FLOOD INSURANCE STUDY

VOLUME 1 of 2

FRANKLIN COUNTY, PENNSYLVANIA
(ALL JURISDICTIONS)

COMMUNITY NAME	COMMUNITY NUMBER
ANTRIM, TOWNSHIP OF	421233
CHAMBERSBURG, BOROUGH OF	420469
FANNETT, TOWNSHIP OF	422424
GREENCASTLE, BOROUGH OF	420470
GREENE, TOWNSHIP OF	421649
GUILFORD, TOWNSHIP OF	421650
HAMILTON, TOWNSHIP OF	421651
LETTERKENNY, TOWNSHIP OF	422425
LURGAN, TOWNSHIP OF	421652
MERCERSBURG, BOROUGH OF	420471
METAL, TOWNSHIP OF	421653
MONT ALTO, BOROUGH OF	420472

COMMUNITY NAME	COMMUNITY NUMBER
MONTGOMERY, TOWNSHIP OF	422426
ORRSTOWN, BOROUGH OF*	422700
PETERS, TOWNSHIP OF	421654
QUINCY, TOWNSHIP OF	421655
SOUTHAMPTON, TOWNSHIP OF	421657
ST. THOMAS, TOWNSHIP OF	421656
WARREN, TOWNSHIP OF	422427
WASHINGTON, TOWNSHIP OF	421658
WAYNESBORO, BOROUGH OF	420473

*No Special Flood Hazard Areas Identified

PRELIMINARY 6/30/2010

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
42055CV001A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the 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 the FIS at any time. In addition, FEMA may revise part of this FIS Report by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS report. Therefore, users should consult with community officials and check the Community Map Repository to obtain the most current FIS report components.

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

Old Zone	New Zone
A1 through A30	AE
B	X
C	X

Initial Countywide FIS Effective Date:

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FLOOD INSURANCE STUDY
FRANKLIN COUNTY, PENNSYLVANIA (ALL JURISDICTIONS)

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Franklin County, Pennsylvania, including the Boroughs of Chambersburg, Greencastle, Mercersburg, Mont Alto, Orrstown and Waynesboro; and the Townships of Antrim, Fannett, Greene, Guilford, Hamilton, Letterkenny, Lurgan, Metal, Montgomery, Peters, Quincy, Southampton, St. Thomas, Warren and Washington (referred to collectively herein as Franklin County) and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the county that will establish actuarial flood insurance rates and to assist the county in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations (CFR) at 44 CFR, 60.3.

Please note that on the effective date of this study, the Borough of Orrstown has no mapped special flood hazard areas. This does not preclude future determinations of Special Flood Hazard Areas (SFHA) that could be necessitated by changed conditions affecting the community (i.e. annexation of new lands) or the availability of new scientific or technical data about flood hazards. The Borough of Shippensburg is geographically located in both Franklin and Cumberland Counties. The Borough of Shippensburg is included in its entirety in the separately published FIS report and Flood Insurance Rate Map (FIRM) for Cumberland County, Pennsylvania.

In some states and 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 takes precedence and the State (or other jurisdictional agency) will be able to explain them.

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

1.2 Authority and Acknowledgments

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

This FIS was prepared to include the all jurisdictions within Franklin County in a countywide format. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as complied from their previously printed FIS reports is shown below.

Chambersburg, Borough of: For the FIS and FIRM dated July 17, 1978, the hydrologic and hydraulic analyses were performed by Gannett, Fleming, Corddry and Carpenter, Inc., for the Federal Insurance Administration (FIA), under Contract No. H-3813. This work was completed in May 1977. All survey work was performed by, or under the direction of, Aero Services, Philadelphia, Pennsylvania, under subcontract to Gannett, Fleming, Corddry and Carpenter, Inc (Reference 1).

Greene, Township of: For the original FIS and FIRM dated November 2, 1990, the hydrologic and hydraulic analyses were prepared by the U. S. Geological Survey (USGS) for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 21. This work was completed in October 1987.

For the FIS and FIRM revision dated August 18, 1992, the USGS revised the elevation for an elevation reference mark, which necessitated adjustments to the floodplain boundaries and base (100-year) flood elevations (Reference 2).

Guilford, Township of For the FIS and FIRM dated June 18, 1990, the hydrologic and hydraulic analyses were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 21. This work was completed in October 1987. The hydrologic and hydraulic analyses for Conococheague Creek were prepared, under agreement with FEMA, during the preparation of the FIS for the Borough of Chambersburg (Reference 3).

Hamilton, Township of: For the FIS and FIRM dated June 18, 1990, the hydrologic and hydraulic analyses were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EHW-85-E-1823, Project Order No. 21. This work was completed in August 1987 (Reference 4).

Mercersburg, Borough of:	For the FIS and FIRM dated July 15, 1992, the hydrologic and hydraulic analyses were performed by the USGS for FEMA under Inter-Agency Agreement No. EMW-90-E-3287, Project Order No. 1. This work was completed in December 1990 (Reference 5).
Mont Alto, Borough of:	For the FIS and FIRM dated July 16, 1990, the hydrologic and hydraulic analyses were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 21. This work was completed in November 1987 (Reference 6).
Montgomery, Township of:	For the FIS and FIRM dated November 4, 1992, the hydrologic and hydraulic analyses for Johnston Run were prepared by the USGS for FEMA under Inter-Agency Agreement No. EMW-90-E-3287, Project Order No. 1. This work was completed in December 1990 (Reference 7).
Peters, Township of:	For the FIS and FIRM dated December 2, 1992, the hydrologic and hydraulic analyses for Johnston Run were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EMW-90-E-3287, Project Order No. 1. This work was completed in December 1990 (Reference 8).
Quincy, Township of:	For the FIS and FIRM dated July 16, 1990, the hydrologic and hydraulic analyses were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 21. This work was completed in November 1987 (Reference 9).
Southampton, Township of:	For the FIS and FIRM dated May 15, 1986, the hydrologic and hydraulic analyses were prepared by Michael Baker, Jr., Inc., for FEMA, under Contract No. EMW-83-1171. This work was completed in September 1984 (Reference 10).
St. Thomas, Township of:	For the FIS and FIRM dated July 16, 1990, the hydrologic and hydraulic analyses were prepared by the USGS for FEMA, under Inter-Agency Agreement No. EHW-85-E-1823, Project Order No. 21. This work was completed in August 1987 (Reference 11).

Washington, Township of:	For the original FIS and FIRM dated June 3, 1986, the hydrologic and hydraulic analyses were prepared by Michael Baker, Jr., Inc., for FEMA, under Contract No. EMW-83-1171. This work was completed in August 1984. For the FIS and FIRM revision dated June 17, 1991, an updated hydraulic analysis for West Branch Antietam Creek was prepared by the USGS for FEMA. This work was completed in October 1989 (Reference 12).
Waynesboro, Borough of:	For the FIS and FIRM dated November 1, 1985, the hydrologic and hydraulic analyses were prepared by Michael Baker, Jr., Inc., for FEMA, under Contract No. EMW-83-1171. This work was completed in July 1984 (Reference 13).

FIS reports were not published for the Townships of Antrim, Fannett, Letterkenny, Lurgan, Metal and Warren; therefore, the authorities and acknowledgements for those communities are not available. There are no previous FISs or FIRMs for the Boroughs of Greencastle and Orrstown; therefore, these communities will not appear in the Community Map History Table (Section 6.0).

For this countywide FIS, the DFIRM database and mapping were prepared for FEMA by GG3, a joint venture between Gannett Fleming, Inc., Camp Hill, Pennsylvania and Greenhorne & O'Mara, Inc., Laurel, Maryland under Contract No. HSFE03-08-D-0007, Task Order No. 3. This preliminary countywide FIS does not include new detailed hydrologic and hydraulic analyses, but rather redelineation of effective flood hazard information and new approximate analyses. This work was completed in June 2010.

The orthophotography base mapping was provided by the PAMAP Program, Pennsylvania Department of Conservation and Natural Resources, Bureau of Topographic and Geologic Survey. This information was photogrammetrically compiled at a scale of 1:2,400 from aerial photography dated April 2007. The digital countywide FIRM was produced in Pennsylvania State Plane South Zone coordinate system (FIPS zone 3702) with a Lambert Conformal Conic projection, units in feet and referenced to the North American Datum of 1983, GRS80 spheroid. Differences in datum and spheroid used in the production of the 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 this FIRM.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting is held typically with representatives of FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify streams to be studied by detailed methods.

The initial and final meeting dates for the previous FIS reports for Franklin County are shown in Table 1, "Initial and Final CCO Meetings."

TABLE 1 - INITIAL AND FINAL CCO MEETINGS

Community Name	Initial CCO Date	Final CCO Date
Borough of Chambersburg	March 1975	May 17, 1977
Township of Greene	April 2, 1985	July 5, 1989
Township of Guilford	April 2, 1985	July 6, 1989
Township of Hamilton	*	*
Borough of Mercersburg	September 21, 1989	August 12, 1991
Borough of Mont Alto	April 2, 1985	July 5, 1989
Township of Montgomery	February 13, 1991	December 10, 1991
Township of Peters	February 13, 1991	December 10, 1991
Township of Quincy	April 2, 1985	July 5, 1989
Township of Southampton	April 1983	June 13, 1985
Township of St. Thomas	April 2, 1985	July 5, 1989
Township of Washington	April 1984	June 14, 1985
Borough of Waynesboro	April 1983	November 11, 1984

* Data not available

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Franklin County, Pennsylvania, including the communities listed in Section 1.1. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

All or portions of the streams in Table 2, "Streams Studied by Detailed Methods" were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

TABLE 2 – STREAMS STUDIED BY DETAILED METHODS

Auxiliary Channel of Conococheague Creek
Back Creek
Cold Spring Run
Conococheague Creek
Conodoguinet Creek
East Branch Antietam Creek
English Valley Run
Falling Spring Branch
Falls Creek
Gum Run
Johnston Run
Middle Spring Creek
Muddy Run No. 1
Red Run
Rowe Run
Tributary A to English Valley Run
Tributary B to English Valley Run
Tributary to Falling Spring Branch
Unnamed Tributary to West Branch Antietam Creek
West Branch Antietam Creek

Streams that have names in this countywide FIS other than those used in the previously printed FIS reports for the communities in which they are located are shown in Table 3, "Stream Name Changes."

TABLE 3 – STREAM NAME CHANGES

Community	Old Name	New Name
Borough of Chambersburg	Falling Spring Creek	Falling Spring Branch
Township of Southampton	Muddy Run	Muddy Run No. 1

This countywide FIS incorporates the determinations of Letters of Map Revision (LOMRs) issued by FEMA, for the projects listed by community in Table 4, "Letters of Map Change."

TABLE 4 – LETTERS OF MAP CHANGE

Type	Case Number	Date Issued	Project Identifier
LOMR	93-03-115P	May 10, 1993	Bayer Home Center - Reflects an updated hydraulic analysis along Conococheague Creek from U.S. Route 11 bridge to approximately 2,800 feet upstream of Cornertown Road bridge.

Numerous flooding sources in the county were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards.

2.2 Community Description

Franklin County is located in south central Pennsylvania. The county is bordered by Juniata County, Pennsylvania to the north; Perry and Cumberland Counties, Pennsylvania to the northeast; Adams County, Pennsylvania to the east; Frederick County, Maryland to the southeast; Washington County, Maryland to the south; Fulton County, Pennsylvania to the west; and Huntingdon County, Pennsylvania to the northwest. The population of Franklin County was 129,313 people as of the year 2000 (Reference 14). The total area of the county is approximately 773 square miles (Reference 14).

Franklin County is located primarily in the Ridge and Valley Province of Pennsylvania. This region is characterized by gently rolling terrain (Reference 1).

The climate in the study area is generally continental in nature, modified by the effects of the Atlantic Ocean and the Gulf of Mexico. Moderately warm summers, with temperatures occasionally rising above 85 degrees Fahrenheit (°F) and cool winters, with temperatures occasionally dropping below 20°F, characterize the climate. Summer and winter mean temperatures range from 74°F to 29°F,

respectively. Temperature extremes range from -21°F (January 1994) to a sultry 103°F (July 1988). The annual precipitation averages 41.53 inches (Reference 15).

2.3 Principal Flood Problems

The history of flooding along the streams in Franklin County indicates that floods can occur in any season of the year; however, the possibility of flooding is greatly reduced during the winter months. Although most severe floods have been attributed to rainfall alone, floods occurring in spring have been compounded by snow melt and moving ice. The area's major floods in late summer and fall have been associated with tropical storms and hurricanes moving up the Atlantic Coast. The following paragraphs summarize the principal flooding problems within Franklin County.

The Conococheague Creek is the chief source of flood damage in the Borough of Chambersburg and the Townships of Greene, Guilford, Hamilton and Peters. The two largest recorded floods on the Conococheague Creek occurred in June 1972, during Tropical Storm Agnes and September 1975, during Tropical Storm Eloise. The river gage upstream located in Fayetteville, Pennsylvania, USGS Gaging Station No. 01614090, registered a peak discharge of 3,920 cubic feet per second (cfs) during Tropical Storm Agnes. The return period for this discharge was approximately 25 years, or a 4-percent-annual-chance of occurrence. The river gage downstream located in Fairview, Maryland, USGS Gaging Station No. 01614500, registered a peak discharge of 32,400 cfs during Tropical Storm Agnes. The return period for this discharge was approximately 150 years, or a 0.67-percent-annual-chance of occurrence. The estimated 1-percent-annual-chance flood for Conococheague Creek at the downstream corporate limit of the Borough of Chambersburg is 8,800 cfs. The elevation of a high water mark along Conococheague Creek experienced during Hurricane Agnes, located at the corner gas station at Lincoln Way West and Hood Streets, was 602.4 feet. The elevation of the watersurface of the estimated 1-percent-annual-chance flood at this location is 601.2 feet or 1.2 feet below that of Hurricane Agnes.

Floodwaters resulting from both Agnes and Eloise caused considerable damage to property, buildings and bridges in these municipalities. Flood damage sustained during Hurricane Agnes within the Borough of Chambersburg was estimated by the Pennsylvania Department of Environmental Protection (PADEP) to be $1,580,553 in 1974 dollars (Reference 16). Extensive inundation occurred in the area between Commerce and Loudon Streets.

Falling Spring Branch is a major source of flooding in the Borough of Chambersburg and the Township of Guilford. The two floods of record occurred in 1972 during Tropical Storm Agnes and in 1975 during Tropical Storm Eloise. No high water marks or peak discharges are available for these flood events on Falling Spring Branch.

Additional sources of flooding include Cold Spring Run in the Township of Greene, Falling Spring Branch and English Valley Branch in the Township of Guilford, Back Creek in the Townships of Hamilton and St. Thomas, Johnston Run in the Borough of Mercersburg and the Townships of Montgomery and Peters, West Branch

Antietam Creek in the Borough of Mont Alto and the Township of Quincy, West Branch Conococheague Creek in the Township of Peters and Unnamed Tributary of West Branch Antietam Creek in the Township of Peters. These streams are ungaged and no data is available to provide information about the magnitude and severity of past flooding in the area.

The history of flooding in the Borough of Waynesboro and the Townships of Southampton and Washington indicates that flooding occurs infrequently and results in only minor damage to private property. This is due to the predominance of agricultural farm land and forested areas along the streams in these municipalities. While the potential for development in the flood plain exists, actual residential development is sufficiently removed so as to limit structural flooding mainly to basements and out buildings.

The two most severe floods in the Township of Southampton occurred in March 1936 as a result of spring rains and snowmelt and in June 1972 from Tropical Storm Agnes. Information regarding discharges during these two events was not available. No damage estimates were available for the Township; however, conversations with local officials and residents indicated that damage to agricultural crops and bridges was not uncommon. Several bridges were destroyed by Tropical Storm Agnes and have since been replaced. Bank erosion along the major watercourses is prevalent within the community.

2.4 Flood Protection Measures

At present, there are no flood protection structures located within the Boroughs of Chambersburg, Mercersburg, Mont Alto and Waynesboro; and the Townships of Greene, Guilford, Hamilton, Montgomery, Peters, Quincy and St. Thomas. Residents of these municipalities rely on the usual warnings through radio, television and the local newspapers for information concerning possible flood conditions.

There are four low dams upstream of the Borough of Chambersburg located on the Conococheague Creek – Penn Hall Dam, Wolfe Lake Dam, Silone Dam and Paper Mill Dam, but these are low flow water impoundment structures as opposed to flood control structures. The Borough of Chambersburg utilizes non-structural measures to aid in the prevention of future flood damage. These are in the form of local land use regulations adopted from the CFR, Title 24, Chapter 10, FIA, Parts 1910.3A and 1910.3B, which controls building within the areas that have a high risk of flooding.

In the Townships of Southampton and Washington stream bank erosion is a problem and has been treated by placing riprap and the use of gabions in several locations. This has contained localized erosion problems but is ineffective as a flood mitigation device.

The Township of Southampton has an abandoned gristmill dam located on Middle Spring Creek, downstream of Shippensburg; however, no substantial retention is created by this dam with the exception of very large flooding events.

There are two small dams located at the headwaters of Falls Creek, at Fort Ritchie,

Maryland. These dams were not designed as flood control structures, but as impoundments for ice-making. Attempts were made to obtain release flow data for these dams without success. Discussions with U.S. Army Corps of Engineers (USACE) engineering personnel indicated that their studies have shown that a total dam failure would have no significant impact on flooding in the study area, including the Township of Washington.

In the Township of Washington, a levee exists on East Branch Antietam Creek. FEMA specifies that all levees must have a minimum of 3-foot freeboard against the 1-percent-annual-chance flood to be considered a safe flood protection structure. This levee does not meet FEMA freeboard requirements.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail 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 which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100- and 500-year floods, have a 10-, 2-, 1- and 0.2-percent-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 one year are considered. For example, the risk of having a flood which equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied by detail methods affecting the communities within Franklin County. Information on the methods used to determine the peak discharge-frequency relationships for each flooding source studied by detailed methods is shown below.

Pre-countywide Analyses

Within Franklin County, the Boroughs of Chambersburg, Mercersburg, Mont Alto and Waynesboro; and the Townships of Greene, Guilford, Hamilton, Montgomery, Peters, Quincy, Southampton, St. Thomas and Washington have a previously published FIS report. The hydrologic analyses described in those reports have been compiled and are summarized below.

Discharges for the reach of Auxiliary Channel of Conococheague Creek located in the Township of Greene and the reach of Conococheague Creek located in the

Borough of Chambersburg and the Townships of Greene, Guilford and Hamilton for were developed from the standard log-Pearson Type III analysis method. The log-Pearson Type III analysis, as outlined by the Water Resources Council requires the mean, M, the standard deviation, S and a skew Coefficient (Reference 17). The method uses the following equations:

$$M = C_m + 0.75 \log (A)$$
$$S = C_x - 0.05 \log (A)$$

Where A is the drainage area in square miles and C_m and C_s are coefficients which are obtained from maps. The Susquehanna River Basin Commission made some modifications to the C_m and skew coefficient maps for use in some of the original FIS studies. Results were compared with available discharge-frequency data, published by the USGS and the USACE.

The flood frequency-discharge values for the reach of Conococheague Creek and Auxiliary Channel of Conococheague Creek located in the Township of Greene were based on statistical analysis of discharge records covering a 16-year period of record at the Fayetteville gaging station and a 48-year period of record at the Fairview, Maryland gaging station.

Discharges for Back Creek, Cold Spring Run, Conodoguinet Creek, English Valley Run, the reach of Falling Spring Branch located in the Township of Guilford, Johnston Run, Tributary A to English Valley Run, Tributary B to English Valley Run, Tributary to Falling Spring Branch, Unnamed Tributary to West Branch Antietam Creek and the reaches of West Branch Antietam Creek located in the Borough of Mont Alto and the Township of Quincy were determined using regional regression equations developed in USGS Water-Resources Investigations 82-21 (Reference 18). Carbonate-rock factors were incorporated into the Pennsylvania State University PSU-IV method to confirm the determinations for Falling Spring Branch, Tributary to Falling Spring Branch, English Valley Run, Tributary A to English Valley Run and Tributary B to English Valley Run (Reference 19). This technique was developed for specific use in estimating peak flood flows for ungaged sites on small streams in Pennsylvania.

For the non-carbonate underlain streams of Conodoguinet Creek and Muddy Run No. 1, located in the Township of Southampton, no authoritative flood discharge information was available. Discharges for these streams were developed using methods described in Water Resources Investigations 82-21 (Reference 18). These results were supplemented with USGS gage analysis data on Newburg Run (USGS Gaging Station No. 01569340), a tributary to Conodoguinet Creek located less than 2 miles downstream of the limit of this study area. Newburg Run is hydrologically and geologically similar to Conodoguinet Creek and Muddy Run No. 1.

For both watershed models, a least-squares fit was performed relating drainage area size to discharge for each return period under investigation. The resulting equations relating drainage area to discharge produced favorable correlation coefficients indicating consistency with both the discharges reported in the FIS for the Borough of Shippensburg for calcareous underlain streams and with discharges developed by the USGS through other methods for non-carbonate underlain streams (Reference 20).

A comparison was made of proposed discharges versus those derived from other methods. For the calcareous model, proposed discharges were compared with those developed using Water Resources Investigation 82-21 regression equations and were found to be within projected standard error (Reference 18). For the non-carbonate model, proposed discharges were compared with those developed using Pennsylvania State University PSU-IV method and the USGS provided confidence interval on Newburg Run discharges (Reference 19). Proposed discharges were within the standard error and the 90 percent confidence interval, respectively.

Discharges for East Branch Antietam Creek, Falls Creek, Red Run and West Branch Antietam Creek, all located in the Borough of Waynesboro and the Township of Washington, were determined using discharge-frequency data from the FIS report for the unincorporated areas of Washington County, Maryland (Reference 21). This information was supplemented by USGS log-Pearson Type III distribution frequency analysis of flow data collected at USGS Gaging Station No. 01690000 on Antietam Creek near the Borough of Waynesboro (Reference 17).

Drainage area versus discharge relationships were plotted on log-log paper and a least-squares fit was performed for each of the selected recurrence intervals. The correlation coefficients of the resulting equations, relating discharge to drainage area, were favorable, indicating that discharges derived from these equations would be consistent with data on similar streams in the FIS for the unincorporated areas of Washington County, Maryland (Reference 21). Discharges obtained from the equations developed were within the 90 percent confidence limits of the USGS-computed discharges for the USGS Gaging Station on Antietam Creek. The equations were used to develop peak discharges at various points along the streams.

A comparison of proposed discharges with those derived from other methods was made. Discharges were computed using methods described in USGS Water Resources Investigations 82-21 (Reference 18). This publication supersedes Water Resources Bulletin No. 13 for determining flood flow discharges in Pennsylvania and yielded answers consistent with those developed from the equations. The proposed discharges were within the standard error of those obtained from Water Resources Investigations 82-21. Discharges were also computed using PSU-IV, but they were considerably higher than those derived by the other methods and inconsistent with the USGS gage data analysis (Reference 19). The PSU-IV method was therefore considered inappropriate for use as a comparative method.

Discharges for the reach of Falling Spring Branch located in the Borough of Chambersburg were calculated using data presented in the USGS Open-File Report, "Floods in Pennsylvania: A Manual for Estimation of Their Magnitude and Frequency," which is a regional method developed from regression analysis relating drainage area, channel slope, percent area of storage and an index of average annual excess precipitation through empirical equations (Reference 22).

Discharges for Middle Spring Creek, Gum Run and Rowe Run were performed using available discharge-frequency data from the FIS report for the Borough of Shippensburg (Reference 20). In the FIS report for the Borough of Shippensburg, the discharges for Middle Spring Creek were determined using the Commonwealth of

Pennsylvania, Department of Transportation, Flood Peak Frequency Manual – PSU III procedure (Reference 23). This method is based upon a regional flood frequency analysis which identifies hydrologic sub-areas within the state and relates basin drainage area to stream flow for selected frequency flooding. The resulting discharge values were then adjusted to compensate for the increased ground water infiltration characteristics due to the geologic information of the watersheds as recommended by the selected method. The watershed for Middle Spring Creek is hydrologically and geologically similar to both Gum and Rowe Runs, all of which are underlain predominantly with calcareous formations of limestone and dolomite (calcium carbonates). Intrinsic to such formations is that a substantial amount of drainage occurs through solution cavities reducing what would otherwise be stream flow; therefore, the hydrologic analysis in the Borough of Shippensburg study was used to provide the basic discharge-drainage area-frequency relationships for Middle Spring Creek, Gum Run and Rowe Run.

Countywide Analyses

For flooding sources studied with approximate methods, the 1-percent-annual-chance flood elevations were determined using USGS Regression Equations (Reference 24) and the USACE's HEC-RAS computer program (Reference 25).

Peak discharge-drainage area relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods for each stream studied by detailed methods are presented in Table 5, "Summary of Discharges".

TABLE 5 – SUMMARY OF DISCHARGES

		Peak Discharges (cubic feet per second)			
Flooding Source and Location	**Drainage Area (square miles)**	**10-Percent-Annual-Chance**	**2-Percent-Annual-Chance**	**1-Percent-Annual-Chance**	**0.2-Percent-Annual-Chance**
AUXILIARY CHANNEL OF CONOCOHEAGUE CREEK					
At the confluence with Conococheague Creek	67.3	*	*	3,200	*
BACK CREEK					
At the confluence with Conococheague Creek	91.6	*	*	14,240	*
At Leafmore Road	55.5	*	*	9,660	*
Above U. S. Route 30	51.1	*	*	9,060	*
Above the confluence of Wilson Run	38.5	*	*	7,270	*

* Data Not Available

TABLE 5 – SUMMARY OF DISCHARGES – (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
COLD SPRING RUN					
At the confluence with Conococheague Creek	2.98	*	*	670	*
At Black Gap Road (State Route 997)	2.75	*	*	620	*
CONOCOCHEAGUE CREEK					
At Boyer Mill Road	113.25	3,800	6,900	8,800	14,300
At the corporate limits between the Township of Greene and the Borough of Chambersburg above Wenger Lane	94.39	3,200	5,900	7,600	12,400
Above U.S. Route 11 bridge	90.5	*	*	7,330	*
Above Sycamore Grove Road bridge	87.3	*	*	7,110	*
At the railroad bridge downstream of the confluence of Mountain Run	84.6	*	*	6,920	*
Above the confluence of Mountain Run At Scotland Road	70.4	*	*	5,920	*
At the divergence of the Auxiliary Channel of Conococheague Creek	67.3	*	*	5,700	*
Above the confluence of English Valley Run	52.3	*	*	4,600	*
Above the confluence of Cold Spring Run	47.7	*	*	4,250	*
Above Black Gap Road bridge (State Route 997)	42.8	*	*	3,880	*
CONODOGUINET CREEK					
Downstream of the confluence of Middle Spring Creek	152.9	8,290	13,700	17,200	29,500
Above the confluence of Middle Spring Creek	105.3	6,480	11,200	14,300	25,400
At McClays Mill Road	101.7	6,330	11,000	14,100	25,000
At Roxbury Road	97.2	6,140	10,800	13,800	24,500
At Hickory Run Road upstream of the confluence of Muddy Run No. 1	54.7	4,200	7,930	10,400	19,400
EAST BRANCH ANTIETAM CREEK					
At Goods Dam Road	47.6	1,790	3,200	4,220	7,130
At Welty Road	30.6	1,240	2,190	2,940	5,170

* Data Not Available

TABLE 5 – SUMMARY OF DISCHARGES – (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
EAST BRANCH ANTIETAM CREEK (continued)					
At Main Street (State Route 16)	29.5	1,200	2,120	2,850	5,020
Above the confluence of Biesecker Run	21.8	930	1,630	2,220	4,020
Above the confluence of Deer Lick Run	18.4	810	1,420	1,930	3,560
ENGLISH VALLEY RUN					
At the corporate limits between the Townships of Guilford and Greene	12.8	*	*	1,270	*
At Lincoln Terrace	9.17	*	*	1,000	*
At Mont Alto Road	5.93	*	*	770	*
At Bikle Road	4.84	*	*	740	*
FALLING SPRING BRANCH					
At the confluence with Conococheague Creek	11.86	400	620	730	1,000
At U.S. Route 30	8.9	310	470	550	750
At Interstate Route 81	6.04	*	*	450	*
At Falling Spring Road	5.62	*	*	420	*
At Quarry Road	4.84	*	*	375	*
At Edwards Avenue	4.4	*	*	340	*
At Garman Drive	3.67	*	*	290	*
At Falling Spring Road upstream of Springview Drive	2.87	*	*	230	*
FALLS CREEK					
At the confluence with Red Run	5.1	270	470	670	1,390
GUM RUN					
At the confluence with Middle Spring Creek	7.1	290	430	500	630
JOHNSTON RUN					
At Edwards Drive	7.71	*	*	1,570	*
At Church Hill Road	6.46	*	*	1,500	*
At the upstream corporate limits between the Borough of Mercersburg and the Townships of Peters and Montgomery	5.17	*	*	1,440	*

* Data Not Available

TABLE 5 – SUMMARY OF DISCHARGES – (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
JOHNSTON RUN (continued)					
At a point approximately 0.87 mile upstream of the corporate limits between the Borough of Mercersburg and the Townships of Peters and Montgomery (upstream Limit of Detailed Study)	4.18	*	*	1,250	*
MIDDLE SPRING CREEK					
At the confluence with Conodoguinet Creek	47.6	2,330	3,530	4,090	5,160
At McClays Mill Road	45.0	2,190	3,320	3,840	4,840
At the confluence of Burd Run (Cumberland County)	43.1	2,090	3,160	3,660	4,620
At the corporate limits between the Township of Southampton and the Borough of Shippensburg	21.5	1,100	1,600	1,900	2,400
At the confluence of Gum Run	18.6	830	1,250	1,450	1,830
MUDDY RUN NO. 1					
At the confluence with Conodoguinet Creek	42.1	3,530	6,900	9,140	17,400
At Orrstown Road (State Route 533)	41.4	3,500	6,840	9,070	17,300
Just downstream of the confluence of Rowe Run	40.4	3,440	6,750	8,960	17,100
At Rowe Run Road (State Route 433)	22.0	2,300	4,880	6,650	13,400
At Muddy Run Road	21.5	2,260	4,820	6,570	13,200
RED RUN					
At the confluence with East Branch Antietam Creek	16.3	730	1,270	1,750	3,250
At private bridge located approximately 2,160 feet upstream of Baer Road	15.4	700	1,220	1,670	3,120
At the confluence of Falls Creek	10.6	510	880	1,230	2,380
At Buchanan Trail East (State Route 16)	5.2	280	480	680	1,410
At Skiway Avenue	4.4	240	420	600	1,250
ROWE RUN					
At the confluence with Muddy Run No. 1	18.0	800	1,200	1,400	1,760
At a point approximately 5,200 feet upstream of the confluence of Muddy Run No. 1	17.4	770	1,150	1,350	1,700

* Data Not Available

TABLE 5 – SUMMARY OF DISCHARGES – (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
ROWE RUN (continued)					
At Rowe Run Road (State Route 433) at Pinola	17.0	750	1,130	1,320	1,660
At a point approximately 740 feet downstream of Pinola Road	11.8	510	750	880	1,110
At Pinola Road	11.2	480	710	830	1,040
At a point approximately 2,600 feet upstream of Pinola Road	5.9	240	350	410	520
At the upstream Limit of Detailed Study	5.4	210	310	370	470
TRIBUTARY A TO ENGLISH VALLEY RUN					
At the confluence with English Valley Run	2.49	*	*	180	*
At Mont Alto Road	2.1	*	*	160	*
TRIBUTARY B TO ENGLISH VALLEY RUN					
At the confluence with English Valley Run	1.32	*	*	140	*
TRIBUTARY TO FALLING SPRING BRANCH					
At Interstate Route 81	1.83	*	*	150	*
At Willowbrook Drive	1.7	*	*	140	*
UNNAMED TRIBUTARY TO WEST BRANCH ANTIETAM CREEK					
At the corporate limits between the Townships of Quincy and Washington	14.7	*	*	620	*
At Wharf Road	13.2	*	*	570	*
At Five Forks Road	11.2	*	*	500	*
WEST BRANCH ANTIETAM CREEK					
At Marsh Road	37.7	1,470	2,620	3,480	6,010
At Buchanan Trail East (State Route 16)	34.5	1,370	2,430	3,240	5,630
At the corporate limits between the Townships of Washington and Quincy	17.7	780	1,360	1,870	3,450
At Orphanage Road	12.6	*	*	1,490	*
At Hess Benedict Road	11.4	*	*	1,380	*

* Data Not Available

TABLE 5 – SUMMARY OF DISCHARGES – (continued)

Flooding Source and Location	Drainage Area (square miles)	Peak Discharges (cubic feet per second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
WEST BRANCH ANTIETAM CREEK (continued)					
At Manheim Road	9.6	*	*	1,240	*
At Mt Zion Road	8.2	*	*	1,130	*
At Stamey Hill Road	7.0	*	*	1,050	*
At the corporate limits between the Borough of Mont Alto and the Township of Quincy	6.8	*	*	1,030	*
At Ash Street	5.7	*	*	970	*
At Anthony Highway (State Route 997)	4.2	*	*	860	*
At Campus Drive	3.7	*	*	820	*

* Data Not Available

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that the flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. The flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5-foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the FIRM (Exhibit 2).

