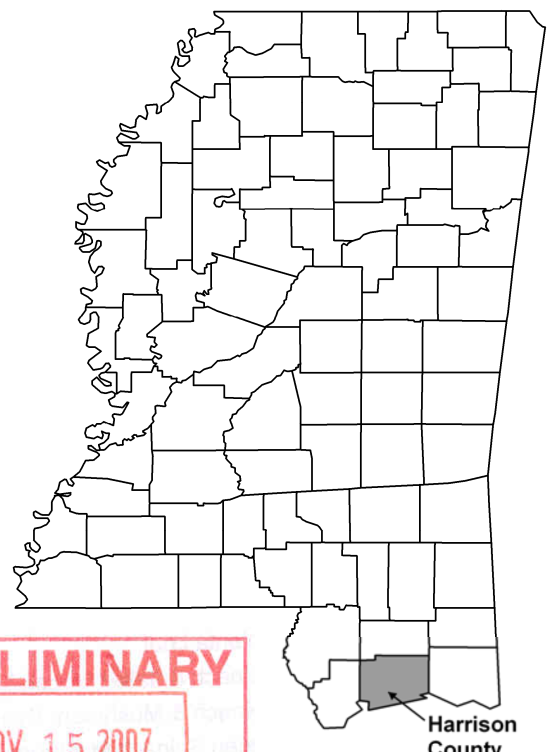
FLOOD INSURANCE STUDY

HARRISON COUNTY, MISSISSIPPI

AND INCORPORATED AREAS

VOLUME 1 OF 3



COMMUNITY NAME	COMMUNITY NUMBER
BILOXI, CITY OF	285252
D'IBERVILLE, CITY OF	280336
GULFPORT, CITY OF	285253
HARRISON COUNTY (UNINCORPORATED AREAS)	285255
LONG BEACH, CITY OF	285257
PASS CHRISTIAN, CITY OF	285261

PRELIMINARY
NOV 15 2007

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
28047CV001A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date:

TABLE OF CONTENTS

Table of Contents – Volume 1

Page

FIGURES

TABLES

EXHIBITS

Table of Contents – Volume 2

EXHIBITS – continued

EXHIBITS – continued

Exhibit 1 – Flood Profiles - continued

Exhibit 2 – 0.2% Annual Chance Wave Envelopes

Table of Contents – Volume 3

EXHIBITS – continued

Exhibit 2 – 0.2% Annual Chance Wave Envelopes

EXHIBITS – continued

Exhibit 2 – 0.2% Annual Chance Wave Envelopes – continued

FLOOD INSURANCE STUDY
HARRISON COUNTY, MISSISSIPPI AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and supersedes the FIS reports and/or Flood Insurance Rate Maps (FIRMs) in the geographic area of Harrison County, Mississippi, including the City of Biloxi, City of D'Iberville, City of Gulfport, City of Long Beach, City of Pass Christian, and unincorporated areas of Harrison County (hereinafter referred to collectively as Harrison County), and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates. This information will also be used by Harrison County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

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

1.2 Authority and Acknowledgments

The sources of authority for this FIS report are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

This FIS was prepared to include the unincorporated areas of, and incorporated communities within, Harrison County in a countywide format. Information on the authority and acknowledgements for each jurisdiction included in this countywide FIS, as compiled from their previous printed FIS reports, is shown below.

Biloxi, City of:	The hydrologic and hydraulic analyses for the March 18, 1987 FIS, were performed by Gee & Jenson Engineers, Architects, Planners, Inc. (the study contractor) for the Federal Emergency Management Agency (FEMA), under contract No. EMW-C-0159. This study was completed in March 1985 (Reference 1).
Gulfport, City of:	For the July 4, 1988 FIS, the hydrologic and hydraulic analyses were prepared by Gee & Jenson Engineers, Architects, Planners, Inc., for FEMA, under Contract No. EMW-C-0159. That work was completed in August 1985.

For the October 4, 2002 FIS, a revision was performed to incorporate three Letters of Map Revision (LOMRs) effective May 25, 1990, February 13, 2001, and April 18, 2001, respectively. The May 25, 1990, LOMR reflected a revision to the floodway and stream alignment along Flat Branch. The hydraulic analysis was prepared by Neel-Schaffer, Inc. The February 13, 2001, LOMR reflected updated hydrologic and hydraulic analyses along Brickyard Bayou, prepared by URS Greiner Woodward Clyde under contract to FEMA under the Hazard Mitigation Technical Assistance Program. The April 19, 2001, LOMR reflected channelization along Bernard Bayou and Flat Branch and the construction of South Bridge at Crosswords Parkway along Bernard Bayou and North Bridge along Flat Branch. The hydraulic and hydrologic analyses were prepared by Jones & Carter, Inc. (Reference 2).

Harrison County, MS (Unincorporated Areas):	For the August 4, 1988 FIS, the hydrologic and hydraulic analyses were prepared by Gee & Jenson Engineers, Architects, Planners, Inc., for FEMA, under Contract No. EMW-C-0159. That work was completed in March 1985. For the October 4, 2002 FIS, a revision was performed to reflect updated corporate limits for the City of Gulfport, Mississippi, due to annexations and to incorporate a LOMR effective April 18, 2001. For this revision, no flooding sources have been revised (Reference 3).
Long Beach, City of:	The coastal hydrologic and hydraulic analyses for the Mississippi Sound and the riverine analyses for the May 4, 1988 FIS were performed by Gee & Jenson Engineers, Architects, Planners, Inc., (the study contractor) for FEMA, under Contract No. EMW-C-0159. This study was completed in March 1985 (Reference 4).
Pass Christian, City of:	The coastal hydrologic and hydraulic analyses for the Mississippi Sound and St. Louis Bay, and riverine analyses for the August 19, 1987 FIS, were performed by Gee & Jenson Engineers, Architects, Planners, Inc., (the study contractor) for FEMA, under Contract No. EMW-C-0159. This study was completed in March 1985 (Reference 5).

The hydrologic and hydraulic analyses for this countywide FIS were performed by the State of Mississippi for FEMA, under Contract No. EMA-2003-GR-5370. This study was completed in __________________.

Base map information shown on the FIRM was provided in digital format by the State of Mississippi. This information was photogrammetrically compiled at a scale of 1:12,000 from aerial photography dated September 2004.

The digital FIRM was produced using the State Plane Coordinate System, Mississippi East, FIPSZONE 2301. The horizontal datum was the North American Datum of 1983, GRS 80 spheroid. Distance units were measured in U.S. feet.

1.3 Coordination

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

The dates of the initial and final CCO meetings held for the communities within the boundaries of Harrison County are shown in Table 1, "CCO Meeting Dates."

TABLE 1. CCO MEETING DATES

Community Name	Initial CCO Date	Final CCO Date
Biloxi, City of	June 19, 1979	March 7, 1986
Gulfport, City of	April 16, 2001	*
Harrison County (Unincorporated Areas)	September 14, 2001	*
Long Beach, City of	*	July 8, 1986
Pass Christian, City of	June 19, 1979	*

* Data not available

For this FIS study, an initial Pre-Scoping Meeting was held on April 2, 2004. A Project Scoping Meeting was held on June, 11 2004, followed by a Post-Scoping Meeting on August 24, 2004. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, Harrison County and the incorporated communities within Harrison County, and Mississippi Geographic Information, LLC, the State study contractor. Coordination with county officials and Federal, State, and regional agencies produced a variety of information pertaining to floodplain regulations, available community maps, flood history, and other hydrologic data. All problems raised in the meetings have been addressed.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS report covers the geographic area of Harrison County, Mississippi, including the incorporated communities listed in Section 1.1.

The March 18, 1987 FIS for the City of Biloxi covered the incorporated area of the City. The areas studied by detailed methods were the entire coastal area of Biloxi, including the Biloxi Bayou, the Back Bay of Biloxi, the Biloxi River, and the Tchoutacabouffa River. The study analysis included coastline flooding due to hurricane induced storm surge and riverine flooding from the Biloxi River and the Tchoutacabouffa River. Both the open coast surge and its inland propagation were studied; in addition, the added effects of wave heights were also considered. The results of the previous study remained unchanged except for the addition of floodways.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through March 1990. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Biloxi (Reference 1).

The July 4, 1988 FIS for the City of Gulfport covered the entire incorporated areas of the city. Flooding caused by the overflow of Bernard Bayou, Brickyard Bayou, and Turkey Creek, and the coastal analysis of Mississippi Sound were studied in detail within the corporate limits.

The October 4, 2002 revision for the City of Gulfport incorporated three previously issued LOMRs. The May 25, 1990, LOMR reflected updated hydraulic analysis and relocation of Flat Branch. The February 13, 2001, LOMR reflected updated hydrologic and hydraulic analyses along Brickyard Bayou. The April 18, 2001, LOMR reflected channelization along Bernard Bayou and Flat Branch and the construction of South Bridge at Crossroads Parkway along Bernard Bayou and North Bridge along Flat Branch. Annexations of land made by the City of Gulfport from the unincorporated areas of Harrison County resulted in the inclusion of detailed flood hazards for Biloxi River, Canal No. 1, Flat Branch, Fritz Creek, and Fritz Creek Tributary.

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 or numerous streams were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the City of Gulfport (Reference 2).

The August 4, 1988 FIS for the unincorporated areas of Harrison County covered the unincorporated areas of the county. Riverine data obtained from the FIS for the unincorporated areas of Harrison County and the FIS for the unincorporated areas of Jackson County were used to merge with and extend the new study results upstream for the Tchoutacabouffa River and its backwater effects on Cypress Creek, Flat Branch, Bernard Bayou, Howard Creek, Parker Creek, Turkey Creek, and the Wolf River. Data from the afore-mentioned studies were also used to develop floodways for the following streams: Tuxachanie Creek, Choctaw Creek, Hog Branch, Palmer Creek, Saucier Creek, West Creek, Hickory Creek, Crow Creek, Pole Branch, Sandy Creek, Big Creek, Mill Creek, and Little Biloxi River.

Riverine data obtained from the U.S. Army Corps of Engineers (USACE) study titled, "Special Flood Hazard Information Report – Biloxi River, Harrison County, Mississippi" (Reference 6), was used to delineate flooding and to develop floodways for the Biloxi River.

For the October 4, 2002 revision, the LOMR dated April 18, 2001, was incorporated and annexations of land made by the City of Gulfport from the unincorporated areas of Harrison County are shown. The LOMR reflected channelization along Bernard Bayou and Flat Branch and the construction of South Bridge at Crossroads Parkway along Bernard Bayou and North Bridge along Flat Branch in the City of Gulfport. A small area of the revision along Flat Branch is currently in the unincorporated areas. Due to the annexations of land made by the City of Gulfport, Flat Branch, Fritz Creek, and Fritz Creek Tributary are now currently in the City of Gulfport and are shown on its FIRM.

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. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or porposed construction through March 1990. The scope and methods of study were proposed to and agreed upon by FEMA and Harrison County (Reference 3).

The May 4, 1988 FIS for the City of Long Beach covers the incorporated area of the city. Flooding caused by overflow of a portion of Canal No. 1 and Canal No. 3 was studied in detail within the community. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The remaining portions of Canal No. 1 and Canal No. 3 and an area along Canal No. 3 between Daugherty Road and Mitchell Road within the corporate limits were studied using approximate methods. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through March 1990. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Long Beach (Reference 4).

The August 19, 1987 FIS for the City of Pass Christian covers the incorporated area of the City of Pass Christian. Flooding caused by overflow of Johnson Bayou (Canal No. 1) was studied in detail within the community. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development of proposed construction through March 1990. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Pass Christian (Reference 5).

Limited detailed analyses were used to study those areas having a low development potential or minimal flood hazards. For both Detailed and Limited Detailed studied streams, the scope and methods of study were proposed to, and agreed upon, by FEMA and the State of Mississippi. For this FIS study, the following table lists the streams which were restudied and/or newly studied by Detailed and Limited detailed methods:

TABLE 2. STREAMS STUDIED BY DETAILED AND
LIMITED DETAILED METHODS

Stream	Limits of Revision/New Detailed and Limited Detailed Study
Bernard Bayou	From a point approximately 750 ft upstream of Mennonite Road to a point approximately 3,000 ft upstream of Mennonite Road.
Bernard Bayou Tributary 3	From the confluence with Bernard Bayou to a point approximately 1.1 mi upstream of Orange Grove Road.
Bernard Bayou Tributary 4	From the confluence with Bernard Bayou Tributary 3 to a point approximately 1,900 ft upstream of Lambrecht Road.
Bernard Bayou Tributary 5	From the confluence with Bernard Bayou Tributary 4 to a point approximately 850 ft upstream of Pheasant Drive.
Bernard Bayou Tributary 6	From the confluence with Bernard Bayou to a point approximately 300 ft upstream of Orange Grove Road.
Big Creek	From a point approximately 5.5 mi upstream of the confluence with Wolf River to a point approximately 6.1 mi upstream of the confluence with Wolf River.
Biloxi River	From a point approximately 250 ft upstream of Pete Hickman Road to the county boundary.
Brickyard Bayou	From just downstream of 25th Avenue to a point approximately 250 ft upstream of Stewart Avenue.
Crow Creek	From a point approximately 3.6 mi. upstream of the confluence with Biloxi River to a point approximately 4.7 mi upstream of the confluence with Biloxi River.
Flat Branch	From a point approximately 4,750’ downstream of U. S. Highway 49 to a point approximately 2,750 ft upstream of Old Highway 49
	From the confluence with Flat Branch Tributary 2 to a point approximately 1.7 mi upstream of the confluence with Flat Branch Tributary 2.
Flat Brach Tributary 1	From a point approximately 1,450 ft downstream of Hamilton Street to a point approximately 3,900 ft upstream of Robinson Road.

TABLE 2. STREAMS STUDIED BY DETAILED AND LIMITED DETAILED METHODS – continued

Stream	Limits of Revision/New Detailed and Limited Detailed Study
Flat Branch Tributary 2	From the confluence with Flat Branch to a point approximately 2,450 ft upstream of the confluence with Flat Branch.
Fritz Creek	From a point approximately 500 ft downstream of O’Neal Road to a point approximately 850 ft upstream of Three Rivers Road.
Fritz Creek Tributary 1	From a point approximately 100 ft upstream of Three Rivers Road to a point approximately 1,100 ft downstream of O’Neal Road.
	From a point approximately 1,100 ft downstream of O’Neal Road to a point approximately 1,050 ft upstream of O’Neal Road.
Fritz Creek Tributary 2	From the confluence with Fritz Creek to a point approximately 1,650 ft upstream of Three Rivers Road.
Hickory Creek	From a point approximately 3,850 ft upstream of McHenry Road to a point approximately 1.5 mi upstream of McHenry Road.
Hog Branch	From a point approximately 2,400 ft downstream of White Plains Road to a point approximately 3,800 ft upstream of White Plains Road.
	From a point approximately 1,800 ft upstream of South Carr Bridge Road to a point approximately 1.9 mi upstream of South Carr Bridge Road.
Little Biloxi River	From a point approximately 100 ft downstream of McHenry Road to a point approximately 6,700 ft upstream of McHenry Road.
Shallow ponding between railroad tracks and Pass Road in the City of Biloxi and unincorporated Harrison County	Shallow ponding bounded by Beauvoir Road approximately 1 mile to the west, Hercules Street on the east, Pass Road on the north, and railroad tracks on the south.
Mill Creek	From a point approximately 4,900 ft upstream of State Highway 53 to a point approximately 1.7 mi upstream of State Highway 53.

TABLE 2. STREAMS STUDIED BY DETAILED AND LIMITED DETAILED METHODS – continued

Stream	Limits of Revision/New Detailed and Limited Detailed Study
Palmer Creek	From a point approximately 3,800 ft upstream of Wortham Road to a point approximately 9,200 ft upstream of Wortham Road.
Parker Creek	From a point approximately 1.2 mi upstream of State Highway 67 to a point approximately 1.8 mi upstream of State Highway 67.
Pole Branch	From a point approximately 300 ft downstream of Cable Bridge Road to a point approximately 3,200 ft upstream of Cable Bridge Road.
Sandy Creek	From a point approximately 1,200 ft downstream of Steel Bridge Road to a point approximately 2,500 ft upstream of Steel Bridge Road.
Saucier Creek	From a point approximately 1,200 ft upstream of State Highway 67 to just upstream of Martha Redmond Road.
Tchoutacabouffa River	From a point approximately 5,500 ft downstream of the confluence with Tchoutacabouffa River Tributary 3 to a point approximately 5,000 ft upstream of the confluence with Railroad Creek.
Tuxachanie Creek	From a point approximately 4,000 ft downstream of White Plains Road to a point approximately 1.6 mi downstream of North Carr Bridge Road.
	From a point approximately 1.4 mi downstream of Bethel Road to a point approximately 4.0 mi upstream of Bethel Road.
West Creek	From a point approximately 2,000 ft downstream of State Highway 67 to a point approximately 1.9 mi upstream of State Highway 67.

Also, floodplain boundaries of streams that have been previously studied by detailed methods were redelineated based on up-to-date topographic information.

All remaining flooding sources in the county were studied by approximate methods, and are the basis of the revised Zone A mappings included on the FIRMs.

This countywide FIS reflects a vertical datum conversion from the National Geodetic Vertical Datum of 1929 (NGVD29) to the North American Vertical Datum of 1988 (NAVD88).

2.2 Community Description

Harrison County encompasses approximately 585 square miles and is bounded on the north by Stone County, on the east by Jackson County, on the west by Hancock County, and on the south by the Mississippi Sound. It is located approximately 140 miles south of the City of Jackson, Mississippi; 60 miles northeast of the City of New Orleans, Louisiana; and 60 miles west of the City of Mobile, Alabama. Primary east-west traffic in Harrison County is served by Interstate Highway 10 and U.S. Highway 90. North-south access is provided by U.S. Highway 49, which reaches the gulf coast area in the City of Gulfport, Mississippi, at its intersection with U.S. Highway 90. Railroad service is provided by the CSX Transportation, which runs from Mobile, Alabama, across coastal Mississippi west to New Orleans, Louisiana. The Illinois Central Railroad also provides service to the north. According to the U.S. Census Bureau, the population has decreased from 189,601 in 2000 to 171,875 in 2006, a -9.3% decrease (Reference 7).

Harrison County, lying on the Mississippi Gulf Coast, is one of the state's principal resort and recreation areas in addition to having a nationwide reputation for its extensive fisheries. The county was formed by the State of Mississippi in 1841 and was named for the ninth President of the United States, William H. Harrison.

The historic key to the county's development can be found in Ship Island. The island served as a supply point for French explorers in early colonial years. It later became a thriving seaport, serving as a transfer depot for larger ocean-going vessels that were restricted by their size from entering the Mississippi Sound. Ship Island eventually diminished in importance as New Orleans developed into a primary gulf port. The construction of a channel from Ship Island to the mainland in 1902 allowed Harrison County to regain its status as a major gulf coast deep-water port.

Harrison County is typified by two distinct, easily recognized, physiographic divisions. The Gulf Coast Flatwoods is a distinctly low, level strip of coastal lowland, forming an irregular belt approximately 5 miles in width along the entire southern boundary of the county. The uplands of the Southern Lower Coastal Plain represent an older region, where erosion has cut deep valleys creating a much more uneven terrain than that of the coastal flatwoods area. The coastal flatwood region has elevations ranging from 0 to 50 feet above the National Geodetic Vertical Datum of 1929 (NGVD29). Elevations increase greatly moving northerly through the lower coastal plain, which exhibits elevations ranging from 90 to 200 feet NGVD29.

The climate in Harrison County is mild with mean annual temperatures in the upper 60 degrees Fahrenheit. Average winter temperatures range from 53 to 60 degrees Fahrenheit and average summer temperatures range from 75 to 82 degrees Fahrenheit. Rainfall averages approximately 62 inches annually with the majority of the accumulation in July through September. Winds in the area are generally southeasterly or southwesterly. Wind speeds usually remain under 10 miles per hour, but increase during storms. Thunderstorms occur between 70 and 80 days per year, many of which are accompanied by severe winds (Reference 8).

Three principle river systems drain Harrison County. The western portion of the county lies within the drainage basin of the Wolf River, which originates in Pearl River County and extends southward approximately 45 miles to its confluence with St. Louis Bay in the Mississippi Sound. The Little Biloxi and Big Biloxi Rivers flow from the north-central portion of the county in a southeasterly direction uniting 2.5 miles north of Wool Market to form the Biloxi River, which empties into the Back Bay of Biloxi. The Tchoutacabouffa River, which meanders along the eastern edge of the county from its origin at the confluence of Cypress Branch and Railroad Creek about 18 miles to the Back Bay of Biloxi, is the largest tributary in Harrison County.

The coastal strip of Harrison County is almost completely developed by both residential and commercial interest. Residential development extends northward to Interstate 10, beyond which woodlands exist containing individual residential home sites and small unincorporated communities. The recent completion of Interstate 10 is expected to increase development, both residential and commercial, along the northern boundaries of the coastal communities.

2.3 Principal Flood Problems

Coastal areas along the Mississippi Sound, St. Louis Bay, Biloxi Bay, and the Back Bay of Biloxi are primarily subject to coastal storm surge flooding and wave action as a result of hurricane and tropical storm activity in the gulf. The lower portions of the Biloxi, Wolf, and Tchoutacabouffa Rivers and other small streams and drainage-ways are subject to flooding from coastal storm surge. These streams are subject to riverine flooding during periods of heavy rainfall from frontal systems passing through or becoming stationary over the area. Severe rainfall can also cause flooding as a result of ponding in low-lying areas and areas with inadequate drainage.

Historical descriptions of past hurricanes and related damage are numerous for this area. During the 1800’s, storms caused significant damage to the gulf coast (Reference 9).

Some of the more significant storms occurring in this century are as follows:

<u>1909 (September 10-21)</u>

Landfalling in Louisiana, the storm caused tides of 8 to 12 feet along the Mississippi coast. Three hundred and fifty lives were reported lost as a result of the storm (Reference 10).

1915 (September 22 – October 1)

This hurricane made landfall near the City of Grand Isle, Louisiana on September 29. Although the storm center passed well west of the Mississippi coast, a pressure of 28.02 inches of mercury (in. Hg) was recorded at the City of Biloxi. High-water elevations ranged from 11.8 feet NGVD29 at Bay St. Louis to 9.0 feet NGVD29 at the Cities of Gulfport and Biloxi. Two hundred and seventy-five lives were reportedly lost because of this storm (Reference 10).

1947 (September 4-21)

This hurricane entered the Gulf of Mexico after passing over Florida. Continuing across the gulf, the hurricane made landfall in southeastern Louisiana on September 19.

High-water marks surveyed after the storm showed elevations ranging from 8 feet NGVD29 at Pascagoula to 15 feet NGVD29 at the City of Bay St. Louis. Portions of the 28-mile seawall were breached during this storm. Fifty-one people were left dead in its wake with damages estimated at $100 million (Reference 10).

1965 Hurricane Betsy (August 27 – September 12)

Entering the Gulf of Mexico on September 8, Hurricane Betsy proceeded on a northwesterly track making landfall west of Grand Isle, Louisiana, on the evening of the ninth. Betsy left many sections of U.S. Highway 90 along the shoreline damaged as a result of wave action and surge. High-water elevations surveyed after the storm were about 12 feet NGVD29 in the vicinity of the Cities of Waveland, Bay St. Louis and Pass Christian. The tide gage at Biloxi recorded a peak surge of 8.6 feet NGVD29 (approximately a 4-percent-annual-chance recurrence interval) (References 11 and 12).

1969 Hurricane Camille (August 14-22)

Camille reached hurricane strength on the morning of August 15, with estimated wind speeds of 90 mph near the center of the storm. Its location was 75 miles off the extreme southwestern tip of Cuba. The storm continued to develop rapidly while traveling on a north-northwest track.

Camille was located 155 miles southeast of New Orleans at 1 pm, on Sunday, August 17, and was tracking to the north-northwest at 12 to 15 mph. Maximum wind speeds were estimated at 160 mph with Weather Bureau predictions of 190 mph for that same afternoon. The center of Camille passed east of the mouth of the Mississippi River and then made landfall at Waveland and Bay St. Louis, Mississippi, at 10:30 pm, August 17. The eye was estimated to be 10 to 12 miles in diameter and a central pressure of 26.85 in. Hg. was recorded in Bay St. Louis.

In Pascagoula, high-water marks up to 11.2 feet NGVD29 were surveyed after the storm (Reference 13). Wind gusts of 81 mph were recorded at the Ingalls Shipyard from the east-southeast during the storm (Reference 14). Camille ranked 5 on the Saffir Simpson Hurricane Scale of 1 to 5 and was the most intense storm to ever hit the United States mainland (Reference 15).

1979 Hurricane Frederic (August 30 – September 14)

Landfalling east of Pascagoula on September 12, 1979, Jackson County was spared from the right front quadrant of the storm and thus from serious flooding. However, with gusts recorded up to 110 knots, the county did sustain heavy damages (Reference 16). The tide gage at the Pascagoula Coast Guard Station peaked at noon on the following day at 5.8 feet NGVD29. This elevation represents approximately a 10-percent-annual-chance recurrence interval.

1985 Hurricane Elena (August 28 – September 4)

Elena, named on August 28 over central Cuba, strengthened into a hurricane on August 29 in the open waters of the southeast Gulf of Mexico. A decrease in forward speed and a turn to the east-northeast threatened the Florida panhandle. Elena eventually made an anti-cyclonic loop off Cedar Key, Florida and began accelerating towards the west-northwest. The storm reached a central pressure of 951 mb on September 1 about 100 mi south of Apalachicola, Florida. Elena weakened after that and made landfall near Biloxi, Mississippi with a central pressure of 959 mb. The highest tides and the storm surge reached about 8 ft in Biloxi and Gulfport, and 10 ft in the Pascagoula area. Several commercial structures were damaged by high winds, estimated at 60 to 105 mph in Gulfport and 90 to 115 mph in Pascagoula. During the period Elena threatened Gulf Coast areas, nearly a million people were evacuated, which may account for the fact that there were no deaths in the area of landfall. Four deaths were attributed to Elena by falling trees, automobile accidents, and heart attacks. The overall economic loss was estimated at over $1.25 billion.

1997 Hurricane Danny (July 16–26)

Danny became a tropical cyclone on July 16 off the southwestern coast of Louisiana. Danny continued to strengthen and became a hurricane early on July 18, but moved slowly and became nearly stationary at times. It finally made landfall just northwest of the Mississippi River Delta near Empire and Buras, Louisiana on July 18. Danny was back in the Gulf of Mexico later the same day and strengthened to Category 1 with 75 mph winds and a minimum central pressure of 984 mb. Danny moved east, then north-northeast near the mouth of Mobile Bay and passed over Dauphin Island before finally making landfall near Mullet Point, Alabama on July 19. The Mississippi coast experienced large amounts of rainfall and estimated winds of about 75 mph near the Mississippi-Alabama state line as Danny traveled toward landfall. Danny was responsible for five deaths in the region. The total reported damages were between $60 and $100 million.

1998 Hurricane Georges (September 15 – October 1)

Georges was named on September 15 while still a tropical storm. It continued to strengthen and reached category 4 status by September 19. Near-surface wind estimates indicated maximum winds of a strong Category 4 hurricane on September 20 about 300 mi east of Guadeloupe in the Lesser Antilles. After making several landfalls along its path from the eastern Atlantic Ocean to the Caribbean Sea, Georges intensified again and made landfall on September 25 in Key West, Florida with a minimum central pressure of 981 mb and maximum winds of 105 mph. The storm shifted eastward and made landfall again, near Biloxi, Mississippi, on the morning of September 28 with a sustained 1-min wind speed of 150 mph and a minimum central pressure of 964 mb. High water marks were taken on the U.S. mainland. Along the Mississippi coast, the range of stillwater marks was 6.9 to 12.1 ft. Similarly, the debris line heights ranged from 5.6 to 12.5 ft in Mississippi. A total of 602 deaths were attributed to Georges making it the 19th-deadliest storm in the Atlantic basin during the twentieth century to date. Most of the deaths were in the Dominican Republic and Haiti, due to flash flooding and subsequent mud slides. One death occurred in the United States—a freshwater drowning in Mobile, Alabama. Insured property damage estimates totaled $2.96 billion in the United States including Puerto Rico and the U.S. Virgin Islands. Based on the insured losses, the total estimated damage from Georges is $5.9 billion, of which $2.31 billion was outside the continental United States.

<u>2005 Hurricane Katrina (August 23-30)</u>

Katrina developed over the central Bahamas on the evening of August 23. The storm strengthened and reached hurricane status on the evening of August 25, less than 2 hours before it made landfall as a Category 1 storm near the border of Miami-Dade County and Broward County. Katrina continued moving west-southwest and entered the Gulf of Mexico early on August 26. The storm intensified to a Category 3 hurricane by noon on August 27 over 275 mi southeast of the mouth of the Mississippi River. Over the next day, Katrina doubled in size and turned toward the northwest. Katrina strengthened to a Category 5 in less than 12 hours and reached 160 mph winds by noon on August 28. Although Katrina did not make landfall near Buras, Louisiana until around noon on August 29 as a strong Category 3 storm (according to best estimates), the storm was large enough that hurricane force winds were reaching the coast as early as August 28.

Since most of the tide gauges failed along the coast and buildings were completely destroyed, it was difficult to determine the storm surge from Katrina. Post-storm assessments by FEMA estimate that the storm surge was 24 to 28 ft along the Mississippi coast across a swath about 20 miles wide, centered roughly on St. Louis Bay. For the eastern half of the Mississippi coast (roughly from Gulfport to Pascagoula), the storm surge was estimated to be 17 to 22 ft reaching up to 6 mi inland and up to 12 mi inland along bays and rivers. Compared to the 1969 storm (Hurricane Camille) that traveled along nearly the same path, Katrina was a weaker storm, but caused as much or more damage due to its large size. The radius of maximum winds was 25-30 n. mi. and hurricane force winds extended at least 75 n mi to the east from the center of the storm. Also, Katrina generated substantial wave setup along the northern Gulf coast while it was still a Category 4 and 5 before it made landfall.

Katrina was a powerful and deadly hurricane that ranks as one of the costliest and one of the five deadliest hurricanes to ever strike the United States. A total of 1,833 fatalities from Louisiana, Mississippi, Florida, Georgia and Alabama are directly and indirectly related to Katrina. Early estimates of the total damages place the losses at over $81 billion.

2.4 Flood Protection Measures

Following the storms of 1909 and 1915 which damaged much of the coastal highway, a 28 mile protective seawall was constructed to prevent future damage. Completed in 1927, the seawall was the longest single concrete structure of its time. According to the Harrison County Civil Defense, the seawall varies in elevation from 5 feet NGVD29 to 11 feet NGVD29 with the majority of the wall being at 11 feet NGVD29.

After September 1947 hurricane, a manmade beach was placed seaward of the seawall to further attenuate damage along the coast. The seawall and beach system have been effective in minimizing wave damage north of the coastal highway.

The west end of Deer Island has been extended with a breakwater. This structure affords wave protection to the eastern Biloxi Marina and commercial fishing area.

A seawall exists in the study area that provides the community with some degree of protection against flooding. However, it has been ascertained that this seawall may not protect the community from rare events such as the 1-percent-annual-chance flood. The criteria use to evaluate protection against the 1-percent-annual-chance flood are 1) adequate design, including freeboard, 2) structural stability, and 3) proper operation and maintenance. Levees that do not protect against the 1-percent-annual-chance flood are not considered in the hydraulic analysis of the 1-percent-annual-chance floodplain.

In the communities of Pass Christian and Biloxi, a storm drainage system consisting of natural and manmade ditches handles storm runoff for the less intense rainfall events.

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 chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 1-percent-annual-chance flood in any 50-year period is approximately 40 percent (4 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community.

Pre-Countywide FIS Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The discharges were determined by the study contractor, and were based on a method presented in “Flood Frequency of Mississippi Streams” (Reference 17). These streams were Bernard Bayou, Brickyard Bayou, Canal No. 1, Canal No. 3, Cypress Creek, Howard Creek, Parker Creek, the Tchoutacabouffa River, Turkey Creek, and Wolf River. This report outlined methods of determining the 10-, 4-, and 1-percent-annual-chance discharges. The computed discharges for the 10-, 4-, and 1-percent-annual-chance frequencies were then graphically extrapolated on log-probability paper to determine the 0.2-percent-annual-chance discharges. The peak flows for the Biloxi River were based on the regional analysis (Reference 6). The regional analyses were made by using 104 gaging stations in the surrounding area. The hydrologic investigation was a part of the Special Flood Hazard Information Report for the Biloxi River (Reference 6).

The peak discharge for the remaining streams studied in detail was obtained by utilizing the U.S. Geological Survey (USGS) publication, “Floods in Mississippi, Magnitude and Frequency” (Reference 18).

This Countywide Analyses

Peak discharges for the streams studied by Limited detailed methods were calculated based on USGS regional regression equations (Reference 19).

For the discharges calculated based on regional regression equations, the rural regression values were updated to reflect urbanization as necessary.

A summary of the drainage area-peak discharge relationships for all the streams is shown in Table 3, “Summary of Discharges.”

TABLE 3. SUMMARY OF DISCHARGES

Detailed Studied Streams

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
BERNARD BAYOU					
At confluence	75.9	7,600	*	15,400	21,500
Just downstream of Three Rivers Road	33.8	4,930	6,750	10,200	15,000
At Three Rivers Road	10.6	4,600	6,300	9,300	13,500
At U.S. Highway 49	9.7	2,700	3,700	5,460	7,600
Just upstream of Old U.S. Highway 49	15.4	*	*	5,808	*
Just downstream of Canal Road	11.5	*	*	5,327	*
Just upstream of County Road	9.6	*	*	5,384	*
Just downstream of County Road	5.6	*	*	3,634	*

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
BERNARD BAYOU – continued					
Just downstream of Harrison County Farm Road	3.2	*	*	3,868	*
BILOXI RIVER					
At Three Rivers Road	240.3	17,000	26,000	31,000	43,800
Just upstream of the confluence of Little Biloxi River	163.1	13,900	21,500	25,200	36,500
Just downstream of the confluence of Saucier Creek	144.3	12,800	20,000	23,500	33,900
At U.S. Highway 49	96.6	10,200	15,700	19,000	27,200
At Lizana Saucier Road	83.3	9,300	14,800	17,500	25,800
BIG CREEK					
Approximately 1 mile upstream of the confluence with Wolf River	*	*	*	5,250	*
BRICKYARD BAYOU					
At Courthouse Road	5.5	1,370	1,960	2,190	2,780
At 37th Street	4.9	1,350	1,920	2,140	2,710
At 28th Street	3.7	1,230	1,720	1,920	2,400
At 25th Street	2.1	1,060	1,450	1,600	1,980
CANAL NO. 1					
At mouth	7.4	1,085	1,769	2,384	3,500
At Menge Road	6.1	947	1,541	2,121	3,150
At Espy Avenue	5.3	864	1,402	1,952	2,900
At Beatline Road	4.0	704	1,132	1,604	2,400
At Pineville Road	2.0	375	591	886	1,400
At Klondike Road	1.4	329	504	734	1,130
CANAL NO. 3					
At mouth	8.2	1,278	2,085	2,807	4,050
At Menge Road	5.4	1,005	1,619	2,210	3,270
At Espy Avenue	4.9	941	1,511	2,103	3,050
Approximately 0.5 mile upstream of Espy Avenue	4.1	783	1,253	1,782	2,630
At Beatline Road	2.7	532	843	1,221	1,750
At Daugherty Road	0.8	158	243	366	530

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
CHOCTAW CREEK					
Just downstream of Forestry Road	6.7	2,258	2,915	4,134	5,936
CROW CREEK					
Approximately 2 miles upstream of the confluence with Biloxi River	8.7	2,264	3,424	4,911	6,955
CYPRESS CREEK					
At Ramset Springs Road	8.9	1,760	2,420	3,645	5,300
FLAT BRANCH					
At confluence	13.6	2,535	3,450	5,075	7,000
Just downstream of O'Neal Road	*	*	*	4,900	*
FRITZ CREEK					
At Interstate 10	7.8	1,910	3,040	3,740	5,600
Just upstream of the confluence with Unnamed Tributary	3.3	1,040	1,620	1,960	2,800
FRITZ CREEK TRIBUTARY					
Just upstream of confluence with Fritz Creek	2.2	725	1,110	1,370	2,050
HICKORY CREEK					
Approximately 1 mile upstream of the confluence with Biloxi River	7.1	1,971	2,556	3,645	5,130
Just downstream of McHenry Road	3.9	1,783	2,289	3,312	4,715
HOG BRANCH					
Just upstream of White Plains Road	6.7	1,810	2,329	3,315	4,760
Just upstream of South Carr Bridge Road	4.2	1,500	1,932	2,760	3,956
HOWARD CREEK					
At Old Highway 67	4.1	1,375	1,794	2,490	3,400
Approximately 3.3 miles upstream of the confluence with Choctaw Creek	1.7	1,112	1,427	2,106	2,984

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
LITTLE BILOXI RIVER					
At confluence with Biloxi River	75.0	5,670	7,308	10,080	14,427
Approximately 2.8 miles upstream of the confluence with Biloxi River	71.6	5,775	7,392	10,230	14,652
Just downstream of Old Highway 49	64.7	5,658	7,245	10,143	14,490
Approximately 1 mile downstream of Harrison County Farm Road	59.2	5,616	7,200	10,080	14,328
Approximately 1.3 miles downstream Harrison County Farm Road	50.5	5,288	6,825	9,525	13,575
Just downstream of Lizana Saucier Road	45.3	5,280	6,800	9,520	13,600
Approximately 1 mile downstream of Herman Ladner Road	36.4	4,640	6,000	8,320	12,000
Just upstream of the confluence with Bully Creek	29.4	4,182	5,412	7,544	10,824
MILL CREEK					
Approximately 1.8 miles upstream of the confluence with Wolf River	*	*	*	4,870	*
PALMER CREEK					
Approximately 1 mile upstream of the confluence with Biloxi River	5.7	1,762	2,216	3,195	4,539
Approximately 0.5 mile upstream of Wortham Road	4.5	1,758	2,257	3,276	4,628
PARKER CREEK					
At Interstate 10	4.5	1,575	2,060	2,875	4,000
At Wolf Market Road	3.0	1,225	1,585	2,175	2,900
Approximately 0.6 mile upstream of U. S. Highway 67	1.48	720	1,075	1,565	2,232
Approximately 3.4 miles upstream of the confluence with Tchoutacabouffa River	0.77	785	988	1,496	2,128
POLE BRANCH					
Approximately 1 mile upstream of the confluence with Wolf River	*	*	*	485	*

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
SANDY CREEK					
Just upstream of Sandy Ridge Cemetery Road	*	*	*	4,228	*
SAUCIER CREEK					
Just upstream of Wortham Road	40.2	5,828	7,520	10,434	15,040
Just upstream of Saucier Fairly Road	36.3	6,264	8,046	10,608	15,300
Just downstream of Bethel Road	12.8	2,688	3,440	4,902	7,052
TCHOUTACABOUFFA RIVER					
At mouth	241.6	15,600	21,420	31,280	44,000
Just upstream of the confluence with Tuxachanie Creek	78.8	8,832	11,424	15,840	22,560
Just upstream of the confluence with Unnamed Tributary	48.8	8,400	9,450	13,125	18,900
TURKEY CREEK					
At Canal Road	14.8	2,200	*	4,600	6,600
At Washington Street	28.2	2,700	3,850	5,800	8,600
At Illinois Central Railroad	25.2	2,600	3,650	5,500	7,950
At Tillman Road Extension	11.5	2,020	2,790	4,200	6,000
At Interstate 10	6.0	1,620	2,500	3,300	5,200
Approximately 1 mile upstream of Landon Road	*	*	*	3,200	*
TUXACHANIE CREEK					
Approximately 1 mile upstream of the confluence with Tchoutacabouffa River	24.9	7,650	9,825	13,650	19,500
Just downstream of Old Highway 15	23.8	7,700	10,010	13,860	19,866
Just downstream of State Highway 15	22.2	8,019	10,368	14,418	20,574
Just downstream of the confluence with Hog Branch	20.5	8,256	10,664	14,706	21,070
Just upstream of White Plains Road	19.4	7,783	9,976	13,846	19,780
Just downstream of Carr Bridge Road	16.0	6,930	8,910	12,420	17,820
Just downstream of the confluence of Choctaw Creek	13.2	7,000	9,100	12,500	18,000

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
WEST CREEK					
Approximately 1 mile upstream of the confluence with Saucier Creek	15.9	3,337	4,277	6,110	8,648
WOLF RIVER					
At Interstate 10	348.2	16,380	21,150	27,860	38,400
Just downstream of the confluence with Big Creek	*	*	*	25,212	*
Approximately 3.25 miles upstream of the confluence with Sandy Creek	*	*	*	24,850	*

Limited Detailed Studied Streams

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
BERNARD BAYOU					
Approximately 750 ft upstream of Mennonite Road	1.0	*	*	916	*
BERNARD BAYOU TRIBUTARY 3					
Just upstream of the confluence with Bernard Bayou	2.8	*	*	2,376	*
Just upstream of the confluence with Bernard Bayou Tributary 4	1.5	*	*	1,391	*
Approximately 4,250 ft upstream of Orange Grove Road	1.0	*	*	1,140	*
BERNARD BAYOU TRIBUTARY 4					
Just upstream of the confluence with Bernard Bayou Tributary 3	1.3	*	*	1,371	*
Approximately 1,750 ft upstream of Orange Grove Road	1.0	*	*	1,165	*
Approximately 1,500 ft downstream of Robinson Road	0.3	*	*	399	*

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Limited Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
BERNARD BAYOU TRIBUTARY 5					
Approximately 200 ft upstream of the confluence with Bernard Bayou Tributary 4	0.5	*	*	651	*
BERNARD BAYOU TRIBUTARY 6					
At the confluence with Bernard Bayou	0.3	*	*	589	*
BIG CREEK					
Approximately 4.5 miles upstream of the confluence with Wolf River	5.4	*	*	5,250	*
BILOXI RIVER					
Approximately 3,900 ft downstream of Pete Hickman Road	59.0	*	*	12,804	*
BRICKYARD BAYOU					
Just downstream of 21st Street	1.0	*	*	1,307	*
CROW CREEK					
Approximately 3.6 miles upstream of the confluence with Biloxi River	5.8	*	*	2,613	*
FLAT BRANCH					
At confluence with Flat Branch Tributary 2	4.2	*	*	2,293	*
Approximately 650 ft upstream of the confluence with Flat Branch Tributary 3	2.9	*	*	1,686	*
FLAT BRANCH TRIBUTARY 1					
At confluence with Flat Branch	1.6	*	*	1,844	*
Approximately 1,150 ft upstream of Saint Charles Street	1.1	*	*	1,390	*

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Limited Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
FLAT BRANCH TRIBUTARY 2					
At confluence with Flat Branch	1.4	*	*	1,224	*
FRITZ CREEK					
Approximately 1,600 ft downstream of O'Neal Road	2.3	*	*	1,895	*
Approximately 5,000 ft upstream of O'Neal Road	1.3	*	*	1,386	*
FRITZ CREEK TRIBUTARY 1					
Approximately 800 ft downstream of O'Neal Road	0.2	*	*	408	*
FRITZ CREEK TRIBUTARY 2					
Approximately 300 ft upstream of the confluence with Fritz Creek	0.3	*	*	446	*
HOG BRANCH					
Approximately 0.6 mile upstream of South Carr Bridge Road	3.0	*	*	1,716	*
Approximately 1.9 miles upstream of South Carr Bridge Road	2.1	*	*	1,421	*
LITTLE BILOXI RIVER					
Approximately 750 ft downstream of McHenry Road	22.3	*	*	6,427	*
MILL CREEK					
Approximately 1.4 mi upstream of State Highway 53	3.9	*	*	4,870	*
PALMER BRANCH					
Approximately 2,400 ft upstream of Wortham Road	4.7	*	*	3,276	*
Approximately 6,100 ft upstream of Wortham Road	3.9	*	*	2,319	*

*Data not available

TABLE 3. SUMMARY OF DISCHARGES - continued

Limited Detailed Studied Streams - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs) 10-percent	2-percent	1-percent	0.2-percent
POLE BRANCH					
Just upstream of Cable Bridge Road	3.2	*	*	2,771	*
SAUCIER CREEK					
Approximately 3,200 ft upstream of State Highway 67	10.4	*	*	3,930	*
TCHOUTACABOUFFA RIVER					
At confluence with Hurricane Creek	21.8	*	*	7,991	**
Just upstream of the confluence with Railroad Creek	3.5	*	*	1,764	*
TUXACHANIE CREEK					
Approximately 1,800 ft downstream of Bethel Road	38.4	*	*	9,613	*
Just upstream of the confluence with Baymond Branch	27.8	*	*	7,589	*
Approximately 2.8 mi upstream of the confluence with Baymond Branch	21.1		*	6,622	*

*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 Flood Insurance Rate Map (FIRM) represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS report in conjunction with the data shown on the FIRM.

Pre-countywide FIS Analyses

Analyses of the hydraulic characteristics of flooding from the riverine sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the water-surface elevation analyses of Bernard Bayou, the Biloxi River, portions of Canal No. 1, Canal No. 3, Cypress Creek, Howard Creek, Parker Creek, the Tchoutacabouffa River (Reference 20), Turkey Creek, and the Wolf River were obtained from field surveys. The remaining cross sections for Canal No. 1 were obtained from the U. S. Soil Conservation Service (SCS) in Jackson (References 21 and 22). All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry.

For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are shown on the FIRM (Exhibit 3).

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (Reference 23). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations were calculated using the slope-area method with the exception of the 10- and 4-percent-annual-chance floods for Bernard Bayou, and the 10-percent-annual-chance flood for Brickyard Bayou and the Tchoutacabouffa River. For the 10-percent-annual-chance flood, a mean tide elevation of 0.15 foot NGVD29 was used as starting water-surface elevation because the slope-area method resulted in a water-surface elevation lower than the mean tide elevation.

Roughness factors (Manning’s n) used in hydraulic computations were chosen based on field observations of the channel and overbank areas.

Water-surface elevations of each stream previously studied by the SCS were computed by establishing rating curves for each cross section. These elevations were plotted and connected to form flood profiles.

Water-surface elevations of floods of the selected recurrence intervals of the streams studied in detail were computed through use of the COE HEC-2 step-backwater computer program (Reference 23). The starting water-surface elevations for Old Fort Bayou were calculated using the slope-area method, with exception of the 10-percent-annual-chance frequency flood. The mean high tide elevation of 0.15 foot NGVD29 was used as the starting water-surface elevation for the 10-percent-annual-chance frequency flood because the water-surface elevation computed by the slope-area method was lower than this.

This Countywide Analyses

Cross section geometries were obtained from a combination of terrain data and field surveys. Bridges and culverts located within the Limited detailed study limits were field surveyed to obtain elevation data and structural geometry.

Downstream boundary conditions for the hydraulics models were set to normal depth using a starting slope calculated from values taken from topographic data, or where applicable, derived from the water-surface elevations of existing effective flood elevations or recalculated flood elevations. Water-surface profiles were computed through the use of USACE HEC-RAS version 3.1.2 computer program (Reference 24). The model was run for the 1-percent-annual-chance storm for the Limited detailed and approximate studies.

Manning's n values used in the hydraulic computations for both channel and overbank areas were based on recent digital orthophotography and field investigations.

Table 4, "Summary of Roughness Coefficients," shows the ranges of the channel and overbank roughness factors used in the computations for all of the streams studied by Detailed and Limited detailed methods.

TABLE 4. SUMMARY OF ROUGHNESS COEFFICIENTS

Detailed Studied Streams

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
Bernard Bayou	0.035-0.080	0.030-0.100
Biloxi River	0.050-0.120	0.080-0.310
Brickyard Bayou	0.035-0.060	0.050-0.100
Canal No. 1	0.040-0.070	0.100-0.150
Canal No. 3	0.050-0.070	0.090-0.150
Cypress Creek	0.050-0.070	0.120-0.150
Flat Branch	0.040-0.045	0.080
Fritz Creek	0.040-0.045	0.075-0.080
Fritz Creek Tributary 1	0.020-0.055	0.075-0.080
Howard Creek	0.050-0.070	0.120-0.150
Parker Creek	0.012-0.060	0.075-0.150
Tchoutacabouffa River	0.030	0.070-0.120
Turkey Creek	0.035-0.055	0.060-0.100
Wolf River	0.030	0.070-0.120

Limited Detailed Studied Streams

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
Bernard Bayou	0.045	0.080
Bernard Bayou Tributary 3	0.045	0.080
Bernard Bayou Tributary 4	0.045	0.080
Bernard Bayou Tributary 5	0.030 - 0.040	0.120
Bernard Bayou Tributary 6	0.045	0.080
Big Creek	0.050	0.120-0.130
Biloxi River	0.050	0.120
Brickyard Bayou	0.040-060	0.080 - 0.150
Crow Creek	0.050	0.120
Flat Branch	0.045	0.080
Flat Branch Tributary 1	0.018 - 0.045	0.100 - 0.150
Flat Branch Tributary 2	0.045	0.080
Fritz Creek	0.050	0.080
Fritz Creek Tributary 1	0.050	0.080 - 0.100

TABLE 4. SUMMARY OF ROUGHNESS COEFFICIENTS - continued

Limited Detailed Studied Streams - continued

FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
Fritz Creek Tributary 2	0.050	0.080
Hickory Creek	0.060	0.150
Hog Branch	0.050	0.100
Little Biloxi River	0.050	0.150
Mill Creek	0.050	0.150
Palmer Branch	0.050	0.150
Parker Creek	0.050	0.120
Pole Branch	0.050	0.100 - 0.120
Sandy Creek	0.040	0.120
Saucier Creek	0.050	0.150
Tchoutacabouffa River	0.050	0.150
Tuxachanie Creek	0.050	0.100
West Creek	0.050	0.150

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 was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 3).

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the Flood Profiles (Exhibit 1) are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to NAVD88.

Coastal Analysis

The hydraulic characteristics of flooding from the sources studied were analyzed 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 in the coastal data tables and flood profiles in the FIS report.

Storm Surge Analysis and Modeling

For areas subject to tidal inundation, the 10-, 2-, 1-, and 0.2-percent-annual-chance stillwater elevations and delineations were taken directly from a detailed storm surge study documented in the Technical Study Data Notebook (TSDN) for this new Mississippi coastal flood hazard study.

The Advanced Circulation model for Coastal Ocean Hydrodynamics (ADCIRC) (Reference 25), developed by the USACE, was selected to develop the stillwater elevations or storm surge levels for coastal Mississippi. ADCIRC uses an unstructured grid and is a finite-element long wave model. ADCIRC has the capability to simulate tidal circulation and storm surge propagation over large areas and is able to provide highly detailed resolution along the shorelines and areas of interest along the open coast and inland bays. It solves three dimensional equations of motion, including tidal potential, Coriolis, and nonlinear terms of the governing equations. The model is formulated from the depth averaged shallow water equations for conservation of mass and momentum which results in the generalized wave continuity equation.

The coastal wave model Simulating Waves Nearshore (SWAN) (Reference 26) is used to calculate the nearshore wave fields required for the addition of wave setup effects. This numerical model is a third-generation (phase-averaged) wave model for the simulation of waves in waters of extreme, intermediate, and finite depths. Model characteristics include the capping of the atmospheric drag coefficient, dynamic adjustment of bathymetry for changing water levels, and specification of the required save points. Three nested grids are used to obtain sufficient nearshore resolution to represent the radiation stress gradients required as ADCIRC inputs. Radiation stress fields output from the SWAN inner grids are used by ADCIRC to estimate the contribution of breaking waves (wave setup effects) to the total storm surge water level.

In order to model storm surge and wave fields using ADCIRC and SWAN, wind and pressure fields are required for input. A model called the Planetary Boundary Layer model (PBL), developed by V.J. Cardone (Reference 27), uses the parameters from a hurricane or storm to simulate the event and develop wind and pressure fields. The PBL model simulates hurricane induced wind and pressure fields by applying the vertically integrated equations of motion. Oceanweather Inc. provided support to run the PBL model and provide wind and pressure fields for each of the selected storms events.

The Joint Probability Method (JPM) was used to develop the stillwater frequency curves for the 10-, 2-, 1-, and 0.2-percent-annual-chance stillwater elevations. The original JPM application, while not called JPM, was developed by Larry Russell (Reference 28). The JPM approach is a simulation methodology that relies on the development of statistical distributions of key hurricane input variables such as central pressure, radius to maximum wind speed, maximum wind speed, translation speed, track heading, etc., and sampling from these distributions to develop model hurricanes. The resulting simulation results in a family of modeled storms that preserve the relationships between the various input model components, but provides a means to model the effects and probabilities of storms that historically have not occurred. The JPM approach was modified for this coastal study based on updated statistical methods developed by FEMA and the USACE for Mississippi and Louisiana. Further details on the JPM approach are included in the Technical Support Data Notebook (TSDN).

An existing ADCIRC grid mesh developed by the USACE was refined along the shoreline of Mississippi and surrounding areas using bathymetric and topographic data from various sources. Bathymetric data consisted of ETOPO5 and Digital Nautical Charts databases in the offshore regions, and was supplemented with NOAA hydrographic surveys. In the nearshore regions, bathymetric data came from the Northern Gulf Littoral Initiative, Naval Oceanographic Office multi-beam and single-beam bathymetry, NOAA bathymetric surveys, and NOAA charts. The topographic portion of the ADCIRC mesh was populated with topographic light detection and ranging (LIDAR) from several sources. For areas inland of the debris line from Hurricane Katrina, pre-Katrina LIDAR collected by EarthData International was used. For areas seaward of the debris line from Hurricane Katrina, post-Katrina LIDAR collected by Woolpert Inc. was used. For the offshore barrier islands, topographic data was taken from LIDAR collected by the USACE. For rivers, channel bottom elevations were taken from riverine profiles from effective FISs. All bathymetric and topographic data were brought to the NAVD88 datum for input to ADCIRC and SWAN. Further details about the terrain data and how it was processed can be found in the TSDN for this study.

The completed ADCIRC grid mesh resulted in a finite element model coded with over 900,000 grid nodes. The NOAA high definition vector shoreline was used to define the change between water and land elements. The grid includes other features, such as islands, roads, bridges, open waters, bays, and rivers. Field reconnaissance detailed the significant drainage and road features, and documentation of coastal structures in the form of seawalls, bulkheads, harbors, and casinos along the beachfront areas. The National Land Cover Dataset was used to define Manning's n values for bottom roughness coefficients input at each node in the mesh. A directional surface wind roughness value was also applied. Further details about the ADCIRC mesh creation and grid development process can be found in the TSDN.

Predicted tidal cycles were used to calibrate the ADCIRC model and refine the grid. Tidal boundary conditions were obtained from the EastCoast2001 tidal database, a digital tidal constituent database. Six tidal constituents were used (K1, O1, M2, S2, N2, and K2). The simulated water-surface elevation time series was compared to measured tides from tide gauge stations for over a 30-day period. Model validation, which tests the model hydraulics and ability to reproduce events, was performed against Hurricanes Katrina (2005), Betsy (1965), and Camille (1969). Simulated water levels for each event were compared to observed water levels from NOAA tidal gauges, as well as available high water marks. Hurricanes Georges and Katrina were used to validate the SWAN model. Modeled wave heights were compared to available historic wave data from NOAA wave buoys.

The SWAN model, used to calculate the wave setup component, used the same topographic and bathymetry data as the ADCIRC grid. The model is forced with wind and pressure fields and deepwater waves calculated by the WAM model from Oceanweather Inc. Results from the SWAN model, run on a low resolution grid, are input to a low resolution ADCIRC grid. Then the water level and wave effects results from ADCIRC are input to a high resolution SWAN grid to obtain the final radiation stress input for a high resolution ADCIRC grid. This process is repeated for the production run of each of the hundreds of synthetic hurricane simulations. The final radiation stress files are also modified to decrease the magnitude of wave radiation stress in vegetated areas before being input to ADCIRC.

Statistical Analysis

Due to the excessive number of simulations required for the traditional JPM method, the Joint Probability Method-Optimum Sampling (JPM-OS) was utilized to determine the stillwater elevations associated with tropical events. JPM-OS is a modification of the JPM method developed cooperatively by FEMA and the USACE for Mississippi and Louisiana coastal flood studies that were being performed simultaneously, and is intended to minimize the number of synthetic storms that are needed as input to the ADCIRC model. The methodology entails sampling from a distribution of model storm parameters (e.g., central pressure, radius to maximum wind speed, maximum wind speed, translation speed, and track heading) whose statistical properties are consistent with historical storms impacting the region, but whose detailed tracks differ. The methodology inherently assumes that the hurricane climatology over the past 60 to 65 years (back to 1940) is representative of the past and future hurricanes likely to occur along the Mississippi coast.

Production runs were carried out with SWAN and ADCIRC on a set of hypothetical storm tracks and storm parameters in order to obtain the maximum water levels for input to the statistical analysis. The hypothetical (synthetic) population of storms was divided into two groups, one for hurricanes of Saffir-Simpson scale Category 3 and 4 strength or "greater storms" and another set for hurricanes of Category 2 strength or "lesser storms." The parameters for each group of the greater storms and lesser storms are provided in Table 5, "Parameter Values for Surge Elevations." A total of 228 individual storms with different tracks and various combinations of the storm parameters were chosen for the production run set of synthetic hurricane simulations. Each storm was run for at least 3 days of simulation and did not include tidal forcing. Wind and pressure fields obtained from the PBL model and wave radiation stress from the SWAN model were input to the ADCIRC model for each production storm. All stillwater results for this study include the effects of wave setup; stillwater without wave effects was not simulated with ADCIRC. Stations for maximum water-surface output were selected on a 500-meter grid with additional stations along drainage features. This resulted in a total of 4,205 stations where the JPM-OS method was applied to obtain return periods of the stillwater elevation. Further details about the production run process can be found in the TSDN.

Stillwater Elevations

The results of the ADCIRC model, as described above, provided stillwater elevations, including wave setup effects that are statistically analyzed to produce probability curves. The JPM-OS is applied to obtain the return periods associated with tropical storm events. The approach involves assigning statistical weights to each of the simulated storms and generating the flood hazard curves using these statistical weights. The statistical weights are chosen so that the effective probability distributions associated with the selected greater and lesser storm populations reproduce the modeled statistical distributions derived from all historical storms.

Stillwater elevations for each of the respective coastal counties of Mississippi (Hancock, Harrison, and Jackson Counties), obtained using the ADCIRC and JPM-OS models, are provided for JPM and ADCIRC grid node locations for the 10-, 2-, 1-, or 0.2-percent-annual-chance return period stillwater elevations in the "Summary of Stillwater Elevations" table in the TSDN. The location of these JPM and ADCIRC grid node stations for each set of return period elevations are listed by their geographic (longitude, latitude) coordinates for reference. A detailed accounting of the statistical analysis and final return period elevations are included in the TSDN.

	TABLE 5. PARAMETER VALUES FOR SURGE ELEVATIONS (Greater Storms)											
	Holland's B		Radius of the scale pressure profile (Nmi)		Sea level pressure (mb)		Forward Speed	Storm Direction	Pre-Filling Model	Post-Filling Model		Annual Rate
Track:	Offshore	Landfall	Offshore	Landfall	Offshore	Landfall	(m/s)	(Degree)			Prob.	(#Storm/Km/year)
1	1.27	1.00	18.61	24.20	933.70	946.31	6.047	-38.91	R	V	1.33E-01	1.32E-03
2	1.27	1.00	39.82	51.80	937.80	955.83	6.047	-13.49	R	V	1.20E-01	2.55E-03
3	1.27	1.00	22.93	29.80	946.30	963.28	6.047	-38.92	R	V	1.33E-01	1.63E-03
4	1.27	1.00	10.83	14.40	950.80	955.83	6.047	-13.49	R	V	1.20E-01	6.94E-04
5	1.27	1.00	20.77	27.00	941.10	955.83	6.047	56.66	R	V	1.08E-01	1.19E-03
6	1.27	1.00	14.70	19.10	911.30	920.05	5.943	-12.81	R	V	3.42E-02	2.68E-04
7	1.27	1.00	30.80	40.00	916.40	934.41	6.014	-12.82	R	V	5.34E-02	8.77E-04
8	1.27	1.00	16.56	21.50	923.80	934.41	4.349	47.33	R	V	4.20E-02	3.71E-04
9	1.27	1.00	8.90	8.90	934.40	934.41	6.014	-12.82	R	V	5.34E-02	2.54E-04
10	1.27	1.00	16.56	21.50	923.80	934.41	14.540	-12.86	R	V	3.49E-02	3.08E-04
11	1.27	1.00	17.98	23.40	931.00	942.98	5.943	-12.82	R	V	3.42E-02	3.28E-04
12	1.27	1.00	16.56	21.50	923.80	934.41	4.346	-71.04	R	V	4.20E-02	3.71E-04
13	1.27	1.00	11.66	15.20	878.60	884.30	5.943	-12.81	R	V	1.06E-02	6.58E-05
14	1.27	1.00	25.30	32.90	891.30	909.30	6.014	-12.82	R	V	1.65E-02	2.23E-04
15	1.27	1.00	13.60	17.70	901.70	909.30	4.349	47.33	R	V	1.30E-02	9.44E-05
16	1.27	1.00	7.31	7.30	909.30	909.30	6.014	-12.82	R	V	1.65E-02	6.44E-05
17	1.27	1.00	13.60	17.70	901.70	909.30	14.540	-12.86	R	V	1.08E-02	7.83E-05
18	1.27	1.00	14.53	18.90	910.00	918.53	5.943	-12.82	R	V	1.06E-02	8.20E-05
19	1.27	1.00	13.60	17.70	901.70	909.30	4.346	-71.04	R	V	1.30E-02	9.43E-05

TABLE 5. PARAMETER VALUES FOR SURGE ELEVATIONS (Lesser Storms)

Track:	Holland's B Offshore	Holland's B Landfall	Radius of the scale pressure profile (Nmi) Offshore	Radius of the scale pressure profile (Nmi) Landfall	Sea level pressure (mb) Offshore	Sea level pressure (mb) Landfall	Forward Speed (m/s)	Storm Direction (Degree)	Pre-Filling Model	Post-Filling Model	Prob.	Annual Rate (#Storm/Km/year)
1	1.27	1.00	41.59	54.10	948.60	966.62	5.42	8.76	R	V	7.29E-02	1.80E-03
2	1.27	1.00	53.63	69.70	957.20	975.25	3.00	23.55	R	V	6.45E-02	2.05E-03
3	1.27	1.00	21.64	28.10	953.10	968.72	3.40	63.87	R	V	7.18E-02	9.23E-04
4	1.27	1.00	12.72	16.50	965.60	972.29	4.93	-9.32	R	V	9.11E-02	6.88E-04
5	1.27	1.00	44.24	57.50	963.20	981.22	4.88	-11.27	R	V	6.85E-02	1.80E-03
6	1.27	1.00	17.19	22.40	969.70	980.89	6.10	31.22	R	V	4.98E-02	5.08E-04
7	1.27	1.00	24.32	31.60	960.30	978.33	6.94	-71.07	R	V	7.55E-02	1.09E-03
8	1.27	1.00	16.94	22.00	954.50	965.47	4.38	-31.63	R	V	5.07E-02	5.10E-04
9	1.27	1.00	27.82	36.20	952.90	970.91	3.71	-59.19	R	V	1.18E-01	1.95E-03
10	1.27	1.00	24.31	31.60	960.30	978.33	2.46	-5.25	R	V	7.55E-02	1.09E-03
11	1.27	1.00	21.64	28.10	953.10	968.72	10.50	-13.83	R	V	7.18E-02	9.23E-04
12	1.27	1.00	53.63	69.70	957.20	975.25	7.89	-45.75	R	V	6.45E-02	2.05E-03
13	1.27	1.00	29.79	38.70	958.00	975.96	6.64	46.64	R	V	1.26E-01	2.22E-03

Wave Height Analysis

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (Reference 29). The 3-foot wave has been established as the minimum size wave capable of causing major damage to conventional wood frame and brick veneer structures.

Figure 1 shows a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Figure 1 also illustrates the relationship between the local stillwater elevation, the ground profile, and the location of the V/A boundary. This inland limit of the coastal high hazard area is delineated to ensure that adequate insurance rates apply and appropriate construction standards are imposed, should local agencies permit building in this coastal high hazard area.

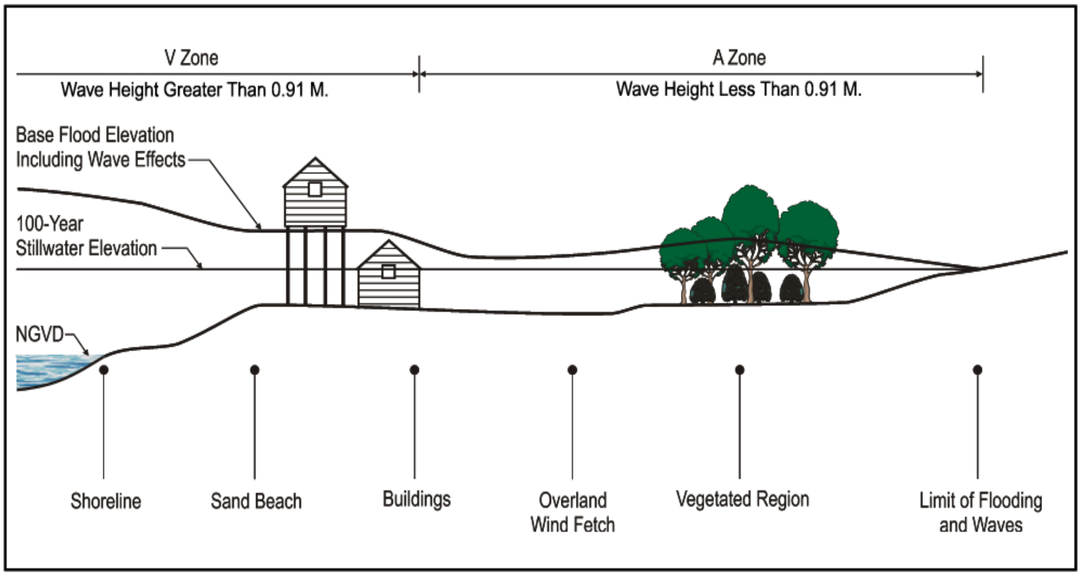


FIGURE 1. TRANSECT SCHEMATIC

Offshore wave characteristics representing a 1- and 0.2-percent-annual-chance flood event were determined using the SWAN 2-D wave model previously used for the wave setup modeling. The results from SWAN modeling for the storm surge study were used to apply a statistical analysis on the wave heights. Mean wave characteristics were determined as specified in the FEMA guidance for V-Zone mapping:

$$H_{bar} = (h_s)(0.625)$$
$$T_{bar} = (T_s)(0.85)$$

Wave H_{bar} is the average wave height of all waves, H_s is the significant wave height or the average over the highest one third of waves, T_{bar} is the average wave period, and T_s is the significant wave associated with the significant wave height.

The wave transects for this study were located considering the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, the transects were spaced at larger intervals. Transects are also located in areas where unique flooding existed and in areas where computer wave heights varied significantly between adjacent transects. Transects are shown on the respective FIRM panels for incorporated areas and unincorporated areas of Harrison, Hancock, and Jackson Counties.

The transect profiles were obtained using bathymetric and topographic data from various sources. Bathymetric data consisted of the Northern Gulf Littoral Initiative (NGLI), which reflects data gathered by multiple Federal and State agencies, universities, and private contractors. The NGLI data were augmented, where necessary, by NOAA navigation charts. The topographic data sources included pre-Hurricane Katrina LIDAR data, which were collected between 2003 and 2005 by the State of Mississippi and the NOAA, and were merged with post-Katrina (September-October 2005) LIDAR data collected along the coast by the USACE. All bathymetric and topographic data were brought to the NAVD88.

Post-Katrina aerial imagery was also utilized. This imagery, dated September 15, 2005, originated from the U.S. Department of Agriculture and was used to define features such as buildings, forested vegetation, and mash grass for input to the wave height models. Detailed information about the features, such as building types and density and vegetation types was gathered during a ground field reconnaissance performed along each transect.

Standard erosion methods defined by FEMA are typically applied to new coastal studies. However, since post-Katrina topographic LIDAR is being used for the transect profiles, it was assumed that the topographic data already represented eroded conditions (post-Katrina) that match that of a 1-percent annual chance event. Thus, no storm-induced erosion analysis was performed for this study. Primary frontal dune mapping was only applied along a segment of the coast in Jackson County, but was not applied anywhere else along the coast of Mississippi due to post-Katrina erosion impacts.

Wave height calculation used in this study follows the methodology described in the Appendix D of the 2003 FEMA Guidelines and Specifications for Flood Hazard Mapping Partners (Reference 30). WHAFIS 4.0 was used to calculate overland wave height propagation and establish base flood elevations. In addition to the 1-percent-annual-chance event, the 0.2-percent-annual-chance event was also modeled with WHAFIS 4.0. The 0.2-percent wave height results are not included on the FIRMs but are provided as wave transect profiles in this FIS.

Stillwater elevations were applied to each ground station along a transect and input to WHAFIS. The stillwater elevations were obtained from the storm surge study at each station where return periods were calculated and values were interpolated between stations to the transects locations. Wave setup was not calculated separately because wave setup was included in the base stillwater elevations from the storm surge analysis.

Wave runup was calculated at selected transects where the slope was steeper than 1 on 10. FEMA “Procedure Memorandum No. 37” (Reference 31) now recommends the use of the 2-percent wave runup for determining base flood elevations. The 2-percent wave runup was determined using the Technical Advisory Committee for Water Retaining Structures (TAW) method (Reference 32). For wave runup at the crest of a slope that transitions to a plateau or downslope, runup values were determined using the "Methodology for wave runup on a hypothetical slope" as described in Appendix D of the 2003 FEMA Guidelines and Specifications for Flood Hazard Mapping Partners (Reference 30).

Along each transect, wave envelopes were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. Between transects, elevations were interpolated using topographic maps, land-use and land-cover data, and engineering judgment to determine the aerial extent of flooding. The results of the calculations are accurate until local topography, vegetation, or cultural developments within the community undergo major changes. The transect data for Harrison County is presented in Table 6, "Coastal Data Table," where the flood hazard zone and base flood elevations for each transect flooding source is provided. This table also describes the location of each transect, and provides the 10-, 2-, 1-, and 0.2-percent-annual-chance stillwater elevations at the start of the transect and the range found along the length of the transect.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the finalization of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

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

TABLE 6. COASTAL DATA TABLE

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Unincorporated Harrison County	1	St. Louis Bay/Gulf of Mexico at Pine Hills Blvd	(30.3739, -89.3334)	5.6 5.6-5.6	15.7 15.7-15.8	18.6 18.6-18.8	23.6 23.6-23.8	VE 21-26 AE 19-21
Unincorporated Harrison County	2	St. Louis Bay/Gulf of Mexico at Pine Hills Road	(30.3748, -89.3198)	5.6 5.5-5.6	15.7 15.7-15.9	18.7 18.6-18.8	23.6 23.6-23.9	VE 21-26 AE 19-21
Unincorporated Harrison County	3	St. Louis Bay/Gulf of Mexico east of Pine Hills Road	(30.3747, -89.3122)	5.6 5.5-5.6	15.6 15.6-15.9	18.4 18.1-18.7	23.6 23.6-24.0	VE 21-26 AE 18-21
Unincorporated Harrison County	4	St. Louis Bay/Gulf of Mexico south of Kiln Delisle Rd	(30.3664, -89.3001)	5.6 5.6-5.6	15.4 15.4-15.8	18.2 17.8-18.4	23.4 23.4-23.8	VE 20-25 AE 18-20
Unincorporated Harrison County	5	St. Louis Bay/Gulf of Mexico south of Kiln Delisle Rd	(30.3658, -89.2935)	5.6 5.6-5.6	15.3 15.3-15.6	18.1 18.1-18.5	23.3 23.3-23.8	VE 21-25 AE 18-21

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Unincorporated Harrison County	6	St. Louis Bay/Gulf of Mexico south of Kiln Delisle Rd	(30.3611, -89.2882)	5.6 5.6-5.6	15.2 15.2-15.5	18.0 18.0-18.4	23.2 23.2-23.8	VE 21-25 AE 18-20
Unincorporated Harrison County	7	St. Louis Bay/Gulf of Mexico west of Wittman Road	(30.3474, -89.2763)	5.6 5.6-5.6	15.0 15.0-15.4	17.8 17.8-18.2	22.9 22.9-23.8	VE 20-24 AE 18-20
Unincorporated Harrison County	8	Gulf of Mexico/Mississippi Sound at 1st Street	(30.3061, -89.2936)	5.6 5.6-5.6	15.0 14.8-15.0	17.7 17.6-17.8	22.8 22.6-23.0	VE 20-26 AE 19-20
Unincorporated Harrison County	9	Gulf of Mexico/Mississippi Sound at 4th Street	(30.3123, -89.2508)	5.7 5.6-5.7	15.1 14.8-15.2	17.9 17.6-18.2	23.0 23.0-23.9	VE 20-26 AE 18-20
Unincorporated Harrison County	10	Gulf of Mexico/Mississippi Sound at Lady Mary Ave	(30.3145, -89.2426)	5.7 5.6-5.7	15.1 14.8-15.1	17.9 17.6-17.9	23.1 22.6-23.8	VE 20-26 AE 18-20

<u>**TABLE 6 COASTAL DATA TABLE (Cont.)**</u>

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Pass Christian, City of Harrison County	11	Gulf of Mexico/Mississippi Sound east of Brown Ave	(30.3169, -89.2352)	5.8 5.6-5.8	15.1 14.8-15.2	17.9 17.6-17.9	23.2 22.5-23.2	VE 20-26 AE 18-20
Pass Christian, City of Harrison County	12	Gulf of Mexico/Mississippi Sound at Jackson Ave	(30.3196, -89.2279)	5.8 5.5-5.8	15.2 14.8-15.3	17.9 17.6-18.2	23.2 22.6-23.4	VE 20-26 AE 18-20
Pass Christian, City of Harrison County	13	Gulf of Mexico/Mississippi Sound at Clarence Ave	(30.3225, -89.2207)	5.8 5.4-5.8	15.2 14.8-15.3	18.4 17.6-18.4	23.2 22.6-23.5	VE 20-27 AE 18-20
Pass Christian, City of Harrison County	14	Gulf of Mexico/Mississippi Sound east of Church St	(30.3245, -89.2131)	5.9 5.3-5.9	15.2 14.8-15.4	18.4 17.5-18.4	23.6 22.5-23.6	VE 20-27 AE 18-20
Pass Christian, City of Harrison County	15	Gulf of Mexico/Mississippi Sound west of Davis Ave	(30.3265, -89.2055)	5.9 5.4-5.9	15.2 14.7-15.3	18.0 17.4-18.0	23.6 22.5-23.6	VE 20-26 AE 18-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Pass Christian, City of Harrison County	16	Gulf of Mexico/Mississippi Sound at Seal Ave	(30.3285, -89.1980)	5.9 5.4-5.9	15.1 14.7-15.2	18.0 17.4-18.2	23.4 22.5-23.5	VE 20-26 AE 18-20
Pass Christian, City of Harrison County	17	Gulf of Mexico/Mississippi Sound at Courtenay Ave	(30.3305, -89.1904)	5.9 5.5-5.9	15.1 14.7-15.1	18.0 17.4-18.0	23.4 22.5-23.4	VE 20-26 AE 18-20
Pass Christian, City of Harrison County	18	Gulf of Mexico/Mississippi Sound east of Lang Ave	(30.3320, -89.1827)	5.9 5.2-5.9	15.1 14.5-15.1	18.0 17.3-18.1	24.1 22.3-24.1	VE 20-26 AE 17-20
Pass Christian, City of Harrison County	19	Gulf of Mexico/Mississippi Sound east of Menge Rd	(30.3349, -89.1755)	6.0 5.2-6.0	15.1 14.5-15.1	18.0 17.3-18.0	23.5 22.4-23.6	VE 20-26 AE 17-20
Pass Christian, City of Harrison County	20	Gulf of Mexico/Mississippi Sound at Wisteria Dr	(30.3376, -89.1682)	6.0 4.9-6.0	15.1 14.4-15.1	18.0 17.2-18.0	23.8 22.3-23.8	VE 20-26 AE 17-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Pass Christian, City of Harrison County	21	Gulf of Mexico/Mississippi Sound at Least Tern Dr	(30.3400, -89.1608)	6.0 6.0-6.0	15.3 14.3-15.3	18.0 17.0-18.0	23.5 21.9-23.7	VE 20-26 AE 17-20
Pass Christian, City of Harrison County	22	Gulf of Mexico/Mississippi Sound at Hayden Ave	(30.3427, -89.1535)	6.0 4.5-6.0	15.3 14.3-15.3	18.0 17.2-18.0	23.7 21.9-24.1	VE 20-26 AE 17-20
Long Beach, City of Harrison County	23	Gulf of Mexico/Mississippi Sound at White Harbor Rd	(30.3447, -89.1459)	6.0 6.0-6.0	15.1 14.3-15.3	18.0 17.9-18.0	23.5 21.1-23.6	VE 20-26 AE 18-20
Long Beach, City of Harrison County	24	Gulf of Mexico/Mississippi Sound at Arbor Station Dr	(30.3477, -89.1391)	6.0 3.9-6.0	15.2 14.1-15.2	18.0 17.6-18.0	23.6 20.0-23.5	VE 20-26 AE 18-20
Long Beach, City of Harrison County	25	Gulf of Mexico/Mississippi Sound at Boggs Dr	(30.3511, -89.1320)	6.0 6.0-6.0	15.3 13.9-15.3	18.0 17.5-18.4	23.5 20.6-23.5	VE 20-26 AE 18-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Long Beach, City of Harrison County	26	Gulf of Mexico/Mississippi Sound at West Ave	(30.3541, -89.1249)	6.0 6.0-6.0	15.3 13.6-15.9	18.0 17.8-19.8	23.5 21.5-24.0	VE 20-25 AE 18-20
Long Beach, City of Harrison County	27	Gulf of Mexico/Mississippi Sound at Russell Ave	(30.3556, -89.1173)	6.0 6.0-6.0	15.4 13.3-15.8	18.4 18.3-19.6	23.9 22.5-23.9	VE 20-26 AE 18-20
Long Beach, City of Harrison County	28	Gulf of Mexico/Mississippi Sound west of S. Burke Ave	(30.3583, -89.1100)	6.0 6.0-6.0	15.3 15.3-15.4	18.4 18.1-18.4	23.8 21.7-23.7	VE 20-26 AE 18-20
Long Beach, City of Harrison County	29	Gulf of Mexico/Mississippi Sound at S. Nicholson Ave	(30.3612, -89.1029)	6.0 6.0-6.0	15.2 15.2-15.4	18.0 17.9-18.0	23.6 23.1-23.5	VE 20-26 AE 18-20
Long Beach, City of Harrison County	30	Gulf of Mexico/Mississippi Sound east of Beach Park Place	(30.3610, -89.0936)	6.0 6.0-6.0	15.2 15.2-15.4	18.0 17.8-18.0	23.7 23.0-23.7	VE 20-26 AE 18-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Long Beach, City of Harrison County	31	Gulf of Mexico/Mississippi Sound at Central Ave	(30.3613, -89.0849)	6.0 6.0-6.0	15.3 15.3-15.4	18.3 18.3-18.3	23.9 23.9-23.9	VE 20-25 AE 18-20
Gulfport, City of Harrison County	32	Gulf of Mexico/Mississippi Sound at Fournieu Rd	(30.3687, -89.0810)	6.0 6.0-6.0	15.2 15.2-15.3	18.2 18.2-18.2	23.8 23.3-24.0	VE 20-25 AE 18-20
Gulfport, City of Harrison County	33	Gulf of Mexico/Mississippi Sound at 41st Street	(30.3708, -89.0734)	6.0 6.0-6.0	15.3 15.1-15.3	18.0 18.0-18.0	24.0 24.0-24.0	VE 20-25 AE 18-20
Gulfport, City of Harrison County	34	Gulf of Mexico/Mississippi Sound between 36th Ave and 33rd Ave	(30.3731, -89.0660)	5.9 4.8-5.9	15.0 14.7-15.0	18.0 18.0-18.0	23.7 23.7-23.8	VE 20-25 AE 18-20
Gulfport, City of Harrison County	35	Gulf of Mexico/Mississippi Sound at Copa Blvd	(30.3761, -89.0506)	5.4 4.8-5.6	15.2 15.2-15.2	18.1 18.1-18.1	23.5 17.6-23.9	VE 20-25 AE 18-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Gulfport, City of Harrison County	36	Gulf of Mexico/Mississippi Sound at 20th Ave	(30.3778, -89.0432)	5.8 5.6-5.8	15.0 9.8-15.3	18.2 18.2-18.2	23.4 17.6-24.3	VE 20-27 AE 18-20
Gulfport, City of Harrison County	37	Gulf of Mexico/Mississippi Sound west of Pratt Ave	(30.3794, -89.0356)	5.8 5.8-5.8	15.1 14.9-15.1	18.3 18.3-18.3	24.2 17.6-24.2	VE 20-25 AE 18-20
Gulfport, City of Harrison County	38	Gulf of Mexico/Mississippi Sound at Hill Place	(30.3810, -89.0279)	6.0 6.0-6.0	15.0 9.8-15.0	18.2 11.6-18.2	24.2 17.6-24.2	VE 20-27 AE 14-20
Gulfport, City of Harrison County	39	Gulf of Mexico/Mississippi Sound east of Evans Ave	(30.3830, -89.0204)	6.1 6.1-6.1	15.1 9.8-15.1	18.0 11.7-18.0	24.1 17.7-24.1	VE 20-25 AE 14-20
Gulfport, City of Harrison County	40	Gulf of Mexico/Mississippi Sound at Alfonso Dr	(30.3847, -89.0127)	6.0 6.0-6.0	15.2 9.8-15.3	18.1 12.4-18.1	24.1 17.3-24.1	VE 20-26 AE 12-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Gulfport, City of Harrison County	41	Gulf of Mexico/Mississippi Sound west of Arkansas Ave	(30.3862, -89.0049)	6.0 5.0-6.1	15.2 10.7-15.3	18.3 13.7-18.3	23.6 18.0-23.6	VE 20-26 AE 14-20
Gulfport, City of Harrison County	42	Gulf of Mexico/Mississippi Sound at Courthouse Rd	(30.3873, -88.9971)	6.0 6.0-6.0	15.1 12.3-15.3	18.2 14.3-18.2	23.3 18.4-23.3	VE 20-26 AE 14-20
Gulfport, City of Harrison County	43	Gulf of Mexico/Mississippi Sound at Tegarden Rd	(30.3884, -88.9893)	6.0 5.2-6.0	15.2 12.3-15.2	18.2 14.3-18.2	23.4 18.3-24.4	VE 20-26 AE 14-20
Gulfport, City of Harrison County	44	Gulf of Mexico/Mississippi Sound at Laurel Rd	(30.3915, -88.9579)	6.0 5.2-6.0	15.0 12.3-15.1	18.1 14.3-18.1	23.3 18.2-23.4	VE 20-25 AE 14-20
Gulfport, City of Harrison County	45	Gulf of Mexico/Mississippi Sound at Allan Dr	(30.3924, -88.9342)	6.0 5.3-6.0	14.9 12.4-14.9	17.8 14.4-17.8	23.2 18.3-23.2	VE 20-26 AE 14-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Gulfport, City of Harrison County	46	Gulf of Mexico/Mississippi Sound west of Southern Circle	(30.3938, -88.9105)	6.0 5.3-6.0	14.7 12.4-14.7	17.7 14.5-17.7	23.2 18.4-23.2	VE 20-25 AE 15-20
Gulfport, City of Harrison County	47	Gulf of Mexico/Mississippi Sound at Venetian Gardens	(30.3913, -88.8887)	6.0 4.6-6.0	14.8 11.5-14.8	17.7 13.7-17.7	23.2 17.6-23.2	VE 20-25 AE 14-20
Biloxi, City of Harrison County	48	Gulf of Mexico/Mississippi Sound at Gateway Dr	(30.3931, -88.8799)	6.0 5.0-6.0	14.7 12.5-14.9	17.9 14.6-17.9	23.5 16.8-23.5	VE 20-25 AE 15-20
Biloxi, City of Harrison County	49	Gulf of Mexico/Mississippi Sound east of Edgewater Gulf Dr	(30.3919, -88.8718)	5.9 5.4-5.9	14.6 12.4-14.7	17.6 14.6-17.6	23.5 18.6-23.5	VE 17-25 AE 15-17
Biloxi, City of Harrison County	50	Gulf of Mexico/Mississippi Sound at Briarfield Ave	(30.3837, -88.8699)	5.9 5.3-5.9	14.6 12.4-14.9	17.8 14.5-17.8	23.1 18.6-23.1	VE 20-25 AE 15-20

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Biloxi, City of Harrison County	51	Gulf of Mexico/Mississippi Sound west of Beauvoir Ave	(30.3805, -88.8622)	5.9 5.2-5.9	14.7 12.4-14.7	17.4 14.5-17.4	23.0 19.0-23.0	VE 17-25 AE 15-17
Biloxi, City of Harrison County	52	Gulf of Mexico/Mississippi Sound at Sadler Beach Dr	(30.3032, -89.2877)	5.9 5.3-5.9	14.5 12.1-14.5	17.4 14.7-17.4	23.1 18.9-23.1	VE 17-24 AE 15-17
Biloxi, City of Harrison County	53	Gulf of Mexico/Mississippi Sound west of Camellia St	(30.3038, -89.2798)	5.9 5.3-5.9	14.3 12.5-14.3	17.3 14.9-17.3	23.2 19-23.2	VE 17-24 AE 15-17
Biloxi, City of Harrison County	54	Gulf of Mexico/Mississippi Sound west of Veterans Ave	(30.3054, -89.2721)	5.8 5.3-5.8	14.2 12.7-14.2	17.2 13.1-17.2	23.1 19.1-23.1	VE 17-24 AE 14-17
Biloxi, City of Harrison County	55	Gulf of Mexico/Mississippi Sound west of Travis St	(30.3078, -89.2647)	5.8 5.2-5.8	14.3 12.6-14.3	17.2 13.3-17.2	23.0 19.1-23.0	VE 17-24 AE 14-17

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Biloxi, City of Harrison County	56	Gulf of Mexico/Mississippi Sound at Iberville Dr	(30.3103, -89.2573)	5.8 5.6-5.8	14.2 12.6-14.3	17.2 15.6-17.2	22.9 20.2-22.9	VE 18-24 AE 16-18
Biloxi, City of Harrison County	57	Gulf of Mexico/Mississippi Sound at St. George St	(30.3891, -88.9814)57	5.8 5.6-5.8	14.1 13.1-14.1	17.1 15.7-17.1	22.8 20.4-22.8	VE 18-24 AE 16-18
Gulfport, City of Harrison County	58	Gulf of Mexico/Mississippi Sound at Chalmers St	(30.4017, -88.9832)	5.8 5.7-5.8	14.1 13.2-14.1	17.0 15.9-17.0	22.6 20.8-22.5	VE 18-24 AE 16-18
Biloxi, City of Harrison County	59	Gulf of Mexico/Mississippi Sound at White Ave	(30.3904, -88.9737)	5.7 5.7-5.7	14.0 13.4-14.0	17.0 16.2-17.0	22.5 21.2-22.5	VE 18-24 AE 16-18
Biloxi, City of Harrison County	60	Gulf of Mexico/Mississippi Sound at Porter Ave	(30.3910, -88.9658)	5.7 5.7-5.7	14.0 13.5-14.0	16.9 16.2-16.9	22.1 21.0-22.0	VE 18-23 AE 16-18

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Biloxi, City of Harrison County	61	Gulf of Mexico/Mississippi Sound at Seal Ave	(30.3918, -88.9500)	5.7 5.7-5.8	13.9 13.5-13.9	16.8 16.2-16.8	22.1 21.4-22.1	VE 18-23 AE 16-18
Gulfport, City of Harrison County	62	Gulf of Mexico/Mississippi Sound at G.E. Ohr St	(30.3923, - 88.9421)	5.7 5.7-5.8	13.7 13.6-14.4	16.7 16.5-17.2	21.8 21.6-22.8	VE 19-24 AE 17-19
Biloxi, City of Harrison County	63	Gulf of Mexico/Mississippi Sound at Lee St	(30.3933, -88.9263)	5.7 5.7-5.8	13.7 13.7-13.8	16.7 16.5-16.7	22.2 21.8-22.2	VE 19-24 AE 17-19
Biloxi, City of Harrison County	64	Gulf of Mexico/Mississippi Sound at Kuhn St	(30.3938, -88.9184)	5.7 5.7-5.8	13.7 13.6-13.8	16.6 16.6-16.8	21.9 21.9-22.0	VE 19-23 AE 17-19
Unincorporated Harrison County	65	Gulf of Mexico/Mississippi Sound on Deer Island	(30.3937, -88.9026)	5.6 5.6-5.7	13.5 13.4-13.8	16.3 16.3-16.7	21.8 21.8-22.0	VE 19-23 AE 17-19

TABLE 6 COASTAL DATA TABLE (Cont.)

Community Name	Transect	Description	Latitude & Longitude at Start of Transect	Starting Stillwater Elevations (feet NAVD 88) Range of Stillwater Elevations (feet NAVD88)				Zone Designation and BFE (feet NAVD 88)
				10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance	
Unincorporated Harrison County	66	Gulf of Mexico on Deer Island	(30.3938, -88.8970)	5.5 5.5-5.7	13.3 13.3-13.8	16.2 16.2-16.6	21.4 21.4-21.9	VE 19-23 AE 17-19
Biloxi, City of Harrison County	67	Gulf of Mexico at Cadet St	(30.3937, -88.8577)	5.7 5.7-5.7	13.7 13.7-13.8	16.5 16.5-16.7	21.8 21.8-22.0	VE 19-21 AE 17-19
Unincorporated Harrison County	68	Gulf of Mexico at Michael Blvd	(30.4034, -88.8585)	5.7 5.7-5.7	13.6 13.6-13.7	16.5 16.5-16.7	22.0 21.9-22.0	VE 19-20 AE 17-19

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD88. Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities may be referenced to NGVD29. This may result in differences in Base Flood Elevations (BFEs) across the corporate limits between the communities.

The elevations shown in the FIS report and on the FIRM for Harrison County are referenced to NAVD88. Ground, structure, and flood elevations may be compared and/or referenced to NGVD29 by applying a conversion factor. To convert elevations from NAVD88 to NGVD29, add -0.01 feet to the NGVD29 elevation. The -0.01 feet value is an average for the entire County. The BFEs shown on the FIRM represent whole-foot rounded values. For example, a BFE of 12.4 feet will appear as 12 feet on the FIRM, and 12.6 feet as 13 feet. Users who wish to convert the elevations in this FIS report to NGVD29 should apply the stated conversion factor to elevations shown on the Flood Profiles and supporting data tables in the FIS report, which are shown at a minimum to the nearest 0.1 foot.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, or for information regarding conversion between the NGVD29 and NAVD88, see the FEMA publication entitled *Converting the National Flood Insurance Program to the North American Vertical Datum of* 1988 (FEMA, June 1992), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Rockville, Maryland 20910 (Internet address http://www.ngs.noaa.gov).

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

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

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1- and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section.

