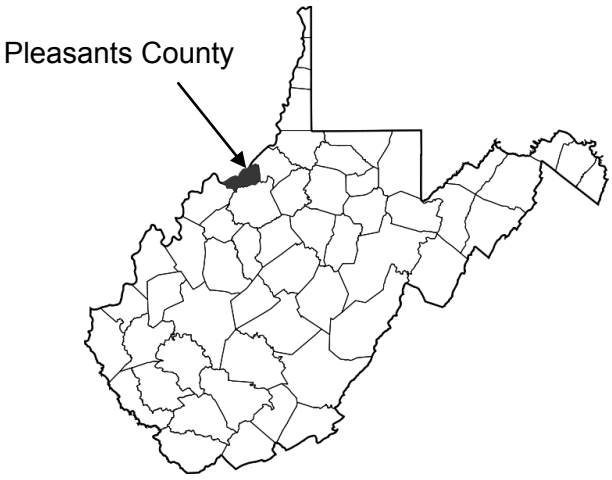
FLOOD INSURANCE STUDY

PLEASANTS COUNTY, WEST VIRGINIA
AND INCORPORATED AREAS



COMMUNITY NAME	COMMUNITY NUMBER
BELMONT, TOWN OF	540253
ST. MARYS, CITY OF	540156
PLEASANTS COUNTY (UNINCORPORATED AREAS)	540225

PRELMINARY
APRIL 30, 2012

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
54073CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) report may not contain all data available within the Community Map Repository. Please contact the Community Map Repository for any additional data.

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

Initial Countywide FIS Effective Date: June 3, 1991

Revised Countywide FIS Date: To Be Determined

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) report investigates the existence and severity of flood hazards in or revises and updates previous FIS/Flood Insurance Rate Maps (FIRMs) for, the geographic area of Pleasants County, West Virginia, including the Cities of St. Marys and of Belmont, and the Unincorporated Areas of Pleasants County (herein referred to collectively as Pleasants County).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood-risk data for various areas of the community that will be used to establish actuarial flood insurance rates and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State or other jurisdictional agency will be able to explain them.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the 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 sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

Information on the authority and acknowledgements for the previously printed FISs and FIRMs for Pleasants County was compiled, and is shown below.

Pleasants County and Incorporated Areas	The hydrologic and hydraulic analyses, for the June 3, 1991 study, were prepared by the U.S. Geological Survey (USGS) for the FEMA, under Inter-Agency Agreement No. EMW-87-E-2512. This work was completed in September 1988 (Reference 1).

For this countywide FIS, new hydraulic analysis was performed on the Ohio River using topographic data flown in 1998 and 2000. These revisions were prepared by the U.S. Army Corps of Engineers (USACE), Huntington District, for FEMA, under Inter-Agency Agreement No. HSFE03-05-X-008. This work was completed in 2007.

Under Joint Venture Contract No. EMP-2003-CO-2606, GG3 (Greenhorne & O'Mara, Inc.) used the revised USACE hydraulic analysis along parts of the Ohio River to delineated new floodplains based upon topographic data flown in 1998 and 2000. The remainder of Pleasants' flood hazard information was digitized from effective FIRMs. This work was completed in 2012.

Base map information shown on the FIRM was provided by West Virginia Statewide Addressing and Mapping Board (SAMB) and U.S. Geological Survey. Imagery was captured at a scale of 1:28,800 in the Spring of 2003 for the purpose of producing natural color digital orthophotos at a two-foot pixel resolution.

The projection used in the preparation of this map is Universal Transverse Mercator (UTM) Zone 17, and the horizontal datum used is North American Datum of 1983 (NAD 83), GRS1980 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude referenced to UTM, NAD83. Differences in the datum, spheroid, projection, or UTM zones used in the production of FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of the information shown on the FIRM.

1.3 Coordination

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

The initial and final meeting dates for the previous FIS report for Pleasants County is listed in Table 1, "Initial and Final CCO Meetings."

Table 1 – Initial and Final CCO Meetings

COMMUNITY NAME	INITIAL MEETING	FINAL MEETING
Pleasants County and Incorporated Areas	May 21, 1986	April 18, 1990

For this revised countywide FIS, the final CCO meeting was held on _____, and attended by representatives of _____. All problems raised at that meeting have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Pleasants County, West Virginia, including incorporated communities listed in Section 1.1.

Table 2, "Flooding Sources Studied by Detailed Methods," lists the streams that were studied by detailed methods. Limits of Detailed Study are indicated on the Flood Profiles (Exhibit 1).

Table 2 – Flooding Sources Studied by Detailed Methods

Middle Island Creek
Ohio River

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development or proposed construction.

Table 3, "Flooding Sources Studied by Approximate Methods," lists the streams that were studied by approximate methods.

Table 3 – Flooding Sources Studied by Approximate Methods

Bull Creek	McKim Creek
French Creek	Sugar Creek

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

2.2 Community Description

Pleasants County is located in the northwestern portion of West Virginia, along the Ohio River. It is bordered by Washington County, Ohio, to the west; Tyler County, West Virginia to the east; Ritchie County, West Virginia to the southeast; and Wood County, West Virginia to the southwest. The population of Pleasants County was 7,605 in 2010 (Reference 2). The City of St. Marys is the county seat.

Pleasants County occupies approximately 134.6 square miles (Reference 3). The climate of Pleasants County is typical of the central temperate zone, having highly variable temperatures and non-seasonal precipitation which varies. The mean annual temperature is 53 degrees Fahrenheit (°F), with mean temperatures of 20°F in January and 85°F in July. The highest recorded temperature was 104°F in July 1988 and the lowest recorded temperature was -24°F in January 1994. Yearly precipitation averages 42 inches, with the maximum monthly averages occurring in July with approximately 4.42 inches of rain, and an annual snowfall of 21 inches (References 4 and 5). Approximately 90 days of the year have 0.1 inch or more of precipitation.

2.3 Principal Flood Problems

Portions of Pleasants County along the Ohio River are subject to periodic flooding. Most flooding occurs during the period from January through April as a result of snowmelt and spring rains over the 27,000-square mile drainage basin.