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

All elevations shown on the Flood Profiles and FIRM (Exhibits 1 and 2) are referenced to the North American Vertical Datum of 1988 (NAVD 88).

Pre-countywide Analyses

Within Franklin County, the Boroughs of Chambersburg, Mercersburg, Mont Alto and Waynesboro; and the Townships of Greene, Guilford, Hamilton, Montgomery, Peters, Quincy, Southampton, St. Thomas and Washington have a previously

published FIS report. The hydraulic analyses described in those reports have been compiled and are summarized below.

Water surface profiles for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods along reaches of Conococheague Creek located in the Borough of Chambersburg and the Townships of Guilford and Hamilton, the reach of Conodoguinet Creek located in the Township of Southampton, East Branch Antietam Creek, Falls Creek, Gum Run, Middle Spring Creek, Muddy Run No. 1, Red Run, Rowe Run and the reach of West Branch Antietam Creek from approximately 2.9 miles upstream of the confluence with Antietam Creek to 5 miles upstream of the confluence with Antietam Creek, located in the Township of Washington were calculated using the USACE's HEC-2 step-backwater computer program (Reference 26).

The water surface profiles along the reach of the Auxiliary Channel of Conococheague Creek above the crossings of Interstate Route 81, located in the Township of Greene, the reach of Cold Spring Run from Mt. Pleasant Road to Brookens Road, located in the Township of Guilford, the reaches of Conococheague Creek, located in the Township of Greene, from the downstream corporate limit to the U.S. Route 11 bridge, from a point approximately 1.1 miles upstream of the Sycamore Grove Road bridge to the State Route 696 (Scotland Road) bridge at the Village of Scotland, from the Woodstock Road bridge to the Cold Springs Road bridge and from 6.4 miles upstream of the corporate limits to 10.7 miles upstream of the corporate limits, the reach of Falling Spring Branch, located in the Township of Guilford, from the downstream corporate limits to Quarry Road, the reach of Johnston Run from approximately 0.47 miles upstream of Edwards Road to the downstream corporate limits of the Borough of Mercersburg, the reach of West Branch Antietam Creek from State Route 997 located in Mont Alto Borough to the upstream corporate limits of the Borough of Waynesboro were computed by modeling channel and bridge hydraulics with the USGS WSPRO step-backwater computer model (References 27 and 28).

The Auxiliary Channel of Conococheague Creek was modeled differently than the main channel, using a base flood discharge equal to 56 percent of the total base flood discharge for this portion of Conococheague Creek.

Within the reach of Cold Spring Run from Mt. Pleasant Road to Brookens Road, located in the Township of Guilford, a natural diversion slough conveys approximately one-third (220 cfs) of the 1-percent-annual-chance flood discharge. Hydraulic calculations for the overbank areas upstream of this slough, which are of similar cross-sectional geometry, roughness and slope, indicate an average velocity of approximately 1.0 foot per second and an average depth of 1.2 feet in the slough. The base flood elevation (799 feet) at the head of this slough is assumed to be the same as that determined by step-backwater computations for the adjoining main channel, which conveys 450 cfs.

The water surface profiles along Back Creek, the reach of Cold Spring Run, downstream of Mt. Pleasant Road to the adjoining modeled portion of the stream located in the Township of Greene; the remaining reaches of Conococheague Creek located in the Township of Greene; English Valley Run; Falling Spring Branch except for the reach from the downstream corporate limits to Quarry Road located in

the Township of Guilford; the remaining reaches of Johnston Run studied by detailed methods excluding the reach from approximately 0.47 miles upstream of Edwards Road to the downstream corporate limits of the Borough of Mercersburg; Tributary A to English Valley Run; Tributary B to English Valley Run; Tributary to Falling Spring Branch; and the reach of West Branch Antietam Creek, from the upstream corporate limits of the Borough of Mont Alto to State Route 997 were determined by adding 1-precent-annual-chance depths to streambed elevations. Normal depths of flooding for the 1-percent-annual-chance flood recurrence interval were estimated from the regional relationship between drainage area and flood depths prepared by the USGS (Reference 29). This relationship was developed by means of regional regression analyses of basin areas and 1-percent-annual-chance within-channel depths observed at stream gages. Depths were adjusted on the basis of hydraulic calculations to account for increased depths due to backwater from hydraulic structures such as bridges, dams and culverts (References 27, 30 and 31). Depths were reduced for segments of the channel of Conococheague Creek bounded by broad floodplains. These reductions to depths derived from the regional depth/drainage-area relationship were estimated from the step-backwater analyses that were made for similar downstream portions of Conococheague Creek.

Cross section information for the reaches of Conococheague Creek and Falling Spring Branch located in the Borough of Chambersburg were obtained from topographic maps compiled from aerial photography flown in April 1970 at a negative scale of 1:1,200 (Reference 32). Cross section information for the reach of the Conodoguinet Creek located in the Township of Southampton, East Branch Antietam Creek, Falls Creek, Gum Run, Middle Spring Creek, Muddy Run No. 1, Red Run, Rowe Run and the reaches of West Branch Antietam Creek located in the Borough of Waynesboro and the Township of Washington were obtained from aerial photographs flown in December 1983 at a negative scale of 1:14,400 (Reference 33). Information below the water line was based on field measurements. All bridges, dams and culverts were field surveyed to obtain elevation data and structural geometry in order to determine the significant backwater effects of these streams.

Cross section information for the Auxiliary Channel of Conococheague Creek; Back Creek; Cold Spring Run; reaches of Conococheague Creek located in the Townships of Greene, Guilford and Hamilton; English Valley Run; the reach of Falling Spring Branch located in the Township of Guilford; Johnston Run; Tributary A to English Valley Run; Tributary B to English Valley Run; Tributary to Falling Spring Branch; the Unnamed Tributary to West Branch Antietam Creek; and reaches of West Branch Antietam Creek located in the Borough of Mont Alto and the Township of Quincy were obtained from field surveys. All bridges, dams and culverts were surveyed to obtain elevation data and structural geometry information. Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures.

The starting water surface elevation for the Auxiliary Channel of the Conococheague Creek was computed by step-backwater analysis for the main channel at the point of confluence.

The starting water surface elevations for the reach of Back Creek located in the Township of St. Thomas, English Valley Run, the remaining reach of Falling Spring

Branch located in the Township of Guilford, Johnston Run, Tributary A to English Valley Run, Tributary B to English Valley Run, Tributary to Falling Spring Branch and Unnamed Tributary to West Branch Antietam Creek were determined from a regional normal-depth/drainage area relationship for 1-percent-annual-chance floods (Reference 26).

The starting water surface elevations along Conococheague Creek, Conodoguinet Creek, Cold Spring Run, East Branch Antietam Creek, Falls Creek, Gum Run, Middle Spring Creek, Rowe Run and reaches West Branch Antietam Creek located in the Borough of Waynesboro and the Township of Washington were calculated by the slope-area method.

The starting water surface elevations along the reach of Falling Spring Branch located in the Borough of Chambersburg were taken from the elevations of the Conococheague Creek profiles at the confluence of the two streams. Profile computations for Conococheague Creek started at the point where the downstream corporate limits for the Borough of Chambersburg (extended) intersect the stream.

The starting water surface elevations along the reach of Falling Spring Branch, located in the Township of Guilford, between Quarry Road and the downstream corporate limits were derived from the FIS report for the Borough of Chambersburg (Reference 1).

The starting water surface elevations for Muddy Run No. 1 and Red Run were determined assuming coincident flood peaks with Conodoguinet Creek and East Branch Antietam Creek, respectively.

The starting water surface elevation for the reach of West Branch Antietam Creek, located in the Township of Quincy, from the downstream corporate limits to State Route 997 were determined from 1-percent-annual-chance flood depths in open-channel portions of West Branch Antietam Creek in the Township of Washington (Reference 12).

Roughness coefficients (Manning's "n" values) were estimated based on a field inspection of the individual streams supplemented by the use of aerial photography. Roughness coefficients were selected using engineering judgment based on tables published by Ven Te Chow and channel conditions and overbank vegetation or land use (Reference 34).

The tabulation showing the channel and overbank Manning’s "n" values for the streams studied by detailed methods can be found in Table 6, “Manning’s “n” Values.”

TABLE 6 – MANNING'S "n" VALUES

Stream	Channel "n"	Overbank "n"
Auxiliary Channel of Conococheague Creek	0.033 – 0.036	0.045 – 0.070
Back Creek	0.034 – 0.040	0.035 – 0.120
Cold Spring Run	0.030 – 0.036	0.045 – 0.070
Conococheague Creek	0.033 – 0.040	0.045 – 0.120
Conodoguinet Creek	0.035	0.045 – 0.100
East Branch Antietam Creek	0.035 – 0.050	0.040 – 0.120
English Valley Run	0.035 – 0.040	0.050 – 0.120
Falling Spring Branch	0.035 – 0.040	0.050 – 0.120
Falls Creek	0.045	0.050 – 0.090
Gum Run	0.045	0.065 – 0.090
Johnston Run	0.030 – 0.042	0.025 – 0.100
Middle Spring Creek	0.040 – 0.047	0.055 – 0.090
Muddy Run No. 1	0.040 – 0.050	0.060 – 0.090
Red Run	0.017 – 0.045	0.050 – 0.090
Rowe Run	0.040 – 0.050	0.060 – 0.090
Tributary A to English Valley Run	0.035 – 0.040	0.050 – 0.120
Tributary B to English Valley Run	0.035 – 0.040	0.050 – 0.120
Tributary to Falling Spring Branch	0.035 – 0.040	0.050 – 0.120
Unnamed Tributary to West Branch Antietam Creek	0.033 – 0.036	0.040 – 0.075
West Branch Antietam Creek	0.033 – 0.060	0.040 – 0.200

Countywide Analyses

No new detailed hydraulic analyses were conducted as part of this countywide FIS; however for flooding sources studied with approximate methods, the 1-percent-annual-chance flood elevations were determined using USGS Regression Equations (Reference 24) and the USACE's HEC-RAS computer program (Reference 25). The peak flood discharges from the regression equations were input into a HEC-RAS model that included cross sections extracted from PAMAP LiDAR data collected in 2007. Because this cross section information was not supplemented with field survey data and the models did not include bridge and culvert information, the resulting floodplain boundaries are considered approximate. Approximately 560 stream miles in the County were analyzed using this approach.

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

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

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

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

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

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

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

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

It is important to note that temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purposes of establishing local vertical control. Although these monuments are not shown on the digital FIRM, they may be found in the Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the NAVD 88, many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum.

For this countywide FIS, all flood elevations shown in the FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in base flood elevations across corporate limits between the communities.

As noted above, the elevations shown in the FIS report and on the FIRM for Franklin County are referenced to NAVD 88. Ground, structure and flood elevations may be compared and/or referenced to NGVD 29 by applying a standard conversion factor.

The conversion factor from NGVD 29 to NAVD 88 for Franklin County is -0.611 foot. The locations used to establish the conversion factor were USGS 7.5-minute topographic quadrangle corners that fell within the County, as well as those that were within 2.5 miles outside the County. The bench marks are referenced to NAVD 88.

Conversion locations and values for Franklin County are shown below in Table 7, "Vertical Datum Conversion Values."

TABLE 7 – VERTICAL DATUM CONVERSION VALUES

USGS 7.5-minute Quadrangle Name	Corner	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Conversion from NGVD 29 to NAVD 88 (foot)
Aughwick	SE	40.250	-77.750	-0.646
Big Cove Tannery	SE	39.750	-78.000	-0.627
Blairs Mills	SE	40.250	-77.625	-0.585
Burnt Cabins	SE	40.000	-77.875	-0.596
Chambersburg	SE	39.875	-77.625	-0.581
Doylesburg	SE	40.125	-77.625	-0.650
Fannettsburg	SE	40.000	-77.750	-0.617
Greencastle	SE	39.750	-77.625	-0.610
McConnellsburg	SE	39.875	-77.875	-0.633
Meadow Grounds	SE	39.875	-78.000	-0.597
Mercersburg	SE	39.750	-77.875	-0.646
Needmore	SE	39.750	-78.125	-0.650
Roxbury	SE	40.000	-77.625	-0.607
Saint Thomas	SE	39.875	-77.750	-0.604
Scotland	SE	39.875	-77.500	-0.548
Shade Gap	SE	40.125	-77.750	-0.607
Shippensburg	SE	40.000	-77.500	-0.577
Waynesboro	SE	39.750	-77.500	-0.553
Williamson	SE	39.750	-77.750	-0.669

Average Conversion from NGVD 29 to NAVD 88 = -0.611 foot

The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 102.4 will appear as 102 on the FIRM and 102.6 will appear as 103. Therefore, users that wish to convert the elevations in this FIS to NGVD 29 should apply the conversion factor (+**0.611** foot) to elevations shown on the Flood Profiles and supporting data tables in this FIS report, which are shown at a minimum to the nearest 0.1 foot.

For more information on NAVD 88, see *Converting the National Flood Insurance Program to the North American Vertical Datum of 1988* or contact the Spatial Reference System Division, National Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring Metro Center 3, 1315 East-West Highway, Silver Spring, Maryland 20910-3282, (301) 713-3242, or visit their web site at www.ngs.noaa.gov (Reference 35).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent-annual-chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent-annual-chance flood elevations; delineations of the 1- and 0.2-percent-annual-chance floodplains; and the 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data tables and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local Community Map Repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For the streams studied in detail, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. The boundaries were interpolated between cross sections using topographic maps (References 36, 37 and 38) and delineated in a GIS environment using PAMAP LiDAR data collected in 2007 (Reference 39).

The 1-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 and 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 elevation but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood

heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

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 8, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development to areas outside the floodways.

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 8, "Floodway Data". The computed floodways are shown on the FIRM. 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.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 8 for certain downstream cross sections of Falling Spring Branch, Middle Spring Creek, and Rowe Run are lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flooding due to backwater from other sources.

The area between the floodway and the 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 by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic".

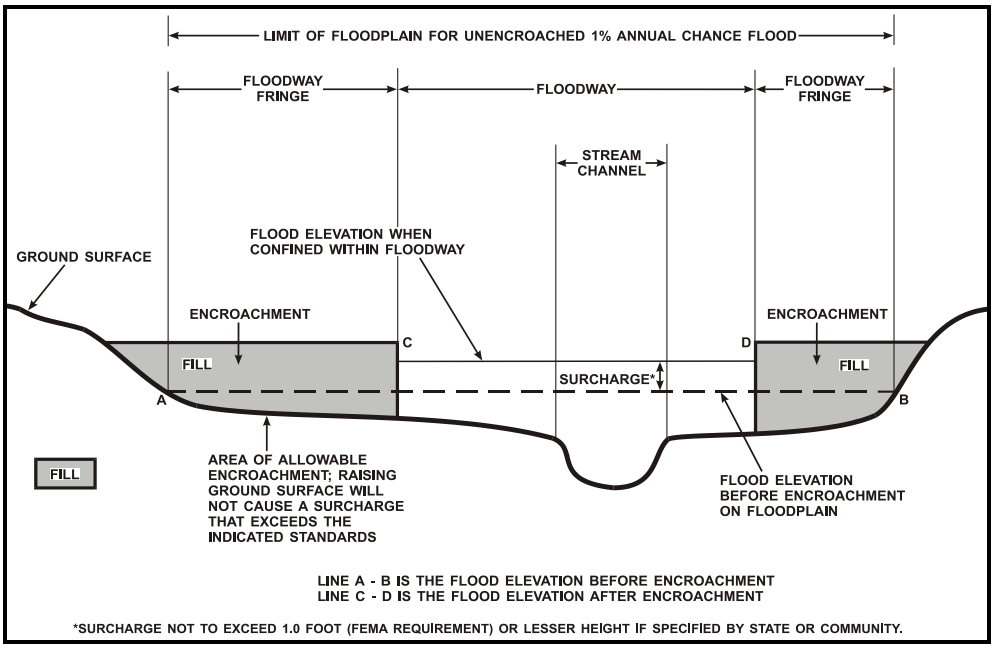

Figure 1 – Floodway Schematic

No floodways were computed for Auxiliary Channel of Conococheague Creek, Back Creek, Cold Spring Run, Conococheague Creek Upstream of the Borough of Chambersburg, English Valley Run, Falling Spring Branch Upstream of the Borough of Chambersburg, Falls Creek Upstream of Penmar Road, Gum Run, Johnston Run, Tributary A to English Valley Run, Tributary B to English Valley Run, Tributary to Falling Spring Branch, Unnamed Tributary to West Branch Antietam Creek, West Branch Antietam Creek Upstream of the Township of Washington.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CONOCOCHEAGUE CREEK								
A	6,550	205	1,819	4.8	563.9	563.9	564.8	0.9
B	7,100	405	2,978	3.0	564.7	564.7	565.7	1.0
C	8,940	285	1,640	5.4	566.6	566.6	567.5	0.9
D	9,820	445	2,826	3.1	568.4	568.4	569.4	1.0
E	11,320	594	3,081	2.9	569.8	569.8	570.7	0.9
F	11,690	703	3,079	2.9	570.2	570.2	571.0	0.8
G	11,860	545	2,300	3.8	570.4	570.4	571.2	0.8
H	12,070	690	2,127	4.1	571.2	571.2	572.0	0.8
I	12,170	318	1,692	5.2	571.3	571.3	572.1	0.8
J	12,570	398	2,624	3.4	572.5	572.5	573.3	0.8
K	13,110	293	2,189	4.0	573.1	573.1	573.5	0.4
L	13,370	238	1,777	5.0	573.3	573.3	574.1	0.8
M	14,390	626	3,112	2.8	574.8	574.8	575.2	0.4
N	15,360	418	2,060	4.2	575.6	575.6	576.1	0.5
O	15,710	327	1,784	4.8	576.6	576.6	577.1	0.5
P	16,940	207	1,692	5.1	579.1	579.1	580.0	0.9
Q	18,500	184	1,877	4.6	581.9	581.9	582.7	0.8
R	20,170	727	5,188	1.7	584.6	584.6	585.6	1.0
S	21,340	402	2,176	4.0	585.0	585.0	585.9	0.9
T	21,880	275	1,682	5.1	585.9	585.9	586.7	0.8
U	23,050	752	2,929	2.9	588.0	588.0	588.8	0.8

[1] Feet above Etter Road Bridge

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

CONOCOCHEAGUE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CONOCOCHEAGUE CREEK (continued)								
V	24,170	317	1,869	4.6	589.5	589.5	590.3	0.8
W	25,550	115	832	10.2	593.5	593.5	594.4	0.9
X	26,160	307	2,270	3.8	597.1	597.1	598.1	1.0
Y	26,580	110	1,122	7.6	597.3	597.3	598.2	0.9
Z	27,130	62	1,065	8.0	599.6	599.6	600.4	0.8
AA	27,320	119	1,356	6.3	601.2	601.2	602.0	0.8
AB	28,580	260	4,123	1.9	605.3	605.3	606.2	0.9
AC	29,130	252	3,668	2.1	605.5	605.5	606.3	0.8
AD	29,870	494	2,317	3.3	605.5	605.5	606.3	0.8
AE	30,530	609	3,823	2.0	605.9	605.9	606.8	0.9
AF	31,710	381	4,323	1.8	606.3	606.3	607.2	0.9
AG	32,470	370	3,355	2.3	606.7	606.7	607.7	1.0
AH	32,910	298	3,016	2.5	606.9	606.9	607.9	1.0
AI	33,450	265	2,394	3.2	607.1	607.1	608.0	0.9
AJ	33,690	461	4,300	1.8	607.2	607.2	608.2	1.0
AK	34,080	740	5,958	1.3	607.3	607.3	608.3	1.0
AL	34,740	375	2,571	3.0	607.4	607.4	608.4	1.0
AM	34,830	415	2,555	3.0	607.8	607.8	608.8	1.0
AN-AY[2]								

[1] Feet above Etter Road Bridge

[2] No floodway data computed

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

CONOCOCHEAGUE CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CONODOGUINET CREEK								
A	600	728	5,953	2.4	545.2	545.2	546.1	0.9
B	1,900	427	3,390	4.2	545.7	545.7	546.5	0.8
C	3,000	457	3,902	3.7	547.0	547.0	547.9	0.9
D	4,000	758	4,350	3.3	547.8	547.8	548.7	0.9
E	4,500	899	5,711	2.5	548.7	548.7	549.3	0.6
F	5,700	394	3,028	4.7	549.2	549.2	550.1	0.9
G	6,500	347	2,772	5.2	550.4	550.4	551.0	0.6
H	7,500	260	3,240	4.4	554.1	554.1	554.4	0.3
I	8,700	224	2,526	5.6	554.8	554.8	555.3	0.5
J	10,300	335	3,828	3.7	556.2	556.2	557.1	0.9
K	11,300	508	4,762	3.0	557.0	557.0	558.0	1.0
L	12,700	295	3,071	4.6	557.8	557.8	558.7	0.9
M	13,300	282	2,847	4.6	558.3	558.3	559.2	0.9
N	14,100	333	3,613	3.9	559.3	559.3	560.3	1.0
O	15,100	347	3,591	3.9	560.1	560.1	561.1	1.0
P	16,500	361	2,790	5.1	561.6	561.6	562.6	1.0
Q	17,500	374	3,511	4.0	563.0	563.0	563.9	0.9
R	18,300	433	3,619	3.9	563.8	563.8	564.7	0.9
S	19,500	361	2,852	4.9	565.1	565.1	565.9	0.8
T	20,200	142	1,656	8.3	567.1	567.1	567.7	0.6

[1] Feet above the Franklin - Cumberland County boundary

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

CONODOGUINET CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CONODOGUINET CREEK (continued)								
U	21,600	156	1,798	7.7	569.6	569.6	570.0	0.4
V	22,500	227	1,913	7.2	571.3	571.3	571.9	0.6
W	23,500	254	2,319	5.6	573.8	573.8	574.7	0.9
X	24,200	556	4,382	2.4	575.6	575.6	576.6	1.0
Y	25,300	244	1,751	5.9	576.5	576.5	577.0	0.5
Z	26,600	238	1,930	5.4	579.1	579.1	580.0	0.9
AA	28,100	314	2,216	4.7	581.6	581.6	582.6	1.0
AB	29,200	258	1,867	5.6	583.2	583.2	584.1	0.9
AC	30,700	420	3,447	3.0	585.4	585.4	586.4	1.0
AD	32,100	471	2,998	3.5	586.5	586.5	587.4	0.9
AE	33,500	233	1,735	6.0	589.9	589.9	590.1	0.2
AF	34,900	211	1,567	6.6	592.6	592.6	593.4	0.8
AG	36,000	345	2,470	4.2	594.7	594.7	595.7	1.0
AH	36,800	280	2,111	4.9	595.7	595.7	596.6	0.9
AI	38,600	415	2,476	4.2	598.4	598.4	599.4	1.0
AJ	39,800	540	3,370	3.1	600.4	600.4	601.4	1.0
AK	40,700	421	2,195	4.7	601.7	601.7	602.6	0.9

[1] Feet above the Franklin - Cumberland County boundary

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

CONODOGUINET CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST BRANCH ANTIETAM CREEK								
A	8,600	274	1,097	3.8	576.4	576.4	577.4	1.0
B	9,250	277	756	5.6	578.2	578.2	579.1	0.9
C	10,200	343	1,510	2.8	580.6	580.6	581.5	0.9
D	11,700	114	638	6.6	582.4	582.4	583.3	0.9
E	13,400	174	1,100	3.8	586.8	586.8	587.8	1.0
F	14,200	200	1,104	3.8	588.2	588.2	589.1	0.9
G	15,000	434	1,707	2.5	589.6	589.6	590.6	1.0
H	15,500	266	1,515	2.8	592.8	592.8	592.8	0.0
I	16,700	281	935	4.5	593.8	593.8	594.3	0.5
J	17,600	264	1,133	3.7	598.1	598.1	599.1	1.0
K	17,900	287	1,351	2.2	600.2	600.2	600.9	0.7
L	19,250	75	286	10.3	602.4	602.4	602.4	0.0
M	20,500	502	1,526	1.9	607.8	607.8	608.6	0.8
N	21,750	91	303	9.7	612.4	612.4	613.0	0.6
O	22,650	404	974	2.9	618.3	618.3	618.8	0.5
P	23,000	199	1,073	2.7	621.0	621.0	621.1	0.1
Q	24,700	505	1,259	2.3	623.9	623.9	624.9	1.0
R	25,800	166	387	7.4	628.2	628.2	628.4	0.2
S	27,300	174	728	3.7	635.5	635.5	636.5	1.0

[1] Feet above confluence with Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

EAST BRANCH ANTIETAM CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST BRANCH ANTIETAM CREEK (continued)								
T	28,200	237	487	5.5	640.4	640.4	640.8	0.4
U	29,550	393	1,216	2.2	645.4	645.4	646.3	0.9
V	31,100	133	403	6.7	649.9	649.9	650.3	0.4
W	32,400	191	604	4.4	658.4	658.4	658.7	0.3
X	33,700	115	695	3.9	670.3	670.3	670.8	0.5
Y	34,300	194	559	4.0	670.9	670.9	671.4	0.5
Z	35,100	495	452	4.9	676.1	676.1	676.2	0.1
AA	36,050	937	1,379	1.6	684.2	684.2	684.3	0.1
AB	36,600	110	333	6.7	687.2	687.2	687.2	0.0
AC	36,800	95	835	2.7	688.7	688.7	688.7	0.0
AD	39,000	375	694	3.2	708.7	708.7	709.1	0.4
AE	40,600	330	488	4.5	721.0	721.0	721.0	0.0
AF	42,350	215	432	5.1	734.8	734.8	735.2	0.4
AG	43,850	210	367	6.0	748.0	748.0	748.2	0.2
AH	44,700	200	552	3.5	752.7	752.7	753.6	0.9

[1] Feet above confluence with Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

