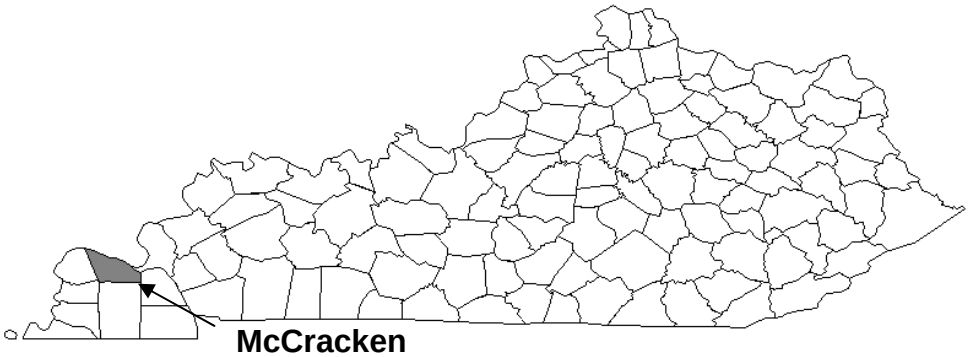
MCCRACKEN COUNTY, KENTUCKY

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
PADUCAH, CITY OF	210152
MCCRACKEN COUNTY (UNINCORPORATED AREAS)	210151



McCracken County

Effective Date November 2, 2011

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

21145CV000A

NOTICE TO FLOOD INSURANCE STUDY USERS

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

Selected Flood Insurance Rate Map panels for the 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
V1 through V30	VE
B	X
C	X

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.

Initial Countywide FIS Effective Date: November 2, 2011

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgments	1
1.3	Coordination	3
2.0	AREA STUDIED	3
2.1	Scope of Study	3
2.2	Community Description	4
2.3	Principal Flood Problems	5
2.4	Flood Protection Measures	5
3.0	ENGINEERING METHODS	6
3.1	Hydrologic Analyses	6
3.2	Hydraulic Analyses	10
3.3	Vertical Datum	13
4.0	FLOODPLAIN MANAGEMENT APPLICATIONS	14
4.1	Floodplain Boundaries	14
4.2	Floodways	15
5.0	INSURANCE APPLICATION	29
6.0	FLOOD INSURANCE RATE MAP	30
7.0	OTHER STUDIES	32
8.0	LOCATION OF DATA	32
9.0	BIBLIOGRAPHY AND REFERENCES	32

TABLE OF CONTENTS (continued)

Page

FIGURES

Figure 1 – Floodway Schematic 16

TABLES

Table 1 - Detailed Study Limits 3

Table 2 - Summary of Discharges 7

Table 3 - Manning's "n" Values 11

Table 4 - Floodway Data 17

Table 5 - Community Map History 31

EXHIBITS

Exhibit 1 - Flood Profiles

Black Branch	Panels 01P- 02P
Camp Creek	Panels 03P- 06P
Champion Creek	Panel 07P-09P
Crooked Creek	Panels 10P- 12P
Cross Creek	Panels 13P
Island Creek	Panels 14P- 19P
Massac Creek	Panels 20P- 25P
Middle Fork Massac Creek	Panels 26P- 30P
Ohio River	Panels 31P- 34P
Perkins Creek	Panels 35P- 38P
Tennessee River	Panel 39P
West Fork Massac Creek	Panels 40P- 43P

FLOOD INSURANCE STUDY
MCCRACKEN COUNTY, KENTUCKY AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of McCracken County, Kentucky; including the City of Paducah and the unincorporated areas of McCracken County (referred to collectively herein as McCracken 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. 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 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 a 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.

This FIS was prepared to include the incorporated communities within McCracken County in a countywide format. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previous printed FIS reports, is shown on the following page.

City of Paducah	The hydrology and hydraulics analyses for this study were performed by Booker Associates, Inc. (the Study Contractor) for the Federal Insurance Administration, under contract number H-4075. This study was completed in January 1978.
McCracken County (Unincorporated Areas)	The hydrology and hydraulics analyses for this study were performed by Booker Associates, Inc. (the Study Contractor) for the Federal Insurance Administration, under contract number H-4075. This study was completed in February 1978.

For this countywide FIS, with the exception of the Black Branch, Camp Creek, Champion Creek, Island Creek, Massac Creek, Middle Fork Massac Creek, Ohio River, Tennessee River and West Fork Massac Creek new hydrologic and hydraulic analyses were prepared for FEMA by AMEC Earth & Environmental, Inc. under Contract No. EMA-2008-CA-5882 and this work was completed in December 2009. Hydrologic and Hydraulic analysis for Black Branch, Camp Creek, Champion Creek, Island Creek, Massac Creek, Middle Fork Massac Creek and West Fork Massac Creek were performed by the Booker Associates, Inc. (the Study Contractor) for the Federal Insurance Administration, under contract number H-4075. A HEC-2 model for the Ohio River was obtained by AMEC from the Louisville district Corps of Engineers (USACE). USACE also provided a HEC-RAS model for the Tennessee River downstream of Kentucky Dam. New detailed hydrologic and hydraulic analyses were performed for Cross Creek, Crooked Creek and Perkins Creek by AMEC Earth & Environmental as part of an update to this flood insurance study. The extents of these analyses are listed in Section 2.0 of this report. Topographic information consisted of Digital Elevation Models produced by using 2-foot contour data provided by McCracken County (Reference 2) for most of the County and 10 meter Digital Elevation Models produced by the U.S Geological Survey (USGS) (Reference 1) for parts of the Ohio River corridor.

Planimetric base map information shown on all FIRM panels was derived from multiple sources. Road centerlines, stream centerlines and political boundary files were provided by the Kentucky Geographic Network and additional stream centerlines and areas were downloaded from the National Hydrography Dataset provided by the U.S. Geological Survey. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features.

The coordinate system used for the production of this FIRM is State Plane, Lambert Conformal Conic, Kentucky Single Zone 1600, North American Datum of 1983 (NAD 83), GRS 80 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the UTM projection, NAD 83. Differences in the datum and spheroid used in the production of FIRMs for adjacent counties

may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

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

For this countywide FIS, initial CCO meetings were held on May 27, 2008, and a final CCO meeting was held on February 8, 2010. The initial meetings were attended by representatives of the City of Paducah, McCracken County, AMEC Earth & Environmental Inc. and Kentucky Division of Water (KDOW). All problems raised at that meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of McCracken County, Kentucky, including the incorporated communities listed in Section 1.1. The areas studied were selected with priority given to all known flood hazards and areas of projected development or proposed construction through April 2009.

Flooding caused by overflow of Black Branch, Camp Creek, Champion Creek, Crooked Creek, Cross Creek, Island Creek, Massac Creek, Middle Fork Massac Creek, Ohio River, Perkins Creek, Tennessee River and West Fork Massac Creek were studied in detail. The extent of the streams studied using detailed methods are listed in Table 1.

TABLE 1- DETAILED STUDY LIMITS

Stream	Limits of Detailed Study
Black Branch	From its confluence with Massac Creek to approximately 120 feet upstream of Buchanan Road.
Camp Creek	From KY HWY 348 to approximately 2800 feet upstream of The Old Houser Road.
Champion Creek	From its confluence with Island Creek to approximately 1550 feet upstream of Clark line Road.
Crooked Creek	From its confluence with Perkins Creek to approximately 430 feet upstream of US HWY 62.

Cross Creek	From approximately 570 feet downstream of Railroad yard to approximately 340 feet upstream of South 24th Street.
Island Creek	Approximately 450 feet upstream of its confluence with Tennessee River to approximately 400 feet upstream of Husband Road.
Massac Creek	From its confluence with Ohio River to approximately 600 feet upstream of Clinton Road.
Middle Fork Massac Creek	From its confluence with Massac Creek to just upstream of State Highway 1438.
Ohio River	For its entire length through McCracken County.
Perkins Creek	From its confluence with Ohio River to approximately 2150 feet upstream of US HWY 62.
Tennessee River	For its entire length within McCracken County.
West Fork Massac Creek	From approximately 3,300 feet upstream of its confluence with Massac Creek to approximately 6500 feet upstream of Biggs road.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

The scope and methods of study were proposed to, and agreed upon, by representatives of McCracken County, the Area Development District (ADD), AMEC Earth & Environmental Inc., and Kentucky Division of Water (KDOW).

2.2 Community Description

McCracken County and its county seat, Paducah, are located in western Kentucky, a part of the Jackson Purchase Region, on the Ohio and Tennessee Rivers. The county is bounded on the north by Massac County, Illinois, on the northeast by Livingston County, on the east by Marshall County, on the south by Graves County, on the southwest by Carlisle County, and on the west by Ballard County.

McCracken County was named for Captain Virgil McCracken, who served in the War of 1812 and was killed at the Battle of the River Raisin. The economy for McCracken County is centralized around industry, especially in the City of Paducah with the Ohio and Tennessee Rivers, and several railroads bringing industry to the area. Although industry and trade brought economy to the county, the export of tobacco played a huge role on the agriculture side of it as well. (Reference 3)

In 2008 64,776 people resided in McCracken County. The land area of the county covers approximately 250 square miles (Reference 4).

The climate in McCracken County is temperate with moderately cold winters and warm, humid summers, resulting in an average annual temperature of 57 degrees as measured by the National Weather Service. Precipitation is fairly well distributed throughout the year. The wettest month, on average, is March. Normal rainfall for the year as a whole is 49.24 inches. (Reference 4)

2.3 Principal Flood Problems

Floods in the study reach of the Ohio River are a result of excessive headwater and major tributary runoff. Historical records of Ohio River flooding in McCracken County show large floods occurred in 1867, 1882, 1883, 1884, 1886, and 1897, in the nineteenth century. Major floods in the twentieth century occurred in 1913, 1937, 1945, 1950, 1963, and 1975. The maximum flood on record is the 1937 flood. The 1950 flood is considered to be the 1-percent-annual chance flood.

Northern McCracken County is situated in the floodplain of the Ohio River. Low-lying areas outside the Paducah flood works are subject to periodic flooding during the Ohio River flood season, which lasts from December through May at Paducah.

Damage during these floods is negligible because valuable property is protected by flood works.

There are no historical records of flooding on Cross Creek, Crooked Creek or Island Creek. However, minor flooding does occur within the Paducah city limits. This flooding is the result of intense local thunderstorms which usually occur in the summer and fall.

2.4 Flood Protection Measures

There are very extensive flood protection measures on the Ohio River at and above the City of Paducah. Numerous flood control reservoirs exist on Ohio River tributaries, particularly those constructed by the Tennessee Valley Authority (TVA) on the Tennessee River. The floodwall and levee system constructed by the COE in the 1940's on the Ohio River protects the city from base flood elevations. These flood works in Paducah, Kentucky are referred to as the Local Flood Protection Project (LFPP). The United States Army Corps of Engineers, Louisville district issued a positive Levee System Evaluation (LSE) to Paducah, Kentucky LFPP on April 6th, 2010. This positive LSE means that Paducah, Kentucky LFPP has met all the requirements for determining the levee system can be reasonably expected to protect against a flood event with at least one percent annual chance exceedance interval, also referred to as the base flood in accordance with EC 1110-2-6067 and 44 CFR 65.10.

During periods of high water on the Ohio River, when the lower gates on the flood works must be closed, minor flooding due to ponding occurs on Island and Cross Creeks. To minimize flood damage and allow for storage of this water, a conservancy zone has been established. Within the corporate limits, construction and filling is prohibited below elevation 331.

Island Creek has its source in McCracken County outside the flood dikes. It then flows into the protected area through a gated structure in the dike system. Due to the small size of the culverts through the dike at this point, the dike acts as a flood retarding dam and reduces the flow downstream in the Island Creek channel.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood-hazard data required for this study. Flood events of a magnitude that is 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-annual-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 the community.

Discharge-frequency data for Black Branch, Camp Creek, Champion Creek, Island Creek, Massac Creek, Middle Fork Massac Creek and West Fork Massac Creek were defined using a regional relationship developed by the U.S Geological Survey (USGS) which relates basin characteristics to stream flow characteristics (Reference 7). Discharges for the 0.2-percent-annual-chance floods on these streams were determined by straight line extrapolation of a log probability graph of flood discharges computed for frequencies up to the 1-percent-annual-chance flood. Discharges below hydraulic structures on Island Creek were reduced to account for extensive flood storage above the structures. The discharge reductions

were based on information provided by the USACE Louisville District (Reference 8).

Natural discharge-frequency curves for the Ohio River were developed by the USACE. Modified discharge-frequency curves for the Ohio River were developed by routing 12 representative floods for the Ohio River modified by an upstream reservoir system. That system included reservoirs completed or near completion in 1976.

A log Pearson type 3 analysis was performed on the annual peak discharges from the Kentucky Dam to establish the 10-, 2-, 1-, and 0.2-percent-annual-chance frequency flows for the Tennessee River. No local drainage was added to the flows originating from the Kentucky Dam.

Rainfall-Runoff Analysis were used to determine discharge-frequency for Cross Creek, Crooked Creek and Perkins Creek.

Peak discharge-frequency area relationship for each flooding source studied in detail in the community are shown in Table 2, Summary of Discharges.

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cubic feet per second) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
BLACK BRANCH					
Confluence with Massac Creek	3.23	1,380	2,130	2,470	3,310
Section C	2.04	949	1,460	1,700	2,280
Section F	1.31	650	1,000	1,160	1,560
CAMP CREEK					
Hardmoney Road	12.22	2,740	4,140	4,776	6,310
Section B	9.98	2,290	3,460	3,990	5,280
Old Mayfield Road (KY 994)	5.75	1,410	2,140	2,470	3,240
Section E	3.37	1,300	1,970	2,270	2,990
Section H	1.99	850	1,280	1,480	1,950
Section I	1.02	470	720	830	1,090
CHAMPION CREEK					
Confluence with Island Creek	6.90	2,300	3,520	4,070	5,800
Old Mayfield Road (KY 994)	6.35	2,160	3,310	3,830	5,450
Section F	3.21	1,280	1,960	2,260	3,220

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cubic feet per second) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
Section G	2.27	964	1,480	1,710	2,430
CROOKED CREEK					
Confluence with Perkins Creek	6.79	1,854	2,625	2,974	3,825
190 feet upstream of confluence with Perkins Creek	3.26	1,298	1,909	2,191	2,897
Buckner Lane	2.26	940	1,434	1,643	2,159
1280 feet upstream of Buckner Lane	1.96	867	1,270	1,455	1,906
Pecan Drive	1.78	813	1,187	1,360	1,784
430 feet upstream of US HWY 62	1.04	527	764	873	1,141
CROSS CREEK					
Above Illinois Central Gulf Railroad Yard	2.02	611	888.4	1,015	1,329
25th Street	1.71	582	848	969	1242
South 24th Street	1.48	491	713	814	1,066
350 feet upstream of South 24th Street	1.28	420	615	704	923
ISLAND CREEK					
Above Cross Creek	25.7	4,150	5,580	6,228	7,808
Approximately 14,000 feet upstream of confluence with Tennessee River	23.20	3,780	5,040	5,598	7,008
Approximately 19,000 feet upstream of confluence with Tennessee River	20.54	3,380	4,430	4,898	6,108
Approximately 27,000 feet upstream of confluence with Tennessee River	17.81	2,930	3,770	4,318	5,108
Above Champion Creek	10.10	1,500	1,620	1,668	1,818
At Levee	8.93	1,238	1,238	1,238	1,238
MASSAC CREEK					
Confluence of Black Branch	38.17	7,260	10,850	12,470	16,560
Section C	32.58	6,580	9,840	11,300	15,000
Above Confluence of Middle Fork Massac Creek	15.21	3,990	5,970	6,860	9,100
At Lovelaceville Road (KY 1438)	12.08	3,410	5,090	5,850	7,760
At Clinton Road (KY 1438)	8.00	2,540	3,800	4,360	5,790

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cubic feet per second) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
MIDDLE FORK MASSAC CREEK					
At confluence with Massac Creek	13.58	3,690	5,520	6,350	8,420
Hines Road	9.63	2,880	4,310	4,960	6,580
Section H	2.62	1,070	1,590	1,830	2,430
At New Hope Church Road	1.54	680	1,020	1,180	1,560
OHIO RIVER					
Mile 927.9	NA*	877,300	1,094,600	1,185,000	1,396,000
Mile 935	NA*	925,000	1,175,000	1,275,000	1,505,000
PERKINS CREEK					
290 feet downstream of KY HWY 305	13.64	2,980	4,235	4,787	6,264
5000 feet upstream of KY HWY 305	10.48	2,542	3,563	4,029	5,275
Abandoned Illinois Central Gulf Railroad	9.4	2,343	3,276	3,708	4,847
Illinois Central Gulf Railroad	8.47	2,207	3,151	3,576	4,617
Hinkleville Road	7.33	1,993	2,837	3,217	4,142
941 feet downstream of confluence with Crooked Creek	7.02	1,919	2,724	3,088	3,976
At confluence with Crooked Creek	6.79	1854	2625	2974	3825
1232 feet upstream of confluence with Crooked Creek	3.53	814	1,175	1,356	1,802
North Friendship Road	2.86	680	996	1,143	1,509
310 feet downstream of Blandville Road	1.88	478	706	812	1,073
2490 feet upstream of US HWY 62	1.11	264	384	439	576
TENNESSEE RIVER					
Mile 3.1	NA+	388,000	480,000	517,000	600,000
WEST FORK MASSAC CREEK					
At confluence with Massac Creek	24.38	5,400	8,110	9,330	12,230
At Railroad	22.78	5,170	7,760	8,930	11,700
Section F	22.78	4,330	5,856	6,185	7,604

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cubic feet per second) 10-Percent Annual Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent Annual Chance
Section H	18.02	4,430	6,640	7,650	10,000
Hinkleville Road (US 60)	12.90	3,520	5,290	6,090	7,980
Section L	7.02	2,280	3,420	3,940	5,160
Above Section P	5.39	1,870	2,810	3,230	4,240
Biggs Road	3.38	1,300	1,960	2,250	2,950
Above Section U	1.68	734	1,100	1,270	1,660

*Drainage Area was not available from the USACE for the Ohio River.

+Drainage Area was not available from the USACE/TVA for the Tennessee River.

Discharges for Zone A studies were developed using Regression Equations contained in the USGS report Estimating the Magnitude of Peak Flows for Streams in Kentucky for Selected Recurrence Intervals (Reference 5). Drainage areas along streams were determined using a flow accumulation grid developed from the USGS 10 meter digital elevation models and corrected National Hydrologic Data (NHD) stream coverage. Flow points along stream centerlines were calculated using the regression equations in conjunction with accumulated area for every 10 percent increase in flow along a particular stream.

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.

Water-surface elevations for floods of selected recurrence intervals were computed for Black Branch, Camp Creek, Champion Creek, Island Creek, Massac Creek, Middle Fork Massac Creek and West Fork Massac Creek using USACE HEC-2 step backwater computer program (Reference 9).

Hydraulic analysis for the Ohio River was performed by the USACE. AMEC converted the HEC-2 model obtained from the USACE for Mound City (mile 918 to mile 981) to a steady state HEC-RAS model.

A HEC-RAS model for the Tennessee River was created using geometry data from and existing Lock and Dam feasibility study performed by the USACE.

Water surface elevations for Cross Creek, Crooked Creek and Perkins Creek were computed using USACE HEC-RAS step backwater computer model (Reference 6).

Roughness coefficients for the streams studied using detailed methods are listed in Table 3.

TABLE 3 - MANNING'S "N" VALUES

Flooding Source	Channel	Overbank
Black Branch	0.020 – 0.065	0.070 - 0.085
Camp Creek	0.047 – 0.067	0.040 – 0.150
Champion Creek	0.024 – 0.098	0.035 – 0.075
Crooked Creek	0.03 – 0.055	0.070 – 0.120
Cross Creek	0.035 – 0.040	0.050 – 0.120
Island Creek	0.041 – 0.089	0.070 – 0.110
Massac Creek	0.041 – 0.089	0.070 – 0.110
Middle Fork Massac Creek	0.063 – 0.079	0.120 – 0.130
Ohio River	0.027 – 0.0275	0.100
Perkins Creek	0.035 – 0.055	0.070 – 0.120
Tennessee River	0.027	0.060
West Fork Massac Creek	0.045 – 0.050	0.070 – 0.120

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.

Cross section data for Black Branch, Camp Creek, Champion Creek, Island Creek, Massac Creek, Middle Fork Massac Creek and West Fork Massac Creek were obtained from aerial photogrammetric surveys. Water sections and sections at hydraulic structures were obtained by field measurements. Cross section data for Crooked Creek, Cross Creek, Ohio River, Perkins Creek and Tennessee River were obtained by field measurements and were located at close intervals above and below bridges in order to compute the backwater effects of these structures in

the urbanized areas. 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 is computed (Section 4.2), selected cross section locations are also shown on the FIRM.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 1- and 2-percent-annual-chance flood elevations are close together, due to limitations of the profile scale, only the 1-percent-annual-chance profile has been shown.

Of special note is the profile of Island Creek. It was found that flooding elevations on Island Creek were either lower or approximately equal to the 1-percent-annual-chance ponding elevation of 330.4 feet which has previously been calculated by the USACE. This elevation was based on the assumption that levee gates were closed and flood waters from Island Creek had to back up behind the levee (Reference 10). Therefore the ponding elevation is considered to be the 1-percent-annual-chance flood elevation.

Approximate (Zone A) hydraulic modeling was performed using HEC-RAS, version 3.1.2, from the U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) (Reference 5). AMEC's program, Automated Floodplain Generator (AFG), was used to assist in the development of the geometries and resulting floodplains throughout the county. AFG employs methodologies of HEC-GeoRAS, a Geographic Information Systems (GIS) interface developed by HEC for the preparation of hydraulic models. In a GIS environment, the engineer places stream centerline and cross-section cut lines. The bank lines and flow path lines are automatically placed, buffering the stream based on user-specified spacing. The AFG then extracts the vertical elevation from the background topography and creates the input geometry file for the HEC-RAS model. Next, cross-section locations are evaluated in reference to the floodplain boundary and are manually adjusted as necessary. The bank stations, Manning's n values, and ineffective flow areas are prescribed in the HEC-RAS model. Subsequently, the water surface elevation is extracted from the HEC-RAS model output and a water surface Triangulated Irregular Network (TIN) is created. The floodplain boundary is delineated based on the difference between the water surface TIN and ground surface TIN.

Detail-studied streams that were not re-studied as part of this map update may include a profile base line on the maps. This profile base line provides a link to the flood profiles included in the FIS report. The detail-studied stream centerline may have been digitized or redelineated as part of this revision. The profile base lines for these streams were based on the best available data at the time of their study and are depicted as they were on the previous FIRMs. In some cases where improved topographical data was used to redelineate floodplain boundaries, the profile base line may deviate significantly from the channel centerline or may be outside the SFHA.

Floodplains were delineated using automated GIS methods. Floodplains were mapped to include backwater effects that govern each flooding source near its downstream extent.

All qualifying benchmarks within a given jurisdiction that are catalogued by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B or C are shown and labeled on the FIRM with their 6-character NSRS Permanent Identifier.

Benchmarks catalogued by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation (e.g., mounted in bedrock)

- Stability B: Monuments which generally hold their position/elevation (e.g., concrete bridge abutment)

- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)

- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS benchmarks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

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 used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD). With the completion of the North American Vertical Datum of 1988 (NAVD), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

All flood elevations shown in this FIS report and on the FIRM are now referenced to NAVD 88. In order to perform this conversion, effective NGVD 29 elevation values were adjusted upward by 0.04 feet. Structure and ground elevations in the

community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in base flood elevations across the corporate limits between the communities.

For more information on NAVD 88, see Converting the National Flood Insurance Program to the North American Vertical Datum of 1988, FEMA Publication FIA-20/June 1992, or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242
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.

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS report provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles, Floodway Data tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS report as well as additional information that may be available at the local community 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 information consisted of Digital Elevation Models produced by using 5-foot contour data provided by McCracken County (Reference 2) for most of the County and 10 meter Digital Elevation Models produced by the U.S Geological Survey (USGS) (Reference 1) for parts of the Ohio River corridor.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM. On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zone AE and A). 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.

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 base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 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 floodways presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain, while allowing a maximum surcharge of 1.0 ft. Floodway widths were computed at cross sections.