Major floods occurred in 1913 and 1936. The water level at St. Marys on March 29, 1923 was 631.1 feet. Observations of water level have been kept at St. Marys since approximately 1884 and at other Ohio River locations since 1762 (Reference 6).

The lower portion of Middle Island Creek in Pleasants County receives flooding as backwater from the Ohio River. The upper portion of Middle Island Creek reaches bank-full stages several times per year due to high-intensity storms, but frequency and damage are minimal.

2.4 Flood Protection Measures

There are no structural flood protection measures on the flooding sources studied in Pleasants County. However, the USACE operates approximately 30 reservoirs for flood control and other purposes in Ohio basin above Pleasants County. The combined functions considerably reduce flood heights on the Ohio River in the County. Water levels on the Ohio River are controlled by the Willow Island Locks and Dam, located within the County at river mile 161.7; and Belleville Locks and Dam, approximately 40 miles downstream (Reference 6). The Ohio River locks and dams are for navigational purposes only, and have only minimal effect on flood levels.

3.0 ENGINEERING METHODS

For the flooding sources studied by detailed methods in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent-annual-chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance (100-year) flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied by detail methods affecting the communities

within Pleasants County. Information on the methods used to determine the peak discharge-frequency relationships for each flooding source studied by detailed methods is shown below.

Countywide Analysis (June 3, 1991)

The Ohio River has a stream gage that would normally be used to provide peak discharges for use in this study. However, since the Ohio River is subject to significant regulation, statistical analysis for this gage would not produce satisfactory results for a realistic flood calculation. In the case of the Ohio River, flood-flow peaks for the selected recurrence interval were taken from the Flood Insurance for the Unincorporated Areas of Washington County, Ohio (Reference 7).

For Middle Island Creek, hydrologic analyses were performed using methods described in USGS Open-File Report 80-1218 (Reference 8). These procedures provide a method to calculate the peak flood discharges for storms of selected recurrence intervals using regression exponents for significant hydrologic and basin characteristics. These were developed by regional analysis using multiple regression techniques and data from stream gages in areas of similar hydrologic characteristics (Reference 8). Since hydrologic calculations for ungaged streams are based on streamflow records, they include consideration of both rainfall and snowmelt conditions, and provide adequate consideration for multiple events.

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Peak flood flows for the Ohio River, as estimated by the USACE (Reference 9), are based on the statistical analysis of observed annual peak discharge, adjusted to account for flood control storage and throughout the river basin.

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 4, "Summary of Discharges".

Table 4 – Summary of Discharges

		PEAK DISCHARGES (cfs)			
FLOODING SOURCE AND LOCATION	**DRAINAGE AREA (sq. miles)**	**10-Percent-Annual-Chance**	**2-Percent-Annual-Chance**	**1-Percent-Annual-Chance**	**0.2-Percent-Annual-Chance**
MIDDLE ISLAND CREEK					
At Little	458	*	*	29,000	*
At Arvilla	482	*	*	30,000	*
OHIO RIVER					
At river mile 157	26,934	312,000	395,000	432,000	515,000
At river mile 147.76	26,371	310,000	393,000	430,000	513,000

* 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 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. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS 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). Unless specified otherwise, 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 (NAVD88).

Countywide Analyses (June 3, 1991)

Cross sections for the backwater analyses of the State Route 7 bridge over Middle Island Creek at Arvilla were obtained by field methods, including the below-water portion of the sections and bridge geometry. The railroad bridge and State Route 2 bridge at the confluence of Middle Island Creek and the Ohio River would have no significant effect on water-surface elevations on Middle Island Creek; therefore, they are not included in the calculations.

Water-surface elevations for Middle Island Creek were calculated using the USGS WSPRO step-backwater computer program (Reference 10).

The 1-percent-annual-chance profile for the Ohio River was taken from the FIS for the Unincorporated Areas of Washington County, Ohio (Reference 7).

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were estimated by engineering judgment and based on field observation at each cross-section and adjusted with known high-water marks and stream gage rating curves where possible. Table 5, "Manning's "n" Values", shows the channel and overbank "n" values for the streams studied by detailed methods.

Table 5 – Manning's "n" Values

Stream	Channel	Overbank
Middle Island Creek	0.040 – 0.044	0.032 – 0.041
Ohio River	0.020 – 0.080	0.040 – 0.080

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Ohio River water surface elevations were computed through the use of the HEC-RAS computer program (Reference 11).

Cross sections for the profile and floodway analyses of the Ohio River were determined at approximately one-quarter of a mile interval. The overbank geometry was developed from Belleville pool and Washington County reach maps dated 1999, provided by the USACE, at a scale of 1:3,600, and a contour interval of 5 feet (Reference 12). The channel geometry was obtained from river soundings completed by the USACE during the summer of 1997.

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

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 abutment)

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

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

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

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 at 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 purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with 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 used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the NAVD88, many FIS reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

For this revised countywide FIS, all flood elevations shown in the FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community, must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced in NGVD29. This may result in differences in base flood elevations across corporate limits between communities.

As noted above, the elevations shown in the FIS report and on the FIRM for Pleasants County are referenced to NAVD88. Ground, structure and flood elevations may be compared and/or referenced to NGVD29 by applying a standard conversion factor. The conversion factor from NGVD29 to NAVD88 for Pleasants County is **-0.550** feet. 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 benchmarks are referenced to NAVD88.

Conversion locations and values for Pleasants County are shown below in Table 6, "Vertical Datum Conversion Values."

Table 6 – Vertical Datum Conversion Values

USGS 7.5-Minute Quadrangle Name	Corner	Longitude (Decimal Degrees)	Latitude (Decimal Degrees)	Conversion from NGVD29 to NAVD88 (foot)
Belmont	SE	39.375	-81.250	-0.535
Bens Run	SE	39.375	-81.000	-0.561
Marietta	SE	39.375	-81.375	-0.551
Raven Rock	SE	39.375	-81.125	-0.541
Willow Island	SE	39.250	-81.250	-0.558
			AVERAGE	**-0.550 feet**

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 NGVD29 should apply the conversion factor (+0.618 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.