EAST BRANCH ANTIETAM CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
FALLING SPRING BRANCH								
A	80	37	79	9.2	602.2	592.2[2]	593.1	0.9
B	720	20	115	6.4	614.6	614.6	614.8	0.2
C	980	22	133	5.5	615.4	615.4	615.7	0.3
D	1,300	26	148	4.9	615.9	615.9	616.7	0.8
E	1,600	28	197	3.7	617.0	617.0	617.8	0.8
F	2,010	26	265	2.8	618.1	618.1	618.9	0.8
G	2,470	52	397	1.8	620.5	620.5	621.3	0.8
H	2,820	28	254	2.9	620.6	620.6	621.4	0.8
I	3,090	32	283	2.6	620.6	620.6	621.5	0.9
J	3,310	55	430	1.7	620.7	620.7	621.6	0.9
K	3,790	289	834	0.8	620.8	620.8	621.7	0.9
L	4,340	137	519	1.3	620.8	620.8	621.8	1.0
M	4,790	166	878	0.7	620.9	620.9	621.9	1.0
N	6,380	28	121	5.0	621.2	621.2	622.0	0.8
O	6,920	28	143	4.3	622.5	622.5	623.3	0.8
P	8,060	22	109	5.6	625.6	625.6	626.4	0.8
Q	8,570	84	119	4.6	628.2	628.2	629.1	0.9
R	9,550	76	360	1.5	630.0	630.0	631.0	1.0
S	10,040	20	83	6.6	631.1	631.1	631.8	0.7

[1] Feet above confluence with Conococheague Creek

[2] Elevation computed without consideration of backwater effects from Conococheague Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

FALLING SPRING BRANCH

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
FALLING SPRING BRANCH (continued)								
T	10,550[1]	22	126	4.4	639.5	639.5	639.5	0.0
U	10,850[1]	32	149	3.7	639.9	639.9	640.1	0.2
V-Y[3]								
FALLS CREEK								
A	650[2]	36	100	6.7	658.2	658.2	658.5	0.3
B	1,450[2]	32	92	7.3	667.0	667.0	667.0	0.0
C	2,300[2]	50	135	5.0	678.7	678.7	679.1	0.4
D	3,700[2]	97	138	4.8	699.5	699.5	699.9	0.4
E	4,500[2]	78	130	5.2	713.2	713.2	714.0	0.8
F	5,500[2]	61	110	6.1	732.8	732.8	733.8	1.0

[1] Feet above confluence with Conococheague Creek

[2] Feet above confluence with Red Run

[3] No floodway data computed

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

FALLING SPRING BRANCH - FALLS CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH [2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
GUM RUN								
A	1,200	32 / 114	274	1.8	670.1	670.1	671.1	1.0
B	1,650	114 / 170	614	0.8	676.1	676.1	676.9	0.8
C	2,600	29 / 61	97	5.2	683.6	683.6	684.2	0.6
D	3,300	47 / 70	144	3.5	690.9	690.9	691.5	0.6
E	4,100	18 / 73	223	2.2	697.3	697.3	698.3	1.0
F	4,500	0 / 58	154	3.2	699.2	699.2	700.0	0.8
G	4,800	0 / 122	228	2.2	703.0	703.0	703.4	0.4
H	5,600	0 / 23	53	9.4	708.8	708.8	708.8	0.0
I	5,900	0 / 110	246	2.0	710.5	710.5	711.2	0.7

[1] Feet above confluence with Middle Spring Creek

[2] Floodway width within Franklin County / Total floodway width

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

GUM RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH [2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE SPRING CREEK								
A	200	56 / 113	707	5.8	544.1	541.9[3]	542.7	0.8
B	600	44 / 80	536	7.6	544.1	543.1[3]	544.1	1.0
C	1,100	47 / 111	667	6.1	545.6	545.6	545.8	0.2
D	1,800	65 / 135	1,013	4.0	547.1	547.1	548.0	0.9
E	3,200	14 / 407	2,252	1.8	549.0	549.0	549.9	0.9
F	4,000	159 / 366	2,048	2.0	549.6	549.6	550.4	0.8
G	5,200	33 / 321	1,760	2.3	550.6	550.6	551.4	0.8
H	5,700	383 / 461	2,371	1.7	551.0	551.0	551.9	0.9
I	6,200	395 / 472	2,050	2.0	551.3	551.3	552.2	0.9
J	6,700	413 / 460	1,594	2.6	552.2	552.2	553.1	0.9
K	7,500	328 / 393	1,278	3.2	553.5	553.5	554.5	1.0
L	8,300	77 / 134	643	6.4	555.9	555.9	556.7	0.8
M	8,900	79 / 142	932	4.4	558.2	558.2	559.2	1.0
N	10,100	16 / 352	2,082	2.0	560.3	560.3	561.1	0.8
O	11,500	35 / 99	650	6.3	562.0	562.0	563.0	1.0
P	12,000	51 / 60	478	8.6	565.4	565.4	565.5	0.1
Q	13,000	96 / 136	984	4.2	568.1	568.1	569.0	0.9
R	13,800	60 / 254	1,329	3.1	569.5	569.5	570.5	1.0
S	14,900	39 / 65	507	8.1	571.6	571.6	572.6	1.0

[1] Feet above confluence with Conodoguinet Creek

[2] Floodway width within Franklin County / Total floodway width

[3] Elevation computed without consideration of backwater effects from Conodoguinet Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

MIDDLE SPRING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH [2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE SPRING CREEK (continued)								
T	15,800	38 / 111	799	4.8	574.8	574.8	575.8	1.0
U	16,300	99 / 193	1,190	3.2	577.7	577.7	578.6	0.9
V	16,600	27 / 123	940	4.1	578.0	578.0	578.9	0.9
W	16,800	134 / 178	2,065	1.9	585.0	585.0	585.0	0.0
X	17,500	113 / 155	1,248	3.1	585.1	585.1	585.1	0.0
Y	18,300	32 / 156	1,171	3.3	585.6	585.6	585.9	0.3
Z	19,000	53 / 312	1,656	2.3	586.0	586.0	586.4	0.4
AA	20,100	31 / 75	513	7.5	586.6	586.6	587.3	0.7
AB	20,700	54 / 107	820	4.7	588.9	588.9	589.7	0.8
AC	21,600	38 / 120	921	4.2	590.5	590.5	591.4	0.9
AD	23,100	101 / 178	1,072	3.6	592.9	592.9	593.8	0.9
AE	24,300	13 / 134	881	4.4	597.1	597.1	598.0	0.9
AF	25,100	35 / 93	553	6.9	599.2	599.2	600.0	0.8
AG	26,300	79 / 218	1,706	2.1	604.3	604.3	605.1	0.8
AH	27,100	410 / 532	2,182	1.7	604.9	604.9	605.7	0.8
AI	27,800	350 / 404	869	4.2	607.1	607.1	607.7	0.6
AJ	28,400	179 / 737	2,266	1.6	609.1	609.1	610.0	0.9
AK	29,400	43 / 286	671	5.5	613.1	613.1	613.3	0.2

[1] Feet above confluence with Conodoguinet Creek

[2] Floodway width within Franklin County / Total floodway width

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

MIDDLE SPRING CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MIDDLE SPRING CREEK (continued)								
AL	30,100	22 / 440[2]	1,371	2.7	617.7	617.7	618.5	0.8
AM	31,800	33 / 98[2]	286	6.6	623.7	623.7	624.2	0.5
AN	37,285	35 / 300[2]	1,383	1.4	656.6	656.6	657.4	0.8
AO	37,475	233 / 300[2]	870	2.2	656.8	656.8	657.6	0.8
AP	38,075	150	301	6.3	660.3	660.3	660.9	0.6
AQ	38,675	144	729	2.6	666.9	666.9	667.8	0.9
AR	39,225	69	330	5.8	668.1	668.1	668.7	0.6
AS	39,725	60	308	4.7	670.5	670.5	671.3	0.8
MUDDY RUN NO. 1								
A	900	310	2,886	3.2	576.5	576.5	577.5	1.0
B	1,500	289	2,844	3.2	577.1	577.1	578.0	0.9
C	2,000	447	4,164	2.2	577.5	577.5	578.4	0.9
D	3,400	431	3,721	2.5	578.2	578.2	579.1	0.9
E	4,400	534	4,438	2.1	578.7	578.7	579.6	0.9
F	5,000	277	2,589	3.5	579.6	579.6	580.4	0.8
G	5,900	312	2,476	3.7	580.5	580.5	581.3	0.8
H	6,600	350	2,672	3.4	581.5	581.5	582.4	0.9

[1] Feet above confluence with Conodoguinet Creek

[2] Floodway width within Franklin County / Total floodway width

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

MIDDLE SPRING CREEK - MUDDY RUN NO. 1

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MUDDY RUN NO. 1 (continued)								
I	8,200[1]	361	2,938	3.1	583.5	583.5	584.5	1.0
J	9,400[1]	398	3,183	2.8	584.7	584.7	585.7	1.0
K	9,850[1]	403	2,928	3.1	585.2	585.2	586.2	1.0
L	11,000[1]	268	2,188	4.1	587.1	587.1	588.1	1.0
M	11,800[1]	309	2,673	3.4	588.4	588.4	589.4	1.0
N	12,600[1]	284	2,226	4.0	589.6	589.6	590.5	0.9
O	13,400[1]	286	2,660	2.5	592.3	592.3	593.0	0.7
P	14,400[1]	269	2,061	3.2	593.0	593.0	593.8	0.8
Q	15,400[1]	272	2,162	3.1	593.8	593.8	594.7	0.9
R	16,200[1]	360	2,316	2.9	594.4	594.4	595.4	1.0
S	17,400[1]	282	1,666	4.0	596.1	596.1	597.0	0.9
T	18,600[1]	385	3,195	2.1	601.2	601.2	602.1	0.9
U	19,000[1]	371	2,666	2.5	601.4	601.4	602.3	0.9
RED RUN								
A	500[2]	68	211	8.3	599.8	599.8	599.8	0.0
B	1,200[2]	153	352	5.0	603.3	603.3	604.2	0.9
C	1,500[2]	143	433	4.0	604.8	604.8	605.6	0.8

[1] Feet above confluence with Conodoguinet Creek

[2] Feet above confluence with East Branch Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

MUDDY RUN NO. 1 - RED RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
RED RUN (continued)								
D	1,800	234	921	1.9	607.9	607.9	608.1	0.2
E	2,400	63	181	9.7	609.1	609.1	609.1	0.0
F	3,700	249	457	3.8	619.6	619.6	620.0	0.4
G	4,200	85	224	7.8	622.9	622.9	623.0	0.1
H	4,600	79	328	5.3	625.3	625.3	626.3	1.0
I	5,800	70	198	8.4	634.3	634.3	634.3	0.0
J	6,600	72	193	8.7	640.7	640.7	640.7	0.0
K	7,250	219	543	3.1	645.1	645.1	645.9	0.8
L	8,000	168	338	4.9	650.1	650.1	650.3	0.2
M	9,900	45	127	9.7	670.2	670.2	670.2	0.0
N	10,900	90	224	5.5	682.2	682.2	682.3	0.1
O	11,700	90	149	8.3	691.7	691.7	691.7	0.0
P	12,200	16	70	9.7	695.3	695.3	695.3	0.0
Q	13,500	25	71	9.6	713.5	713.5	714.5	1.0
R	14,800	33	77	8.8	730.8	730.8	731.3	0.5
S	15,600	27	100	6.8	742.3	742.3	742.3	0.0
T	16,820	33	78	8.7	764.4	764.4	764.4	0.0
U	17,200	20	65	10.4	774.9	774.9	774.9	0.0

[1] Feet above confluence with East Branch Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

RED RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ROWE RUN								
A	500	106	211	6.6	585.2	579.6[2]	579.8	0.2
B	1,100	109	467	3.0	585.2	582.6[2]	583.3	0.7
C	1,700	107	425	3.3	585.2	583.6[2]	584.1	0.5
D	2,600	56	300	4.7	585.2	584.7[2]	585.5	0.8
E	3,400	55	263	5.3	586.3	586.3	587.3	1.0
F	4,400	189	779	1.8	587.9	587.9	588.9	1.0
G	5,200	129	602	2.2	590.3	590.3	590.4	0.1
H	6,000	116	547	2.5	590.6	590.6	590.9	0.3
I	6,800	96	375	3.6	591.3	591.3	591.9	0.6
J	7,300	47	137	9.6	592.7	592.7	592.7	0.0
K	7,800	73	220	4.0	597.3	597.3	597.3	0.0
L	8,300	67	273	3.2	598.4	598.4	598.5	0.1
M	8,600	41	126	6.6	599.8	599.8	600.5	0.7
N	9,400	61	201	4.1	605.4	605.4	605.4	0.0
O	10,000	70	192	4.3	607.5	607.5	607.6	0.1
P	10,500	86	307	2.7	611.2	611.2	611.2	0.0
Q	11,100	90	220	1.9	614.4	614.4	614.7	0.3

[1] Feet above confluence with Muddy Run No. 1

[2] Elevation computed without consideration of backwater effects from Muddy Run No. 1

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

ROWE RUN

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ROWE RUN (continued)								
R	12,100[1]	23	59	6.9	616.8	616.8	617.2	0.4
S	13,300[1]	31	139	2.9	620.9	620.9	621.7	0.8
T	14,200[1]	46	136	3.0	622.7	622.7	623.2	0.5
WEST BRANCH ANTIETAM CREEK								
A	15,750[2]	226	464	7.5	590.2	590.2	591.1	0.9
B	16,400[2]	179	755	4.6	595.4	595.4	596.0	0.6
C	17,200[2]	88	431	8.1	596.5	596.5	597.3	0.8
D	17,900[2]	168	1,134	3.1	599.7	599.7	600.7	1.0
E	19,300[2]	146	910	3.8	601.9	601.9	602.9	1.0
F	20,200[2]	154	809	4.3	604.0	604.0	604.8	0.8
G	20,800[2]	255	1,247	2.8	605.1	605.1	605.9	0.8
H	21,250[2]	110	490	6.6	607.2	607.2	607.4	0.2
I	22,400[2]	233	693	4.7	609.7	609.7	610.4	0.7
J	23,300[2]	193	850	3.8	611.7	611.7	612.5	0.8
K	24,100[2]	162	656	4.9	613.1	613.1	613.8	0.7
L	24,400[2]	270	1,237	2.6	615.6	615.6	616.4	0.8

[1] Feet above confluence with Muddy Run No. 1

[2] Feet above confluence with Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

ROWE RUN - WEST BRANCH ANTIETAM CREEK

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WEST BRANCH ANTIETAM CREEK (continued)								
M	26,100	107	456	7.1	618.6	618.6	619.2	0.6
N	26,600	180	800	4.0	620.6	620.6	621.5	0.9
O	28,300	226	474	4.0	624.6	624.6	625.5	0.9
P	29,085	239	1,244	1.5	632.7	632.7	632.7	0.0
Q	30,340	121	456	4.1	637.6	637.6	637.6	0.0
R	31,150	60	374	5.0	638.7	638.7	639.1	0.4
S	31,850	213	738	2.5	640.7	640.7	641.3	0.6

[1] Feet above confluence with Antietam Creek

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

FLOODWAY DATA

WEST BRANCH ANTIETAM CREEK

5.0 INSURANCE APPLICATIONS

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

Zone AE

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

Zone AH

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

Zone AO

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

Zone AR

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

Zone A99

Zone A99 is the flood insurance risk zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

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

Zone VE

Zone VE is the flood insurance risk zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

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

Zone X (Future Base Flood)

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

Zone D

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

6.0 FLOOD INSURANCE RATE MAP

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

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens and symbols, the 1-percent-annual-chance floodplains and the location of the selected cross sections used in the hydraulic analyses.

The countywide FIRM presents flooding information for the entire geographic area of Franklin County. Previously, separate Flood Hazard Boundary Maps and/or FIRMS were prepared for each identified flood-prone community within 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 flood-prone community, prior to the initial countywide FIRM, are presented in Table 9, "Community Map History."

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Franklin County has been compiled into this countywide FIS. Therefore, this FIS 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. Countywide FIS reports for the adjacent counties of Fulton County, Pennsylvania, Huntingdon County, Pennsylvania, Juniata County, Pennsylvania, and Washington County, Maryland are currently underway. The Countywide FIS reports for the adjacent counties of Adams County, Pennsylvania, Cumberland County, Pennsylvania, Frederick County, Maryland and Perry County, Pennsylvania have gone effective.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Division, One Independence Mall, Sixth Floor, 615 Chestnut Street, Philadelphia, Pennsylvania 19106-4404.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Antrim, Township of	September 20, 1974	May 28, 1976	April 24, 1981	
Chambersburg, Borough of	December 28, 1973	None	July 17, 1978	
Fannett, Township of	February 7, 1975	August 22, 1980	October 29, 1982	
Greencastle, Borough of	September 10, 1976	None	None	
Greene, Township of	December 6, 1974	September 10, 1976	November 2, 1990	August 18, 1992
Guilford, Township of	January 3, 1975	None	June 18, 1990	
Hamilton, Township of	September 6, 1974	September 24, 1976	June 18, 1990	
Letterkenny, Township of	December 20, 1974	April 11, 1980	September 17, 1982	
Lurgan, Township of	November 1, 1974	None	September 1, 1978	
Mercersburg, Borough of	June 21, 1974	April 23, 1976	March 1, 1986	July 15, 1992
Metal, Township of	January 24, 1975	May 30, 1980	September 1, 1986	
Mont Alto, Borough of	July 26, 1974	May 14, 1976	July 16, 1990	
Montgomery, Township of	December 13, 1974	None	August 1, 1986	November 4, 1992

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Peters, Township of	September 13, 1974	May 28, 1976	September 1, 1986	December 2, 1992
Quincy, Township of	December 27, 1974	June 20, 1980	July 16, 1990	
Southampton, Township of	May 31, 1974	October 8, 1976	May 15, 1968	
St. Thomas, Township of	September 13, 1974	August 13, 1976	July 16, 1990	
Warren, Township of	January 24, 1975	December 19, 1980	September 1, 1986	
Washington, Township of	September 6, 1974	July 2, 1976 March 11, 1977	June 3, 1986	June 17, 1991
Waynesboro, Borough of	December 3, 1976	None	November 1, 1985	

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)

COMMUNITY MAP HISTORY

9.0 BIBLIOGRAPHY AND REFERENCES

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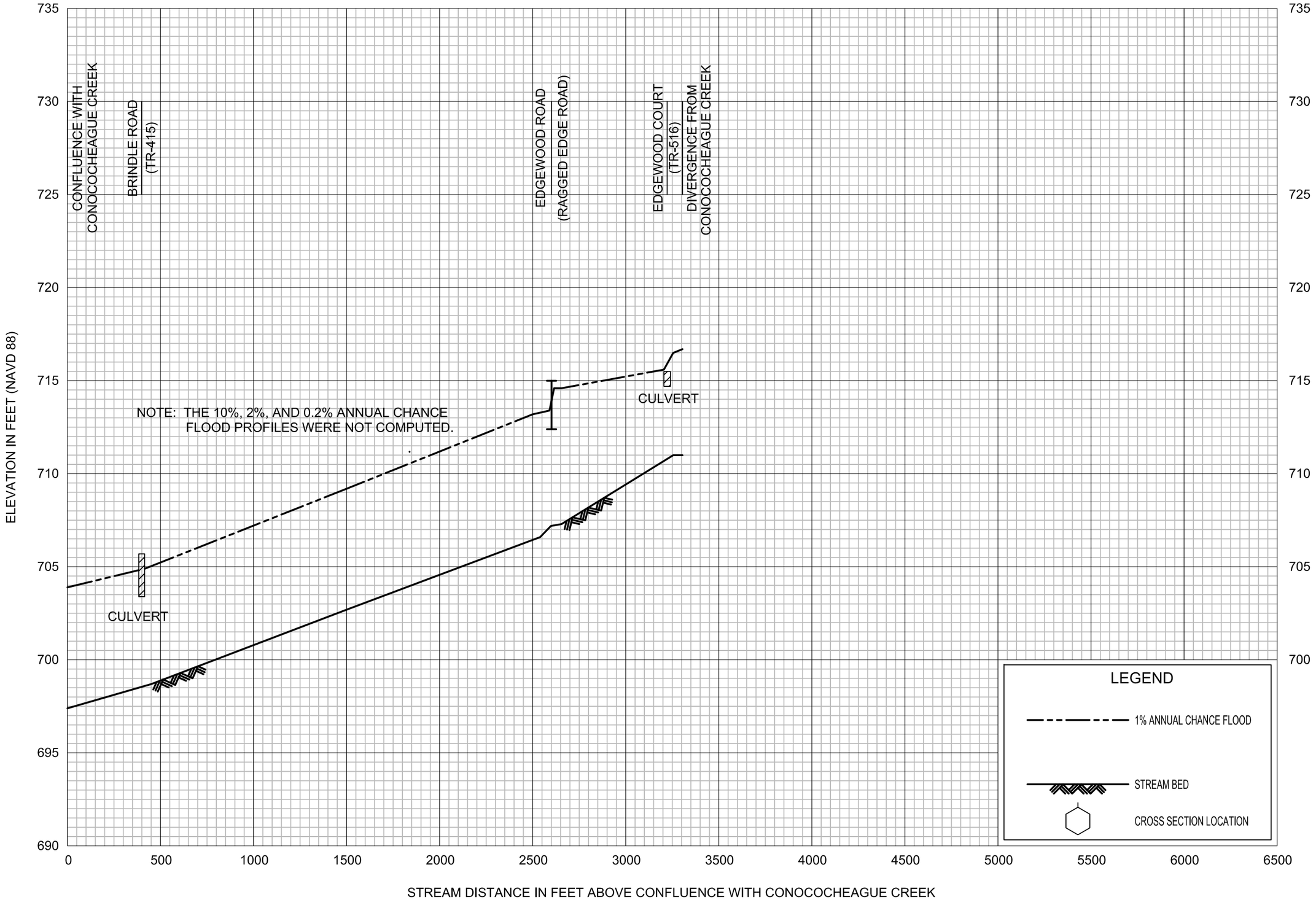
FLOOD PROFILES

AUXILIARY CHANNEL OF CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



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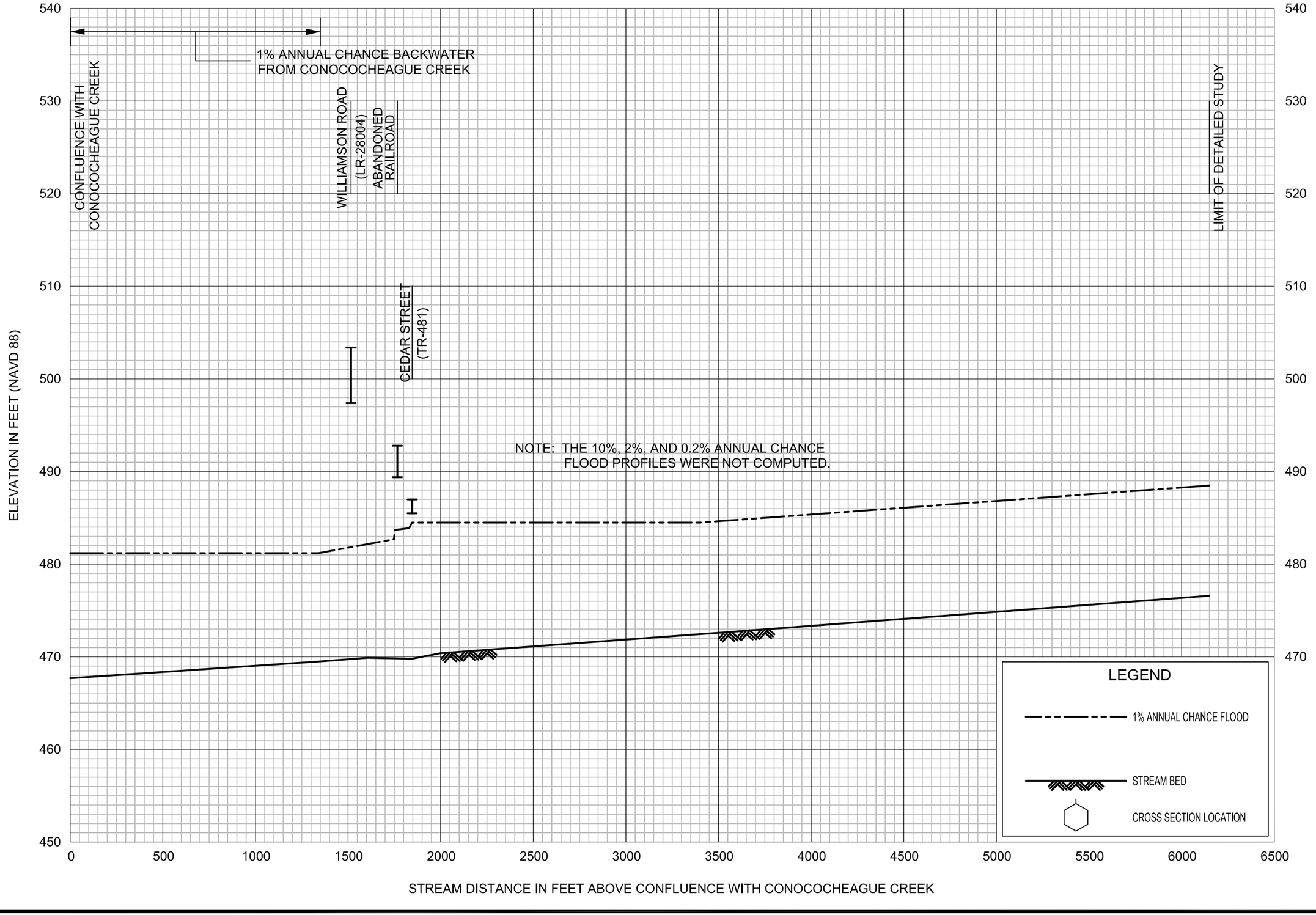


FLOOD PROFILES

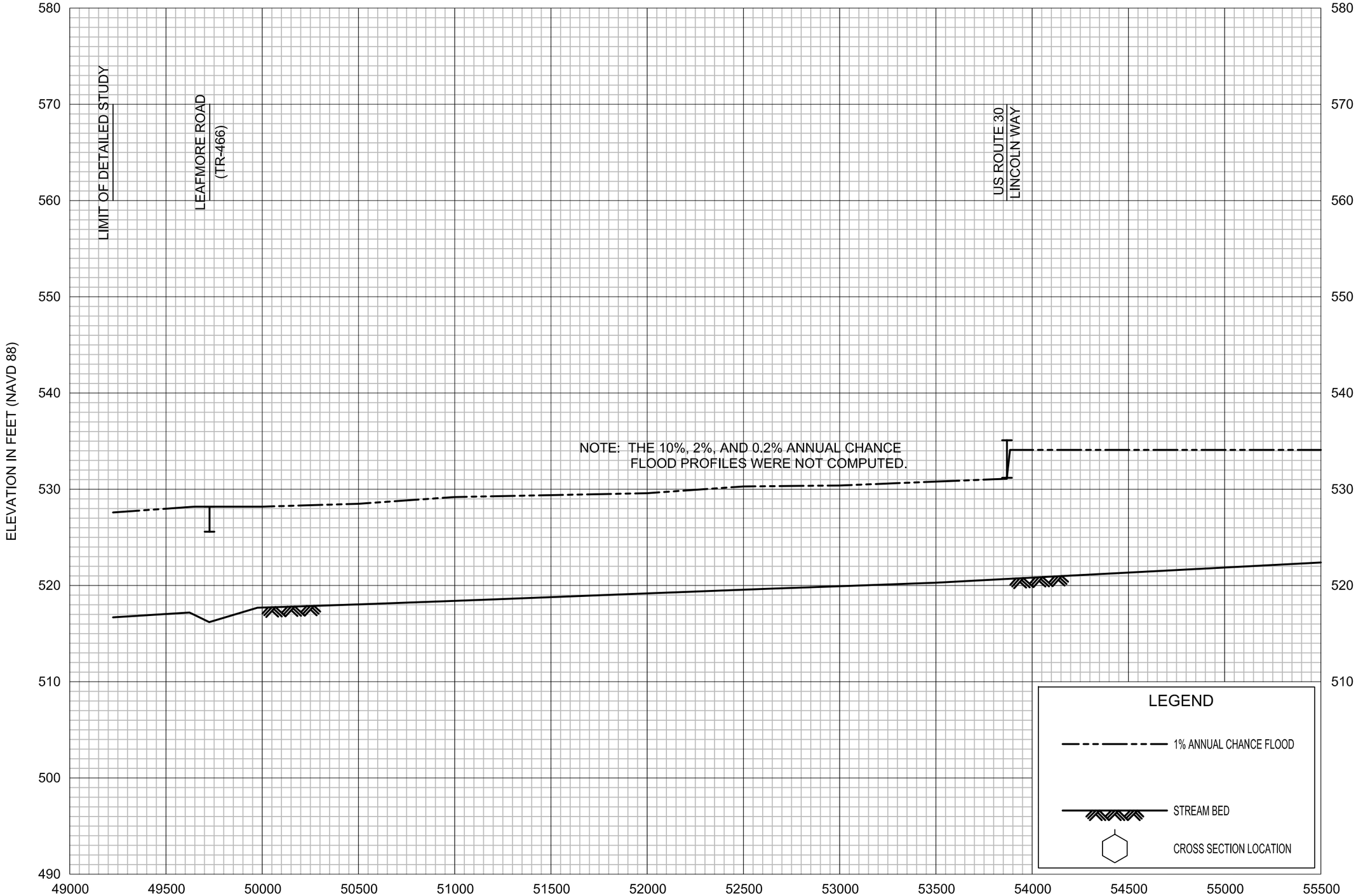
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

