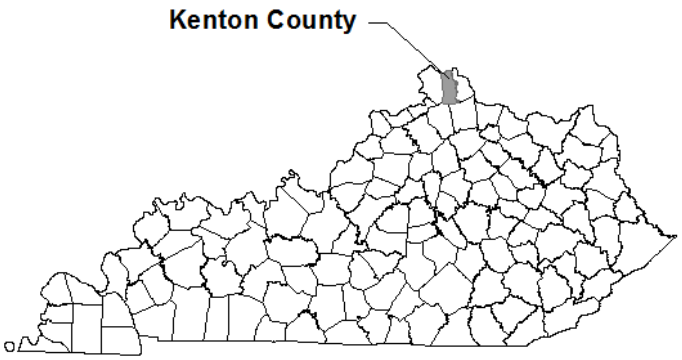

KENTON COUNTY, KENTUCKY

AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
Bromley, City of	210253
Covington, City of	210129
Crescent Springs, City of	210450
Crestview Hills, City of	210451
Edgewood, City of	210452
Elsmere, City of	210453
Erlanger, City of	210378
Fairview, City of	210407
Fort Mitchell, City of	210454
Fort Wright, City of	210249
Independence, City of	210240
Kenton County (Unincorporated Areas)	210128
*Kenton Vale, City of	210262
Lakeside Park, City of	210455
Ludlow, City of	210266
*Park Hills, City of	210409
Ryland Heights, City of	210389
Taylor Mill, City of	210246
Villa Hills, City of	210456
*Walton, City of	210481

*No special flood hazard areas identified

REVISED
May 16, 2013

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER

21117CV000B

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

Old Zone(s)	New Zone
Al through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date: March 16, 2009
Revised Countywide FIS Date(s): May 16, 2013

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FLOOD INSURANCE STUDY
KENTON COUNTY, KENTUCKY
AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) report revises and supersedes the FIS reports and/or Flood Insurance Rate maps (FIRMs) in the geographic area of Kenton County, Kentucky including the Cities of Bromley, Covington, Crescent Springs, Crestview Hills, Edgewood, Elsmere, Erlanger, Fairview, Fort Mitchell, Fort Wright, Independence, Kenton Vale, Lakeside Park, Ludlow, Park Hills, Ryland Heights, Taylor Mill, Villa Hills, Walton, and the unincorporated areas of Kenton County (hereinafter referred to collectively as Kenton County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Please note that the Cities of Park Hills, Kenton Vale, and Walton have no special flood hazard areas identified. Please note that the City of Walton is geographically located in Kenton and Boone Counties. The portion of the City of Walton only within Kenton County is included in this FIS report. See separately published FIS report and Flood Insurance Rate Map (FIRM) for Boone County, Kentucky and Incorporated Areas for flood information for the portion of Walton in Boone County.

This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Kenton County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the 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 has 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 FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

For this countywide FIS, the hydrologic and hydraulic analyses were prepared by URS Corporation (study contractor) for the Federal Emergency Management Agency (FEMA), under Contract No. EMA-2009-CA-5931. This work was completed in April 2011.

Information on the authority and acknowledgements for each of the previously printed FISs and Flood Insurance Rate Maps (FIRMs) for communities within Kenton County was compiled, and is shown below.

Kenton County	The hydrologic and hydraulic analyses for this study were performed by the United States Geological Survey (USGS), for the Federal Insurance Administration (FIA), under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 8. This work, which was completed in February 1979, covered all significant flooding sources affecting the unincorporated areas of Kenton County (Reference 2).
City of Bromley	The hydrologic and hydraulic analyses for this study were performed by USGS for the FIA under Interagency Agreement No. IAA-H-9-76, Project Order No. 8. This study was completed in May 1978 (Reference 3).
City of Covington	The hydrologic and hydraulic analyses for Banklick Creek were performed by the U.S. Army Corps of Engineers (COE), Louisville District, (the Study Contractor) for FEMA, under the Limited Map Maintenance Program, Contract Number IA-EMW-91-E-3529 (Reference 4). The hydrologic and hydraulic analyses for the Ohio River were obtained from the COE (Reference 5).

City of Fort Wright	The hydrologic and hydraulic analyses for Banklick Creek were performed by the COE Louisville District, (the Study Contractor) for FEMA, under the Limited Map Maintenance Program, Contract Number IA-EMW-91-E-3529. The hydrologic and hydraulic analyses for Banklick Creek tributary, Horse Branch, and Horse Branch Tributary were performed by the USGS under Interagency Agreement No. IAAH-9-77, Project Order No. 8, and were completed in May 1978 (Reference 6). The hydrologic and hydraulic analyses for the Ohio River were obtained from the COE (Reference 5).
City of Independence	The hydrologic and hydraulic analyses for this study were performed by the USGS, for the FIA, under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 8. This work, which was completed in July 1978, covered all significant flooding sources affecting the City of Independence (Reference 7).
City of Ludlow	The hydrologic and hydraulic analyses for this study were performed by the USGS for the FIA under Inter-Agency Agreement No. (IAA)-H-9-76. This work, which was completed in April 1978, covered all significant flooding sources in the City of Ludlow (Reference 8).
City of Taylor Mill	In the original March 1979 study, the hydrologic and hydraulic analyses were prepared by the USGS for the FIA, under Inter-Agency Agreement No. IAA-H-9-76, Project Order No. 8. That work was completed in April 1978. In the August 1995 revision, the hydrologic and hydraulic analyses were prepared by the COE, Louisville District, for FEMA, under Inter-Agency Agreement No. IA-EMW-91-E-3529. That work was completed in the summer of 1991 (Reference 9).

The digital base mapping information was provided by The Kentucky Transportation Cabinet, The National Hydrography Dataset, The Kentucky Division of Geographic Information, National Agriculture Imagery Program (NAIP) 2010, The National Geodetic Survey, and effective DFIRM data. The coordinate system used for the production of this DFIRM is the Kentucky Coordinate System, Single Zone, North American Datum of

1983 (NAD83). All elevation data are based on the North American Vertical Datum of 1988 (NAVD88). The DFIRM units are in U.S. Feet. 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 DFIRMs of this study.

1.3 Coordination

The initial Consultation Coordination Officer's (CCO) meeting was held with representatives from FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. The final CCO meeting was held with representatives from FEMA, the community and the study contractor to review the results of the study. All problems raised in the meeting have been addressed in this study.

The dates of the pre-countywide initial and final CCO meetings held in Kenton County and the incorporated communities within its boundaries for the Effective FIS are listed in Table 1, "Initial and Final CCO Meetings for Effective FIS".

Table 1 – Initial and Final CCO Meetings for Effective FIS

COMMUNITY NAME	FIS DATE	INITIAL MEETING	FINAL MEETING
Kenton County	March 16, 2009	March 17, 2005	November 15, 2007

For this countywide FIS, an initial CCO meeting was held on May 6, 2010, and was attended by representatives of the community, the study contractor, and FEMA. The final CCO meeting was held on October 25, 2011, and was attended by representatives of Kenton County, Kentucky Division of Water, FEMA, and URS Corporation. All problems raised at the meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Kenton County, Kentucky, including incorporated communities listed in Section 1.1. Table 2, "Areas Studied by Detailed Methods," lists the streams that were studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction.

The Ohio River in Kenton County and the Licking River were incorporated into this FIS as a leverage study obtained from the US Army Corps of Engineers, Louisville District (USACE).

Licking River is a new detailed study for this FIS based on HEC-RAS data provided by the USACE and Light Detection and Ranging (LiDAR) elevation data from the Northern Kentucky Area Planning Commission (NKAPC). URS Corporation created a new HEC-

RAS model by combining data from each of the respective elevation data sources, adding bridge data, and calibrating the model to historic high water marks for the March 1964 flood (Reference 1).

The flooding sources studied previously by detailed methods and redelineation for the FIS are shown in Table 2.

Table 2 – Areas Studied by Detailed Methods

Stream	**Limits of Detailed Study**
Banklick Creek	From confluence with Licking River to confluence with Bristow Road
Banklink Creek Tributary	From confluence with Banklick Creek to confluence with Madison Pike
Brushy Fork	From confluence with Banklick Creek to Wilson Road
DeCoursey Creek	Along DeCoursey Pike, from confluence with Licking River to 1.4 miles south of said confluence
Fowler Creek	From confluence with Banklick Creek to 550 feet west of Werhman Road
Holds Branch	From River stations 2,700 feet to 3,820 feet
Horse Branch	From Confluence with Horse Branch to Reeves Road
Licking River	From mouth at the Ohio River to Kenton County/Pendleton County boundary
Ohio River	Section of stream forming the northern Kenton County boundary
Pleasant Run Creek	From confluence with Ohio River to northern Fort Mitchell city limits
Pleasant Run Creek Tributary 1	From Mouth at Pleasant Run Creek to Cities of Ludlow/Covington boundary
Pleasant Run Creek Tributary 2	From confluence with Pleasant Run Creek to southern city limits of Ludlow

Table 2 – Areas Studied by Detailed Methods

Stream	Limits of Detailed Study
Thompson Branch	From confluence with Fowler Creek to Fowler Creek Road/Cox Road intersection
Various	Countywide

Approximate analyses were used to study those areas having a low development potential or minimal flooding hazards. The scope and methods of study were proposed to, and agreed upon, by FEMA and the communities.

2.2 Community Description

Kenton County is located in northern Kentucky and is a part of the metropolitan area immediately south of Cincinnati, Ohio. It is bordered on the east by Campbell County, on the west by Boone County, on the south by Grant and Pendleton Counties, and on the north by the State of Ohio. The Ohio River forms the northern boundary and the Licking River forms the eastern boundary of the county.

In the 2010 US Census, the population was determined to be 159,720, an increase of 5.5 percent since 2000. The total land area is 162 square miles (Reference 24). The economy is diversified, including light industry and agriculture.

Kenton County, named for Simon Kenton, an early pioneer, was founded in 1840 from lands taken from Campbell County. It is part of the Bluegrass Region and is underlain by rocks of the Ordovician geological age. The topography of northern Kenton County is generally rough. The topsoil, except for the Ohio River alluvium, is thin, rocky, and covers limestones and calcareous shales. It has a very slow infiltration rate when saturated and a moderate to high runoff potential.

The area climate is generally temperate and well-suited to agriculture and other human activities. The climate elements of sunlight, heat, moisture, and winds are all in moderation without prolonged extremes. Rainfall is abundant and fairly regular throughout the year, usually as short showers. Heavy snowfalls are rare.

The seasons differ markedly; warm to cool weather prevails, with extremes of heat and cold occurring only for short durations. Mean annual rainfall is 50 inches and mean annual temperature is 56°F.

All streams, or portions thereof, included in this study are entirely within Kenton County. The extreme upper end of Banklick Creek extends into Boone County. The Ohio River borders Kenton County to the north. It flows generally southwest; has a drainage area of 204,000 square miles at the mouth; and is the border between Hamilton County, Ohio, and Kentucky. Most of the reach is in backwater from a series of high-level dams. The stream has a wide, meandering flood plain that is inundated by high-level floods and, at times, will cause backwater as far upstream as Holds Branch. The floodplain of the Ohio River in the unincorporated areas of Kenton County consists of rural farmland.

Pleasant Run Creek, a tributary to the Ohio River, has a drainage area of 6.2 square miles at its mouth at Bromley, Kentucky. The length of Pleasant Run Creek studied in detail is approximately 1.5 miles, and the stream gradient is approximately 100 feet per mile. Pleasant Run Creek rises in the vicinity of South Fort Mitchell and Crescent Park and runs generally north to the Ohio River. Up to the first bridge on Bromley-Crescent Springs Road, Pleasant Run Creek is subject to backwater flooding from the Ohio River.

The banks of the main channel are low, and the flood plains are wide, flat, and subject to flooding by headwater floods as well as backwater floods. Between the first bridge on Bromley Road and the bridge on Bromley and Amsterdam Roads, the banks are moderately high and flooding is less severe along the flood plains. Most of the area is in pasture up to Bromley and Amsterdam Roads. One trailer court is located in this reach of Pleasant Run Creek, and there is potential for future development. Upstream from Pleasant Run Creek Tributary, above Bromley and Amsterdam Roads, Pleasant Run Creek is deeply entrenched and flood flows are confined to the main channel most of the way to the second culvert under the Southern Railroad. There is no potential for development along this reach of Pleasant Run Creek, except along the high banks above the threat of high water. Upstream from the second railroad culvert, as the stream flows through the City of Fort Mitchell, the banks are low and subject to overflow. Part of a trailer court occupies a landfill between the third and fourth railroad culverts. The portion of the trailer court on the landfill has been flooded several times since development.

Above the fourth railroad culvert, the stream reenters unincorporated Kenton County land. The banks of Pleasant Run Creek are low and subject to overflow. The floodplains are wide and slope gradually towards the main channel. The floodplain downstream from Pleasant Run Road is cultivated, but has potential for future development. Urbanization has occurred along Pleasant Run Creek upstream from Pleasant Run Road.

Pleasant Run Creek Tributary 2, which runs along Bromley and Amsterdam Roads, rises north of the City of Crescent Springs and flows generally easterly to Pleasant Run Creek. The upstream three-fourths of the stream is deeply entrenched; the valley walls are steep, and there is little or no flood plain. The downstream one-fourth of the creek has a moderately deep channel with narrow flood plains that are subject to flooding during extreme floods, and has potential for urban development. The Licking River forms the eastern boundary of Kenton County. The stream rises in the southeastern part of Kentucky in Magoffin and Floyd Counties. The drainage area is 3,707 square miles at the confluence with the Ohio River. Flows are regulated by Cave Run Dam near Morehead, Kentucky. The intervening drainage area between Cave Run Dam and the mouth is 2,981 square miles. The Licking River valley in Kenton County is wide and meandering. The valley walls are generally steep and run down to the main channel in places, while there are wide floodplains in others. The floodplains are generally low and subject to flooding during moderate to extreme floods. Flooding along the lower Licking River is influenced by backwater from the Ohio River. Very little development has occurred along the Licking River flood plains because of the depth of flooding; however, they do have potential for future development. Banklick Creek rises along the southern end of the Boone-Kenton County border near Walton, Kentucky and runs generally northeast through the Cities of Independence, Covington, and Fort Wright, then east through the Cities of Covington and Taylor Mill to the Licking River.

The drainage area of Banklick Creek is 58.3 square miles at its mouth. During extreme floods, backwater from the Licking River extends approximately 4.5 miles up Banklick Creek. The banks of Banklick Creek are generally low and subject to overflow during moderate floods. The floodplains are generally wide. Flood plains in the upper three-fourths of the basin are comprised of pasture and timberlands, but are considered to have potential for urban development. The lower one-fourth of the basin is being urbanized rapidly. Fowler Creek rises near Nicholson, Kentucky, flows generally north, and empties into Banklick Creek. It has a drainage area of 7.9 square miles at the mouth. The stream gradient is steep between the mouth and Pelly Road, approximately 77 feet per mile. The main channel is deep and has little or no floodplain. Upstream from Pelly Road, the stream gradient is mild, approximately 42 feet per mile. The banks of Fowler Creek above the mouth of Thompson Branch are generally low, and the floodplains are wide and subject to frequent flooding in some areas.

The floodplains are used for agricultural purposes. Thompson Branch rises near White Tower, Kentucky, and flows generally north before emptying into Fowler Creek. It has a drainage area of 2.0 square miles at the mouth. Thompson Branch is approximately 0.8 mile long, and the stream gradient is approximately 55 feet per mile. The floodplains are wide and subject to frequent flooding. Highways and many private roads are subject to frequent flooding. No buildings are within the flooded area of Thompson Branch. Brushy Fork, a tributary of Banklick Creek, has a drainage area of 5.2 square miles at the mouth and is approximately 3.7 miles long. The stream gradient is mild, approximately 27 feet per mile. The floodplains are generally wide and subject to frequent flooding. Highways are subject to flooding in several places. Few buildings are within the flooded area of Brushy Fork. The portion of Brushy Fork included in this county study is the upper end of the stream and consists of a 0.6-mile long reach above Shaw Road. This reach is sparsely settled, but has potential for future development. Decoursey Creek flows generally north through the extreme eastern part of Kenton County. It rises near the Town of White Tower, Kentucky, and flows nearly parallel to the Licking River. The drainage area is 8.7 square miles, and the basin slope is approximately 15 feet per mile. The channel is deeply entrenched and not subject to overflow from headwater floods; however, the lower end of the reach will overflow from backwater from the Licking River.

City of Bromley

The City of Bromley is in the extreme north-central part of Kentucky and is a part of the metropolitan area immediately south of Cincinnati, Ohio. It has a population of 784 (2006 census projection); a decrease of 24 percent from the 1975 census (Reference 10). The economy is diversified, including light industry and agriculture. Pleasant Run Creek rises between South Fort Mitchell and Lakeside, Park, Kentucky, and flows generally northeast through lightly urbanized development before entering the Ohio River between Ludlow and Bromley.

City of Covington

The City of Covington is in the northeastern part of Kenton County, directly south of Cincinnati, Ohio.

The Covington area contains predominantly steep to very steep terrain that has clayey subsoil on limestone and shale uplands. The soils along the Ohio River are generally loamy or sandy and better drained than the soils along the Licking River and the small

creeks in the area. Many soils along the Licking River and small creeks formed in slack water, fine-textured sediments (Reference 4).

Covington, one of the two recognized county seats, with a 2006 census population estimation of 42,811 (Reference 10), features a diversified economy of both manufacturing and wholesale-retail outlets. Growth potential indicators of the Cincinnati metropolitan area portend a promising future for the Covington area.

Development in the floodplains of the studied streams is very limited at the present. Areas along the Ohio and Licking Rivers are protected by a system of floodwalls and levees, and any development is primarily a river-oriented commercial enterprise. The floodplain of Banklick Creek underwent development and some channel realignment in the 1980s (Reference 4).

City of Fort Wright

The City of Fort Wright is located in the north-central part of Kentucky and is a part of the metropolitan area immediately south of Cincinnati, Ohio. The economy is diversified, including light industry and agriculture.

Banklick Creek, which flows generally north through the city, rises in the southwestern part of Kenton County near Walton, Kentucky. It has a drainage area of 58.3 square miles and flows generally northeast through undeveloped farmland before entering the Licking River near Fort Wright. The basin slope of Banklick Creek at the reach along Fort Wright is approximately 6 feet per mile.

Horse Branch, Horse Branch Tributary, and Banklick Creek Tributary are all steep-gradient streams, characterized by deep narrow channels and much rock outcrop. Horse Branch rises near Edgewood, Kentucky, flows generally northeast, and empties into Banklick Creek. It has a drainage area of 4.2 square miles, is 0.7 mile long, and has a gradient of approximately 80 feet per mile. Horse Branch Tributary rises in Fort Wright, Kentucky, and flows generally south before emptying into Horse Branch a short distance upstream from the mouth. It has a drainage area of 1.5 square miles, is 0.6 mile long, and has a gradient of approximately 96 feet per mile. Banklick Creek Tributary rises near Kenton Vale, Kentucky, and flows generally southeast to empty into Banklick Creek. It has a drainage area of 0.8 square mile, is 0.6 mile long, and has a gradient of approximately 60 feet per mile.

City of Independence

The City of Independence, located in central Kenton County, in the extreme north-central part of Kentucky, is a part of the metropolitan area immediately south of Cincinnati, Ohio. It is one of the two recognized county seats of Kenton County. Independence had a population of 19,065 (2005 census projection), an increase of 13,830 over the 1975 census figure (Reference 10). The economy is diversified, including light industry and agriculture.

Communities adjacent to the City of Independence are the City of Ridgeview Heights to the northwest, the City of Latonia Lakes to the northeast, Boone County to the west, and unincorporated areas of Kenton County to the south. Banklick Creek, which flows generally northeast through the City of Independence, originates in southwestern Kenton

County, near the City of Walton, Kentucky. It is the parent stream for Fowler Creek and Brushy Fork.

Banklick Creek has a drainage area of 22.1 square miles at the mouth of Fowler Creek (outside the corporate limits). It flows generally northeast through undeveloped farmland before entering Licking River, near the City of Taylor Mill, northeast of Independence. The stream gradient of Banklick Creek is generally mild; basin slope for the reach through Independence is approximately 33 feet per mile. The banks are generally low, and the floodplain is wide and subject to frequent flooding in many areas. A 1,900-foot—long channel diversion runs upstream from the mouth of Brushy Fork. The channel diversion is deeply entrenched in bedrock and not subject to overflowing.

Fowler Creek originates near Nicholson, Kentucky, flows generally north, and empties into Banklick Creek outside the corporate limits. It has a drainage area of 7.9 square miles at the mouth. The stream gradient is steep, approximately 77 feet per mile, between the mouth and Pelly Road (outside the corporate limits). The main channel is deep, with little or no floodplain. Upstream from Pelly Road and within the City of Independence, the stream gradient is mild, approximately 42 feet per mile; the banks are generally low, and the flood plain is wide and subject to frequent flooding in some areas. Severe flooding along Fowler Creek upstream from McCullum Pike inundates Oliver Road and some buildings along the banks of the stream.

Brushy Fork begins near Banklick, Kentucky, to the south of Independence, and flows generally north before emptying into Banklick Creek. It has a drainage area of 5.2 square miles at the mouth and is approximately 3.7 miles long. The stream gradient is mild, approximately 27 feet per mile. The floodplain is generally wide and subject to frequent flooding. Highways are subject to flooding in several places. Few buildings are located within the Brushy Fork floodplain.

City of Ludlow

The City of Ludlow is in the extreme north-central part of Kentucky and is a part of the metropolitan area immediately south of Cincinnati, Ohio. It has a population of 4,674 (2005 census projection) a decrease of 90 from the 1975 census (Reference 10). The economy is diversified, including light industry and agriculture. Pleasant Run Creek rises between South Fort Mitchell and Lakeside Park, Kentucky, and flows generally northeast through lightly urbanized development before entering the Ohio River between Ludlow and Bromley. Pleasant Run Creek Tributary rises in Lookout Heights, Kentucky, and flows north-northwest to enter Pleasant Run Creek on the west side of Ludlow.

City of Taylor Mill

The City of Taylor Mill is located in the extreme north-central part of Kentucky and is a part of the metropolitan area immediately south of Cincinnati, Ohio. It is bordered on the north, south, and west by the City of Covington and on the east by the City of Fairview and the unincorporated areas of Kenton County. The economy is diversified, including light industry and agriculture. The City has a 2005 census population estimate of 6,733 (Reference 10).

Banklick Creek has a drainage area of 58.3 square miles at the mouth and flows generally northeast through undeveloped farmland before entering the Licking River near the City of Taylor Mill.

Banklick Creek, which flows along the north side of the city, rises in the southwestern part of Kenton County near the Town of Walton, Kentucky. Basin slope of Banklick Creek at the reach along the City of Taylor Mill is approximately 6 feet per mile.

2.3 Principal Flood Problems

Kenton County

Past flooding on the streams within Kenton County indicates that flooding may occur during any season of the year. The majority of major floods occurred during February, March, April, and May. Runoff from snowmelt is generally inconsequential, but can be significant at times. Storms occurring during the early summer months are often associated with tropical storms moving north from the Gulf of Mexico. Intense rainfall is the major cause of headwater floods. Flooding from streams in the Banklick Creek basin results primarily from bank overflow rather than backwater because of the steep gradient of the tributaries; however, backwater flooding does occur at the lower ends of Pleasant Run Creek, Banklick Creek, and Decoursey Creek. The Ohio River backs up Pleasant Run Creek, while the Licking River contributes to the backwater flooding of Banklick Creek and Decoursey Creek. Major flood problems in the Banklick Creek basin have not been adequately documented, because of the lack of stream gages and records. The most recent and maximum known headwater flood on Banklick Creek occurred on July 15, 1962, and was centered in Fort Wright, Kentucky. Reliable bucket catches of rainfall collected by the U.S. Geological Survey ranged from 7.0 to 7.7 inches, and the discharge at the Louisville and Nashville Railroad Bridge in Lakeview was 16,400 cubic feet per second. The recurrence interval of this flood has been estimated at 200 years. Most of the rainfall occurred between 8:30 and 9:00 a.m. Many houses in the basin were damaged, and several were destroyed. One life was lost.

Stream gradients on tributaries are mild to steep upstream from the floodplain of the Ohio River and Licking River. The valleys of the tributary streams are generally narrow with very little floodplain of their own, and hazardous velocities are the rule rather than the exception. Flood damage is primarily limited to bank erosion.

A USACE Report from December 1968 notes significant flooding events on the Licking River in January 1937, April 1948, May 1961, and March 1964 (Reference 1).

City of Bromley

No record exists of major floods on Pleasant Run Creek since these floods are normally minimal compared to floods on the Ohio River. Headwater floods are produced by intense rainfall in the basin. Stream gradient is extremely steep upstream from the floodplain of the Ohio River. The valley is narrow with very little floodplain, and hazardous velocities are the rule rather than the exception. Flood damage is primarily limited to bank erosion. The maximum known backwater flood to affect the City of Bromley occurred in January 1937 and was caused by backwater from the Ohio River. Velocities were negligible at this time, but a stage of 507.2 feet National Geodetic Vertical Datum of 1929 (NGVD29) occurred in downtown Bromley and caused severe damage from inundation.

City of Covington

Major flood problems along the Ohio and Licking Rivers have been negated by the construction of a system of floodwalls and levees. This system will provide a level of

protection equal to 3 feet above the flood record set in January-February 1937 (Reference 11). The damages resulting from the 1937 flood in Covington were about $1,400,000. A flood of this magnitude in the Covington area would have a recurrence interval in excess of 500 years.

City of Fort Wright

The maximum known backwater flood to affect the City of Fort Wright occurred in January 1937 and was the result of backwater from the Licking and Ohio Rivers. A stage of 511.0 feet occurred at the mouth of Banklick Creek. Velocities were negligible because the entire lower reach of Banklick Creek was in backwater. The area along Banklick Creek was sparsely settled and damage was minor.

No records exist of floods on Horse Branch, Horse Branch Tributary, or Banklick Creek Tributary since these floods are normally minimal compared to floods on Banklick Creek. Headwater floods are produced by intense rainfall in the basin. Stream gradient is extremely steep upstream from the floodplain of Banklick Creek. The valley is narrow with very little floodplain, and hazardous velocities are the rule rather than the exception.

City of Independence

Within the City of Independence, no records exist for floods on Banklick Creek, Fowler Creek, or Brushy Fork. Headwater floods are produced by intense rainfall in the basin. Stream gradients on tributaries are steep to mild upstream of the floodplain of Banklick Creek. The valley is narrow with very little floodplain, and hazardous velocities are the rule rather than the exception. Flood damage is primarily limited to bank erosion.

City of Ludlow

No record exists of major floods on Pleasant Run Creek and Pleasant Run Creek Tributary since these floods are normally minimal compared to floods on the Ohio River. Headwater floods are produced by intense rainfall in both basins. Stream gradient is extremely steep upstream from the flood plain of the Ohio River. The valley is narrow with very little flood plain and hazardous velocities are the rule rather than the exception. Flood damage is primarily limited to bank erosion.

The maximum known backwater flood to affect the City of Ludlow occurred in January 1937, and was caused by backwater from the Ohio River. Velocities were negligible at this time, but a stage of 507.2 feet occurred in downtown Ludlow and caused severe damage from inundation.

City of Taylor Mill

No record exists of major floods on Holds Branch because these floods are normally minimal compared to floods on Banklick Creek. Headwater floods are produced by intense rainfall in the basin. Stream gradient is extremely steep upstream from the floodplain of Banklick Creek. The valley is narrow with very little floodplain, and hazardous velocities are common. Flood damage is primarily limited to bank erosion.

The maximum known backwater flood to affect the City of Taylor Mill occurred in January 1937, and was the result of backwater from the Licking River. A stage of 511.0 feet NGVD29 occurred at the mouth of Banklick Creek. Velocities were negligible because the entire lower reach of Banklick Creek was in backwater. The area along Banklick Creek was sparsely settled and damage was minor.

2.4 Flood Protection Measures

Kenton County

There are no known flood protection structures for the unincorporated areas of Kenton County. Residential and commercial development along all streams studied has stimulated interest in their flood potential.

The U.S. Soil Conservation Service constructed Doe Run Lake (Dam No. 3) on Bullock Pen Creek, a Banklick Creek tributary, to reduce flood peaks downstream of this facility.

The Cave Run Dam in Morehead, Kentucky, operated by the COE for flood control of the Licking River, reduces flood peaks at Covington and Fort Wright. The dam was built for multiple purposes, including flood protection and recreation.

City of Bromley

There is no flood protection of any kind for the City of Bromley.

City of Covington

The Covington local flood protection project, consisting of levees, floodwalls, pumping plants, and other necessary appurtenances, affords protection to the City of Covington against Ohio River and Licking River floods equal to the maximum of record (1937 flood) with a freeboard of 3 feet (Reference 11). With additional reductions provided by the upstream reservoir system, a flood of this magnitude would have a recurrence interval in excess of 500 years. Except in isolated cases, flooding from interior drainage in protected areas is not considered a problem.

City of Independence

No flood protection structures exist in the City of Independence. Residential and commercial development along all three streams has stimulated interest in their flood potential.

City of Ludlow

There is no flood protection of any kind for the City of Ludlow.

City of Taylor Mill

There are no flood protection structures for the City of Taylor Mill. Residential development along Holds Branch has stimulated interest in the flood potential of this stream. In the early l960s, the channel bottom was dredged approximately three (3) feet.

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 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-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 (100-year) 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.

Previous Countywide Analysis

For existing approximate and limited detailed studies included in this FIS, 1-percent annual chance discharges were obtained from the USGS regression equations presented in USGS Water Resources Investigations Report (WRIR) 03-4180 (Reference 12).

Hydrologic and hydraulic analyses for Banklick Creek and Fowler Creek were provided by the U.S. Army Corps of Engineers, Louisville District. Discharges were calculated using a 2002 HEC-HMS model imported from a previous COE HEC-1 model (Reference 13). The Banklick Creek hydrologic analysis incorporated a Soil Conservation Service (SCS) model study developed for the construction of SCS Dam No. 3 (Doe Run Lake), tributary to Banklick Creek.

The following section is a compilation of previously published hydrologic information from earlier FIS reports.

For Pleasant Run Creek, Pleasant Run Creek Tributary 1, Pleasant Run Tributary 2, Banklick Creek Tributary, Horse Branch, Horse Branch Tributary, Banklick Creek (upstream of the updated 2002 COE model), Fowler Creek (upstream of the updated 2002 COE model), Brushy Fork, Thompson Branch, Holds Branch and DeCoursey Creek, the discharges for the 10-, 2-, 1- and 0.2-percent annual chance floods were determined using *Estimating Magnitude and Frequency of Floods in Kentucky*, which relates drainage area and a dimensionless geographical factor to stream flow characteristics (Reference 16). The geographical factor provides an index of the variations in flood peaks with geology and topography.

Revised Analysis

An updated gage analysis of the Licking River is performed using USGS Gage 03253500, "Licking River at Catawba, KY," which has collected peak annual regulated flow data from 1974 to 2009.

The USACE produced the stage-discharge-frequency curves for the Ohio River Basin Comprehensive Survey Appendix C, Hydrology (USACE, 1966). For the Ohio River natural flood frequency computations, the observed peak annual flows for all years since initiation of storage were adjusted to natural conditions by evaluating actual reservoir effects existing at that particular time. The computed natural statistics (mean, standard

deviation, coefficient of skew) for the entire period of record were adjusted by reconciling adjacent points and comparing drainage area proportions to produce consistent statistics throughout the length of the Ohio River (U.S. Department of the Interior, 1965). Stage-frequency curves were developed by converting flows to stage using crest stage-maximum discharge relationships plotted from historical data and extended rating curves prepared in connection with an Ohio River Standard Project Flood (SPF) study (USACE, 1966).

To determine modified flood peaks for the Ohio River, 12 historical floods plus 3 hypothetical floods of greater magnitude were used in the analyses of flow modification (USACE, 1966). The flows for those 15 floods; which are considered representative of the basin, were modified by the operation of USACE reservoirs. That system included reservoirs that were completed or near completion in 1976. Graphs showing the amount of reduction in peak discharge versus the natural discharge for the foregoing inundations were used to develop curves indicating average reservoir system capability to reduce peak flows for various recurrence intervals.

