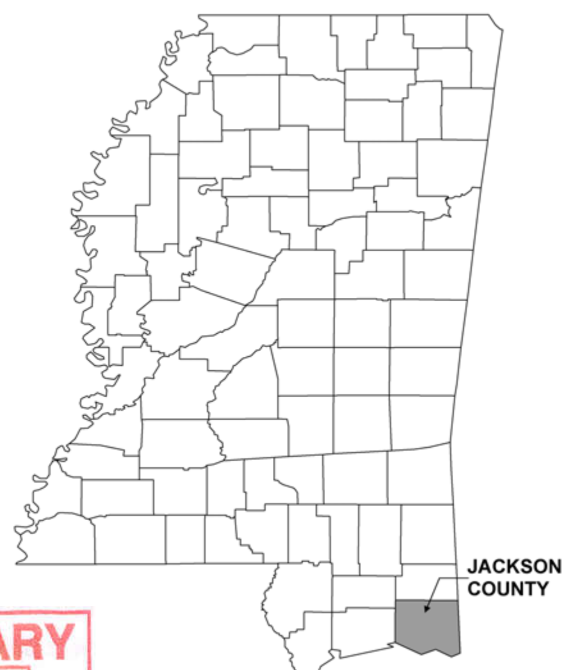
FLOOD INSURANCE STUDY

JACKSON COUNTY, MISSISSIPPI

AND INCORPORATED AREAS

VOLUME 1 OF 2



COMMUNITY NAME	COMMUNITY NUMBER
GAUTIER, CITY OF	280332
JACKSON COUNTY (UNINCORPORATED AREAS)	285256
MOSS POINT, CITY OF	285258
OCEAN SPRINGS, CITY OF	285259
PASCAGOULA, CITY OF	285260

PRELIMINARY
NOV 16 2007

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
28059CV001A

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:

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FLOOD INSURANCE STUDY
JACKSON 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 Jackson County, Mississippi, including the City of Gautier, City of Moss Point, City of Ocean Springs, City of Pascagoula and unincorporated areas of Jackson County (hereinafter referred to collectively as Jackson 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 Jackson 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, Jackson 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.

Gautier, City of:	The hydrologic and hydraulic analyses for the December 3, 1987 FIS were obtained from the Flood Insurance Study for the Unincorporated Areas of Jackson County, Mississippi (Reference 1).
Jackson County (Unincorporated Areas):	The coastal hydrologic and hydraulic analysis for the Mississippi Sound and riverine analyses for the lower reaches of the Escatawpa River, Johns Bayou, Bluff Creek, Black Creek, Cypress Creek and Old Fort Bayou for the September 4, 1987 FIS were performed by Gee and 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 February 1985. Hydrologic and hydraulic data for determination of floodways in the upper reaches of streams listed above as well as for the Pascagoula River, Bayou Costapia, Lyons Creek, Moungers Creek, Perigal Creek, Waters Creek, Woodmans Branch, Ditch No. 1, Ditch No. 2, Ditch No. 3, and the Tchoutacabouffa River were taken from the FIS prepared by the U.S. Soil Conservation Service (SCS) in 1972 and a second FIS for the Unincorporated Areas of Jackson County (References 2 and 3).

Moss Point, City of:	The hydrologic and hydraulic analyses for the September 4, 1987 FIS, as well as the coastal hydrologic and hydraulic analyses, were performed by Gee and Jenson Engineers, Architects, Planners, Inc., (the study contractor) for FEMA, under Contract No. EMW-C-0159. This study was completed in February 1985.
Ocean Springs, City of:	The hydrologic and hydraulic analyses for the March 18, 1987 FIS were performed by Gee and Jenson Engineers, Architects, Planners, Inc., (the study contractor) for FEMA, under Contract No. EMW-C-0159. This study was completed in February 1985.
Pascagoula, City of:	The hydrologic and hydraulic analyses for the September 15, 1983 FIS were performed by Gee and Jenson Engineers, architects, Planners, Inc., (the study contractor) for FEMA, under Contract No. EMW-C-0159. This study was completed in July 1982.

The hydrologic and hydraulic analyses for this countywide FIS were performed by the State of Mississippi for FEMA, under Contract No. EMA-2004-CA-5028. 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 Jackson County are shown in Table 1, "CCO Meeting Dates."

TABLE 1. CCO MEETING DATES

Community Name	Initial CCO Date	Final CCO Date
Gautier, City of	*	September 16, 1987
Jackson County (Unincorporated Areas)	June 18, 1979	September 16, 1986
Moss Point, City of	June 18, 1979	September 16, 1986
Ocean Springs, City of	June 18, 1979	July 7, 1986
Pascagoula, City of	June 18, 1979	April 7, 1983

* 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 July 14, 2004, followed by a Post-Scoping Meeting on August 27, 2004. Attendees for these meetings included representatives from the Mississippi Department of Environmental Quality, Mississippi Emergency Management Agency, FEMA National Service Provider, Jackson County and the incorporated communities within Jackson 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 Jackson County, Mississippi, including the incorporated communities listed in Section 1.1.

The December 3, 1987 FIS for the City of Gautier covered the incorporated area of the city. The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data. Approximate methods of analysis were used to study all remaining areas having a potential flood hazard that did not have detailed scientific or technical data available. The areas studied by approximate methods were the upper portions of Sioux Bayou and Mary Walker Bayou.

The September 4, 1987 FIS for the City of Moss Point covered the incorporated area of the city. Flooding caused by overflow of the Escatawpa River and the Pascagoula River was studied by detailed methods within the community. 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 February 1990. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Moss Point.

The March 18, 1987 FIS for the City of Ocean Springs covered the incorporated area of the city. Flooding caused by overflow of Old Fort Bayou, Biloxi Bay, Davis Bayou and Mississippi Sound within the community was studied in detail. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. Approximate analyses were used to study several areas along Old Fort Bayou, Biloxi Bay, Davis Bayou, and the Mississippi Sound. The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through September 1988. The scope and methods of study were proposed to and agreed upon by FEMA and the City of Ocean Springs.

The September 15, 1983 FIS study of the City of Pascagoula covered the incorporated area of the city. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through July 1987.

The September 4, 1987 FIS study of Jackson County, Mississippi covered the unincorporated areas of the county. Portions of the flooding caused by overflow of the Escatawpa River, Johns Bayou, Bluff Creek, Black Creek, Cypress Creek and Old Fort Bayou were studied in detail. Portions of Bayou Costapia, Lyons Creek, Moungers Creek, Perigal Creek, Waters Creek, Woodmans Branch and the Tchoutacabouffa River were also studied in detail. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. Portions of the Escatawpa River, Bluff Creek, Bayou Costapia, Black Creek, the Pascagoula River and other tributaries were studied by 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 February 1990. The scope and methods of study were proposed to and agreed upon by FEMA and Jackson County.

Limited detailed 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 State of Mississippi. For this FIS study, the following table lists the streams which were newly studied by Limited detailed methods:

TABLE 2. STREAMS STUDIED BY LIMITED DETAILED METHODS

Stream	Limits of Revision/New Limited Detailed Study
Jackson Creek	From the confluence with Escatawpa River to the Mississippi/Alabama state line.
Jackson Creek Tributary 2	From the confluence with Jackson Creek to a point approximately 4,150 feet upstream of the confluence with Jackson Creek.
Old Fort Bayou Tributary 7	From a point approximately 4,750 feet upstream of the confluence with Old Fort Bayou to a point approximately 350 feet upstream of Humphrey Road.
Old Fort Bayou Tributary 8	From a point approximately 2,100 feet upstream of the confluence with Old Fort Bayou Tributary 7 to a point approximately 4,600 feet upstream of the confluence with Old Fort Bayou Tributary 7.
Waters Creek	From McGregor Road to the confluence with Waters Creek Tributary 4.

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

Jackson County encompasses approximately 736 square miles and is bordered on the north by George County, on the east by Mobile County, Alabama, and on the west by Harrison and Stone Counties. The boundaries extend southward into the Mississippi Sound including Petit Bois, Horn, and Round Islands. It is located approximately 165 miles south of the City of Jackson, Mississippi, 15 miles west of the City of Mobile, Alabama and 75 miles east of the City of New Orleans, Louisiana.

Primary east-west traffic in Jackson County is served by Interstate 10 and U.S. Highway 90. North-south access is provided via State Highways 57, 63, and 613. Rail service is provided by the CSX Transportation and the Mississippi Export Railway Line, which extends north from the City of Pascagoula to the City of Lucedale, handling local freight and serving the paper mill located in the City of Moss Point.

The 2006 population was estimated at 130,577, a 0.6 percent decrease from the 2000 population of 131,420 (Reference 4).

Jackson County, lying on the eastern end of the Mississippi Gulf Coast, has a wide range of natural resources and industry. Pascagoula, the county seat, has acquired national prominence as a ship-building center since the construction of Ingalls Shipyard located at the mouth of the Pascagoula River. The Port of Pascagoula, consisting of two harbors located at the mouth of the Pascagoula River and at Bayou Casotte, provides mooring and service facilities for large tonnage vessels into Jackson County. The port can facilitate vessels whose drafts exceed 30 feet in depth. Major cargos handled by the port include crude oil and petroleum products, petrol chemicals and LP-gas, grain, fish, and paper products. The port is also the location for commercial fish processing industries and Ingalls Shipyard. Small marinas along the coastal strip and inland waterways handle the majority of commercial and private fishing vessels.

The coastal location of Jackson County has provided a diversified industrial-based economy. Major industries include ship construction, oil refining, commercial fish processing, seaport facilities, pulp and paper production, and chemical manufacturing.

The climate in Jackson County is mild with mean annual temperatures in the upper 60's. Average winter temperatures range from 53 degrees Fahrenheit to 60 degrees Fahrenheit with mean summer temperatures ranging from 75 degrees Fahrenheit 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 (Reference 5).

Jackson County is in the southern part of the Gulf Coastal Plain. The Coastal Flatwood Area, located in the southern part of the county, is nearly flat, most of which is near sea level. Surface drainage is very slow and during stormy seasons, brackish water often covers the flat areas.

Elevations in the county gradually increase toward the north culminating in a series of north-south ridges along an east-west terrace escarpment south of Big Point and VanCleave. Northwest of this escarpment, the landscape is rolling and the drainage pattern is widely branched. Elevations in this area are generally in excess of 100 feet National Geodetic Vertical Datum of 1929 (NGVD29). In the northern and northeastern part of the county, the landscape is level to gently undulating and is broken by scattered, poorly drained swales and by low areas along streams. Major streams in this part of the county exhibit distinct valleys and are generally better drained than those in the coastal flatwoods. The Pascagoula and Escatawpa Rivers are bordered by flat, poorly drained strips that are approximately 4 miles wide and consist mostly of tidal marsh and swamp. There are a few steep escarpments along the rivers in the northern part of the county.

Two principle river systems drain Jackson County. The majority of the county lies within the drainage basin of the Pascagoula River north of Moss Point and extends approximately 10 miles to its origin at the confluence of Franklin Creek, Jackson Creek and Big Creek. The extreme western portion of the county is drained via Old Fort Bayou north of the City of Ocean Springs and the tributary of the Tchoutacabouffa River.

Relatively little of the coastal area of Jackson County has been developed due to the extensive area covered by the coastal and riverine floodplains in the county. Most residential and commercial development is located in the communities of Pascagoula, Moss Point, and Ocean Springs with newer development occurring along U.S. Highway

90 between Gautier and Ocean Springs. Some residential development is occurring southwest of Gautier in the coastal lowlands south of Graveline Bay. Industrial development is concentrated east of Pascagoula and along State Highway 613 east of Moss Point. Development north of Interstate 10, in the heavily wooded uplands, consists mainly of individual residential home sites and small fishing camps scattered along the Pascagoula and Escatawpa Rivers.

2.3 Principal Flood Problems

Coastal areas along the Mississippi Sound, Biloxi Bay, Davis Bayou, Lake Yazoo, Bayou Chico, Bayou Casotte, West Prong, Old Fort Bayou and the lower reaches of the Pascagoula and Escatawpa floodplains are primarily subject to coastal storm surge flooding and wave action as a result of hurricane and tropical storm activity in the gulf. Rivers, streams, and tributaries are subject to riverine flooding during periods of heavy rainfall. 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 6).

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 7).

<u>1915 (September 22 – October 1)</u>

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 7).

<u>1947 (September 4-21)</u>

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 7).

<u>1965 Hurricane Betsy (August 27 – September 12)</u>

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 25-year recurrence interval) (References 8 and 9).

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 10). Wind gusts of 81 mph were recorded at the Ingalls Shipyard from the east-southeast during the storm (Reference 11). 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 12).

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 13). 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-year 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 anticyclonic 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.

2005 Hurricane Katrina (August 23-30)

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. Portions of the seawall in Jackson County are contained within the corporate limits of Ocean Springs and Pascagoula and therefore, offer no appreciable protection for the unincorporated areas of the county.

The seawall system in Ocean Springs is located in two sections along the south shore. The first section extends from Weeks Bayou to Halstead Road along Shearwater Drive. The second section extends from the U.S. Highway 90 bridge to Inner Harbor. The seawall system in Pascagoula extends along Beach Boulevard and averages about 6 feet in elevation.

The seawall has been effective in minimizing wave damage during minimal strength hurricanes. In addition, a man-made beach was placed seaward of the seawall to further attenuate storm damage. The beach has been replenished after major storms since 1947.

The Louisville & Nashville Railroad and U.S. Highway 90 do offer resistance to waves propagating into the Pascagoula River floodplain.

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

3.1 Hydrologic Analyses

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

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 of the required frequencies for the Escatawpa River were based on the regional frequency analysis made by the USACE, Mobile District, in April 1984. The hydrologic investigation was a part of the district's flood control study of the Orange Grove Community in Jackson County (Reference 14). The computed discharges for the 10- and 1-percent-annual-chance frequencies were graphically extrapolated on log-probability paper to determine the 0.2-percent-annual-chance discharges. No riverine analyses were prepared for the Pascagoula River because the flooding is dominated by coastal storm surge.

The flows of the required frequencies for Old Fort Bayou were based on a method presented in "Flood Frequency of Mississippi Streams" (Reference 15). This report outlined methods of determining the 10-, 2.5- and 1-percent-annual-chance discharges. The computed flows for the frequencies were then graphically extrapolated on log-probability paper to determine the 0.2-percent-annual-chance discharges.

The flows of the required frequencies for Black Creek, Bluff Creek, Johns Bayou, Cypress Creek, and Old Fort Bayou were based on a method presented in "Flood Frequency of Mississippi Streams" (Reference 15). This report outlined methods of determining the 10-, 2-, and 1-percent-annual-chance discharges. The computation of flows for the Escatawpa River was based on the regional frequency analysis made by the USACE (Reference 14). The computed flows for the 10-, 2-, 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 discharges for the streams studied in detail by the SCS were obtained from the U.S. Geological Survey (USGS) publication, "Floods in Mississippi, Magnitude and Frequency," (Reference 16), where applicable. Although the methodologies for the previous and present studies differ, the results are reasonably comparable. Whenever there were significant discrepancies in discharges based on the new and old methods, the profiles computed using the discharges based on the new methods were heavily weighted in merging of new and old profiles.

This Countywide Analyses

Peak discharges for the streams studied by Limited detailed methods were calculated based on USGS regional regression equations (Reference 17).

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
BAYOU COSTAPIA					
Just downstream of Daisy-Vestry Road	30.7	7,245	*	13,110	19,044
Just upstream of Latimer Road	10.3	2,780	*	5,100	7,340
BLACK CREEK					
Just upstream of Interstate 10	45.5	4,000	*	8,330	12,400
BLUFF CREEK					
At mouth	128.5	9,070	*	18,330	26,000
CYPRESS CREEK					
Just upstream of Ramset Serings Road	8.9	1,760	*	3,645	5,300
Just downstream of confluence of Ditch No. 2	6.2	1,155	*	2,150	3,700
Just upstream of confluence of Ditch No. 2	4.9	945	*	2,045	3,000
ESCATAWPA RIVER					
At mouth	1,070	35,000	*	68,780	100,030
Just upstream of Interstate 10	969	33,070	*	65,340	95,320
Just upstream of confluence of Franklin Creek	885	31,400	*	62,340	91,180
JOHNS BAYOU					
At mouth	3.8	890	*	1,800	2,400
OLD FORT BAYOU					
At mouth	48.2	4,680	7,720	9,710	15,400
Just upstream of Interstate 10	28.2	4,680	7,720	9,710	15,400
Just upstream of confluence of Old Fort Bayou Tributary	18.2	3,890	6,340	8,010	12,900

* 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
PERIGAL CREEK					
Just upstream of Latimer Road	5.3	1,665	*	3,060	4,329
Just downstream of confluence of Ditch No. 3	4.7	1,625	*	3,040	4,361
Just downstream of Seamen Road	3.4	1,470	*	2,756	3,938
TCHOUTACABOUFFA RIVER					
Just downstream of confluence of Bayou Billie	65.8	8,798	*	15,794	27,772

Limited Detailed Studied Streams

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. mi.)	PEAK DISCHARGES (cfs)			
		10-percent	2-percent	1-percent	0.2-percent
JACKSON CREEK					
Approximately 2,470 ft upstream of Forts Lake Road	36.1	*	*	8,697	*
JACKSON CREEK TRIBUTARY 2					
Approximately 300 ft upstream of confluence with Jackson Creek	0.5	*	*	456	*
OLD FORT BAYOU TRIBUTARY 7					
Just upstream of the confluence with Old Fort Bayou	2.9	*	*	1,704	*
Approximately 5,150 ft downstream of Humphrey Road	1.0	*	*	955	*
OLD FORT BAYOU TRIBUTARY 8					
Just upstream of confluence with Old Fort Bayou Tributary 7	1.4	*	*	985	*
WATERS CREEK					
At McGregor Rd	6.9	*	*	3,011	*

* 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 Old Fort Bayou were obtained by field measurements (References 18 and 19). Bridges and culverts were field checked 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).

Roughness factors (Manning's n) used in hydraulic computations were chosen based on field observations of the stream and floodplain area. The roughness coefficients for the main channel of Old Fort Bayou ranged from 0.03 to 0.045, with floodplain roughness values ranging from 0.075 to 0.085 for all floods.

Water-surface elevations of floods of the selected recurrence intervals of the streams studied in detail were computed through use of the USACE HEC-2 step-backwater computer program (Reference 20). 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 feet 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.

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

Cross sections for the water-surface elevation analyses of the Escatawpa River, Black and Bluff Creeks, Johns Bayou, Cypress Creek and Old Fort Bayou were obtained by field measurements. Bridges and culverts were field checked to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 3).

Roughness factors (Manning's n) used in hydraulic computations were chosen based on field observations of the stream and floodplain area. The roughness coefficients for the main channel of the Escatawpa River and Black Creek ranged from 0.03 to 0.035 and 0.035 to 0.06 with overbank roughness values ranging from 0.06 to 0.12 and 0.08 to 0.15, respectively, for all floods.

The roughness coefficient for the main channel of Bluff Creek, Johns Bayou and Cypress Creek ranged from 0.03 to 0.06 with overbank roughness values ranging from 0.09 to 0.15 for all floods. The roughness coefficient for the main channel of Old Fort Bayou ranges from 0.03 to 0.045 with overbank roughness values ranging from 0.06 to 0.08 for all floods.

The starting water-surface elevations for all sources were calculated using the slope-area method, with the exception of the 10-percent-annual-chance frequency flood of the Escatawpa River and Old Fort Bayou. Since the starting water-surface elevations of the Escatawpa River and Old Fort Bayou for the 10-percent-annual-chance flood were lower than the mean tide elevation of 0.15 feet NGVD29, the known starting water-surface elevation of 0.15 was used.

Water-surface elevations of floods of the selected recurrence intervals for Black and Bluff Creeks, Johns Bayou, Cypress Creek, Old Fort Bayou and the Escatawpa River were computed through use of the USACE HEC-2 step-backwater computer program (Reference 21).

Water-surface elevations of each stream previously studied (Reference 2) were computed by establishing rating curves for each cross section. These elevations were plotted and connected to form flood profiles. The profiles were redrafted for this study and merged with the profiles of streams restudied.

Water-surface elevations for Bayou Castelle and Old Fort Bayou Tributary were obtained by interpolation between those of Old Fort Bayou and the Pascagoula River.

The 1-percent-annual-chance flood of Old Fort Bayou Tributary has reversible direction. It can either flow southeasterly towards Bayou Castelle or westerly towards Old Fort Bayou. This occurs because the water-surface profiles for Old Fort Bayou Tributary are relatively flat with no dominant direction of flow.

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

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

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 22). 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 Limited detailed methods.

TABLE 4. SUMMARY OF ROUGHNESS COEFFICIENTS

Limited Detailed Studied Streams		
FLOODING SOURCE	CHANNEL "N"	OVERBANK "N"
Jackson Creek	0.030 – 0.040	0.100
Jackson Creek Tributary 2	0.050	0.150
Old Fort Bayou Tributary 7	0.050	0.150
Old Fort Bayou Tributary 8	0.045	0.100
Waters 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 Analyses

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 23), 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 24) 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 25), 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 26). 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 FIS. 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 Analyses

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 Analyses

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 27). 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.

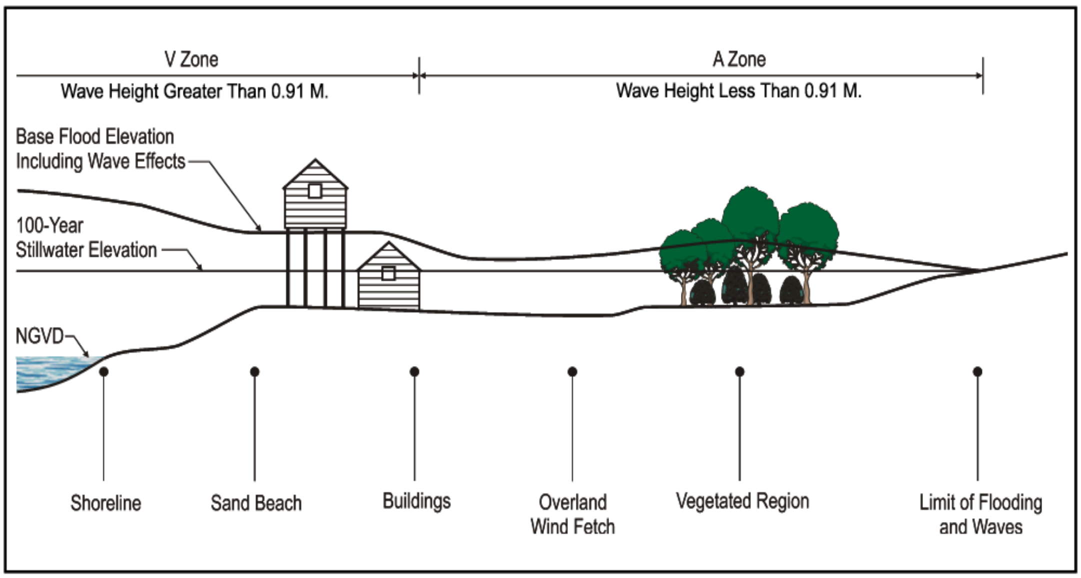

FIGURE 1. TRANSECT SCHEMATIC

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 28). 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 29) 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 30). 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 28).

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 Jackson 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 Jackson County	1	Biloxi Bay at Rue Dauphin St (just east of county line)	(30.4247, -88.8756)	5.8 5.8-5.9	13.9 13.9-14.4	16.9 16.9-17.30	22.1 22.1-22.8	VE 19-23 AE 17-19
Unincorporated Jackson County	2	Biloxi Bay at Back Bay of Biloxi Street	(30.4263, -88.8675)	5.9 5.9-5.9	14.0 14.0-14.4	17.0 17.0-17.3	22.4 22.4-22.8	VE 19-22 AE 17-19
Unincorporated Jackson County	3	Biloxi Bay at Ascot Drive	(30.4278, -88.8635)	5.8 5.8-5.9	14.0 11.4-14.2	17.0 17.0-17.2	22.3 22.3-22.8	VE 19-23 AE 17-23
Unincorporated Jackson County	4	Biloxi Bay east of Crescent Shore Drive	(30.4299, -88.8579)	5.8 5.8-5.9	14.0 14.0-14.2	17.0 17.0-17.0	22.4 22.2-22.8	VE 19-22 AE 17-19
Unincorporated Jackson County	5	Gulf of Mexico/Mississippi Sound at Deer Island	(30.3773, -88.8563)	5.5 5.5-5.8	13.4 13.3-14.0	16.1 16.1-17.0	21.3 21.3-22.3	VE 19-24 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 Jackson County	6	Gulf of Mexico/Mississippi Sound at Deer Island	(30.3760, -88.8531)	5.5 5.5-5.7	13.3 13.3-13.6	16.1 16.3-16.6	21.3 21.3-22.2	VE 19-23 AE 16-19
Unincorporated Jackson County	7	Gulf of Mexico/Mississippi Sound at Deer Island	(30.3727, -88.8464)	5.5 5.3-5.7	13.1 13.0-13.5	15.9 15.8-16.5	21.3 21.3-22.2	VE 18-23 AE 16-19
Unincorporated Jackson County	8	Gulf of Mexico/Mississippi Sound at Deer Island	(30.3690, -88.8381)	5.4 5.2-5.7	12.9 12.7-13.4	15.8 15.5-16.4	21.0 20.9-22.10	VE 19-23 AE 16-18
Ocean Springs, City of Jackson County	9	Biloxi Bay at East Beach Drive and just east of Sheawater Drive	(30.3973, -88.8156)	5.6 5.1-5.6	13.3 12.4-13.3	16.3 15.1-16.3	21.6 20.3-21.8	VE 18-22 AE 15-18
Ocean Springs, City of Jackson County	10	Back Bay at Beach Drive	(30.3937, -88.8076)	5.5 4.9-5.6	13.0 12.2-13.2	15.9 14.8-16.2	21.2 19.7-21.8	VE 19-22 AE 15-18

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	
Gautier, City of Jackson County	11	Back Bay at Gulf Coast Research Laboratory	(30.3925, -88.7986)	5.5 4.8-5.6	12.9 11.8-13.3	15.9 14.1-16.3	21 18.9-21.7	VE 19-22 AE 14-17
Unincorporated Jackson County	12	Back Bay at Gulf Island National Seashore, Magnolia Area	(30.3898, -88.7912)	5.4 4.7-5.5	12.8 11.2-13.2	15.7 13.7-16.3	20.9 18.2-21.6	VE 18-22 AE 14-18
Unincorporated Jackson County	13	Gulf of Mexico/Mississippi Sound near end of wooden bulkhead	(30.3727, -88.7855)	5.4 4.4-5.4	12.7 10.5-13.0	15.6 12.4-15.9	20.8 16.6-21.4	VE 16-22 AE 13-17
Unincorporated Jackson County	14	Gulf of Mexico/Mississippi Sound at David Bayou and Pointe Aux Chenes Road	(30.3715, -88.7826)	5.4 4.2-5.4	12.6 9.9-12.8	15.5 11.3-15.7	20.6 15.3-21.3	VE 18-21 AE 11-18
Unincorporated Jackson County	15	Gulf of Mexico/Mississippi Sound at Point Aux Chenez Road	(30.3684, -88.7762)	5.4 3.5-5.4	12.5 8.7-12.8	15.4 10.3-15.6	20.6 13.7-21.1	VE 19-21 AE 10-17

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	
Unincorporated Jackson County	16	Gulf of Mexico/Mississippi Sound at Seashore Drive	(30.3654, -88.7698)	5.3 3.7-5.3	12.4 9.1-12.8	15.2 10.8-15.5	20.4 14.1-21	VE 18-20 AE 11-17
Unincorporated Jackson County	17	Gulf of Mexico/Mississippi Sound at Lake Mars Avenue	(30.4397, -88.5286)	5.3 5.3-5.3	12.3 12.3-12.7	15.1 15.1-15.7	20.2 20.2-20.9	VE 18-20 AE 15-16
Unincorporated Jackson County	18	Gulf of Mexico/Mississippi Sound at Starfish Avenue and 15th Street	(30.3602, -88.7493)	5.2 5.2-5.3	12.1 12.1-12.7	14.8 14.8-15.6	19.9 19.9-20.9	VE 18-20 AE 15-17
Unincorporated Jackson County	19	Gulf of Mexico/Mississippi Sound at Belle Fountaine Point	(30.3434, -88.7304)	5.2 5.2-5.7	12.1 12.1-13.4	14.7 14.7-15.9	19.6 19.6-20.8	VE 17-20 AE 15-17
Unincorporated Jackson County	20	Gulf of Mexico/Mississippi Sound and Graveline Bay at St. Andrews Golf Course	(30.3429, -88.7120)	5.2 5.2-5.7	12.1 12.1-13.4	14.6 14.6-16.1	19.6 19.6-21	VE 17-20 AE 15-18

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	
Unincorporated Jackson County	21	Gulf of Mexico/Mississippi Sound and Graveline Bay at East Bell Fountaine	(30.3460, -88.6965)	5.3 5.3-5.7	12.3 12.3-13.2	14.7 14.7-15.8	19.6 19.6-21	VE 17-20 AE 15-18
Unincorporated Jackson County	22	Gulf of Mexico/Mississippi Sound at Old Shell Landing Road	(30.3712, -88.7027)	5.3 5.3-5.5	12.3 12.3-13.3	14.8 14.8-15.4	19.8 19.8-21.4	VE 18-20 AE 15-17
Unincorporated Jackson County	23	Gulf of Mexico/Mississippi Sound at Shell Landing Golf Club	(30.3847, -88.6755)	5.3 5.3-5.5	12.3 12.3-13.0	14.8 14.8-15.4	19.8 19.8-21	VE 19-20 AE 15-17
Gautier, City of Jackson County	24	Gulf of Mexico/Mississippi Sound at Pointe Clear Riviera	(30.3632, -88.6629)	5.3 5.3-5.5	12.3 12.0-12.8	14.8 14.8-15.4	19.9 19.9-21.3	VE 17-20 AE 15-17
Gautier, City of Jackson County	25	Gulf of Mexico/Mississippi Sound at Robert Heirm Road	(30.3602, -88.6523)	5.3 5.3-5.3	12.2 12.2-12.3	14.6 14.6-14.8	19.6 19.6-21.3	VE 17-20 AE 15-17