02P



FLOOD PROFILES

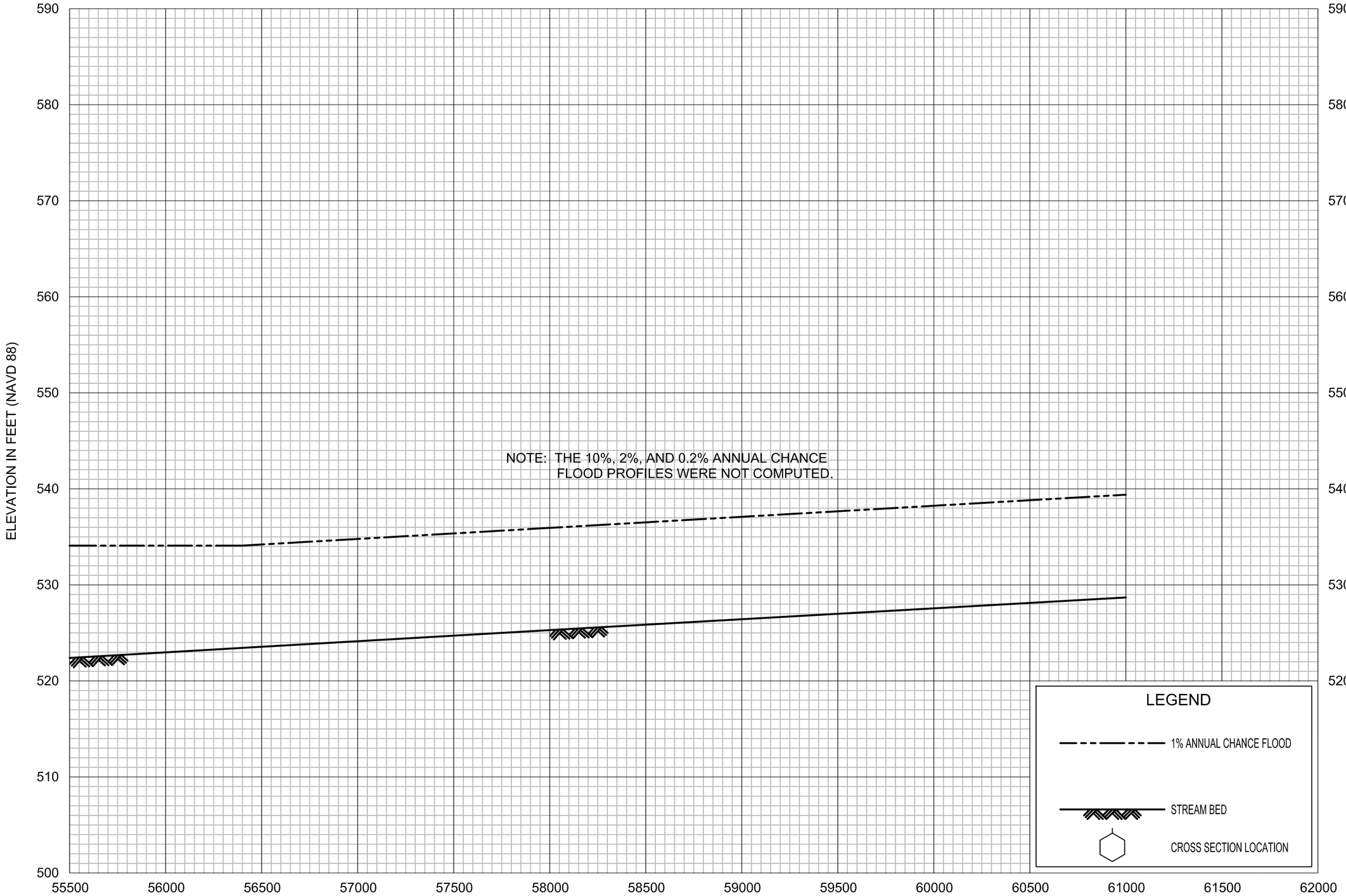
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

03P



FLOOD PROFILES

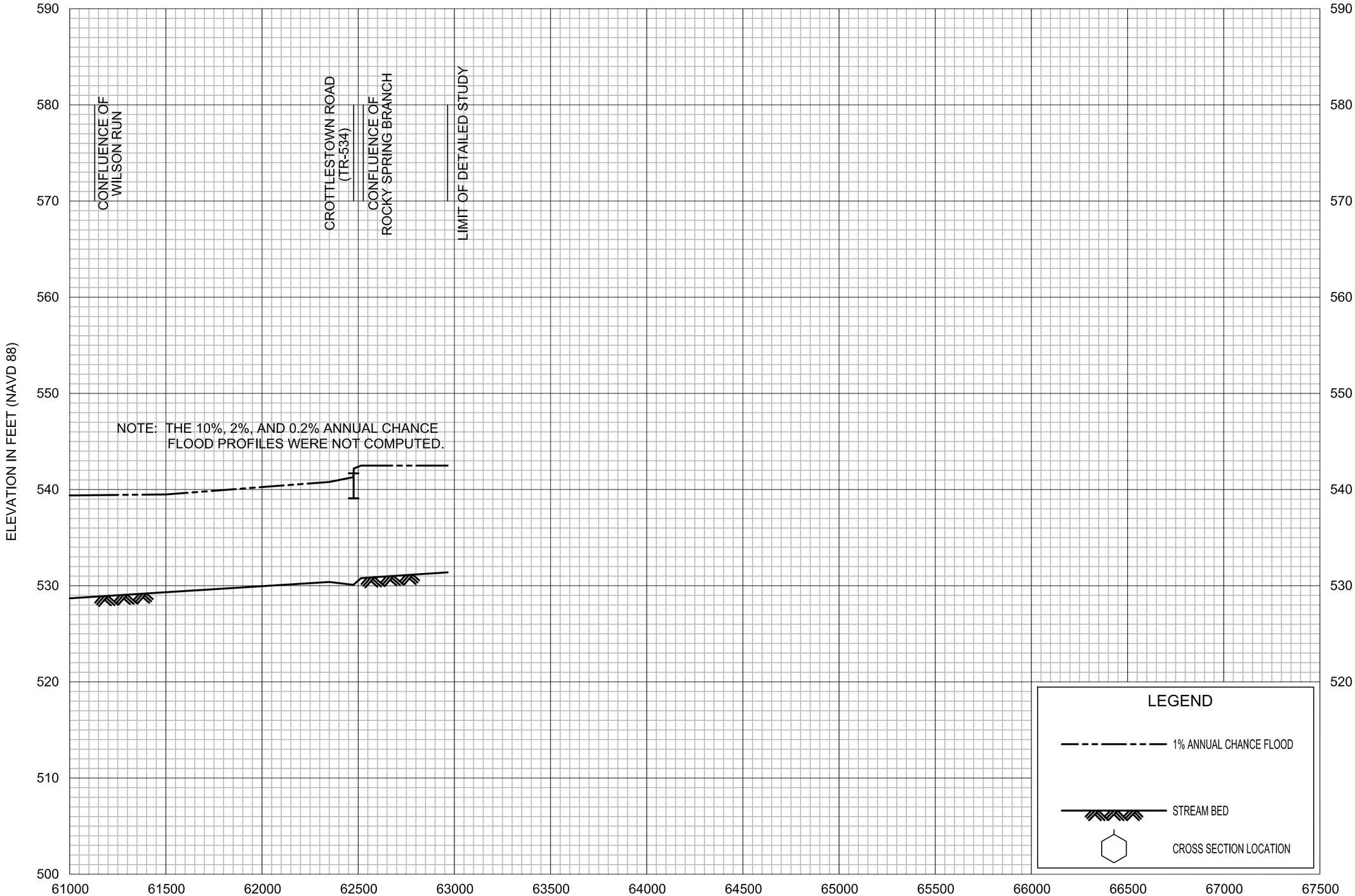
BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

04P



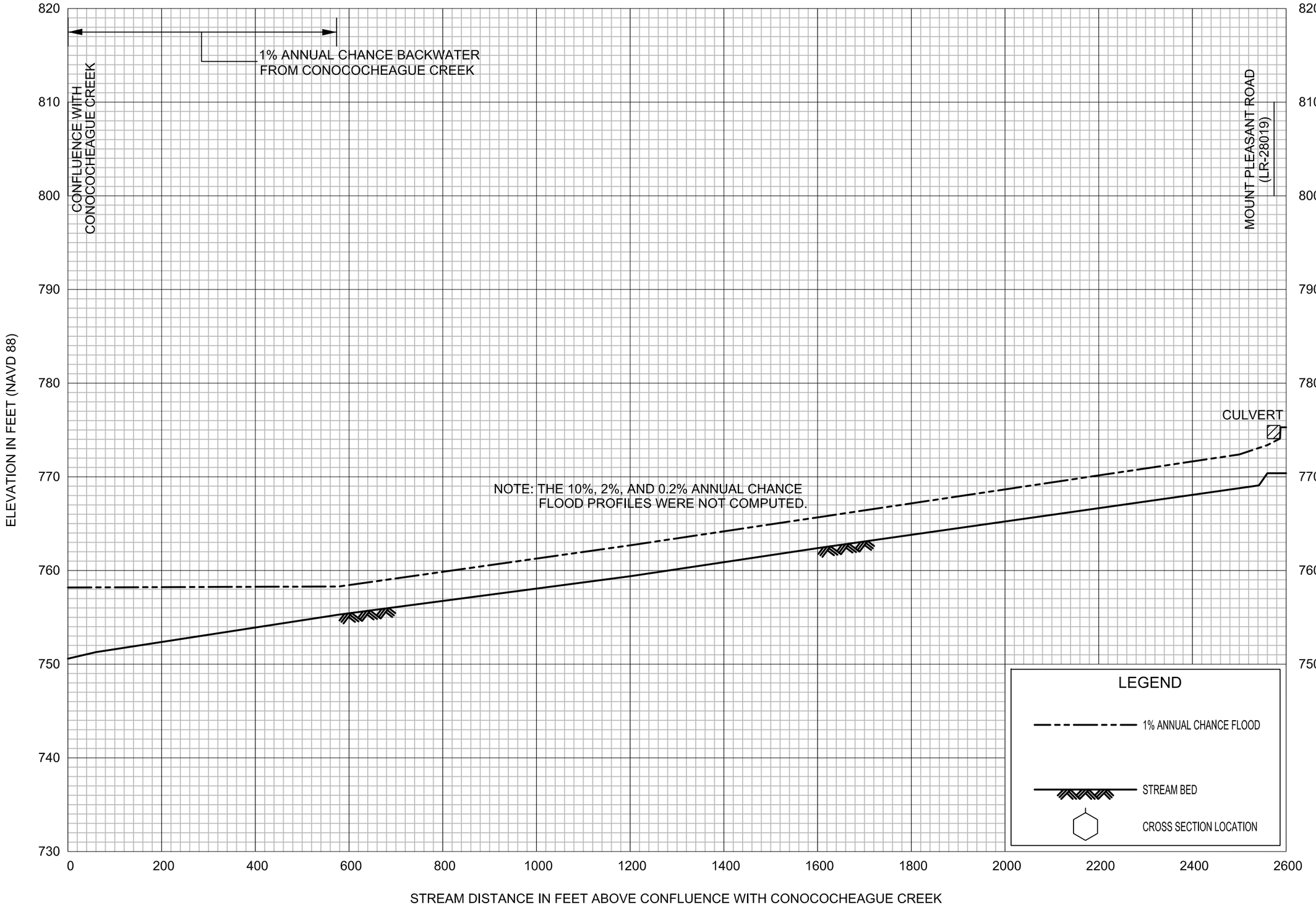
FLOOD PROFILES

BACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



FLOOD PROFILES

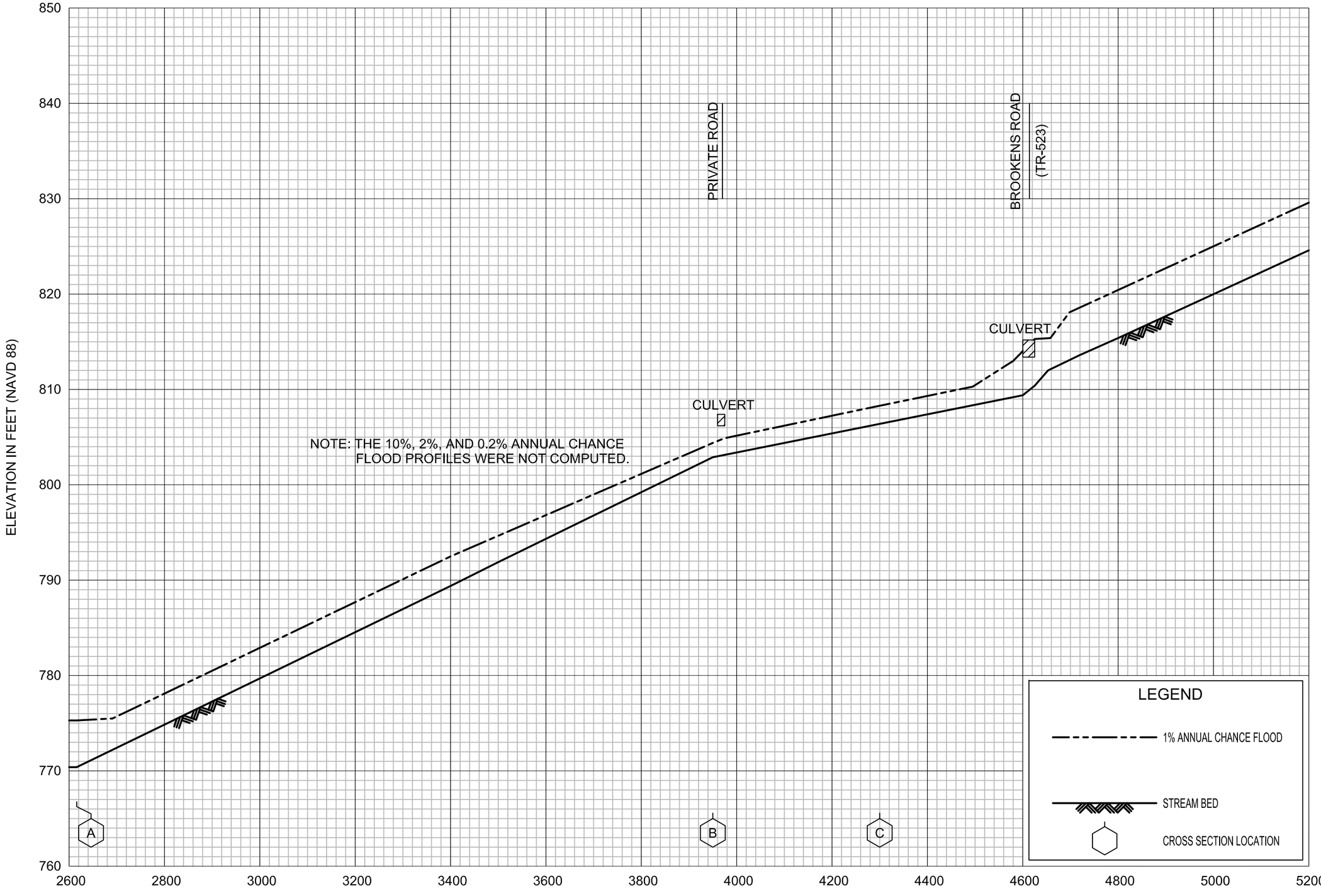
COLD SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

06P



FLOOD PROFILES

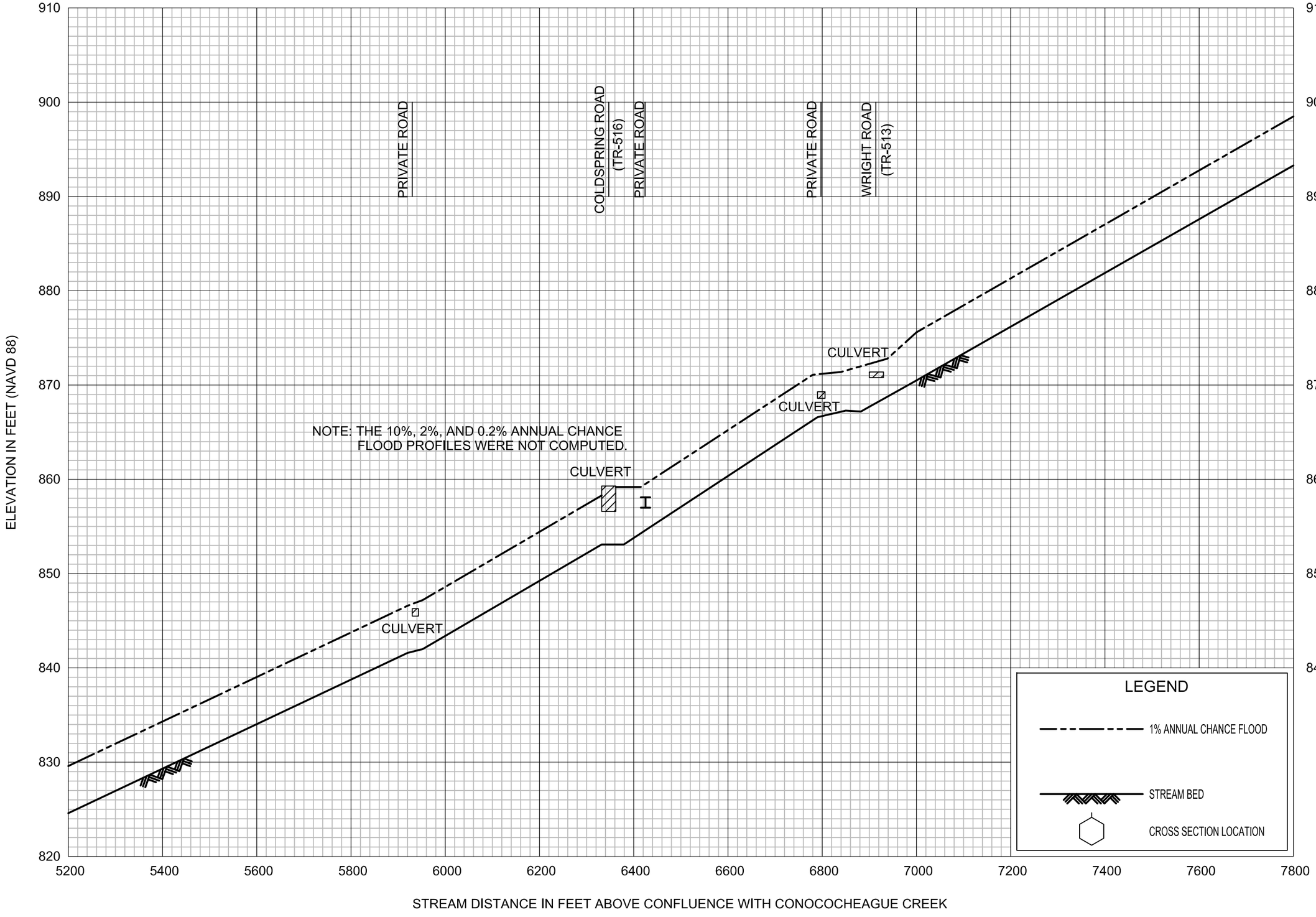
COLD SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

07P



FLOOD PROFILES

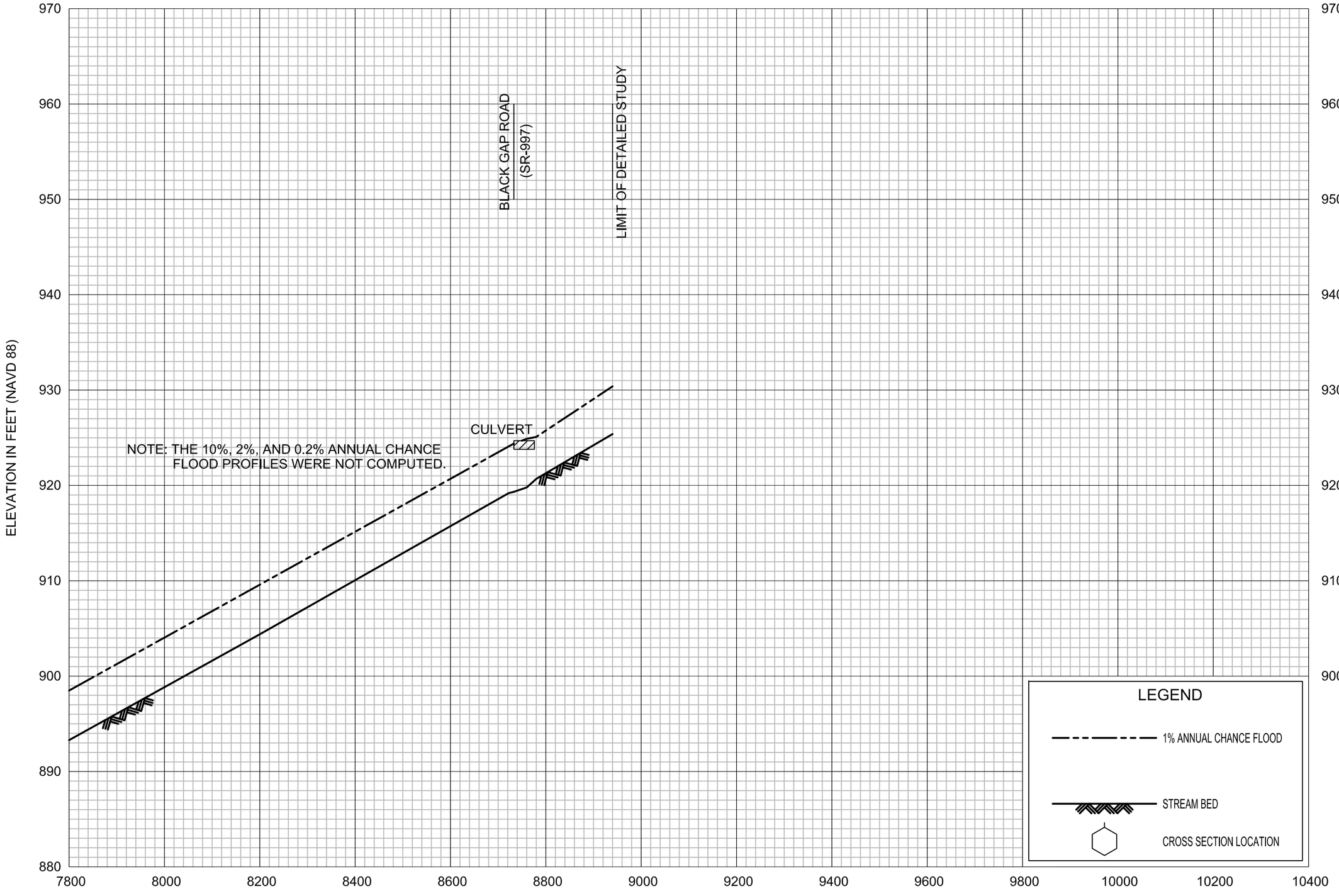
COLD SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

08P



FLOOD PROFILES

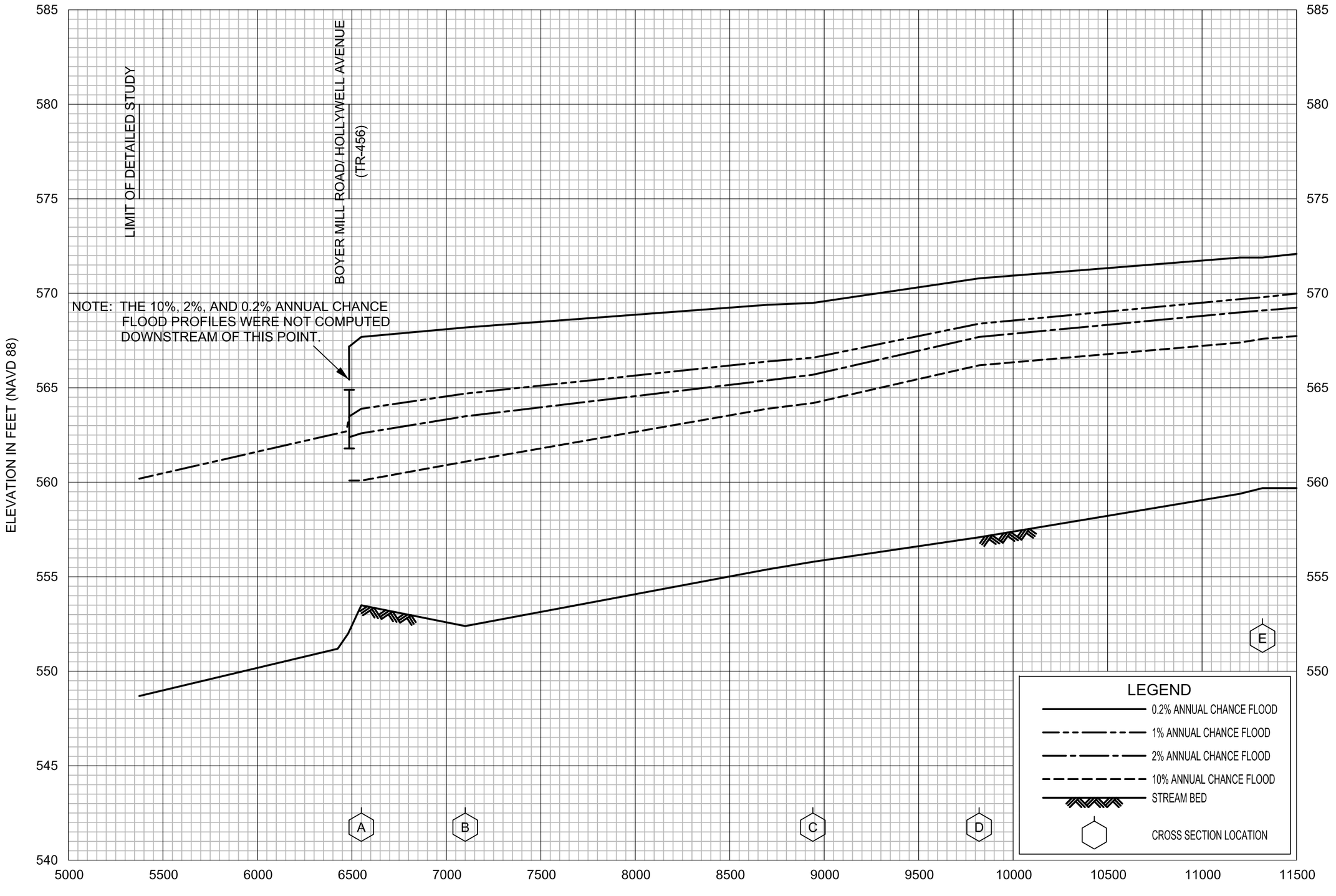
COLD SPRING RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

09P



FLOOD PROFILES

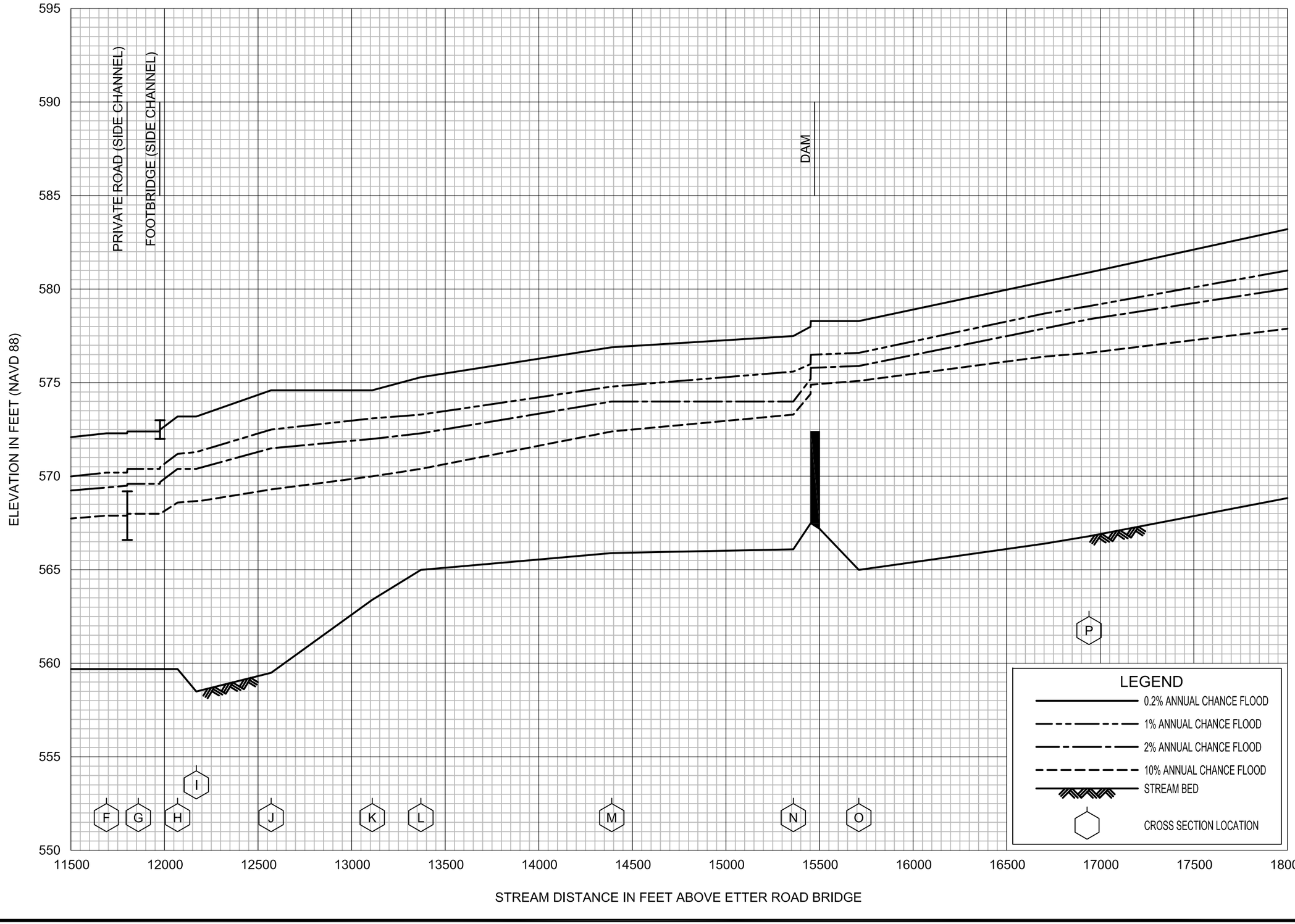
CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