For this study, LIDAR data from Earthdata International was used to delineate floodplain boundaries. The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 3). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, and VE), and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by Limited detailed and approximate methods, only the 1-percent-annual-chance floodplain boundary is shown on the FIRM (Exhibit 3).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the NFIP, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 1-percent-annual-chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent-annual-chance flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodway presented in this FIS report and on the FIRM was computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections of detailed study streams (Table 7). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary is 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 7, “Floodway Data,” for certain downstream cross sections 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.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bernard Bayou								
A	3,000	989	3,527	2.0	*	1.9[2]	2.9	1.0
B	9,450	816	3,446	2.0	*	2.4[2]	3.3	0.9
C	10,684	1,130	7,870	0.9	*	2.5[2]	3.4	0.9
D	19,584	979	2,103	3.3	*	3.0[2]	3.7	0.7
E	25,334	750	7,464	2.0	*	3.8[2]	4.8	1.0
F	33,059	736	11,381	1.3	*	4.1[2]	5.0	0.9
G	39,234	282	4,459	2.3	*	4.3[2]	5.2	0.9
H	41,634	124	1,166	8.7	*	4.2[2]	5.1	0.9
I	41,923	130	1,533	6.1	*	6.2[2]	7.1	0.9
J	42,623	218	1,966	4.7	*	7.5[2]	7.9	0.4
K	44,427	162	2,036	4.6	14.7	10.4[2]	10.6	0.2
L	46,282	100	636	8.6	15.0	11.6[2]	11.6	0.0
M	46,934	330	4,004	1.4	15.4	13.1[2]	13.5	0.4
N	47,199	80	778	7.0	15.4	13.1[2]	13.1	0.0
O	49,699	60	855	6.4	19.1	18.9[2]	19.8	0.9
P	50,849	397	3,066	1.9	22.0	21.9[2]	22.9	1.0
Q	59,499	530	2,741	1.9	30.0	30.0	31.0	1.0
R	69,149	573	2,950	1.8	43.8	43.8	44.8	1.0
S	76,999	596	2,811	1.3	56.5	56.5	57.5	1.0
T	87,599	542	2,815	1.4	73.6	73.6	74.6	1.0

[1] Feet above confluence with Back Bay of Biloxi
[2] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Big Creek								
A	20,360[1]	588	3,274	1.6	54.1	54.1	55.1	1.0
Biloxi River								
A	13,675[2]	1,623	15,251	2.0	*	6.6[3]	7.6	1.0
B	20,117[2]	2,422	17,406	1.7	*	8.9[3]	9.7	0.8
C	24,605[2]	1,973	16,760	1.8	15.2	11.6[3]	12.0	0.4
D	36,168[2]	3,144	47,348	0.7	18.9	18.5[3]	19.5	1.0
E	40,498[2]	2,691	42,389	0.7	20.0	19.8[3]	20.8	1.0
F	49,421[2]	3,166	44,794	0.7	22.2	22.1[3]	23.1	1.0
G	55,440[2]	4,310	51,161	0.6	23.6	23.6	24.6	1.0
H	60,403[2]	3,736	48,790	0.6	25.4	25.4	26.4	1.0
I	71,122[2]	3,451	35,714	0.7	27.8	27.8	28.8	1.0
J	76,824[2]	1,750	15,049	1.7	29.7	29.7	30.7	1.0
K	80,256[2]	1,726	15,798	1.6	32.1	32.1	33.1	1.0
L	85,906[2]	2,778	19,287	1.3	35.2	35.2	36.1	0.9
M	89,443[2]	1,614	14,058	1.8	37.4	37.4	38.3	0.9
N	98,314[2]	1,541	16,056	1.5	43.4	43.4	44.3	0.9
O	105,283[2]	549	8,496	2.2	47.7	47.7	48.6	0.9
P	111,830[2]	1,663	13,938	1.4	51.6	51.6	52.6	1.0

[1] Feet above confluence with Wolf River
[2] Feet above confluence with Back Bay of Biloxi
[3] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

BIG CREEK - BILOXI RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Biloxi River (continued)								
Q	112,886[1]	1,104	11,372	1.7	52.6	52.6	53.6	1.0
R	121,070[1]	1,431	15,285	1.2	57.0	57.0	57.9	0.9
S	129,571[1]	1,668	5,789	3.3	63.8	63.8	64.6	0.8
T	136,594[1]	2,000	12,102	1.4	73.2	73.2	73.8	0.6
Brickyard Bayou								
A	930[2]	140	1,443	1.5	*	3.4[3]	4.4	1.0
B	1,120[2]	134	1,335	1.6	*	3.4[3]	4.4	1.0
C	1,531[2]	248	1,641	1.3	*	3.6[3]	4.6	1.0
D	2,671[2]	280	1,580	1.4	*	4.1[3]	4.9	0.8
E	3,721[2]	382	1,215	1.8	*	4.8[3]	5.3	0.5
F	4,135[2]	350	1,651	1.3	*	5.3[3]	5.7	0.4
G	6,395[2]	150	775	2.8	*	6.4[3]	6.5	0.1
H	6,671[2]	230	1,104	1.9	*	6.9[3]	7.0	0.1
I	7,784[2]	165	1,066	2.0	*	8.2[3]	8.2	0.0
J	8,259[2]	90	635	3.4	*	8.2[3]	8.2	0.0
K	8,648[2]	80	568	3.8	*	8.5[3]	8.5	0.0
L	9,968[2]	166	859	2.5	*	9.1[3]	9.5	0.4

[1] Feet above confluence with Back Bay of Biloxi
[2] Feet above confluence with Bernard Bayou
[3] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

BILOXI RIVER - BRICKYARD BAYOU

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Brickyard Bayou (continued)								
M	10,182	170	981	2.0	*	9.3[2]	9.7	0.4
N	11,337	232	1,708	1.1	*	9.5[2]	9.8	0.3
O	11,634	139	915	2.1	*	9.5[2]	9.8	0.3
P	13,064	125	704	2.7	*	9.9[2]	10.2	0.3
Q	13,371	125	930	2.1	13.0	10.3[2]	10.6	0.3
R	16,171	755	2,132	0.9	13.0	10.8[2]	11.2	0.4
S	18,246	133	631	3.1	13.0	11.2[2]	11.9	0.7
T	18,464	230	1,006	1.9	13.0	11.5[2]	12.2	0.7
U	20,344	90	597	3.2	13.0	12.7[2]	13.1	0.4
V	20,528	85	852	2.3	13.5	13.0[2]	13.5	0.5
W	21,328	65	482	4.0	13.5	13.1[2]	13.7	0.6
X	21,496	90	535	3.0	14.8	14.5[2]	15.1	0.6

[1] Feet above confluence with Bernard Bayou
[2] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

BRICKYARD BAYOU

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Canal No. 1								
A	8,840	630	2,331	1.0	*	5.5[2]	6.5	1.0
B	15,240	185	1,071	2.0	*	8.2[2]	8.5	0.3
C	16,370	239	1,398	1.5	*	8.9[2]	9.4	0.5
D	18,090	342	1,139	1.9	*	10.2[2]	10.9	0.7
E	19,990	266	1,125	1.7	*	12.2[2]	13.0	0.8
F	20,890	386	1,086	1.8	*	13.6[2]	14.4	0.8
G	22,710	415	846	2.3	17.6	16.0[2]	17.0	1.0
H	24,650	118	724	2.2	18.7	18.2[2]	19.2	1.0
I	26,230	731	3,705	0.4	19.0	18.6[2]	19.6	1.0
J	27,330	365	2,359	0.7	19.0	18.7[2]	19.7	1.0
K	29,430	325	1,863	0.9	19.4	19.2[2]	20.2	1.0
L	31,530	385	1,736	0.9	19.9	19.8[2]	20.8	1.0
M	34,330	760	3,856	0.4	20.2	20.2	21.2	1.0
N	35,930	400	1,829	0.5	20.4	20.4	21.4	1.0
O	37,730	316	930	1.0	20.7	20.7	21.7	1.0
P	39,630	493	1,861	0.4	21.2	21.2	22.2	1.0
Q	40,530	415	1,330	0.6	21.3	21.3	22.3	1.0
R	41,330	350	1,061	0.7	21.6	21.6	22.6	1.0

[1] Feet above confluence with Saint Louis Bay
[2] Elevation computed without consideration of storm surge effects from Saint Louis Bay/ Mississippi Sound
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

CANAL NO. 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Canal No. 3								
A	5,650[1]	327	1,494	1.9	*	2.7[3]	3.7	1.0
B	9,330[1]	572	2,249	1.2	*	4.4[3]	5.4	1.0
C	12,830[1]	73	589	3.8	*	6.4[3]	7.4	1.0
D	16,430[1]	100	955	2.3	*	9.7[3]	10.7	1.0
E	16,974[1]	100	1,015	2.2	*	10.3[3]	11.3	1.0
F	19,475[1]	183	1,078	2.1	*	12.4[3]	13.3	0.9
G	20,615[1]	96	695	3.2	17.1	13.9[3]	14.8	0.9
H	21,310[1]	202	978	2.1	17.2	15.0[3]	16.0	1.0
I	22,550[1]	486	1,904	1.1	17.5	16.1[3]	16.9	0.8
J	23,120[1]	450	2,036	1.0	17.7	16.3[3]	17.2	0.9
K	24,350[1]	365	990	1.8	18.0	17.0[3]	18.0	1.0
L	25,705[1]	232	1,436	1.2	18.6	18.1[3]	19.1	1.0
M	28,195[1]	336	1,086	1.1	20.1	20.0[3]	20.9	0.9
N	29,825[1]	404	1,988	0.6	20.3	20.3	21.3	1.0
O	30,520[1]	395	1,961	0.6	20.4	20.4	21.4	1.0
P	31,330[1]	172	875	0.4	20.5	20.5	21.5	1.0
Q	33,195[1]	138	429	0.9	21.1	21.1	22.1	1.0
R	34,545[1]	150	516	0.7	21.4	21.4	22.4	1.0
Choctaw Creek								
A	6,680[2]	383	2,114	2.0	85.3	85.3	86.3	1.0

[1] Feet above confluence with Saint Louis Bay
[2] Feet above confluence with Tuxachanie Creek
[3] Elevation computed without consideration of storm surge effects from Saint Louis Bay
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

CANAL NO. 3 - CHOCTAW CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Crow Creek								
A	11,450[1]	220	1,841	2.7	90.1	90.1	91.1	1.0
Cypress Creek								
A	2,500[2]	200	1,648	2.2	13.8	5.6[4]	6.5	0.9
Flat Branch								
A	1,050[3]	118	866	5.9	14.9	8.6[5]	9.0	0.4
B	1,276[3]	138	1,002	5.1	15.4	13.9[5]	14.2	0.3
C	4,131[3]	139	607	5.0	18.5	18.4[5]	18.4	0.0
D	4,299[3]	139	589	4.9	18.7	18.5[5]	18.5	0.0
E	12,794[3]	143	2,085	2.4	35.7	35.7	35.8	0.1
F	13,714[3]	59	723	6.8	35.7	35.7	35.9	0.2
G	16,000[3]	553	3,395	1.4	41.2	41.2	42.0	0.8
H	18,000[3]	364	2,331	2.1	42.3	42.3	43.1	0.8
I	21,055[3]	129	4,053	4.4	48.8	48.8	49.0	0.2
J	25,000[3]	500	4,621	1.1	52.9	52.9	53.9	1.0

[1] Feet above confluence with Biloxi River
[2] Feet above confluence with Tchoutacabouffa River
[3] Feet above confluence with Bernard Bayou
[4] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
[5] Elevation computed without consideration of storm surge effects from Bernard Bayou

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

FLOODWAY DATA

CROW CREEK - CYPRESS CREEK - FLAT BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Fritz Creek								
A	4,578[1]	300	2,077	1.8	*	6.2[4]	7.2	1.0
B	8,808[1]	276	1,932	1.9	*	8.0[4]	9.0	1.0
C	10,808[1]	156	1,028	3.2	*	9.1[4]	9.8	0.7
D	14,908[1]	205	943	3.5	15.7	14.6[4]	15.3	0.7
E	18,208[1]	358	1,086	1.8	22.2	22.2	22.8	0.6
F	22,108[1]	88	477	4.1	28.9	28.9	29.8	0.9
Fritz Creek Tributary 1								
A	4,024[2]	164	621	2.2	27.0	27.0	27.9	0.9
B	11,624[2]	117	397	3.4	52.0	52.0	52.8	0.8
C	13,596[2]	250	1,178	1.2	53.1	53.1	54.0	0.9
Hickory Creek								
A	4,600[1]	170	1,040	3.5	78.0	75.4[5]	76.4	1.0
B	18,800[1]	256	1,689	2.0	108.1	108.1	109.1	1.0
Hog Branch								
A	4,500[3]	550	3,318	1.1	43.8	43.8	44.7	0.9
B	5,900[3]	415	1,670	2.0	55.2	55.2	56.2	1.0
C	16,300[3]	268	1,453	1.9	75.4	75.4	76.4	1.0

[1] Feet above confluence with Biloxi River
[2] Feet above confluence with Fritz Creek
[3] Feet above confluence with Tuxachanie Creek
[4] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
[5] Elevation computed without consideration of backwater effects from Biloxi River
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

FRITZ CREEK - FRITZ CREEK TRIBUTARY 1 - HICKORY CREEK - HOG BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Howard Creek								
A	3,930[1]	77	663	3.8	*	9.0[4]	9.9	0.9
B	6,330[1]	145	575	4.3	15.1	13.4[4]	14.2	0.8
C	8,730[1]	278	935	2.7	23.3	23.3	23.9	0.6
D	17,180[1]	587	3,410	0.6	62.4	62.4	63.4	1.0
Little Biloxi River								
A	6,350[2]	632	4,289	2.4	26.2	26.2	27.2	1.0
B	14,700[2]	774	6,209	1.6	32.1	32.1	33.1	1.0
C	30,100[2]	464	3,983	2.5	40.6	40.6	41.6	1.0
D	45,550[2]	677	4,041	2.5	54.8	54.8	55.8	1.0
E	62,850[2]	730	5,257	1.8	68.5	68.5	69.5	1.0
F	74,450[2]	704	4,784	2.0	79.8	79.8	80.8	1.0
G	83,250[2]	635	4,505	1.8	89.6	89.6	90.6	1.0
H	95,800[2]	789	4,915	1.5	100.2	100.2	101.2	1.0
Mill Creek								
A	9,500[3]	418	1,840	2.6	103.3	103.3	104.3	1.0
Palmer Creek								
A	5,130[2]	233	1,639	1.9	51.6	51.6	52.6	1.0
B	11,920[2]	210	1,454	2.3	72.9	72.9	73.9	1.0

[1] Feet above confluence with Tchoutacabouffa River
[2] Feet above confluence with Biloxi River
[3] Feet above confluence with Wolf River
[4] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

HOWARD CREEK - LITTLE BILOXI RIVER - MILL CREEK - PALMER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Parker Creek								
A	3,000[1]	240	1,762	1.6	*	7.4[4]	8.3	0.9
B	3,830[1]	404	3,110	0.9	*	7.8[4]	8.8	1.0
C	7,430[1]	94	550	4.0	*	12.6[4]	13.4	0.8
D	13,220[1]	67	495	3.2	32.0	32.0	33.0	1.0
E	17,880[1]	238	738	2.0	66.4	66.4	67.4	1.0
Pole Branch								
A	5,620[2]	230	**	**	53.8	53.8	54.8	1.0
Sandy Creek								
A	8,430[2]	160	**	**	49.0	49.0	50.0	1.0
Saucier Creek								
A	11,400[3]	680	**	**	48.4	48.4	49.4	1.0
B	27,550[3]	620	**	**	63.0	63.0	64.0	1.0
C	42,250[3]	103	1,268	3.9	88.9	88.9	89.9	1.0

[1] Feet above confluence with Tchoutacabouffa River
[2] Feet above confluence with Wolf River
[3] Feet above confluence with Biloxi River
[4] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding
** Data not Available

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

FLOODWAY DATA

PARKER CREEK - POLE BRANCH - SANDY CREEK - SAUCIER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Tchoutacabouffa River								
A	4,100[1]	1,226	10,326	3.0	*	3.7[3]	4.7	1.0
B	14,900[1]	1,000	8,960	3.5	*	5.7[3]	6.6	0.9
C	21,764[1]	1147	11741	2.7	*	7.0[3]	7.9	0.9
D	25,464[1]	580	11788	2.7	*	7.6[3]	8.5	0.9
E	38,014[1]	384	9312	3.4	*	8.3[3]	9.2	0.9
F	52,464[1]	300	6546	4.8	13.9	11.1[3]	11.7	0.6
G	55,914[1]	292	4161	7.5	13.9	11.9[3]	12.6	0.7
H	71,514[1]	108	1408	11.2	15.2	14.6[3]	15.6	1.0
I	107,264[1]	204	3057	4.3	37.1	37.1	38.1	1.0
Turkey Creek								
A	2,680[2]	297	2,053	2.8	*	9.5[3]	10.3	0.8
B	7,730[2]	435	3,452	1.7	14.2	11.4[3]	12.4	1.0
C	10,430[2]	495	4,186	1.4	14.2	12.2[3]	13.2	1.0
D	12,830[2]	200	1,398	3.9	14.6	13.2[3]	14.2	1.0
E	13,530[2]	263	2,671	2.1	14.8	13.9[3]	14.8	0.9
F	14,570[2]	735	5,821	0.9	15.4	14.4[3]	15.4	1.0
G	21,430[2]	129	898	5.4	16.6	16.3[3]	17.2	0.9
H	25,230[2]	500	3,111	1.6	20.4	20.3[3]	21.3	1.0
I	28,330[2]	1,006	4,362	1.1	21.7	21.7	22.6	0.9
J	31,685[2]	798	1,770	2.6	24.9	24.9	25.8	0.9

[1] Feet above confluence with Biloxi River
[2] Feet above confluence with Bernard Bayou
[3] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

TCHOUTACABOUFFA RIVER - TURKEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Turkey Creek (continued)								
K	34,285[1]	1,767	9,435	0.4	25.6	25.6	26.6	1.0
L	37,845[1]	1,369	7,388	0.6	25.8	25.8	26.7	0.9
M	40,245[1]	2,622	8,968	0.5	26.0	26.0	26.9	0.9
N	41,805[1]	1,705	9,180	0.5	26.1	26.1	27.0	0.9
O	45,745[1]	277	1,163	2.8	26.6	26.6	27.5	0.9
P	47,005[1]	600	2,682	1.2	27.7	27.7	28.4	0.7
Q	62,100[1]	529	1,484	2.2	44.5	44.5	45.5	1.0
Tuxachanie Creek								
A	7,350[2]	395	3,756	3.6	14.6	12.7[3]	13.4	1.0
B	13,400[2]	91	1,474	9.4	17.5	17.5	18.5	1.0
C	24,200[2]	157	2,230	6.5	24.8	24.8	25.8	1.0
D	32,350[2]	194	2,864	5.1	30.6	30.6	31.6	1.0
E	36,338[2]	195	3,290	4.5	32.0	32.0	33.0	1.0
F	38,500[2]	184	5,704	4.4	34.3	34.3	35.2	0.9
G	43,500[2]	429	8,292	1.7	38.0	38.0	38.4	0.4
H	47,500[2]	362	5,127	3.3	40.5	40.5	41.2	0.7
I	53,000[2]	139	3,187	4.3	45.5	45.5	46.1	0.6
J	61,500[2]	410	4,298	3.2	51.6	51.6	52.3	0.7
K	67,500[2]	438	6,094	2.3	56.5	56.5	57.3	0.8
L	82,050[2]	157	2,338	5.3	69.7	69.7	70.7	1.0

[1] Feet above confluence with Bernard Bayou
[2] Feet above confluence with Tchoutacabouffa River
[3] Elevation computed without consideration of storm surge effects from Tchoutacabouffa River

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

TURKEY CREEK - TUXACHANIE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
West Creek								
A	4,200[1]	77	1283	4.8	79.5	79.5	80.5	1.0
Wolf River								
A	3,600[2]	3,160	16127	1.7	**	3.6[3]	4.6	1.0
B	9,327[2]	2,928	17213	1.6	**	5.0[3]	5.8	0.8
C	24,749[2]	1,999	15039	1.9	**	8.0[3]	8.5	0.5
D	31,549[2]	1,950	12482	2.2	**	10.7[3]	11.2	0.5
E	38,389[2]	2,200	18595	1.5	**	13.2[3]	13.9	0.7
F	43,855[2]	1,714	11879	2.3	**	14.8[3]	15.8	1.0
G	51,655[2]	1,220	12856	2.2	20.2	18.9[3]	19.6	0.7
H	54,855[2]	1,077	8446	3.3	21.0	20.2[3]	21.0	0.8
I	65,185[2]	1,108	*	*	24.6	24.4[3]	25.4	1.0
J	119,855[2]	196	*	*	51.2	51.2	52.2	1.0

[1] Feet above confluence with Saucier Creek
[2] Feet above confluence with Saint Louis Bay
[3] Elevation computed without consideration of storm surge effects from Saint Louis Bay
* Floodway data not computed
** BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

WEST CREEK - WOLF RIVER

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. For detailed study streams, a listing of stream velocities at selected cross sections is provided in Table 7. In order to reduce the risk of property damage in areas where the stream velocities are high, the county 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 of the 1-percent-annual-chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

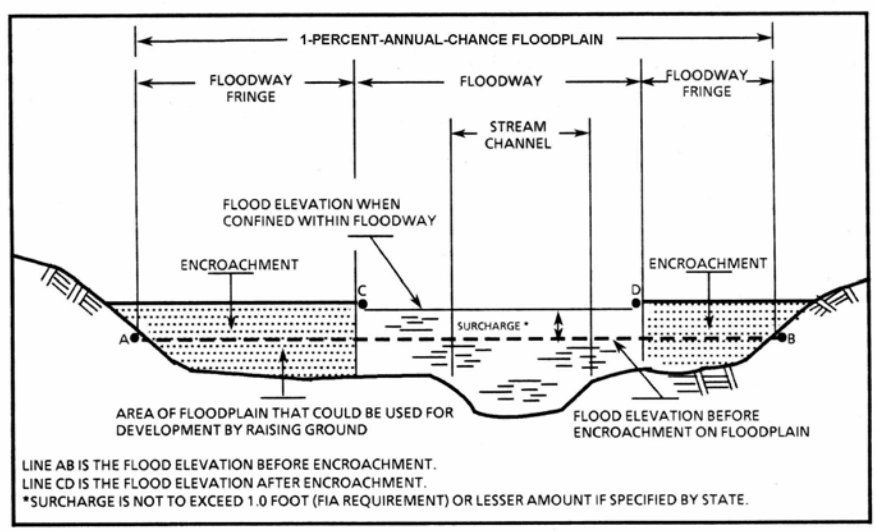


FIGURE 2. FLOODWAY SCHEMATIC

5.0 INSURANCE APPLICATION

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

Zone A

Zone A is the flood insurance 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 base (1-percent-annual-chance) flood elevations (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 the 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 the 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 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 base flood by levees. No BFEs or 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 risk zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use the zones and BFEs in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

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

The countywide FIRM presents flooding information for the entire geographic area of Harrison County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. This countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community up to and including this countywide FIS are presented in Table 8, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Biloxi, City of	June 27, 1970	None	June 30, 1970	July 1, 1974 April 16, 1976 August 8, 1980 March 15, 1984 March 18, 1987
D'Iberville, City of	September 18, 1970[1]	July 1, 1974[1]	June 15, 1978[1]	June 20, 1980[1] October 1, 1983[1] June 15, 1984[1] October 4, 2002[1]
Gulfport, City of	May 26, 1970	None	May 29, 1970	July 1, 1974 February 20, 1976 November 16, 1983 July 4, 1988 October 4, 2002
Harrison County (Unincorporated Areas)	September 18, 1970	July 17, 1974	June 15, 1978	June 20, 1980 October 1, 1983 June 15, 1984 August 4, 1988 August 18, 1992 October 4, 2002

[1] This community did not have its own FIRM prior to August 4, 1988. The land area for this community was previously shown on the FIRM for the unincorporated areas of Harrison County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the FIRM for Harrison County.

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Long Beach, City of	July 17, 1970	None	June 19, 1970	July 1, 1974 October 17, 1975 November 16, 1983 May 4, 1988
Pass Christian, City of	May 26, 1970	None	May 29, 1970	July 1, 1974 October 17, 1975 November 16, 1983 August 19, 1987

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

This is a multi-volume FIS. Each volume may be revised separately, in which case it supersedes the previously printed volume. Users should refer to the Table of Contents in Volume 1 for the current effective date of each volume; volumes bearing these dates contain the most up-to-date flood hazard data.

An FIS has been prepared for the City of Biloxi, the City of Gulfport, the City of Long Beach, the City of Pass Christian, and Harrison County Unincorporated areas.

This FIS report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the NFIP.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Insurance and Mitigation Division, FEMA Region IV, Koger-Center — Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, GA 30341.

9.0 BIBLIOGRAPHY AND REFERENCES

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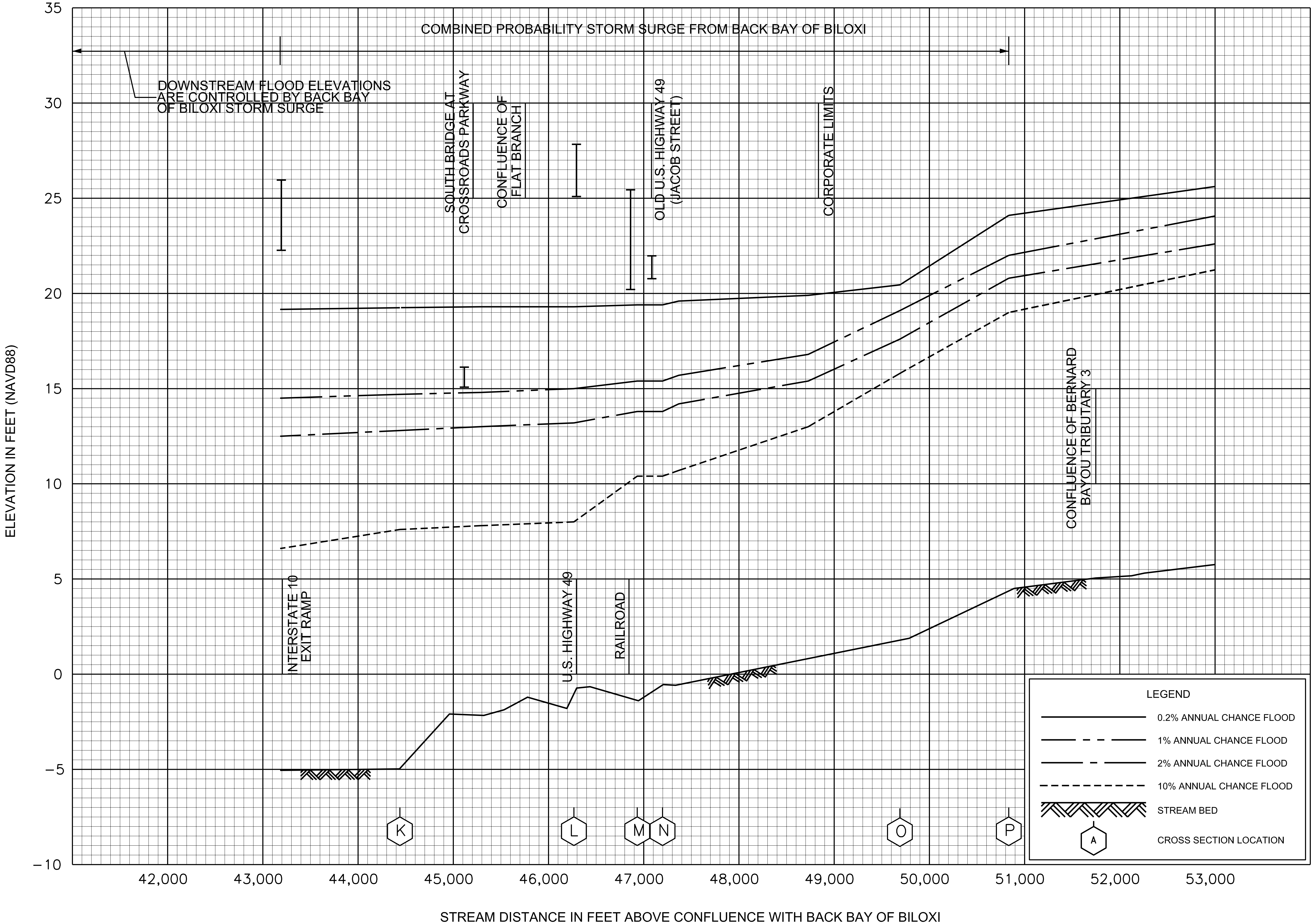

FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS AND INCORPORATED AREAS

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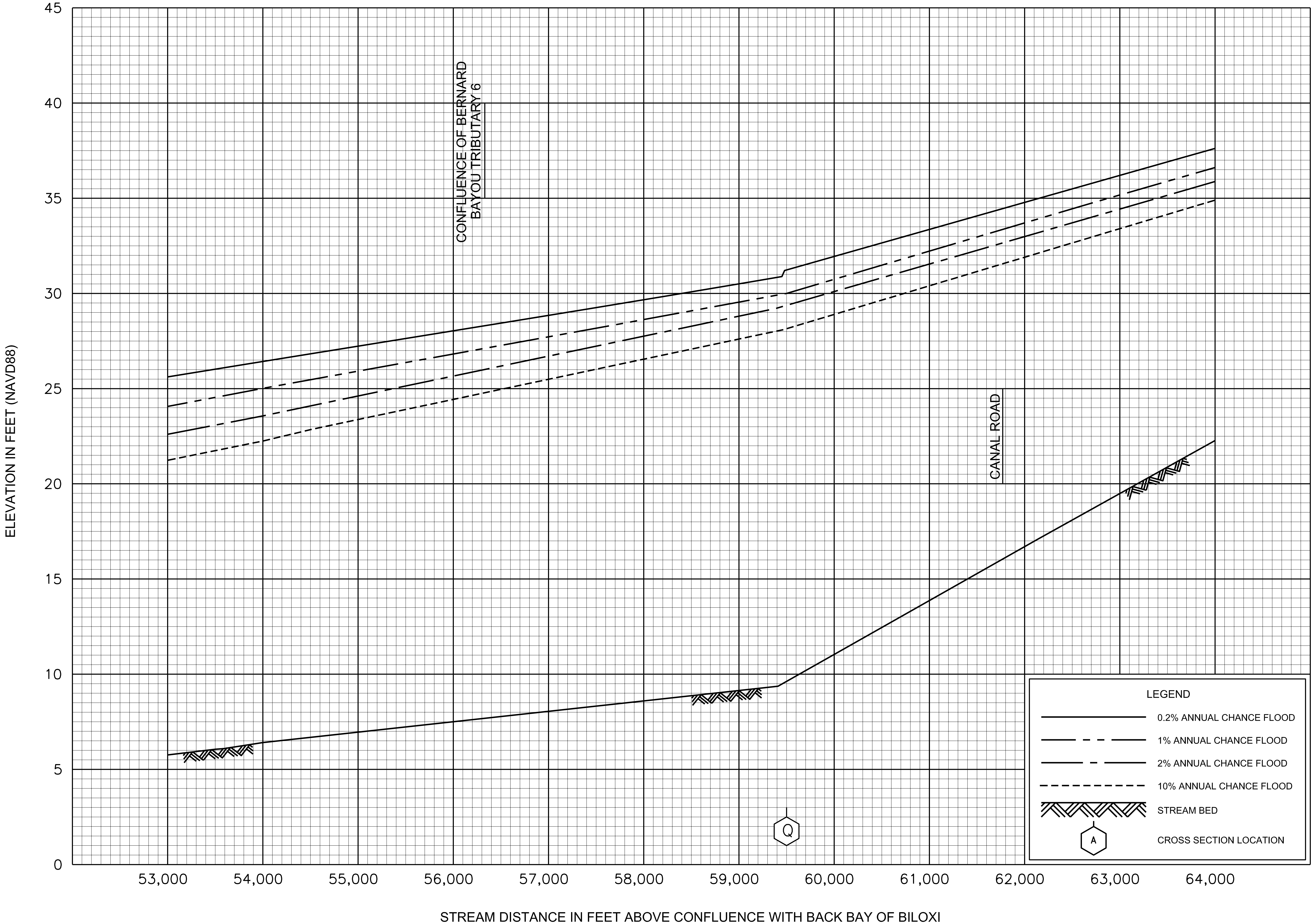

FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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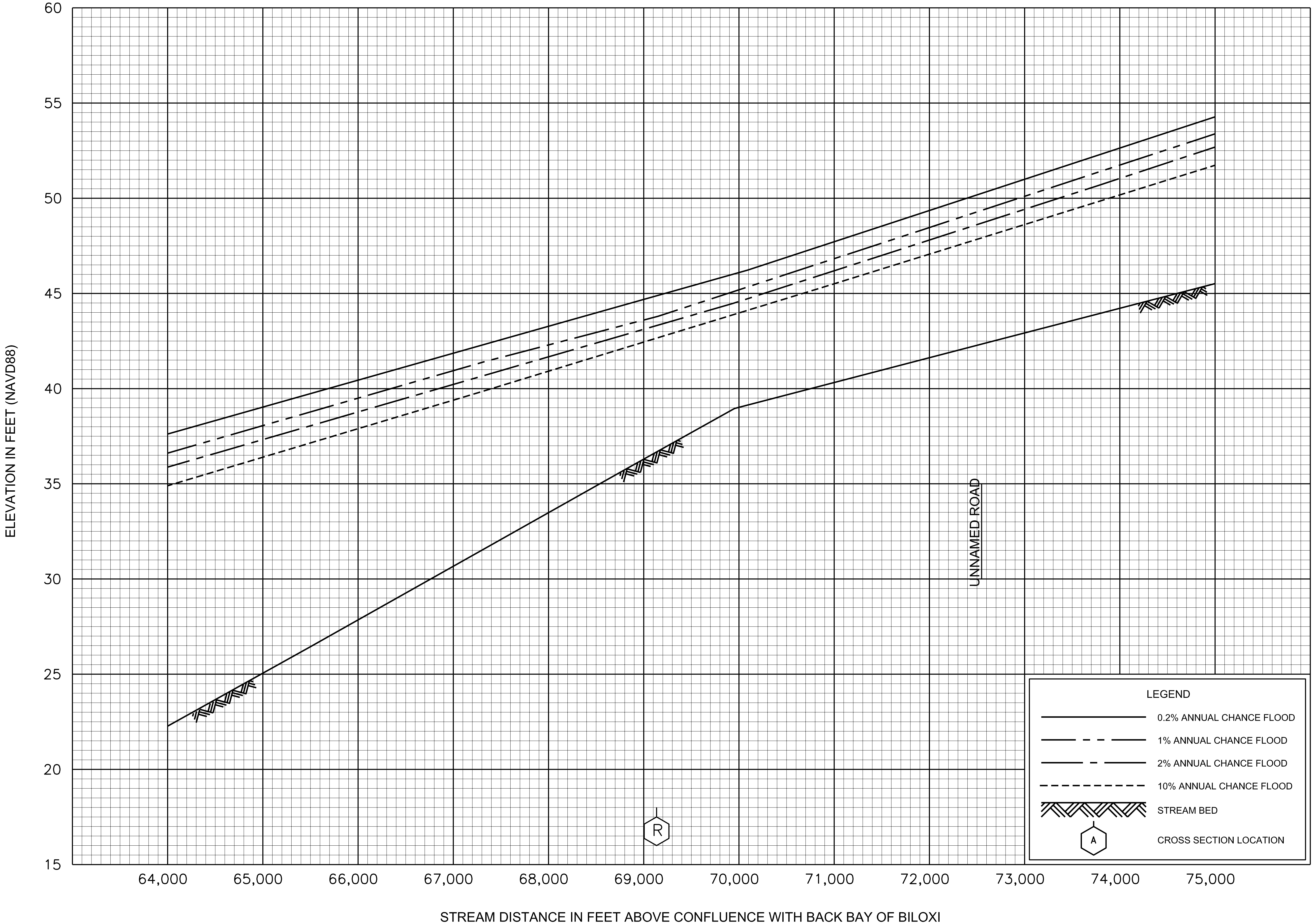


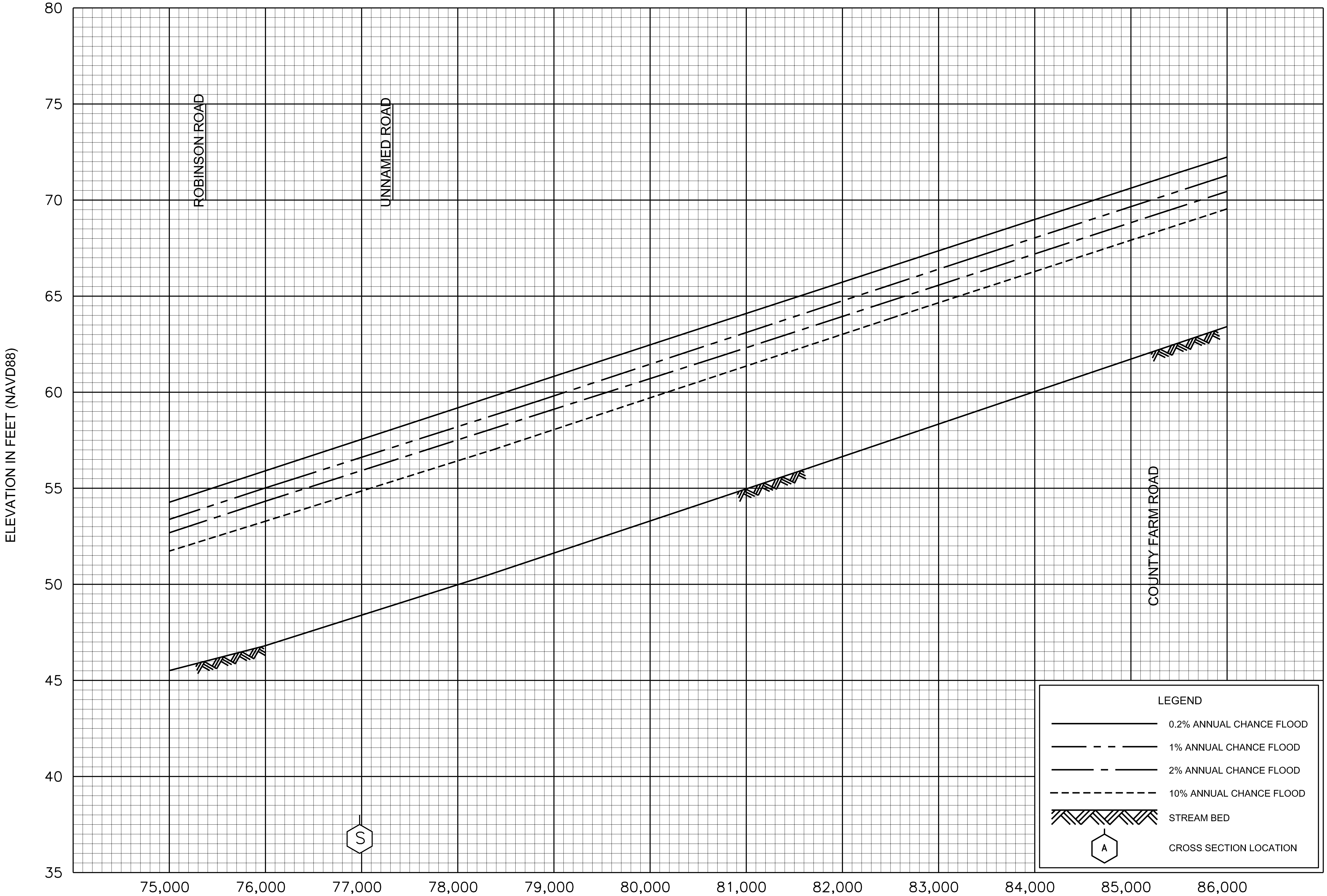
FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BACK BAY OF BILOXI

FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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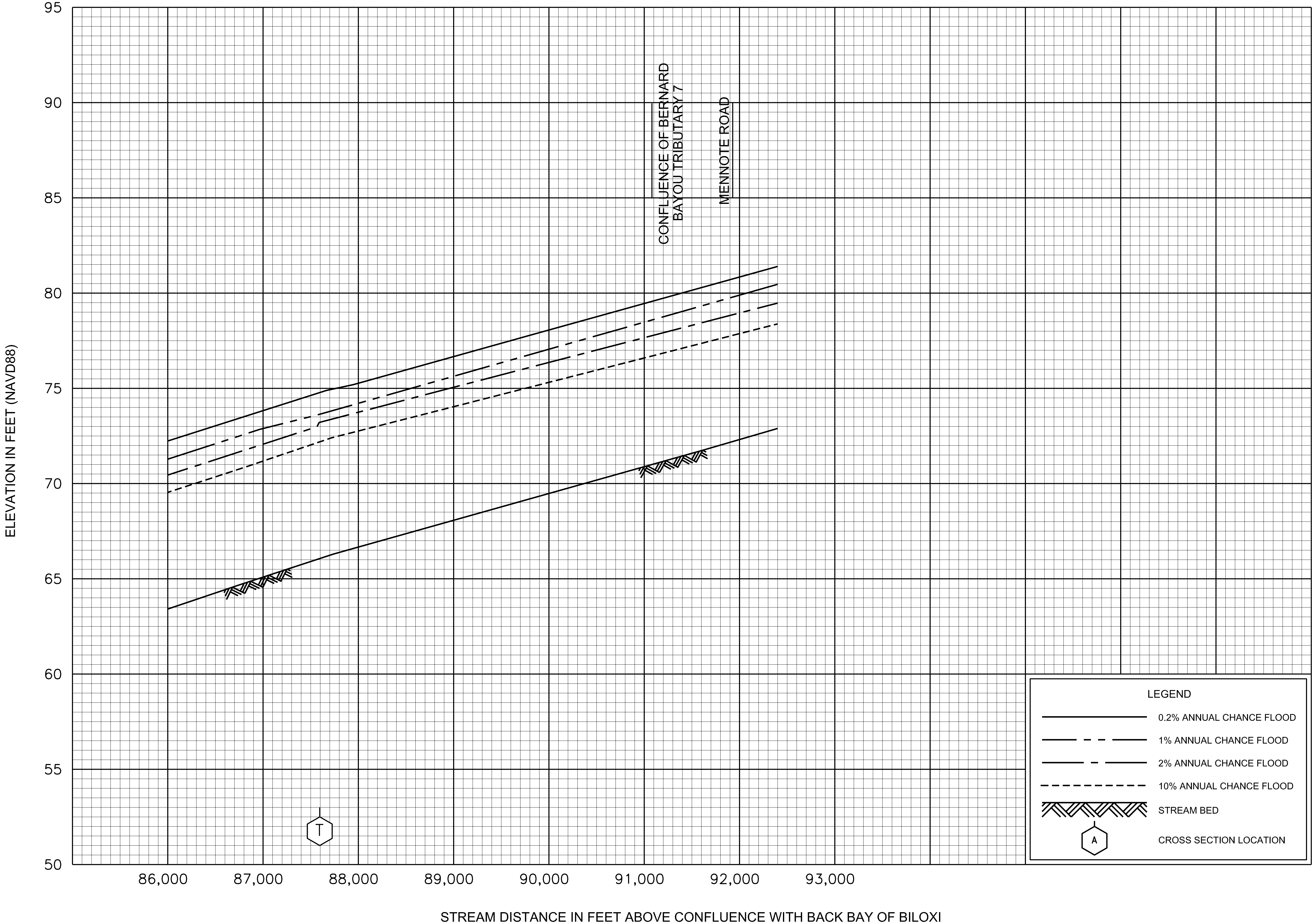


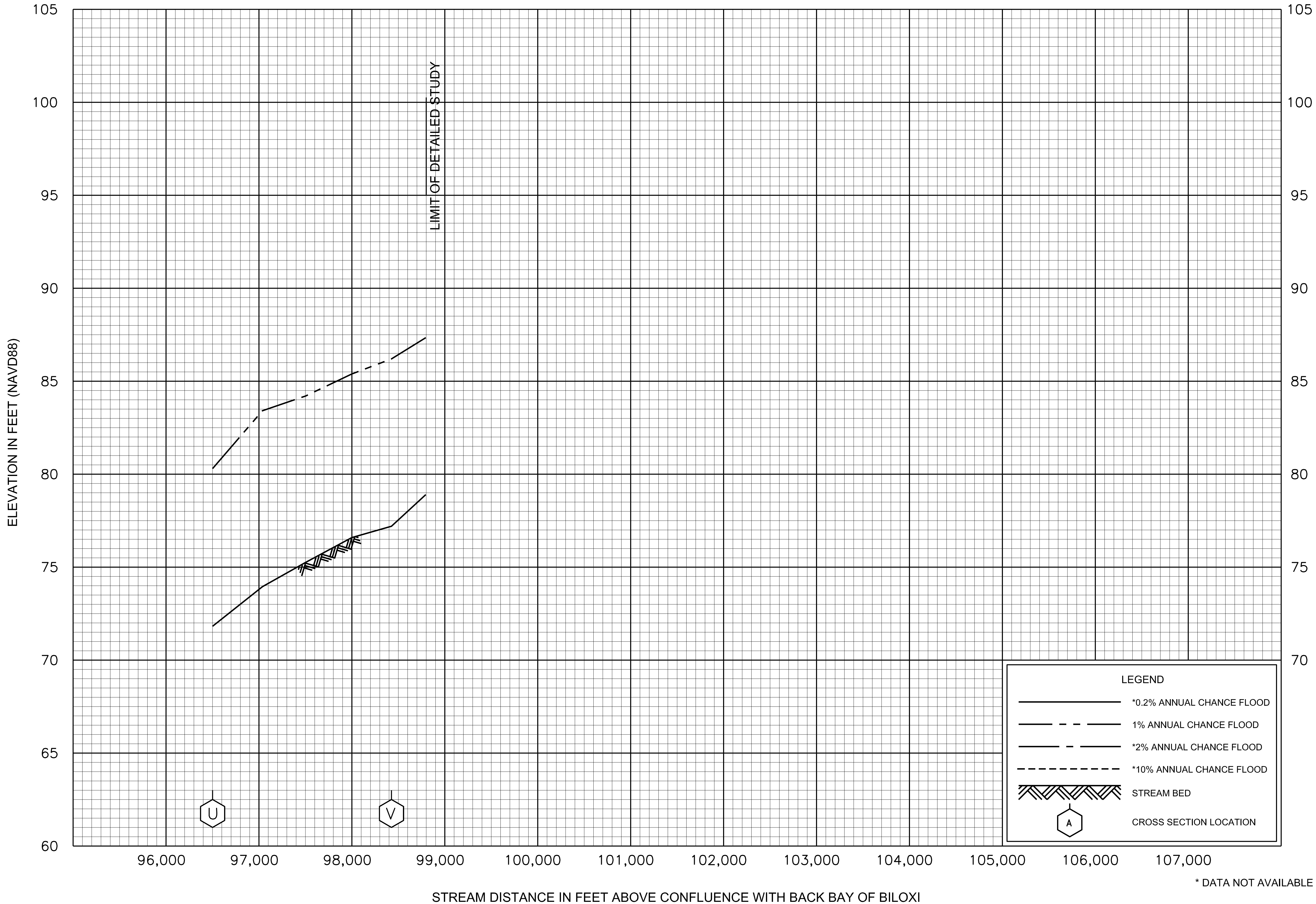
FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

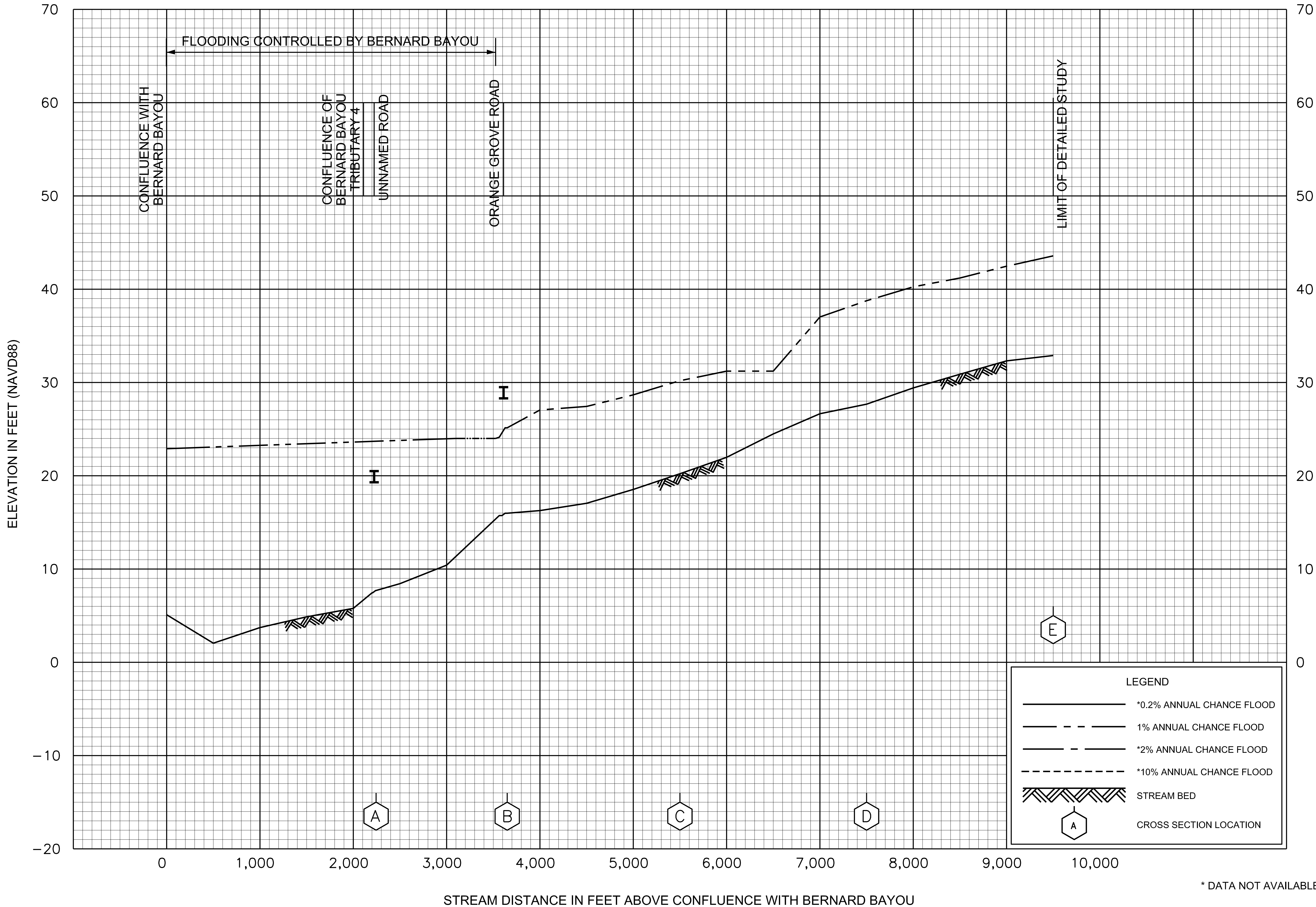


FLOOD PROFILES

BERNARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

FLOOD PROFILES

BERNARD BAYOU TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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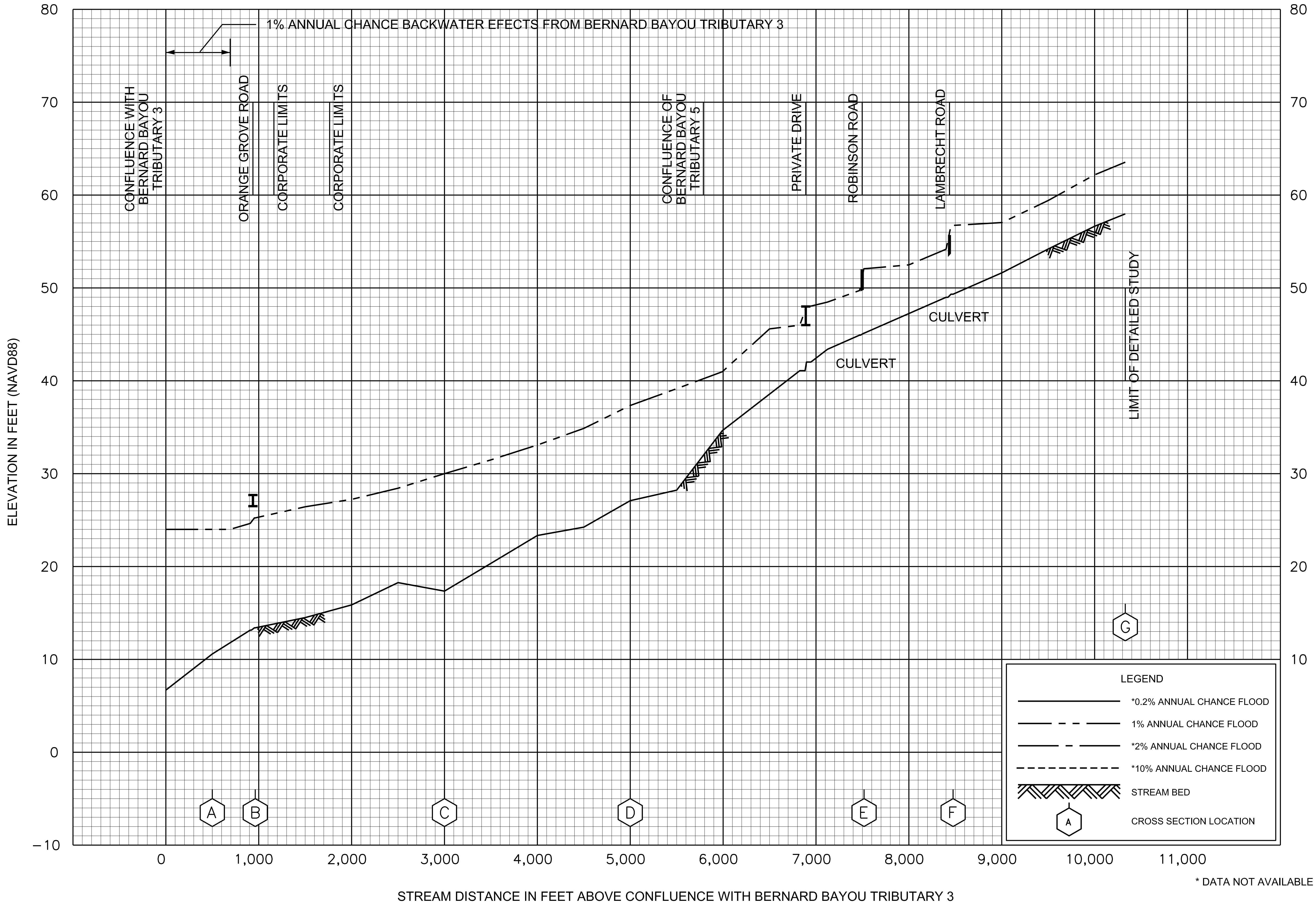

FLOOD PROFILES

BERNARD BAYOU TRIBUTARY 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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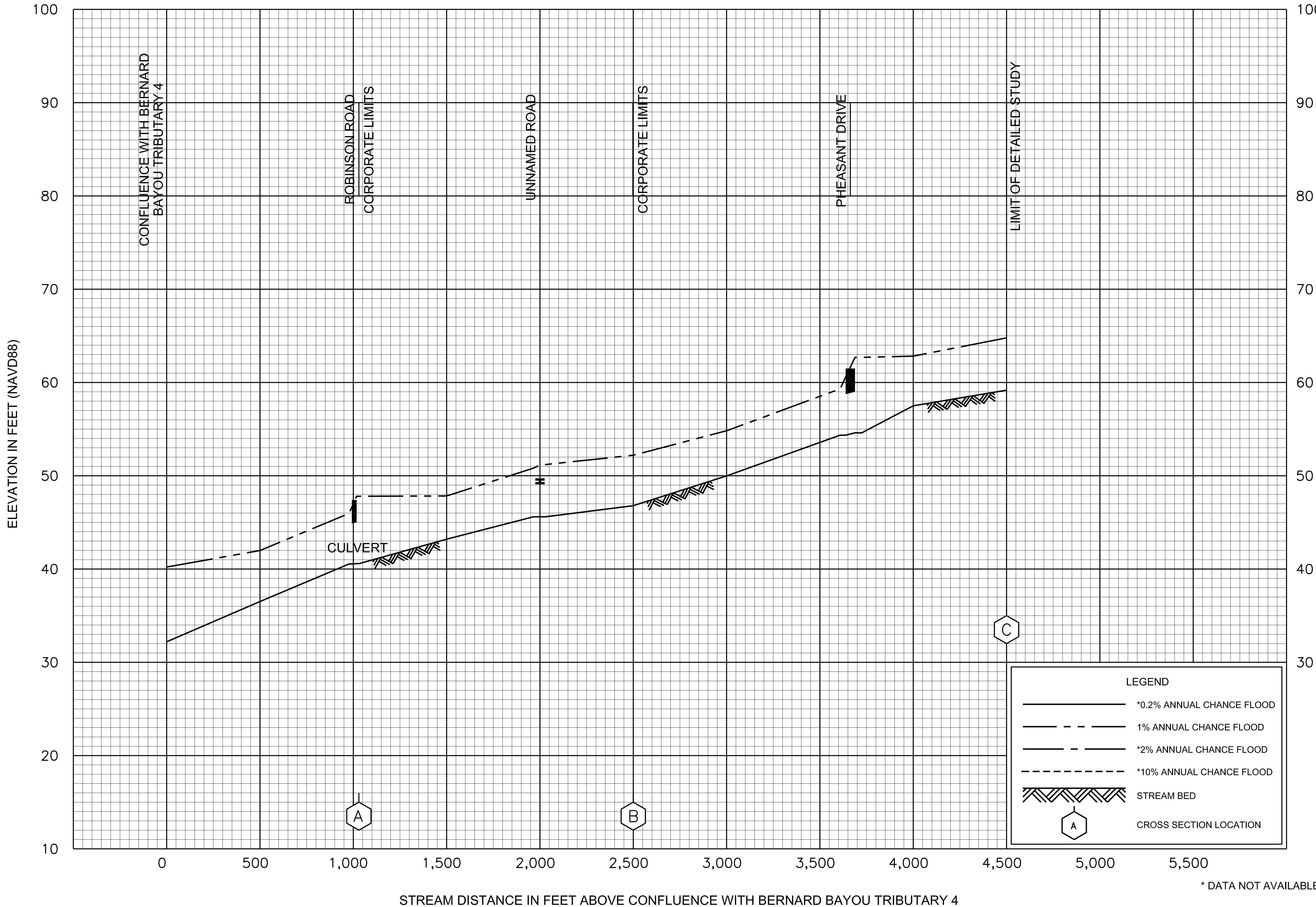


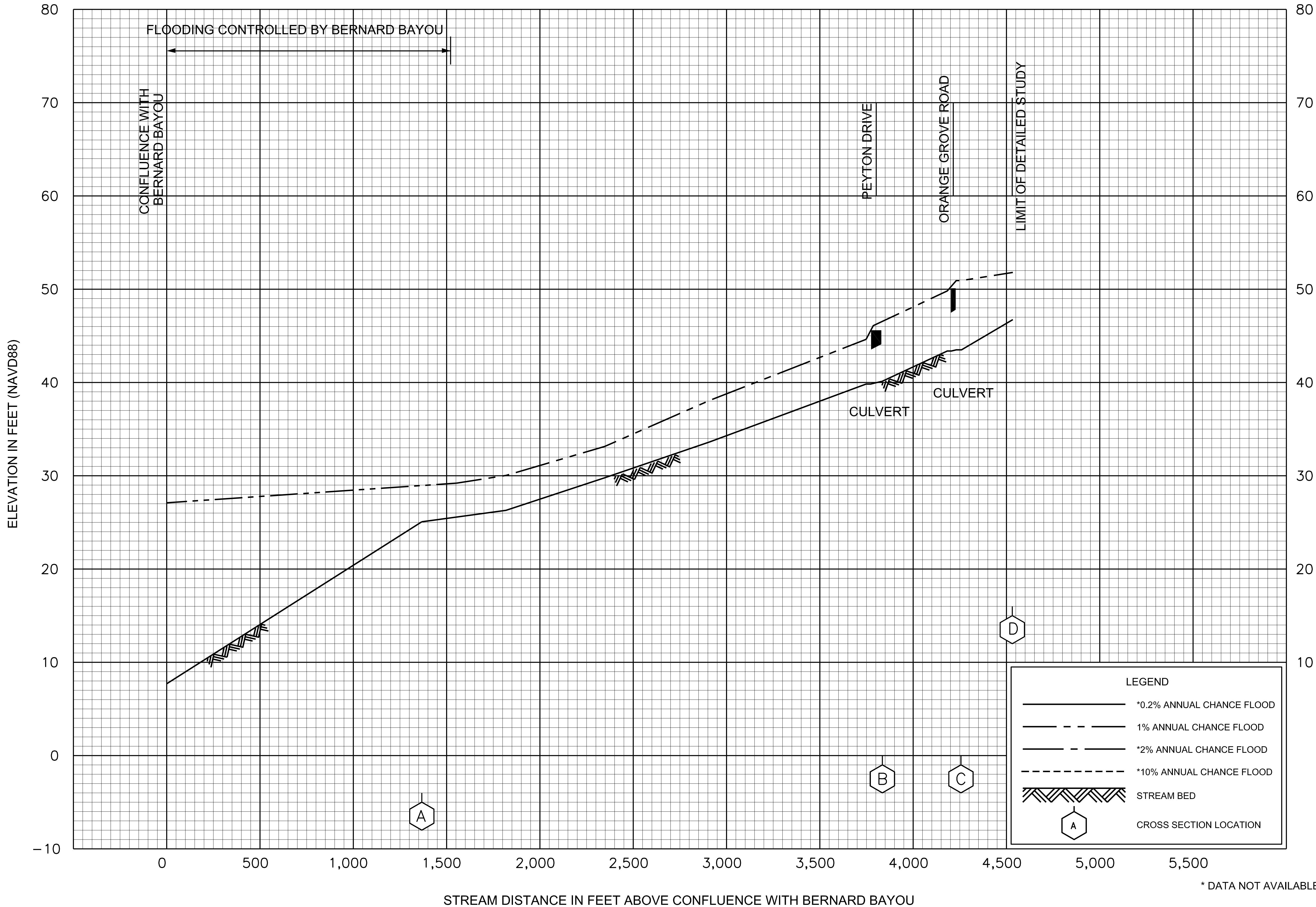
FLOOD PROFILES

BERNARD BAYOU TRIBUTARY 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



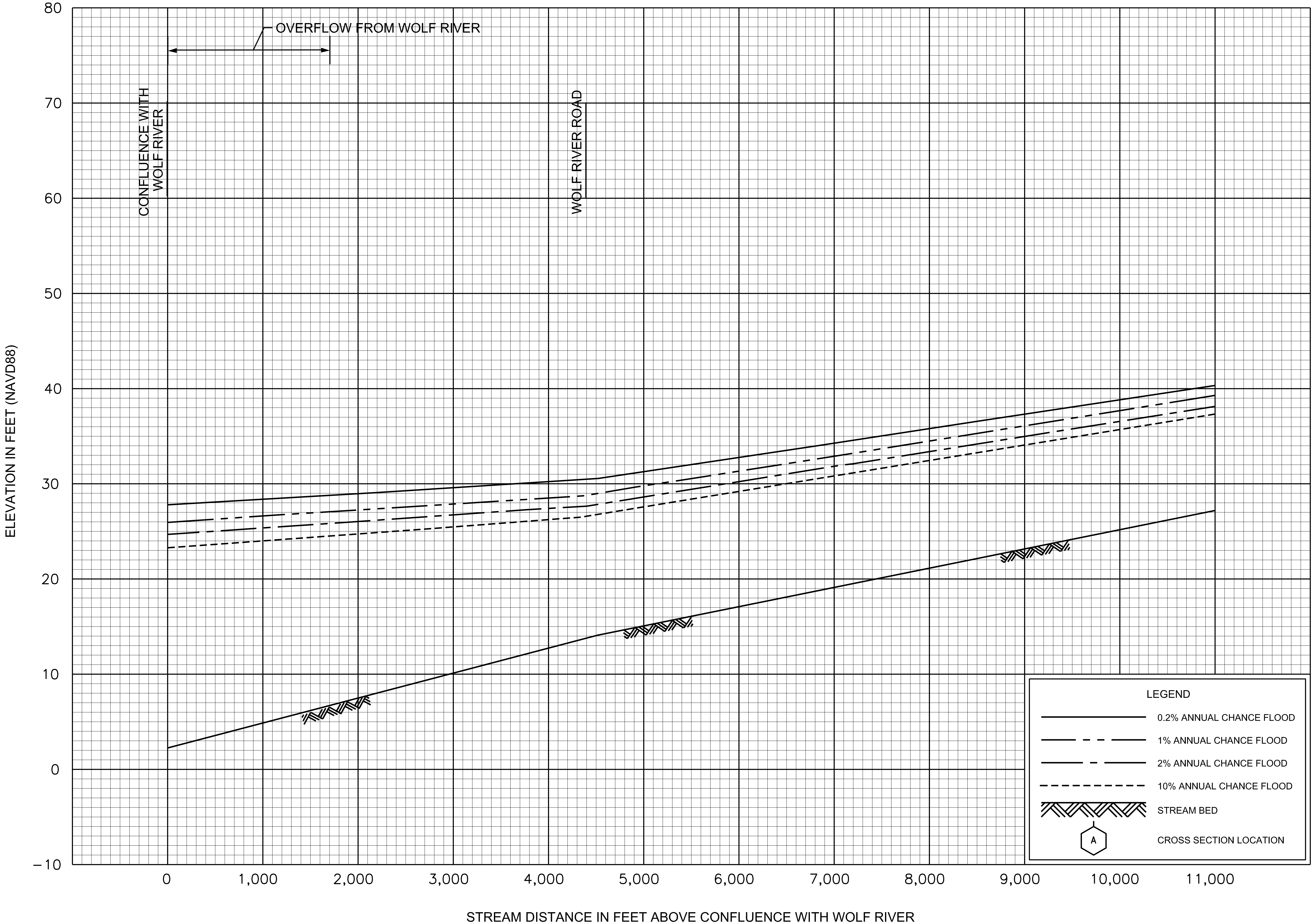
FLOOD PROFILES

BERNARD BAYOU TRIBUTARY 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

BIG CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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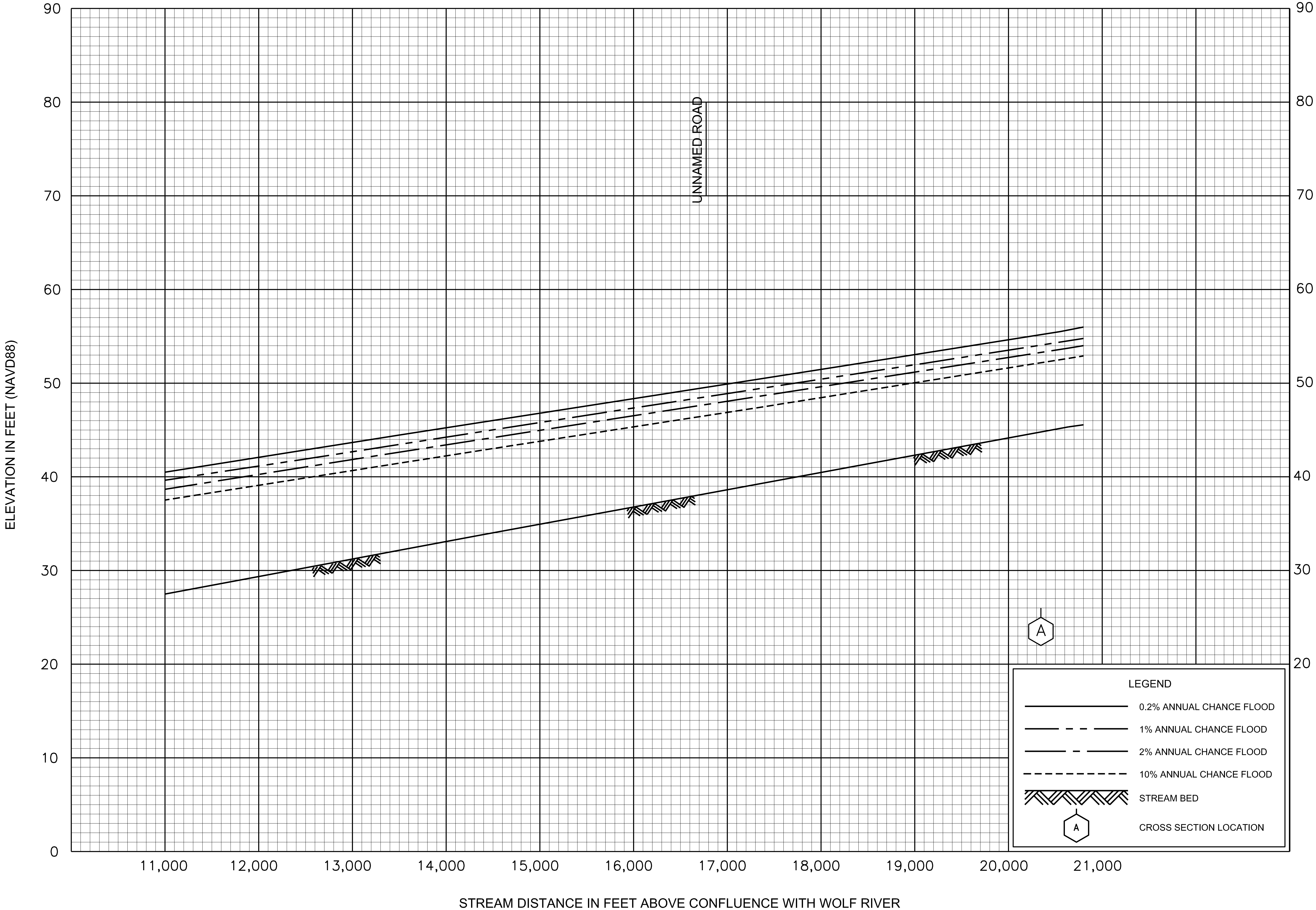

FLOOD PROFILES

BIG CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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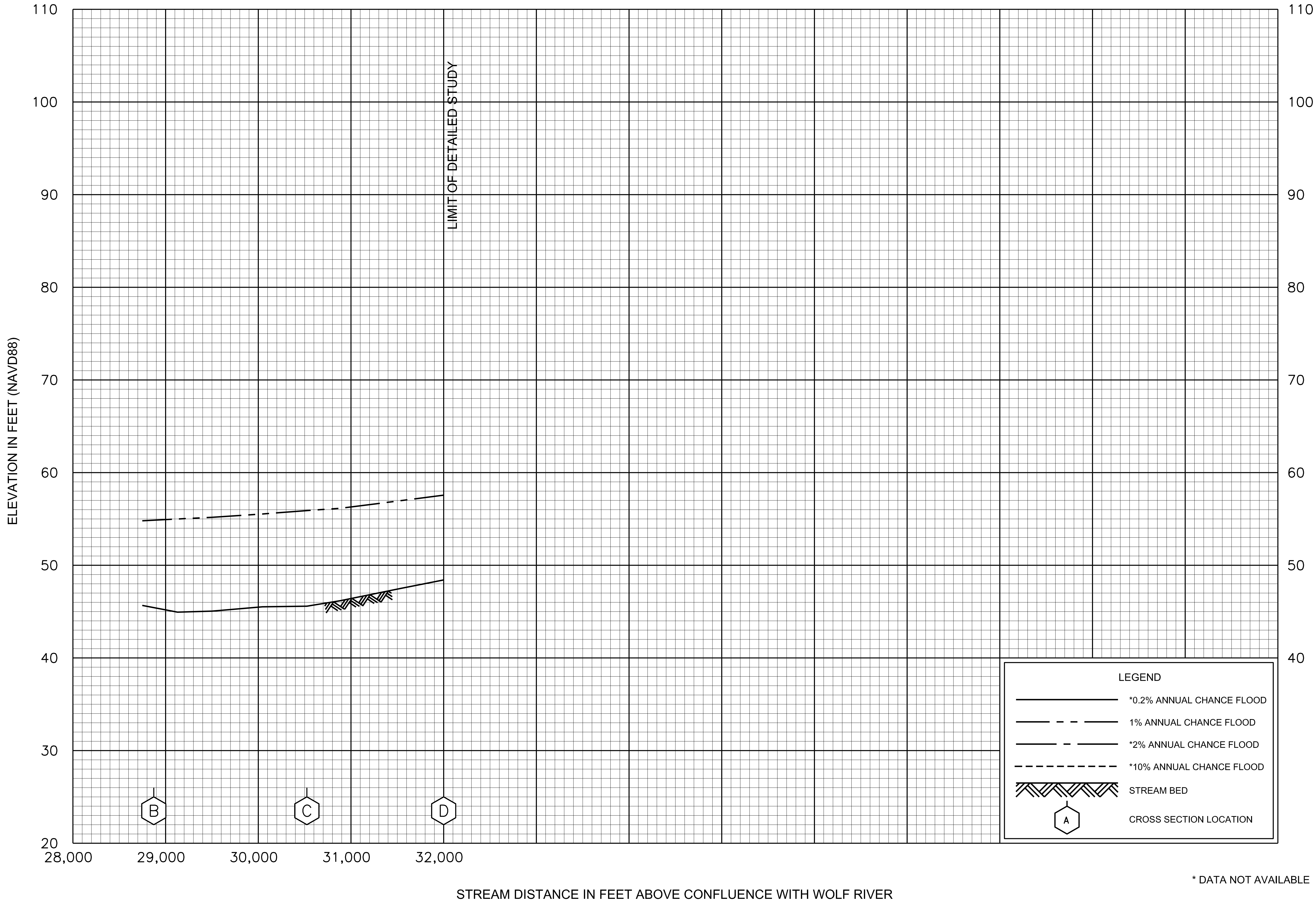


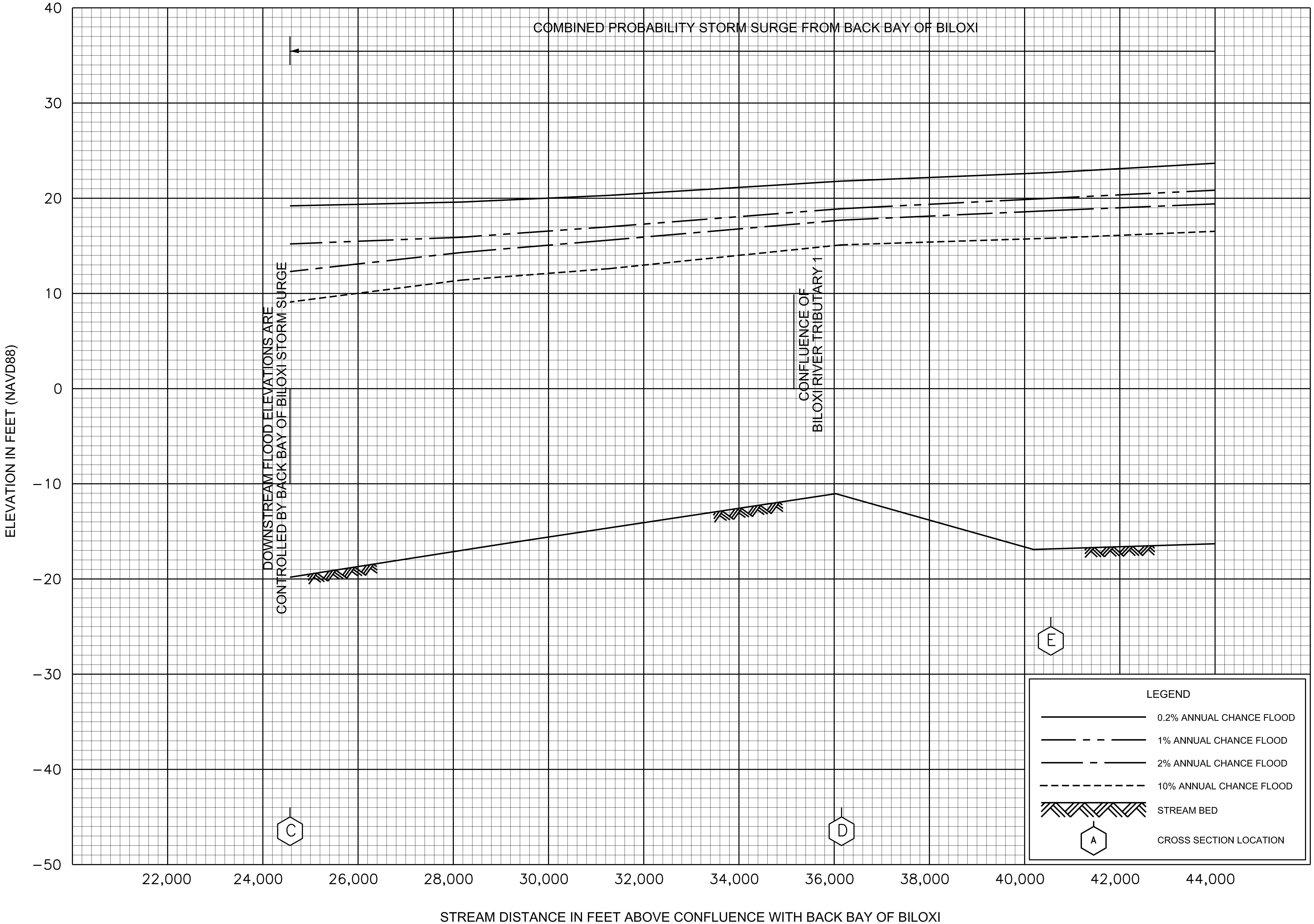
FLOOD PROFILES

BIG CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

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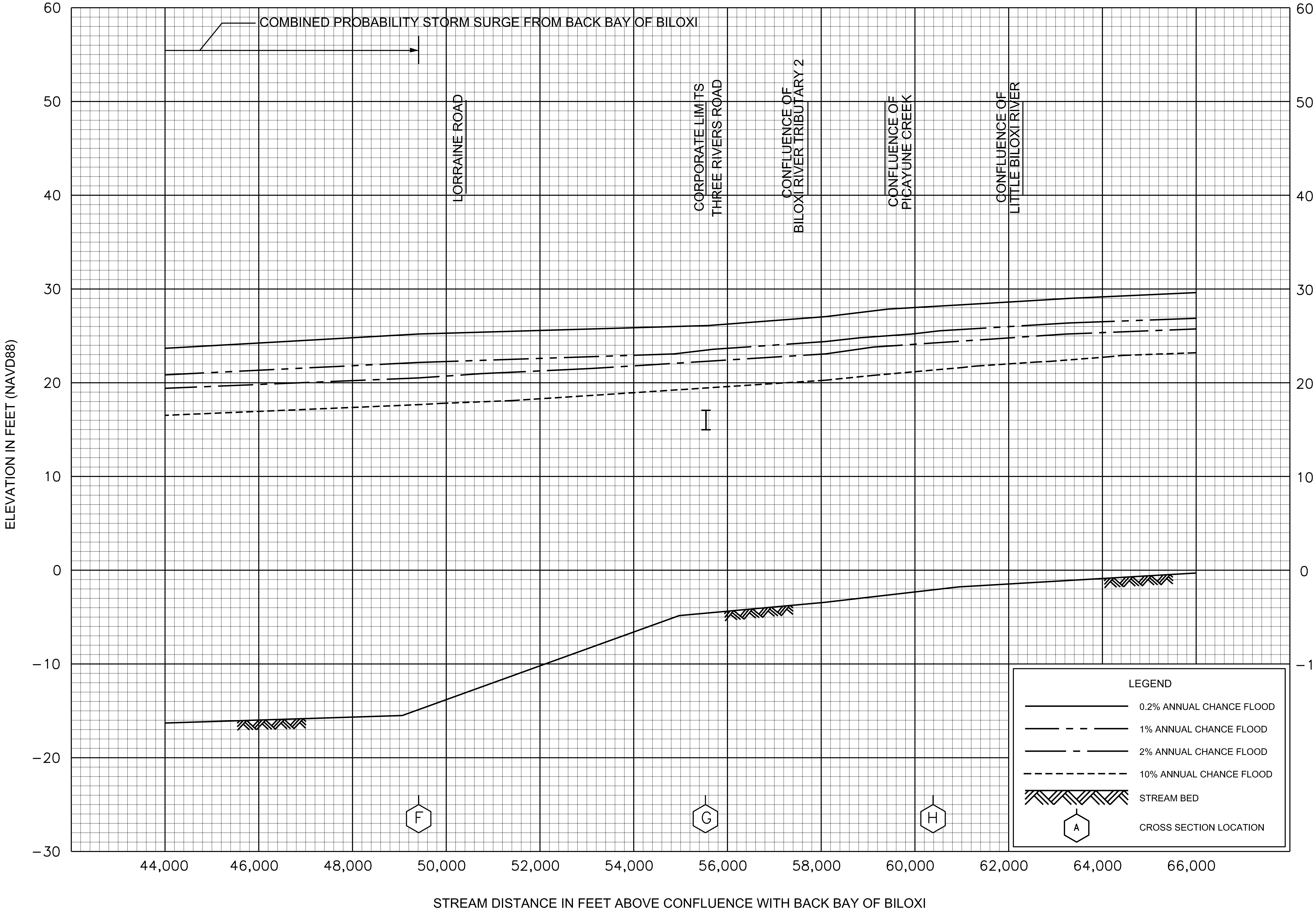


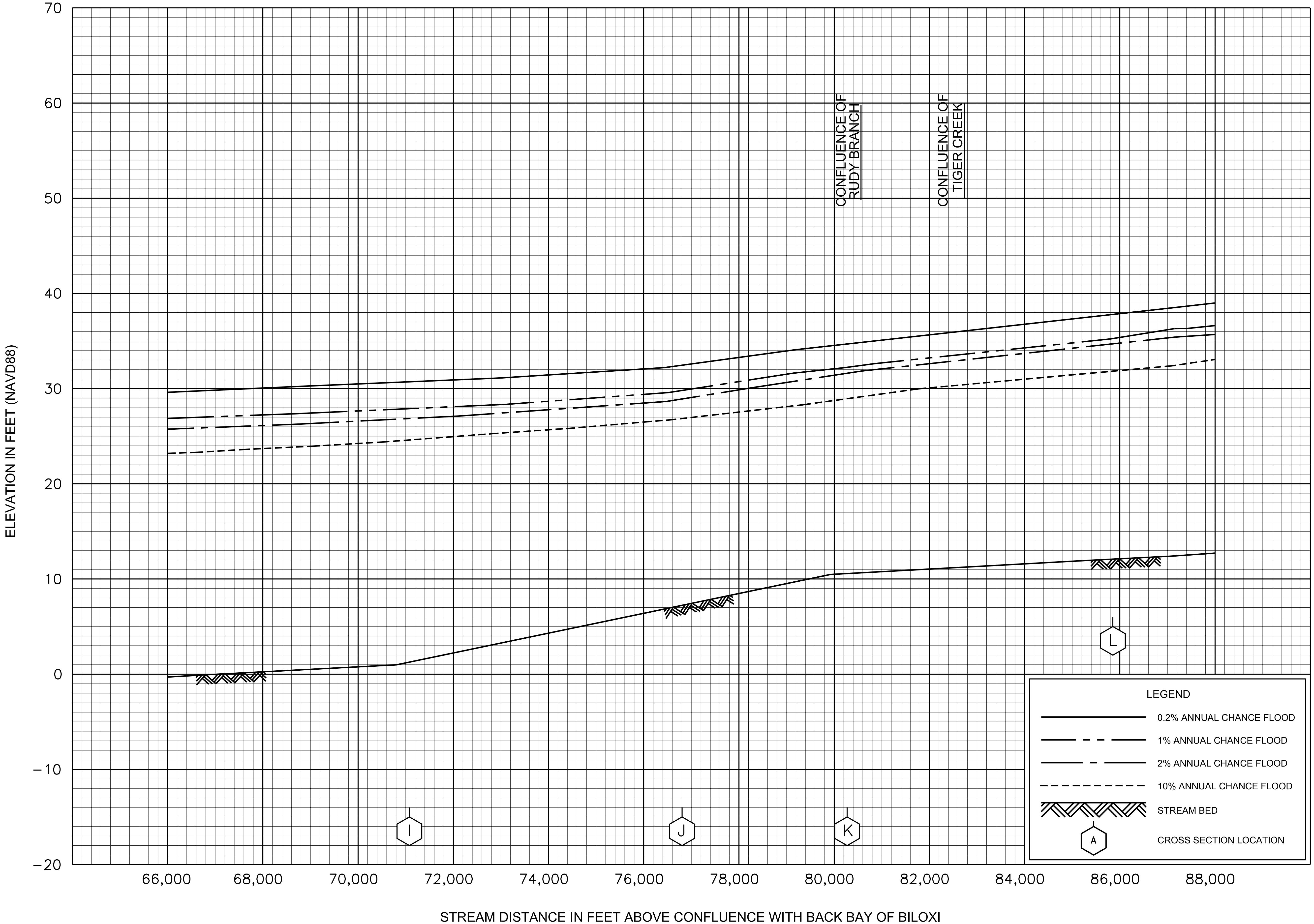
FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



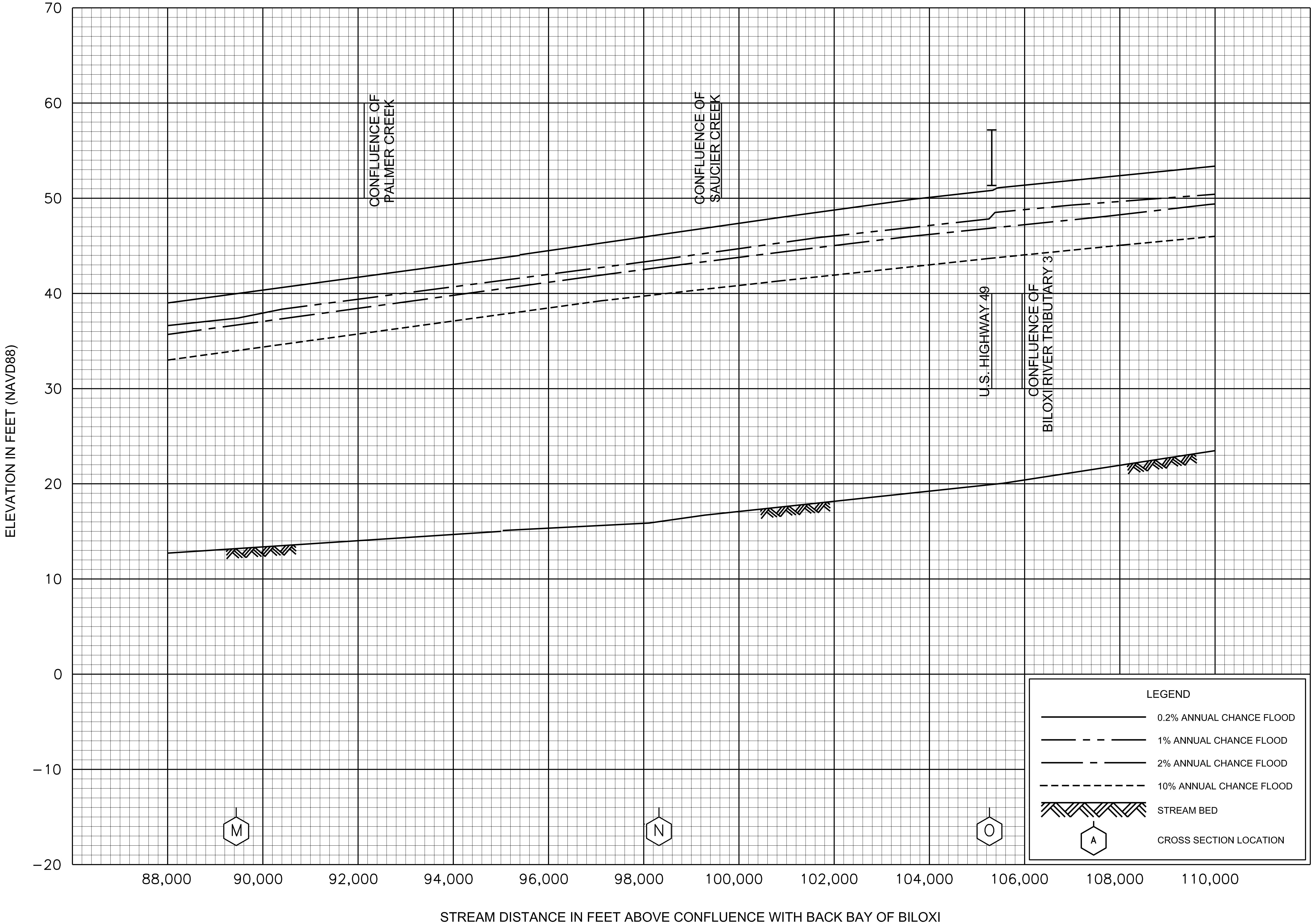
FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



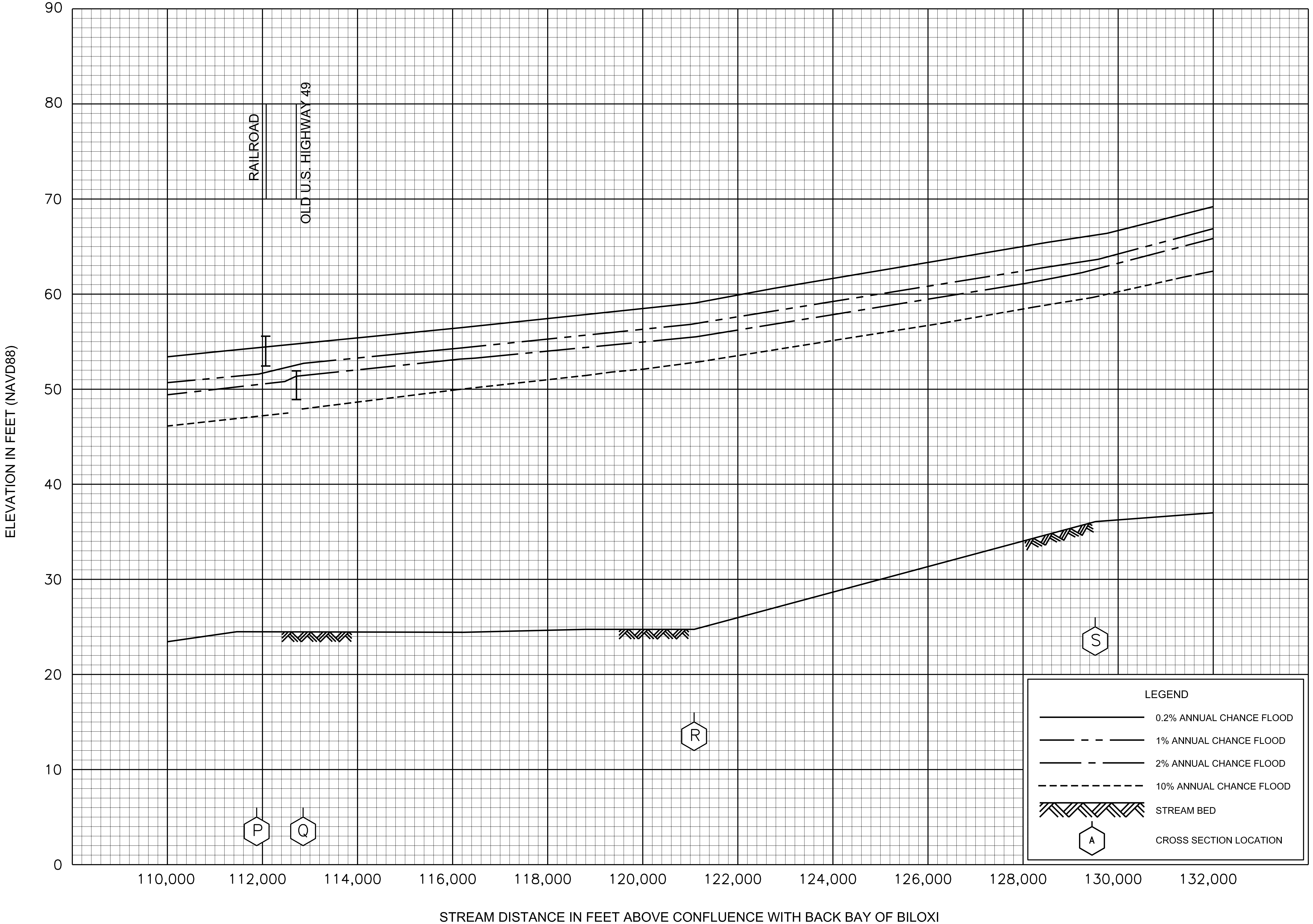
FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



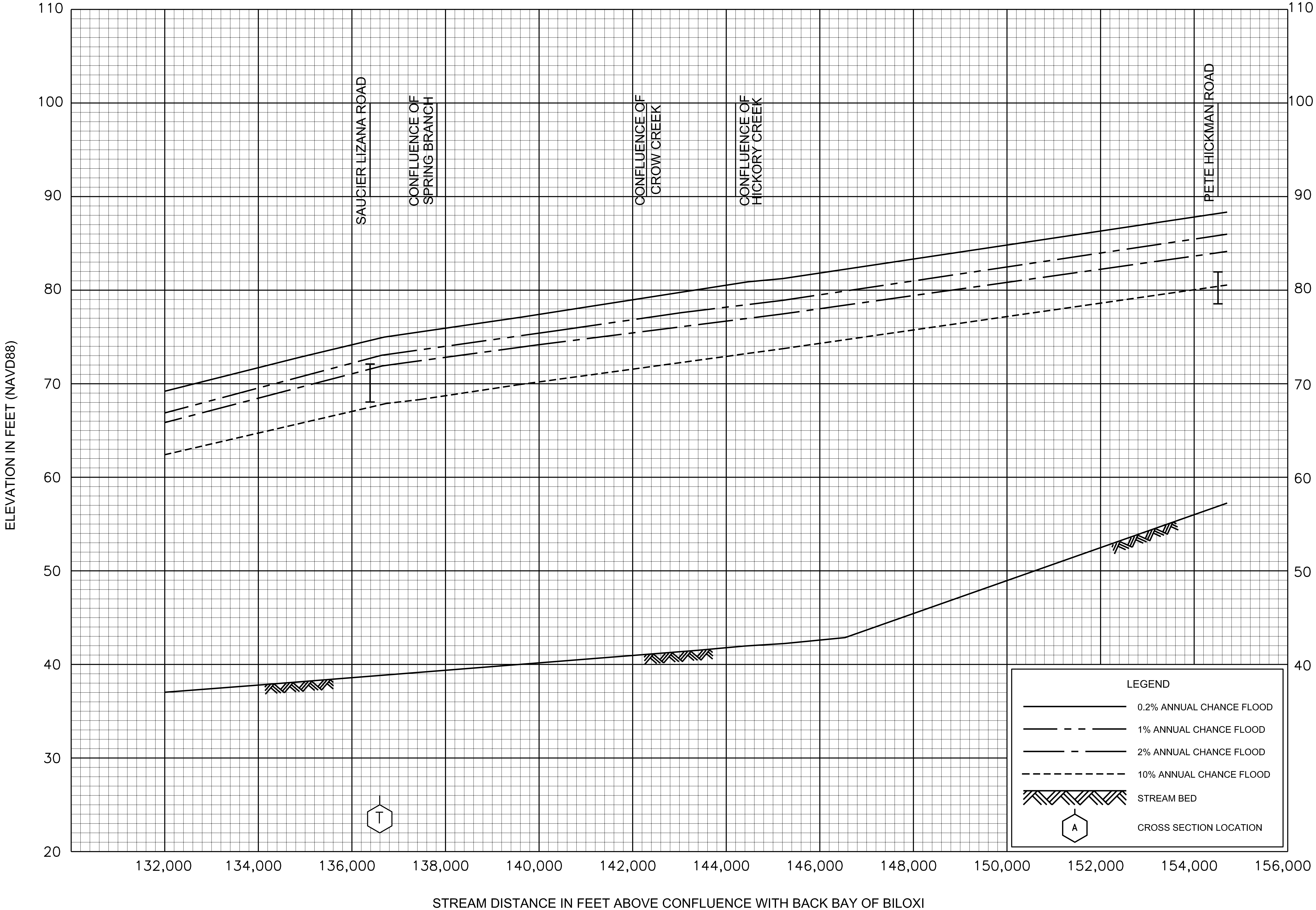
FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

BILOXI RIVER

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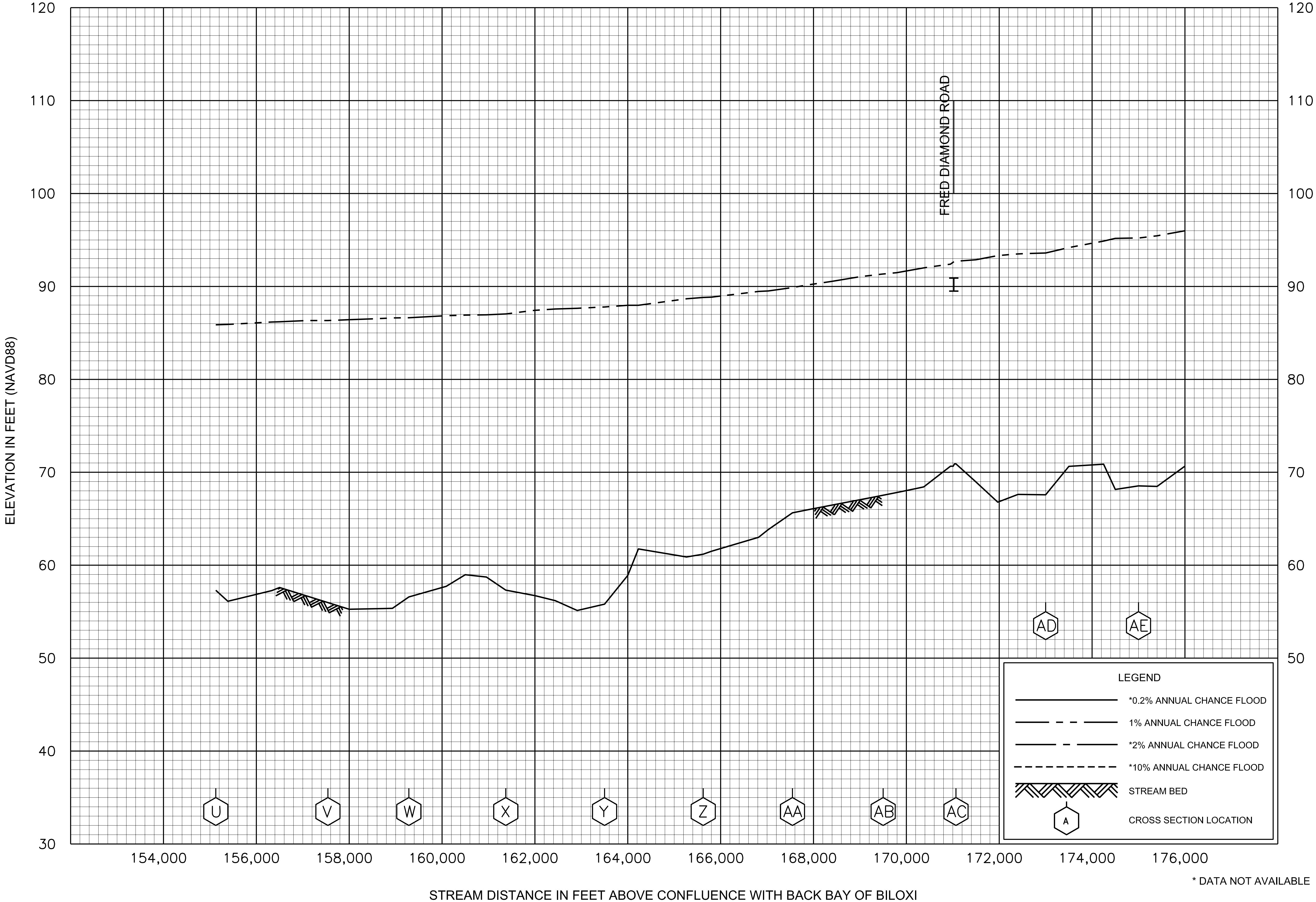
HARRISON COUNTY, MS

AND INCORPORATED AREAS



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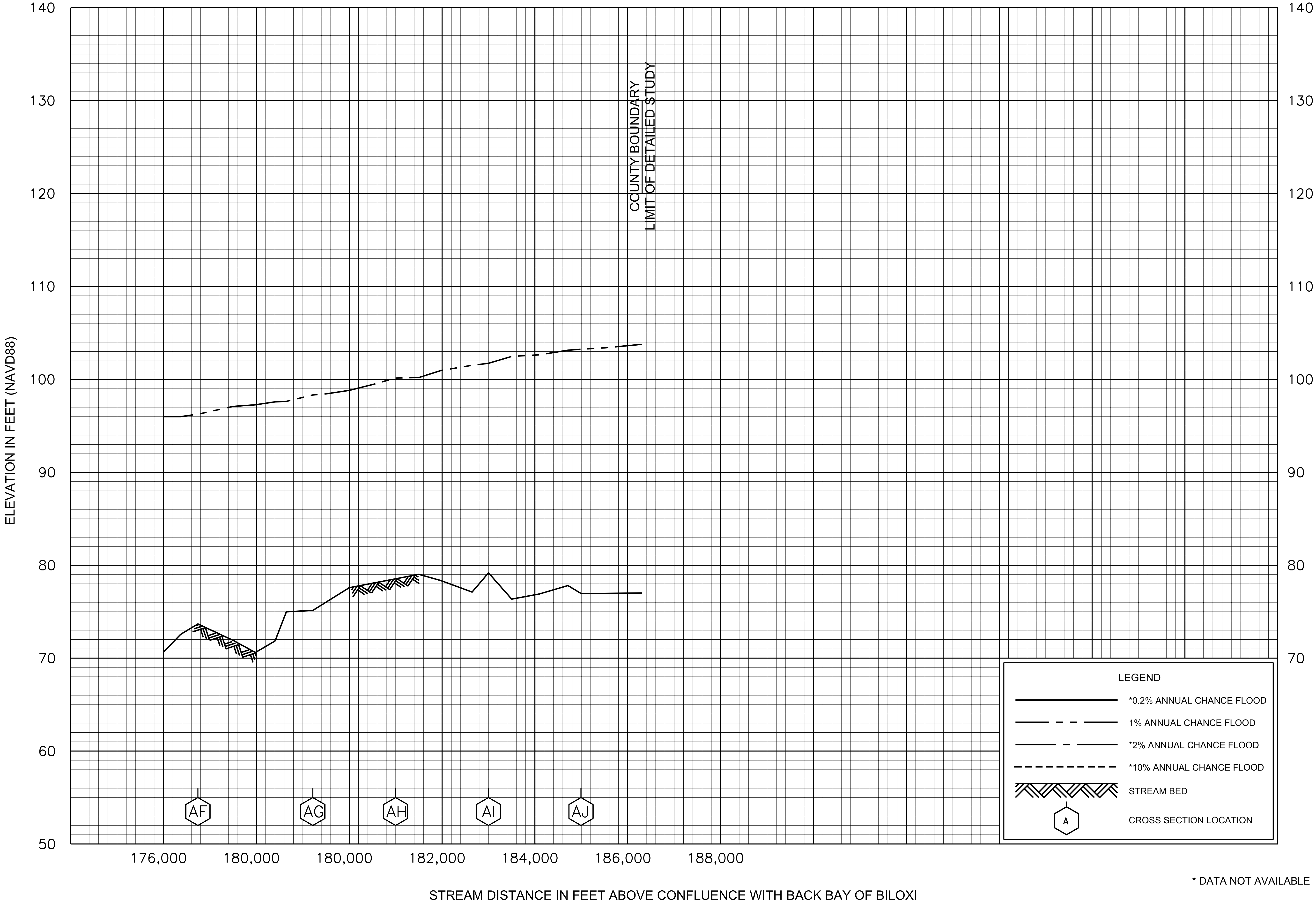
FLOOD PROFILES

BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

FLOOD PROFILES

BILOXI RIVER

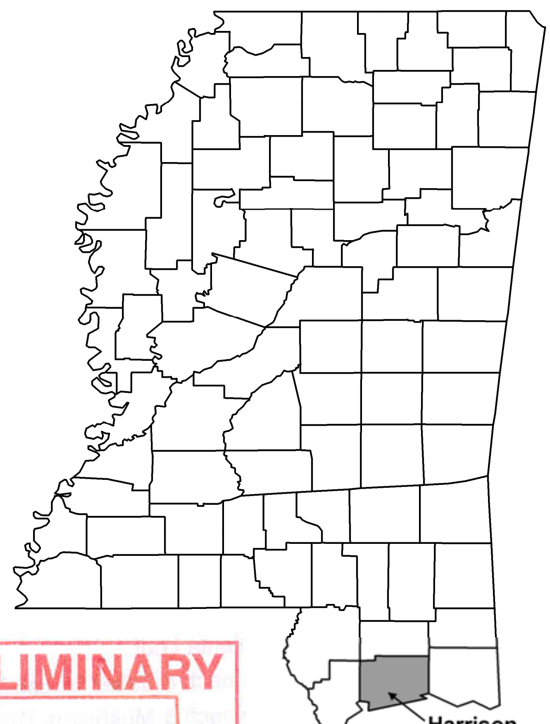
FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

FLOOD INSURANCE STUDY

HARRISON COUNTY, MISSISSIPPI
AND INCORPORATED AREAS

VOLUME 2 OF 3



COMMUNITY NAME	COMMUNITY NUMBER
BILOXI, CITY OF	285252
D'IBERVILLE, CITY OF	280336
GULFPORT, CITY OF	285253
HARRISON COUNTY (UNINCORPORATED AREAS)	285255
LONG BEACH, CITY OF	285257
PASS CHRISTIAN, CITY OF	285261

PRELIMINARY
NOV 15 2007

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
28047CV002A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date:

TABLE OF CONTENTS

Table of Contents – Volume 1

Table of Contents – Volume 1 -continued

Table of Contents – Volume 2

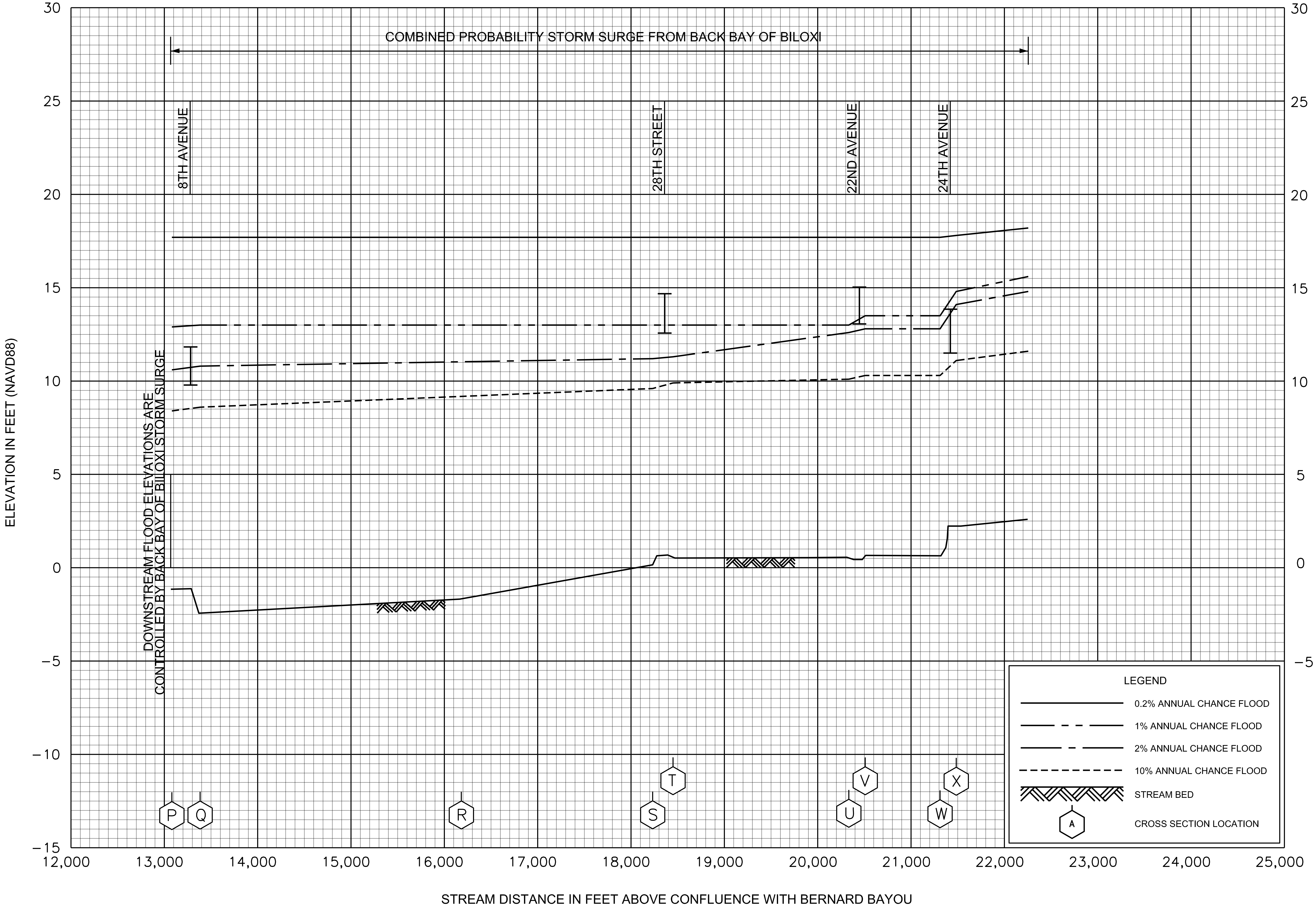
Table of Contents – Volume 2 – continued

EXHIBITS – continued

Table of Contents – Volume 3

EXHIBITS – continued

EXHIBITS – continued

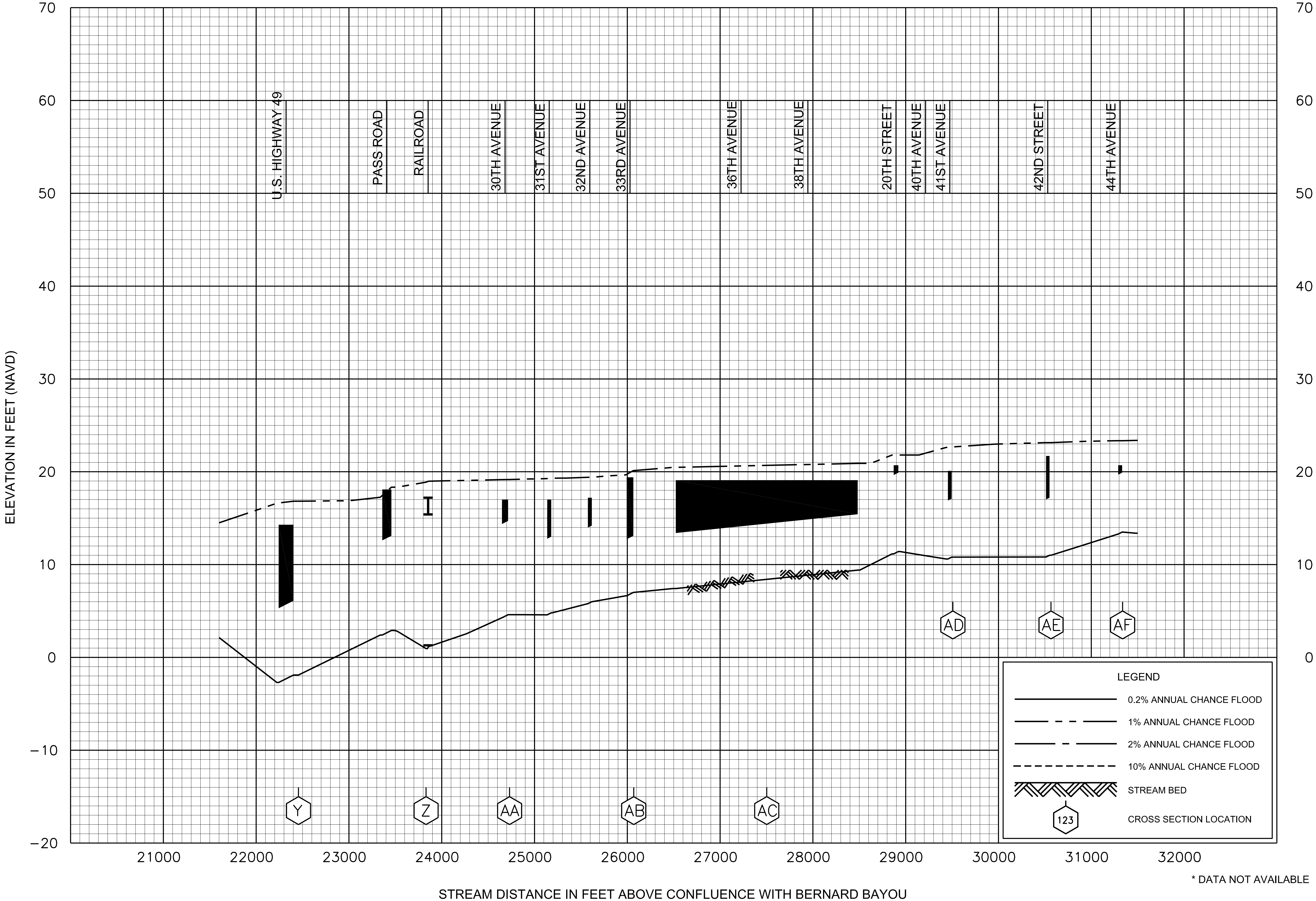


FLOOD PROFILES

BRICKYARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS AND INCORPORATED AREAS



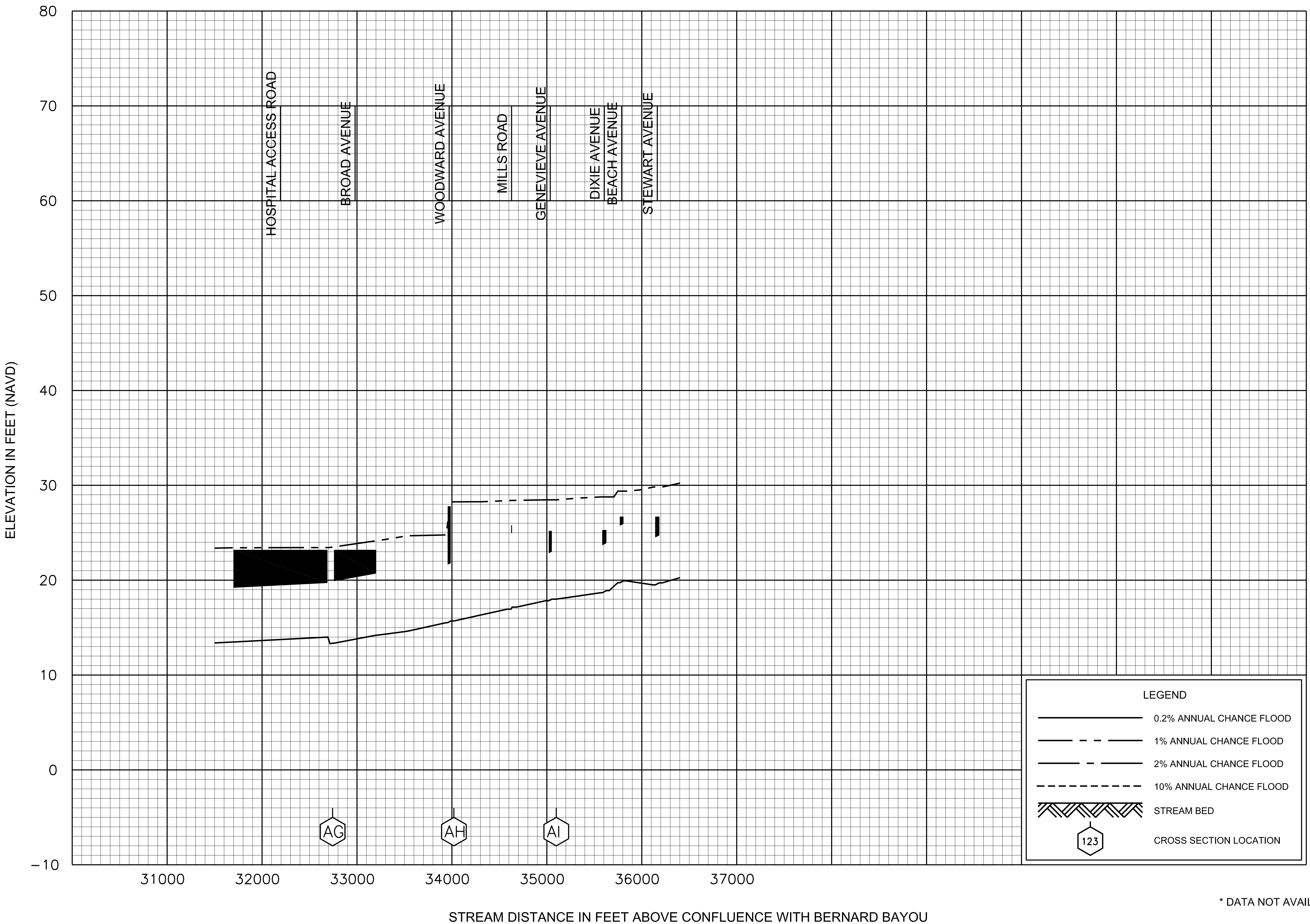
FLOOD PROFILES

BRICKYARD BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, NC

AND INCORPORATED AREAS



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FLOOD PROFILES

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HARRISON COUNTY, NC

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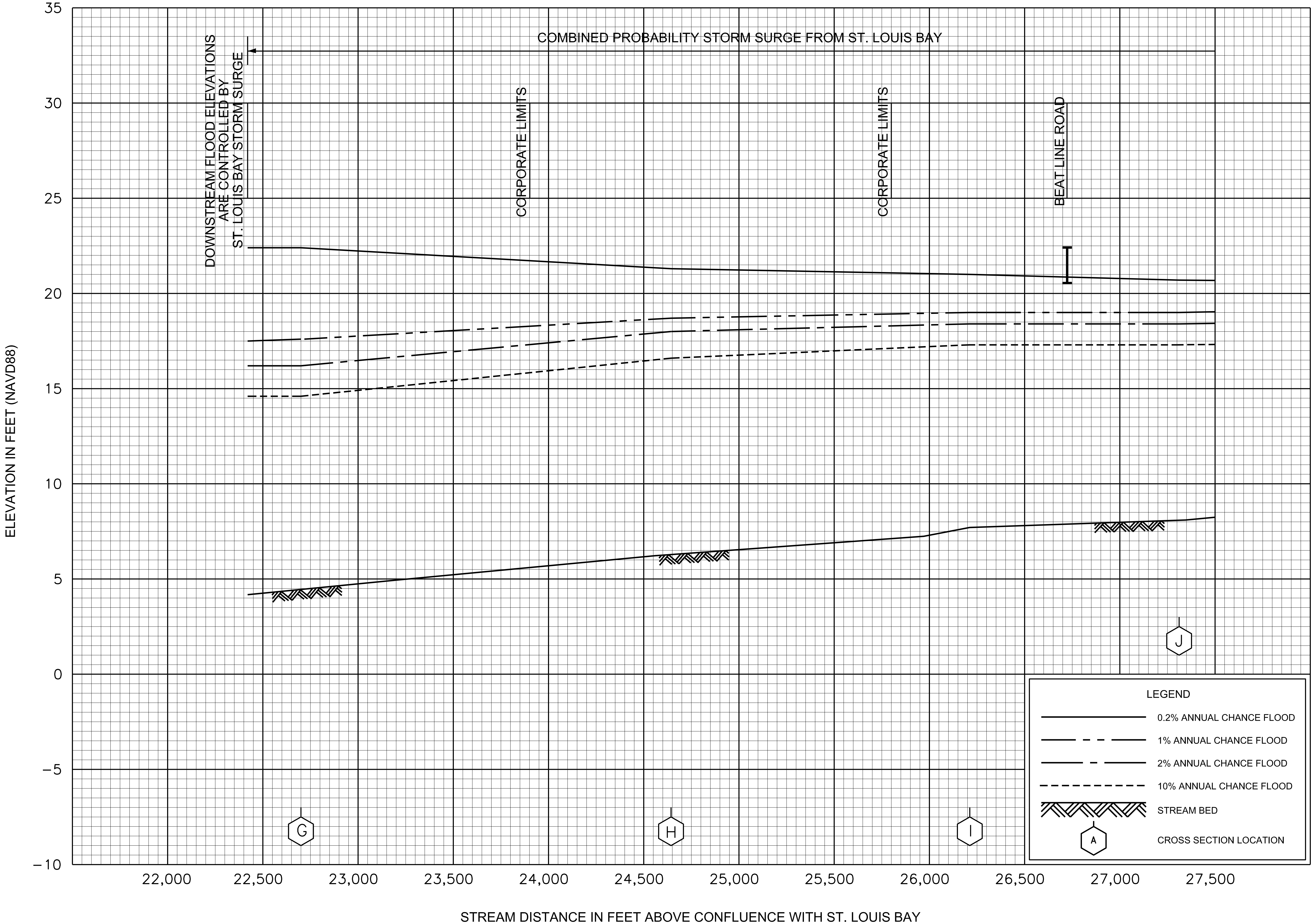
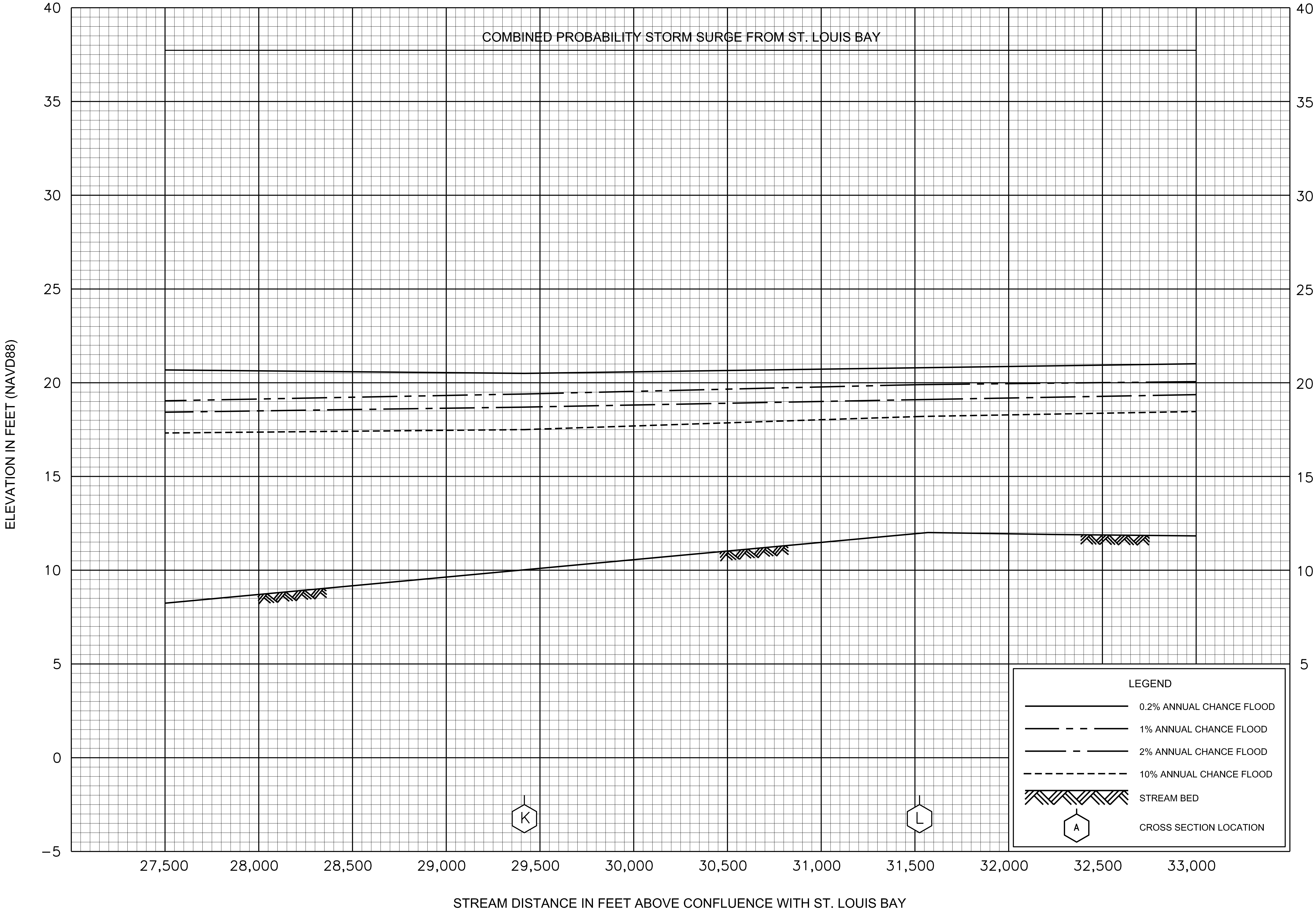


FLOOD PROFILES

CANAL NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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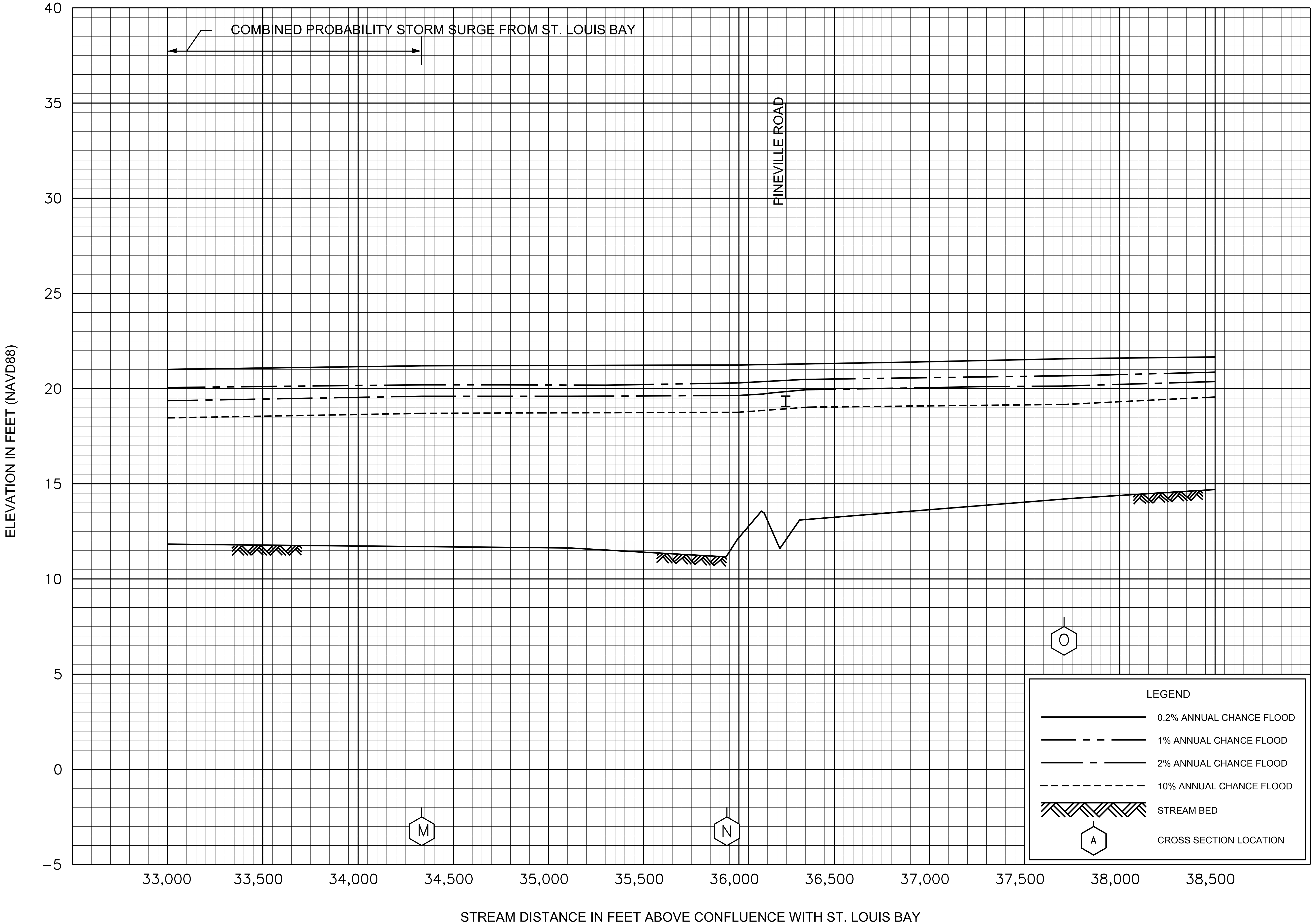
AND INCORPORATED AREAS



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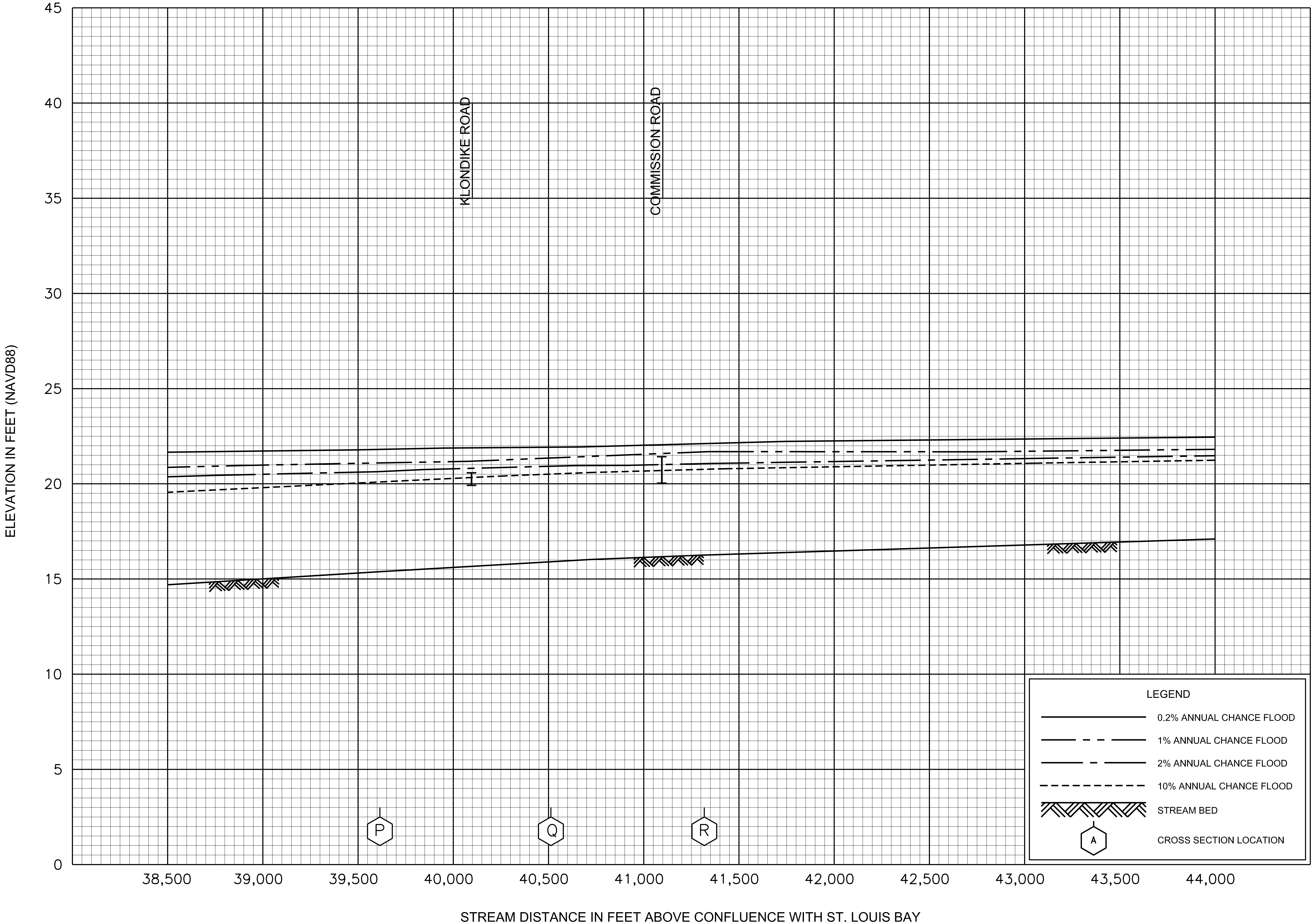

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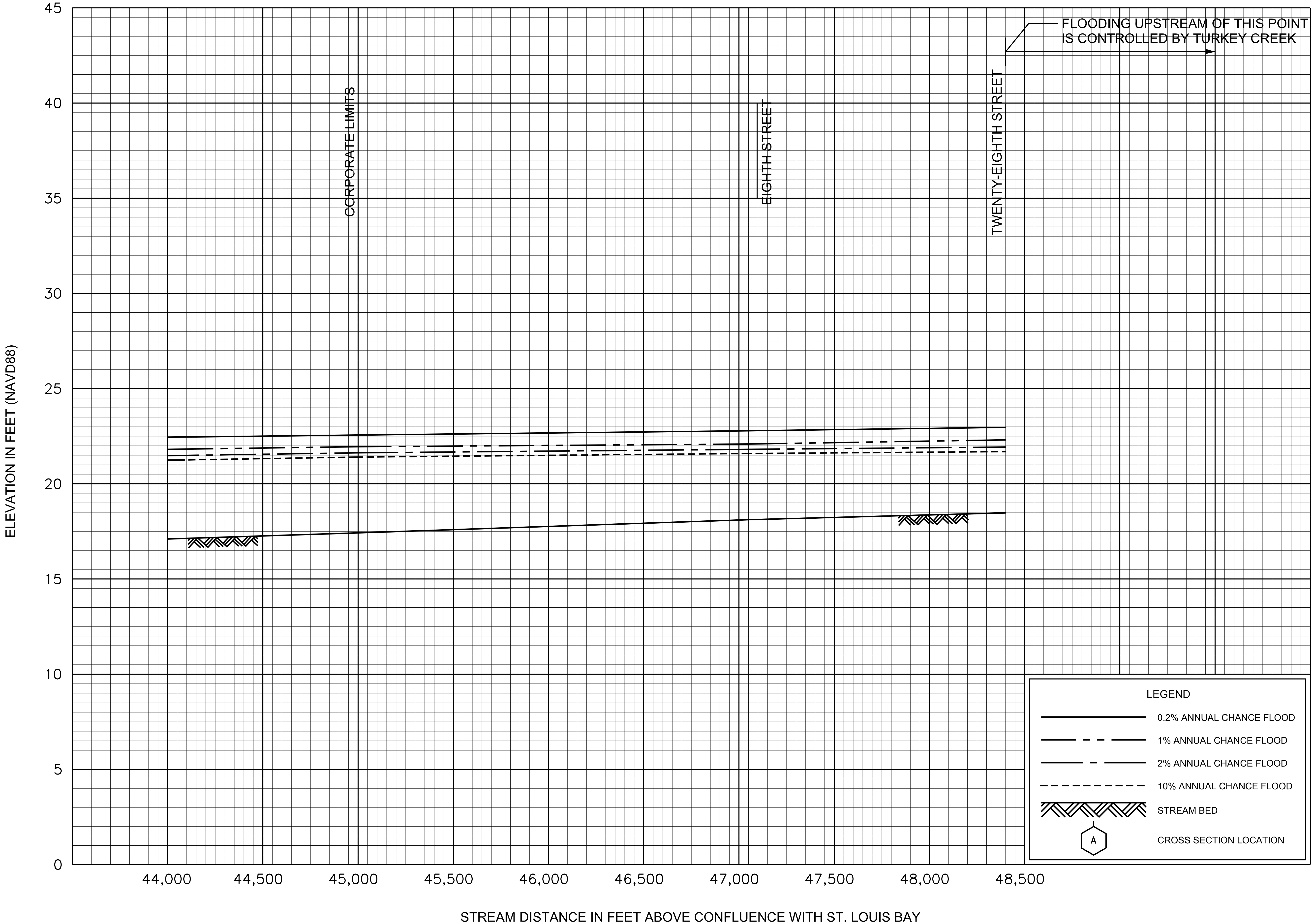

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HARRISON COUNTY, MS

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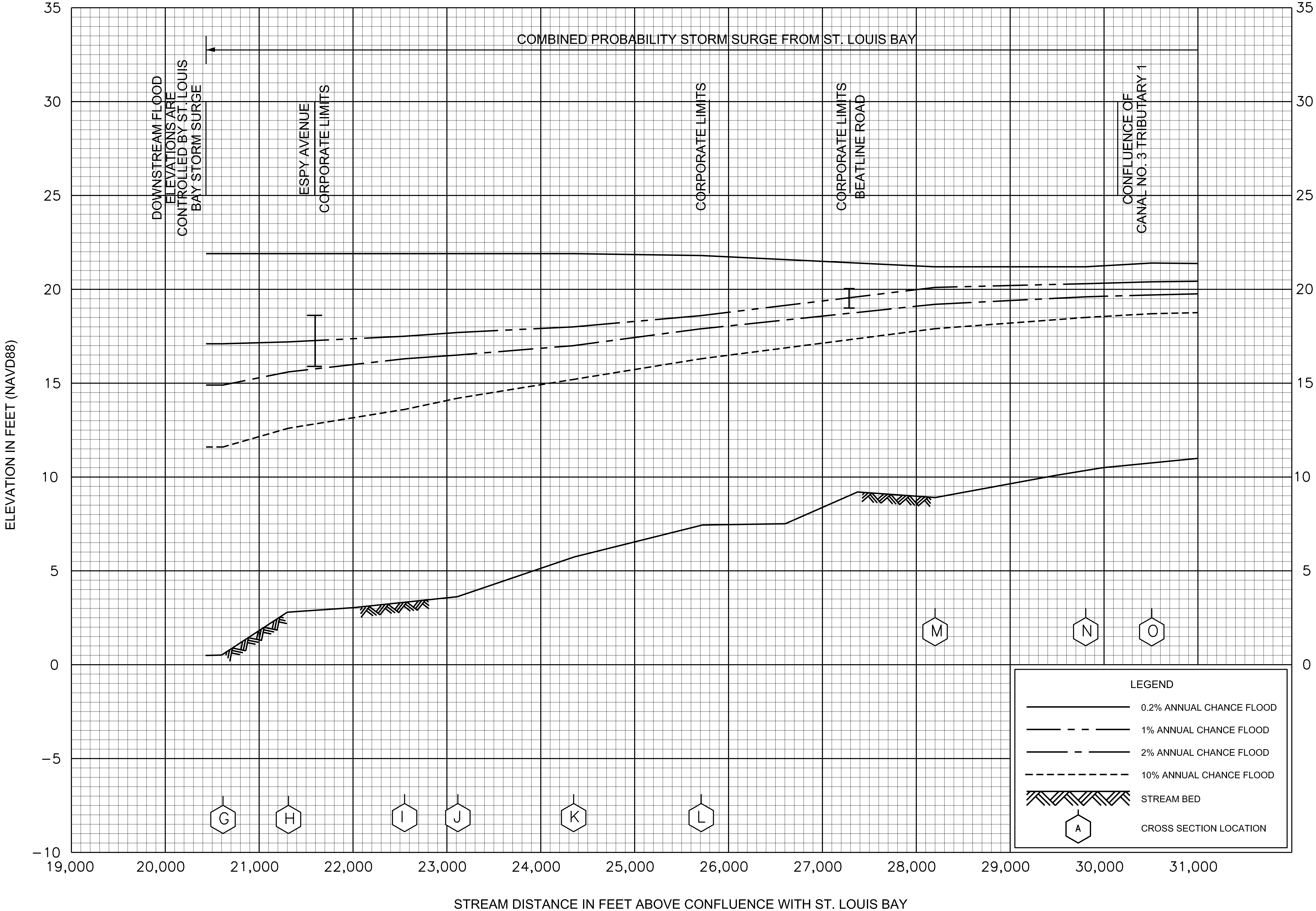

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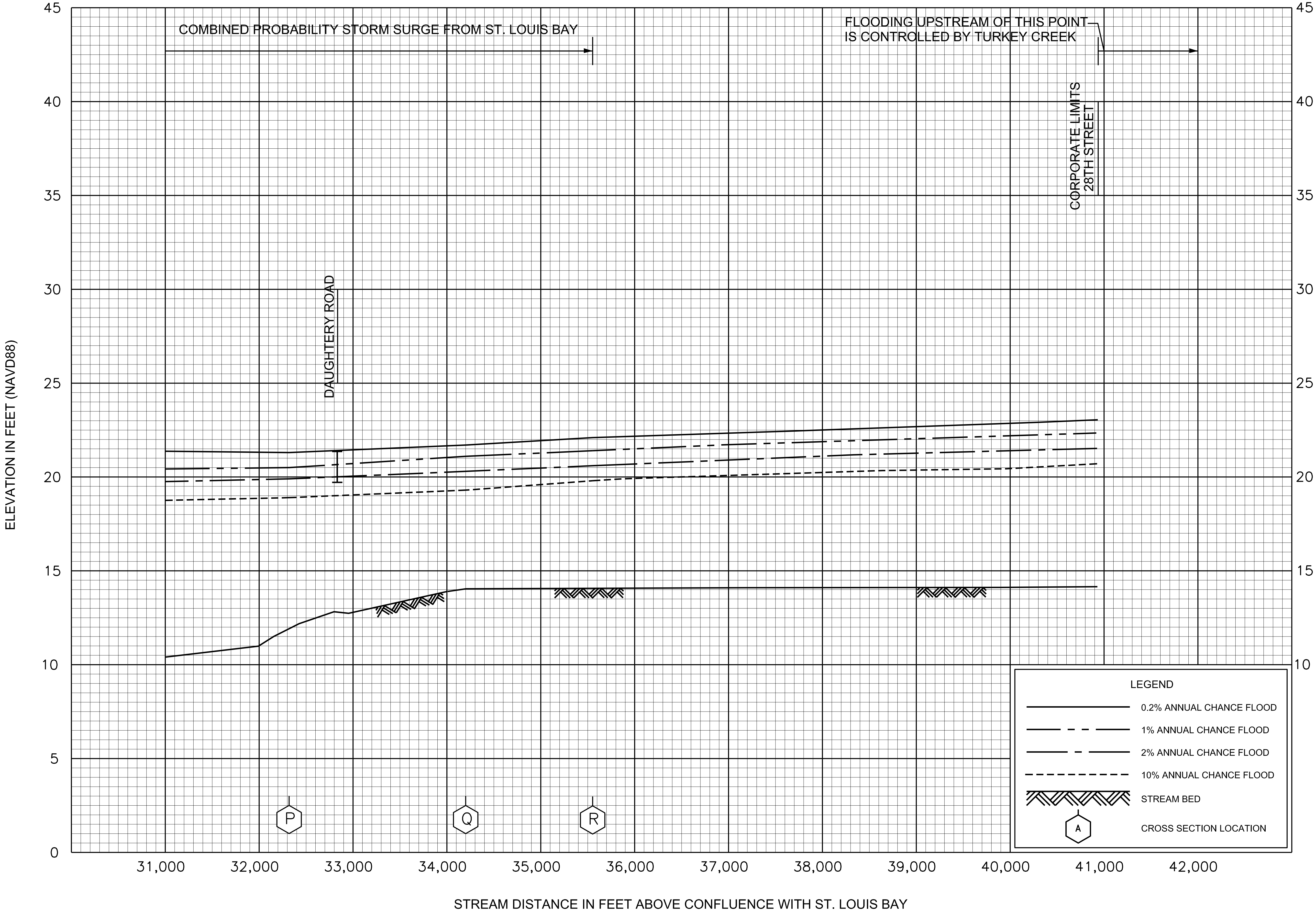
CANAL NO. 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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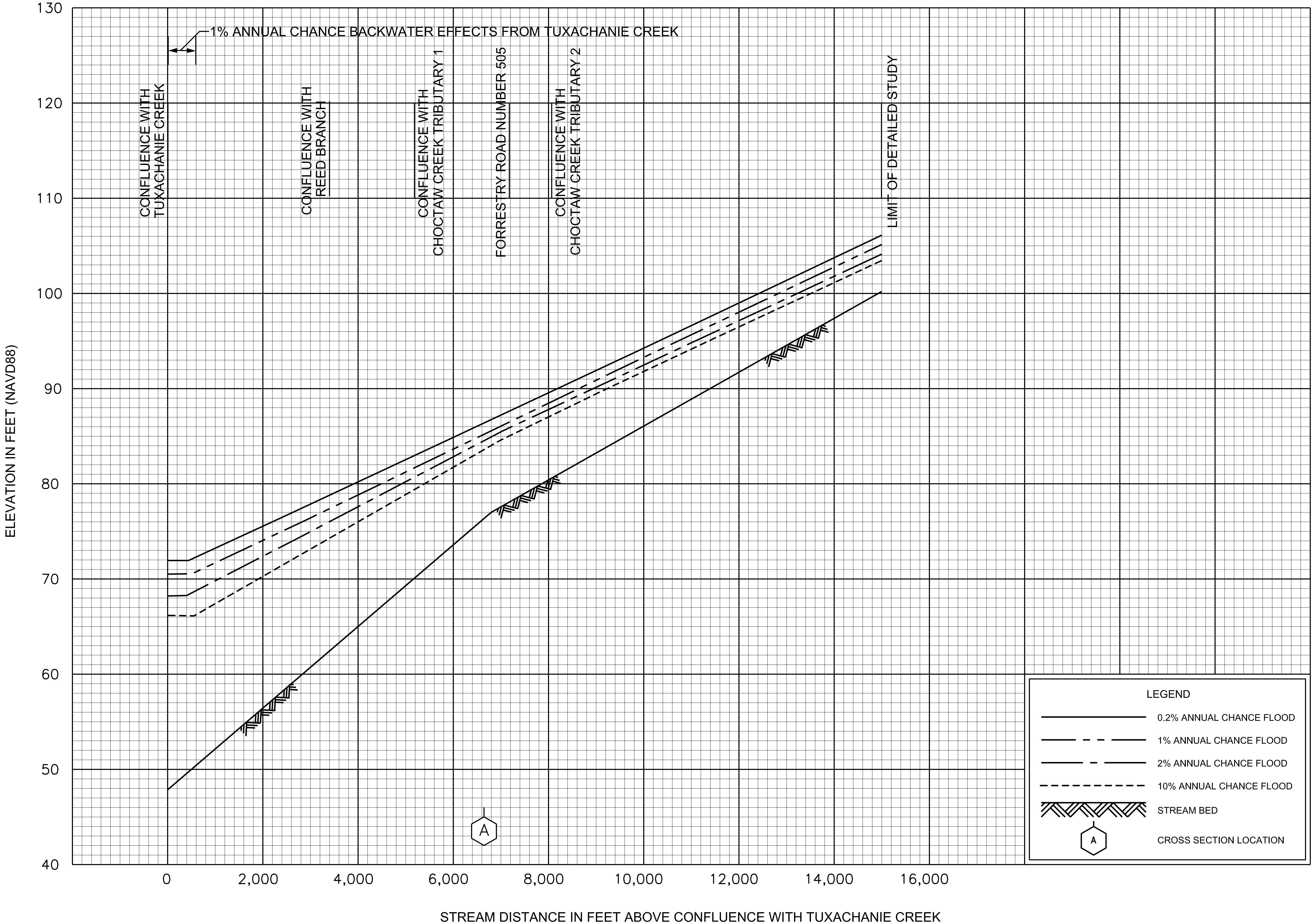


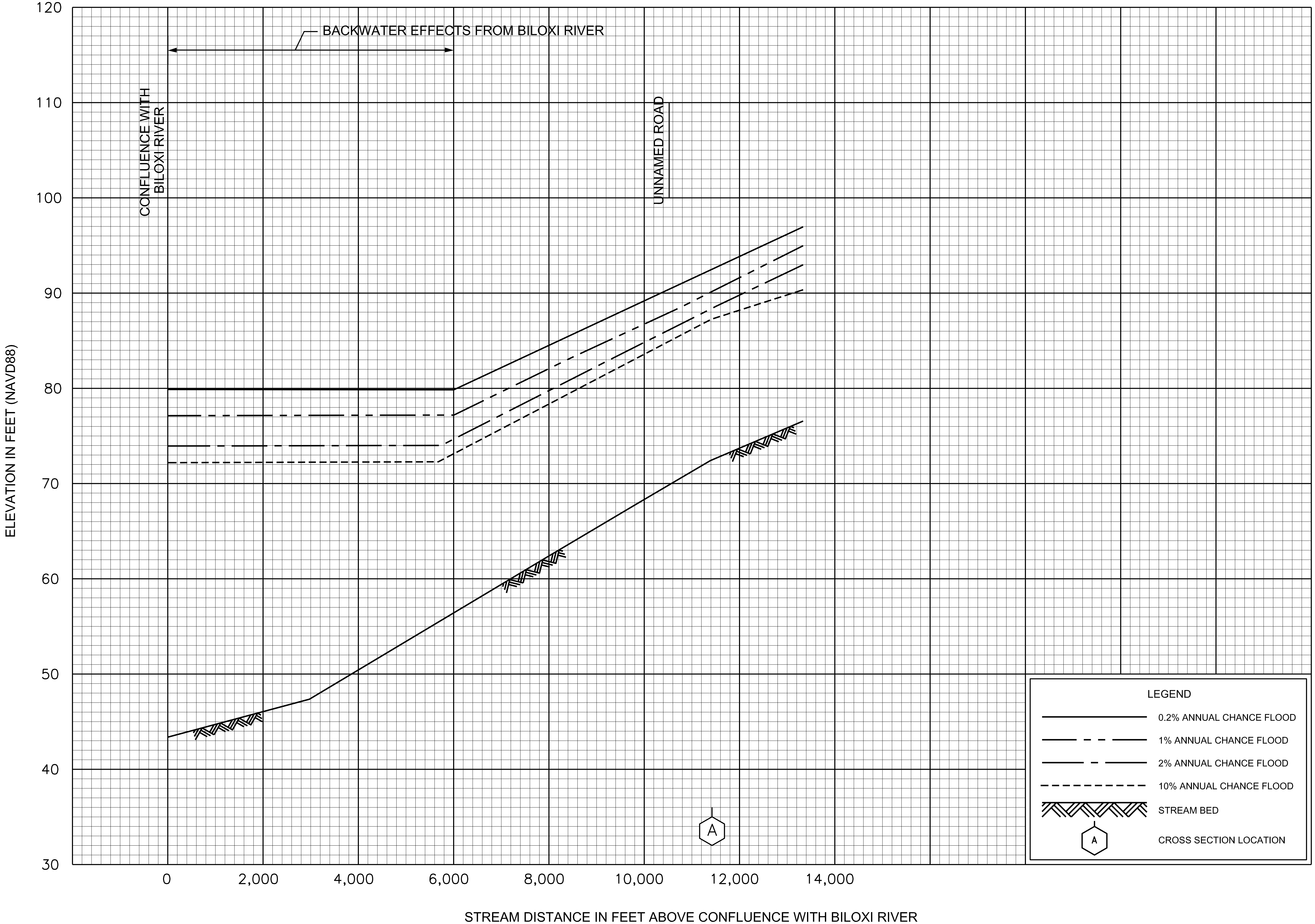
FLOOD PROFILES

CHOCTAW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

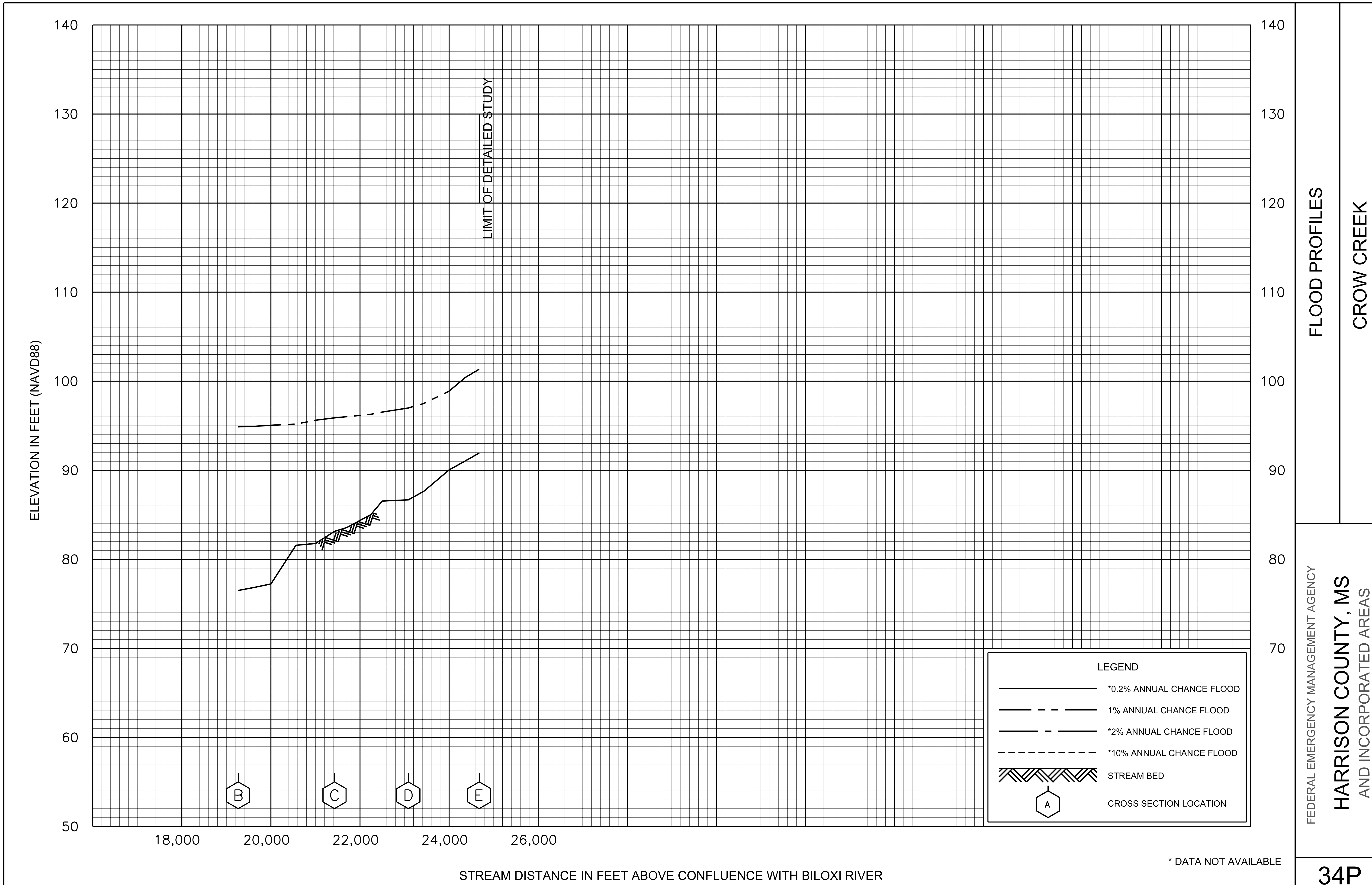


FLOOD PROFILES

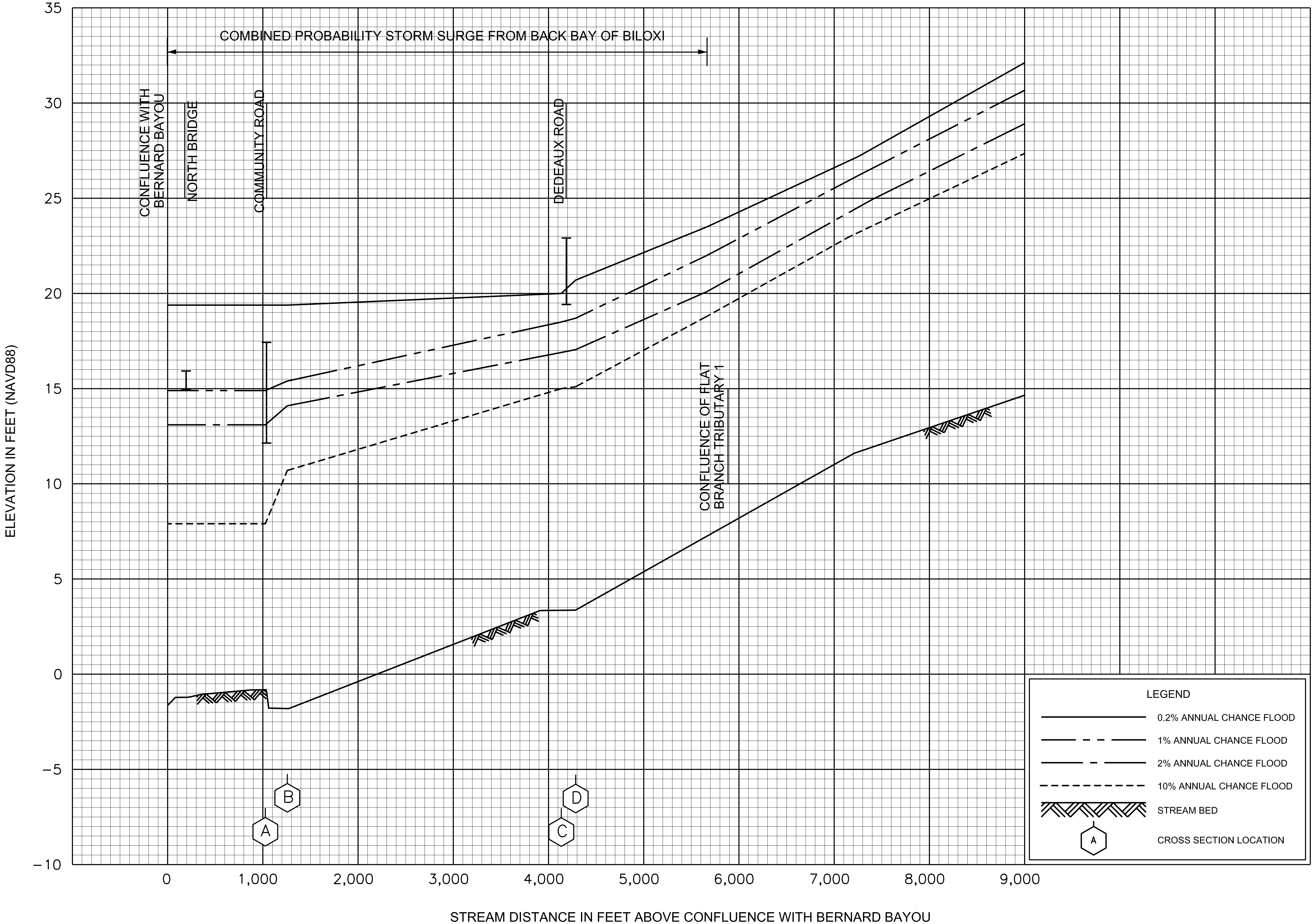
CROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



140
130
120
110
100
90
80
70
60
50
ELEVATION IN FEET (NAVD88)
LIMIT OF DETAILED STUDY
B
C
D
E
18,000
20,000
22,000
24,000
26,000
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BILOXI RIVER
LEGEND
*0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
*10% ANNUAL CHANCE FLOOD
STREAM BED
A
CROSS SECTION LOCATION
* DATA NOT AVAILABLE
FLOOD PROFILES
CROW CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS
34P



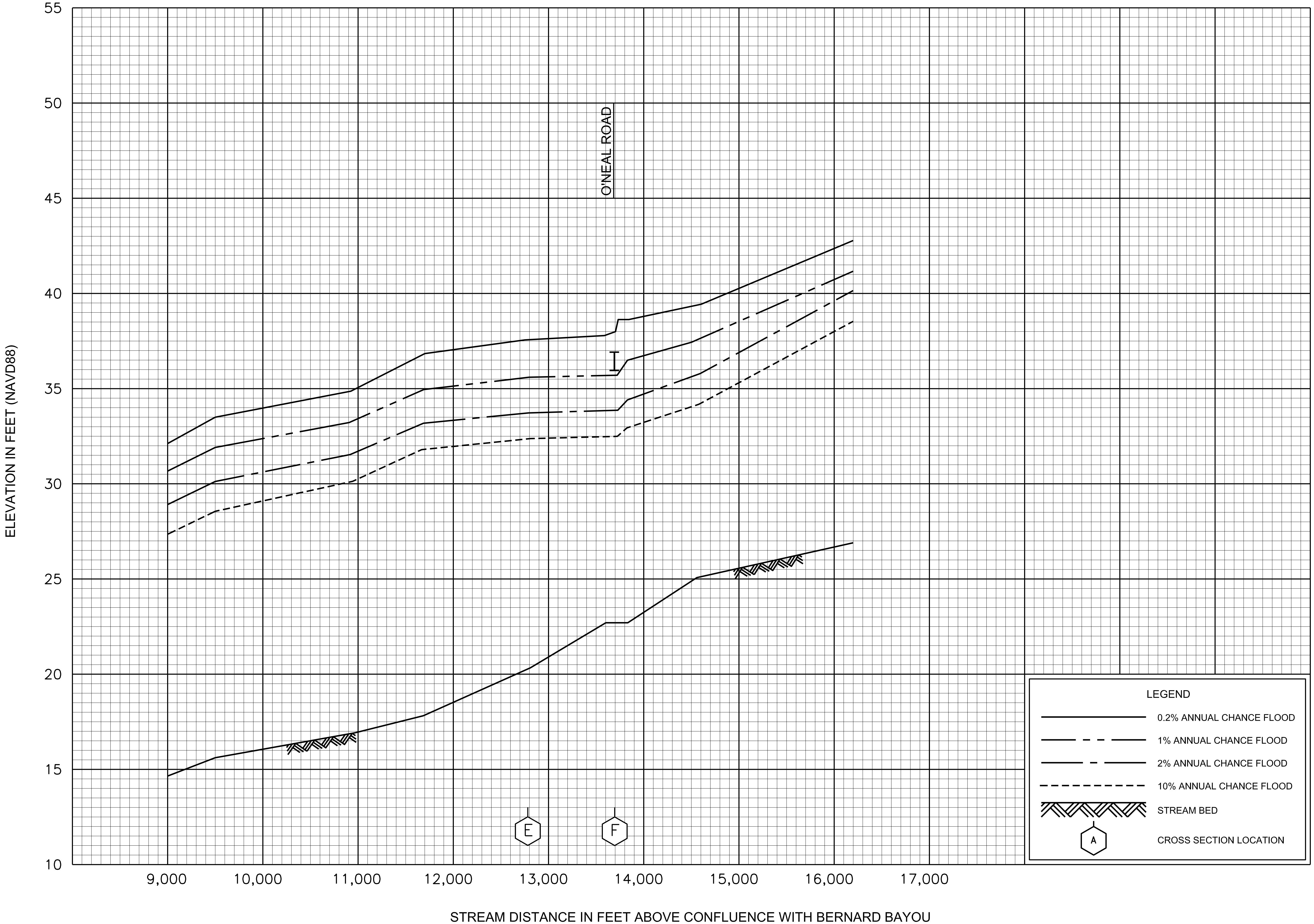
FLOOD PROFILES

FLAT BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

35P



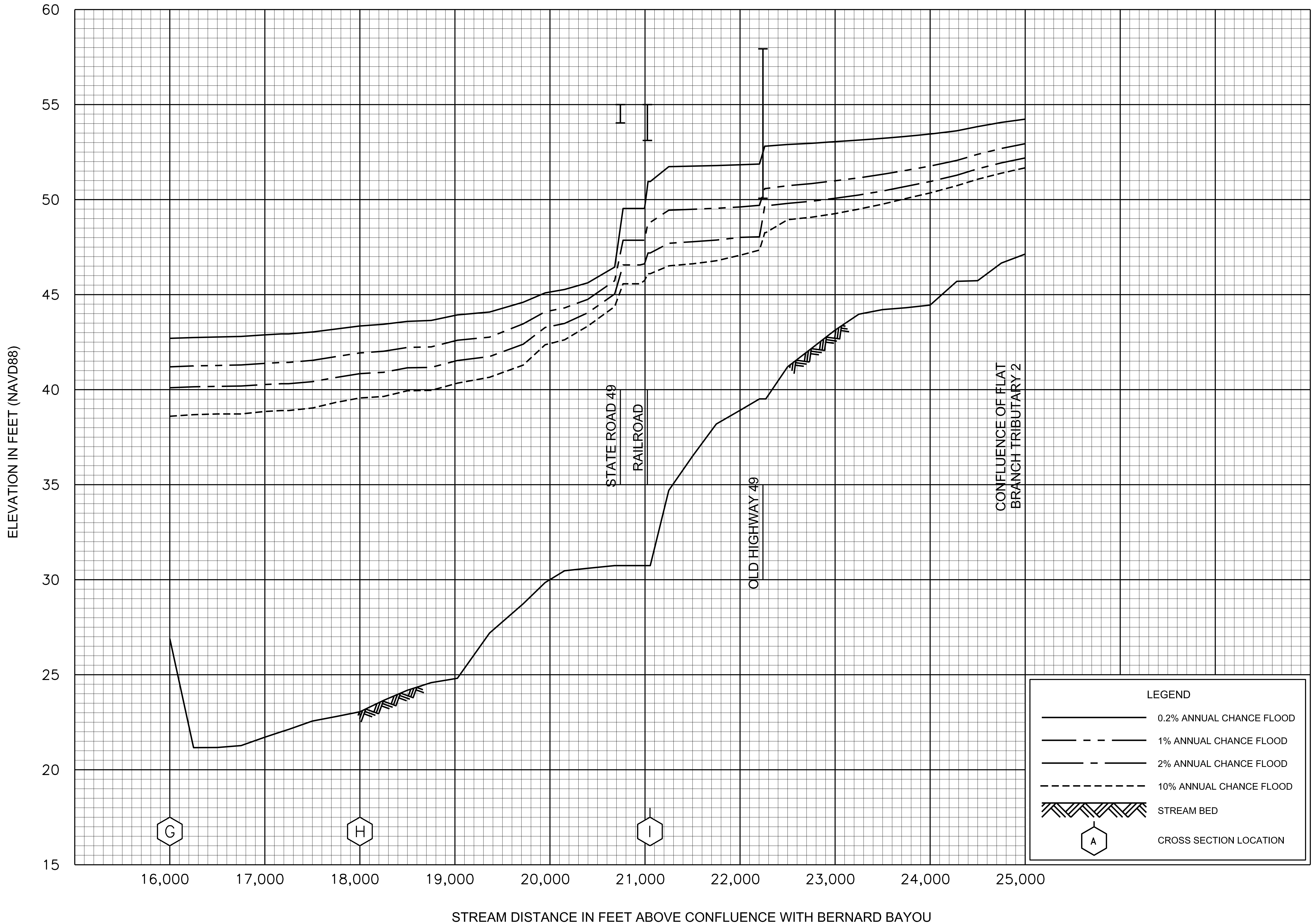
FLOOD PROFILES

FLAT BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

36P



FLOOD PROFILES

FLAT BRANCH

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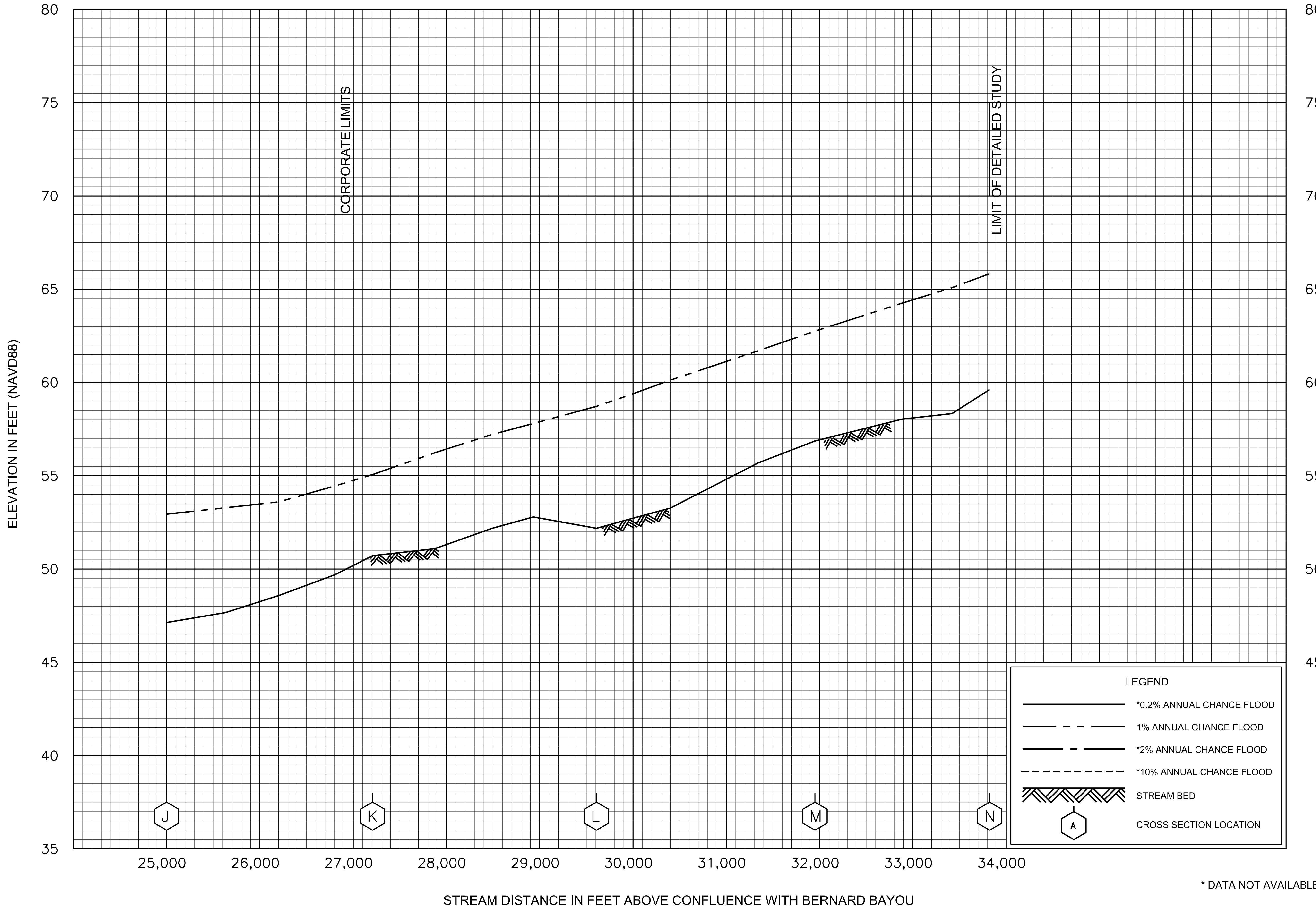
HARRISON COUNTY, MS

AND INCORPORATED AREAS



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FLOOD PROFILES

FLAT BRANCH

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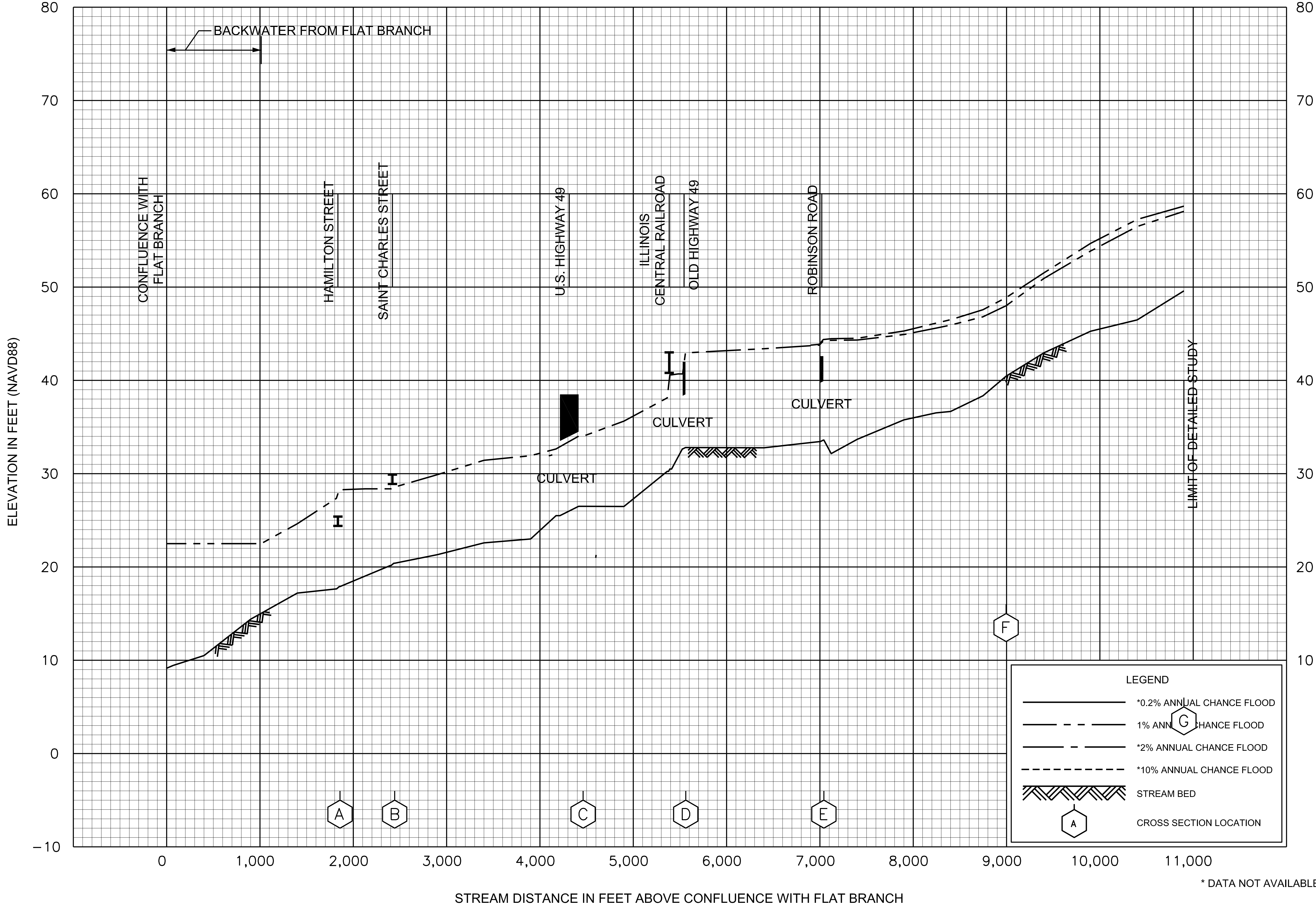


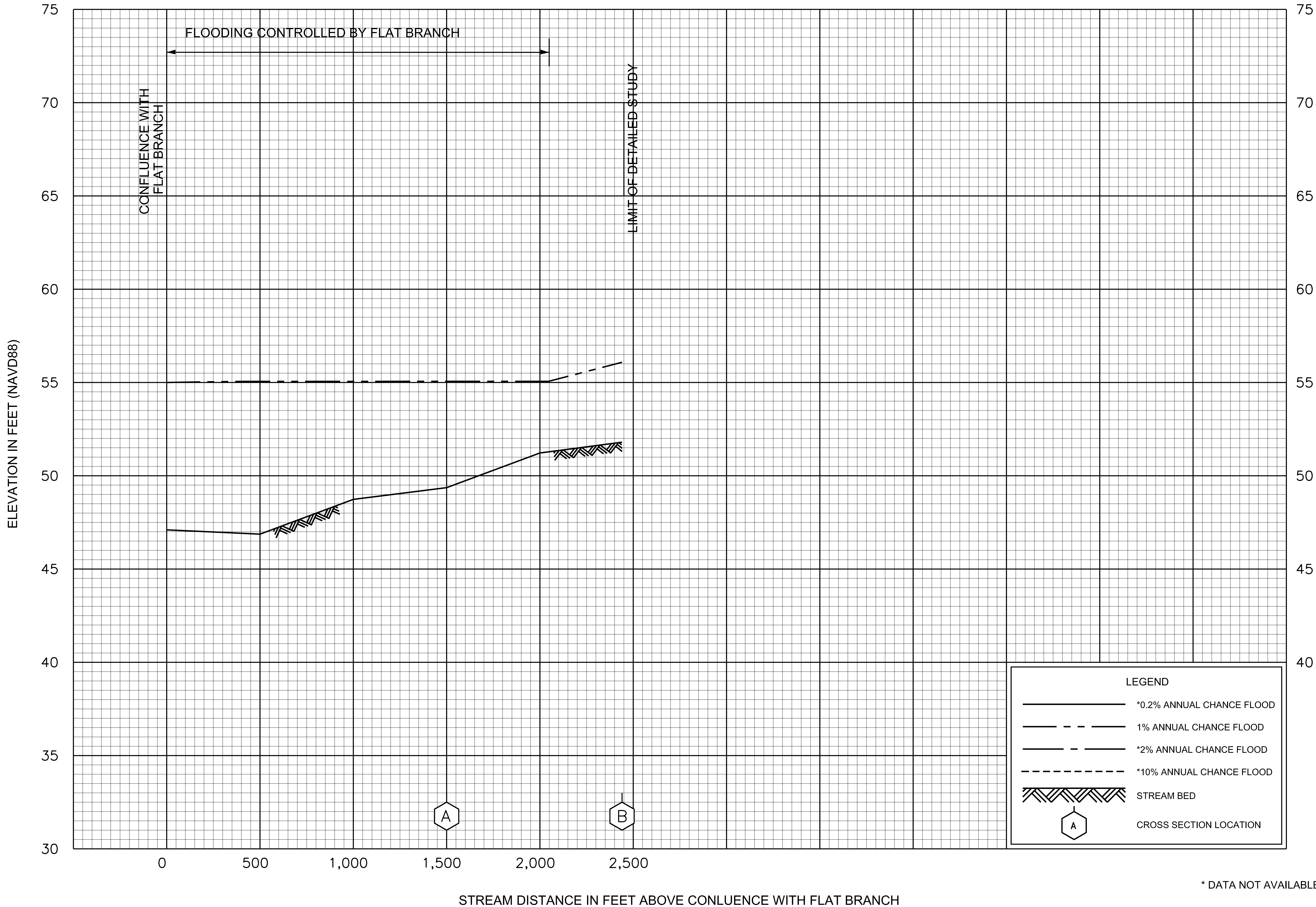
FLOOD PROFILES

FLAT BRANCH TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUTNY, MS

AND INCORPORATED AREAS



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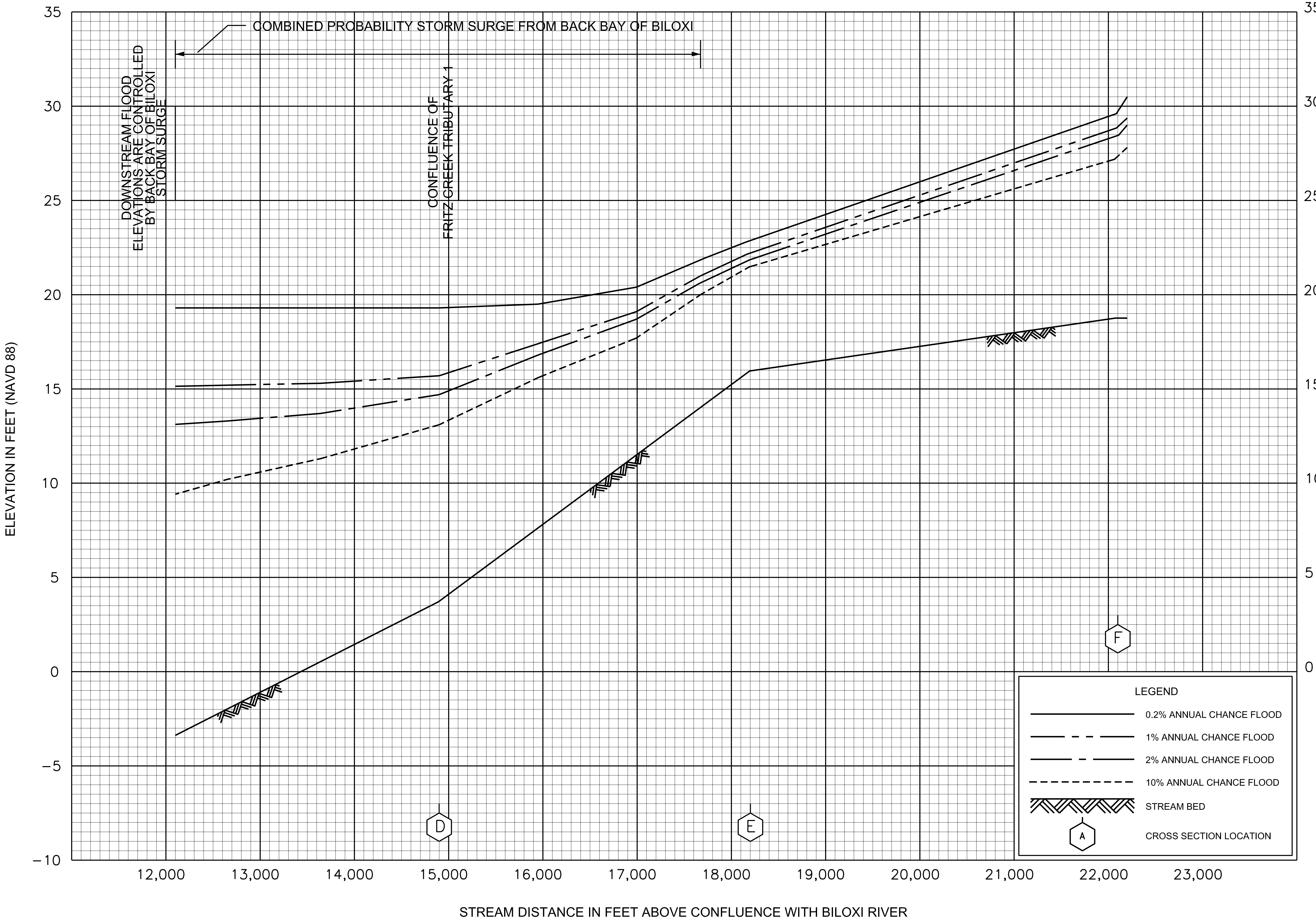
FLOOD PROFILES

FLAT BRANCH TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUTNY, MS

AND INCORPORATED AREAS



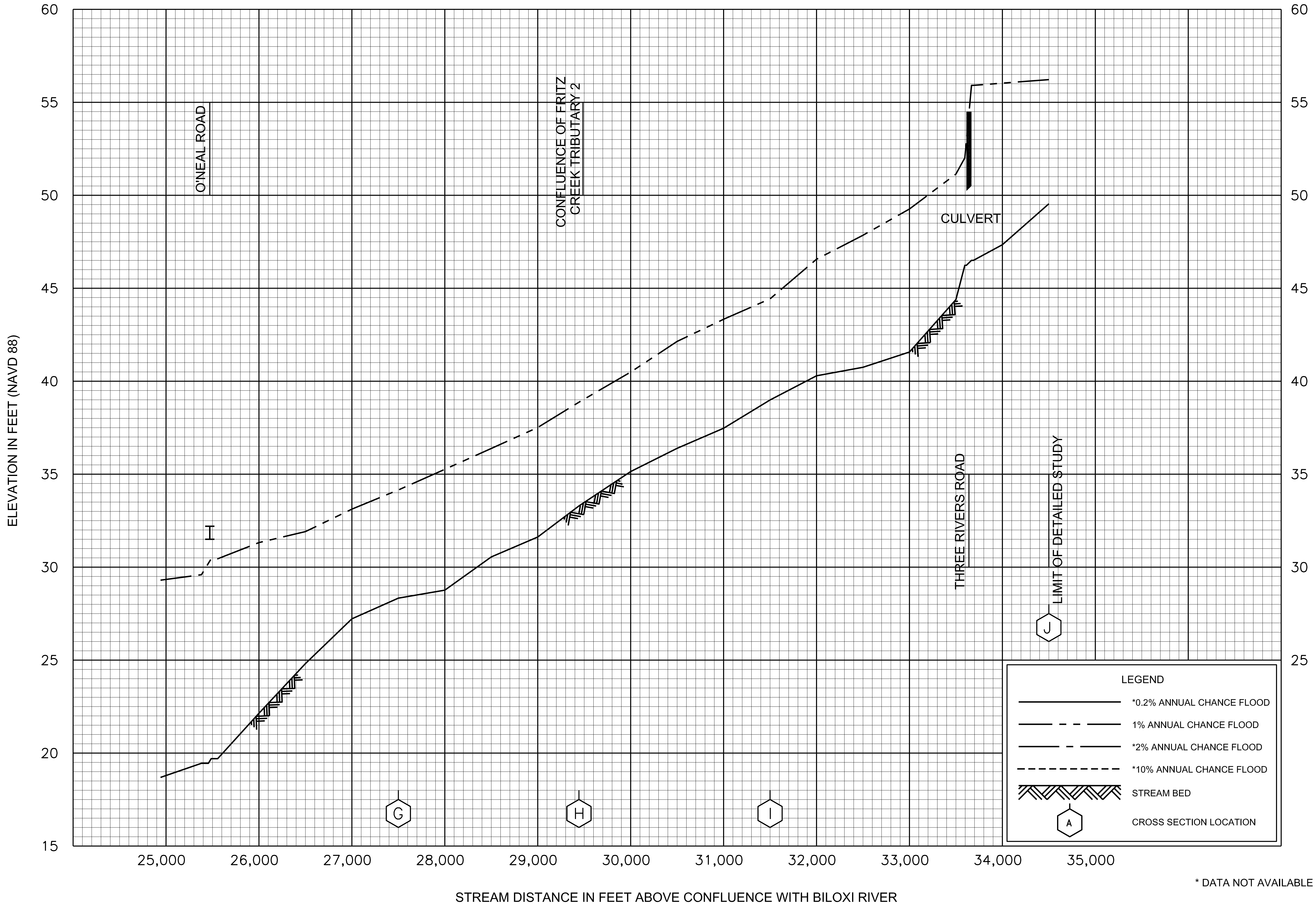
FLOOD PROFILES

FRITZ CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



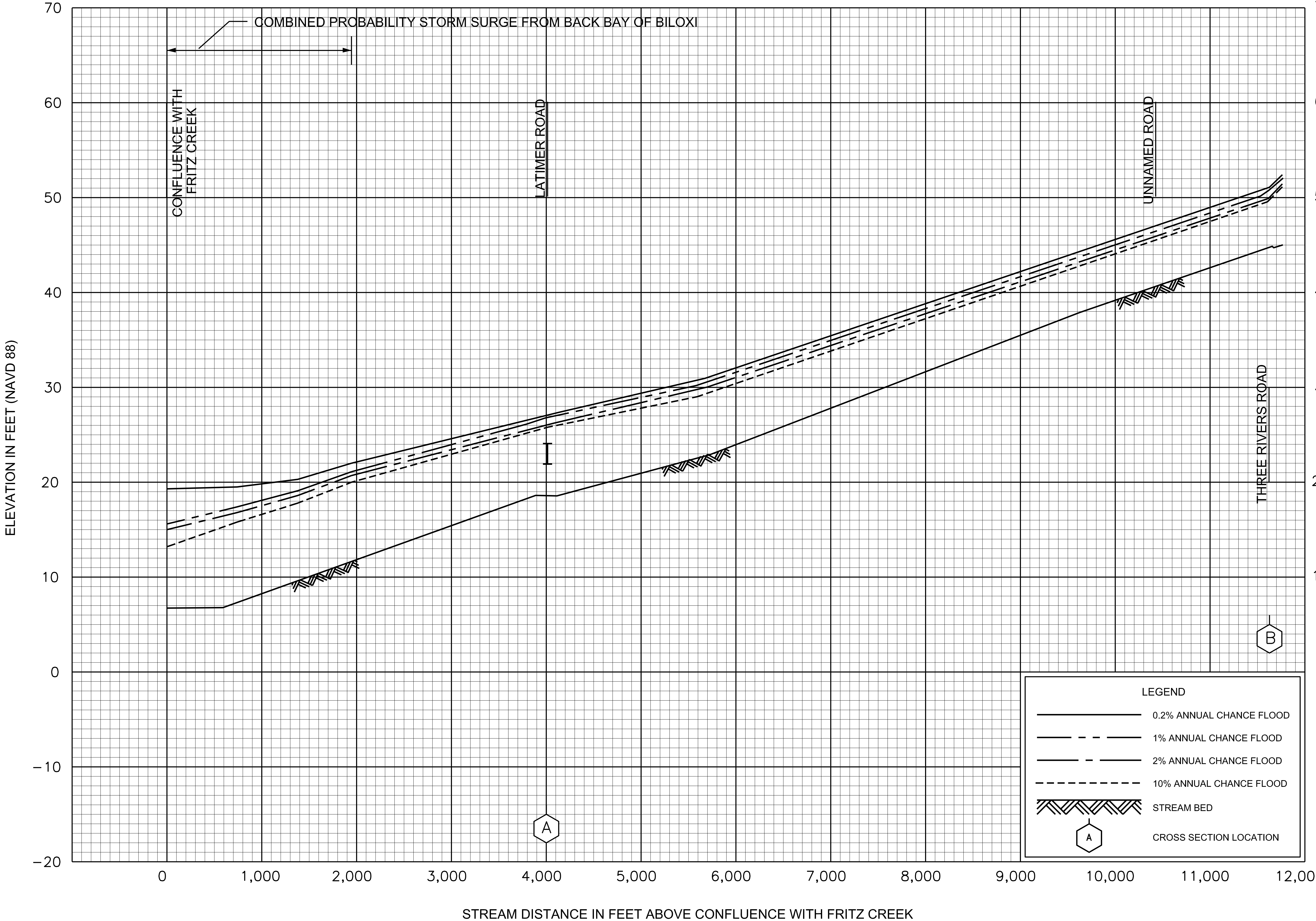
FLOOD PROFILES

FRITZ CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

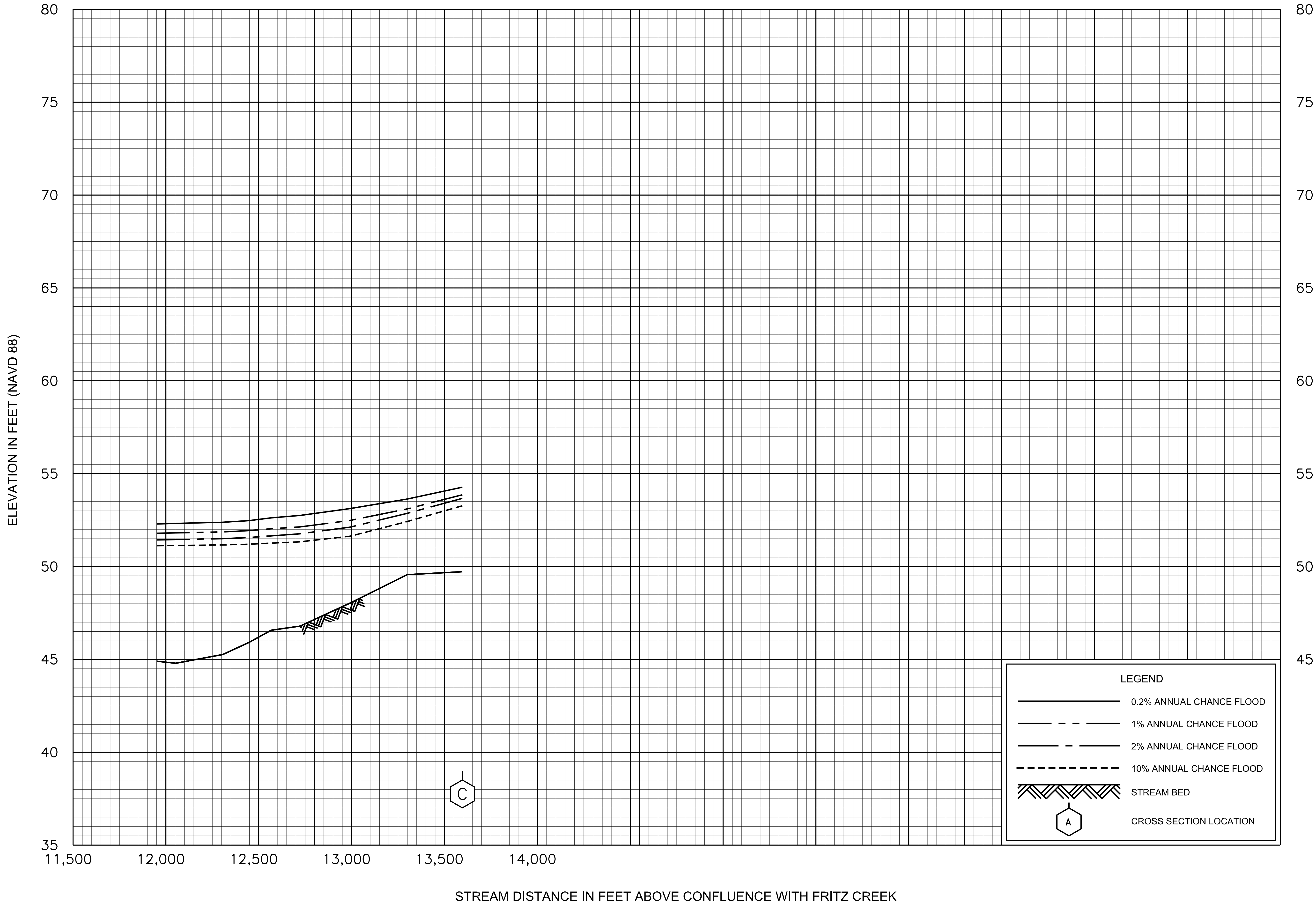


FLOOD PROFILES

FRITZ CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

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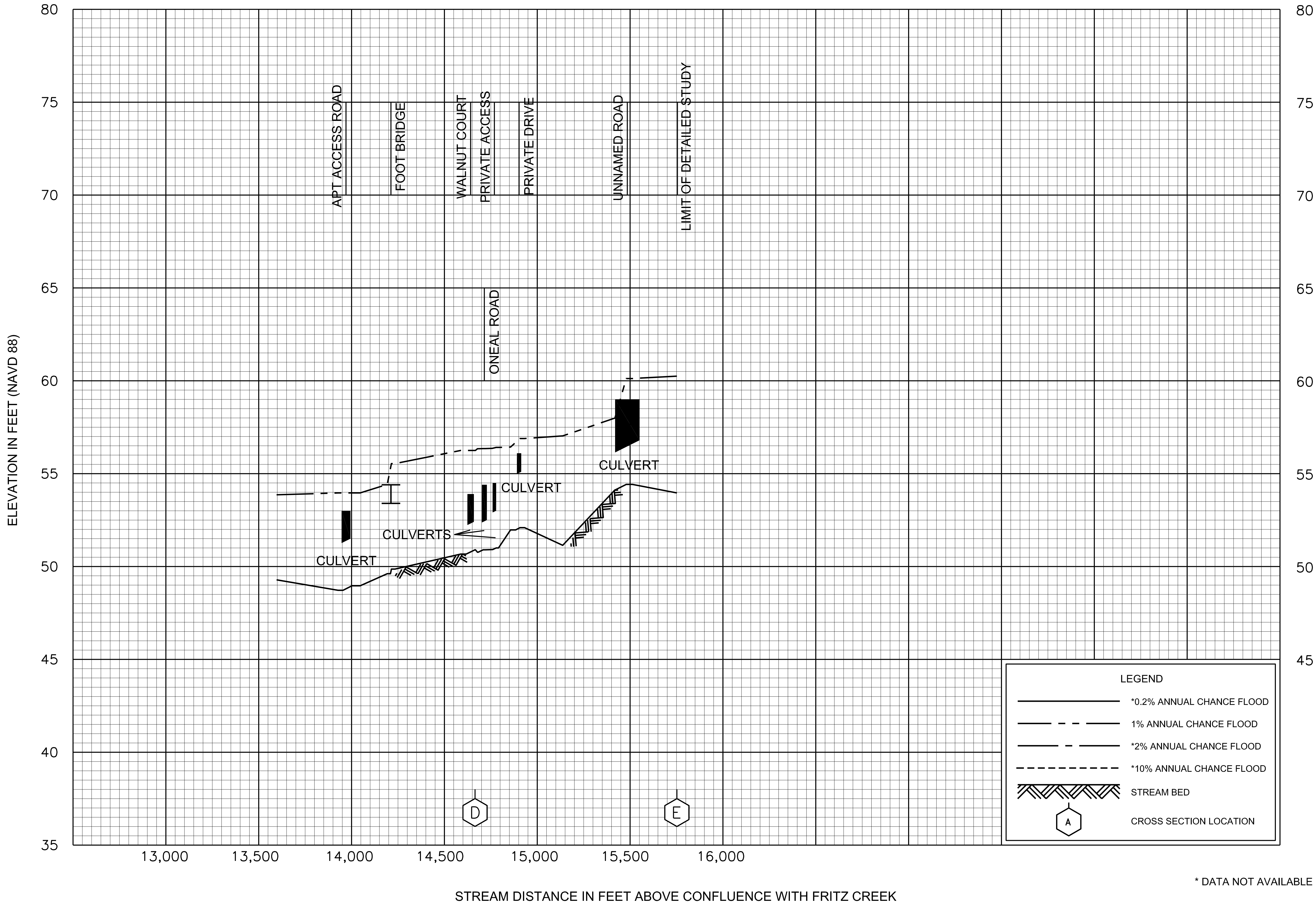

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FLOOD PROFILES

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HARRISON COUNTY, MS
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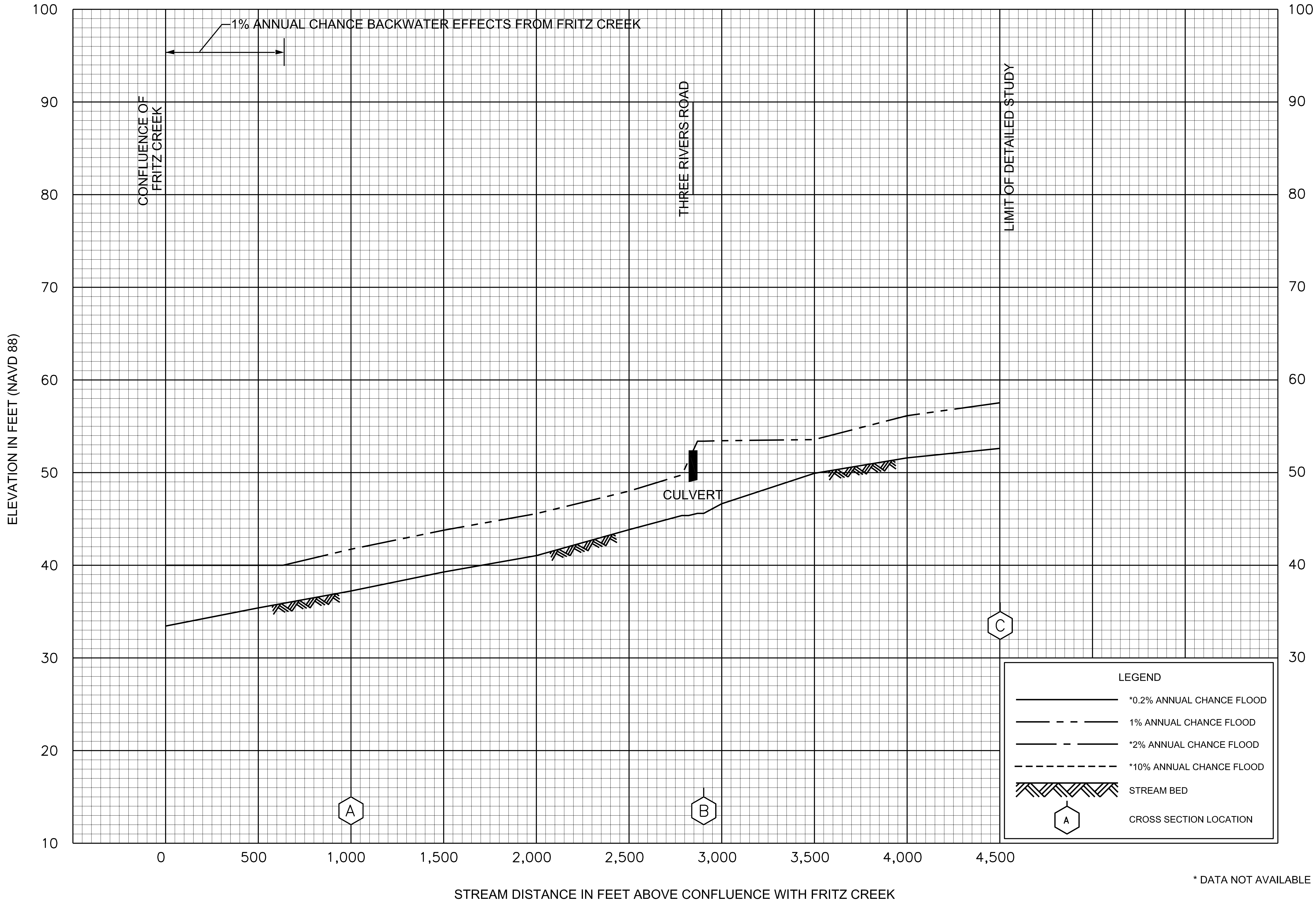

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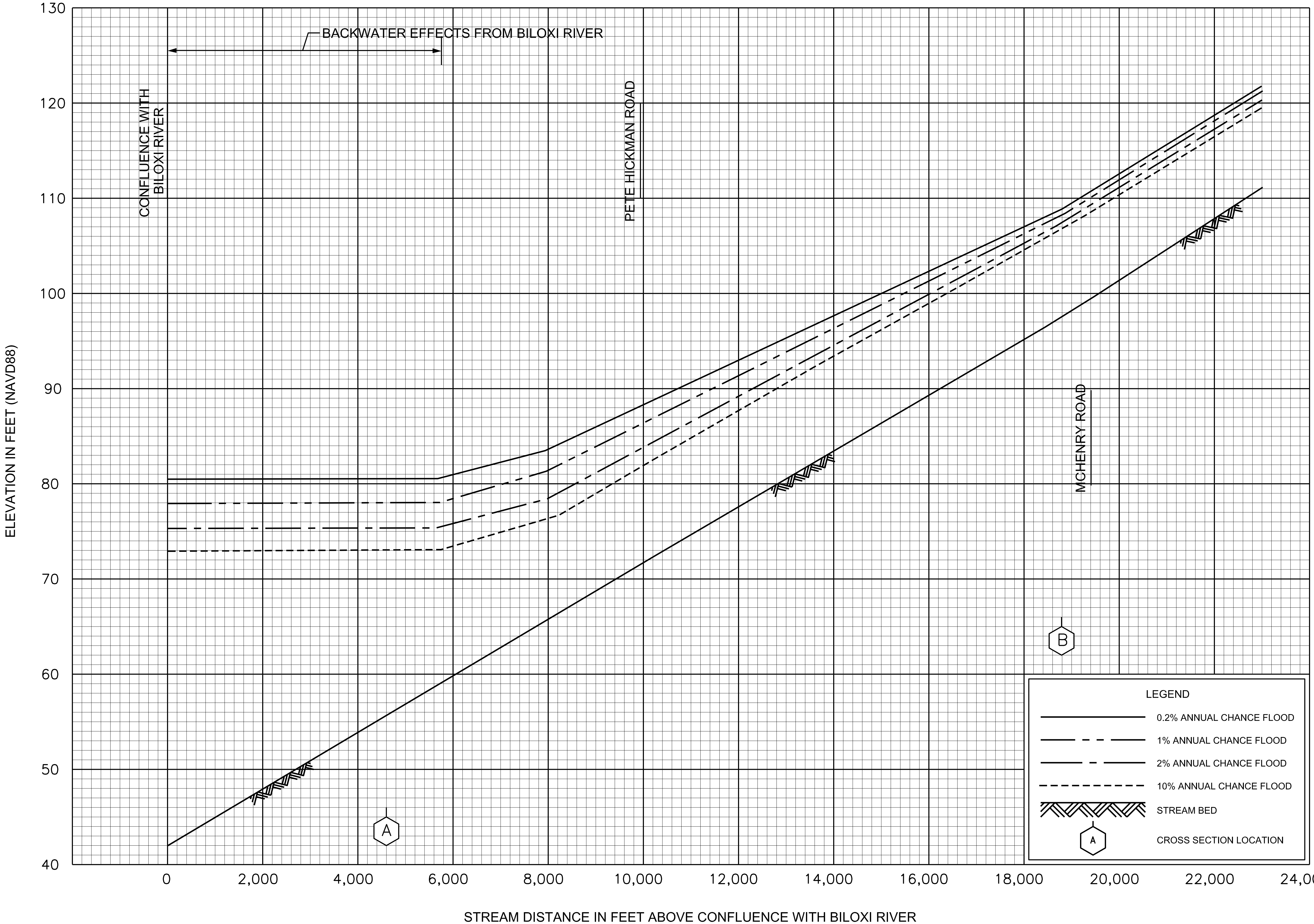
FLOOD PROFILES