NAVD88 = NGVD29 + conversion factor

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

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

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each FIS provides 1-percent-annual-chance (100-year) flood elevations and delineations of the 1- and 0.2-percent-annual-chance (500-year) floodplain boundaries and 1-percent-annual-chance floodway to assist communities in developing floodplain management measures. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 13).

For the Ohio River, the boundaries were delineated in a GIS environment using high resolution topographic data created in 2003 for the state of West Virginia (Reference 14).

For streams studied by approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 2). The boundary of the 1-percent-annual-chance floodplain was delineated using the topographic maps referenced above and the previous FIS for the Unincorporated Areas of Pleasants County (Reference 15).

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local

communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS report and on the FIRM were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections Table 7, "Floodway Data Table". 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.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage and heightens potentials flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 7, "Floodway Data Table". To reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

The area between the floodway and 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the Water Surface Elevation (WSEL) of the 1-percent-annual-chance flood more than 1-foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic".

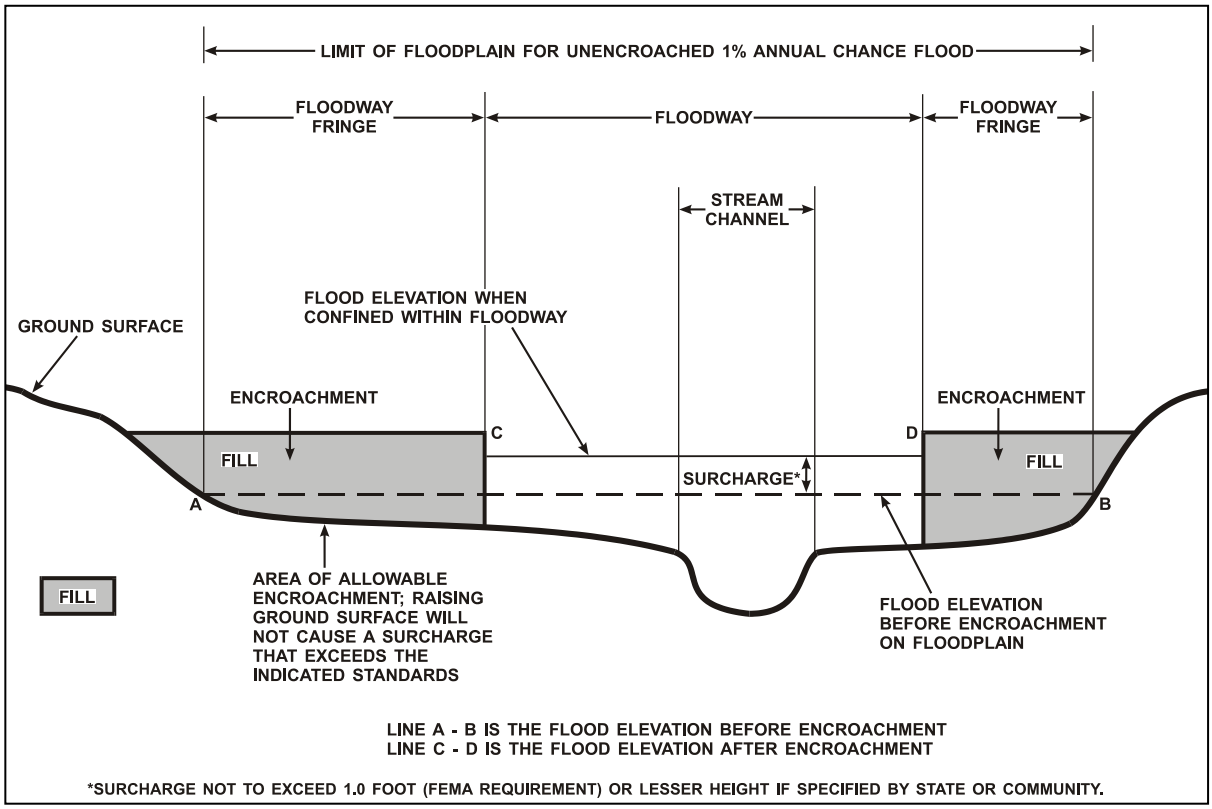


Figure 1 – Floodway Schematic

No floodways were computed for Middle Island Creek.

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER								
A	164.73	1,705	76,957	5.6	619.4	620.3	620.3	0.9
B	164.50	1,465	67,755	6.4	619.4	620.3	620.3	0.9
C	164.26	1,357	63,796	6.8	619.5	620.3	620.3	0.9
D	164.04	1,438	67,743	6.4	619.7	620.6	620.6	0.9
E	163.72	1,403	64,202	6.8	619.8	620.7	620.7	0.9
F	163.52	1,433	63,848	6.8	619.9	620.8	620.8	0.9
G	163.25	1,361	66,747	6.5	620.1	621.0	621.0	0.9
H	163.00	1,358	69,887	6.2	620.3	621.2	621.2	0.9
I	162.76	1,395	70,945	6.1	620.4	621.3	621.3	0.9
J	162.51	1,399	69,858	6.2	620.5	621.4	621.4	0.9
K	162.25	1,397	72,603	6.0	620.7	621.5	621.5	0.9
L	162.00	1,524	77,951	5.6	620.8	621.7	621.7	0.9
M	161.50	1,543	65,844	6.6	621.1	622.0	622.0	0.9
N	161.25	1,470	66,257	6.5	621.2	622.1	622.1	0.9
O	160.98	1,597	70,553	6.1	621.4	622.3	622.3	0.9
P	160.77	1,606	73,254	5.9	621.5	622.4	622.4	0.9
Q	160.52	1,556	73,852	5.9	621.6	622.5	622.5	0.9
R	160.24	1,846	79,115	5.5	621.9	622.7	622.7	0.9
S	160.04	2,019	81,029	5.3	622.0	622.9	622.9	0.9

