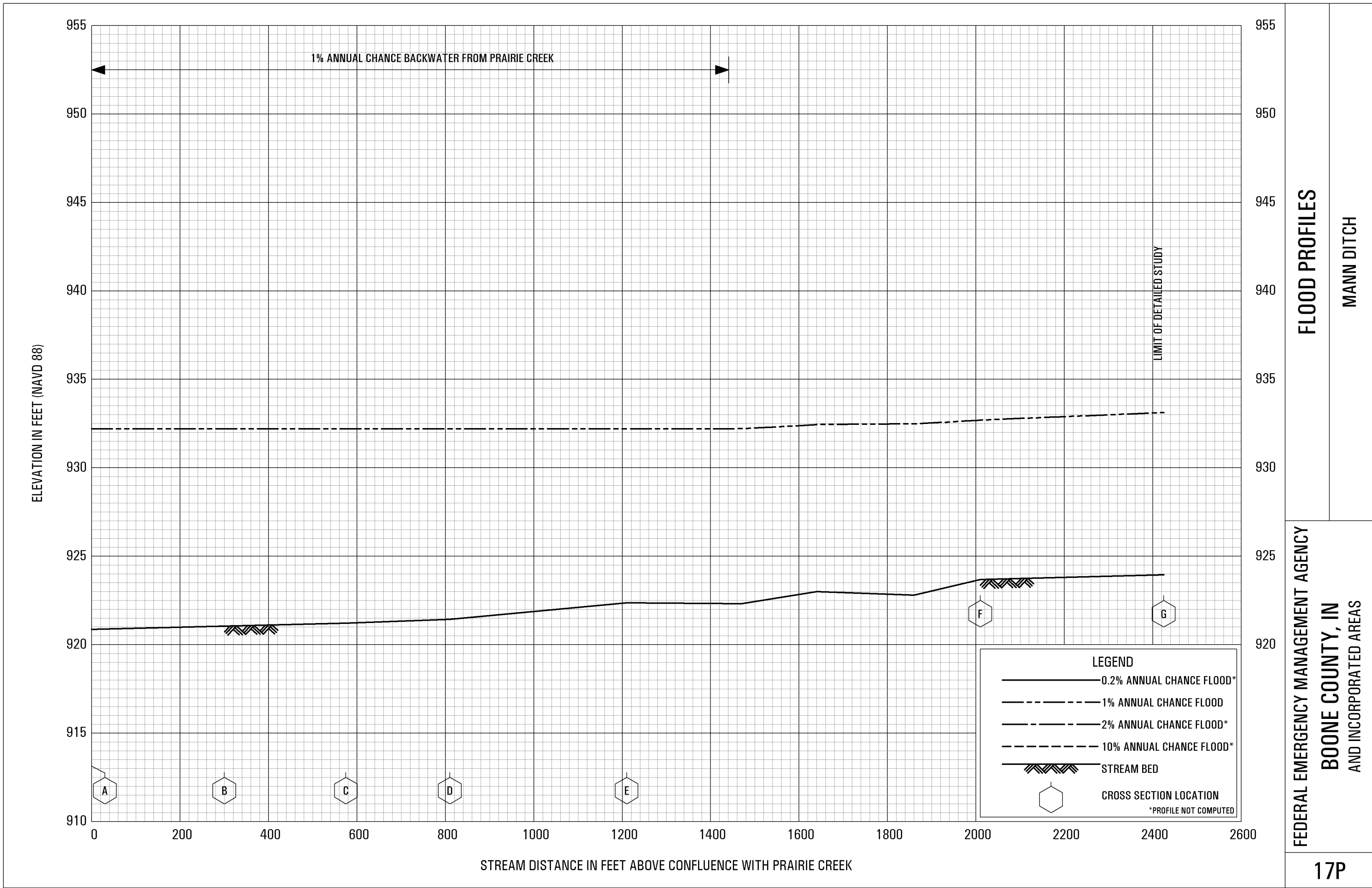


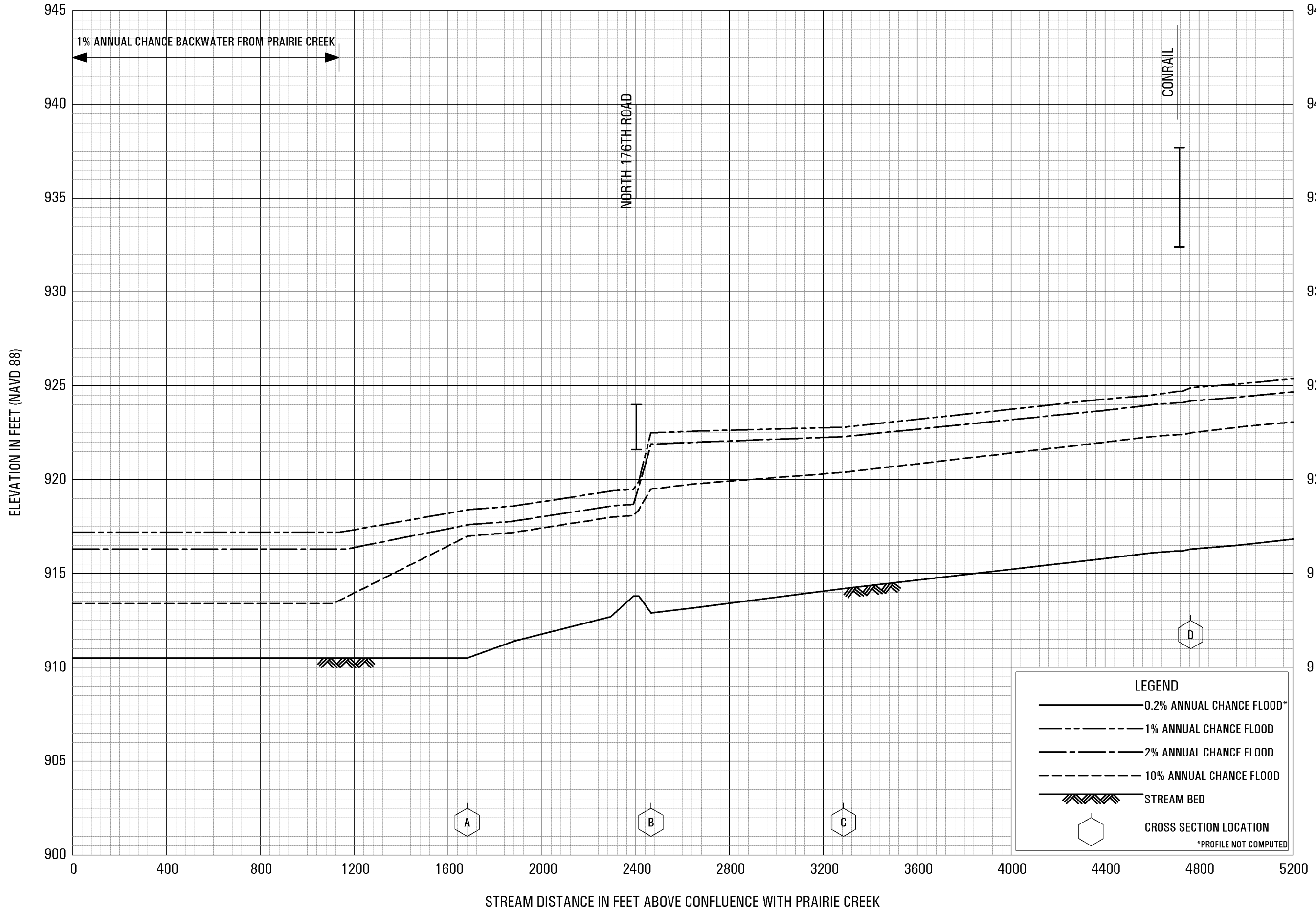
FLOOD PROFILES

FISHBACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS



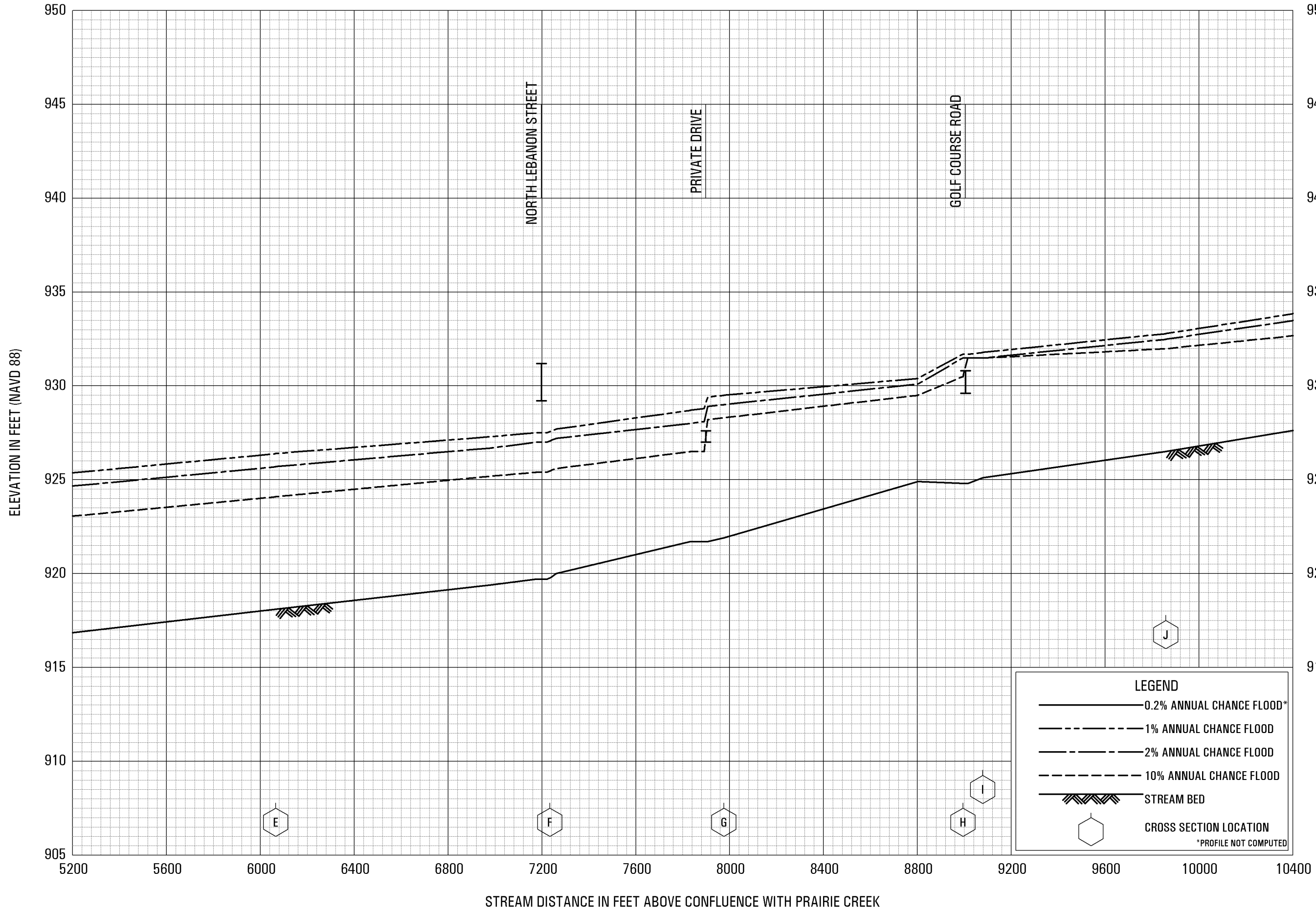


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