FRITZ CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

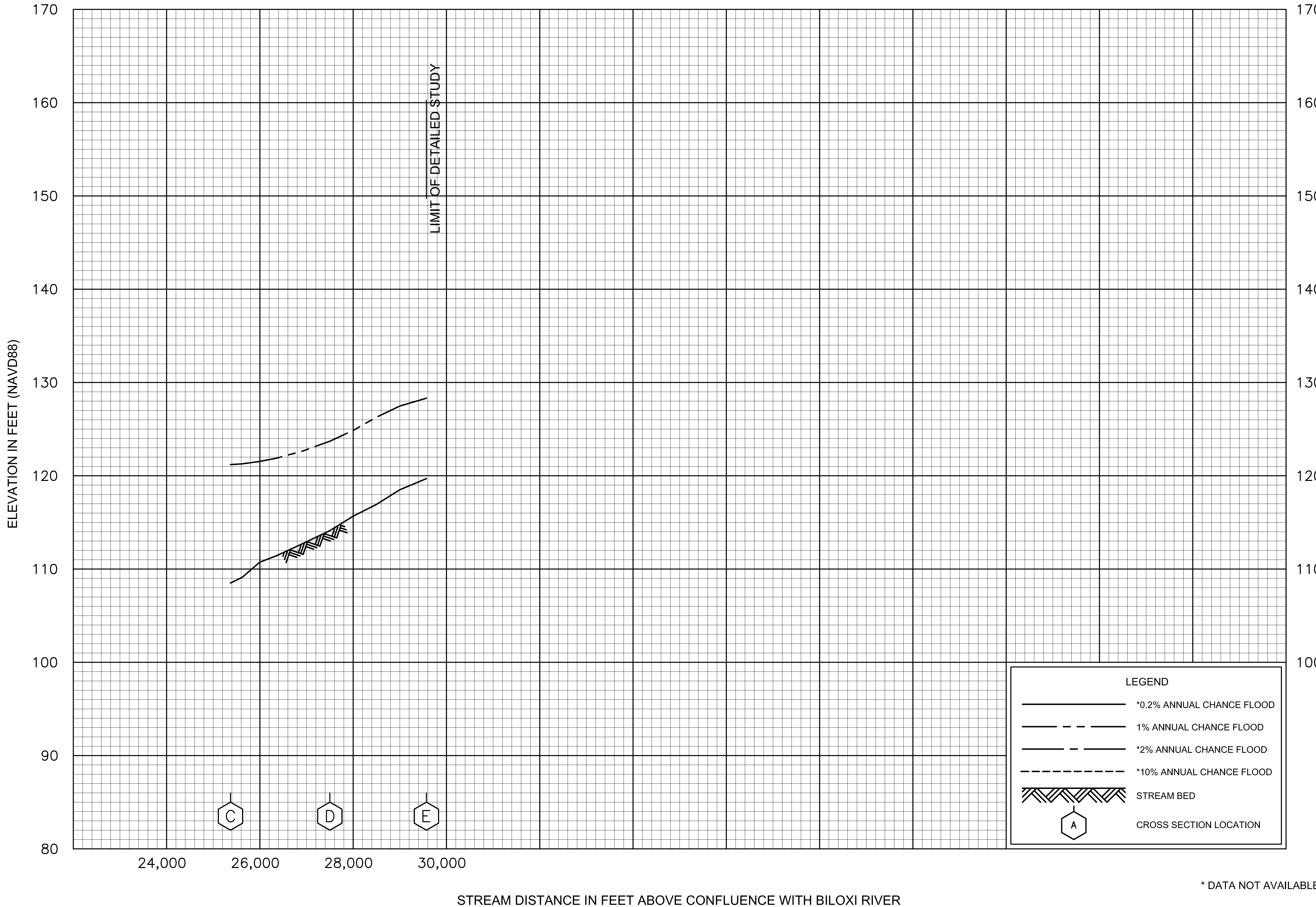


FLOOD PROFILES

HICKORY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

HICKORY CREEK

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HARRISON COUNTY, MS
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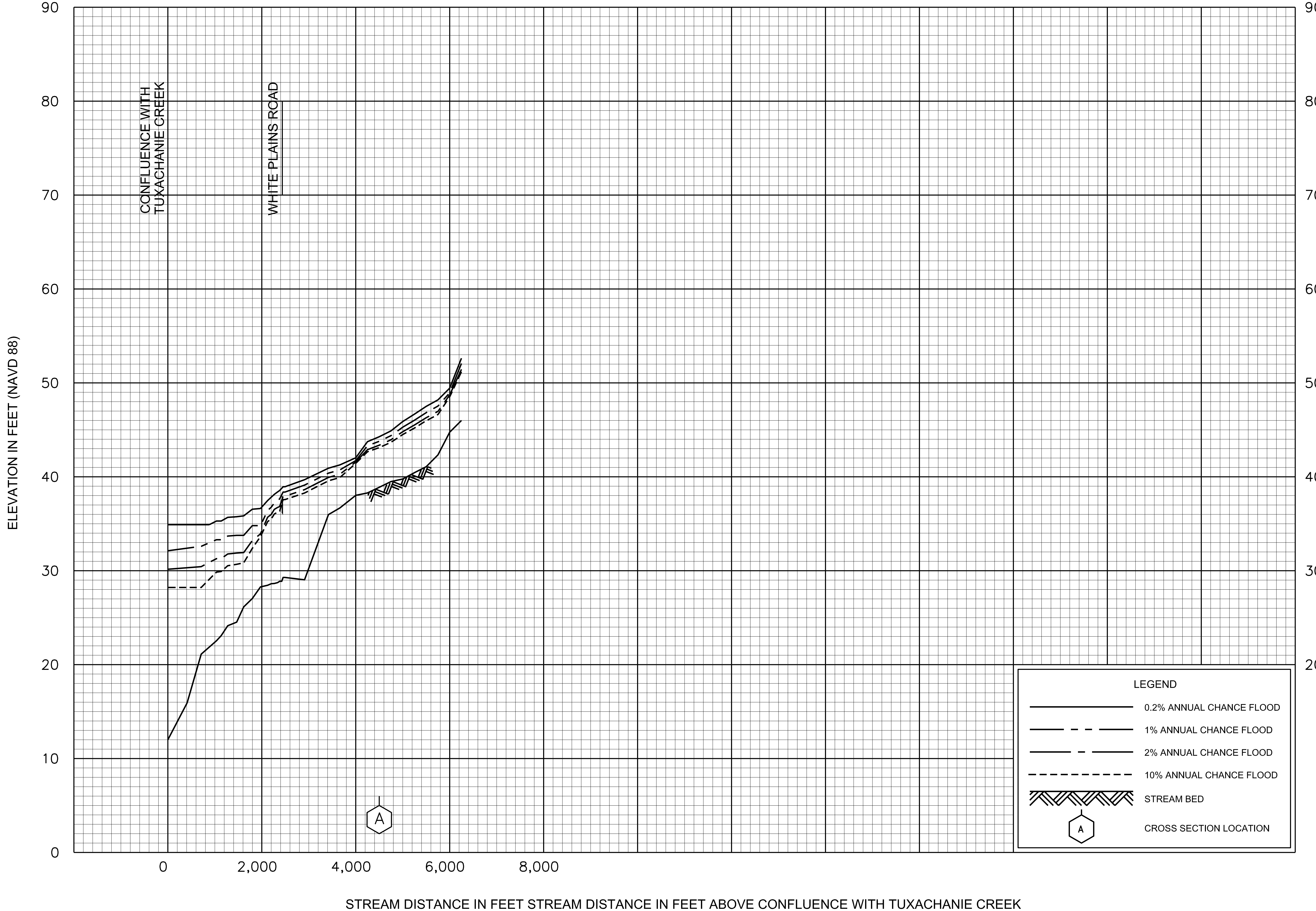


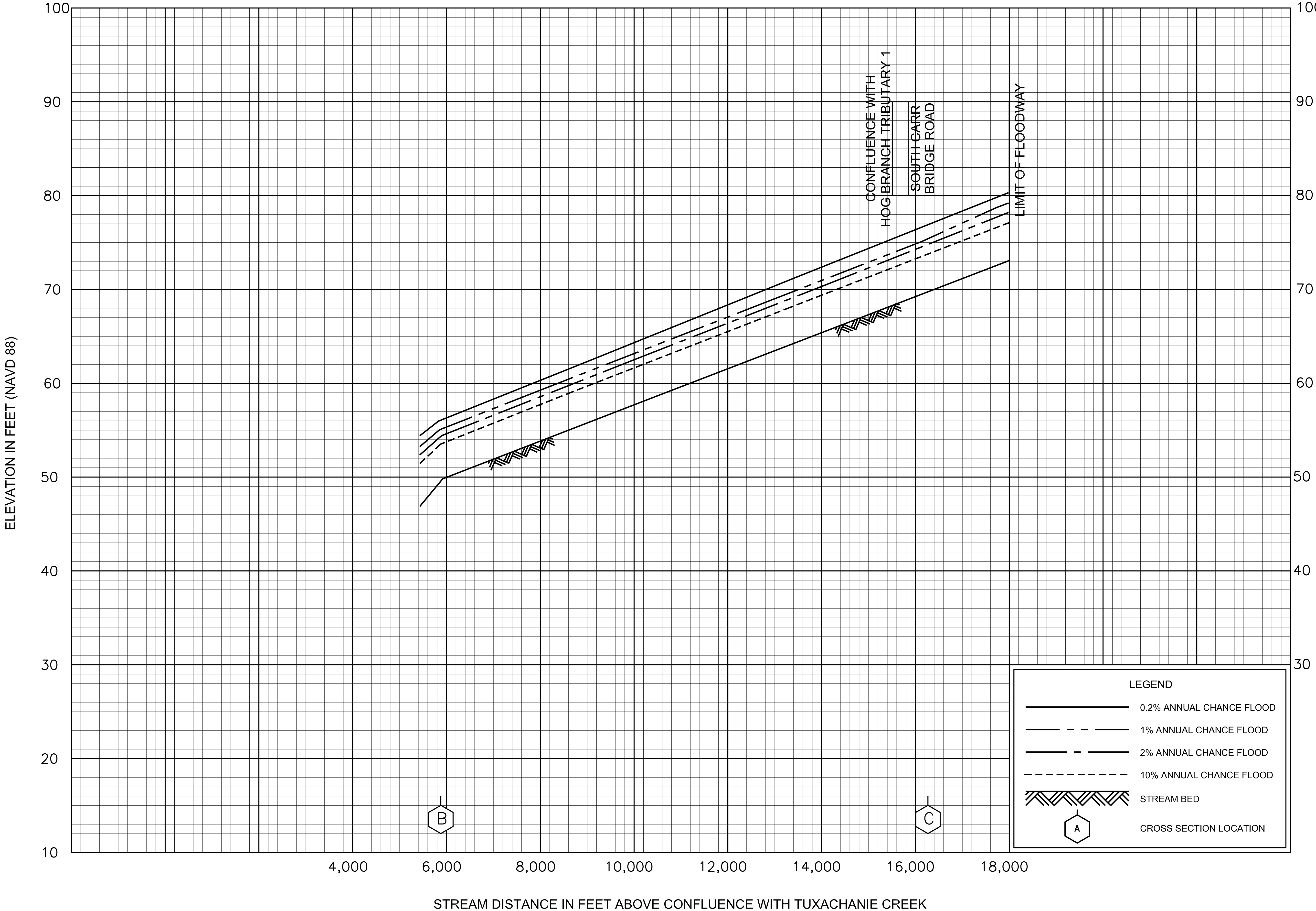
FLOOD PROFILES

HOG BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

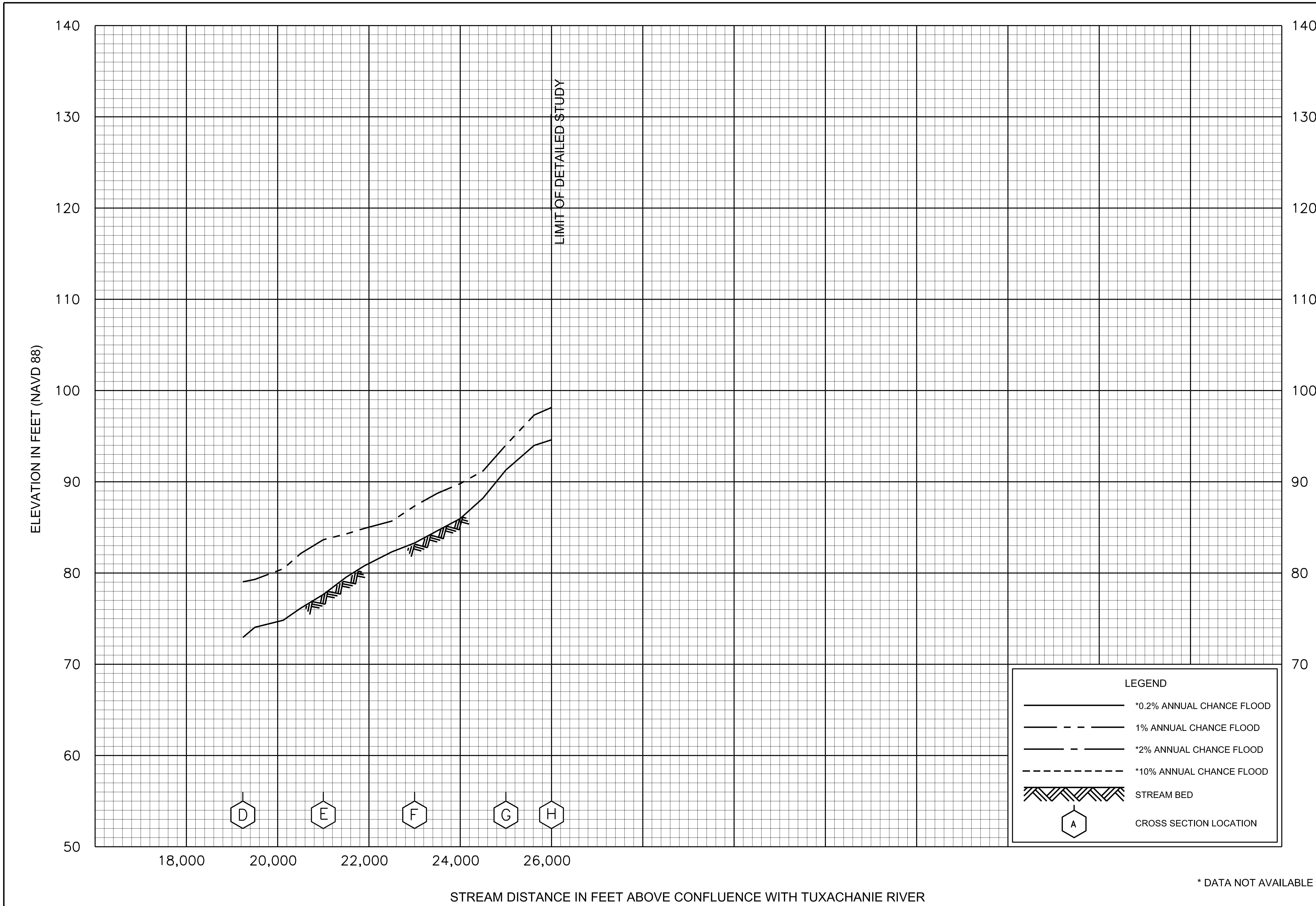


FLOOD PROFILES

HOG BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS AND INCORPORATED AREAS



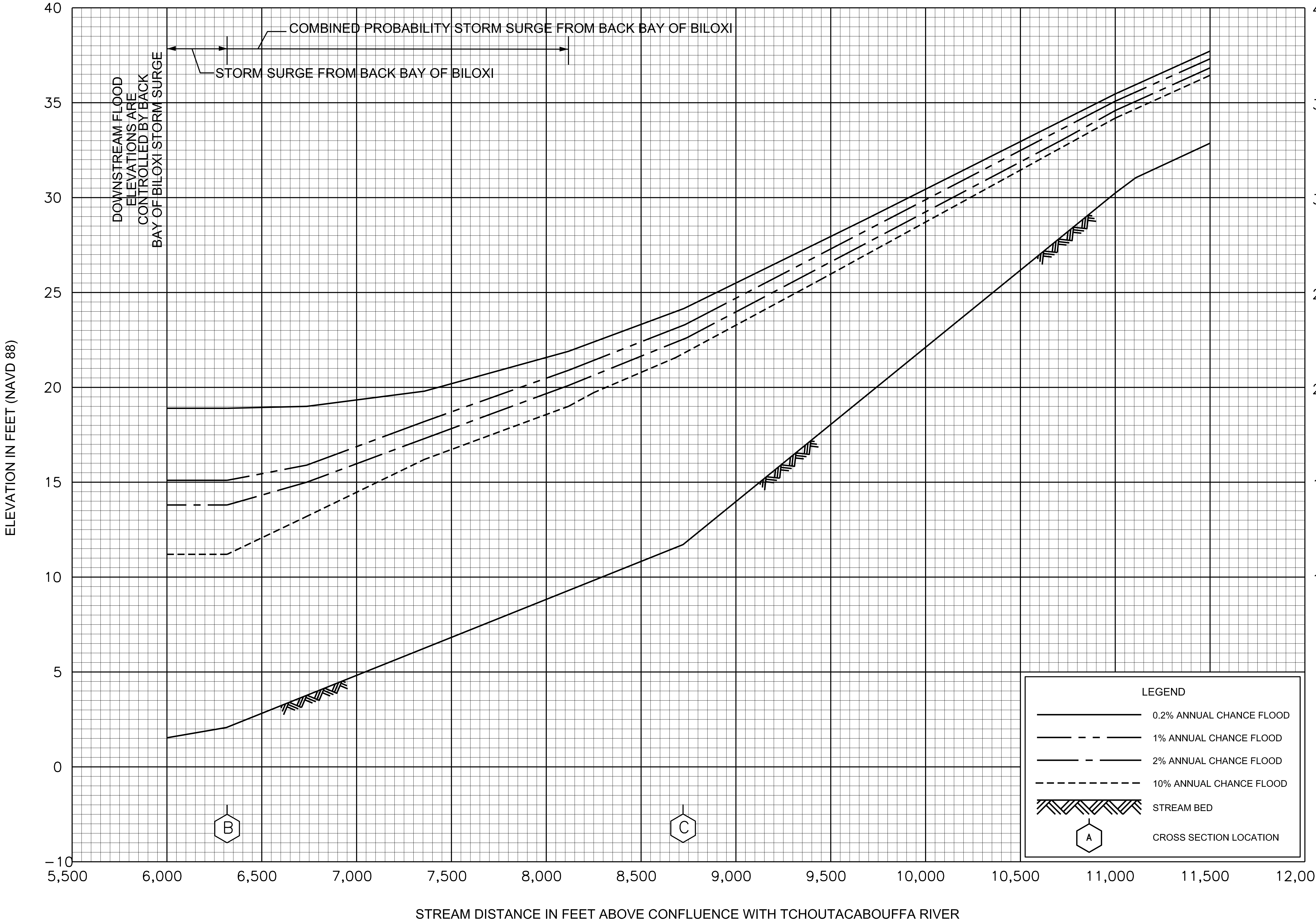
FLOOD PROFILES

HOG BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



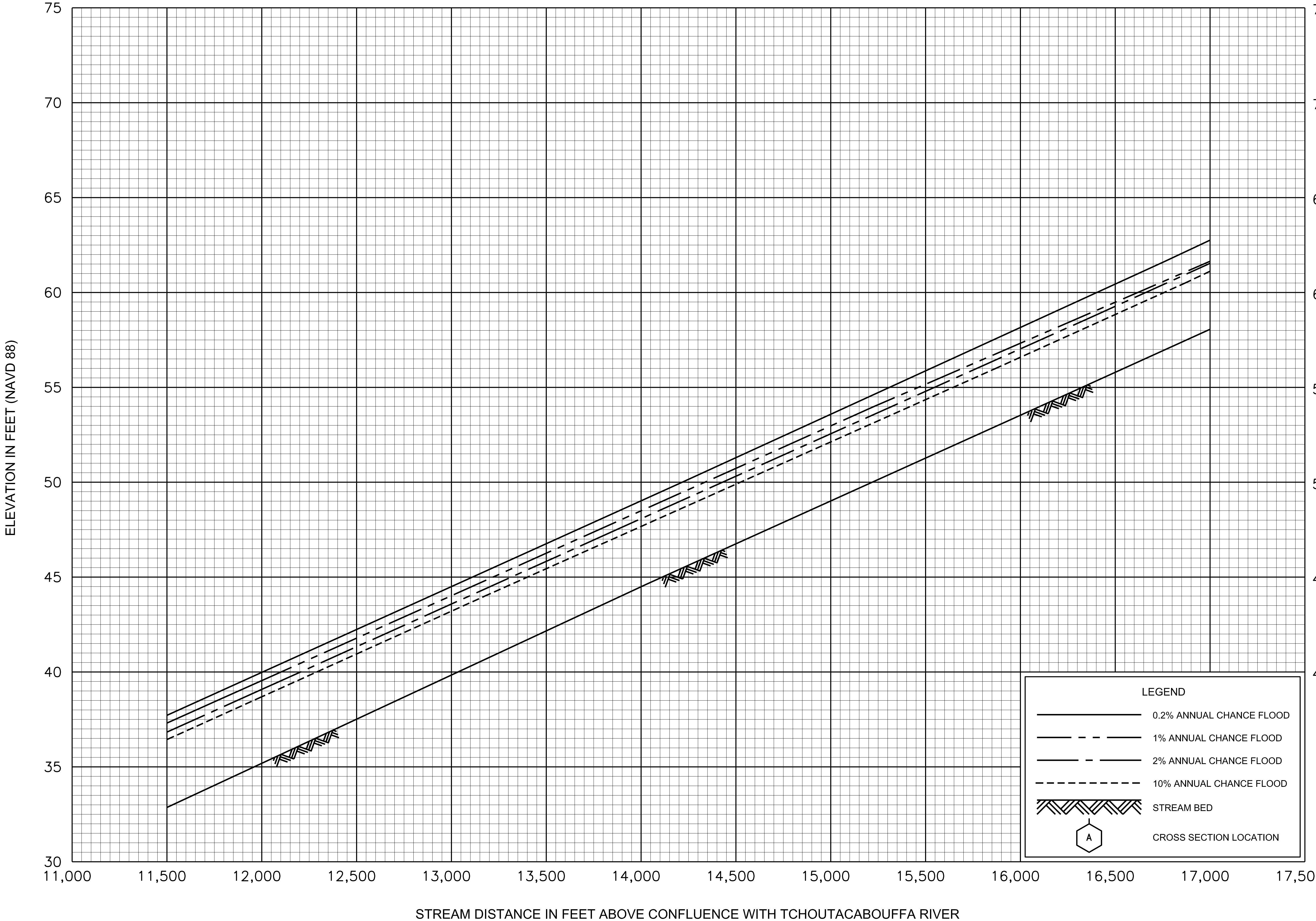
FLOOD PROFILES

HOWARD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

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HARRISON COUNTY, MS
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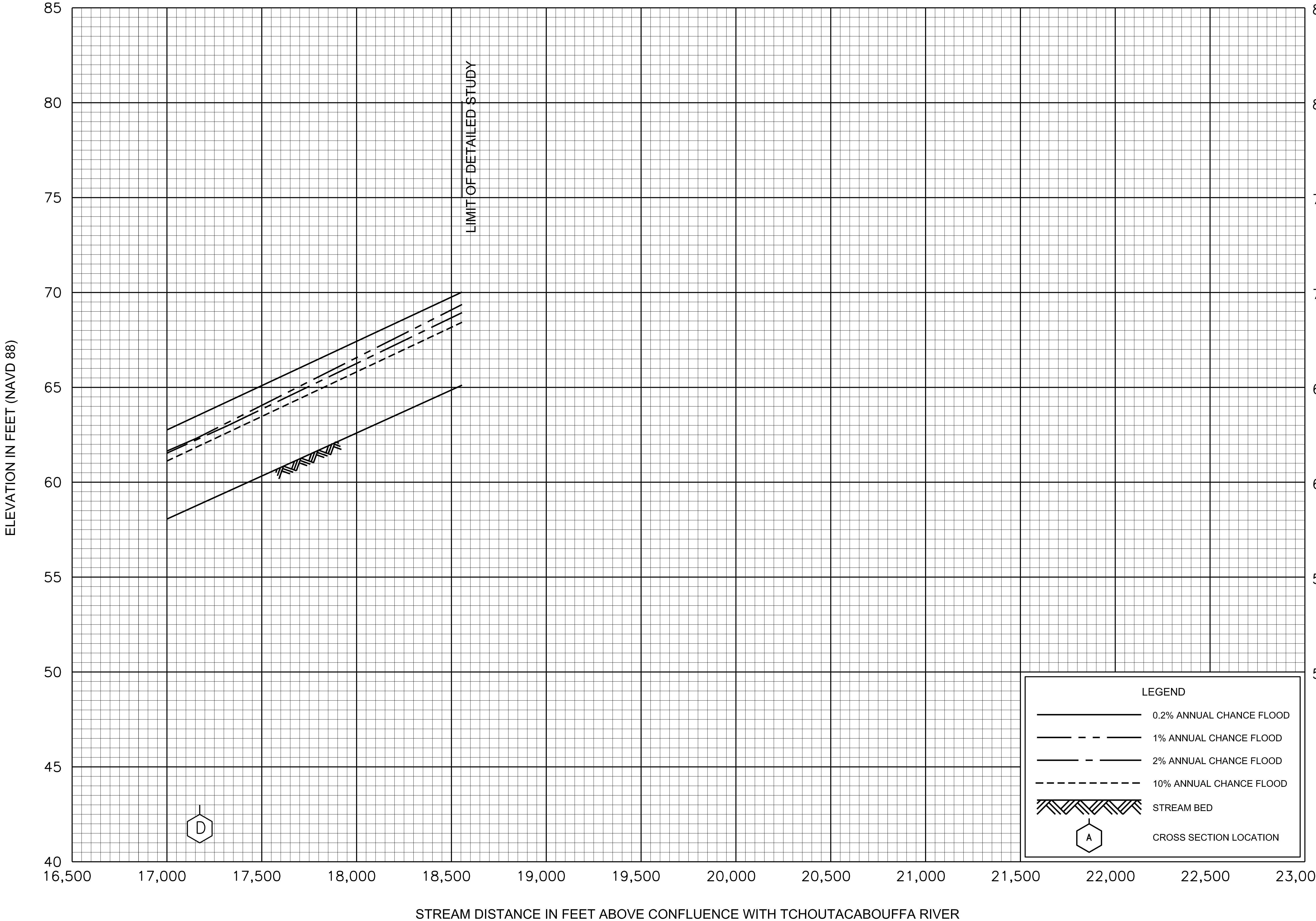

FLOOD PROFILES

HOWARD CREEK

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HARRISON COUNTY, MS
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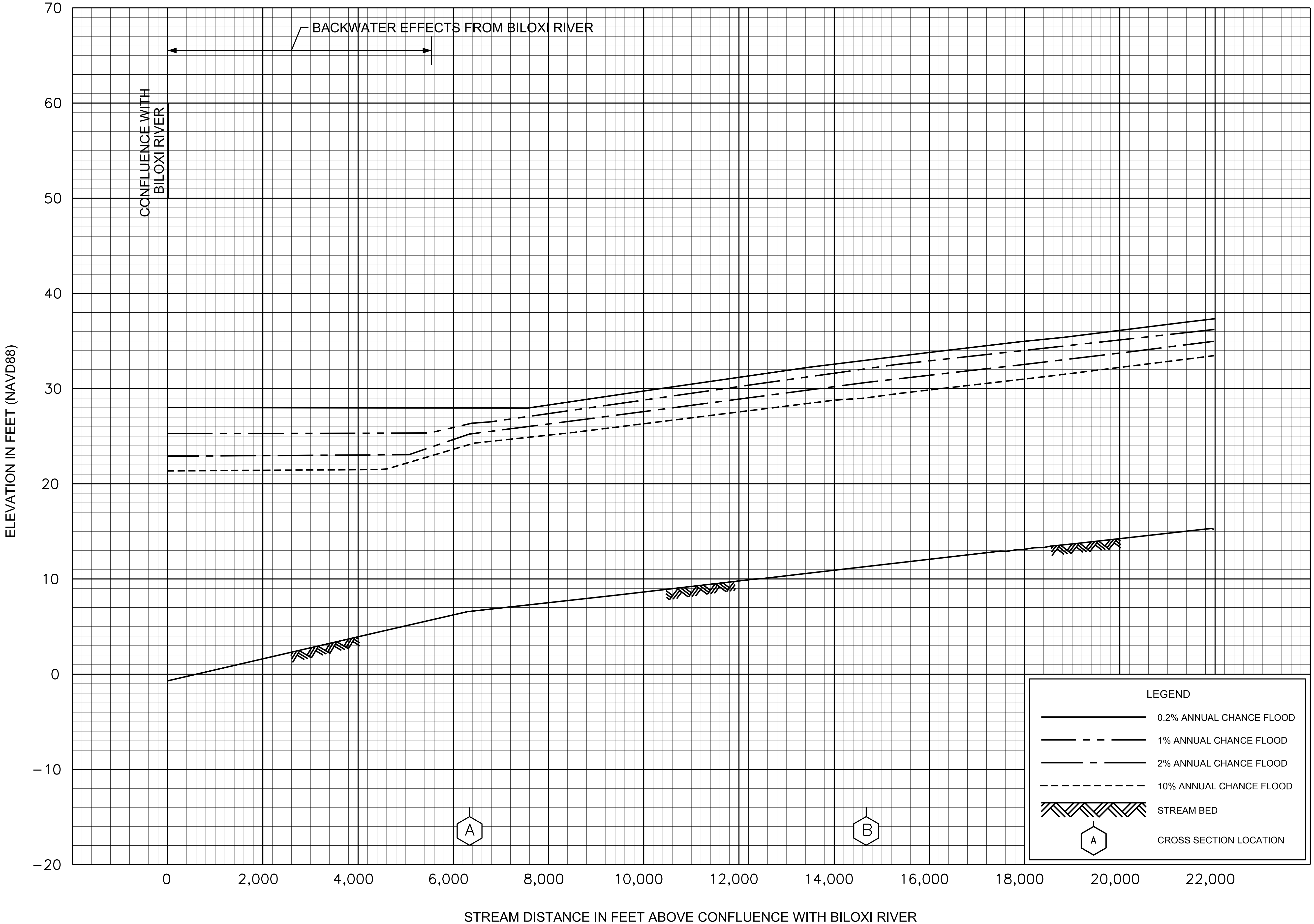


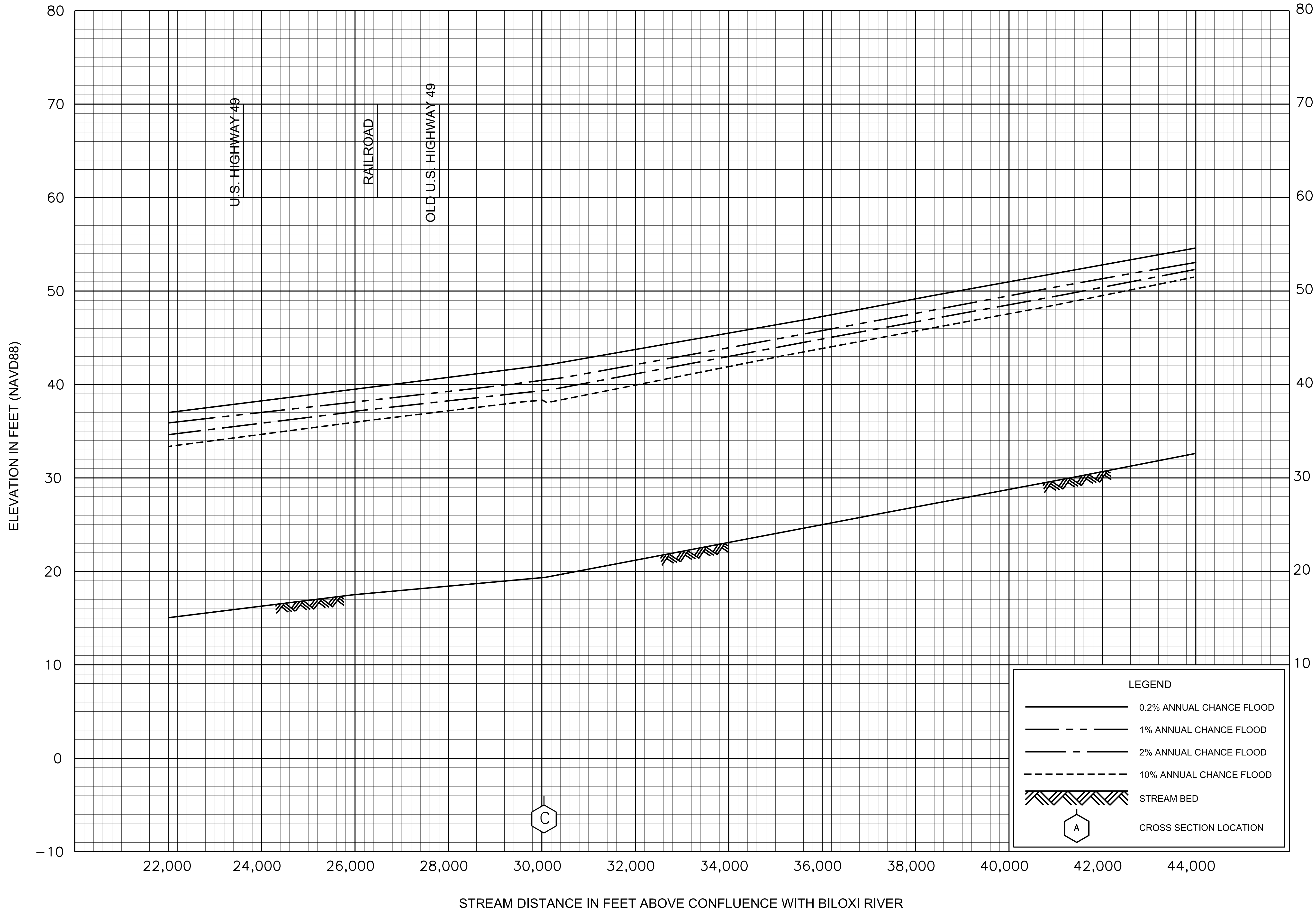
FLOOD PROFILES

LITTLE BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

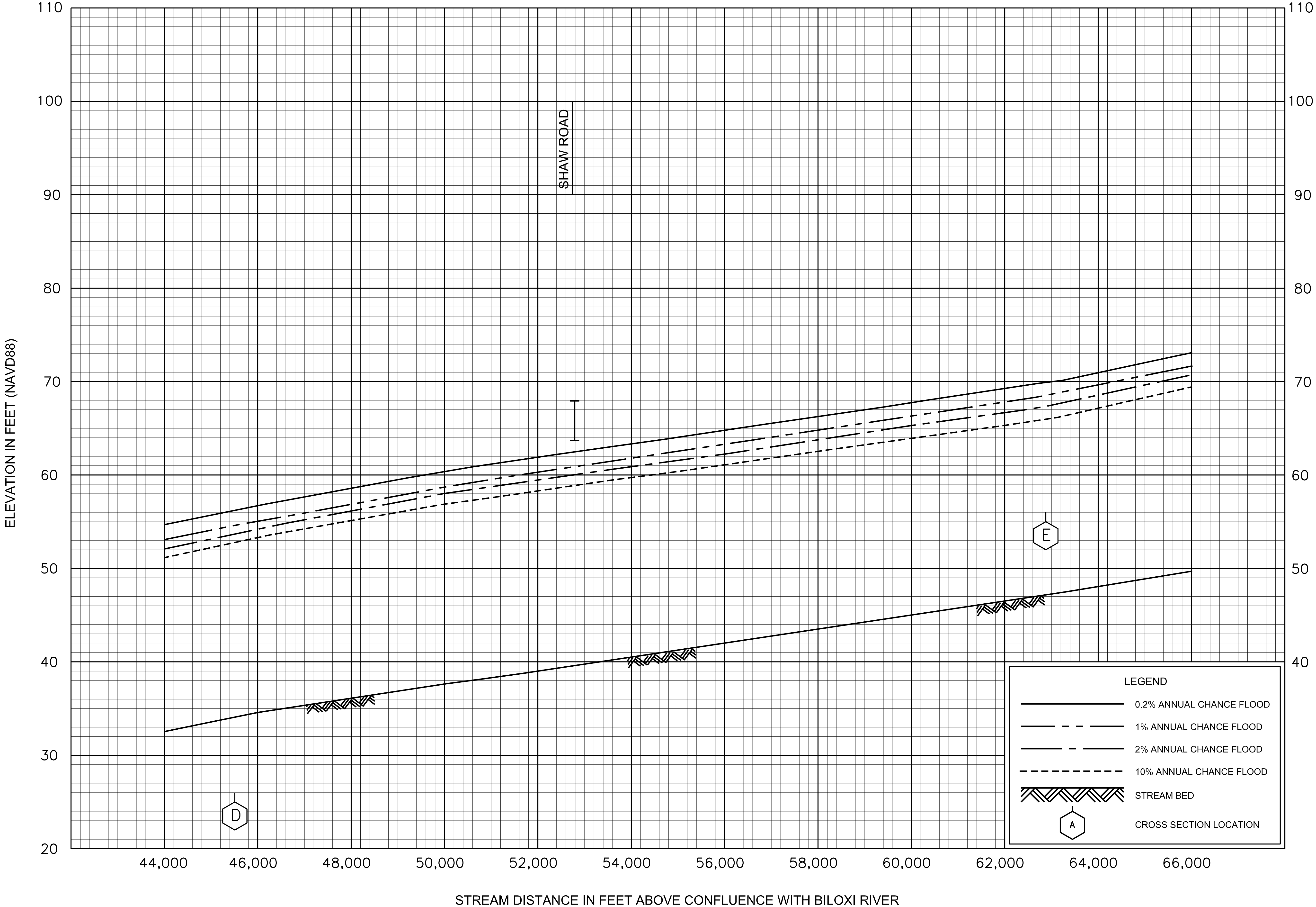


FLOOD PROFILES

LITTLE BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

LITTLE BILOXI RIVER

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HARRISON COUNTY, MS
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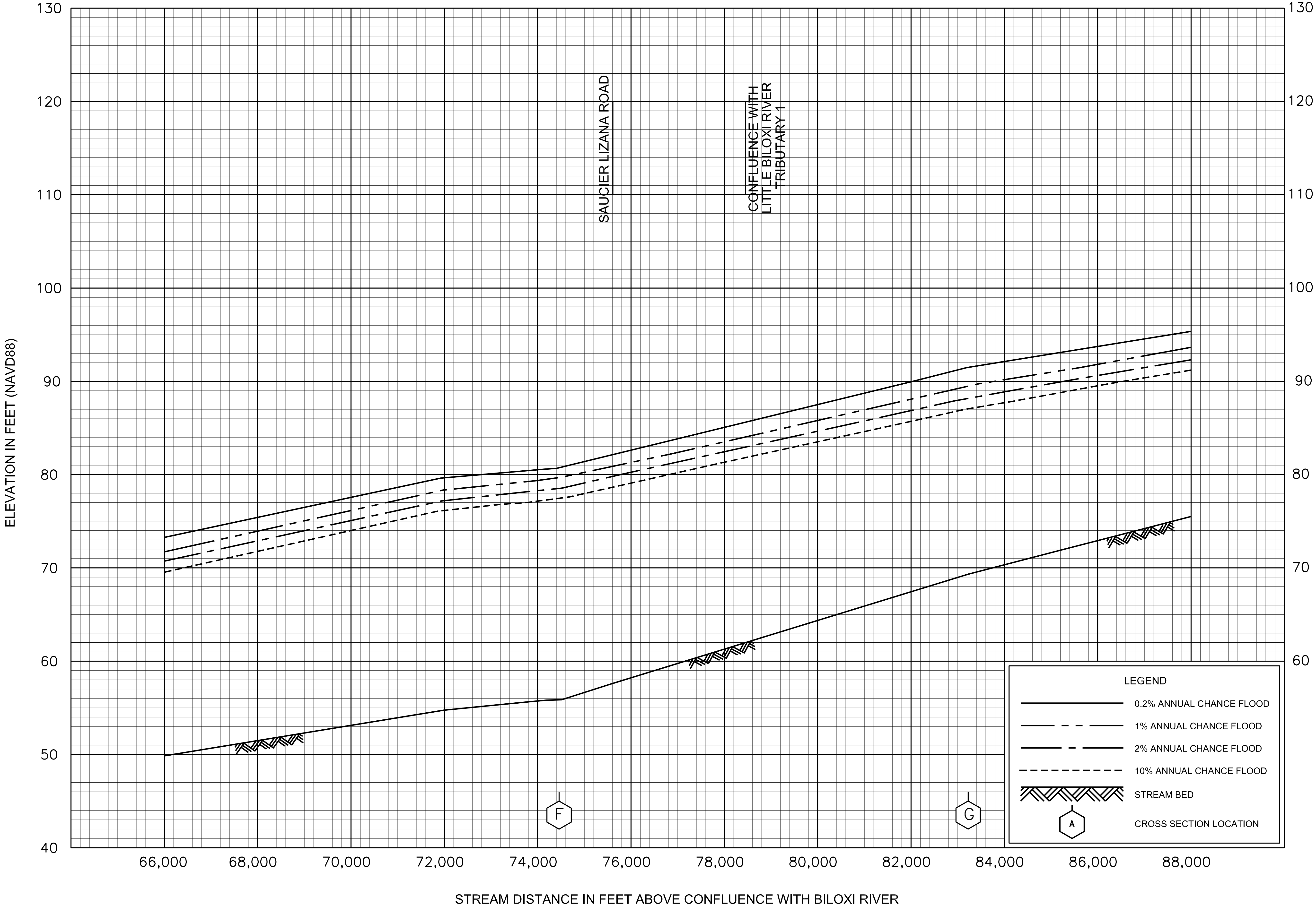

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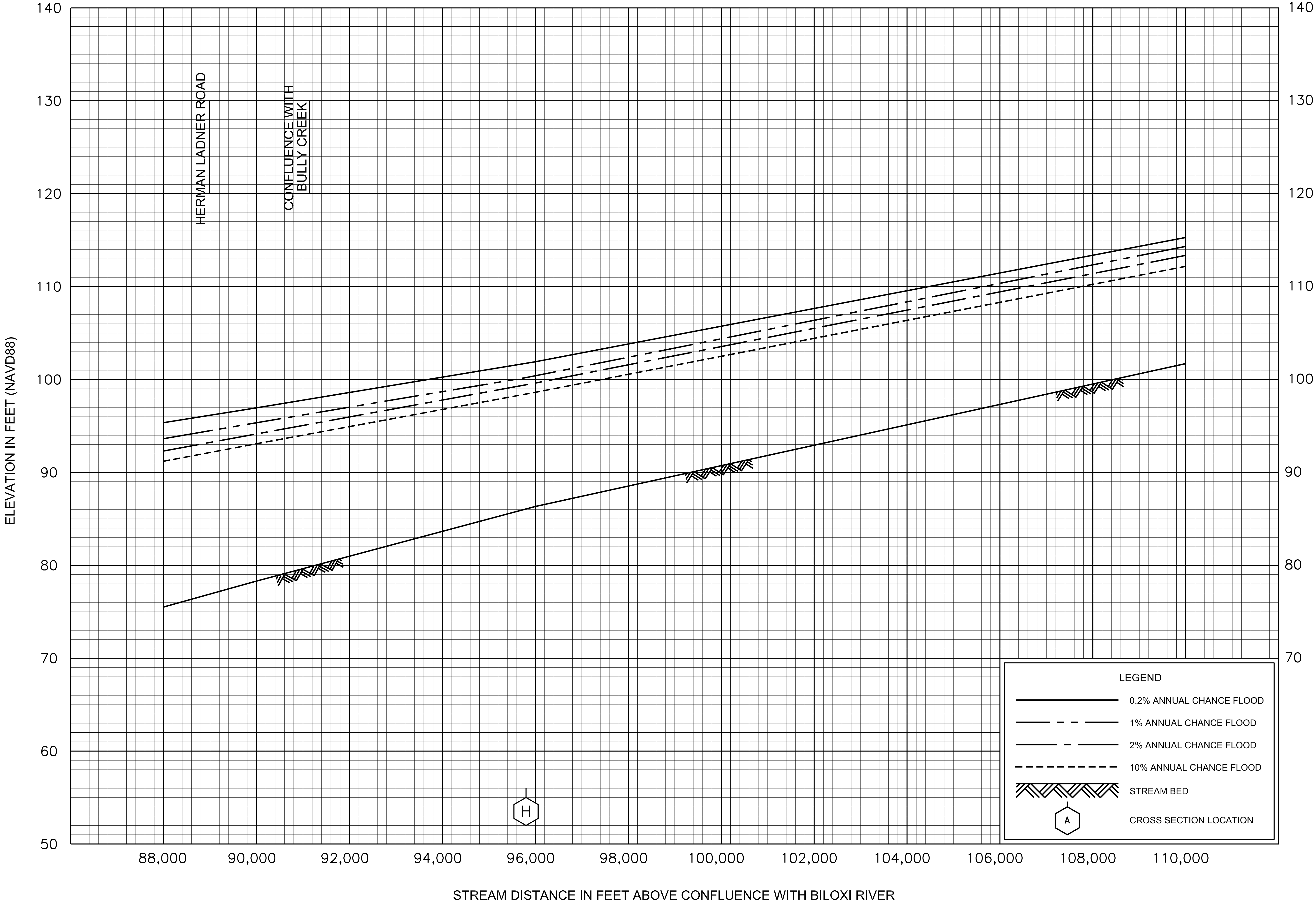

FLOOD PROFILES

LITTLE BILOXI RIVER

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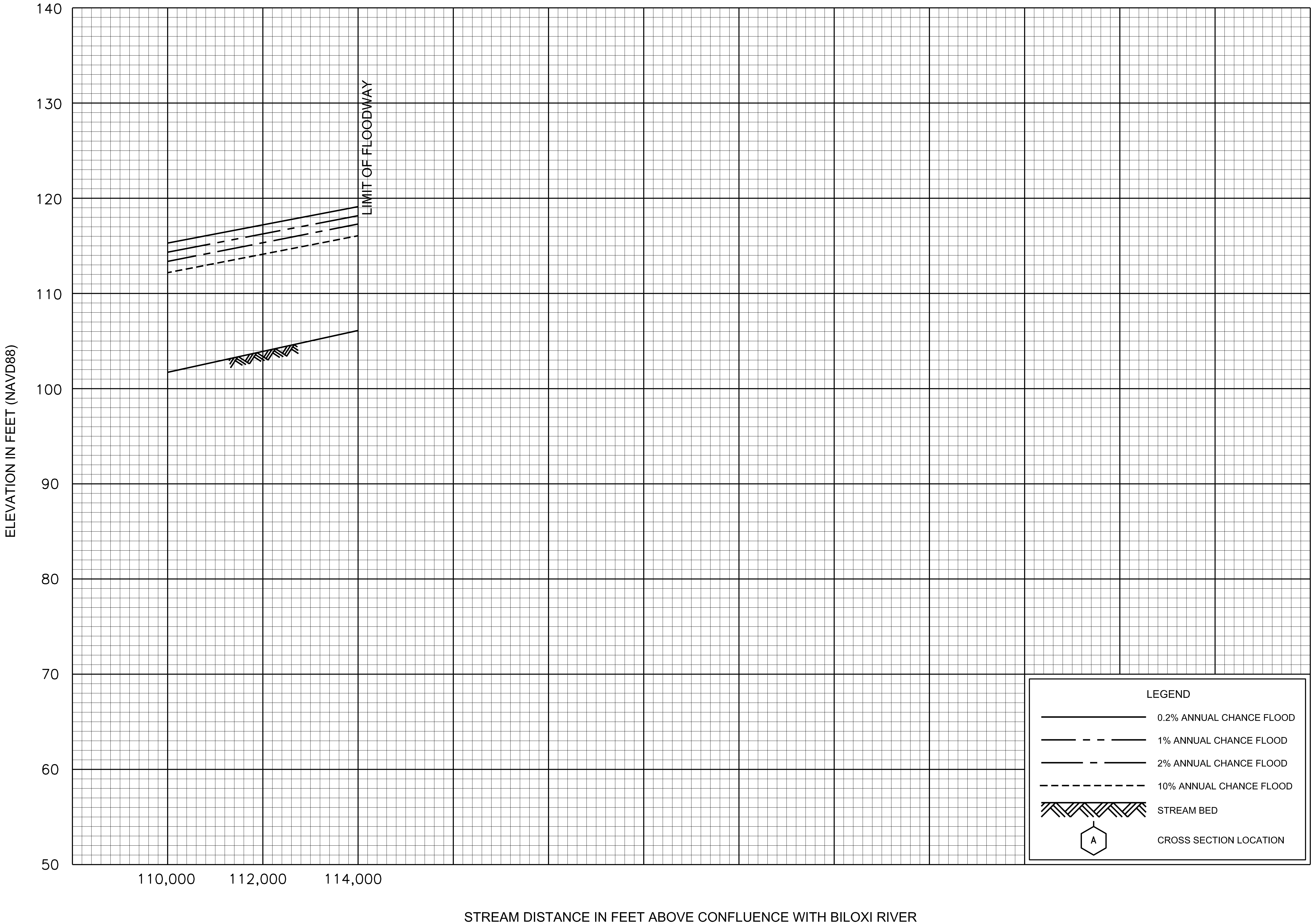


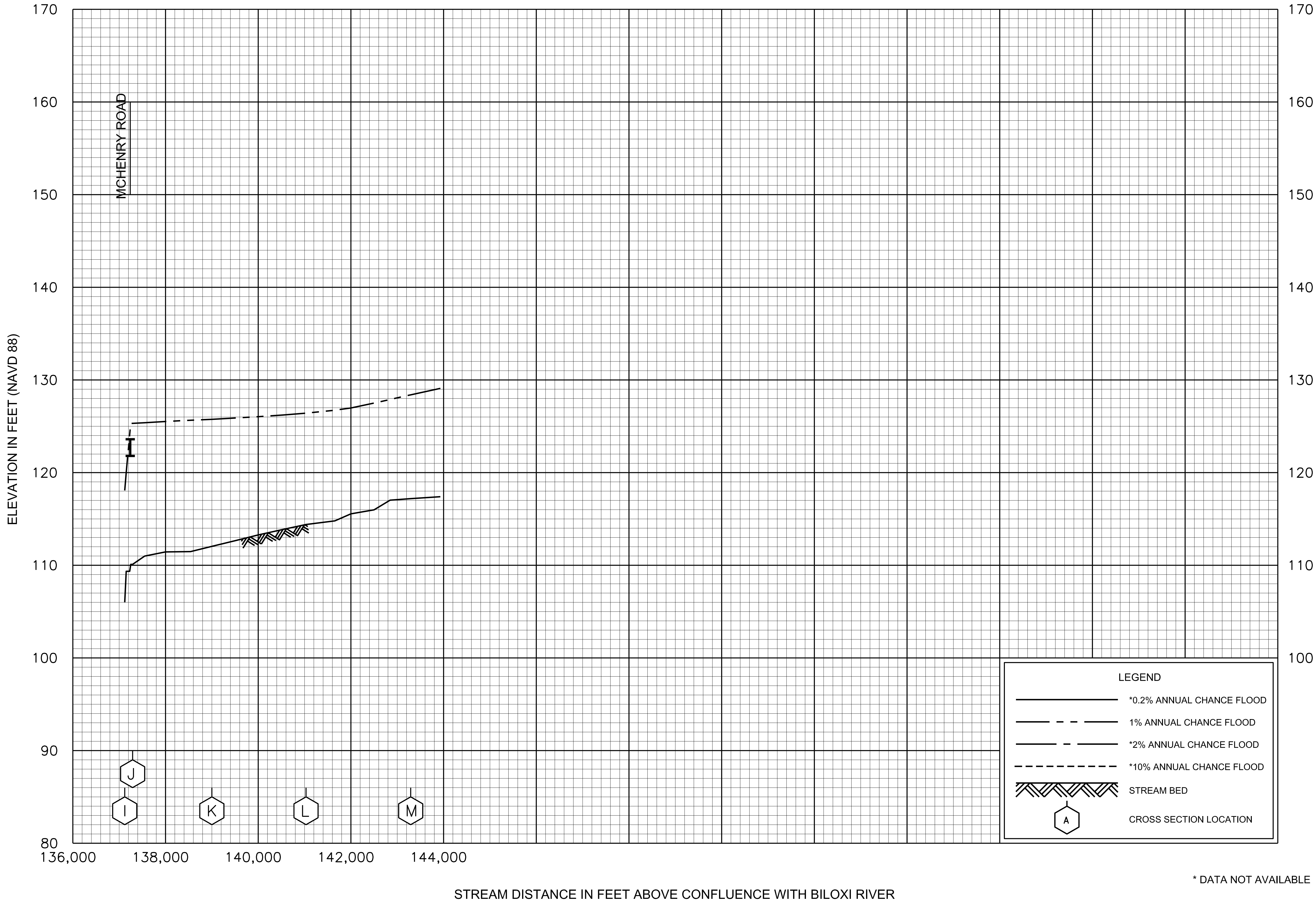
FLOOD PROFILES

LITTLE BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

60P



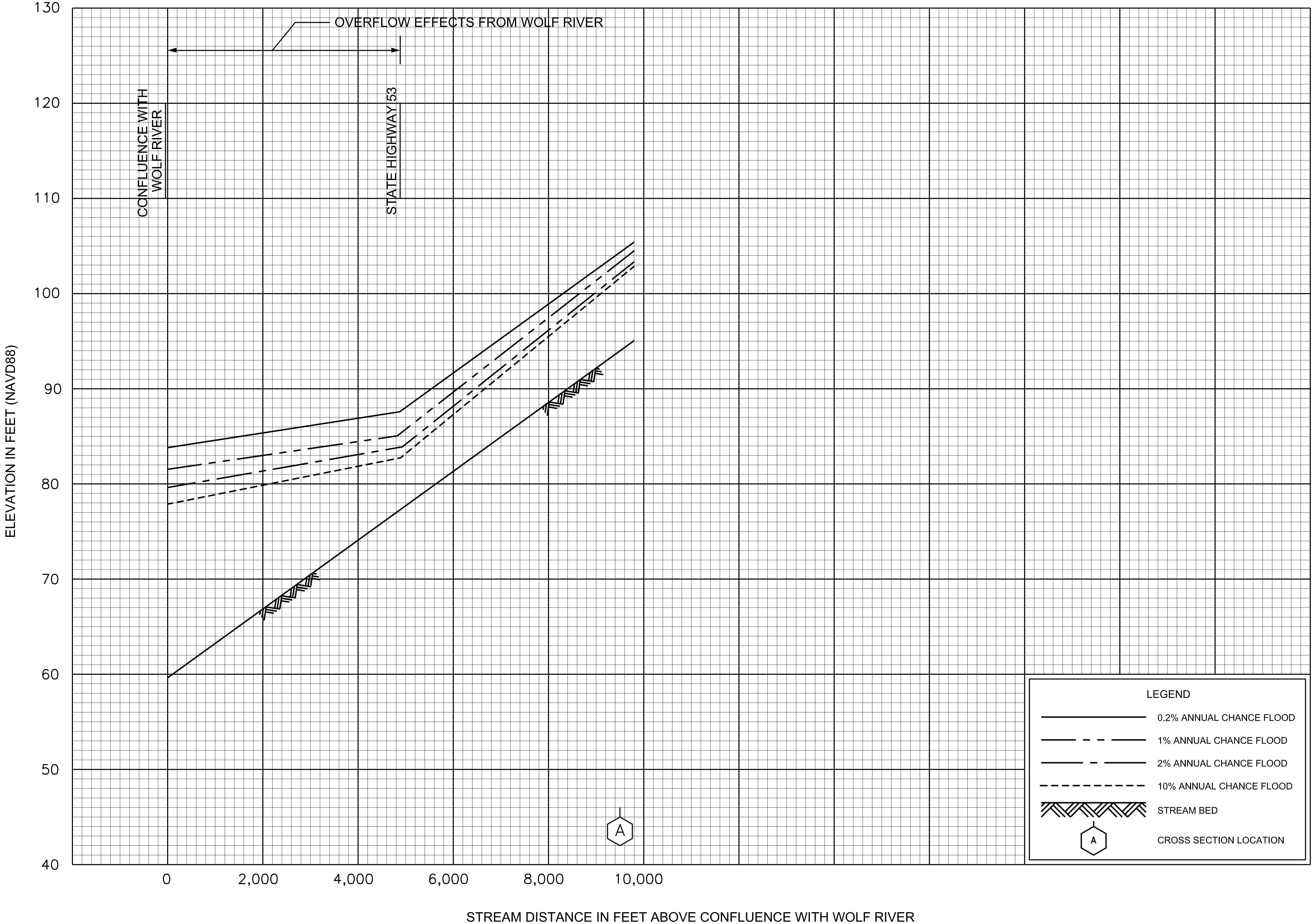
FLOOD PROFILES

LITTLE BILOXI RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



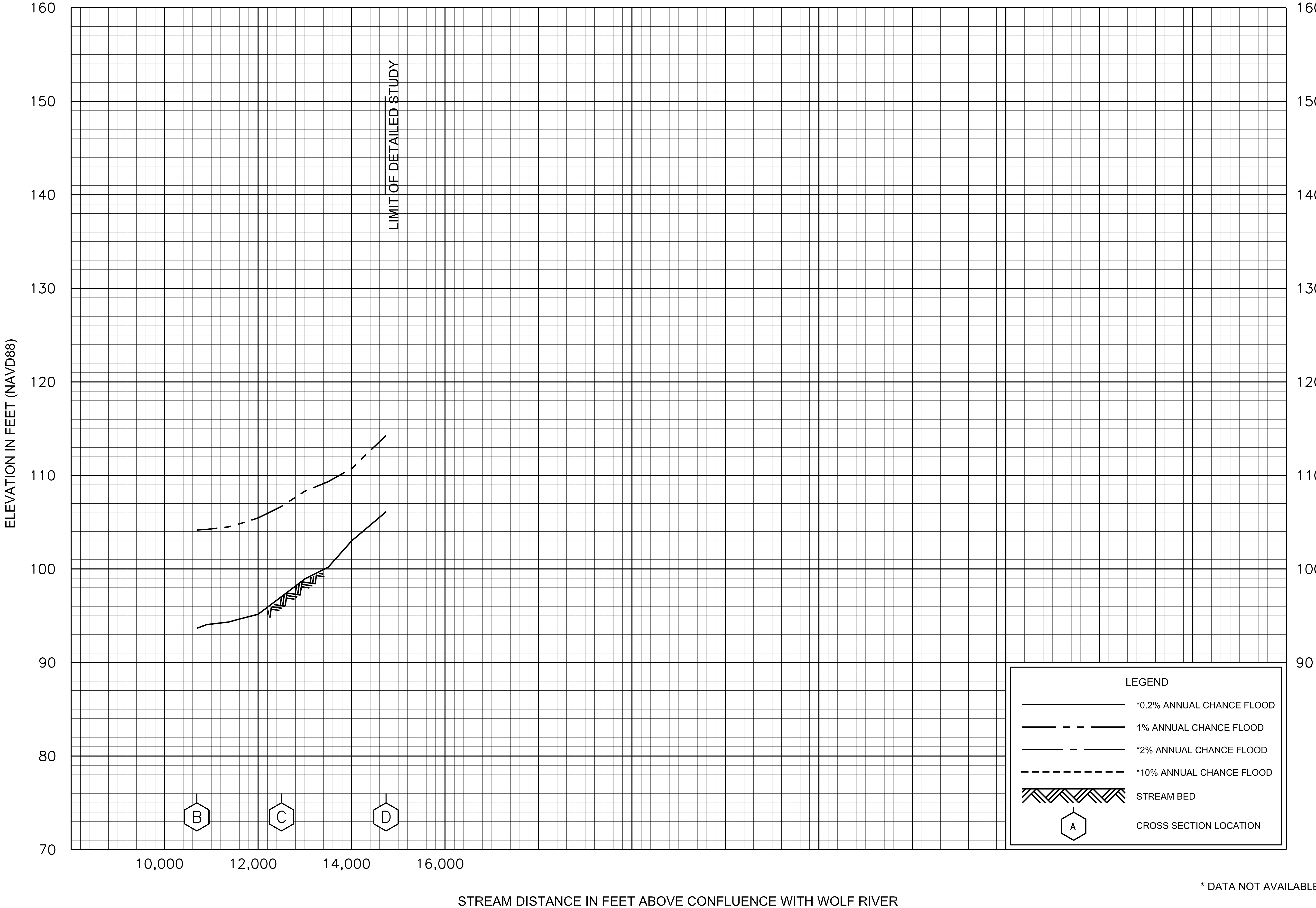
FLOOD PROFILES

MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

62P



FLOOD PROFILES

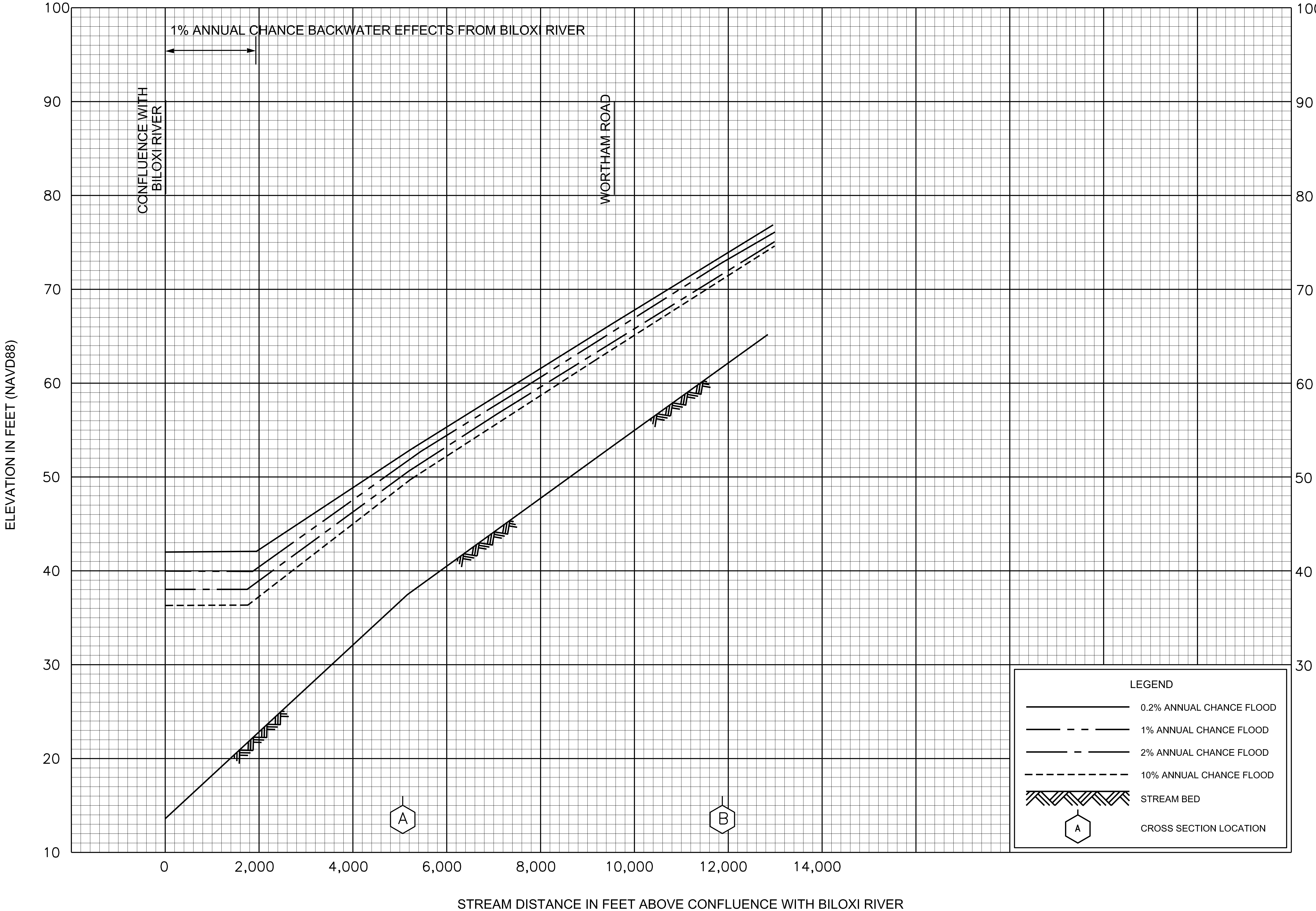
MILL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

63P



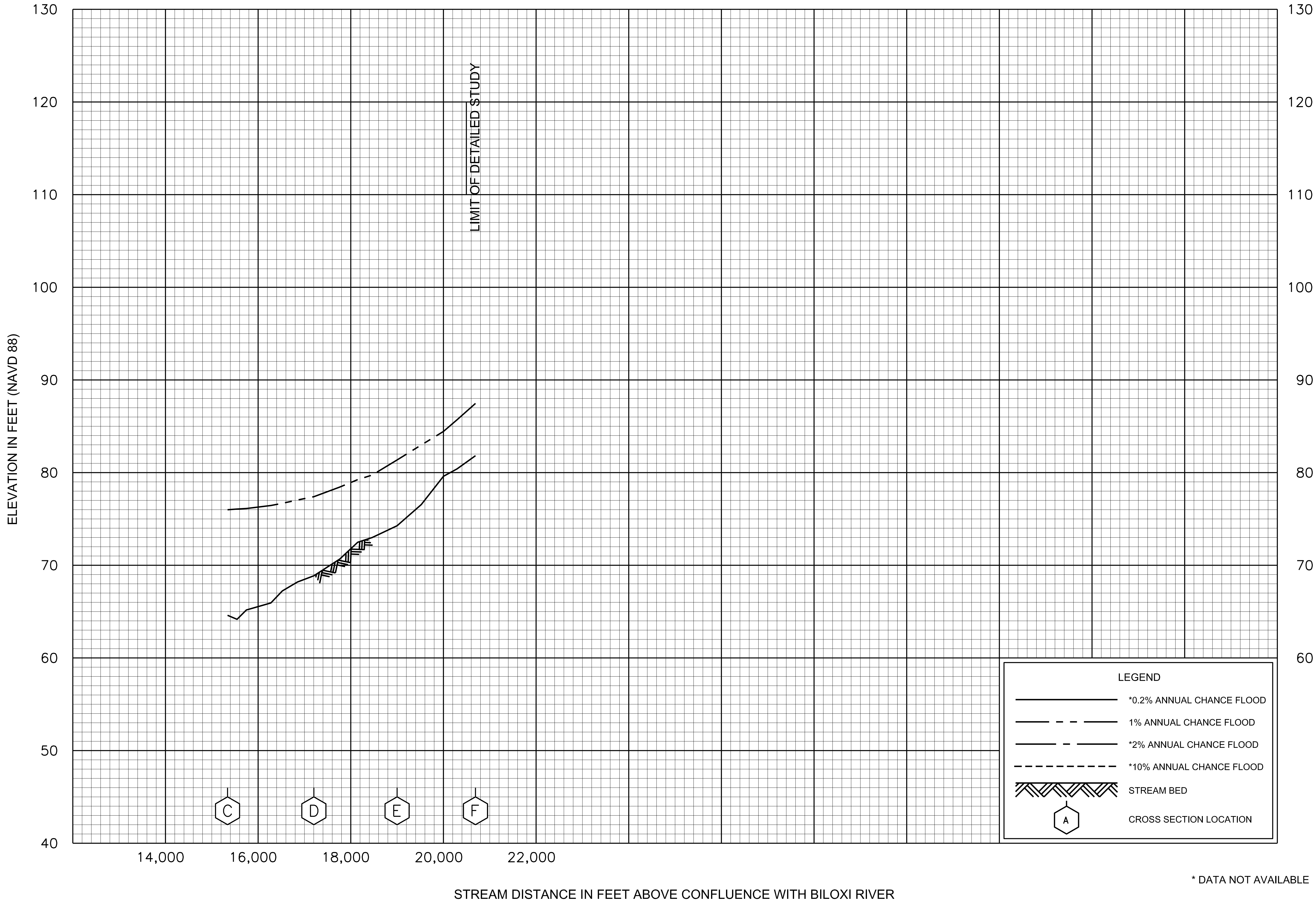
FLOOD PROFILES

PALMER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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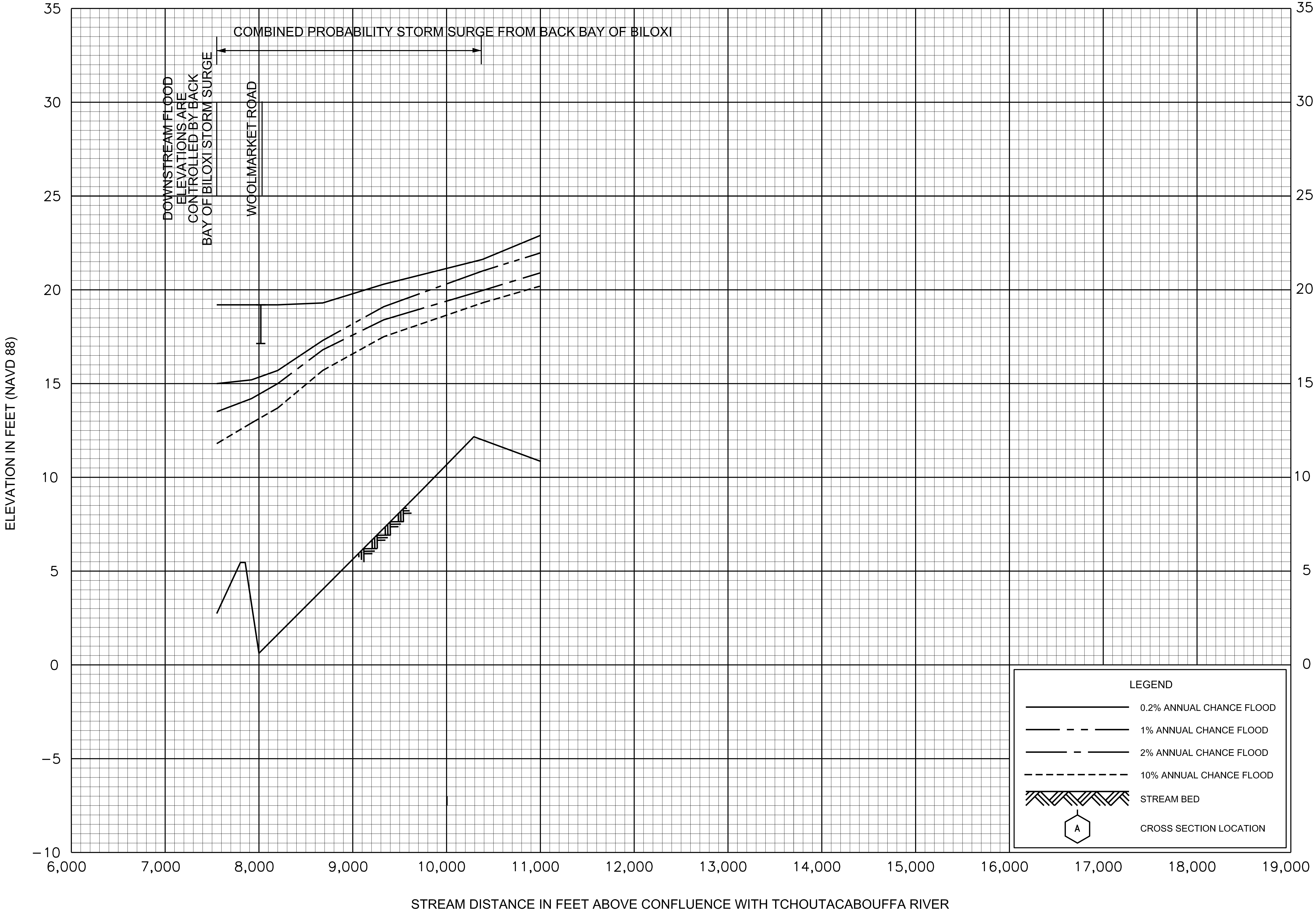
FLOOD PROFILES

PALMER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



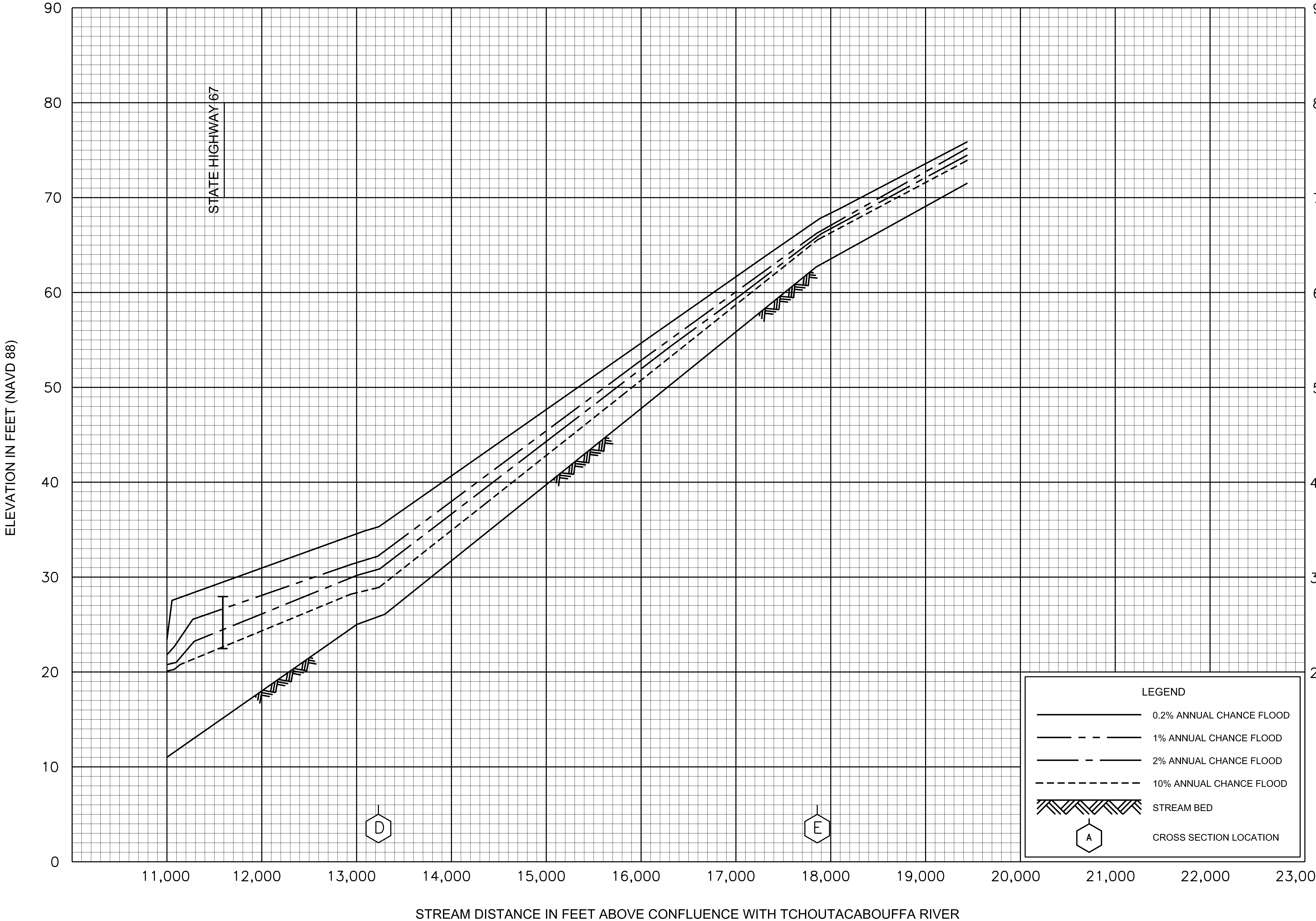
FLOOD PROFILES

PARKER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

66P



FLOOD PROFILES

PARKER CREEK

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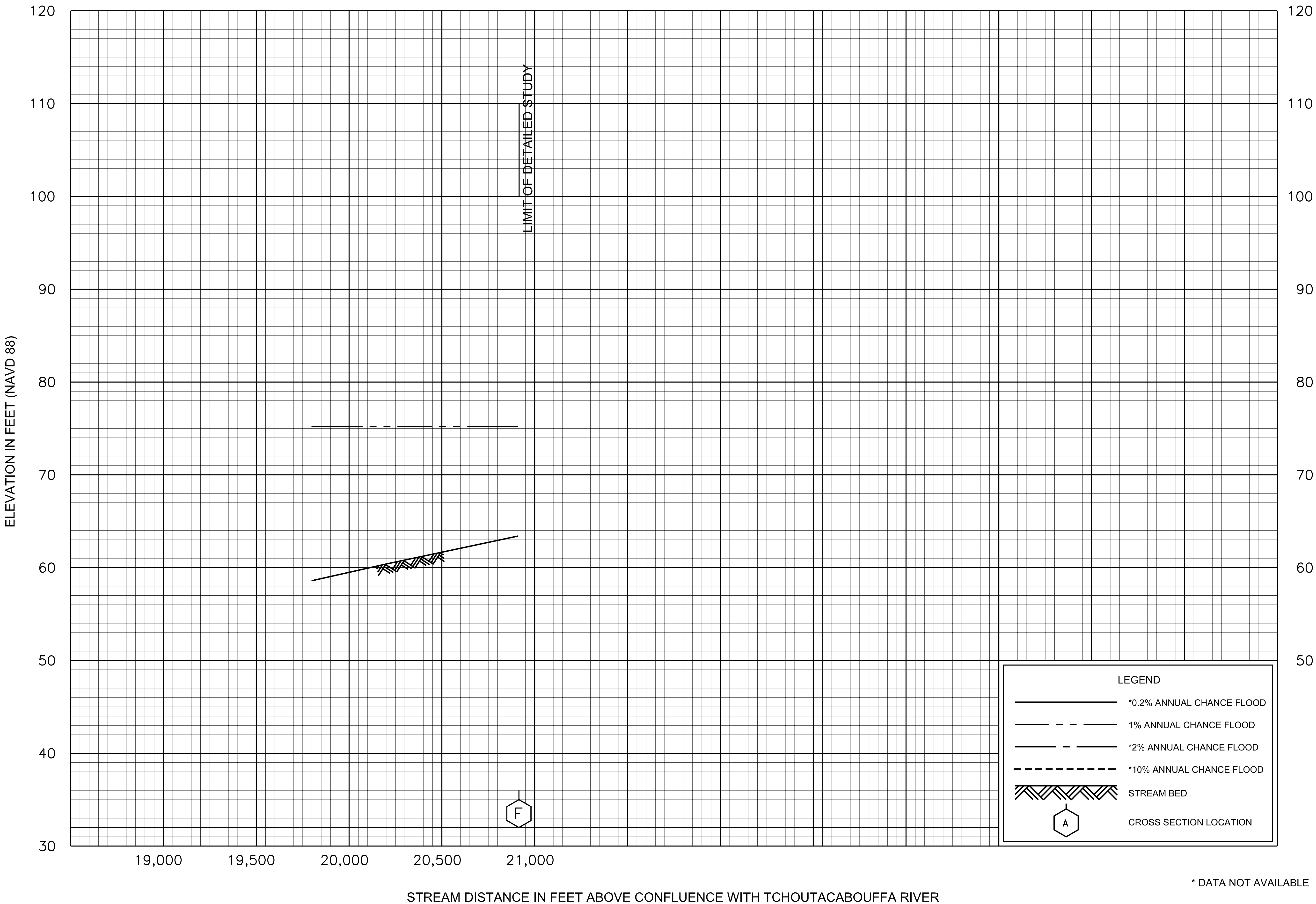

FLOOD PROFILES

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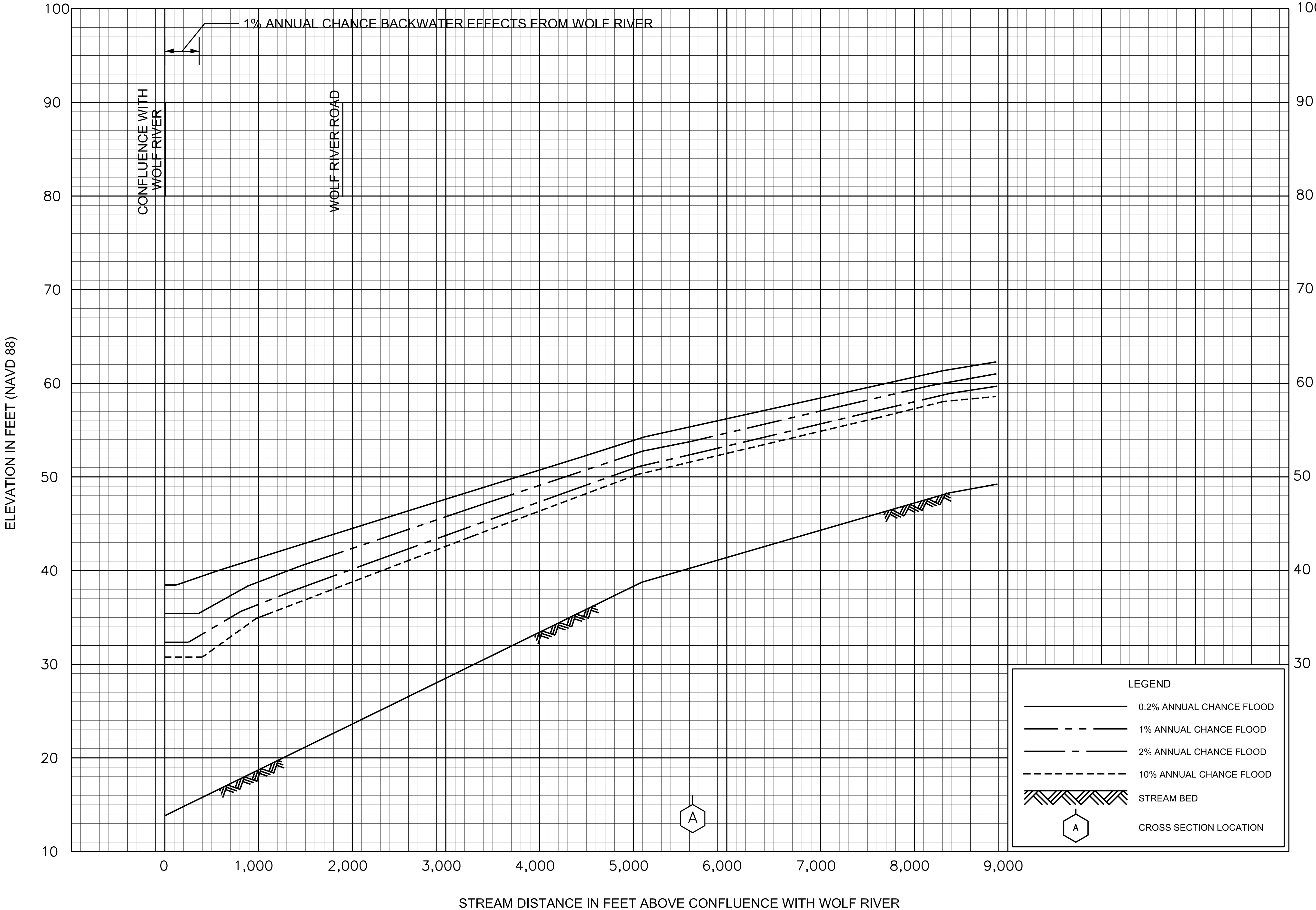


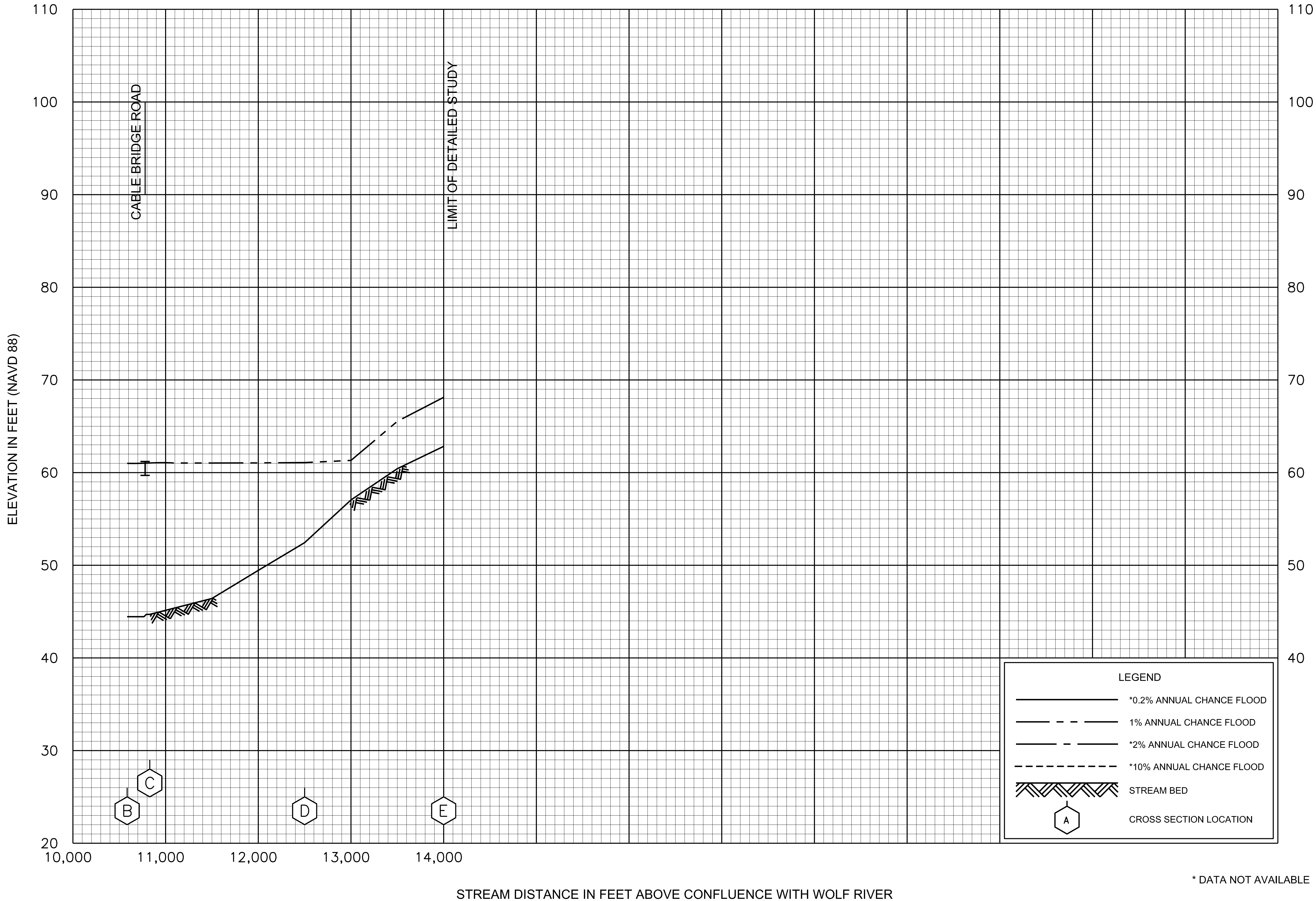
FLOOD PROFILES

POLE BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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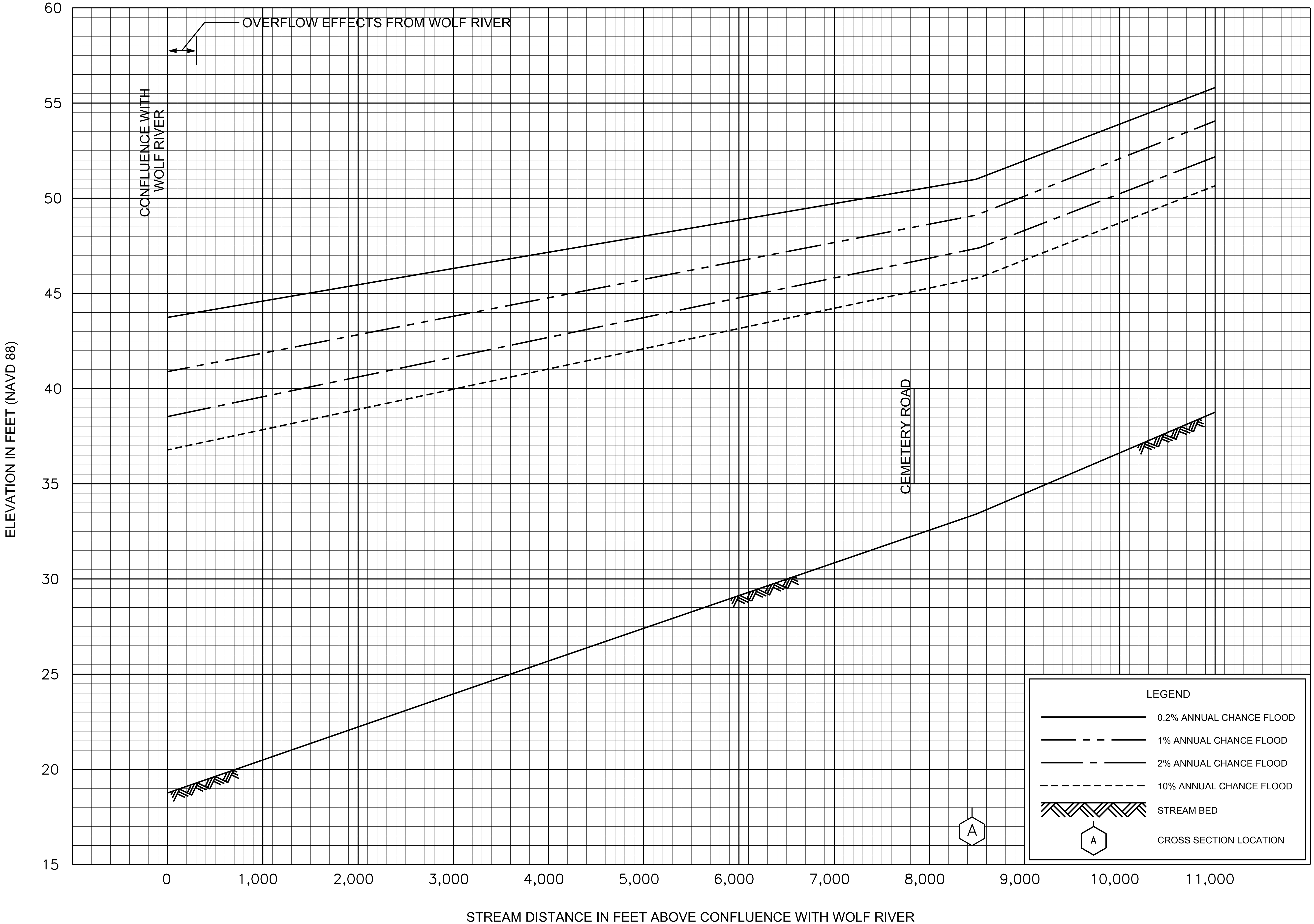
FLOOD PROFILES

POLE BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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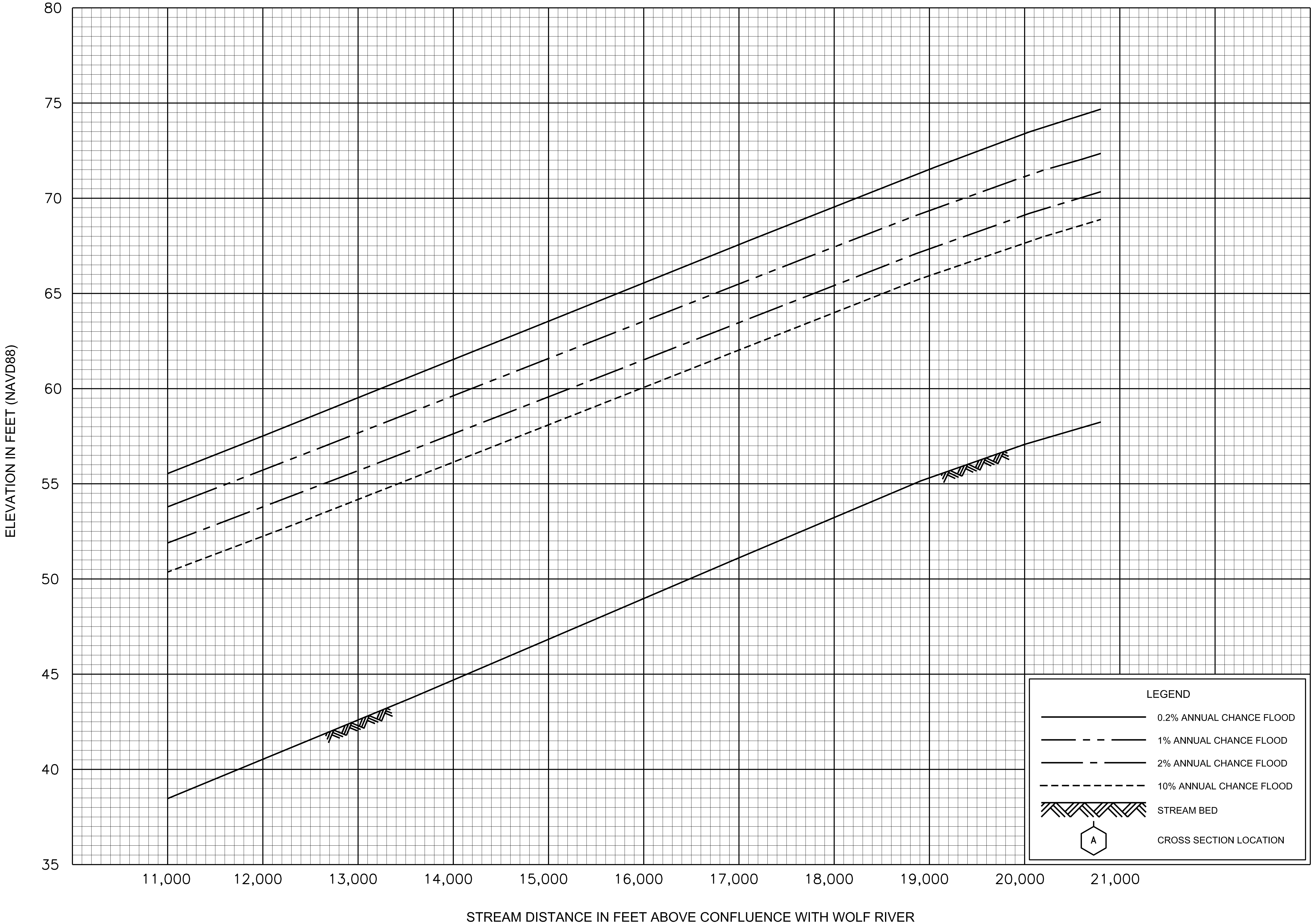
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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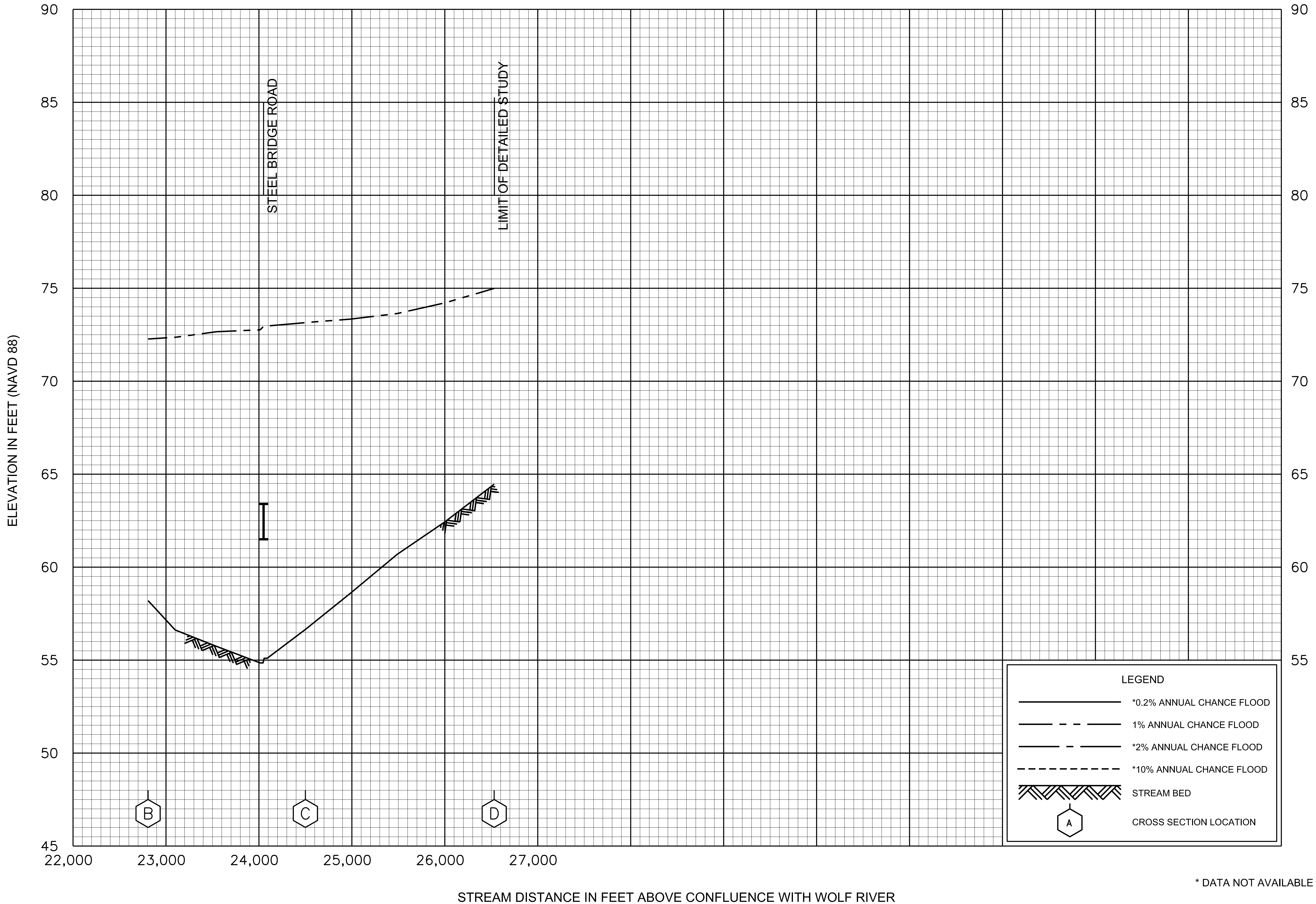
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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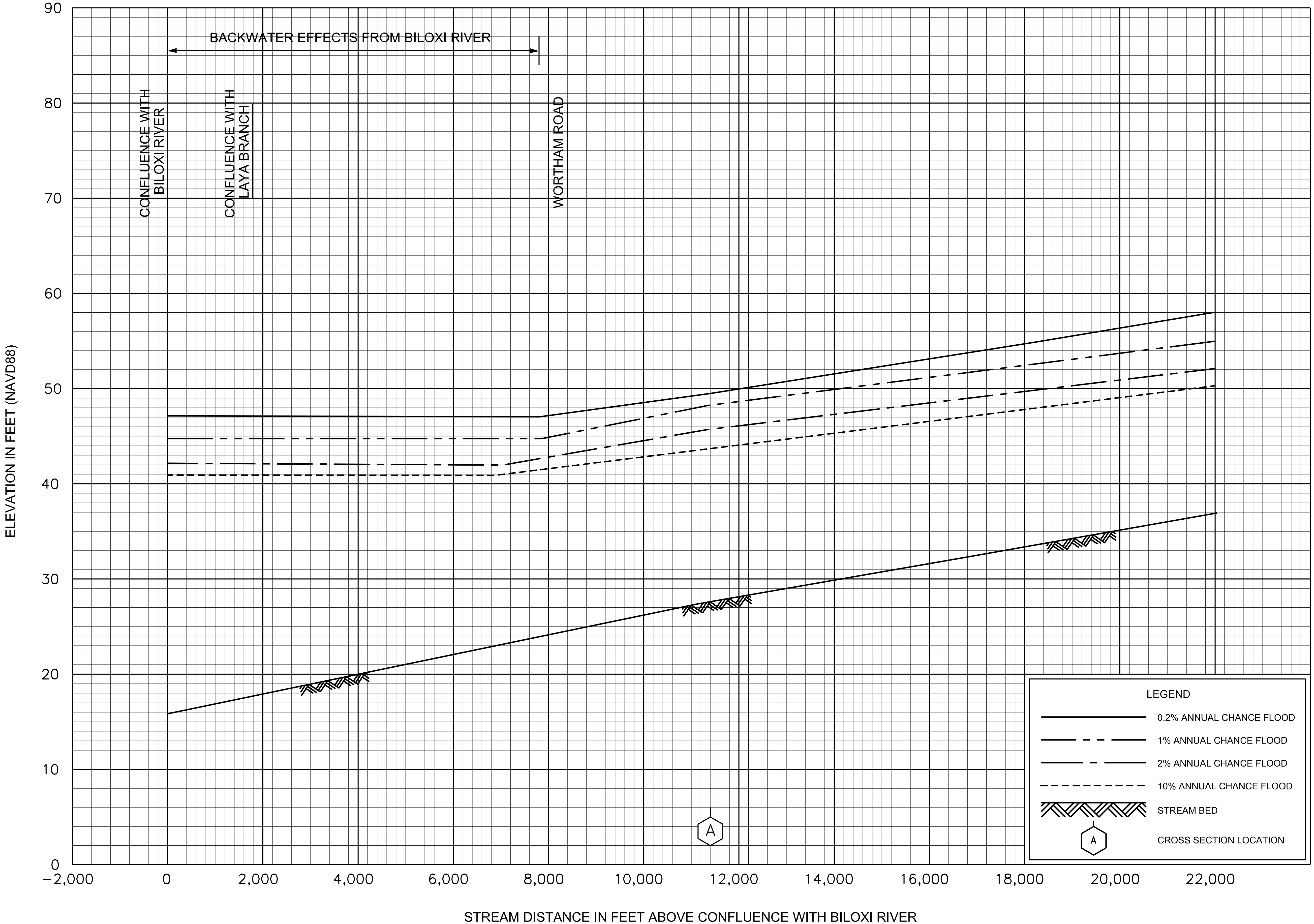
SANDY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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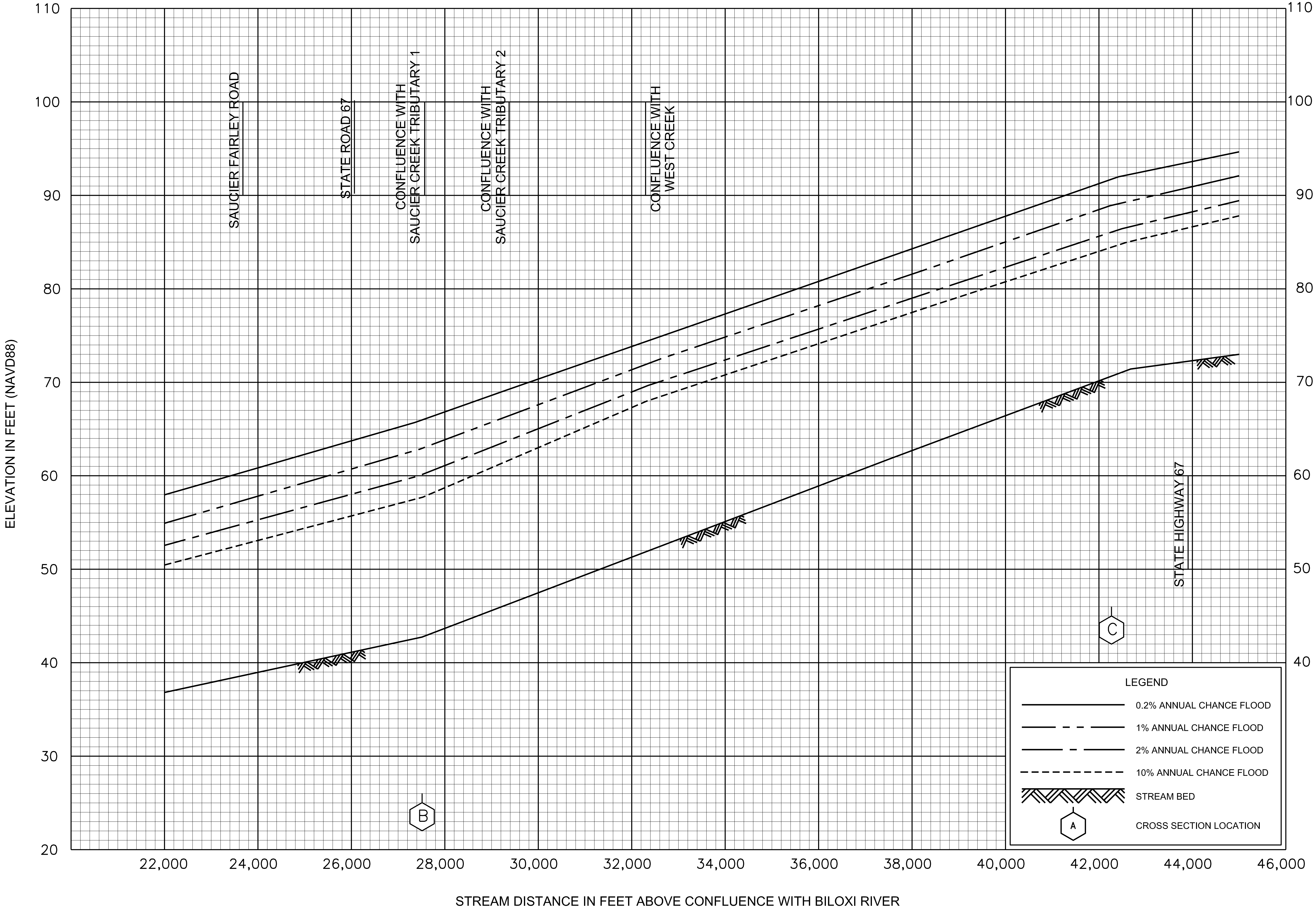
FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