10P



FLOOD PROFILES

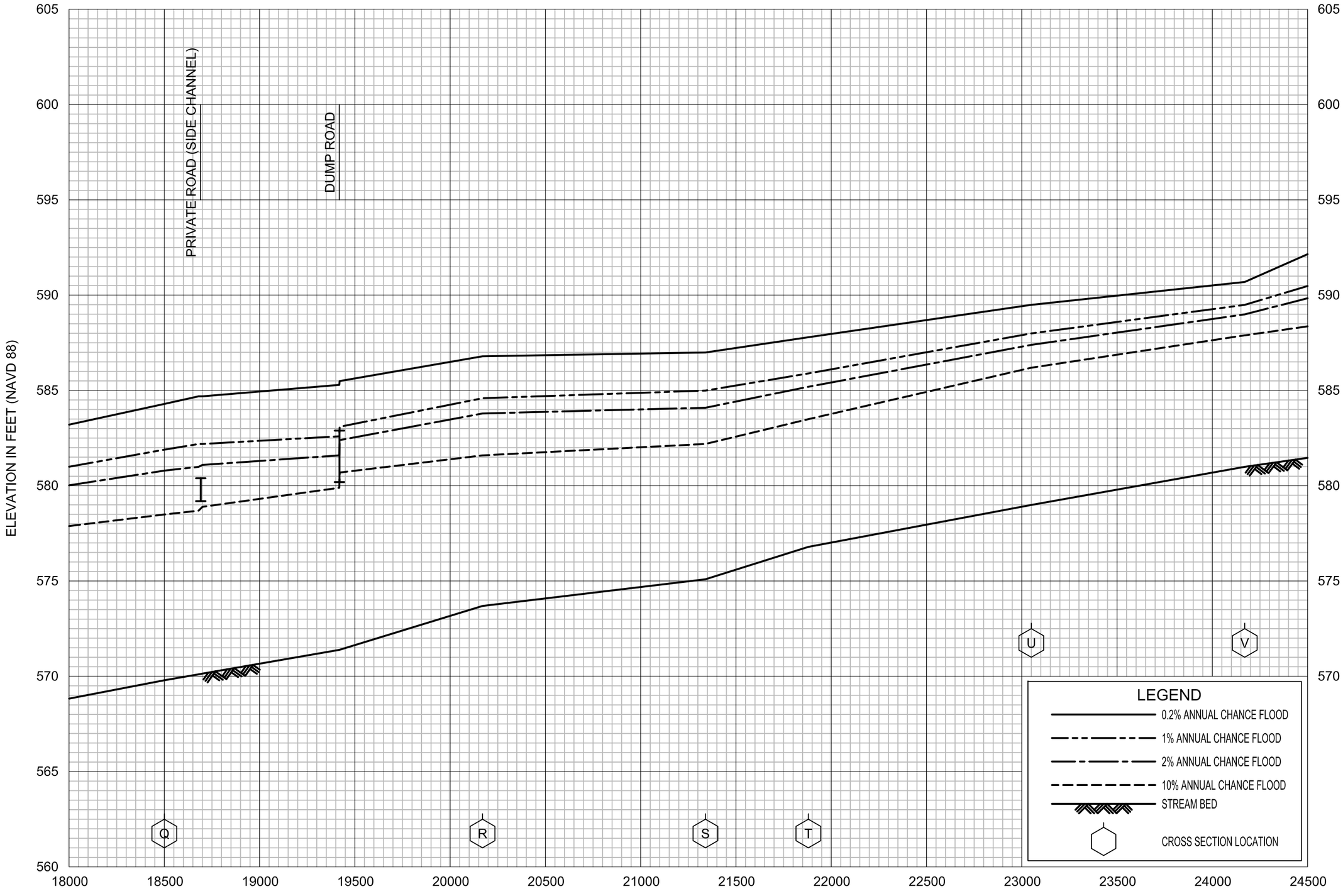
CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

11P



FLOOD PROFILES

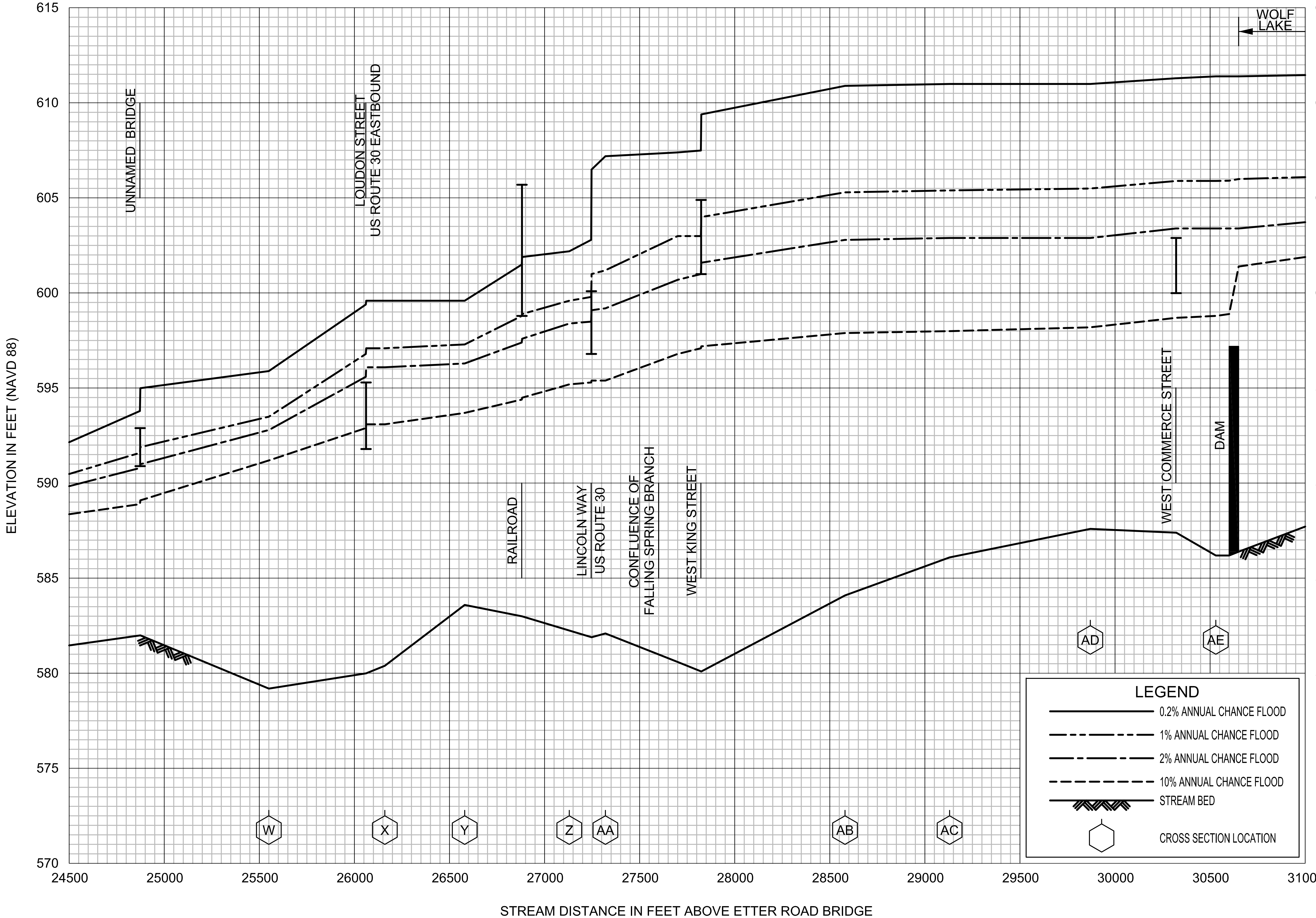
CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

12P



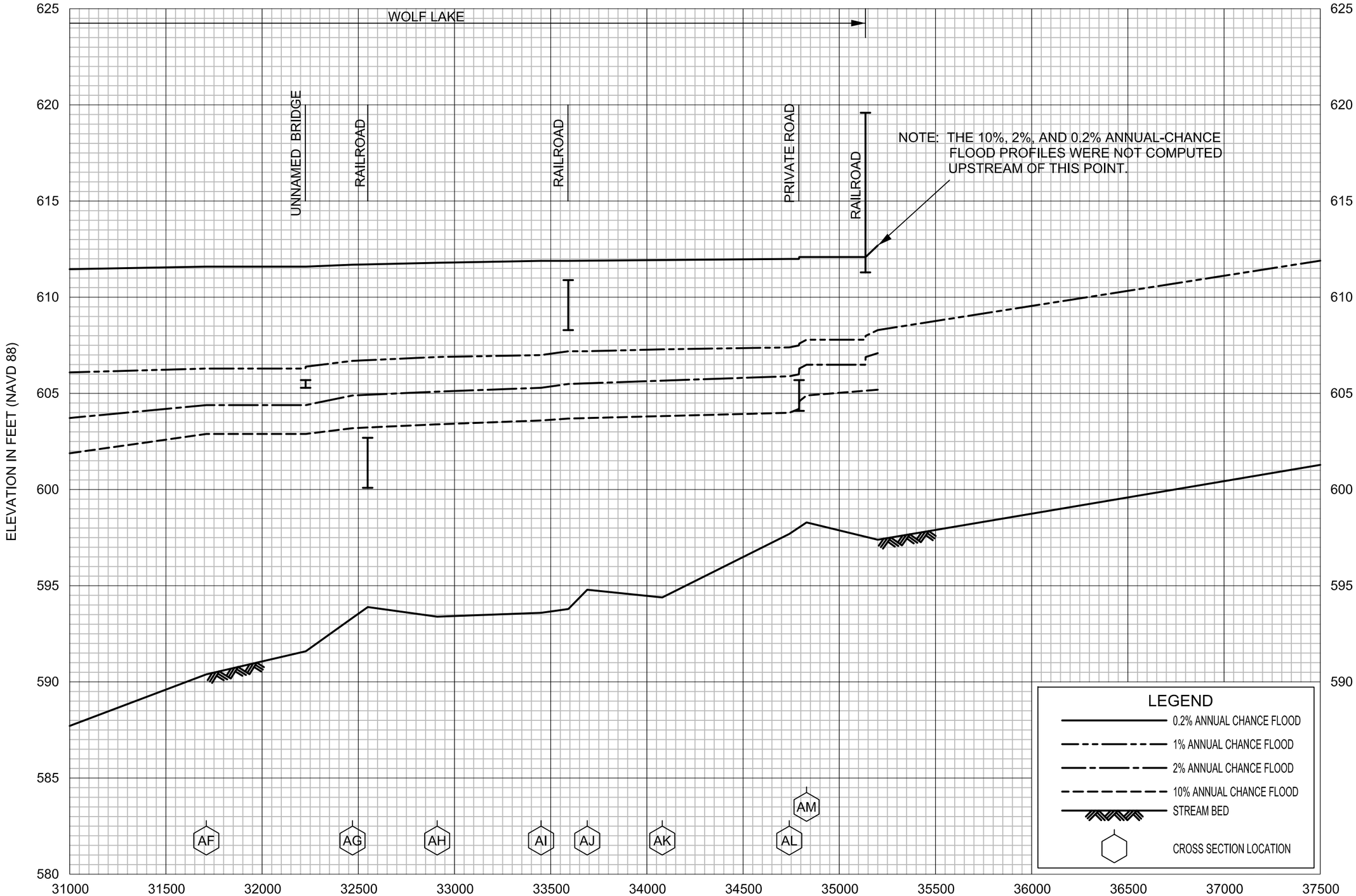
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



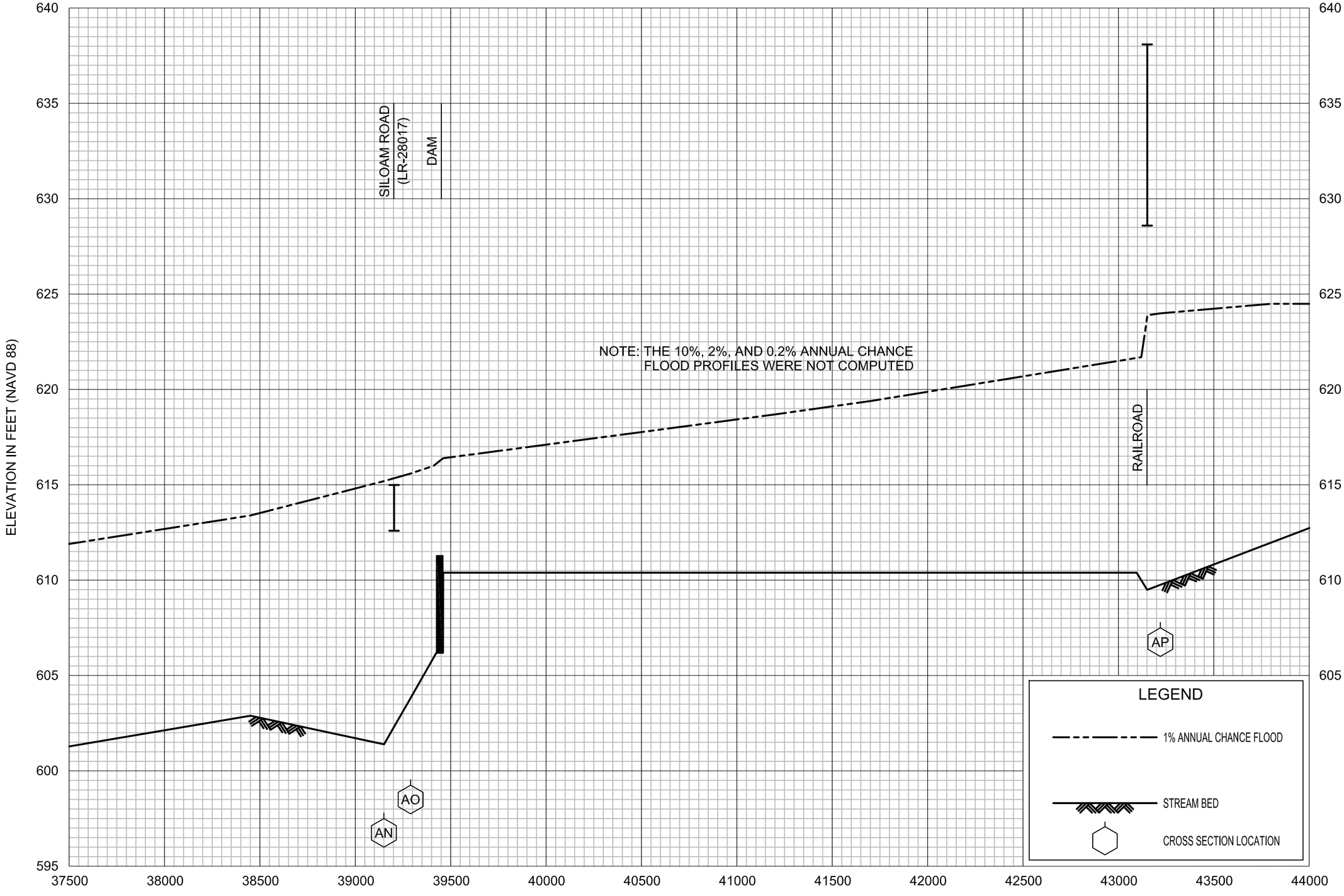
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

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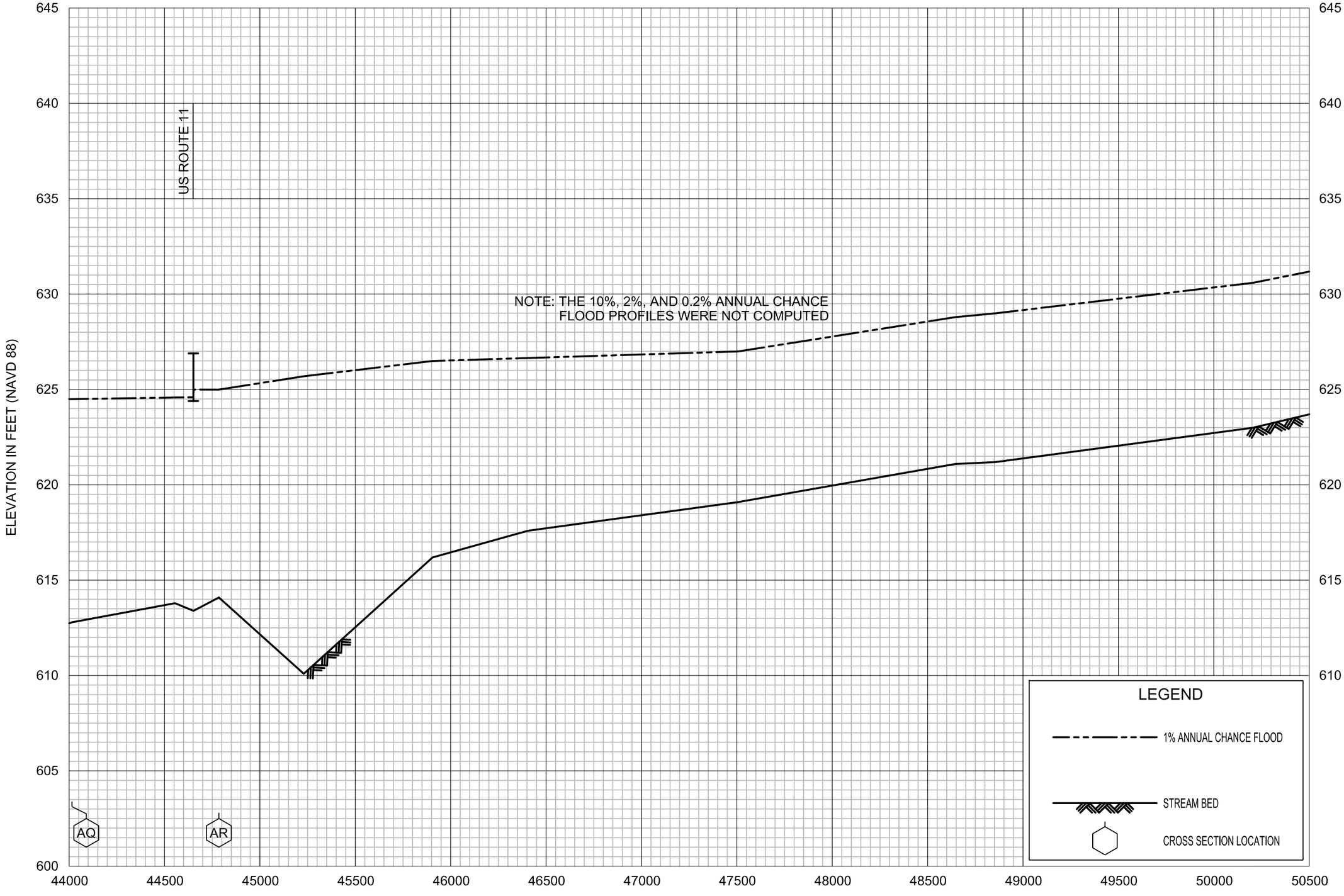


FLOOD PROFILES

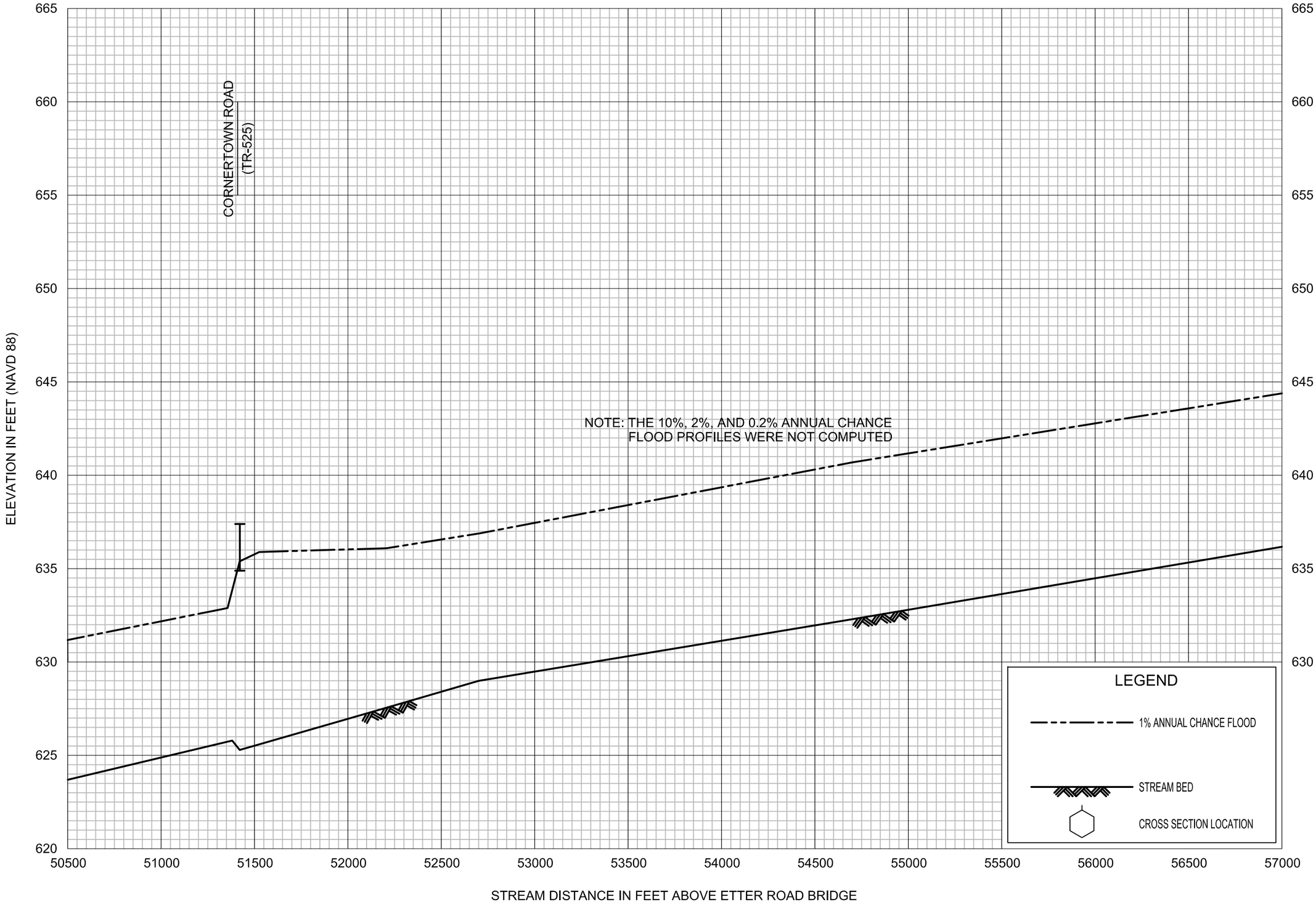
CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

16P



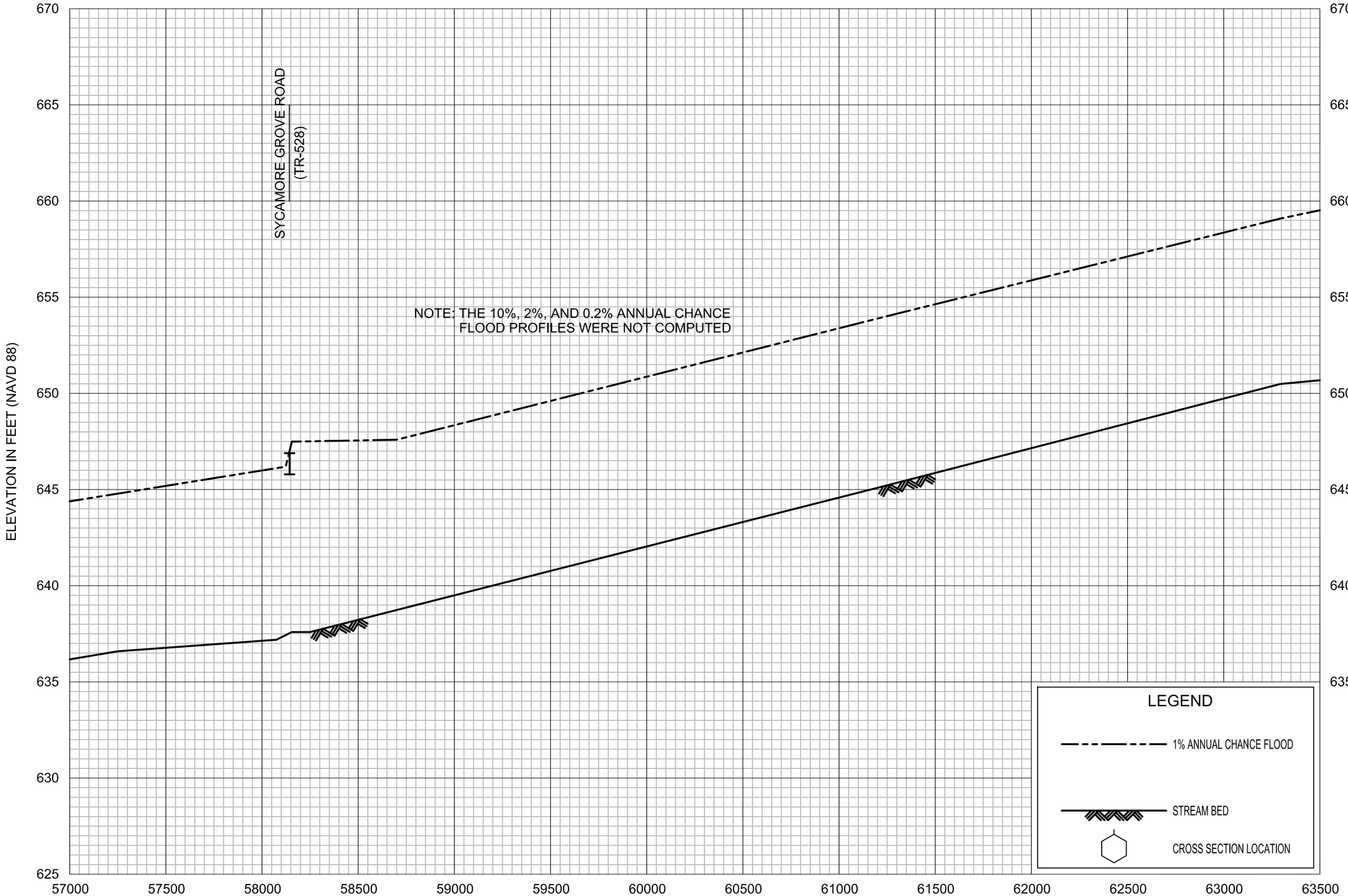
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



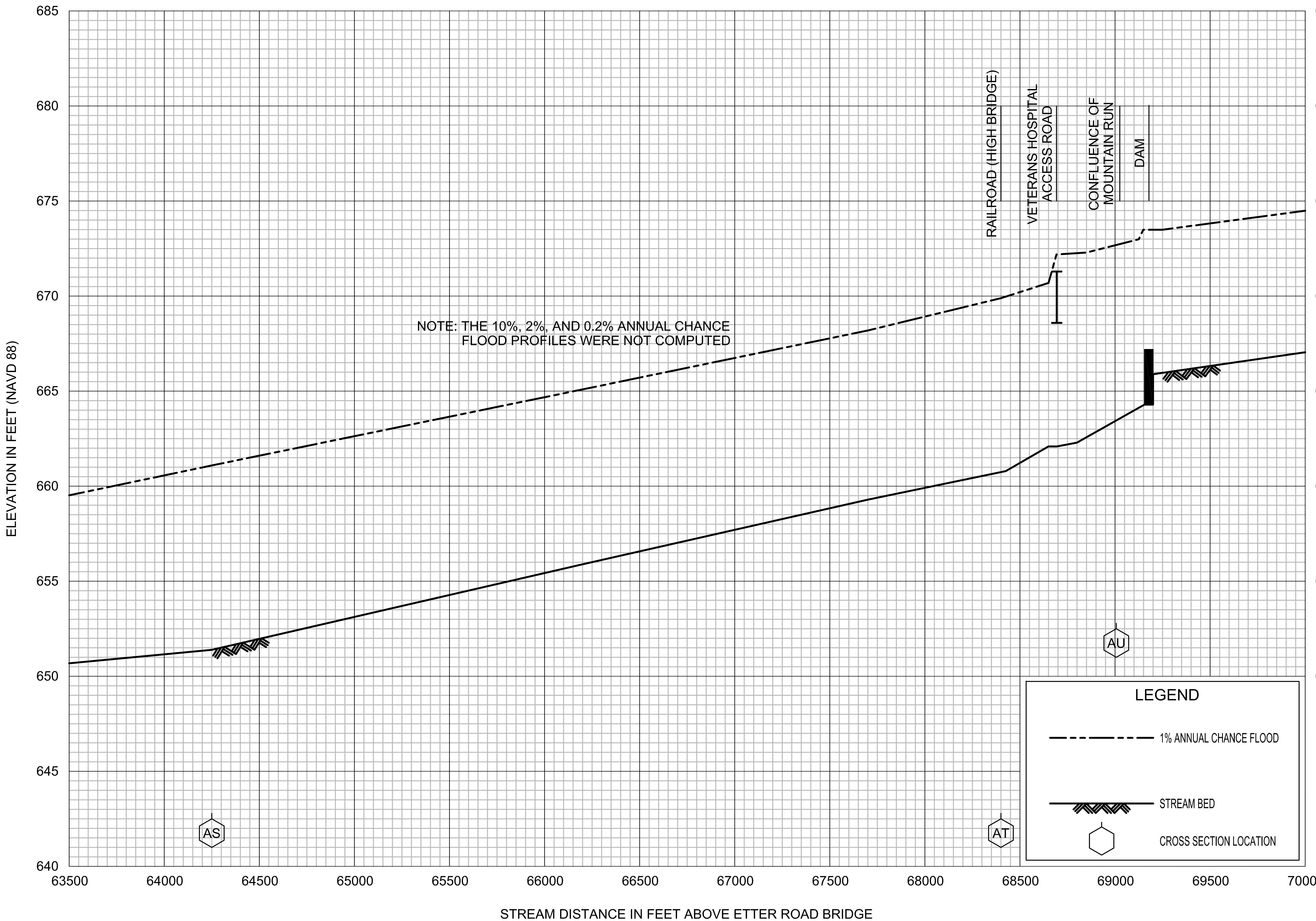
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