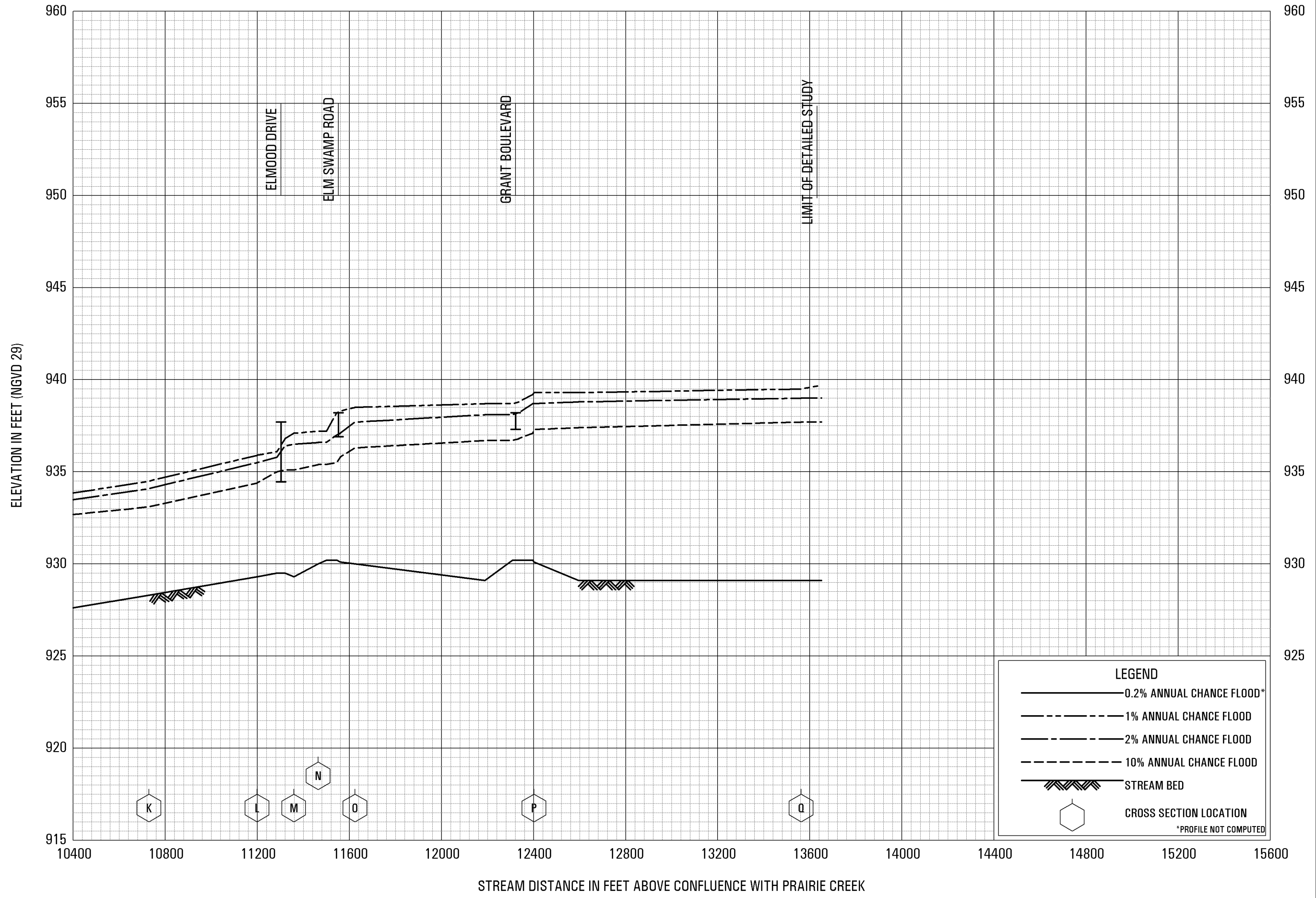
FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS



FLOOD PROFILES
NEW REYNOLDS DITCH

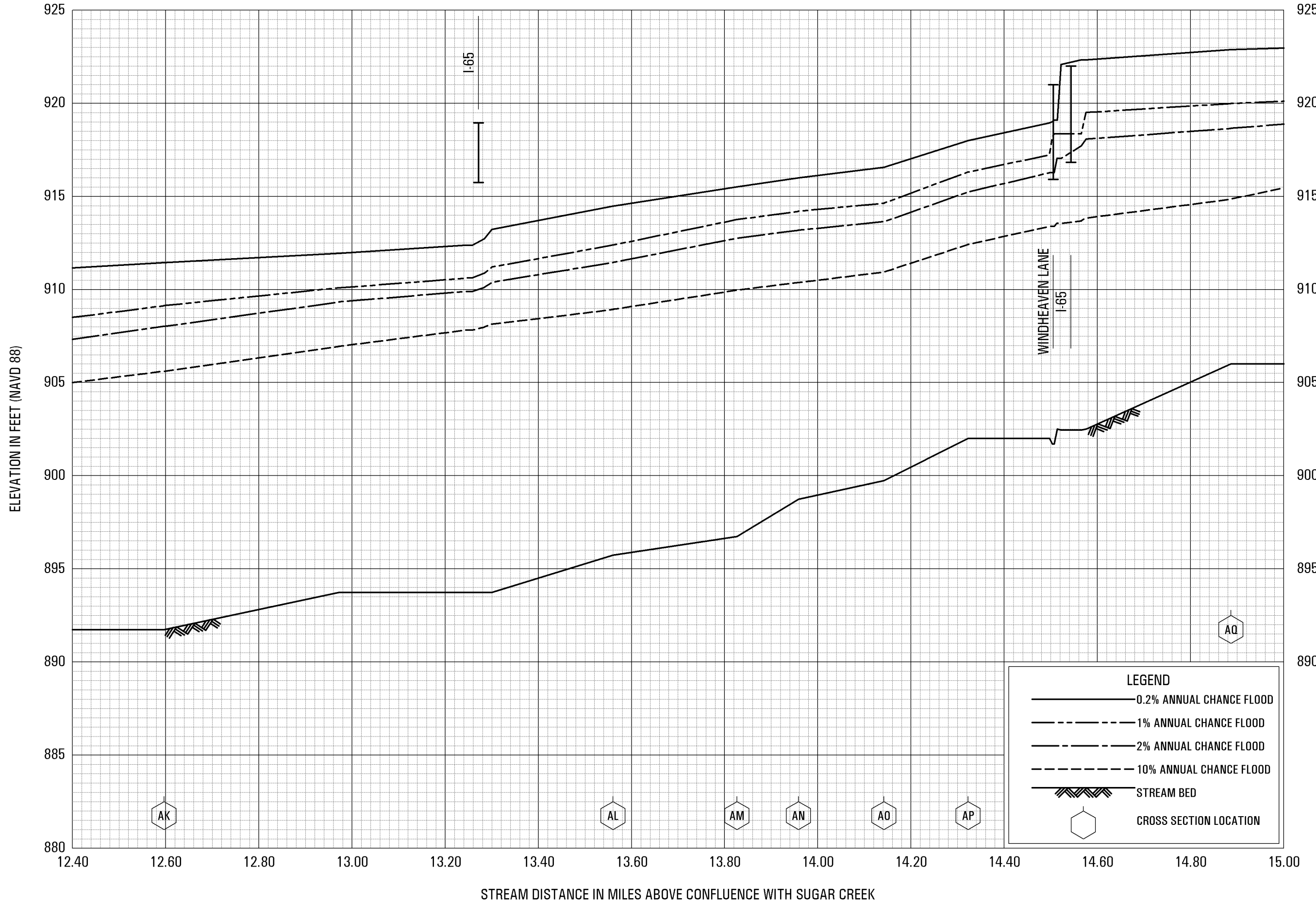
FEDERAL EMERGENCY MANAGEMENT AGENCY
BOONE COUNTY, IN
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FLOOD PROFILES