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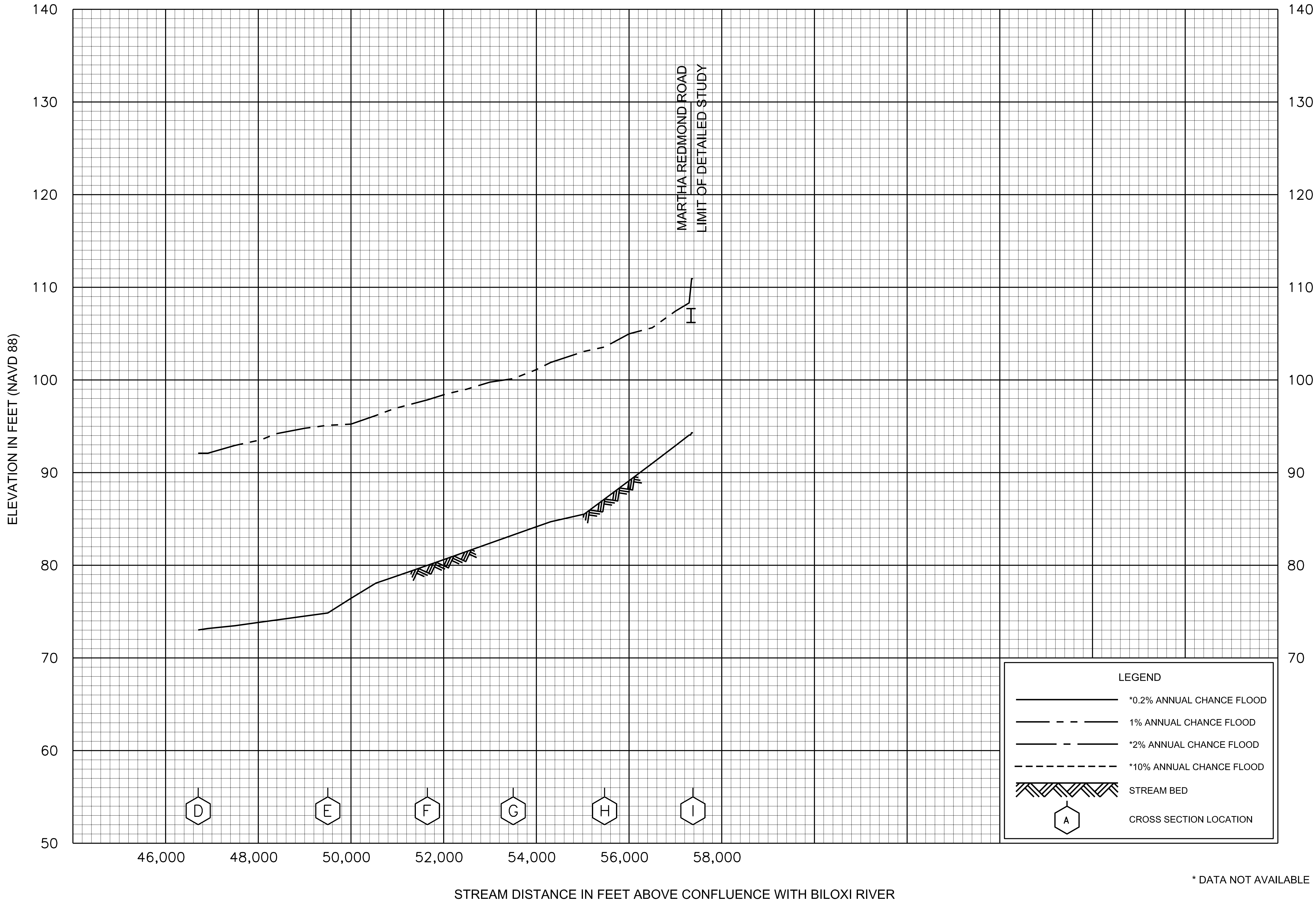
FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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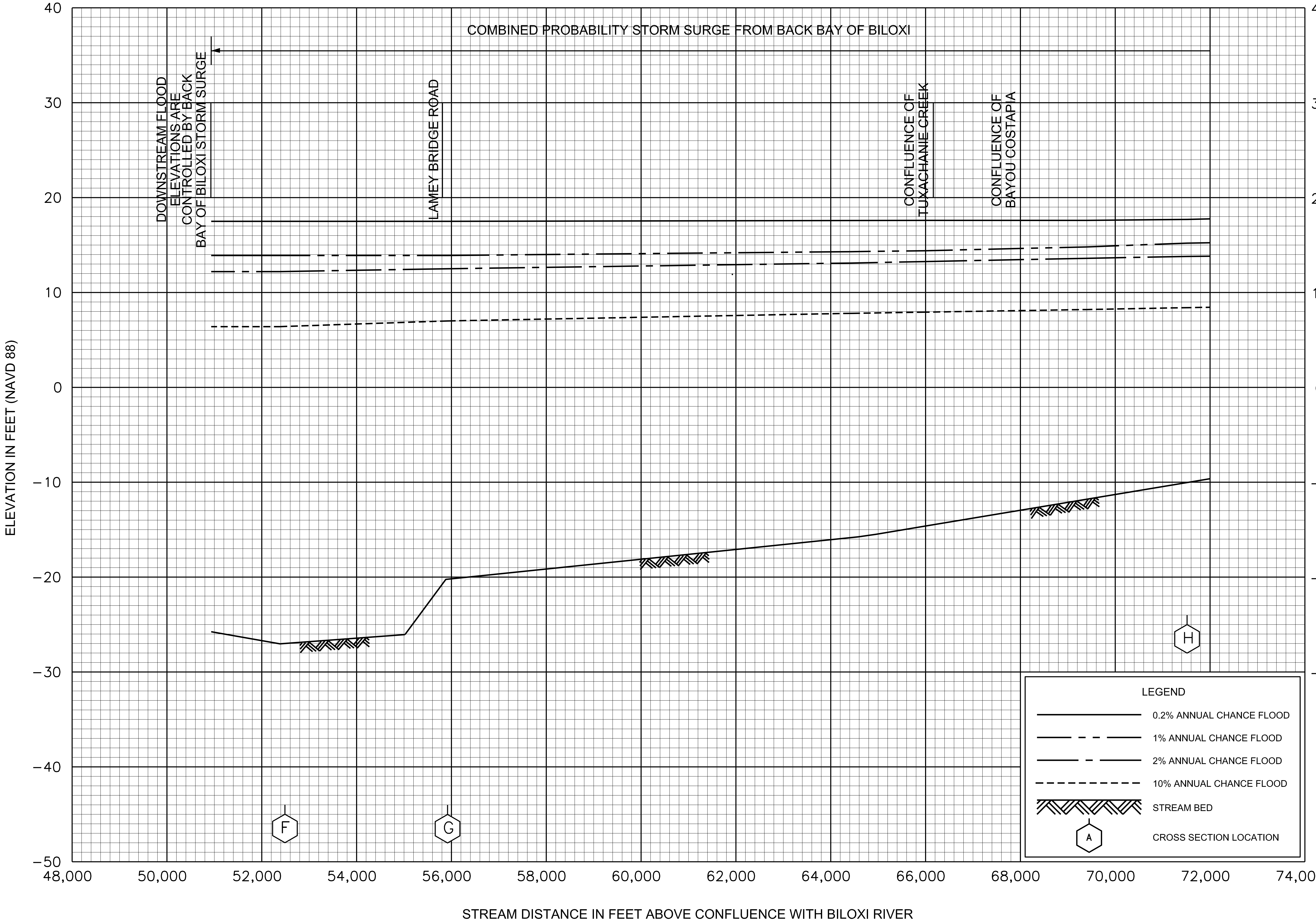
SAUCIER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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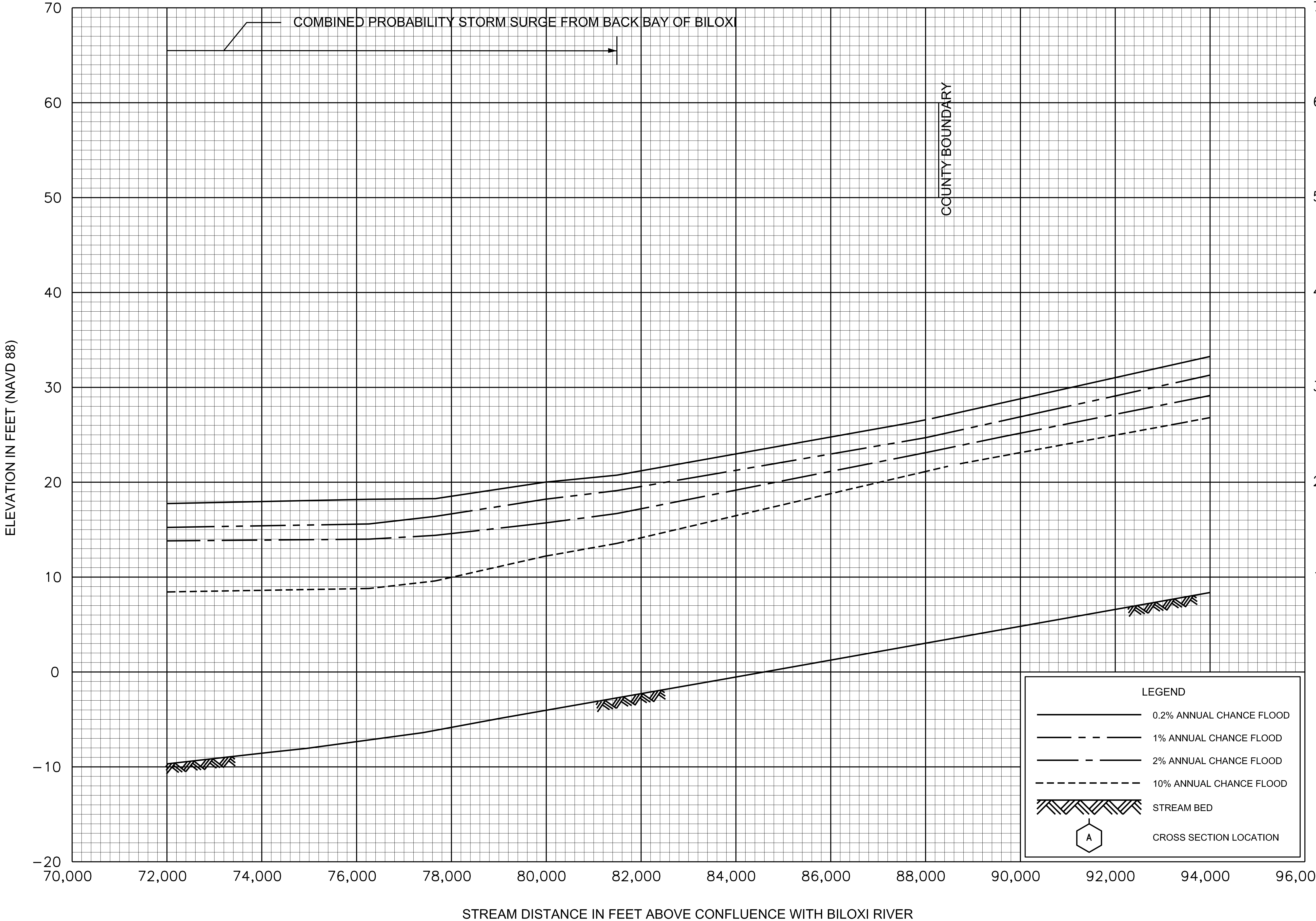
TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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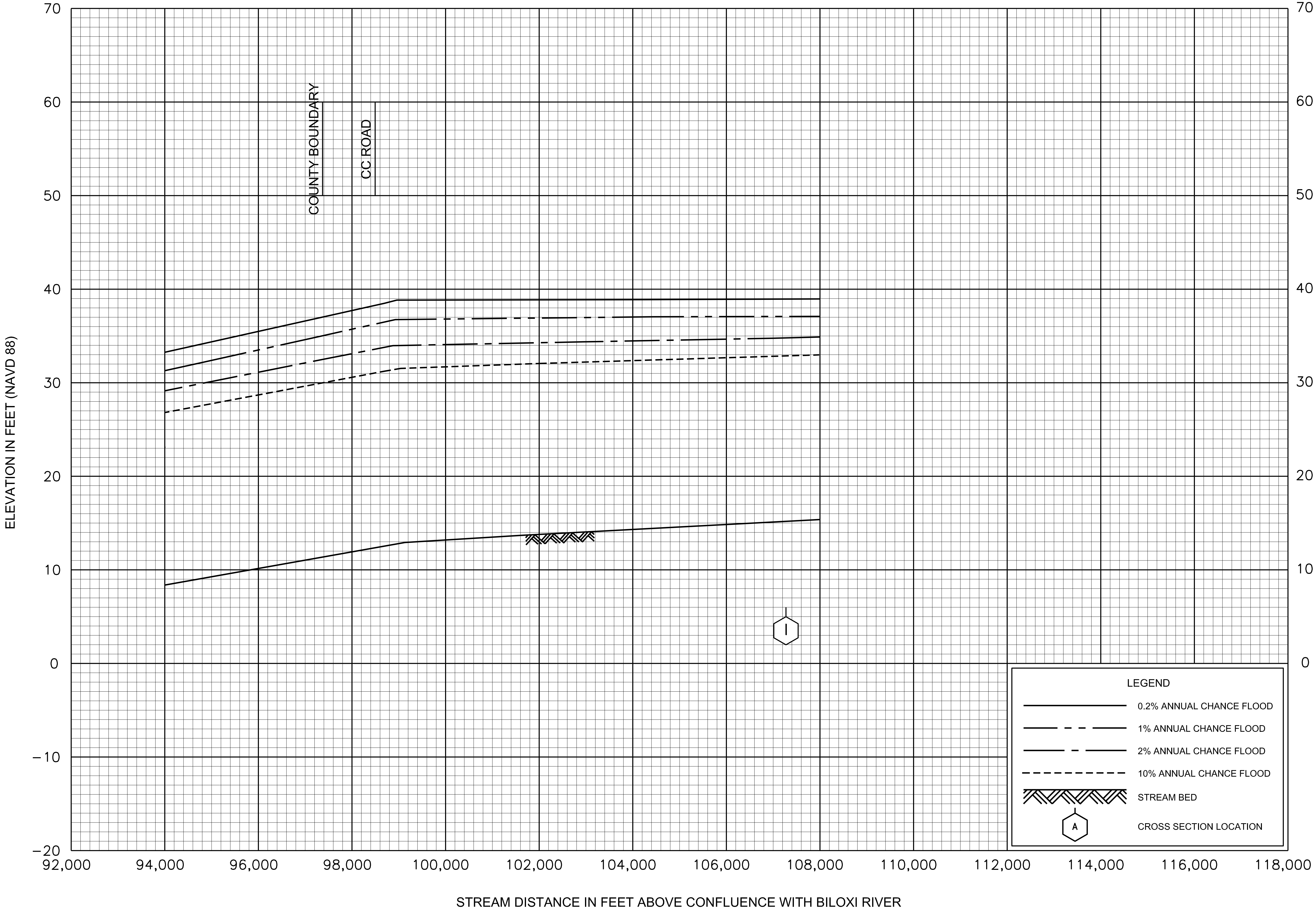
TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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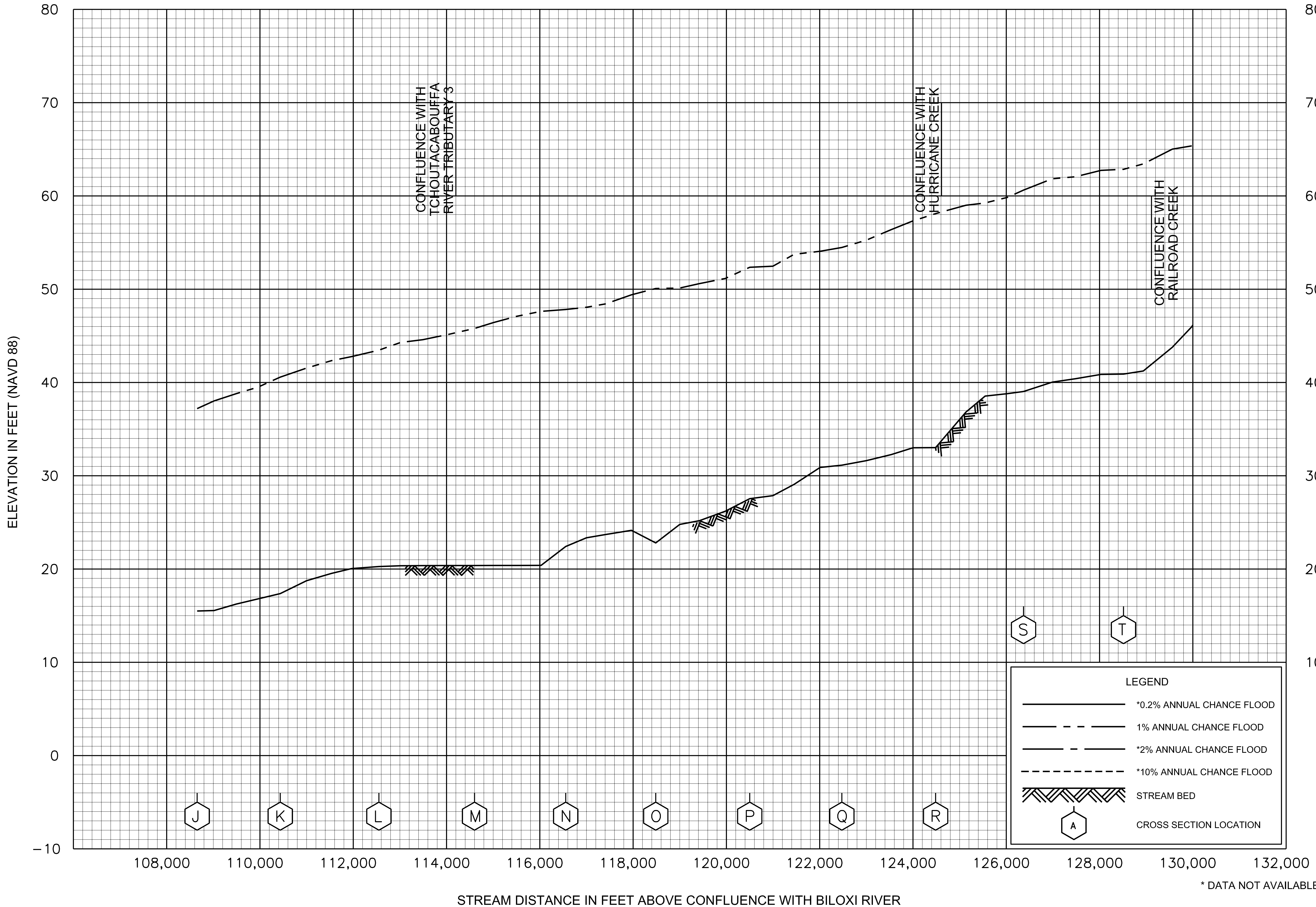
TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

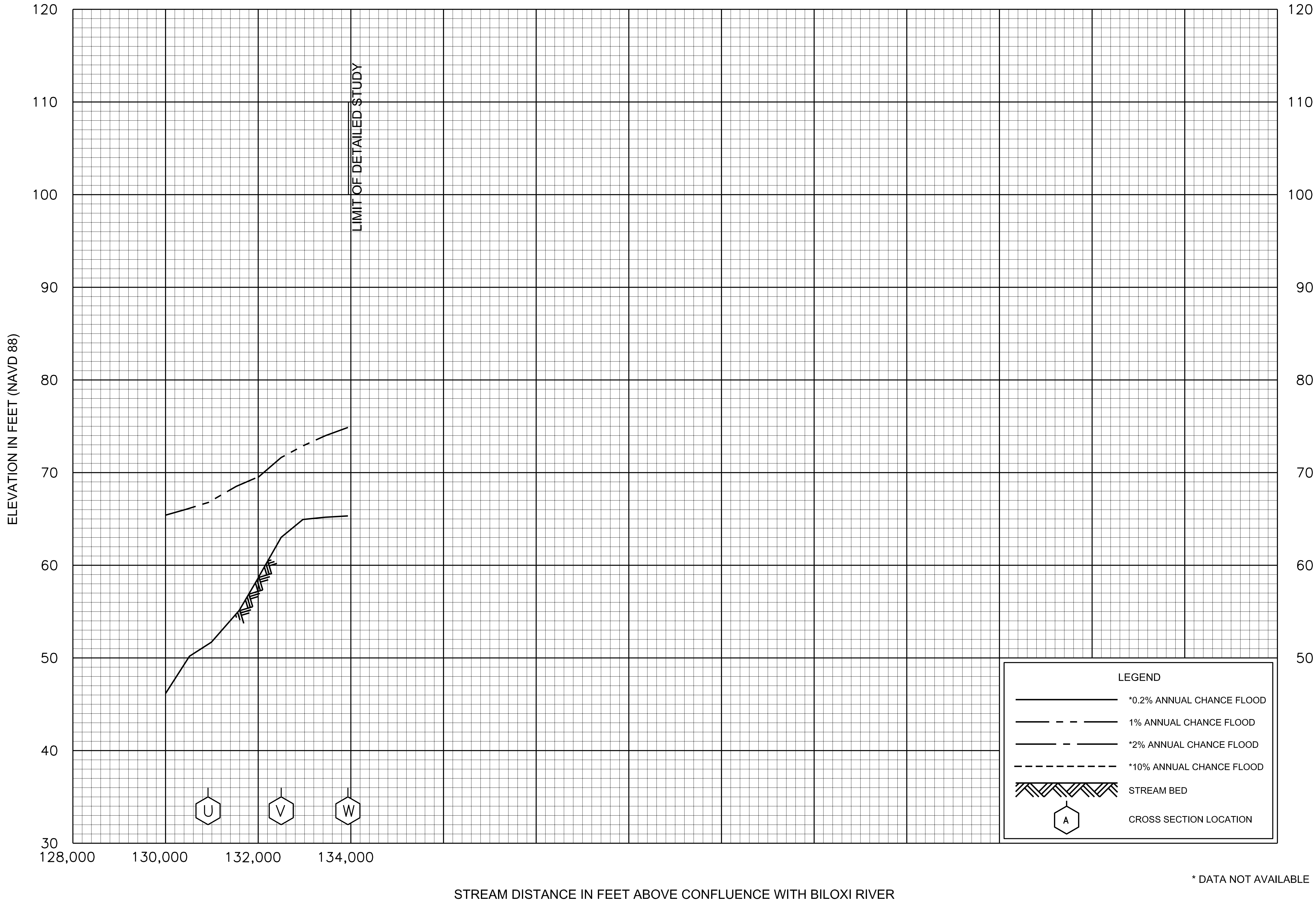


FLOOD PROFILES

TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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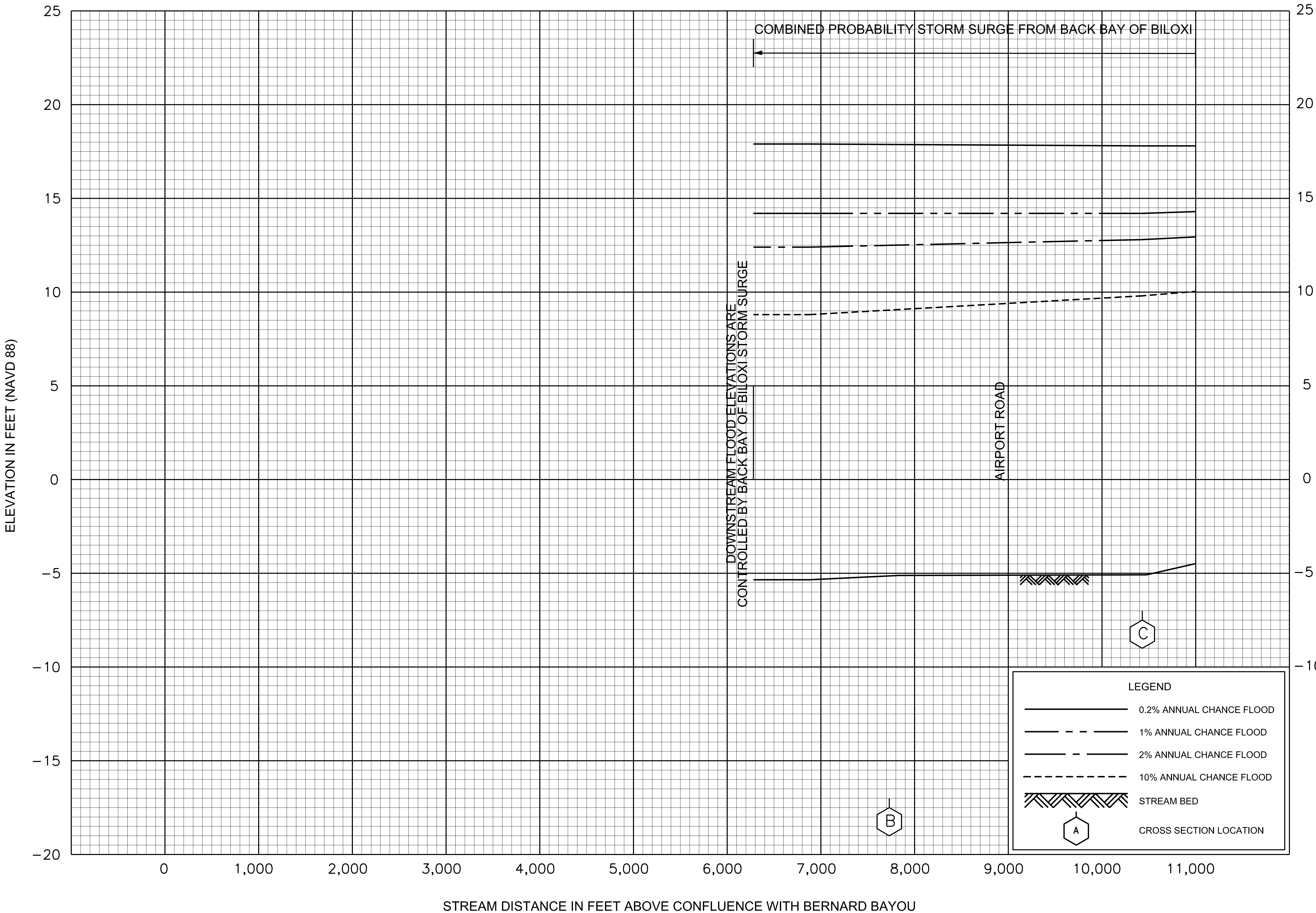
TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



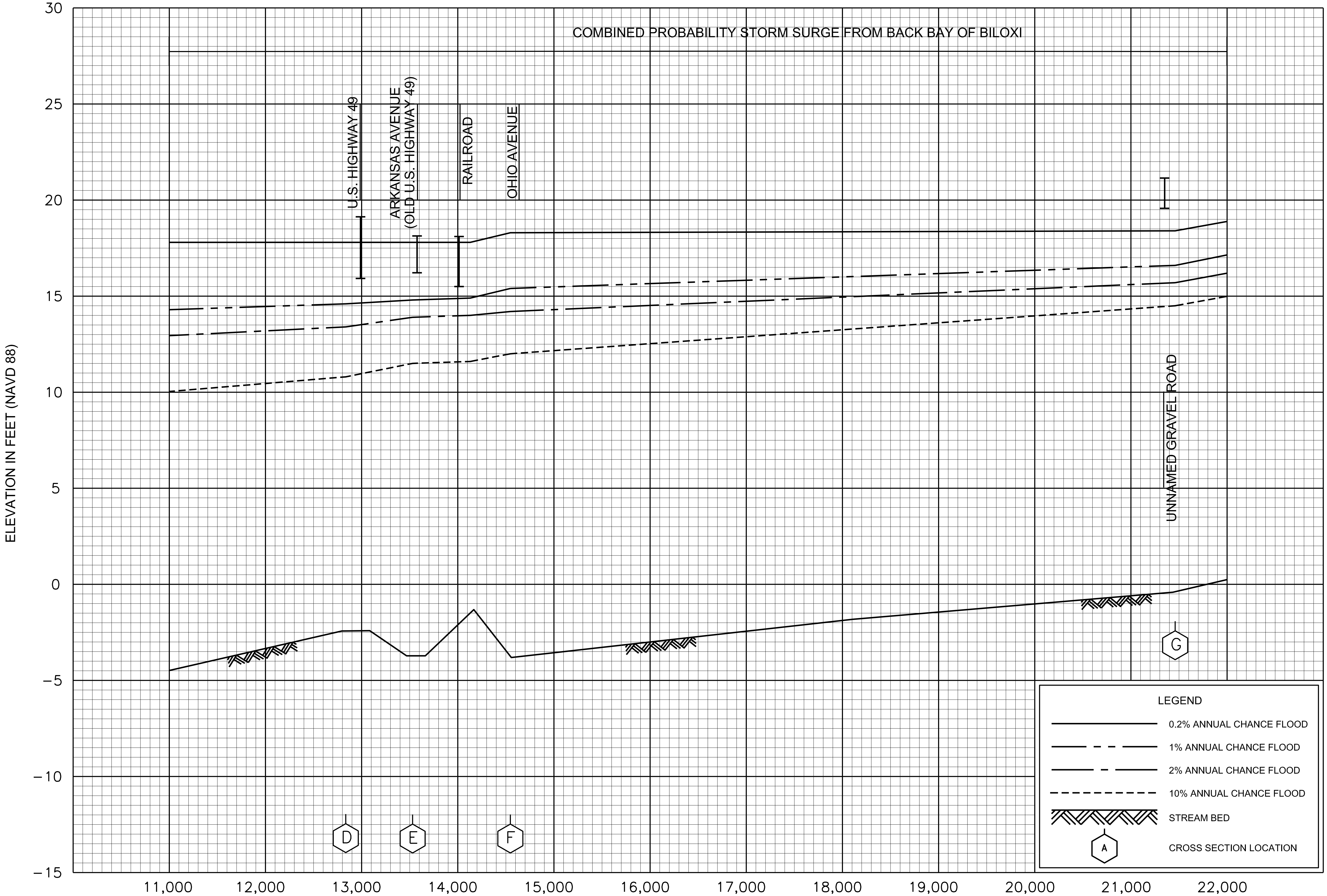
FLOOD PROFILES

TURKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

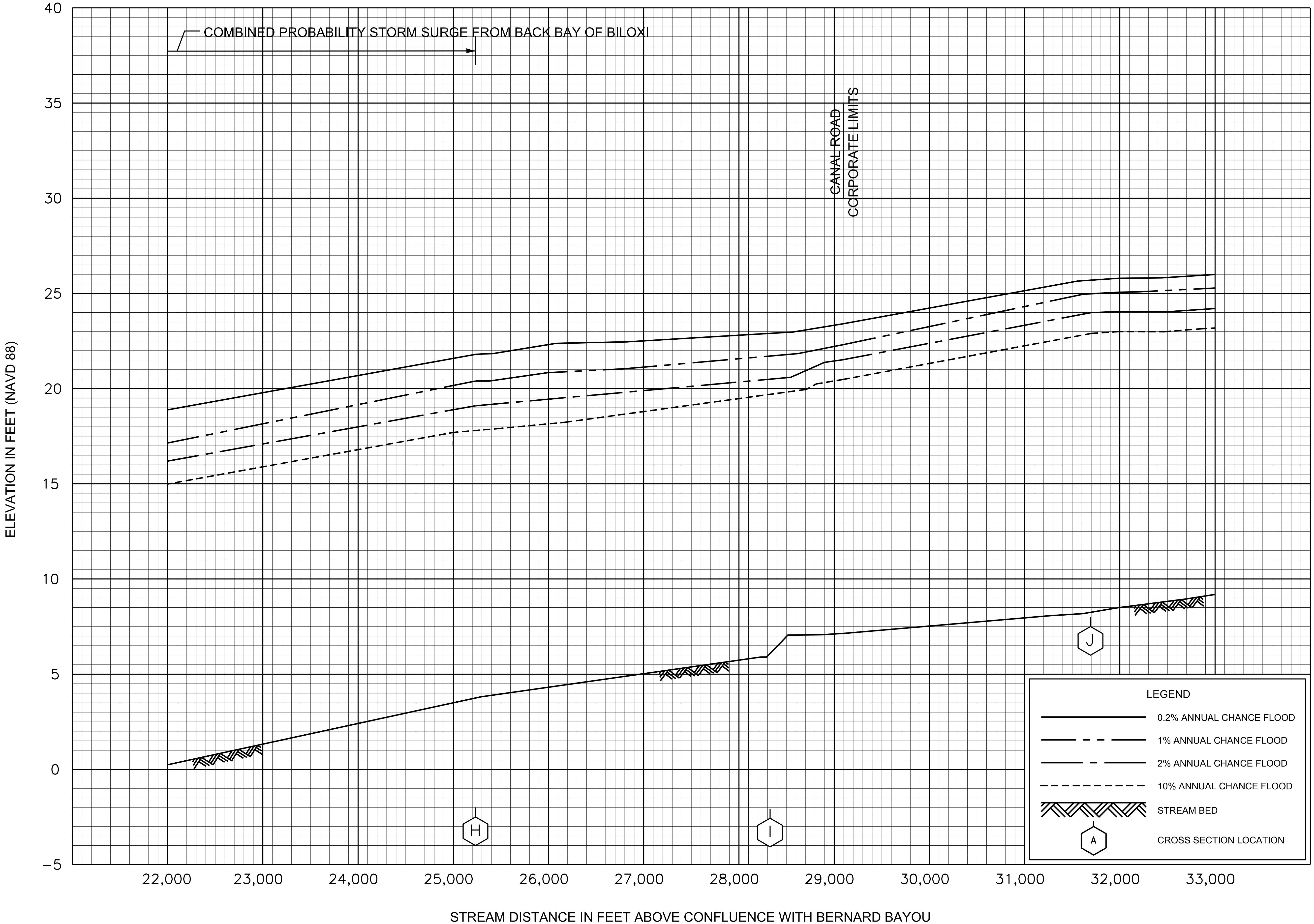


FLOOD PROFILES

TURKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

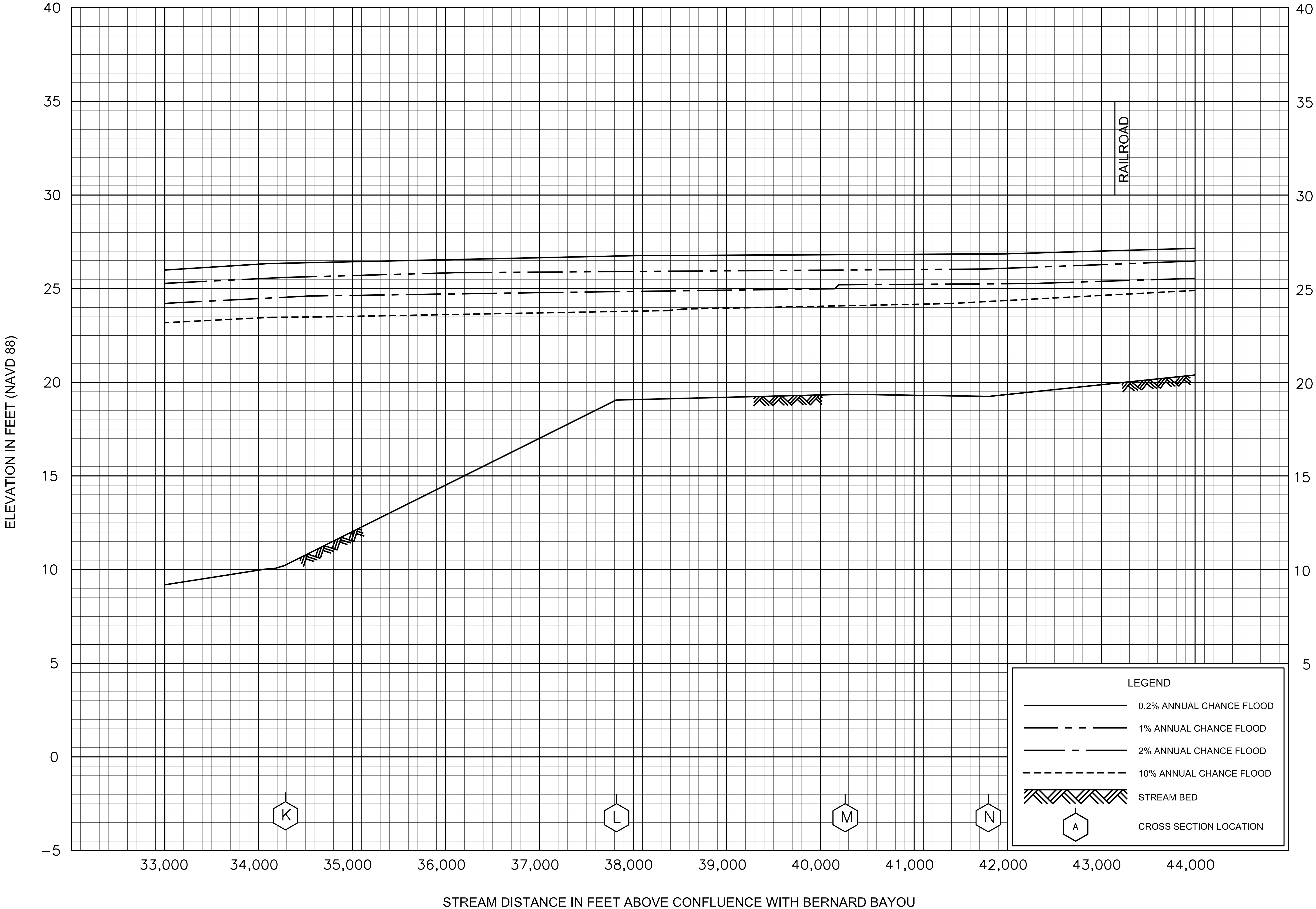


FLOOD PROFILES

TURKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

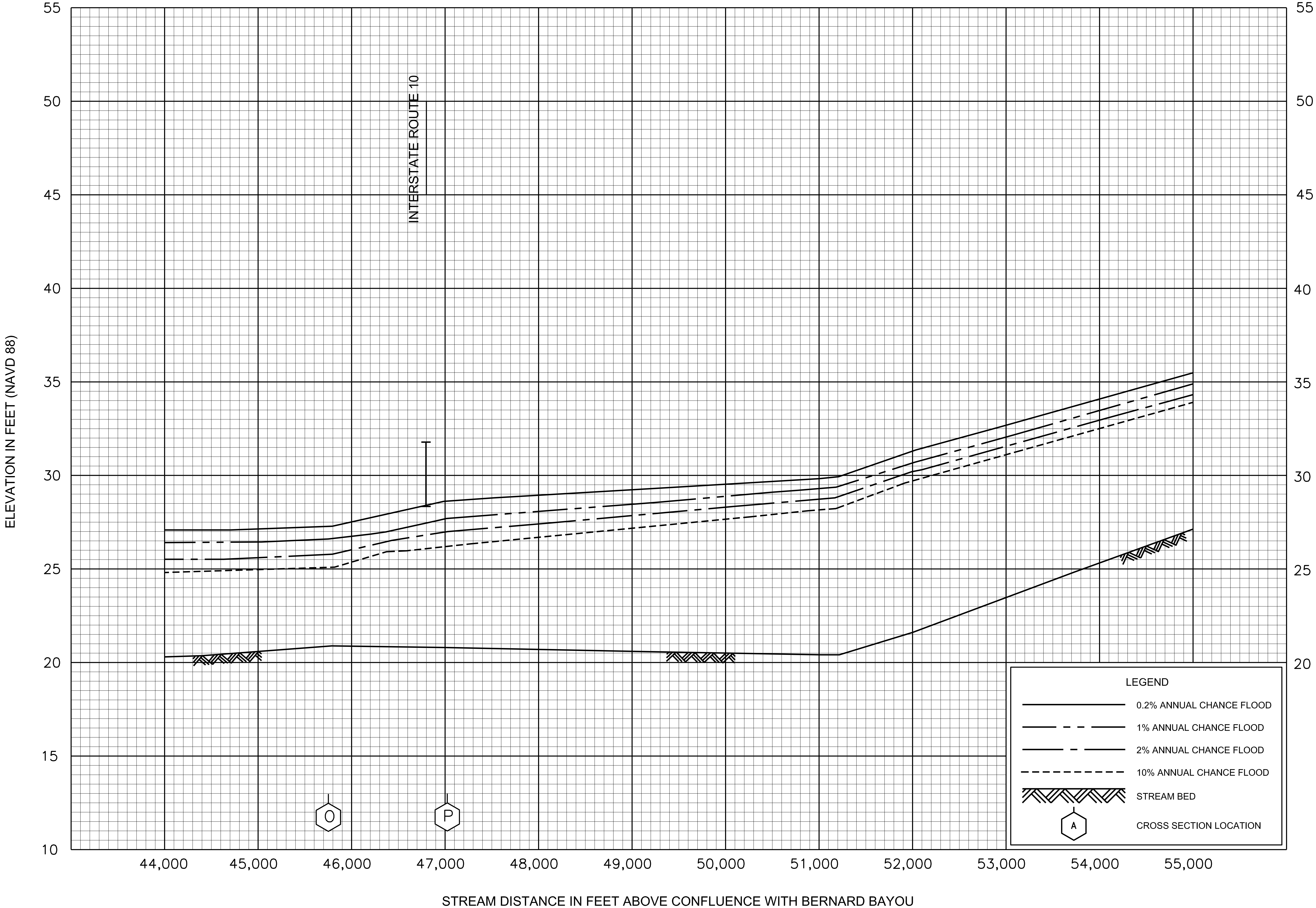


FLOOD PROFILES

TURKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

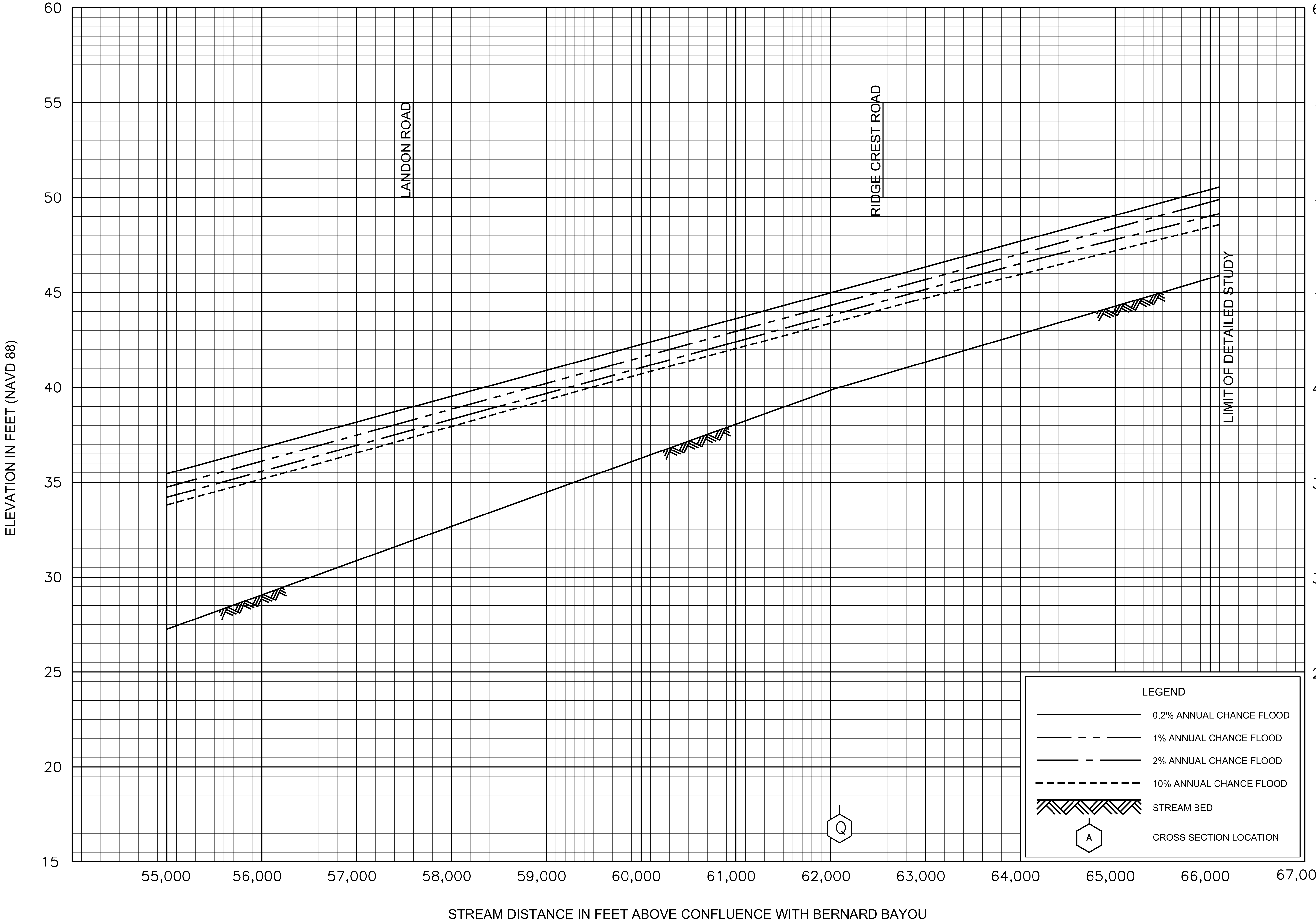


FLOOD PROFILES

TURKEY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

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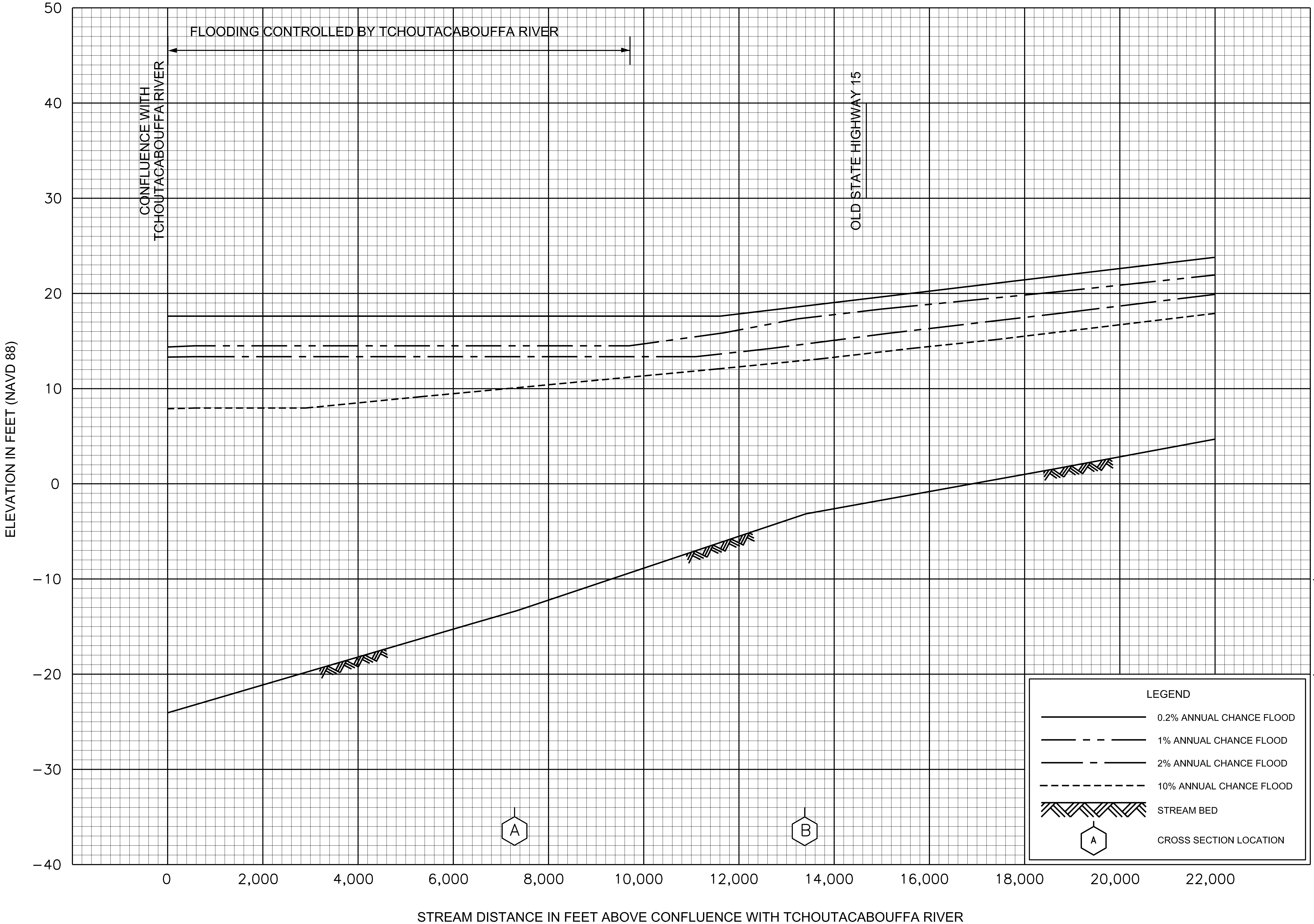
FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

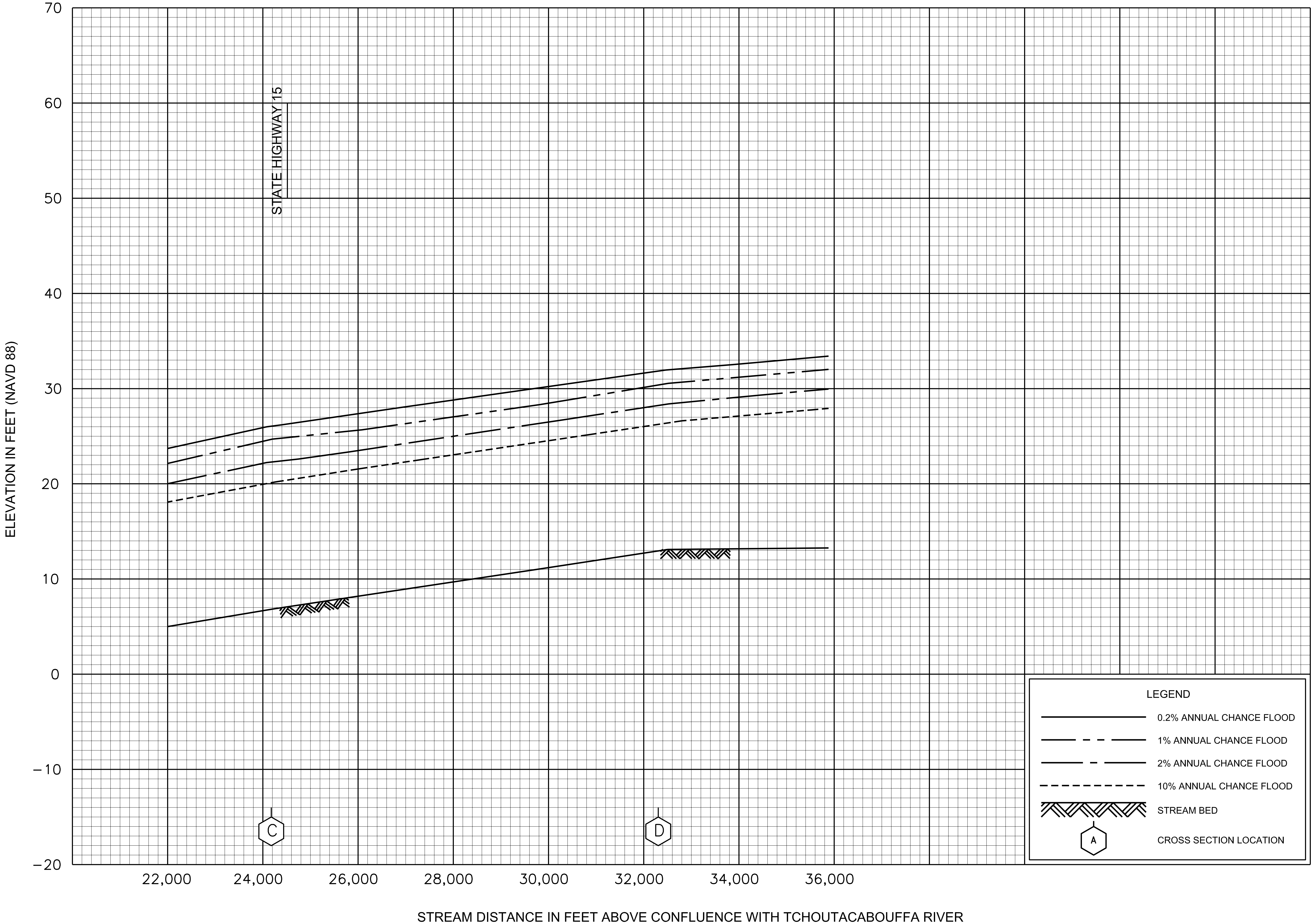


FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS AND INCORPORATED AREAS



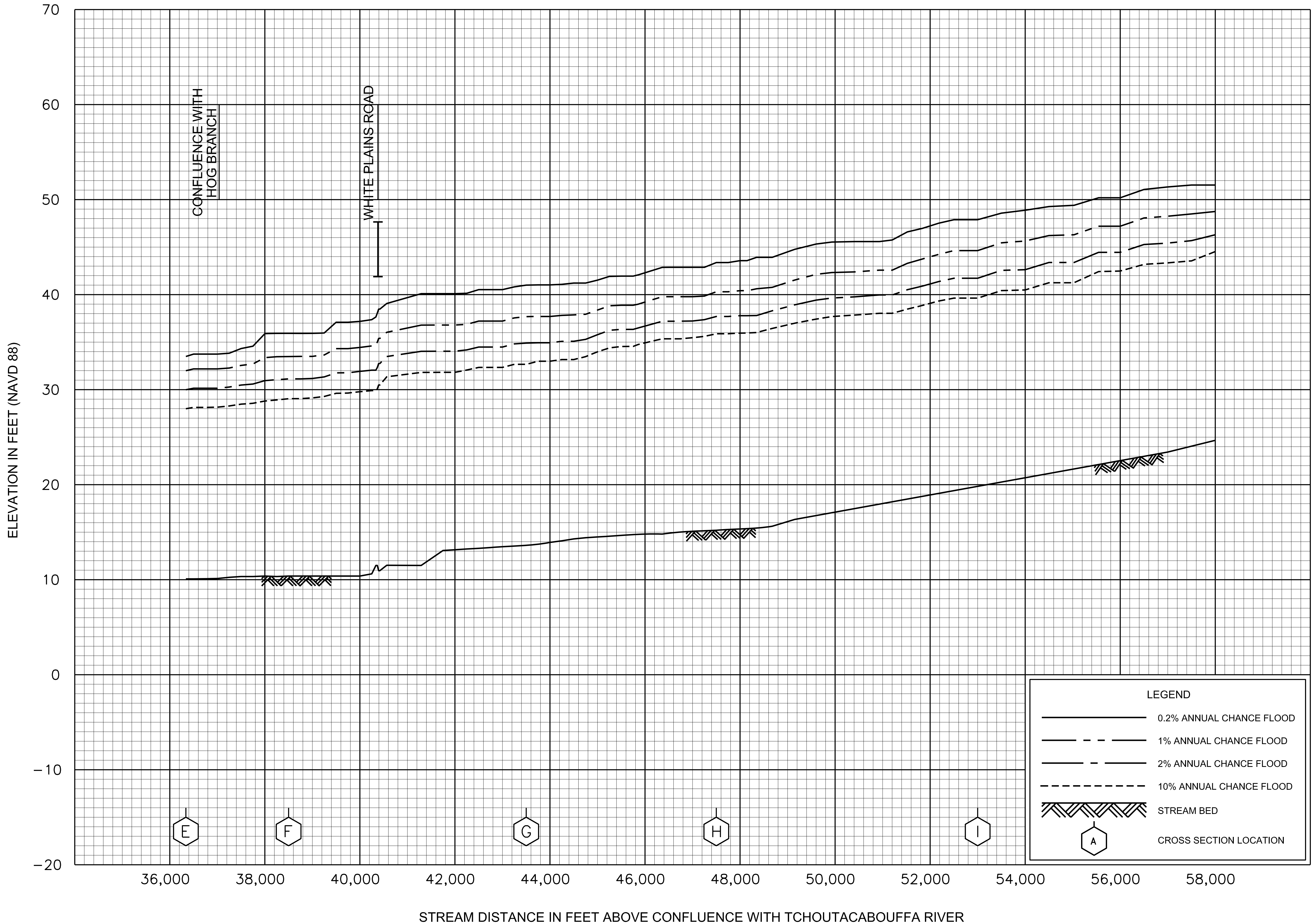
FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



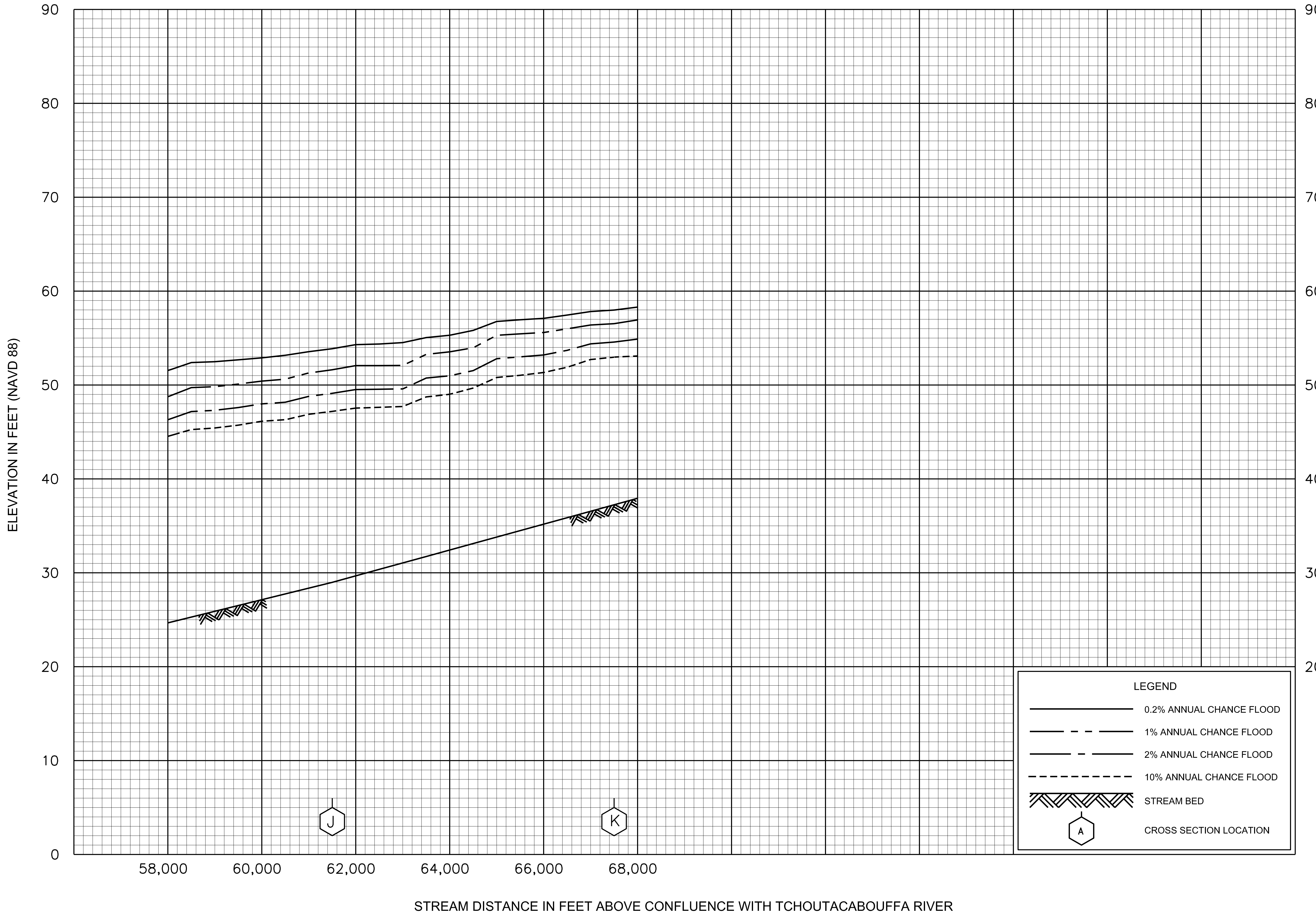
FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



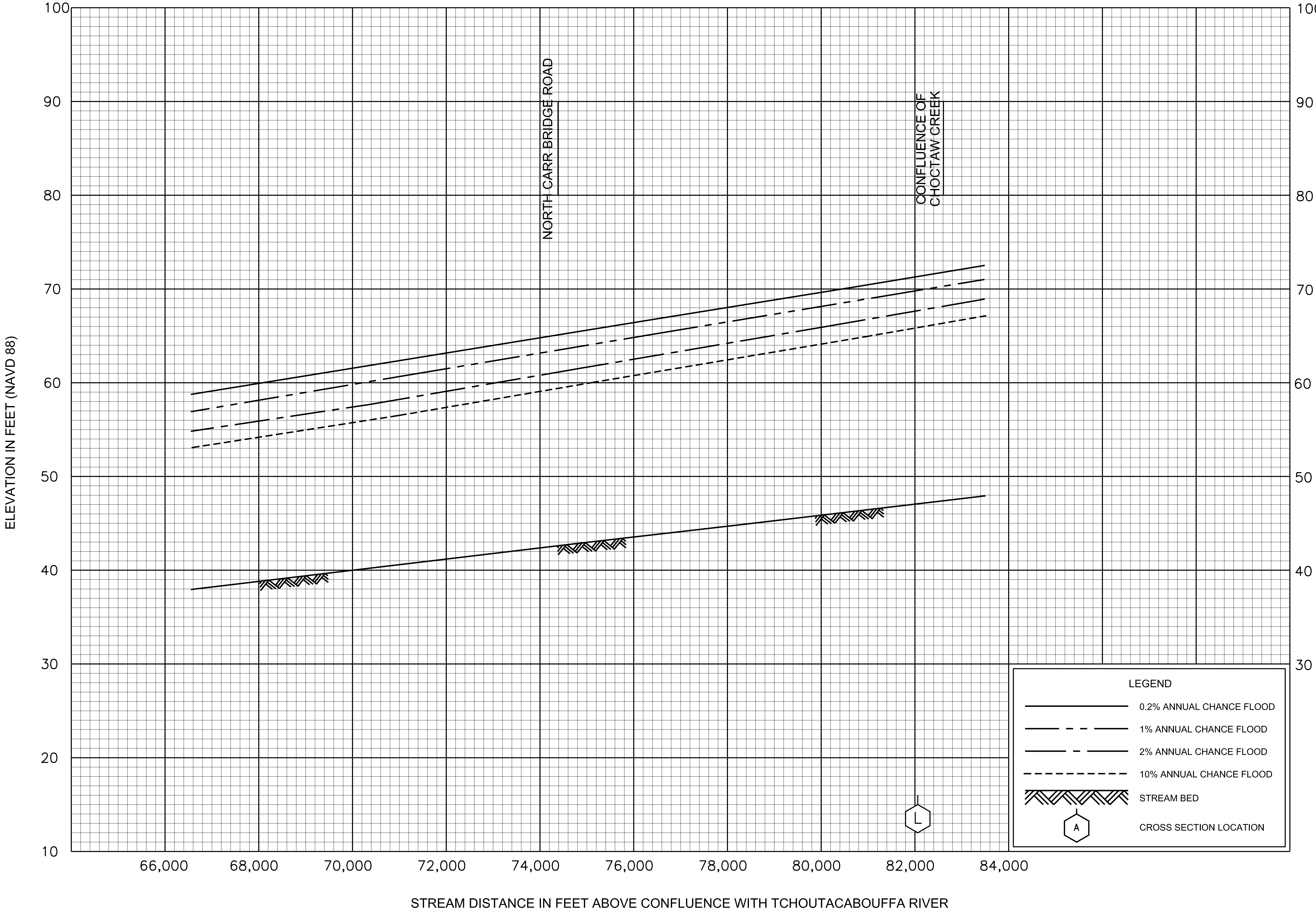
FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



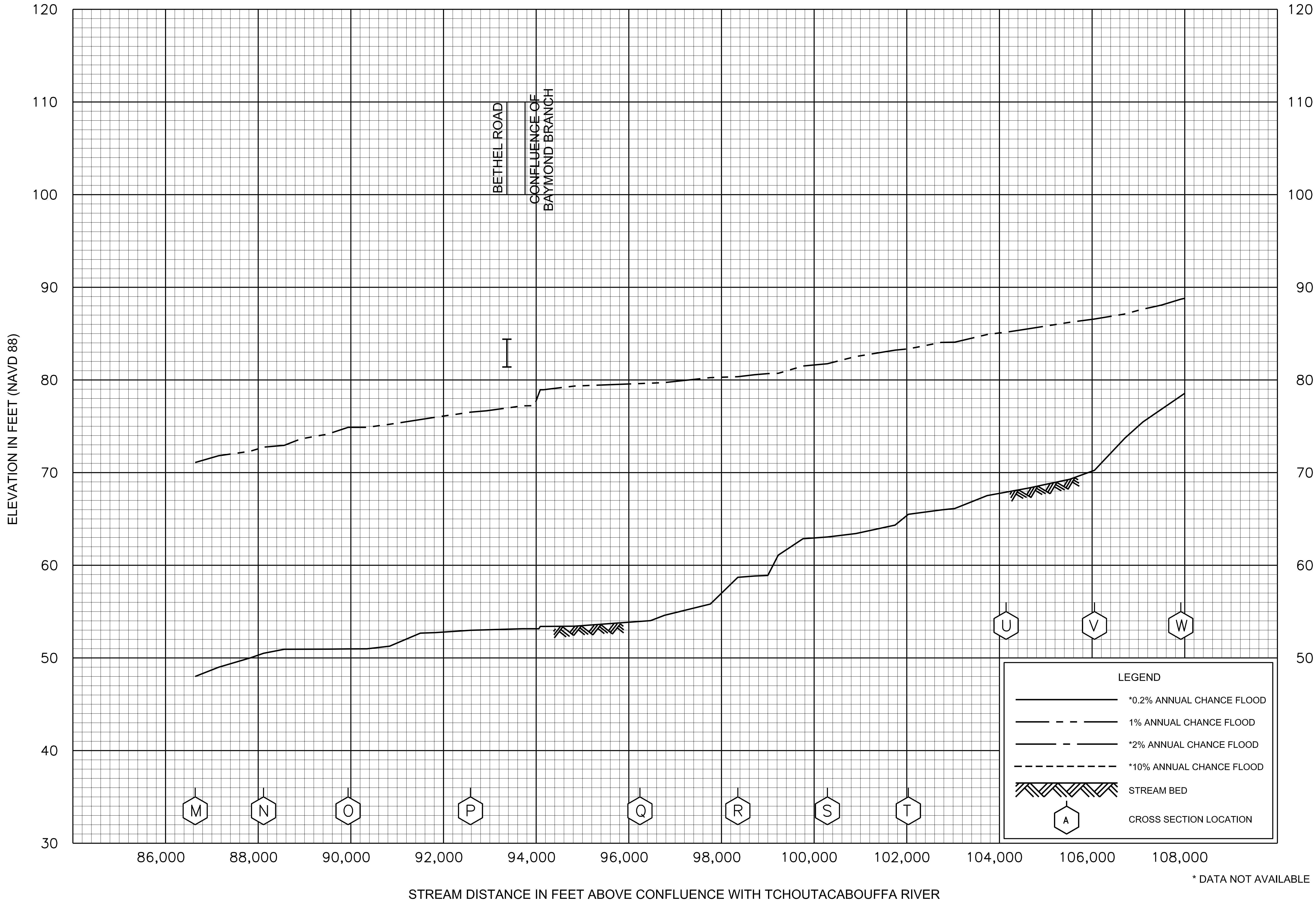
FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



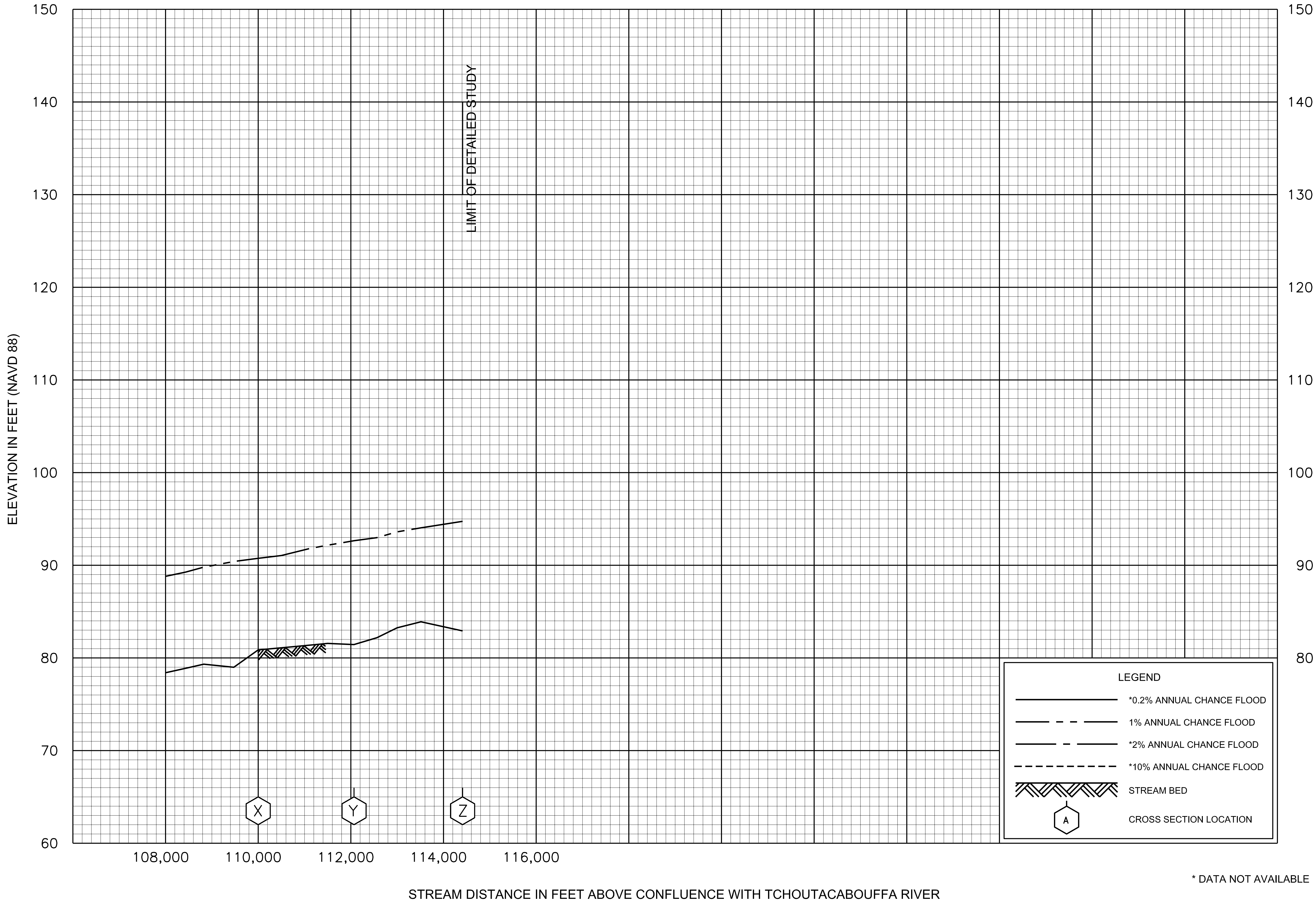
FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



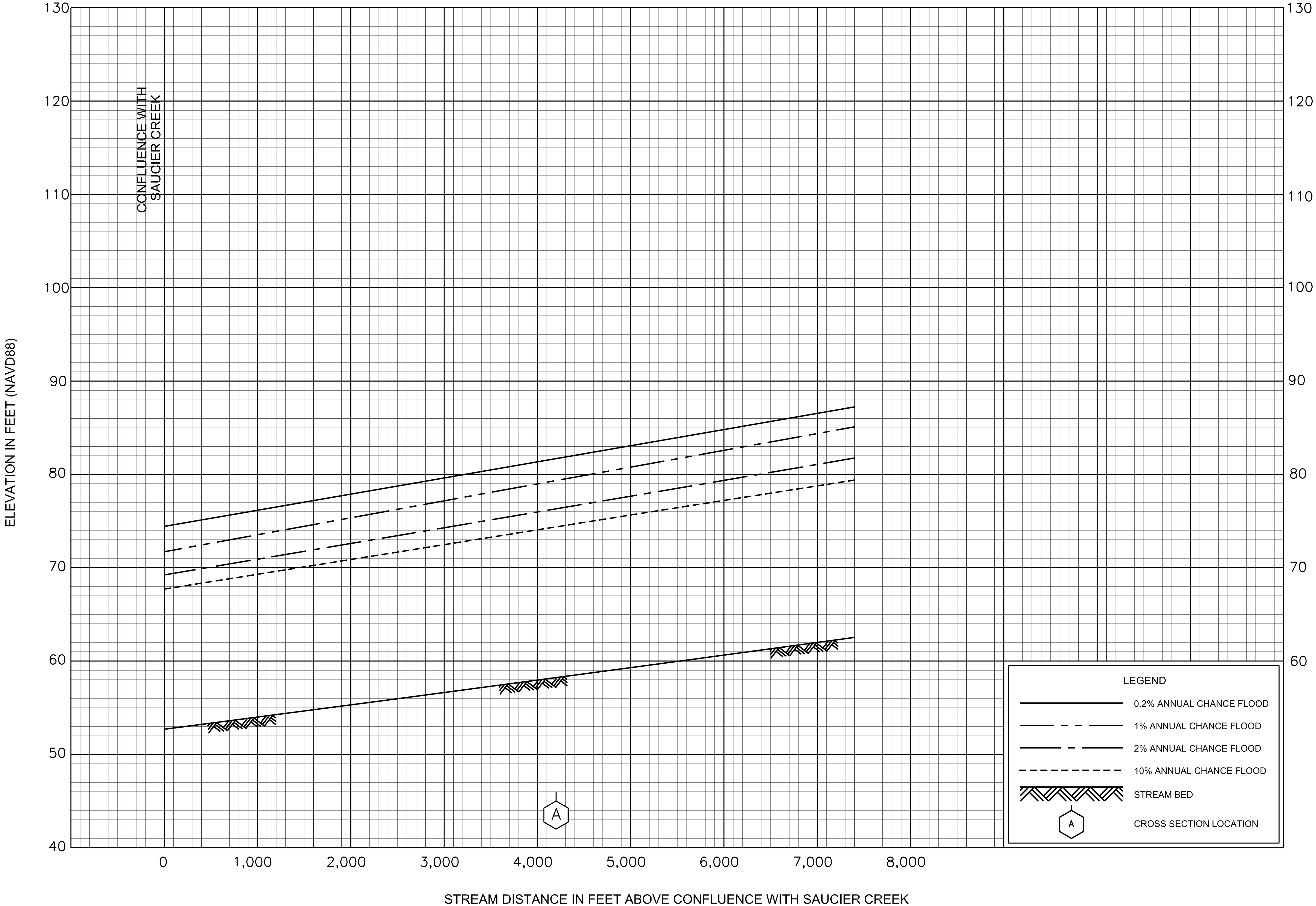
* DATA NOT AVAILABLE

FLOOD PROFILES

TUXACHANIE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

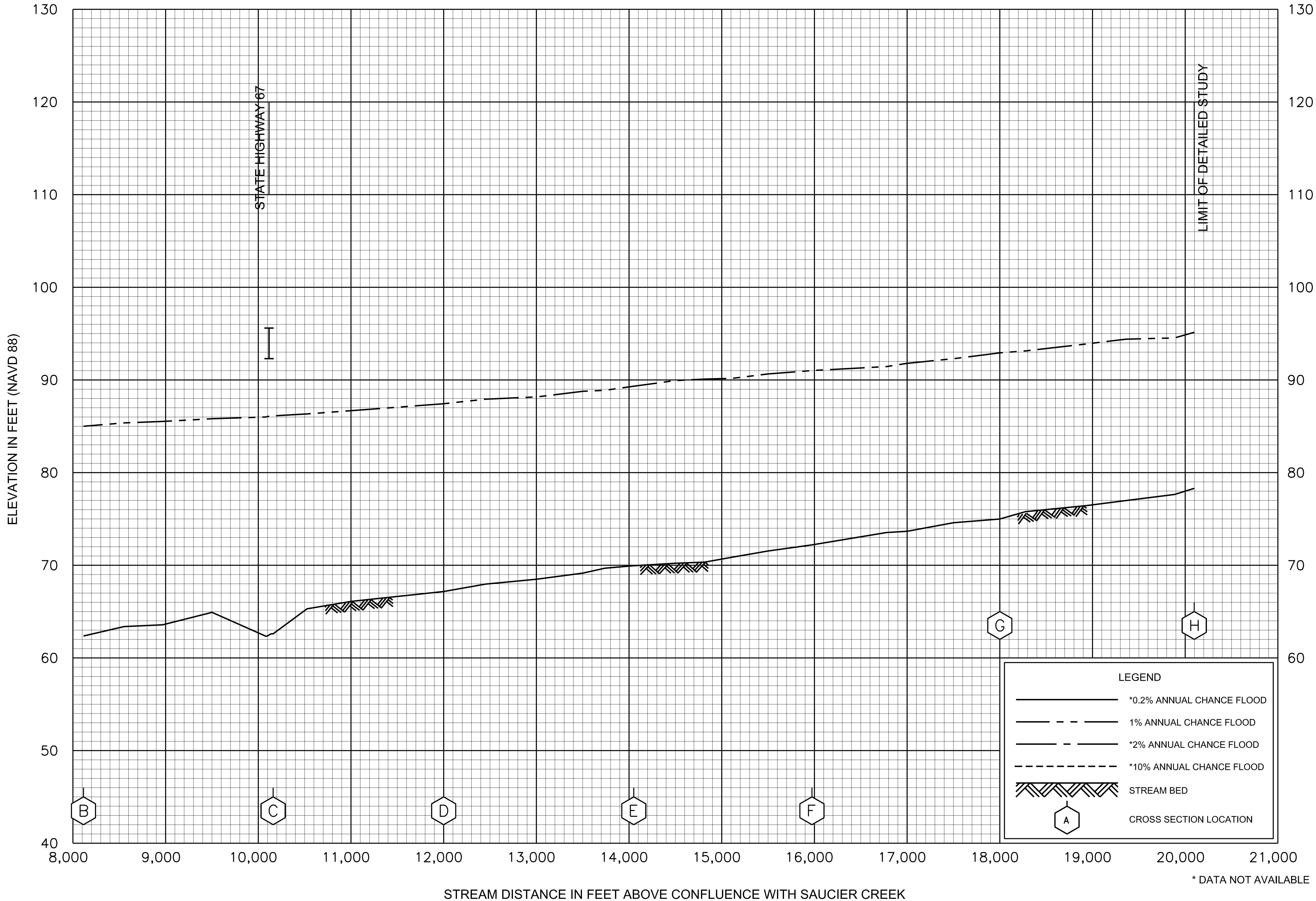


FLOOD PROFILES

WEST CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



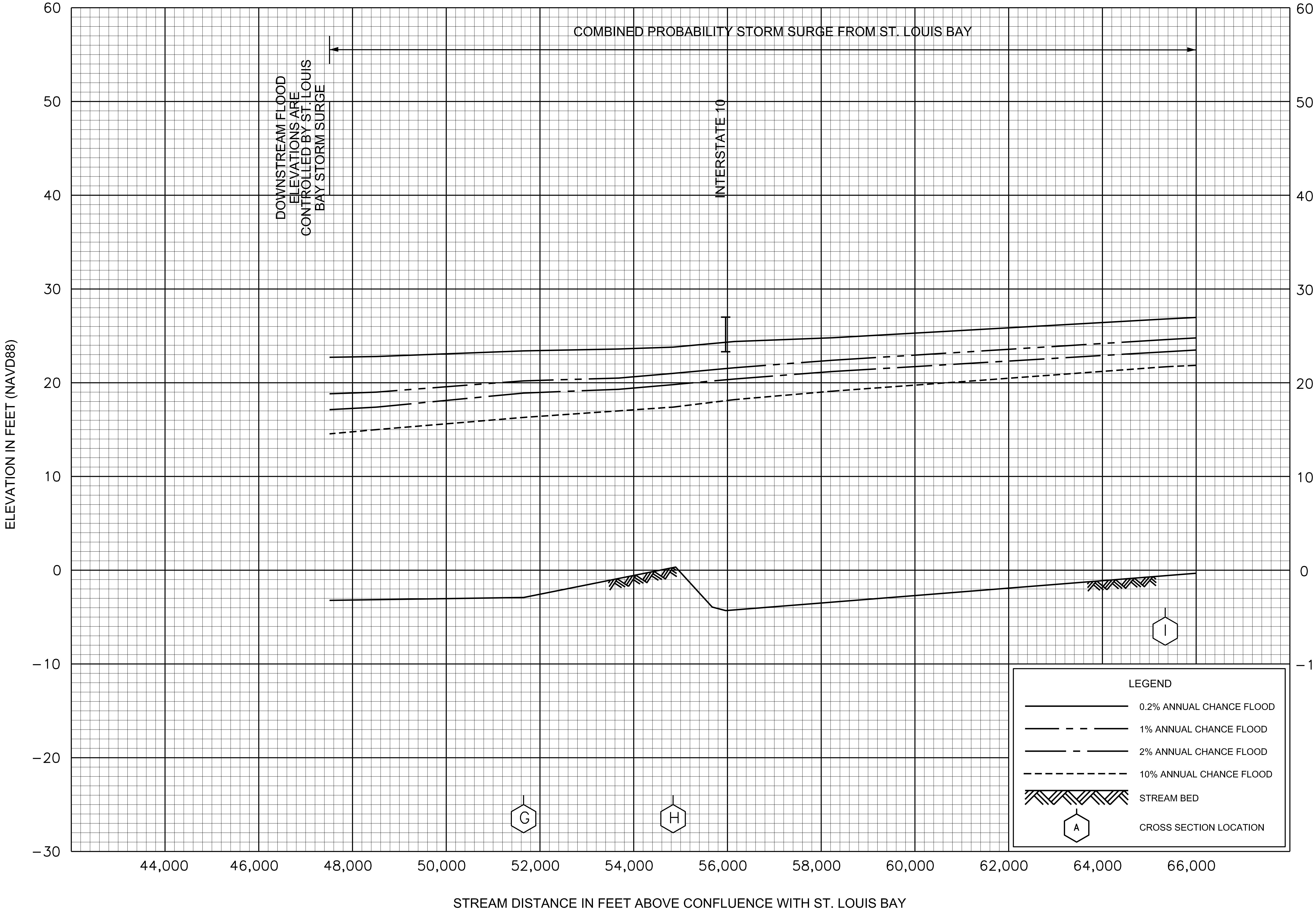
FLOOD PROFILES

WEST CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

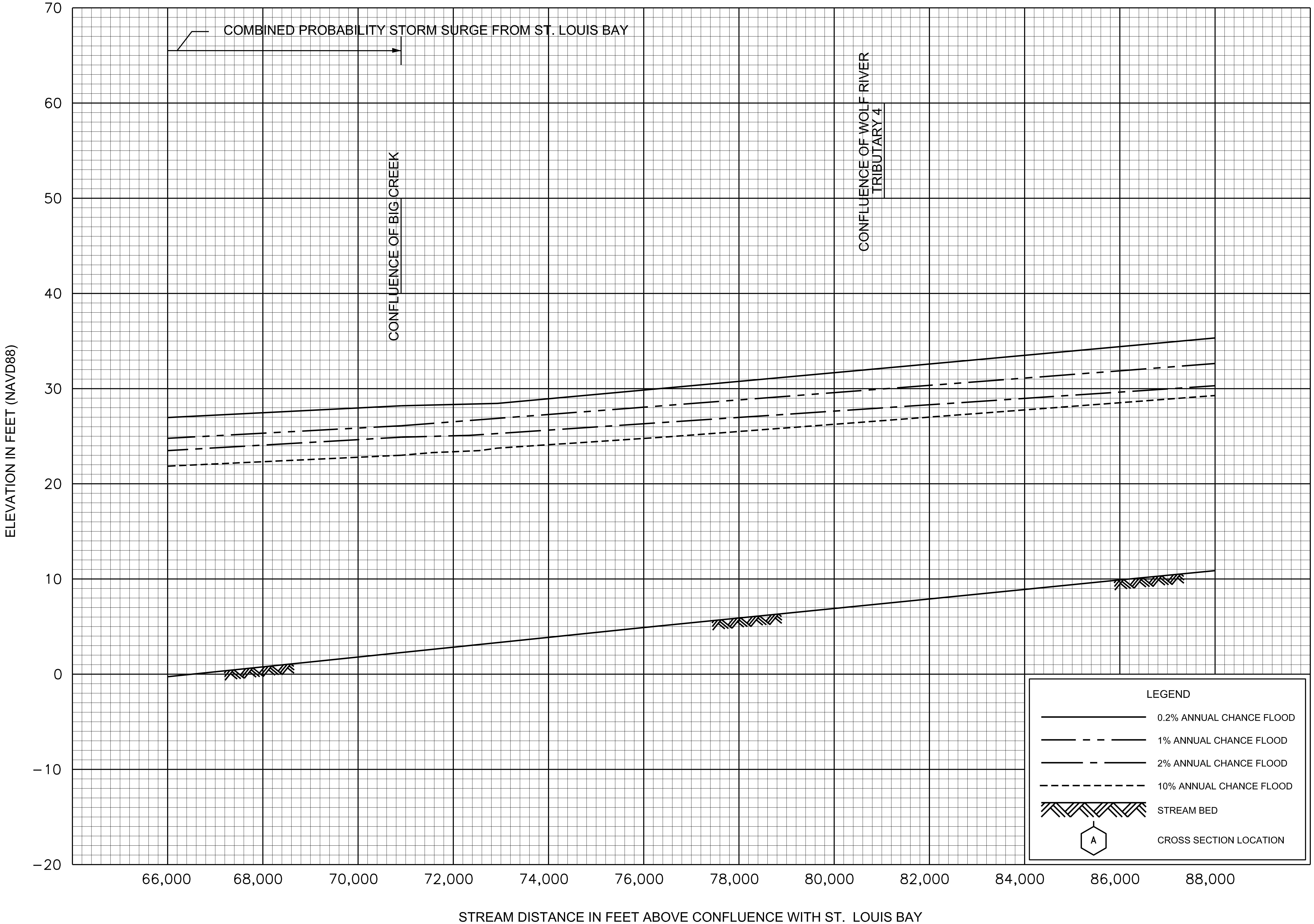


FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS

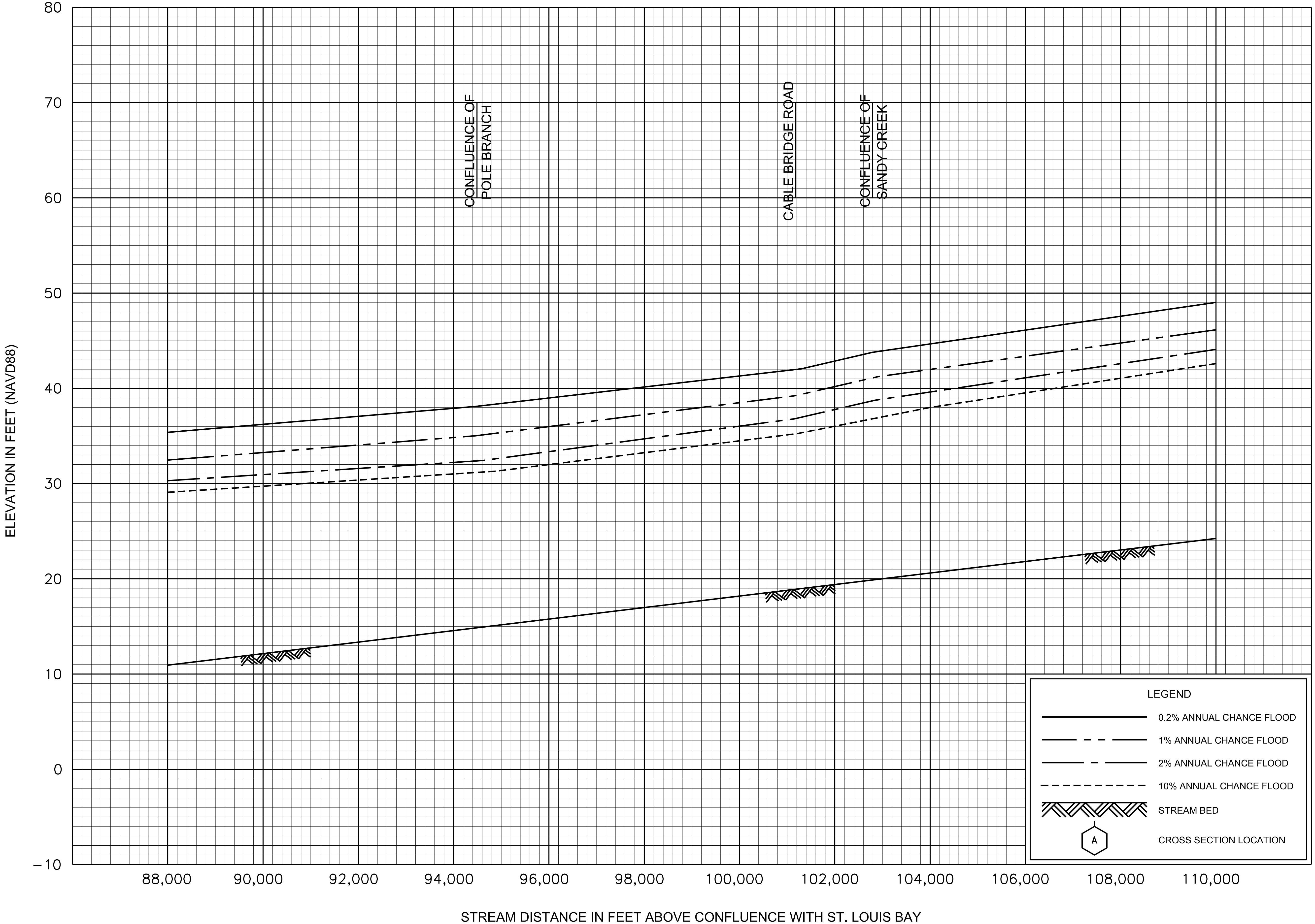


FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

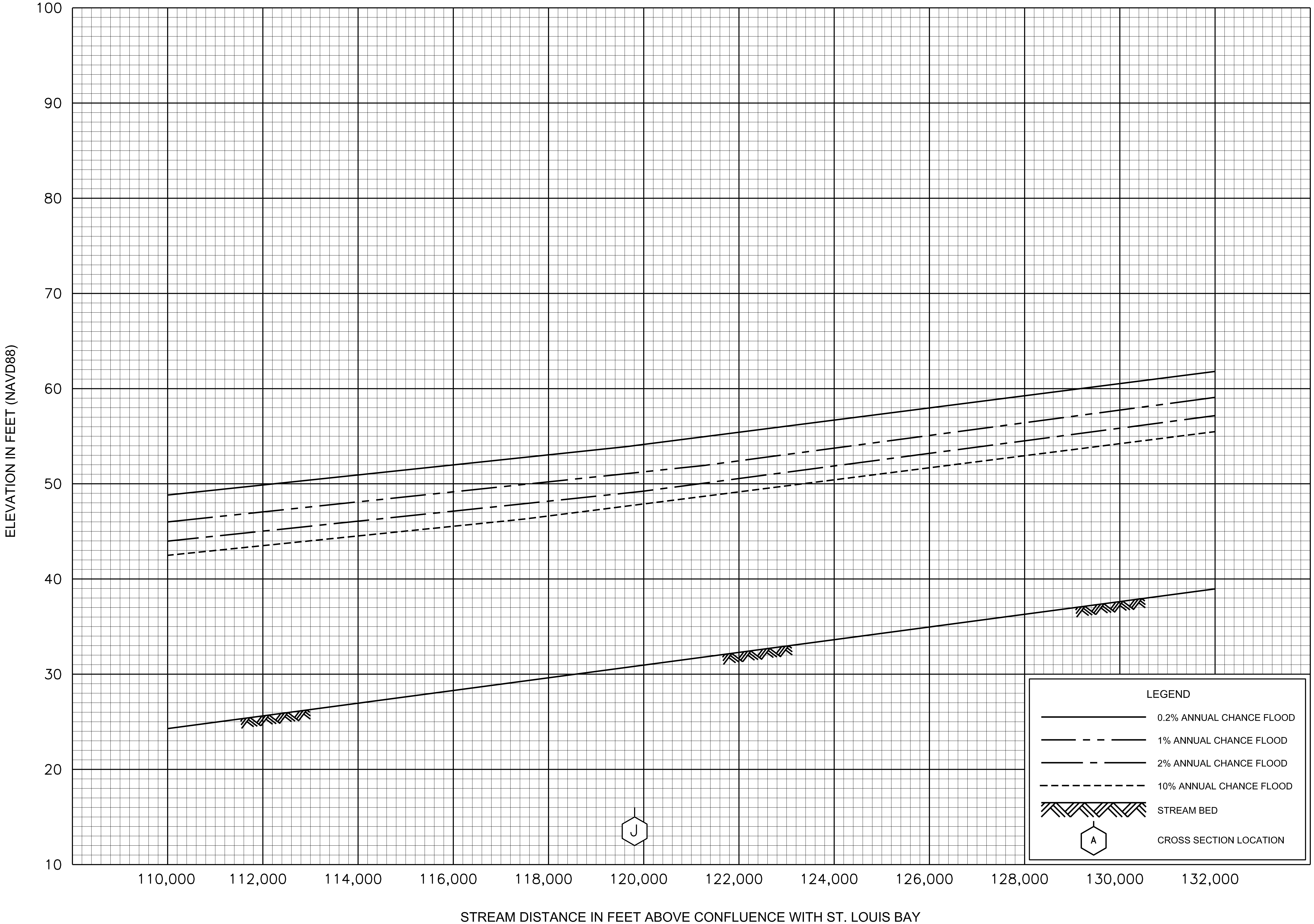
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