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

Table 3- Summary of Discharges

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10%-ANNUAL-CHANCE	2%-ANNUAL-CHANCE	1%-ANNUAL-CHANCE	0.2%-ANNUAL-CHANCE
BANKLICK CREEK					
At confluence with Licking River	58.3	9,950	16,200	19,300	27,600
Above confluence with Horse Branch	50.4	9,530	15,700	18,700	26,500
Just upstream of confluence of Holds Branch	46.4	10,400	16,400	19,300	27,000
Above confluence with Bullock Pen Creek	33.8	9,580	15,400	18,300	25,700
Above confluence with Wayman Branch	*	9,090	14,700	17,400	24,500
Above confluence with Fowler Creek	22.1	6,390	10,400	12,400	17,506
Above confluence with Brushy Fork	15.1	2,250	3,340	3,830	4,990
Above Cody Road	14.1	2,150	3,190	3,660	4,770
BANKLICK CREEK TRIBUTARY 2					
At confluence with Banklick Creek	0.8	302	468	539	719

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10%-ANNUAL-CHANCE	2%-ANNUAL-CHANCE	1%-ANNUAL-CHANCE	0.2%-ANNUAL-CHANCE
BRUSHY FORK					
Above confluence with Banklick Creek	5.2	1,090	1,640	1,890	2,490
Above Independent Station Road	4.1	930	1,410	1,620	2,140
Above Banklick Station Road	2.9	740	1,130	1,300	1,720
DECOURSEY CREEK					
At confluence with Licking River	8.7	1,560	2,330	2,670	3,500
FOWLER CREEK					
At confluence with Banklick Creek	7.9	2,780	4,420	5,220	7,170
At confluence with Thompson Branch	4.5	990	1,490	1,720	2,260
Above Harris Road	2.1	590	900	1,040	1,380
HOLDS BRANCH					
At mouth	2.3	634	965	1,120	1,470
HORSE BRANCH					
At confluence with Banklick Creek	4.2	940	1,430	1,640	2,160
Just upstream of confluence with Horse Branch Tributary	2.7	705	1,070	1,240	1,640
HORSE BRANCH TRIBUTARY					
At confluence with Horse Branch	1.5	463	710	821	1,090
LICKING RIVER					
At confluence with Ohio River	3,707	74,400	93,500	109,700	138,600
Just upstream of Banklick Creek	3,637	73,500	92,400	108,400	137,000
At River Mile 18.6	3,513	71,900	90,400	106,100	134,100
OHIO RIVER					
Markland L&D Upper Gage (Mile 531.5)	83,170	565,000	705,000	760,000	890,000
Mile 474 at Cincinnati gage	76,580	532,000	663,000	718,000	842,000

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10%-ANNUAL-CHANCE	2%-ANNUAL-CHANCE	1%-ANNUAL-CHANCE	0.2%-ANNUAL-CHANCE
PLEASANT RUN CREEK					
Confluence with Ohio River	6.2	1,230	1,850	2,130	2,790
Above confluence with Pleasant Run Creek Tributary	5.1	1,080	1,620	1,870	2,460
Above Cross Section I	3.9	905	1,370	1,580	2,080
Above confluence with Pleasant Run Creek Tributary	1.8	530	810	935	1,240
PLEASANT RUN CREEK TRIBUTARY 1					
At confluence with Pleasant Run Creek (Amsterdam Road)	1.6	497	761	880	1,170
PLEASANT RUN CREEK TRIBUTARY 2					
At confluence with Pleasant Run Creek	1.1	382	589	682	907
THOMPSON BRANCH					
At confluence with Fowler Creek	2.0	560	860	990	1,320

* Data not provided in previous study

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.

Previous Analysis

For new and revised approximate and limited detailed studies in this updated FIS, hydraulic analyses for the 1-percent annual chance flood event were performed using the U.S.

Army Corps of Engineers Hydrologic Engineering Center River Analysis Software (HEC-RAS) model, version 3.1.3 (Reference 17).

Models for revised approximate study reaches contained unsurveyed cross- sections with an average spacing of approximately 1,000 feet and did not include structures, such as bridges and culverts. Models for limited detailed studies contained unsurveyed cross-sections with an average spacing of approximately 500 feet and included structures.

Cross-section geometry model data was created using 2-foot contour topographic mapping from the Northern Kentucky Planning Commission (NKAPC). Structure geometry information was obtained from measurements recorded during field reconnaissance and construction drawings obtained from the Kentucky Transportation Cabinet.

Aerial photography from 2004 obtained from NKAPC and photographs and notes from FMSM field reconnaissance were used to determine Manning's roughness coefficients for the hydraulic models. A representative overbank and channel Manning's roughness coefficient was selected for each revised approximate study reach. Limited detailed study reach models included variation in Manning's roughness coefficients. Roughness values ranged from 0.030 to 0.100 for the overbanks and 0.030 to 0.070 within the channel.

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

Water-surface elevations of floods of the selected recurrence interval for the Ohio River were computed using the USACE HEC-RAS River Analysis step- backwater computer program. Starting water-surface elevations for the Ohio River HEC-RAS models were obtained using gaged data and known elevation- discharge relationships at those locations.

Roughness factors (Manning's "n") used in the hydraulic computations were chosen by field inspection and HEC-2 model reproduction of historic highwater profiles.

A HEC-RAS hydraulic model for Banklick Creek and Fowler Creek was provided by the U.S. Army Corps of Engineers, Louisville District for this updated FIS. Cross-section geometric data was created using 2' or 4'-contour topographic mapping from the Northern Kentucky Area Planning Commission (NKAPC).

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 Flood Insurance Study 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 topographic data was used to redelineate floodplain boundaries, the "profile base line" may deviate significantly from the channel centerline or may be outside the Special Flood Hazard Area (SFHA).

Roughness factors (Manning's "n") used in the hydraulic computations were chosen using engineering judgment and were based on field observations of the streams and

flood plain areas. Roughness coefficients for streams studied in detail in Kenton County are found in Table 4.

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 Digital Flood Insurance Rate Maps (Exhibit 2).

The following section is a compilation of hydraulic information from previously published FIS reports where streams were studied in detail.

Kenton County

Tranquil flow exists for Brushy Fork and Decoursey Creek, and the profiles were determined by the use of the U.S. Geological Survey E43l step-backwater computer program (Reference 18). Both rapid and tranquil flow occur in all other streams in this study, and alternate water—surface elevations, based on computer program J635 (Reference 19), were used to define the profile in reaches where rapid flow occurs; where tranquil flow occurred, computer program E43 1 was used.

Cross sections for the backwater analysis of the streams studied in Kenton County were obtained from a ground survey run by the study contractor. Both the above-water and below-water ground elevations were obtained by field measurement. All bridges were field checked to obtain elevation data and structural geometry.

Starting water-surface elevations for Pleasant Run Creek, Banklick Creek, and Decoursey Creek were provided by the U.S. Army Corps of Engineers, Louisville District, Hydraulics Branch. Those for Pleasant Run Creek were based on Ohio River profiles developed through use of the HEC-2 computer program (Reference 21) for the City of Cincinnati, Ohio, and Hamilton County, Ohio, Flood Insurance Studies (References 22 and 20, respectively). Those for DeCoursey Creek were based on Licking River profiles developed for the FIS for Campbell County, Kentucky (Reference 15). Confluence elevations were used because it was determined that these flooding sources would peak at the same time, and this would represent the most extreme possible combination of events.

Starting water-surface elevations for Fowler Creek, Thompson Branch, and Brushy Fork were taken at the confluence with Banklick Creek because flooding was determined to be coincident. Starting elevations were determined for Pleasant Run Creek Tributary using a bridge analysis at the Oak Street crossing, downstream of Kenton County. Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1).

City of Bromley

Cross sections for the backwater analysis of Pleasant Run Creek were obtained from a ground survey run January 1977. Both the above-water and below-water sections were obtained in this manner.

Channel-roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgment and based on field observations of the streams and flood plain areas. Roughness values for the main channel of Pleasant Run Creek range from 0.040 to 0.045 with floodplain roughness values ranging from 0.050 to 0.150 for all floods.

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the USGS computer step-backwater models E431 and J635. Starting water-surface elevations for Pleasant Run Creek were furnished by the COE based on profiles of the Ohio River obtained by use of the COE HEC-2 step-backwater computer program (Reference 21). The starting elevation for the 10-year flood only was computed using standard methods for computing water- surface elevations on the upstream side of culverts. Cross section A on Pleasant Run Creek is immediately upstream from a three-barrel culvert under Oak Street. Water-surface elevations for the 2-, 1- and 0.2-percent annual chance floods on the Ohio River were sufficiently high to flood Oak Street and elevations furnished by the COE were used.

City of Fort Wright

Cross sections for Banklick Creek Tributary, Horse Branch, and Horse Branch Tributary were obtained by field survey.

Starting water-surface elevations were computed by the slope-area method. Through use of the USGS E431 and J635 computer programs for Banklick Creek Tributary, Horse Branch, and Horse Branch Tributary.

Roughness coefficients (Manning's "n") were chosen on the basis of field investigations and verification of known high-water elevations.

City of Independence

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the U.S. Geological Survey step-backwater computer models E-43l and J-635. Brushy Fork, within the corporate limits of Independence, exhibits tranquil flow, and the profile was determined by use of computer program E-431. Both rapid and tranquil flow occur in Banklick Creek and Fowler Creek. Alternate water-surface elevations were used to define the profile in reaches with increased velocities.

Cross sections for the backwater analysis of Banklick Creek, Fowler Creek, and Brushy Fork were obtained from a ground survey performed during January 1977. Both the above-water and below- water ground elevations were obtained by field measurement. All bridges were field checked to obtain elevation data and structural geometry.

Roughness coefficients (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and based on field observations of the streams and flood plain areas. Roughness values for the main channel of Banklick Creek ranged from 0.050 to 0.070, with overbank roughness values ranging from 0.050 to 0.065. Corresponding channel roughness values for Fowler Creek and Brushy Fork ranged from 0.035 to 0.080 and from 0.035 to 0.055, respectively, and corresponding overbank roughness values ranged from 0.035 to 0.050 and 0.035 to 0.060, respectively.

Starting water-surface elevations for floods of selected recurrence intervals on Banklick Creek were obtained from confluence elevations based on Licking River profiles developed for the Flood Insurance Study for the City of Covington, Kentucky (Reference 4). Starting elevations for Fowler Creek and Brushy Fork were obtained from the confluence elevations at Banklick Creek, based on normal-depth calculations.

City of Ludlow

Cross section data for the streams in the study area were obtained by a ground survey run January 1977. All bridges and culverts were field surveyed to obtain elevation data and structural geometry. Cross sections were located at close intervals upstream and downstream of bridges and culverts in order to compute significant backwater effects of these structures.

Cross sections for the backwater analysis of Pleasant Run Creek and Pleasant Run Creek Tributary were obtained from a ground survey run January 1977. Both the above-water and below-water sections were obtained in this manner. There are no bridges or culverts directly within the backwater analysis. Apparent stream crossings on the topographic map, are in reality, fords. Elevations of low steel and top of road were obtained for all stream crossings within the City of Ludlow, but outside of the backwater analysis.

Channel-roughness factors (Manning's "n") used in the hydraulic computations, were chosen by engineering judgment and based on field observations of the streams and floodplain areas. Roughness values for the main channel of Pleasant Run Creek range from 0.040 to 0.045 with floodplain roughness values ranging from 0.050 to 0.150 for all floods. Roughness values for the main channel of Pleasant Run Creek Tributary range from 0.035 to 0.150 with floodplain roughness values ranging also from 0.035 to 0.150 for all floods.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Water-surface elevations of floods of the selected recurrence intervals were developed using the USGS's computer step-backwater Models E431 and J635. Starting water-surface elevations for Pleasant Run Creek and Pleasant Run Creek Tributary 1 were furnished by the COE based on profiles of the Ohio River obtained by use of the COE HEC-2 step-backwater computer program. The starting elevation for the 10-year flood, only, was computed using standard methods for computing water-surface elevations on the upstream side of culverts. Section A on Pleasant Run Creek is immediately upstream from a three-barrel culvert under Oak Street. Water- surface elevations for the 2-, 1- and 0.2-percent annual chance floods were sufficiently high to flood Oak Street and elevations furnished by the COE for the Ohio River were used.

City of Taylor Mill

Cross sections for the flooding sources studied by detailed methods were obtained from field surveys. All bridges, drains, and culverts were field surveyed to obtain elevation data and structural geometry.

For Holds Branch, water-surface elevations of floods of the selected recurrence intervals were computed using the USGS E431 and J635 computer step- backwater models. Starting water-surface elevations for Holds Branch were taken from the Banklick Creek profiles from the FIS for the Village of Lakeview, Ohio (Reference 23).

Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Roughness factors (Mannings "n") used in the hydraulic computations were chosen by field investigations and verification of known high-water elevations. For Banklick

Creek, the channel "n" values ranged from 0.045 to 0.080, and the overbank "n" values ranged from 0.040 to 0.075. For Holds Branch, the channel "n" values ranged from 0.030 to 0.055, and the overbank "n" values ranged from 0.035 to 0.055.

Table 4- Manning's "n" Values

Stream	Channel "n"	Overbank "n"
Banklick Creek	0.03 5-0.050	0.03 5-0.080
Banklick Creek (effective)	0.050-0.070	0.050-0.065
Banklick Creek Tributary	0.050-0.05 5	0.050-0.075
Brushy Fork	0.03 5-0.055	0.03 5-0.060
DeCoursey Creek	0.035-0.040	0.035-0.040
Fowler Creek	0.035-0.050	0.035-0.075
Fowler Creek (effective)	0.035-0.080	0.035-0.050
Holds Branch	0.030-0.055	0.035-0.055

Table 4- Manning's "n" Values (cont.)

Stream	Channel "n"	Overbank "n"
Horse Branch	0.035-0.075	not published
Horse Branch Tributary	0.035-0.075	0.035-0.075
Licking River	0.050-0.100	0.050-0.150
Ohio River	0.027-0.035	0.040-0.110
Pleasant Run Creek	0.040-0.045	0.040-0.150
Pleasant Run Creek Tributary 1	0.035-0.150	0.035-0.150
Pleasant Run Creek Tributary 2	0.040-0.050	0.035-0.045
Thompson Branch	0.035-0.075	0.035-0.070

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 2- and 1-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.

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

Revised Analysis

This FIS update is comprised entirely of new approximate studies, an updated study of the Licking River, and a leverage study of the Ohio River. All information provided in the previous analysis is valid for past studies, none of which have been modified in the current study.

Hydraulic analyses of the 1-percent annual chance flood event for new approximate studies were performed using U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis Software (HEC-RAS), version 4.1.0.

New approximate studies were modeled using unsurveyed cross-sections at a spacing of approximately 500 feet. Cross-section elevation data was extracted from LIDAR topographic data generated by the Northern Kentucky Area Planning Commission (NKAPC) in 2007.

Manning's n values were determined for approximate studies based on effective model data and visual inspection of study areas. Values of 0.035-0.05 for channel roughness and 0.06-0.1 for overbank roughness were used in this study.

Ohio River

A HEC-RAS hydraulic model for the Ohio River, Markland Pool reach, was provided by the U.S. Army Corps of Engineers, Louisville District for this updated FIS. The model was developed for a Flood Insurance Study for the Ohio River.

Cross sections for the Ohio River were determined from detailed mapping with bathymetry (1" = 600' with 5-foot contour intervals), developed for the Corps of Engineers -- Ohio River navigation studies.

Licking River

For the updated study of the Licking River, channel cross section geometry was derived from the USACE HEC-RAS model. Overbank geometry for the Licking River within Kenton County was derived from LiDAR-based DEM data from the NKAPC. Structure data were obtained from Kentucky Transportation Cabinet drawings, survey, and data from the USACE HEC-RAS model. High water mark data from a 1968 USACE report were used to calibrate the model to the March 1964 flood (Reference 1). The calibration was performed by adjusting Manning's n values. A new floodway boundary was developed for this study.

The Ohio River leverage study was produced using a hydraulic model of the Ohio River Markland Pool reach provided by the U.S. Army Corps of Engineers.

All elevations were referenced to the National Geodetic Vertical Datum of 1988 (NGVD88).

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 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD88. Structure and ground elevations in the community must, therefore, be

referenced to NAVD88. Some of the data used in this study were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD88. The datum conversion factor from NGVD29 to NAVD88 in Kenton County is -0.668 feet. The data points used to determine the conversion are listed in Table 5, "Vertical Datum Conversion."

Table 5 – Vertical Datum Conversion

Quad Name	Corner	Longitude	Latitude	Conversion from NGVD to NAVD
Burlington	SE	38.99	-84.625	-0.659
Cincinnati West	SE	39.125	-84.5	-0.617
Covington	SE	39	-84.5	-0.722

Table 5 – Vertical Datum Conversion (cont.)

Independence	SE	38.87	-84.500	-0.686
Union	SE	38.87	-84.625	-0.656
			AVERAGE	**-0.668 feet**

For additional information regarding conversion between the NGVD29 and NAVD88, visit the National Geodetic Survey website at http://www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey, SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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 (100-year) flood elevations and delineations of the 1- and 0.2-percent-annual-chance (500-year) 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, Floodway Data table, and Summary of Stillwater Elevations 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 data with a contour interval of two feet.

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), 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 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 1-percent-annual-chance 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 FIS report and on the FIRM were 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 6, “Floodway Data”). 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 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

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. A listing of stream velocities at selected cross sections is provided in Table 6. 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.

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplains will not cause more than a 1.0-foot increase in the BFEs at any point within the county.

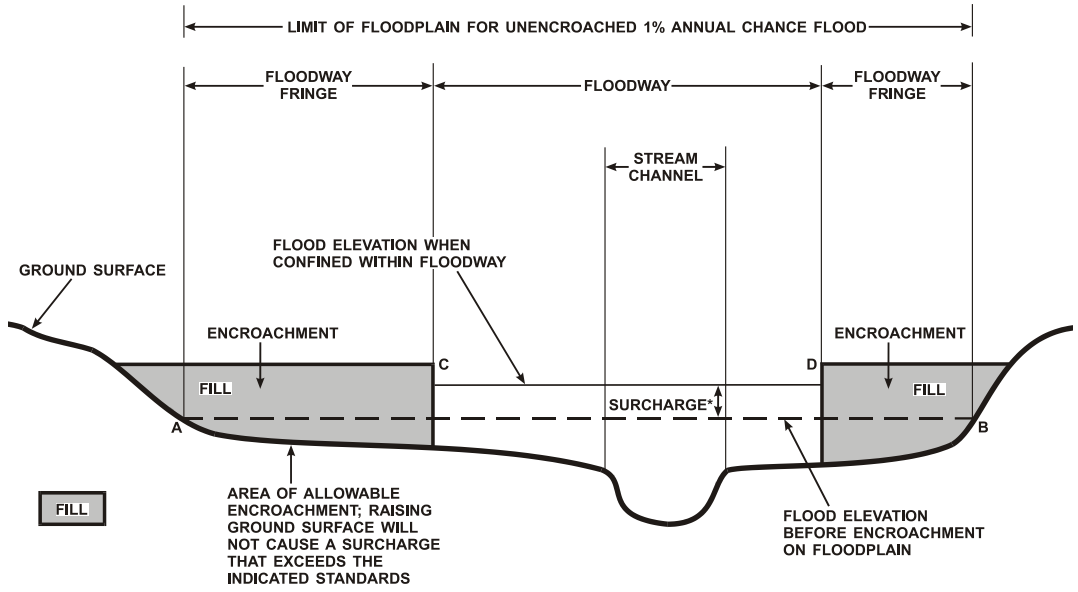

Figure 1 - Floodway Schematic

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK								
A	1,056	130	1,631	11.8	499.5	469.8 [2]	470.5 [2]	0.7
B	1,183	134	1,842	10.5	499.5	471.0 [2]	471.5 [2]	0.5
C	1,779	143	2,245	8.6	499.5	473.7 [2]	474.0 [2]	0.3
D	2,967	121	2,610	7.4	499.5	476.4 [2]	476.6 [2]	0.2
E	4,652	126	1,767	10.9	499.5	481.1 [2]	481.7 [2]	0.6
F	5,787	165	3,759	5.1	499.5	484.7 [2]	485.1 [2]	0.4
G	6,246	159	4,135	6.1	499.5	485.3 [2]	485.7 [2]	0.4
H	6,959	130	2,985	6.5	499.5	486.5 [2]	487.2 [2]	0.7
I	8,004	208	3,509	5.5	499.5	487.8 [2]	488.7 [2]	0.9
J	8,612	206	4,024	4.8	499.5	488.8 [2]	489.8 [2]	1.0
K	9,187	226	5,764	3.4	499.5	489.5 [2]	490.2 [2]	0.7
~~L~~	9,816	220	5,310	3.6	499.5	490.9 [2]	491.6 [2]	0.7
M	11,463	390	6,882	2.8	499.5	491.9 [2]	492.8 [2]	0.9
N	12,788	237	4,636	4.2	499.5	492.5 [2]	493.5 [2]	1.0
O	12,978	239	5,045	3.8	499.5	492.8 [2]	493.8 [2]	1.0
P	13,596	322	5,182	3.7	499.5	493.1 [2]	494.1 [2]	1.0
Q	14,937	225	4,078	4.7	499.5	494.1 [2]	495.0 [2]	0.9
R	15,946	427	6,245	3.1	499.5	495.0 [2]	495.9 [2]	0.9
S	17,582	442	6,694	2.9	499.5	495.7 [2]	496.7 [2]	1.0
T	18,876	126	2,632	7.1	499.5	496.1 [2]	497.1 [2]	1.0
U	19,325	190	3,344	5.6	499.5	496.9 [2]	497.8 [2]	0.9
V	20,117	155	2,459	7.6	499.5	497.6 [2]	498.5 [2]	0.9
W	20,544	153	3,616	5.2	499.4	499.4	500.1	0.7
X	21,521	156	3,315	5.6	499.8	499.8	500.5	0.7
Y	21,849	140	3,161	5.9	500.0	500.0	500.7	0.7

[1] Feet above mouth

[2] Water-surface elevations computed with consideration of backwater from Licking River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

BANKLICK 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK (continued)								
Z	23,095	166	3,869	4.8	501.1	501.1	501.8	0.7
AA	23,459	153	3,645	5.1	501.3	501.3	502.0	0.7
AB	23,728	149	3,496	5.4	501.4	501.4	502.1	0.7
AC	23,860	223	4,788	3.9	501.6	501.6	502.4	0.8
AD	24,425	306	6,736	2.8	502.1	502.1	502.9	0.8
AE	24,621	320	8,310	2.3	502.8	502.8	503.8	1.0
AF	25,481	581	9,557	2.0	503.0	503.0	504.0	1.0
AG	26,057	594	12,233	1.5	503.1	503.1	504.1	1.0
AH	26,664	334	7,063	2.7	503.1	503.1	504.1	1.0
AI	27,514	637	7,957	2.4	503.8	503.8	504.8	1.0
AJ	28,216	383	6,346	3.0	504.7	504.7	505.6	0.9
AK	28,860	380	5,919	3.2	505.0	505.0	505.9	0.9
AL	29,594	400	6,719	2.9	505.4	505.4	506.3	0.9
AM	30,196	436	6,527	3.0	505.8	505.8	506.7	0.9
AN	31,247	370	4,885	4.0	506.2	506.2	507.2	1.0
AO	32,224	409	5,444	3.5	506.9	506.9	507.9	1.0
AP	33,211	450	4,423	4.4	508.1	508.1	509.0	0.9
AQ	34,214	201	1,790	10.8	510.0	510.0	510.9	0.9
AR	35,149	357	3,000	6.4	513.8	513.8	514.5	0.7
AS	35,820	486	4,078	4.7	515.9	515.9	516.5	0.6
AT	37,625	273	3,272	5.6	520.3	520.3	520.4	0.1
AU	38,502	183	1,758	10.4	522.4	522.4	522.9	0.5
AV	38,866	224	2,161	8.5	525.0	525.0	525.3	0.3
AW	39,927	149	1,345	12.9	532.0	532.0	532.1	0.1
AX	41,010	126	1,958	8.9	539.0	539.0	539.1	0.1

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK (continued)								
AY	42,604	245	2,535	6.9	548.6	548.6	549.6	1.0
AZ	43,613	260	2,246	7.8	554.4	554.4	554.8	0.4
BA	44,621	191	2,098	5.9	562.3	562.3	562.5	0.2
BB	45,397	200	1,047	11.8	567.7	567.7	567.8	0.1
BC	45,561	215	2,472	5.0	575.1	575.1	575.1	0.0
BD	46,110	170	1,971	6.3	575.7	575.7	575.8	0.1
BE	46,749	129	1,368	9.1	577.5	577.5	577.5	0.0
BF	47,261	148	1,114	11.1	581.1	581.1	581.3	0.2
BG	47,494	196	1,709	7.3	586.8	586.8	586.8	0.0
BH	47,990	198	1,031	12.0	589.9	589.9	589.9	0.0
BI	48,576	165	1,094	11.3	596.5	596.5	596.6	0.1
BJ	49,463	135	1,463	8.5	603.2	603.2	603.3	0.1
BK	49,986	126	1,200	10.3	606.0	606.0	606.7	0.7
BL	50,514	100	899	13.8	608.8	608.8	608.9	0.1
BM	50,672	102	1,785	7.0	616.2	616.2	621.0	4.8
BN	51,322	117	1,899	6.5	617.9	617.9	621.9	4.1
BO	51,559	130	1,824	6.8	618.9	618.9	622.5	3.6
BP	51,971	110	1,102	11.3	623.3	623.3	623.8	0.5
BQ	52,430	207	2,648	4.7	629.9	629.9	630.9	1.0
BR	52,990	162	1,530	8.1	634.2	634.2	634.6	0.4
BS	53,571	201	865	14.3	638.4	638.4	638.7	0.3
BT	53,692	267	2,648	4.7	644.9	644.9	645.1	0.2
BU	54,173	145	1,144	10.8	646.2	646.2	646.5	0.3
BV	54,696	130	1,296	9.6	653.4	653.4	654.3	0.9
BW	55,150	209	1,507	8.2	658.5	658.5	659.0	0.5

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK (continued)								
BX	55,596	144	656	7.5	664.7	664.7	664.7	0.0
BY	56,346	126	719	6.8	673.4	673.4	673.4	0.0
BZ	56,996	128	804	6.1	678.4	678.4	678.4	0.0
CA	57,696	110	684	7.2	683.2	683.2	683.2	0.0
CB	58,306	122	511	9.6	692.2	692.2	692.2	0.0
CC	58,476	86	444	8.6	695.3	695.3	695.3	0.0
CD	58,946	41	343	11.2	699.0	699.0	699.0	0.0
CE	59,126	34	336	11.4	700.3	700.3	700.3	0.0
CF	59,316	56	295	13.0	704.4	704.4	704.4	0.0
CG	59,386	62	305	12.6	708.5	708.5	708.5	0.0
CH	59,756	61	330	11.6	712.8	712.8	712.8	0.0
CI	60,186	162	548	7.0	716.9	716.9	716.9	0.0
CJ	60,636	112	440	8.7	719.1	719.1	719.1	0.0
CK	61,051	297	715	5.4	722.4	722.4	722.4	0.0
CL	61,696	80	623	6.1	725.5	725.5	725.7	0.2
CM	61,856	82	558	6.9	725.9	725.9	726.2	0.3
CN	62,466	120	713	5.4	727.9	727.9	728.7	0.8
CO	62,846	102	523	7.3	729.3	729.3	730.0	0.7
CP	63,526	163	560	6.8	734.9	734.9	734.9	0.0
CQ	64,096	86	500	7.7	738.5	738.5	738.7	0.2
CR	64,416	70	501	7.6	740.4	740.4	740.5	0.1
CS	65,166	106	719	5.3	742.8	742.8	743.1	0.3
CT	65,306	94	839	4.6	743.0	743.0	743.3	0.3
CU	65,476	92	617	6.2	743.1	743.1	743.5	0.4
CV	66,036	74	693	5.5	744.2	744.2	744.9	0.7

[1] Feet above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

BANKLICK 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK (continued)								
CW	66,481	89	835	4.6	745.0	745.0	745.8	0.8
CX	66,606	79	607	6.3	745.8	745.8	746.4	0.6
CY	67,246	102	800	4.8	747.7	747.7	748.1	0.4
CZ	67,636	78	691	5.5	748.2	748.2	748.7	0.5
DA	68,361	112	984	3.9	749.4	749.4	750.0	0.6
DB	68,476	107	976	3.9	750.9	750.9	751.3	0.4
DC	69,196	101	1,050	3.6	751.6	751.6	752.0	0.4
DD	69,646	113	1,019	3.8	751.9	751.9	752.3	0.4
DE	70,096	105	857	4.5	752.2	752.2	752.7	0.5
DF	70,416	127	1,013	3.8	752.6	752.6	753.1	0.5
DG	70,546	92	893	4.1	753.3	753.3	753.7	0.4
DH	71,046	190	1,584	2.3	753.7	753.7	754.2	0.5
DI	71,846	100	1,114	3.3	754.2	754.2	754.7	0.5
DJ	71,966	104	980	3.7	754.9	754.9	755.3	0.4
DK	72,076	94	920	4.0	755.0	755.0	755.5	0.5
DL	72,516	74	675	5.4	755.5	755.5	755.9	0.4
DM	73,186	109	913	4.0	756.7	756.7	757.1	0.4
DN	73,316	70	671	5.5	757.6	757.6	757.8	0.2
DO	73,946	66	712	5.1	758.5	758.5	759.0	0.5
DP	74,346	90	753	4.9	759.1	759.1	759.6	0.5
DQ	74,876	97	848	4.2	759.9	759.9	760.5	0.6
DR	75,516	87	775	4.7	760.9	760.9	761.5	0.6
DS	76,076	92	792	4.6	761.7	761.7	762.4	0.7
DT	76,446	68	651	5.6	762.2	762.2	763.0	0.8
DU	76,516	81	714	5.1	762.8	762.8	763.3	0.5

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK (continued)								
DV	77,076	74	678	5.4	763.7	763.7	764.3	0.6
DW	77,456	65	720	5.1	764.4	764.4	765.0	0.6

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BANKLICK CREEK TRIBUTARY 4								
A	110	127	919	0.6	499.5	485.9 [2]	486.9 [2]	1.0
B	280	107	870	0.6	499.5	485.9 [2]	486.9 [2]	1.0
C	1,030	104	674	0.8	499.5	485.9 [2]	486.9 [2]	1.0
D	1,490	63	412	1.3	499.5	485.9 [2]	486.9 [2]	1.0
E	1,900	42	92	5.9	499.5	486.9 [2]	487.5 [2]	0.6
F	2,380	46	134	4.0	499.5	491.8 [2]	492.0 [2]	0.2
G	2,510	24	60	9.0	499.5	494.1 [2]	494.1 [2]	0.0
H	2,730	39	129	4.2	499.5	497.3 [2]	497.7 [2]	0.4
I	3,200	30	90	6.0	503.8	503.8	504.0	0.2
J	3,620	-	-	-	511.0	511.0	-	-

[1] Feet above mouth

[2] Water-surface elevations computed without consideration of backwater from Licking 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BRUSHY FORK								
A	210	99	1,089	1.7	693.7	693.7	694.7	1.0
B	610	238	1,504	1.3	693.8	693.8	694.8	1.0
C	1,890	80	298	6.3	695.1	695.1	695.9	0.8
D	2,410	45	280	6.8	698.7	698.7	699.1	0.4
E	3,000	69	299	6.3	702.1	702.1	702.5	0.4
F	3,930	48	290	6.5	707.8	707.8	707.8	0.0
G	4,500	48	306	6.2	710.5	710.5	710.5	0.0
H	4,910	78	347	5.4	712.0	712.0	712.0	0.0
I	5,420	60	267	7.1	714.6	714.6	714.6	0.0
J	6,000	59	276	6.8	718.1	718.1	718.3	0.2
K	6,300	55	197	9.6	721.7	721.7	721.7	0.0
L	6,520	77	286	6.6	724.4	724.4	724.4	0.0
M	6,720	71	259	7.3	725.8	725.8	725.8	0.0
N	6,830	95	333	5.7	726.8	726.8	726.8	0.0
O	7,070	101	370	5.8	728.0	728.0	728.0	0.0
P	7,370	131	315	6.1	729.8	729.8	729.8	0.0
Q	7,630	56	265	7.1	732.0	732.0	732.3	0.3
R	8,010	67	320	5.9	734.5	734.5	735.1	0.6
S	8,400	92	261	7.2	737.9	737.9	737.9	0.0
T	8,780	85	383	4.9	740.6	740.6	740.7	0.1
U	9,000	63	329	5.8	741.3	741.3	741.4	0.1
V	9,060	50	344	4.7	741.5	741.5	742.5	1.0
W	9,340	47	244	6.6	742.3	742.3	742.9	0.6
X	9,840	45	224	7.2	744.0	744.0	744.6	0.6
Y	10,310	47	199	8.1	746.7	746.7	747.1	0.4
Z	10,910	41	262	6.2	749.9	749.9	750.9	1.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
BRUSHY FORK (continued)								
AA	11,530	52	285	5.7	752.4	752.4	753.3	0.9
AB	12,330	44	269	6.0	755.5	755.5	756.1	0.6
AC	12,760	65	254	6.4	757.7	757.7	758.0	0.3
AD	13,280	60	264	6.1	760.9	760.9	761.1	0.2
AE	13,650	40	219	7.4	762.3	762.3	763.0	0.7
AF	14,270	55	318	5.1	765.1	765.1	766.0	0.9
AG	14,790	48	224	7.2	767.1	767.1	767.9	0.8
AH	15,220	46	280	5.8	769.2	769.2	770.0	0.8
AI	15,590	49	273	5.9	770.1	770.1	770.9	0.8
AJ	16,210	51	202	8.0	772.8	772.8	773.3	0.5
AK	16,730	47	332	4.9	776.7	776.7	776.7	0.0
AL	16,780	61	348	4.7	777.6	777.6	778.2	0.6
AM	17,090	42	253	6.4	778.4	778.4	778.9	0.5
AN	17,470	36	205	7.9	779.9	779.9	780.6	0.7
AO	18,100	38	239	6.8	783.8	783.8	784.7	0.9
AP	18,410	40	232	7.0	785.9	785.9	786.7	0.8
AQ	18,840	51	257	6.3	788.9	788.9	789.2	0.3
AR	19,480	44	233	7.0	792.3	792.3	792.9	0.6
AS	19,820	48	261	6.2	794.1	794.1	795.1	1.0
AT	20,140	62	262	5.0	796.9	796.9	796.9	0.0
AU	20,480	96	353	3.7	797.6	797.6	797.6	0.0
AV	20,930	42	141	9.2	798.6	798.6	798.6	0.0
AW	21,210	69	193	6.8	801.1	801.1	801.1	0.0
AX	21,560	68	135	9.6	803.5	803.5	803.5	0.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
DECOURSEY CREEK								
A	510	46	200	13.3	501.8	458.6 [2]	458.6 [2]	0.0
B	920	42	195	13.7	501.8	464.8 [2]	464.8 [2]	0.0
C	1,750	83	410	6.5	501.8	472.4 [2]	472.4 [2]	0.0
D	1,850	67	467	5.7	501.8	473.1 [2]	473.1 [2]	0.0
E	10,730	56	254	10.5	539.9	539.9	539.9	0.0