NEW REYNOLDS DITCH

**FEDERAL EMERGENCY MANAGEMENT AGENCY
BOONE COUNTY, IN
AND INCORPORATED AREAS**

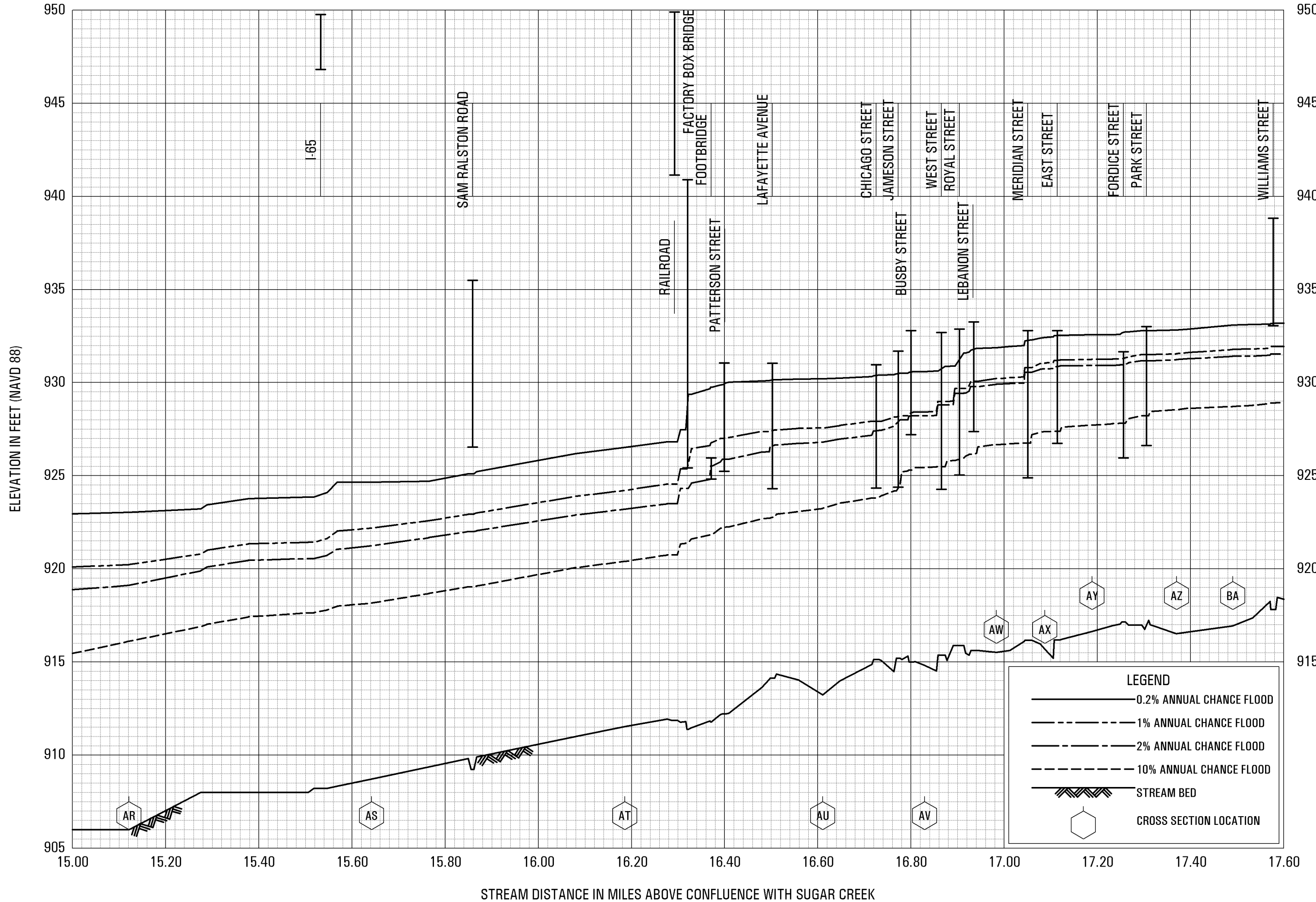


FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS

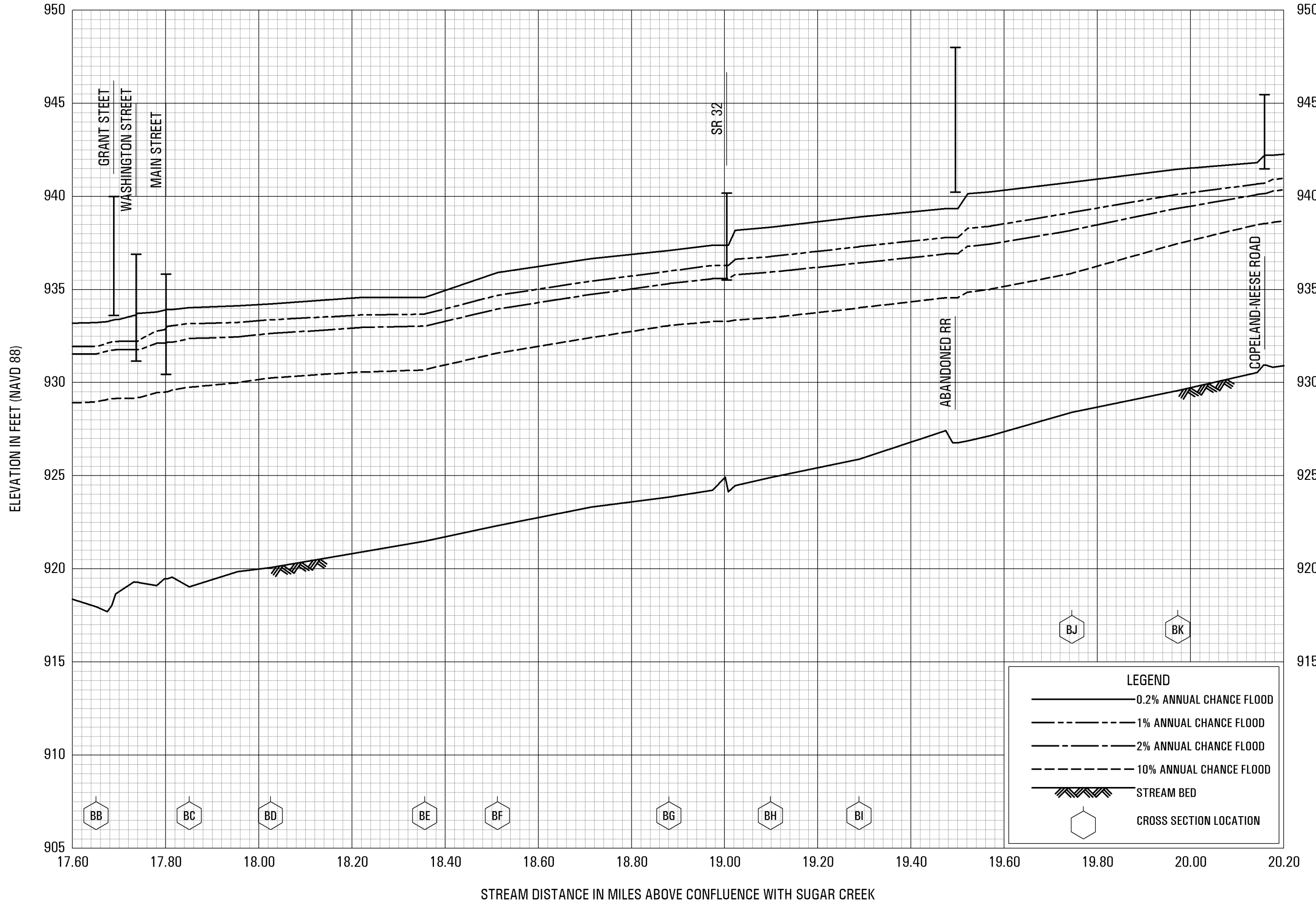


FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
AND INCORPORATED AREAS

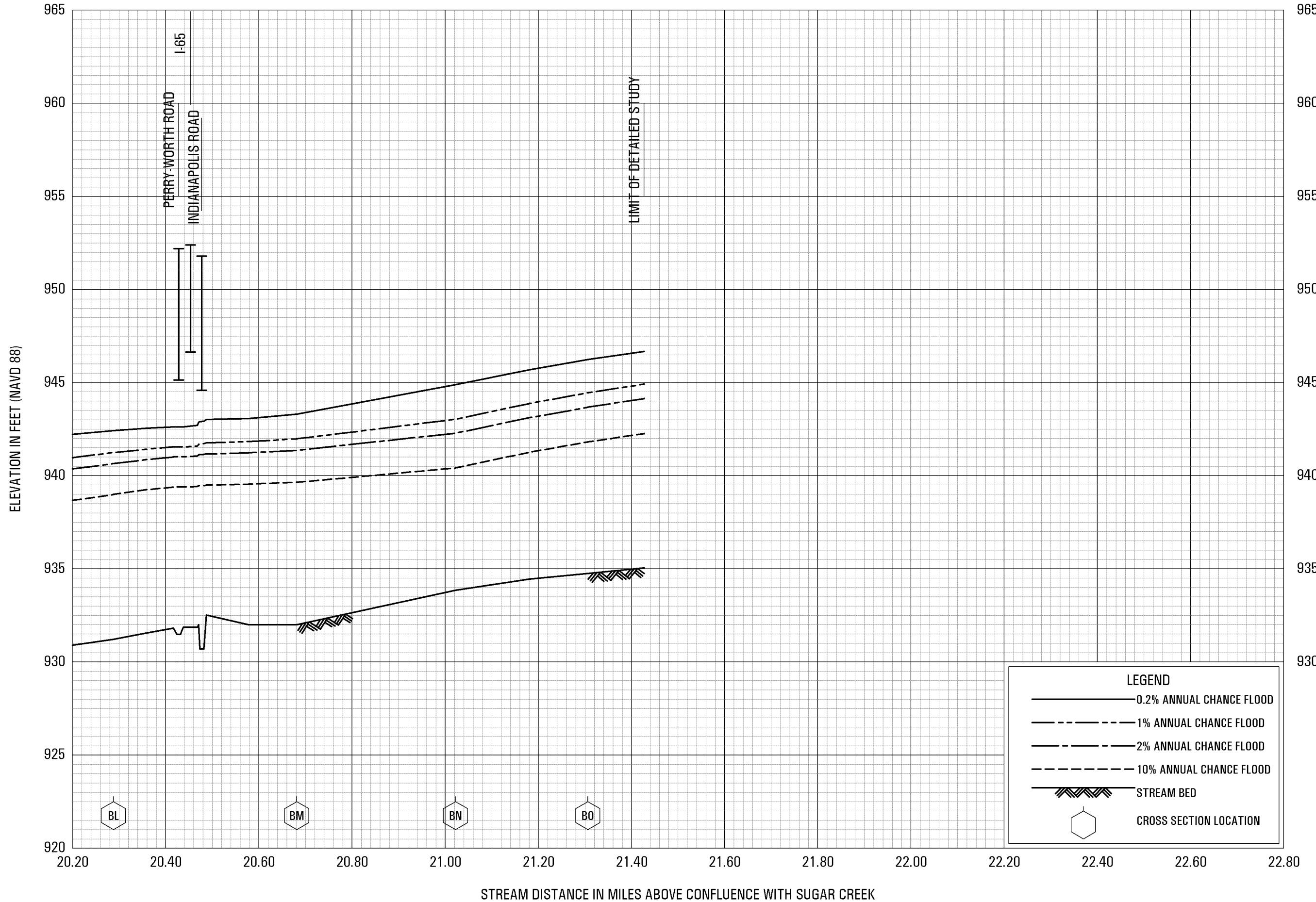


FLOOD PROFILES

PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOONE COUNTY, IN