Between cross-sections, the floodway boundaries were interpolated. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is 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 (WSEL) of the base flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

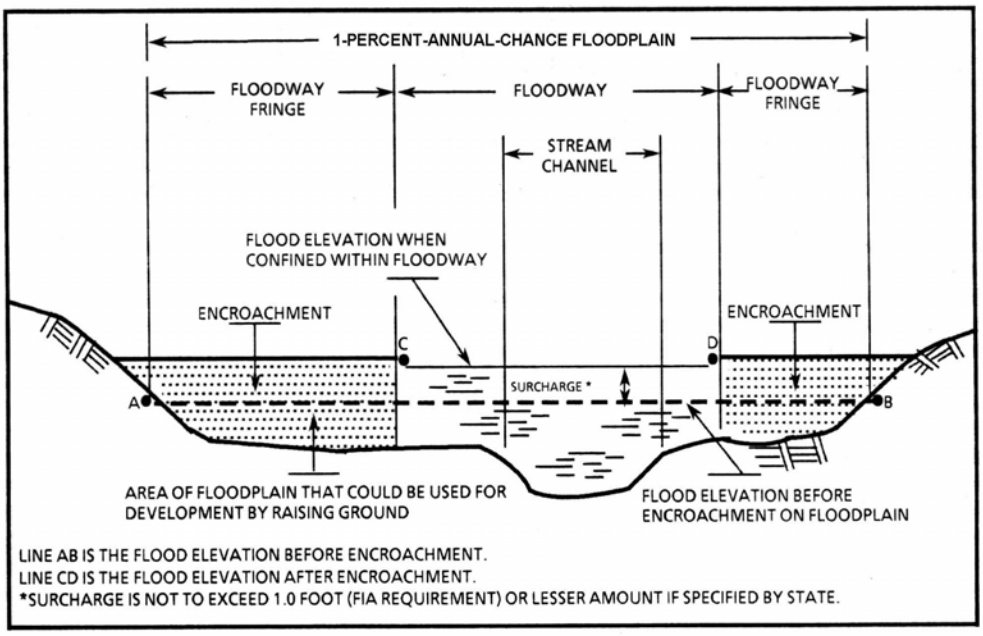


FIGURE 1: FLOODWAY SCHEMATIC

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Black Branch								
A	4,450	100	499	4.9	346.1	346.1	346.7	0.6
B	7,255	165	751	3.3	354.0	354.0	354.9	0.9
C	9,035	152	384	4.4	359.3	359.3	359.5	0.2
D	11,585	114	565	3.0	368.4	368.4	369.3	0.9
E	12,660	45	334	5.1	372.9	372.9	373.1	0.2
F	15,670	46	300	3.9	385.2	385.2	385.7	0.5
G	17,455	47	281	4.1	390.6	390.6	390.7	0.1

[1]Distance above confluence with Massac Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

BLACK BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Camp Creek								
A	22,600	543	1,822	2.6	351.5	351.5	352.5	1.0
B	24,250	973/411[2]	3,003	1.3	353.7	353.7	354.6	0.9
C	26,538	1,100/299[2]	3,864	1.0	357.3	357.3	358.2	0.9
D	29,505	700/24[2]	2,060	1.2	362.4	362.4	363.4	1.0
E	30,698	170	474	4.8	366.5	366.5	367.4	1.0
F	33,352	491	1,821	1.2	374.0	374.0	375.0	1.0
G	34,700	350	1,566	1.4	374.7	374.7	375.7	1.0
H	38,340	109	295	5.0	386.6	386.6	387.5	0.9
I	41,920	36	161	5.2	400.6	400.6	400.8	0.2

[1]Distance above confluence with West Fork Clarks River
[2]Width/width within County

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

CAMP CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Champion Creek								
A	3,485	779	2,880	1.4	335.1	335.1	335.6	0.5
B	4,367	735	3,101	1.3	335.3	335.3	335.9	0.6
C	5,767	456	1,048	3.9	336.2	336.2	337.0	0.8
D	7,530	808	2,070	2.0	342.0	342.0	343.0	1.0
E	8,965	1,268	2,091	1.8	347.2	347.2	348.2	1.0
F	11,497	510	863	2.6	357.4	357.4	358.4	1.0
G	14,020	190	660	2.6	367.0	367.0	367.9	0.9

[1]Distance above confluence with Island Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

CHAMPION CREEK

FLOODING SOURCE		FLOODWAY			BASE 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
Crooked Creek								
A	3,982	98	352	4.1	375.9	375.9	376.0	0.1
B	4,974	86	315	4.6	378.4	378.4	378.8	0.4
C	9,633	39	245	3.6	396.8	396.8	396.8	0.0
D	10,617	52	242	3.6	402.1	402.1	402.1	0.0

[1]Feet above confluence with Perkins Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOODWAY DATA

CROOKED CREEK

FLOODING SOURCE		FLOODWAY			BASE 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
Cross Creek								
A	4,171	34	349	2.8	332.6	332.6	332.6	0.0
B	6,080	76	444	2.2	334.9	334.9	335.0	0.1
C	7,280	98	416	2.0	335.9	335.9	336.4	0.5
D	8,412	34	138	5.9	337.8	337.8	337.9	0.1
E	8,944	50	218	3.7	340.4	340.4	340.6	0.2

[1]Feet above a point 1440 feet downstream of Mallory Street

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

CROSS CREEK, KY
AND INCORPORATED AREAS

FLOODWAY DATA

CROSS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Massac Creek								
A	27,830	1,058	3,348	3.4	337.5	336.9[2]	337.9[2]	1.0
B	29,750	1,442	5,407	2.1	340.3	340.3	341.0	0.7
C	31,780	843	4,029	2.8	342.0	342.0	342.8	0.8
D	35,581	557	2,165	5.2	347.2	347.2	348.0	0.8
E	37,616	1,228	5,747	2.0	350.3	350.3	351.3	1.0
F	39,486	903	3,402	3.3	351.2	351.2	352.2	1.0
G	42,191	795	3,248	2.1	355.9	355.9	356.9	1.0
H	49,276	1,105	3,221	2.1	366.3	366.3	367.2	0.9
I	51,676	1,120	4,110	1.7	369.8	369.8	370.7	0.9
J	53,991	901	3,968	1.7	373.8	373.8	374.7	0.9
K	54,861	414	2,154	3.2	375.7	375.7	376.7	1.0
L	56,796	1,116	7,568	0.8	381.1	381.1	382.0	0.9
M	58,186	925	3,111	1.9	383.4	383.4	384.4	1.0

[1] Feet above confluence with Ohio River
[2] Water-surface elevation computed without consideration of backwater effects from Ohio River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

MASSAC CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Middle Fork Massac Creek								
A	2,541	850	2,092	3.0	354.2	353.7[2]	354.2[2]	0.5
B	4,571	86	3,942	1.6	357.0	357.0	357.6	0.6
C	6,820	398	2,302	2.8	361.7	361.4	362.4	1.0
D	11,201	1,215	5,326	1.2	371.8	371.8	372.7	0.9
E	12,861	837	2,889	2.2	373.8	373.8	374.8	1.0
F	13,901	982	3,399	1.9	376.3	376.3	377.3	1.0
G	18,571	99	909	5.5	387.1	387.1	387.7	0.6
H	20,460	561	2,207	0.8	390.9	390.9	391.7	0.8
I	21,350	298	641	2.9	392.3	392.3	392.9	0.6
J	22,450	356	903	2.0	397.3	397.3	397.9	0.6
K	24,080	32	259	7.1	404.1	404.1	404.5	0.4
L	25,830	51	379	4.8	411.2	411.2	411.7	0.5

[1]Feet above confluence with Massac Creek
[2]Water-surface elevation computed without considering backwater effects from Massac Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

MIDDLE FORK MASSAC CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)[2]	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Ohio River								
A	956.00	6,372/4,074	298,830	4.3	334.5	334.5	335.4	0.9
B	955.00	6,280/5,828	291,361	4.4	334.7	334.7	335.6	0.9
C	954.00	6,453/6,125	278,525	4.6	334.8	334.8	335.7	0.9
D	953.00	6,000/5,974	257,736	5	335.0	335.0	335.9	0.9
E	952.00	4,982/4,907	251,786	5.1	335.3	335.3	336.2	0.9
F	951.00	5,000/4,837	249,137	5.1	335.6	335.6	336.4	0.8
G	950.00	4,813/4,330	251,842	5.1	335.8	335.8	336.7	0.9
H	949.00	4,753/4,460	261,912	4.9	336.1	336.1	337.0	0.9
I	948.00	4,535/4.140	251,078	5.1	336.3	336.3	337.2	0.9
J	947.00	4,210/3,486	242,576	5.3	336.5	336.5	337.4	0.9
K	946.00	4,354/3,106	252,292	5.1	336.8	336.8	337.7	0.9
L	945.00	3,690/3,035	226,667	5.6	336.9	336.9	337.9	1.0
M	944.11	2,810	203,597	6.3	337.1	337.1	338.0	0.9
N	943.00	4,745/4,627	231,692	5.5	337.3	337.3	338.2	0.9
O	942.00	5,000/4,253	257,071	5	337.8	337.8	338.7	0.9
P	941.00	5,000/4,839	262,536	4.9	338.0	338.0	338.9	0.9
Q	940.00	5,250/4,972	265,159	4.8	338.2	338.2	339.1	0.9
R	939.00	4,594/4,436	254,493	5	338.4	338.4	339.3	0.9
S	938.00	4,942/4,339	238,653	5.3	338.7	338.7	339.7	1.0
T	937.00	5,909/4,942	283,921	4.5	339.1	339.1	340.1	1.0
U	936.00	7,112/4,108	300,173	4.3	339.3	339.3	340.3	1.0

[1]Stream distance in miles below Pittsburgh
[2]Width/width within County

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET) [2]	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
V	935.00	7,832/3,649	311,095	4.1	339.5	339.5	340.5	1.0
W	933.90	12,004/4,168	347,520	3.4	339.7	339.7	340.6	0.9
X	932.90	14,636/2,982	395,499	3	340.2	340.2	341.1	0.9

[1]Stream distance in miles below Pittsburgh
[2]Width/width within County

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			BASE 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
Perkins Creek								
A	27,618	162	813	4.6	342.1	342.1	342.3	0.2
B	35,436	120	700	5.1	353.8	353.8	354.5	0.7
C	37,392	86	681	4.7	359.4	359.4	359.5	0.1
D	39,811	127	864	3.6	361.9	361.9	362.9	1.0
E	45,311	58	250	4.6	372.8	372.8	373.0	0.2
F	48,279	42	195	5.9	380.6	380.6	380.6	0.0
G	50,047	61	229	3.5	386.8	386.8	387.2	0.4
H	52,398	58	190	4.3	396.2	396.2	396.3	0.1

[1]Feet above confluence with Ohio River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOODWAY DATA

PERKINS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET) [2]	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tennessee River								
A	3.1	6,000/2,324	176,490	2.9	340.5	339.5[3]	340.3	0.8
B	5.3	2,830/700	112,046	4.6	340.7	339.7[3]	340.6	0.9
C	7.8	3,820/1,011	130,380	4.0	341.1	340.5[3]	341.3	0.8

[1]Stream distance in miles above confluence with Ohio River
[2]Width/width within County
[3]Elevation computed without consideration of overflow effects from Ohio River

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

TENNESSEE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
West Fork Massac Creek								
A	7,400	313	1,867	5.0	340.5	340.5	340.8	0.3
B	7,675	448	1,473	6.1	341.5	341.5	342.1	0.6
C	10,480	772	3,407	2.6	345.8	345.8	346.3	0.5
D	12,640	940	3,725	2.4	348.2	348.2	349.1	0.9
E	14,606	864	2,570	3.5	351.6	351.6	352.5	0.9
F	16,355	710	4,410	1.4	353.7	353.7	354.6	0.9
G	18,279	168	951	6.5	356.7	356.7	357.2	0.5
H	20,654	886	3,179	2.4	362.2	362.2	362.9	0.7
I	23,579	361	2,024	3.8	367.1	367.1	367.9	0.8
J	27,079	1,374	4,139	1.8	372.1	372.1	373.0	0.9
K	30,309	1,036	3,919	1.6	377.1	377.1	378.0	0.9
L	32,809	535	1,678	2.3	379.4	379.4	380.0	0.6
M	33,749	1,240	4,812	0.8	381.9	381.9	382.6	0.7
N	35,439	524	1,776	2.2	384.8	384.8	385.6	0.8
O	36,589	849	3,211	1.2	387.6	387.6	388.5	0.9
P	38,849	290	719	5.5	390.4	390.4	391.0	0.6
Q	41,373	344	1,295	2.5	398.8	398.8	399.6	0.8
R	43,677	728	1,351	2.4	404.0	404.0	404.7	0.7
S	45,978	162	708	4.6	410.8	410.8	411.5	0.7
T	48,564	42	368	6.1	416.6	416.6	417.5	0.9
U	50,784	121	557	4.0	426.5	426.5	427.3	0.8
V	52,924	39	279	4.6	432.7	432.7	433.2	0.5

[1]Distance above confluence with Massac Creek

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

FLOODWAY DATA

WEST FORK MASSAC CREEK

5.0 INSURANCE APPLICATION

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 rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base (1-percent-annual-chance) flood elevations (BFEs) or 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 rate 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 (sq. mi.), and areas protected from the base flood by levees. No BFEs or 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 rate 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 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 countywide FIRM presents flooding information for the entire geographic area of McCracken County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 5, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Paducah, City of	June 13, 1975	None	April 15, 1980	February 12, 1982
McCracken County (Unincorporated Areas)	December 6, 1974	June 24, 1977	June 4, 1980	None

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the 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 Federal Insurance and Mitigation Division, FEMA Region IV, Koger-Center - Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To ensure that any user is aware of all revisions, it is advisable to contact the map repository of flood hazard data located in the community.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Geological Survey, 7.5 Minute Series (Topographic) Maps, Scale: 1:24,000. The National Elevation Dataset (NED) 1/3 Arc Second is a raster product assembled by the U.S. Geological Survey (USGS). NED 1/3 Arc Second is designed to provide National elevation data in a seamless form with a consistent datum, elevation unit, and projection. Data corrections are made in the NED 1/3 Arc Second assembly process to minimize, but not eliminate, artifacts, perform edge matching, and fill sliver areas of missing data. NED 1/3 Arc Second has a resolution of 1/3 arc-second (approximately 10 meters). Projection is geographic, horizontal datum is NAD83 and vertical datum is NAVD88. 2004.

2. 2-foot contours, scale 1” = 200’ (McCracken County). Horizontal datum is NAD83, Geoid Model is GEOID03, US Feet, and vertical datum is NAVD88.

3. MyKentuckyGenealogy
http://www.mykentuckygenealogy.com/ky_county/hi.htm

4. Cabinet for Economic Development, Kentucky Quick Facts.
http://www.thinkkentucky.com. Last updated July 28, 2008.

5. U.S. Geological Survey, Technique for Estimating Magnitude and Frequency of Floods in Kentucky, Water Resources Investigations 76-62, Nov. 1976.

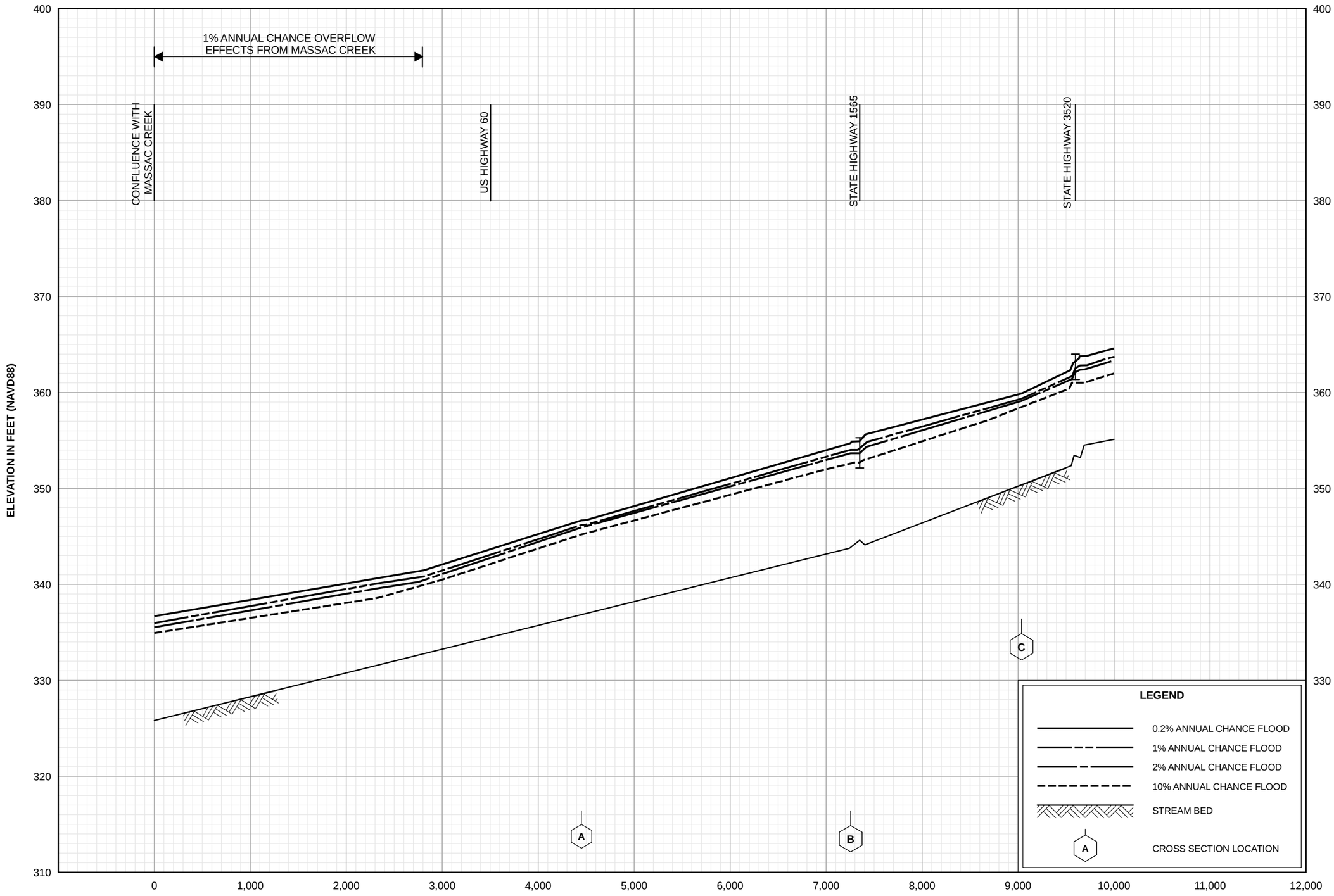
6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, "River Analysis System," HEC-RAS, Version 3.1.2 Computer Program, revised April 2004.

7. U.S Geological Survey, “Technique for Estimating Magnitude and Frequency of Floods in Kentucky,” Water Resources Investigation 76-62, November 1976.

8. U.S Army Corps of Engineers, Louisville District, Flood Plain Information-Ohio River and Tributaries-McCracken County, Kentucky, April 1968.

9. U.S. Army Corps of Engineers, Hydrologic Engineer Center, HEC-2 Water Surface Profiles, Davis, California, November 1976.

10. U.S. Army Corps of Engineers, Louisville District, Floodplain Information- Ohio River and Tributaries- McCracken County, Kentucky, April 1968.



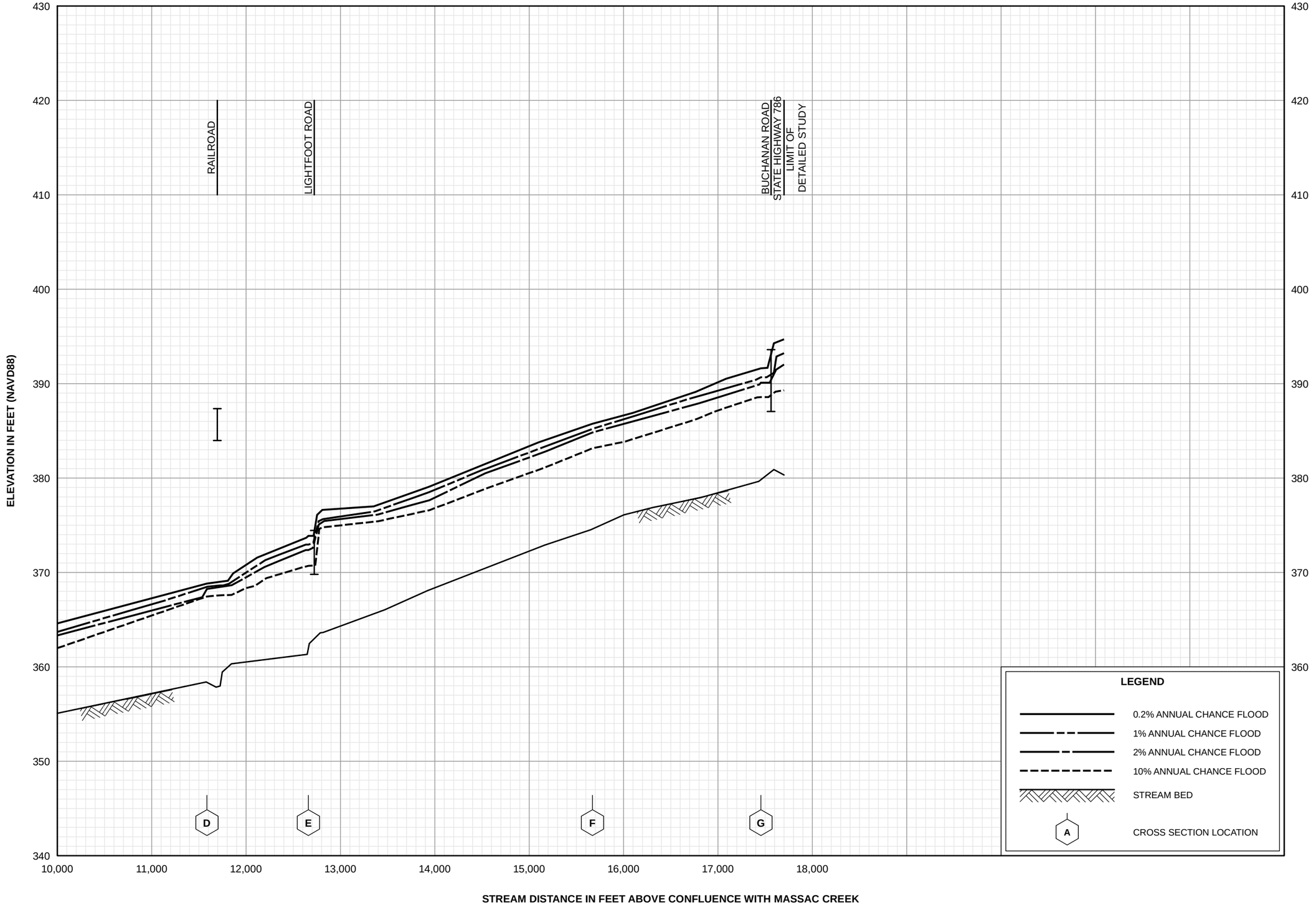
FLOOD PROFILES

BLACK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

01P



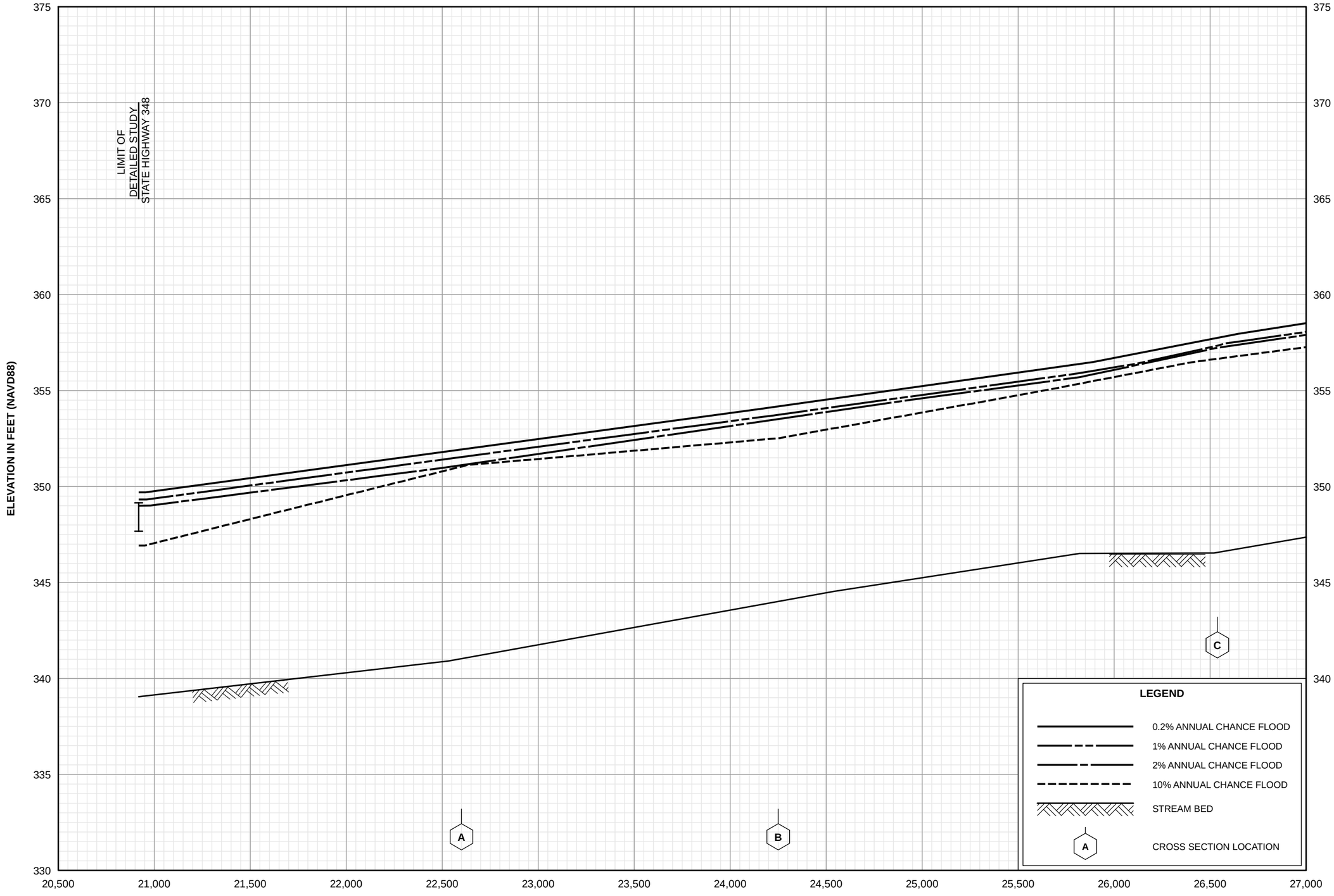
FLOOD PROFILES

BLACK BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

02P



ELEVATION IN FEET (NAVD88)