[1] Feet above mouth

[2] Water-surface elevations computed without consideration of backwater from Licking 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
FOWLER CREEK								
A	375	90	953	5.5	563.1	563.1	564.0	0.9
B	898	68	518	10.1	564.9	564.9	565.4	0.5
C	1,584	75	478	10.9	573.2	573.2	573.2	0.0
D	2,112	63	419	12.5	580.1	580.1	580.1	0.0
E	2,640	60	501	10.4	587.0	587.0	587.2	0.2
F	3,168	71	453	11.5	592.8	592.8	593.1	0.3
G	3,696	51	359	14.6	602.7	602.7	602.7	0.0
H	4,224	60	481	10.9	611.9	611.9	611.9	0.0
I	4,752	63	395	13.2	618.4	618.4	618.4	0.0
J	5,280	89	541	9.7	626.8	626.8	626.8	0.0
K	5,808	76	424	12.3	632.9	632.9	632.9	0.0
L	6,035	69	437	11.9	636.7	636.7	636.7	0.0
M	6,505	238	992	5.3	651.4	651.4	651.4	0.0
N	6,864	61	498	10.5	652.1	652.1	652.1	0.0
O	7,392	64	492	10.6	657.4	657.4	657.4	0.0
P	7,920	63	537	9.7	666.9	666.9	666.9	0.0
Q	8,448	60	373	14.0	675.6	675.6	675.6	0.0
R	8,976	67	432	12.1	686.1	686.1	686.1	0.0
S	9,504	52	459	11.4	699.3	699.3	699.3	0.0
T	10,032	59	427	12.2	706.1	706.1	706.4	0.3
U	10,481	62	378	13.8	712.1	712.1	712.1	0.0
V	10,560	53	409	13.5	714.0	714.0	714.0	0.0
W	10,592	53	908	7.4	719.2	719.2	719.2	0.0
X	10,613	89	814	6.4	719.4	719.4	719.4	0.0
Y	10,802	60	320	7.8	719.4	719.4	719.4	0.0
Z	11,022	80	427	5.8	719.4	719.4	719.4	0.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
FOWLER CREEK (continued)								
AA	11,302	77	490	5.1	719.4	719.4	720.4	1.0
AB	11,647	65	362	6.9	722.6	722.6	722.7	0.1
AC	11,877	67	356	7.0	725.5	725.5	725.5	0.0
AD	12,262	44	261	6.6	730.4	730.4	730.4	0.0
AE	12,482	36	185	9.3	733.1	733.1	733.3	0.2
AF	12,852	54	245	7.0	739.2	739.2	739.5	0.3
AG	13,232	47	257	6.7	743.1	743.1	743.3	0.2
AH	13,592	58	292	5.9	746.0	746.0	746.3	0.3
AI	14,032	49	330	5.2	748.1	748.1	748.5	0.4
AJ	14,442	58	284	6.0	749.5	749.5	750.0	0.5
AK	14,782	69	352	4.5	751.6	751.6	751.6	0.0
AL	15,382	71	357	4.8	753.5	753.5	753.7	0.2
AM	15,752	54	229	7.5	755.4	755.4	755.7	0.3
AN	16,022	67	336	5.1	757.7	757.7	758.1	0.4
AO	16,732	65	400	4.3	760.0	760.0	760.7	0.7
AP	17,102	84	405	4.2	761.0	761.0	761.8	0.8
AQ	17,422	63	295	5.8	762.2	762.2	763.1	0.9
AR	17,942	54	344	5.0	764.4	764.4	765.4	1.0
AS	18,372	70	390	4.4	765.6	765.6	766.6	1.0
AT	18,812	76	399	4.3	766.8	766.8	767.7	0.9
AU	19,222	91	374	4.6	767.9	767.9	768.9	1.0
AV	19,622	63	348	4.9	769.2	769.2	770.2	1.0
AW	19,822	38	223	7.7	770.2	770.2	771.0	0.8
AX	19,872	54	287	6.0	770.7	770.7	771.7	1.0
AY	20,442	60	333	5.2	773.4	773.4	773.9	0.5
AZ	20,842	80	400	4.3	774.5	774.5	775.3	0.8

[1] Feet above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

FOWLER 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
FOWLER CREEK (continued)								
BA	20,912	68	315	5.5	774.6	774.6	775.3	0.7
BB	21,382	59	319	5.4	776.0	776.0	776.9	0.9
BC	22,012	45	239	7.2	778.1	778.1	779.1	1.0
BD	22,362	46	262	6.6	780.0	780.0	781.0	1.0
BE	22,672	54	343	5.0	781.4	781.4	782.3	0.9
BF	23,012	87	406	4.2	782.8	782.8	783.2	0.4
BG	23,332	50	259	6.6	784.1	784.1	784.1	0.0
BH	23,422	54	294	5.8	784.3	784.3	784.4	0.1
BI	23,692	47	236	7.3	785.5	785.5	786.1	0.6
BJ	24,112	60	307	5.6	787.6	787.6	788.4	0.8
BK	24,552	60	324	5.3	789.1	789.1	789.9	0.8
BL	24,672	65	349	4.9	789.5	789.5	790.4	0.9
BM	25,082	61	303	5.7	790.7	790.7	791.5	0.8
BN	25,492	39	177	9.7	792.9	792.9	793.3	0.4
BO	25,912	52	283	6.1	796.0	796.0	796.5	0.5
BP	26,122	60	348	3.0	796.6	796.6	797.3	0.7
BQ	26,212	35	214	4.9	796.9	796.9	797.7	0.8
BR	26,512	67	224	4.6	797.4	797.4	798.1	0.7
BS	26,812	43	310	3.4	799.0	799.0	799.3	0.3
BT	26,892	100	625	2.0	802.6	802.6	803.6	1.0
BU	27,132	95	441	2.0	802.7	802.7	803.7	1.0
BV	27,612	68	245	4.2	803.7	803.7	804.3	0.6
BW	27,872	40	171	6.1	804.8	804.8	805.3	0.5
BX	28,332	46	178	5.8	807.3	807.3	808.1	0.8
BY	28,922	45	159	6.5	811.4	811.4	812.0	0.6
BZ	29,252	45	212	4.9	813.0	813.0	814.0	1.0

[1] Feet above mouth

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

FOWLER 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
FOWLER CREEK (continued)								
CA	29,502	41	151	6.9	814.3	814.3	815.2	0.9
CB	29,682	34	130	8.0	817.0	817.0	817.0	0.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
HORSE BRANCH								
A	540	51 [3]	1,749	0.9	499.5	487.1 [2]	487.1 [2]	0.0
B	780	36 [3]	185	8.9	499.5	487.1 [2]	487.1 [2]	0.0
C	1,130	43 [3]	128	9.7	499.5	492.6 [2]	492.6 [2]	0.0
D	1,580	61 [3]	209	5.9	499.5	498.4 [2]	498.4 [2]	0.0
E	2,060	32 [3]	169	7.3	502.3	502.3	502.3	0.0
F	2,340	25 [3]	129	9.6	507.8	507.8	507.8	0.0
G	3,320	34 [3]	119	10.4	528.3	528.3	528.3	0.0
H	3,570	40 [3]	132	9.4	533.7	533.7	533.7	0.0

[1] Feet above mouth

[2] Water-surface elevations computed without consideration of backwater from Licking River

[3] 100-year flood is within main channel - encroachment shown as top of bank of main channel

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
HORSE BRANCH TRIBUTARY								
A	280	44	130	6.3	499.5	493.2 [2]	494.1 [2]	1.0
B	560	254	494	1.7	499.5	498.9 [2]	498.9 [2]	0.0
C	750	394	200	4.1	499.5	499.1 [2]	499.1 [2]	0.0
D	1,080	424	137	6.0	501.3	501.3	501.3	0.0
E	1,310	48	426	1.9	505.0	505.0	505.9	0.9
F	1,738	334	89	9.2	512.7	512.7	512.7	0.0
G	1,800	344	113	7.2	514.7	514.7	514.7	0.0
H	2,050	39	113	7.3	519.5	519.5	519.5	0.0
I	2,360	46	123	6.7	524.5	524.5	524.5	0.0
J	2,600	30	87	9.4	530.0	530.0	530.0	0.0
K	2,820	30	86	9.5	536.1	536.1	536.1	0.0
L	2,984	57	159	5.1	542.6	542.6	542.6	0.0
M	3,014	73	130	6.3	544.0	544.0	544.0	0.0
N	3,165	31	112	7.3	546.7	546.7	546.7	0.0
O	3,745	54	137	6.0	563.1	563.1	563.1	0.0

[1] Feet above mouth

[2] Water-surface elevations computed without consideration of backwater from Licking River

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH [2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
LICKING RIVER								
A	528	57 / 349	18,668	5.8	497.6	492.3 [3]	493.3 [3]	1.0
B	2,555	66 / 348	17,115	6.3	497.6	492.9 [3]	493.9 [3]	1.0
C	3,898	21 / 329	16,945	6.4	497.6	493.5 [3]	494.4 [3]	1.0
D	5,396	11 / 333	17,982	6.0	497.6	494.1 [3]	495.1 [3]	1.0
E	6,554	11 / 354	17,964	6.0	497.6	494.7 [3]	495.6 [3]	1.0
F	7,972	0 / 351	19,076	5.7	497.6	495.2 [3]	496.2 [3]	1.0
G	9,285	228 / 654	24,534	4.4	497.6	495.7 [3]	496.7 [3]	1.0
H	11,026	12 / 399	20,111	5.4	497.6	496.1 [3]	497.1 [3]	1.0
I	12,056	32 / 415	19,572	5.5	497.6	496.4 [3]	497.4 [3]	1.0
J	13,464	39 / 564	23,555	4.6	497.6	496.9 [3]	497.9 [3]	1.0
K	14,782	97 / 687	26,749	4.1	497.6	497.3 [3]	498.3 [3]	1.0
L	16,010	66 / 497	20,611	5.3	497.6	497.4 [3]	498.4 [3]	1.0
M	16,306	37 / 469	21,754	5.0	497.7	497.7	498.7	1.0
N	17,518	317 / 849	29,285	3.7	498.2	498.2	499.1	1.0
O	19,994	1035 / 1487	31,676	3.4	498.7	498.7	499.6	1.0
P	21,382	1048 / 1454	34,355	3.2	498.9	498.9	499.9	1.0
Q	23,674	92 / 609	23,704	4.6	499.3	499.3	500.3	1.0
R	25,385	131 / 529	21,698	4.9	499.7	499.7	500.7	1.0
S	28,274	44 / 599	23,119	4.6	500.5	500.5	501.5	1.0
T	30,647	43 / 523	23,123	4.6	501.1	501.1	502.1	1.0
U	35,929	26 / 468	21,696	4.9	502.4	502.4	503.4	1.0
V	38,675	90 / 560	24,398	4.4	503.1	503.1	504.1	1.0
W	39,466	119 / 545	23,713	4.5	503.3	503.3	504.3	1.0
X	44,738	393 / 846.	28,227	3.8	504.4	504.4	505.4	1.0

[1] Feet above mouth
[2] Width within Kenton County / Total floodway width
[3] Water-surface elevations computed without consideration of backwater from Ohio River

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

LICKING RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH [2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
LICKING RIVER (continued)								
Y	50,010	147 / 548	24,266	4.4	505.6	505.6	506.6	1.0
Z	55,282	179/ 604	23,930	4.5	506.9	506.9	507.9	1.0
AA	60,554	218 / 617	25,778	4.2	508.2	508.2	509.2	1.0
AB	66,353	220 / 610	24,846	4.3	509.4	509.4	510.4	1.0
AC	71,625	710 / 1013	30,132	3.6	510.6	510.6	511.6	1.0
AD	77,472	207 / 778	29,483	3.6	511.6	511.6	512.6	1.0
AE	81,955	213 / 609	27,458	3.9	512.3	512.3	513.3	1.0
AF	86,648	189 / 636	26,116	4.1	513.3	513.3	514.3	1.0
AG	87,690	227 / 551	23,428	4.6	513.4	513.4	514.4	1.0
AH	93,236	262 / 866	33,148	3.2	514.7	514.7	515.7	1.0
AI	98,508	161 / 860	29,634	3.6	515.5	515.5	516.5	1.0
AJ	103,554	143 / 1046	37,686	2.8	516.6	516.6	517.6	1.0
AK	108,271	313 / 838	28,941	3.7	517.2	517.2	518.2	1.0
AL	113,495	255 / 695	25,822	4.2	518.0	518.0	518.9	1.0
AM	118,518	290 / 675	26,918	4.0	519.0	519.0	519.9	1.0
AN	123,539	1231 / 1576	40,783	2.6	520.2	520.2	521.1	0.9
AO	131,170	108 / 522	22,044	4.9	521.2	521.2	522.2	1.0
AP	136,040	311 / 705	25,542	4.2	522.5	522.5	523.5	1.0
AQ	141,012	158 / 490	22,535	4.8	523.7	523.7	524.7	1.0
AR	145,402	119 / 1491	40,786	2.6	524.7	524.7	525.6	1.0
AS	149,619	126 / 441	20,808	5.2	525.2	525.2	526.2	1.0
AT	157,862	610 / 883	36,408	2.9	527.2	527.2	528.3	1.0
AU	158,838	562 / 854	38,023	2.8	527.4	527.4	528.4	1.0

[1] Feet above mouth
[2] Width within Kenton County / Total floodway width

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

FLOODWAY DATA

LICKING 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
OHIO RIVER								
A	477.50	1,715	112,919	6.5	494.3	494.3	495.3	1.0
B	477.00	1,739	111,516	6.9	494.4	494.4	495.4	1.0
C	476.50	1,612	107,808	6.9	494.5	494.5	495.5	1.0
D	476.00	1,890	125,872	5.7	494.9	494.9	496.0	1.0
E	475.00	1,518	103,062	7.3	495.0	495.0	496.1	1.0
F	474.50	1,570	111,458	6.7	495.3	495.3	496.4	1.0
G	474.00	1,385	89,579	8.2	495.5	495.5	496.5	1.0
H	473.50	1,593	109,501	6.7	495.5	495.5	496.5	1.0
I	473.00	1,310	99,805	7.5	495.9	495.9	496.9	1.0
J	472.75	1,228	88,394	8.3	496.1	496.1	497.1	1.0
K	472.25	1,437	106,089	7.1	496.1	496.1	497.1	1.0
L	472.00	1,208	87,099	8.4	496.2	496.2	497.2	1.0
M	471.75	1,162	81,447	8.9	496.2	496.2	497.2	1.0
N	471.50	1,173	82,911	8.8	496.4	496.4	497.4	1.0
O	471.00	1,380	104,779	7.0	497.3	497.3	498.3	1.0
P	470.50	1,387	103,311	7.2	497.4	497.4	498.4	1.0

[1] Miles below headwaters at Pittsburgh

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
PLEASANT RUN CREEK								
A	1,110	57	409	5.2	495.5	485.7 [2]	486.7 [2]	1.0
B	2,110	172	1,005	1.9	495.5	487.3 [2]	488.1 [2]	0.8
C	2,330	152	790	2.4	495.5	487.5 [2]	488.3 [2]	0.8
D	3,000	147	709	2.6	495.5	488.6 [2]	489.5 [2]	0.9
E	3,740	267	764	2.5	495.5	490.8 [2]	491.8 [2]	1.0
F	4,420	226	772	2.4	495.5	493.1 [2]	494.1 [2]	1.0
G	4,805	279	885	2.1	495.5	494.0 [2]	495.0 [2]	1.0
H	5,225	52	248	7.5	496.3	496.3	496.3	0.0
I	5,710	38	235	8.0	498.7	498.7	499.3	0.6
J	5,855	53	241	7.8	499.7	499.7	499.9	0.2
K	6,215	68	282	6.6	502.9	502.9	502.9	0.0
L	6,435	58	221	8.5	505.2	505.2	505.2	0.0
M	6,565	46	207	9.0	507.0	507.0	507.0	0.0
N	6,670	49	242	7.7	508.1	508.1	508.1	0.0
O	6,840	43	205	7.7	510.3	510.3	510.3	0.0
P	7,028	62	214	7.4	511.9	511.9	511.9	0.0
Q	7,215	78	206	7.7	514.6	514.6	514.6	0.0
R	7,550	83	195	8.1	522.7	522.7	522.7	0.0
S	7,790	59	210	7.5	525.8	525.8	525.8	0.0
T	8,015	44	181	8.7	528.1	528.1	528.1	0.0
U	8,205	49	218	7.3	530.1	530.1	530.1	0.0
V	8,435	49	258	6.1	532.1	532.1	532.1	0.0
W	8,500	64	280	5.6	534.7	534.7	534.7	0.0
X	8,710	38	169	9.3	535.9	535.9	535.9	0.0
Y	8,975	48	153	10.3	539.7	539.7	539.7	0.0

[1] Feet above mouth
[2] Water-surface elevations computed without consideration of backwater from 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
PLEASANT RUN CREEK (continued)								
Z	9,240	55	216	7.3	544.3	544.3	544.3	0.0
AA	9,600	33	156	10.1	551.7	551.7	551.7	0.0
AB	9,725	52	247	6.4	554.5	554.5	554.5	0.0
AC	9,850	57	180	8.8	555.7	555.7	555.7	0.0
AD	10,010	43	113	8.2	559.0	559.0	559.0	0.0
AE	10,270	32	95	9.8	566.4	566.4	566.4	0.0
AF	10,440	34	111	8.4	570.1	570.1	570.1	0.0
AG	10,460	46	295	3.2	576.8	576.8	576.8	0.0
AH	10,810	41	105	8.9	580.1	580.1	580.1	0.0
AI	11,160	59	118	8.0	592.7	592.7	592.7	0.0
AJ	16,620	41	107	4.7	727.3	727.3	727.3	0.0
AK	16,930	17	51	10.0	729.8	729.8	729.8	0.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
PLEASANT RUN CREEK TRIBUTARY 1								
A	600	215	1,533	0.4	495.5	486.4 [2]	487.3 [2]	0.9
B	1,005	208	1,383	0.5	495.5	486.4 [2]	487.3 [2]	0.9
C	1,615	77	305	2.2	495.5	486.4 [2]	487.4 [2]	1.0
D	1,950	20	65	10.5	495.5	490.3 [2]	490.3 [2]	0.0
E	2,500	58	164	4.2	496.1	496.1	497.1	1.0
F	2,935	93	125	5.4	500.4	500.4	500.4	0.0

[1] Feet above mouth
[2] Water-surface elevations computed without consideration of backwater from 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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
PLEASANT RUN CREEK TRIBUTARY 2								
A	310	41	111	8.0	561.6	561.6	561.6	0.0
B	420	32	92	9.6	565.7	565.7	565.7	0.0
C	590	102	381	2.3	572.1	572.1	572.1	0.0
D	740	42	101	8.8	573.6	573.6	573.6	0.0
E	930	43	137	6.4	577.4	577.4	577.4	0.0
F	1,230	33	99	8.9	582.2	582.2	582.2	0.0
G	1,360	69	147	6.0	585.6	585.6	585.6	0.0

[1] Feet above mouth

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 (NAVD)	WITHOUT FLOODWAY (NAVD)	WITH FLOODWAY (NAVD)	DIFFERENCE
THOMPSON BRANCH								
A	180	45	207	4.8	728.7	728.7	728.7	0.0
B	250	41	161	6.1	730.3	730.3	730.3	0.0
C	400	31	99	10.0	734.8	734.8	734.8	0.0
D	530	93	235	4.2	739.0	739.0	739.0	0.0
E	900	44	150	6.6	741.0	741.0	741.0	0.0
F	1,340	55	182	0.6	745.3	745.3	745.3	0.0
G	1,460	24	175	5.6	746.4	746.4	746.5	0.1
H	1,850	25	135	7.3	749.8	749.8	750.8	1.0
I	2,275	25	138	7.2	753.0	753.0	753.9	0.9
J	2,820	64	324	3.0	760.9	760.9	760.9	0.0
K	2,915	63	481	2.1	763.0	763.0	763.0	0.0
L	3,050	36	262	3.8	763.1	763.1	763.1	0.0
M	3,125	75	338	2.9	763.2	763.2	763.3	0.1
N	3,360	48	217	4.6	763.4	763.4	763.5	0.1
O	3,455	40	250	4.0	766.0	766.0	766.0	0.0
P	3,585	44	222	4.4	766.2	766.2	766.4	0.2
Q	3,790	84	191	5.2	767.1	767.1	767.5	0.4
R	4,175	46	179	5.5	770.7	770.7	770.8	0.1
S	4,525	48	169	5.9	772.5	772.5	773.5	1.0
T	4,695	44	169	5.8	774.2	774.2	774.9	0.7
U	4,795	71	359	2.8	778.2	778.2	779.2	1.0
V	4,985	49	304	3.3	778.5	778.5	779.5	1.0
W	5,275	35	157	6.3	779.7	779.7	780.7	1.0
X	5,525	34	169	5.9	782.7	782.7	783.7	1.0
Y	5,755	21	134	7.4	785.4	785.4	786.3	0.9

[1] Feet above mouth

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The 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 rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report 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, and areas protected from the 1-percent-annual-chance flood by levees. No BFEs or 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.

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 countywide FIRM presents flooding information for the entire geographic area of Kenton County. Previously, separate FIRMs were prepared for each identified floodprone incorporated community and/or for the unincorporated areas of the county. 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 7, "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 preparation of this study can be obtained by contacting the Federal Emergency Agency, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

Table 7- Community Map History

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Bromley, City of	February 1, 1974	May 21, 1976; December 15, 1978	April 15, 1980	None
Covington, City of	March 15, 1974	March 15, 1976	June 15, 1979	January 22, 1982; June 16, 1993
Crescent Springs, City of	March 16, 2009	None	March 16, 2009	None
Crestview Hills, City of	March 16, 2009	None	March 16, 2009	None
Edgewood, City of	March 16, 2009	None	March 16, 2009	None
Elsmere, City of	March 16, 2009	None	March 16, 2009	None
Erlanger, City of	March 16, 2009	None	March 16, 2009	None
Fairview, City of	March 16, 2009	None	March 16, 2009	None

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KENTUCKY
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Fort Mitchell, City of	March 16, 2009	None	March 16, 2009	None
Fort Wright, City of	January 17, 1975	August 12, 1977	September 30, 1980	June 16, 1993
Independence, City of	February 8, 1974	July 16,1976	September 17, 1980	None
Kenton County (Unincorporated Areas)	October 18, 1974	July 1, 1977	July 2, 1981	None
*Kenton Vale, City of	None	None	None	None
Lakeside Park, City of	March 16, 2009	None	March 16, 2009	None
Ludlow, City of	February 1, 1974	February 27,1976	September 28, 1979	None
*Park Hills, City of	None	None	None	None

*No special flood hazard areas identified

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KENTUCKY
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Ryland Heights, City of	March 16, 2009	None	March 16, 2009	None
Taylor Mill, City of	February 15, 1974	May 7, 1976	August 16, 1995	None
Villa Hills, City of	March 16, 2009	None	March 16, 2009	None
*Walton, City of	None	None	None	None

* No special flood hazard areas identified

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KENTUCKY
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

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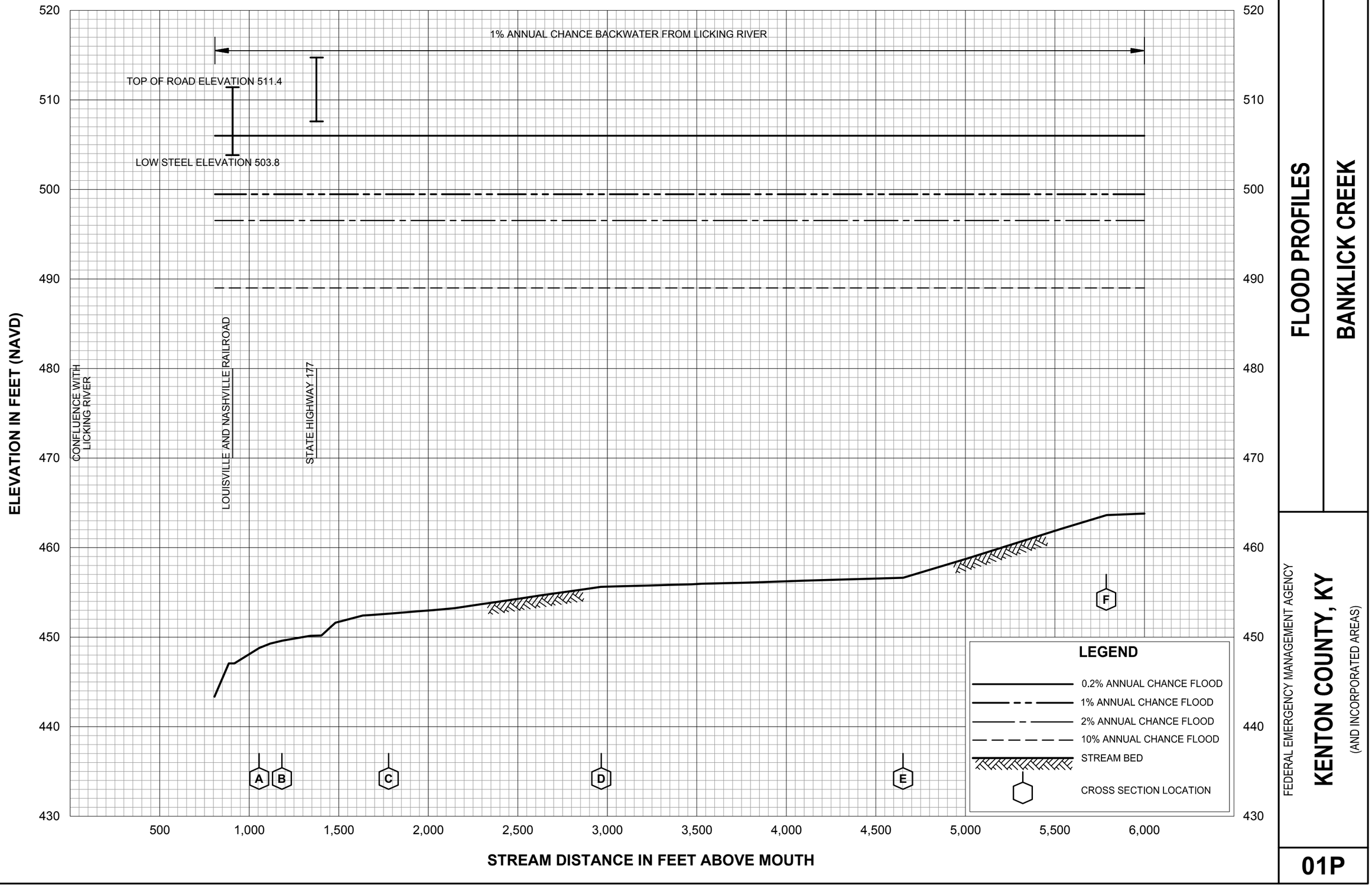

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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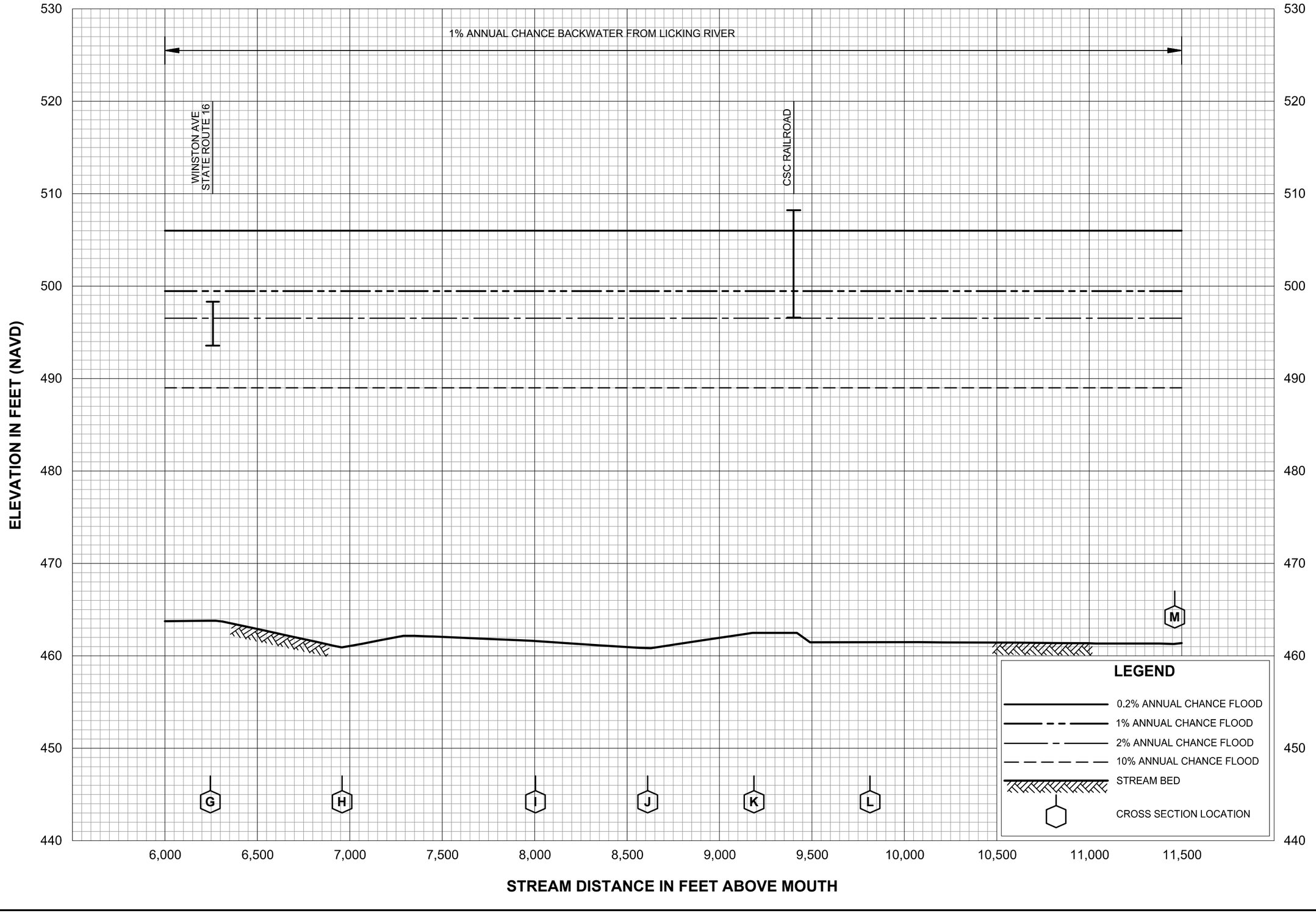

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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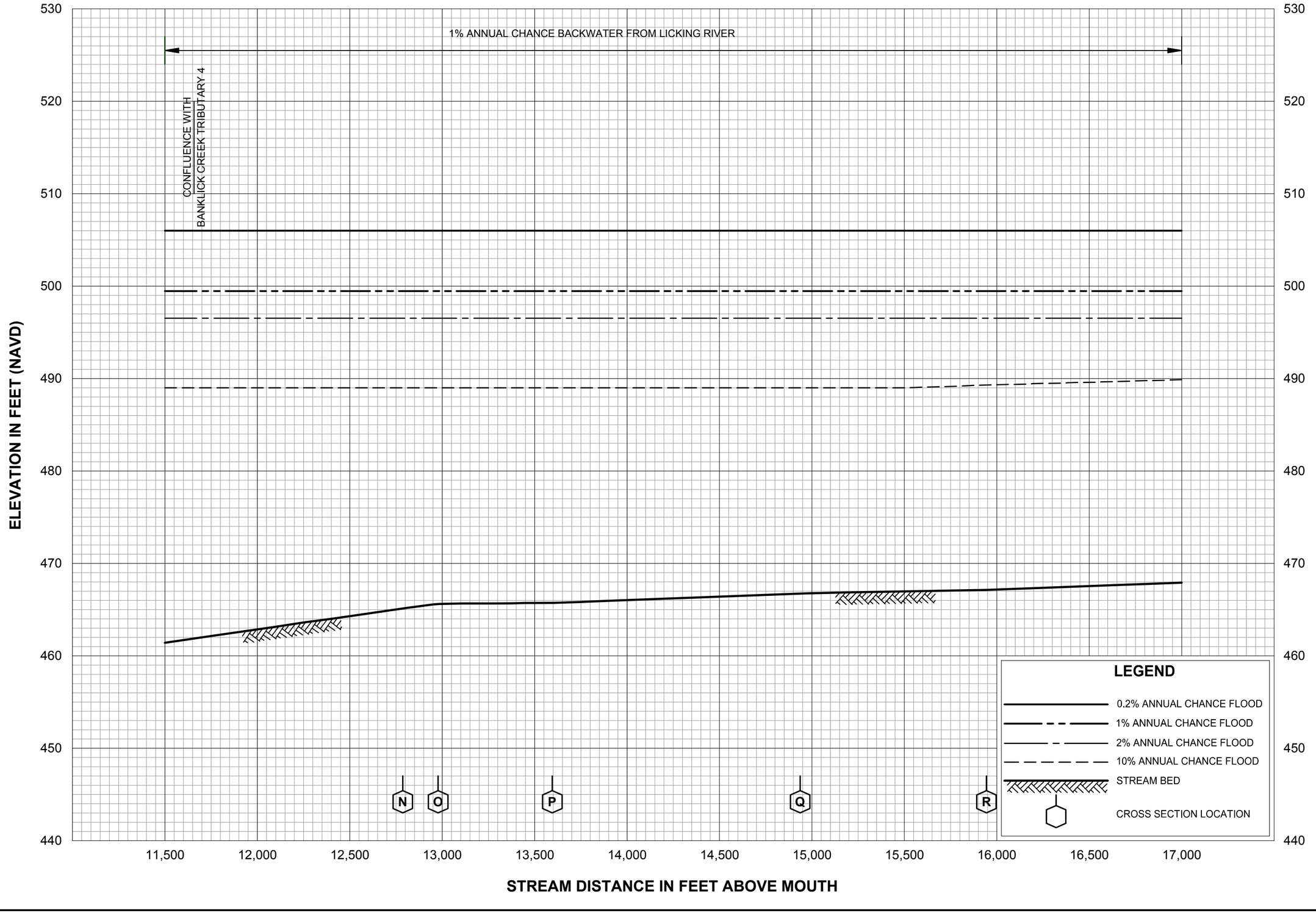