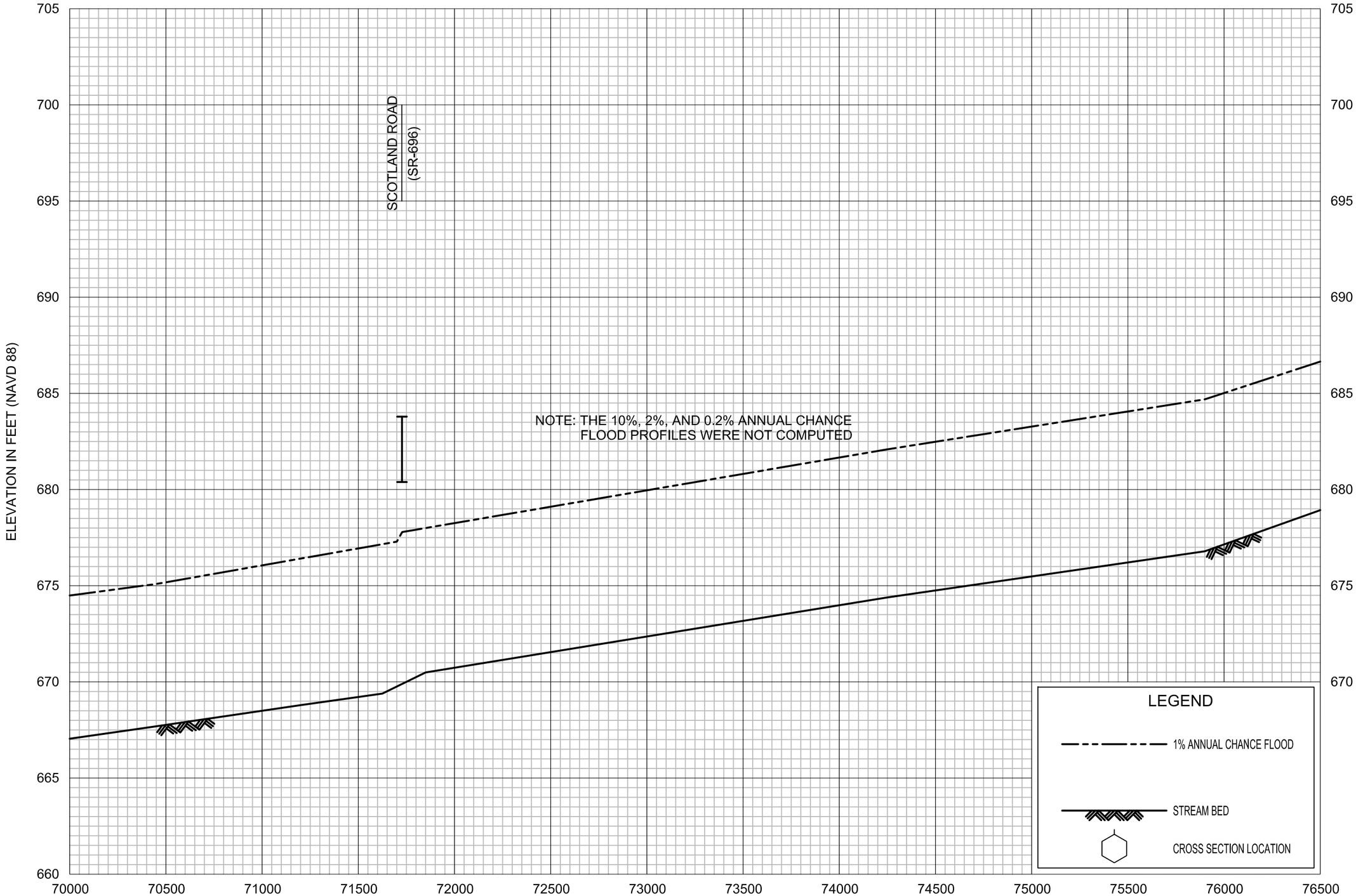
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



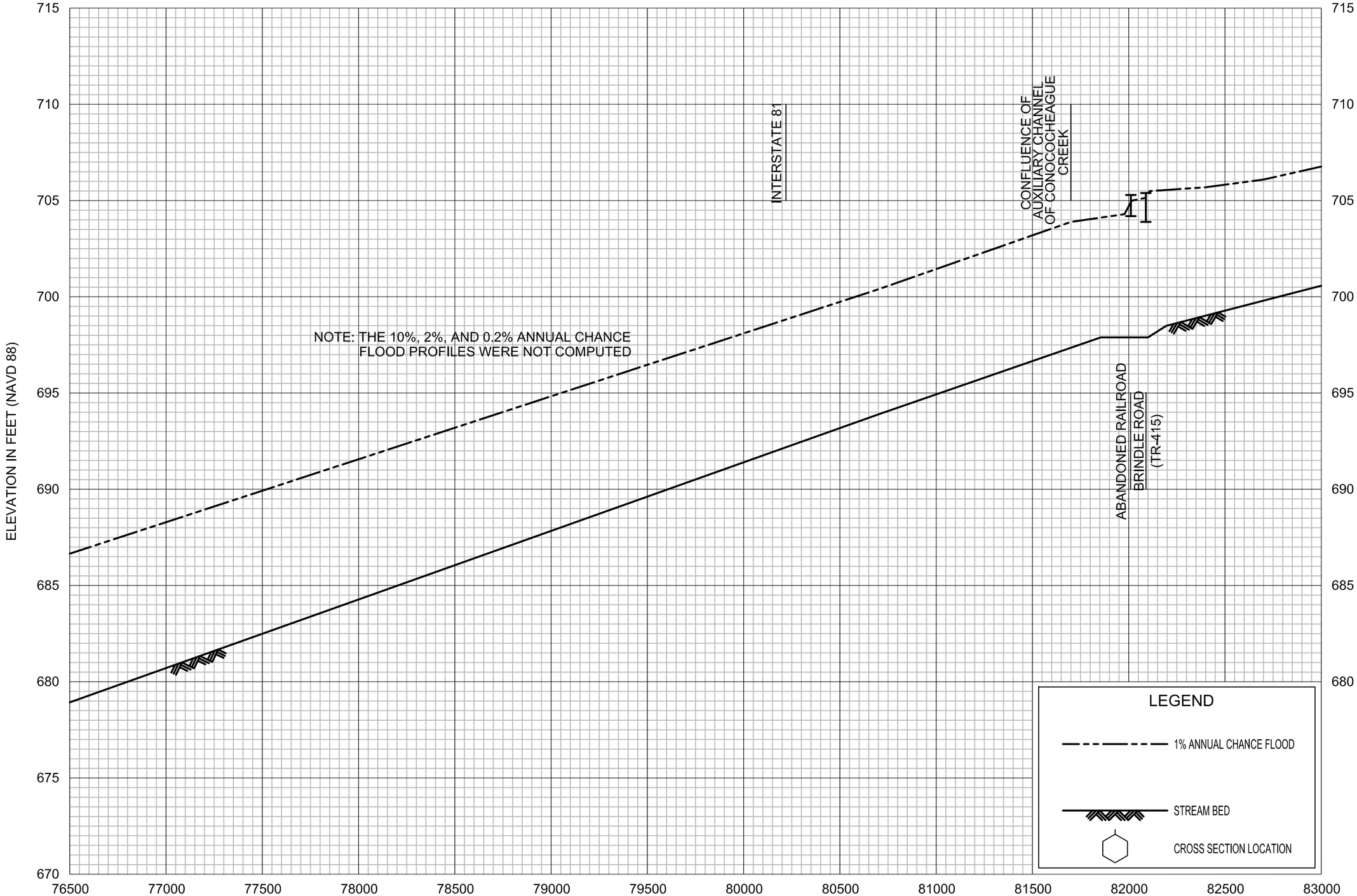
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



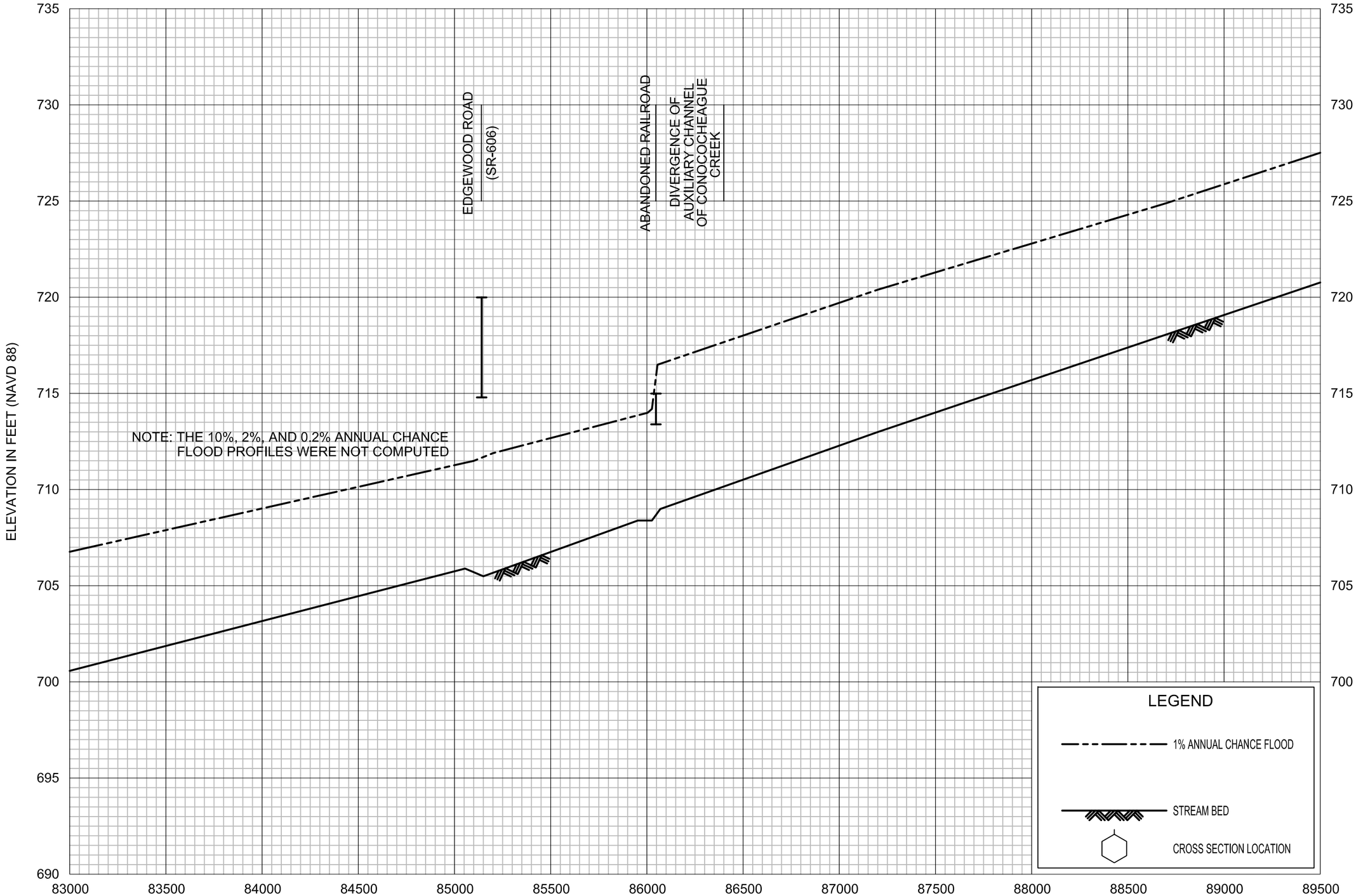
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



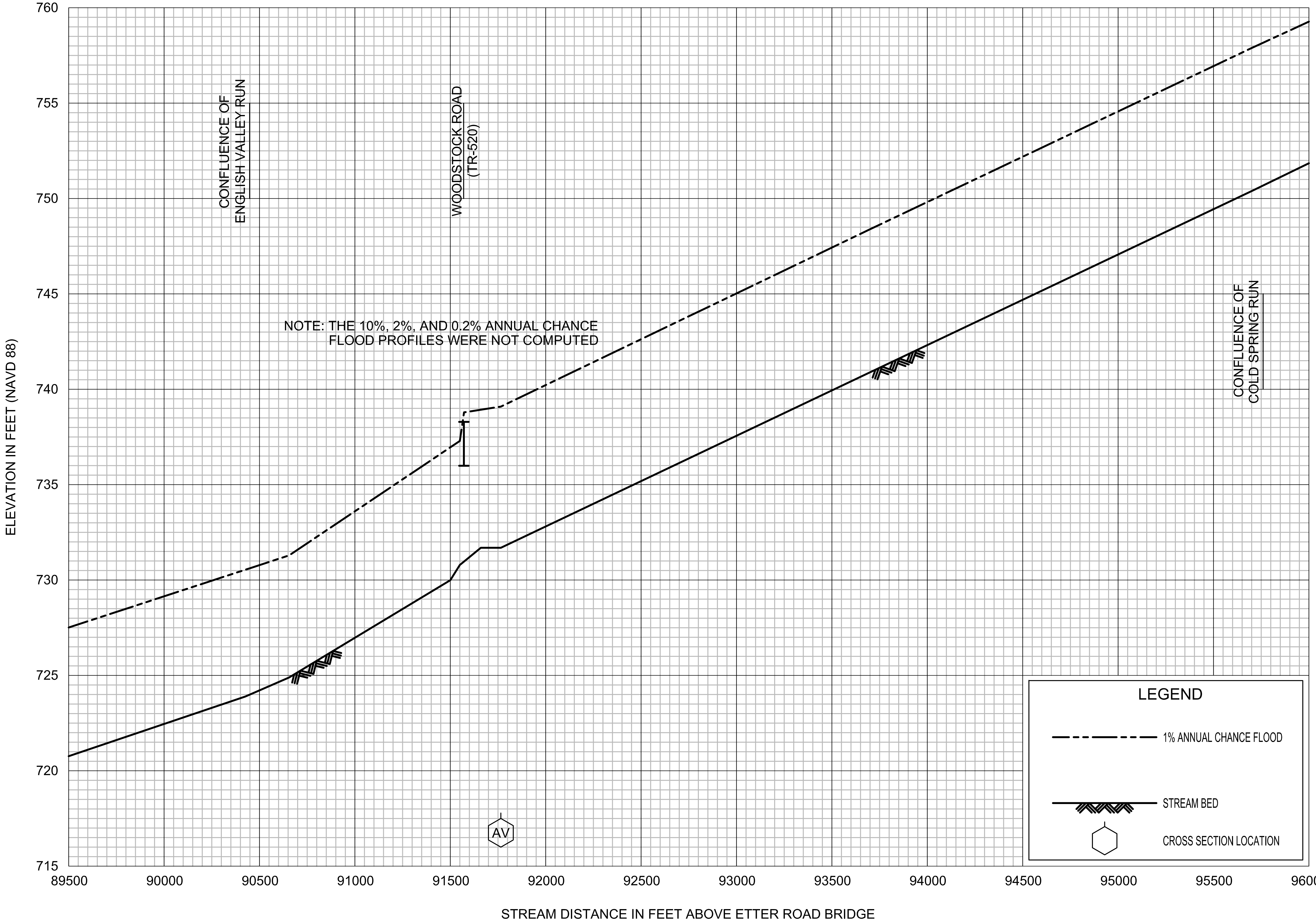
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



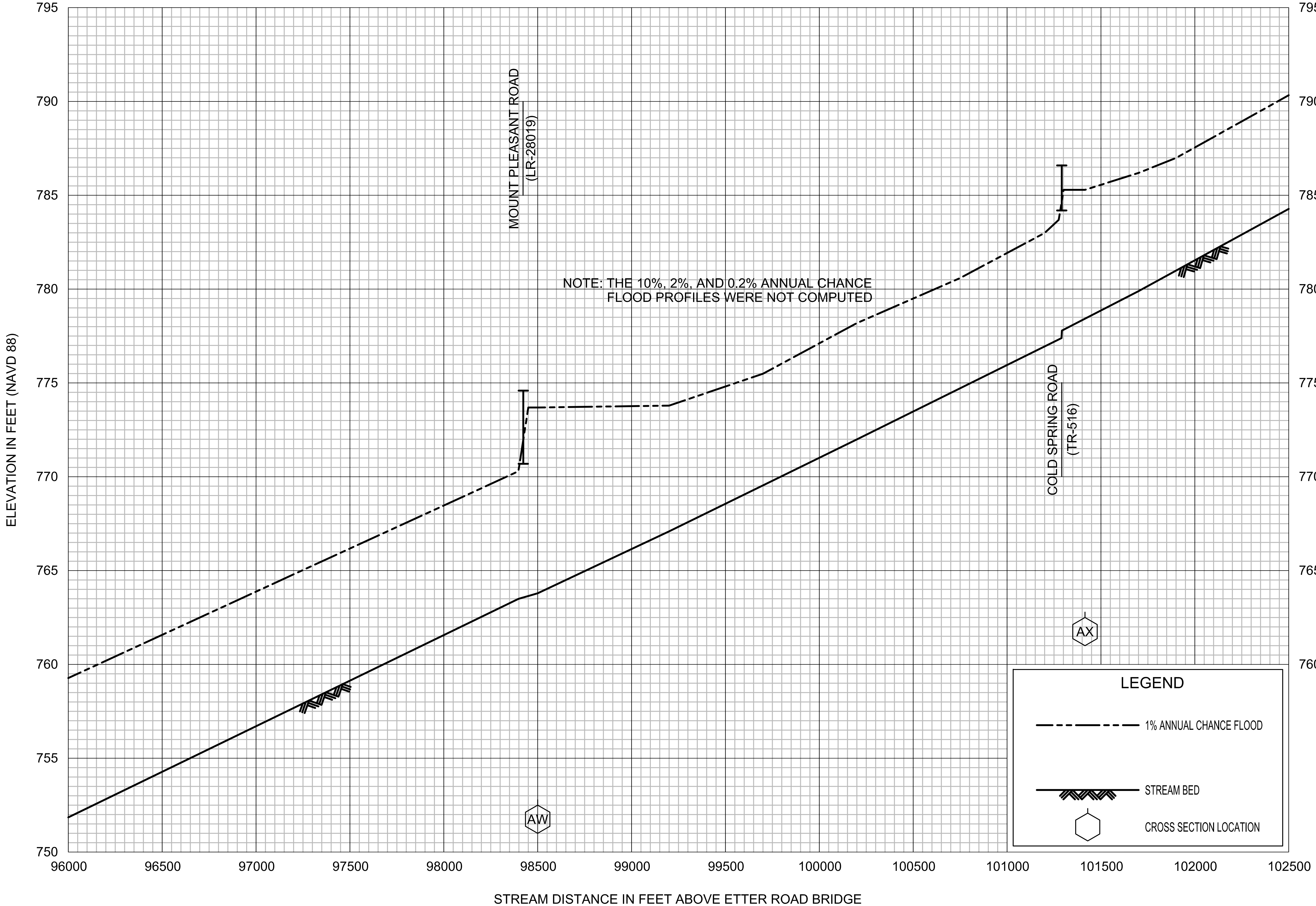
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)

23P



FLOOD PROFILES

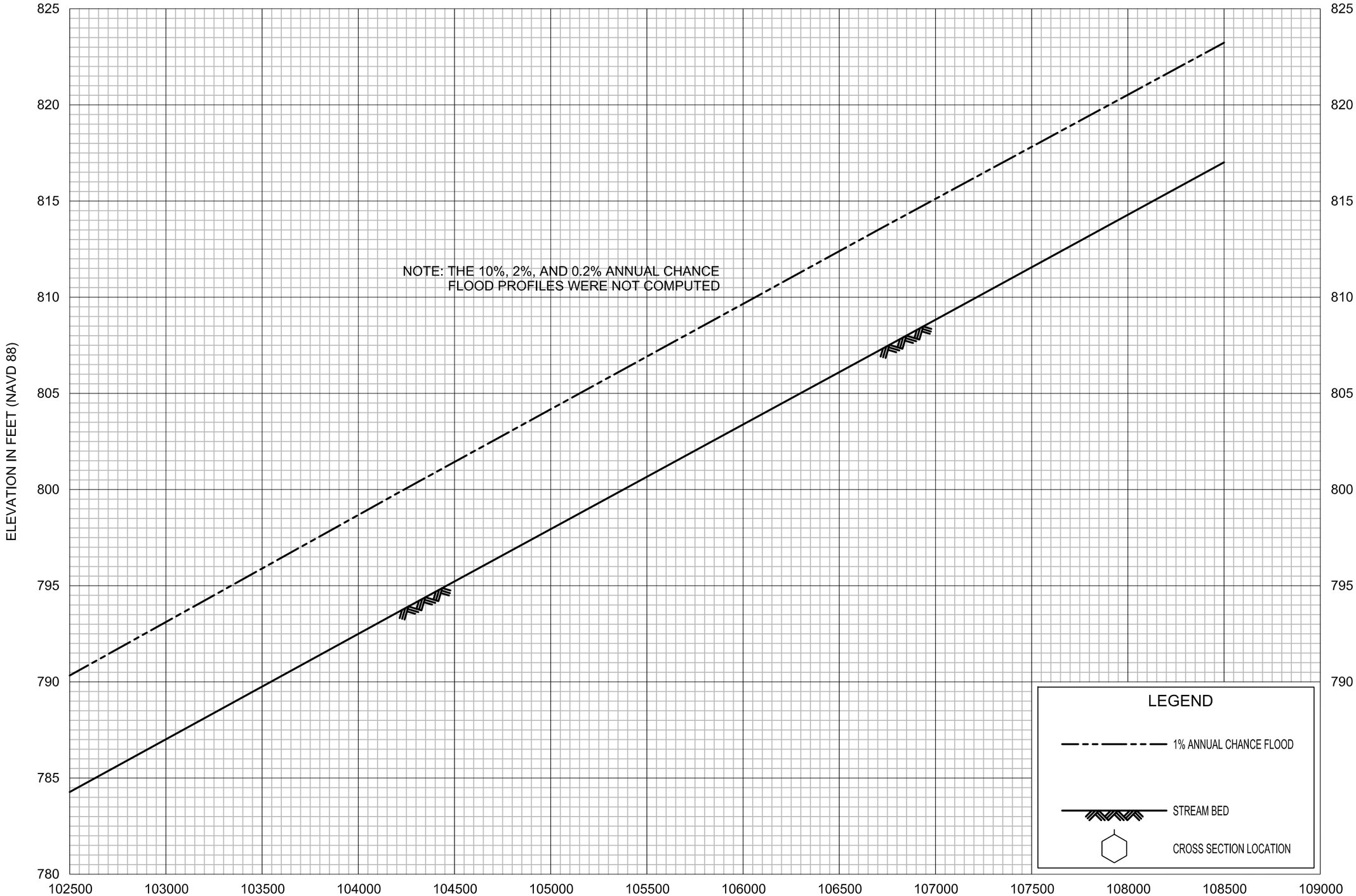
CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

24P



FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

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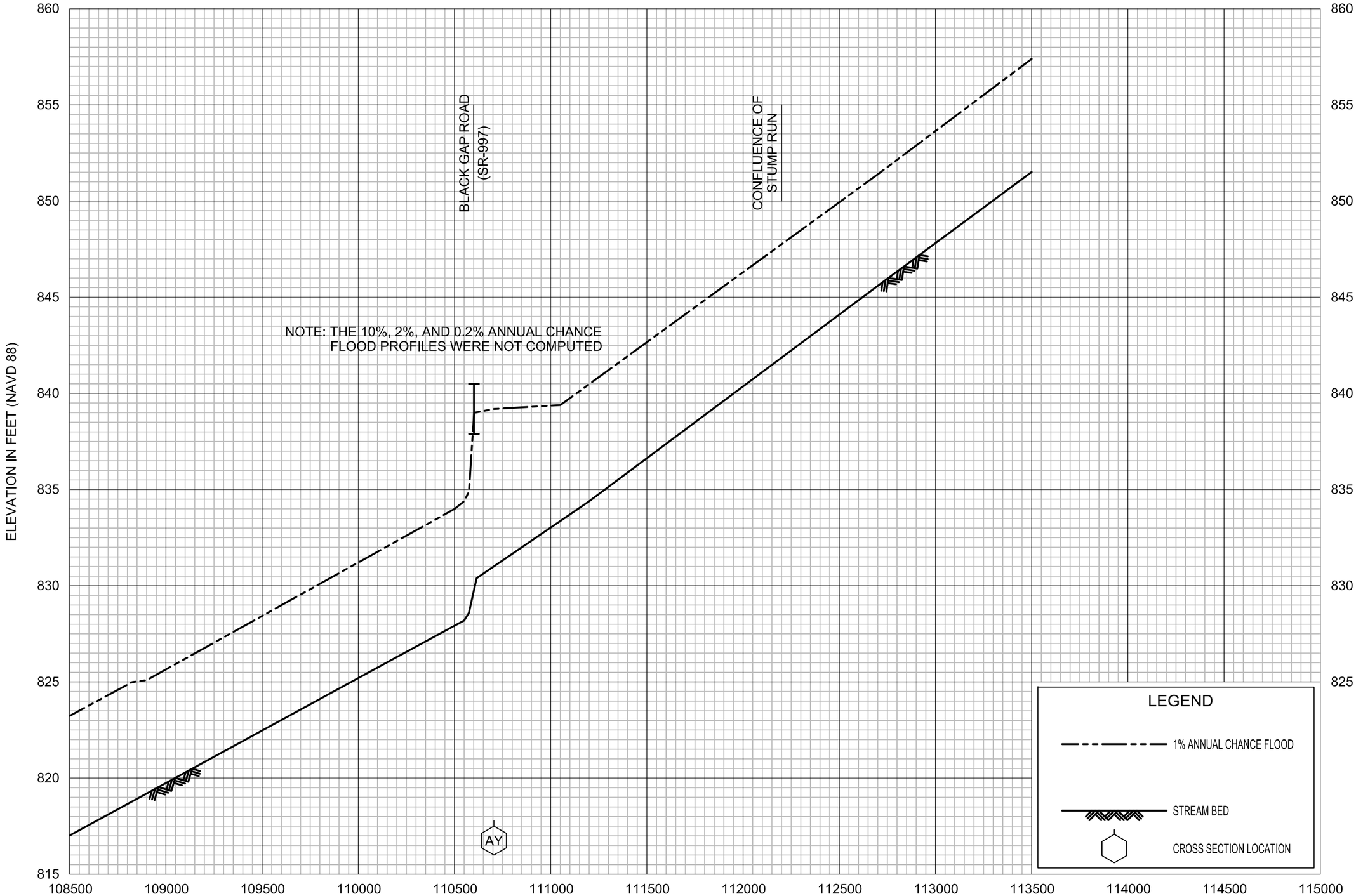


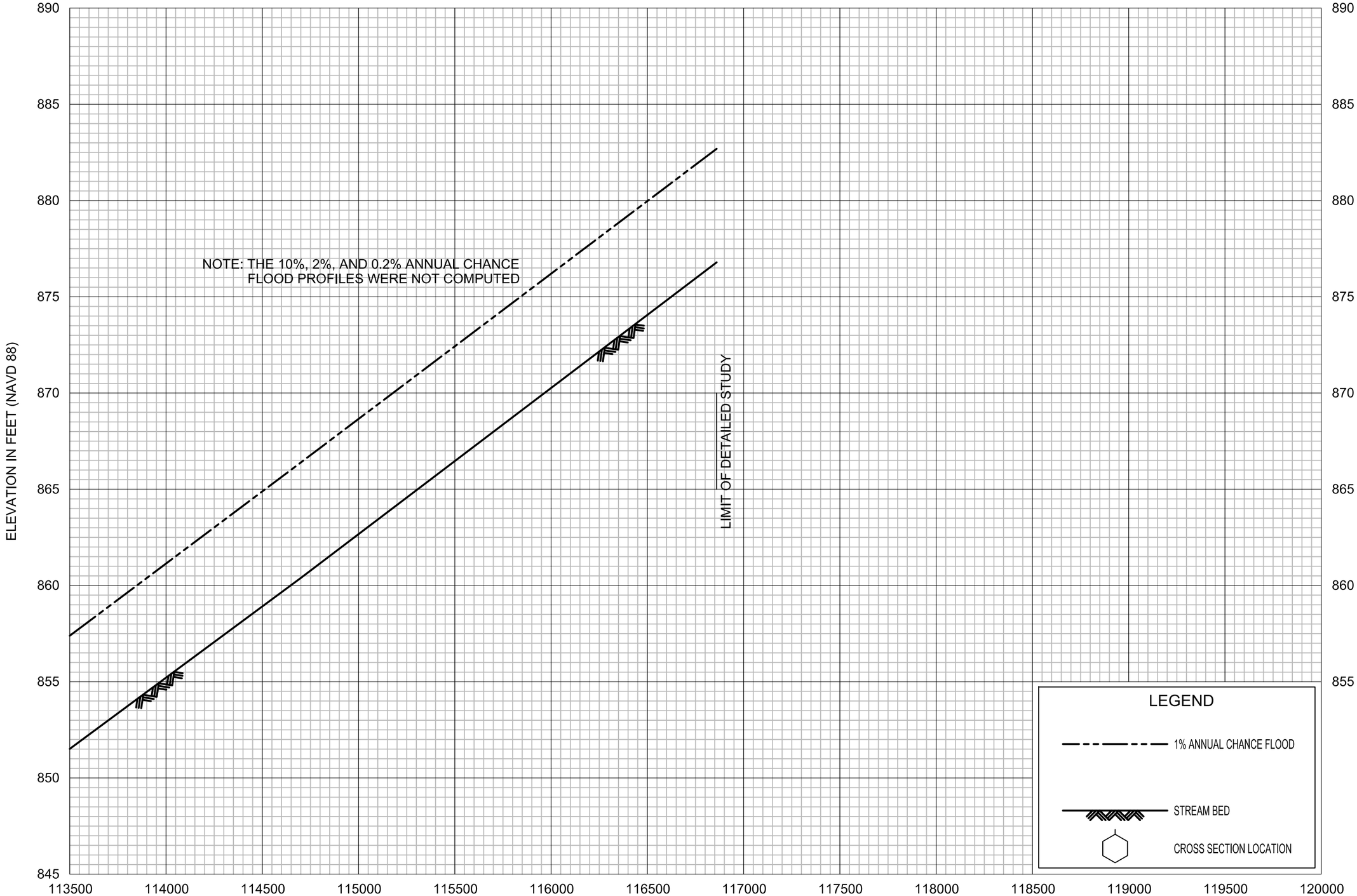
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