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH WEST FORK CLARKS RIVER

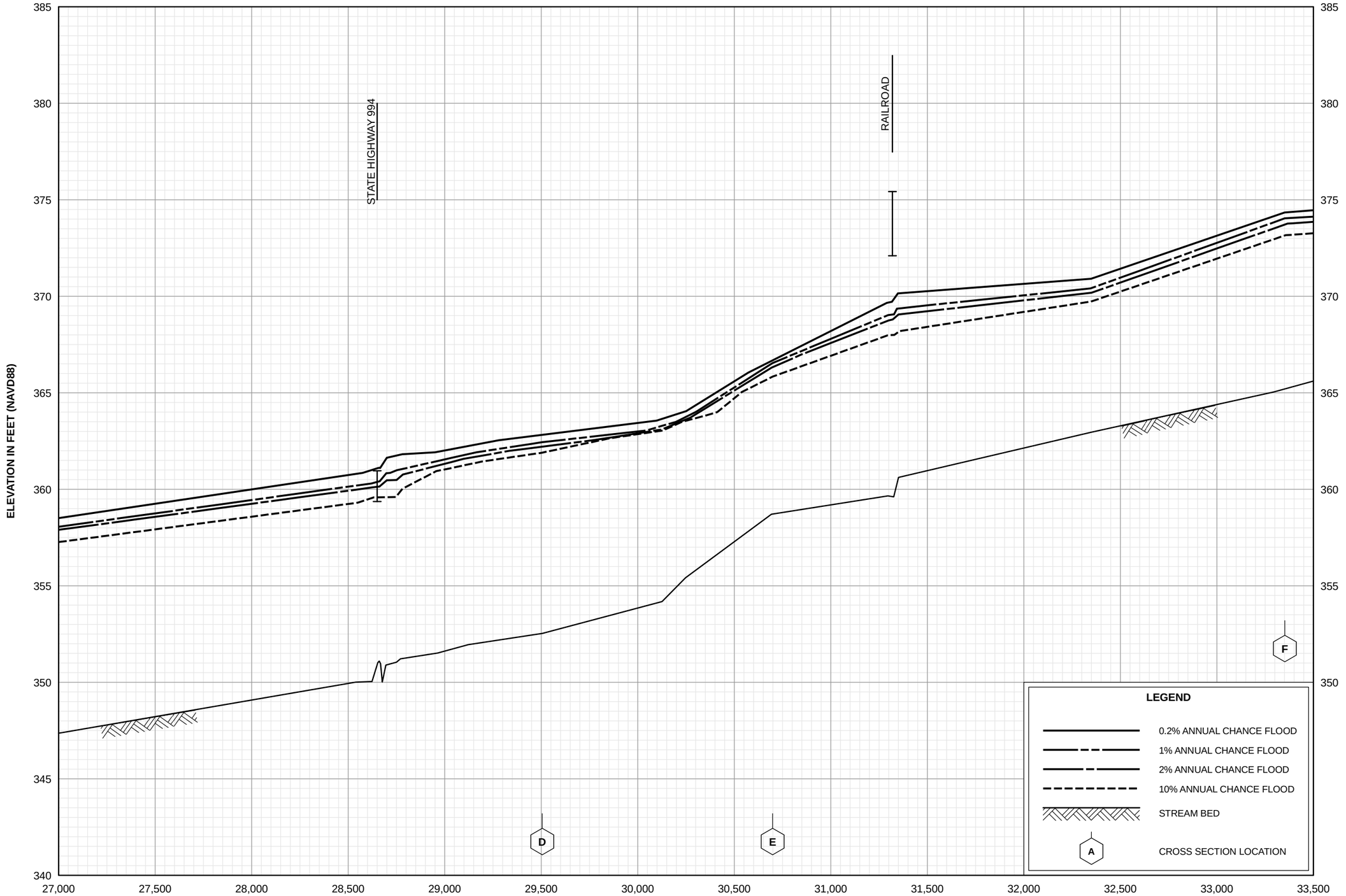
FLOOD PROFILES

CAMP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

03P



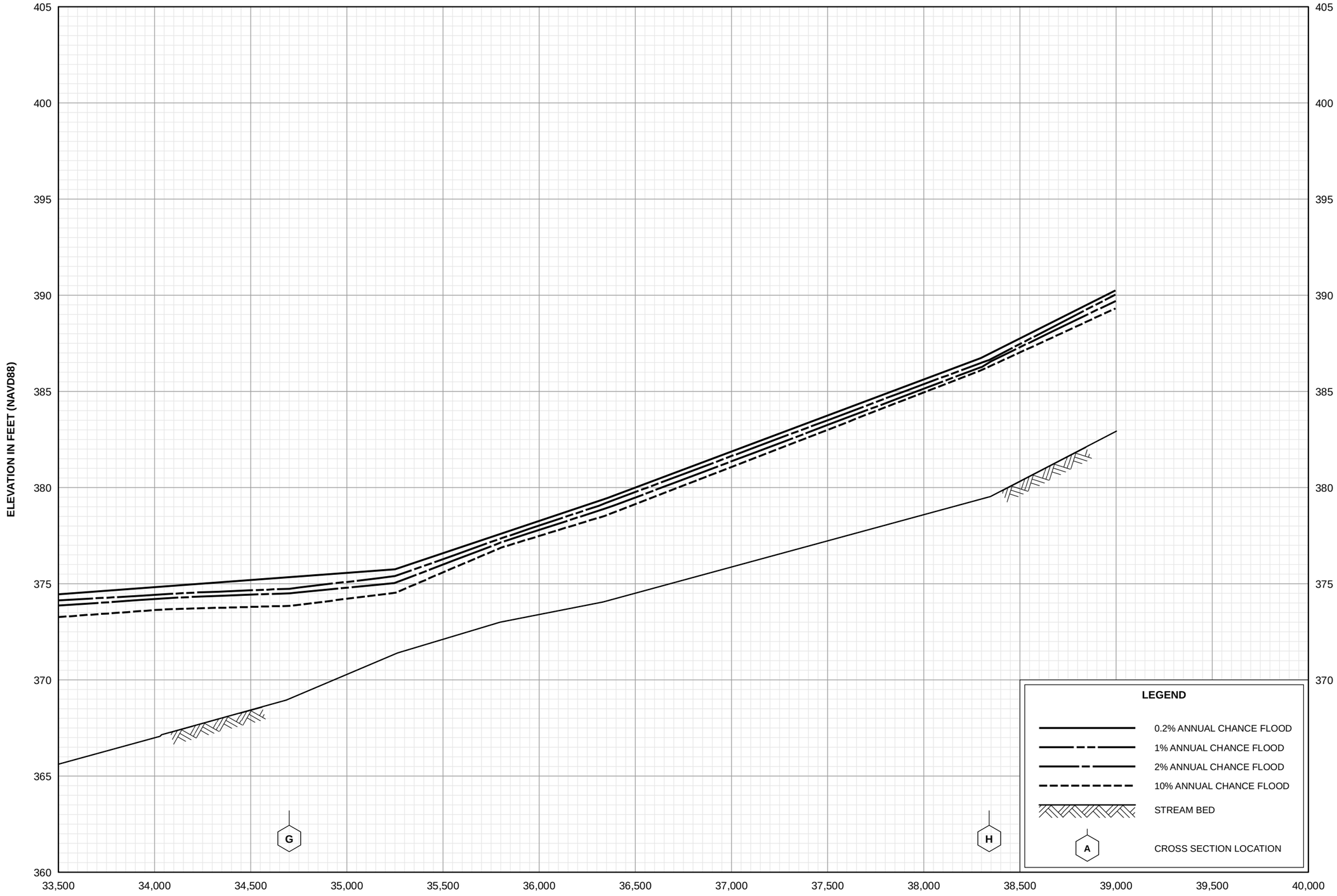
FLOOD PROFILES

CAMP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

04P

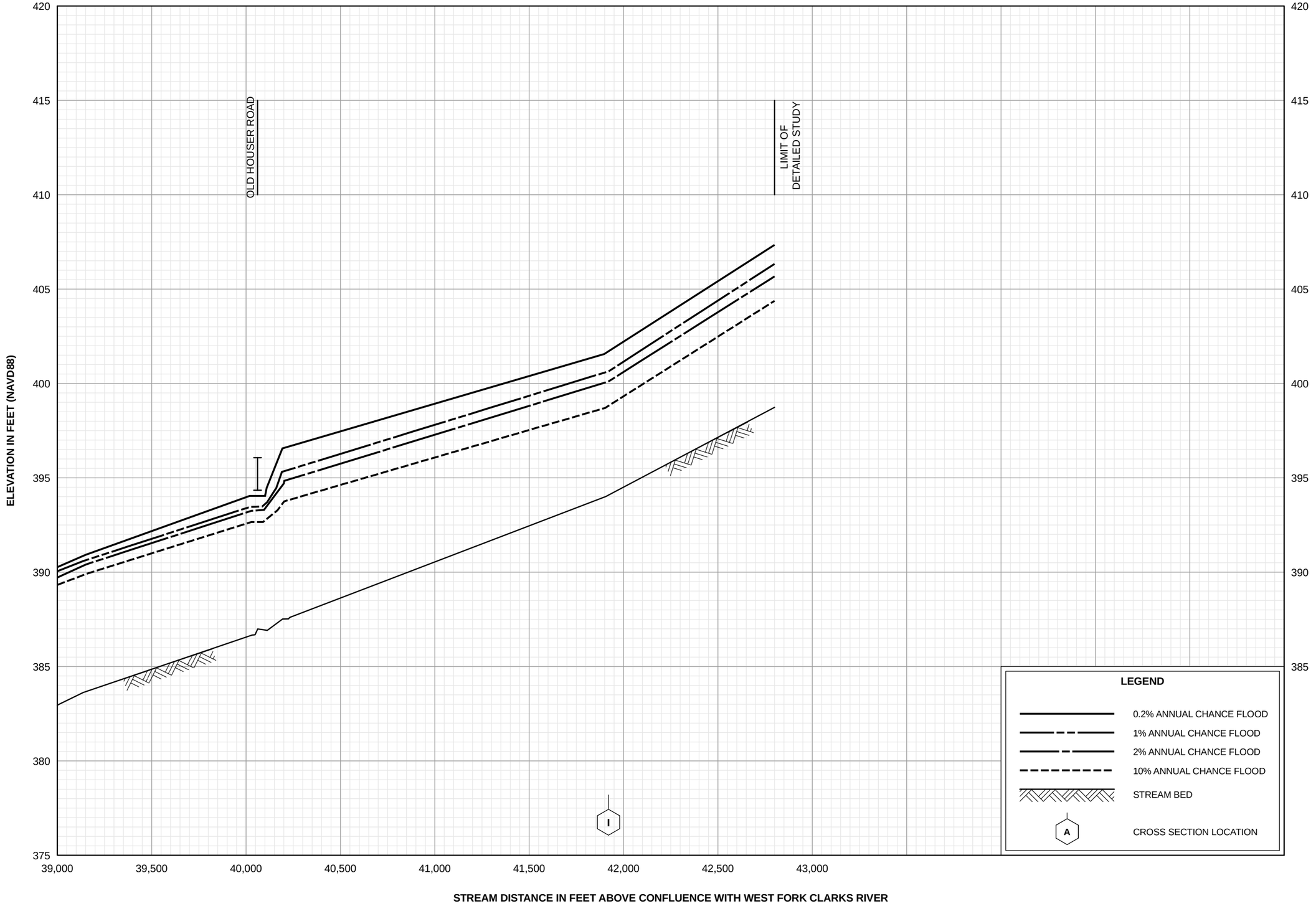


FLOOD PROFILES

CAMP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



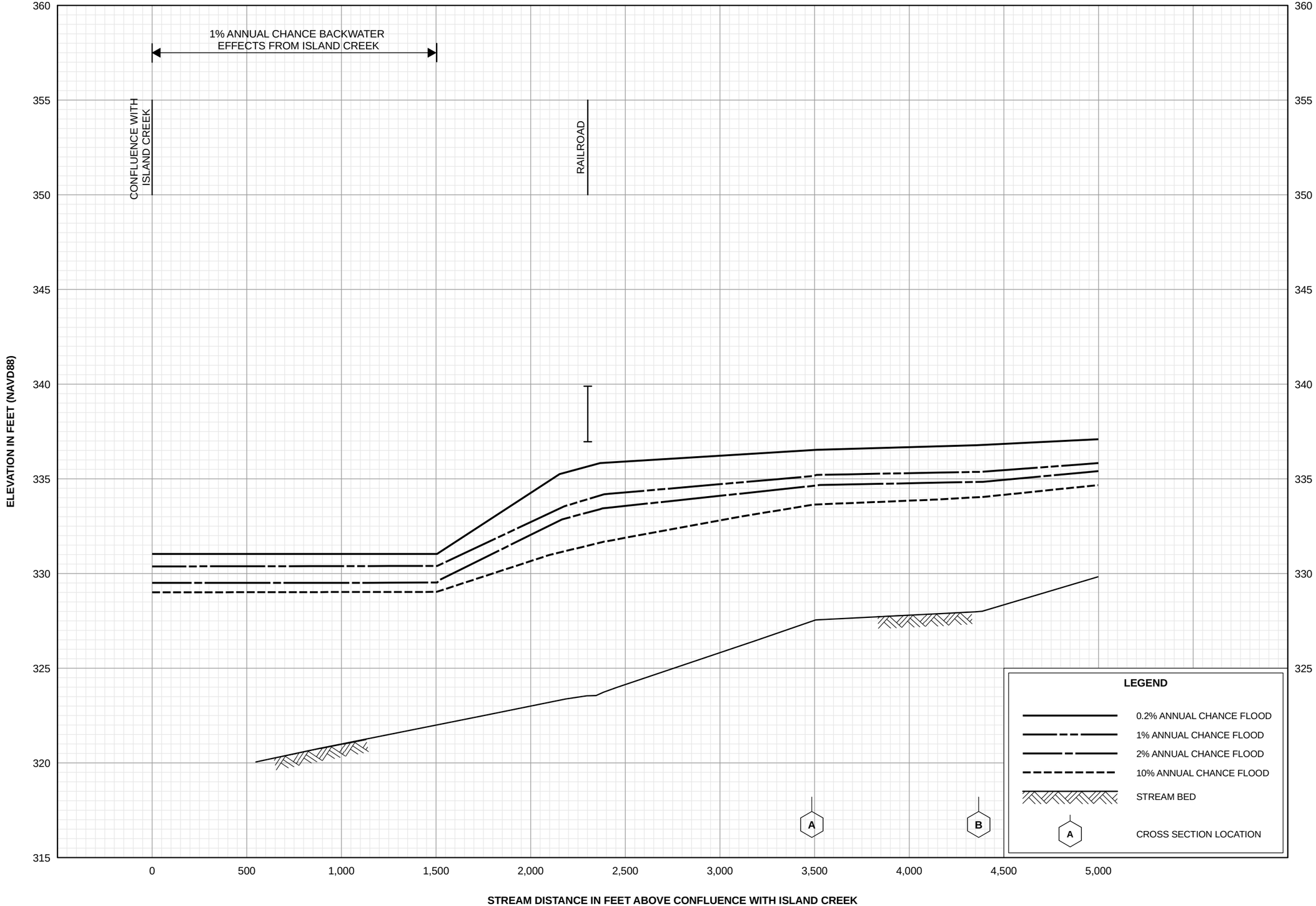
FLOOD PROFILES

CAMP CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

06P



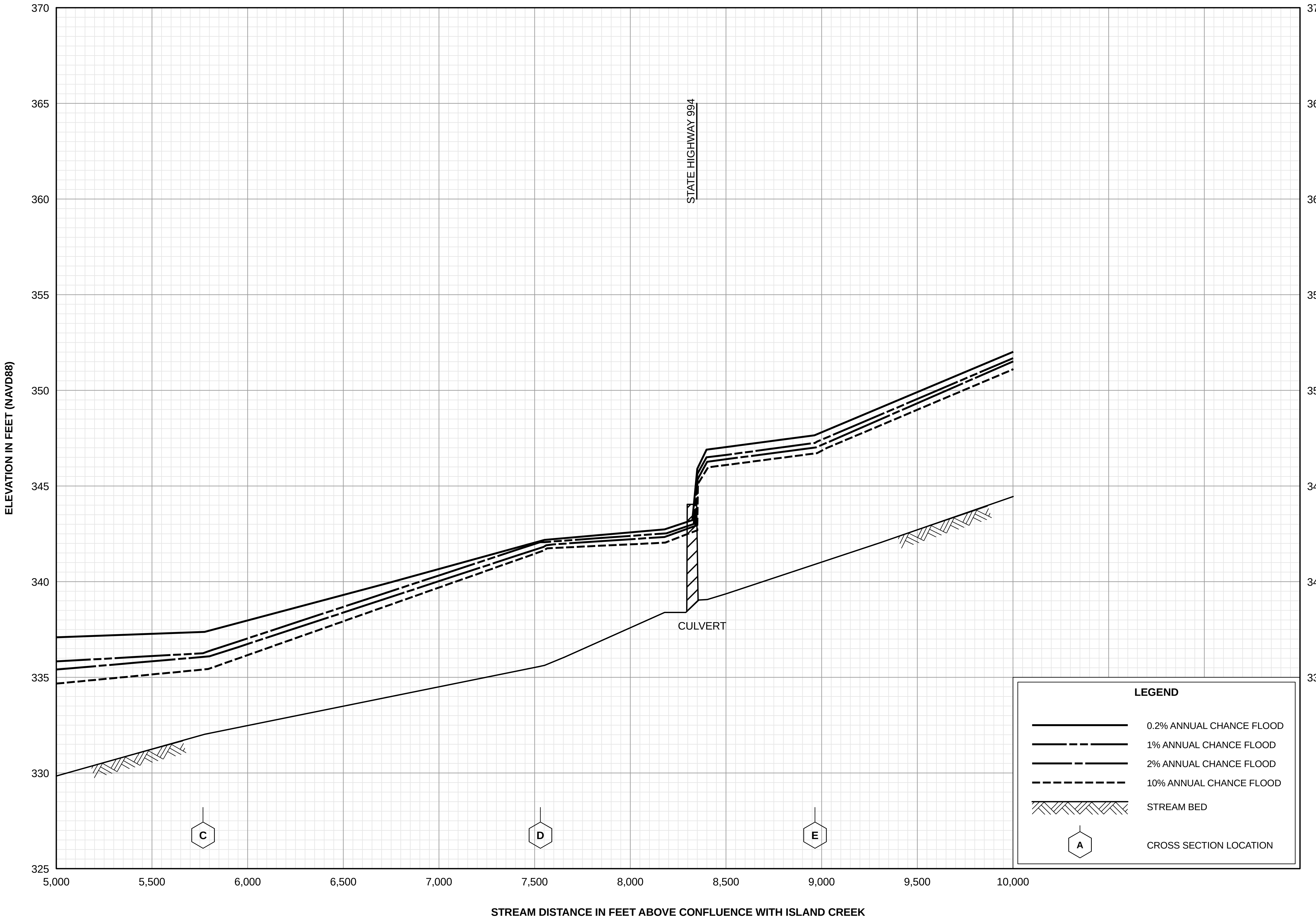
FLOOD PROFILES

CHAMPION CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

07P



FLOOD PROFILES

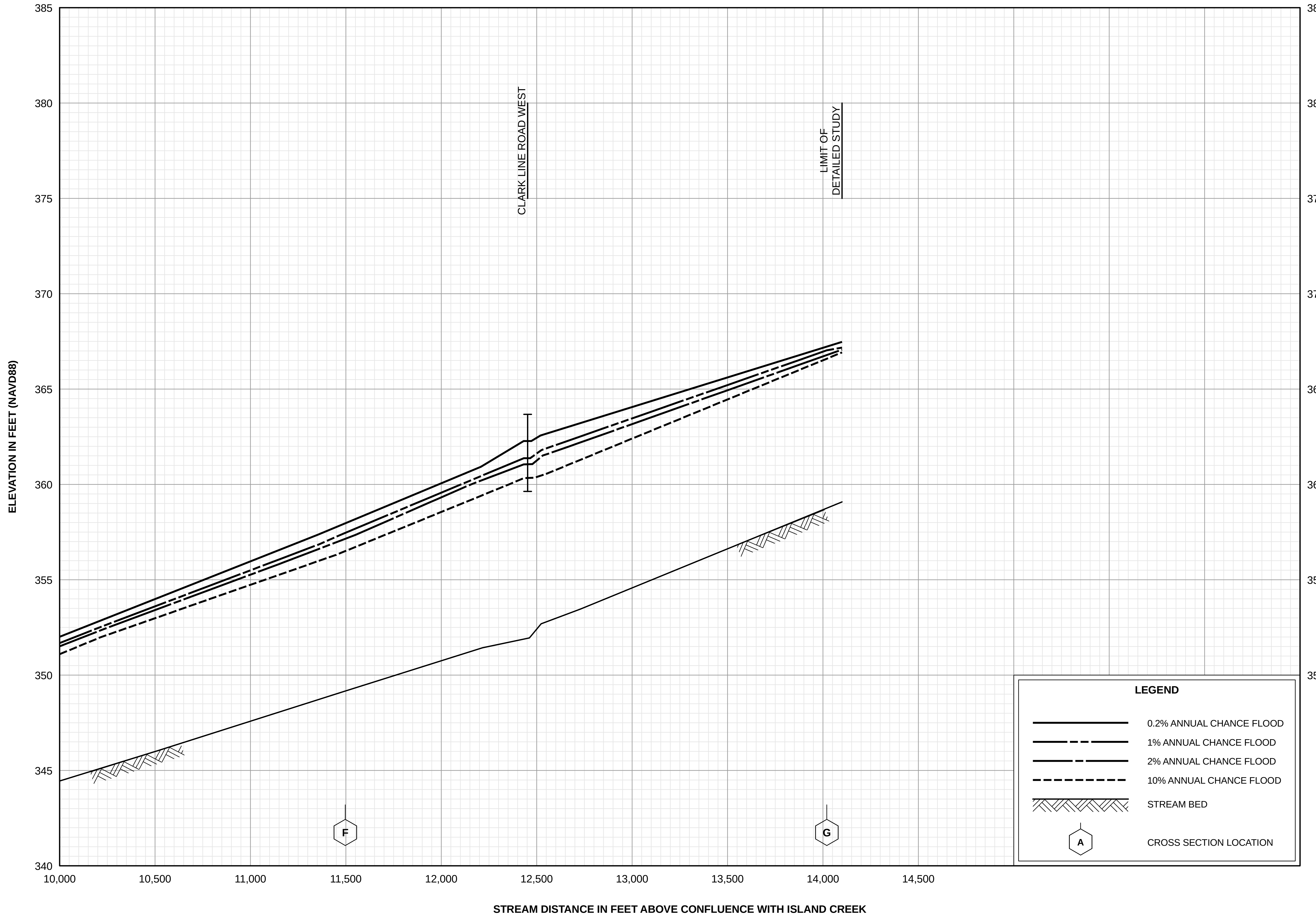
CHAMPION CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY

AND INCORPORATED AREAS

08P



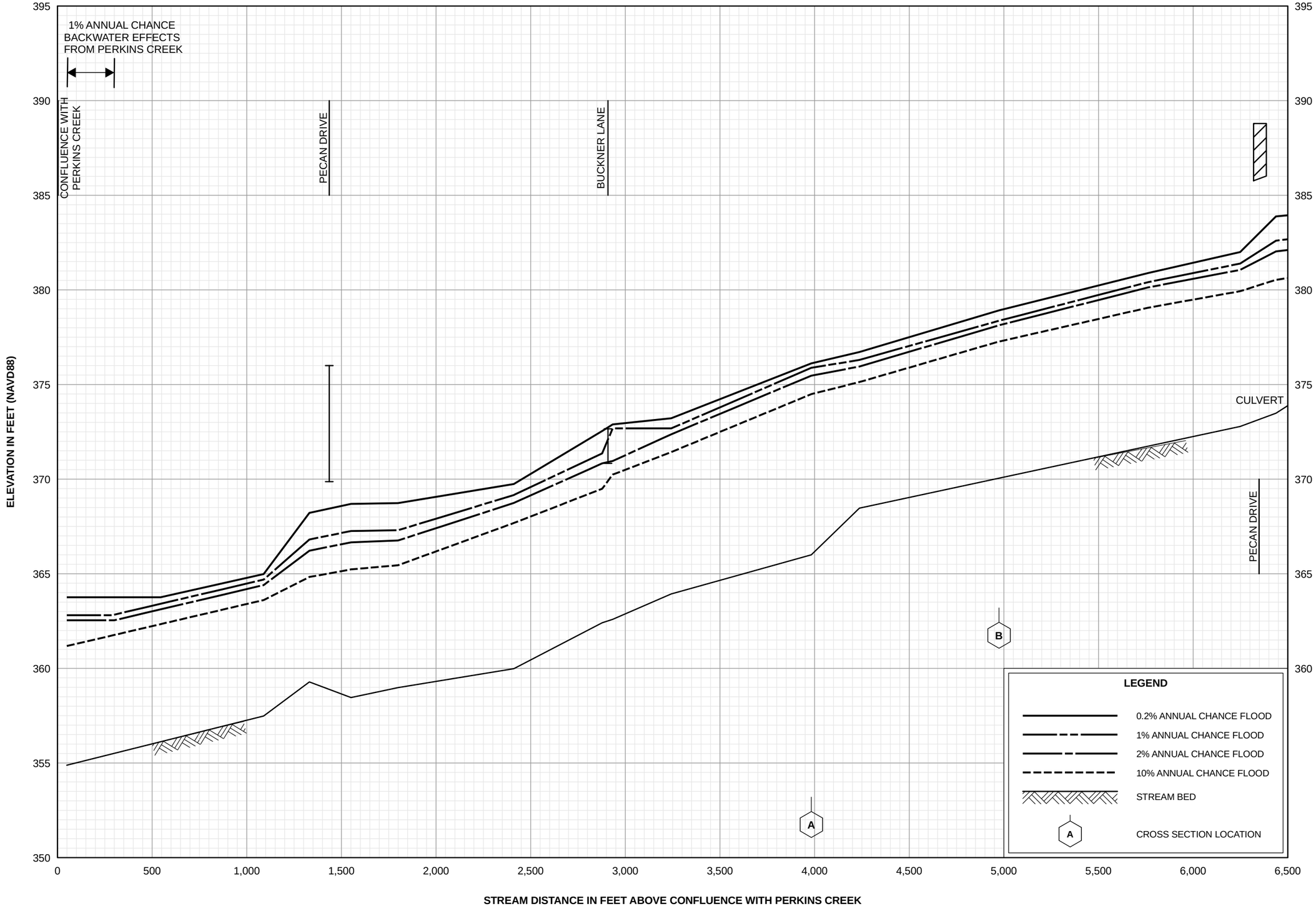
FLOOD PROFILES

CHAMPION CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

09P



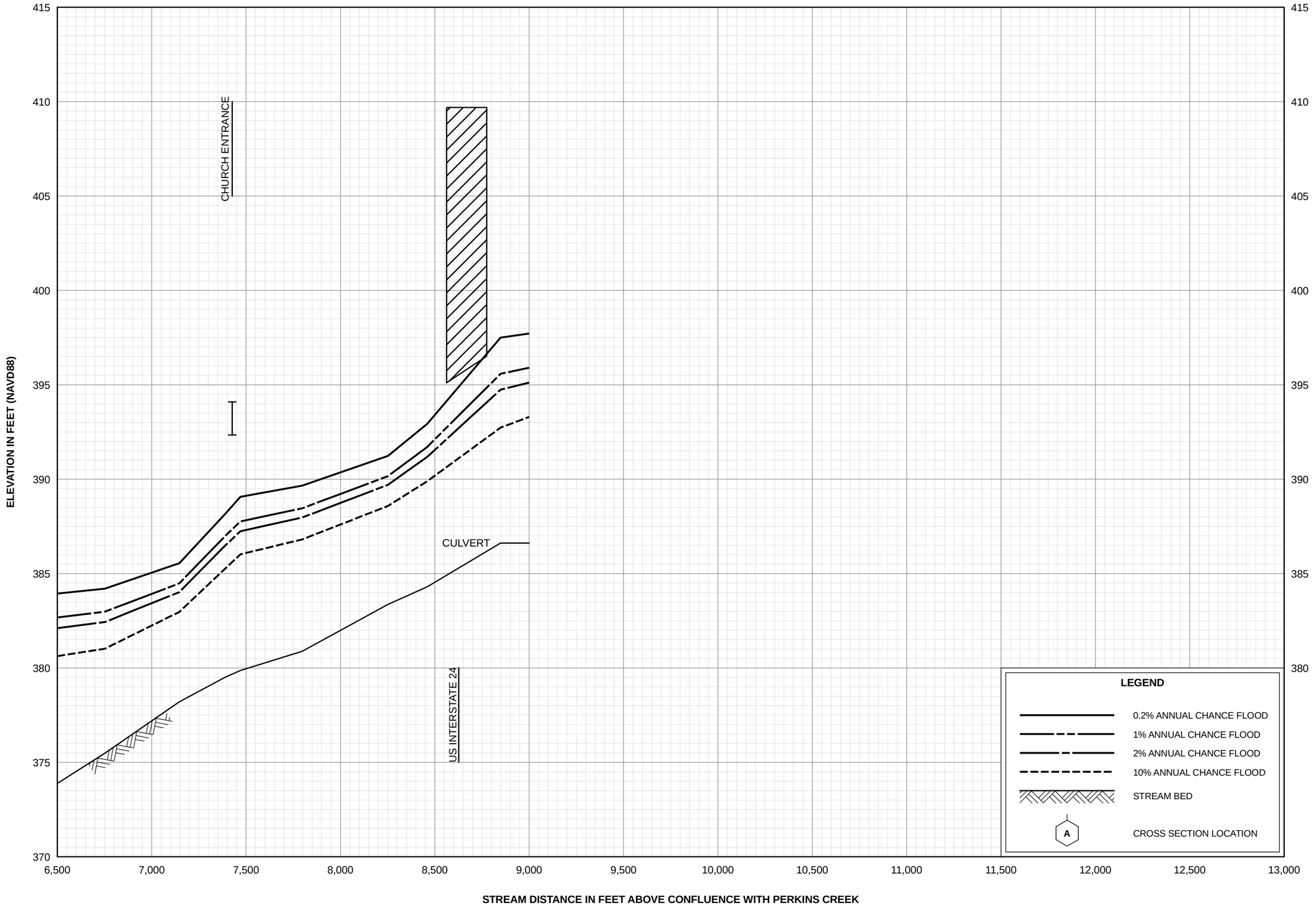
FLOOD PROFILES

CROOKED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

10P



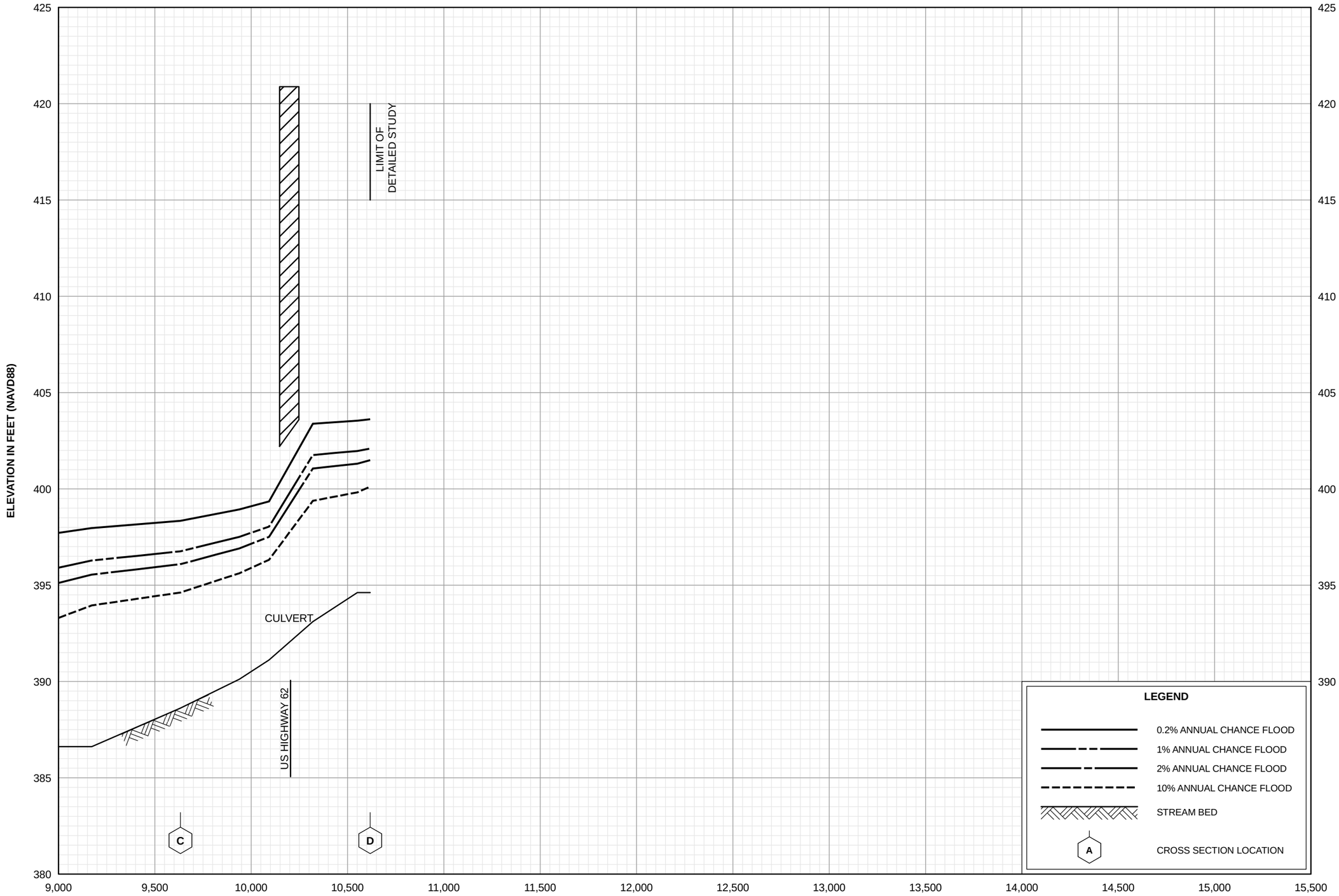
FLOOD PROFILES

CROOKED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

11P

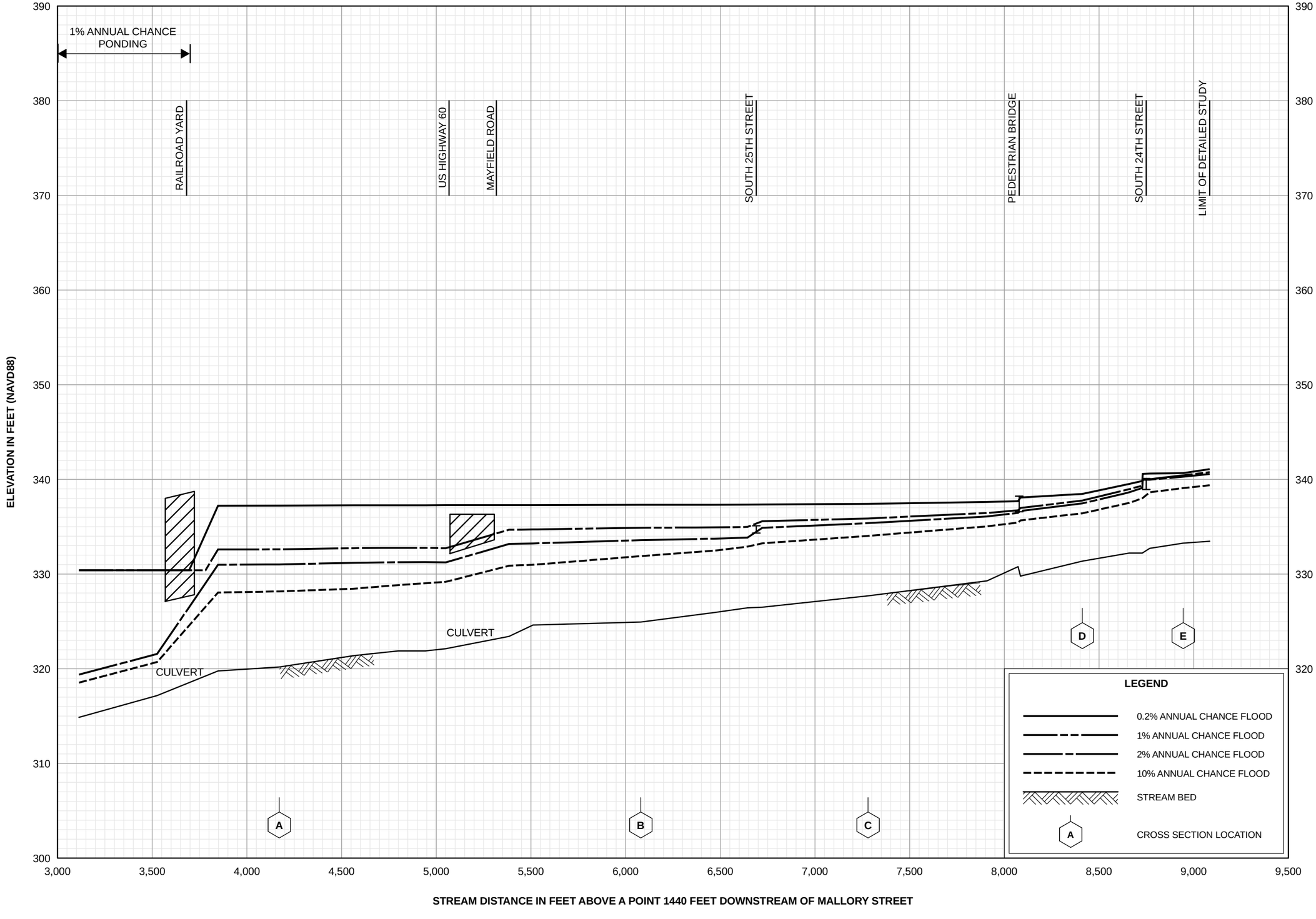


FLOOD PROFILES

CROOKED CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



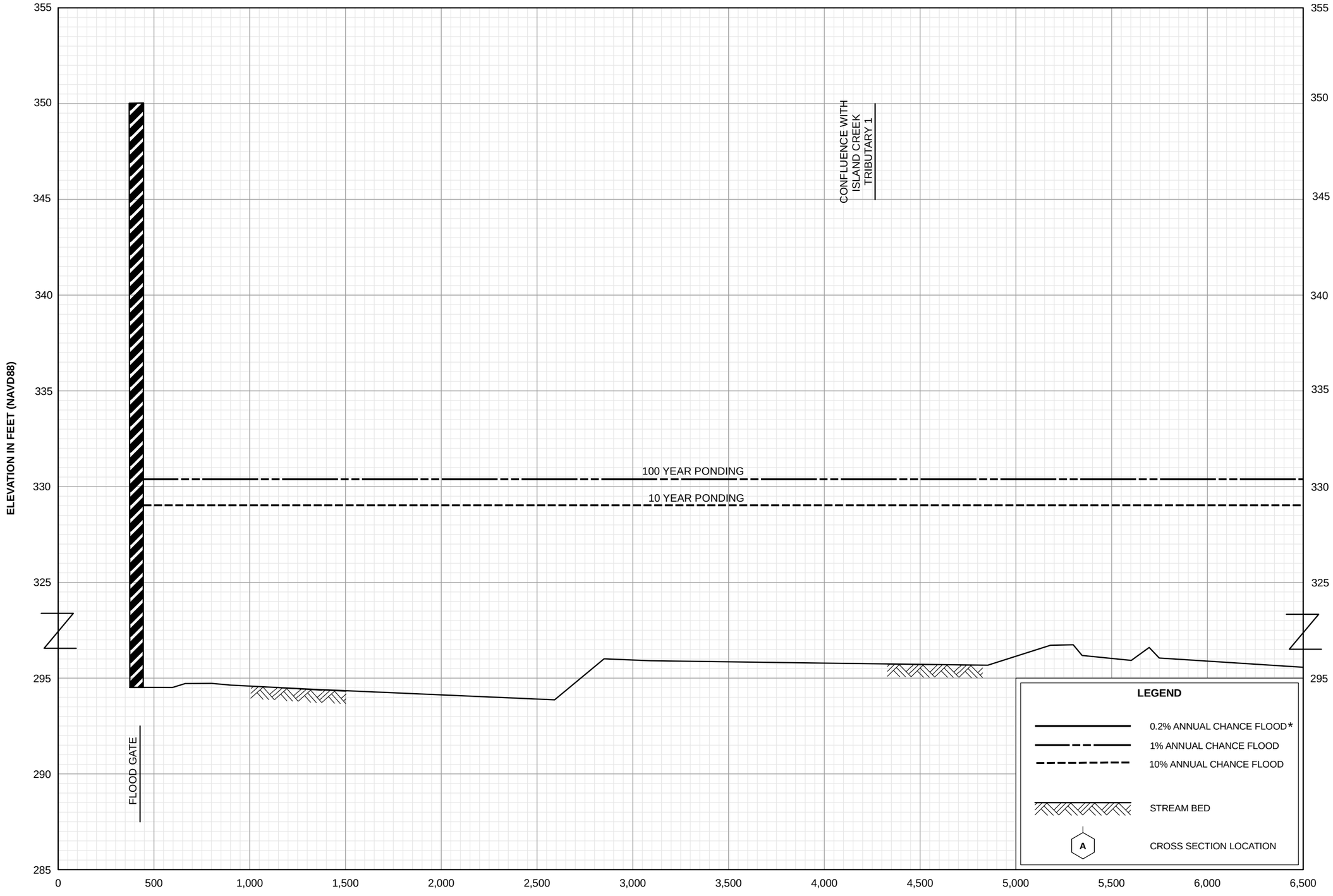
FLOOD PROFILES

CROSS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

13P



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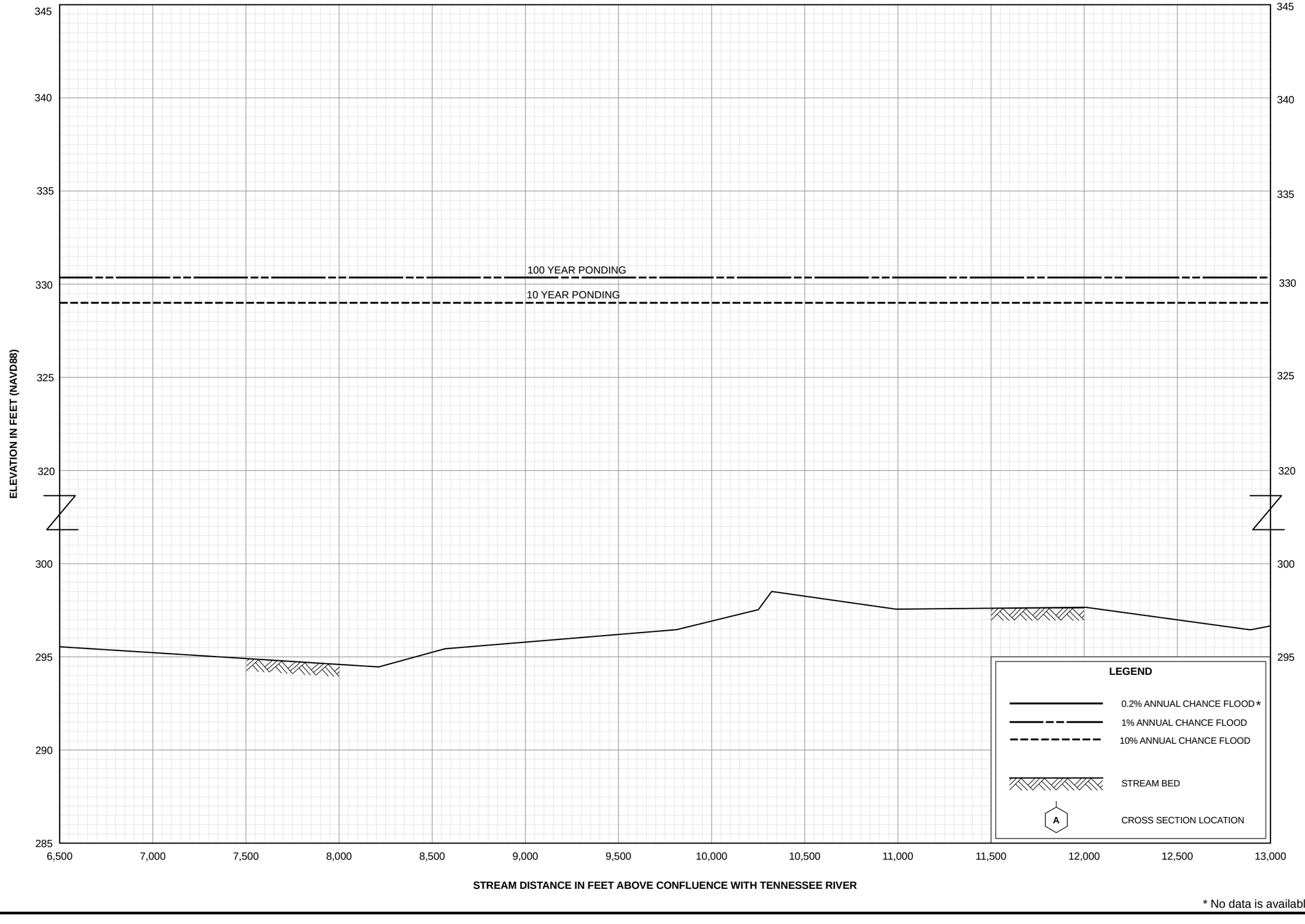
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



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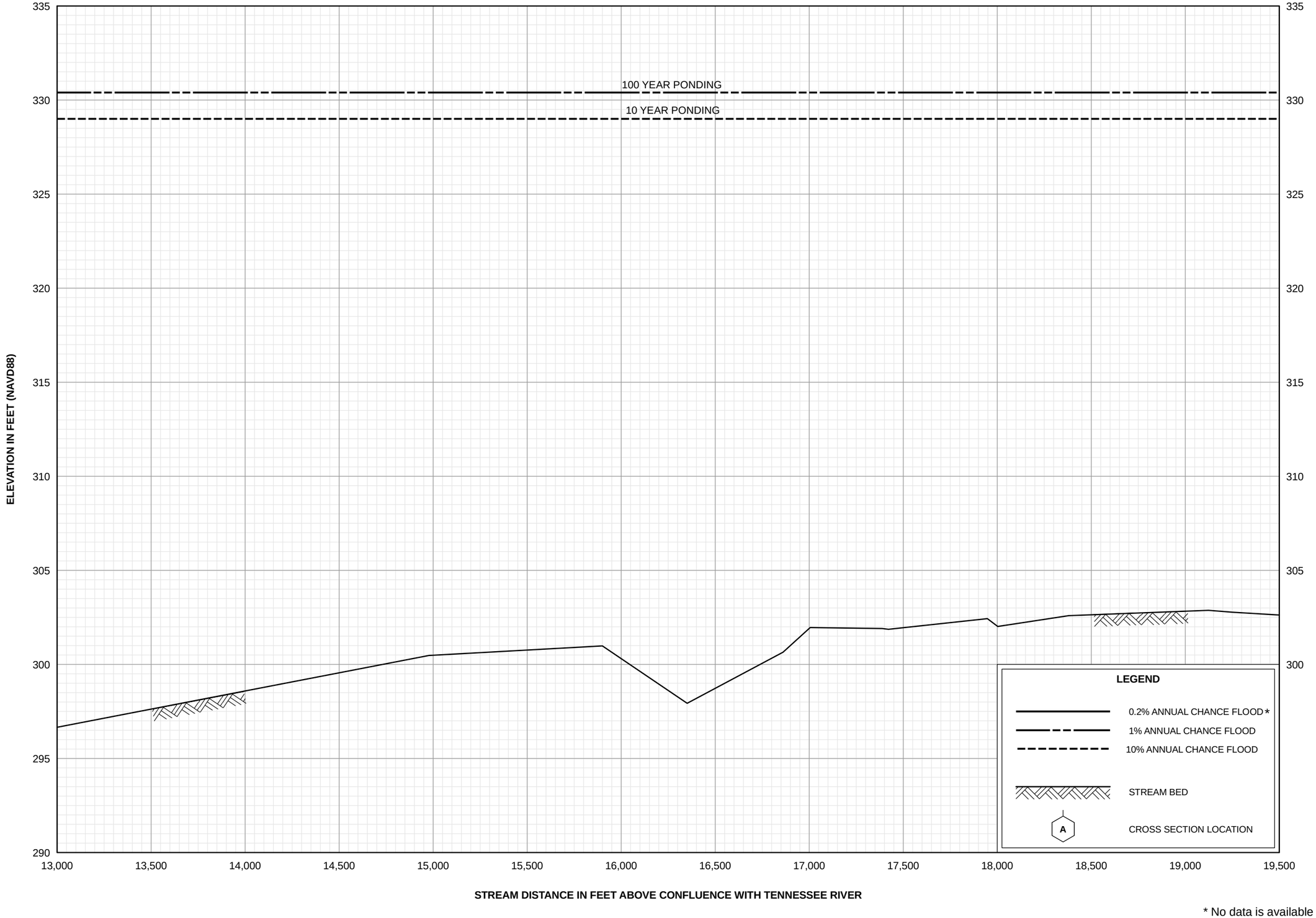
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