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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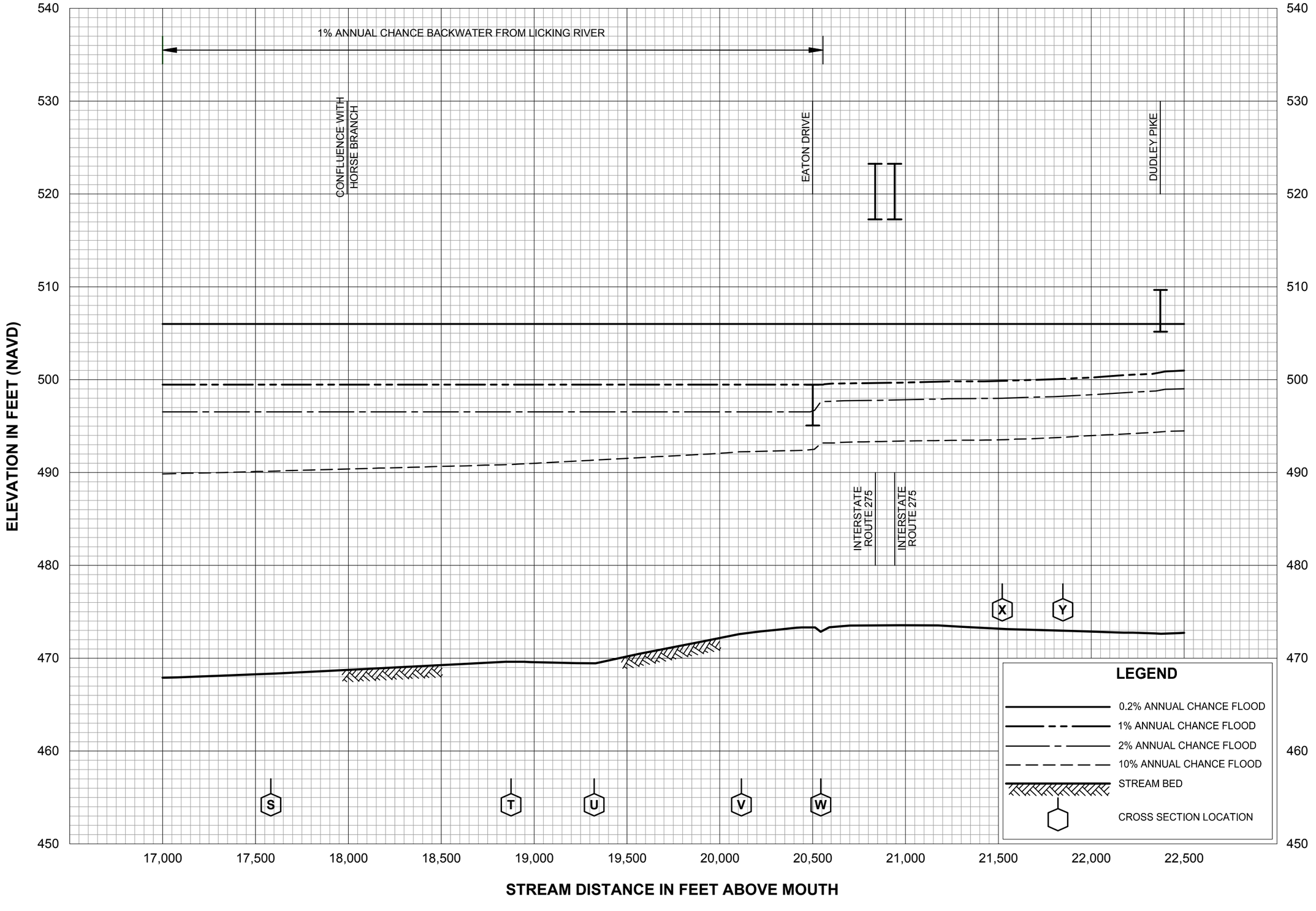

FLOOD PROFILES

BANKLICK CREEK

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KENTON COUNTY, KY

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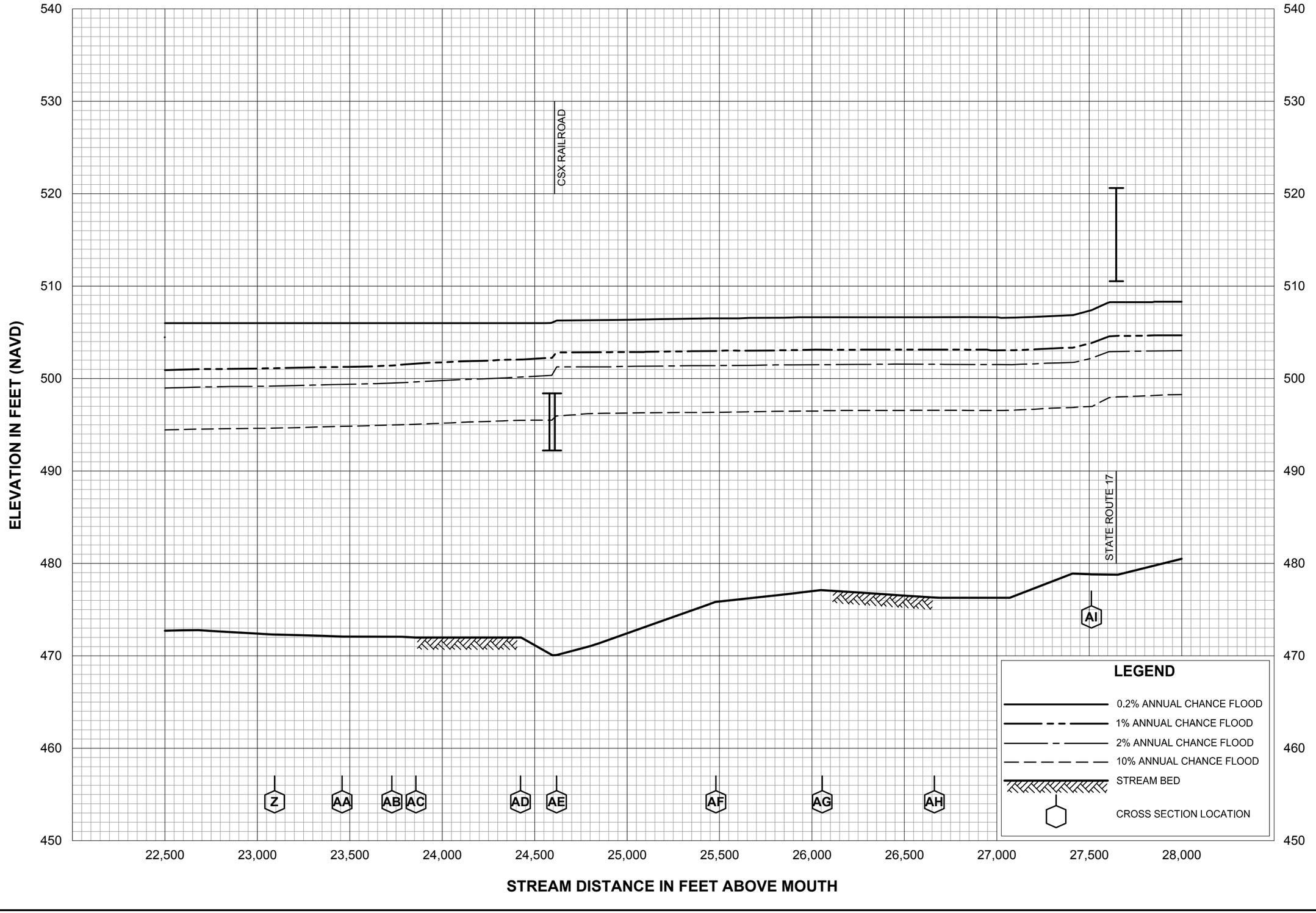

FLOOD PROFILES

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KENTON COUNTY, KY

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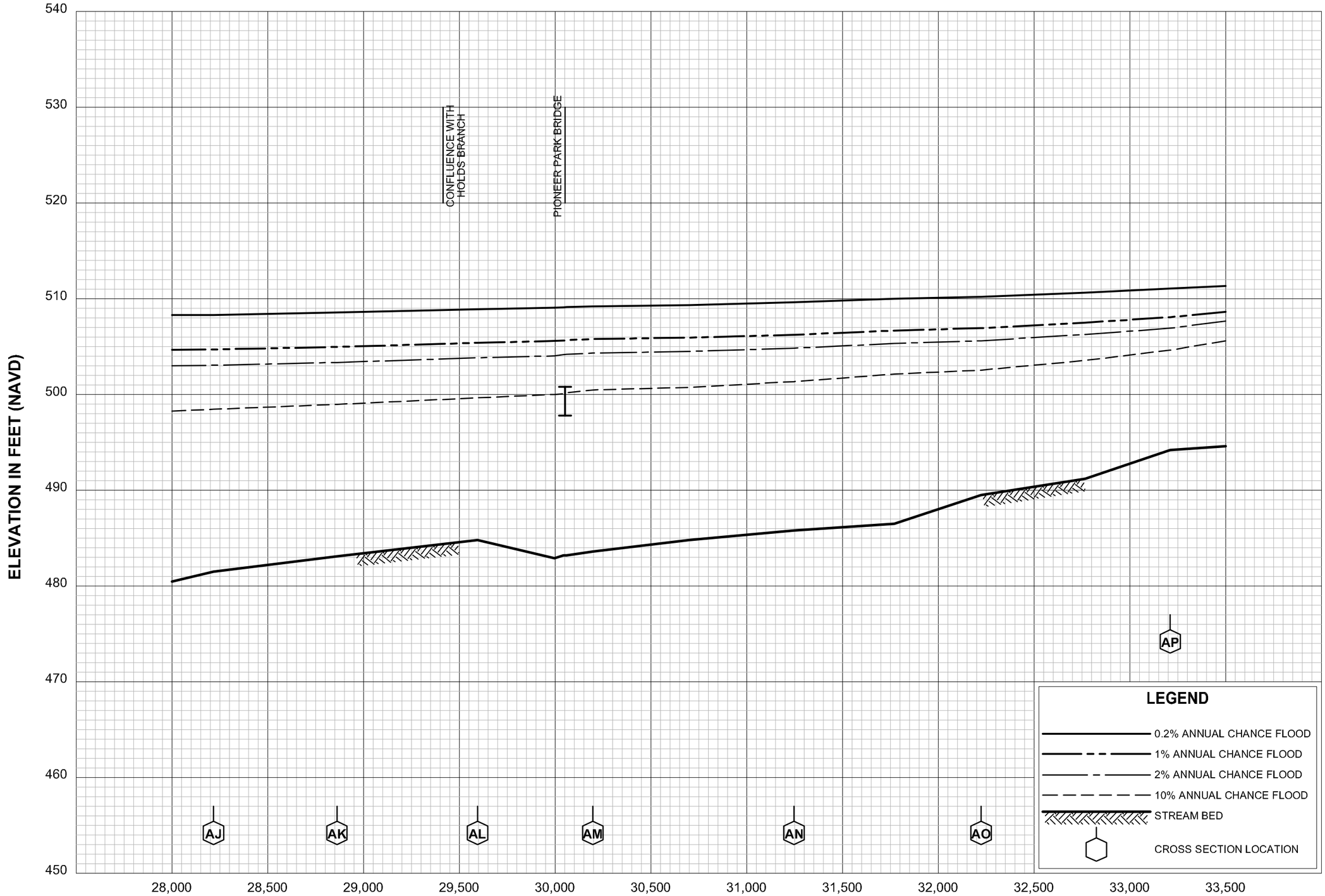

FLOOD PROFILES

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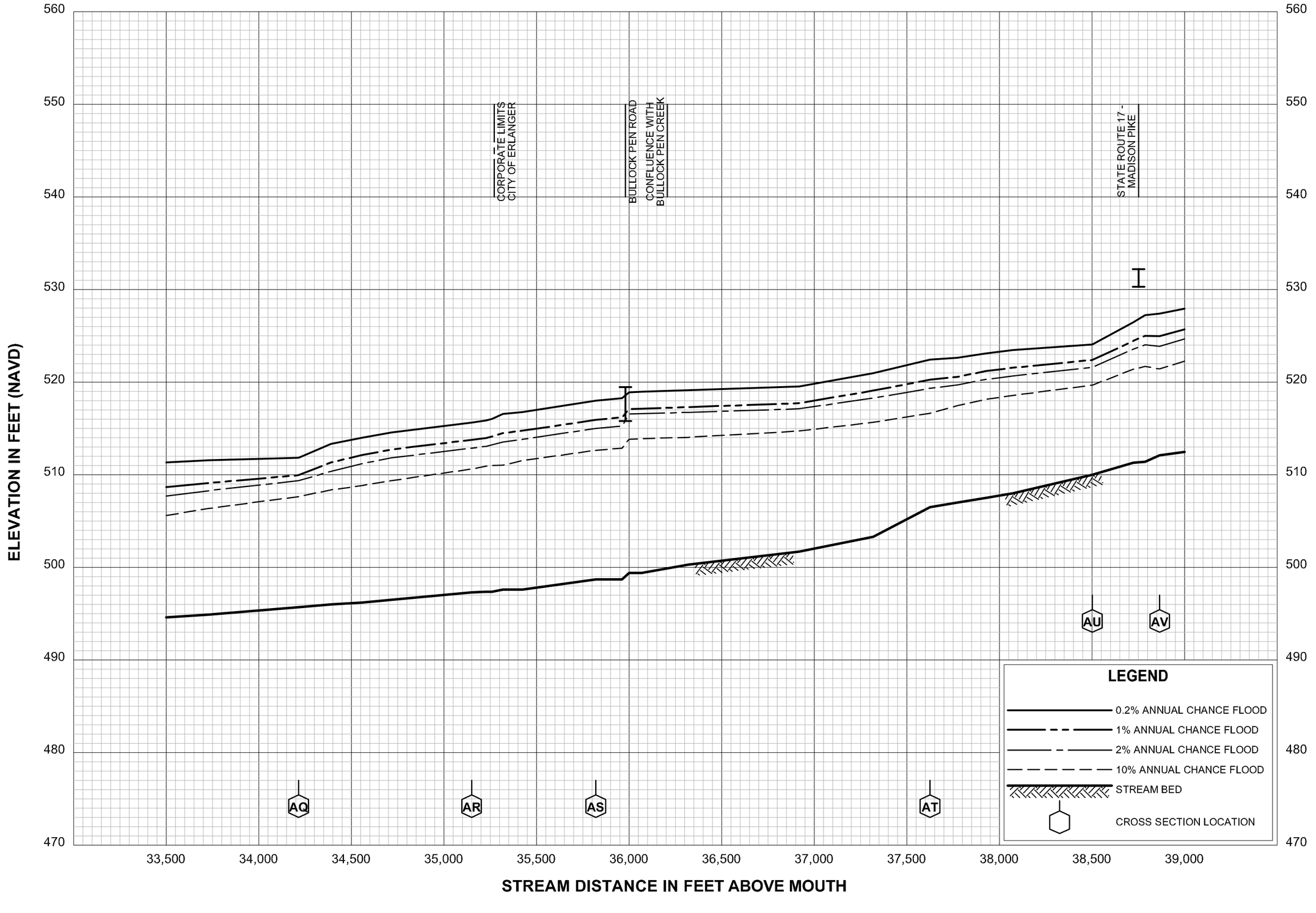

FLOOD PROFILES

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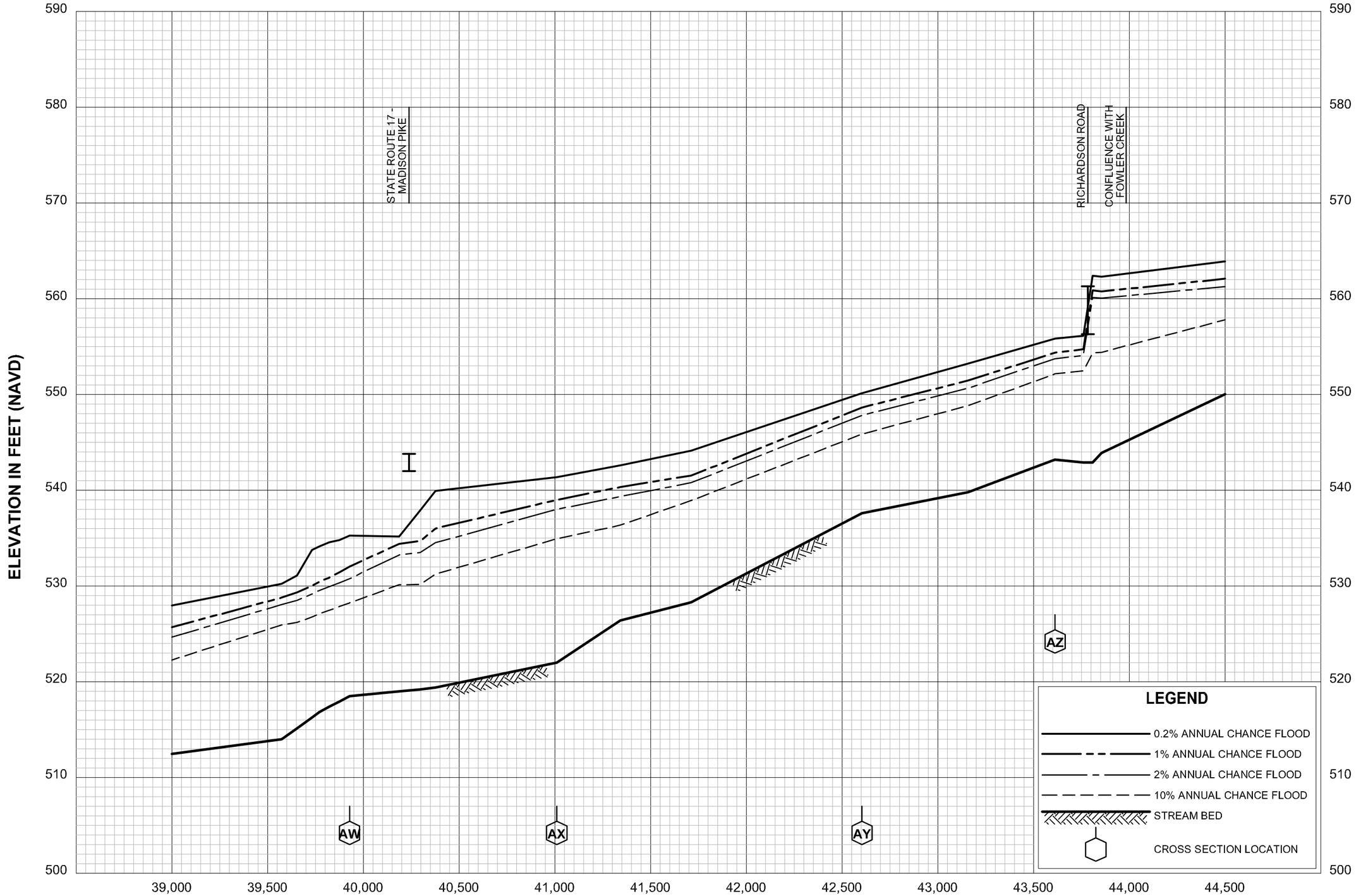

FLOOD PROFILES

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FEDERAL EMERGENCY MANAGEMENT AGENCY

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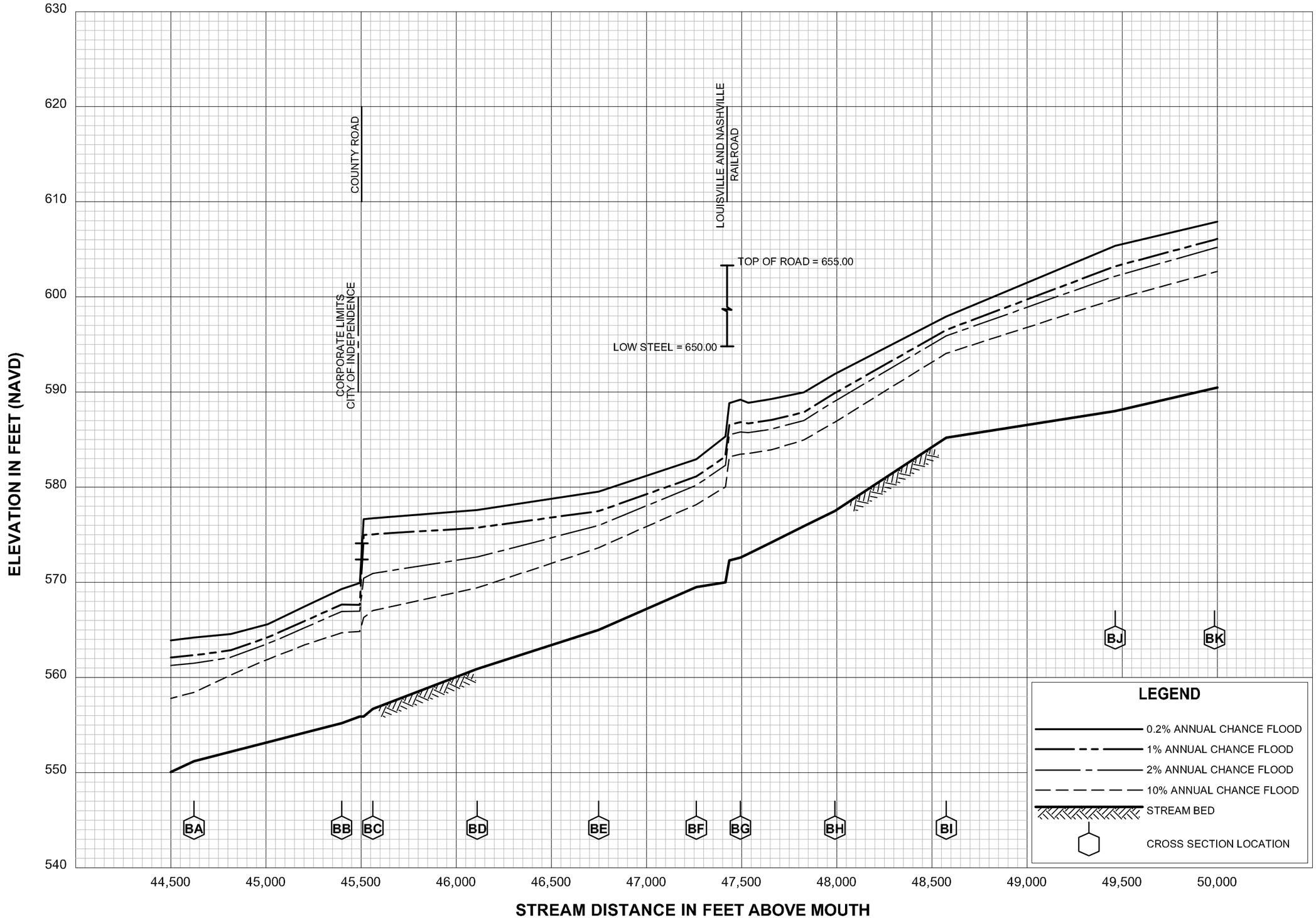

FLOOD PROFILES

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FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

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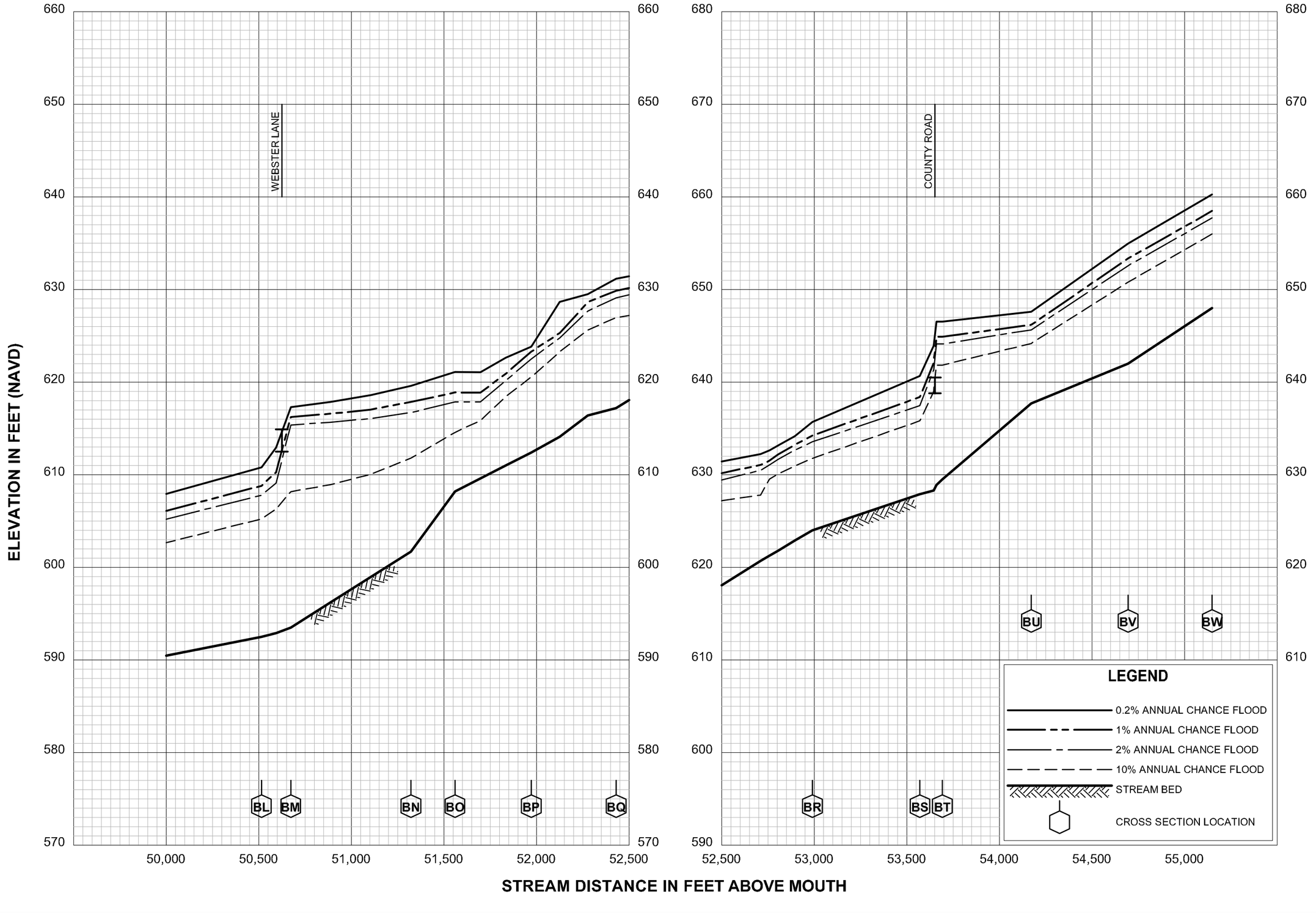

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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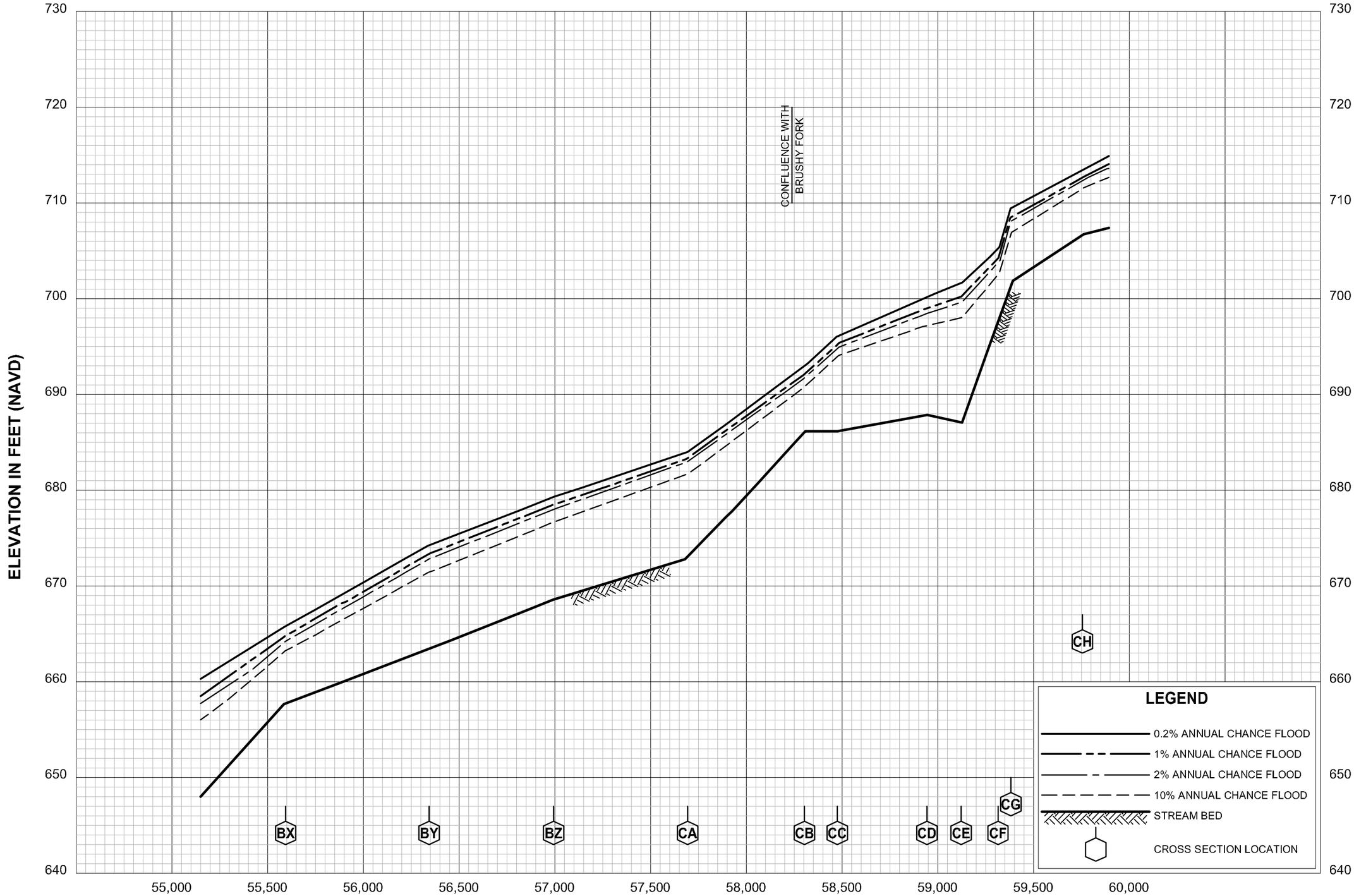