[1] Stream distance in miles below Pittsburgh, Pennsylvania

[2] Width extends beyond County boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (CONTINUED)								
T	159.75	1,866	84,005	5.1	622.2	623.1	623.1	0.9
U	159.50	1,613	76,522	5.7	622.3	623.1	623.1	0.8
V	159.25	1,759	79,184	5.5	622.4	623.3	623.3	0.9
W	159.14	1,906	79,393	5.4	622.5	623.3	623.3	0.9
X	159.00	2,135	85,732	5.0	622.6	623.5	623.5	0.9
Y	158.81	2,491	92,239	4.7	622.8	623.7	623.7	0.9
Z	158.53	2,724	102,566	4.2	623.0	623.8	623.8	0.9
AA	158.27	2,559	96,742	4.5	623.1	623.9	623.9	0.9
AB	158.00	1,977	73,726	5.9	623.1	624.0	624.0	0.9
AC	157.79	1,240	61,926	7.0	623.2	624.0	624.0	0.8
AD	157.51	1,104	59,135	7.3	623.4	624.2	624.2	0.8
AE	157.28	1,319	68,127	6.3	623.7	624.6	624.6	0.8
AF	157.00	1,438	73,469	5.9	623.9	624.8	624.8	0.9
AG	156.80	1,283	68,012	6.4	624.0	624.8	624.8	0.8
AH	156.48	1,103	59,315	7.3	624.0	624.9	624.9	0.9
AI	156.23	1,121	59,256	7.3	624.2	625.1	625.1	0.9
AJ	156.00	1,119	56,658	7.6	624.4	625.2	625.2	0.9
AK	155.75	1,150	60,044	7.2	624.6	625.4	625.4	0.8

[1] Stream distance in miles below Pittsburgh, Pennsylvania

[2] Width extends beyond County boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (CONTINUED)								
AL	155.51	1,345	65,138	6.6	624.8	625.6	625.6	0.8
AM	155.36	1,337	67,013	6.5	624.9	625.7	625.7	0.8
AN	155.34	1,337	66,398	6.5	624.9	625.7	625.7	0.8
AO	155.26	1,421	70,037	6.2	625.0	625.8	625.8	0.9
AP	155.11	1,390	66,081	6.5	625.0	625.8	625.8	0.8
AQ	155.02	1,479	64,610	6.7	625.0	625.8	625.8	0.9
AR	154.79	2,003	67,910	6.3	625.1	626.0	626.0	0.9
AS	154.54	2,577	72,338	5.9	625.2	626.0	626.0	0.9
AT	154.27	3,000	81,334	5.3	625.5	626.3	626.3	0.9
AU	154.00	2,916	79,265	5.4	625.5	626.4	626.4	0.8
AV	153.75	2,904	81,029	5.3	625.7	626.5	626.5	0.8
AW	153.45	3,061	85,417	5.0	625.8	626.7	626.7	0.8
AX	153.22	2,934	86,913	5.0	625.9	626.8	626.8	0.8
AY	153.00	2,618	84,816	5.1	626.0	626.8	626.8	0.8
AZ	152.76	2,036	77,438	5.6	626.0	626.9	626.9	0.8
BA	152.53	1,239	62,535	6.9	626.1	626.9	626.9	0.8
BB	152.27	1,361	67,429	6.4	626.3	627.1	627.1	0.8

[1] Stream distance in miles below Pittsburgh, Pennsylvania

[2] Width extends beyond County boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (CONTINUED)								
BC	152.15	1,674	73,670	5.8	626.4	627.3	627.3	0.8
BD	152.00	2,096	79,953	5.4	626.6	627.4	627.4	0.8
BE	151.76	2,373	87,347	4.9	626.7	627.5	627.5	0.8
BF	151.62	2,239	84,521	5.1	626.7	627.5	627.5	0.8
BG	151.50	2,075	93,061	4.6	626.8	627.6	627.6	0.8
BH	151.25	1,594	74,097	5.8	626.7	627.5	627.5	0.8
BI	151.00	1,461	69,131	6.2	626.9	627.6	627.6	0.8
BJ	150.74	1,328	66,701	6.5	627.0	627.8	627.8	0.8
BK	150.51	1,216	65,102	6.6	627.1	627.9	627.9	0.8
BL	150.22	1,300	66,311	6.5	627.3	628.1	628.1	0.8
BM	150.00	1,312	64,536	6.7	627.4	628.2	628.2	0.8
BN	149.83	1,422	68,340	6.3	627.5	628.3	628.3	0.8
BO	149.49	1,116	57,675	7.5	627.5	628.3	628.3	0.8
BP	149.25	1,082	57,950	7.4	627.6	628.4	628.4	0.8
BQ	149.00	1,337	69,730	6.2	627.9	628.7	628.7	0.8
BR	148.68	1,400	69,054	6.2	627.9	628.8	628.8	0.8
BS	148.54	1,390	71,610	6.0	628.0	628.9	628.9	0.8

[1] Stream distance in miles below Pittsburgh, Pennsylvania

[2] Width extends beyond County boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD88)	WITHOUT FLOODWAY (FEET NAVD88)	WITH FLOODWAY (FEET NAVD88)	INCREASE (FEET)
OHIO RIVER (CONTINUED)								
BT	148.27	1,363	69,386	6.2	628.1	628.9	628.9	0.8
BU	147.96	1,400	69,274	6.2	628.2	629.0	629.0	0.8
BV	147.79	1,474	75,588	5.7	628.3	629.1	629.1	0.8
BW	147.51	1,530	75,189	5.7	628.4	629.2	629.2	0.8
BX	147.28	1,522	74,313	5.8	628.4	629.2	629.2	0.8
BY	147.00	1,421	72,690	5.9	628.5	629.3	629.3	0.8

[1] Stream distance in miles below Pittsburgh, Pennsylvania

[2] Width extends beyond County boundary

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

FLOODWAY DATA

OHIO RIVER

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

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

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. 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 rate zone that corresponds to 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 rate zone that corresponds to 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 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 base 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 rate 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 rate 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 rate 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 rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1-foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile (sq. mi.), and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

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

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent-annual-chance floodplains, floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The current FIRM presents flooding information for the geographic area of Pleasants County. Previously, separate Flood Boundary and Floodway Maps (FBFMs) and/or FIRMs, were prepared for each incorporated community with identified flood hazard areas. Historical map dates relating to pre-countywide maps prepared for each community are presented in Table 8, “Community Map History”.