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	
Gautier, City of Jackson County	26	Gulf of Mexico/Mississippi Sound at Oakleigh Place	(30.3601, -88.6470)	5.2 5.2-5.2	12.2 12.2-12.2	14.6 14.6-14.7	19.6 19.6-21.3	VE 17-20 AE 15-17
Gautier, City of Jackson County	27	Gulf of Mexico/Mississippi Sound at The Lewis House ("Old Fields")	(30.3603, -88.6393)	5.2 5.2-5.3	12.1 12.1-12.3	14.5 14.5-14.7	19.4 19.4-20.2	VE 17-20 AE 15-17
Gautier, City of Jackson County	28	Gulf of Mexico/Mississippi Sound, approximately 640 feet east of terminus of Colin J. McRae Road	(30.3649, -88.6306)	5.2 3.9-5.2	12.2 9.1-12.2	14.5 10.9-14.6	19.4 15.0-19.8	VE 17-20 AE 11-17
Gautier, City of Jackson County	29	Gulf of Mexico/Mississippi Sound approximately 360 feet west of Vaughndale Drive	(30.3691, -88.6239)	5.2 3.4-5.2	12.2 7.7-12.3	14.5 9.1-14.5	19.5 12.3-19.6	VE 11-20 AE 9-17
Gautier, City of Jackson County	30	Gulf of Mexico/Mississippi Sound at Soundview Drive	(30.3725, -88.6173)	5.2 4.0-5.2	12.1 8.9-12.1	14.4 10.7-14.4	19.4 14.1-19.4	VE 13-19 AE 11-17

TABLE 6. COAST<u></u>AL 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 Jackson County	31	West Channel of the Pascagoula River approximately 2,300 feet north of the U.S. Route 90 crossing	(30.3898, -88.6088)	4.4 3.2-4.4	9.6 7.7-9.6	11.5 8.9-11.5	15.7 12.8-15.7	VE 12-16 AE 9-12
Unincorporated Jackson County	32	West Channel of the Pascagoula River, approximately 2,450 feet northeast of the location of Transect 31	(30.3961, -88.6056)	4.2 2.8-4.2	9.2 5.8-9.2	11.1 7.5-11.1	15.2 9.3-15.2	VE 12-15 AE 8-12
Unincorporated Jackson County	33	West Channel of the Pascagoula River at the eastern end of the CSX Transportation bridge	(30.3770, -88.6042)	5.1 3.1-5.1	11.2 7.4-11.2	14.0 8.8-14.0	18.6 12.0-18.6	VE 12-19 AE 9-15
Unincorporated Jackson County	34	West Channel of the Pascagoula River approximately 1,950 feet southeast of the location of Transect 33	(30.3725, -88.6008)	5.1 3.3-5.2	11.7 7.9-11.7	14.1 9.6-14.1	18.7 13.3-18.8	VE 12-19 AE 10-16
Unincorporated Jackson County	35	Gulf of Mexico/Mississippi Sound approximately 4,500 feet southeast of the location of Transect 34	(30.3690, -88.5871)	5.1 3.4-5.1	11.7 6.5-11.8	14.0 7.7-14.0	18.6 13.1-18.6	VE 12-19 AE 8-14

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 Jackson County	36	Gulf of Mexico/Mississippi Sound at Spanish Point	(30.3523, -88.5809)	4.9 3.3-5.0	11.5 7.6-11.5	13.8 9.5-13.8	18.4 12.8-18.4	VE 12-19 AE 9-16
Pascagoula, City of Jackson County	37	Gulf of Mexico/Mississippi Sound at U S Naval facility	(30.3282, -88.5763)	4.8 3.8-5.0	11.3 8.5-11.7	14.0 10.8-14.0	18.1 13.1-18.5	VE 13-20 AE 13-16
Pascagoula, City of Jackson County	38	Gulf of Mexico/Mississippi Sound west of the intersection of Beach Boulevard and Hague Street	(30.3444, -88.5600)	5.0 3.9-5.0	11.7 7.6-11.7	14.1 10.7-14.1	18.6 13.7-18.6	VE 13-20 AE 11-16
Pascagoula, City of Jackson County	39	Gulf of Mexico/Mississippi Sound approximately 100 feet east of the intersection of Beach Boulevard and Pascagoula Street	(30.3432, -88.5533)	5.0 4.0-5.0	11.7 8.2-11.8	14.1 12.8-14.1	18.7 13.7-18.7	VE 16-20 AE13-16
Pascagoula, City of Jackson County	40	Gulf of Mexico/Mississippi Sound approximately 420 feet east of the intersection of Beach Boulevard and Market Street	(30.3434, -88.5473)	5.0 3.3-5.0	11.7 7.5-11.9	14.1 9.5-14.1	18.7 13.0-18.8	VE 12-20 AE 10-16

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	
Pascagoula, City of Jackson County	41	Gulf of Mexico/Mississippi Sound approximately 870 feet east of the intersection of Beach Boulevard and 11th Street	(30.3438, -88.5401)	5.0 2.9-5.0	11.6 7.9-11.8	14.1 9.5-14.1	18.7 13.2-18.8	VE 12-19 AE 10-16
Pascagoula, City of Jackson County	42	Gulf of Mexico/Mississippi Sound approximately 200 feet east of the intersection of Beach Boulevard and Oliver Street	(30.3432, -88.5355)	4.9 3.3-5.0	11.5 7.9-11.7	14.0 9.4-14.0	18.6 13.3-18.6	VE 12-20 AE 9-16
Pascagoula, City of Jackson County	43	Gulf of Mexico/Mississippi Sound east of the intersection of Beach Boulevard and Westwood Street	(30.3427, -88.5315)	4.9 3.2-4.9	11.5 7.6-11.9	14.0 9.3-14.0	18.5 12.9-18.6	VE 12-19 AE 9-16
Pascagoula, City of Jackson County	44	Gulf of Mexico/Mississippi Sound approximately 230 feet west of the intersection of Beach Boulevard and Martin Street	(30.3415, -88.5238)	4.9 3.0-4.9	11.4 7.9-12.1	13.9 9.7-13.9	18.4 13.7-19.0	VE 16-19 AE 10-16
Pascagoula, City of Jackson County	45	Gulf of Mexico/Mississippi Sound at Greenwood Island, west of the confluence of Bayou Casotte	(30.3335, -88.5179)	4.7 2.4-4.9	11.2 7.6-12.2	13.6 9.2-14.1	18.1 12.7-19.3	VE 12-19 AE10-16

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	
Pascagoula, City of Jackson County	46	Gulf of Mexico/Mississippi Sound east of the confluence of Bayou Casotte	(30.3191, -88.5011)	4.7 2.4-5.1	11.1 7.4-12.6	13.6 9.6-15.1	17.9 12.5-19.6	VE 12-19 AE 10-16
Pascagoula, City of Jackson County	47	Gulf of Mexico/Mississippi Sound approximately 4800 feet south of the terminus of State Route 611	(30.3196, -88.4938)	4.7 2.6-5.2	11.1 7.7-12.9	13.6 9.7-15.6	18.0 14.5-20.0	VE 17-19 AE 10-18
Unincorporated Jackson County	48	Gulf of Mexico/Mississippi Sound approximately 2400 feet east of the location of Transect 47	(30.3192, -88.4862)	4.7 2.4-5.2	11.1 7.4-13.0	13.7 9.3-15.7	18.0 12.1-20.3	VE 12-19 AE 9-17
Unincorporated Jackson County	49	Gulf of Mexico/Mississippi Sound approximately 2400 feet east of the location of Transect 48 (Pointe aux Chenes)	(30.3188, -88.4786)	4.7 2.5-5.4	11.0 7.6-13.3	13.7 9.7-16.0	18.0 13.9-20.6	VE 17-19 AE 10-18
Unincorporated Jackson County	50	Gulf of Mexico/Mississippi Sound approximately 4700 feet east of the location of Transect 49	(30.3249, -88.4649)	4.8 2.2-5.8	11.2 7.3-13.4	13.9 9.7-16.1	18.3 12.1-20.6	VE 12-19 AE 10-17

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	
Unincorporated Jackson County	51	Gulf of Mexico/Mississippi Sound approximately 7,315 feet northeast of the location of Transect 50	(30.3375, -88.4470)	4.9 2.2-5.7	11.4 7.3-13.1	14.3 9.4-15.9	18.9 12.7-20.5	VE 14-20 AE 9-18
Unincorporated Jackson County	52	Gulf of Mexico/Mississippi Sound (Point aux Chenes Bay), east of the confluence of Cumbest Bayou	(30.3593, -88.4372)	5.1 2.0-5.5	12.0 7.5-13.0	14.9 9.4-15-9	19.6 13.0-20.7	VE 18-20 AE 9-18
Unincorporated Jackson County	53	Gulf of Mexico/Mississippi Sound (Point aux Chenes Bay), west of the confluence of Crooked Bayou	(30.3586, -88.4226)	5.0 2.1-5.6	11.7 6.6-13.0	14.7 8.1-16.1	19.4 11.2-20.9	VE 18-21 AE 8-18
Unincorporated Jackson County	54	Gulf of Mexico/Mississippi Sound at South Rigolets	(30.3430, -88.4098)	4.7 4.7-5.6	11.0 10.0-13.0	13.9 12.8-16.2	18.6 12.7-21.1	VE 18-21 AE 13-18
Unincorporated Jackson County	55	Gulf of Mexico/Mississippi Sound at the confluence of Bayou Heron (Mississippi state boundary)	(30.3847, -88.3962)	5.2 5.2-5.6	12.1 10.9-12.8	15.4 11.4-16.2	20.3 13.7-21.1	VE 18-22 AE 11-18

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 Jackson 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 0.08 feet to the NGVD29 elevation. The 0.08 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	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Bayou Costapia								
A	9,000[1]	470	*	*	21.3	21.3	22.3	1.0
Black Creek								
A	6,200[2]	1,887	9,559	0.9	**	5.3[3]	6.3	1.0
B	9,970[2]	575	3,544	2.3	13.0	5.9[3]	6.9	1.0
C	15,670[2]	1,561	9,409	0.9	13.2	7.8[3]	8.8	1.0
D	19,656[2]	638	5,527	1.5	14.0	9.3[3]	10.1	0.8
E	26,136[2]	589	5,996	1.4	14.0	11.0[3]	11.8	0.8
F	30,346[2]	737	7,759	1.1	14.0	11.7[3]	12.6	0.9
G	33,620[2]	600	6,956	1.2	14.0	13.4[3]	14.2	0.8
H	35,170[2]	695	7,906	1.0	14.3	14.3	15.2	0.9
I	38,600[2]	525	*	*	15.0	15.0	16.0	1.0
J	46,350[2]	724	*	*	17.1	17.1	18.1	1.0

[1] Feet above confluence with Tchoutacabouffa River
[2] Feet above confluence with Escatawpa River
[3] Elevation computed without consideration of storm surge effects from Pascagoula Bay
* Data not available
** BFE determined by coastal storm surge flooding

TABLE 7	FEDERAL EMERGENCY MANAGEMENT AGENCY **JACKSON COUNTY, MS** AND INCORPORATED AREAS	**FLOODWAY DATA** **BAYOU COSTAPIA – BLACK 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
Bluff Creek								
A	15,150[1]	500	6,703	2.7	**	5.8[4]	6.8	1.0
B	22,350[1]	2,977	27,250	0.6	**	6.0[4]	7.0	1.0
C	29,500[1]	2,285	15,663	1.1	**	6.2[4]	7.2	1.0
D	38,050[1]	1,284	10,656	1.7	**	7.0[4]	8.0	1.0
E	45,650[1]	1,711	12,417	1.4	9.6	7.9[4]	8.9	1.0
F	63,600[1]	800	*	*	14.5	14.5	15.5	1.0
Cypress Creek								
A	7,120[2]	172	992	3.7	**	10.3[5]	11.1	0.8
B	10,650[2]	100	787	3.2	16.6	16.4[5]	17.1	0.7
C	15,650[2]	300	1,435	1.4	23.8	23.8	24.5	0.7
Escatawpa River								
A	1,249[3]	1,300	14,638	4.7	*	4.0[6]	5.0	1.0
B	5,200[3]	1,178	14,079	4.9	*	4.9[6]	5.9	1.0
C	10,972[3]	3,539	49,418	1.4	*	5.7[6]	6.7	1.0
D	12,732[3]	2,908	33,467	2.1	*	5.8[6]	6.8	1.0
E	18,602[3]	2,630	23,990	2.9	*	6.1[6]	7.1	1.0

[1] Feet above confluence with West Pascagoula River
[2] Feet above confluence with Tchoutacabouffa River
[3] Feet above confluence with Pascagoula River
[4] Elevation computed without consideration of storm surge effects from Mississippi Sound
[5] Elevation computed without consideration of storm surge effects from Bay of Biloxi
[6] Elevation computed without consideration of storm surge effects from Pascagoula Bay
* Data not available
** BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
JACKSON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

BLUFF CREEK – ESCATAWPA 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
Escatawpa River (continued)								
F	20,102[1]	2,200	21,942	3.1	*	6.4[3]	7.4	1.0
G	22,982[1]	1,128	14,028	4.9	*	6.7[3]	7.7	1.0
H	25,482[1]	1,590	14,809	4.6	*	7.5[3]	8.5	1.0
I	37,402[1]	5,193	42,324	1.6	*	9.5[3]	10.5	1.0
J	55,942[1]	4,559	39,778	1.7	*	11.1[3]	12.0	0.9
K	61,262[1]	2,231	27,408	2.4	*	12.2[3]	13.1	0.9
L	64,012[1]	2,375	32,138	2.0	13.0	12.6[3]	13.5	0.9
M	66,912[1]	2,880	39,072	1.7	13.2	13.0[3]	13.9	0.9
N	84,062[1]	3,391	42,462	1.5	14.6	14.6	15.6	1.0
O	91,942[1]	2,044	28,556	2.2	16.2	16.2	17.2	1.0
P	100,012[1]	1,751	27,729	2.2	19.4	19.4	20.2	0.8
Johns Bayou								
A	2,900[2]	1,154	5,457	0.3	10.5	4.3[3]	5.3	1.0
B	5,200[2]	142	1,058	1.7	10.5	4.5[3]	5.5	1.0
C	7,600[2]	92	403	4.5	10.5	6.2[3]	7.2	1.0
D	8,980[2]	187	*	*	10.5	10.1[3]	11.1	1.0
E	12,880[2]	172	*	*	17.3	17.3	18.3	1.0
F	16,590[2]	268	*	*	26.4	26.4	27.4	1.0

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

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY
JACKSON COUNTY, MS
AND INCORPORATED AREAS

FLOODWAY DATA

ESCATAWPA RIVER – JOHNS BAYOU

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
Lyons Creek								
A	9,660[1]	181	*	*	20.6	17.0[4]	18.0	1.0
Moungers Creek								
A	3,630[2]	550	*	*	15.1	15.1	16.1	1.0
B	10,900[2]	671	*	*	22.4	22.4	23.4	1.0
Old Fort Bayou								
A	10,000[3]	1,239	9,363	1.0	**	3.0[5]	3.9	0.9
B	17,972[3]	300	4,203	2.3	**	3.4[5]	4.2	0.8
C	29,872[3]	270	3,629	2.7	**	4.4[5]	5.1	0.7
D	39,772[3]	283	3,346	2.9	**	5.5[5]	6.2	0.7
E	49,672[3]	512	4,594	2.1	**	7.1[5]	8.0	0.9
F	58,272[3]	785	6,082	1.6	11.6	9.9[5]	10.8	0.9
G	64,272[3]	715	4,364	2.2	12.0	11.2[5]	12.2	1.0
H	72,072[3]	349	2,592	3.1	15.0	15.0	16.0	1.0

[1] Feet above confluence with Escatawpa River
[2] Feet above confluence with Bluff Creek
[3] Feet above confluence with Back Bay of Biloxi
[4] Elevation computed without consideration of backwater effects from Escatawpa River
[5] Elevation computed without consideration of storm surge effects from Back Bay of Biloxi
* Data not available
** BFE determined by coastal storm surge flooding

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

FLOODWAY DATA

LYONS CREEK – MOUNGERS CREEK – OLD FORT BAYOU

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
Perigal Creek								
A	1,270[1]	451	*	*	26.3	24.3[5]	25.3	1.0
B	3,770[1]	312	*	*	28.3	28.3	29.3	1.0
C	9,600[1]	285	*	*	37.7	37.7	38.7	1.0
Tchoutacabouffa River								
A	94,347[2]	115	1,966	8.0	33.3	33.3	34.3	1.0
Waters Creek								
A	2,600[3]	325	*	*	22.2	22.2	23.2	1.0
Woodmans Branch								
A	7,310[4]	110	*	*	32.2	32.2	33.2	1.0

[1] Feet above confluence with Bayou Costapia
[2] Feet above confluence with Biloxi River
[3] Feet above confluence with Moungers Creek
[4] Feet above confluence with Bluff Creek
[5] Elevation computed without consideration of overflow effects from Bayou Costapia
* Data not available

TABLE 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

FLOODWAY DATA

PERIGAL CREEK – TCHOUTACAABOUFFA RIVER - WATERS CREEK – WOODMANS BRANCH

A floodway is not appropriate in areas such as those that may be inundated by flood waters from lakes and shallow flooding areas. No floodways are shown for the Pascagoula River or its tributaries Red Creek, Little Black creek, and Big Cedar Creek because of the broad, flat floodplain. Floodways were not computed for Ditch Nos. 1, 2, and 3 because of the small drainage area of these streams.

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.

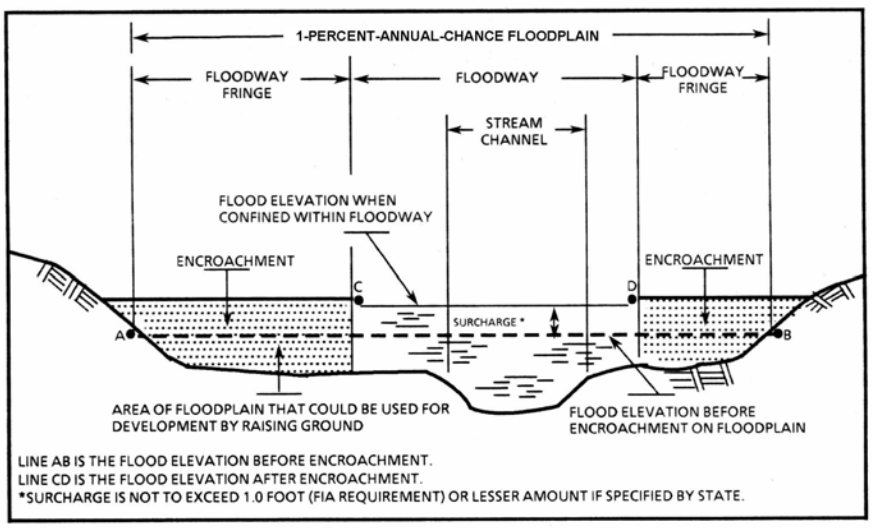

FIGURE 2. FLOODWAY SCHEMATIC

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 Jackson 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
Gautier, City of	September 18, 1970	None	April 3, 1978	October 1, 1983 March 15, 1984 December 3, 1987 August 18, 1992
Jackson County (Unincorporated Areas)	September 18, 1970	July 1, 1974	April 3, 1978	October 1, 1983 March 15, 1984 September 4, 1987 August 18, 1992 April 16, 1993
Moss Point, City of	September 18, 1970	None	July 1, 1974	April 9, 1976 November 16, 1983 September 4, 1987
Ocean Springs, City of	September 11, 1970	None	September 11, 1970	July 1, 1974 May 14, 1976 March 1, 1984 March 18, 1987 August 18, 1992
Pascagoula, City of	September 18, 1970	None	September 18, 1970	July 1, 1974 May 14, 1976 March 15, 1984

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 Gautier, the City of Moss Point, the City of Ocean Springs, the City of Pascagoula, and the unincorporated areas of Jackson County.

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.

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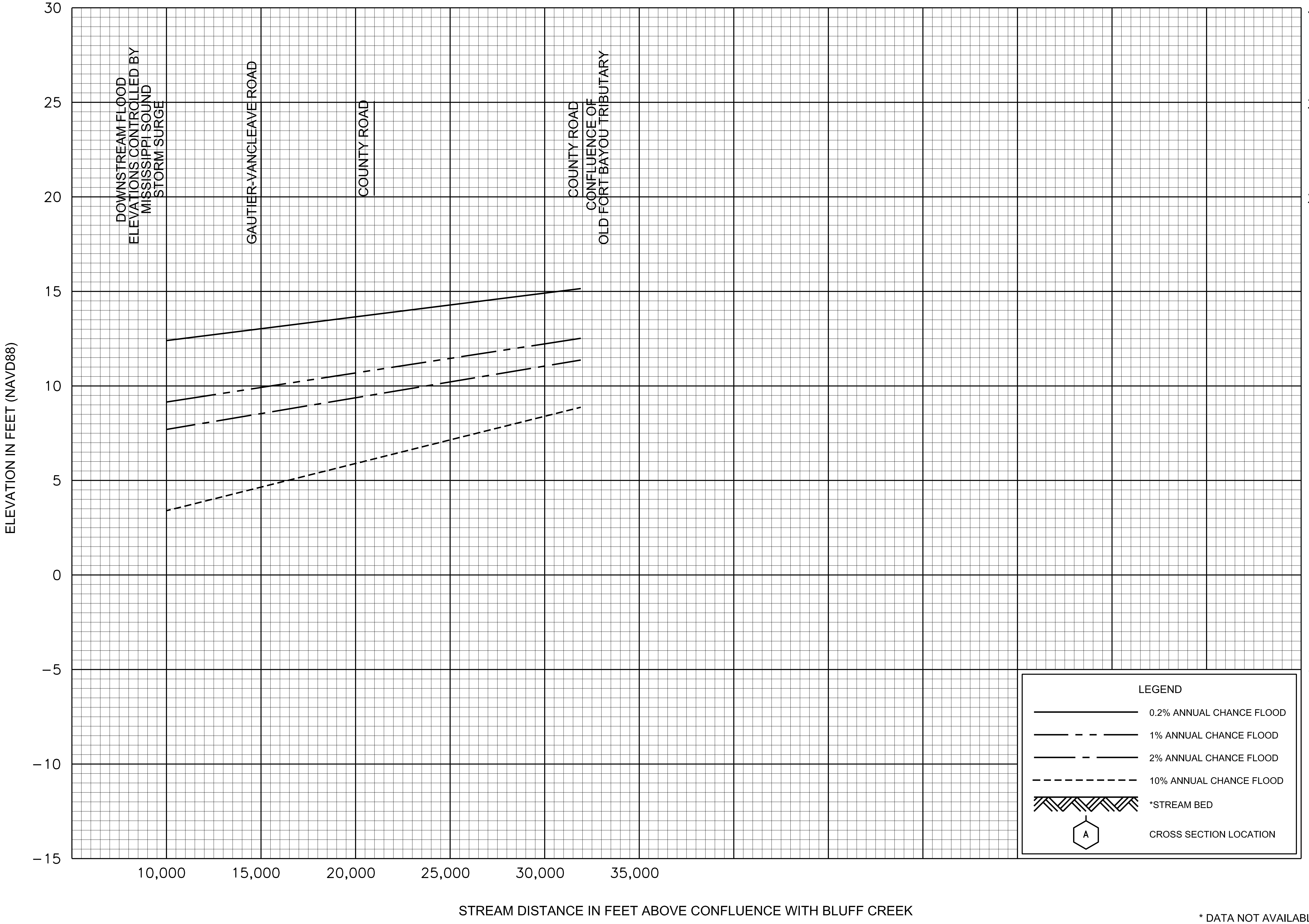