15P



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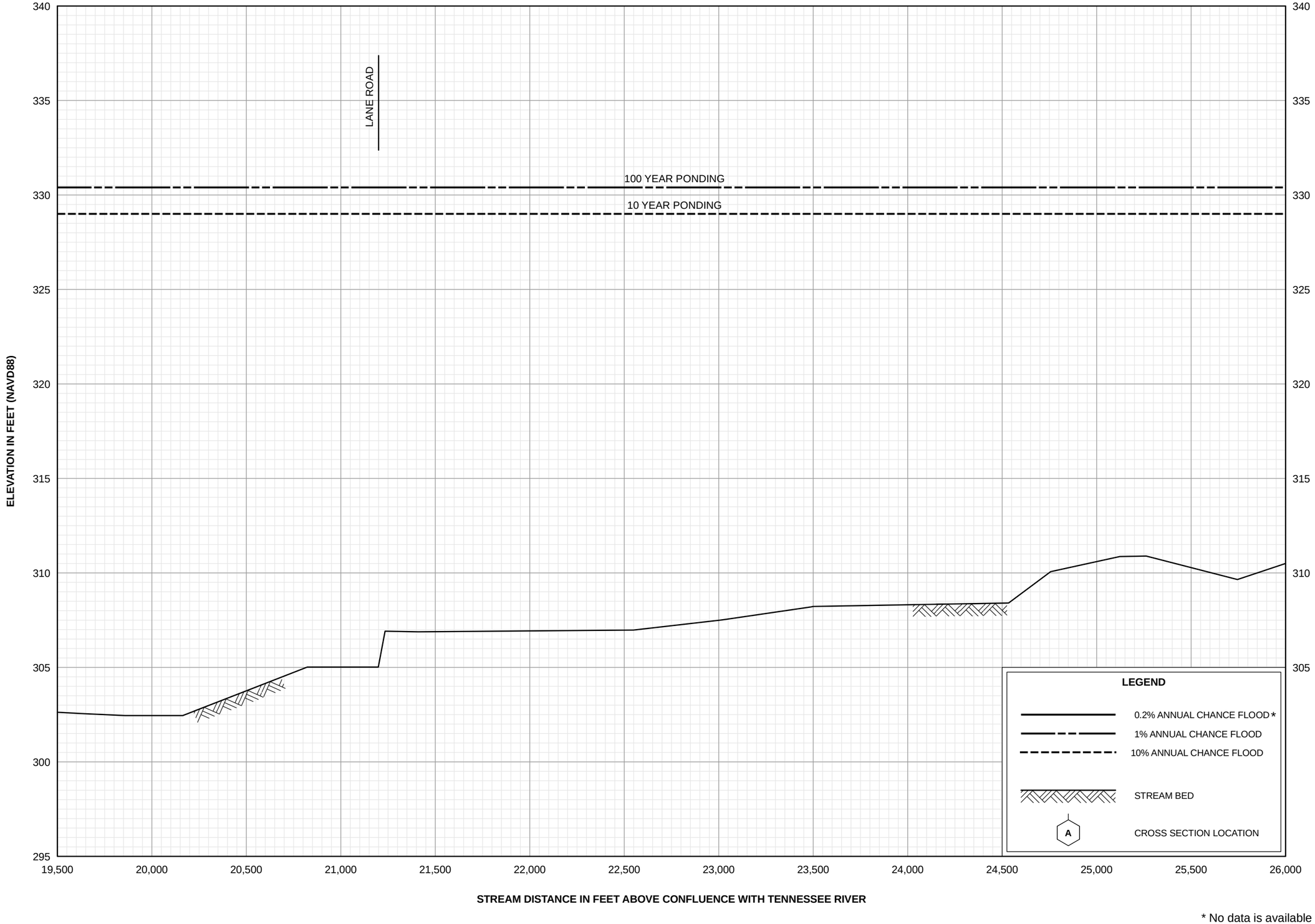
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

16P



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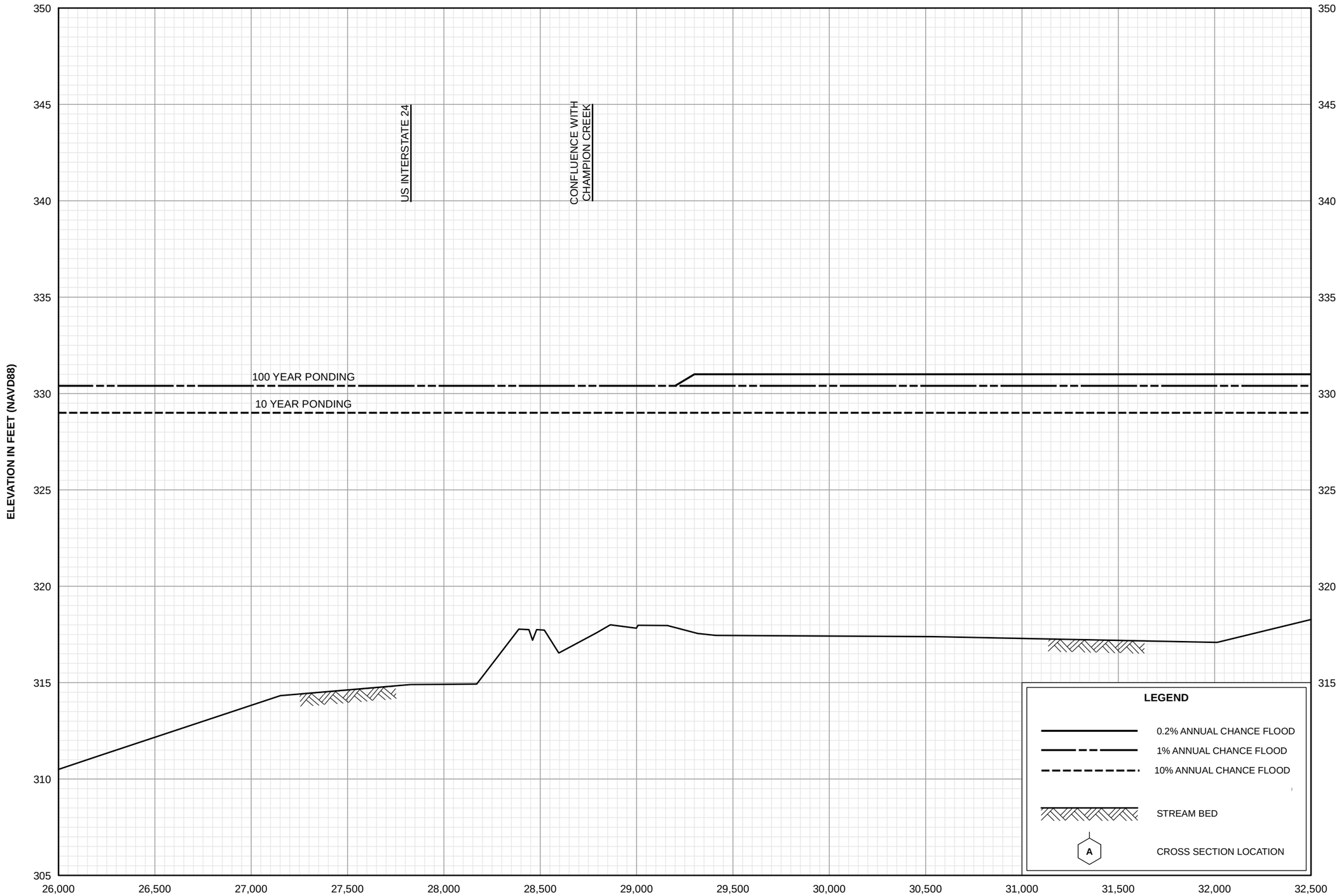
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

17P



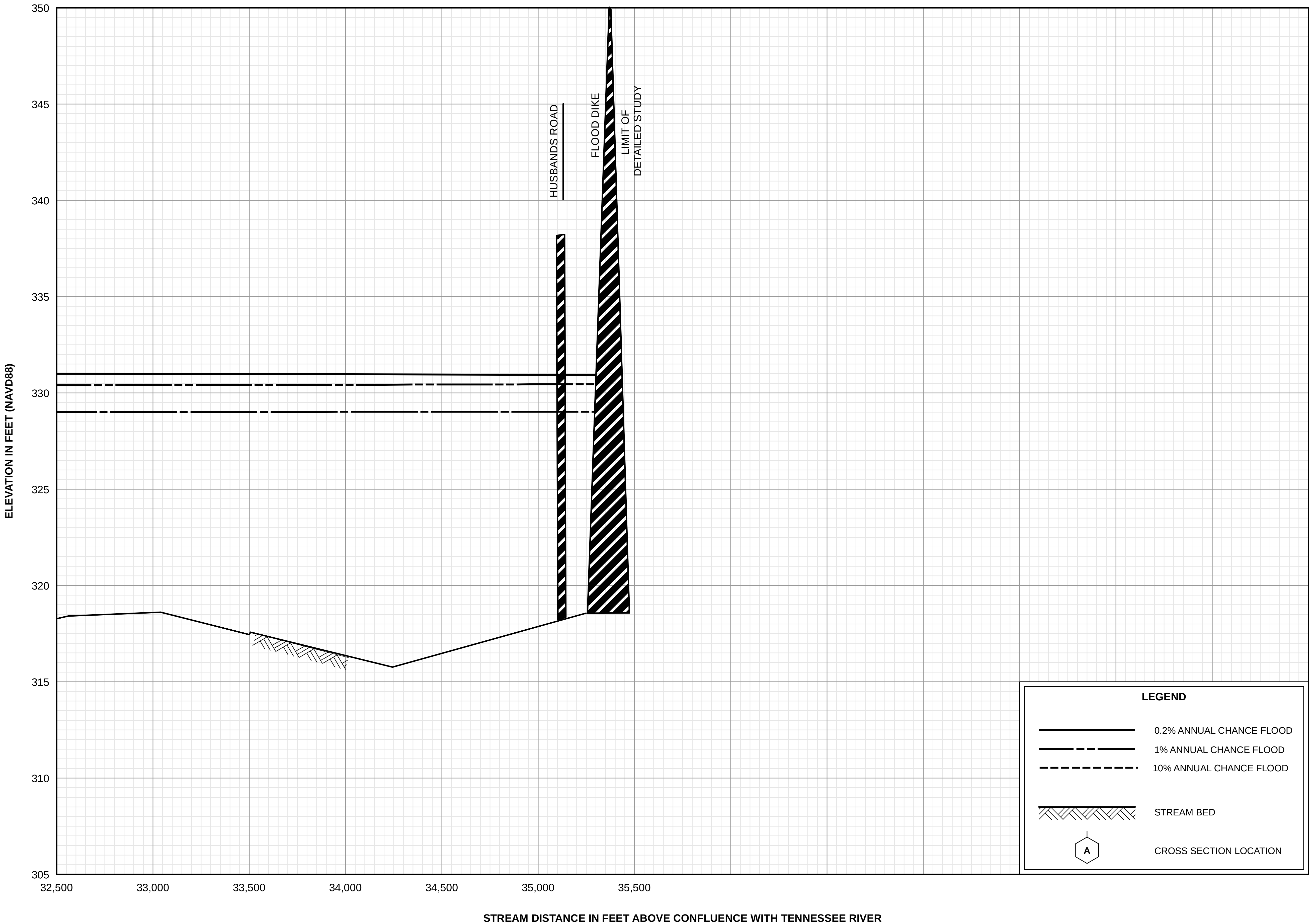
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

18P



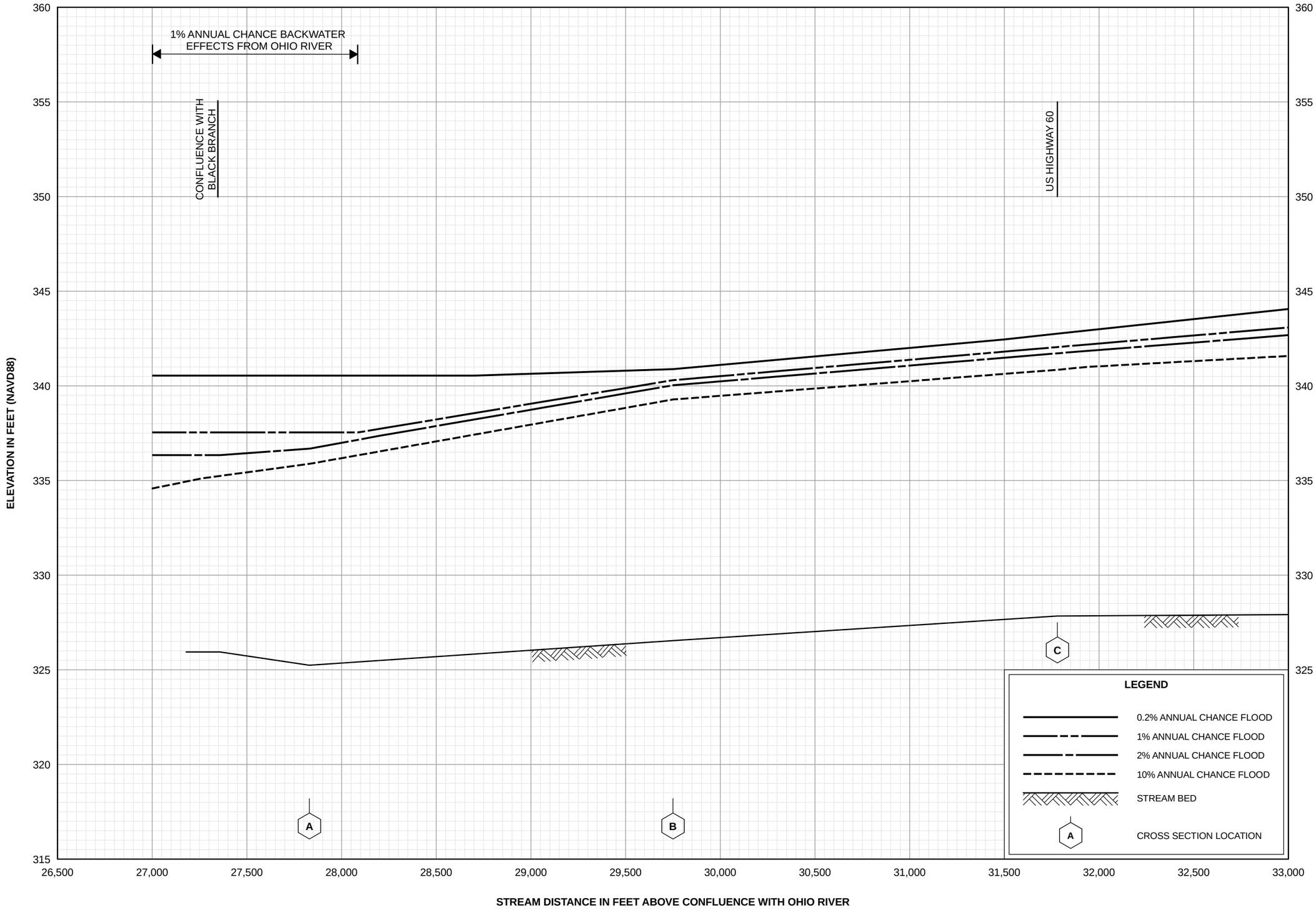
FLOOD PROFILES

ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY

AND INCORPORATED AREAS

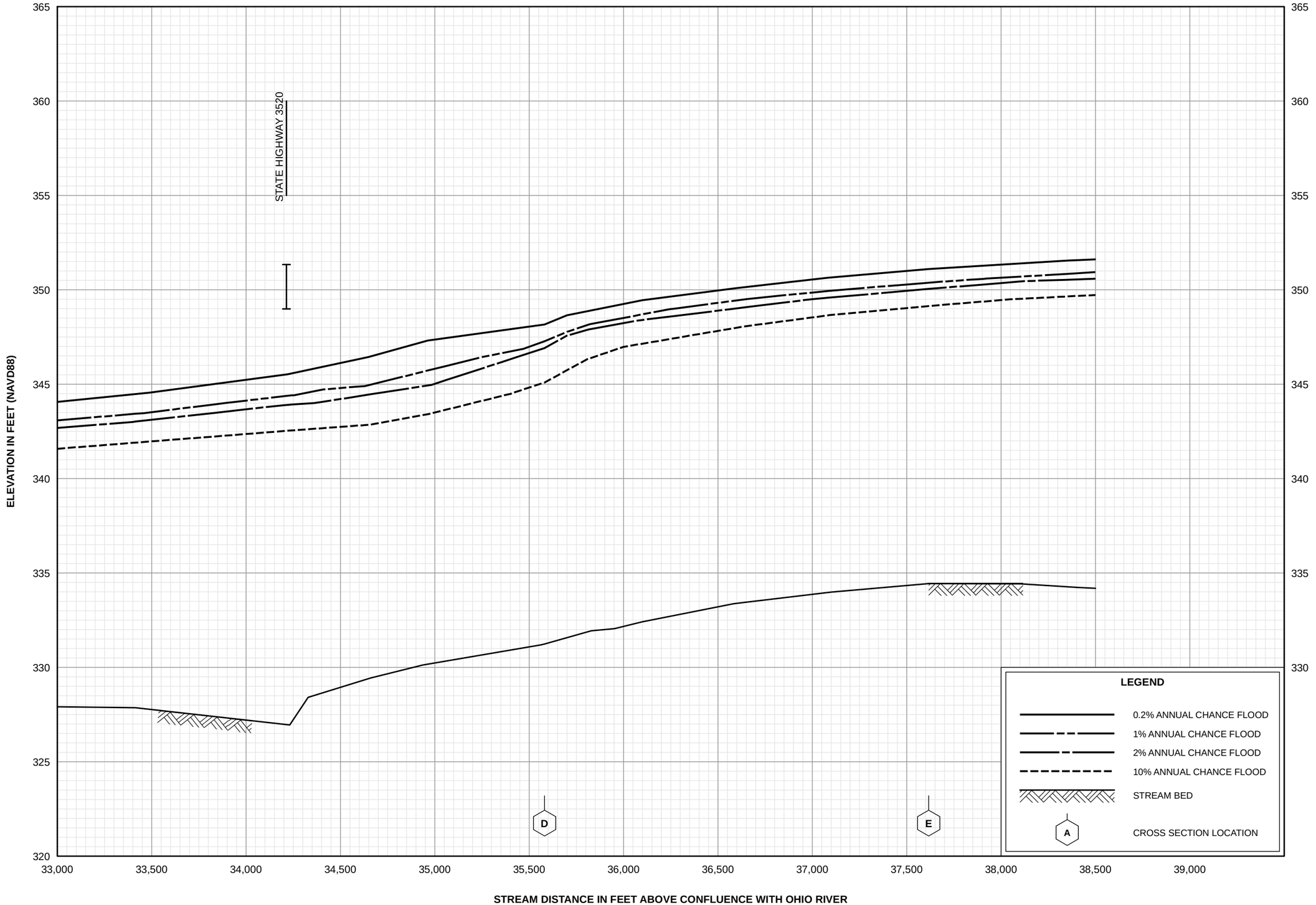


FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



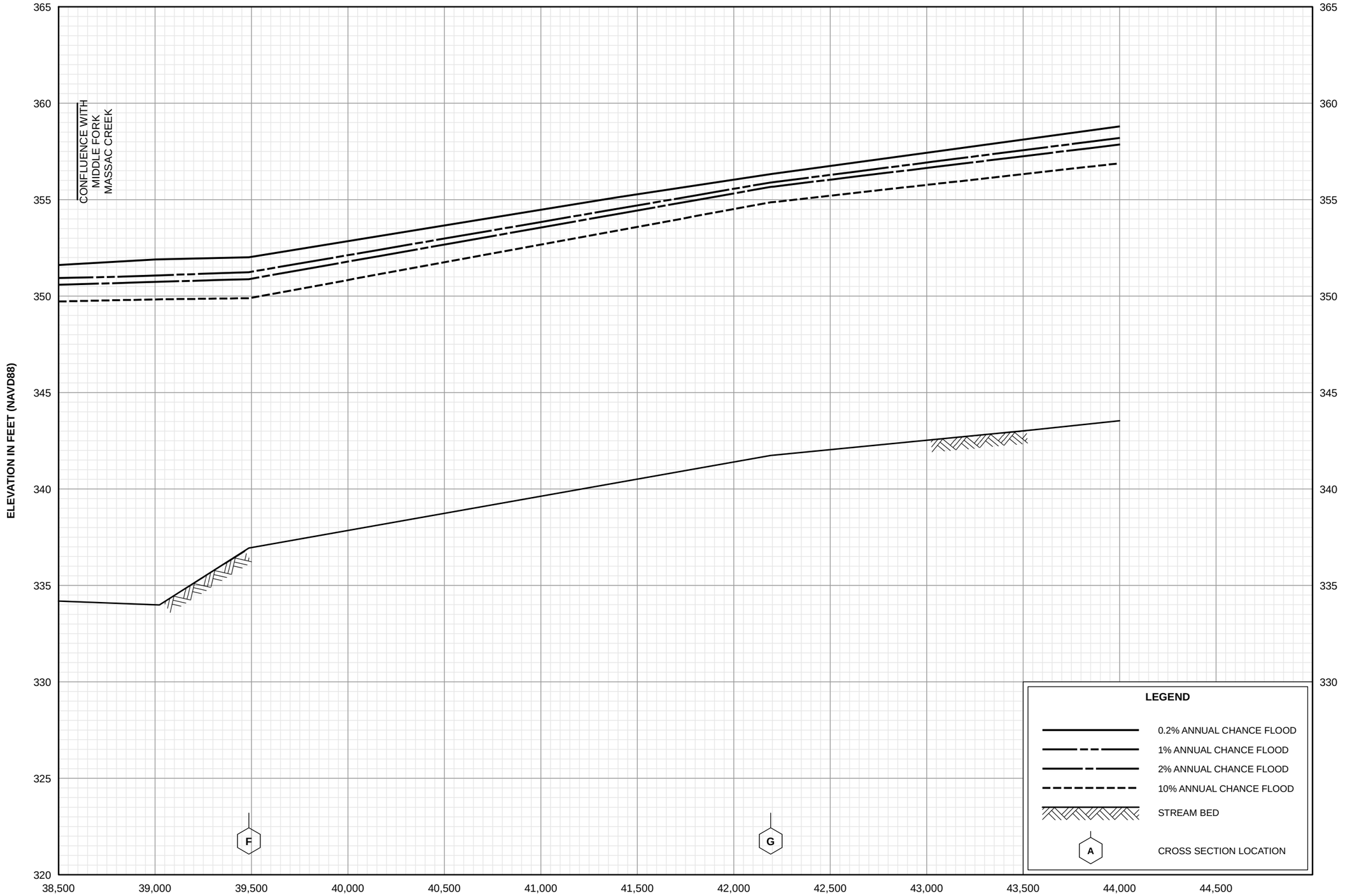
FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

21P



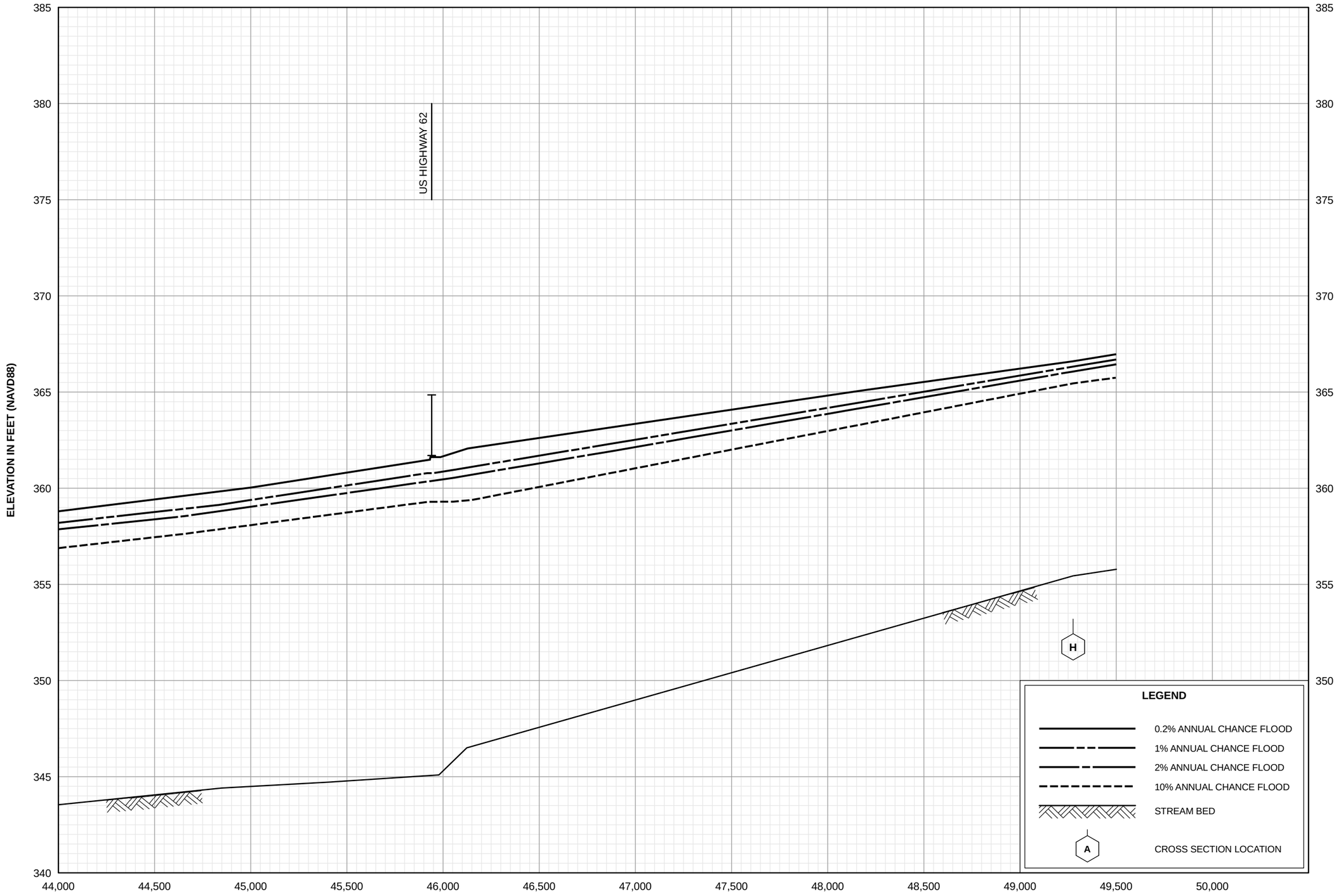
FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