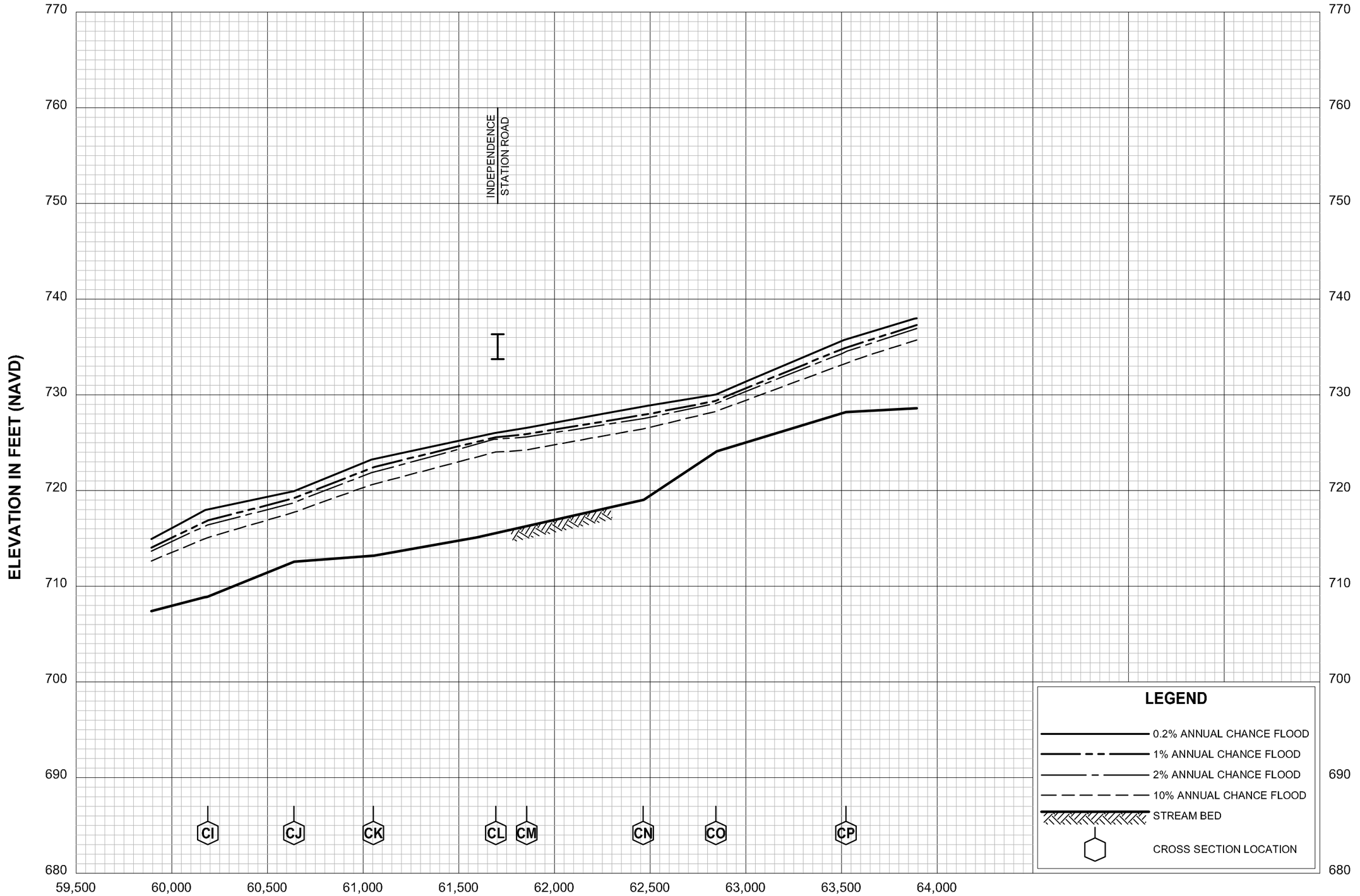
FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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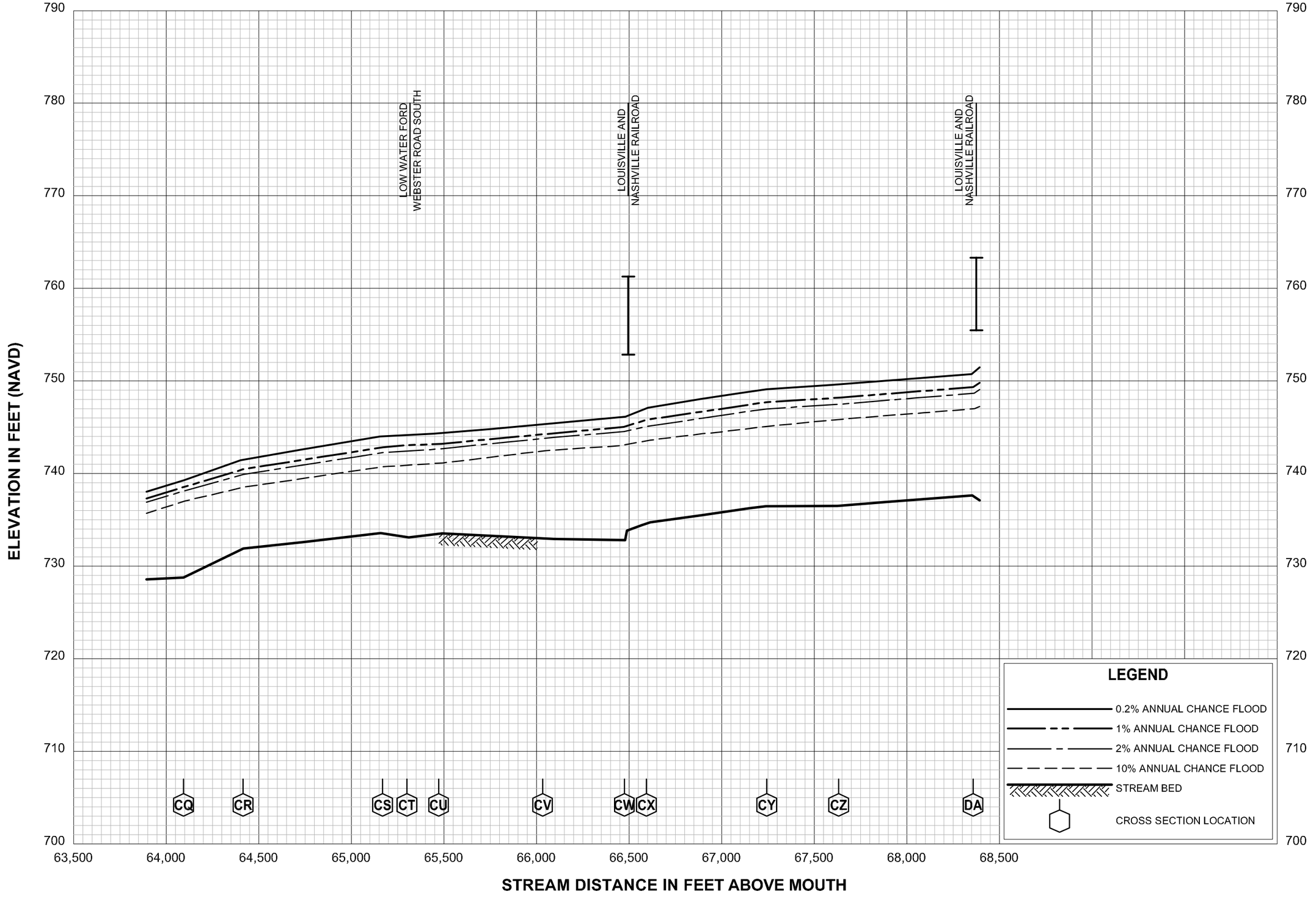

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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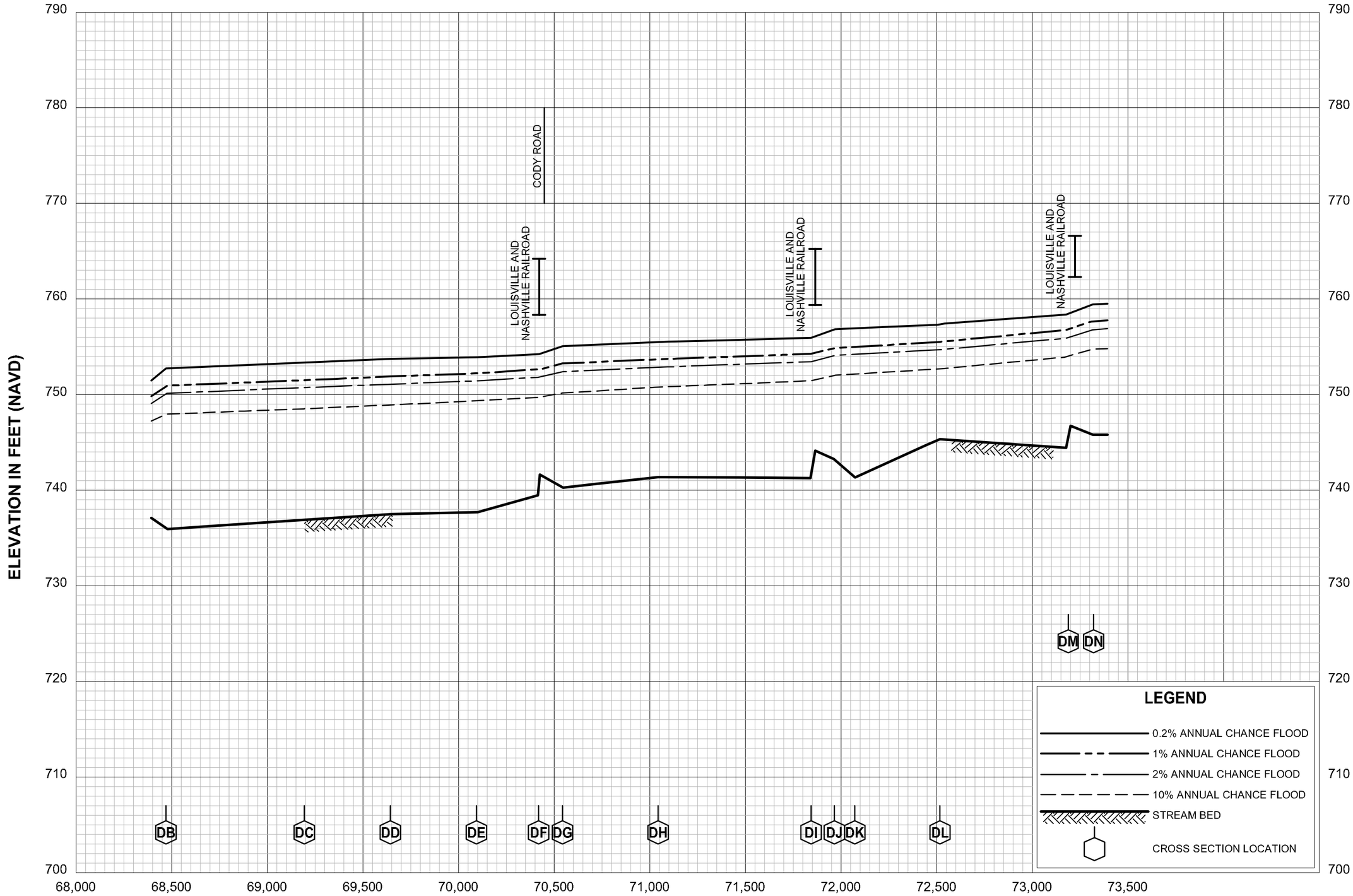

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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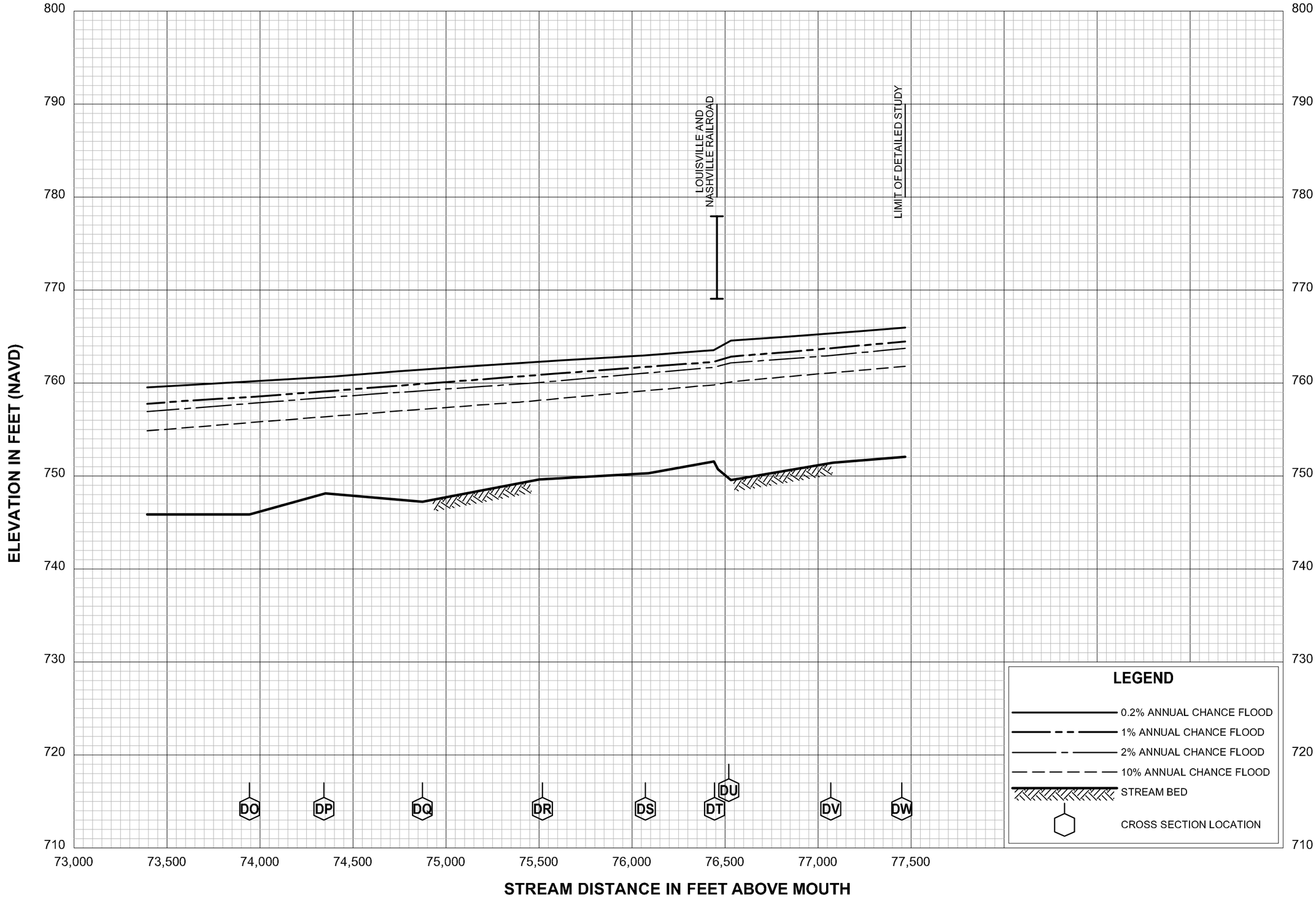

FLOOD PROFILES

BANKLICK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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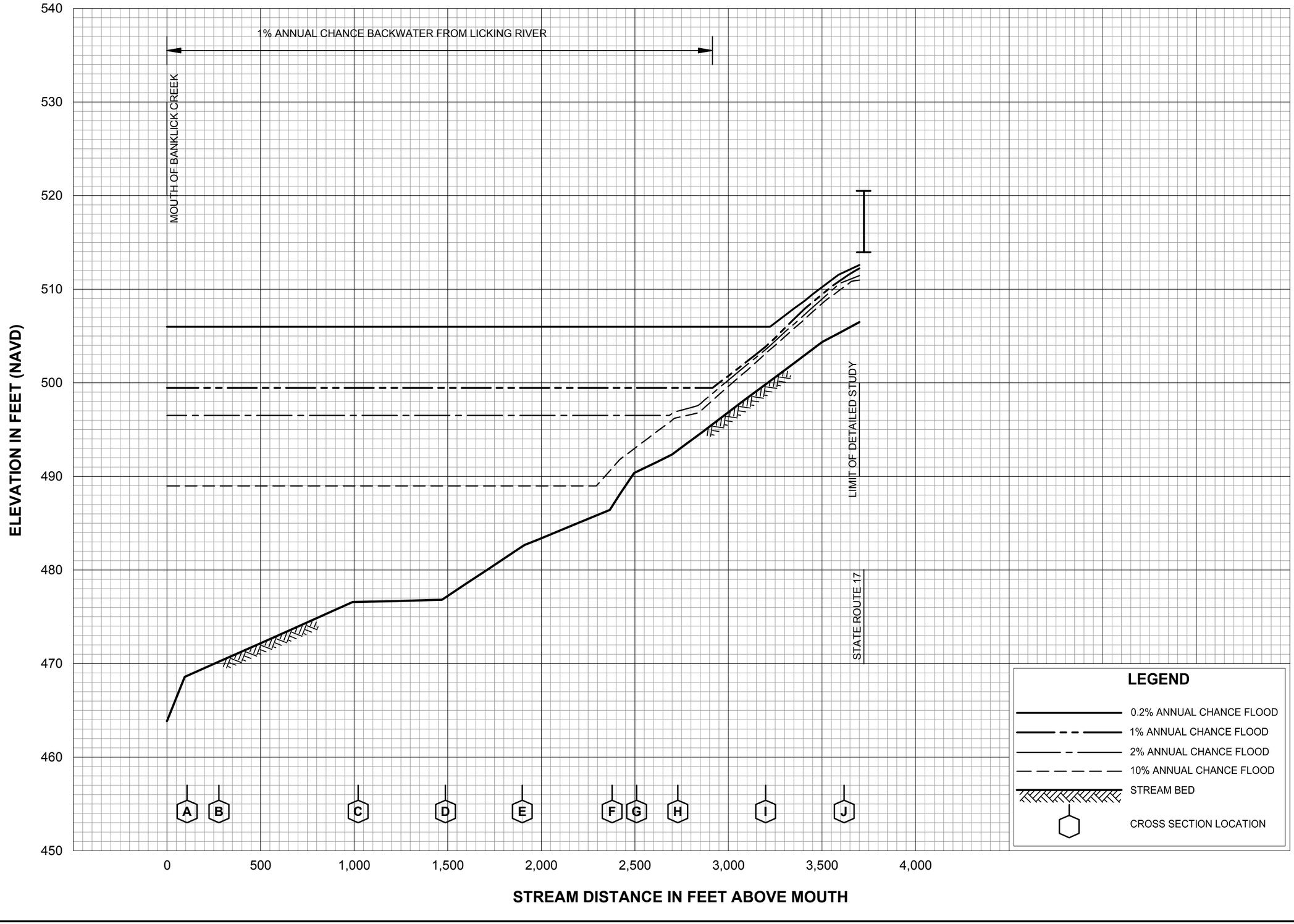

FLOOD PROFILES

BANKLICK CREEK TRIBUTARY 4

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KENTON COUNTY, KY

(AND INCORPORATED AREAS)

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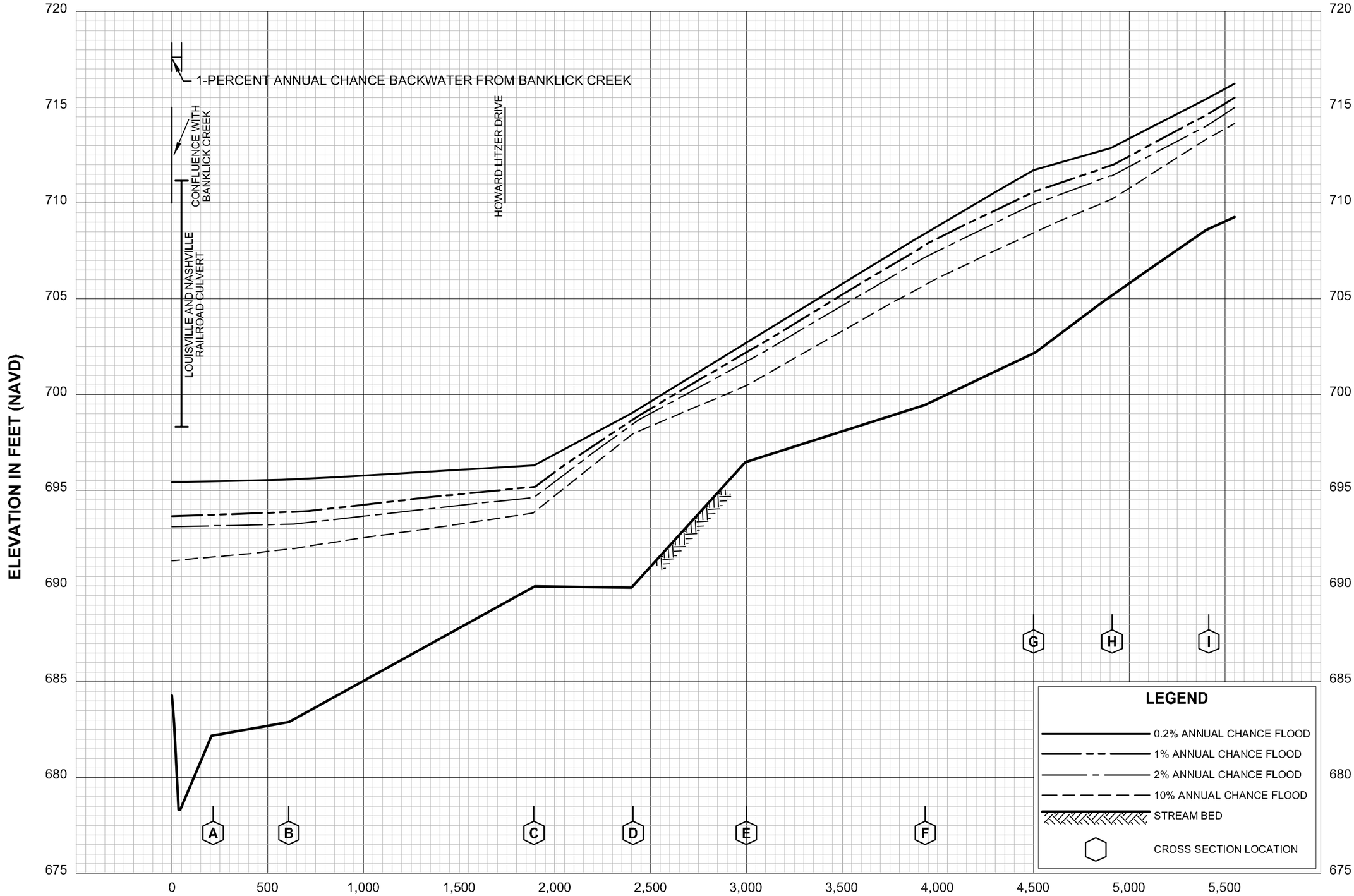


FLOOD PROFILES

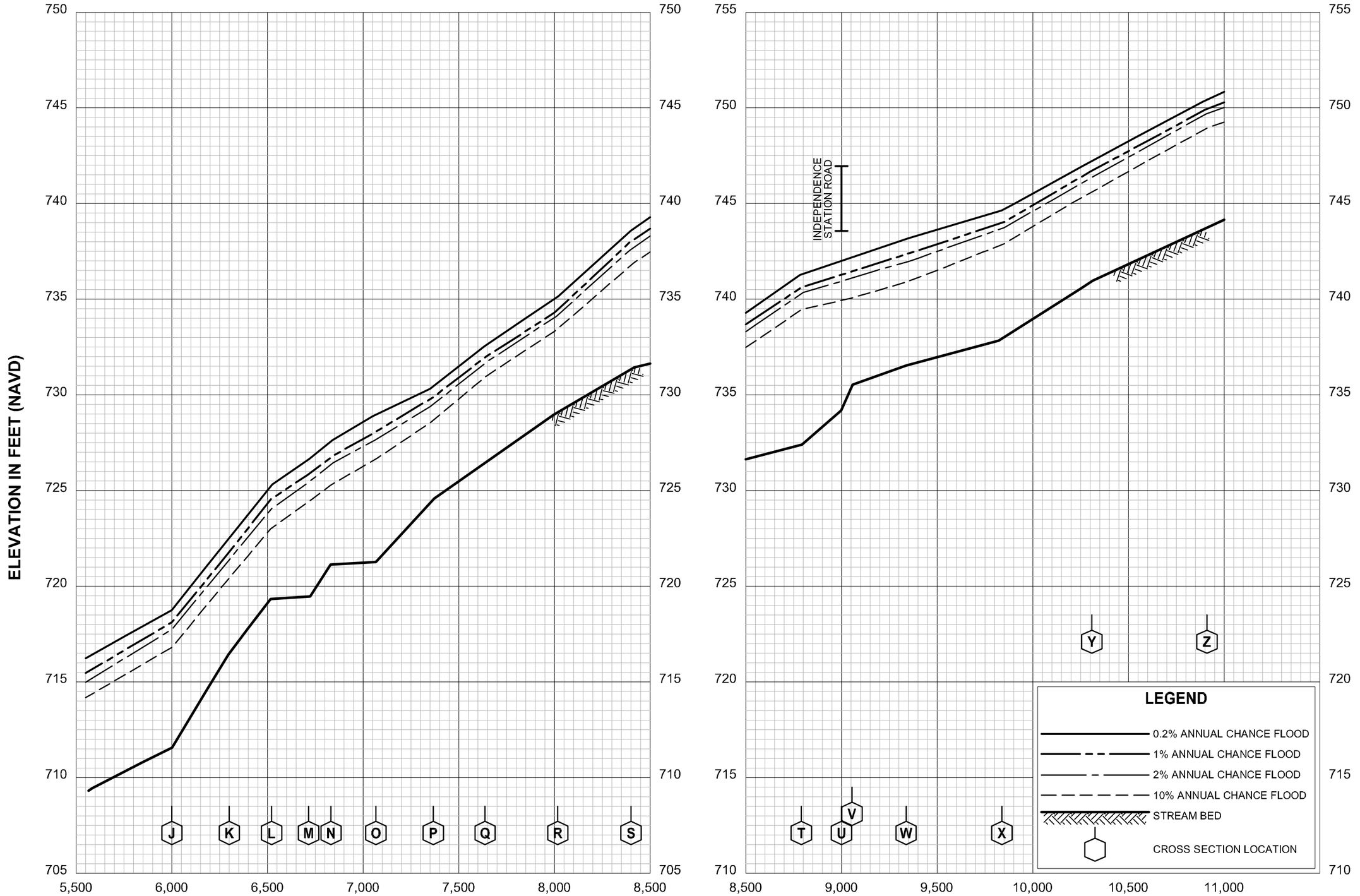
BRUSHY FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

17P



FLOOD PROFILES

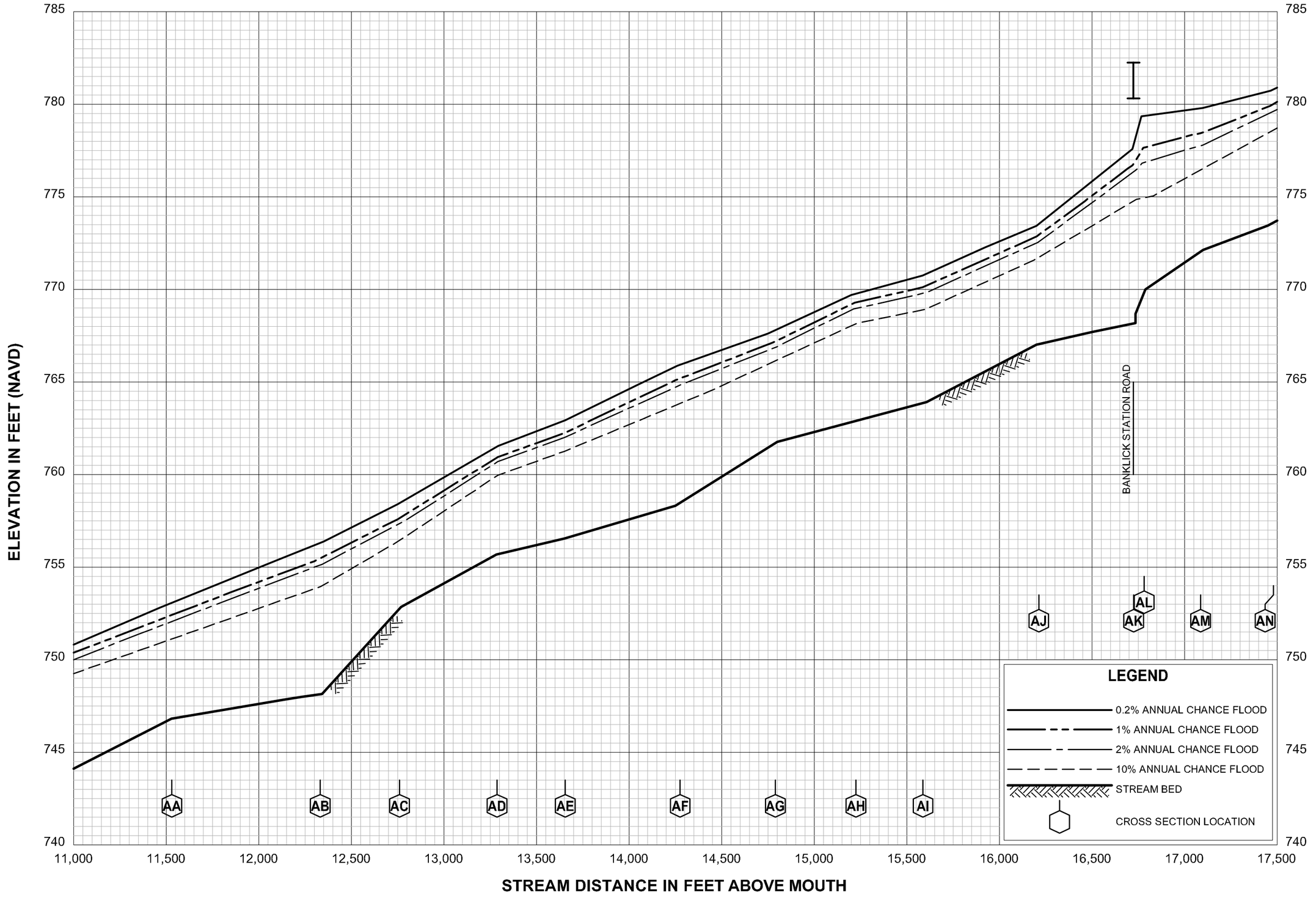
BRUSHY FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

18P



FLOOD PROFILES

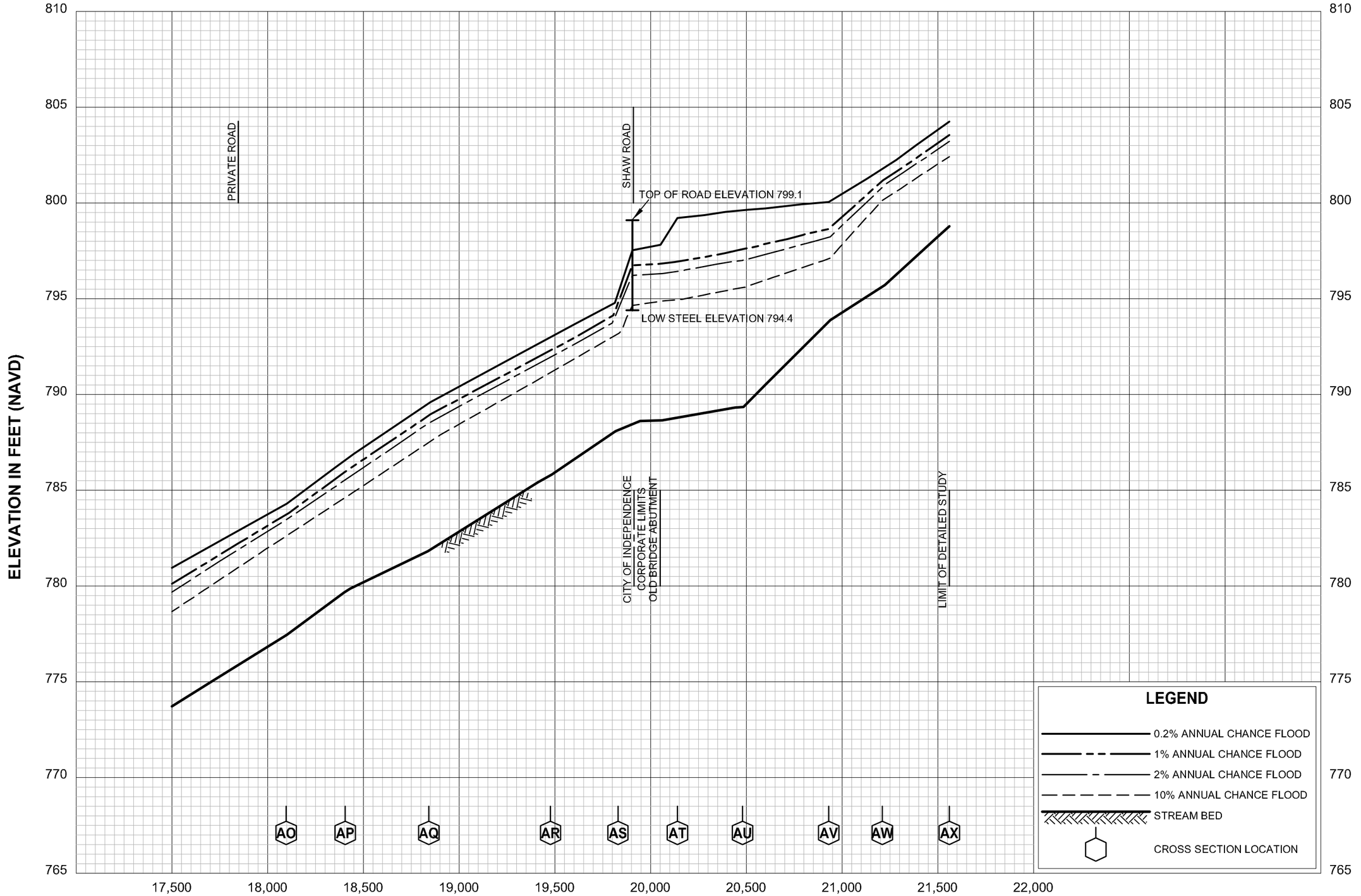
BRUSHY FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