* DATA NOT AVAILABLE

FLOOD PROFILES

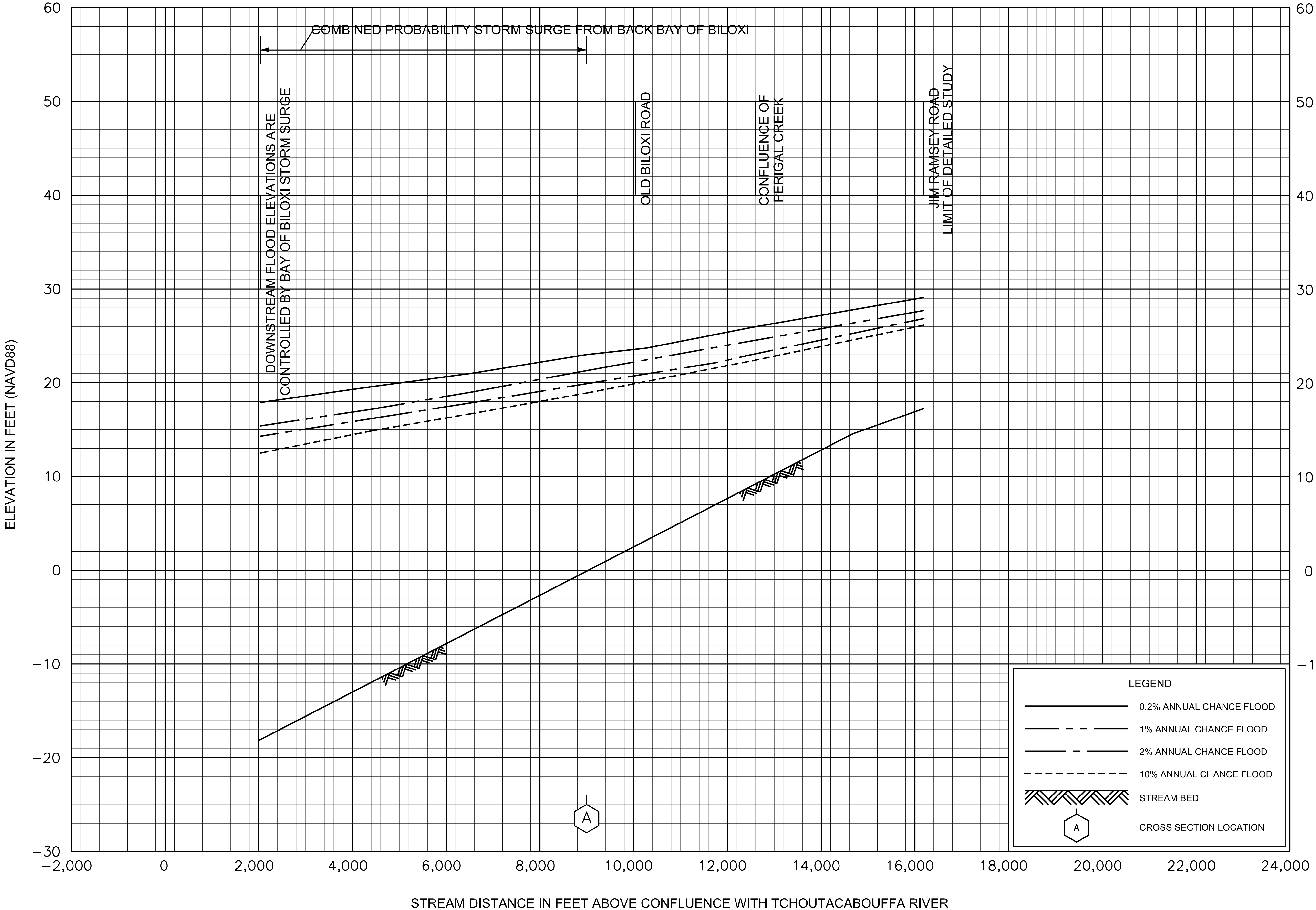
BAYOU CASTELLE

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

01P



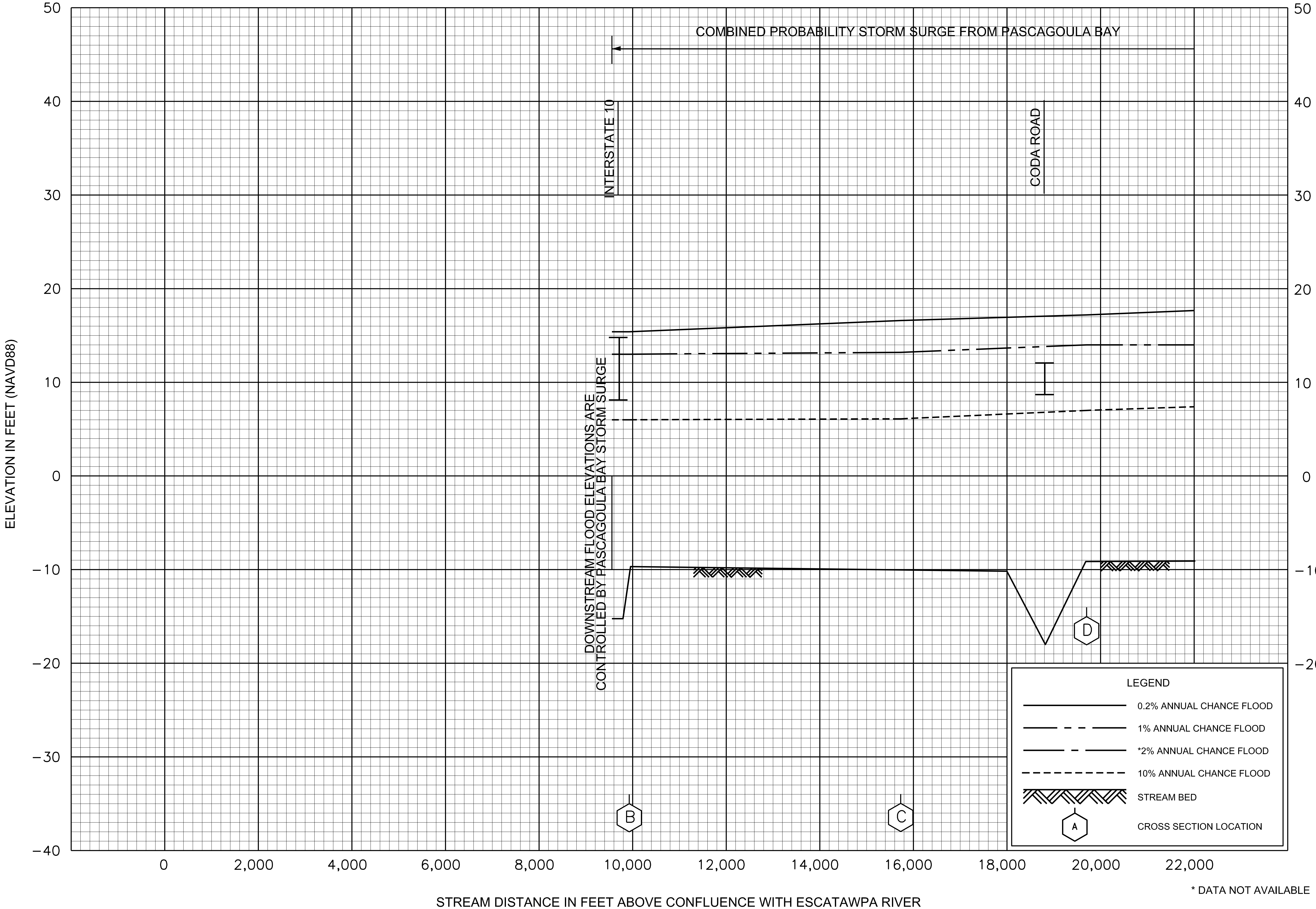
FLOOD PROFILES

BAYOU COSTAPIA

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS

02P



* DATA NOT AVAILABLE

FLOOD PROFILES

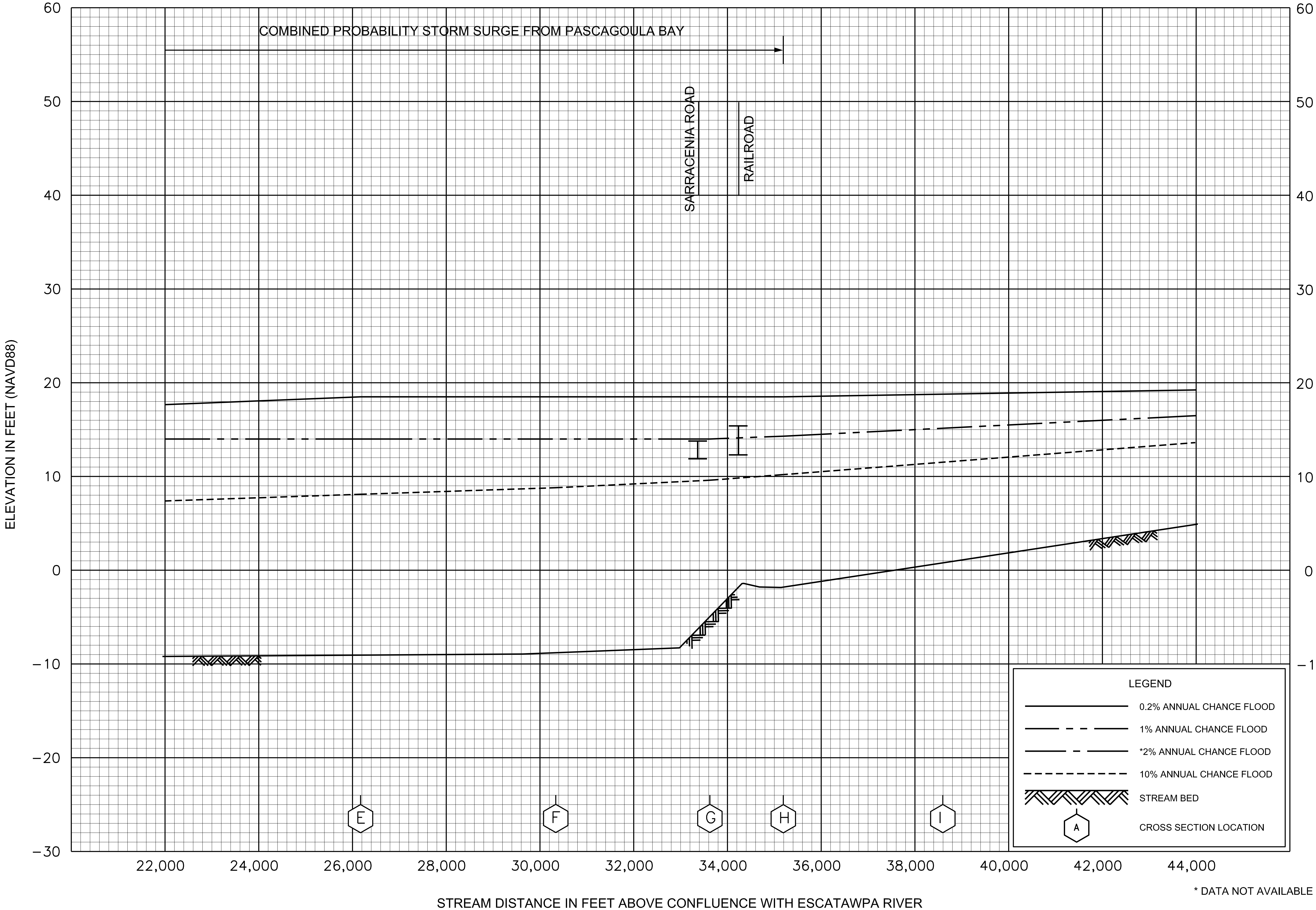
BLACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

03P



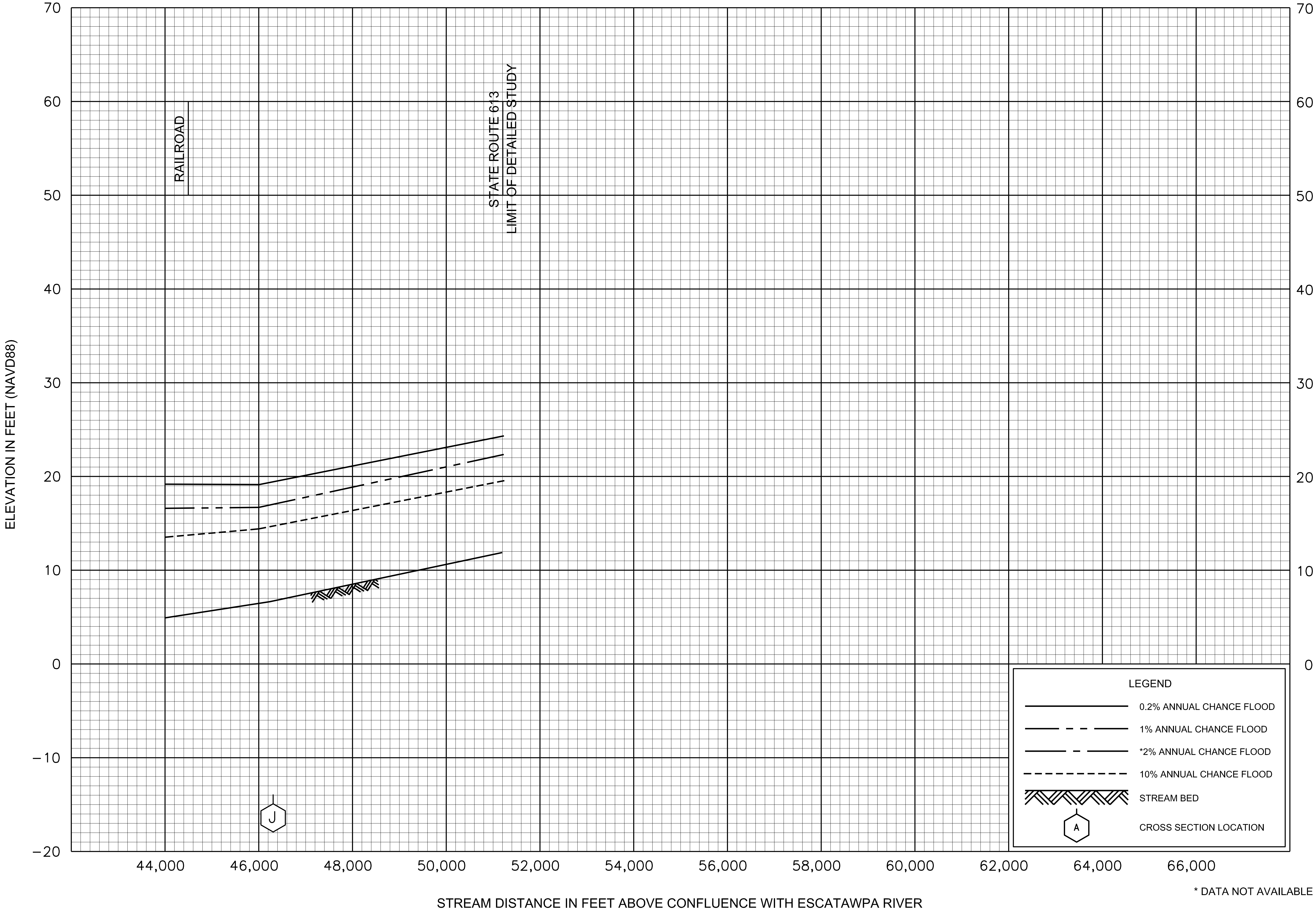
FLOOD PROFILES

BLACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



FLOOD PROFILES

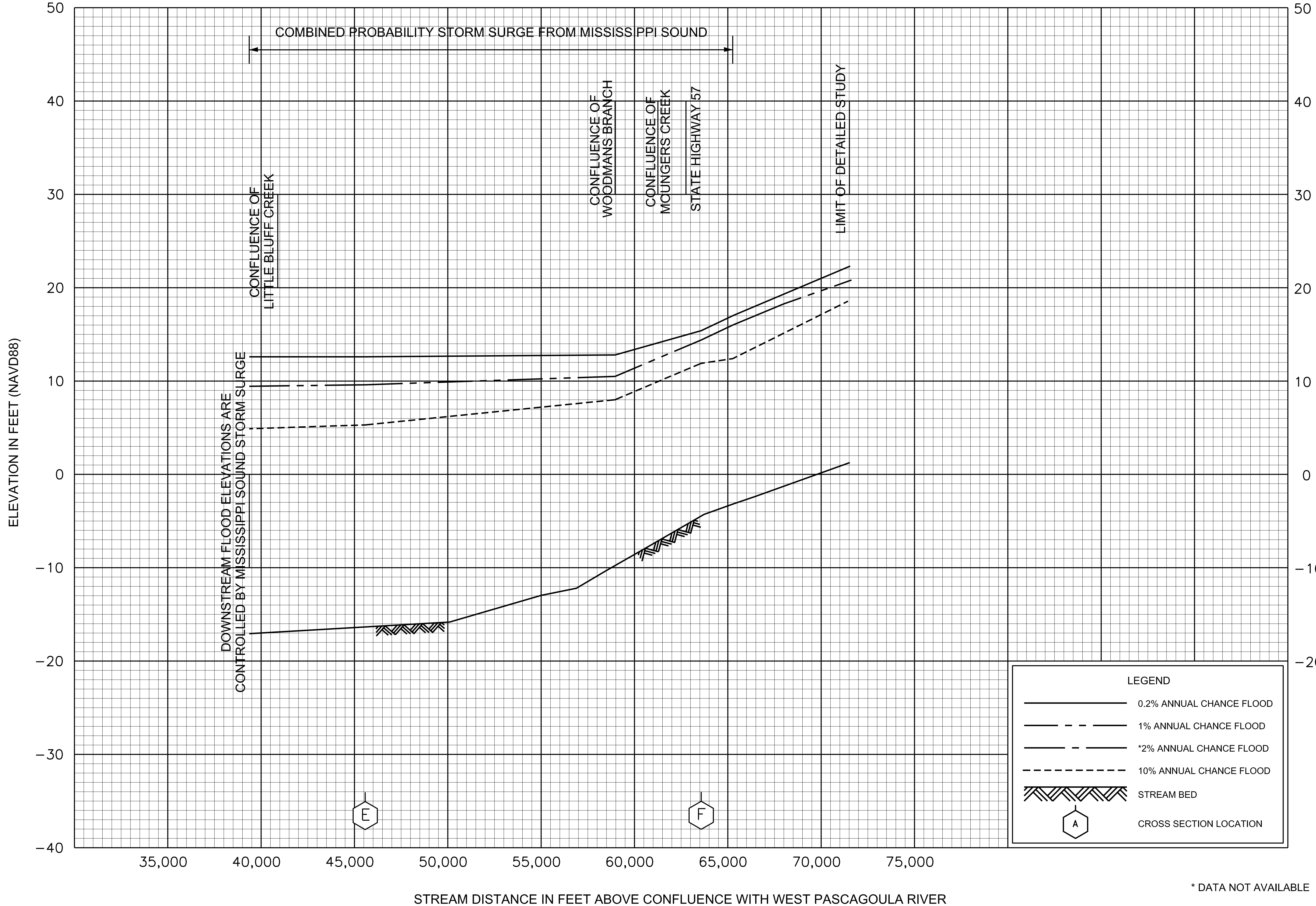
BLACK CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

05P



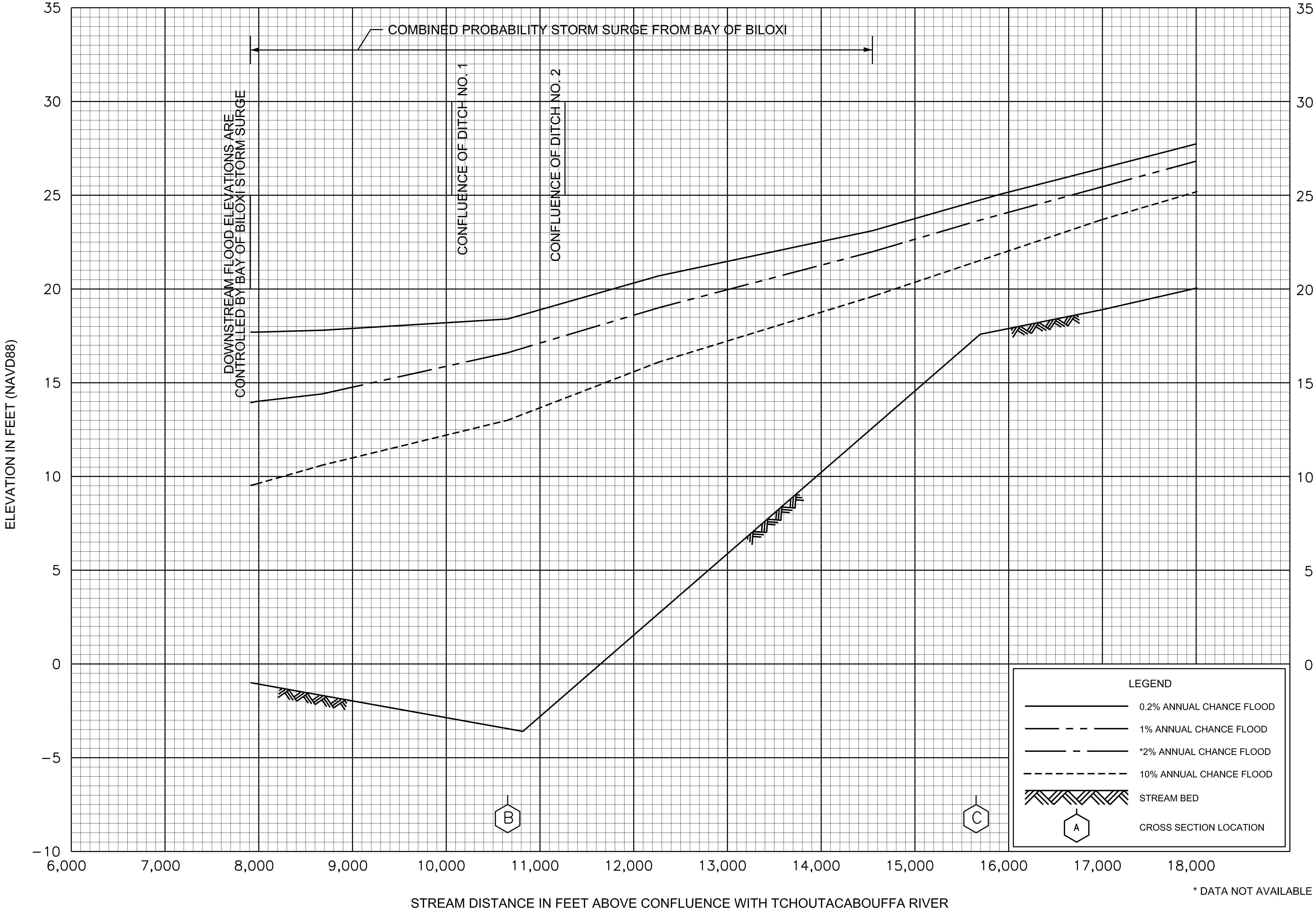
FLOOD PROFILES

BLUFF CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS AND INCORPORATED AREAS

06P



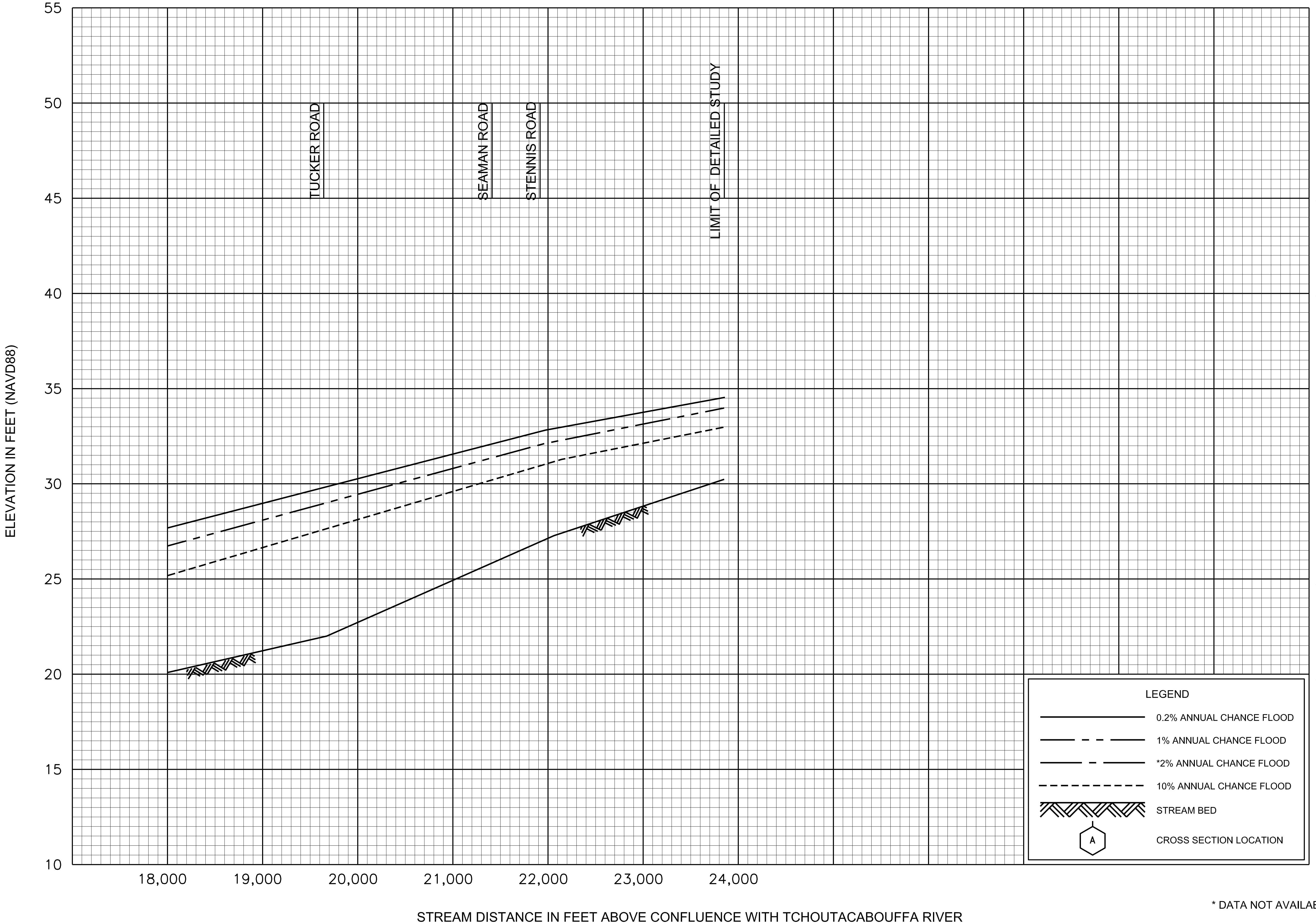
* DATA NOT AVAILABLE

FLOOD PROFILES

CYPRESS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



* DATA NOT AVAILABLE

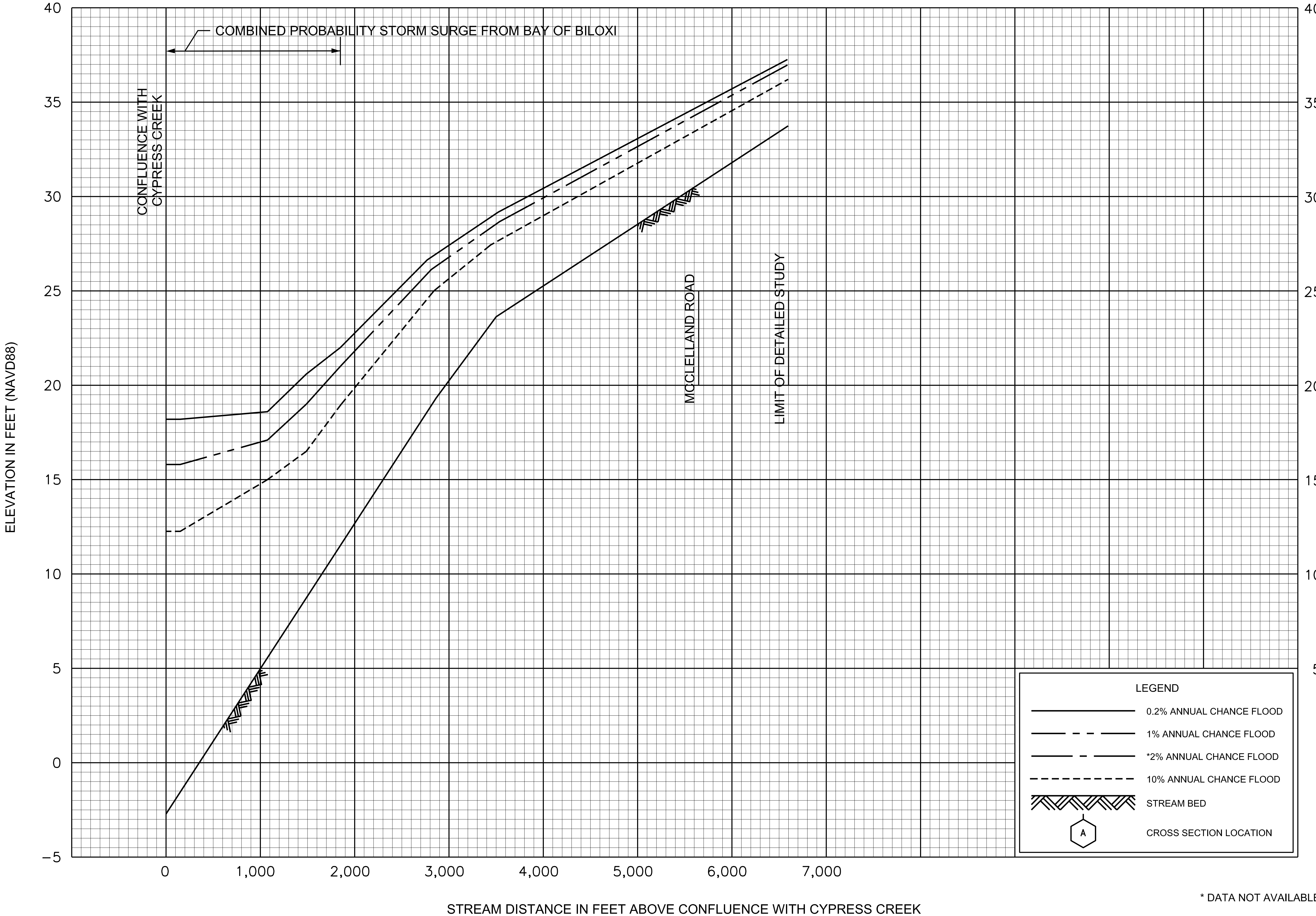
FLOOD PROFILES

CYPRESS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



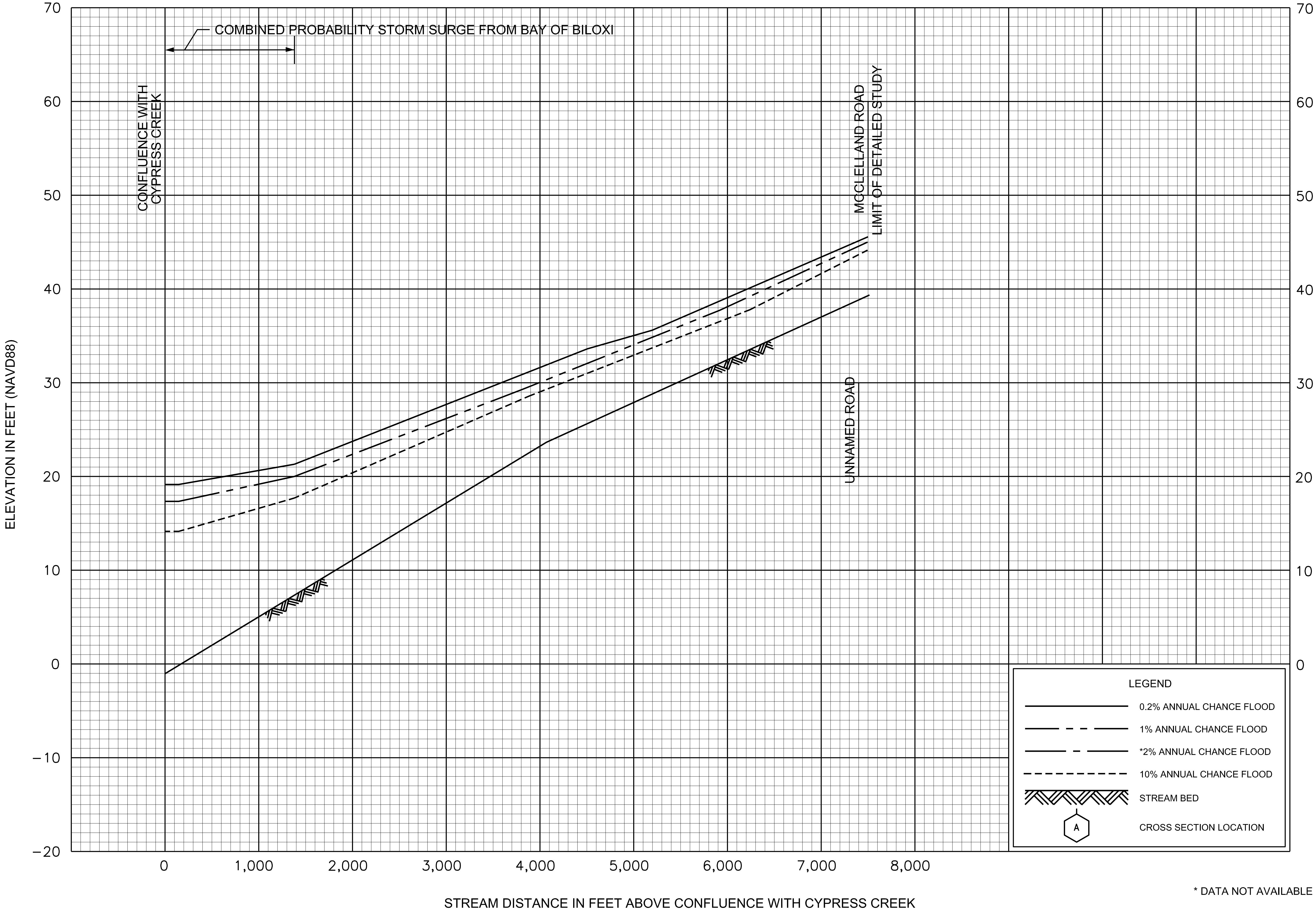
FLOOD PROFILES

DITCH NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



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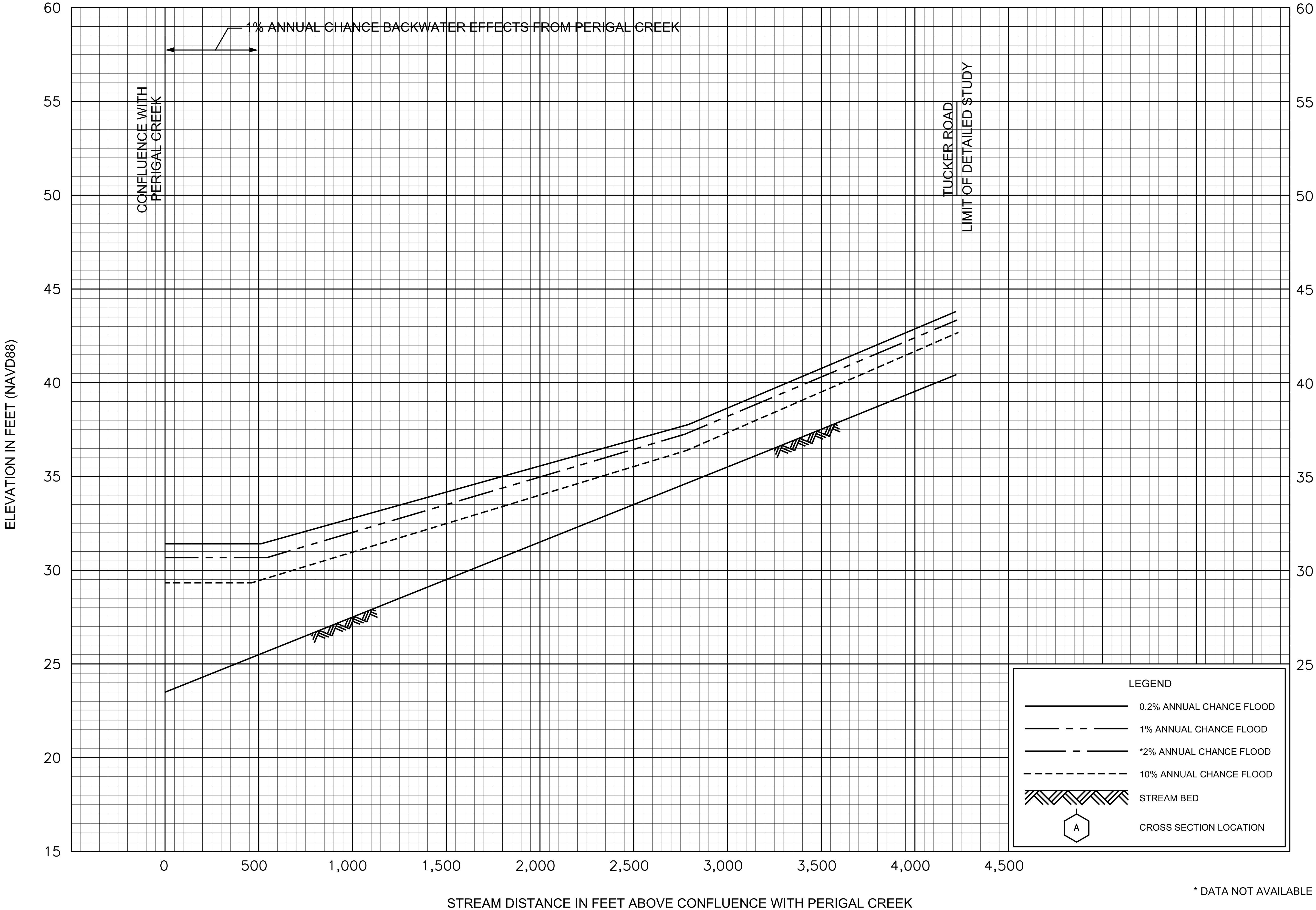
FLOOD PROFILES