22P

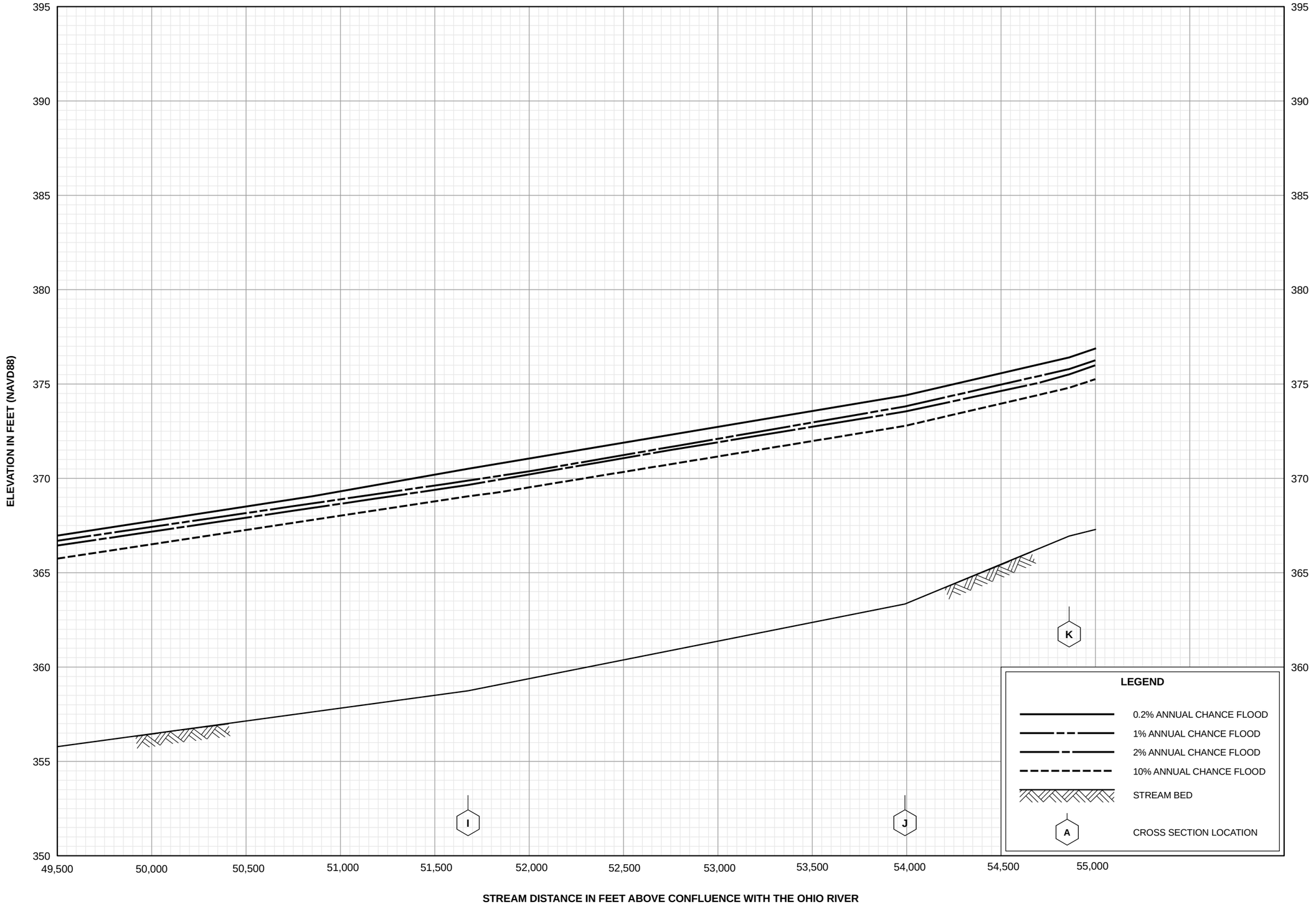


FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

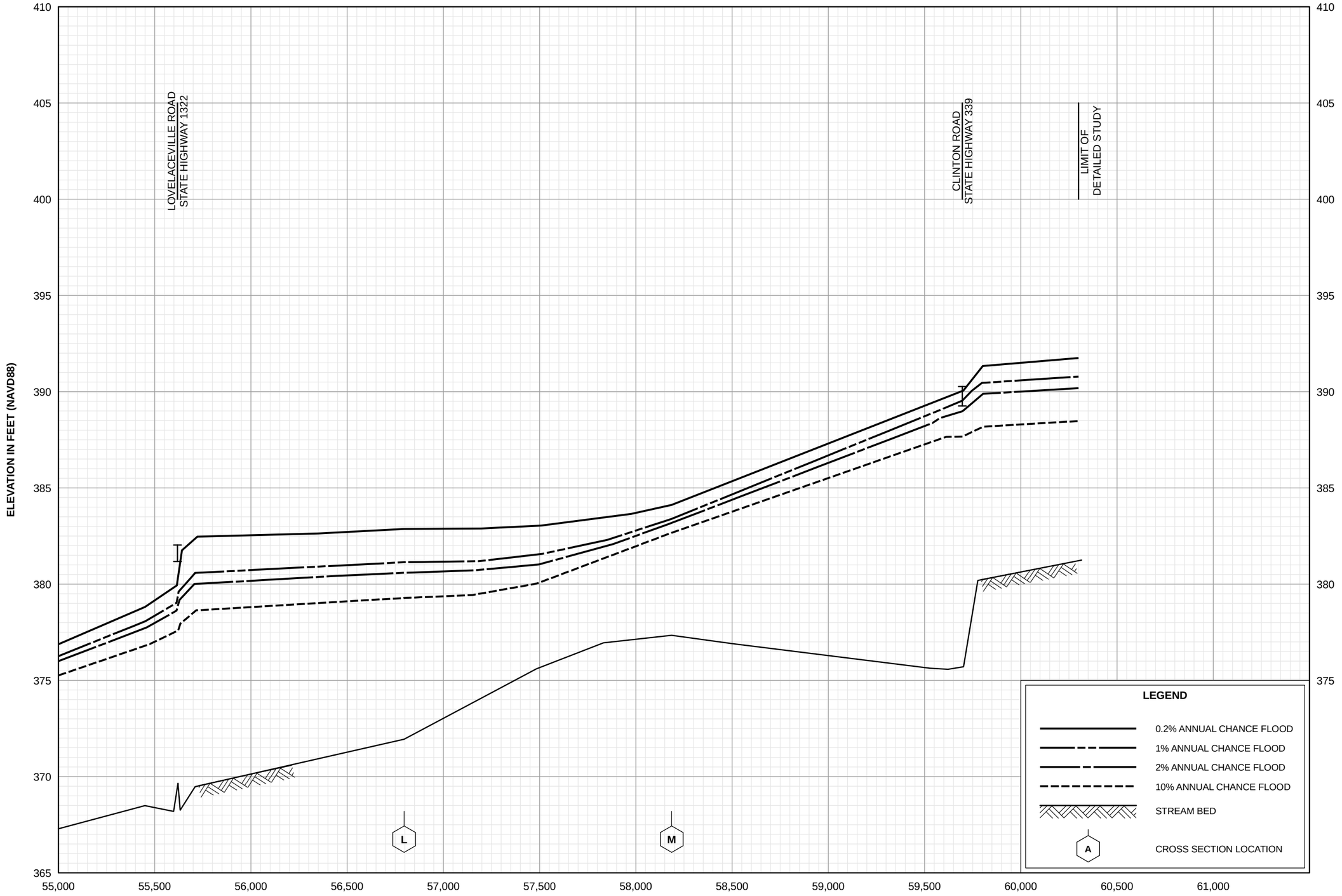


FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

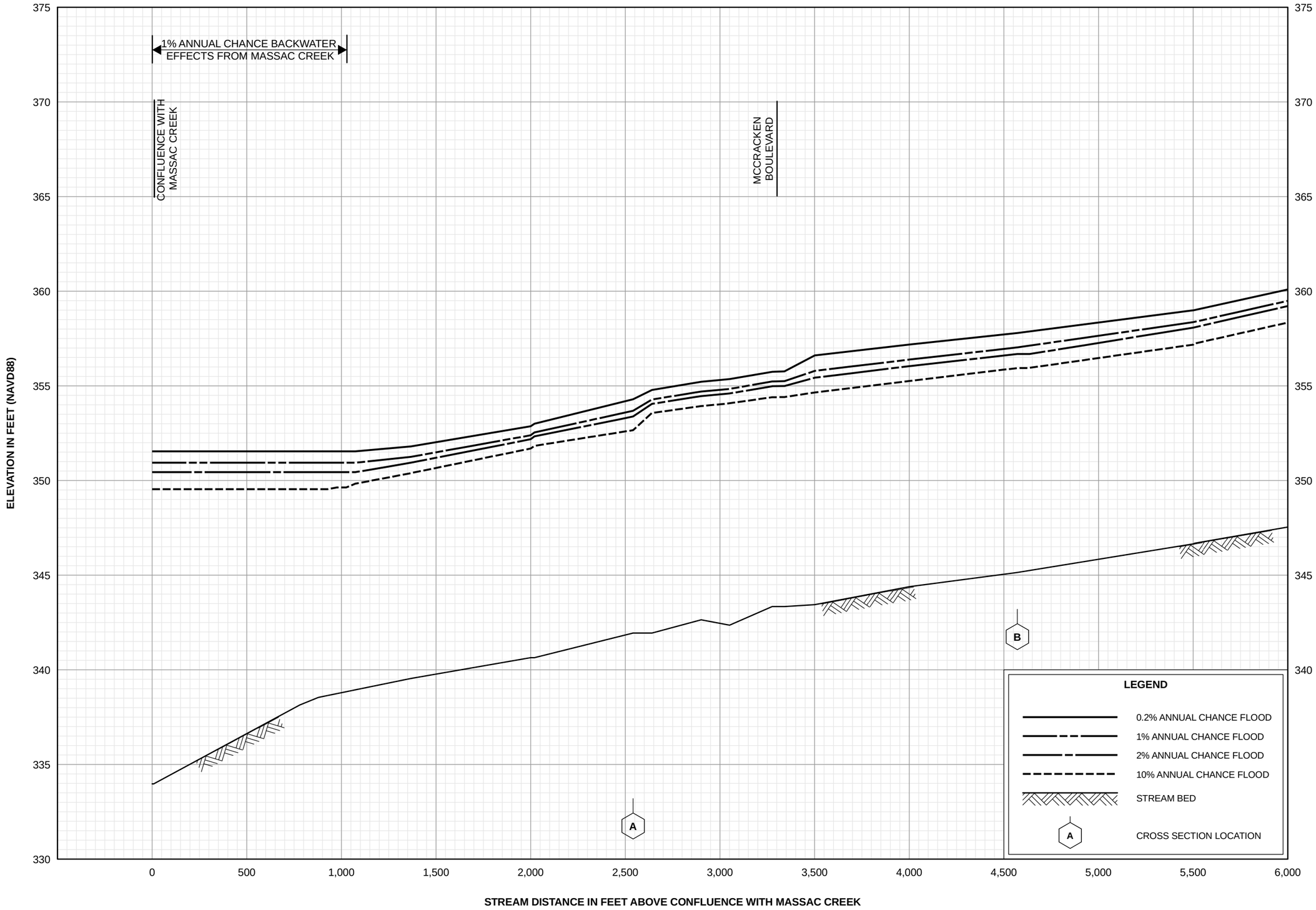


FLOOD PROFILES

MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



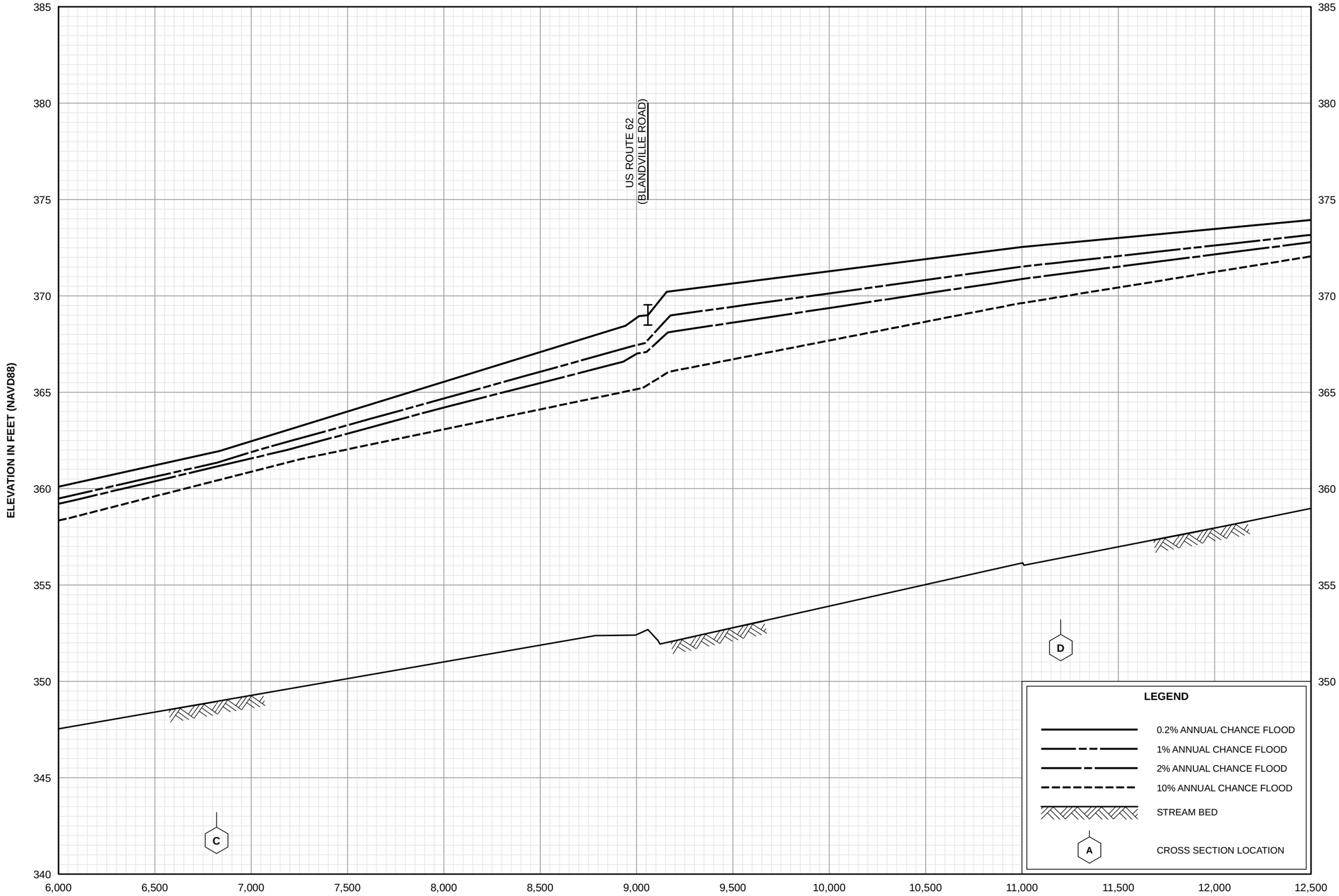
FLOOD PROFILES

MIDDLE FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

26P

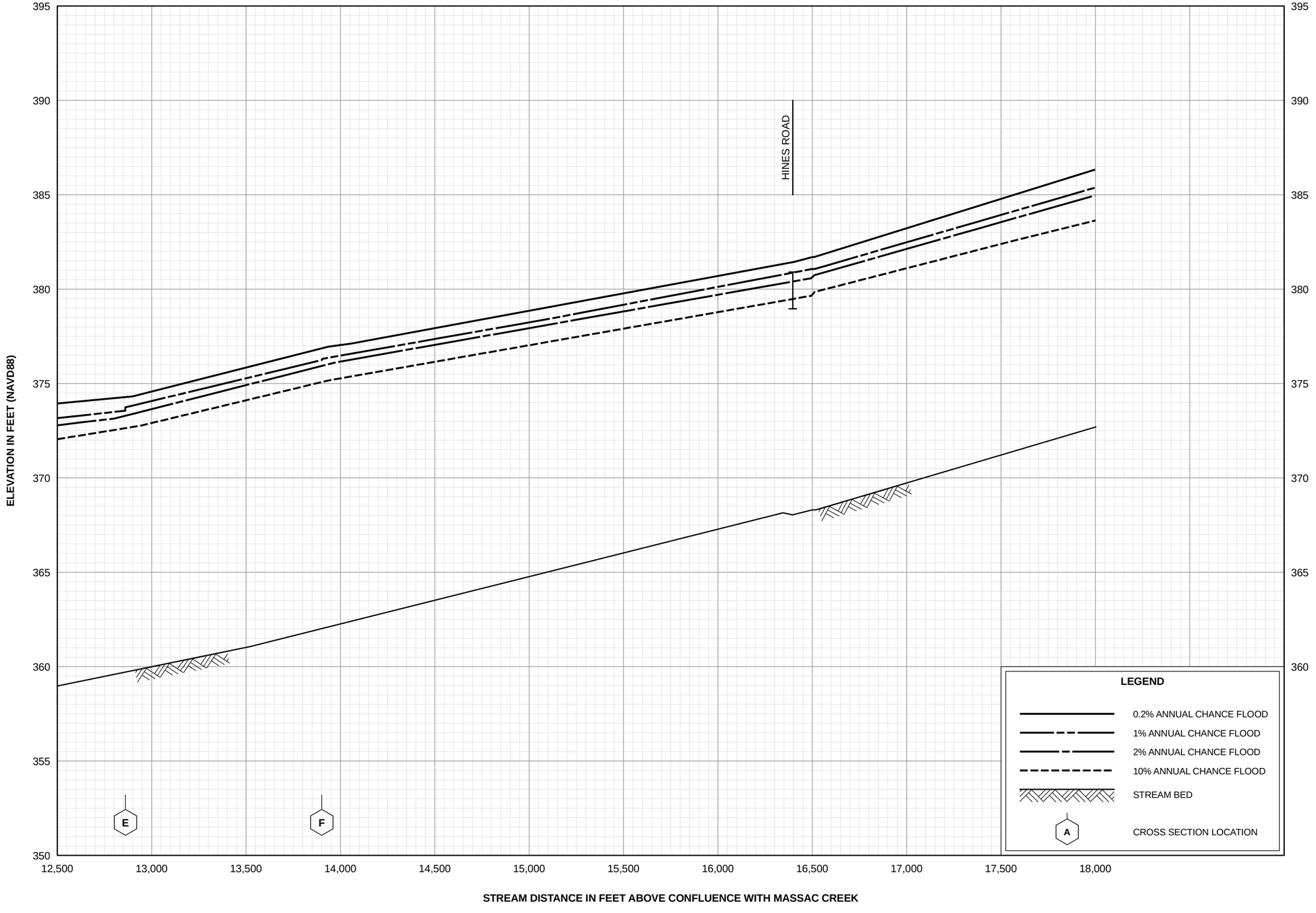


FLOOD PROFILES

MIDDLE FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

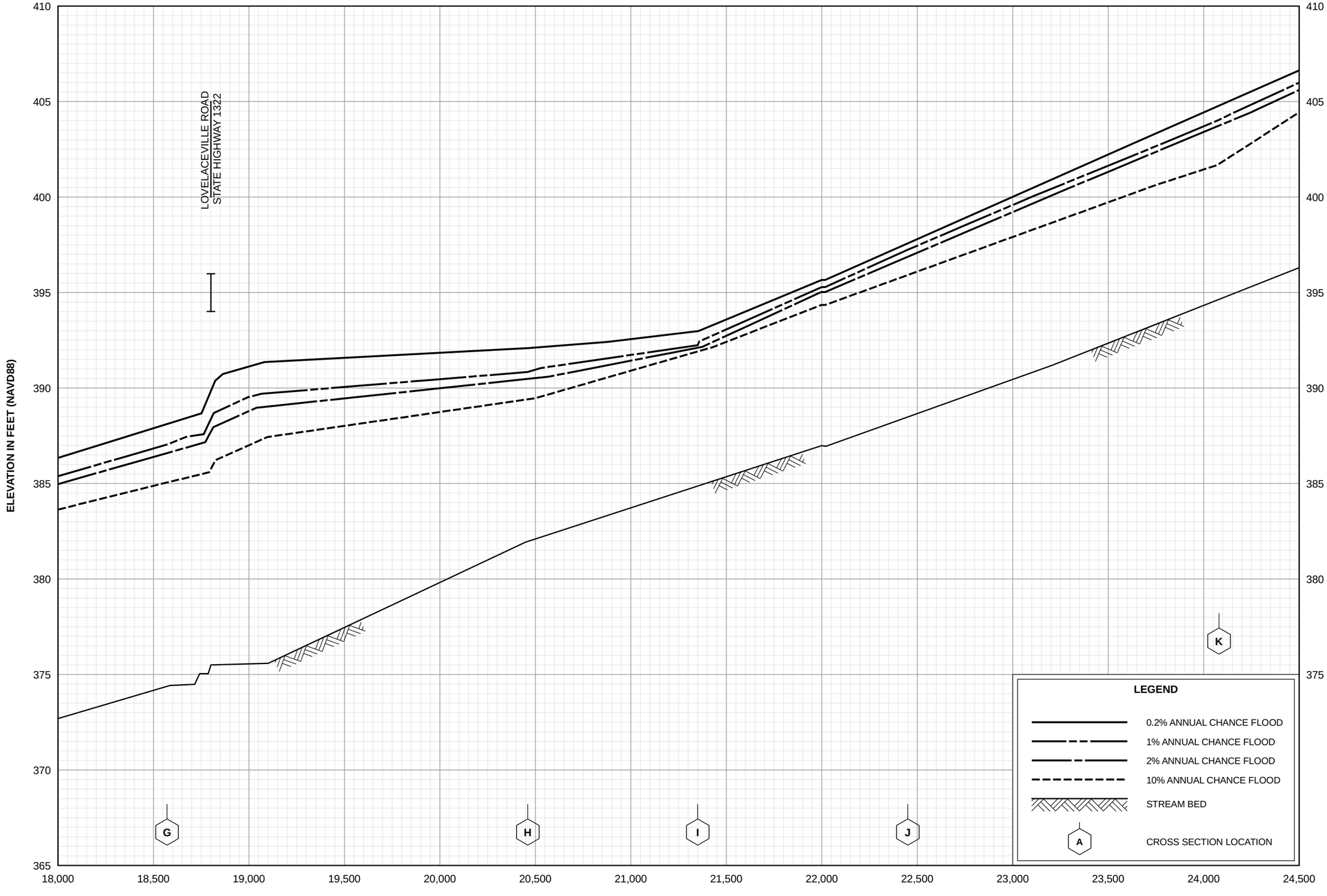


FLOOD PROFILES

MIDDLE FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

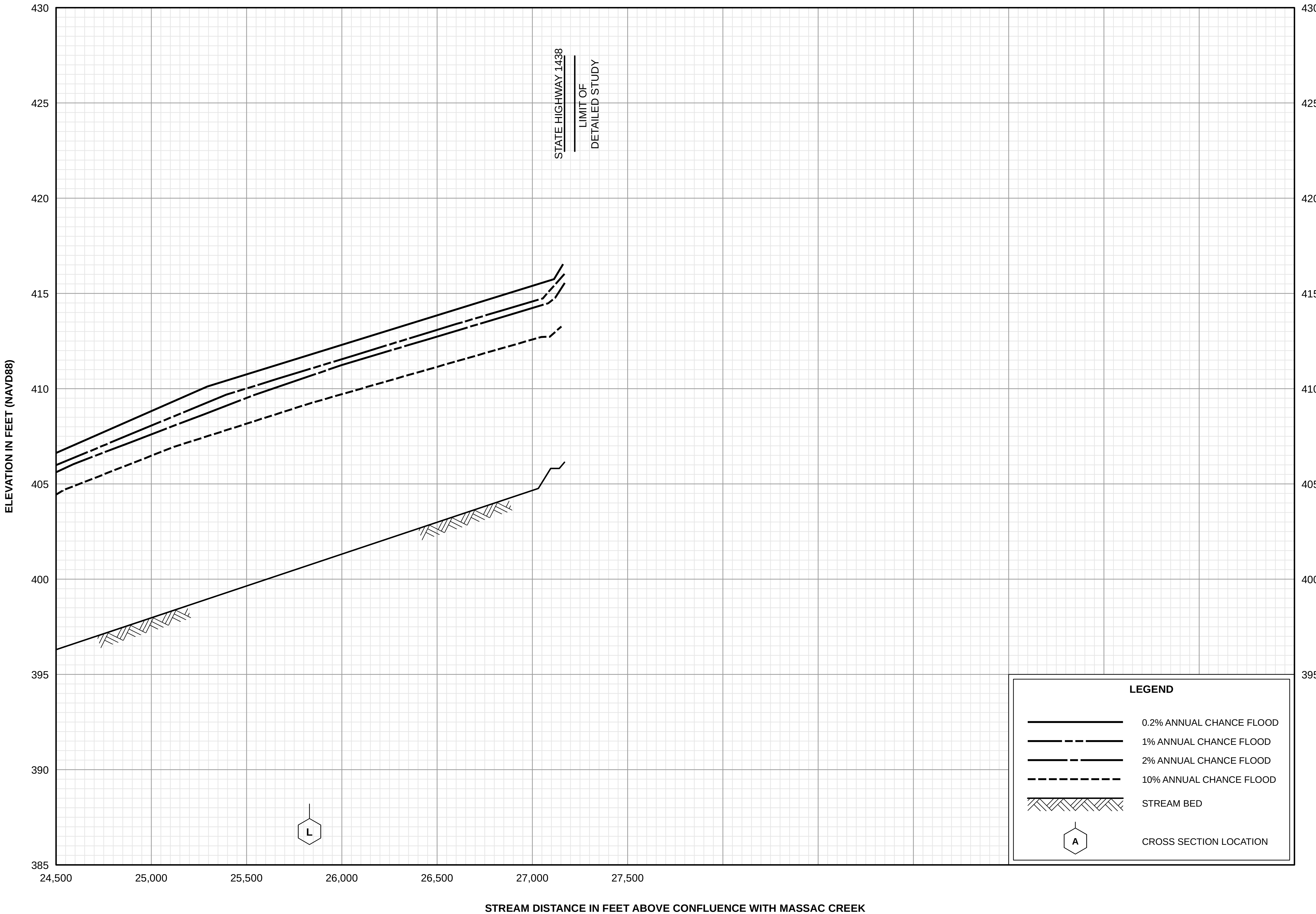