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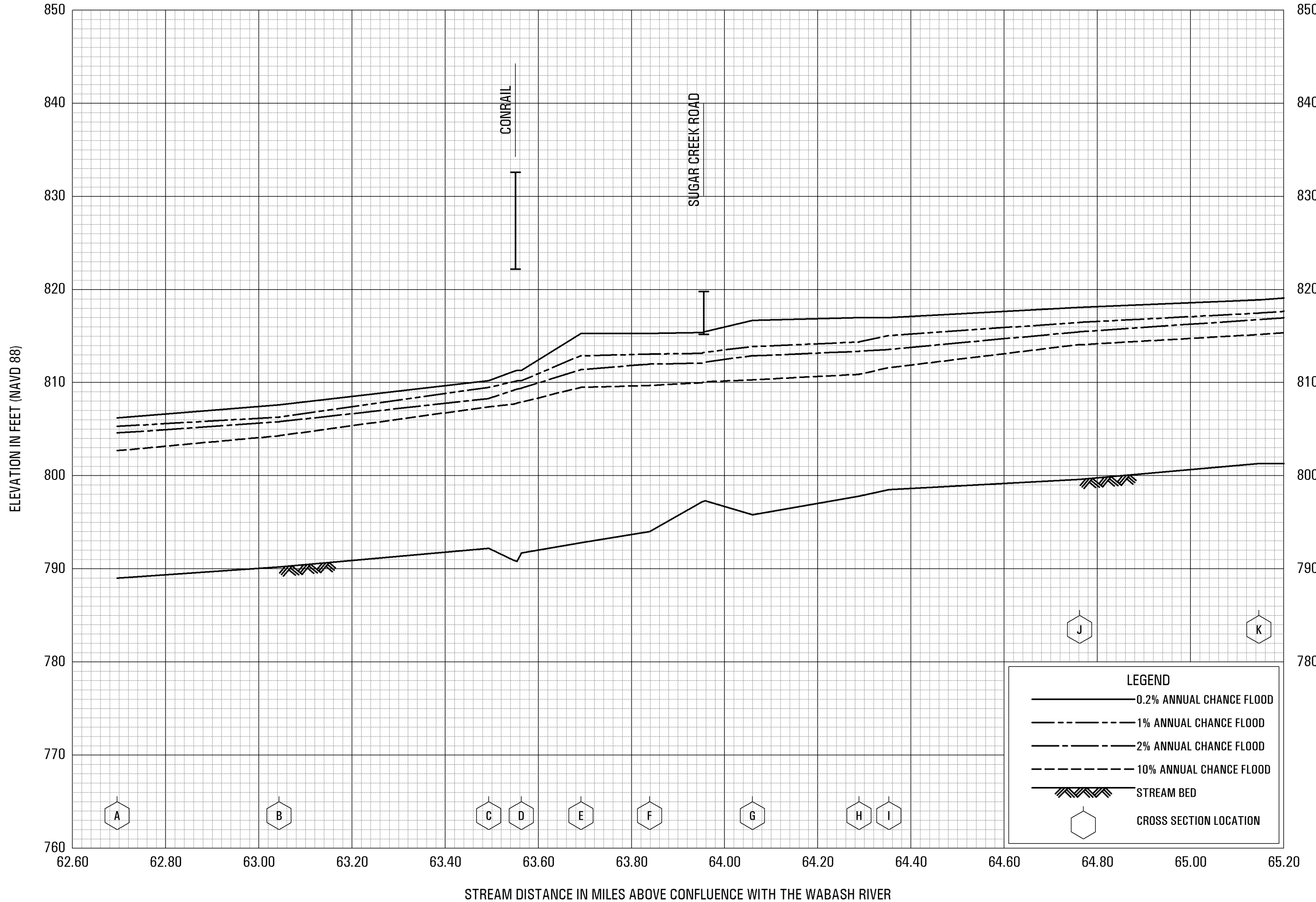


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PRAIRIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