99P



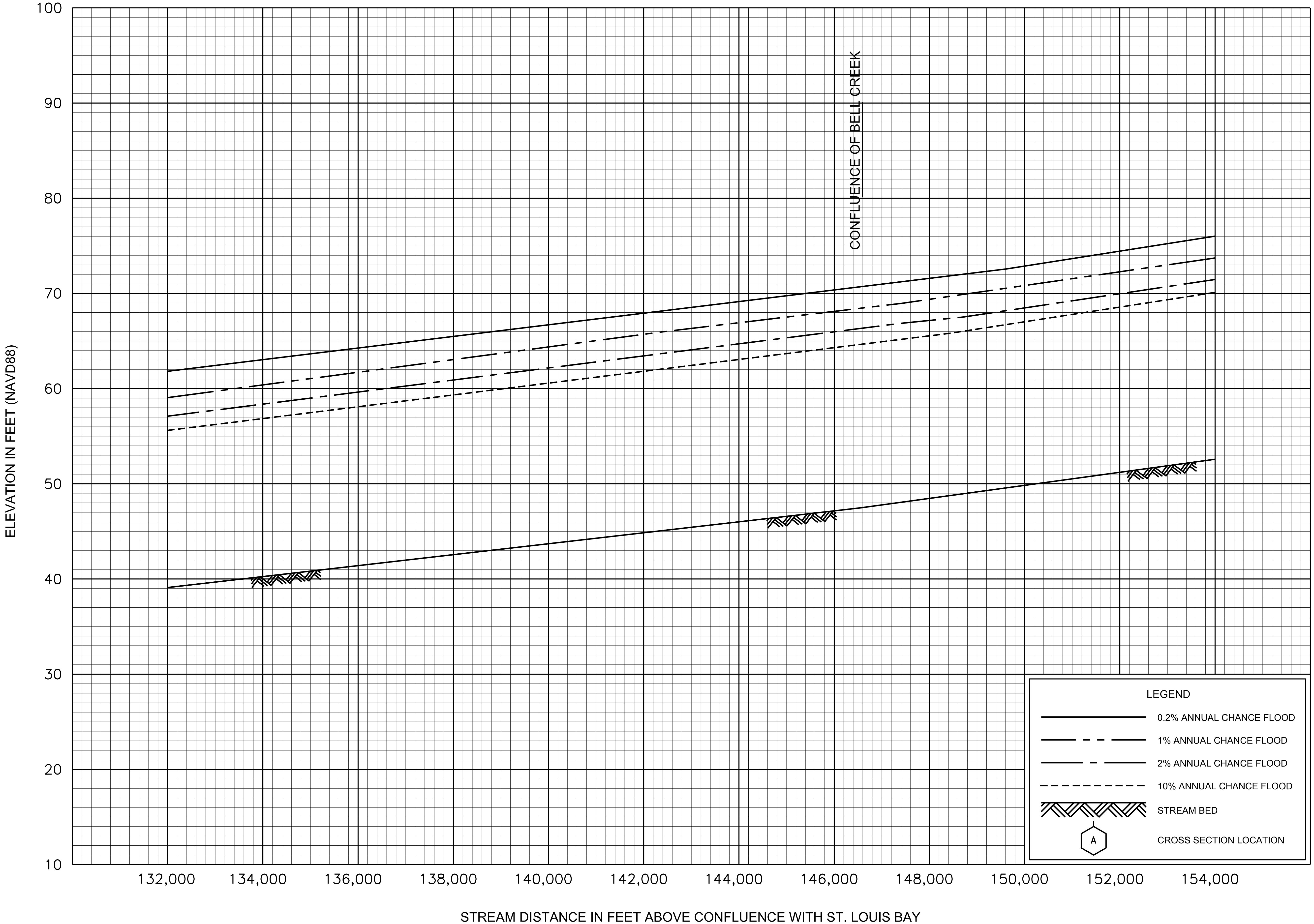
FLOOD PROFILES

WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



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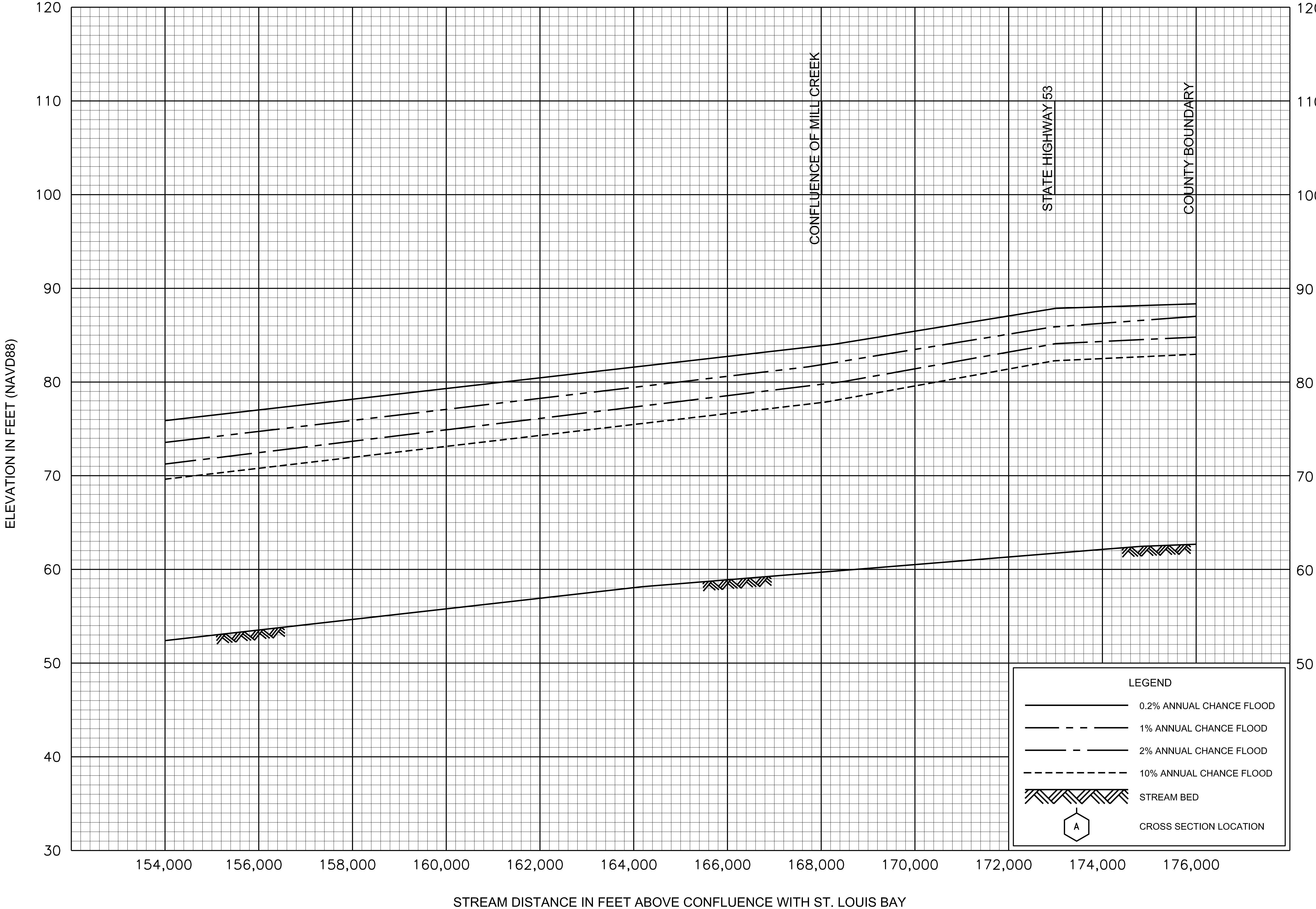
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

101P



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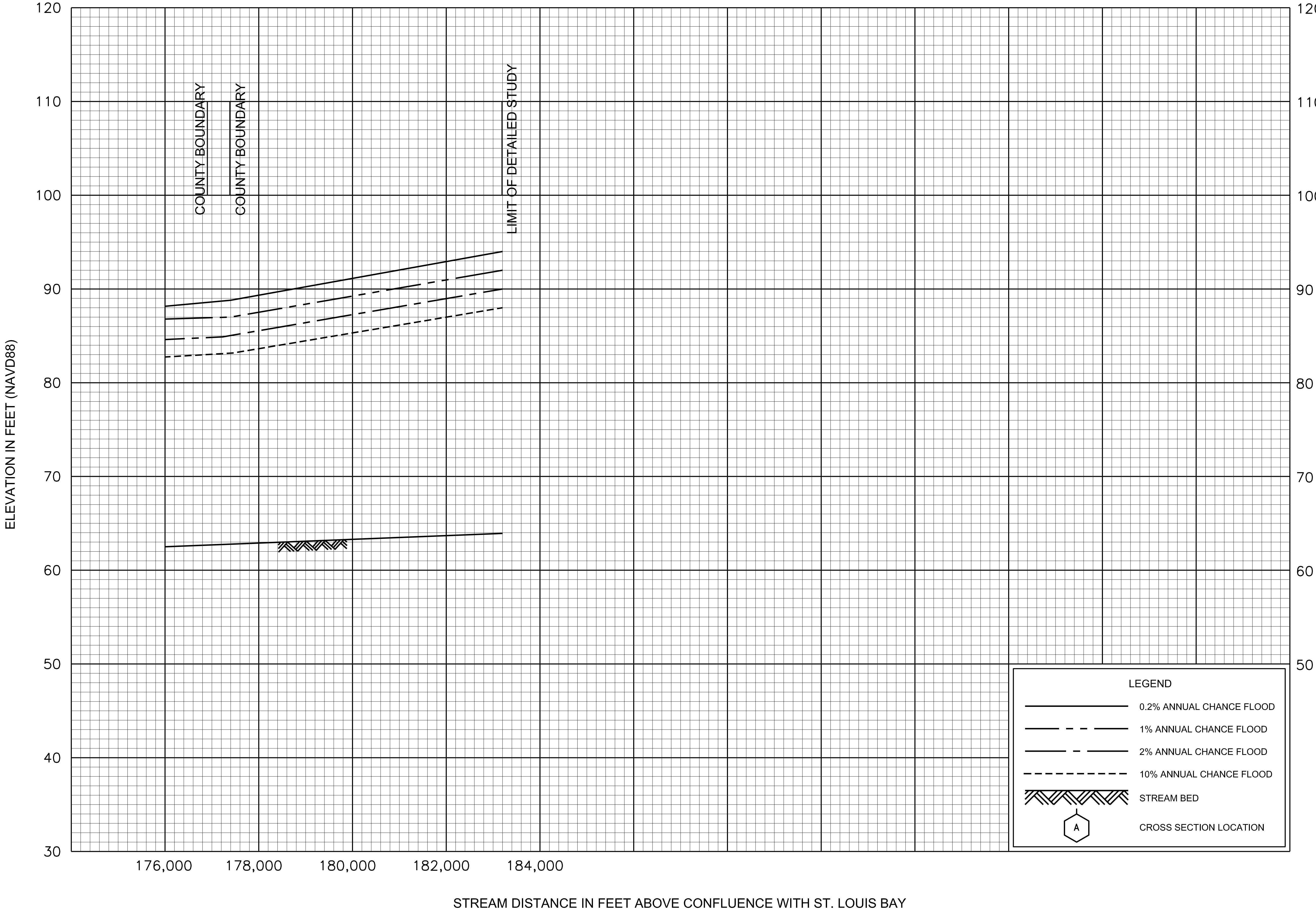
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS
AND INCORPORATED AREAS



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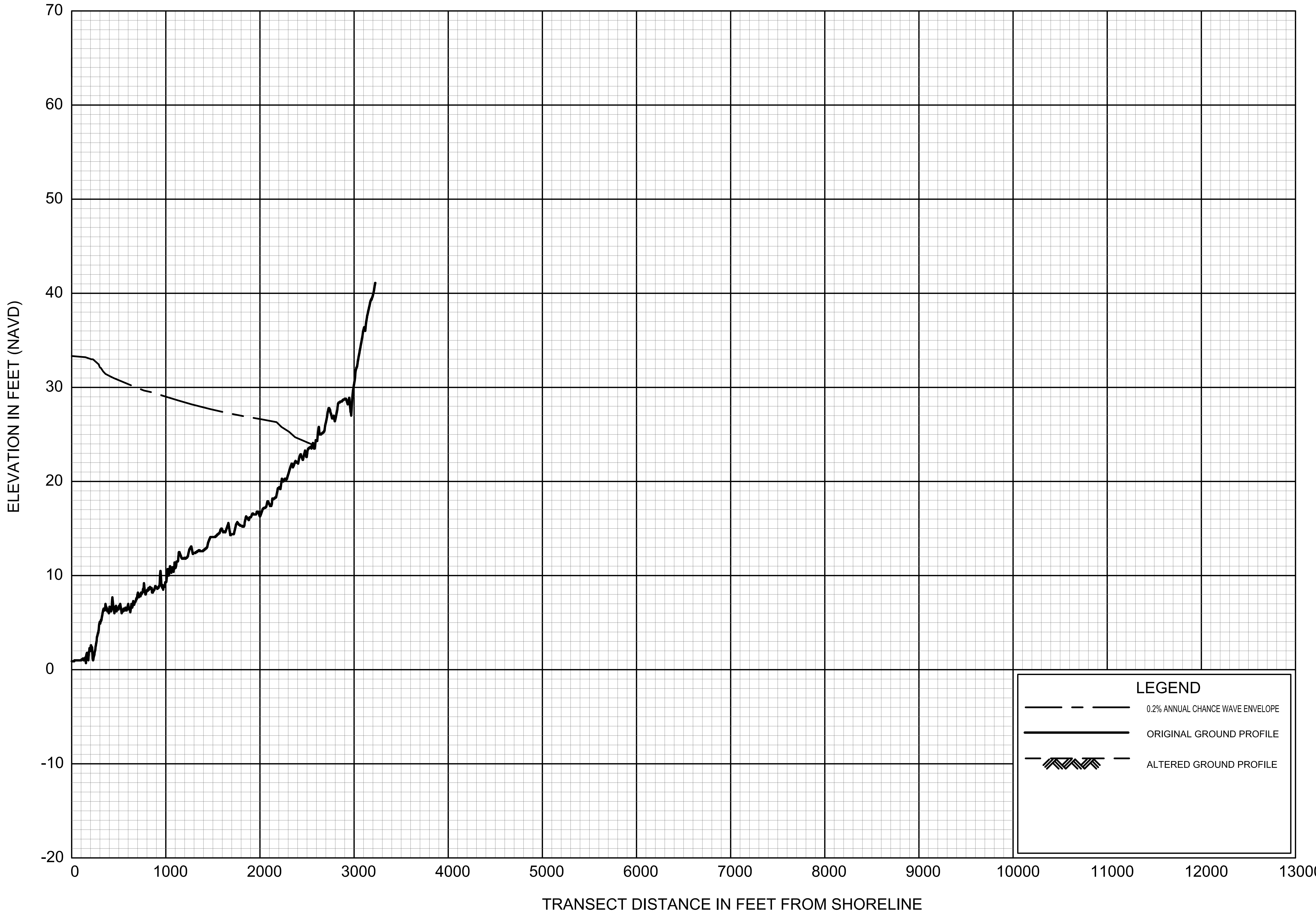
WOLF RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

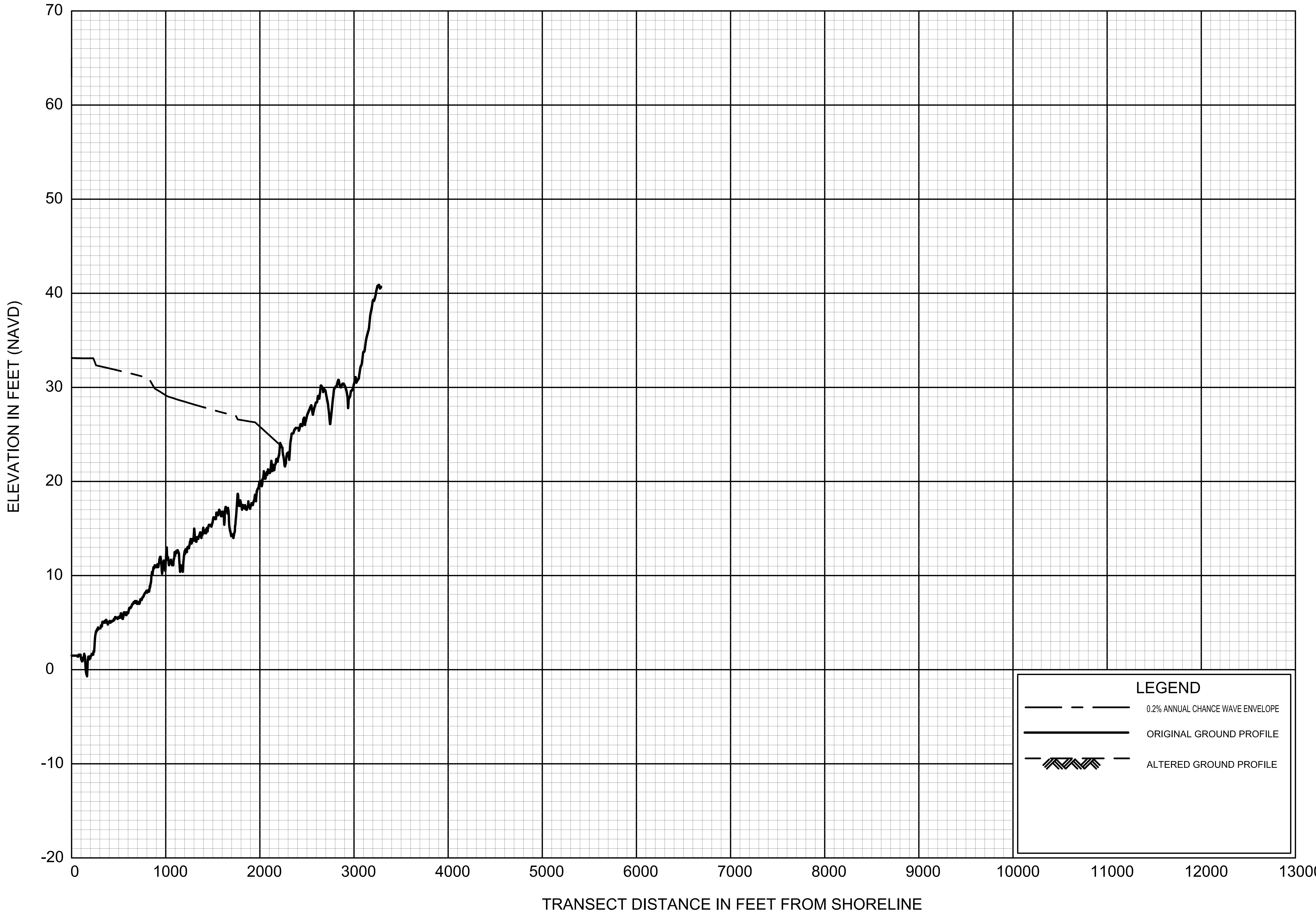
TRANSECT 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

01P



0.2% ANNUAL CHANCE WAVE ENVELOPE

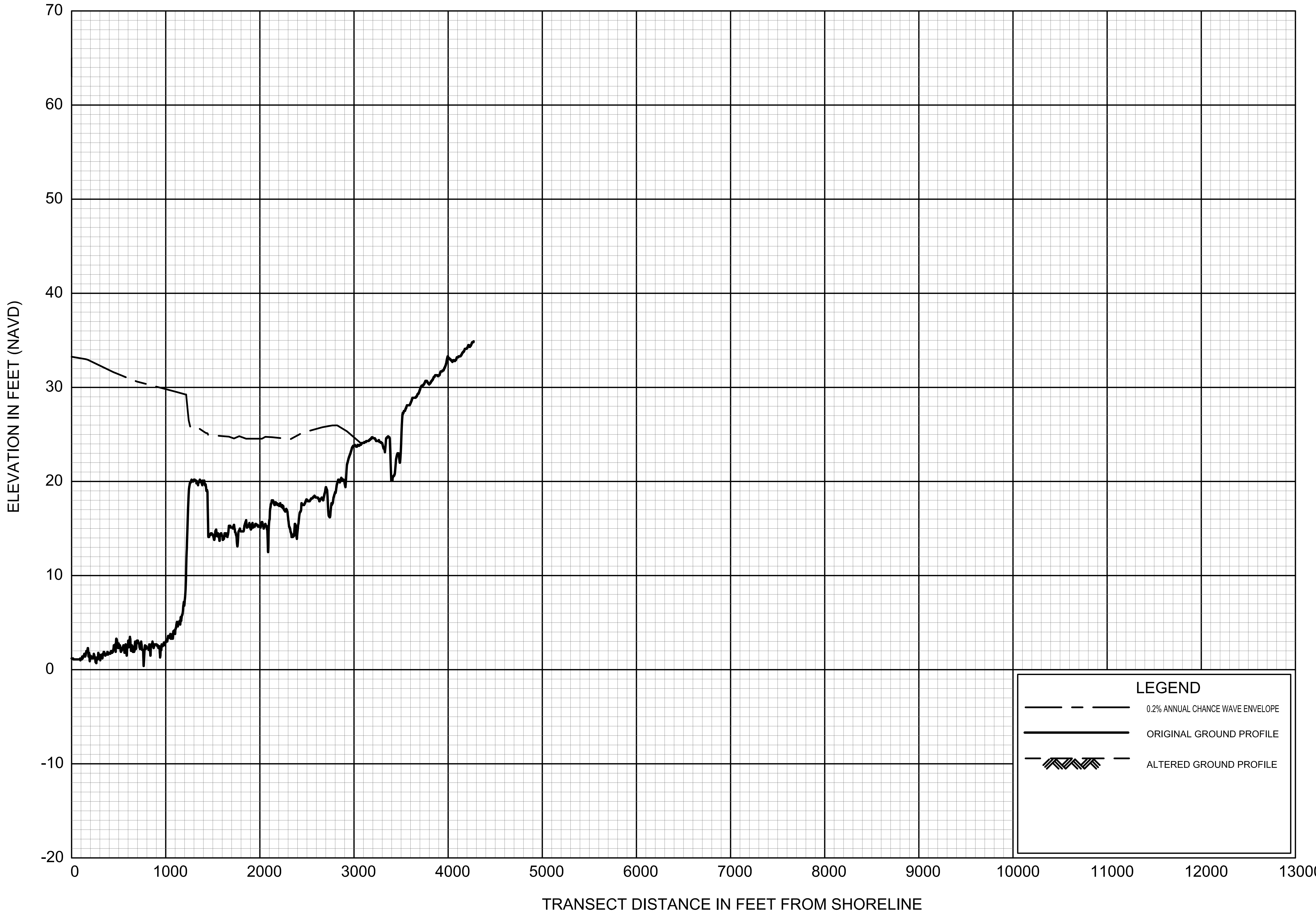
TRANSECT 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

02P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

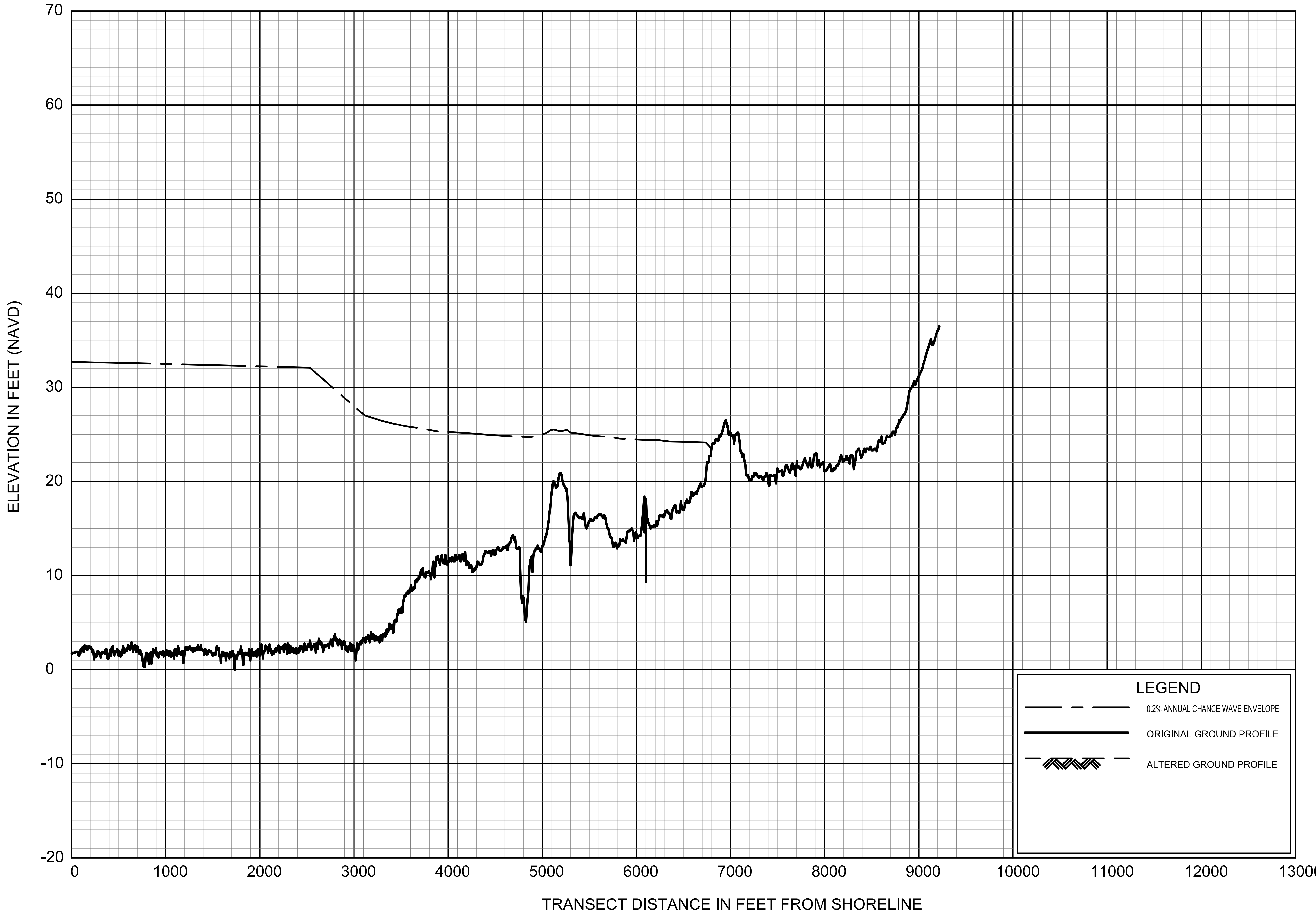
HARRISON COUNTY, MS

AND INCORPORATED AREAS

03P

0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 4

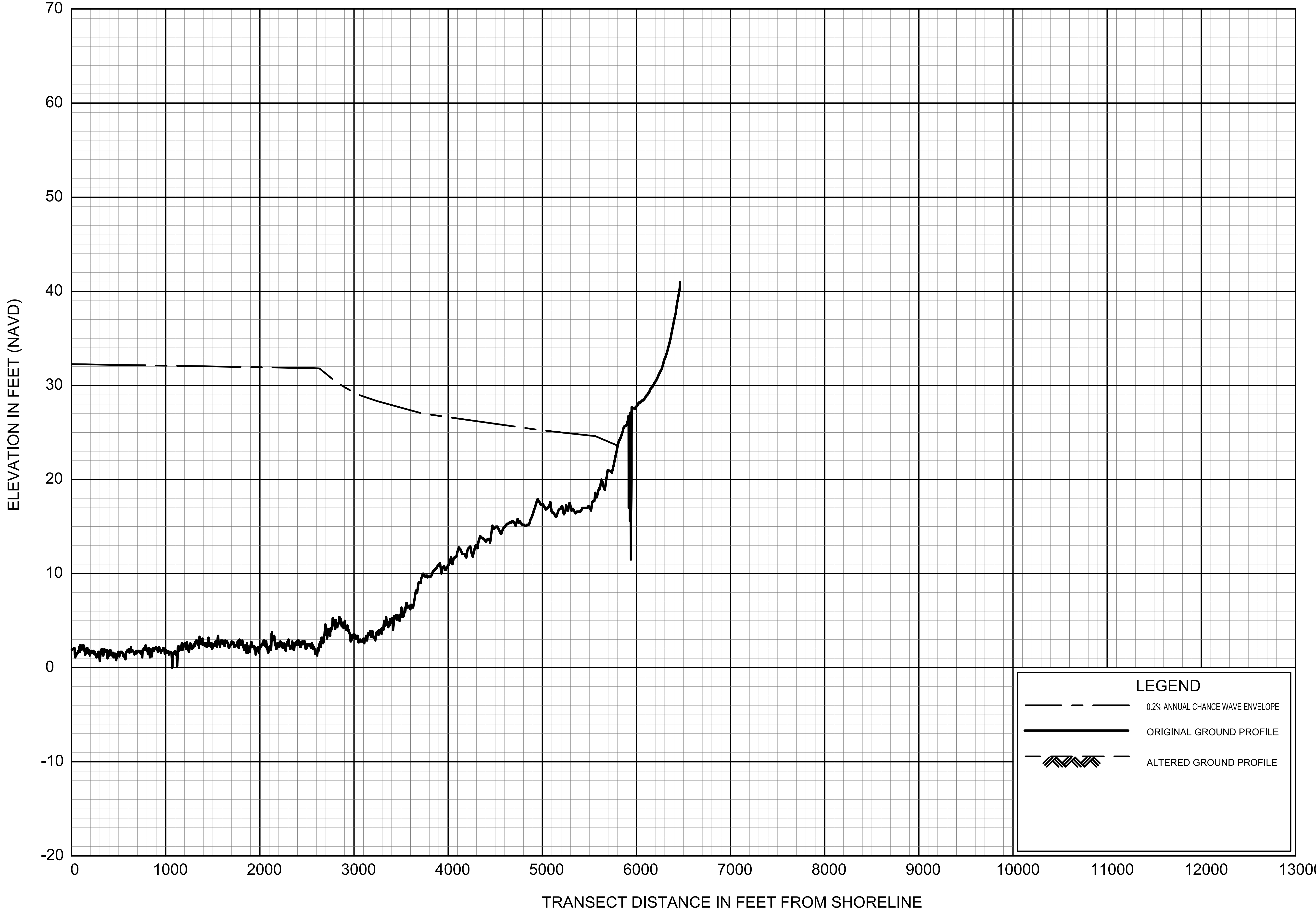


FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

04P



0.2% ANNUAL CHANCE WAVE ENVELOPE

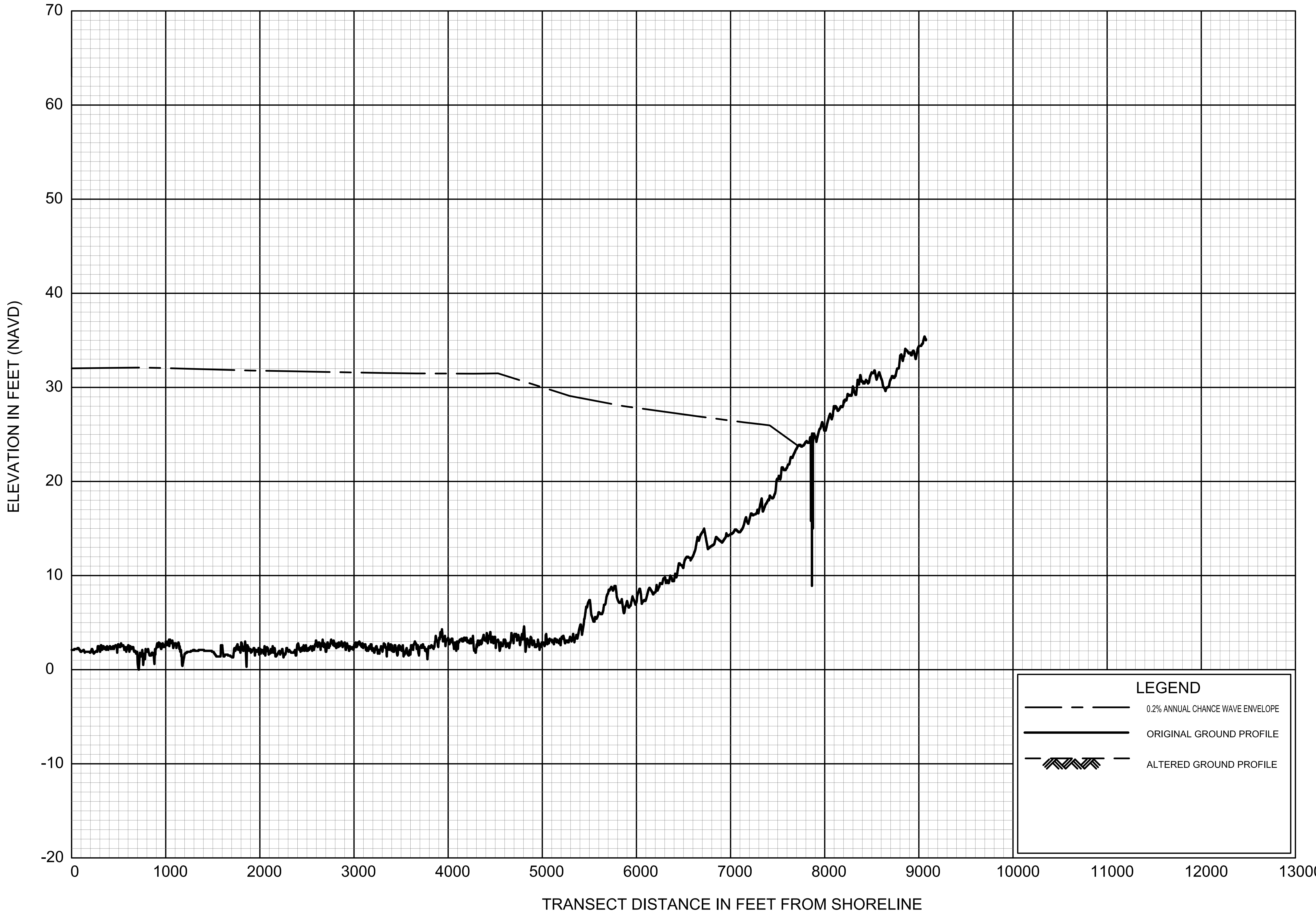
TRANSECT 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

05P



0.2% ANNUAL CHANCE WAVE ENVELOPE

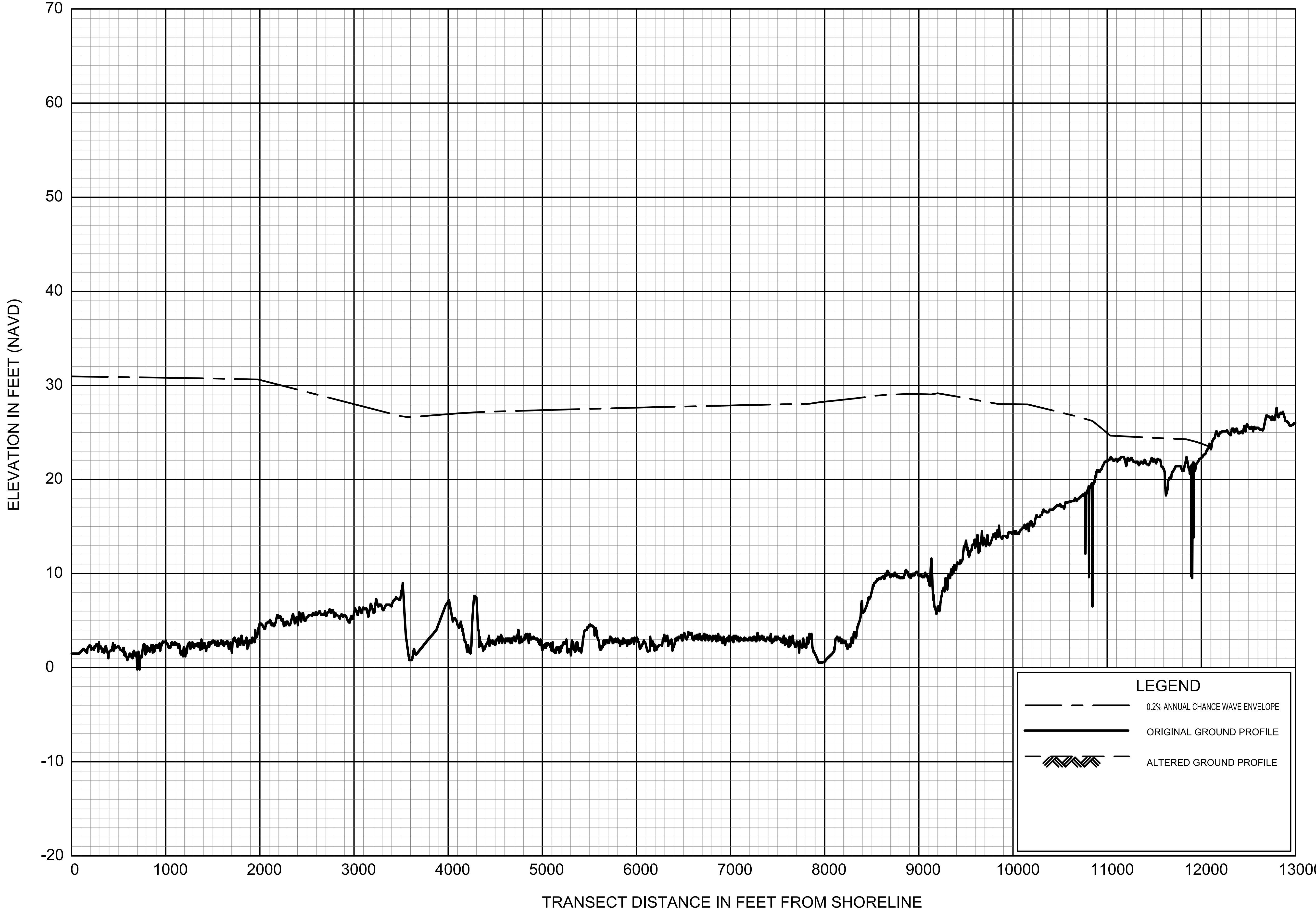
TRANSECT 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

06P



0.2% ANNUAL CHANCE WAVE ENVELOPE

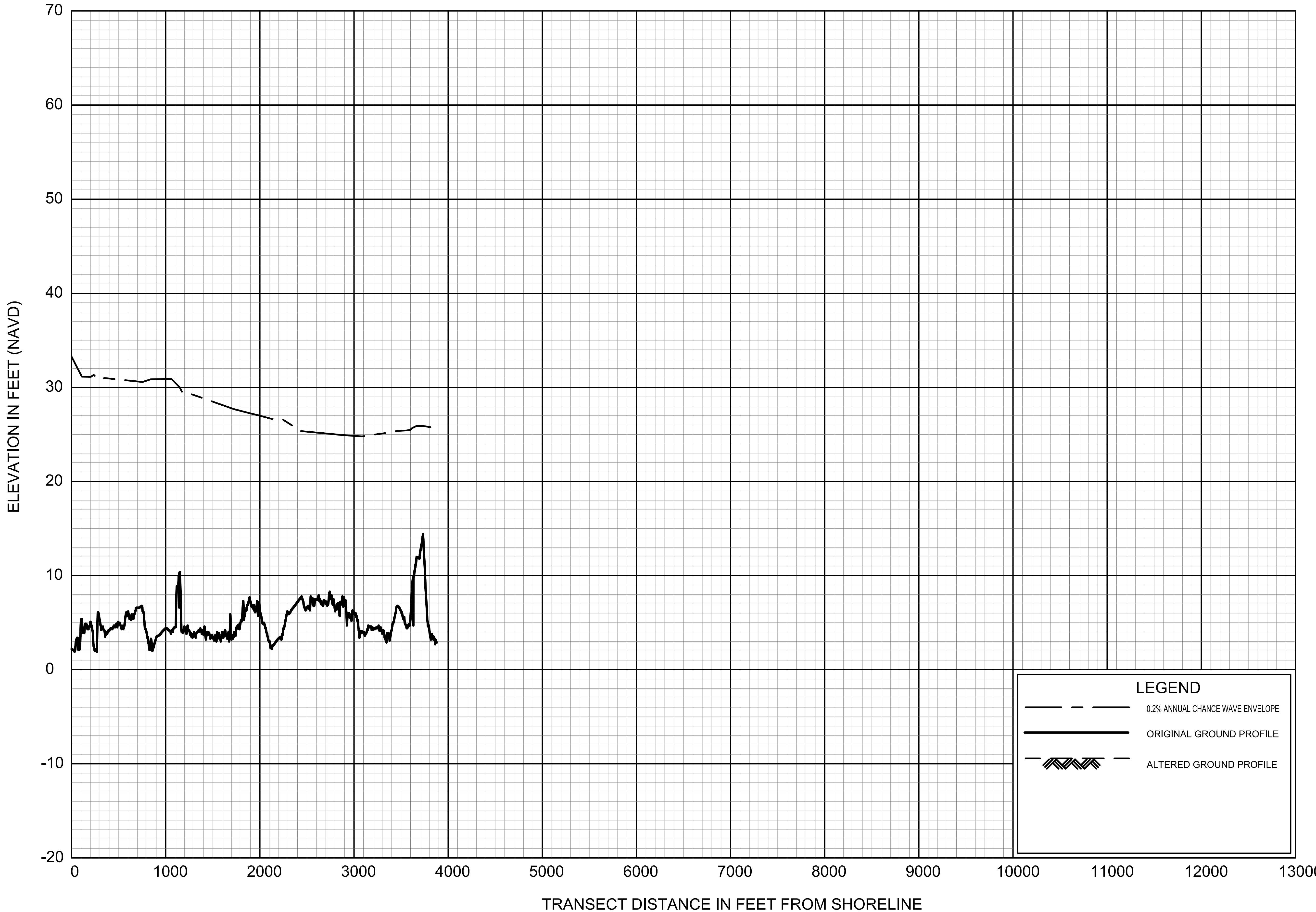
TRANSECT 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

07P



0.2% ANNUAL CHANCE WAVE ENVELOPE

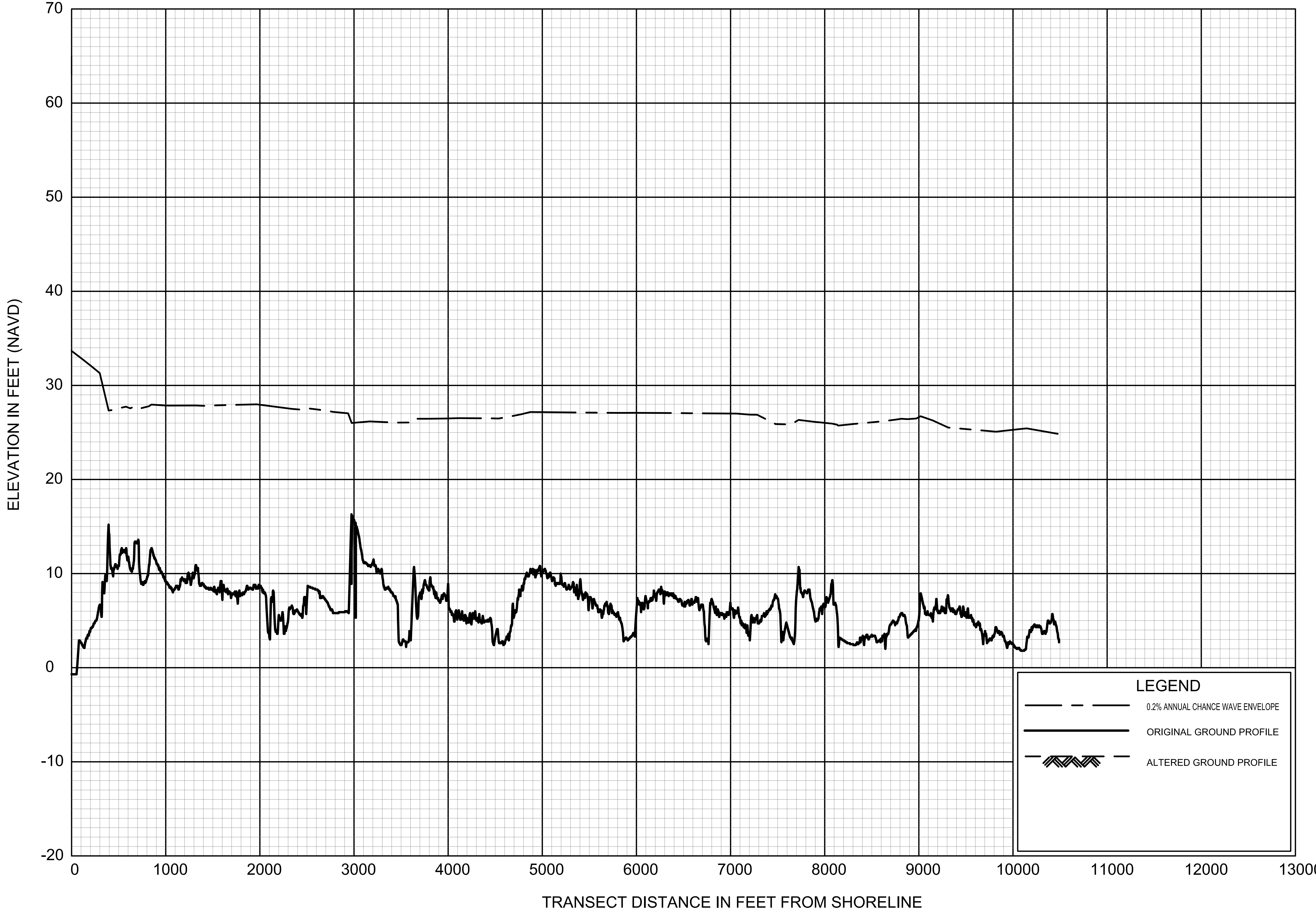
TRANSECT 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

08P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

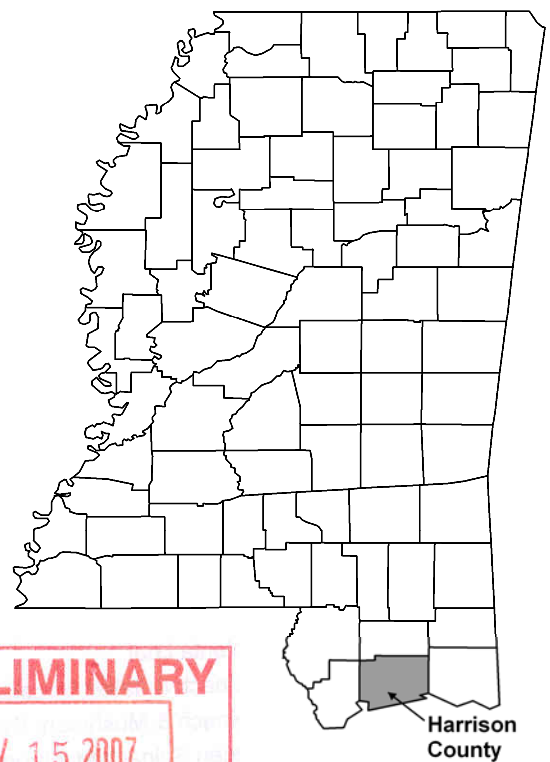
09P

FLOOD INSURANCE STUDY

HARRISON COUNTY, MISSISSIPPI

AND INCORPORATED AREAS

VOLUME 3 OF 3



COMMUNITY NAME	COMMUNITY NUMBER
BILOXI, CITY OF	285252
D'IBERVILLE, CITY OF	280336
GULFPORT, CITY OF	285253
HARRISON COUNTY (UNINCORPORATED AREAS)	285255
LONG BEACH, CITY OF	285257
PASS CHRISTIAN, CITY OF	285261

PRELIMINARY
NOV 15 2007

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
28047CV003A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Countywide FIS Effective Date:

TABLE OF CONTENTS

Table of Contents – Volume 1

Table of Contents – Volume 1 -continued

Page

FIGURES

TABLES

EXHIBITS

Table of Contents – Volume 2

EXHIBITS – continued

Table of Contents – Volume 2 – continued

EXHIBITS – continued

Exhibit 1 – Flood Profiles - continued

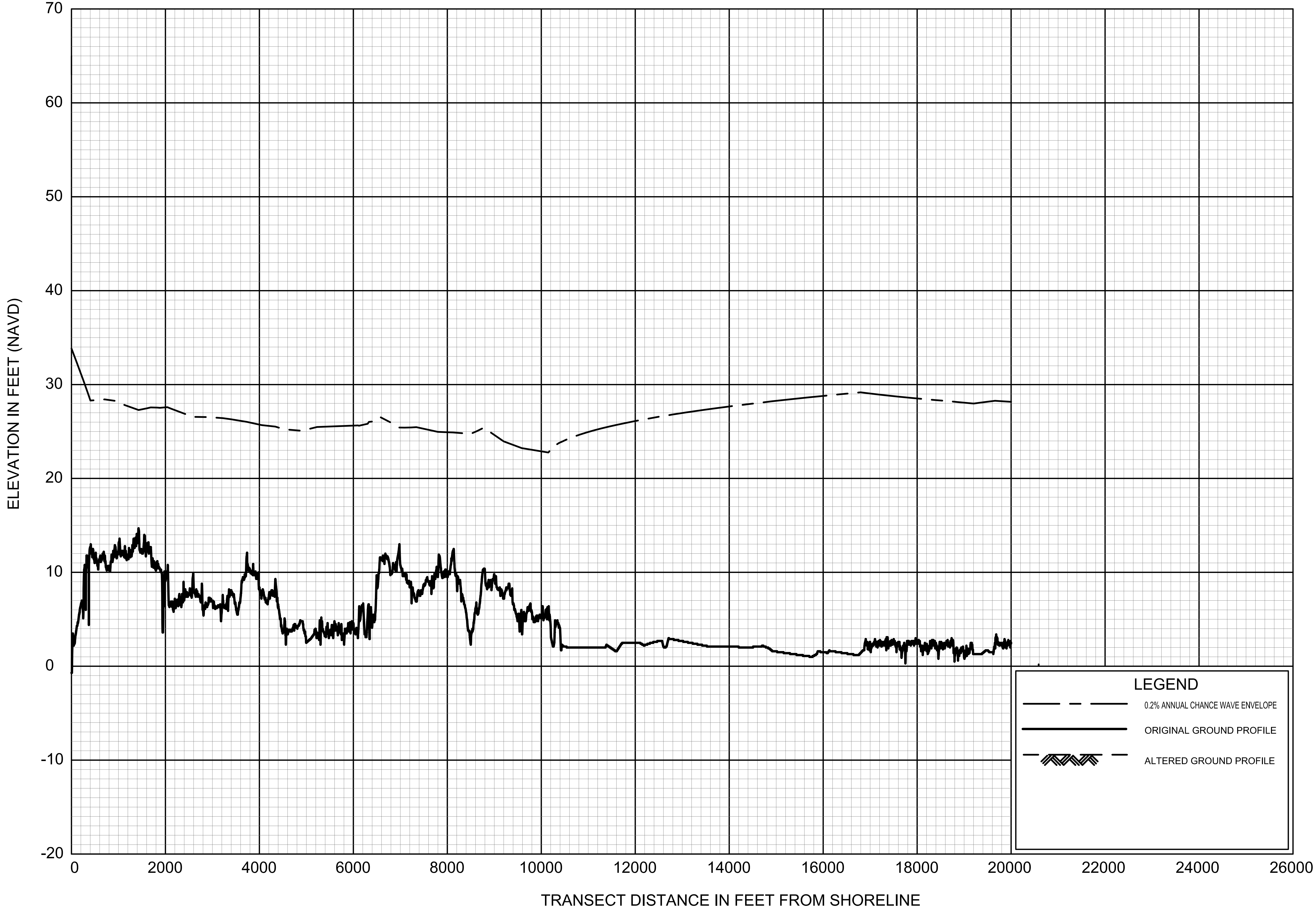
Exhibit 2 – 0.2% Annual Chance Wave Envelopes

Table of Contents – Volume 3

EXHIBITS – continued

Exhibit 2 – 0.2% Annual Chance Wave Envelopes

EXHIBITS – continued



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

10P

0.2% ANNUAL CHANCE WAVE ENVELOPE

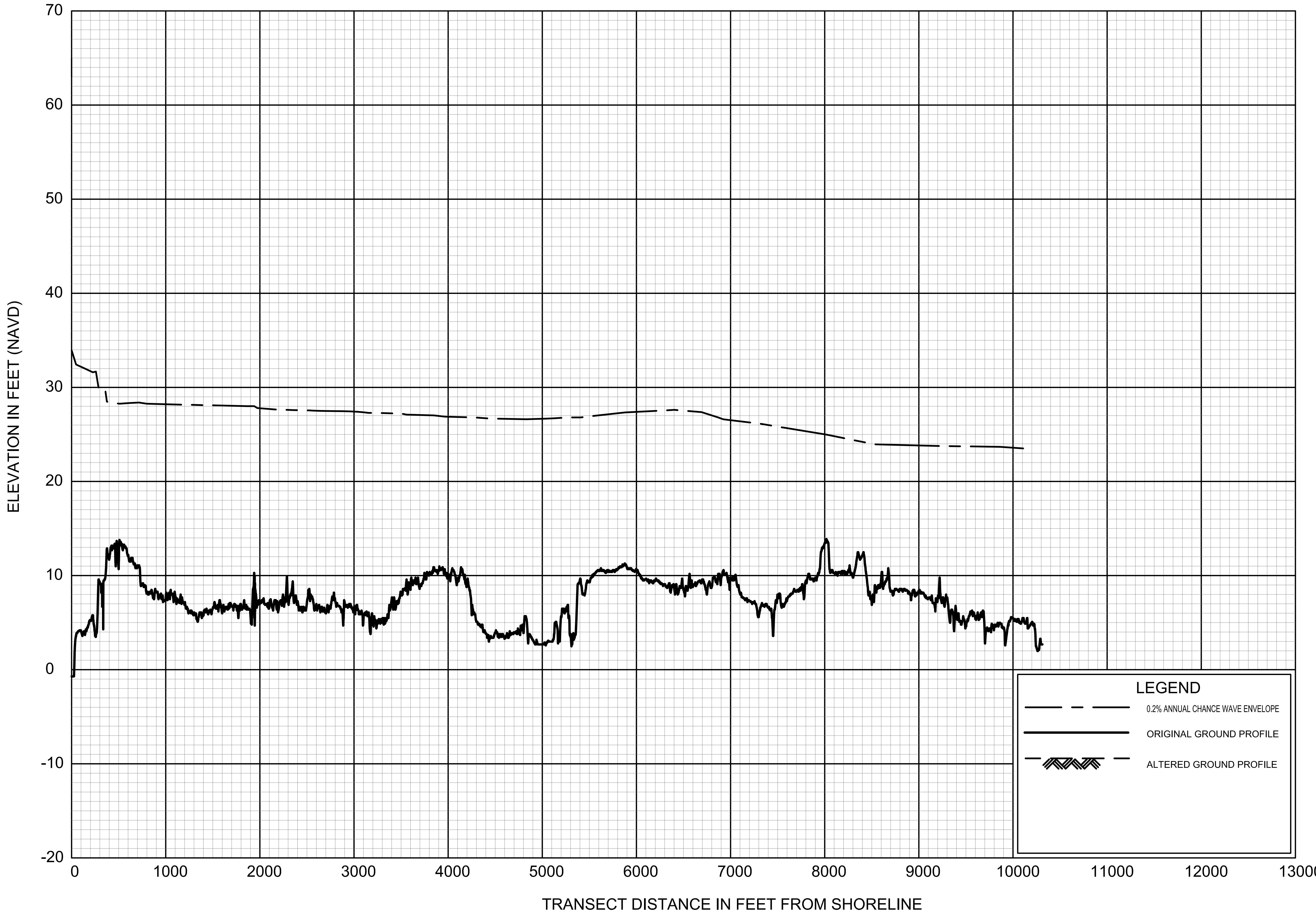
TRANSECT 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

11P



0.2% ANNUAL CHANCE WAVE ENVELOPE

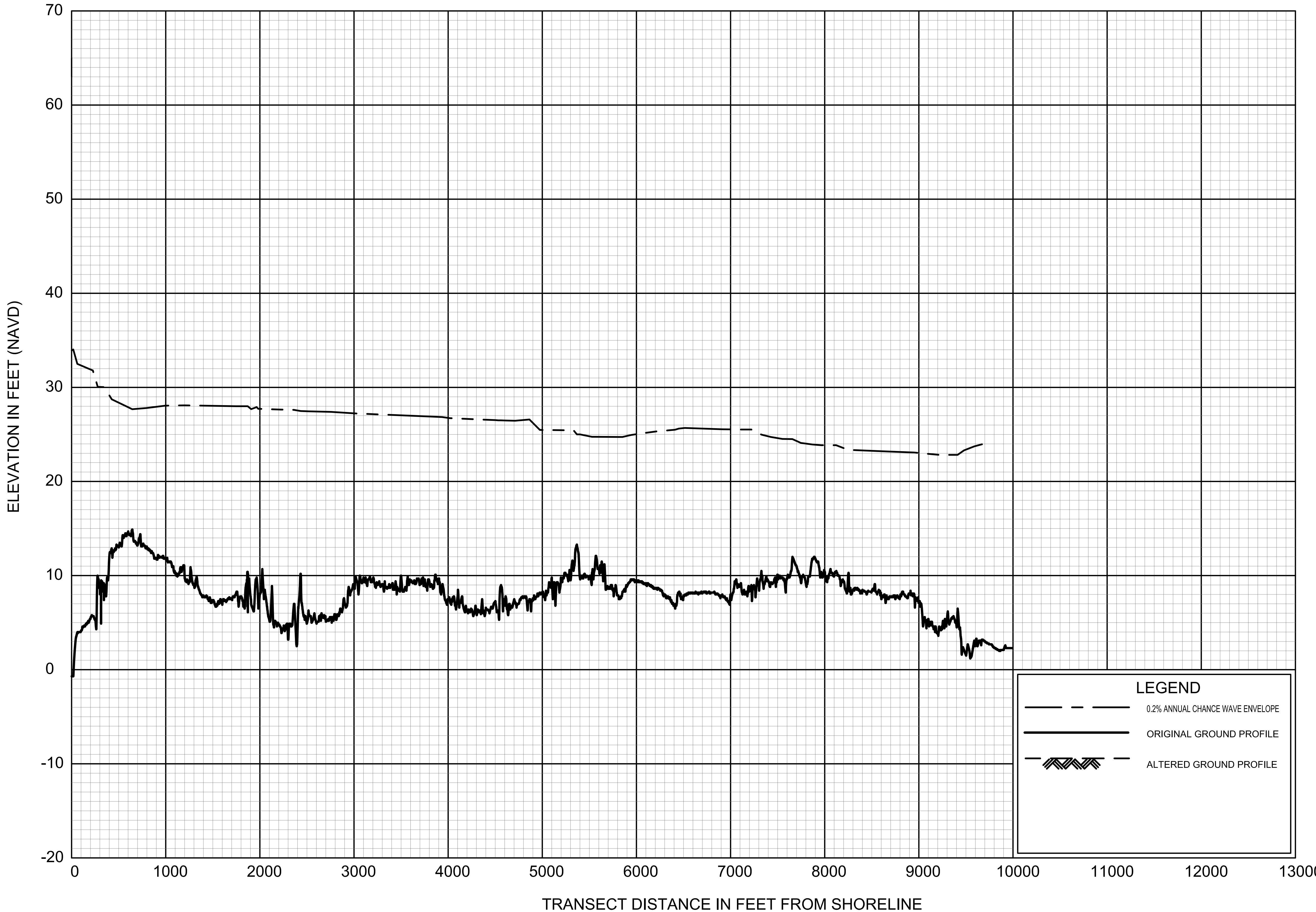
TRANSECT 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

12P



0.2% ANNUAL CHANCE WAVE ENVELOPE

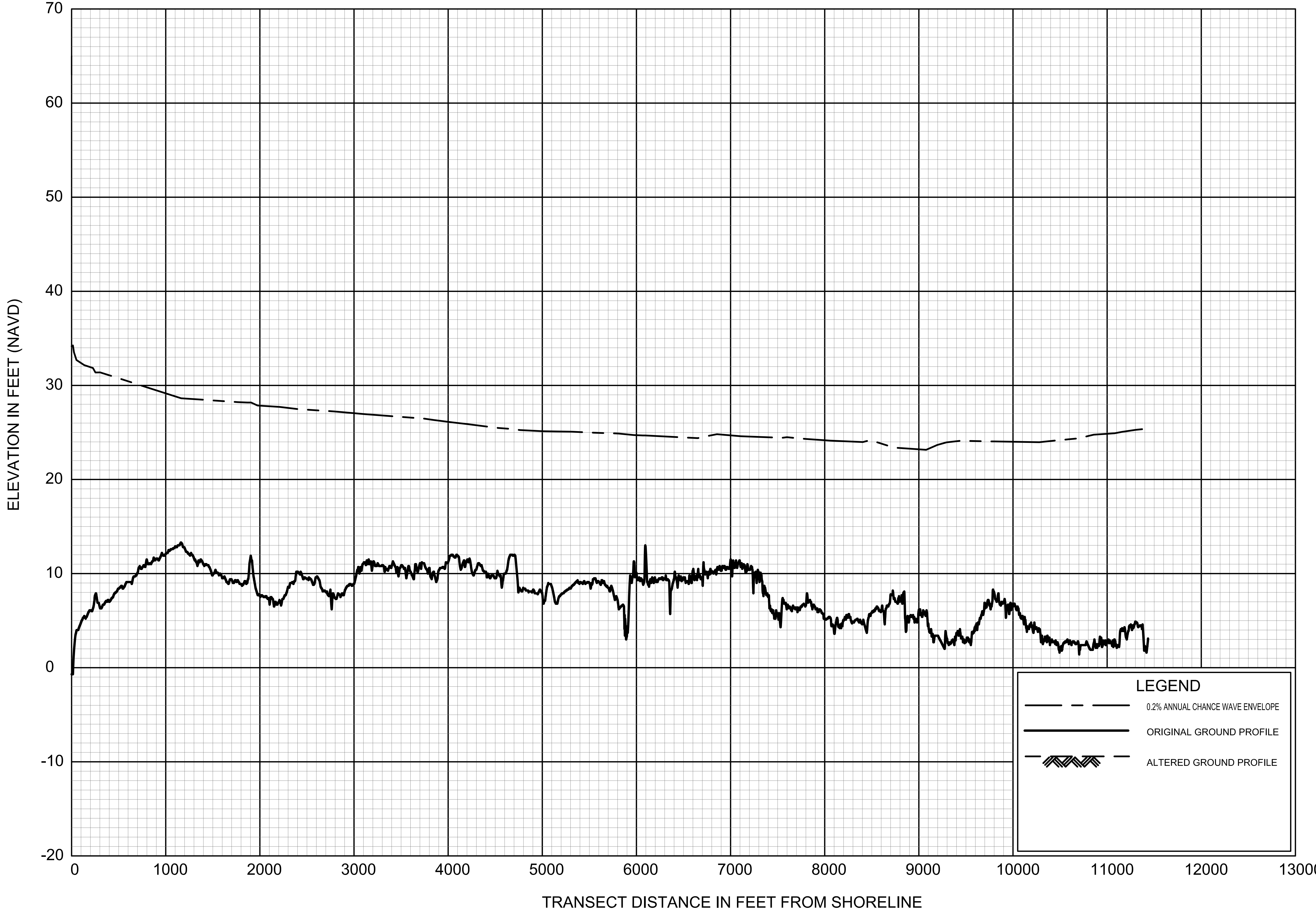
TRANSECT 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

13P



0.2% ANNUAL CHANCE WAVE ENVELOPE

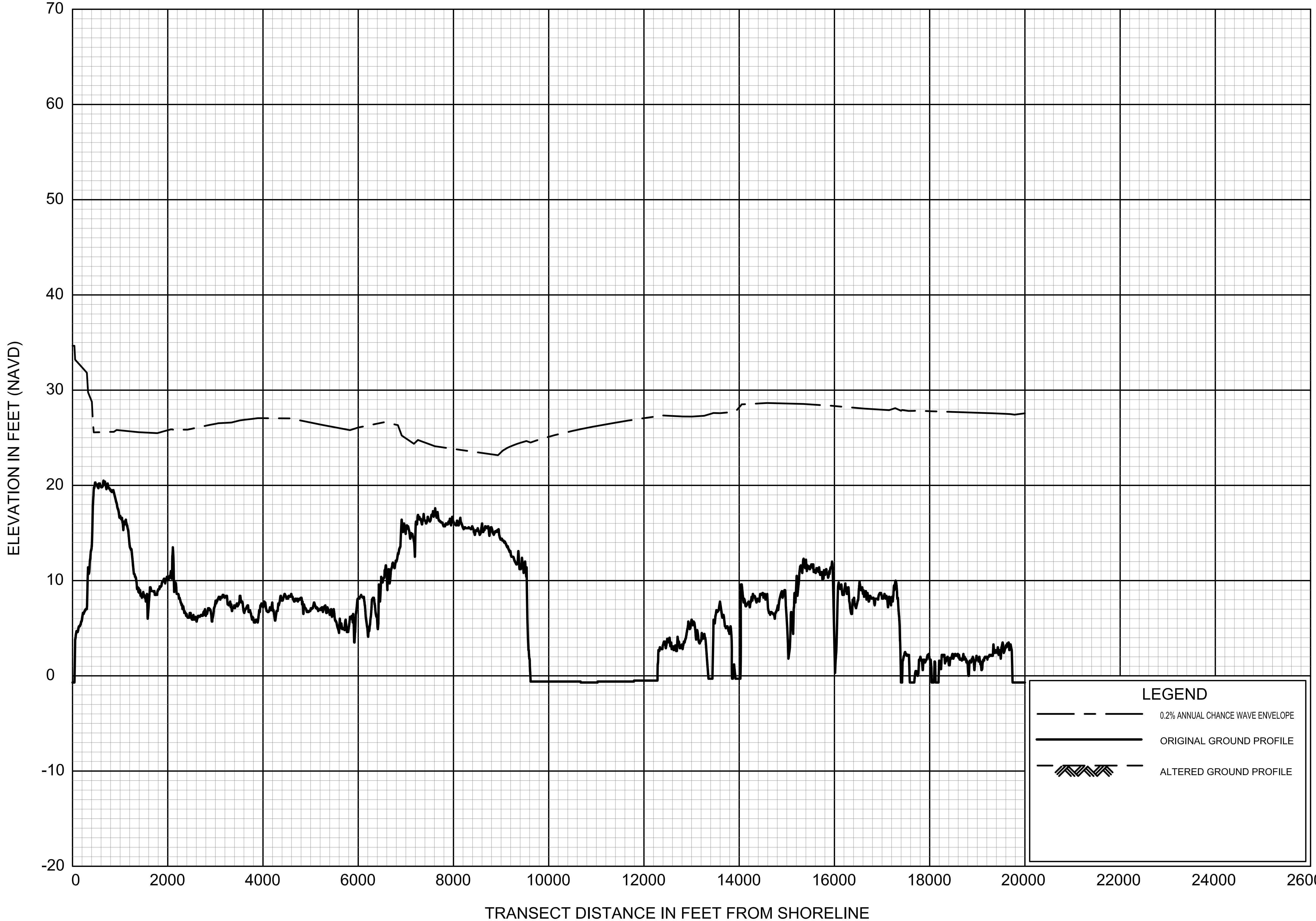
TRANSECT 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

14P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

15P

0.2% ANNUAL CHANCE WAVE ENVELOPE

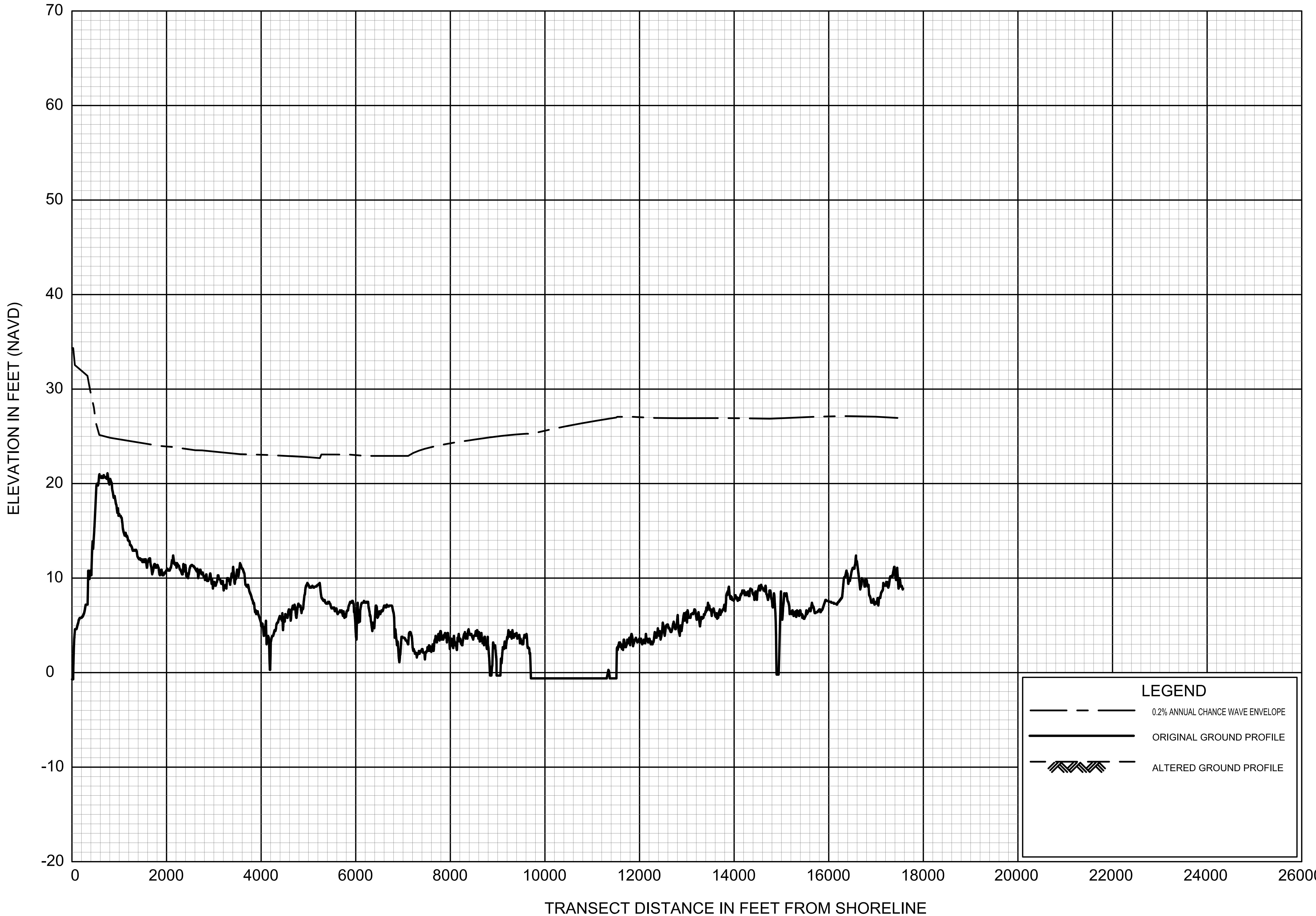
TRANSECT 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

16P



0.2% ANNUAL CHANCE WAVE ENVELOPE

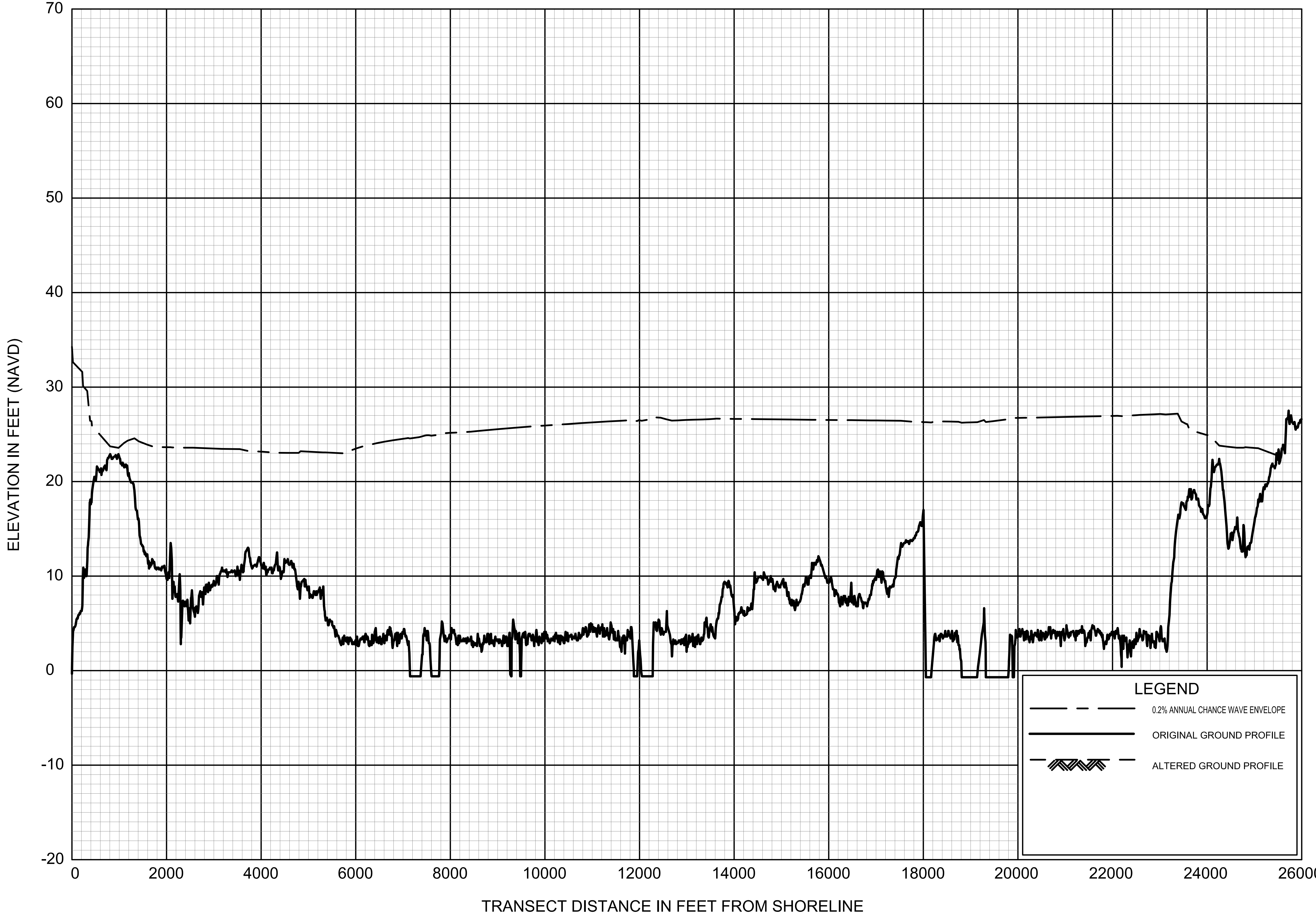
TRANSECT 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

17P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

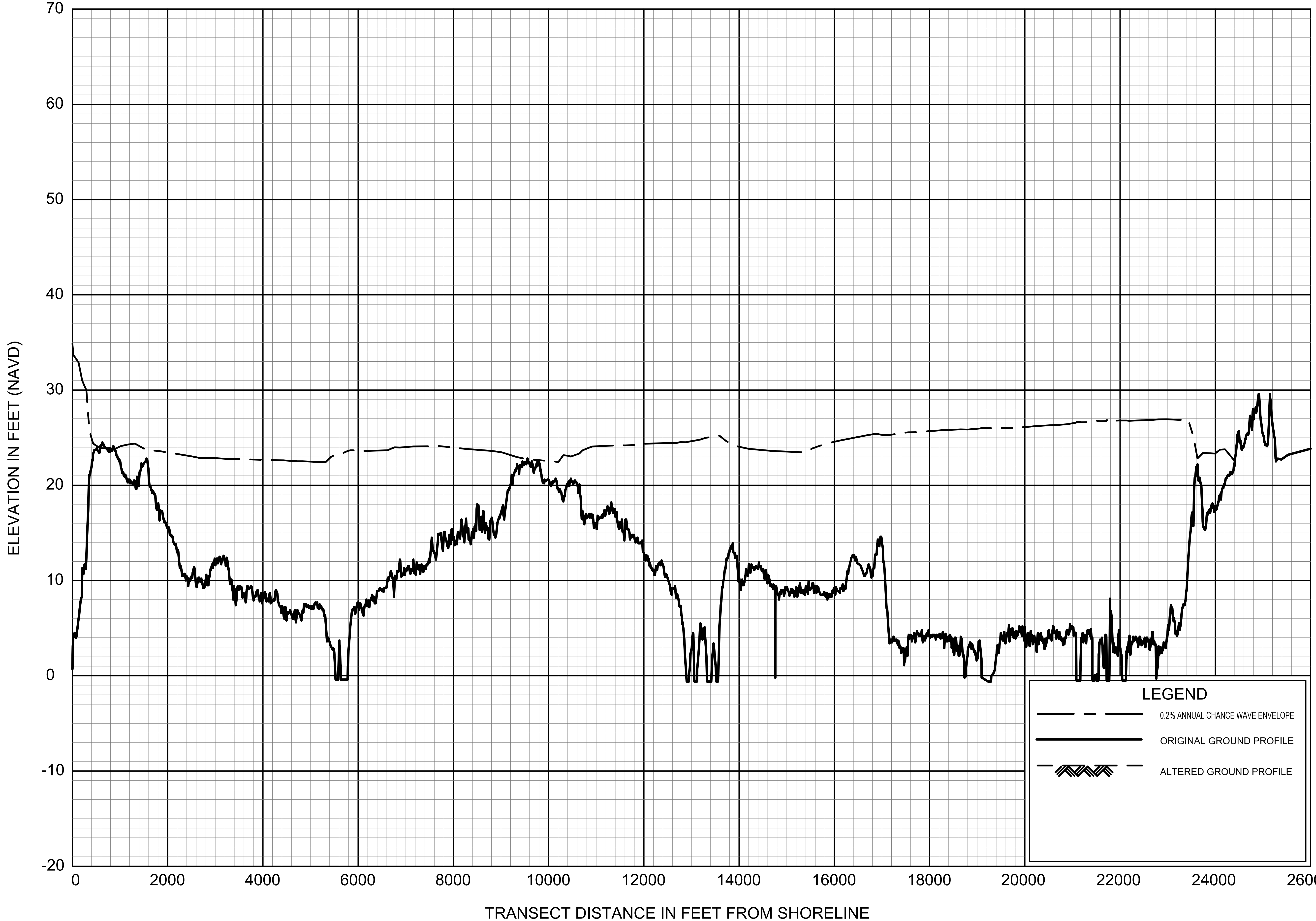
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

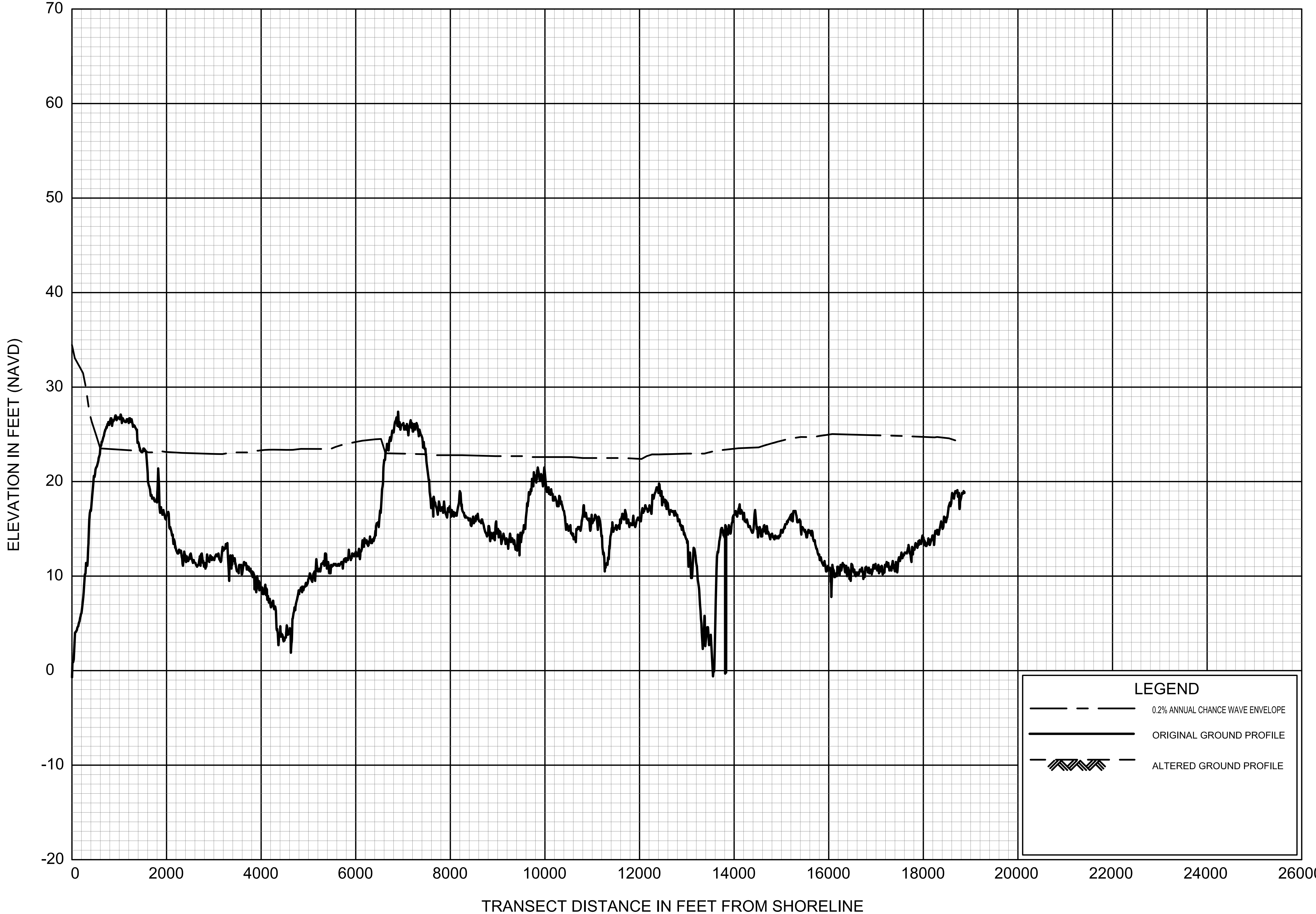
TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

20P



0.2% ANNUAL CHANCE WAVE ENVELOPE

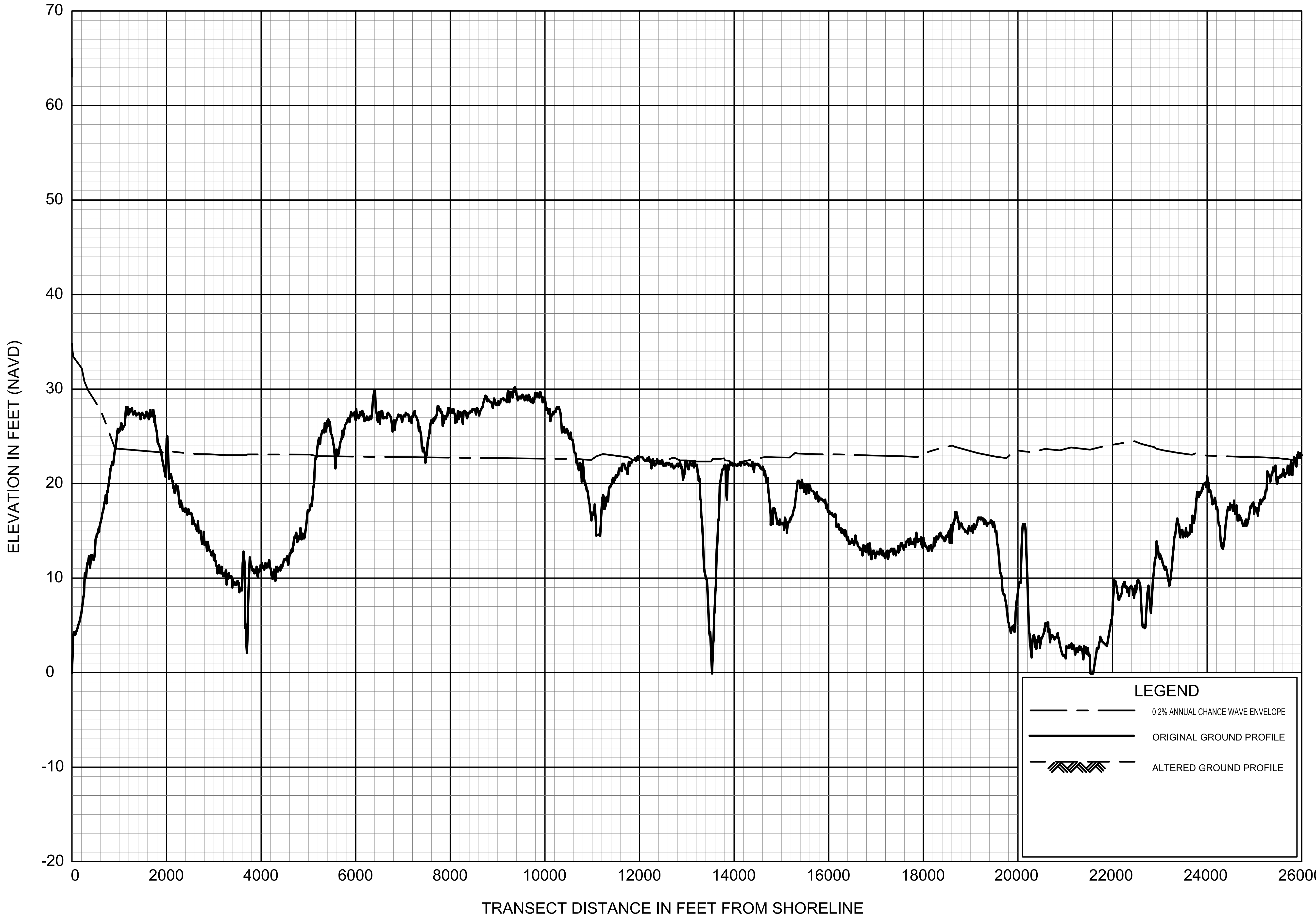
TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

21P



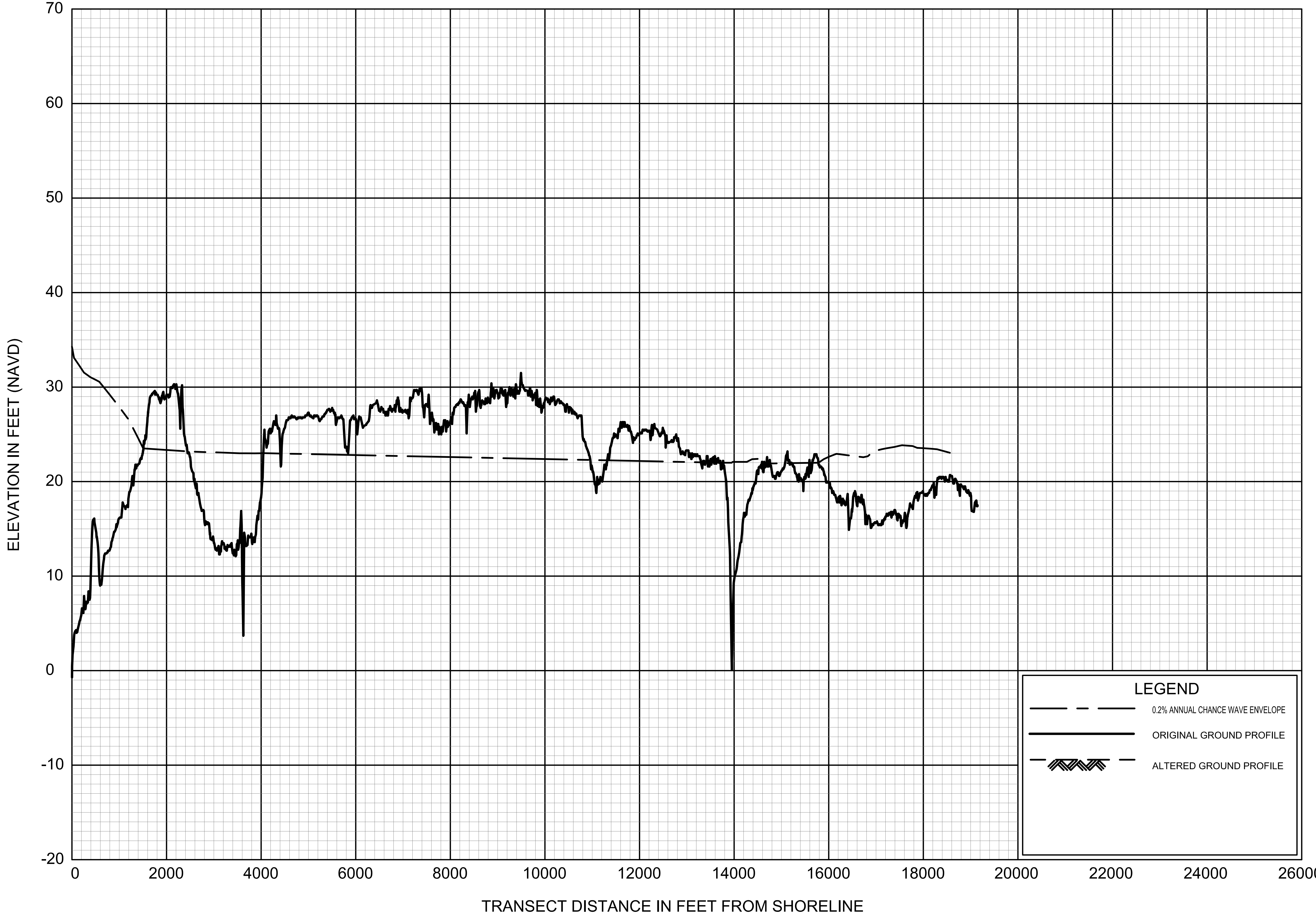
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

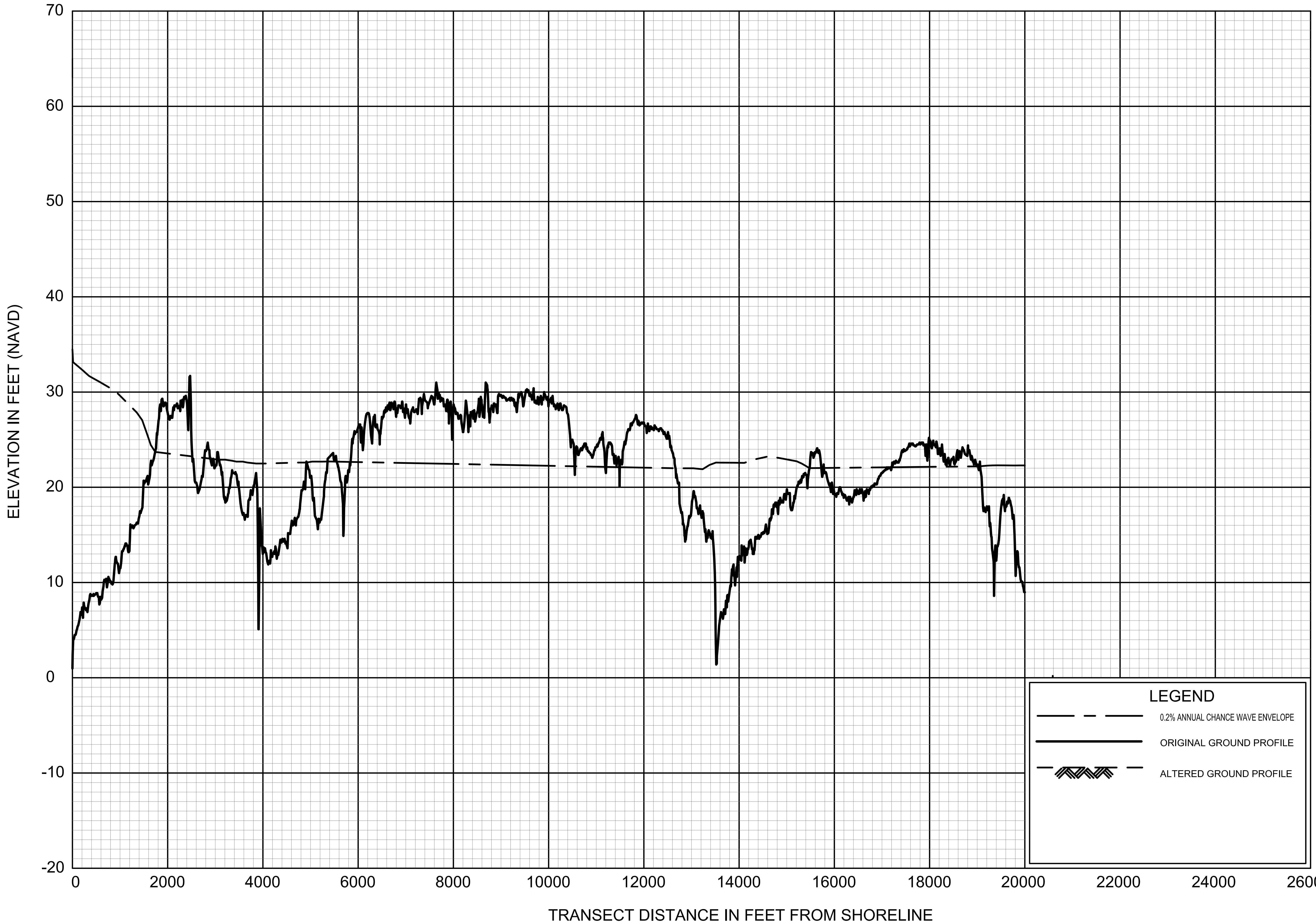
TRANSECT 21

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

23P



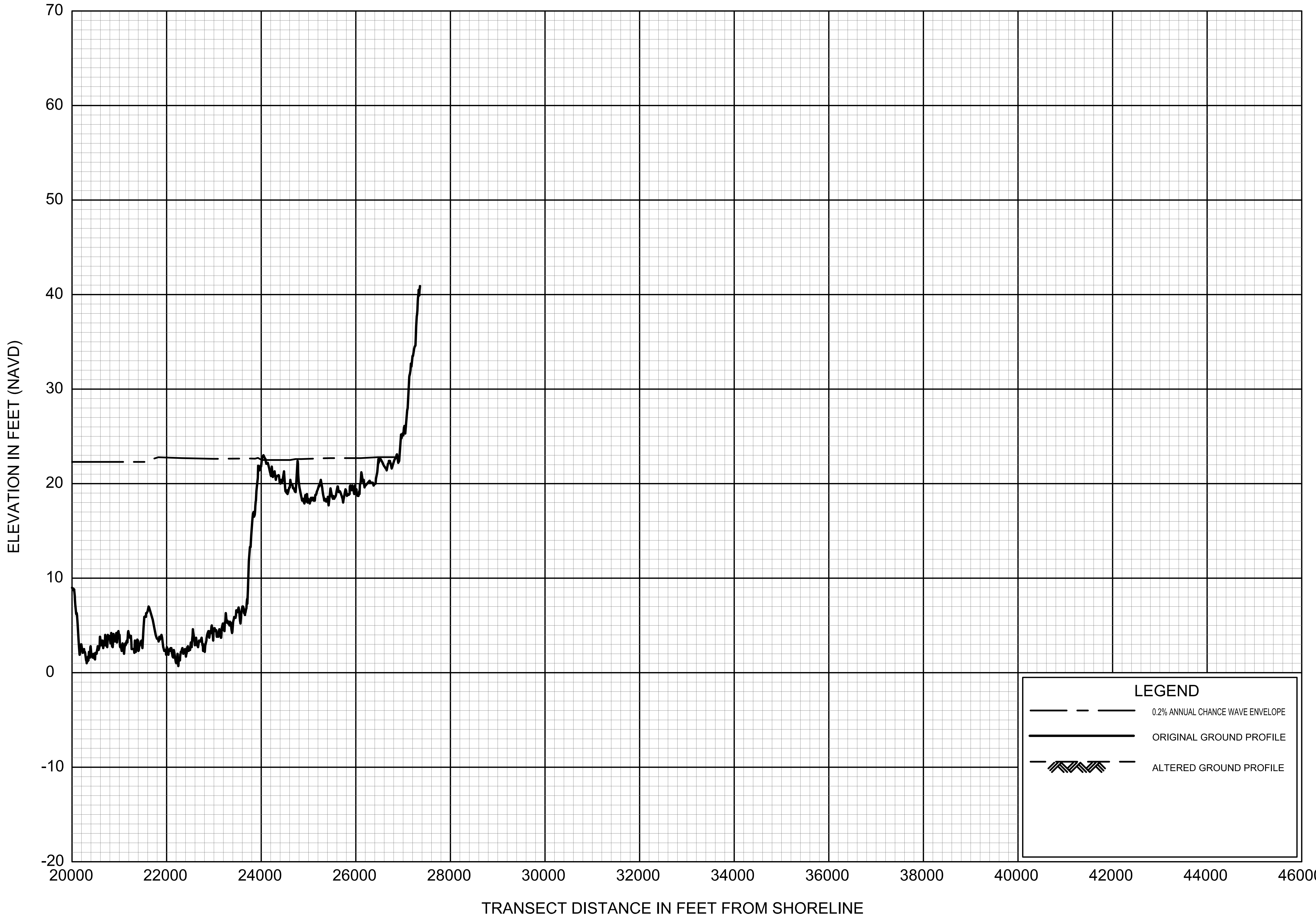
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 22