DITCH NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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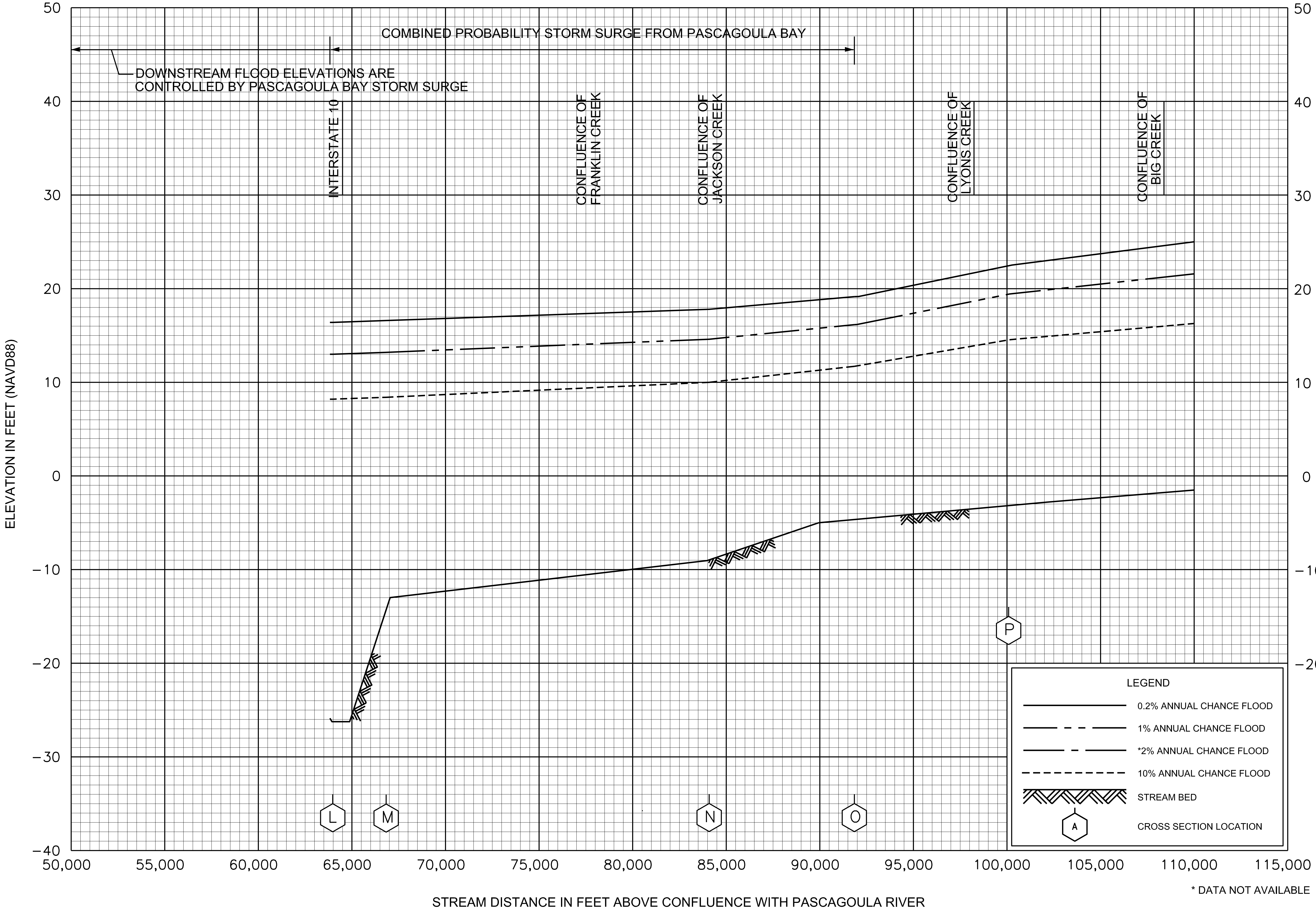
FLOOD PROFILES

DITCH NO. 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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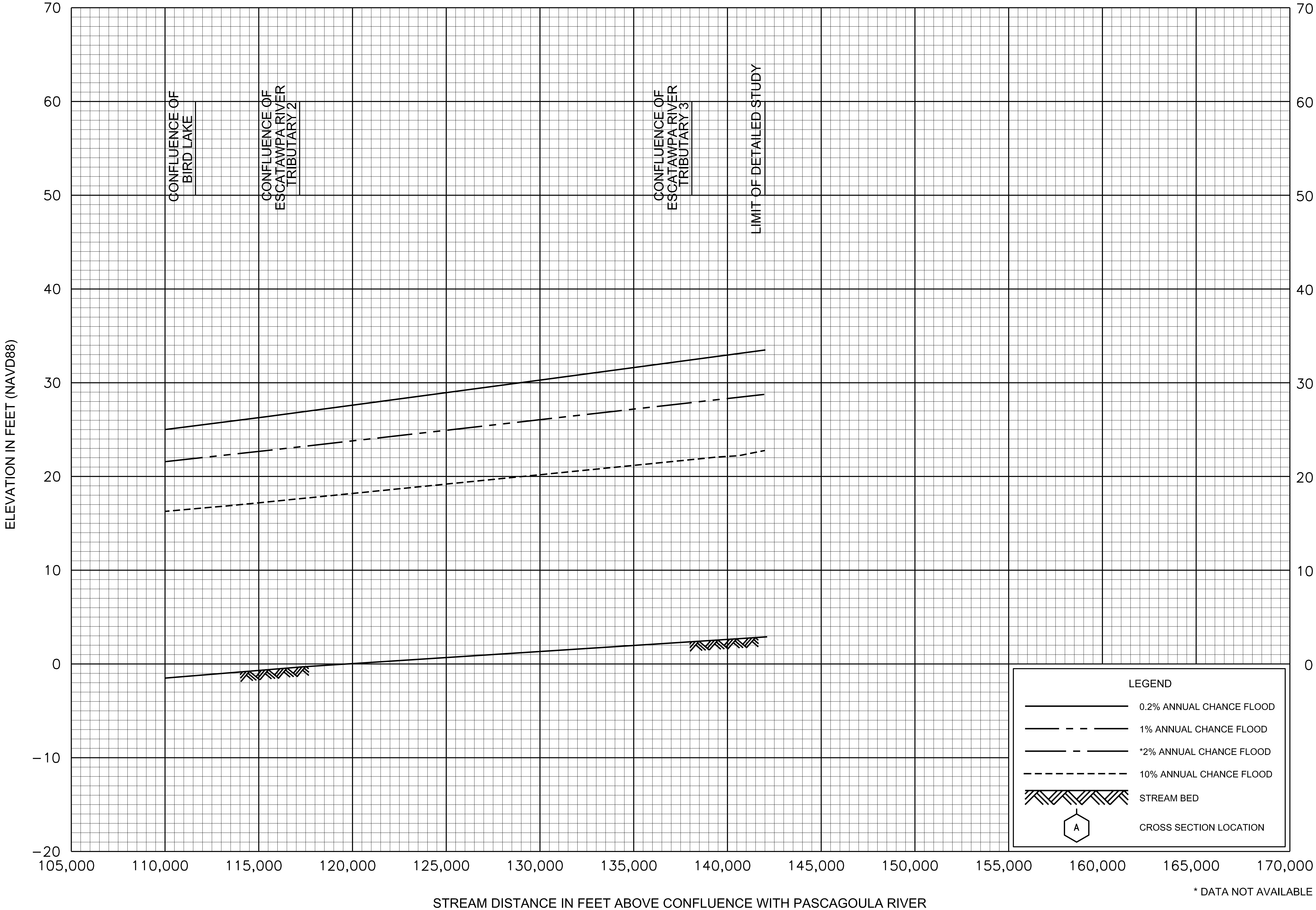
FLOOD PROFILES

ESCATAWPA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



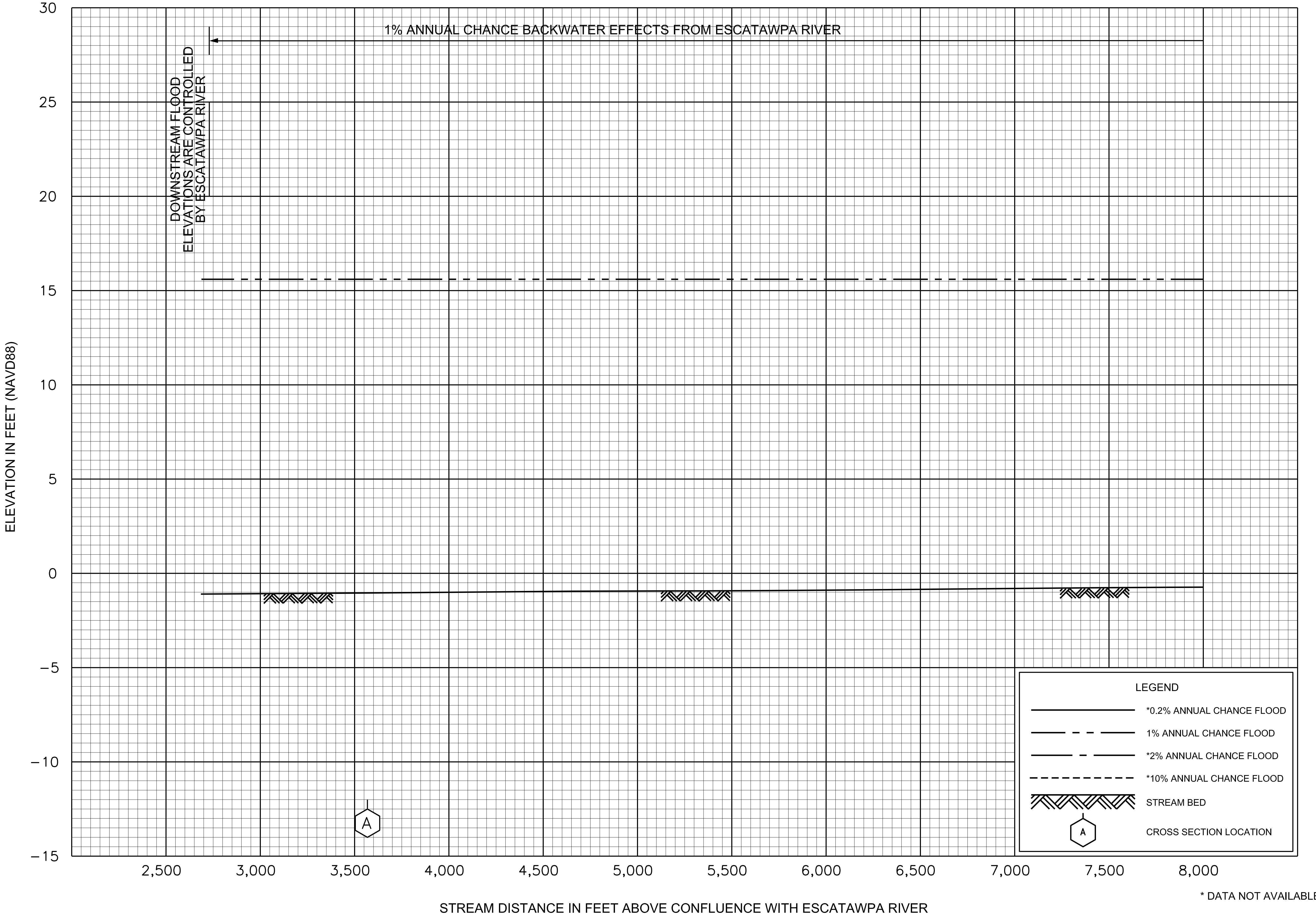
FLOOD PROFILES

ESCATAWPA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

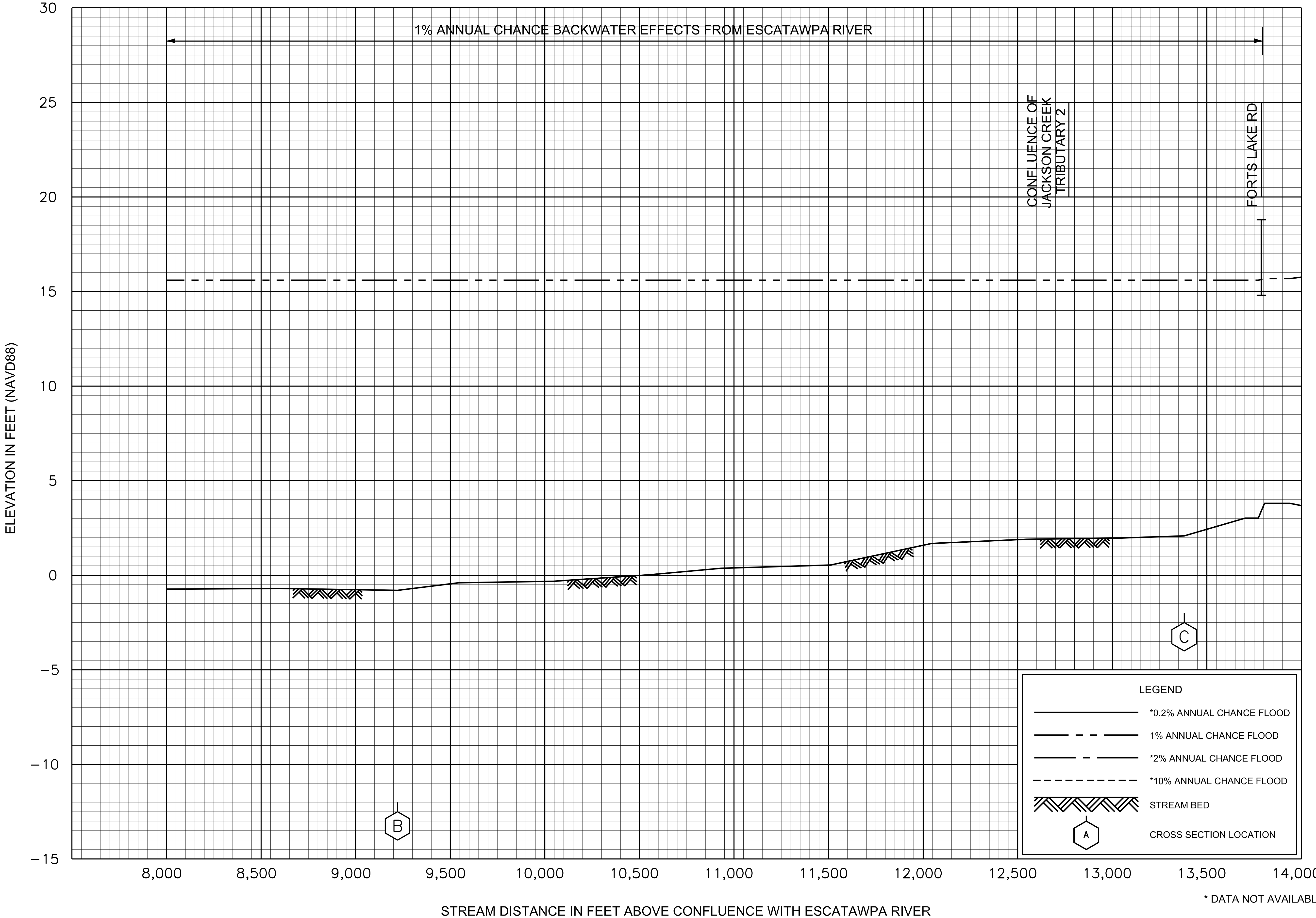


FLOOD PROFILES

JACKSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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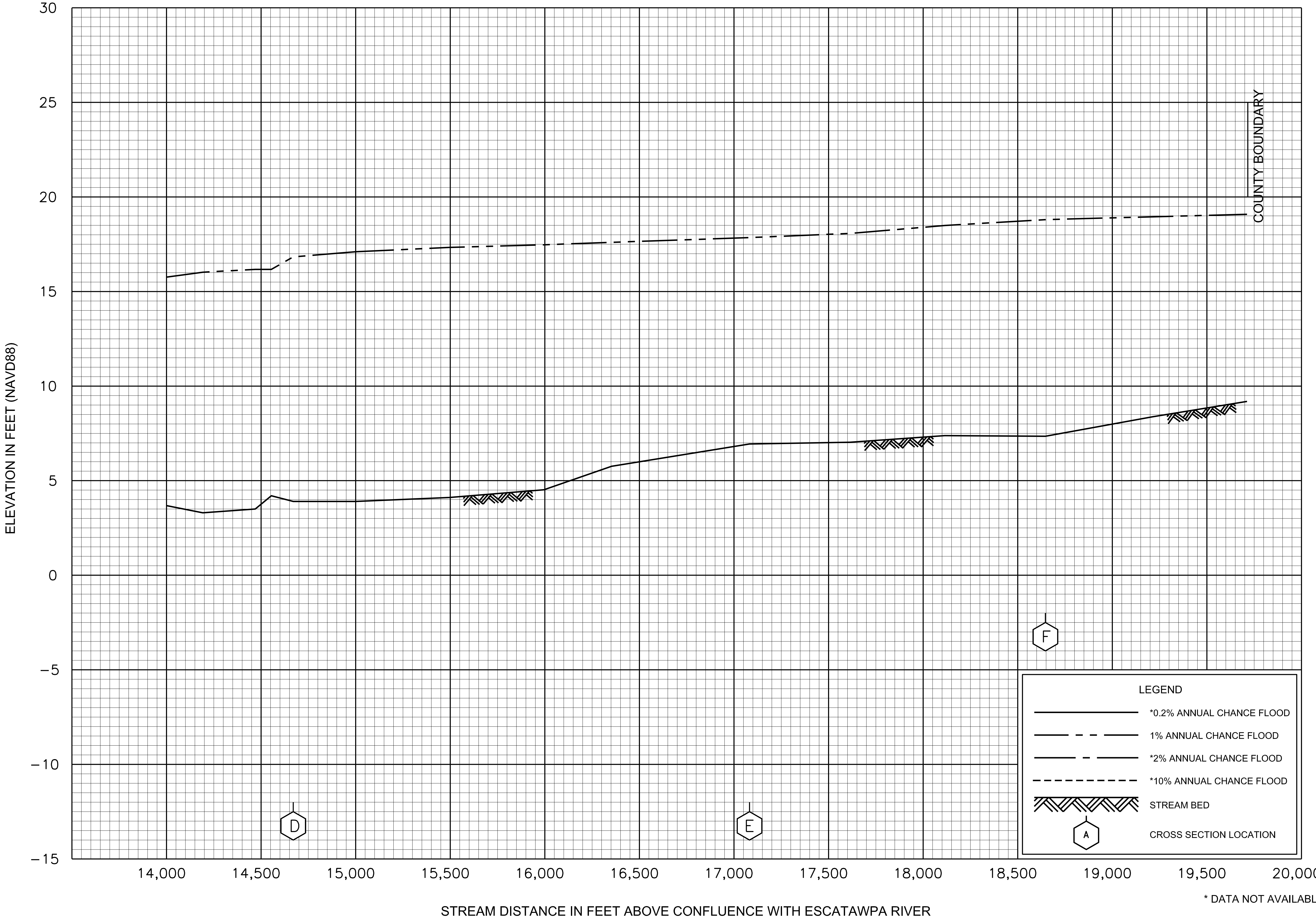
FLOOD PROFILES

JACKSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS

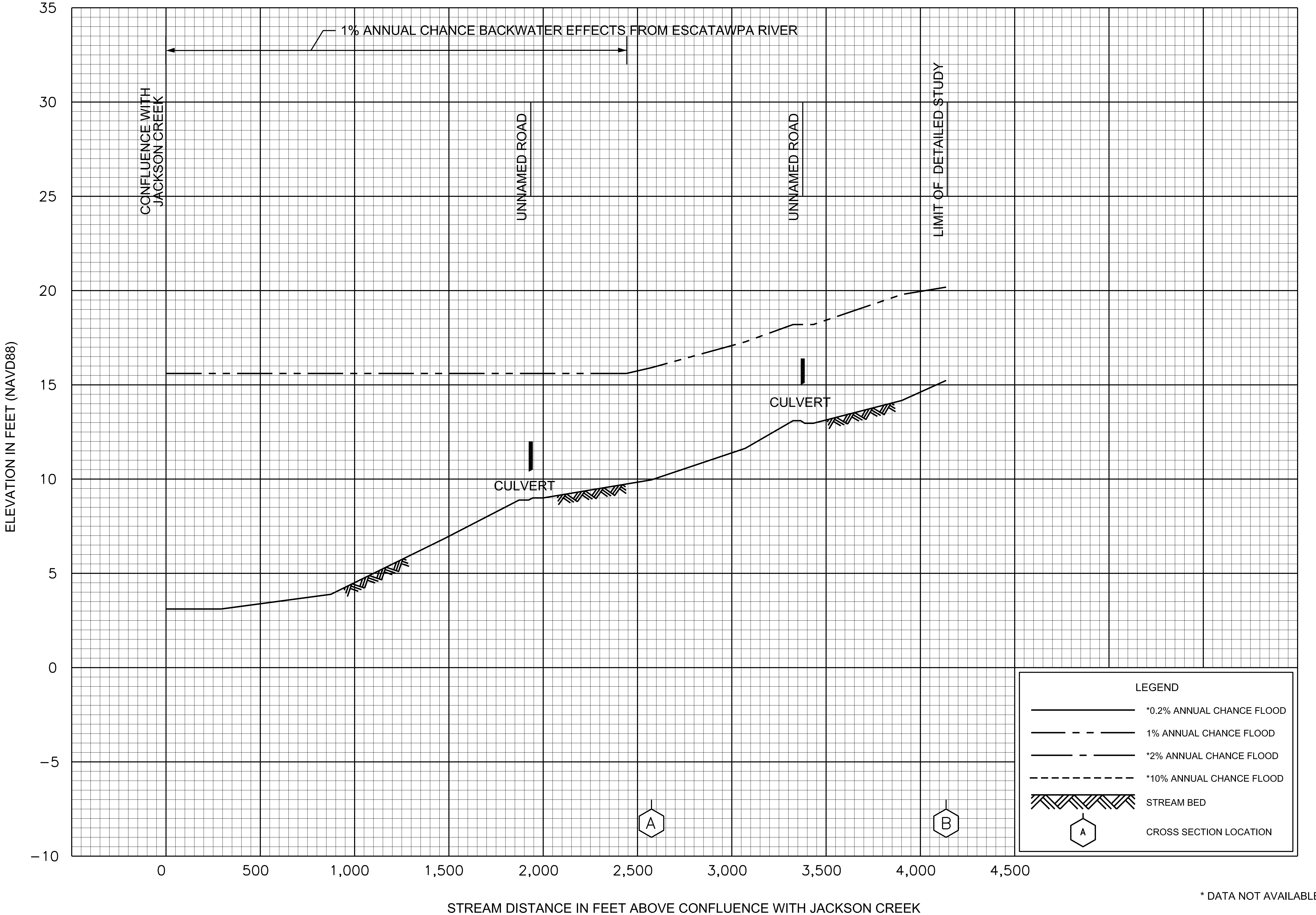


FLOOD PROFILES

JACKSON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS

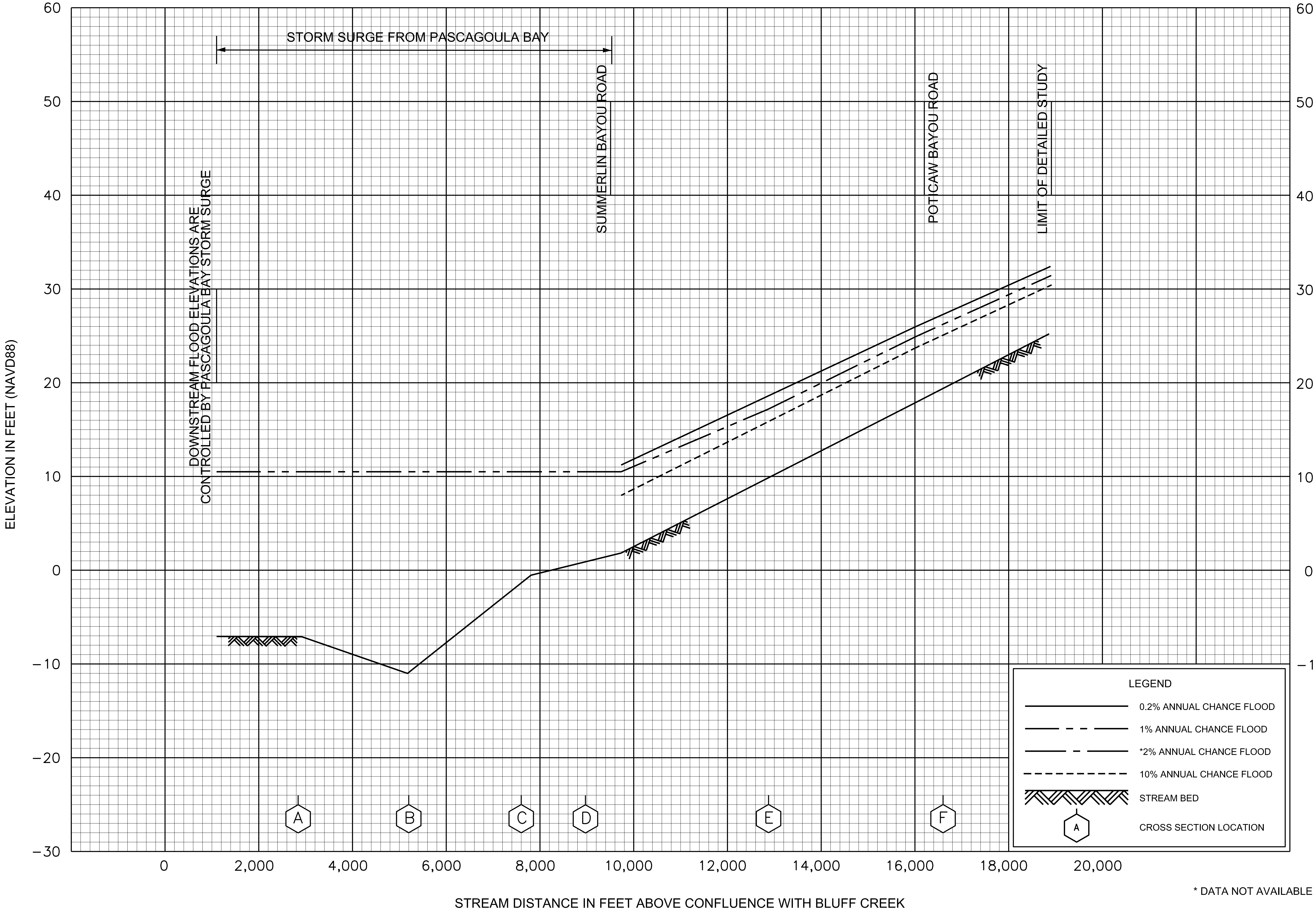


FLOOD PROFILES

JACKSON CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



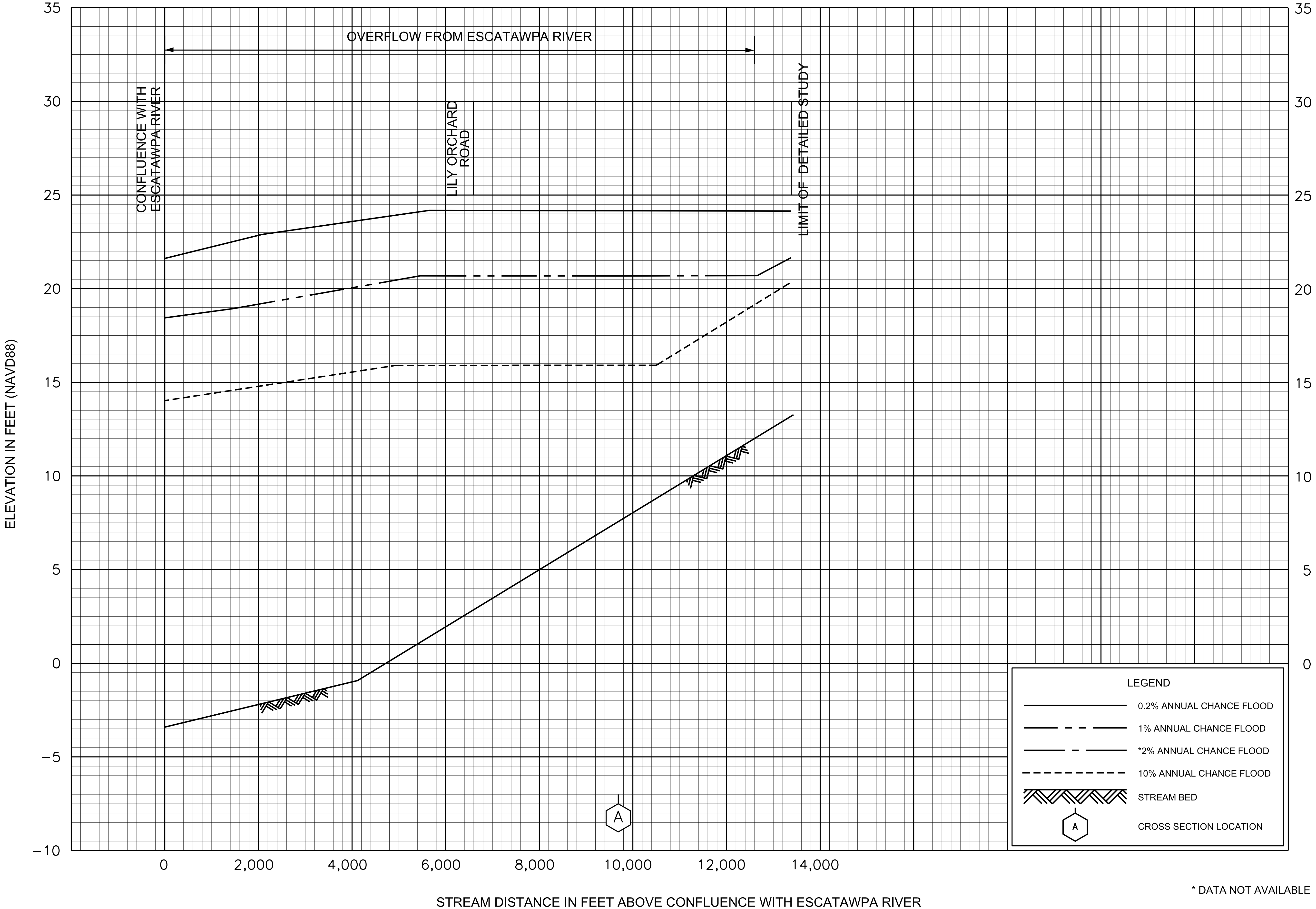
FLOOD PROFILES

JOHNS BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

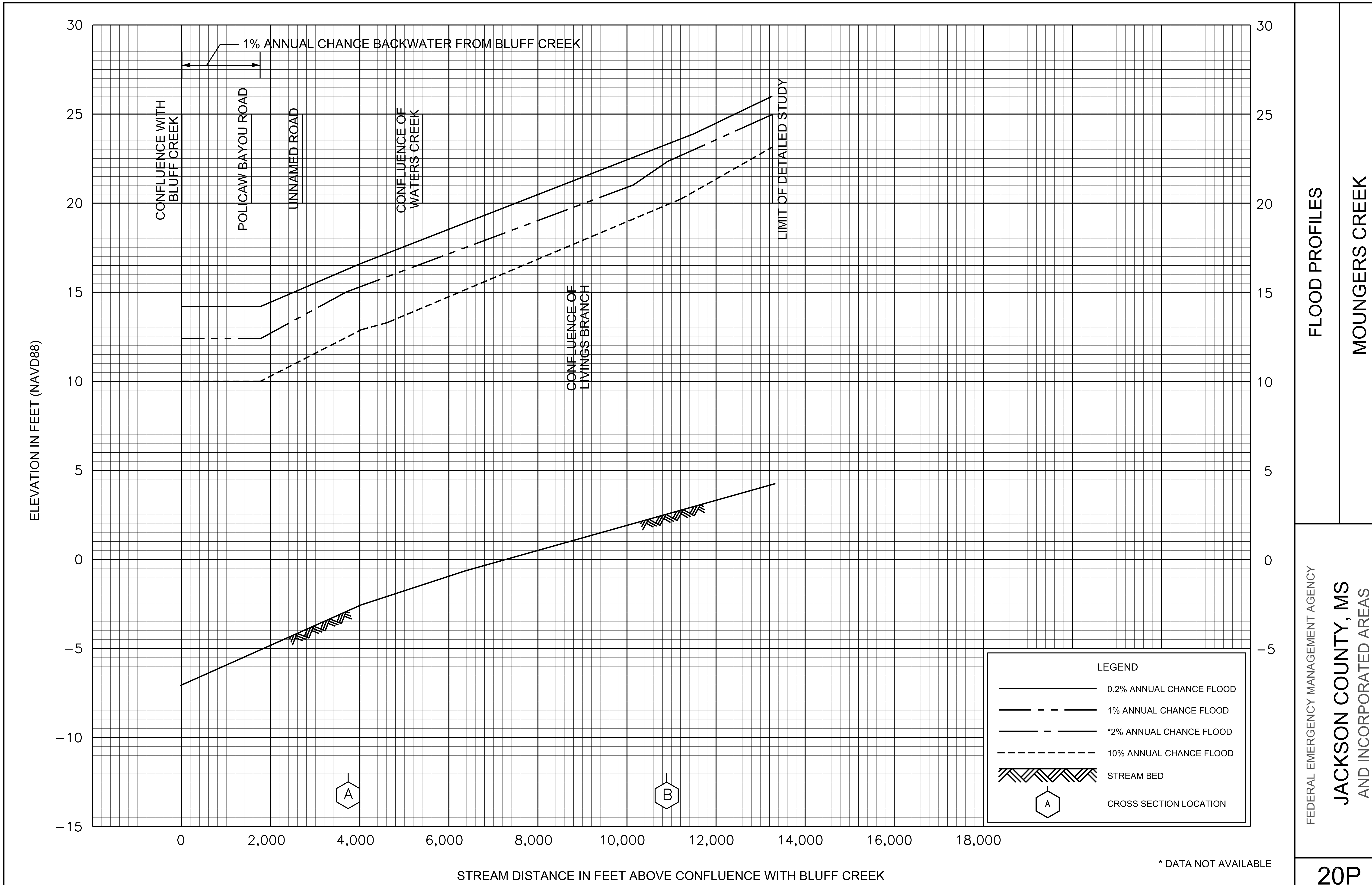


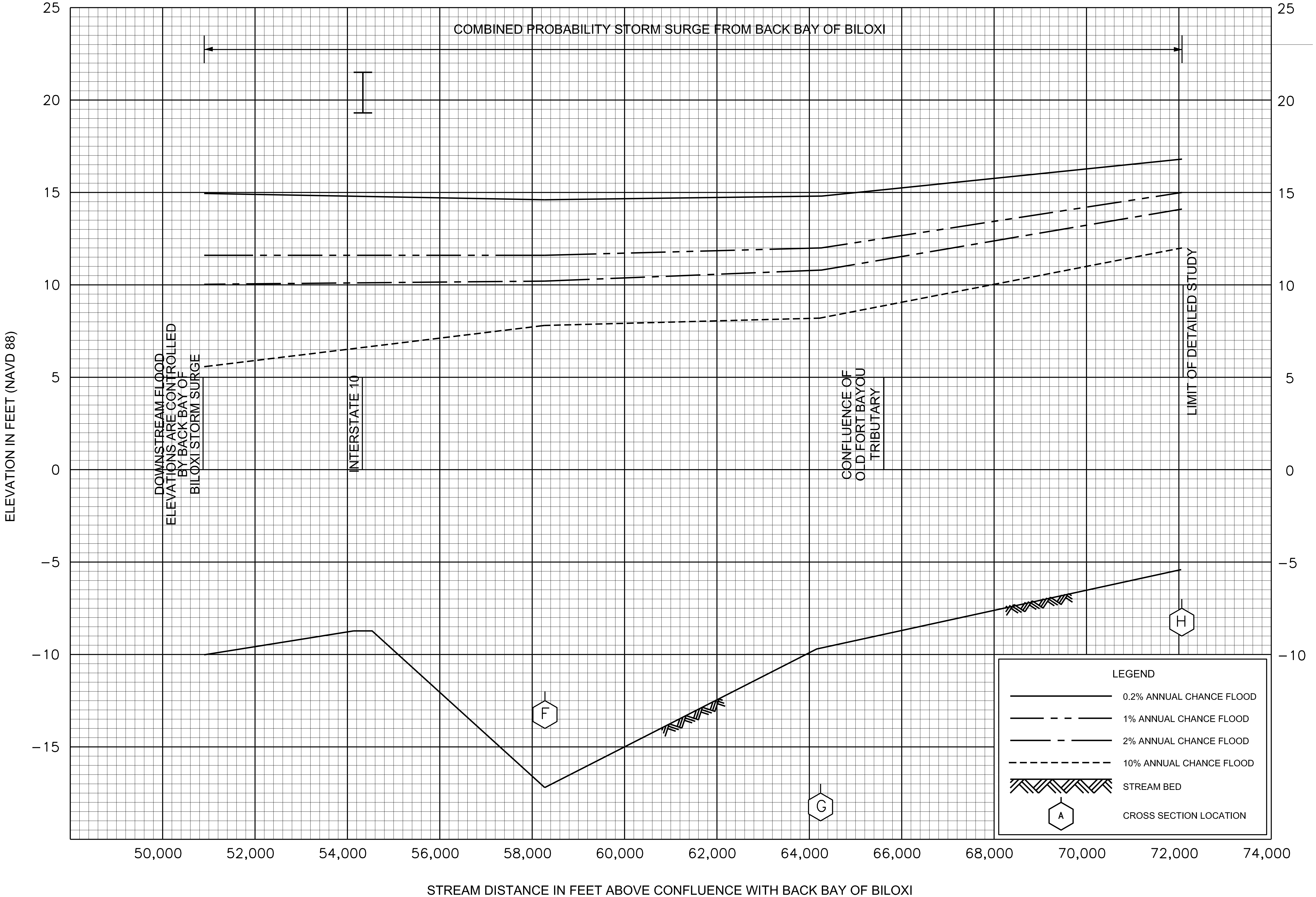
FLOOD PROFILES

LYONS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS


1% ANNUAL CHANCE BACKWATER FROM BLUFF CREEK
CONFLUENCE WITH BLUFF CREEK
POLICAW BAYOU ROAD
UNNAMED ROAD
CONFLUENCE OF WATERS CREEK
CONFLUENCE OF LIVINGS BRANCH
LIMIT OF DETAILED STUDY
ELEVATION IN FEET (NAVD88)
STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH BLUFF CREEK
30
25
20
15
10
5
0
−5
−10
−15
0
2,000
4,000
6,000
8,000
10,000
12,000
14,000
16,000
18,000
A
B
LEGEND
0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
*2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
CROSS SECTION LOCATION
* DATA NOT AVAILABLE
FLOOD PROFILES
MOUNGERS CREEK
FEDERAL EMERGENCY MANAGEMENT AGENCY
JACKSON COUNTY, MS
AND INCORPORATED AREAS



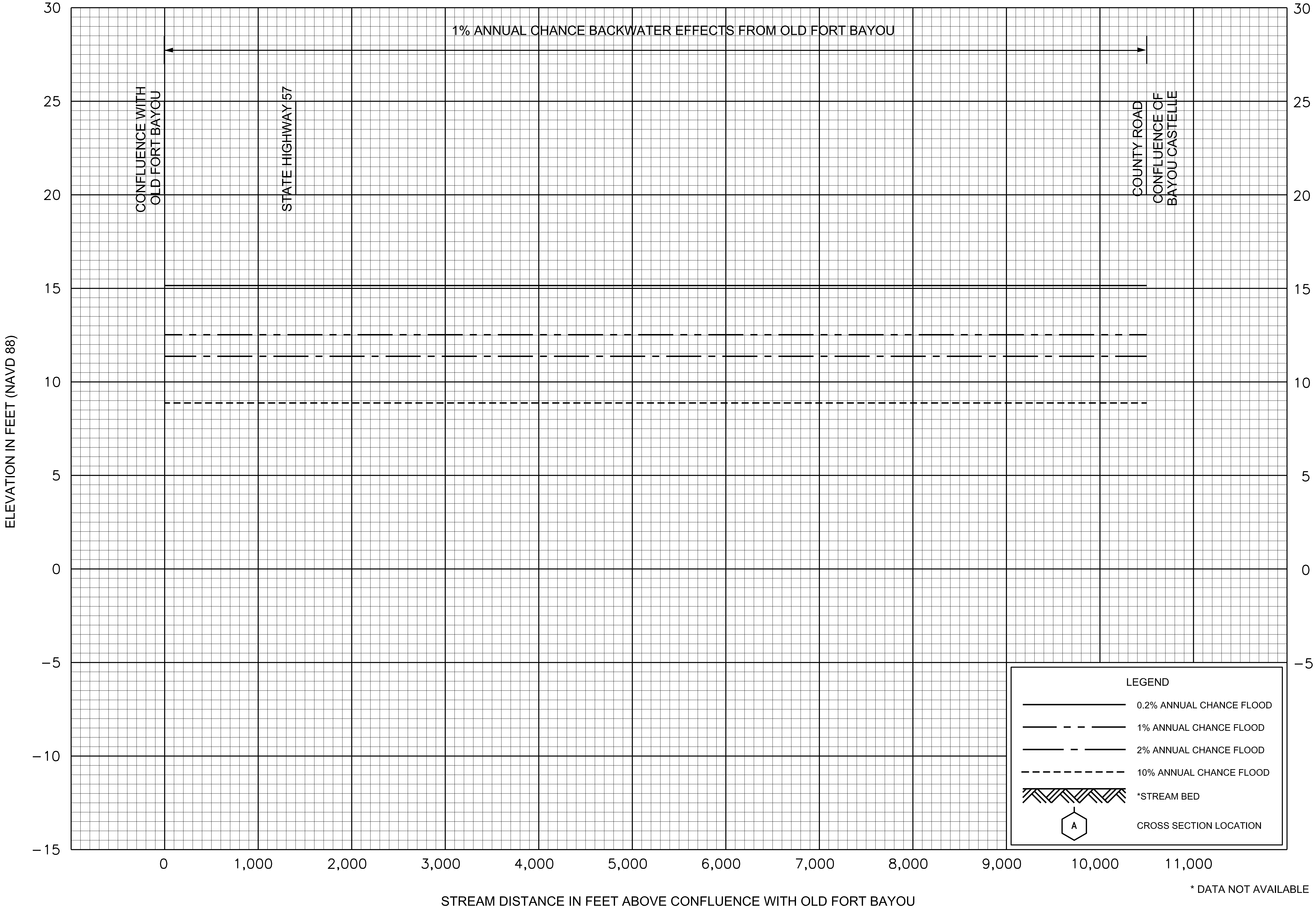
FLOOD PROFILES

OLD FORT BAYOU

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



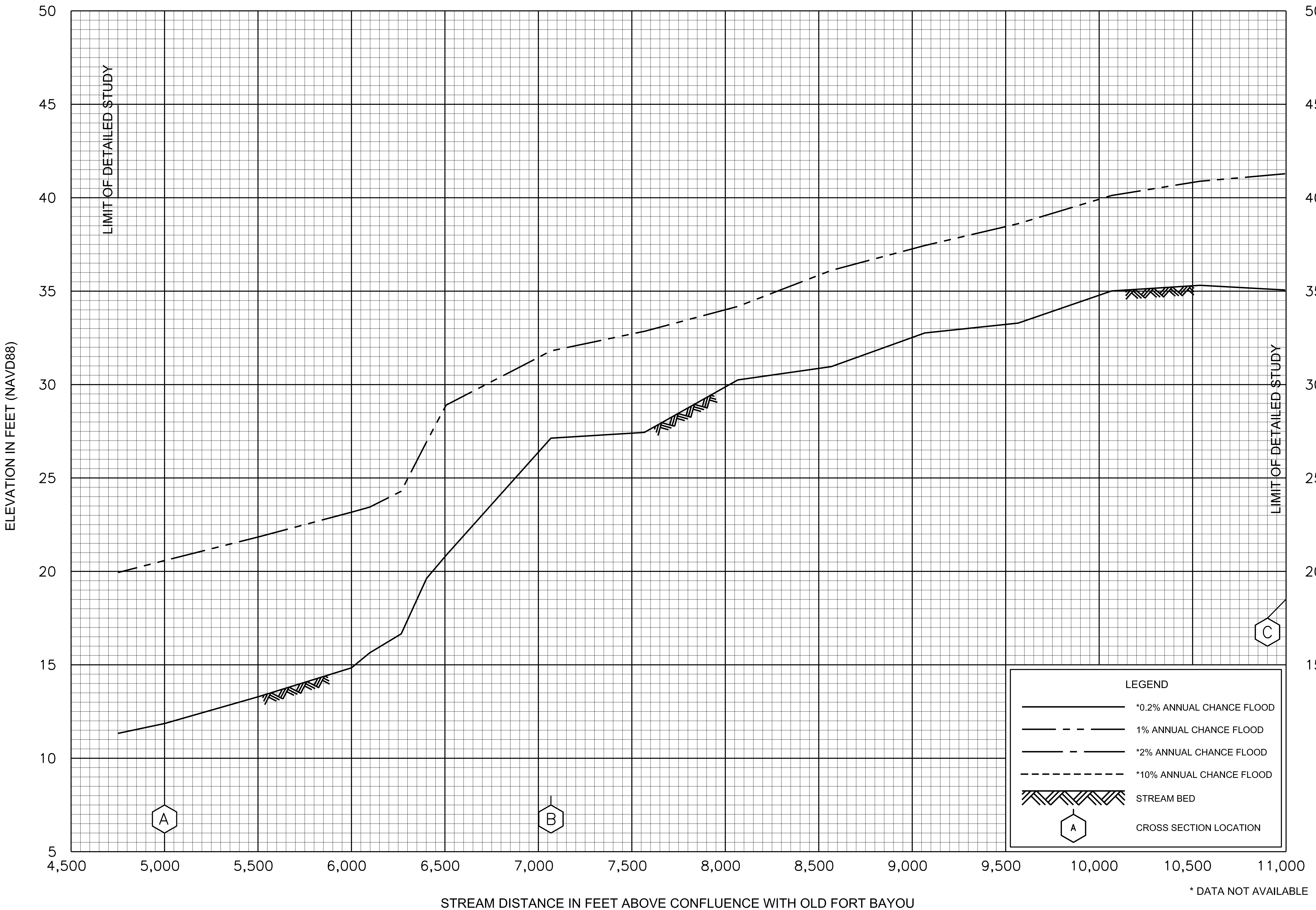
FLOOD PROFILES

OLD FORT BAYOU TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



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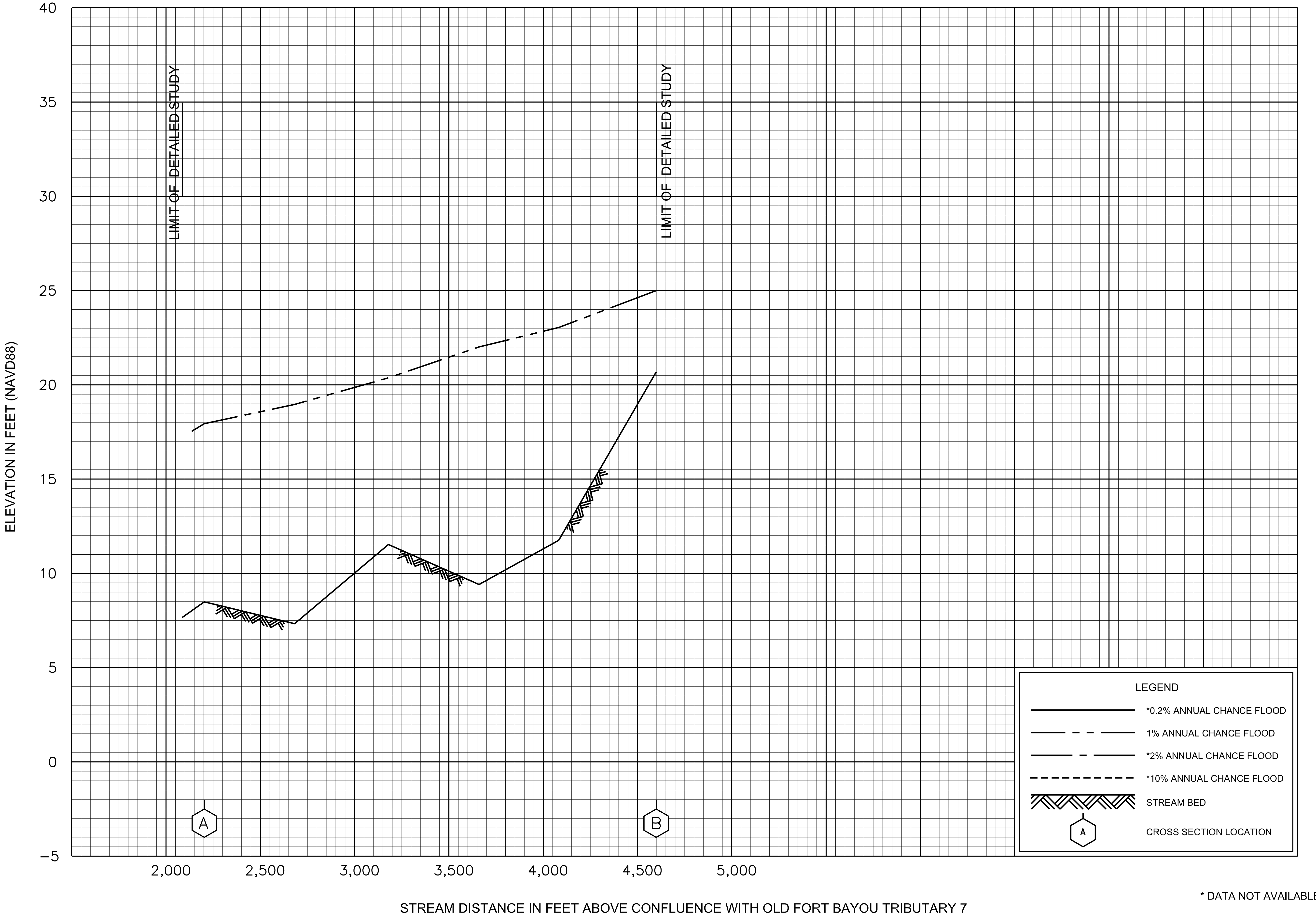
FLOOD PROFILES

OLD FORT BAYOU TRIBUTARY 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



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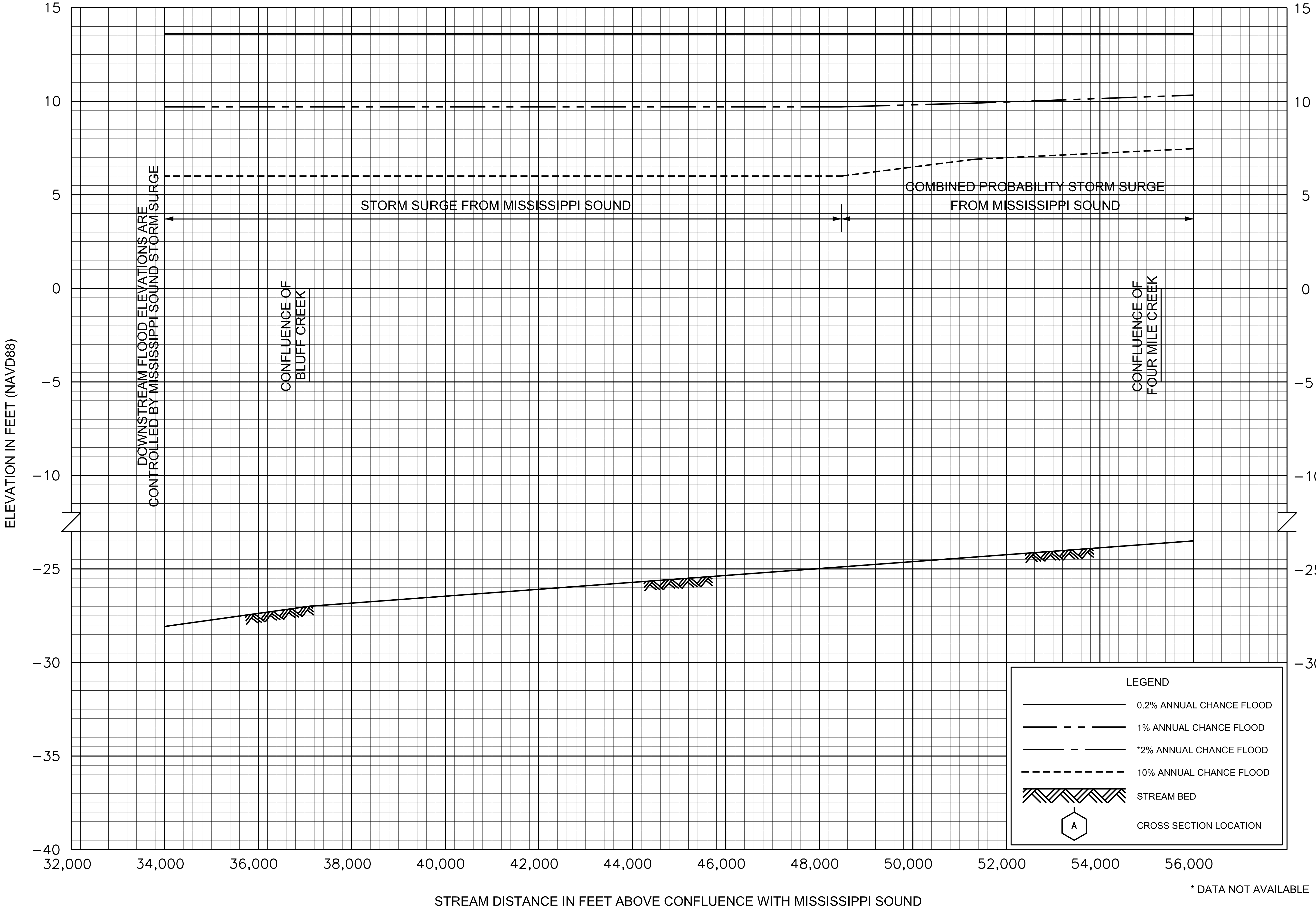
FLOOD PROFILES

OLD FORT BAYOU TRIBUTARY 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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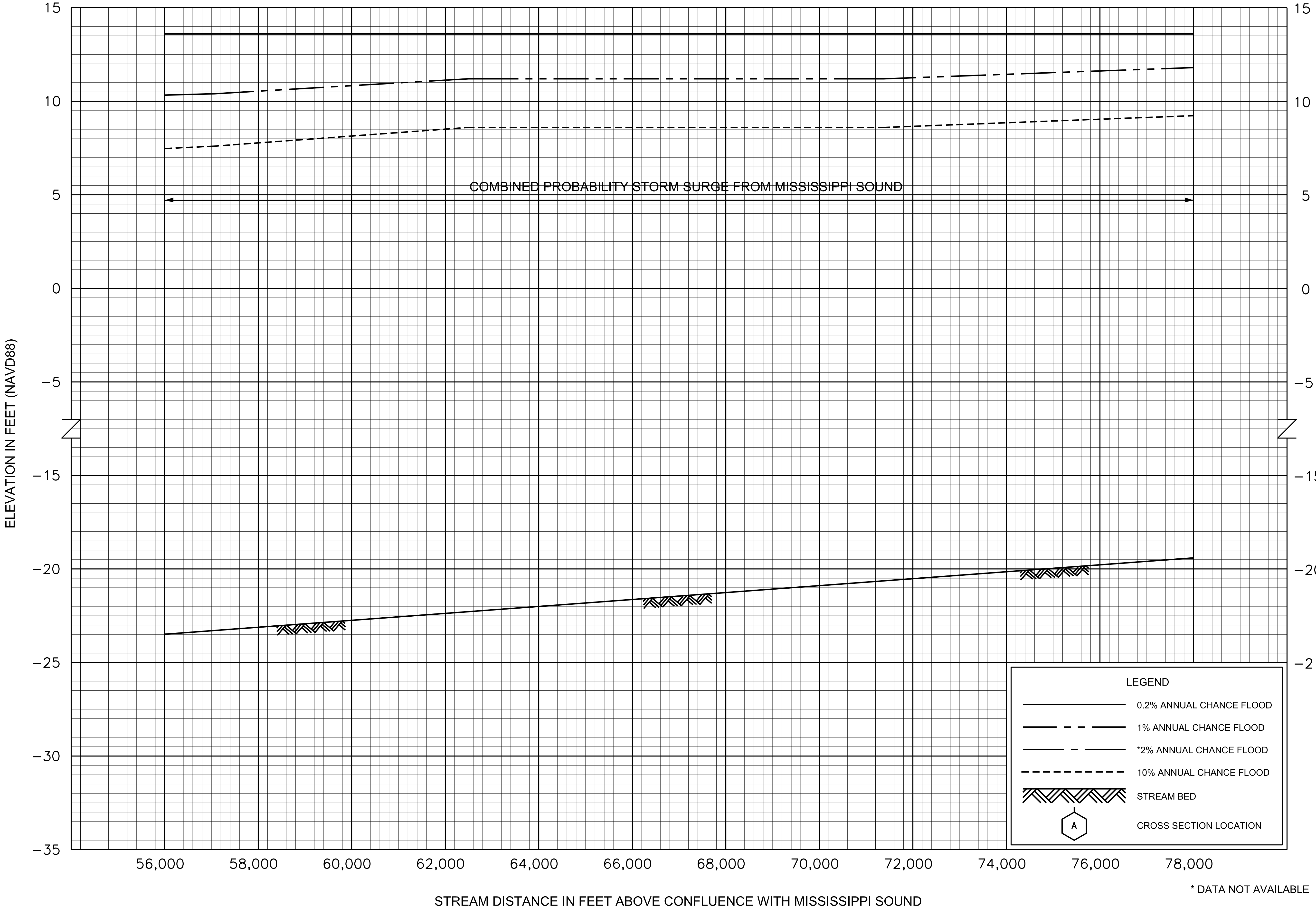
FLOOD PROFILES