19P



FLOOD PROFILES

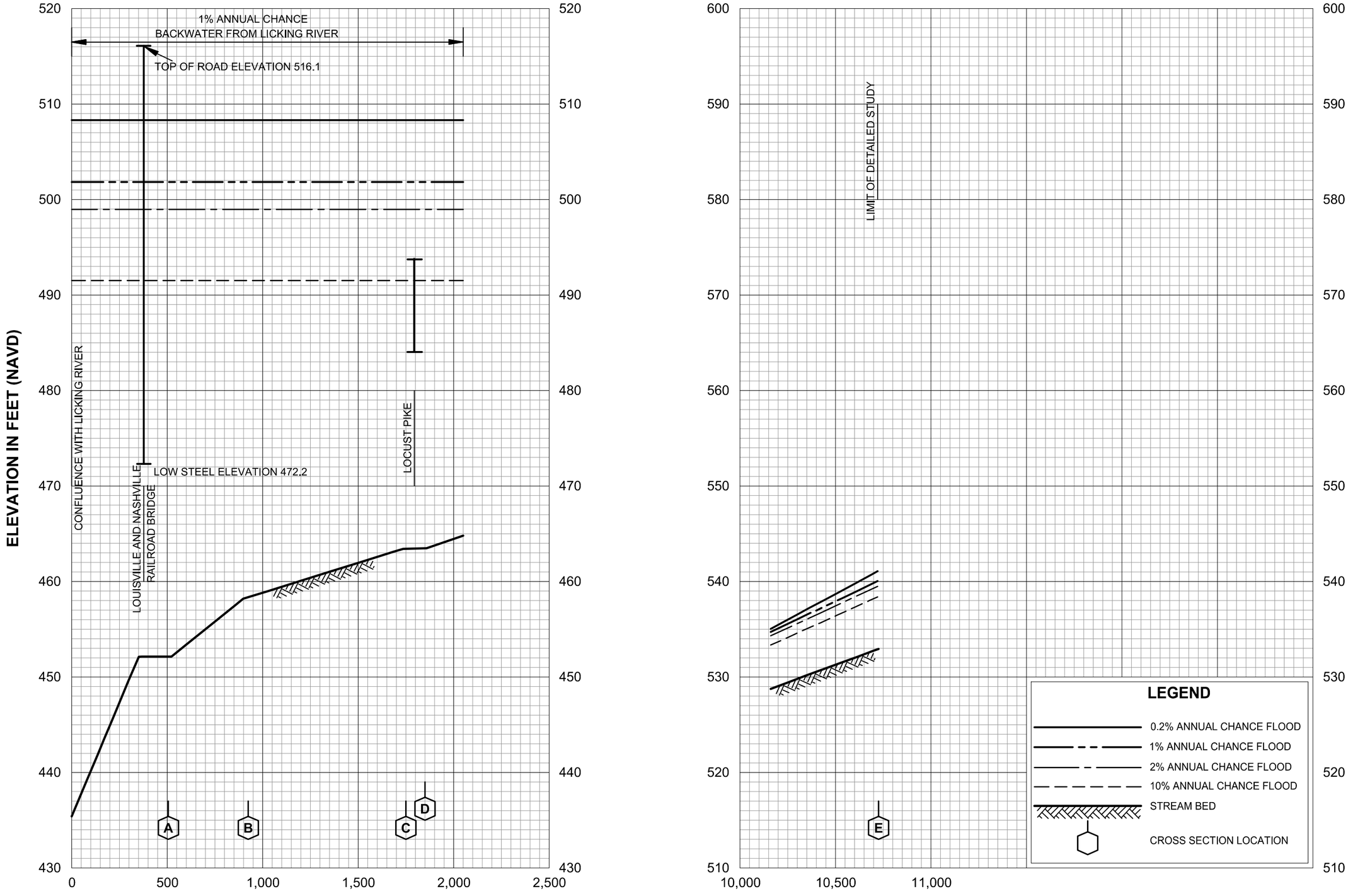
BRUSHY FORK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

20P



FLOOD PROFILES

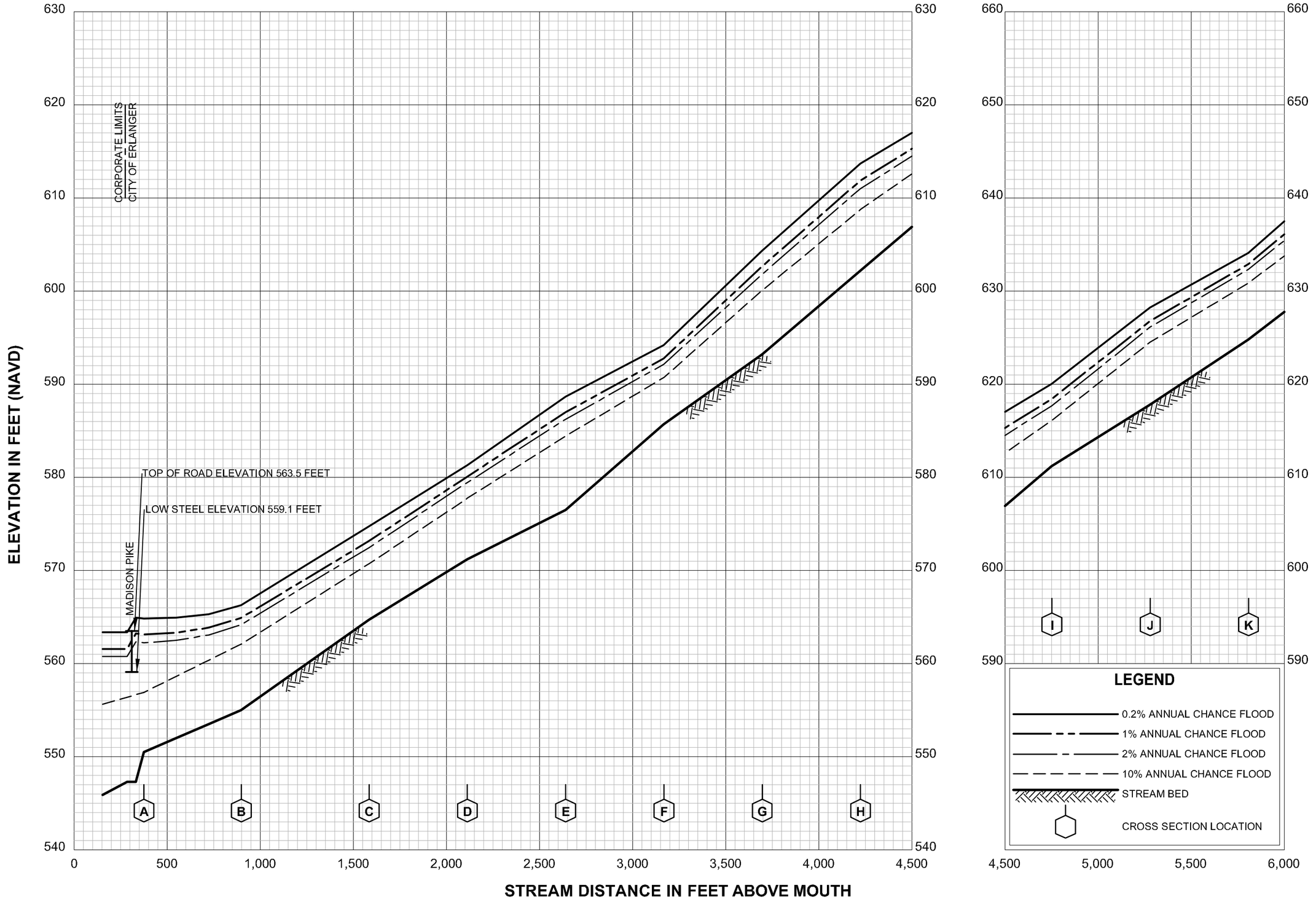
DECOURSEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

21P



FLOOD PROFILES

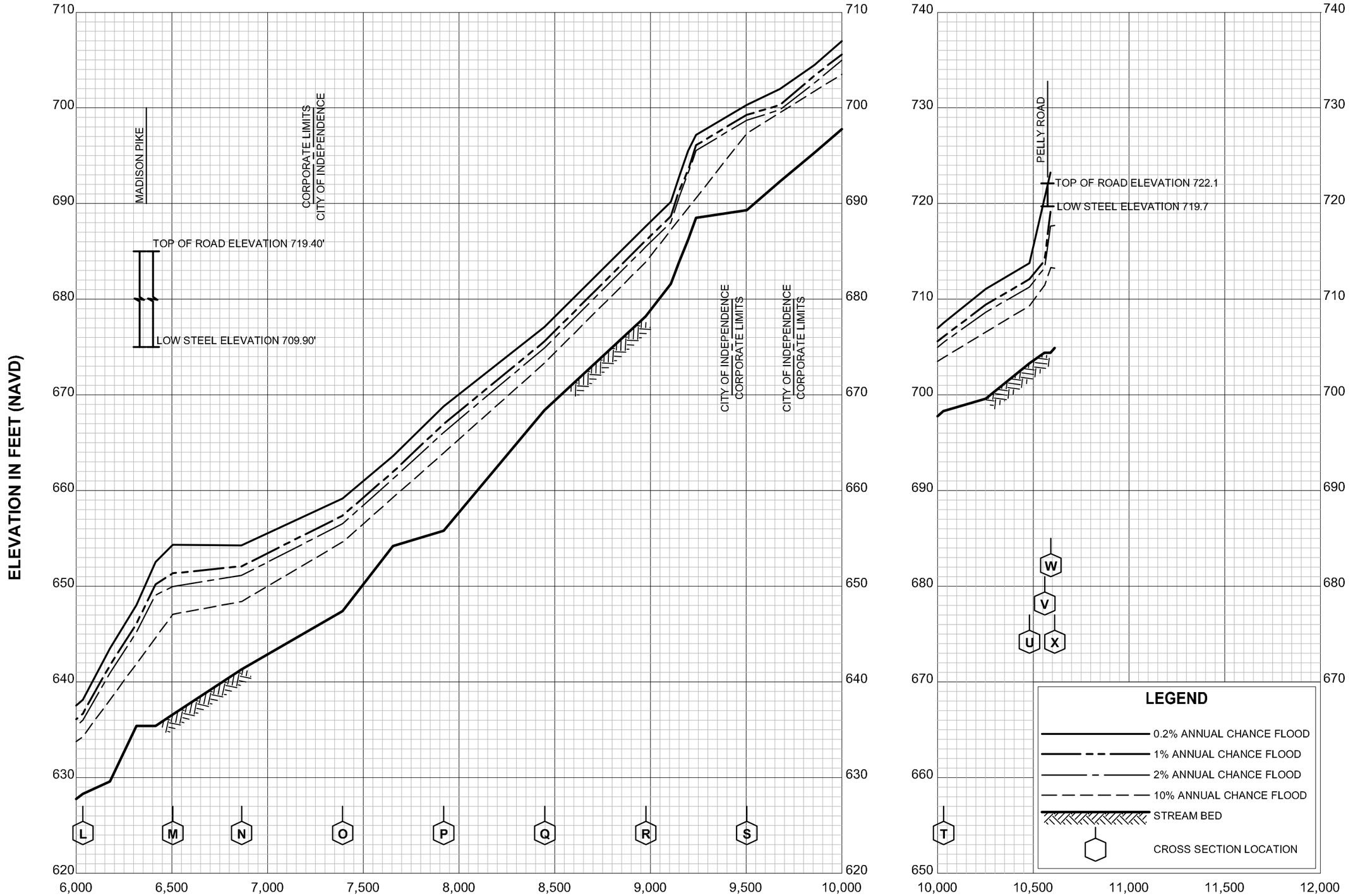
FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

22P



FLOOD PROFILES

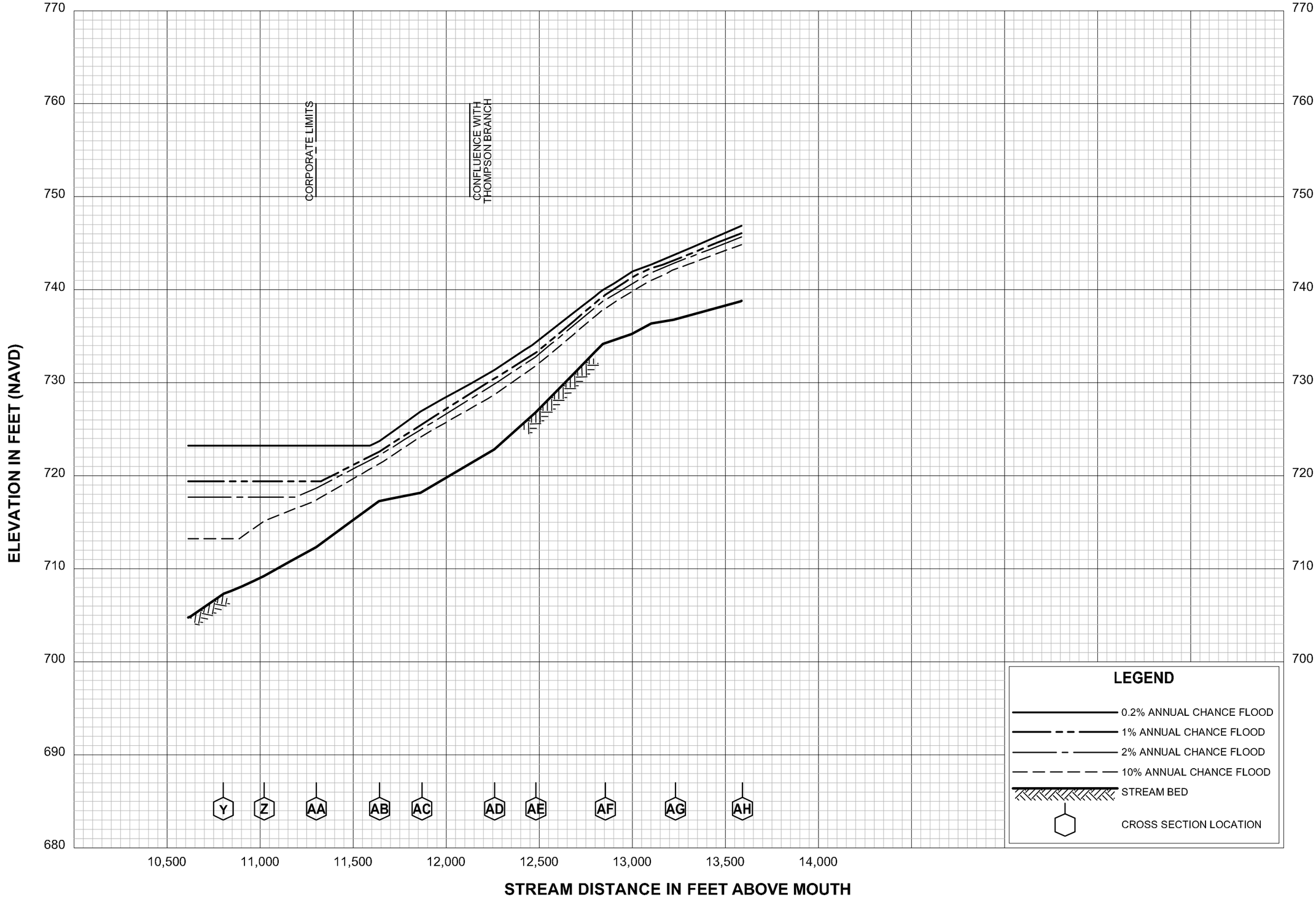
FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

AND INCORPORATED AREAS

23P



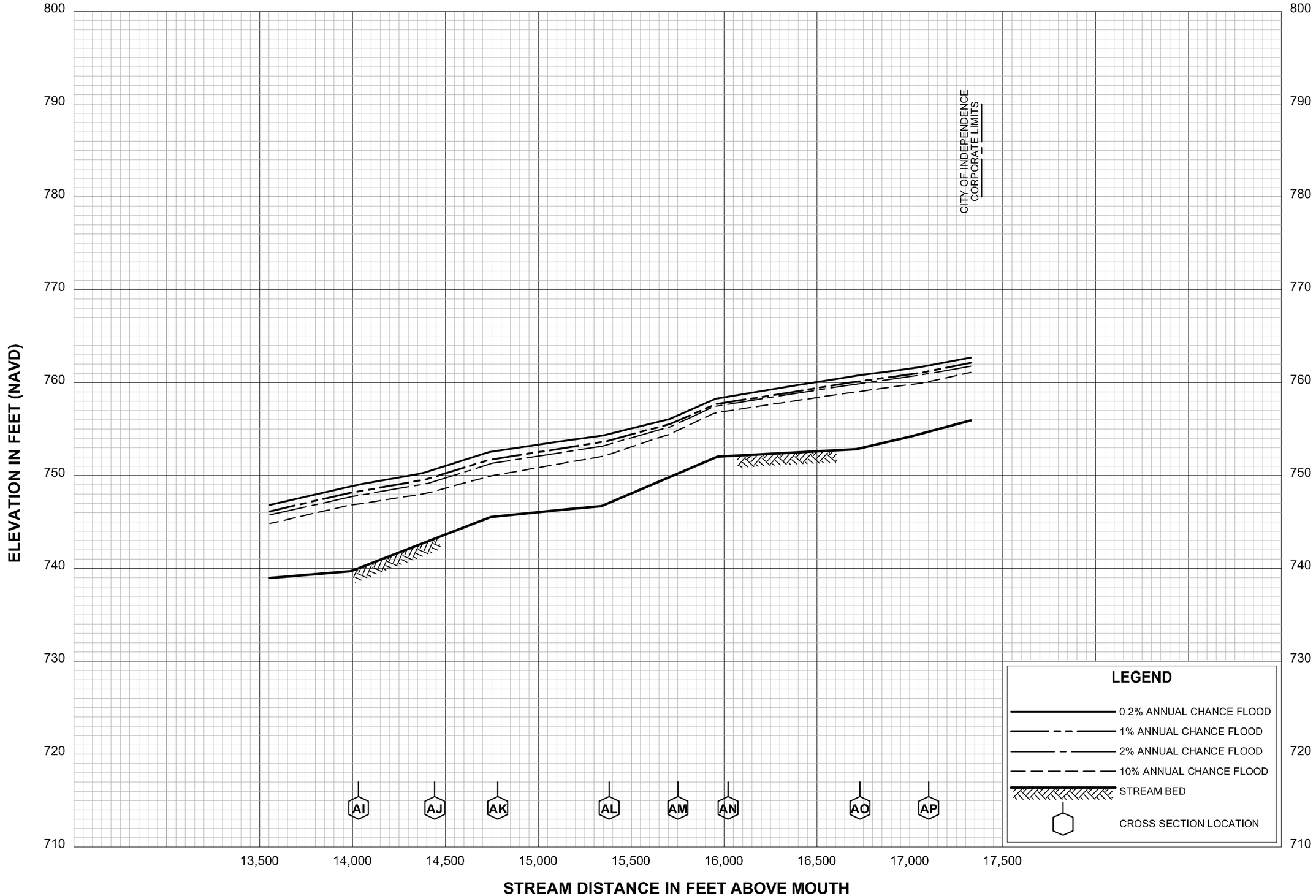
FLOOD PROFILES

FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

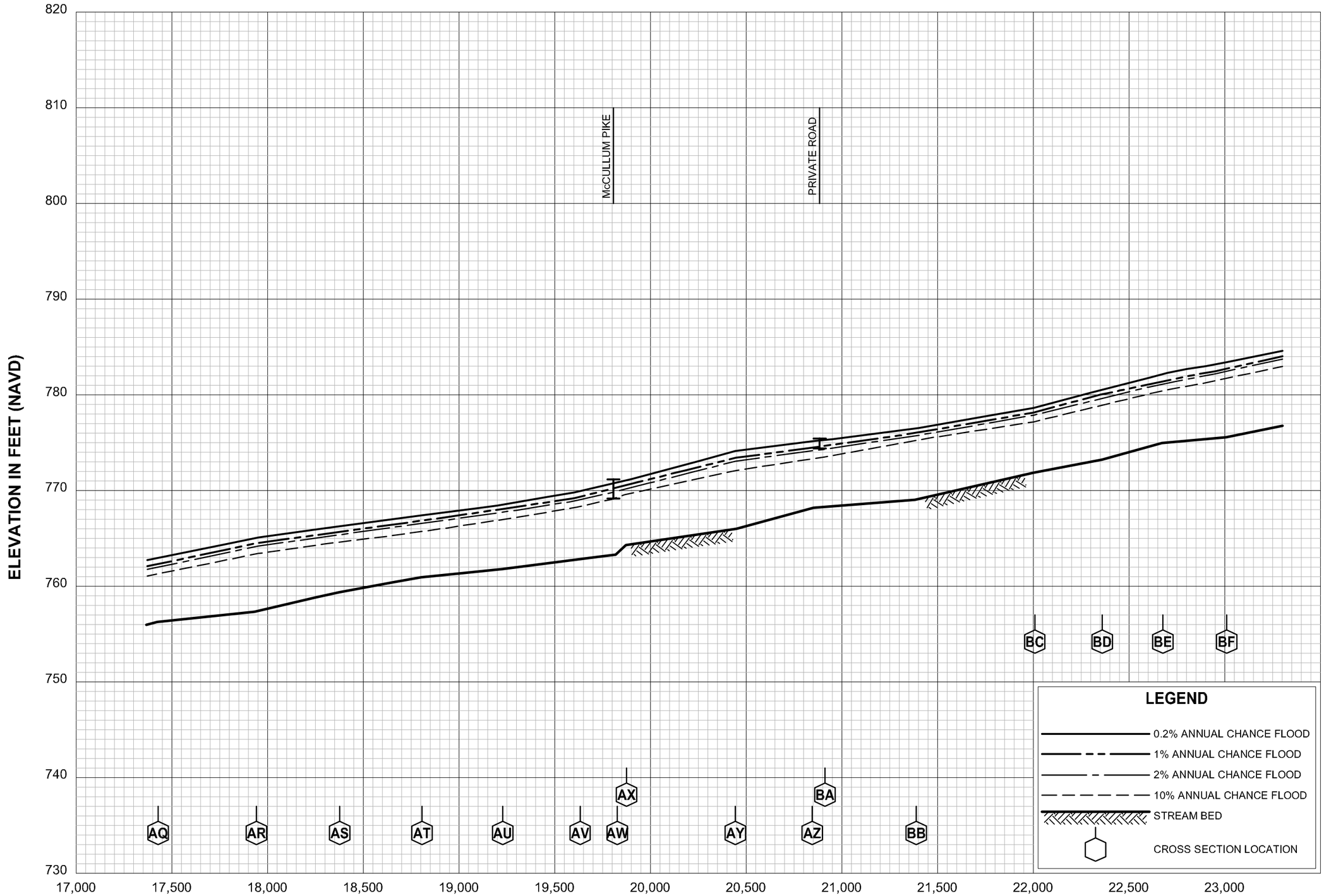
FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

25P



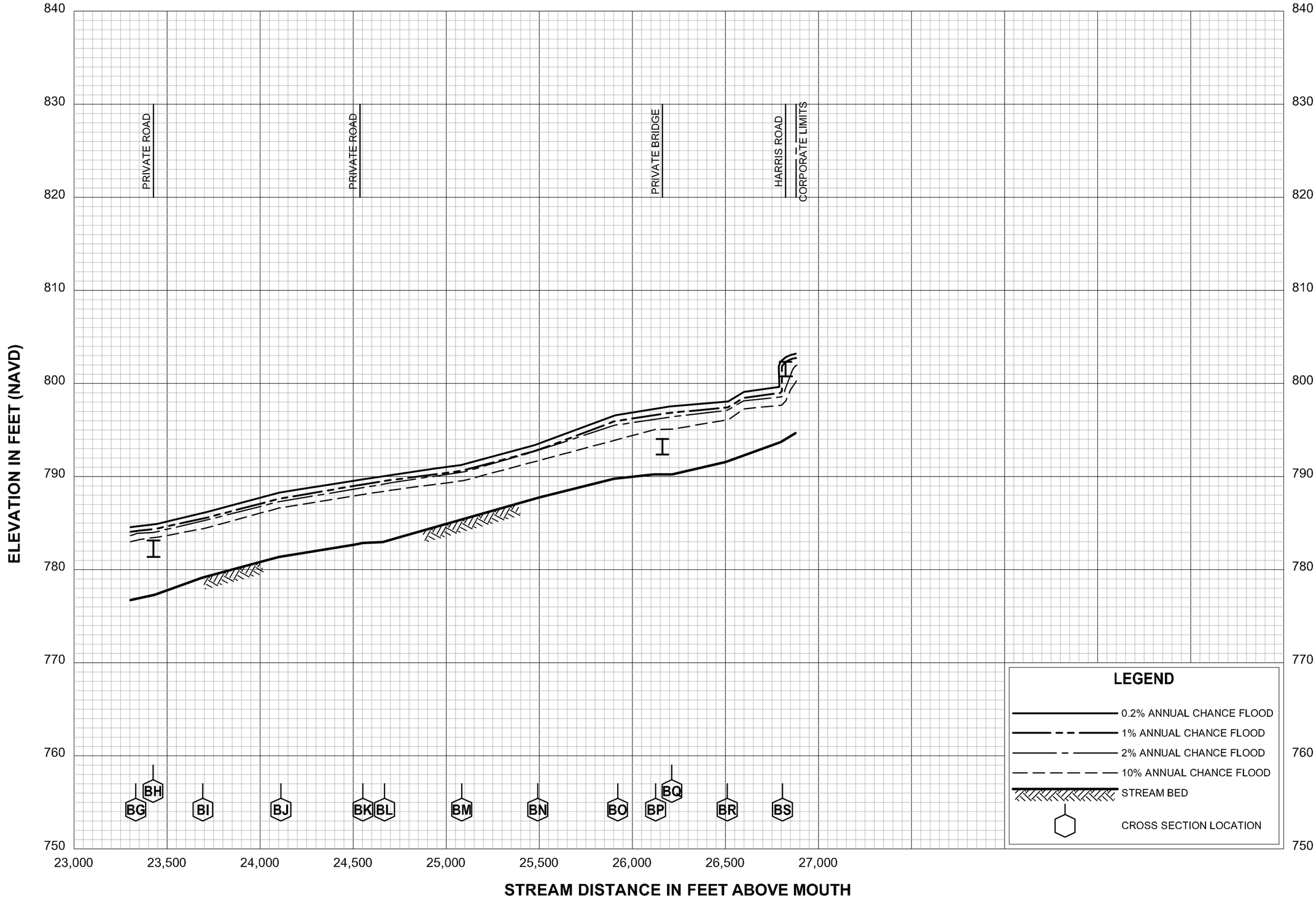
FLOOD PROFILES

FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



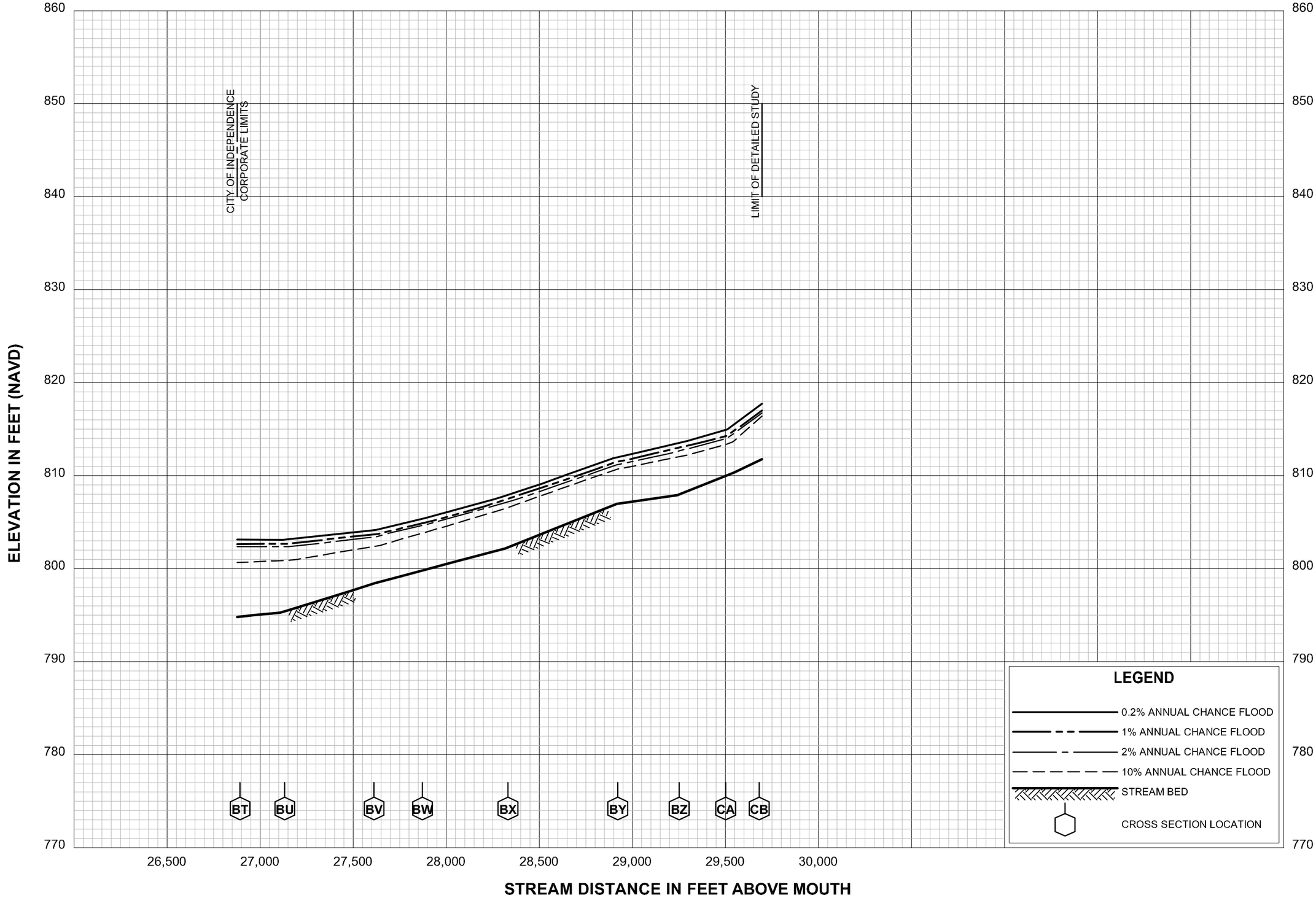
FLOOD PROFILES

FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



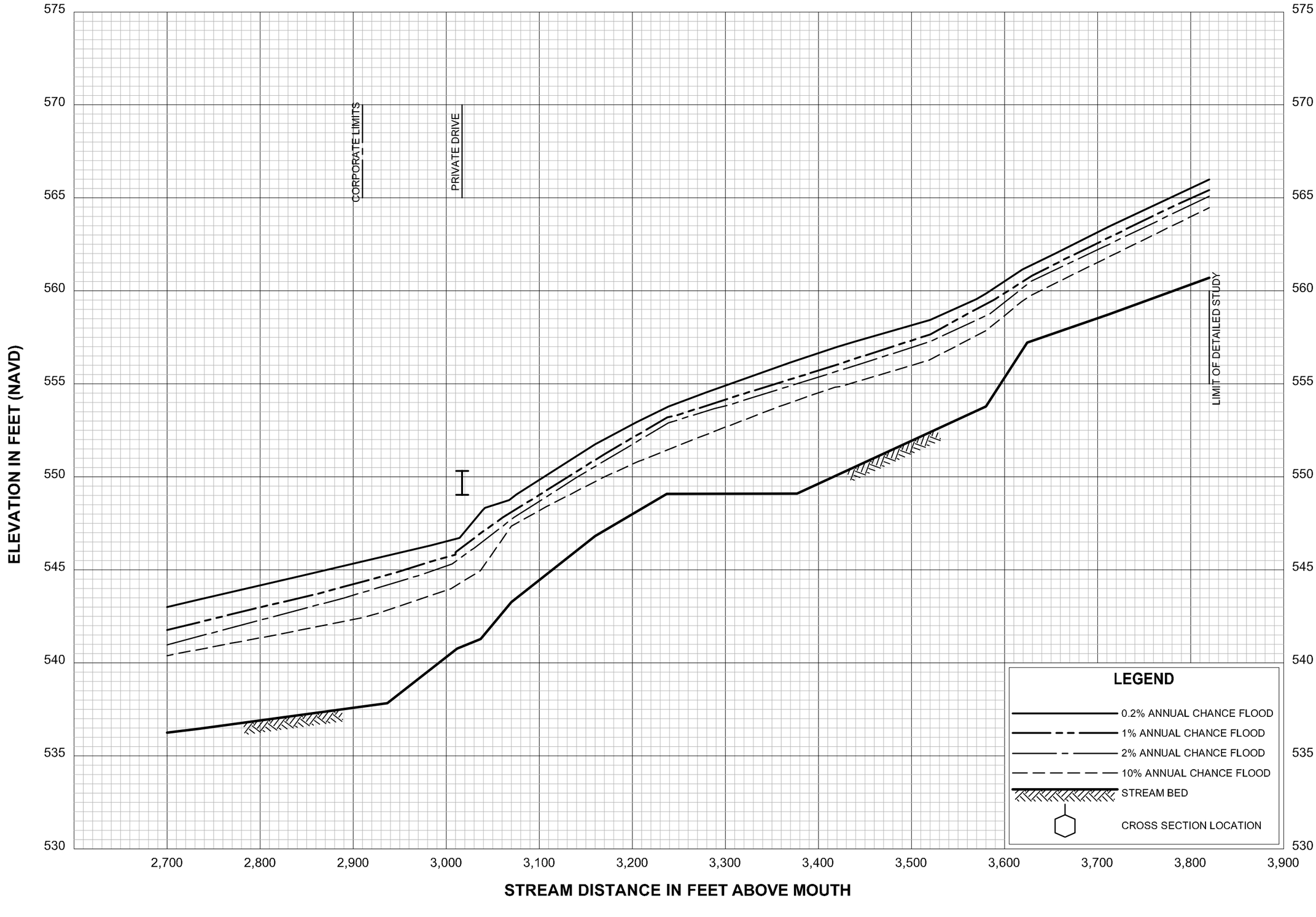
FLOOD PROFILES

FOWLER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

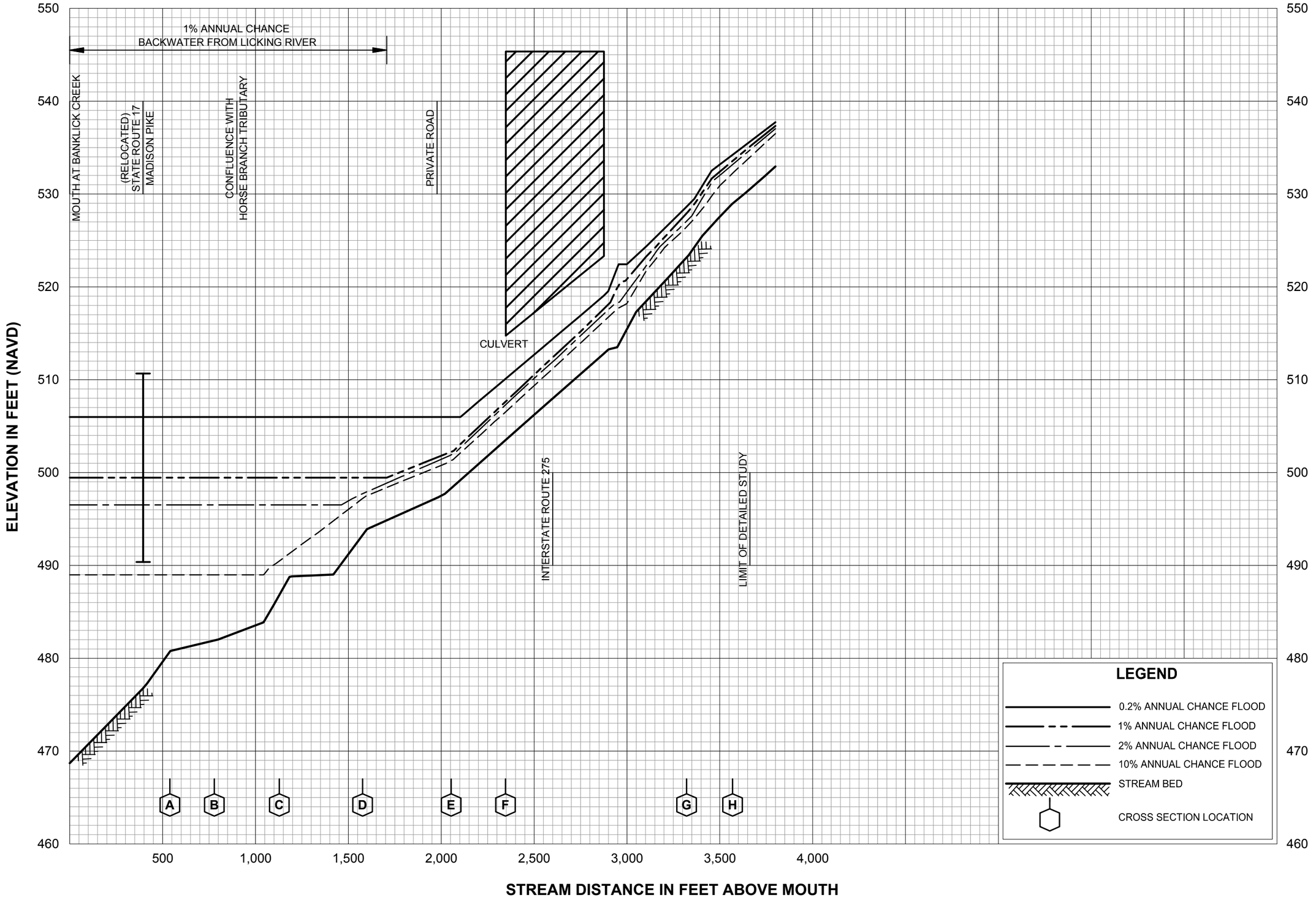
HOLDS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