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Belmont, City of	February 21, 1975	None	June 3, 1991	
St. Marys, City of	March 29, 1974	January 2, 1976	June 3, 1991	
Pleasants County (Unincorporated Areas)	January 3, 1975	None	June 3, 1991	

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Pleasants County has been compiled into this revised countywide FIS. Therefore, this FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

FISs have been prepared for the following communities Ritchie, Tyler, and Wood Counties, West Virginia, and Incorporated Areas (Reference 16, 17 and 18) and Washington County, Ohio and Incorporated Areas (Reference 19).

8.0 LOCATION OF DATA

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

9.0 BIBLIOGRAPHY AND REFERENCES

1. Federal Emergency Management Agency, Flood Insurance Study, Pleasants County (Incorporated Areas), Pleasants County, West Virginia, Washington, D.C., June 3, 1991.

2. U.S. Census Bureau, 2010 U.S. Census: Pleasants County, West Virginia. Retrieved on March 27, 2012 from http://2010.census.gov/

3. Willis, Todd C., West Virginia Blue Book – 1984, Charleston, West Virginia, December 1984.

4. The Weather Channel, Monthly Averages for Pleasants County, West Virginia. Retrieved on September 14, 2010 from http://www.weather.com.

5. U.S. department of Commerce, National Oceanic and Atmospheric Administration, No. 81, Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1951-1980, Asheville, North Carolina, National Climatic Center, September 1982.

6. U.S. Army Corps of Engineers, Huntington District, Flood Plain Information: Ohio River/Pleasants County, West Virginia, December 1974.

7. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Unincorporated Areas of Washington County, West Virginia, Washington, D.C., February 18, 1981.

8. U.S. Department of the Interior, Geological Survey, Open-File Report 80-1218, Techniques for Estimating Magnitude and Frequency of Floods in West Virginia by G.S. Runner, Washington, D.C., October 1980.

9. U.S. Army Corps of Engineers, Ohio River Basin, Comprehensive Survey, Appendix C, Hydrology, Cincinnati, Ohio, August 1966.

10. U.S. Federal Highway Administration, Report FHWA/RD-86/108, Bridge Waterways Analysis Model/Research Report by J.O. Shearman, W.H. Kirby, V.R. Schneider, and H.N. Flippo, Jr., Washington, D.C., March 1986.

11. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System, Davis, California.

12. U.S. Army Corps of Engineers, Ohio River, Belleville Pool Reach and Washington County Reach – Ohio River and West Virginia, Compiled in 1999.

13. U.S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet; Belmont, West Virginia, 1976; Bens Run, West Virginia, 1972; Ellenboro, West Virginia, 1975; Ravens Rock, West Virginia, 1972; Schultz, West Virginia, 1975; Willow Island, West Virginia, 1976.

14. United States Geological Survey and West Virginia Statewide Addressing and Mapping Board (SAMB), State of West Virginia, 2003, 1/9-Arc Second National Elevation Dataset, Sioux Falls, SD, 2005.

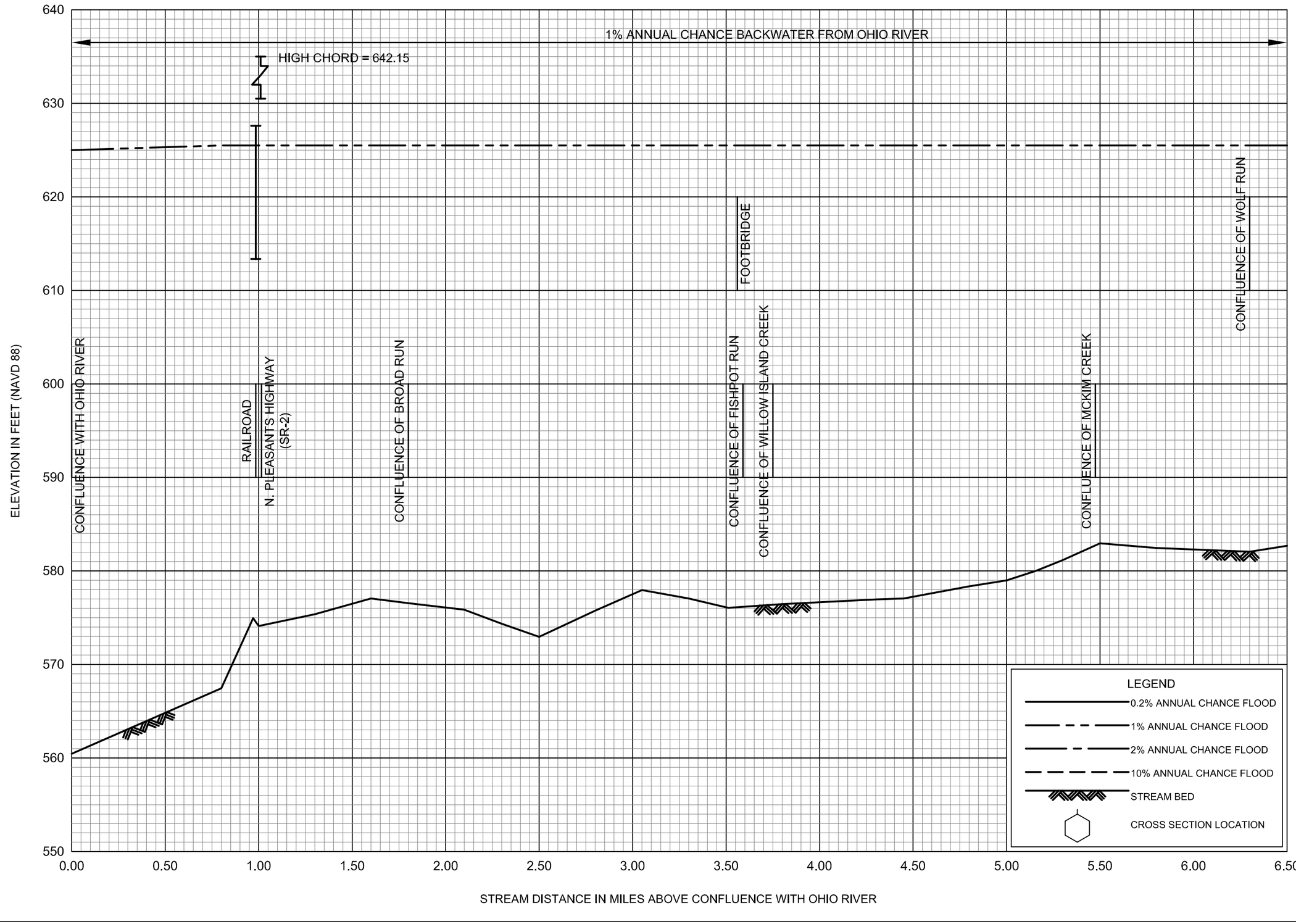
15. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Unincorporated Areas of Pleasants County, West Virginia, January 3, 1975.