WEST PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



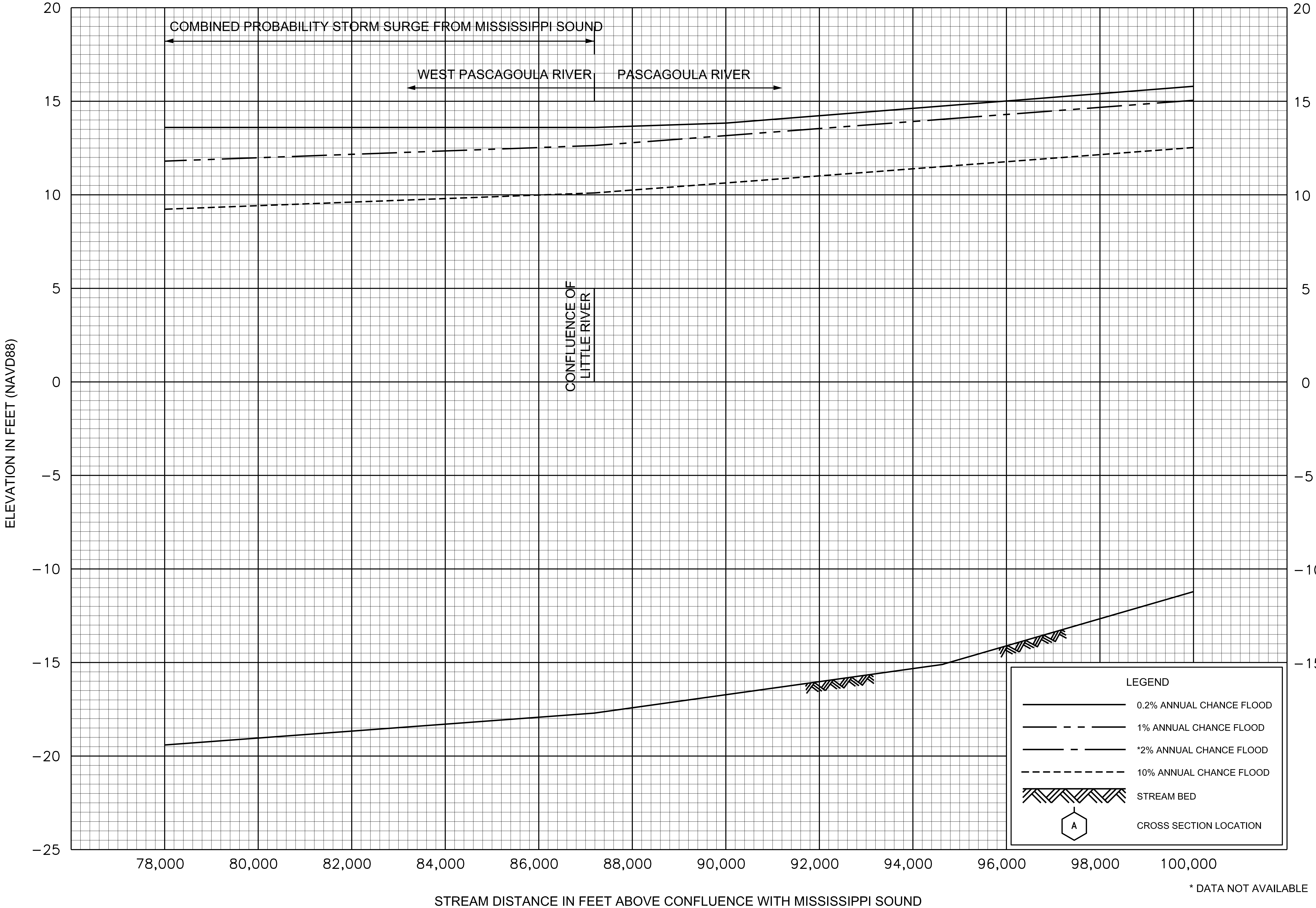
FLOOD PROFILES

WEST PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

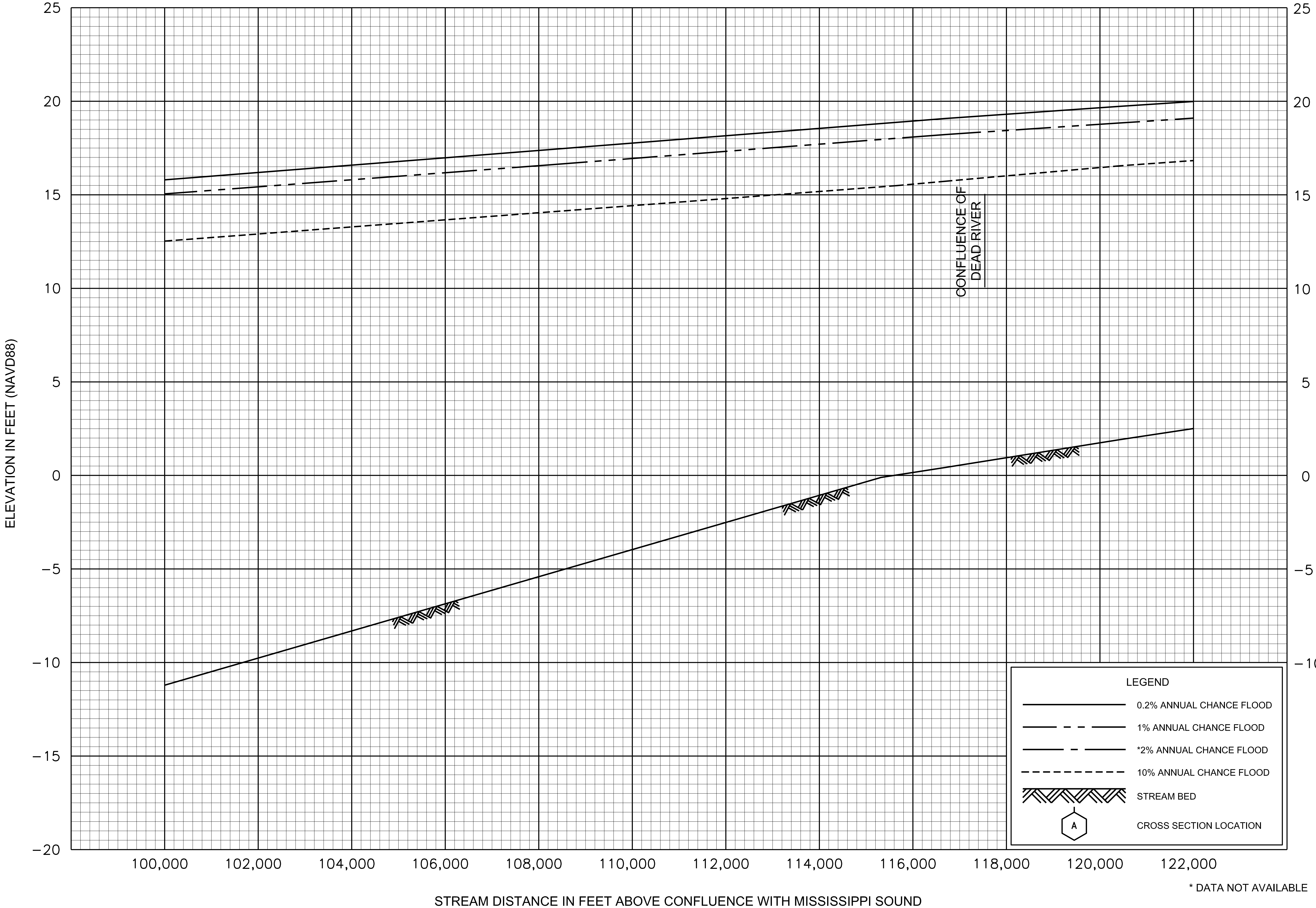


FLOOD PROFILES

WEST PASCAGOULA RIVER - PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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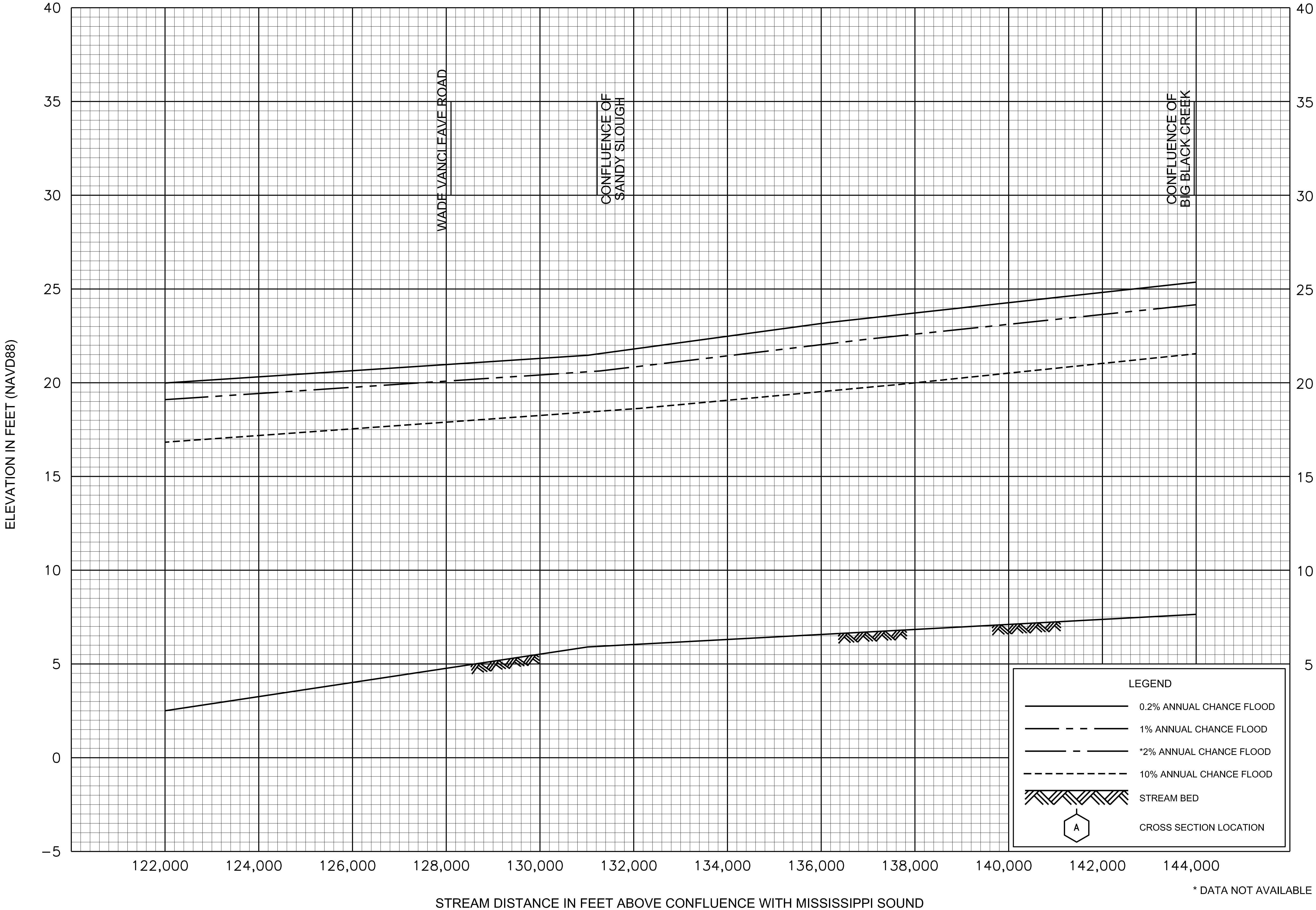
FLOOD PROFILES

PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

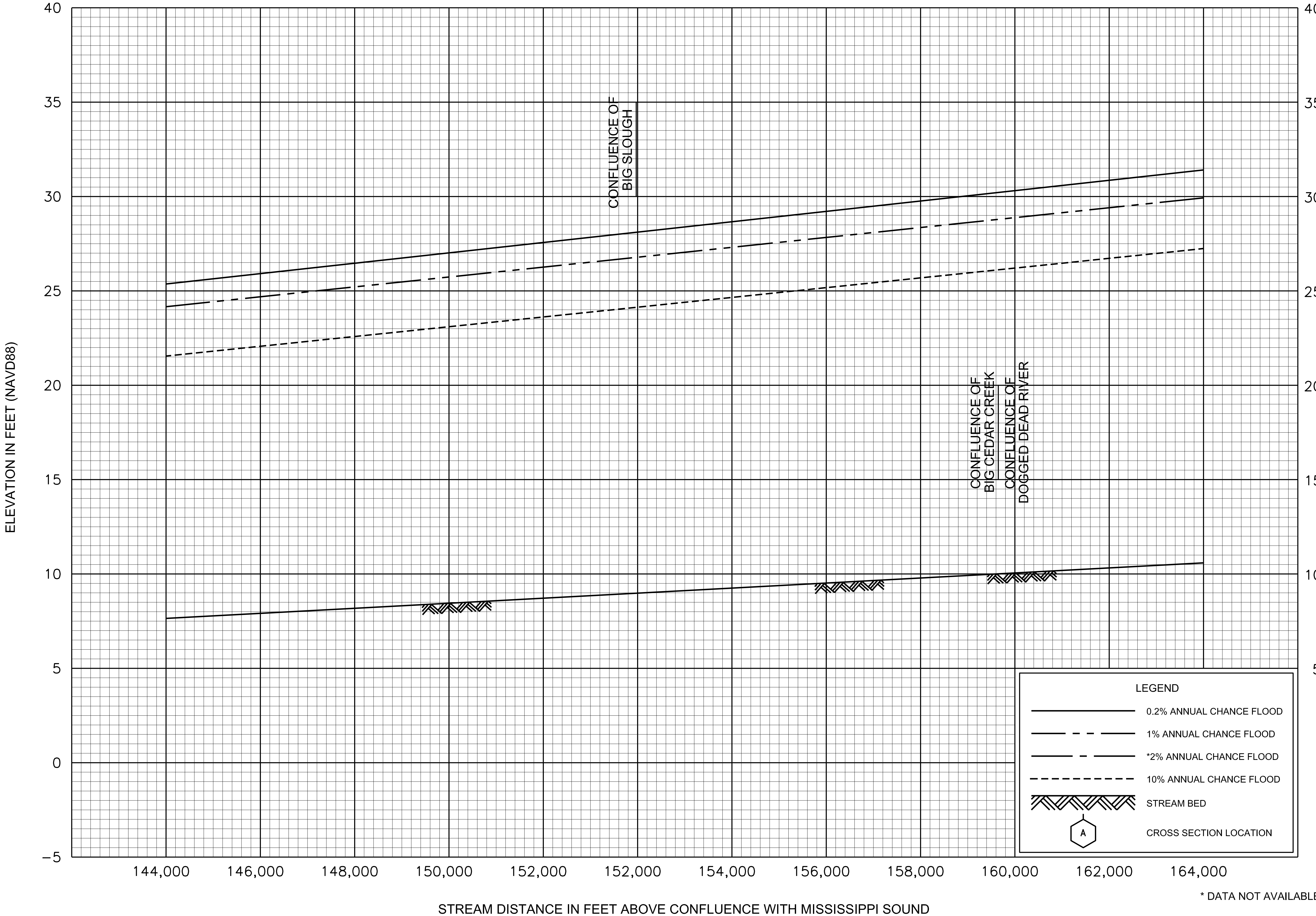


FLOOD PROFILES

PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



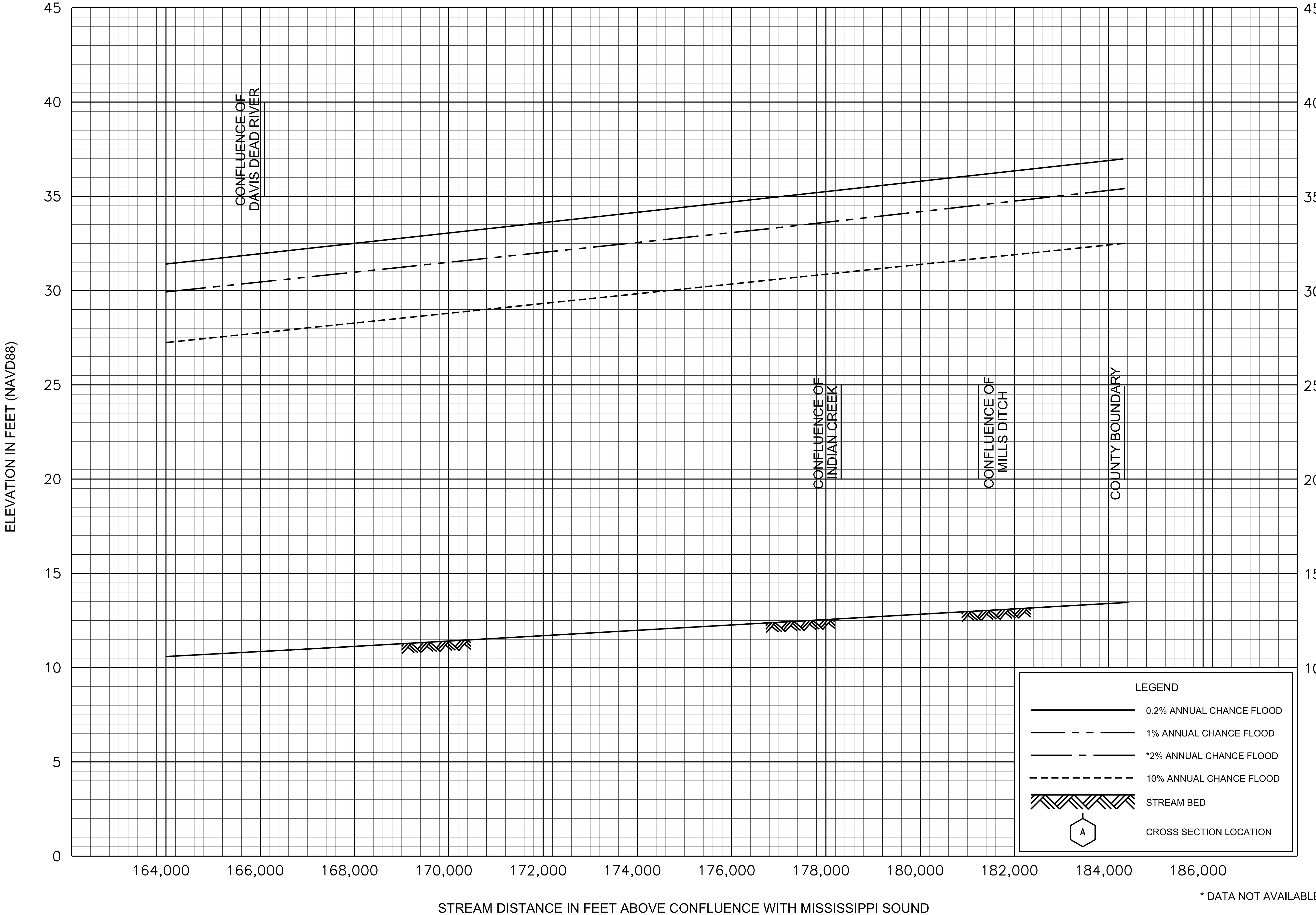
FLOOD PROFILES

PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



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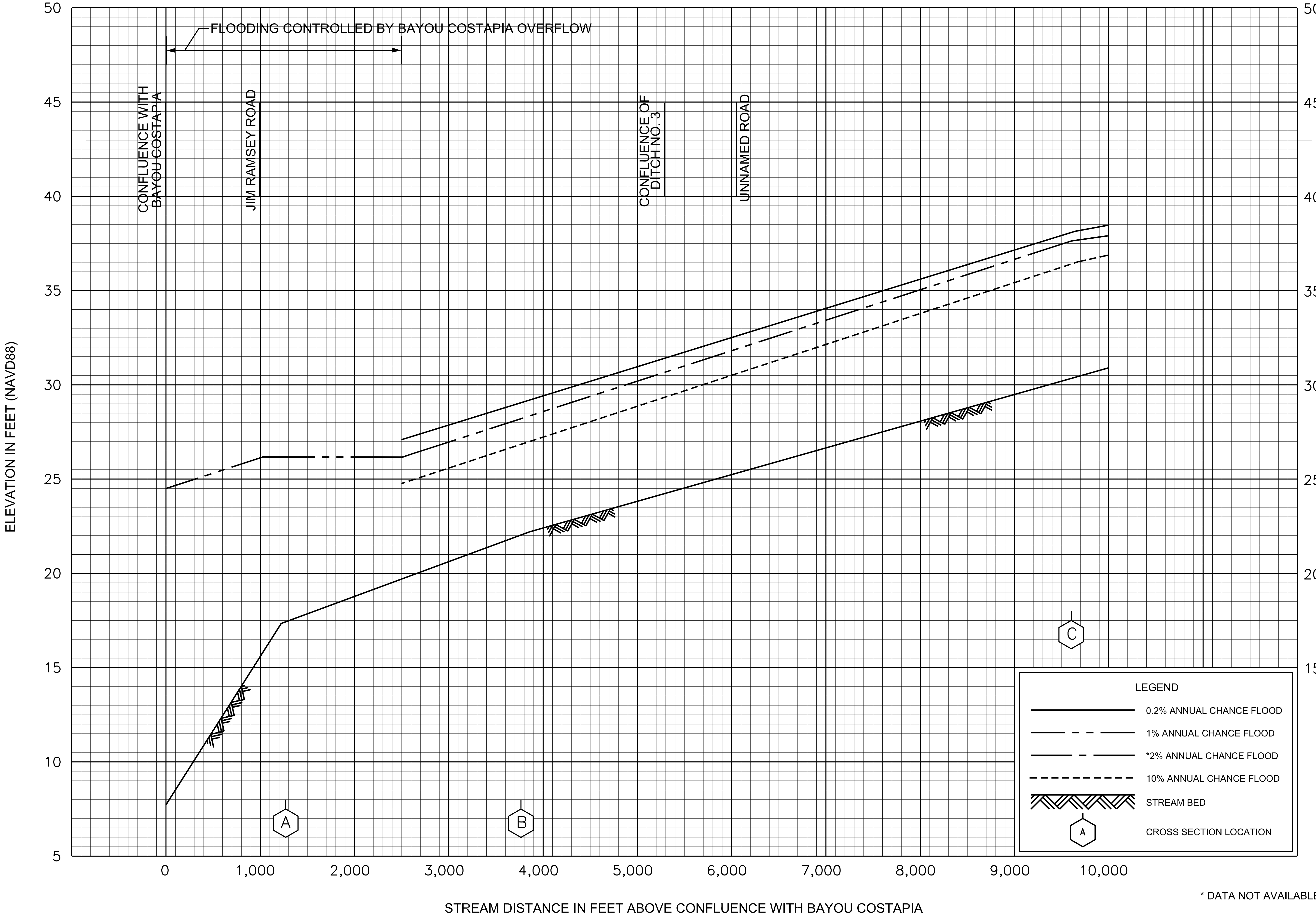
FLOOD PROFILES

PASCAGOULA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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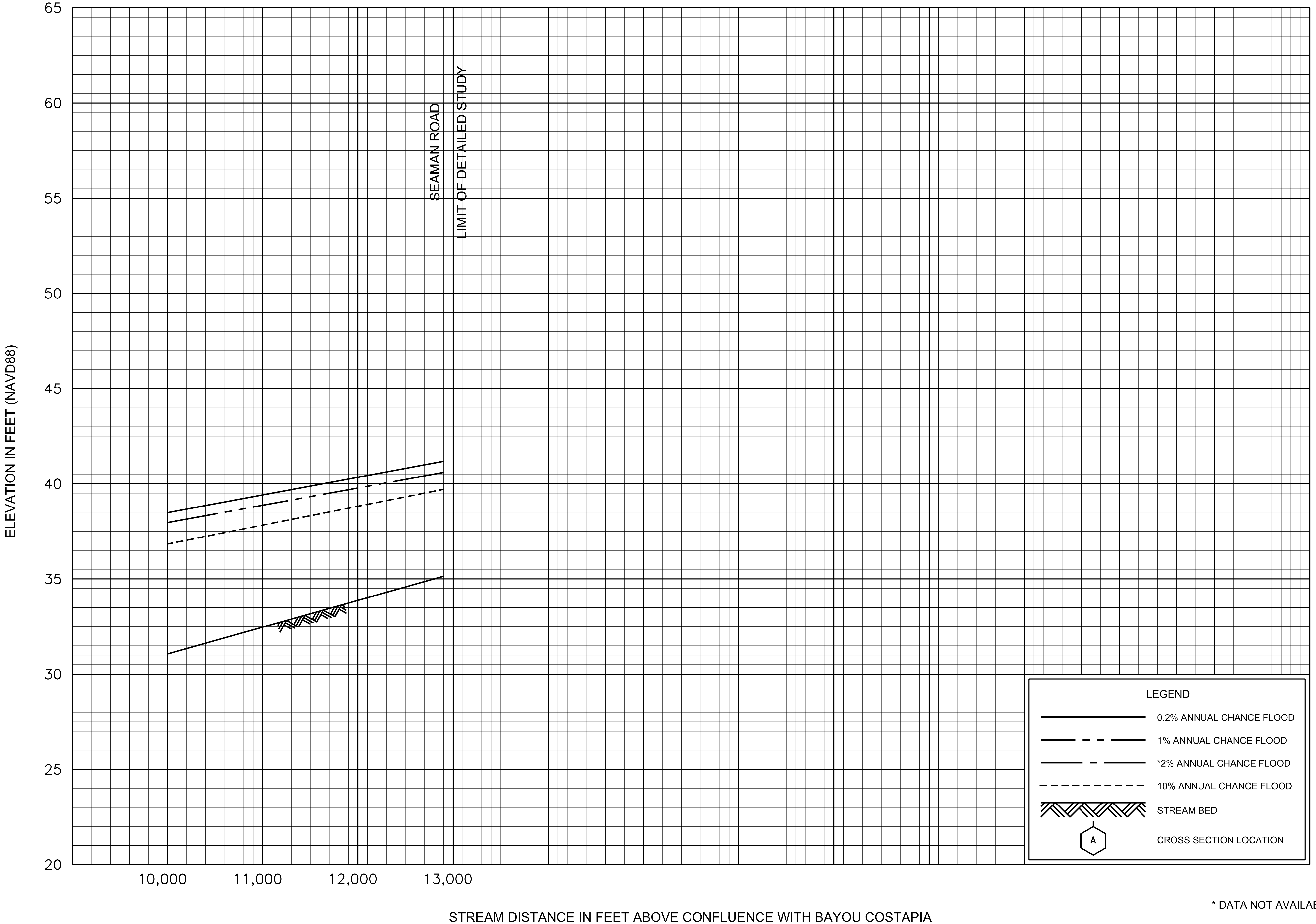
FLOOD PROFILES

PERIGAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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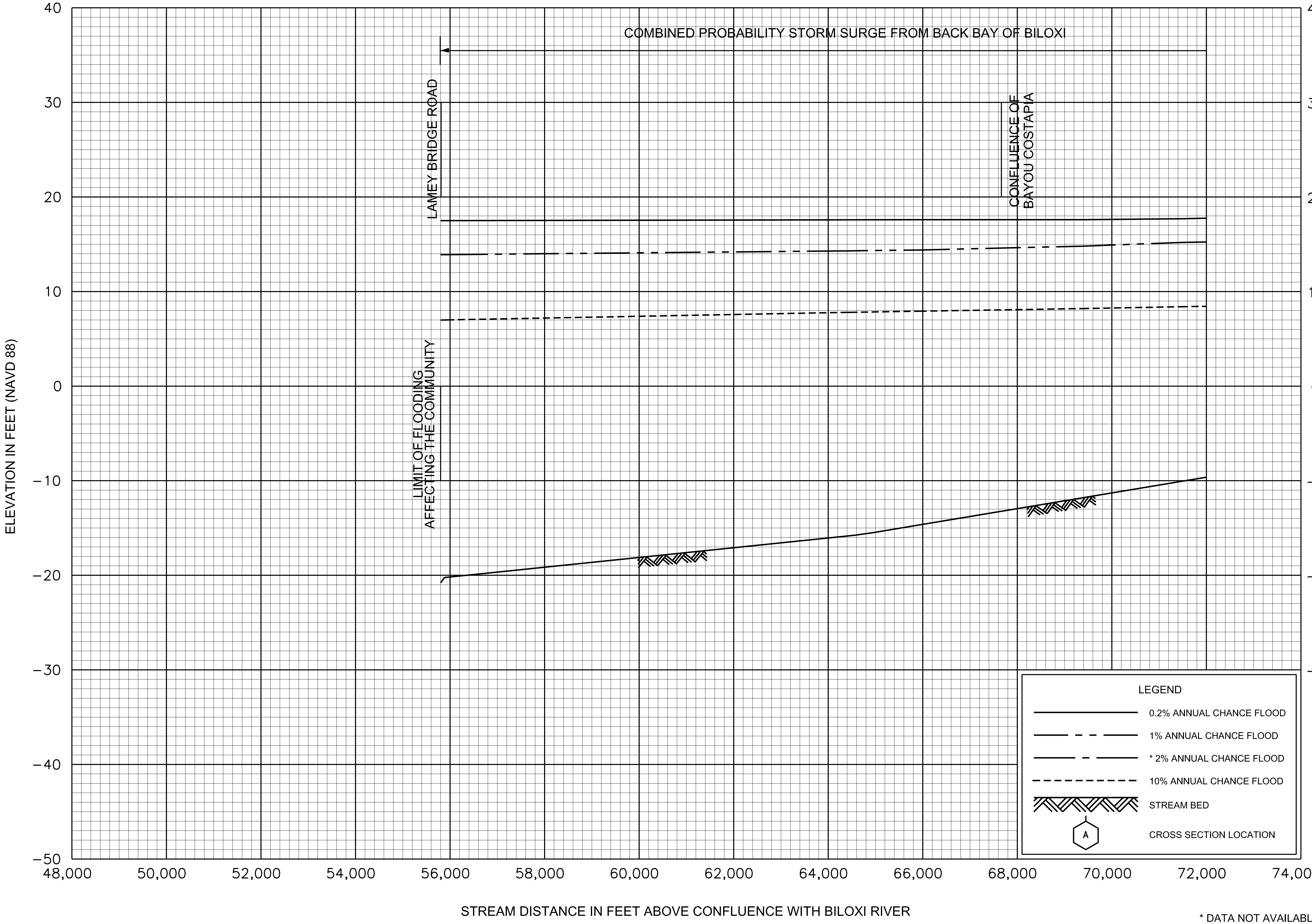
FLOOD PROFILES

PERIGAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



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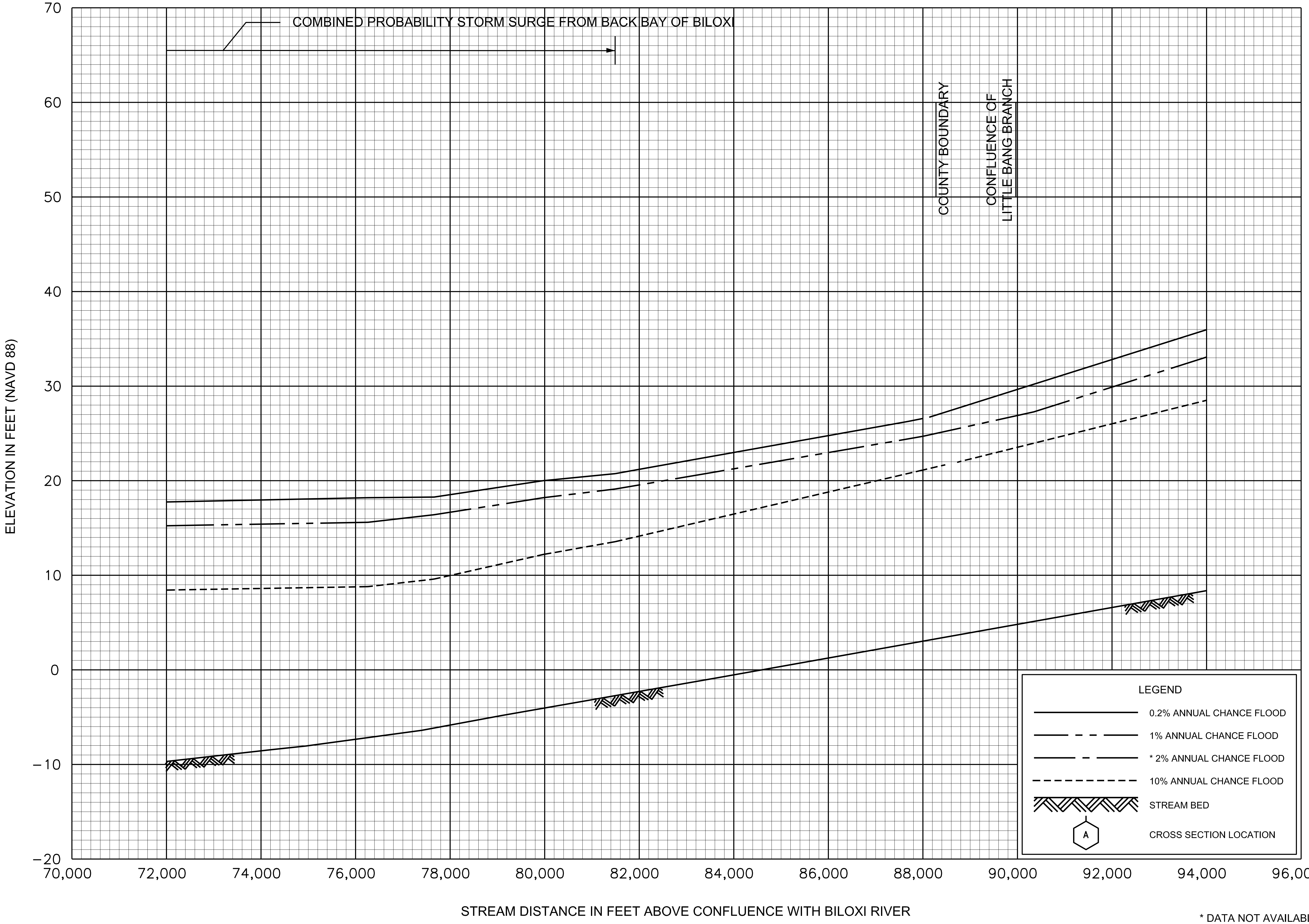
FLOOD PROFILES

TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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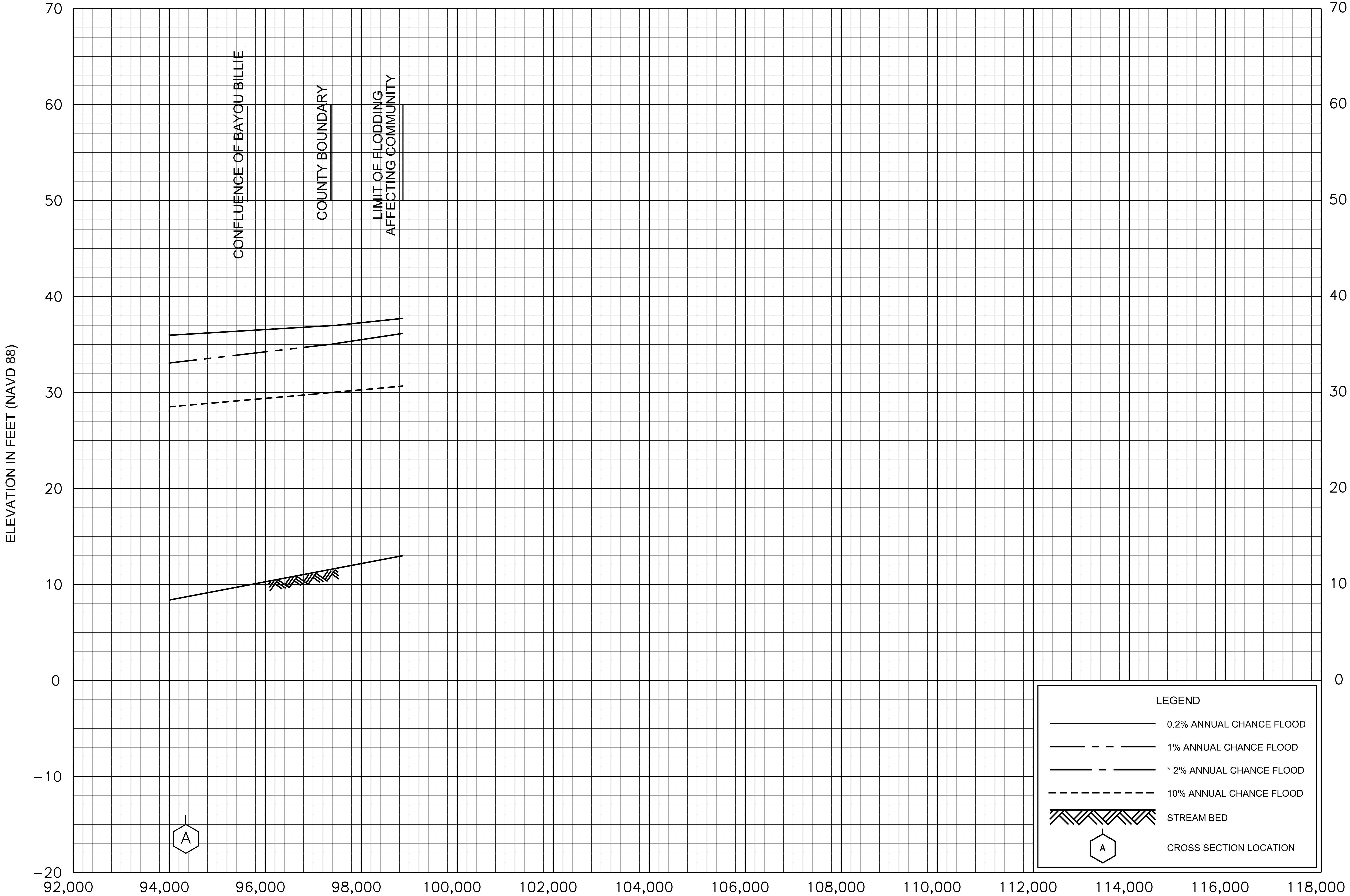
FLOOD PROFILES

TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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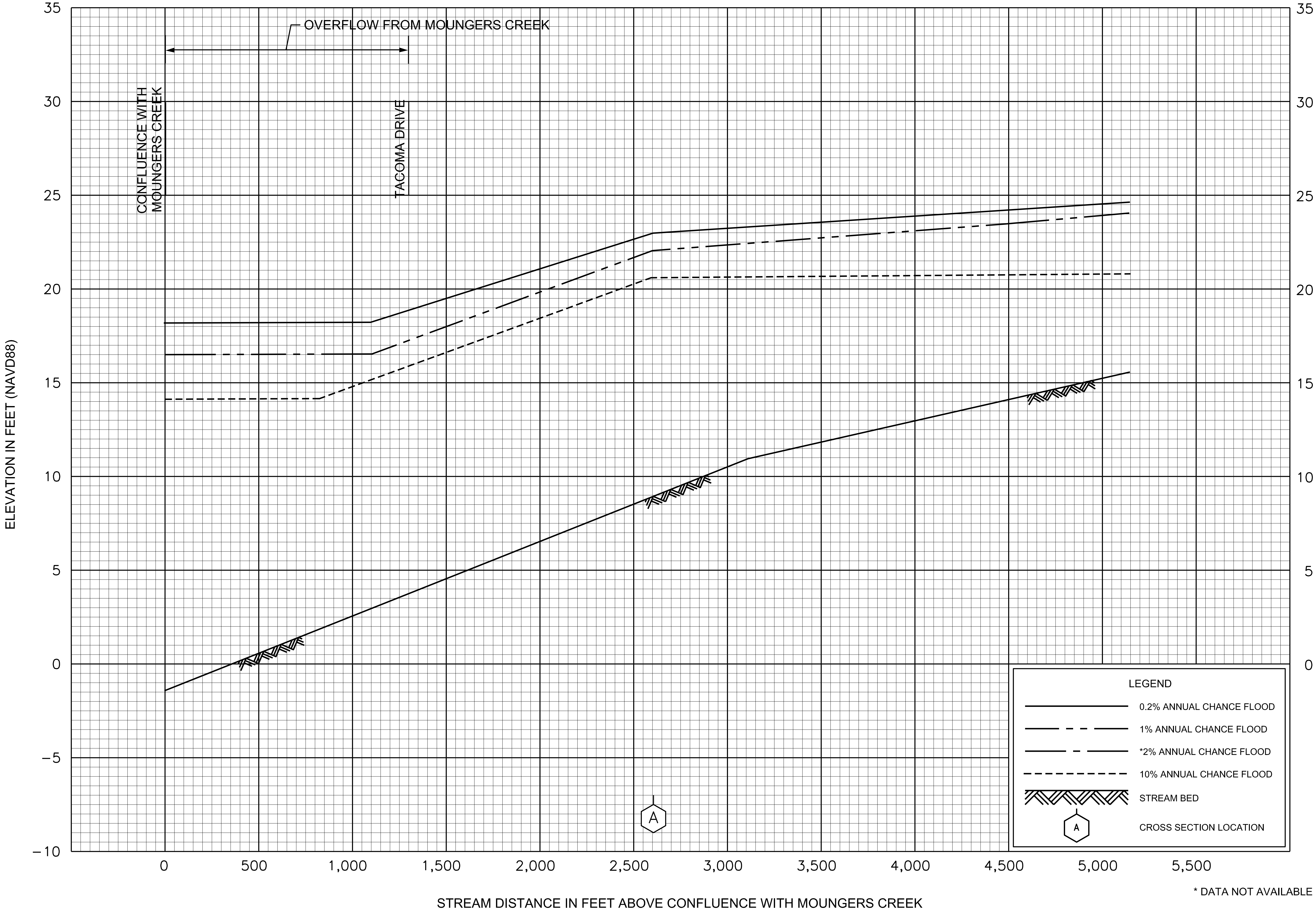
FLOOD PROFILES

TCHOUTACABOUFFA RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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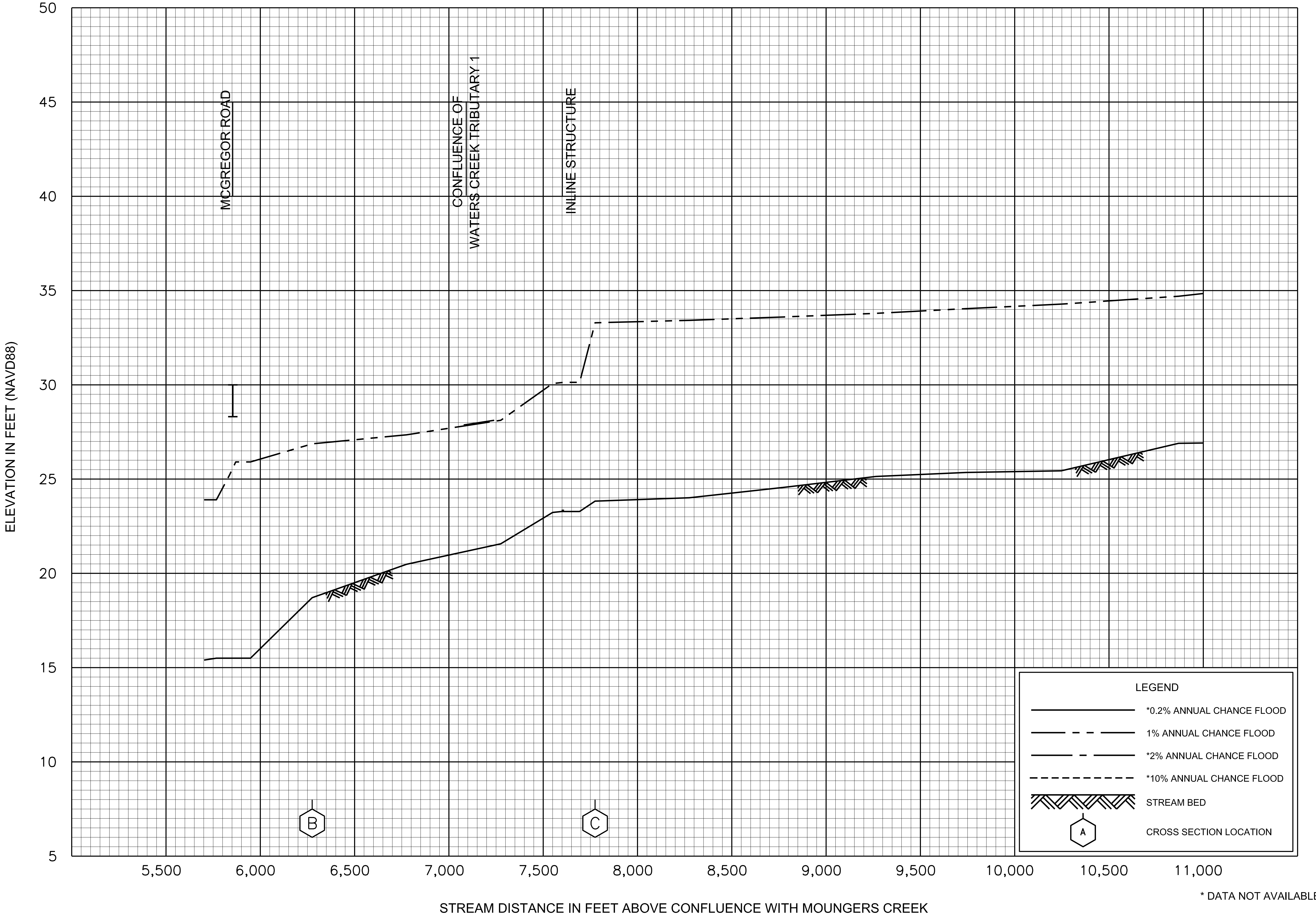
FLOOD PROFILES

WATERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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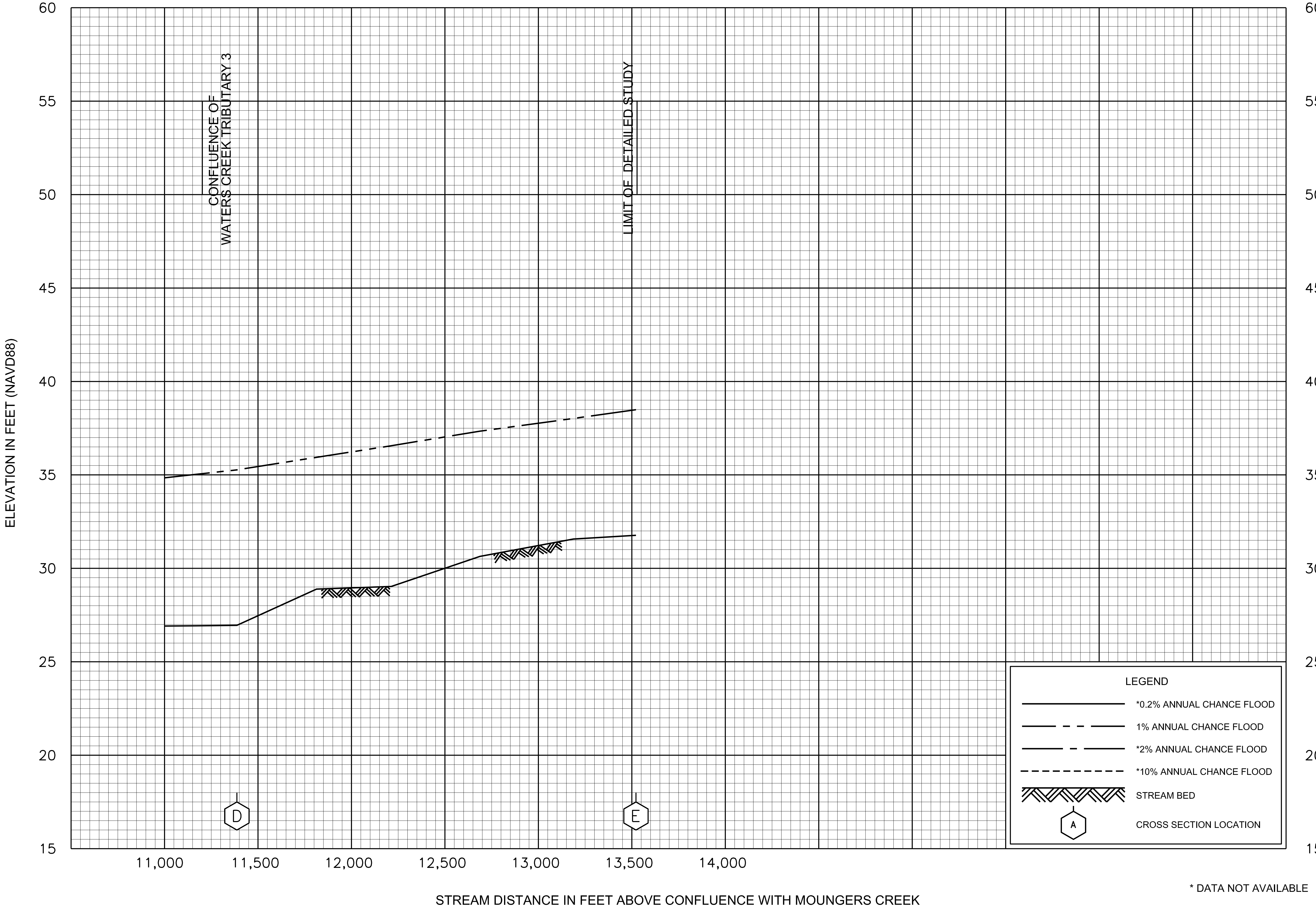
FLOOD PROFILES

WATERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



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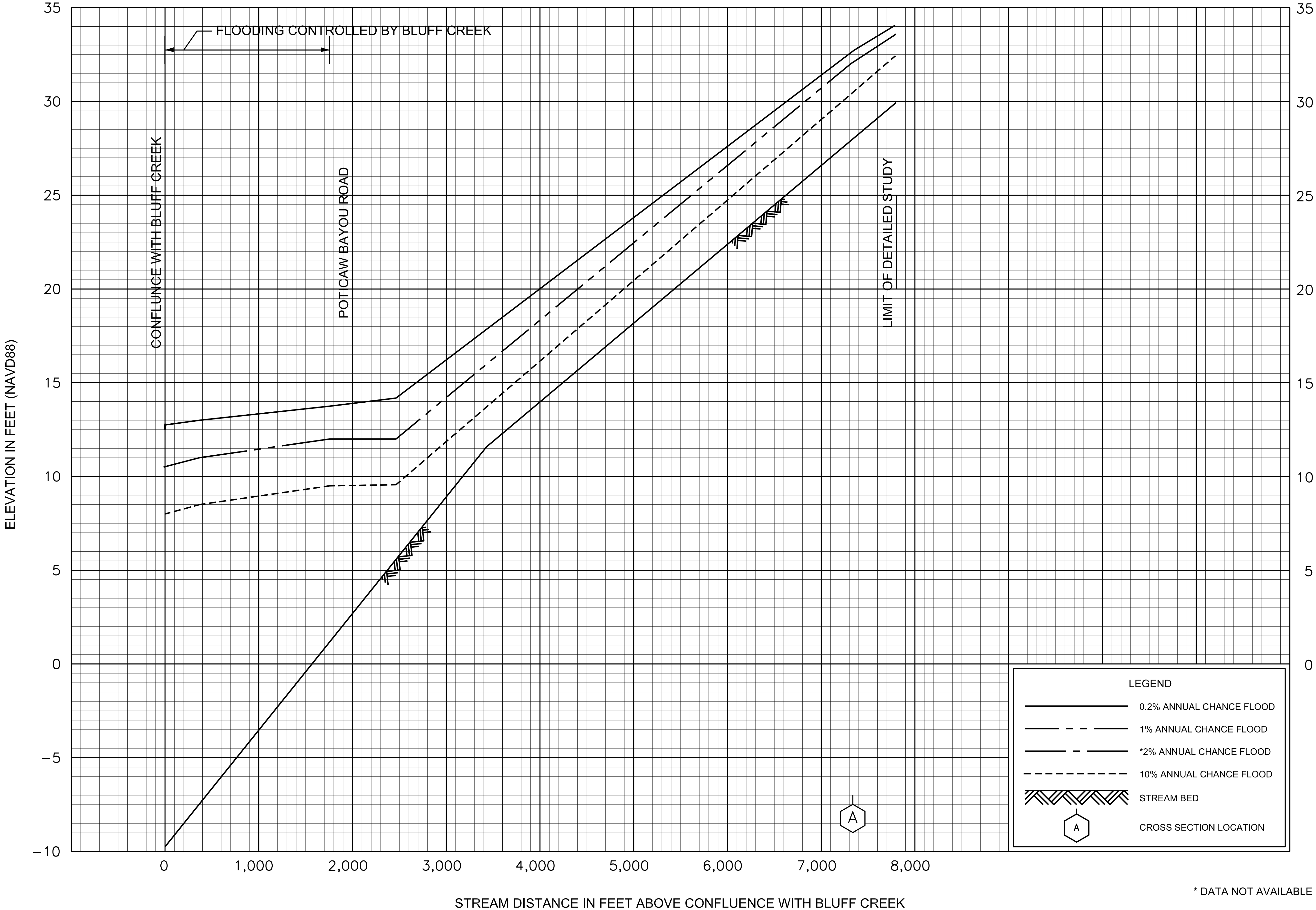
FLOOD PROFILES

WATERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS
AND INCORPORATED AREAS



FLOOD PROFILES

WOODMANS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

FLOOD INSURANCE STUDY

JACKSON COUNTY, MISSISSIPPI
AND INCORPORATED AREAS

VOLUME 2 OF 2

COMMUNITY NAME	COMMUNITY NUMBER
GAUTIER, CITY OF	280332
JACKSON COUNTY (UNINCORPORATED AREAS)	285256
MOSS POINT, CITY OF	285258
OCEAN SPRINGS, CITY OF	285259
PASCAGOULA, CITY OF	285260

PRELIMINARY
NOV 16 2007

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
28059CV002A

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:

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Table of Contents – Volume 1

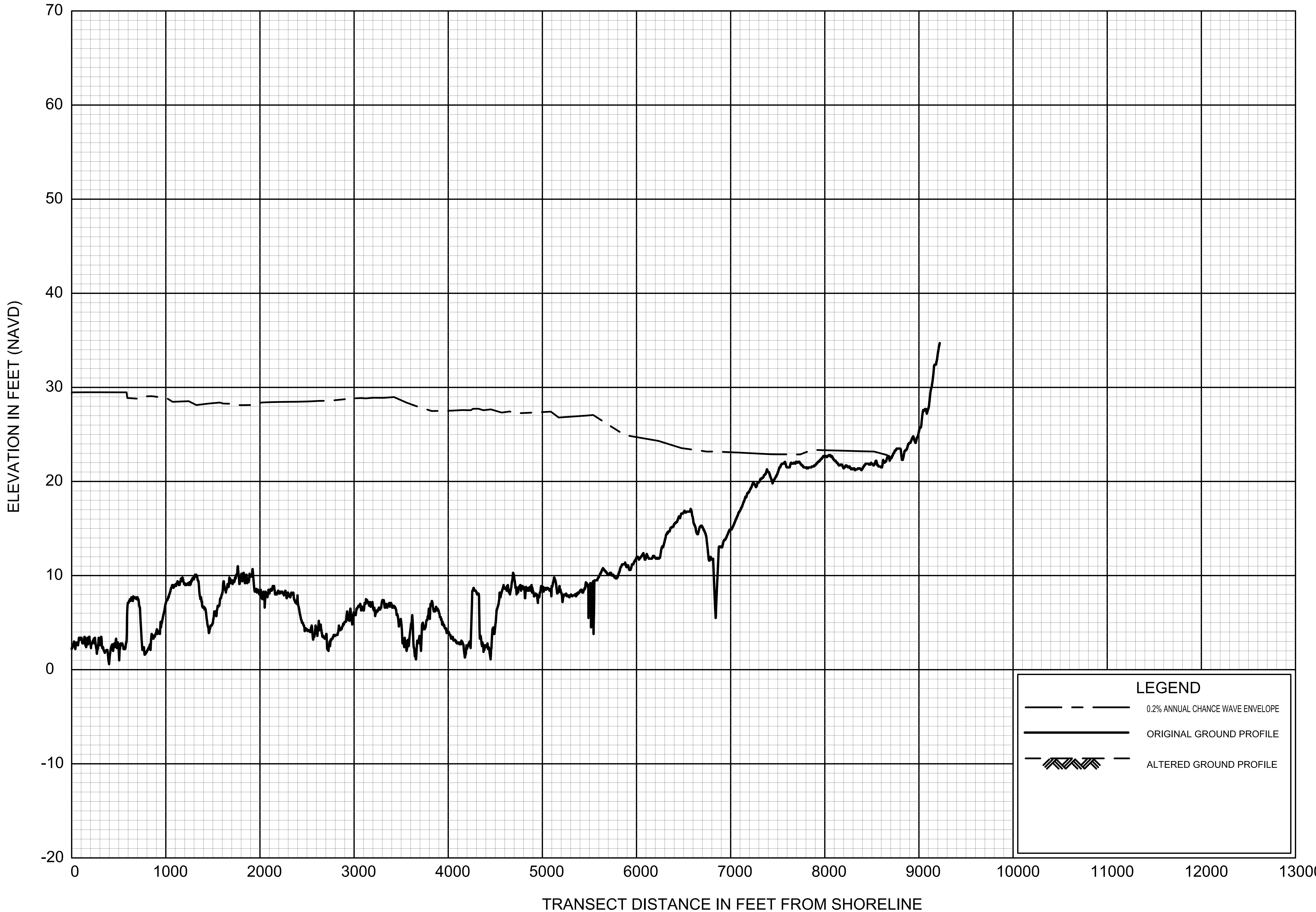
Table of Contents – Volume 1 -continued

Table of Contents – Volume 2

EXHIBITS - continued

Exhibit 2 – 0.2% Annual Chance Wave Envelopes

EXHIBITS - continued



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

01P

0.2% ANNUAL CHANCE WAVE ENVELOPE

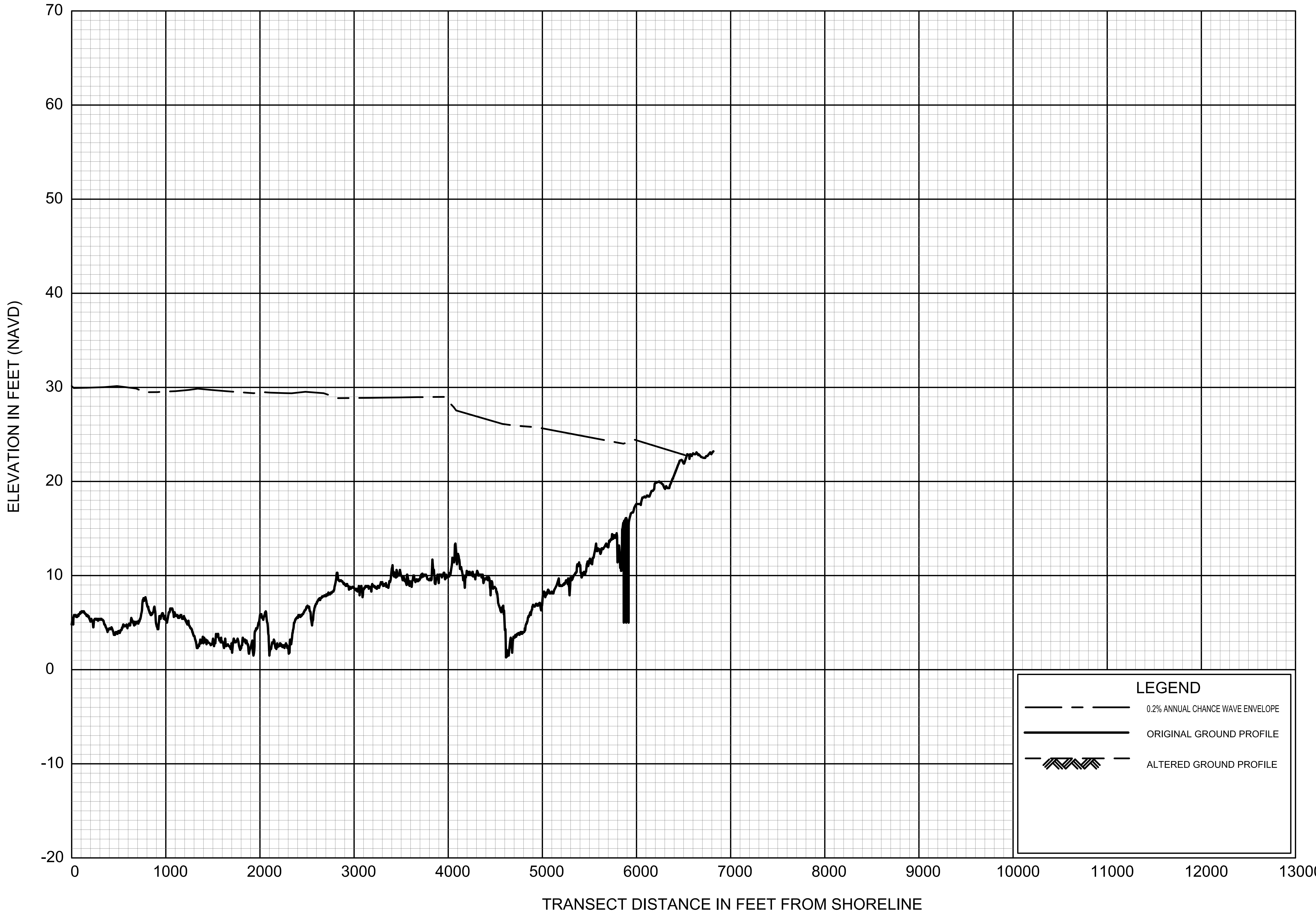
TRANSECT 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