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

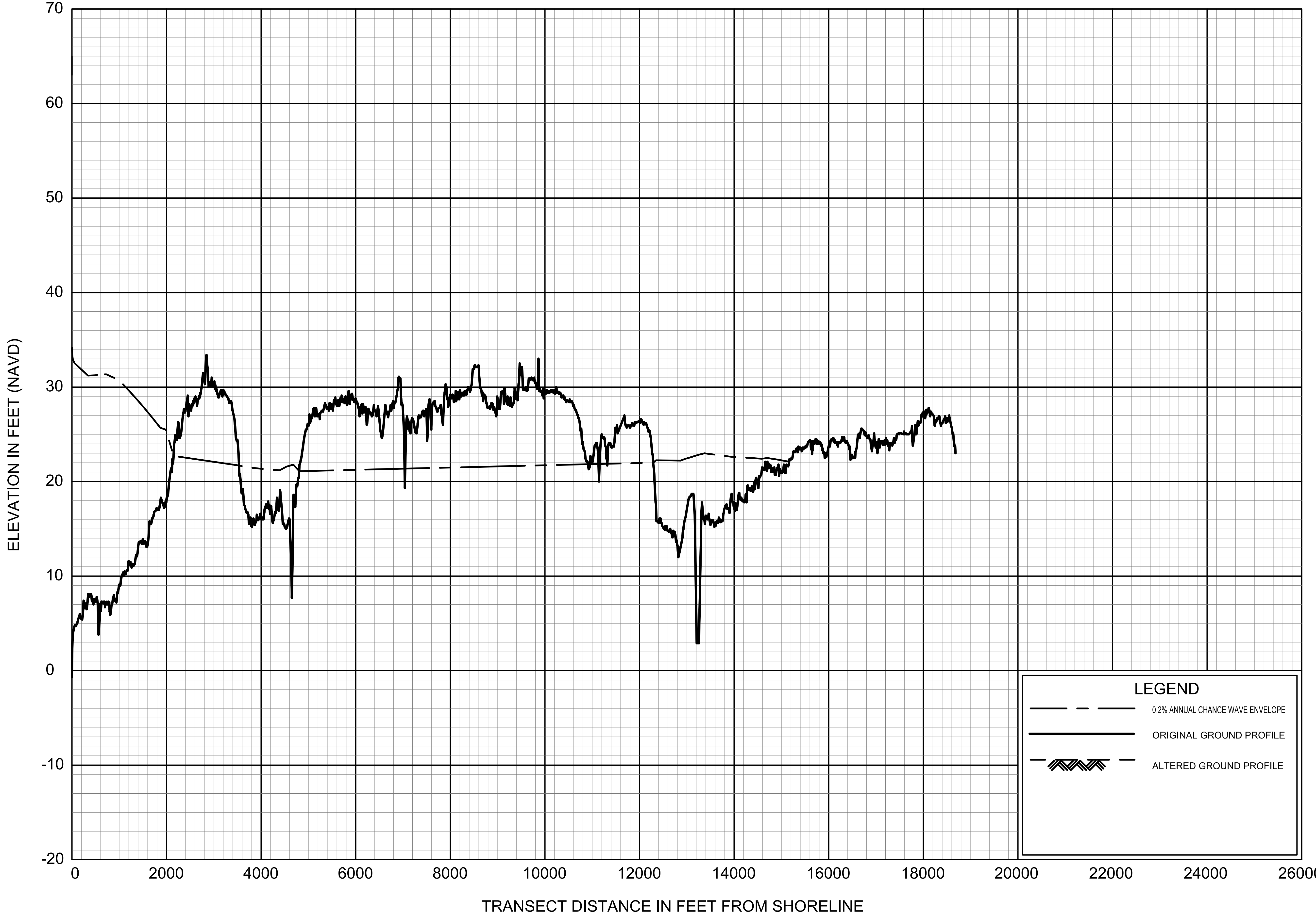
TRANSECT 22

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

25P



0.2% ANNUAL CHANCE WAVE ENVELOPE

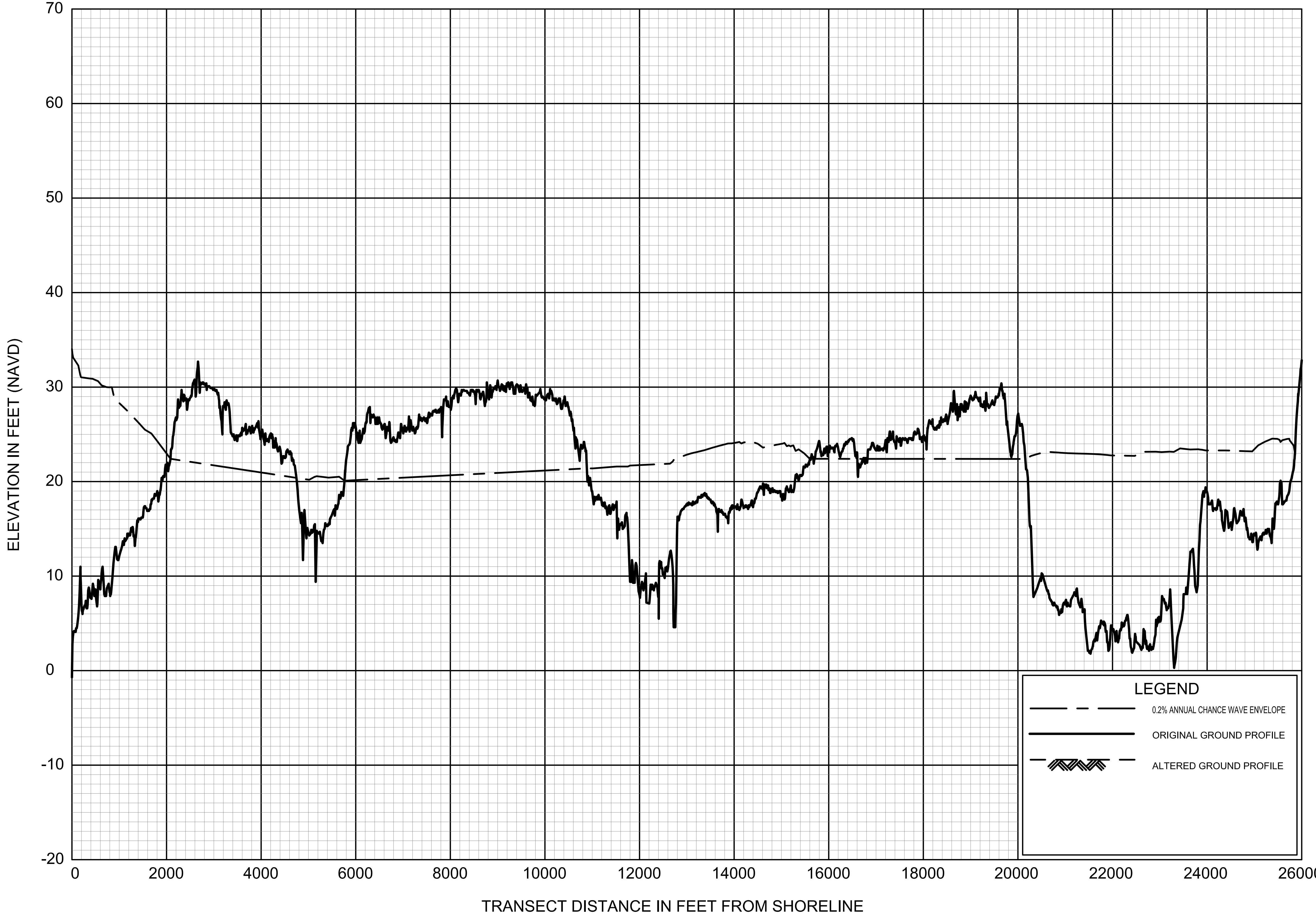
TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

26P



0.2% ANNUAL CHANCE WAVE ENVELOPE

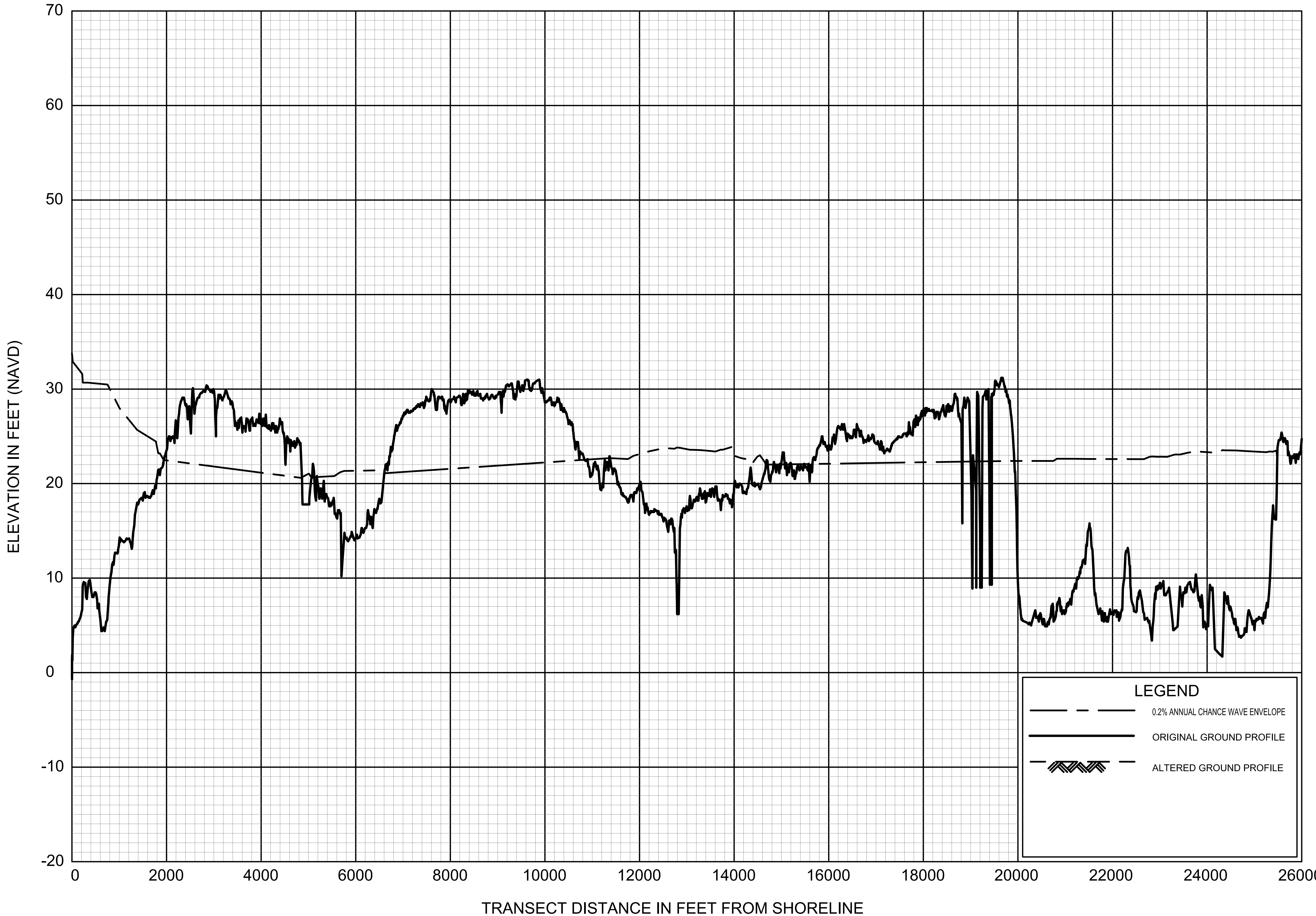
TRANSECT 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

27P



0.2% ANNUAL CHANCE WAVE ENVELOPE

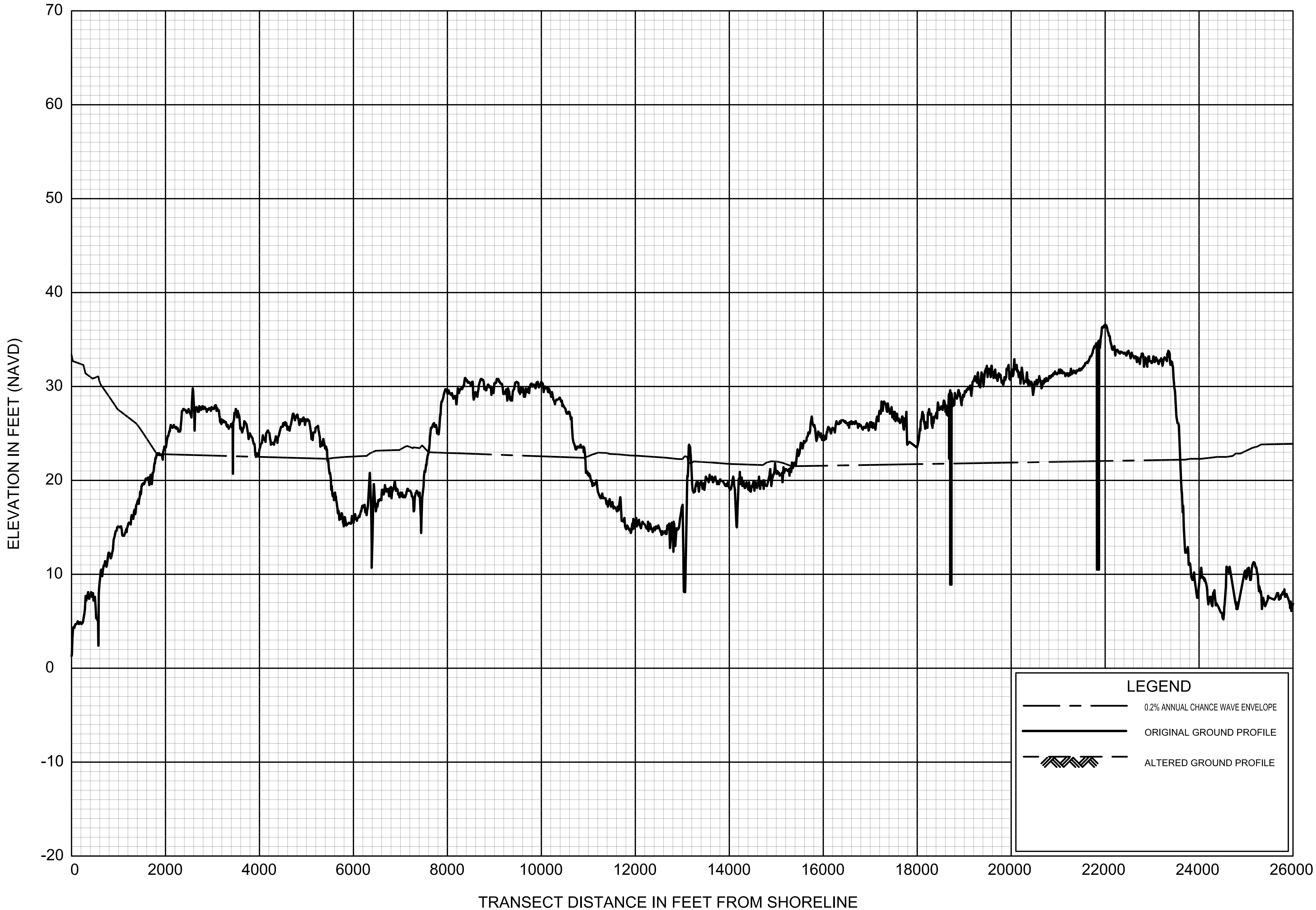
TRANSECT 25

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

28P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 26

FEDERAL EMERGENCY MANAGEMENT AGENCY

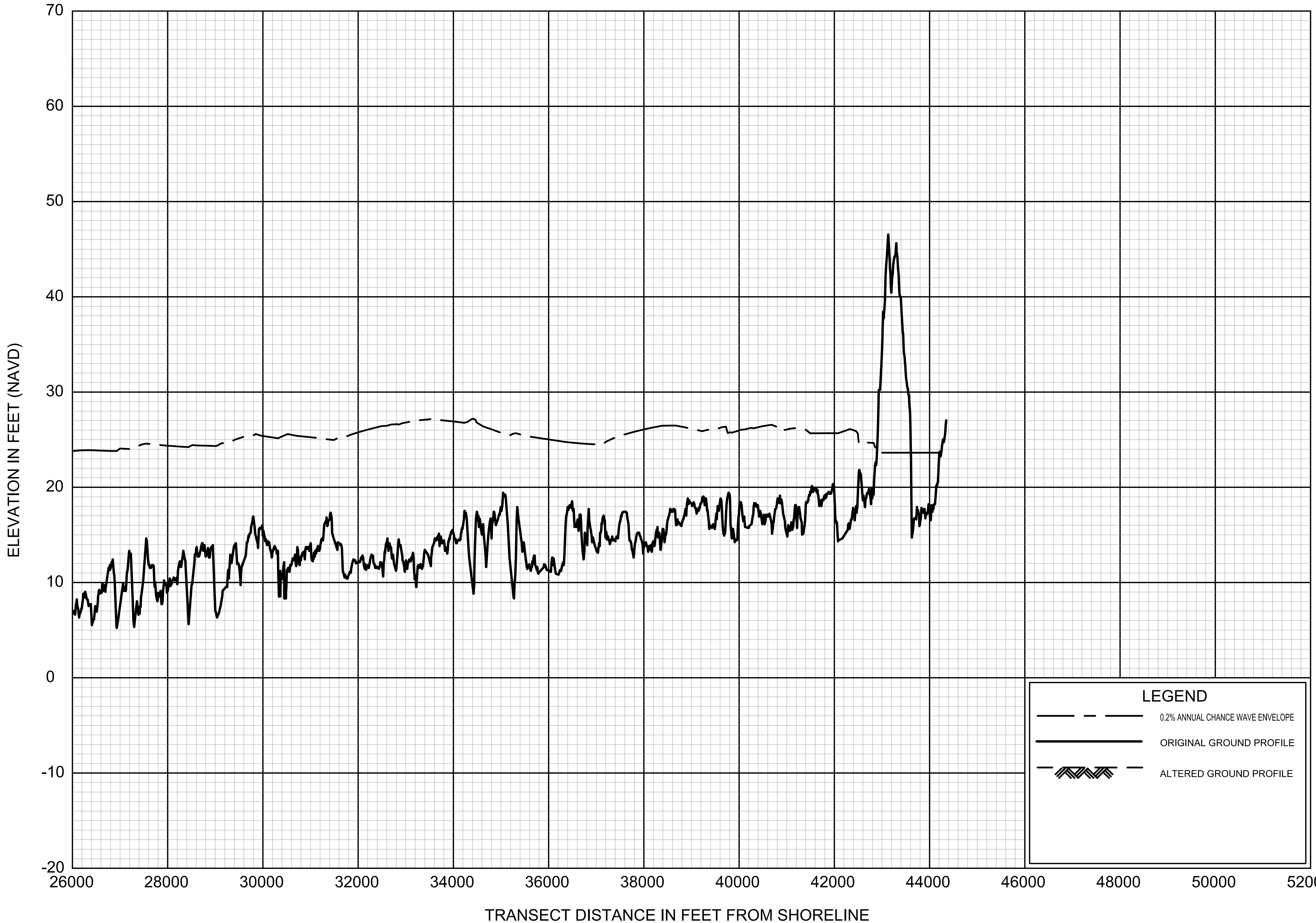
HARRISON COUNTY, MS

AND INCORPORATED AREAS

29P

0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 26

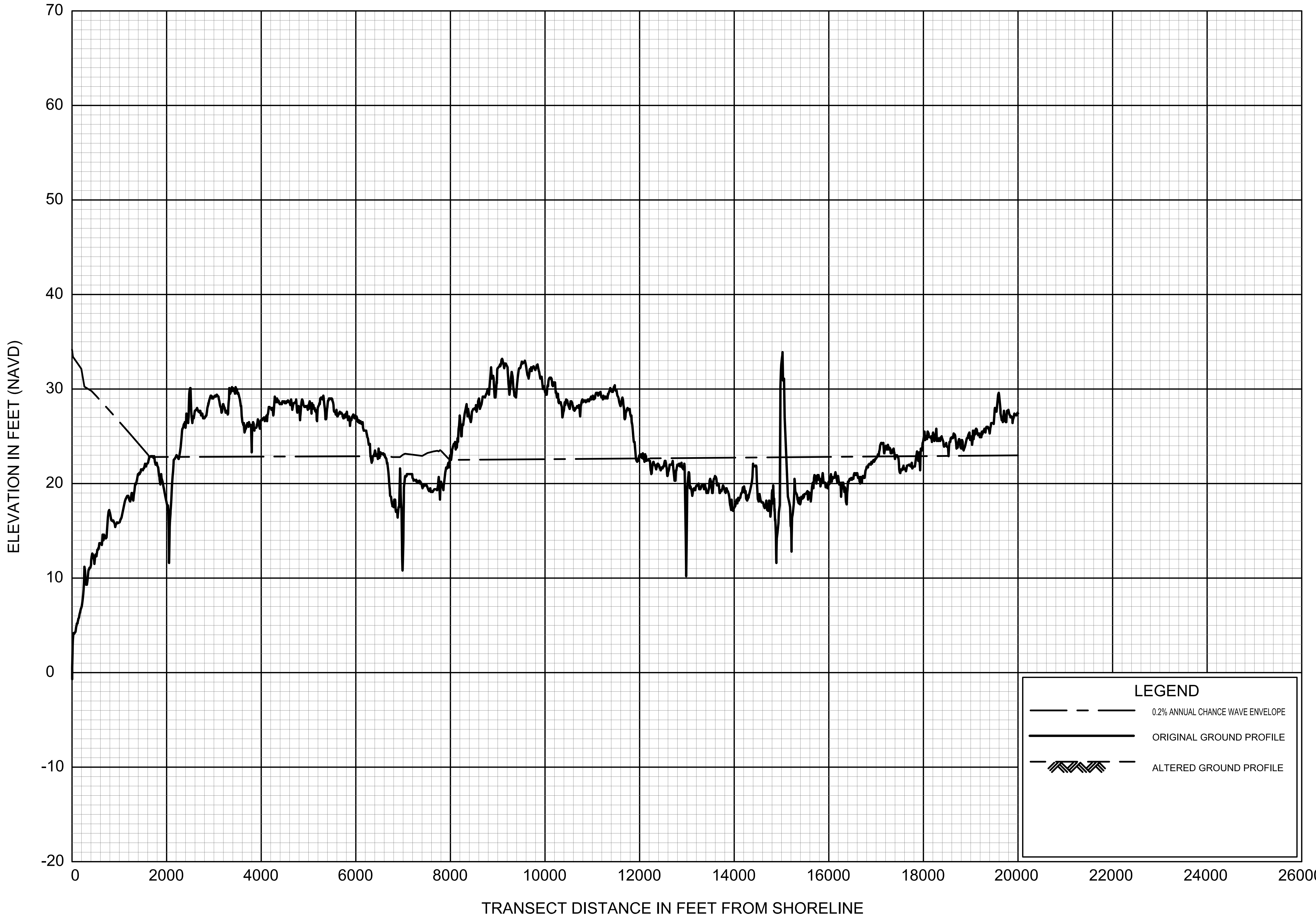


FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

30P



0.2% ANNUAL CHANCE WAVE ENVELOPE

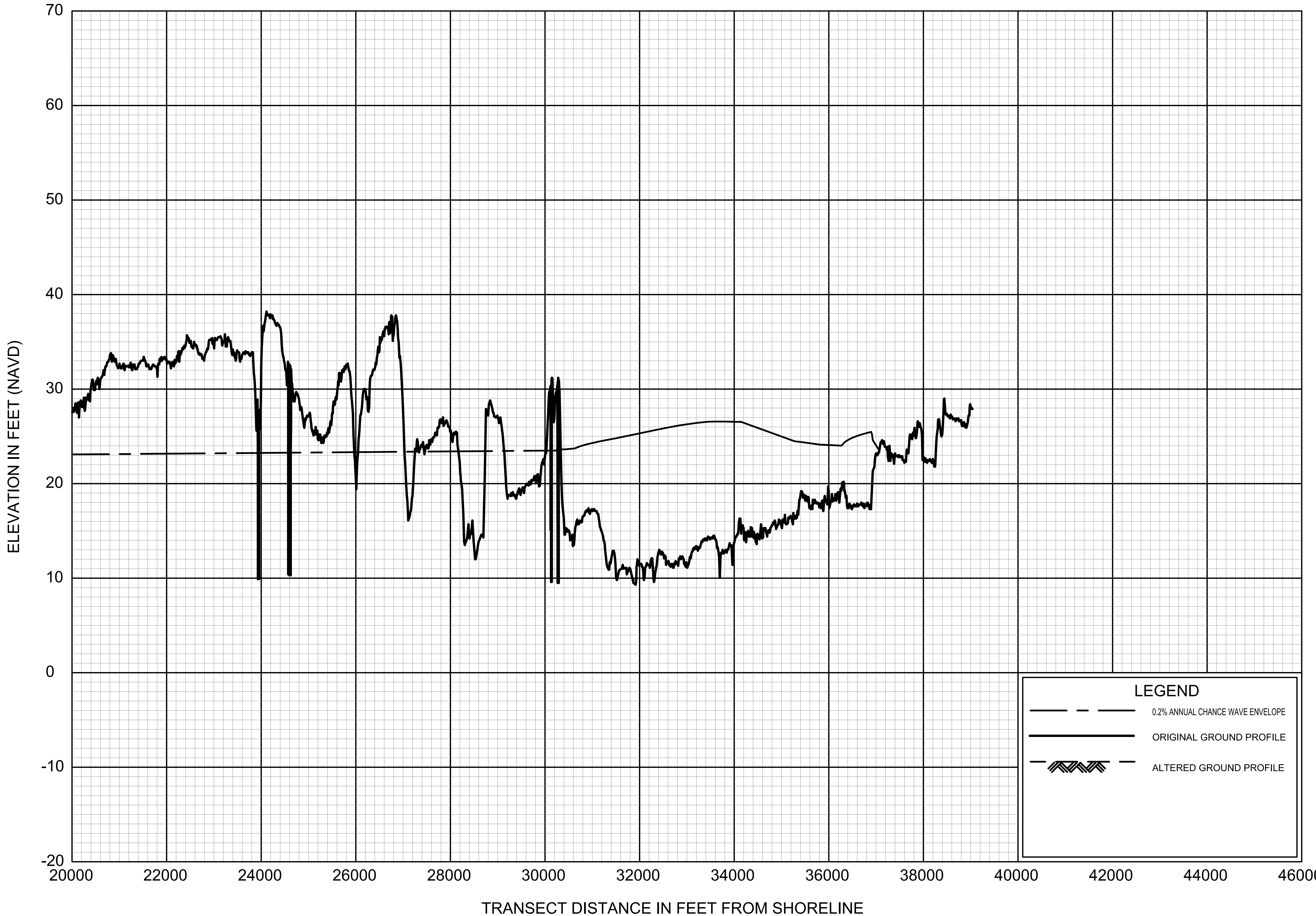
TRANSECT 27

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

31P



0.2% ANNUAL CHANCE WAVE ENVELOPE

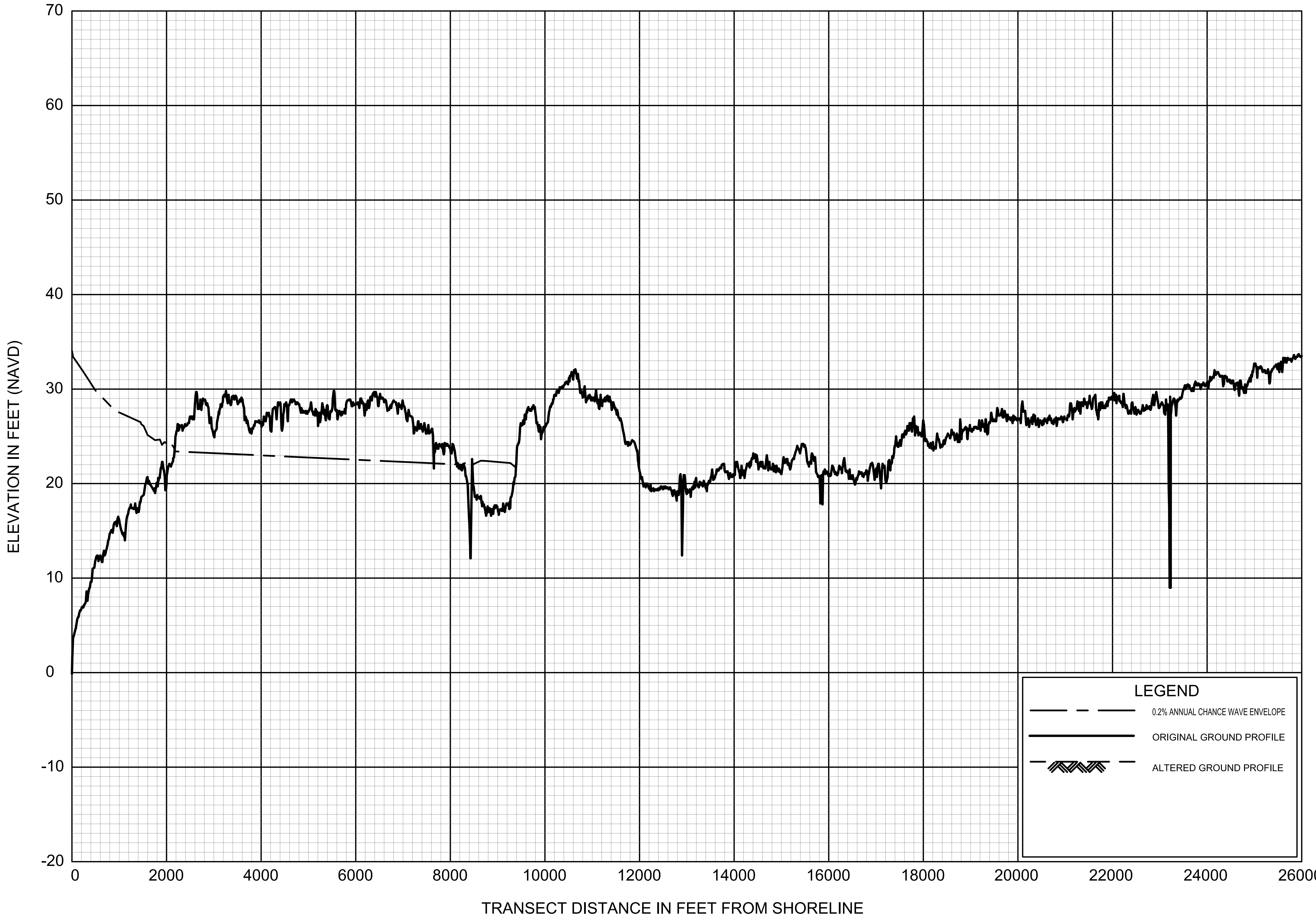
TRANSECT 27

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

32P



0.2% ANNUAL CHANCE WAVE ENVELOPE

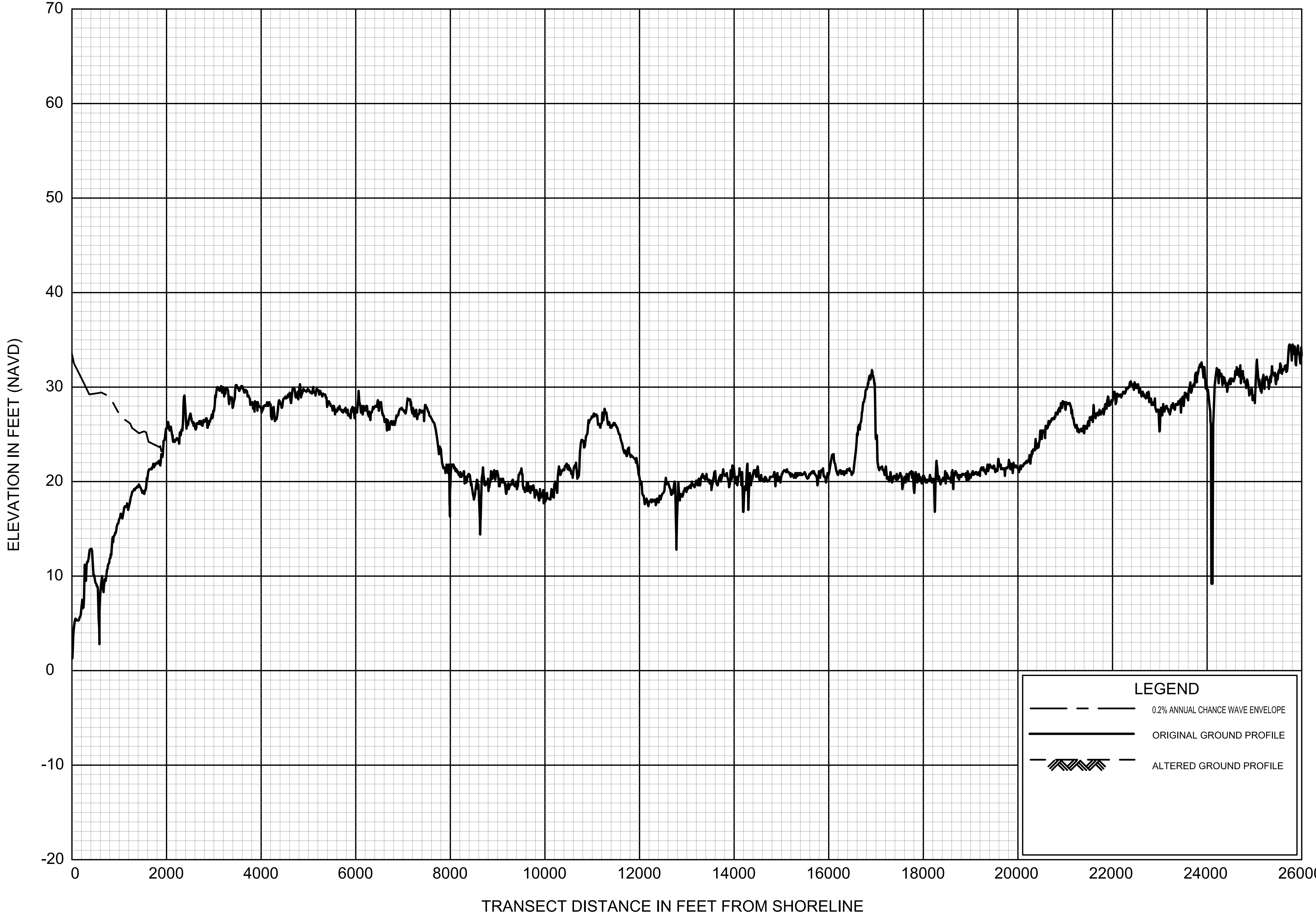
TRANSECT 28

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

33P



0.2% ANNUAL CHANCE WAVE ENVELOPE

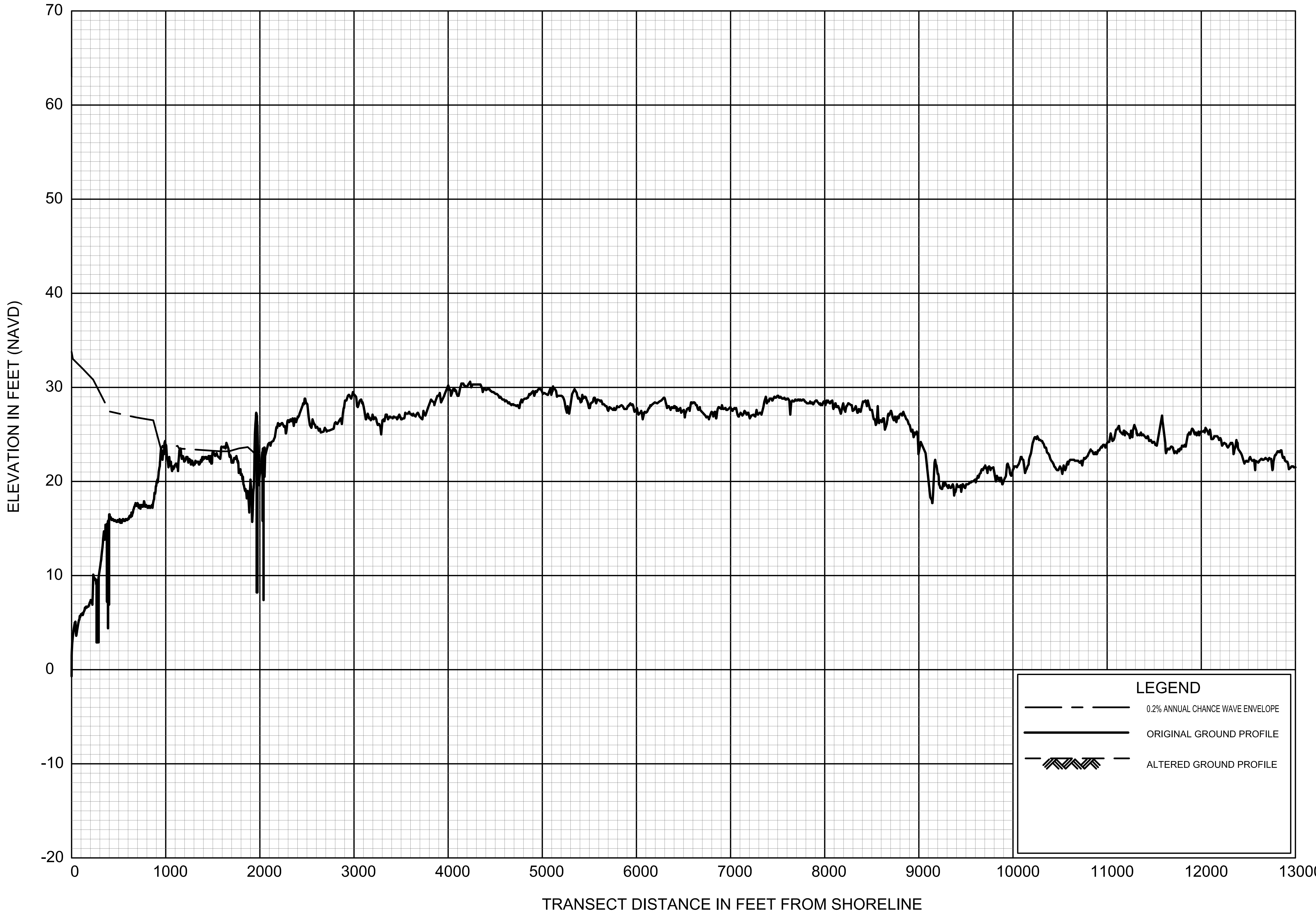
TRANSECT 29

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

34P



0.2% ANNUAL CHANCE WAVE ENVELOPE

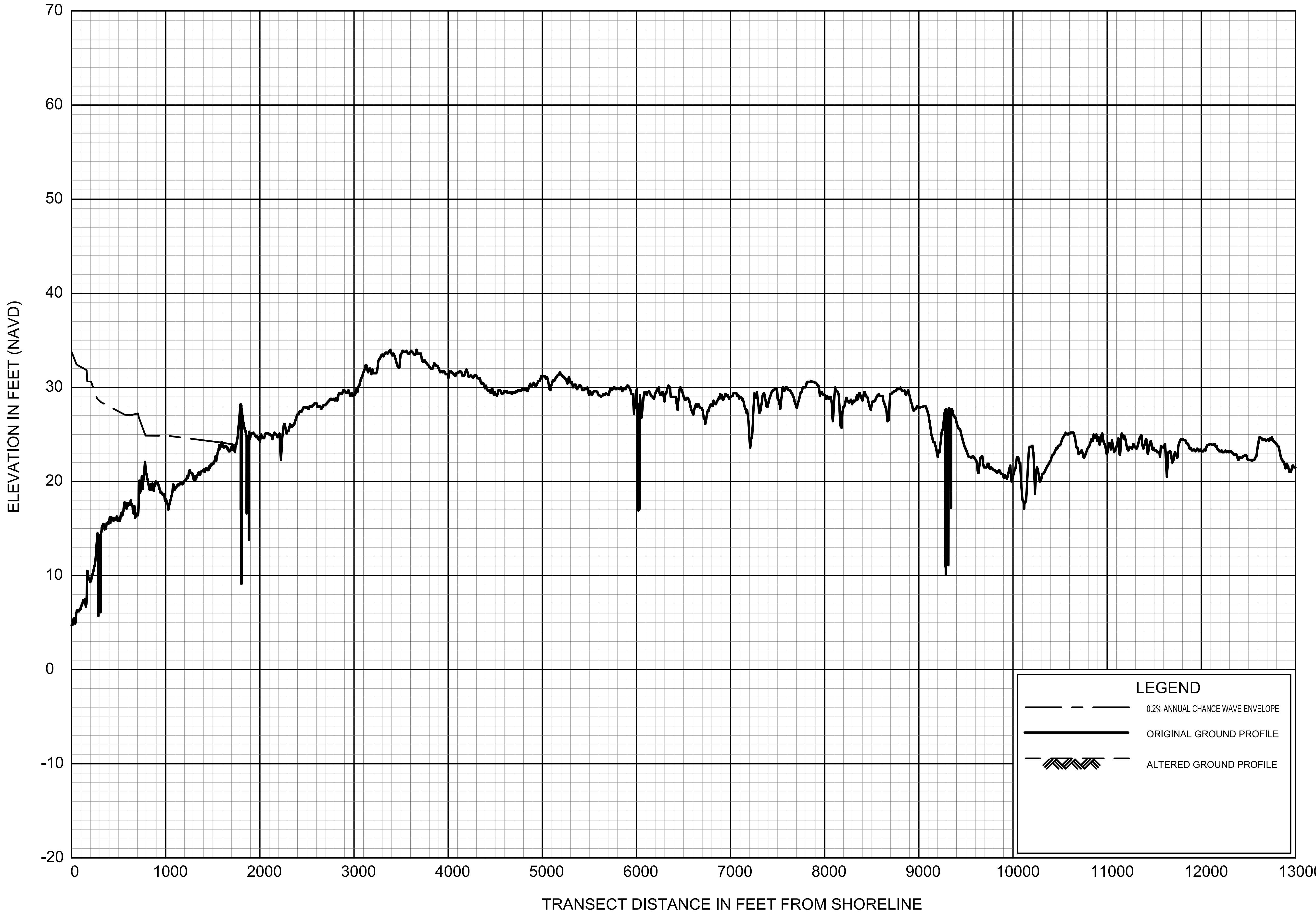
TRANSECT 30

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

35P



0.2% ANNUAL CHANCE WAVE ENVELOPE

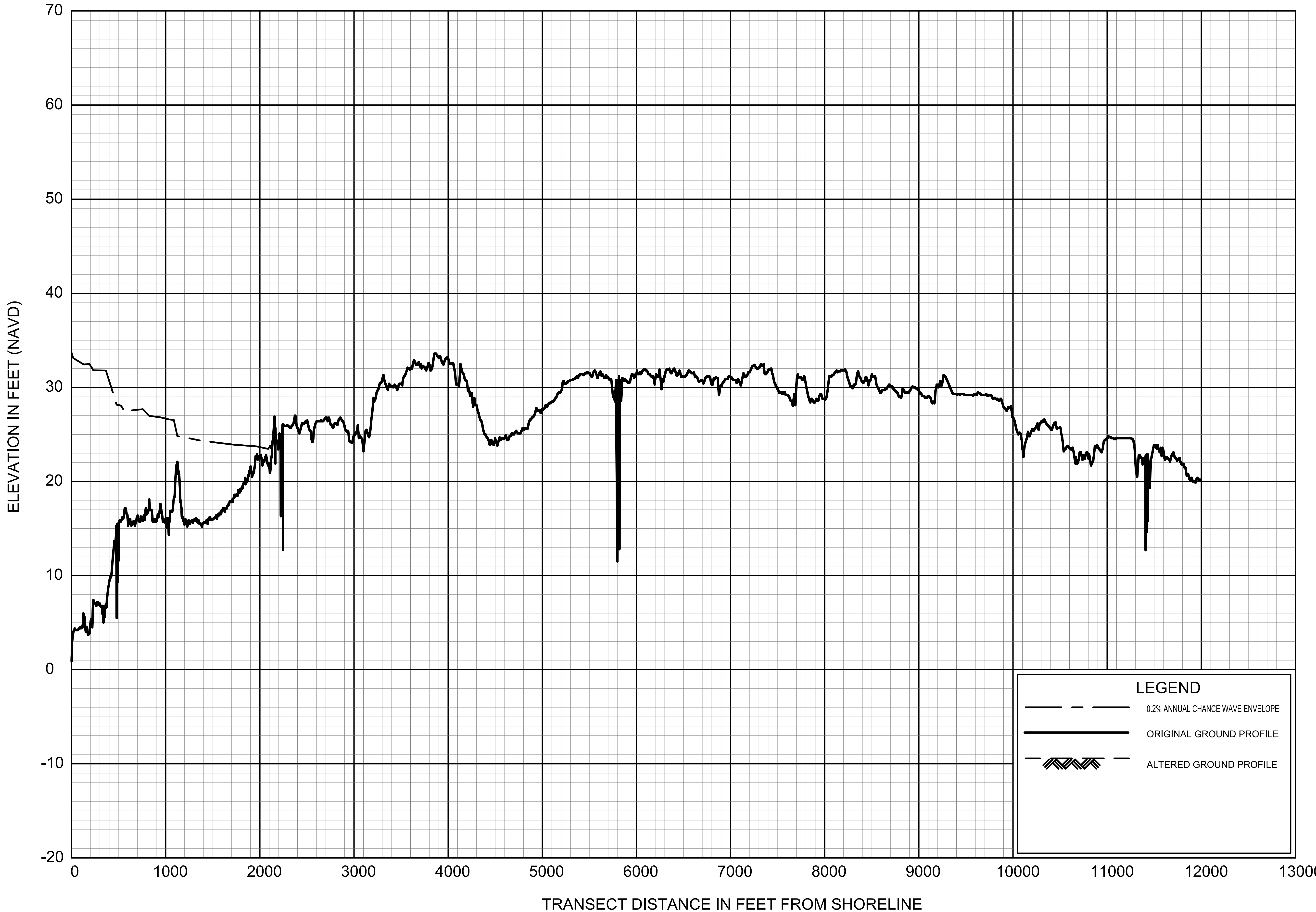
TRANSECT 31

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

36P



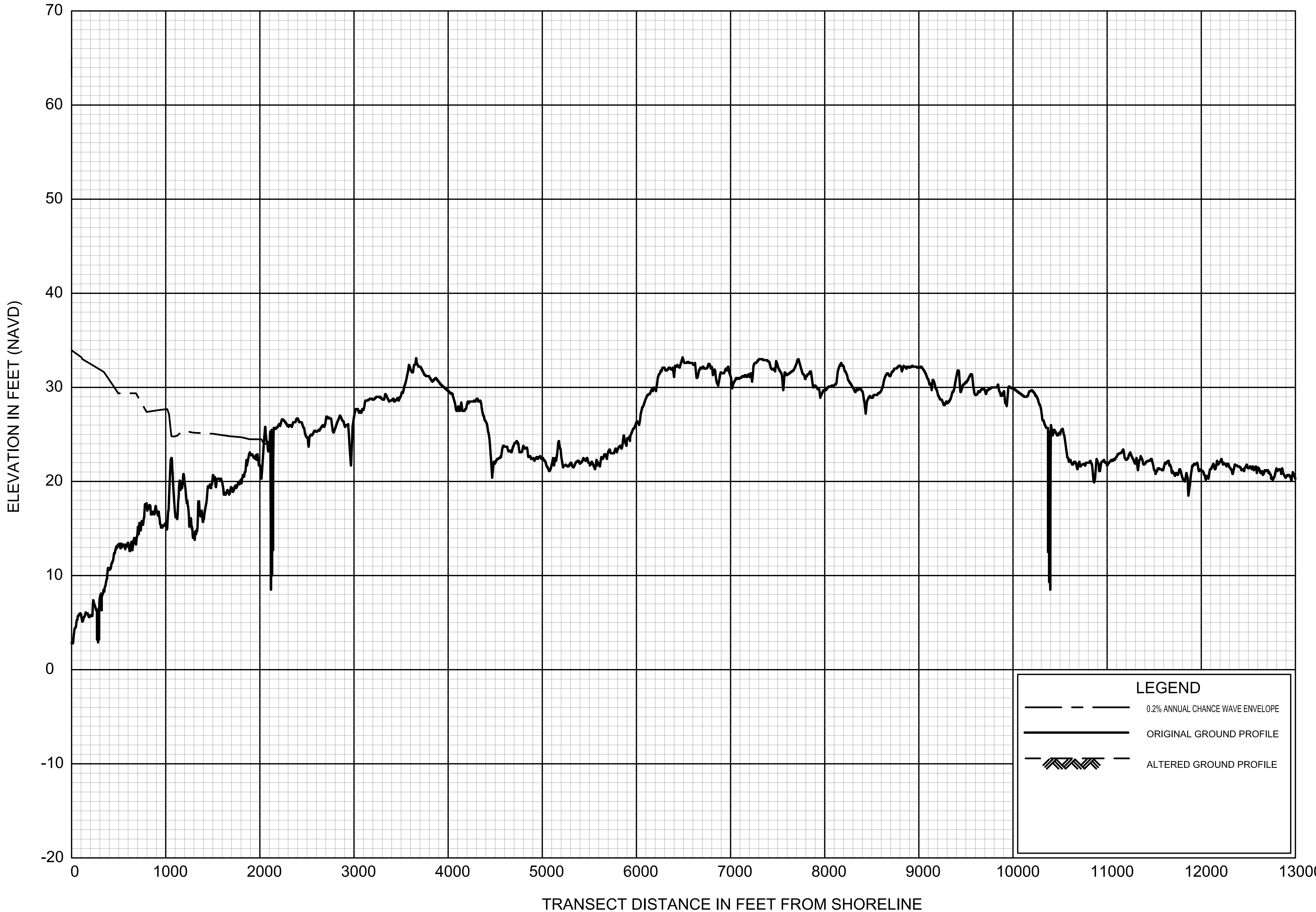
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 32

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

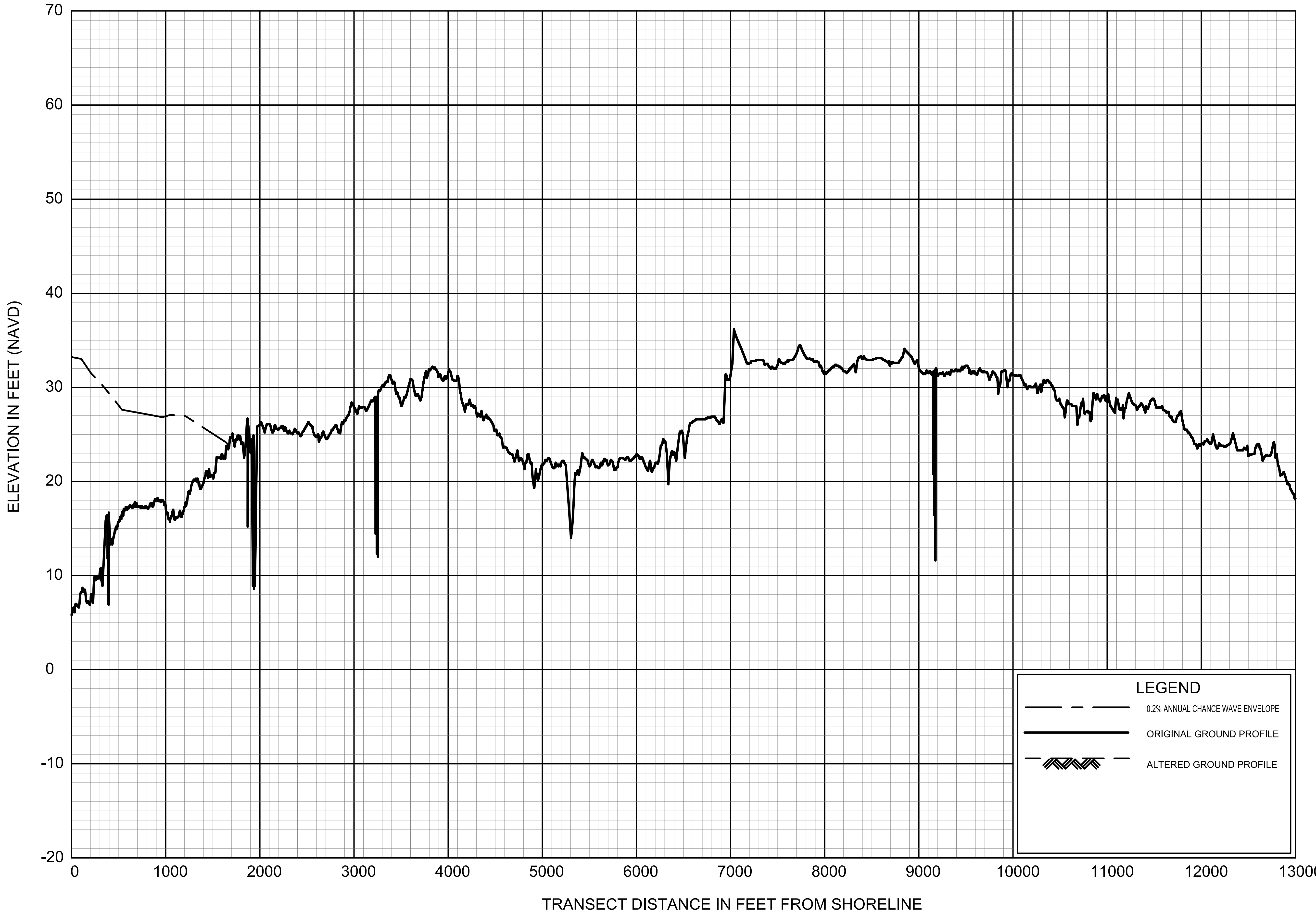
TRANSECT 33

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

38P



0.2% ANNUAL CHANCE WAVE ENVELOPE

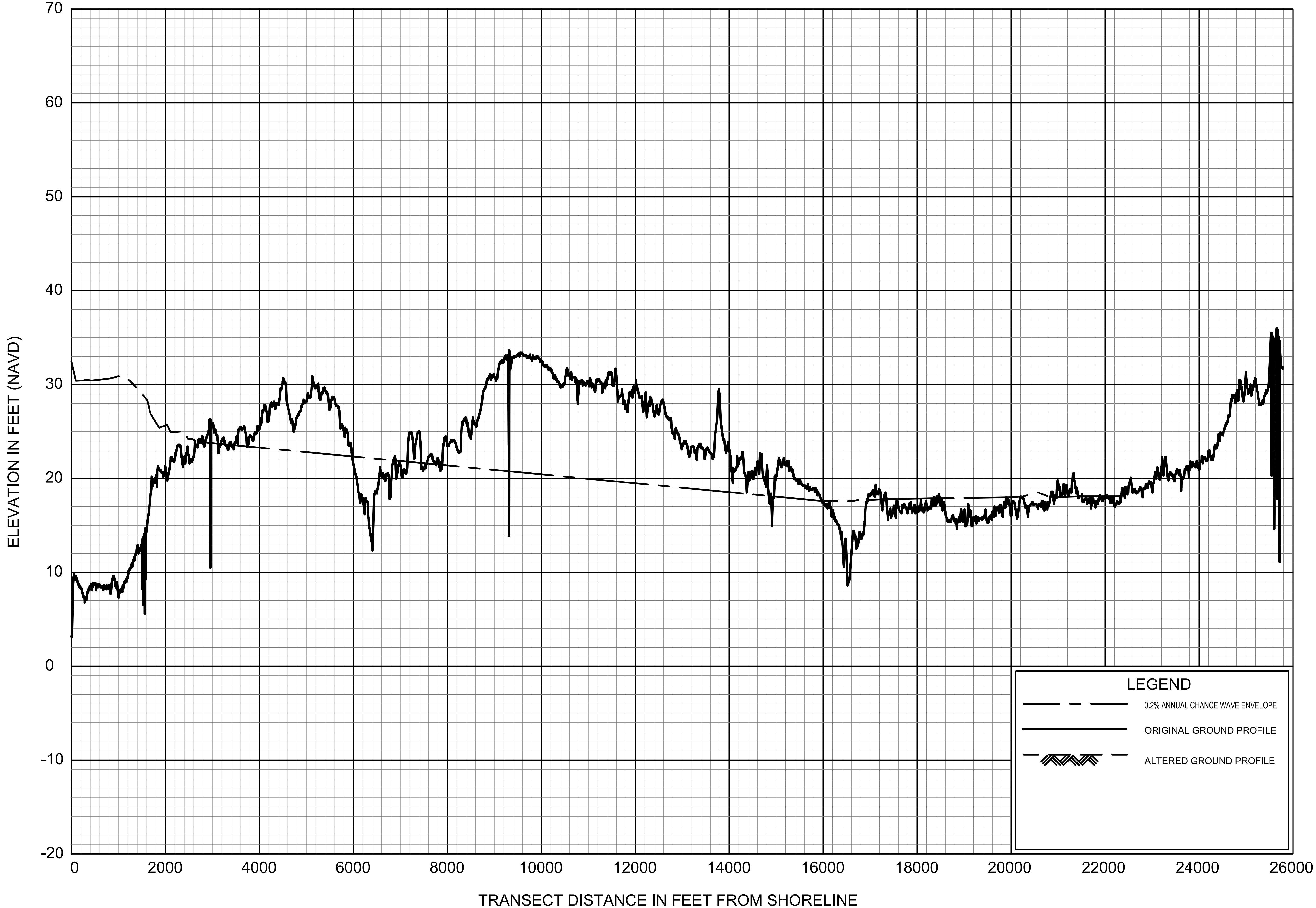
TRANSECT 34

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

39P



0.2% ANNUAL CHANCE WAVE ENVELOPE

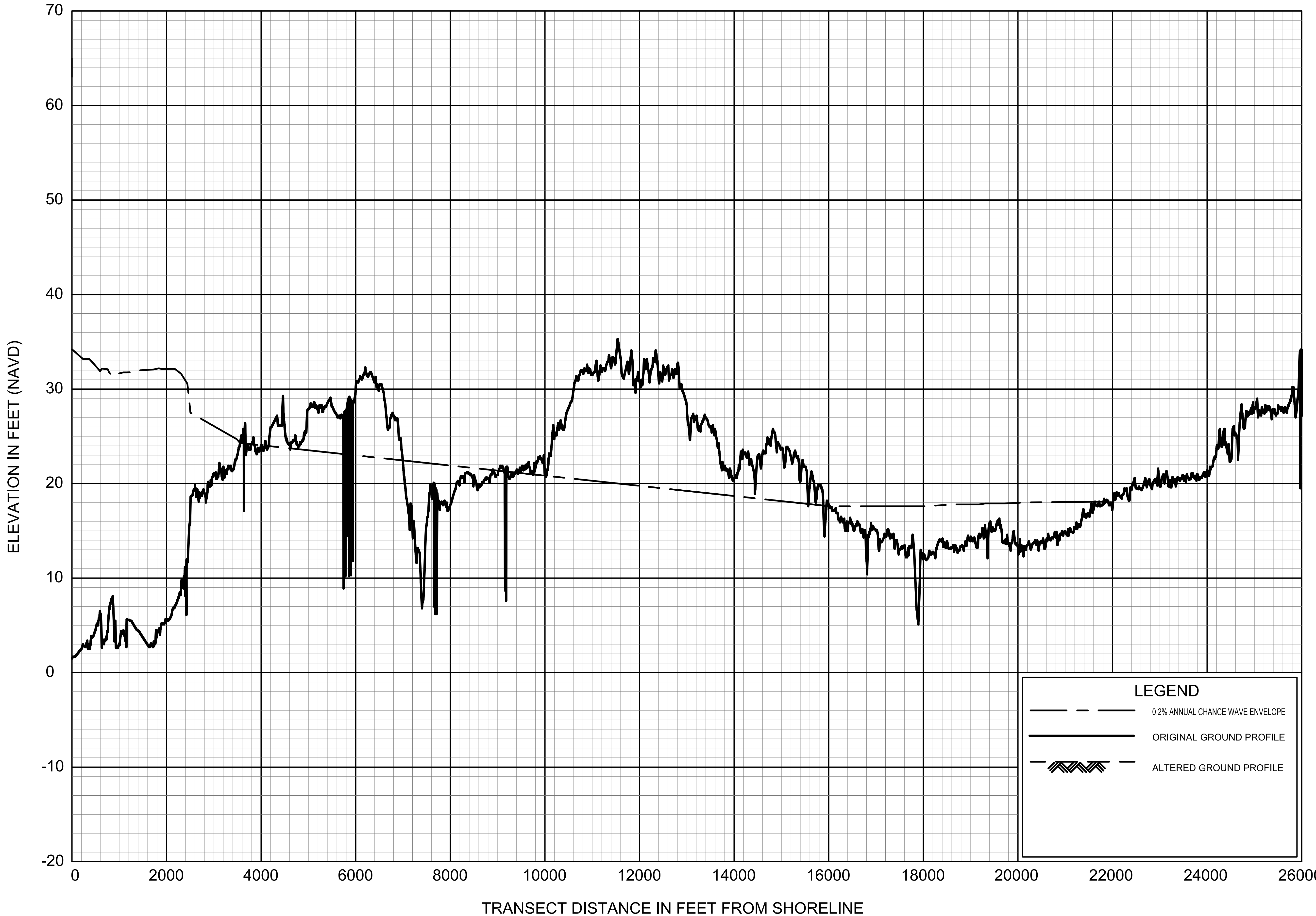
TRANSECT 35

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

40P



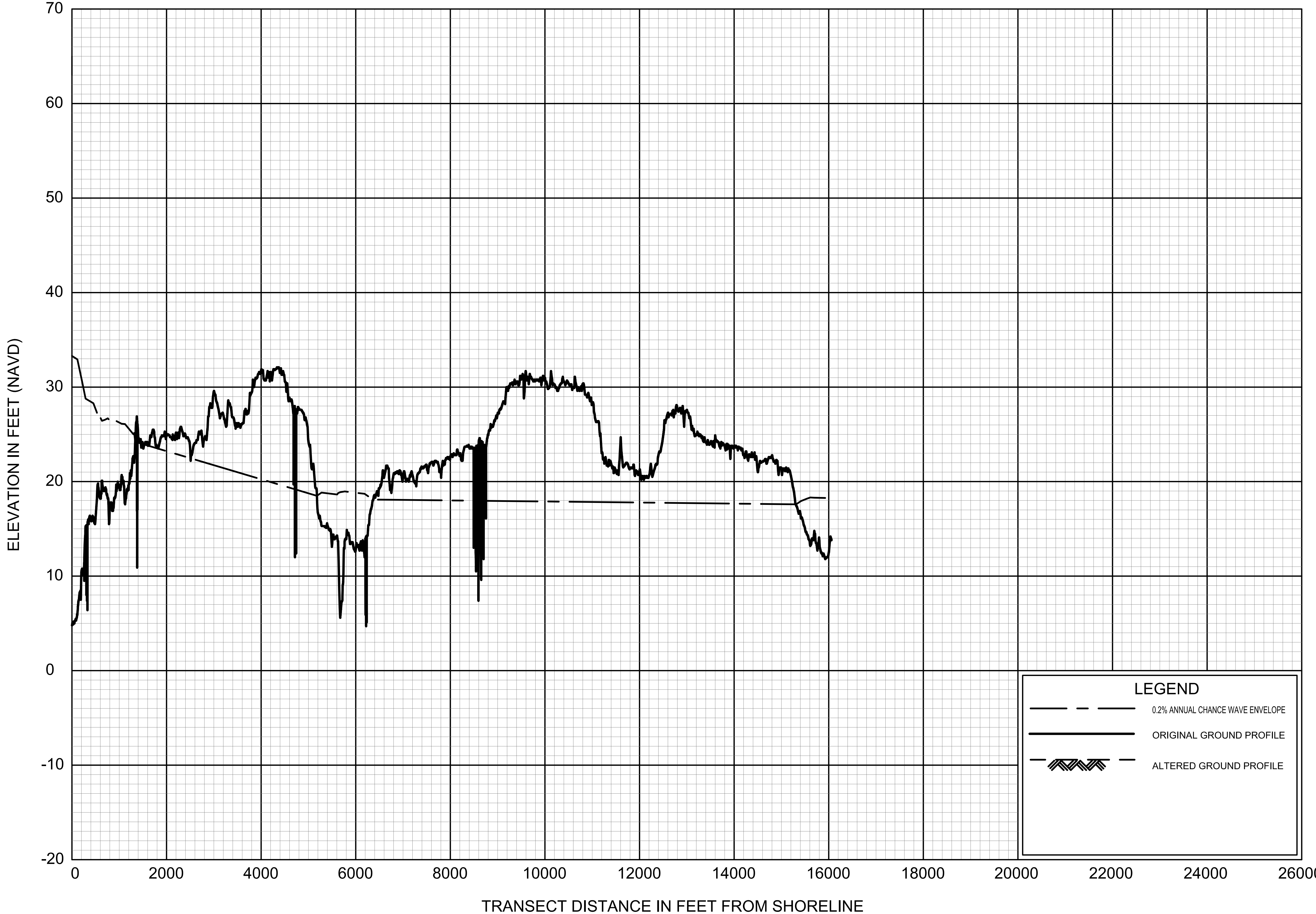
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 36

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

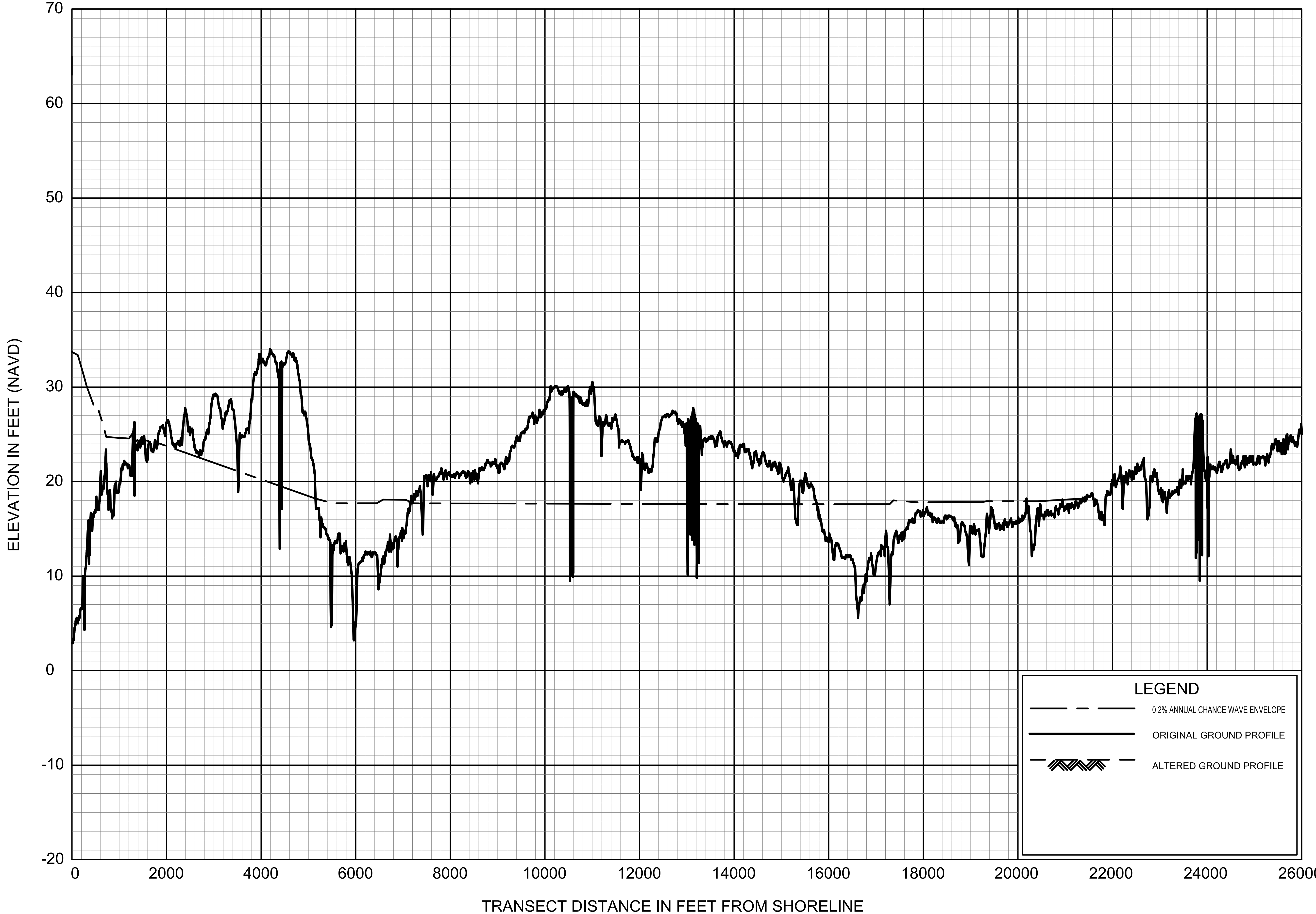
TRANSECT 37

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

42P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 38

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

43P

0.2% ANNUAL CHANCE WAVE ENVELOPE

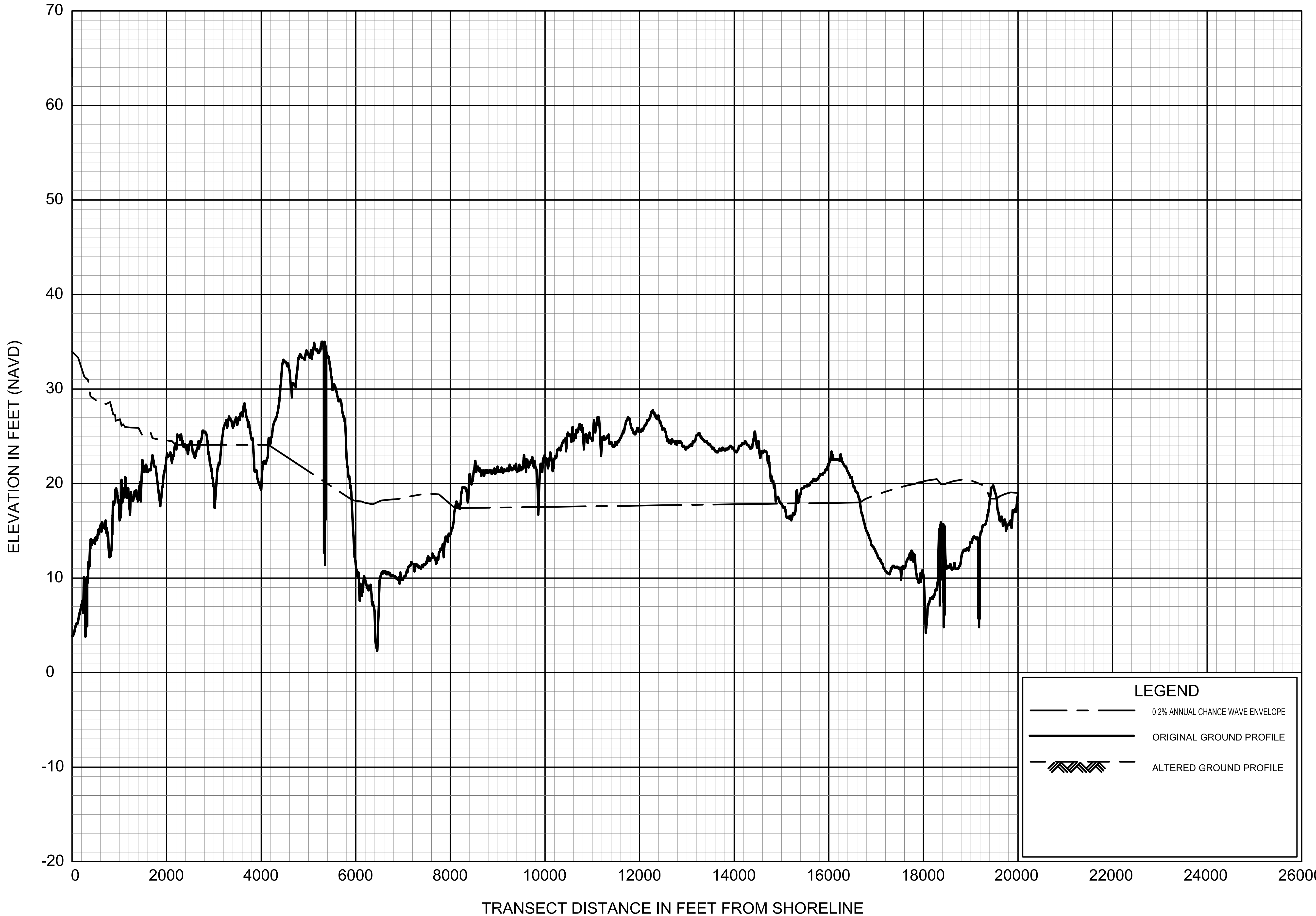
TRANSECT 39

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

44P



0.2% ANNUAL CHANCE WAVE ENVELOPE

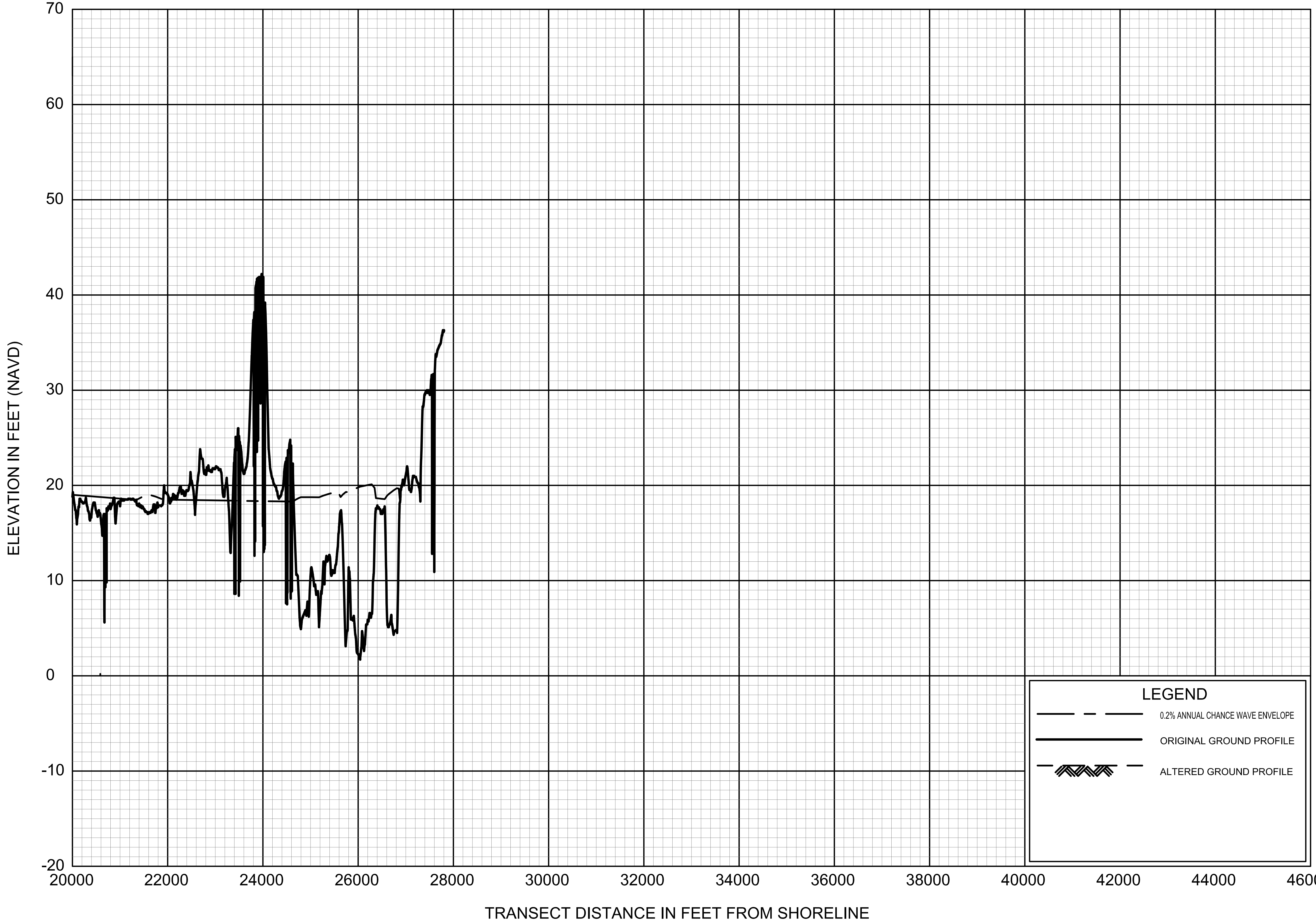
TRANSECT 40

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

45P



0.2% ANNUAL CHANCE WAVE ENVELOPE

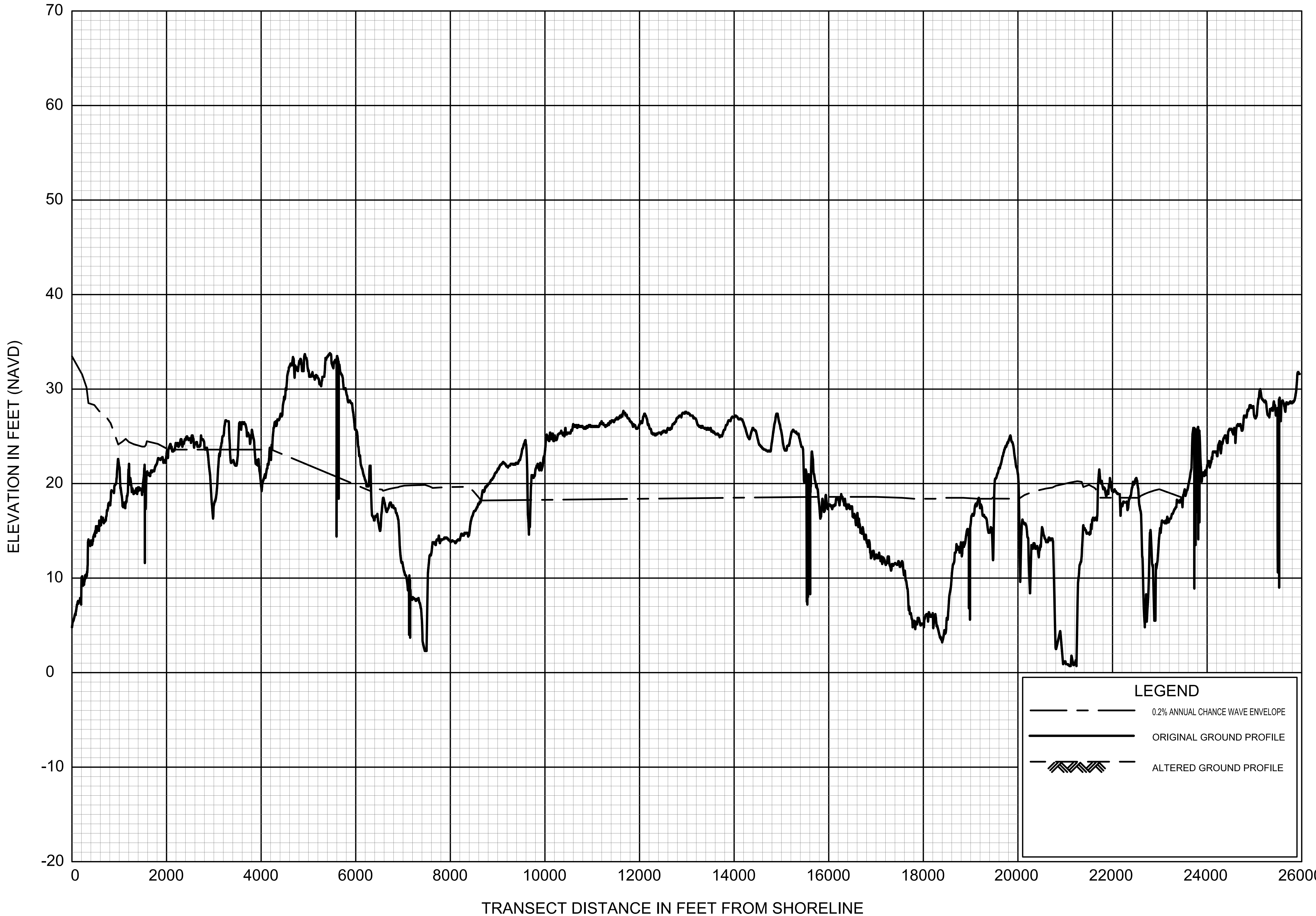
TRANSECT 40

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

46P



0.2% ANNUAL CHANCE WAVE ENVELOPE

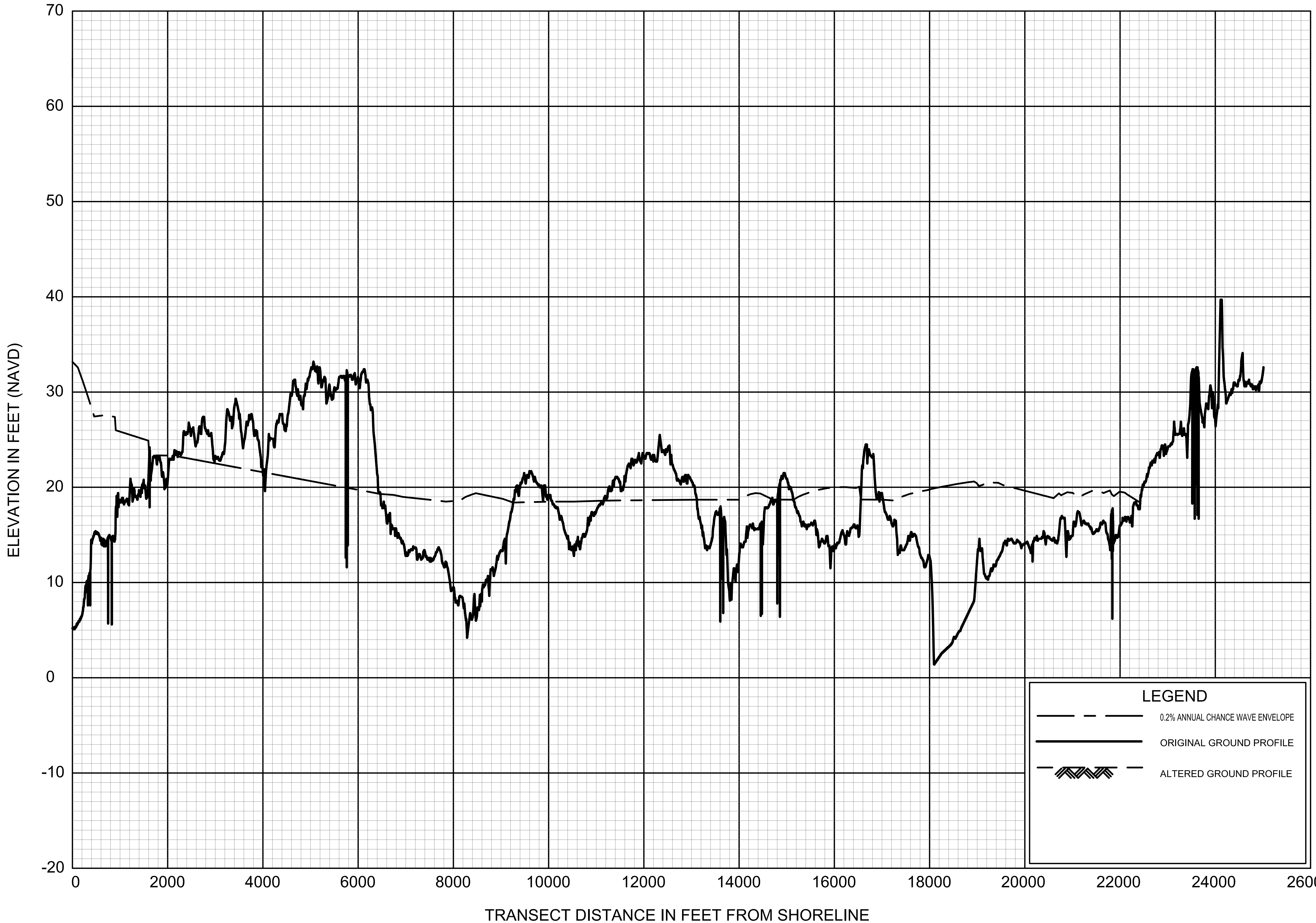
TRANSECT 41

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

47P



0.2% ANNUAL CHANCE WAVE ENVELOPE

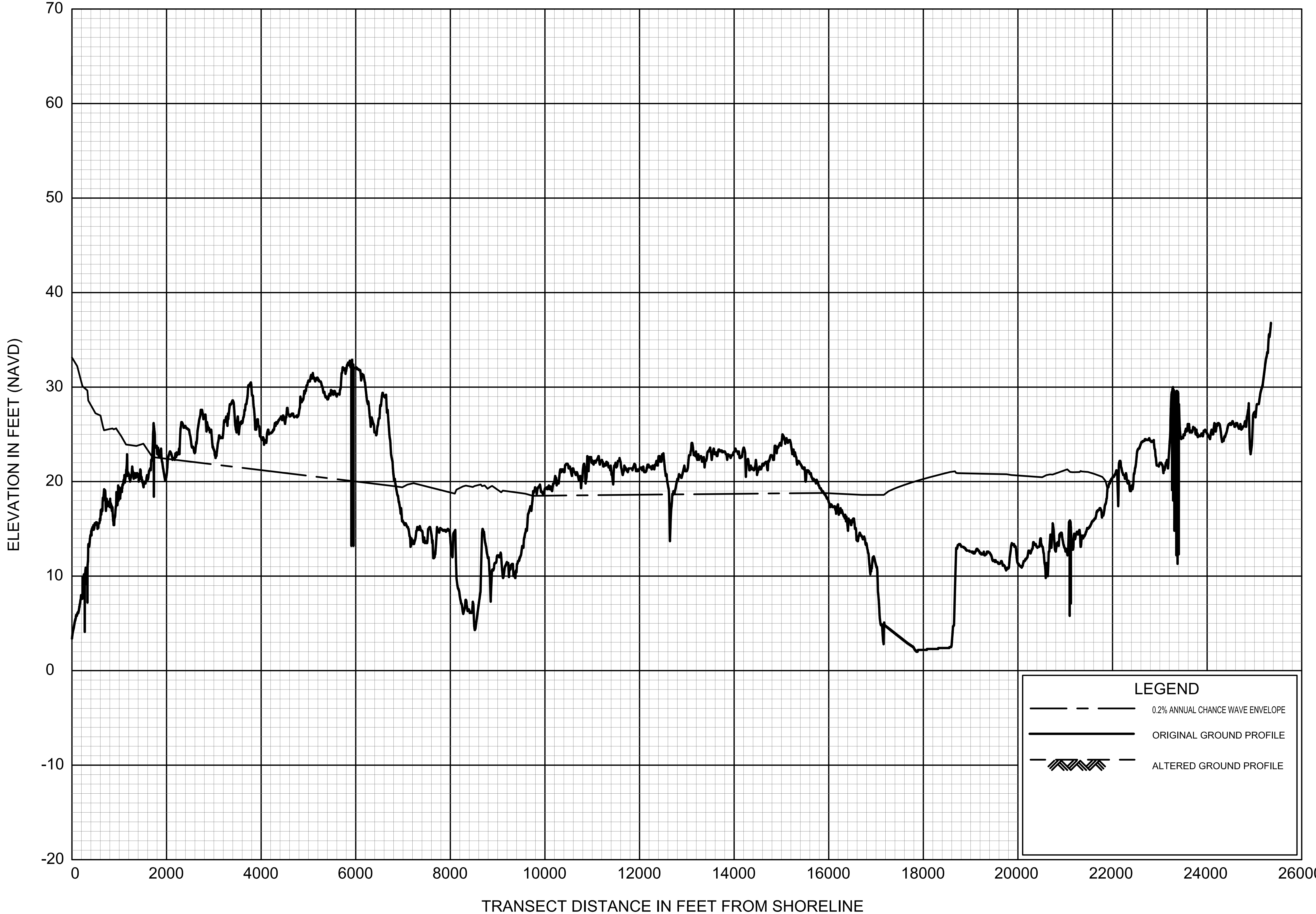
TRANSECT 42

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

48P



0.2% ANNUAL CHANCE WAVE ENVELOPE

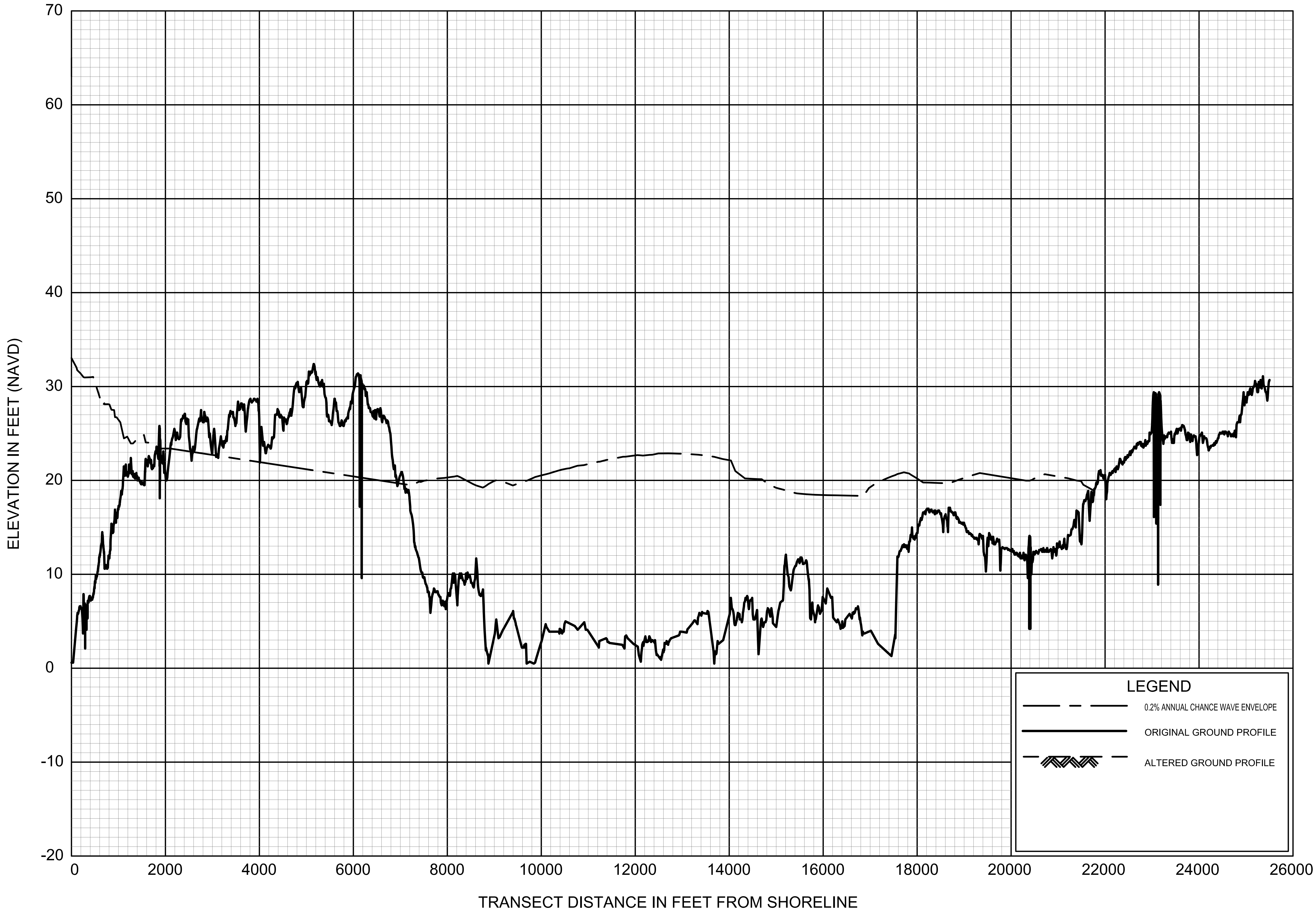
TRANSECT 43

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

49P



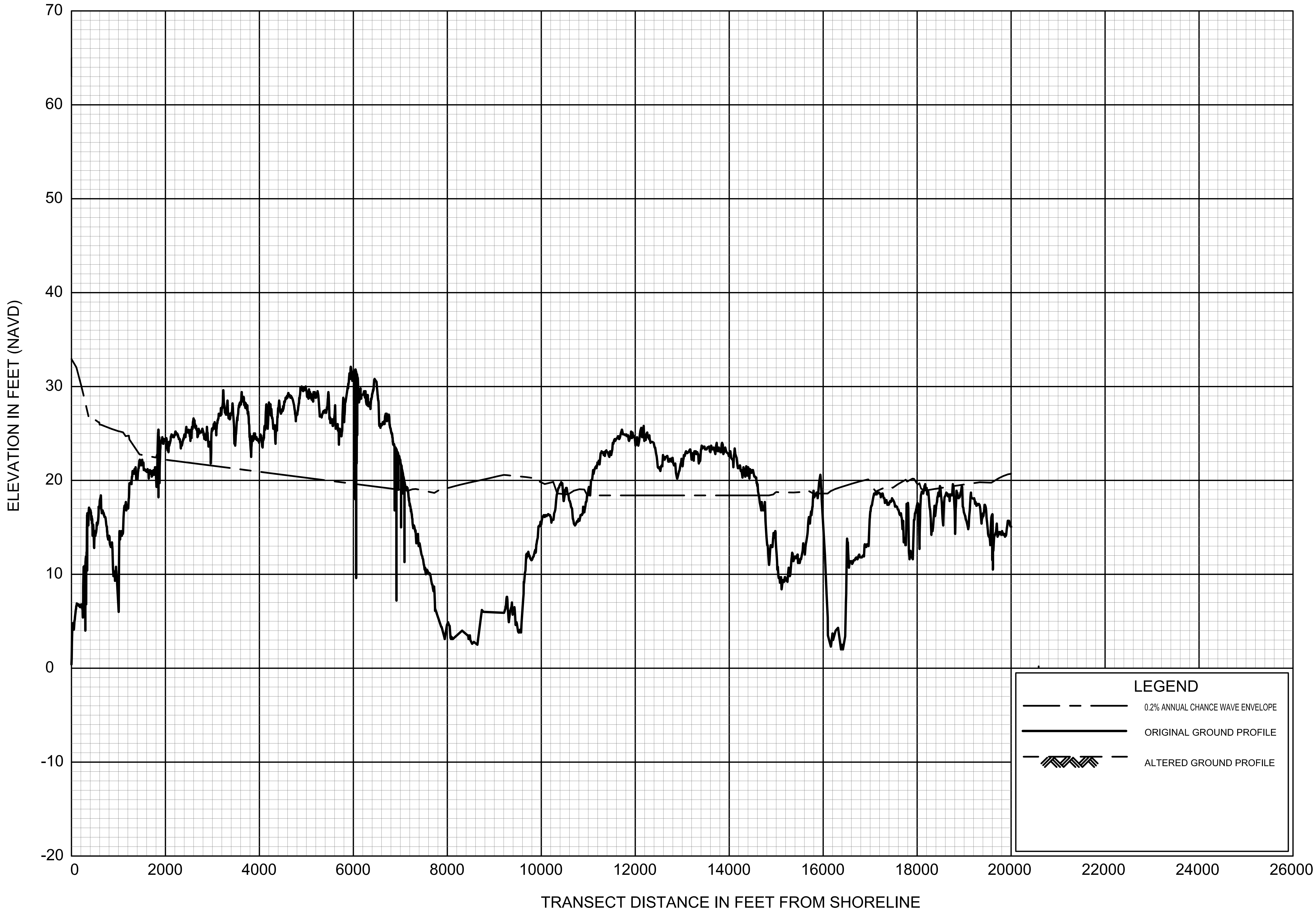
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 44