16. Federal Emergency Management Agency, Flood Insurance Study, Ritchie County and Incorporated Areas, Ritchie County, West Virginia, Washington, D.C., February 2, 2012.

17. Federal Emergency Management Agency, Flood Insurance Study, Tyler County and Incorporated Areas, Tyler County, West Virginia, Washington, D.C., May 3, 2010.

18. Federal Emergency Management Agency, Flood Insurance Study, Wood County and Incorporated Areas, Wood County, West Virginia, Washington, D.C., study underway.

19. Federal Emergency Management Agency, Flood Insurance Study, Washington County and Incorporated Areas, Washington County, Ohio, Washington, D.C., February 16, 2006.



FLOOD PROFILES

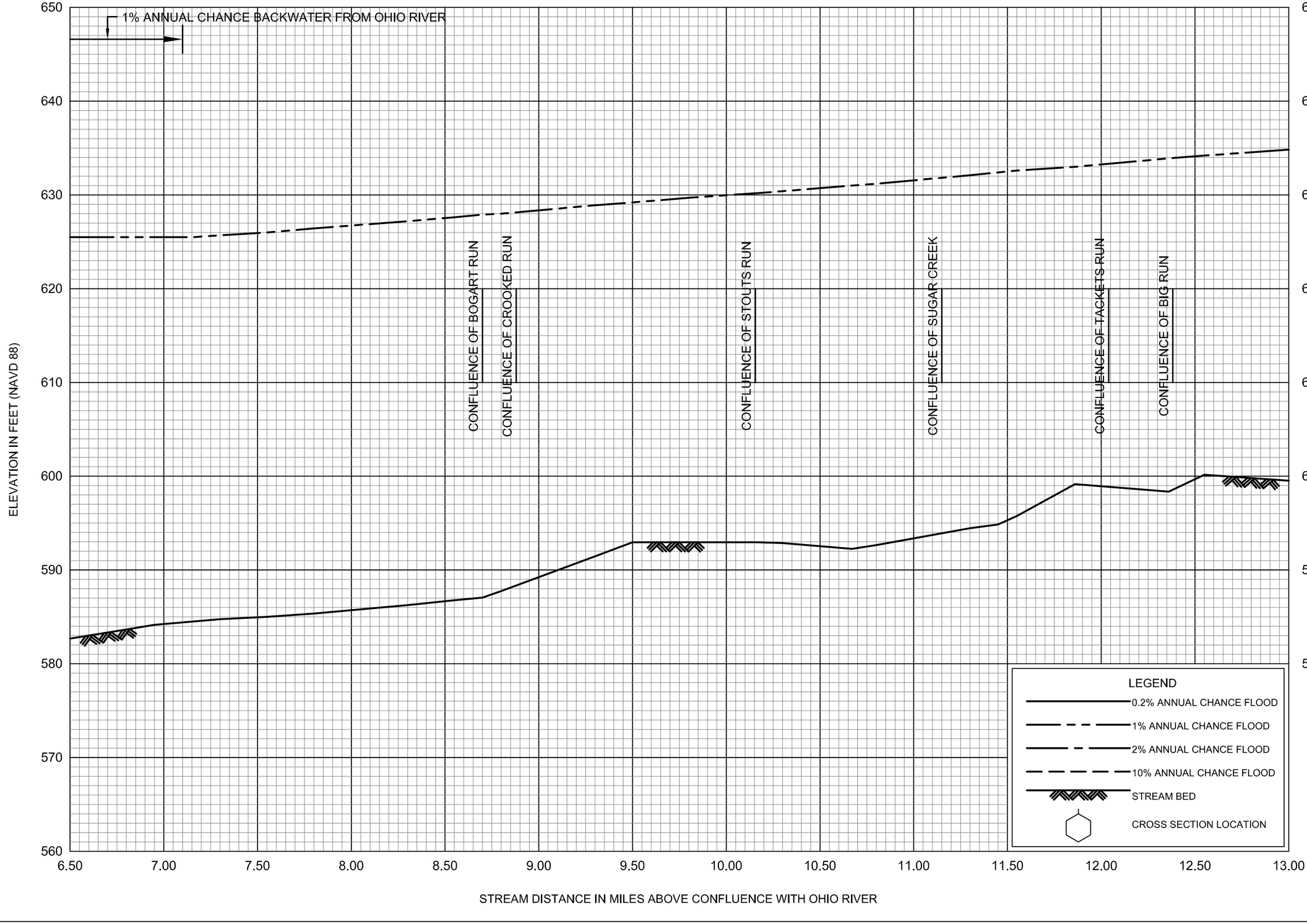
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANT COUNTY, WV