FLOOD PROFILES

MIDDLE FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

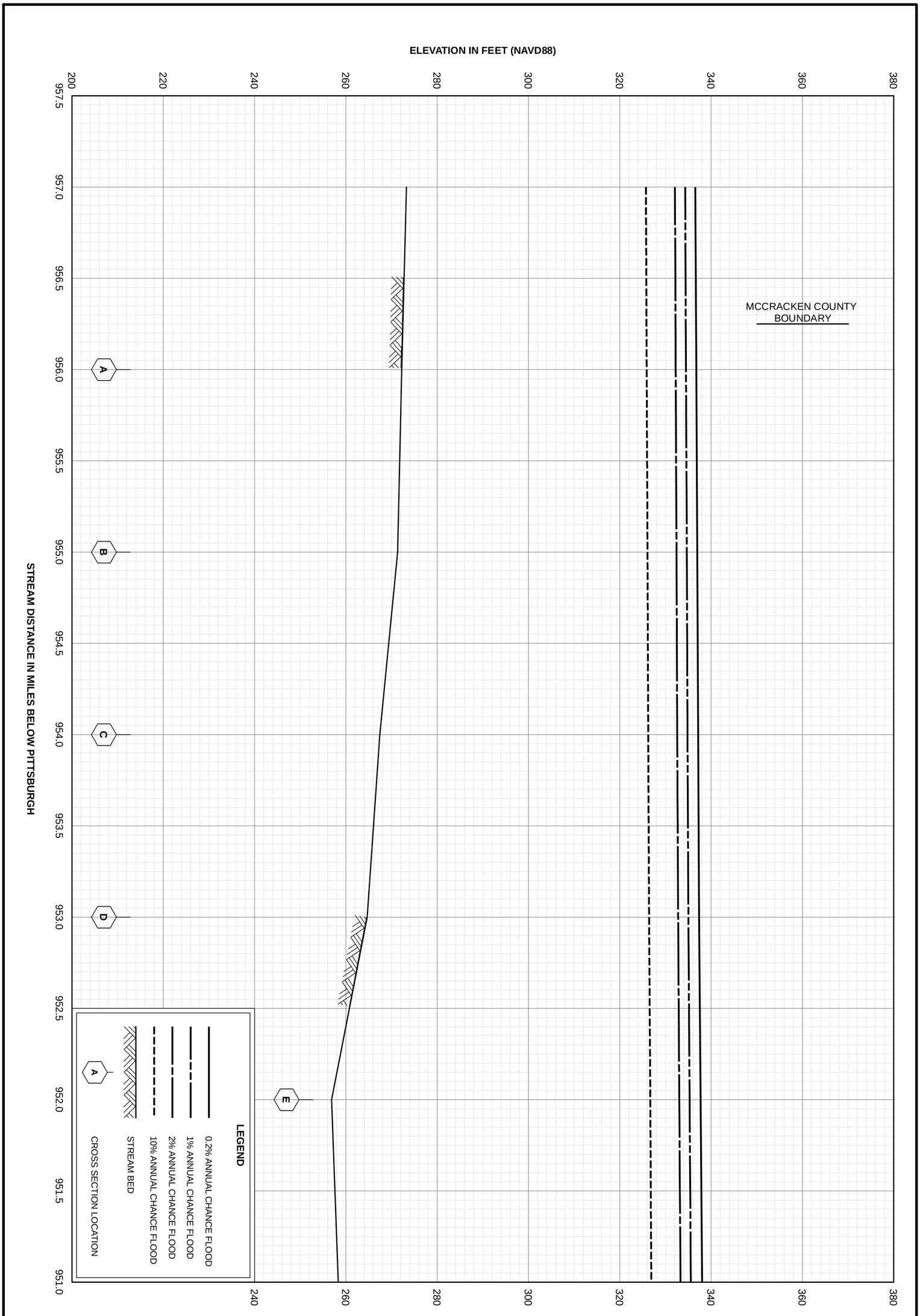


FLOOD PROFILES

MIDDLE FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



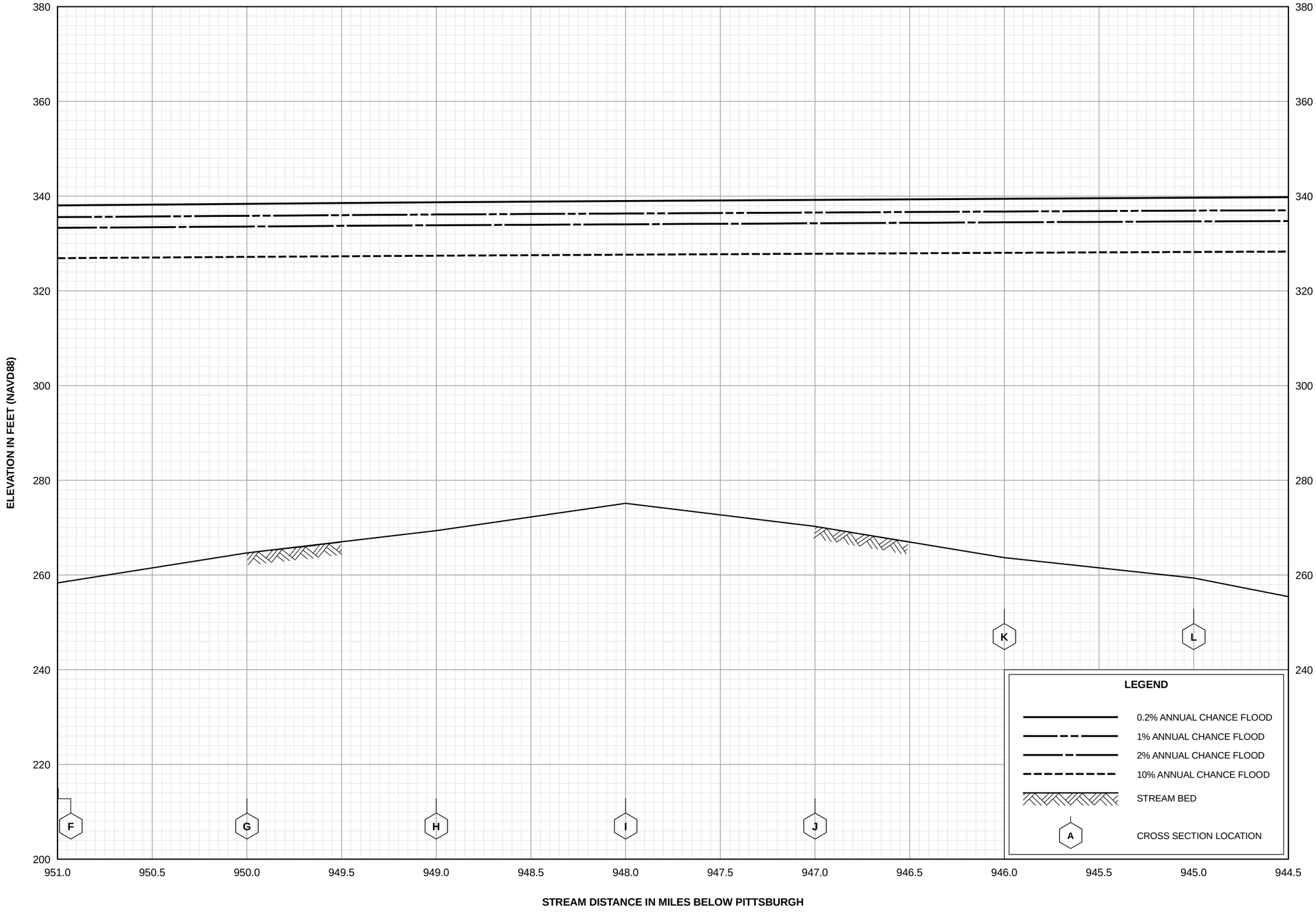
FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOOD PROFILES

OHIO RIVER

31P



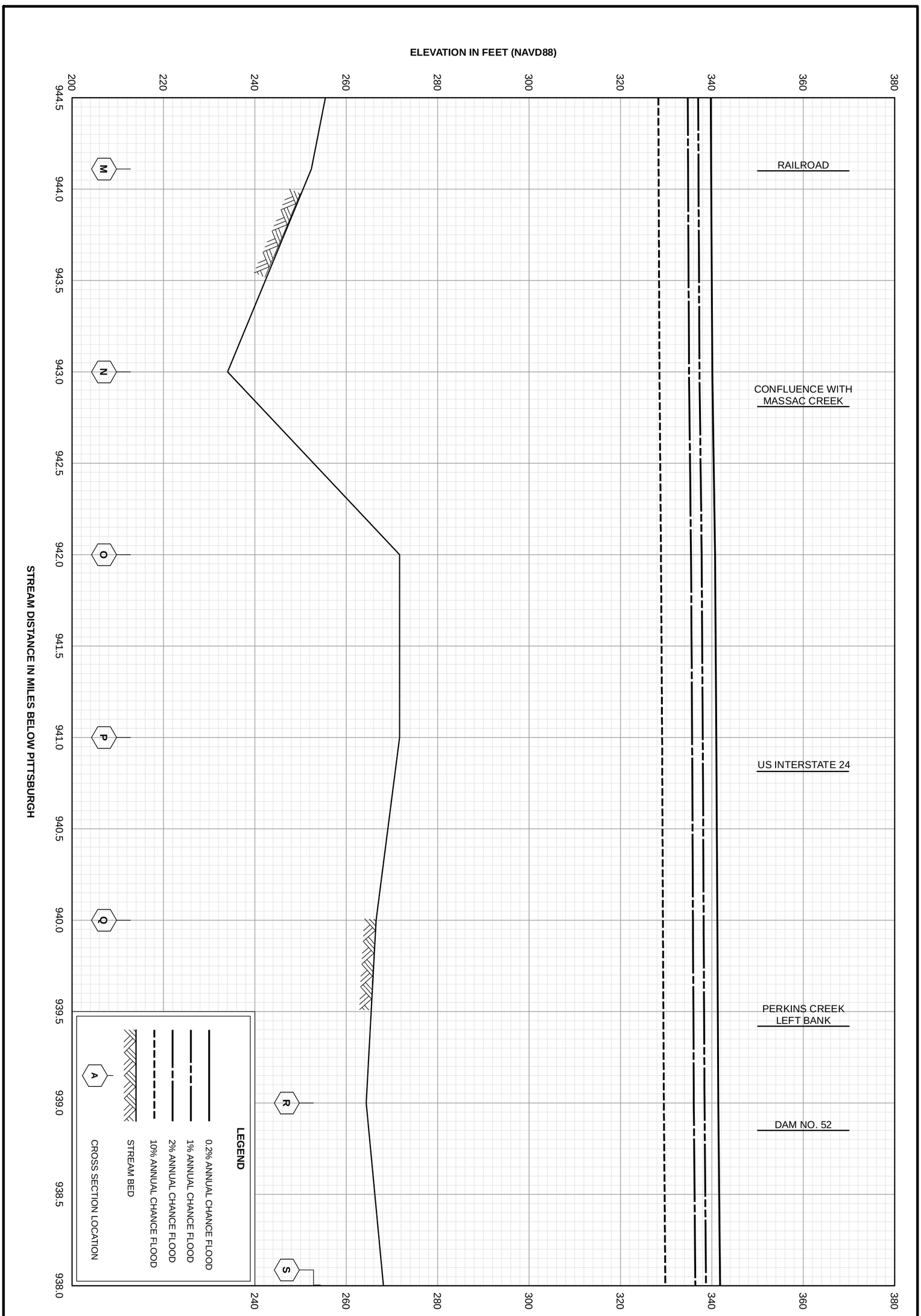
FLOOD PROFILES

OHIO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

32P



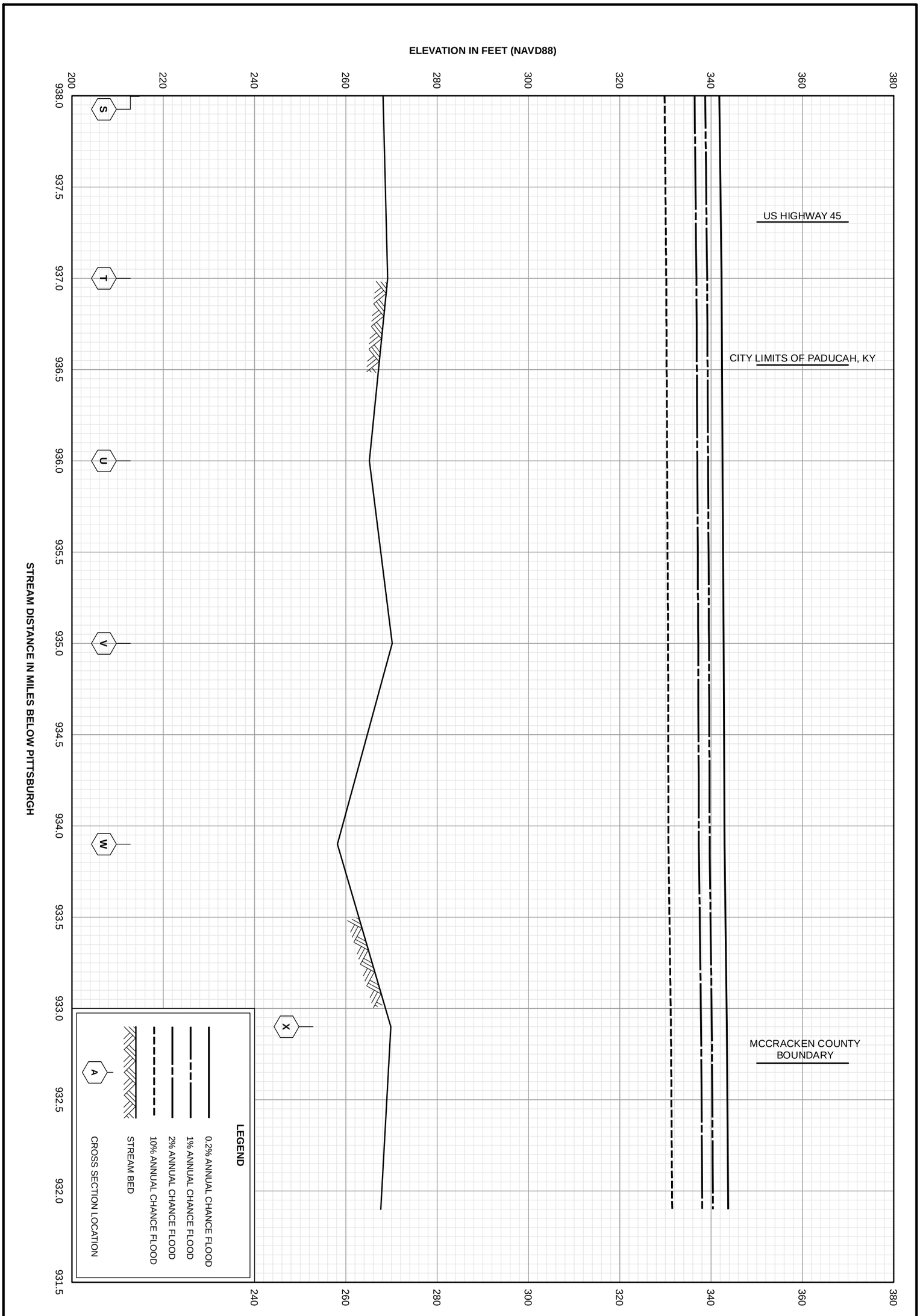
33P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOOD PROFILES

OHIO RIVER



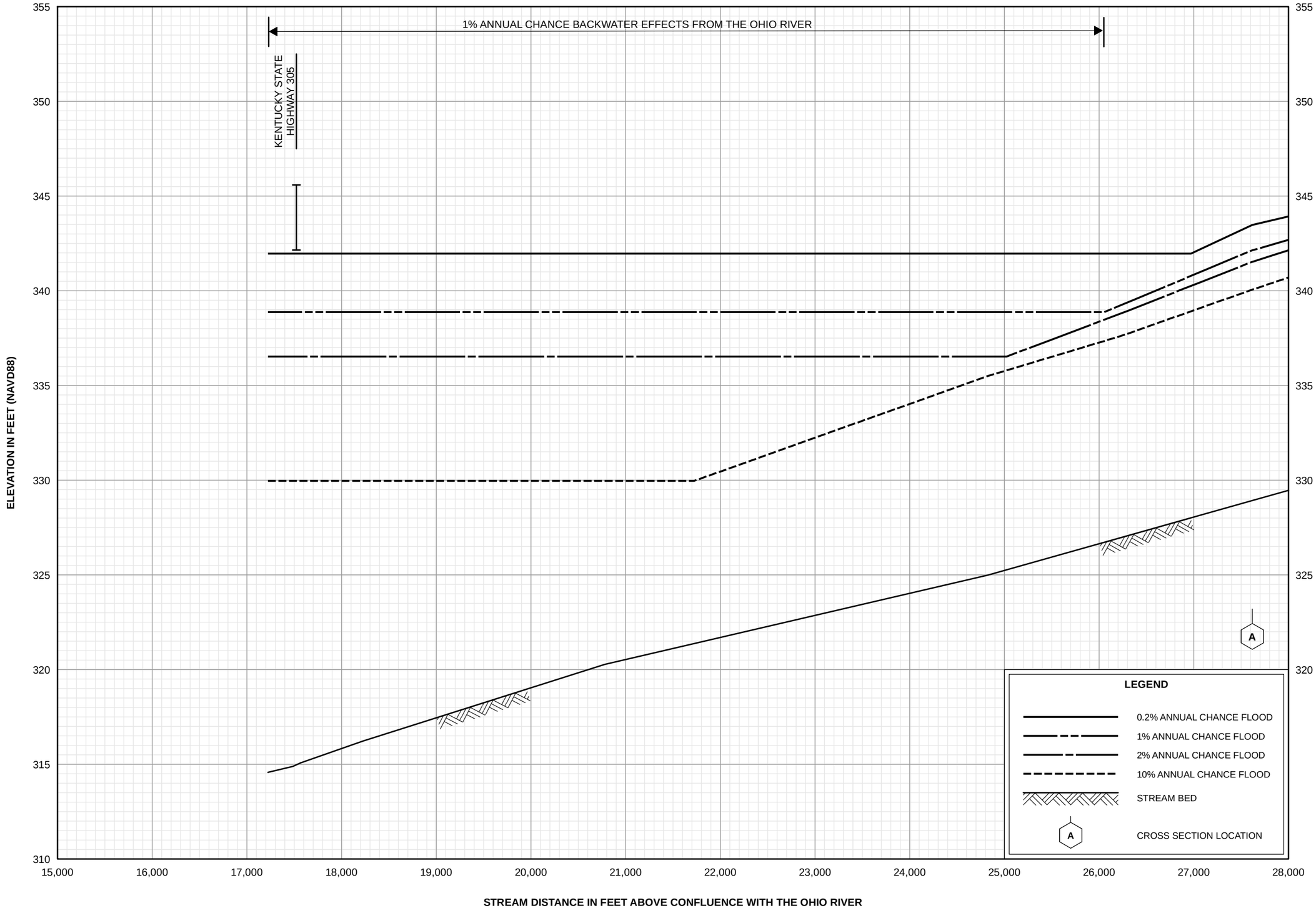
34P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOOD PROFILES