29P



FLOOD PROFILES

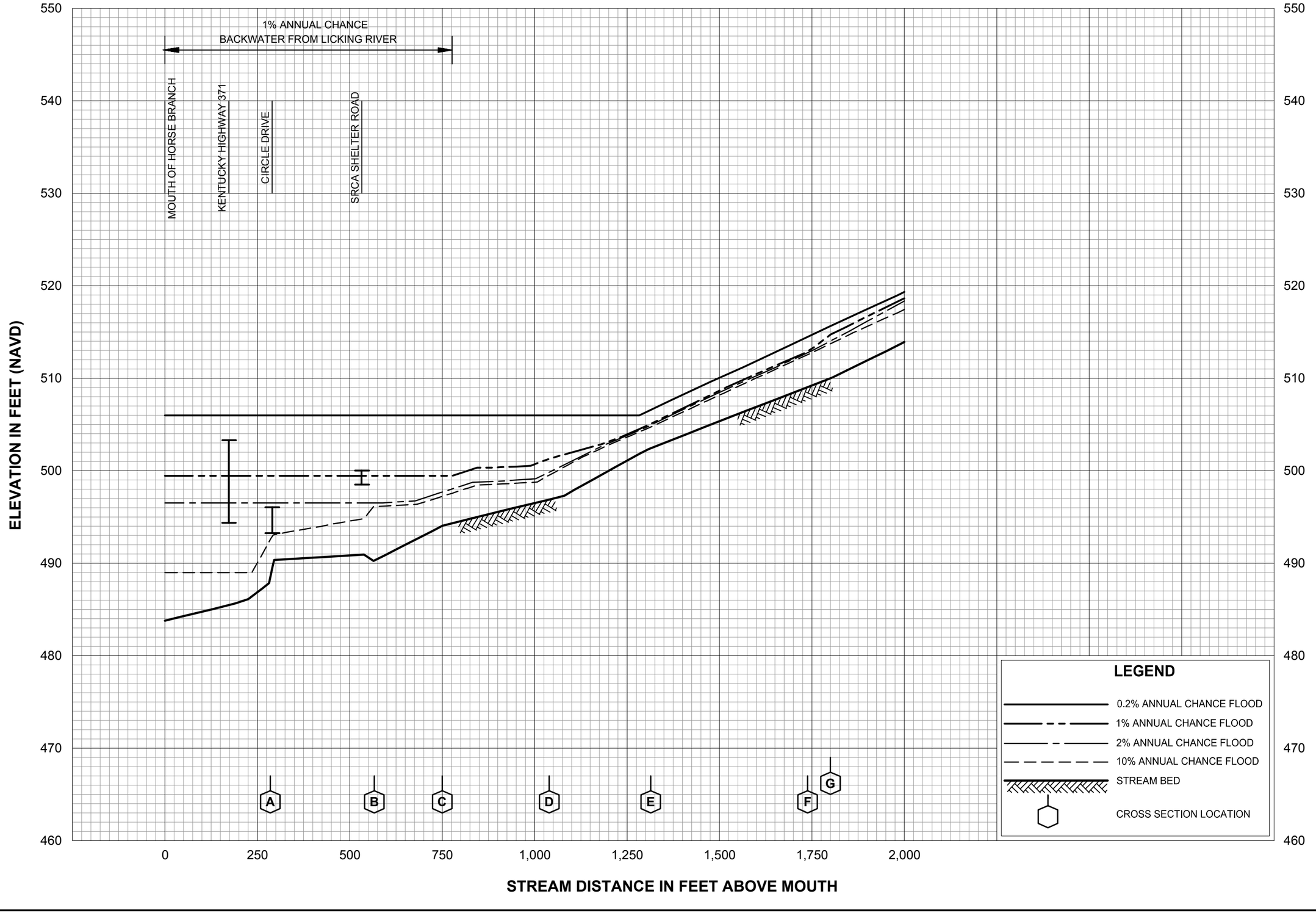
HORSE BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

30P



FLOOD PROFILES

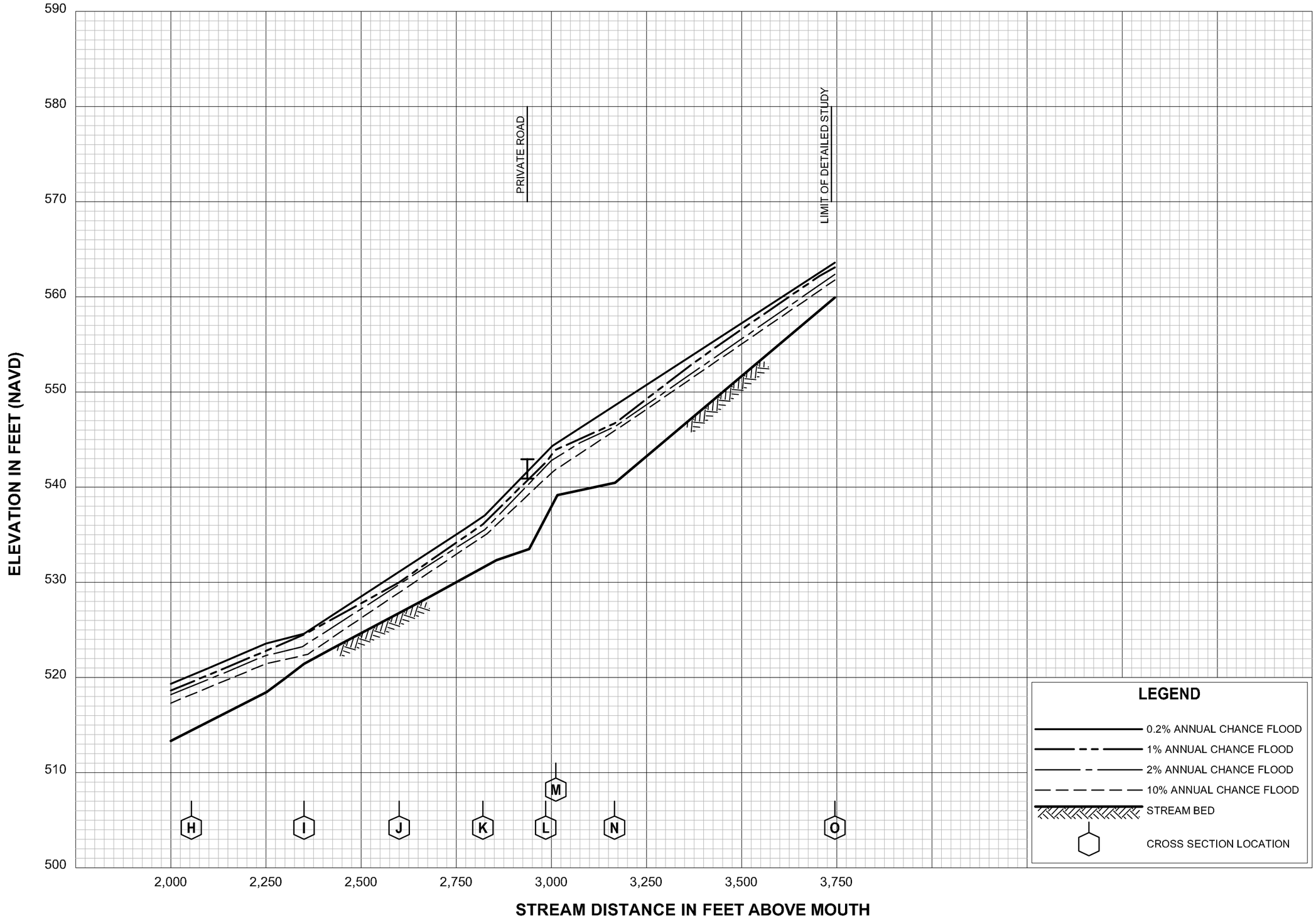
HORSE BRANCH TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

31P



FLOOD PROFILES

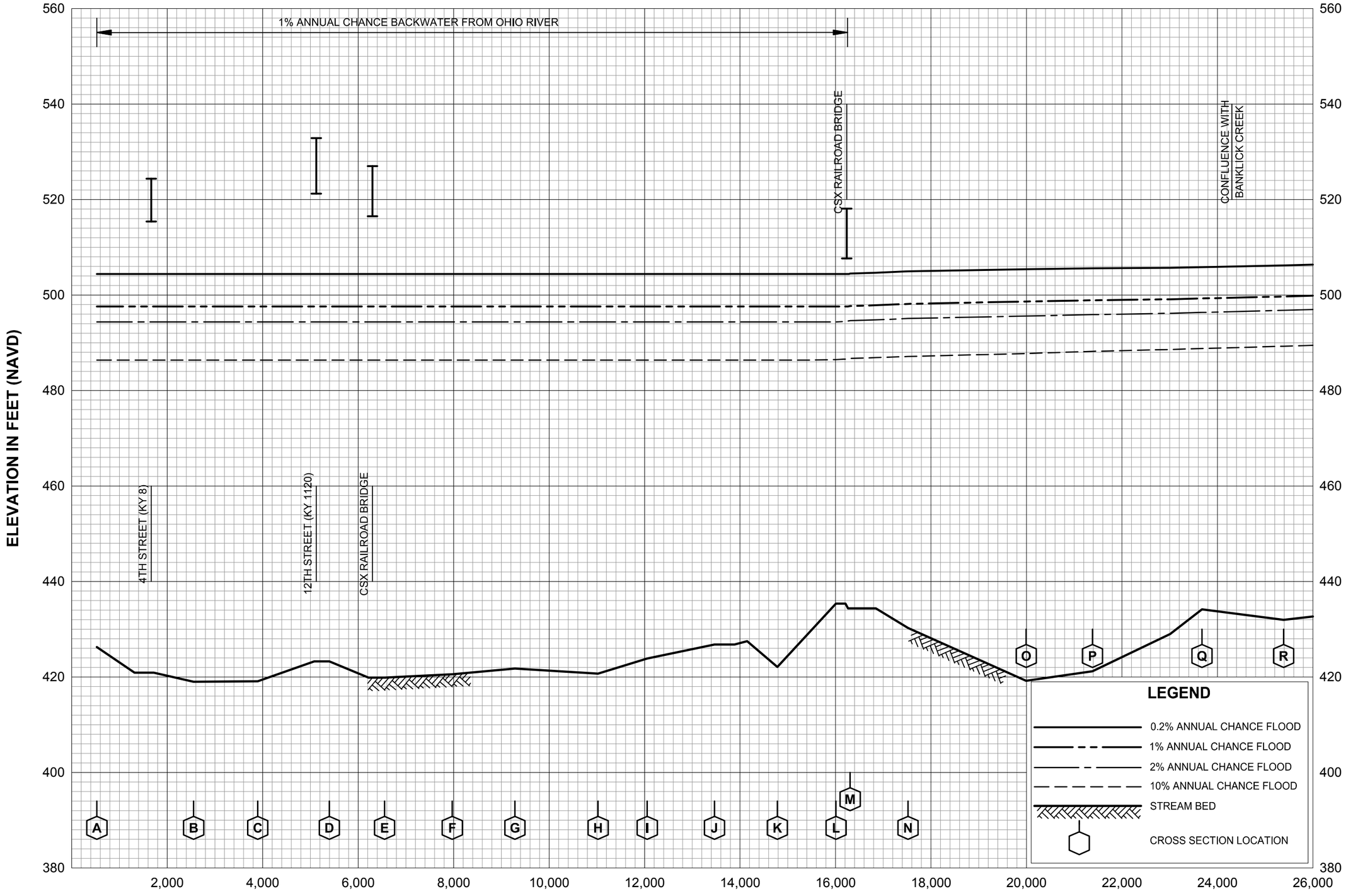
HORSE BRANCH TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

32P



FLOOD PROFILES

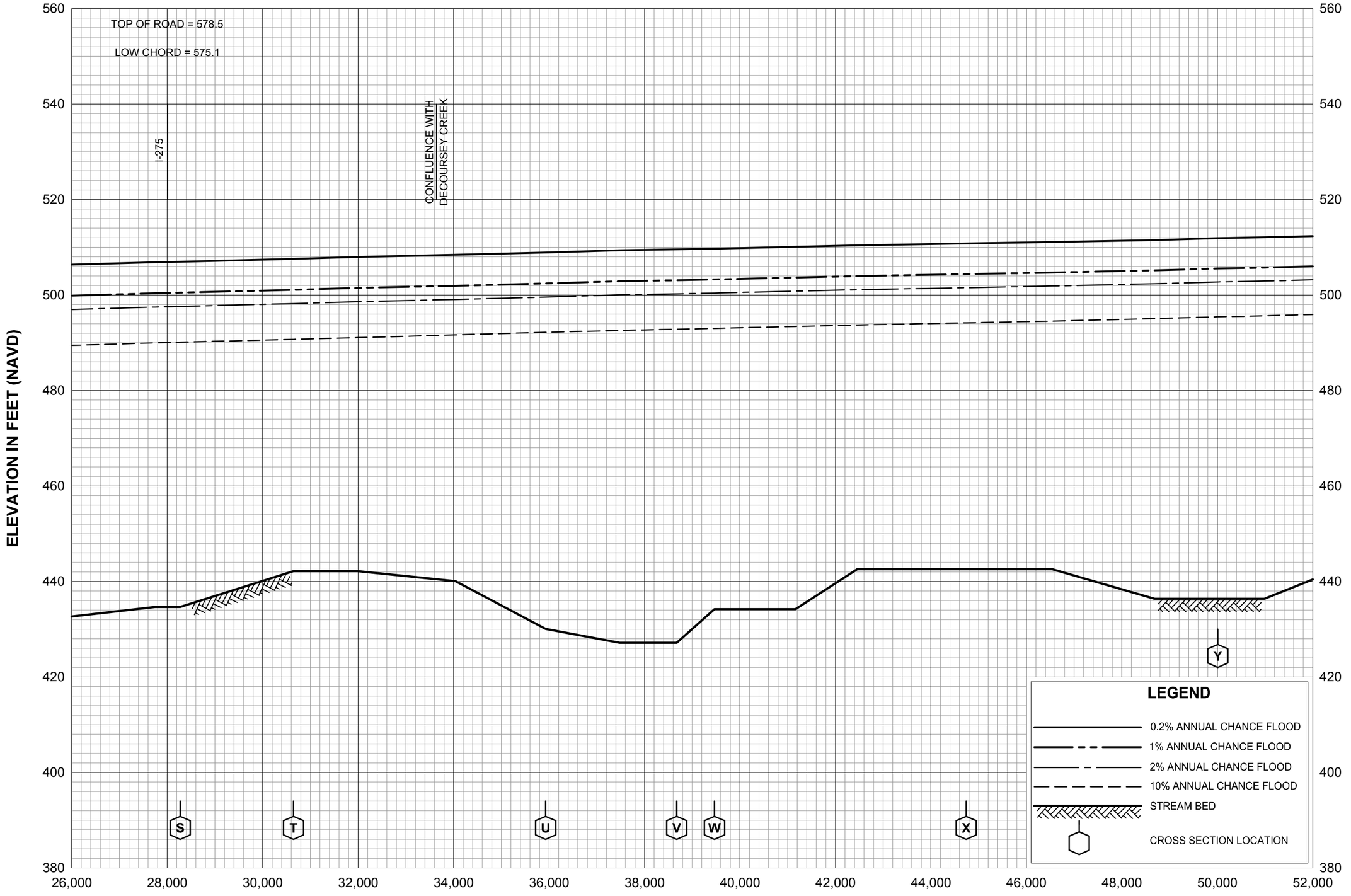
LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

33P



FLOOD PROFILES

LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

34P

ELEVATION IN FEET (NAVD)

560
540
520
500
480
460
440
420
400
380

52,000 54,000 56,000 58,000 60,000 62,000 64,000 66,000 68,000 70,000 72,000 74,000 76,000 78,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH OHIO RIVER

Z AA AB AC AD

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

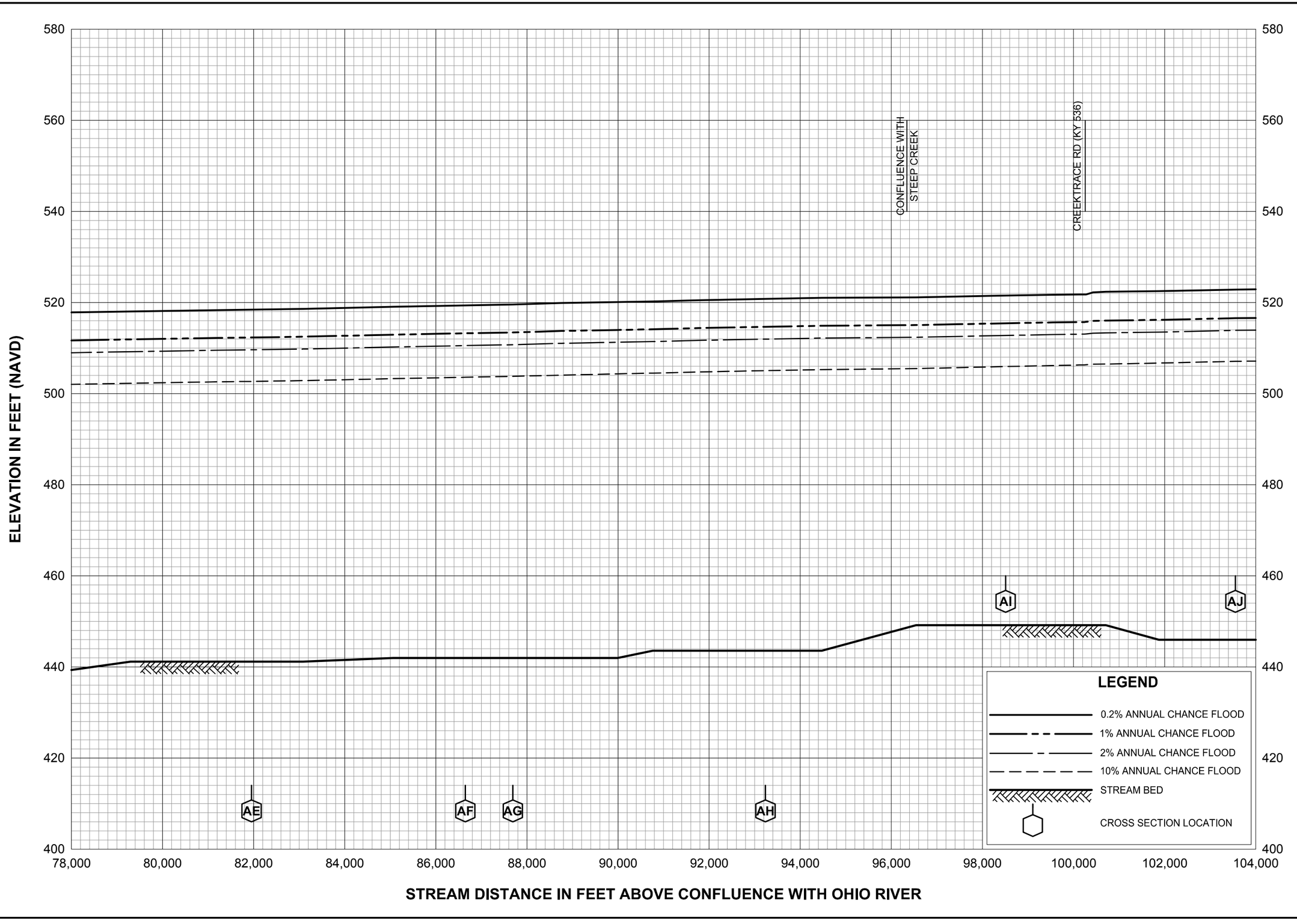
LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

35P



FLOOD PROFILES

LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

36P

ELEVATION IN FEET (NAVD)

580
560
540
520
500
480
460
440
420
400

CONFLUENCE WITH BOWMAN CREEK

CONFLUENCE WITH CRUISES CREEK

AK AL AM AN

104,000 106,000 108,000 110,000 112,000 114,000 116,000 118,000 120,000 122,000 124,000 126,000 128,000 130,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH OHIO RIVER

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

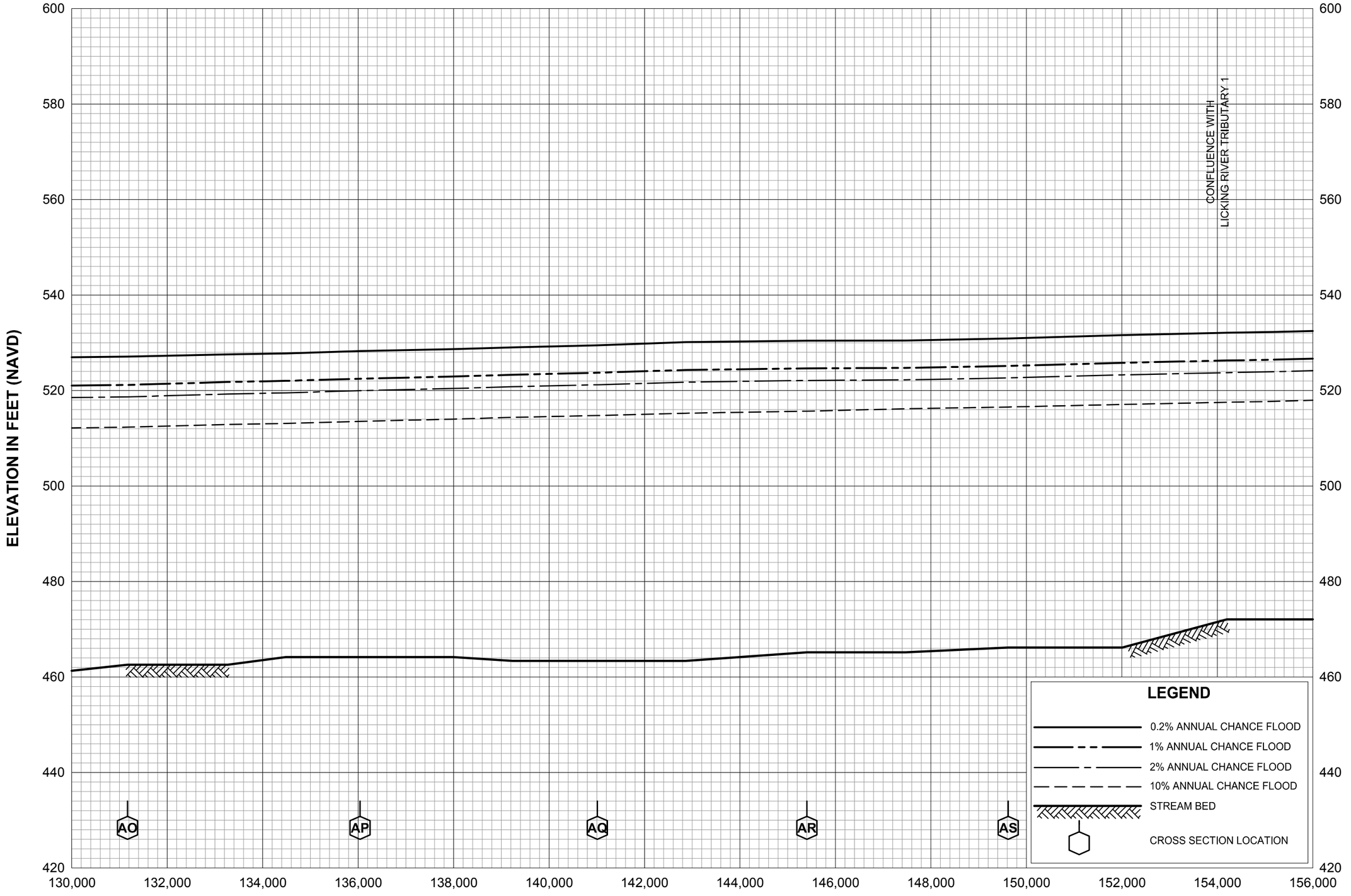
LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

37P



FLOOD PROFILES

LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

38P

ELEVATION IN FEET (NAVD)

600
580
560
540
520
500
480
460
440
420

156,000 158,000 160,000 162,000 164,000 166,000 168,000 170,000 172,000 174,000 176,000 178,000 180,000 182,000

AT AU

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- CROSS SECTION LOCATION

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH OHIO RIVER

FLOOD PROFILES

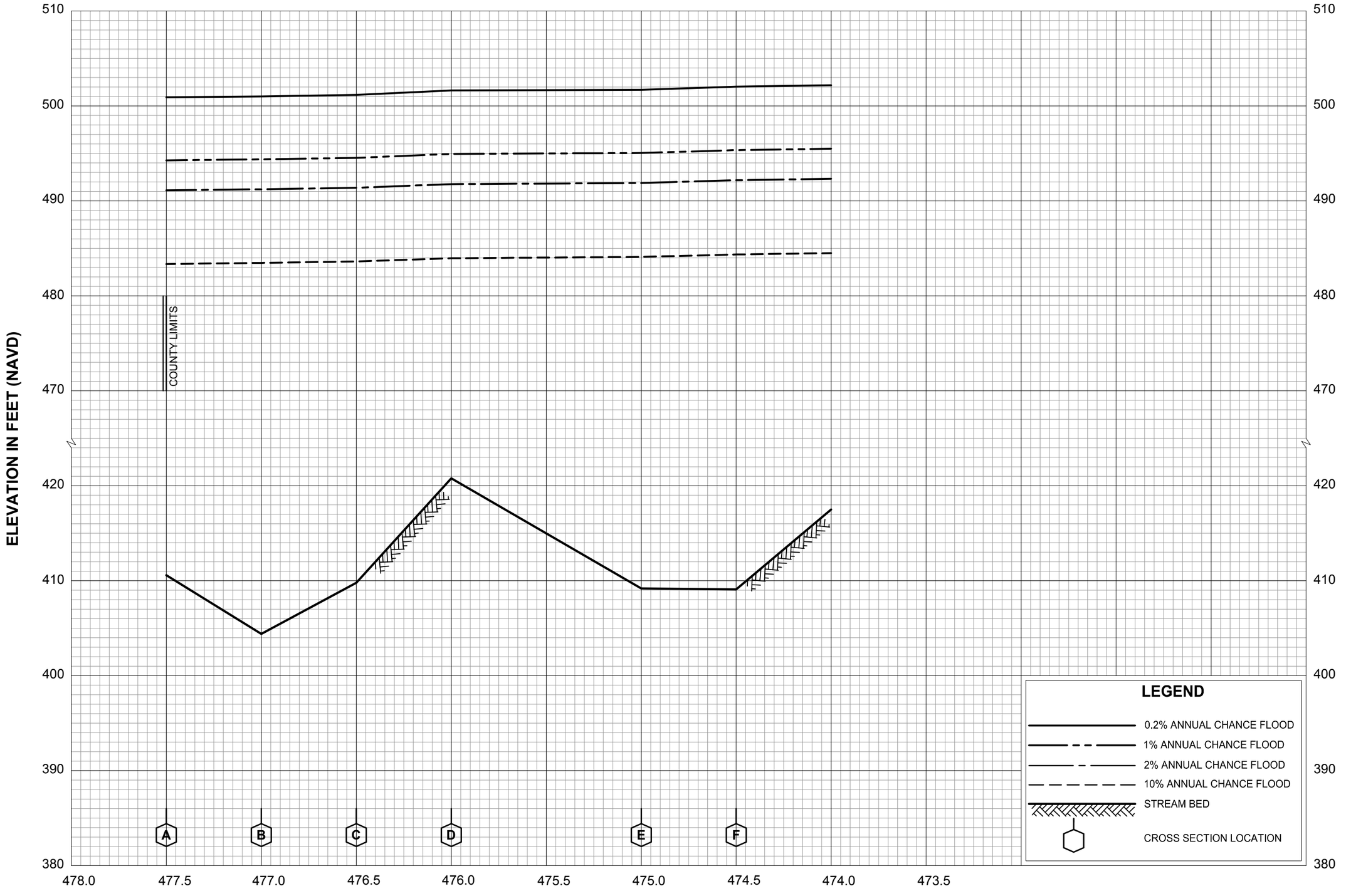
LICKING RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