AND INCORPORATED AREAS

01P



FLOOD PROFILES

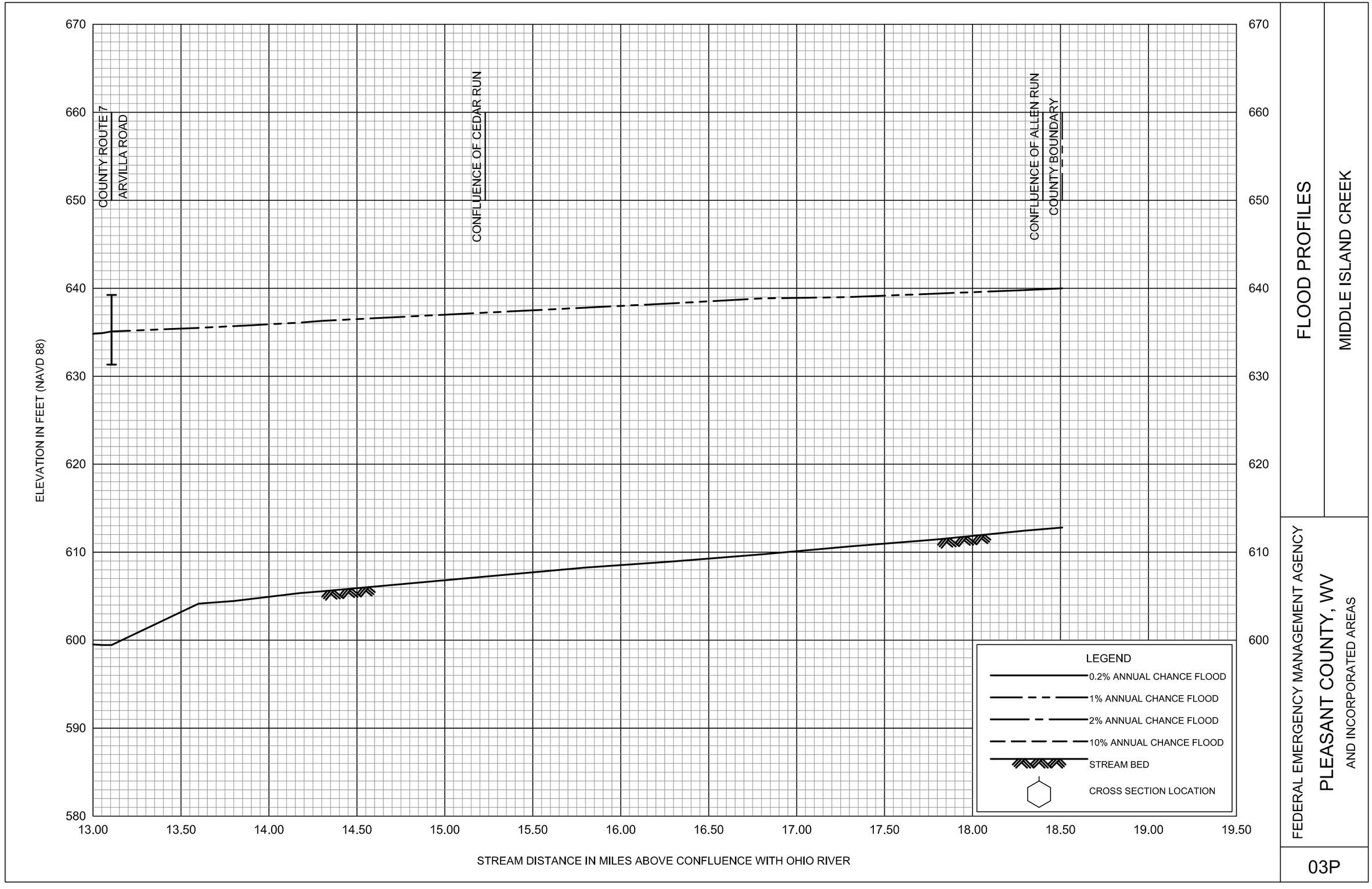
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANT COUNTY, WV

AND INCORPORATED AREAS

02P



FLOOD PROFILES

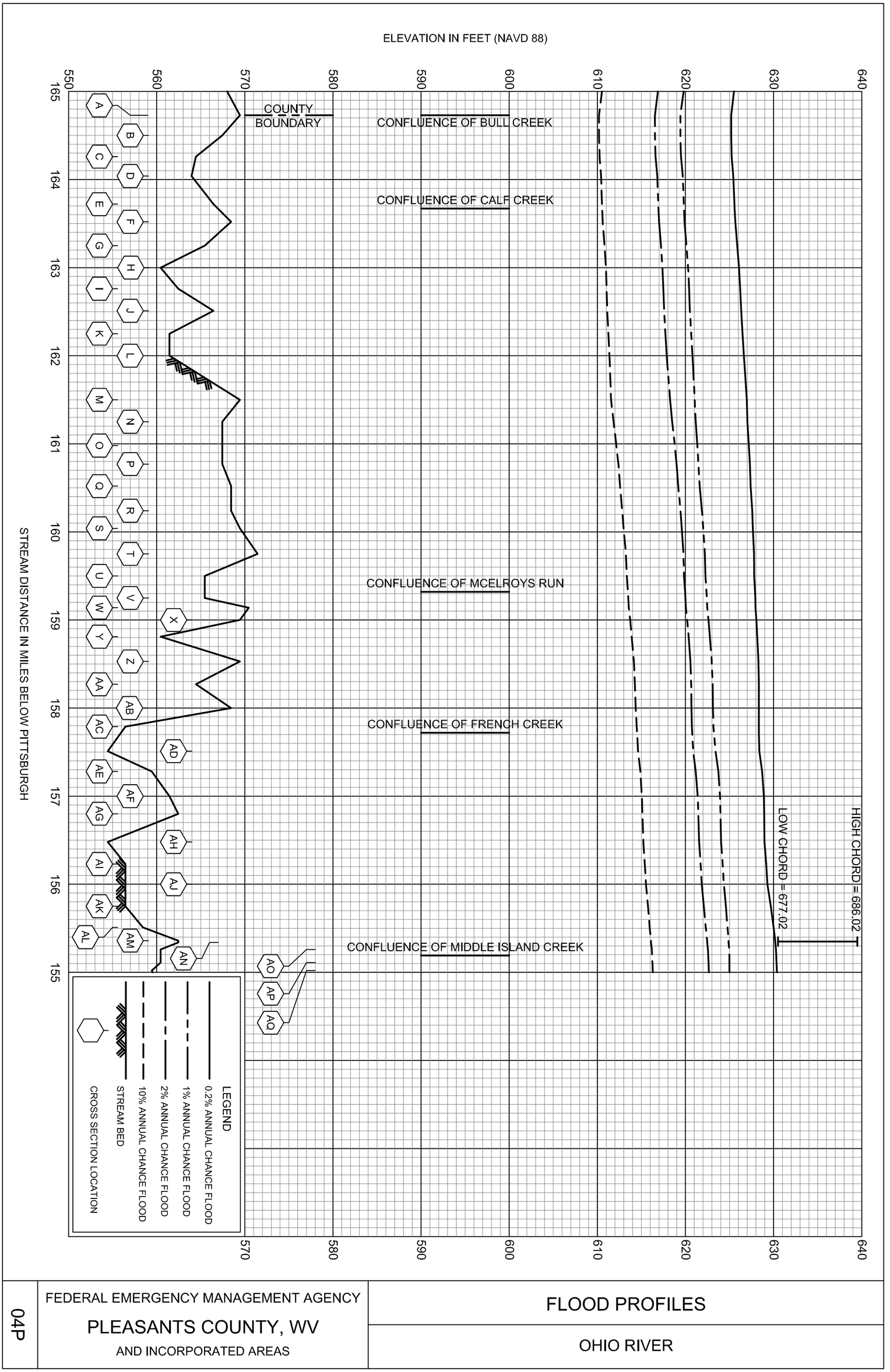
MIDDLE ISLAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