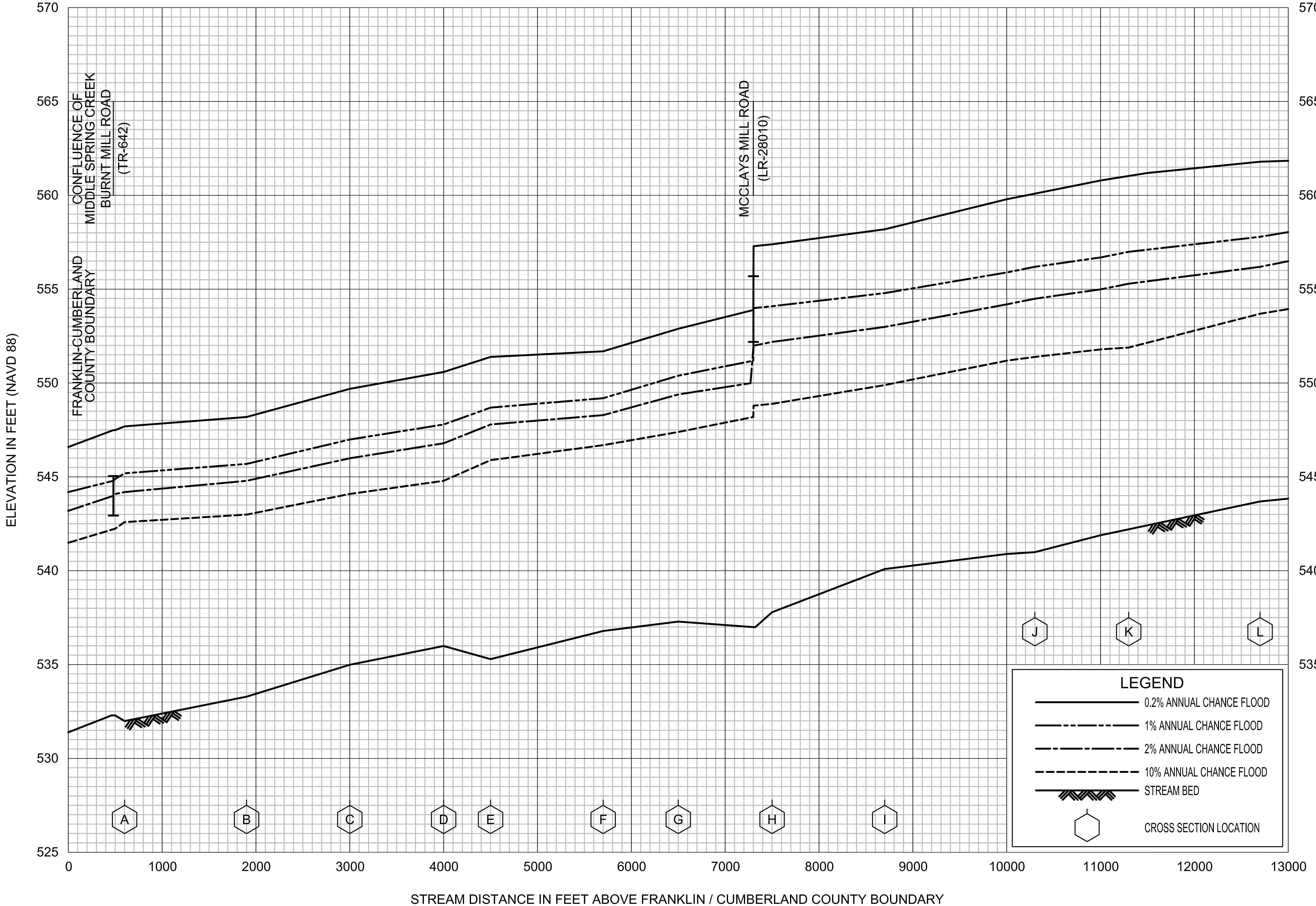
FLOOD PROFILES

CONOCOCHEAGUE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



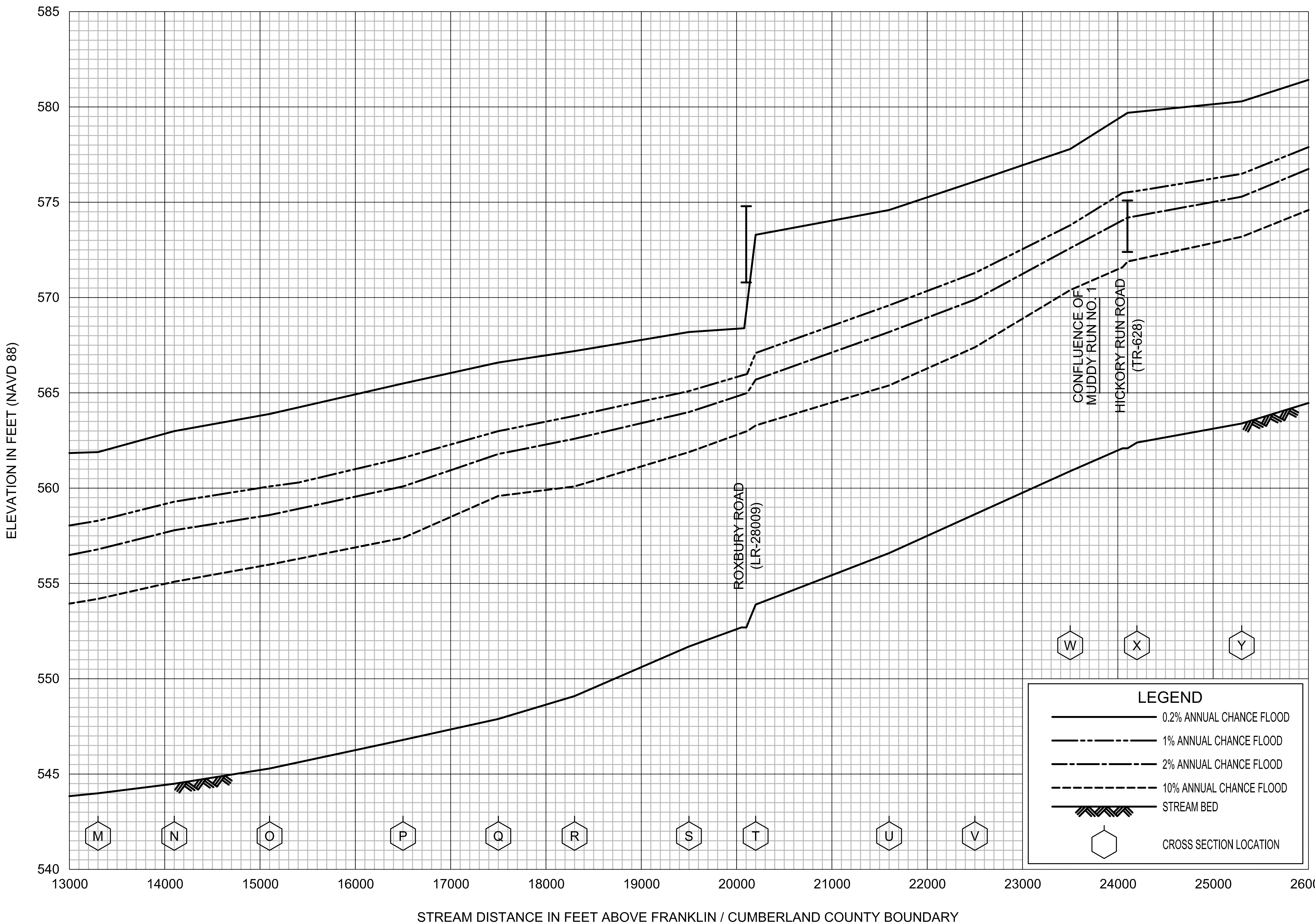
FLOOD PROFILES

CONODOGUINET CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



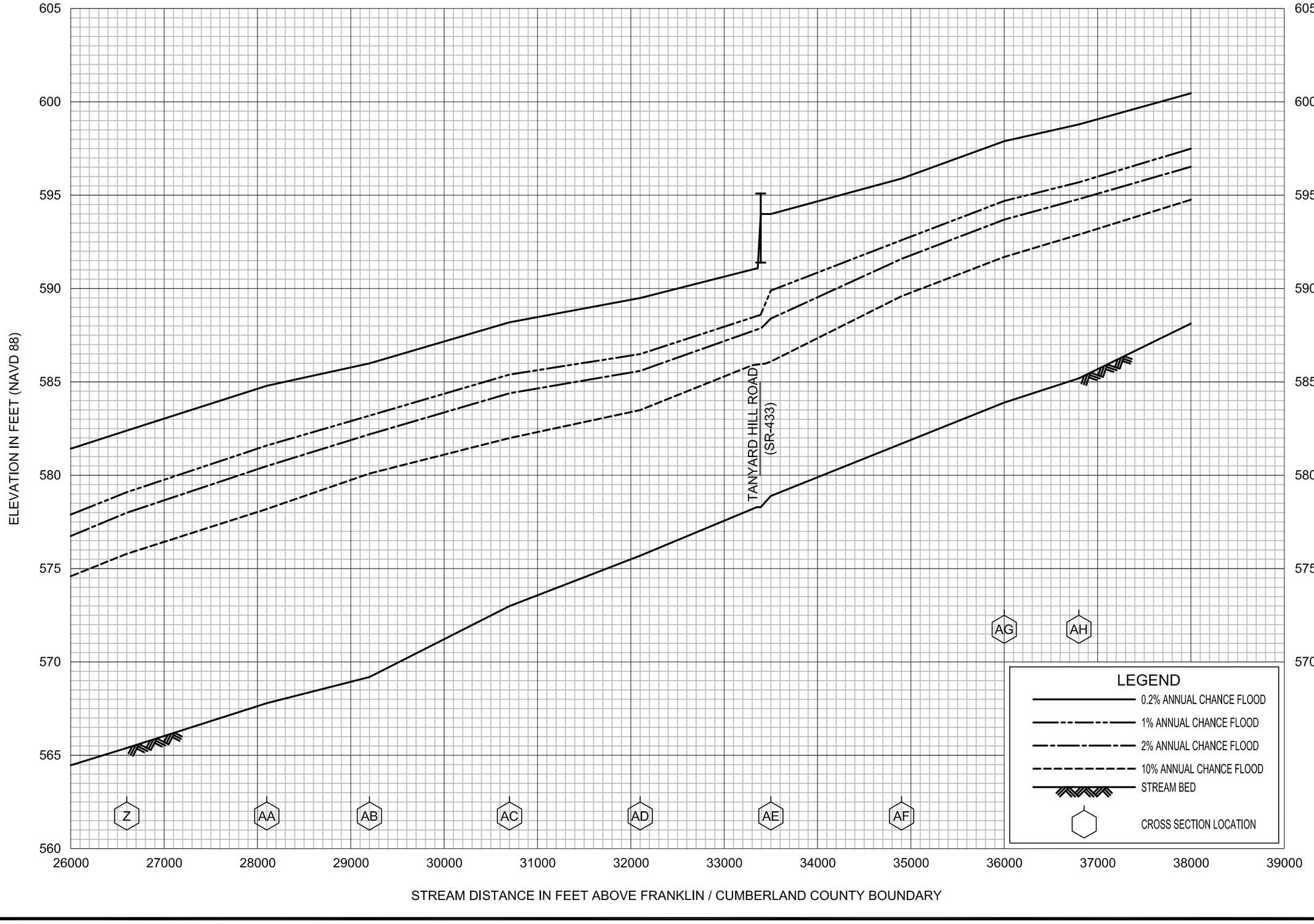
FLOOD PROFILES

CONODOGUINET CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)

29P



FLOOD PROFILES

CONODOGUINET CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

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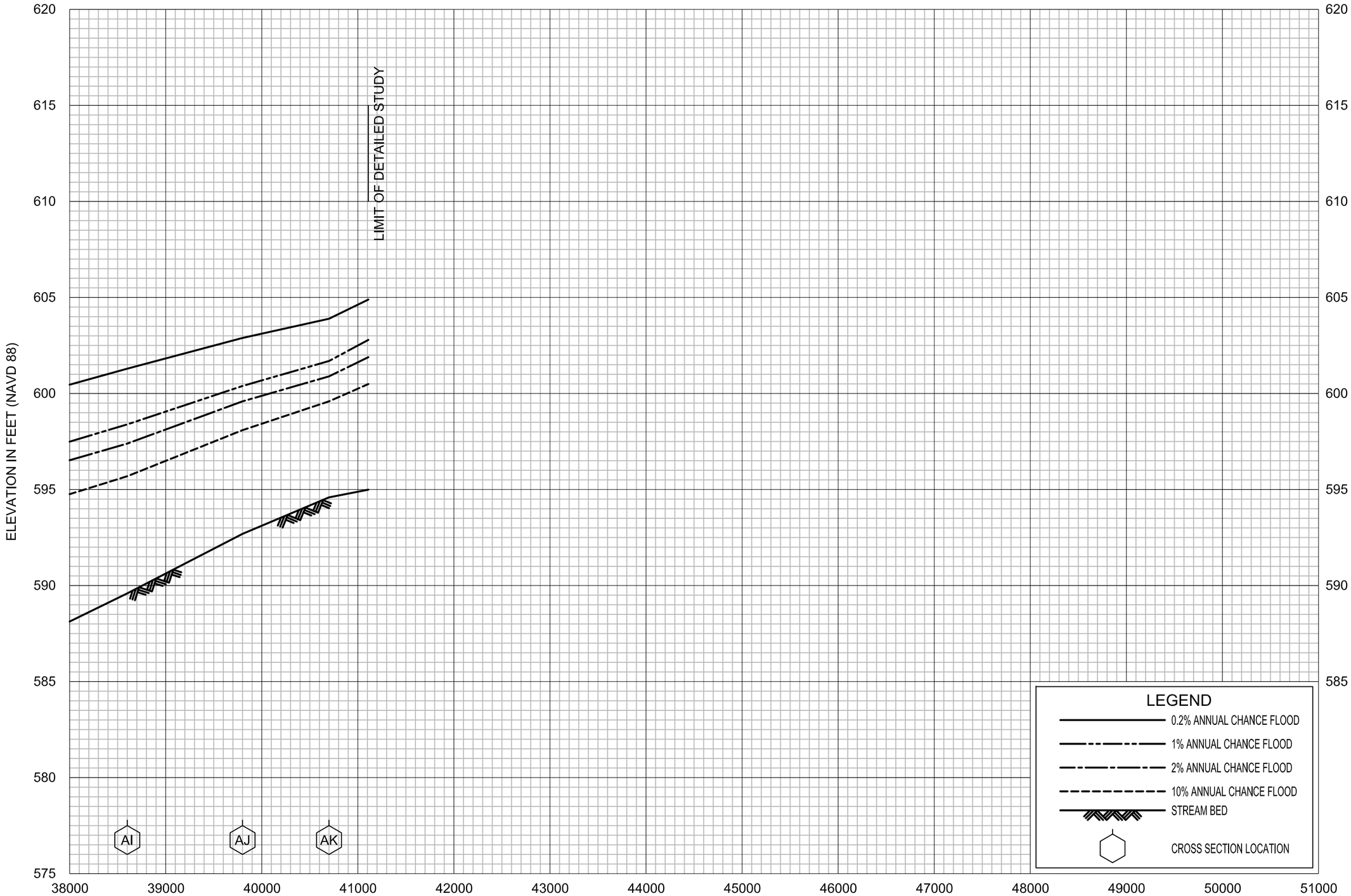


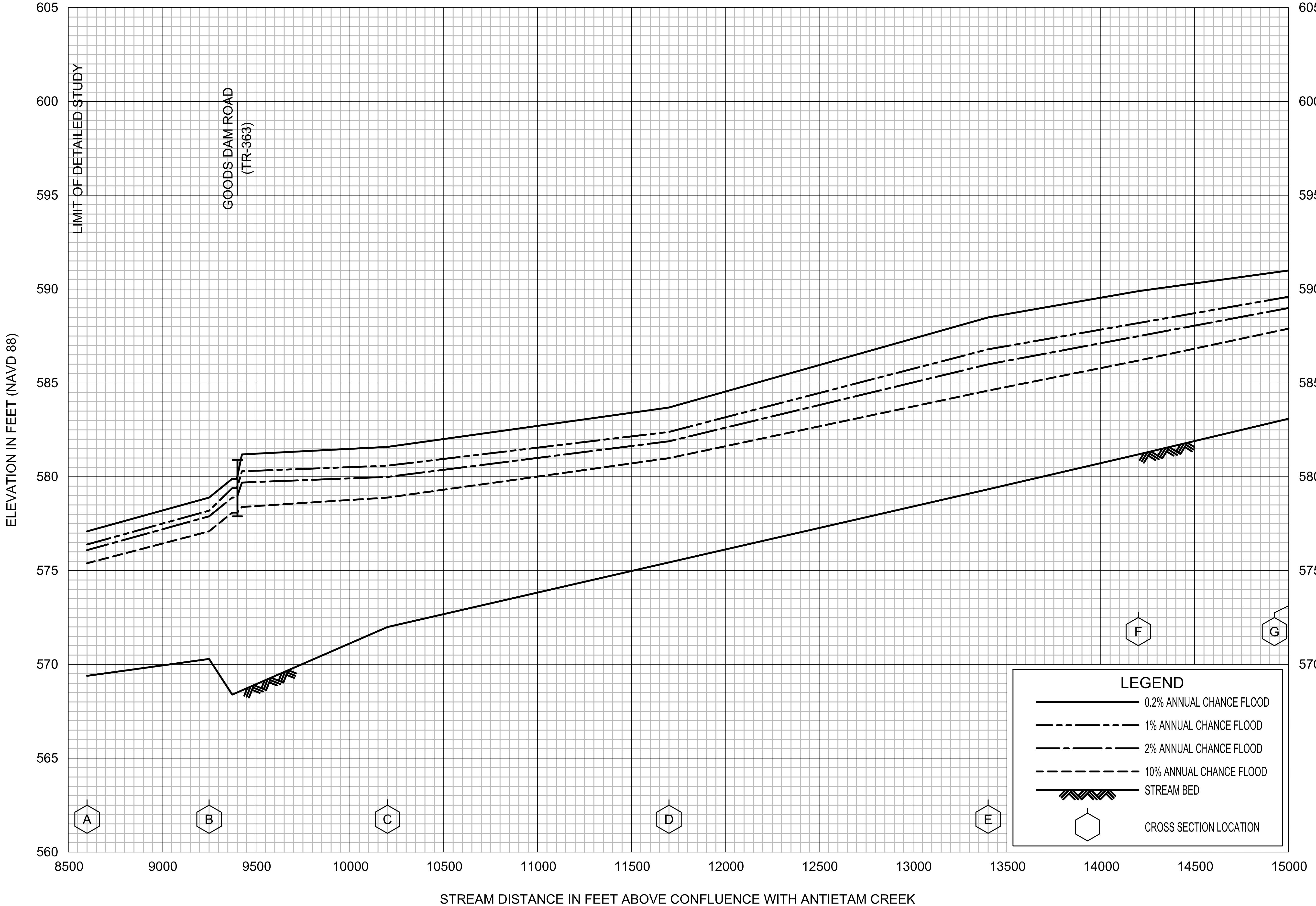
FLOOD PROFILES

CONODOGUINET CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



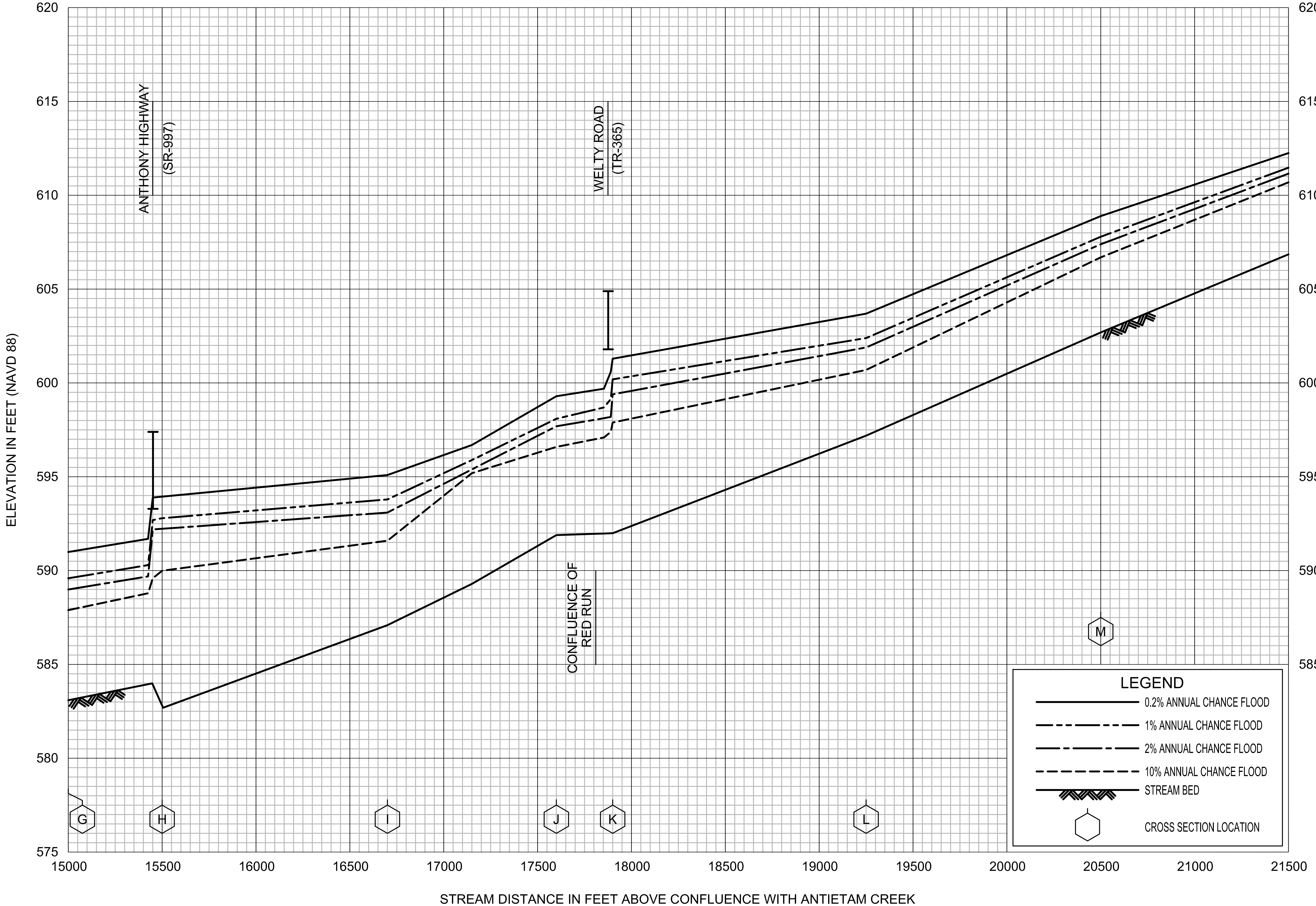
FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

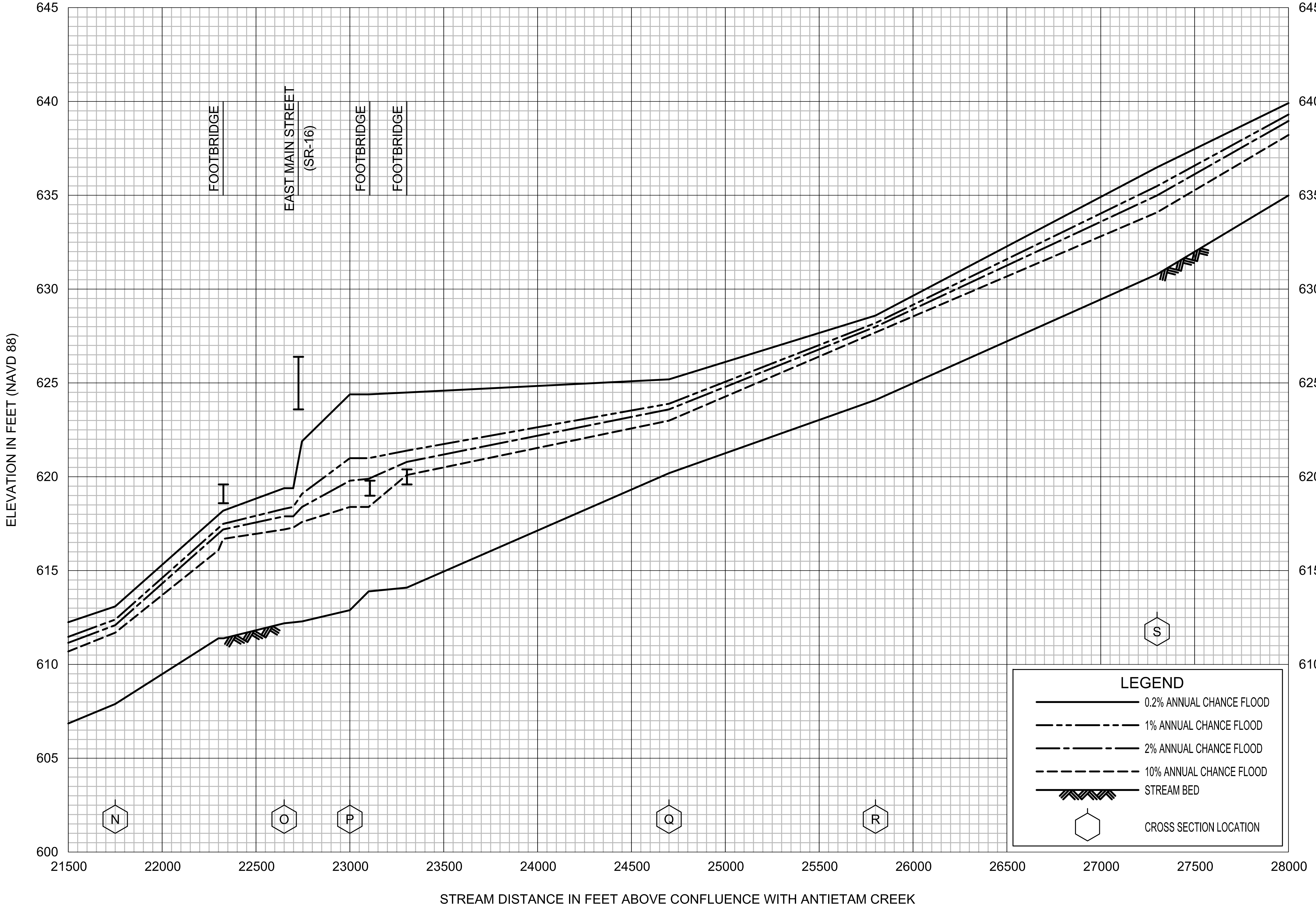


FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA (ALL JURISDICTIONS)