39P



FLOOD PROFILES

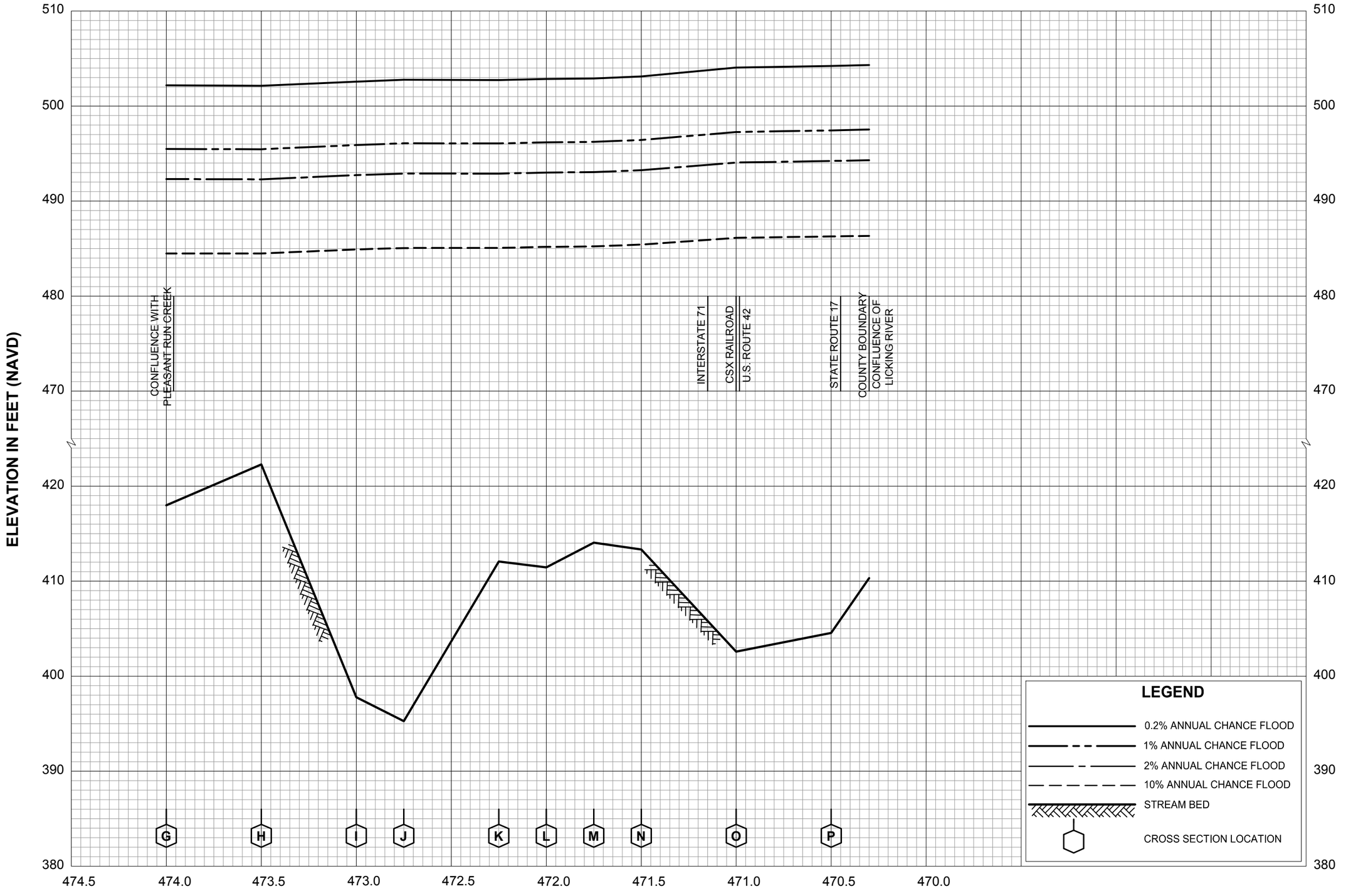
OHIO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

40P



FLOOD PROFILES

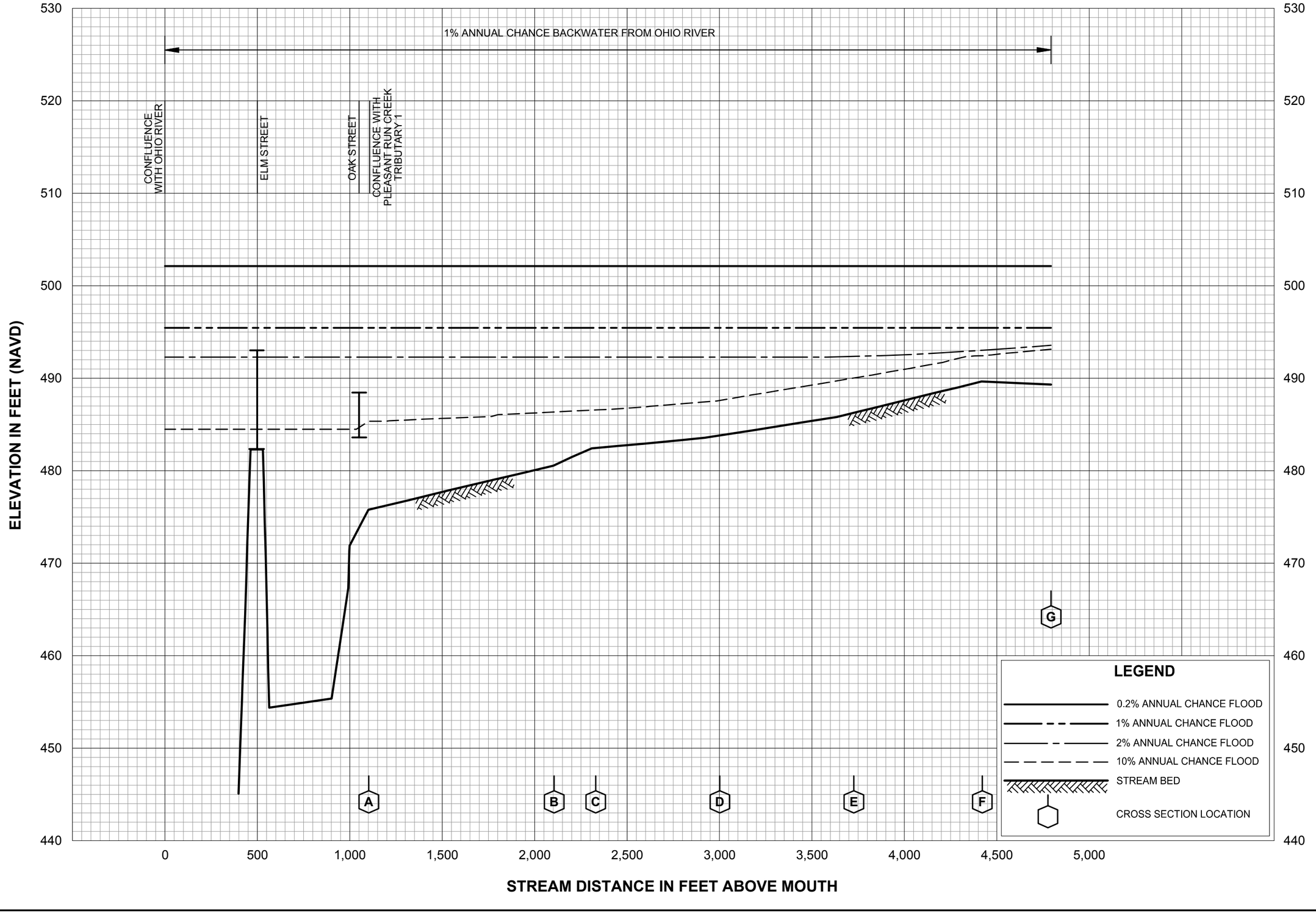
OHIO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

41P



FLOOD PROFILES

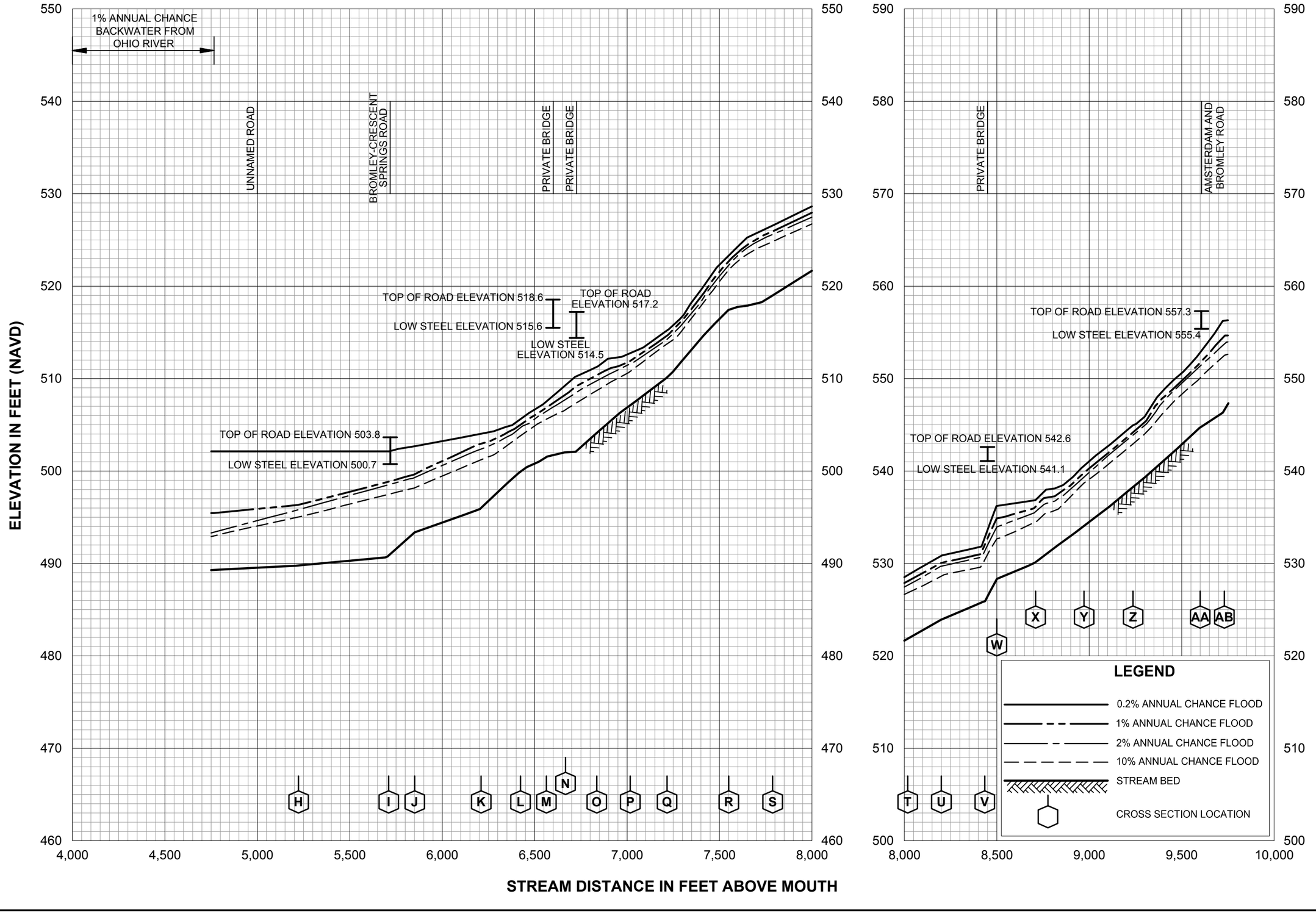
PLEASANT RUN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

42P



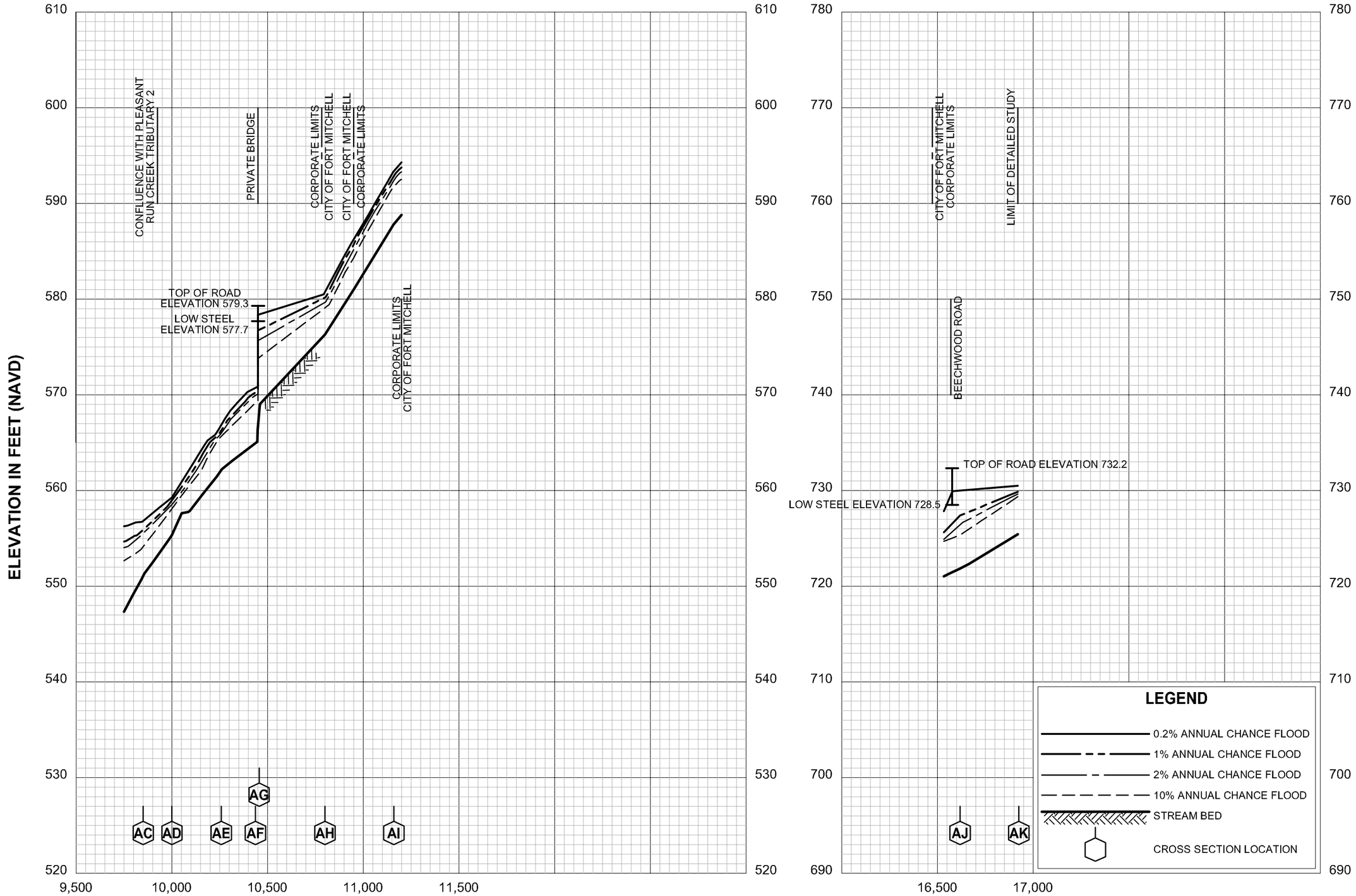
FLOOD PROFILES

PLEASANT RUN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



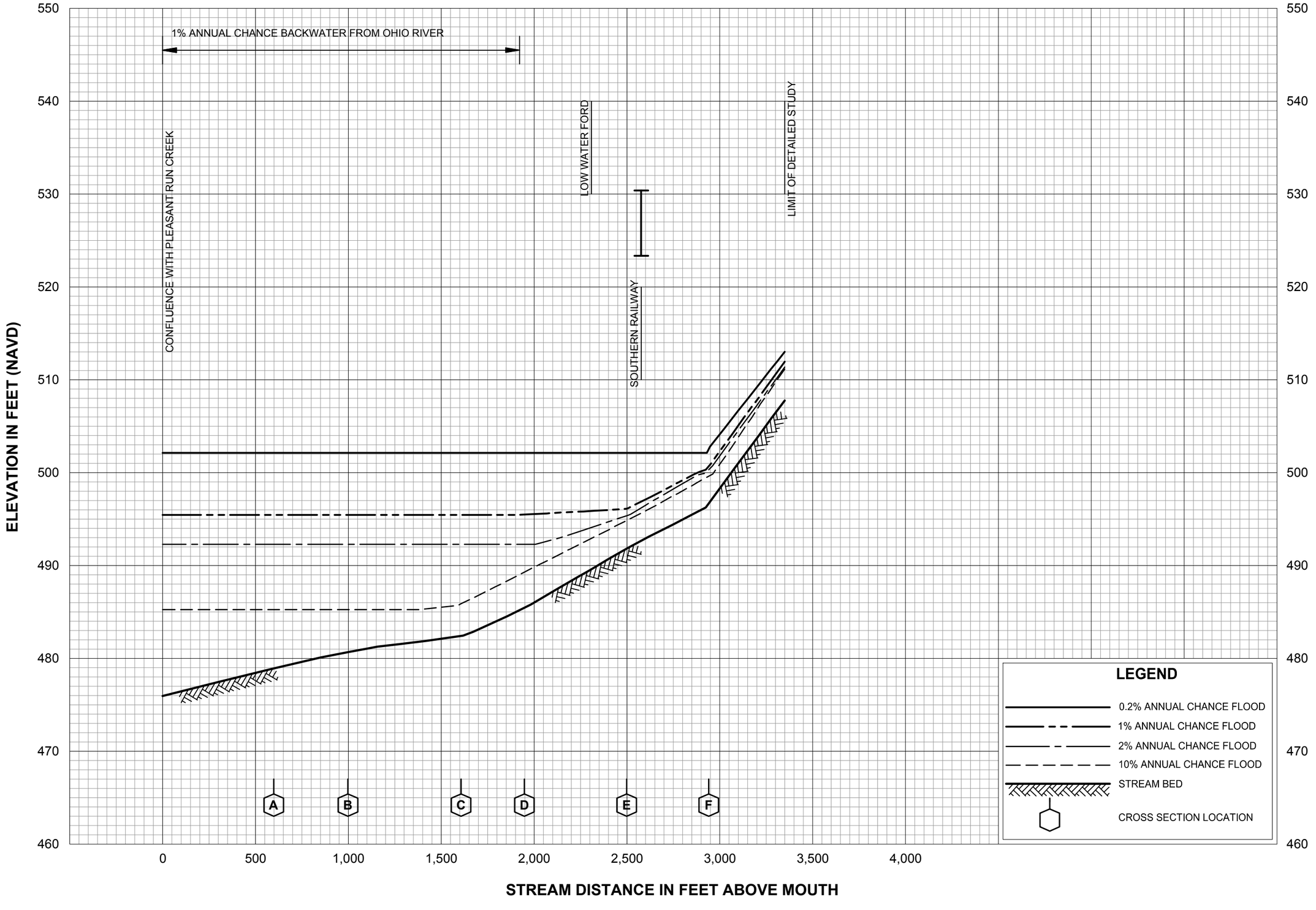
FLOOD PROFILES

PLEASANT RUN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

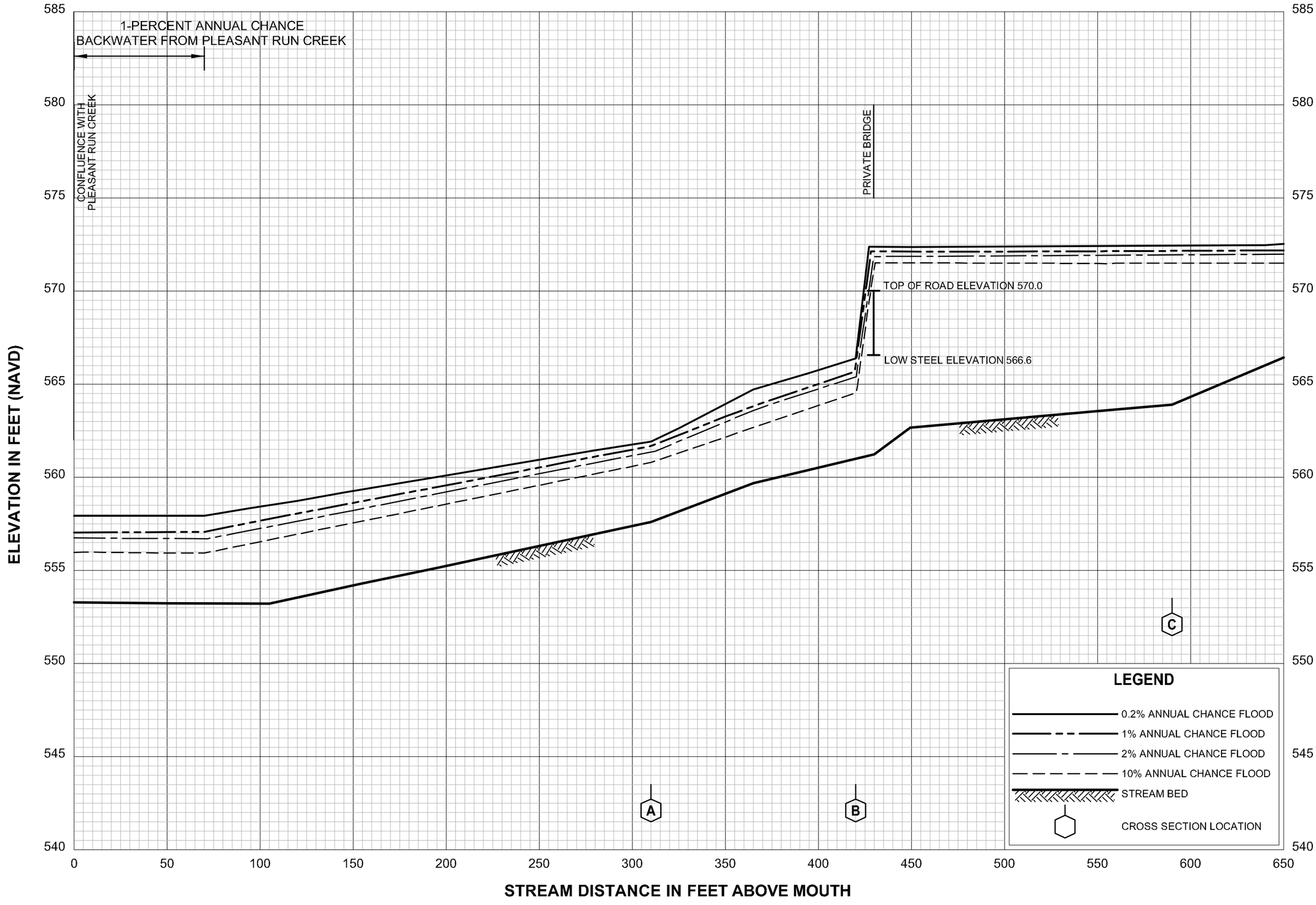
PLEASANT RUN CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

45P



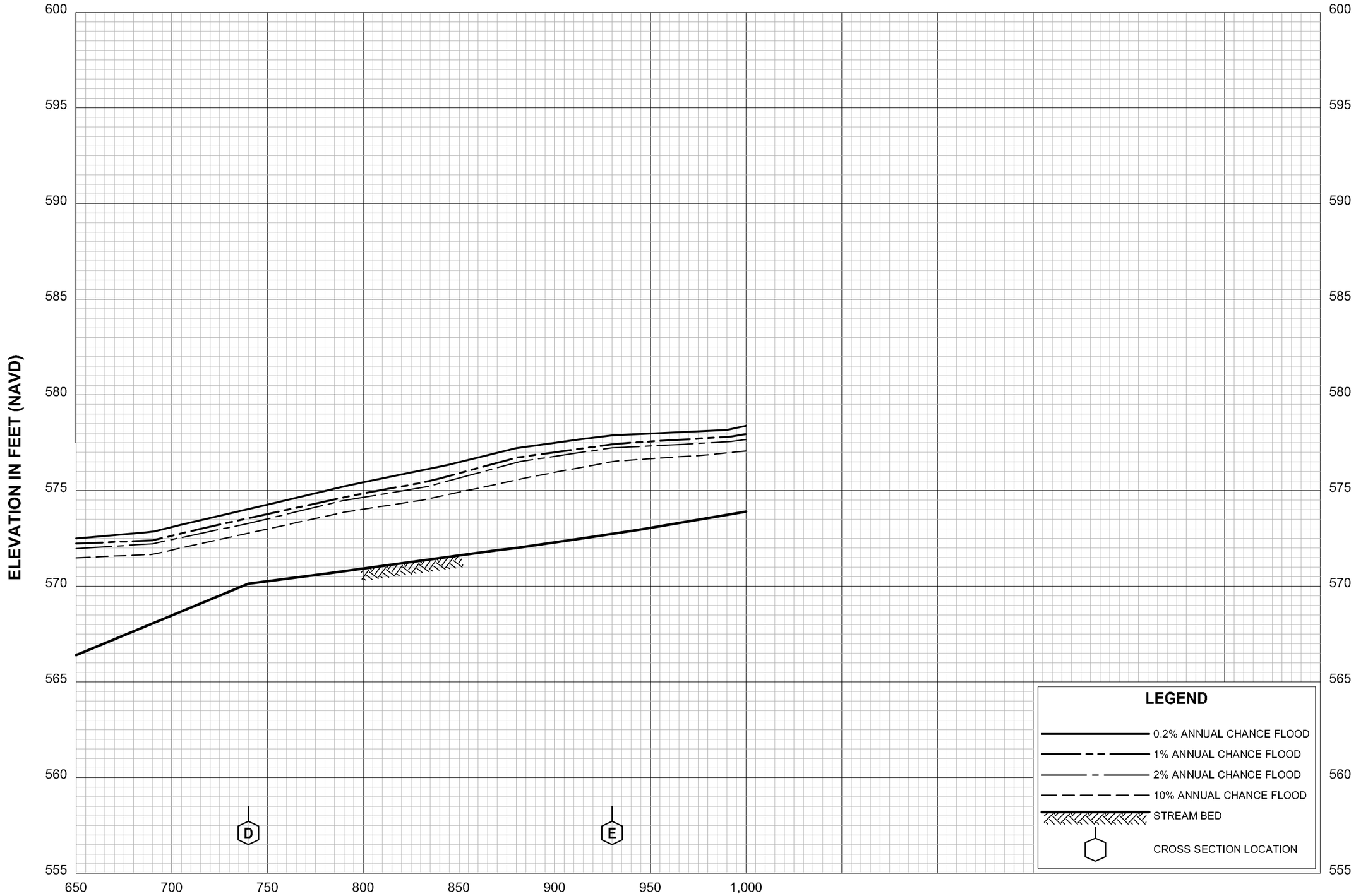
FLOOD PROFILES

PLEASANT RUN CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

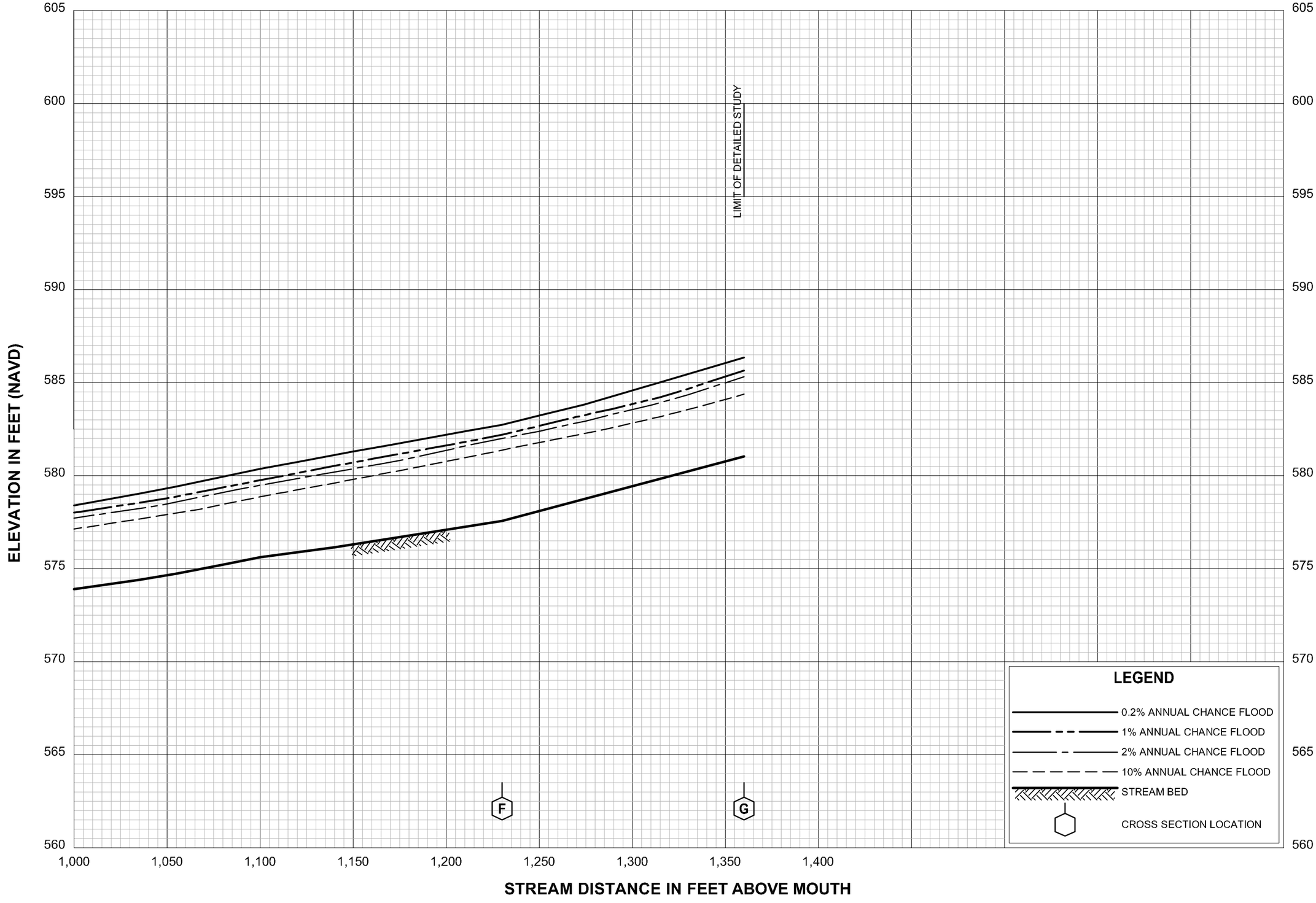
PLEASANT RUN CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

47P



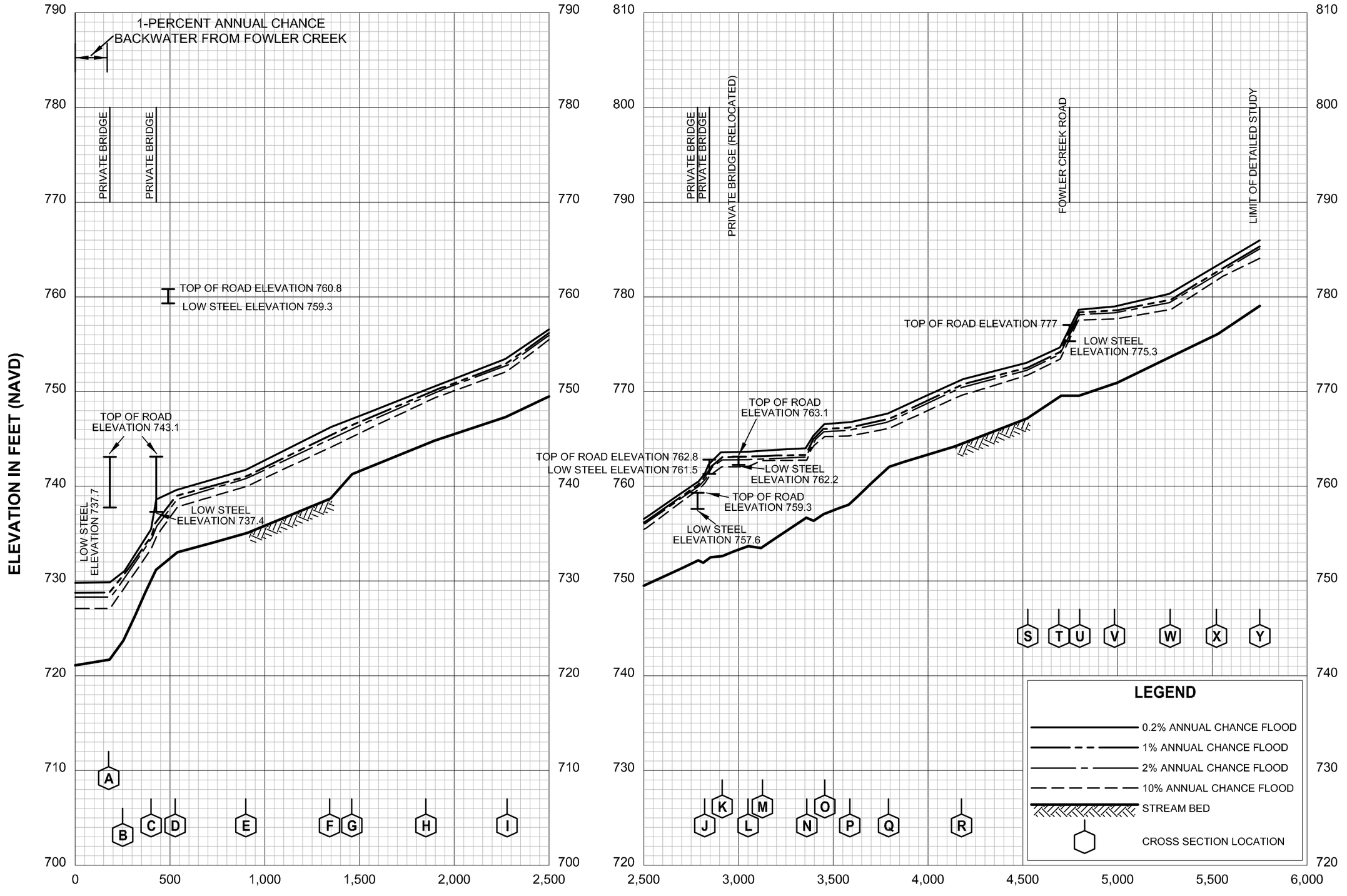
FLOOD PROFILES

PLEASANT RUN CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)



FLOOD PROFILES

THOMPSON BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

KENTON COUNTY, KY

(AND INCORPORATED AREAS)

49P