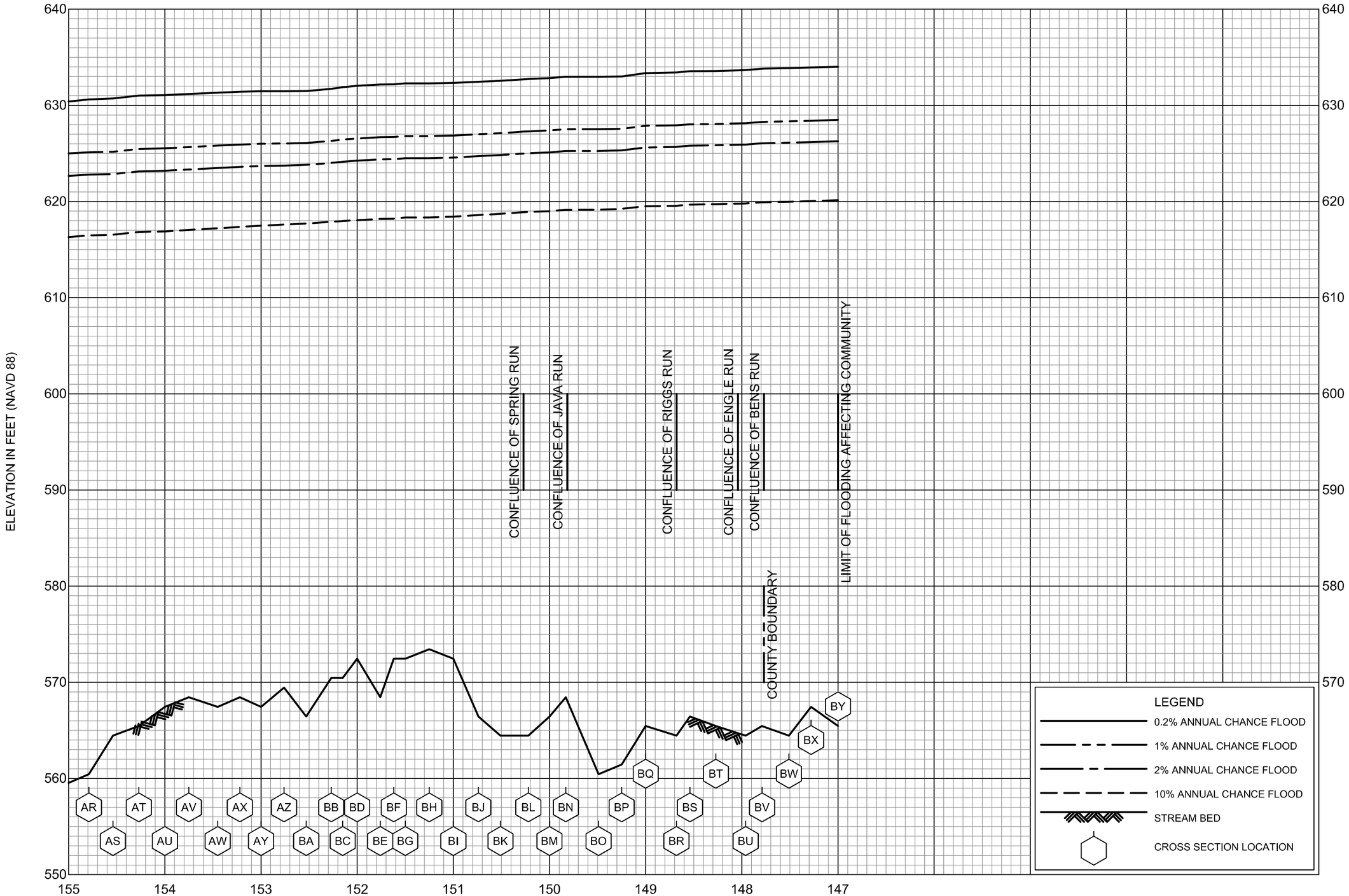
PLEASANT COUNTY, WV

AND INCORPORATED AREAS

03P



04P	FEDERAL EMERGENCY MANAGEMENT AGENCY PLEASANTS COUNTY, WV AND INCORPORATED AREAS	FLOOD PROFILES OHIO RIVER



FLOOD PROFILES

OHIO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

PLEASANTS COUNTY, WV

AND INCORPORATED AREAS

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