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

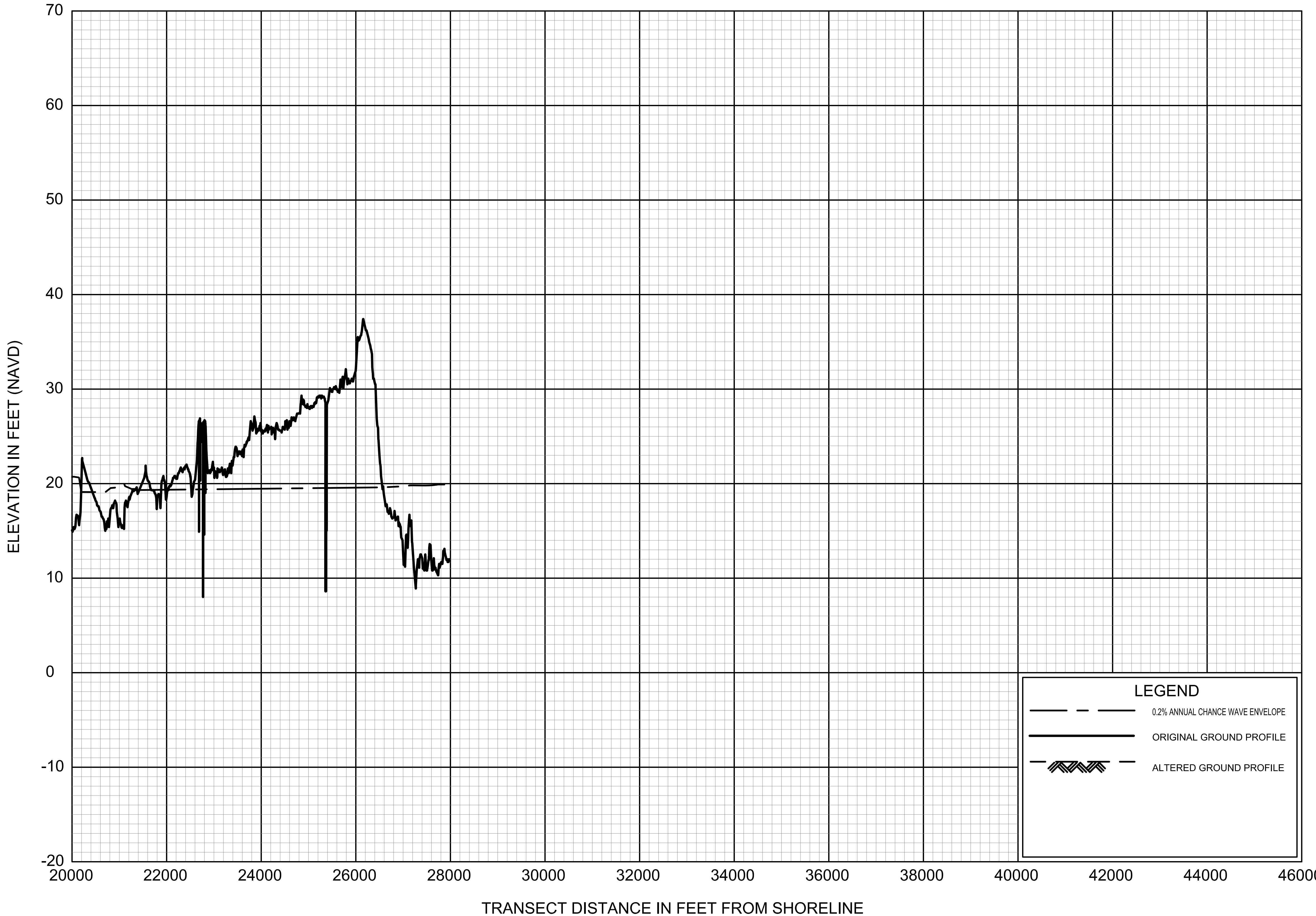
TRANSECT 45

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

51P



0.2% ANNUAL CHANCE WAVE ENVELOPE

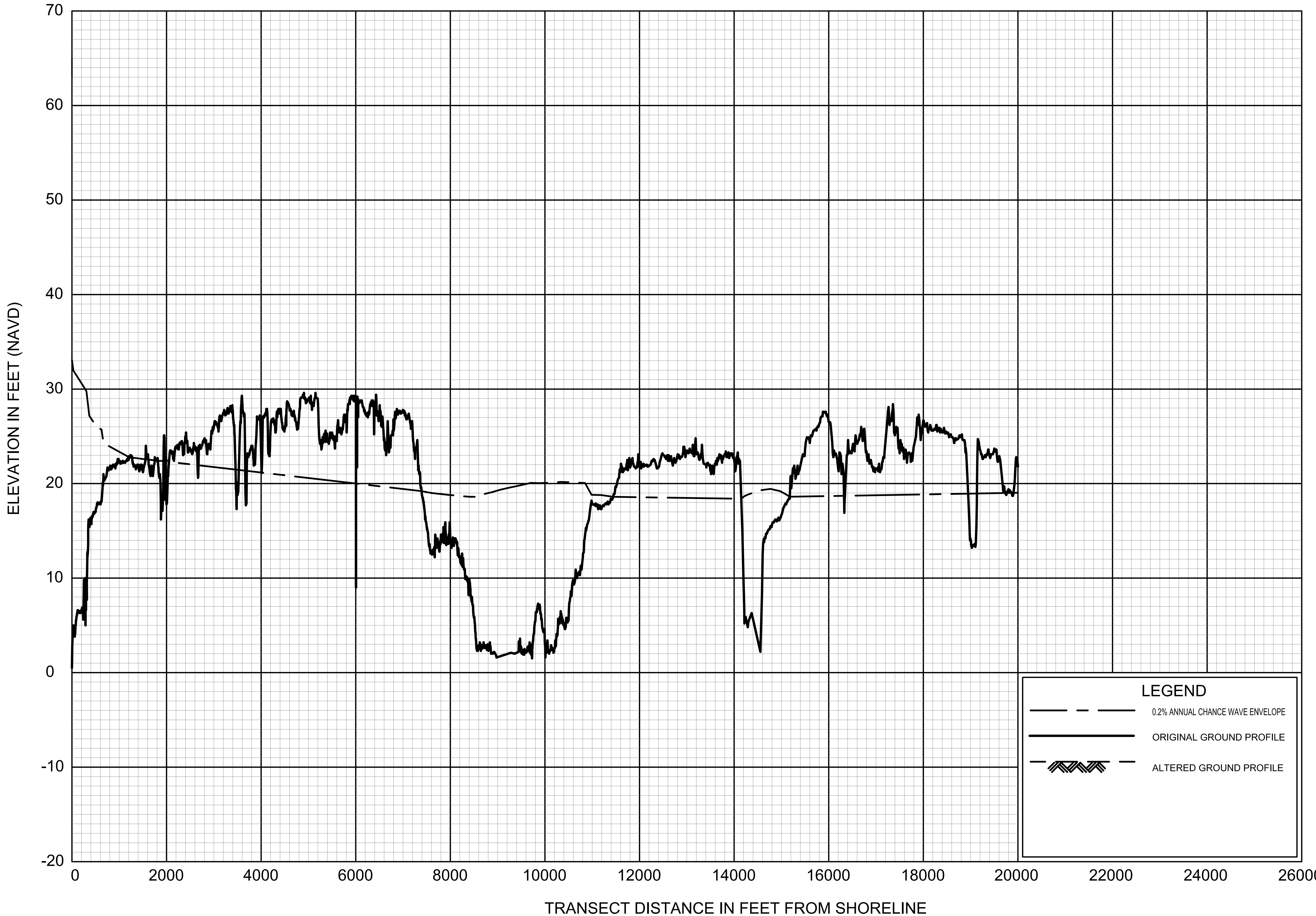
TRANSECT 45

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

52P



0.2% ANNUAL CHANCE WAVE ENVELOPE

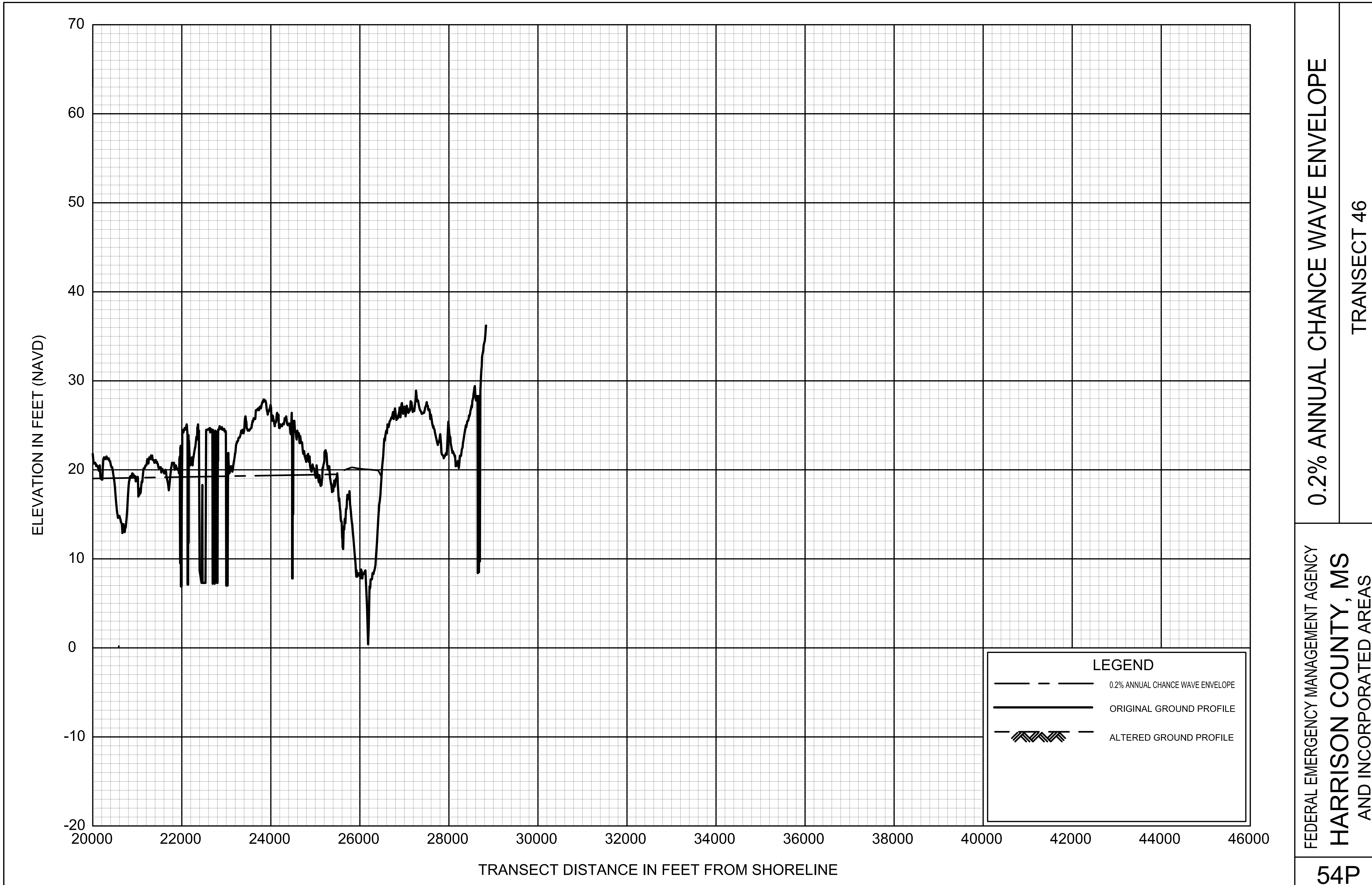
TRANSECT 46

FEDERAL EMERGENCY MANAGEMENT AGENCY

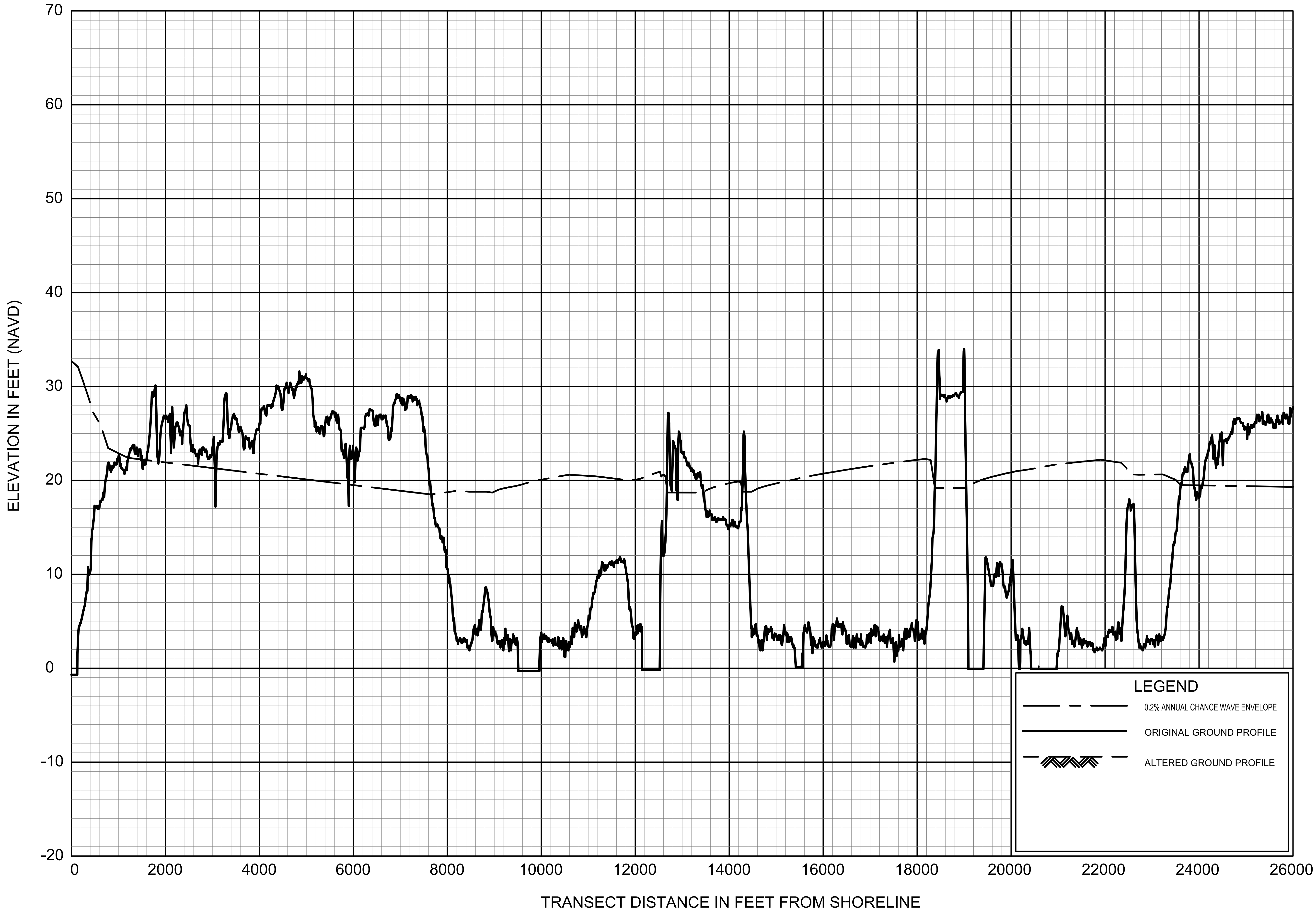
HARRISON COUNTY, MS

AND INCORPORATED AREAS

53P



ELEVATION IN FEET (NAVD)
70
60
50
40
30
20
10
0
-10
-20
20000
22000
24000
26000
28000
30000
32000
34000
36000
38000
40000
42000
44000
46000
TRANSECT DISTANCE IN FEET FROM SHORELINE
LEGEND
0.2% ANNUAL CHANCE WAVE ENVELOPE
ORIGINAL GROUND PROFILE
ALTERED GROUND PROFILE
0.2% ANNUAL CHANCE WAVE ENVELOPE
TRANSECT 46
FEDERAL EMERGENCY MANAGEMENT AGENCY
HARRISON COUNTY, MS
AND INCORPORATED AREAS
54P



0.2% ANNUAL CHANCE WAVE ENVELOPE

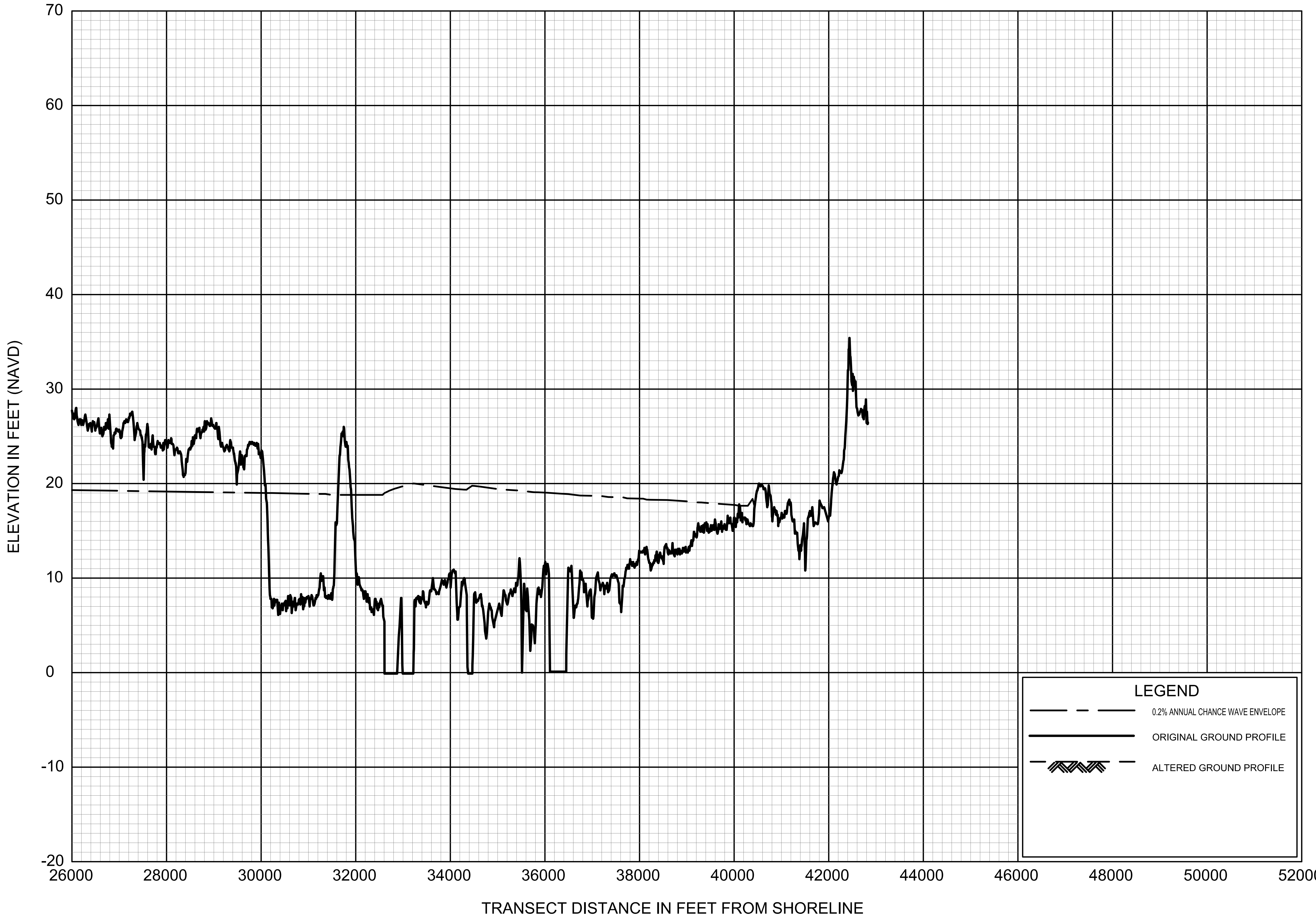
TRANSECT 47

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

55P



0.2% ANNUAL CHANCE WAVE ENVELOPE

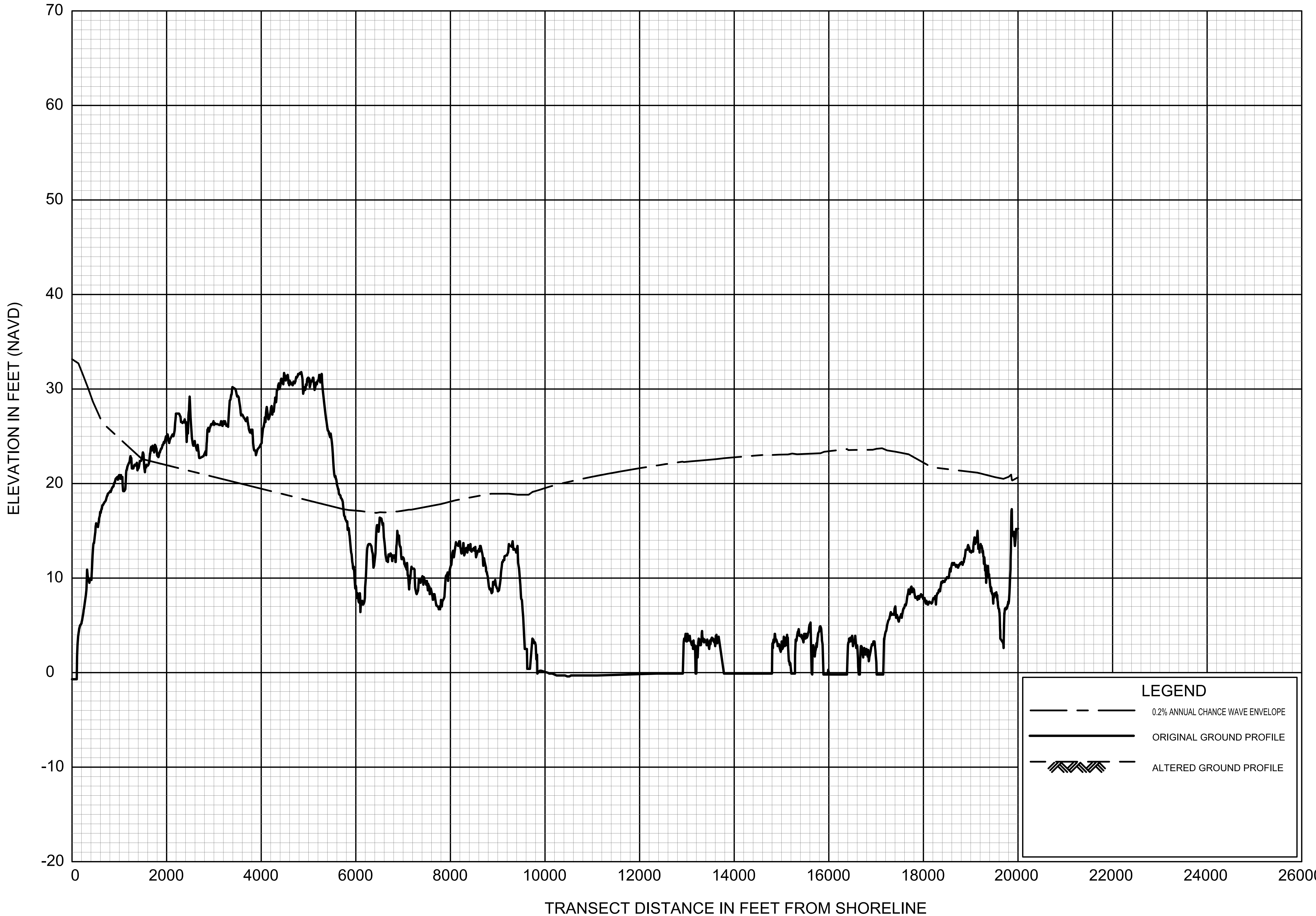
TRANSECT 47

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

56P



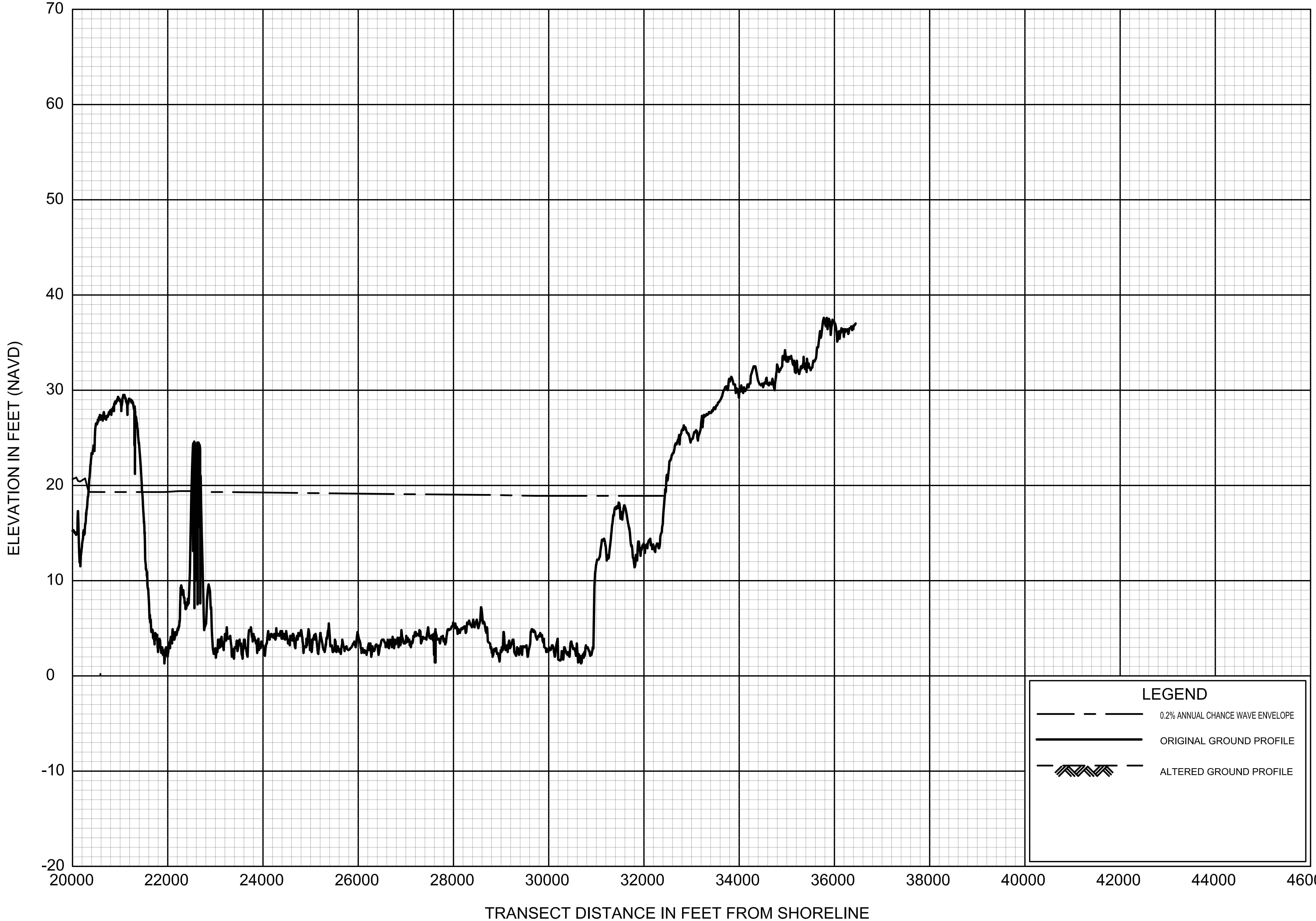
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 48

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



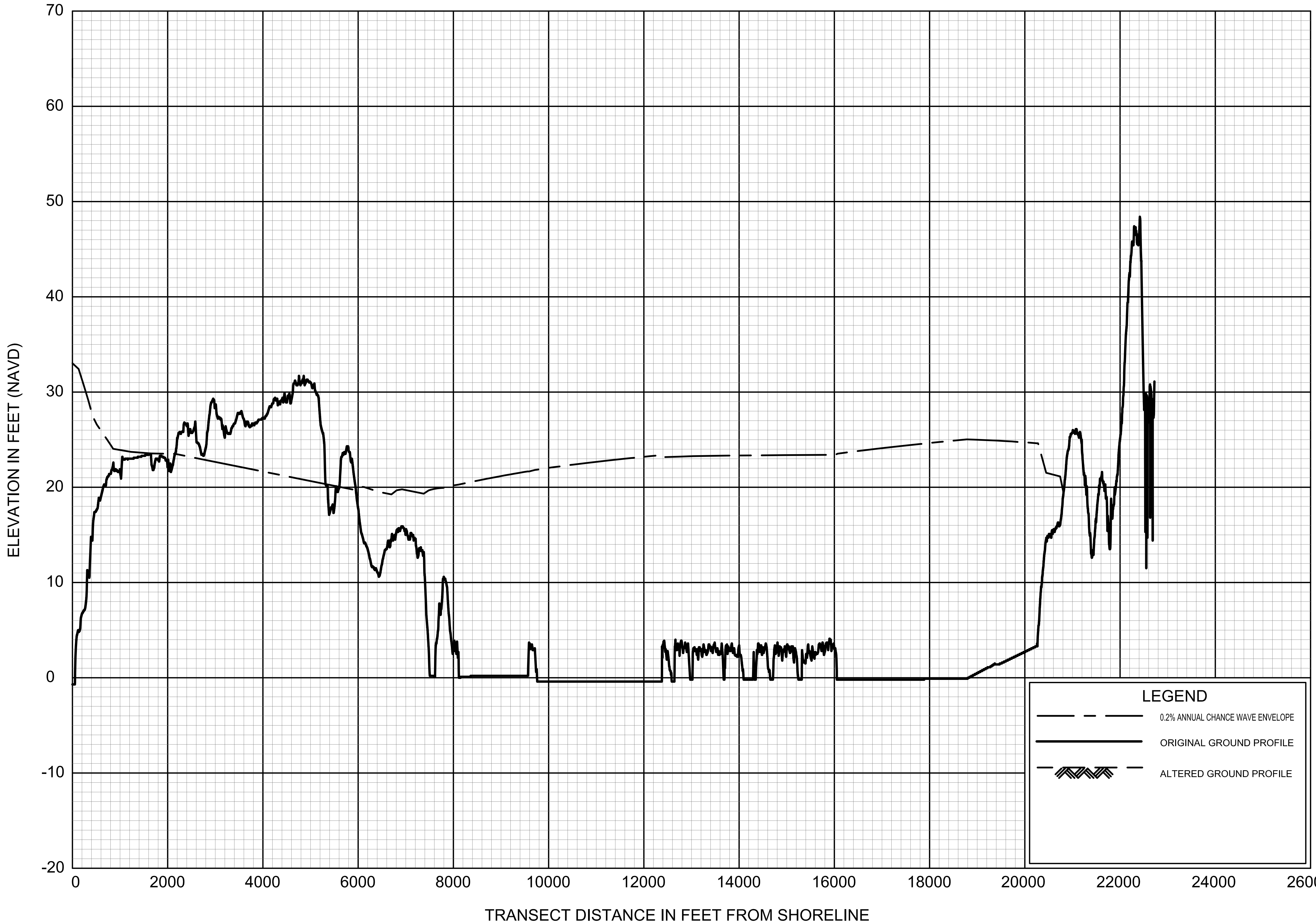
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 48

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

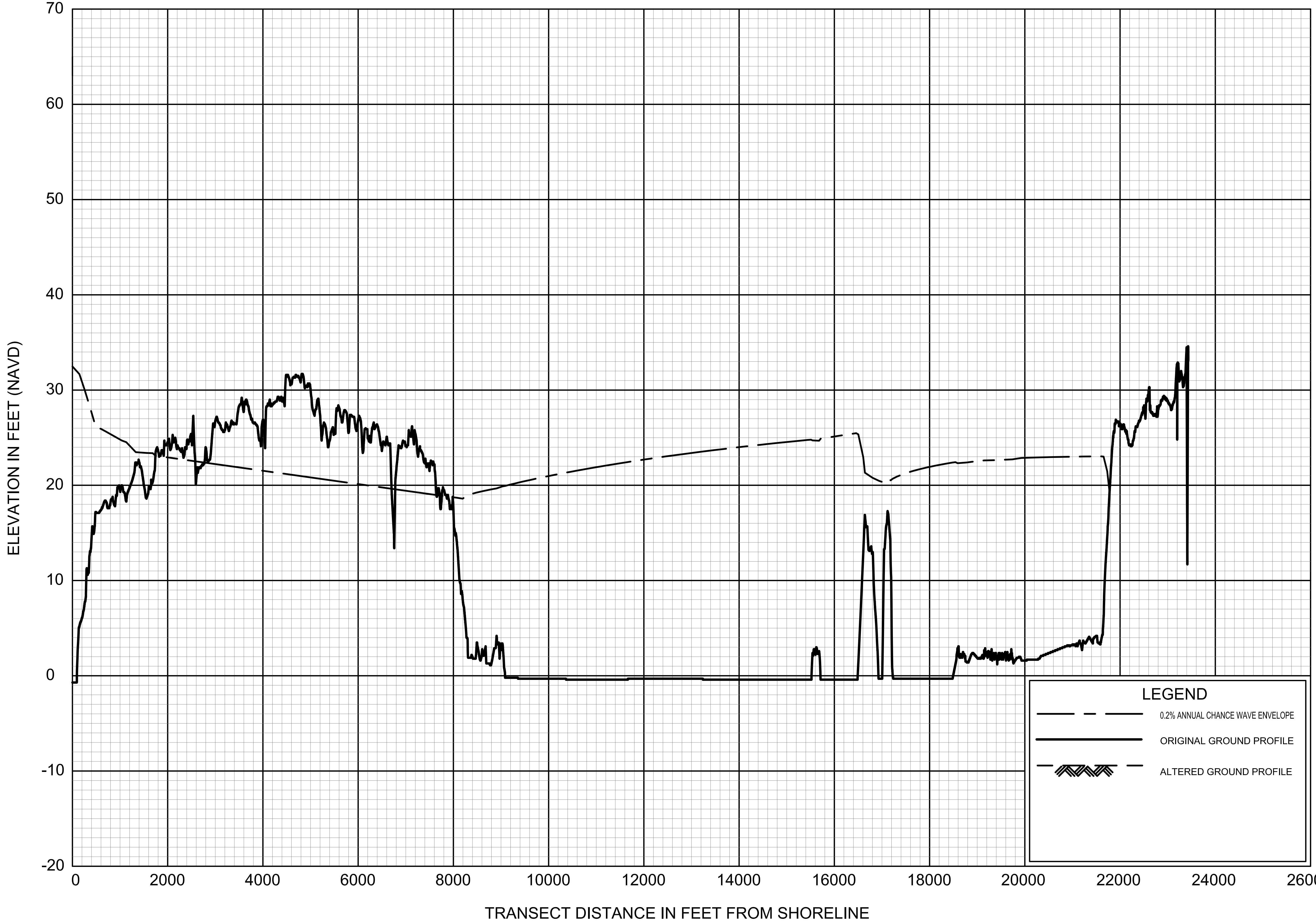
TRANSECT 49

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

59P



0.2% ANNUAL CHANCE WAVE ENVELOPE

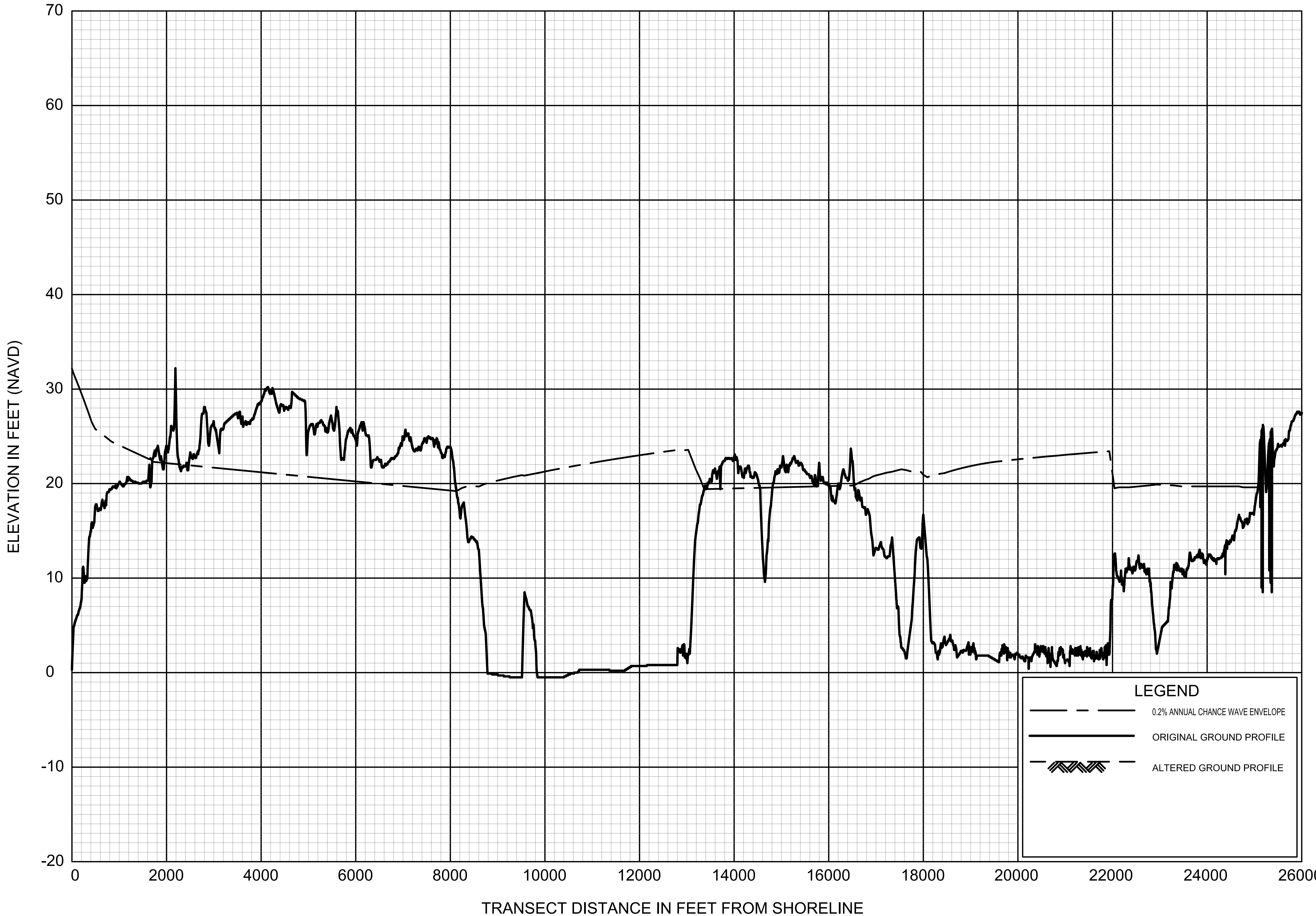
TRANSECT 50

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

60P



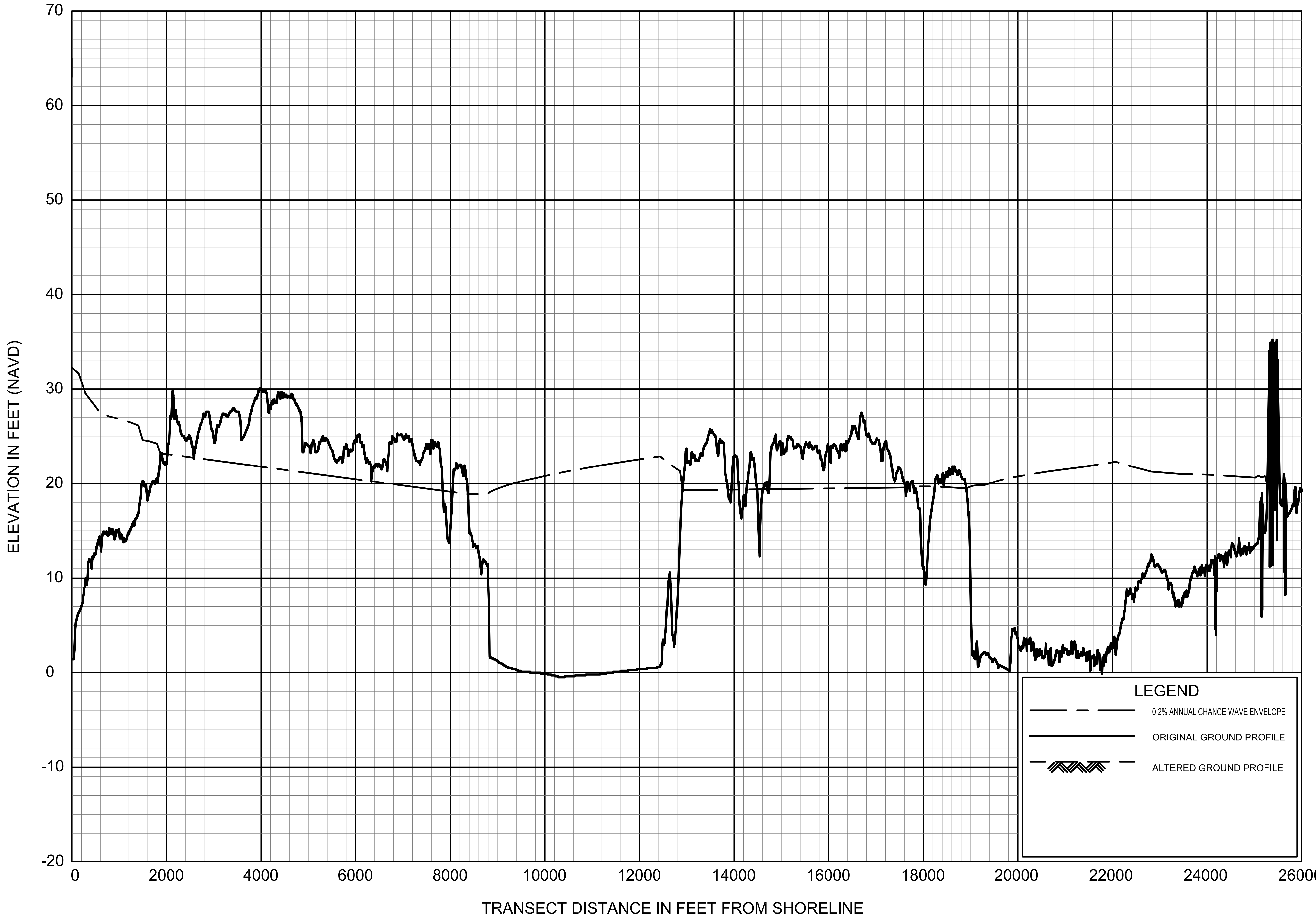
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 51

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 52

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

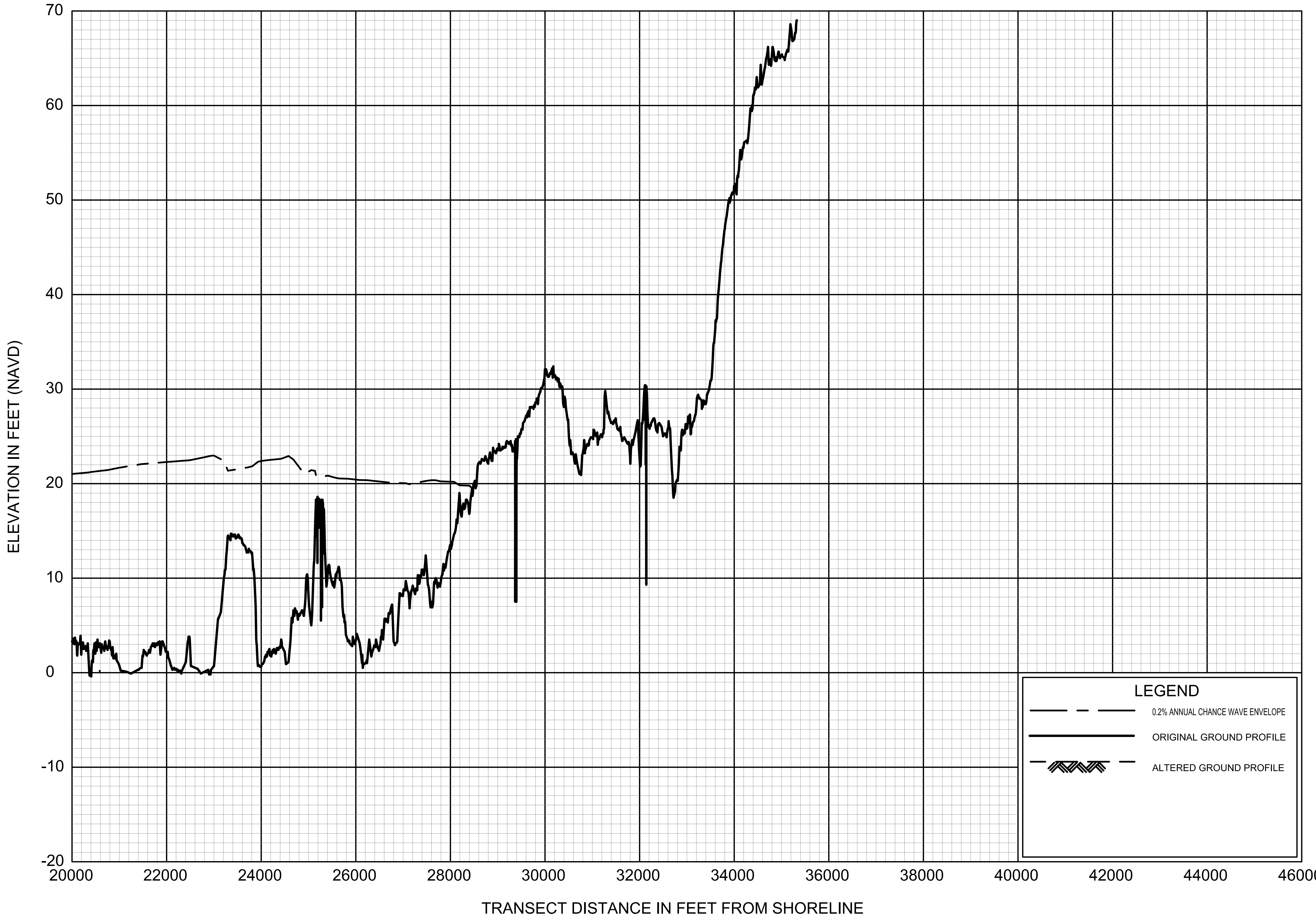
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 53

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

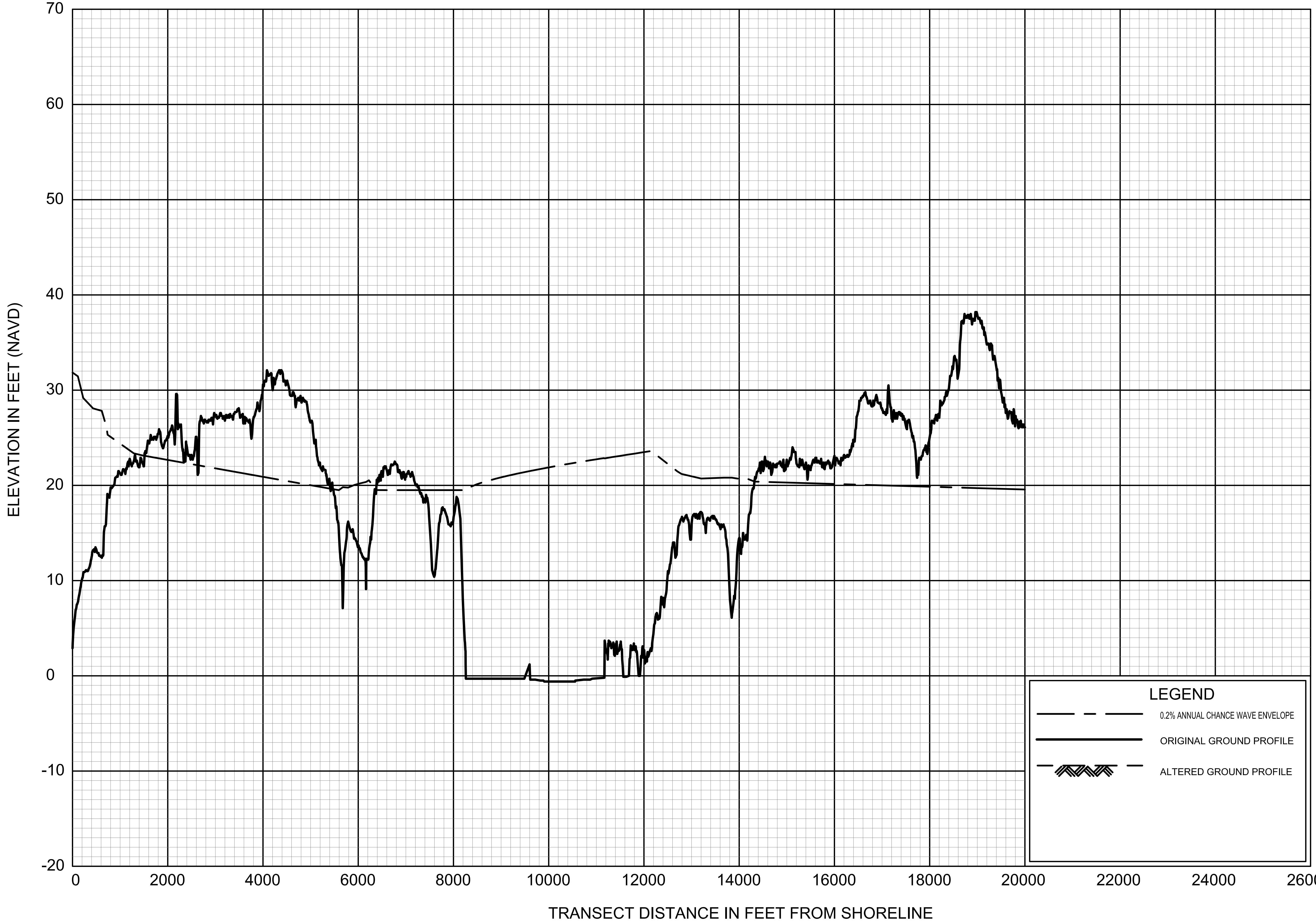
TRANSECT 53

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

64P



0.2% ANNUAL CHANCE WAVE ENVELOPE

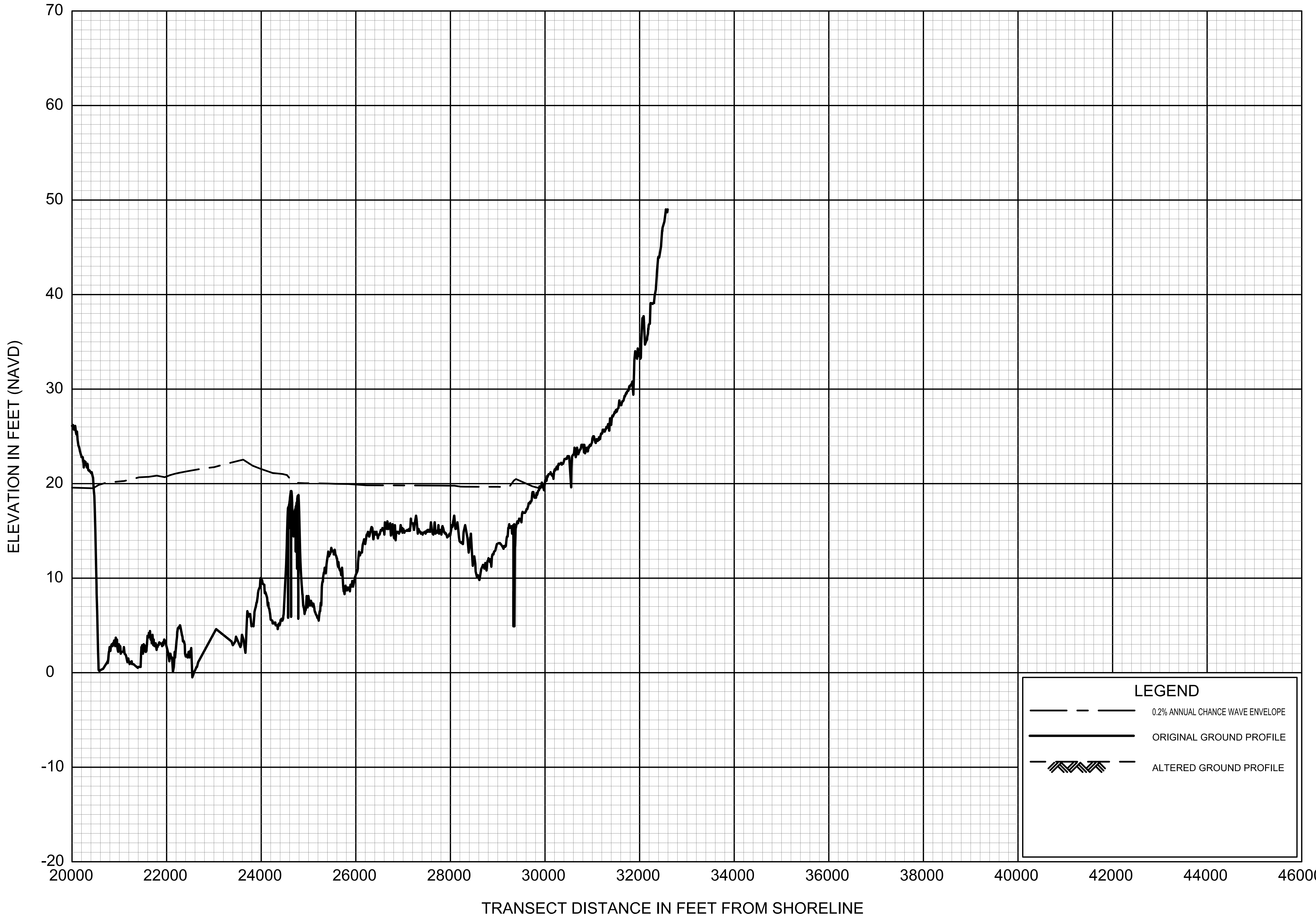
TRANSECT 54

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

65P



0.2% ANNUAL CHANCE WAVE ENVELOPE

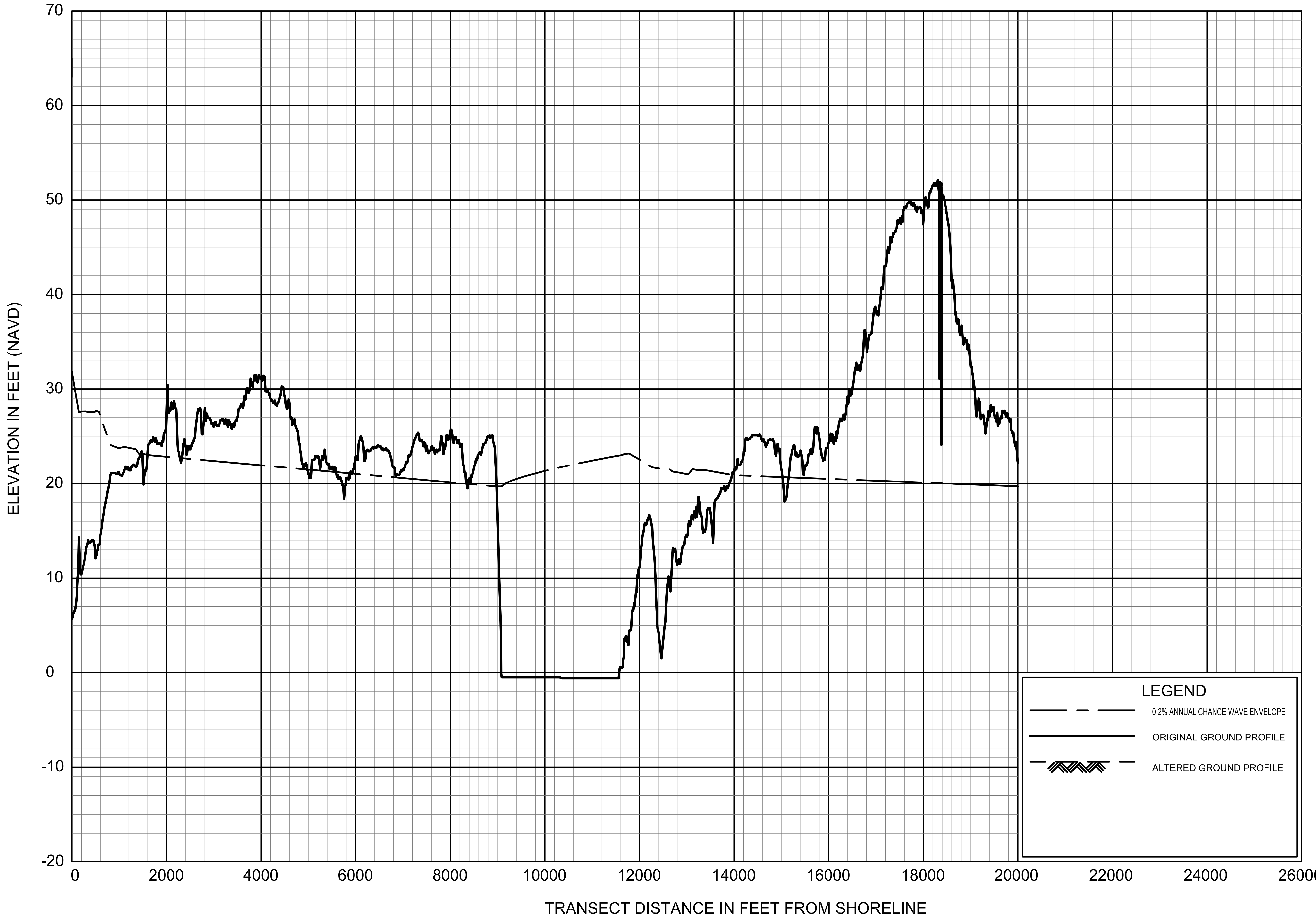
TRANSECT 54

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

66P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 55

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

67P

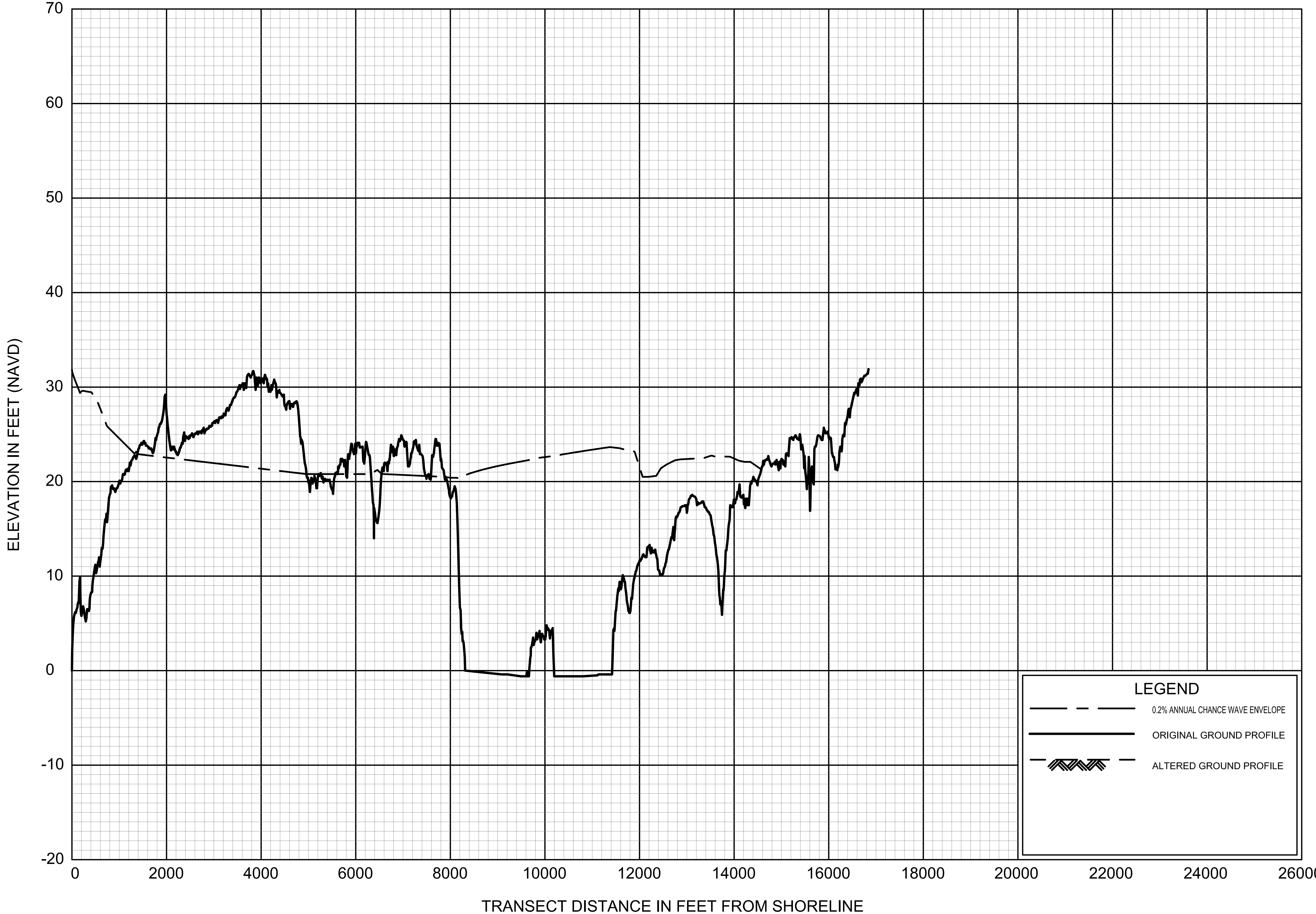
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 55

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

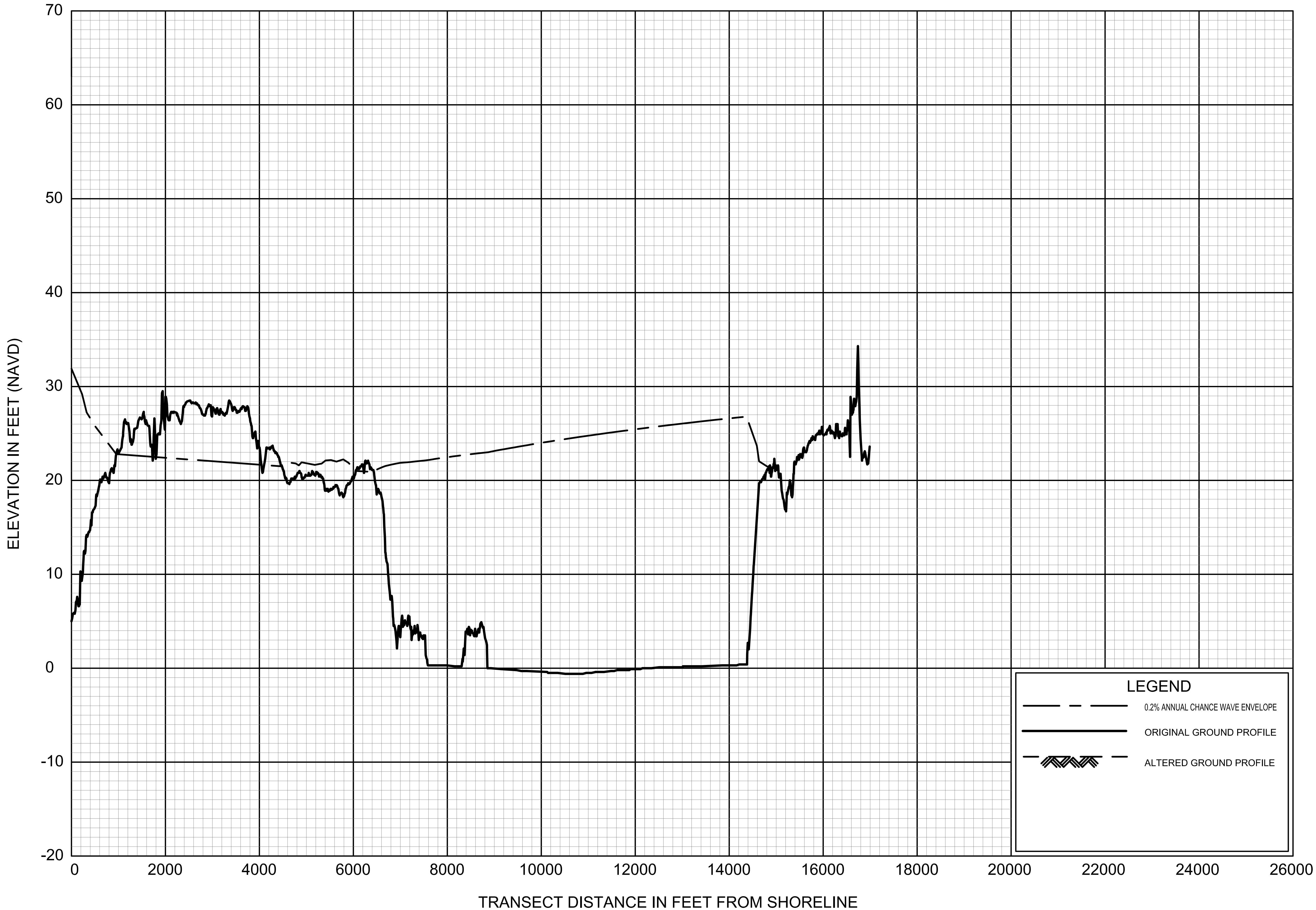
TRANSECT 56

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

69P



0.2% ANNUAL CHANCE WAVE ENVELOPE

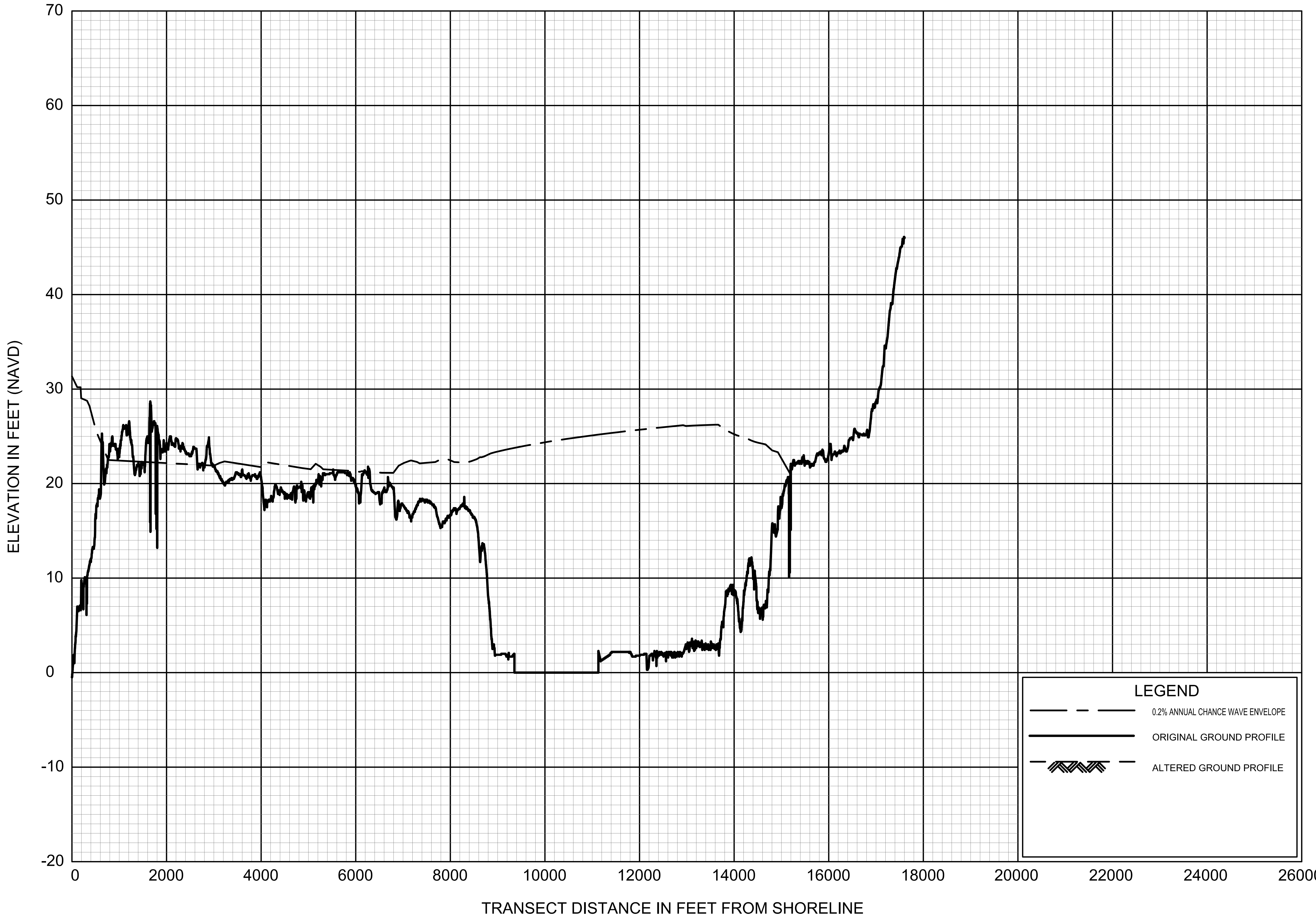
TRANSECT 57

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

70P



0.2% ANNUAL CHANCE WAVE ENVELOPE

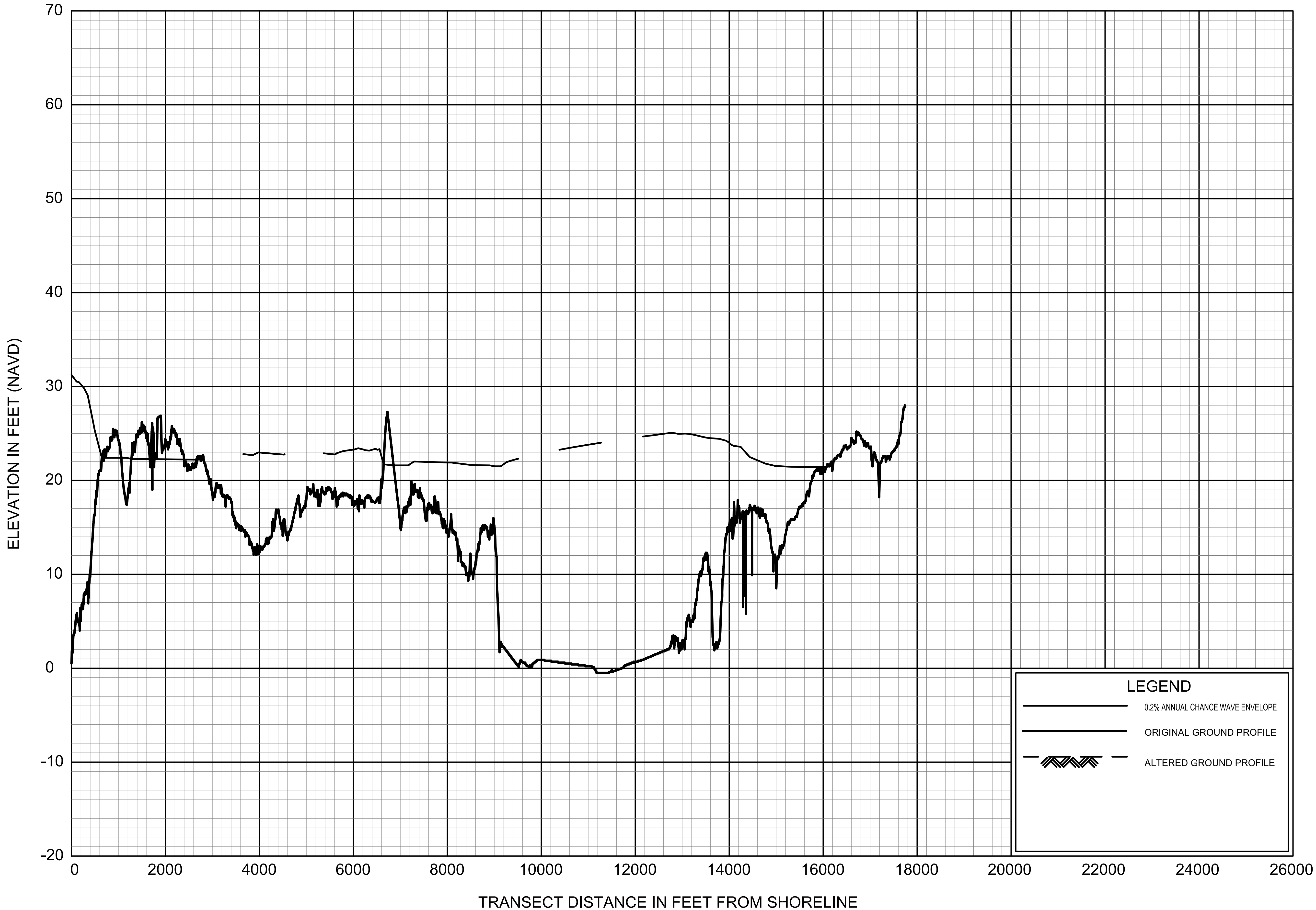
TRANSECT 58

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

71P



0.2% ANNUAL CHANCE WAVE ENVELOPE

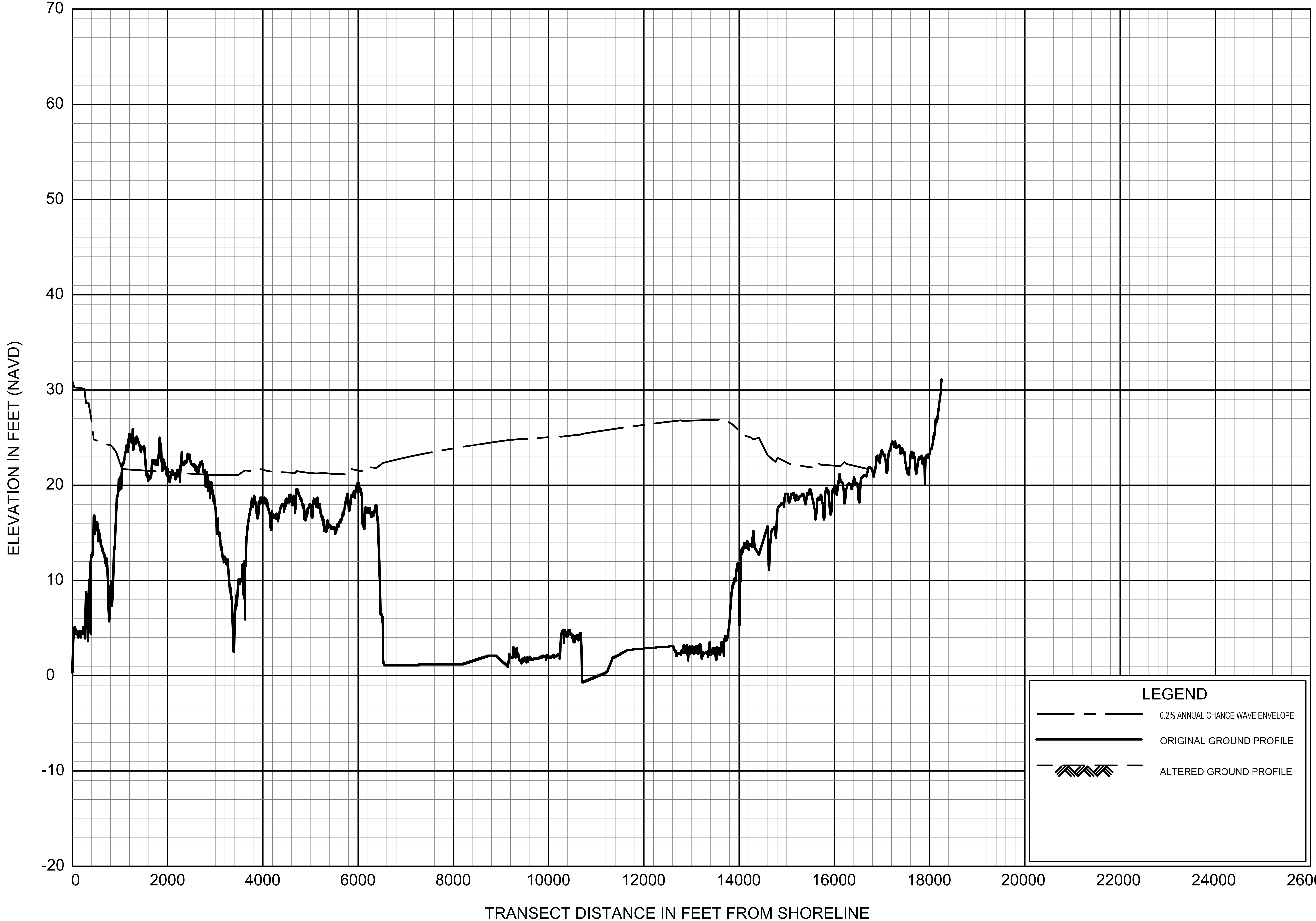
TRANSECT 59

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

72P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 60

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

0.2% ANNUAL CHANCE WAVE ENVELOPE

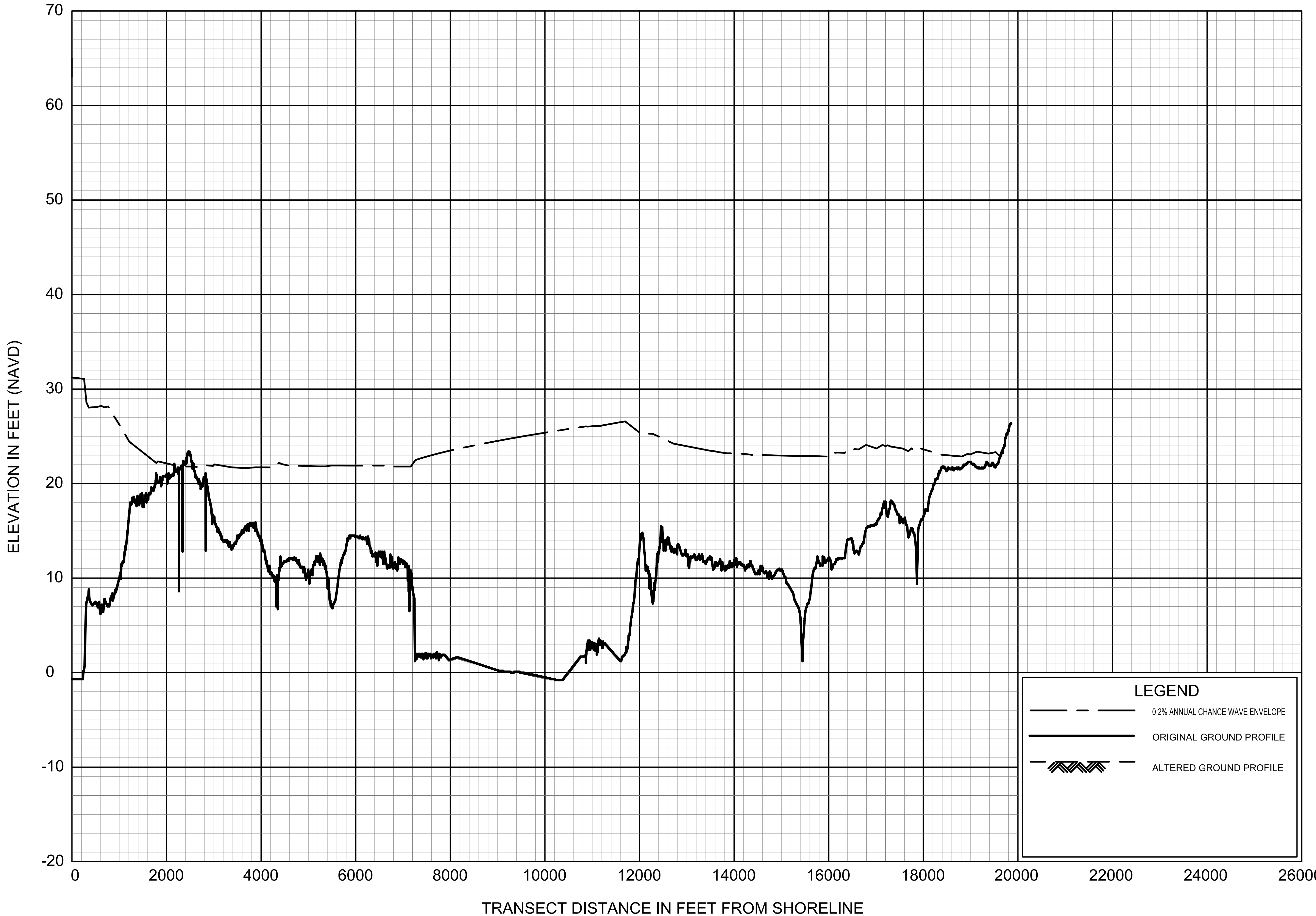
TRANSECT 61

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

74P



0.2% ANNUAL CHANCE WAVE ENVELOPE

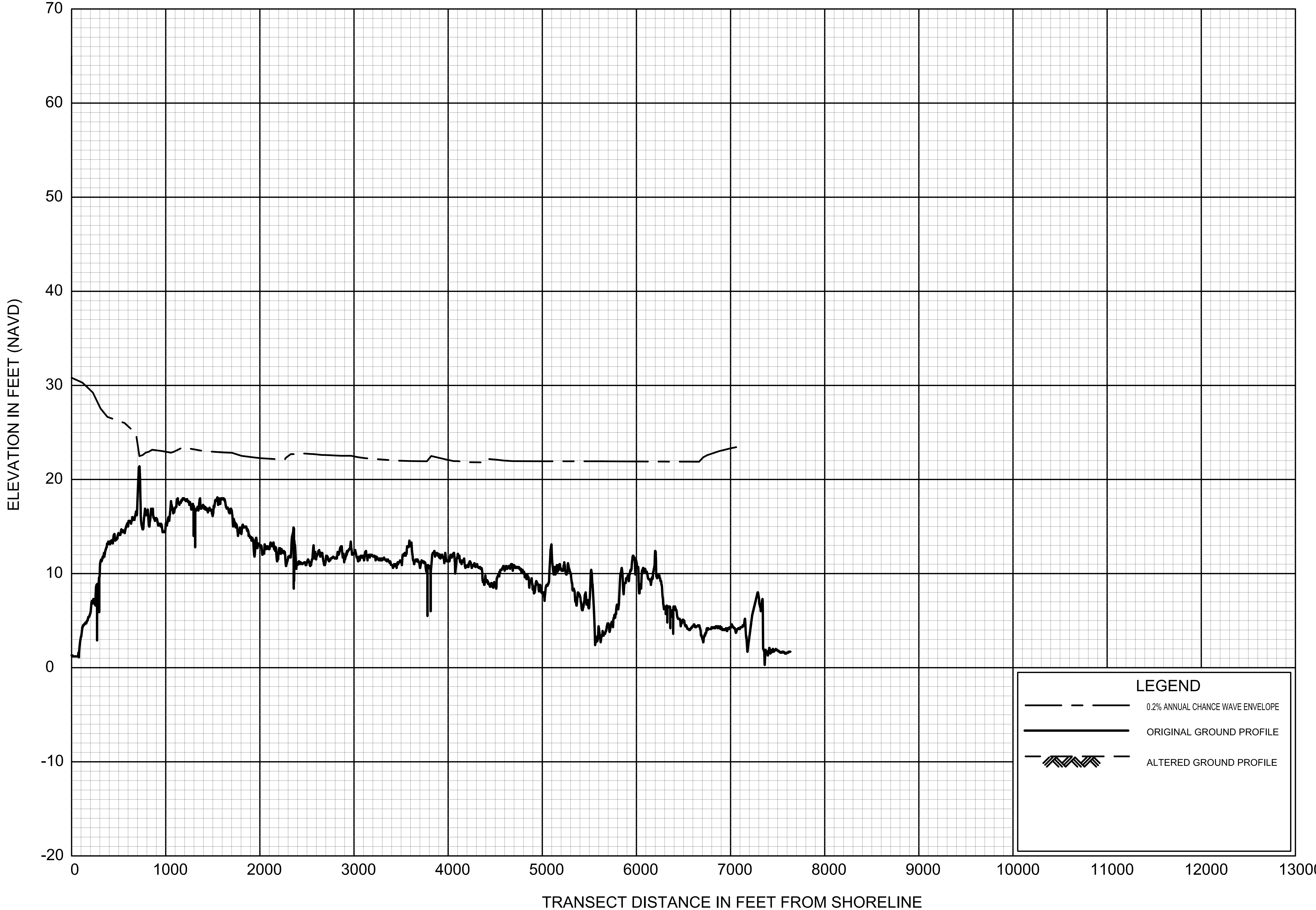
TRANSECT 62

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

75P



0.2% ANNUAL CHANCE WAVE ENVELOPE

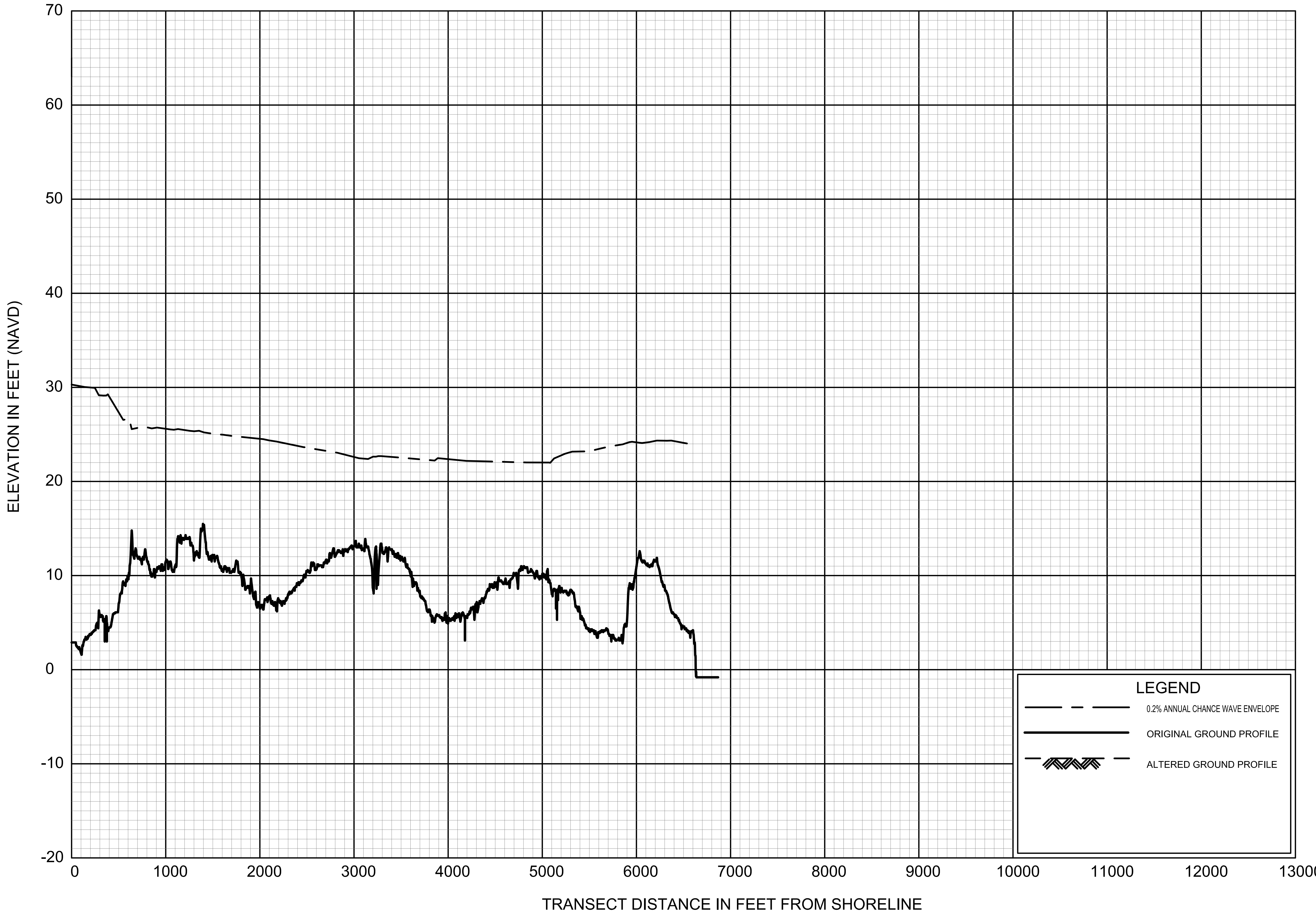
TRANSECT 63

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

76P



0.2% ANNUAL CHANCE WAVE ENVELOPE

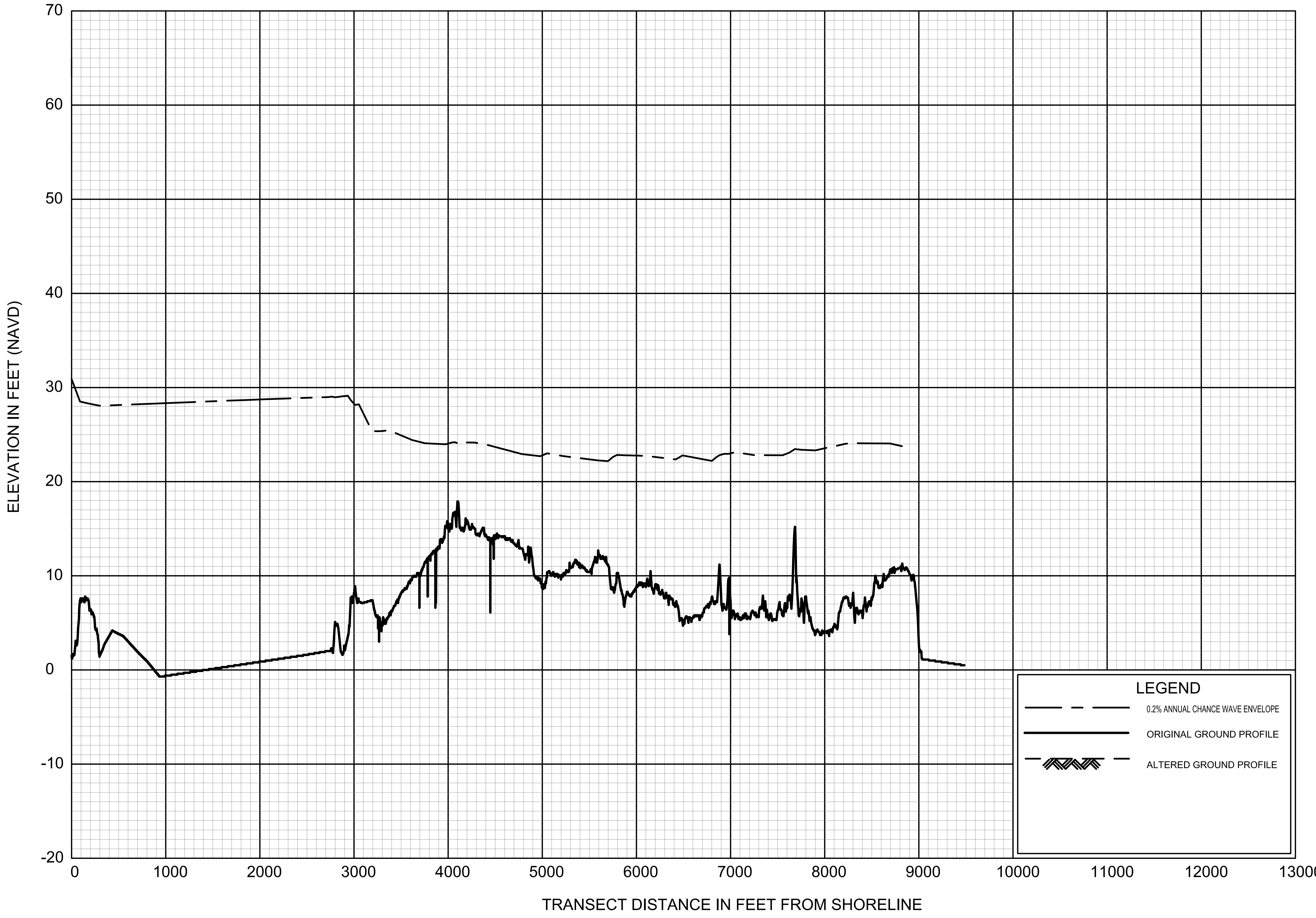
TRANSECT 64

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

77P



0.2% ANNUAL CHANCE WAVE ENVELOPE

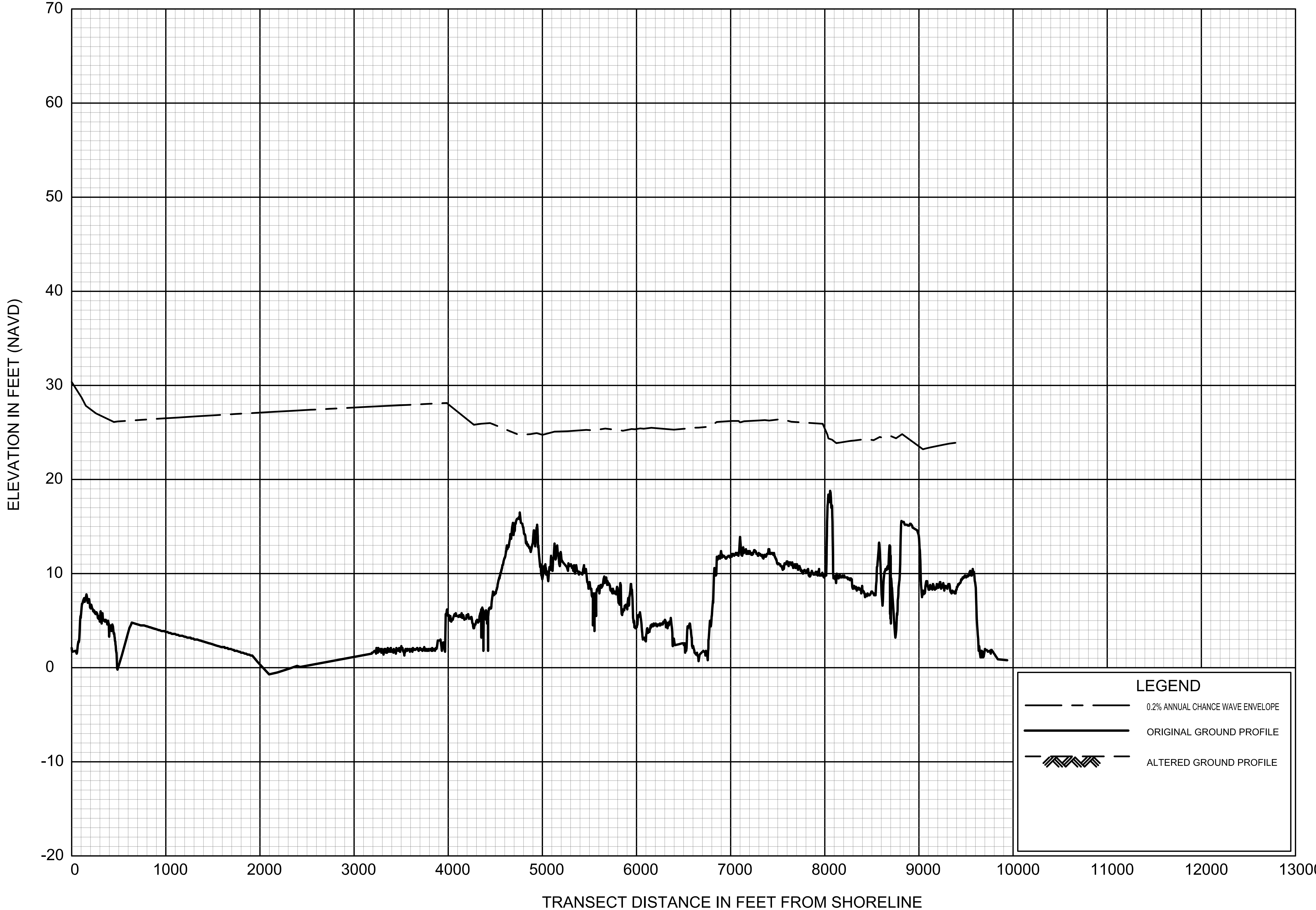
TRANSECT 65

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

78P



0.2% ANNUAL CHANCE WAVE ENVELOPE

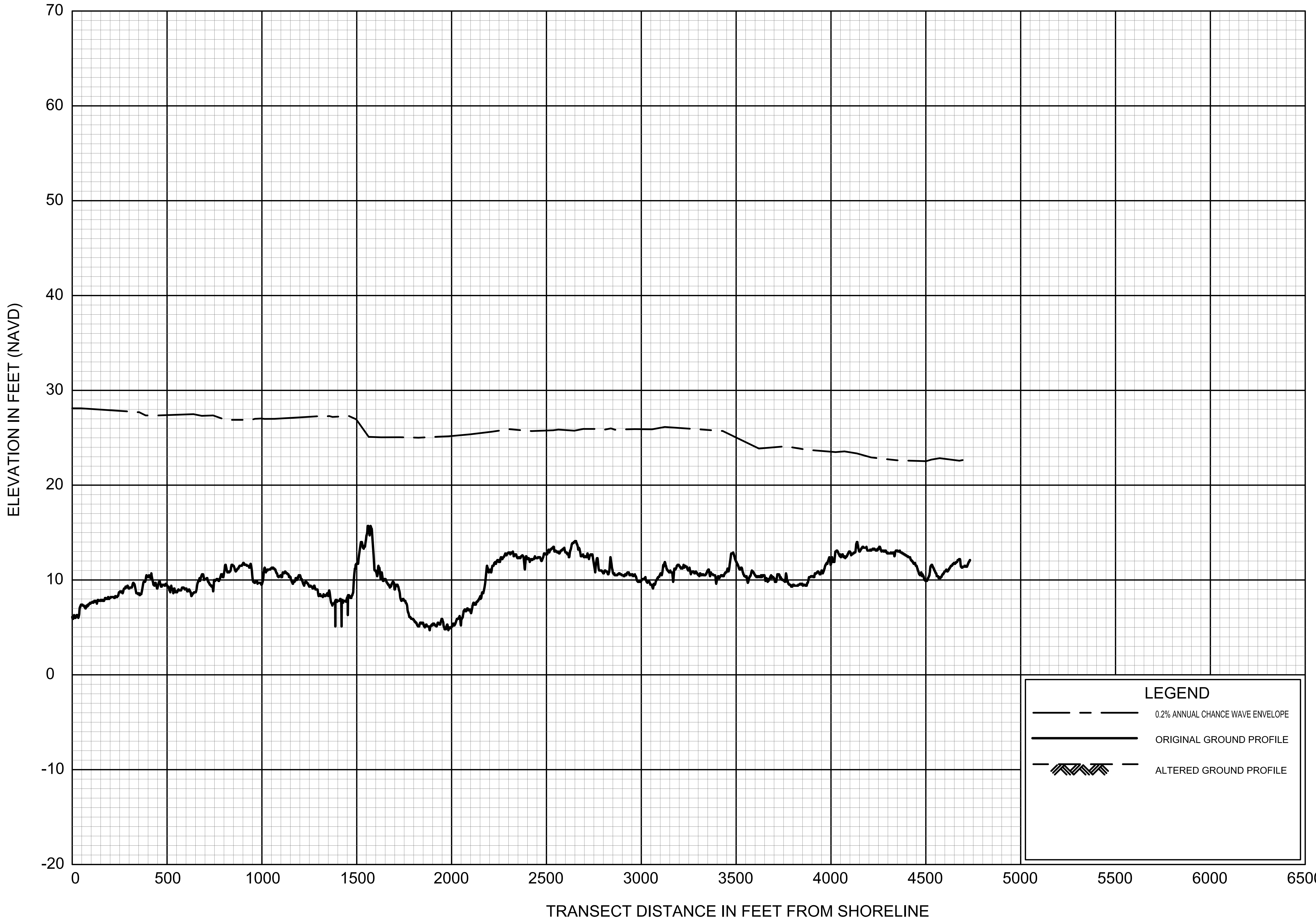
TRANSECT 66

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

79P



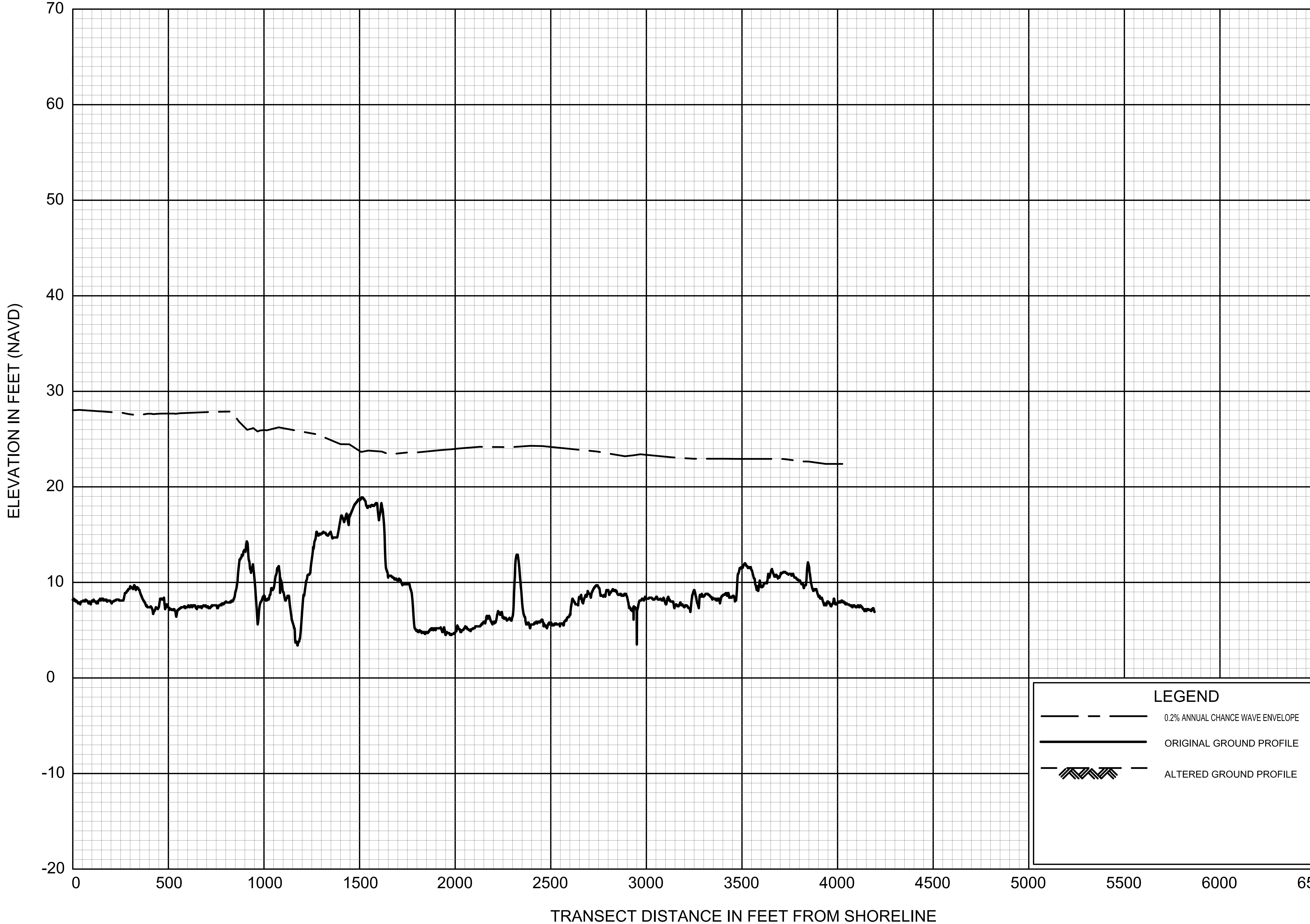
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 67

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 68

FEDERAL EMERGENCY MANAGEMENT AGENCY

HARRISON COUNTY, MS

AND INCORPORATED AREAS

81P