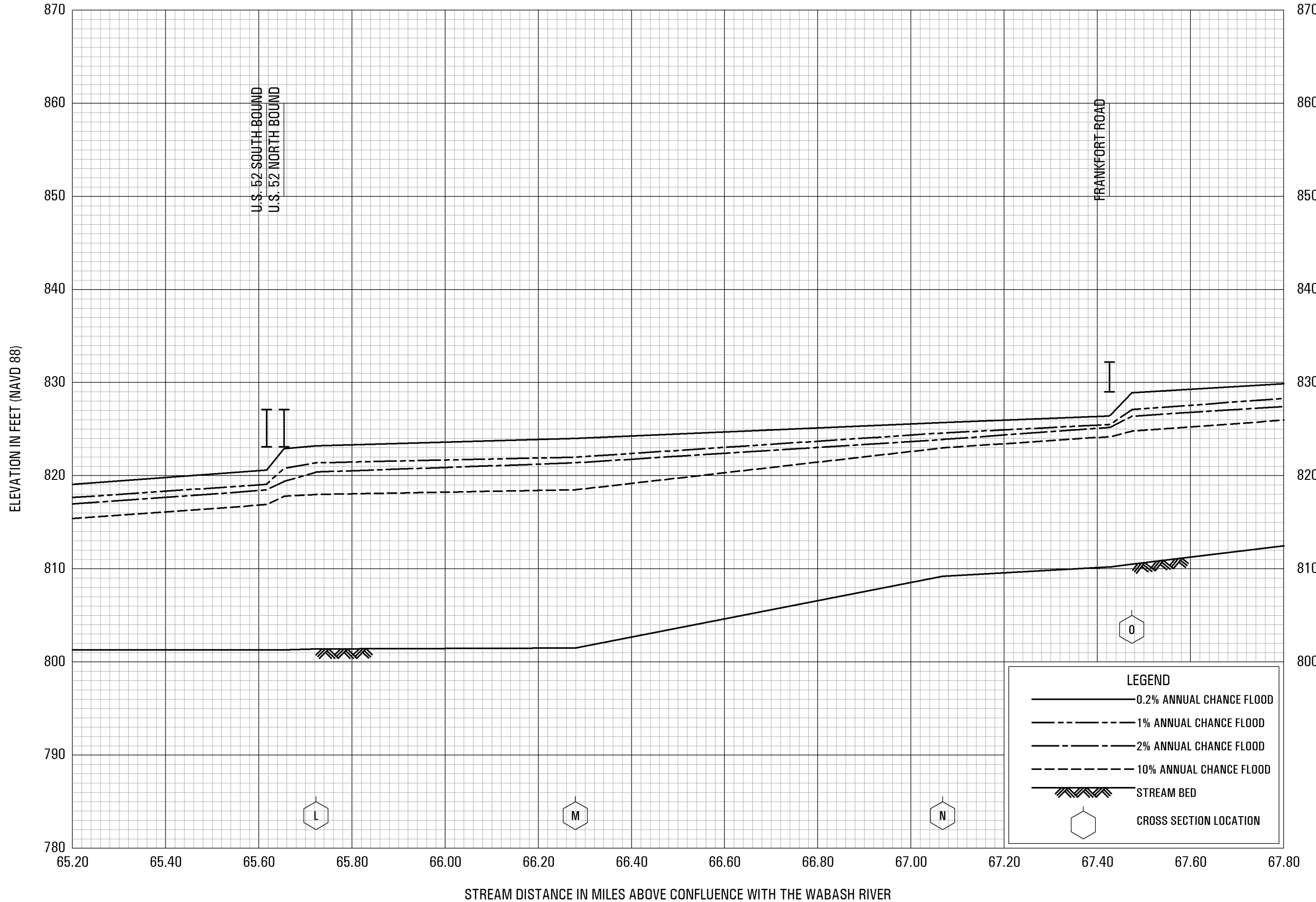
BOONE COUNTY, IN
AND INCORPORATED AREAS



FLOOD PROFILES

SUGAR CREEK

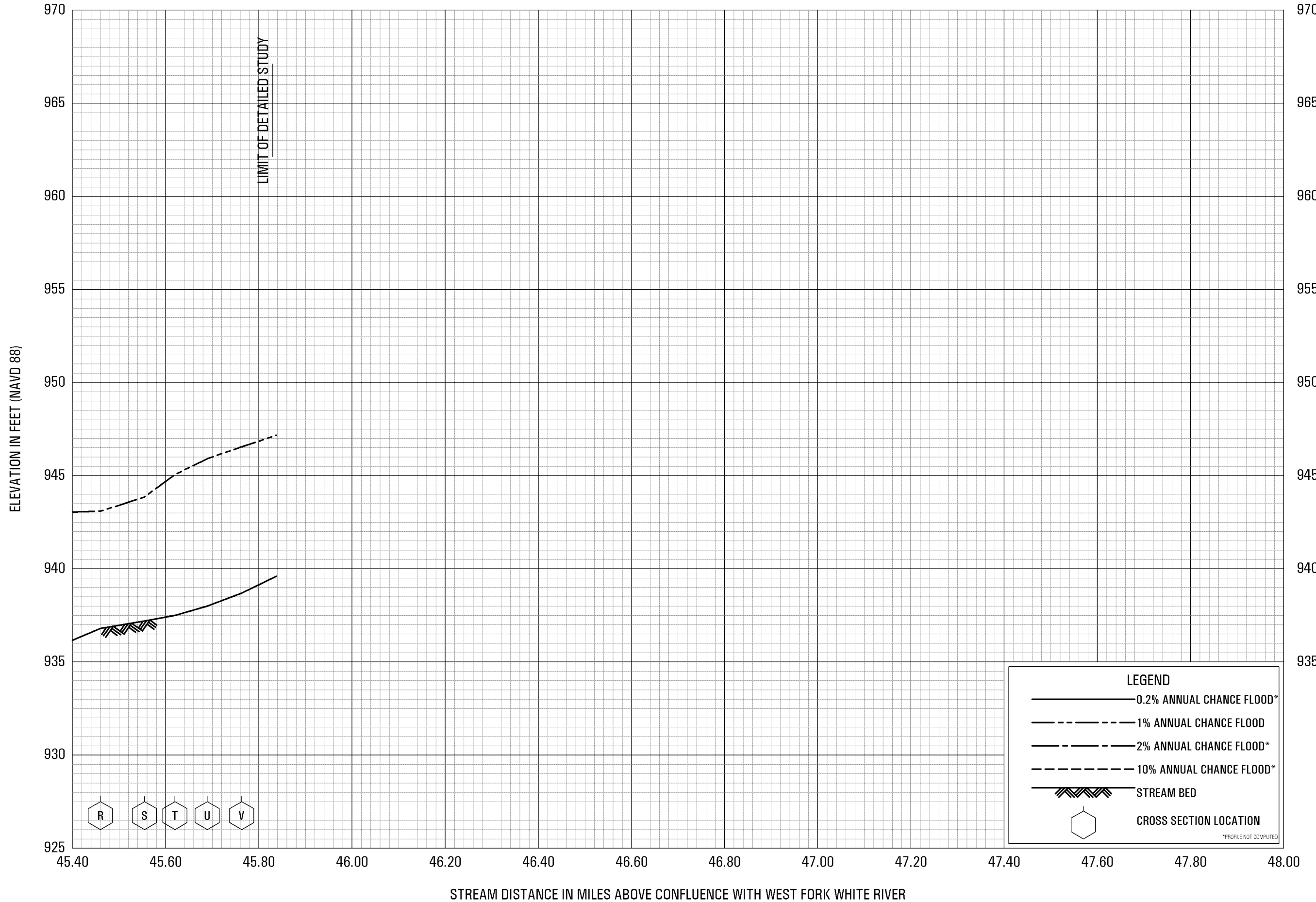
FEDERAL EMERGENCY MANAGEMENT AGENCY
BOONE COUNTY, IN
 AND INCORPORATED AREAS



FLOOD PROFILES

SUGAR CREEK

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FLOOD PROFILES

WHITE LICK CREEK

**FEDERAL EMERGENCY MANAGEMENT AGENCY
BOONE COUNTY, IN
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