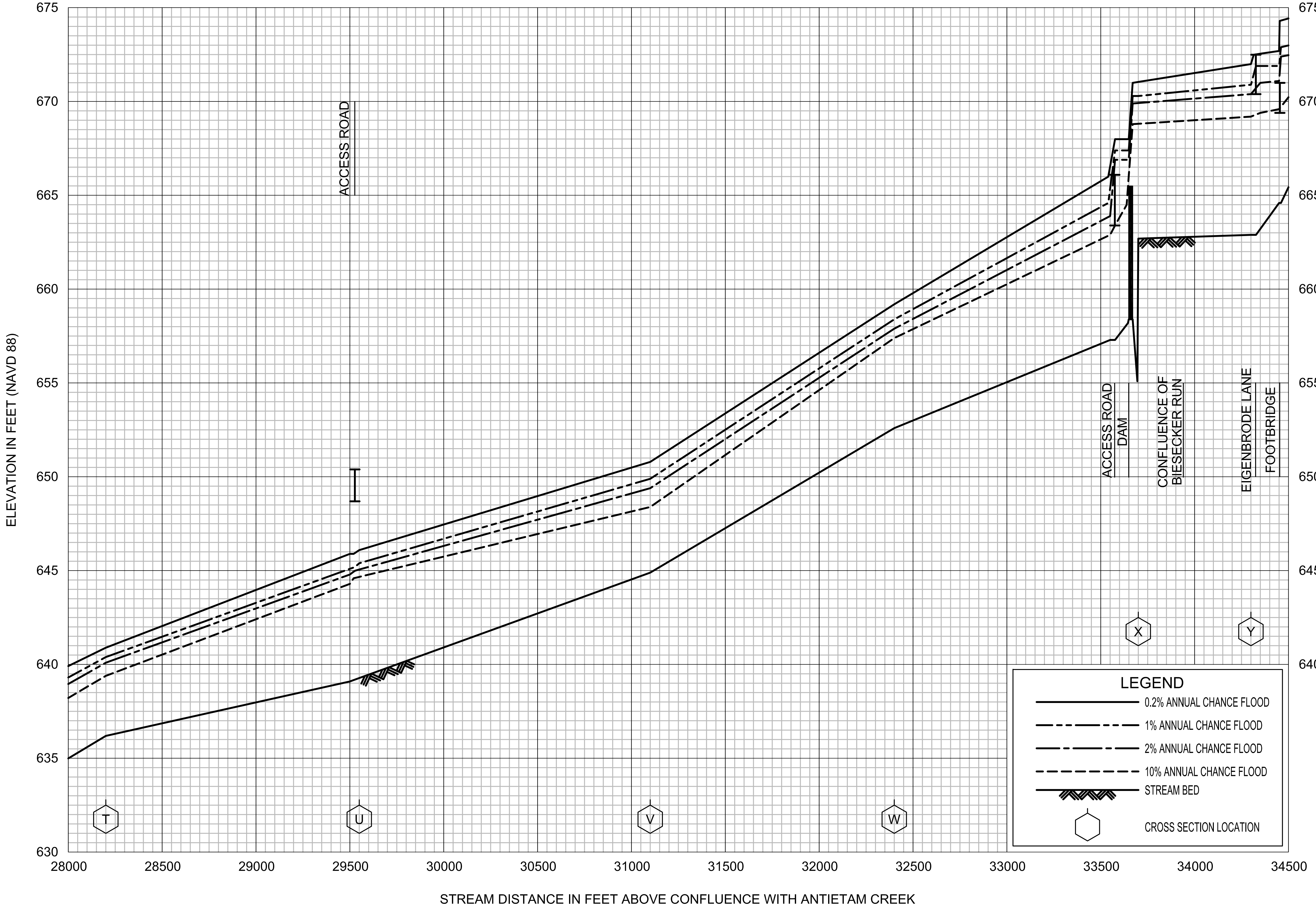


FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)

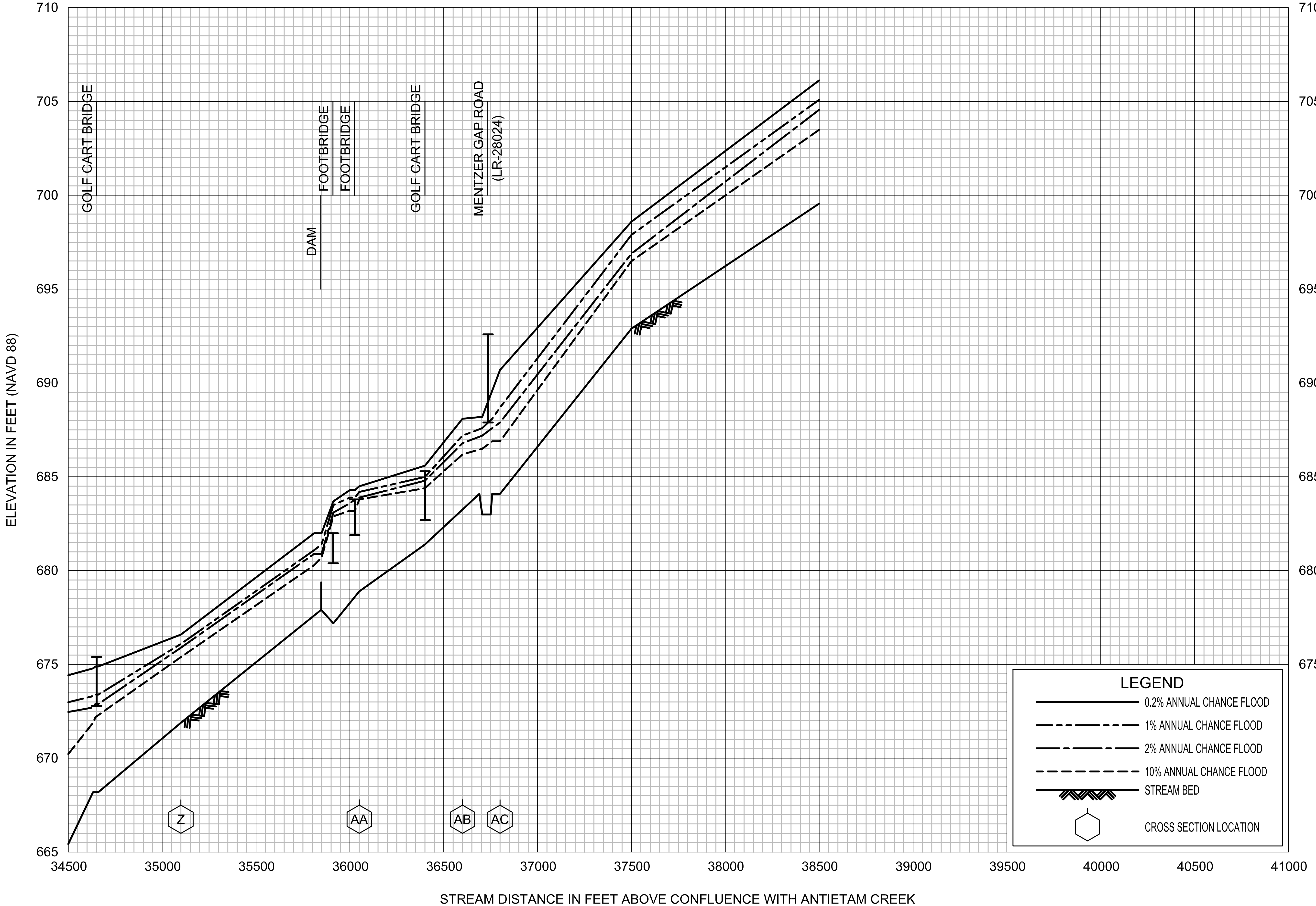


FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA
(ALL JURISDICTIONS)



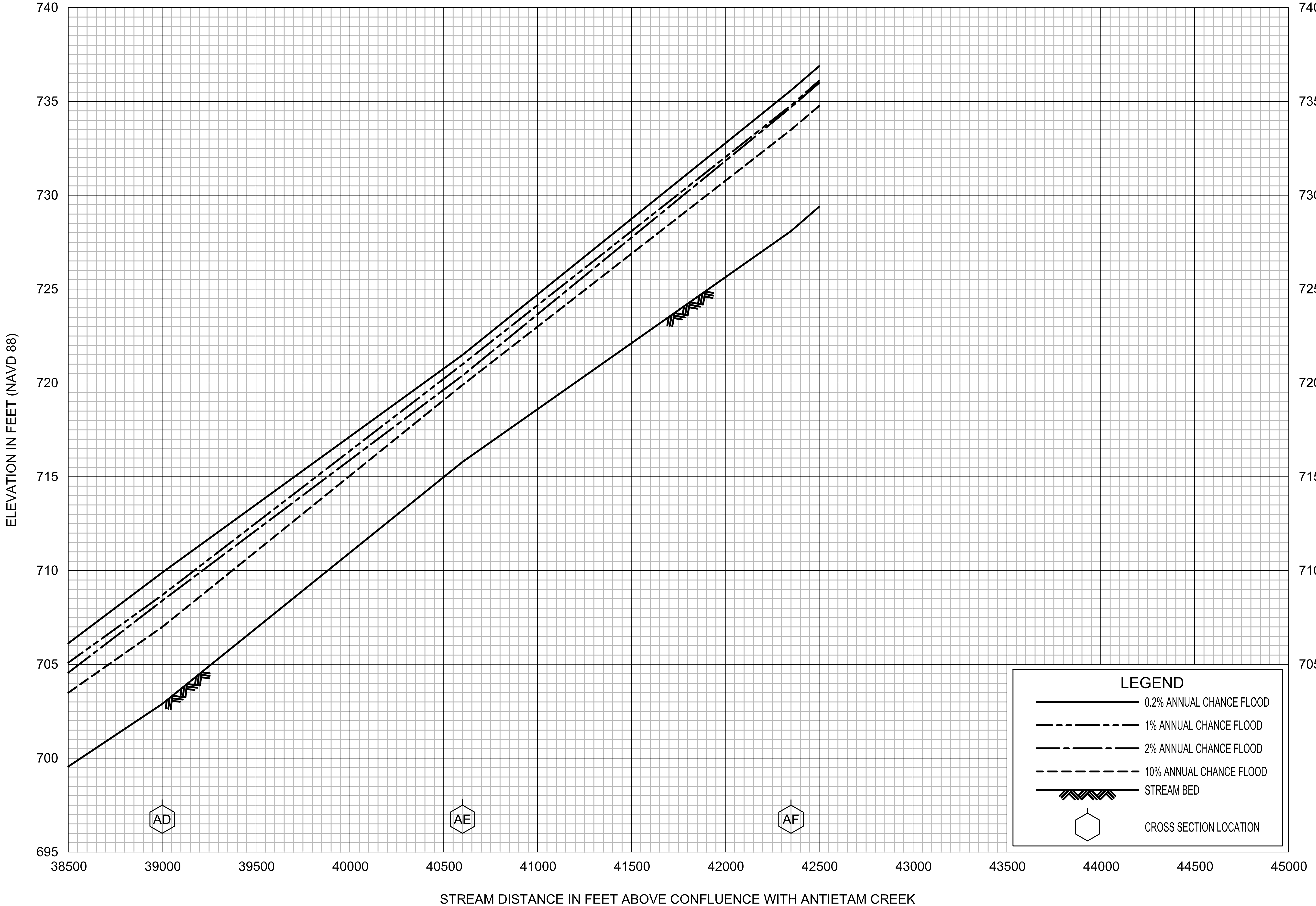
FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



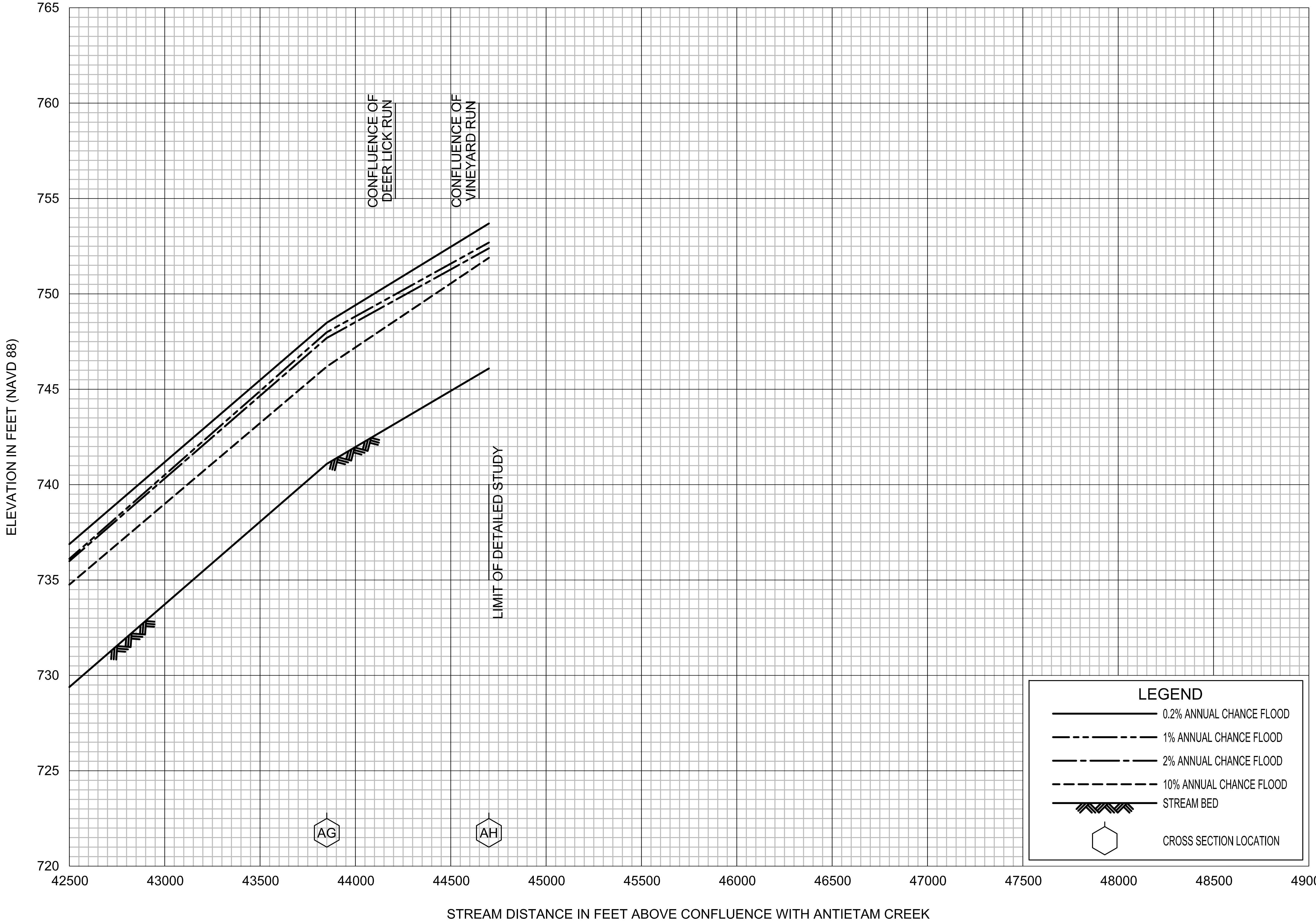
FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



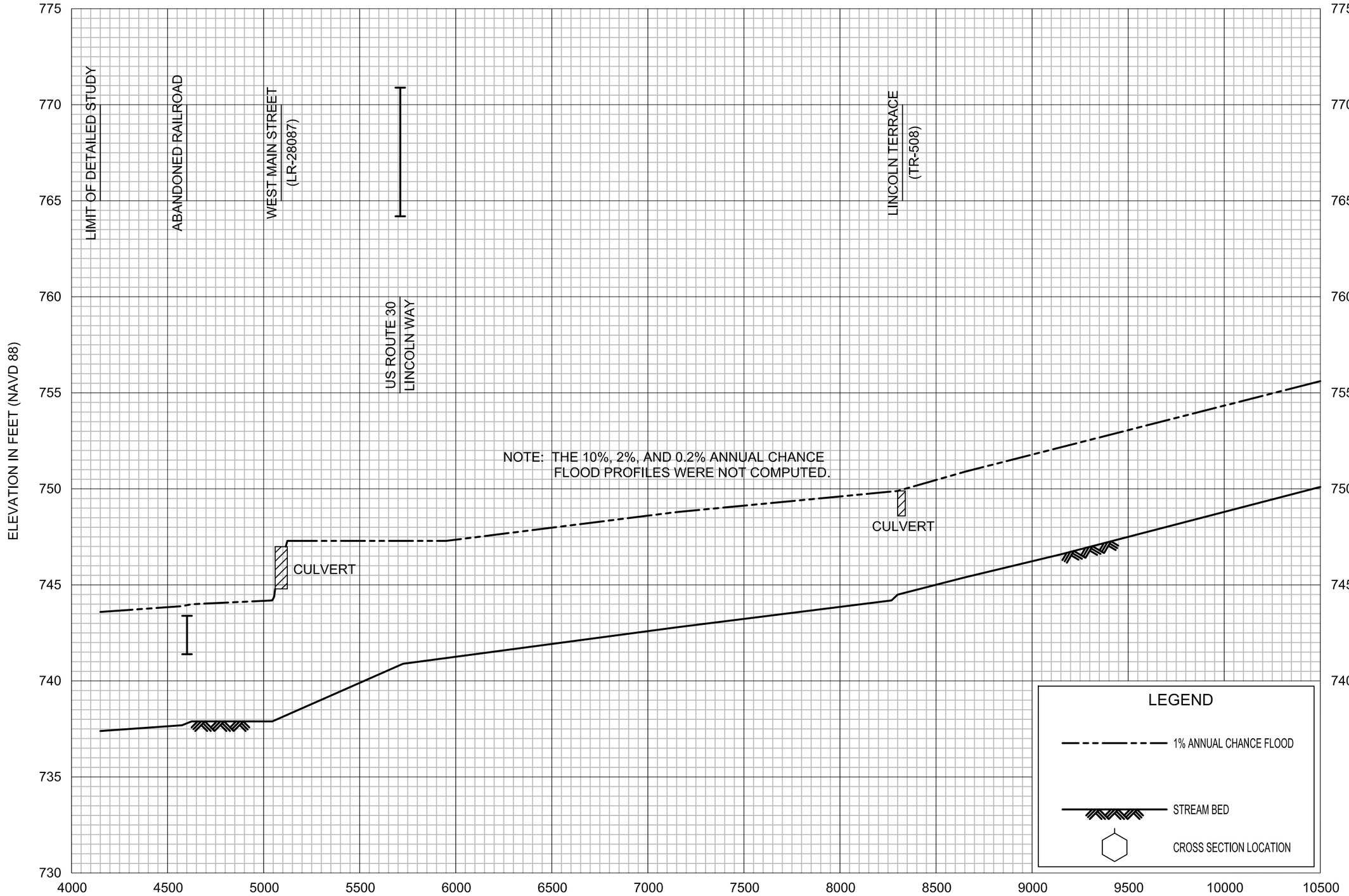
FLOOD PROFILES

EAST BRANCH ANTIETAM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



FLOOD PROFILES

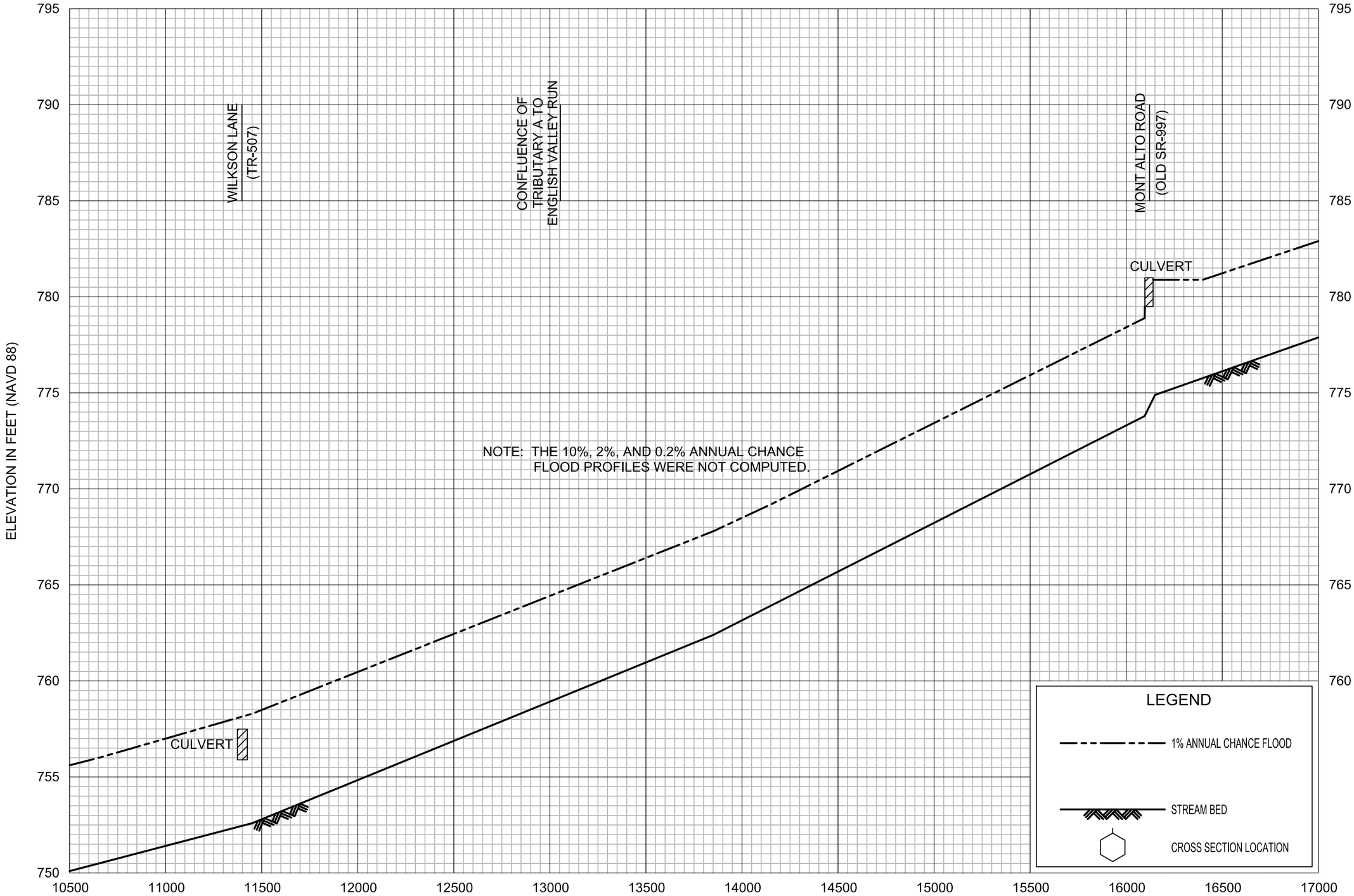
ENGLISH VALLEY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

39P



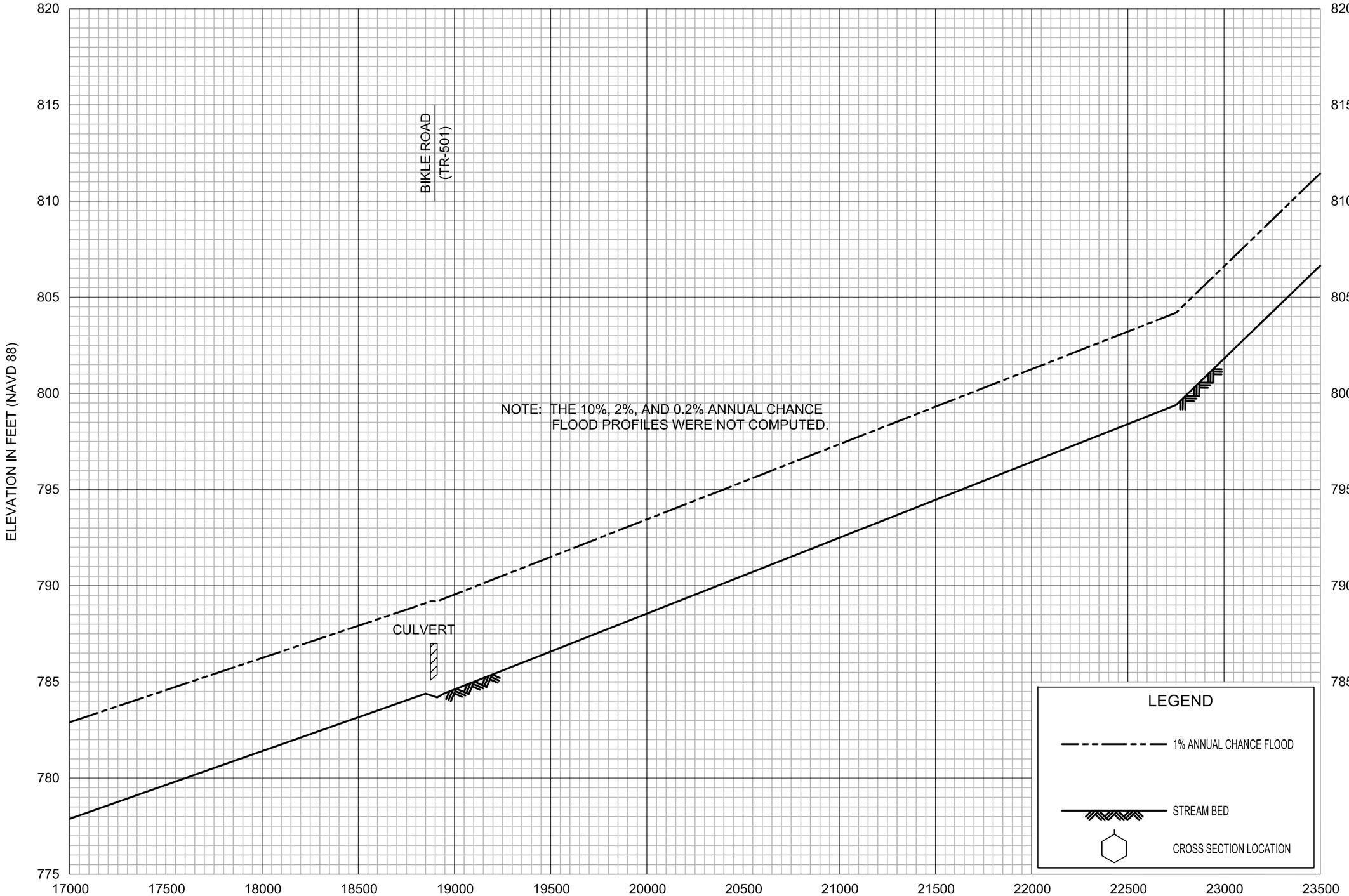
FLOOD PROFILES

ENGLISH VALLEY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)



FLOOD PROFILES

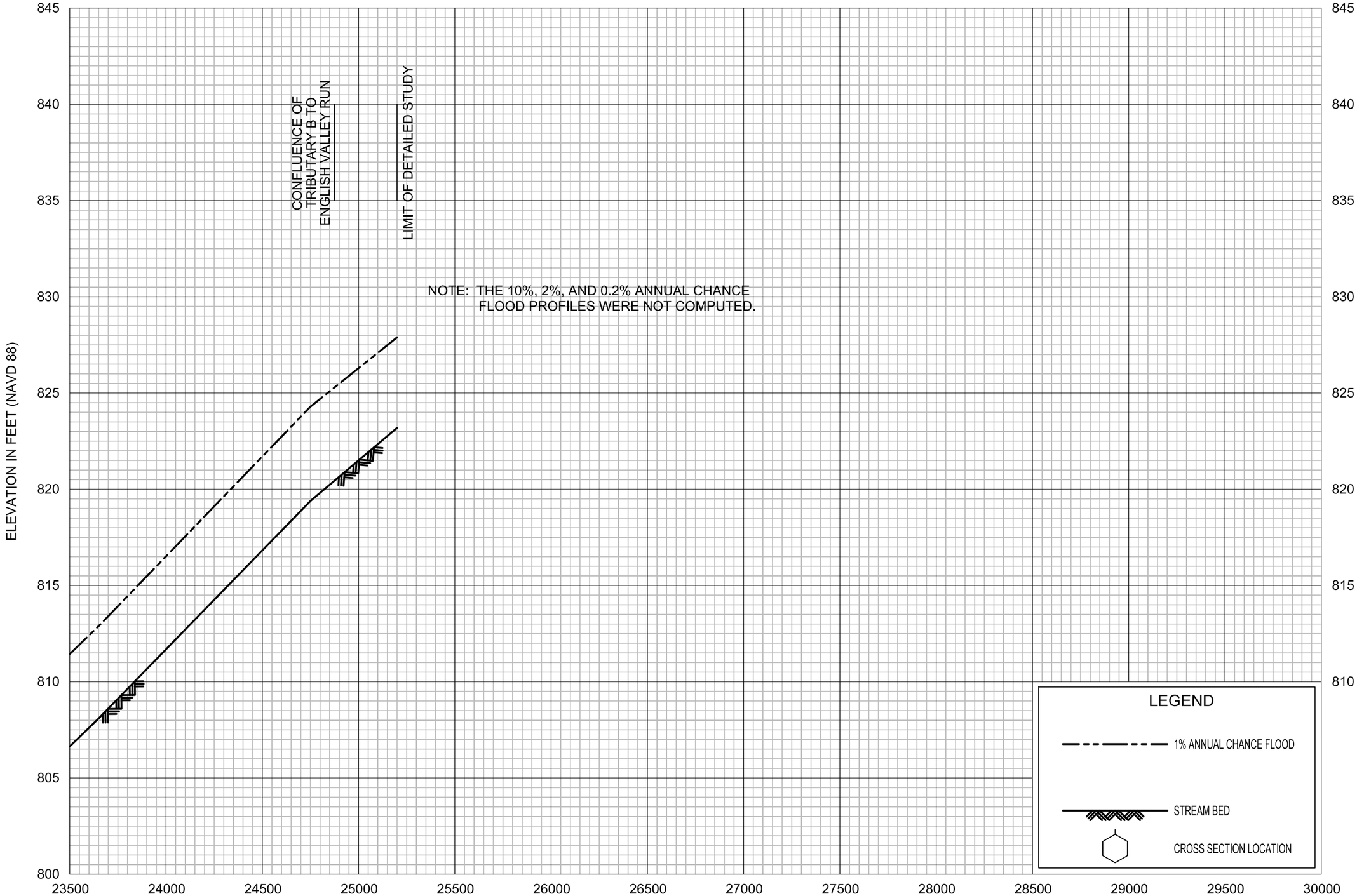
ENGLISH VALLEY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)

41P



FLOOD PROFILES

ENGLISH VALLEY RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

FRANKLIN COUNTY, PA

(ALL JURISDICTIONS)