OHIO RIVER



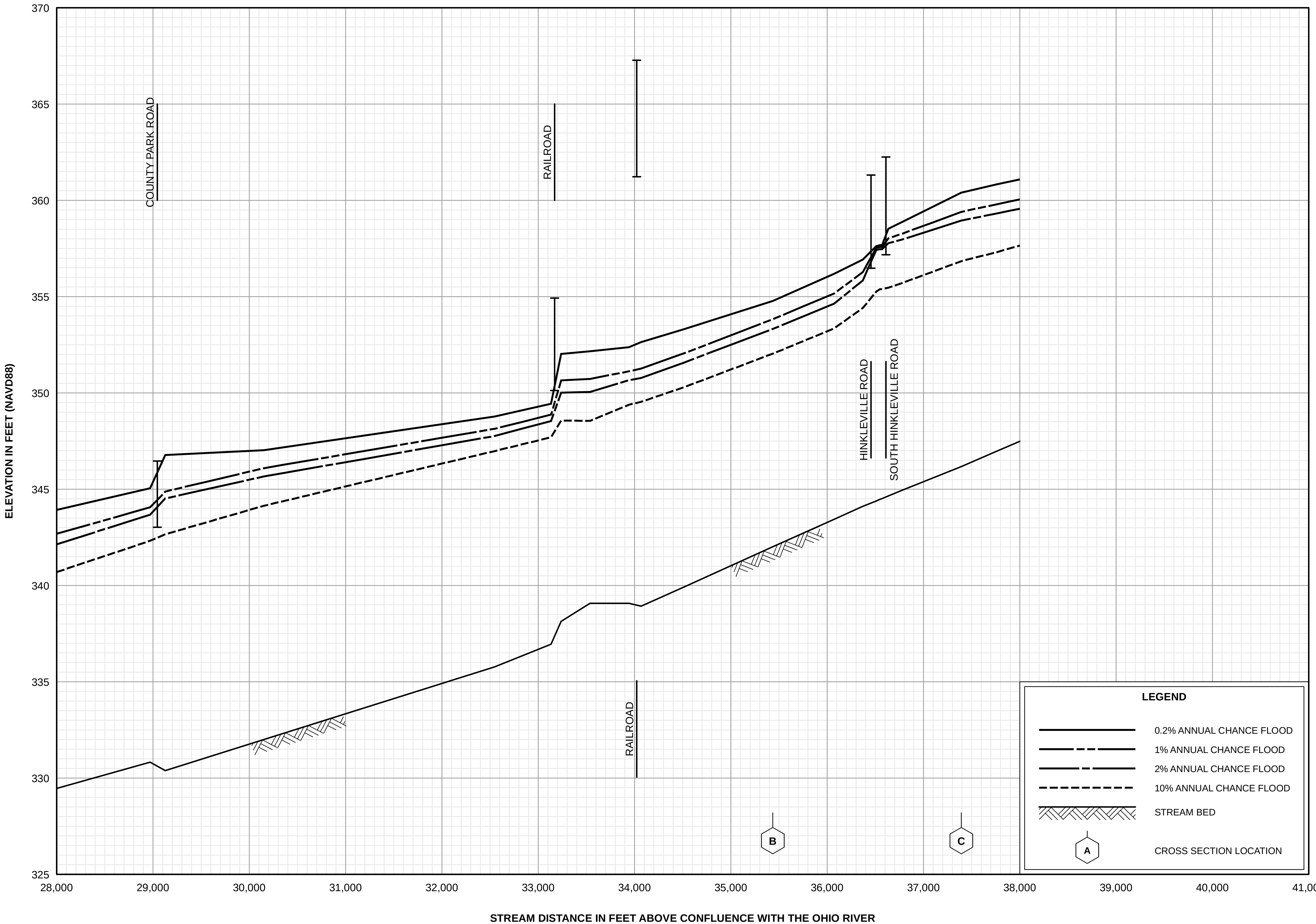
FLOOD PROFILES

PERKINS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

35P



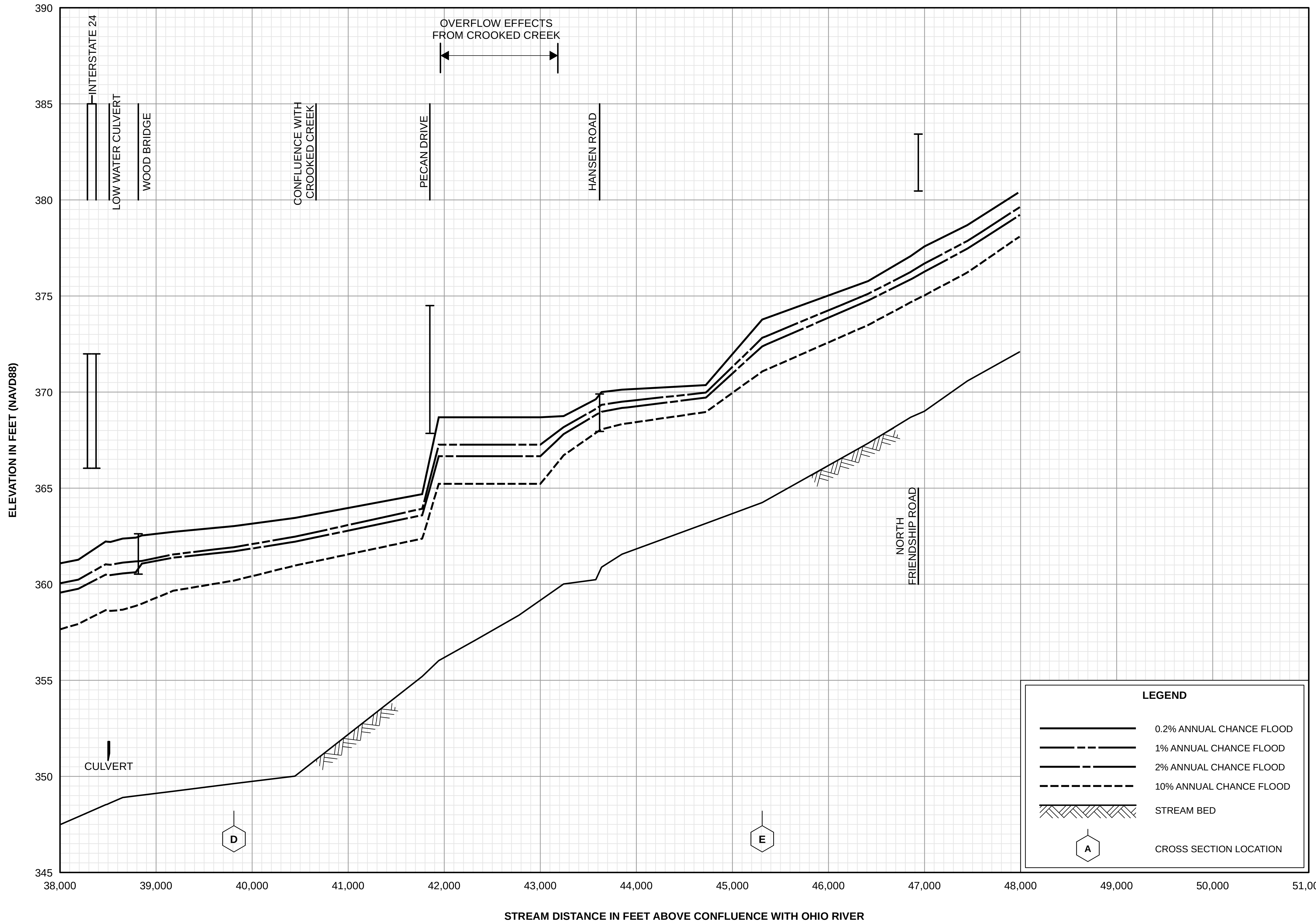
FLOOD PROFILES

PERKINS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY

AND INCORPORATED AREAS

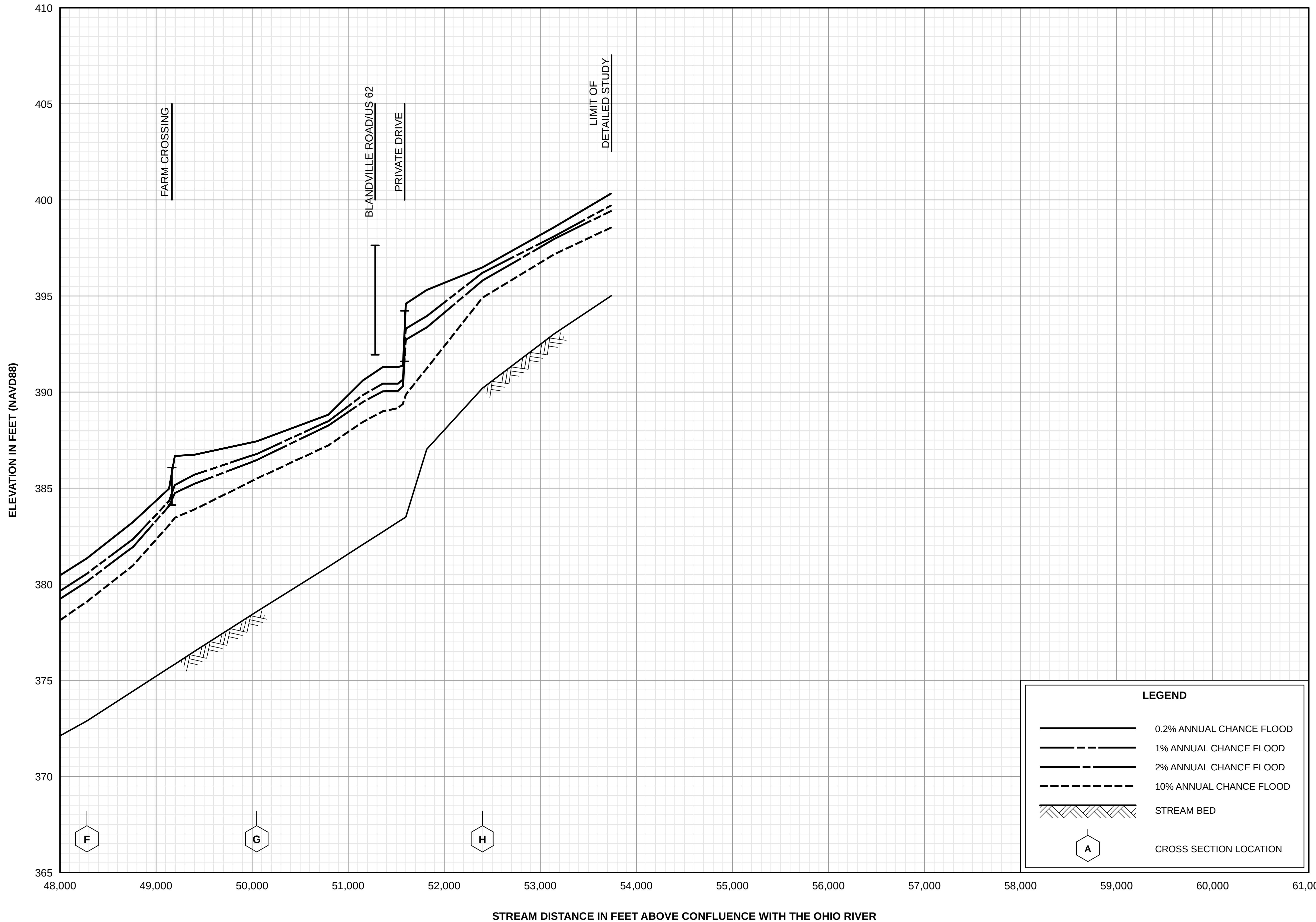


FLOOD PROFILES

PERKINS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY AND INCORPORATED AREAS

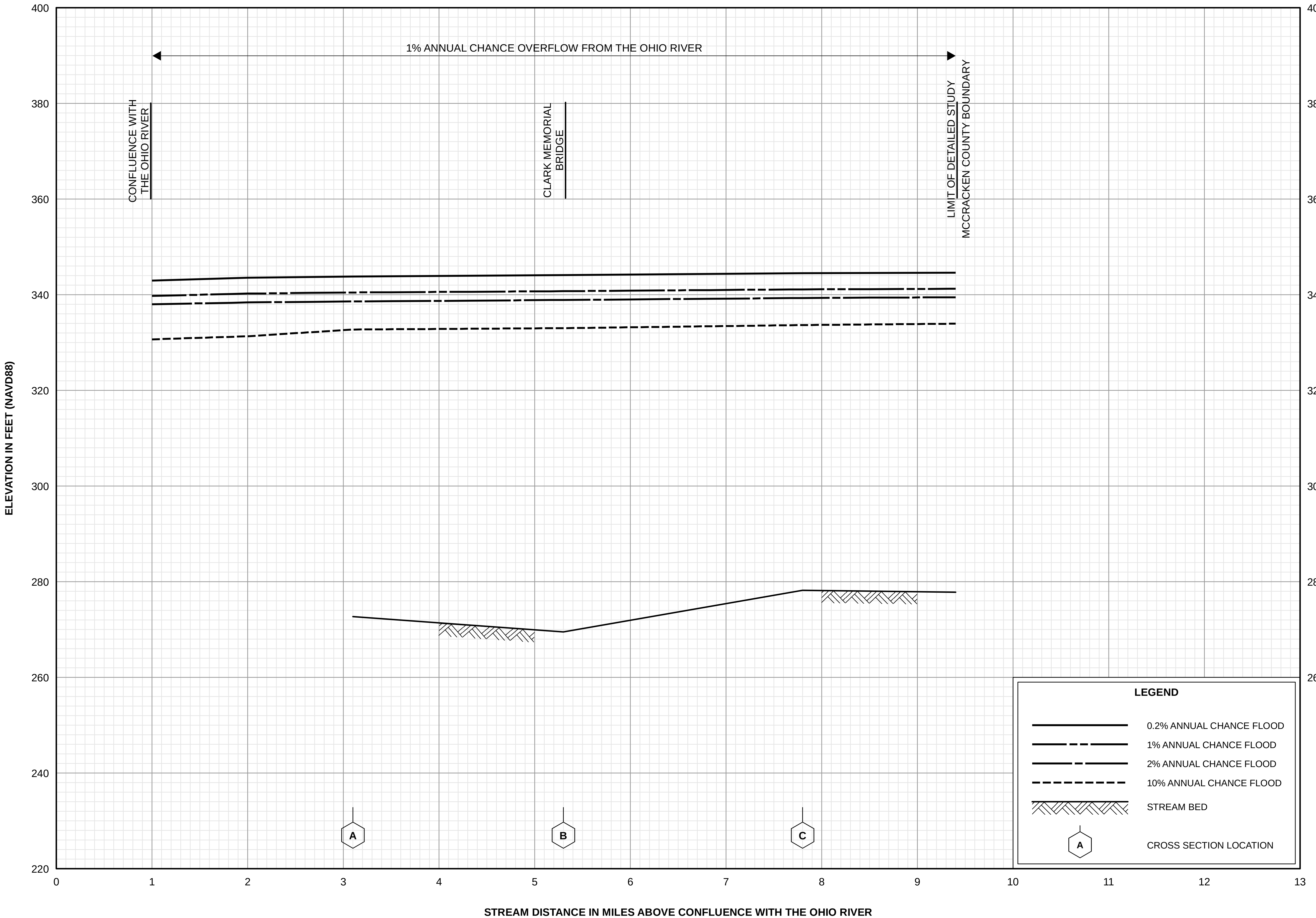


FLOOD PROFILES

PERKINS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

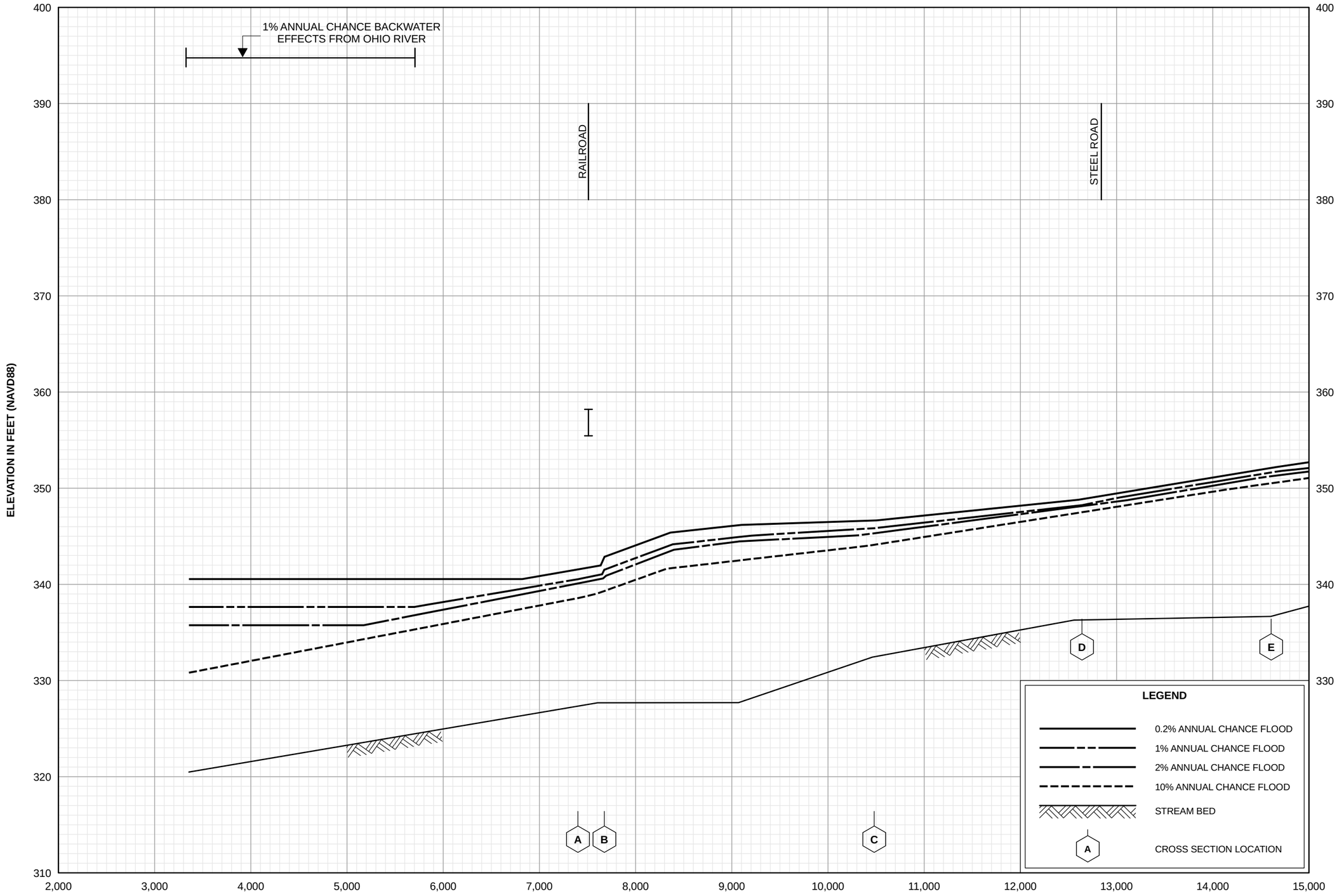


FLOOD PROFILES

TENNESSEE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

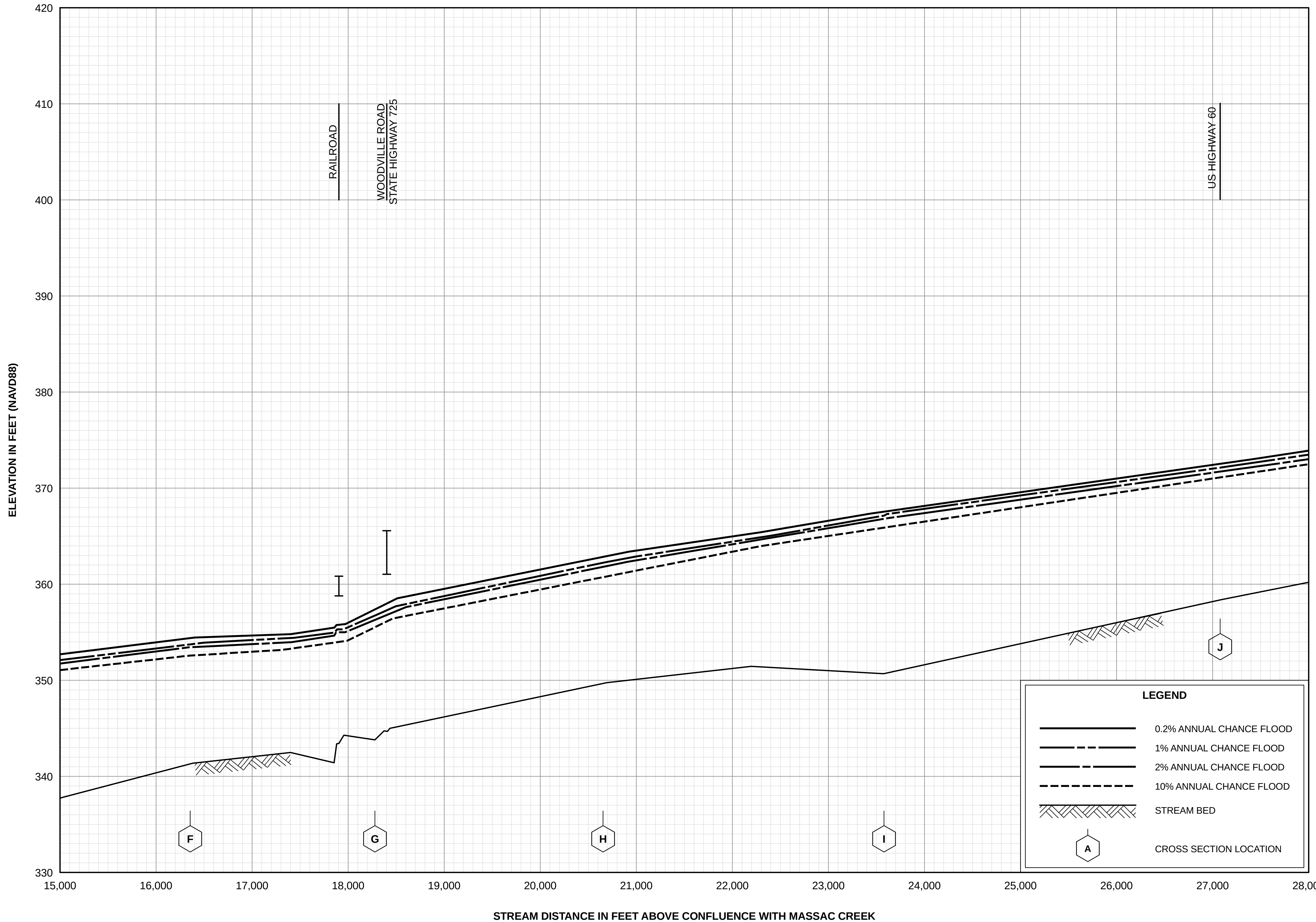


FLOOD PROFILES

WEST FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS



FLOOD PROFILES

WEST FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY

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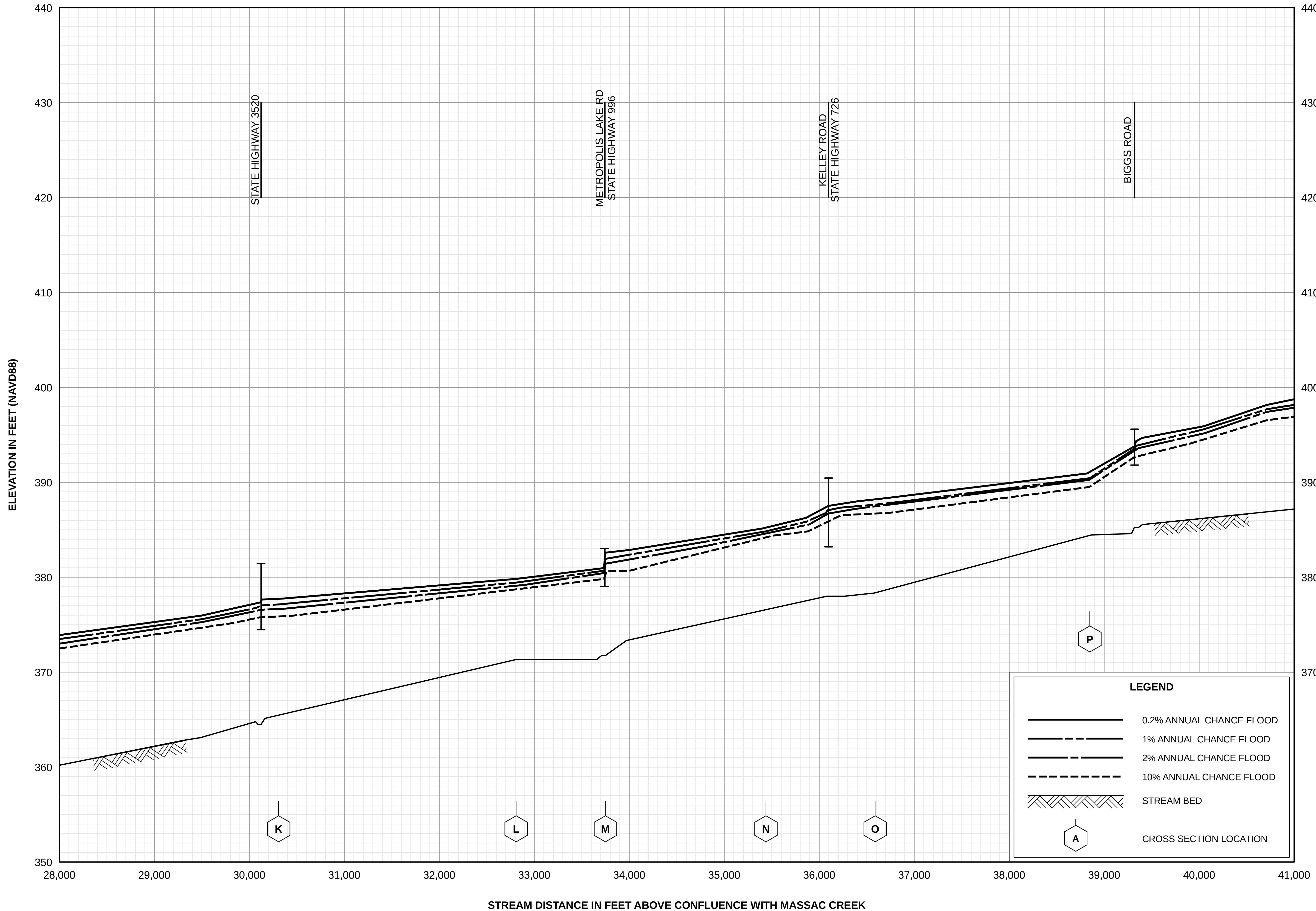
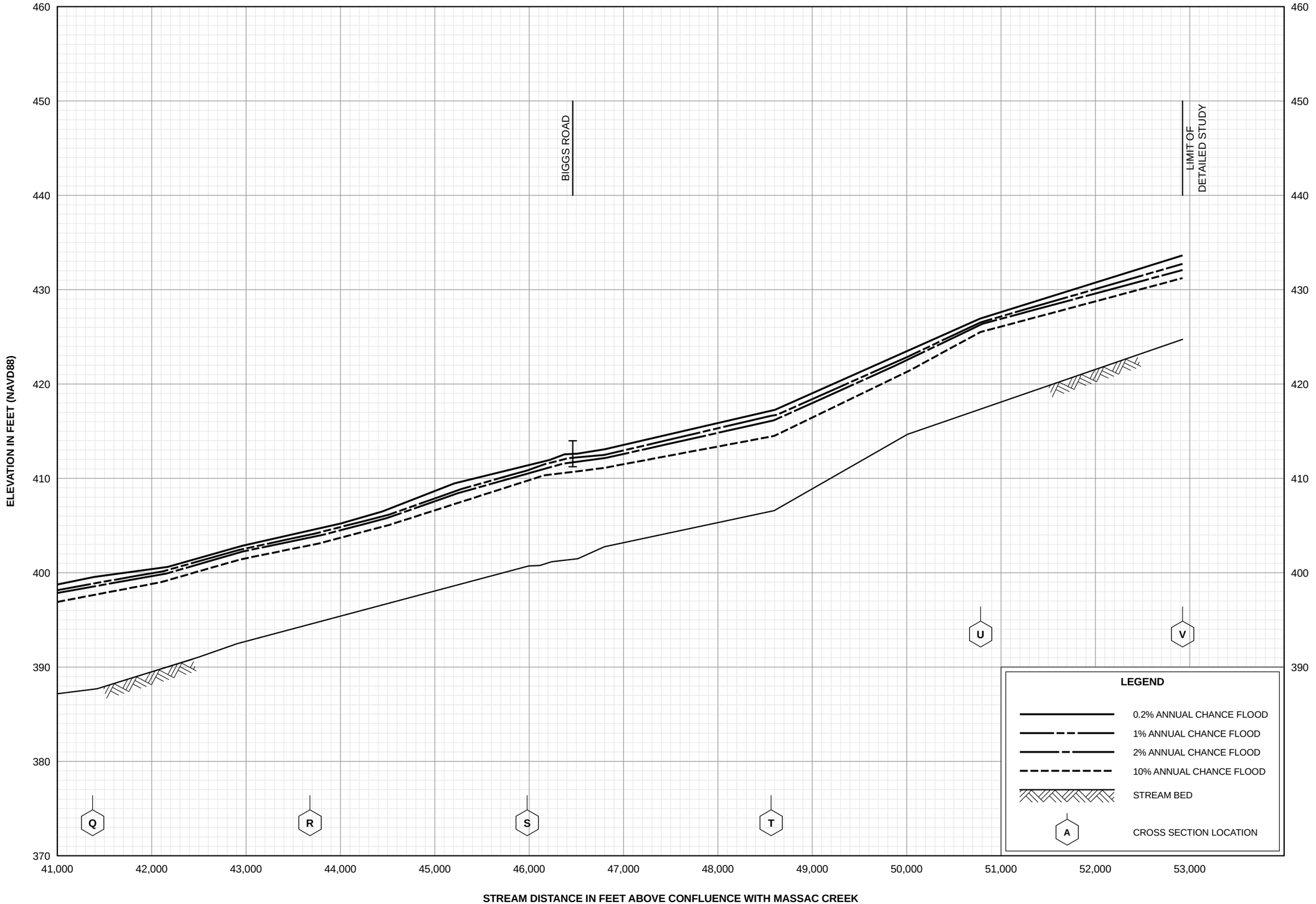


FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

FLOOD PROFILES

WEST FORK MASSAC CREEK



FLOOD PROFILES

WEST FORK MASSAC CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

MCCRACKEN COUNTY, KY
AND INCORPORATED AREAS

43P