02P



0.2% ANNUAL CHANCE WAVE ENVELOPE

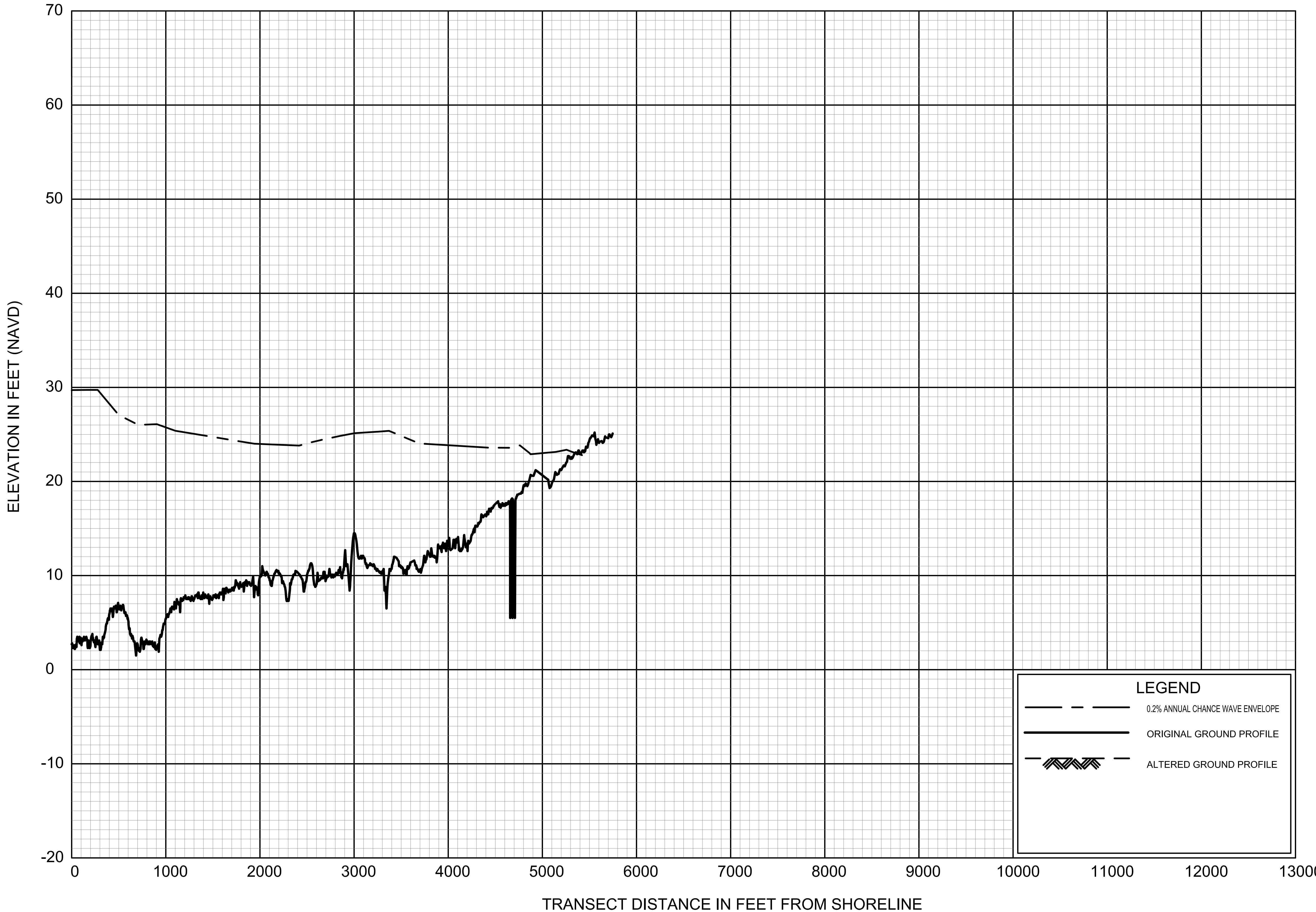
TRANSECT 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

03P



0.2% ANNUAL CHANCE WAVE ENVELOPE

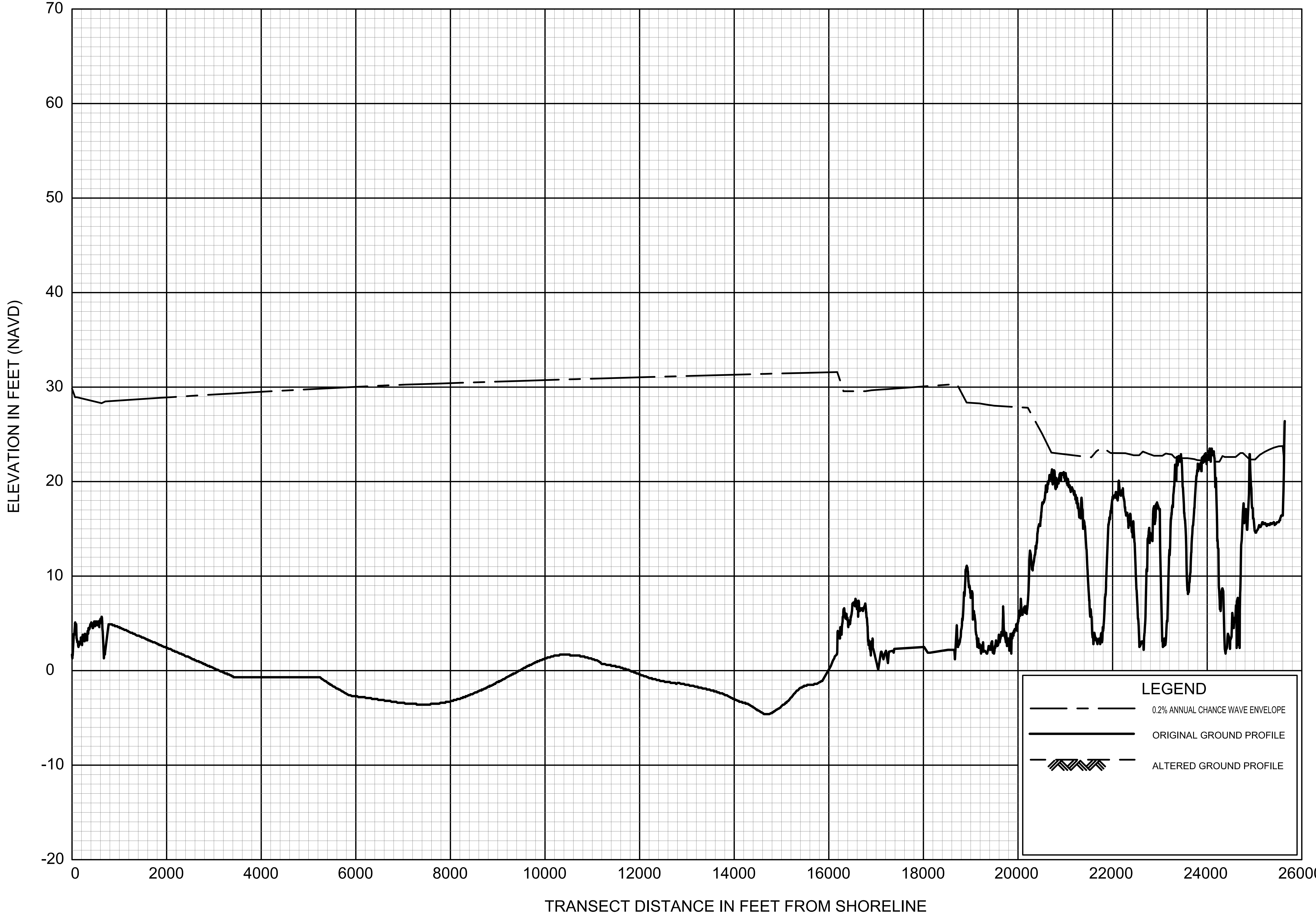
TRANSECT4

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

04P



0.2% ANNUAL CHANCE WAVE ENVELOPE

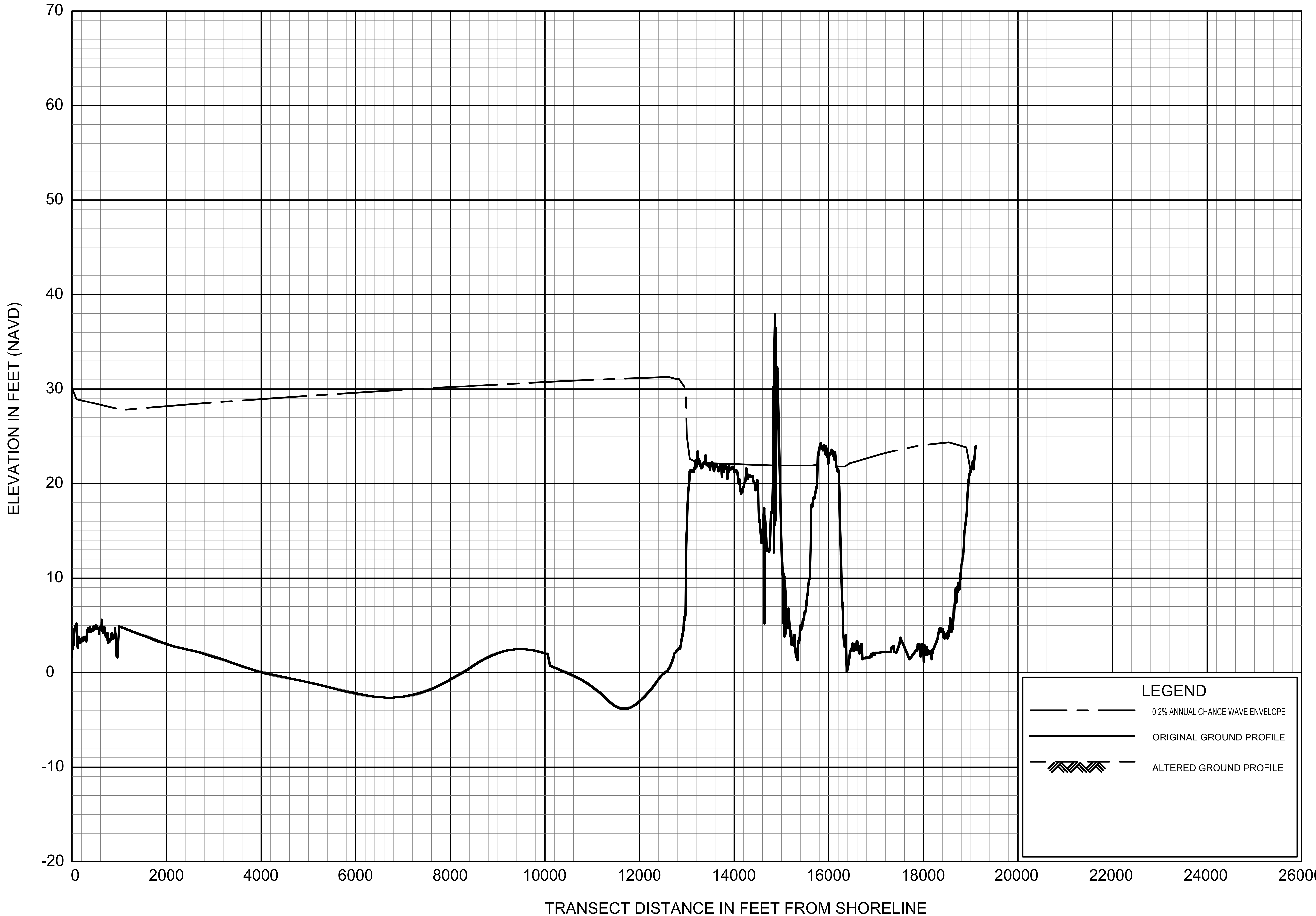
TRANSECT 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

05P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

06P

0.2% ANNUAL CHANCE WAVE ENVELOPE

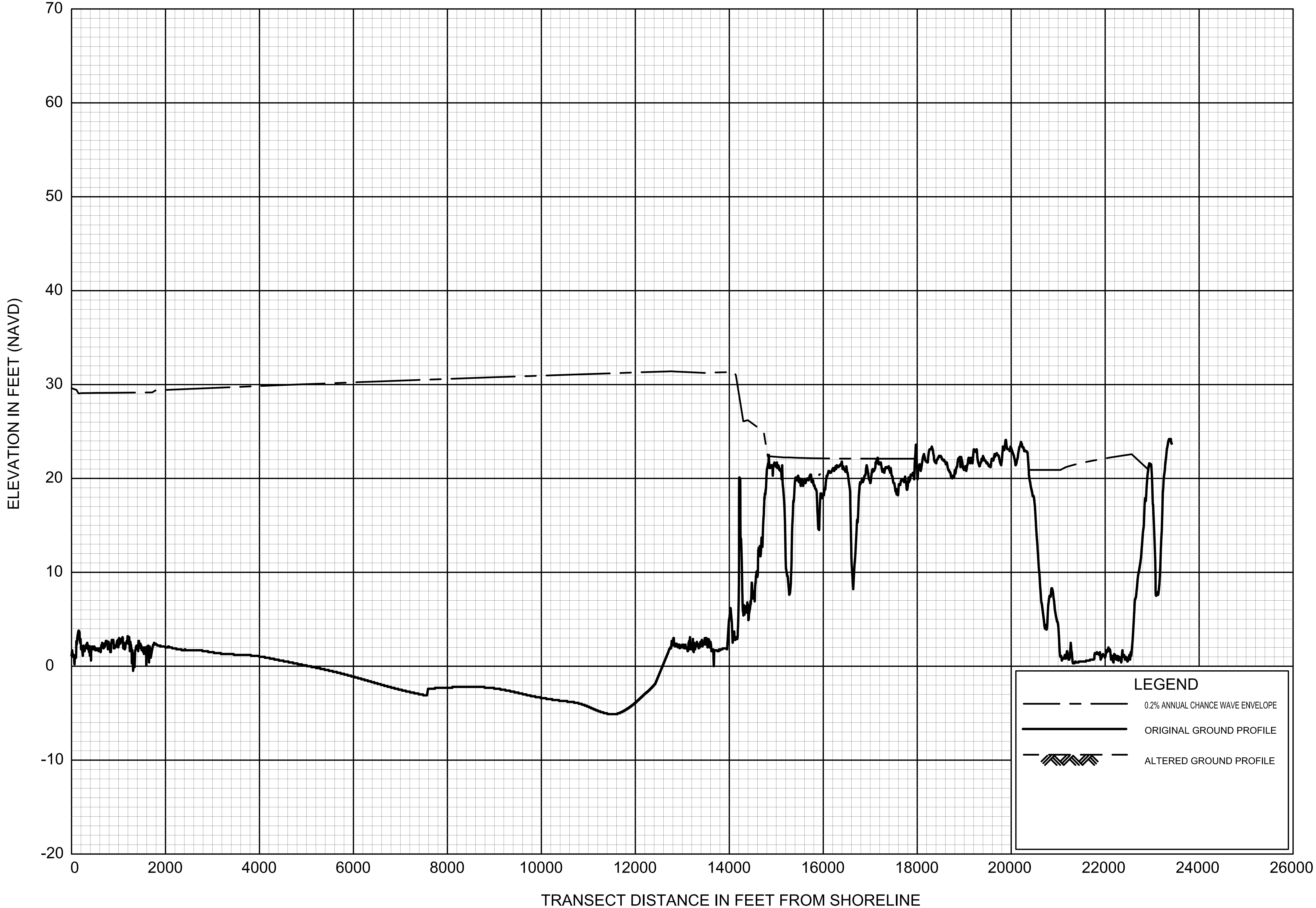
TRANSECT 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

07P



0.2% ANNUAL CHANCE WAVE ENVELOPE

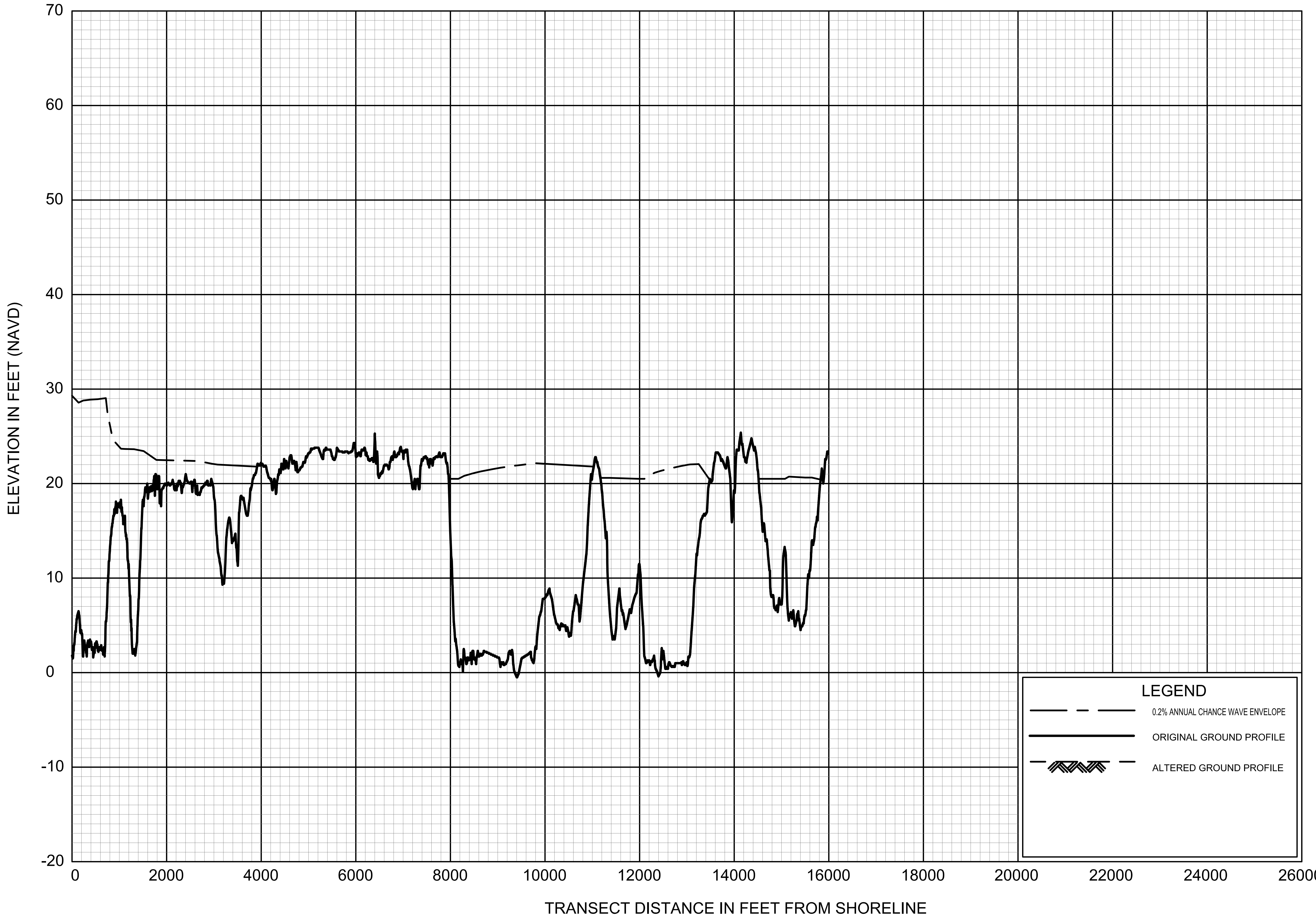
TRANSECT 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

08P



0.2% ANNUAL CHANCE WAVE ENVELOPE

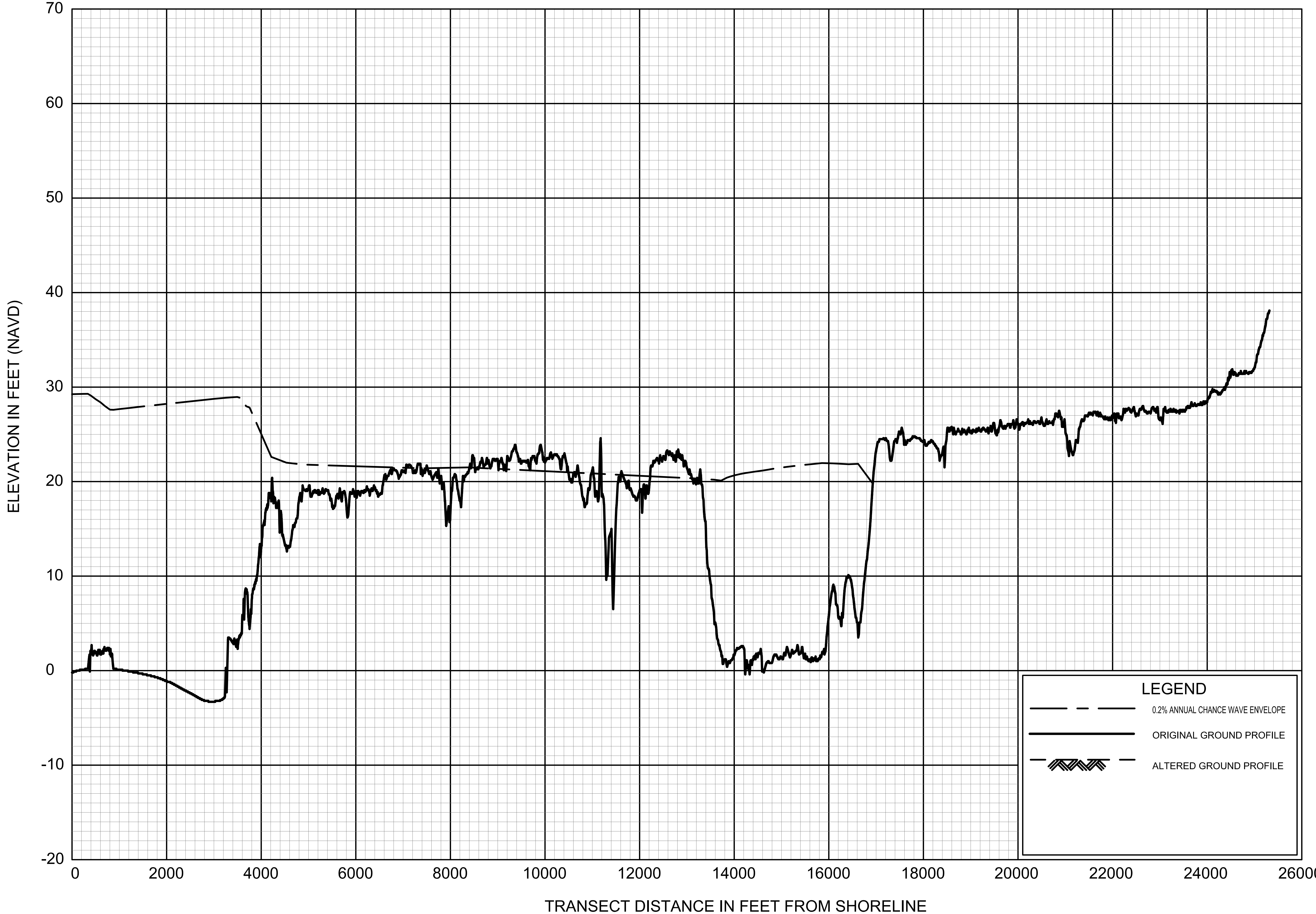
TRANSECT 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

09P



0.2% ANNUAL CHANCE WAVE ENVELOPE

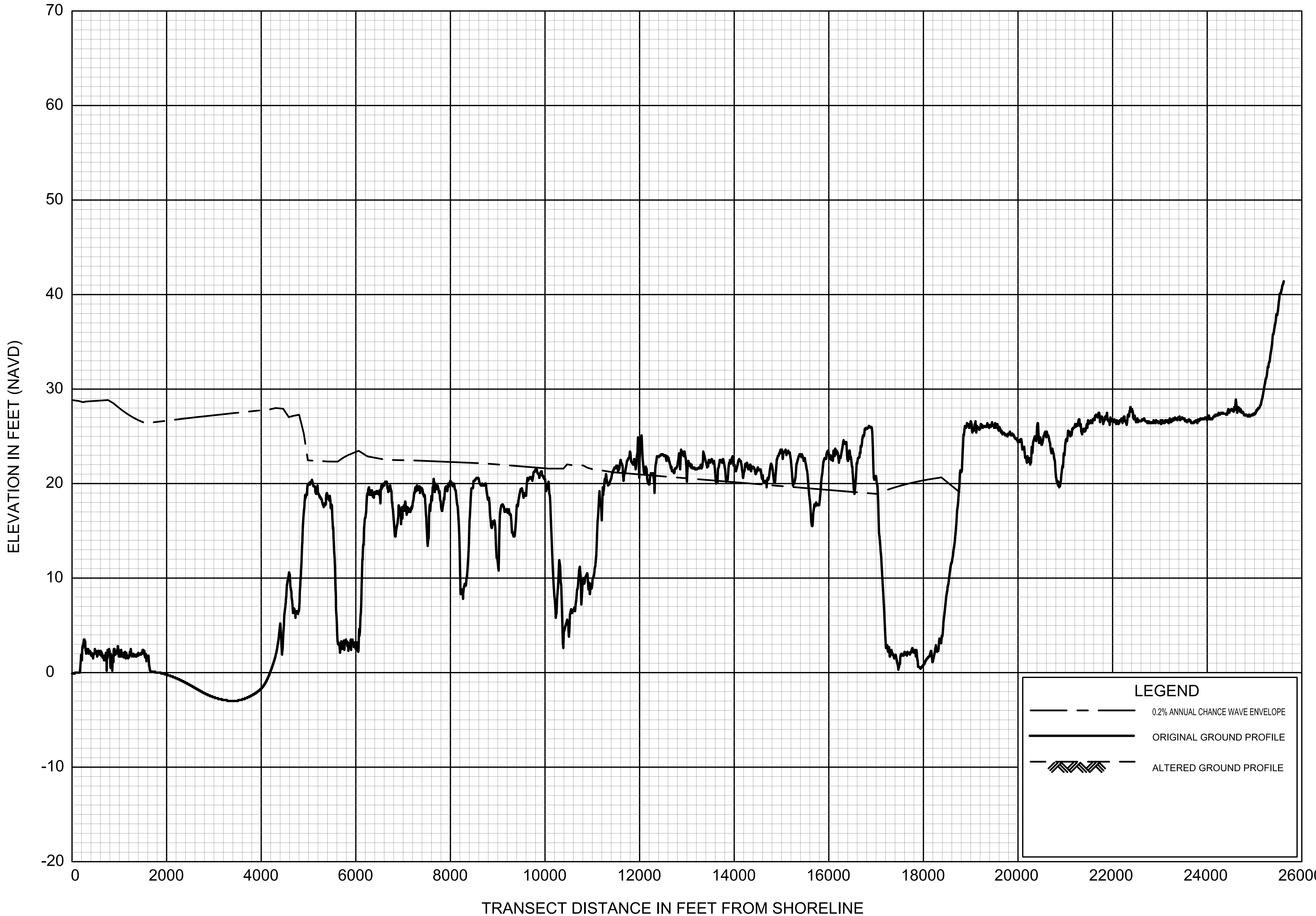
TRANSECT 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

10P



0.2% ANNUAL CHANCE WAVE ENVELOPE

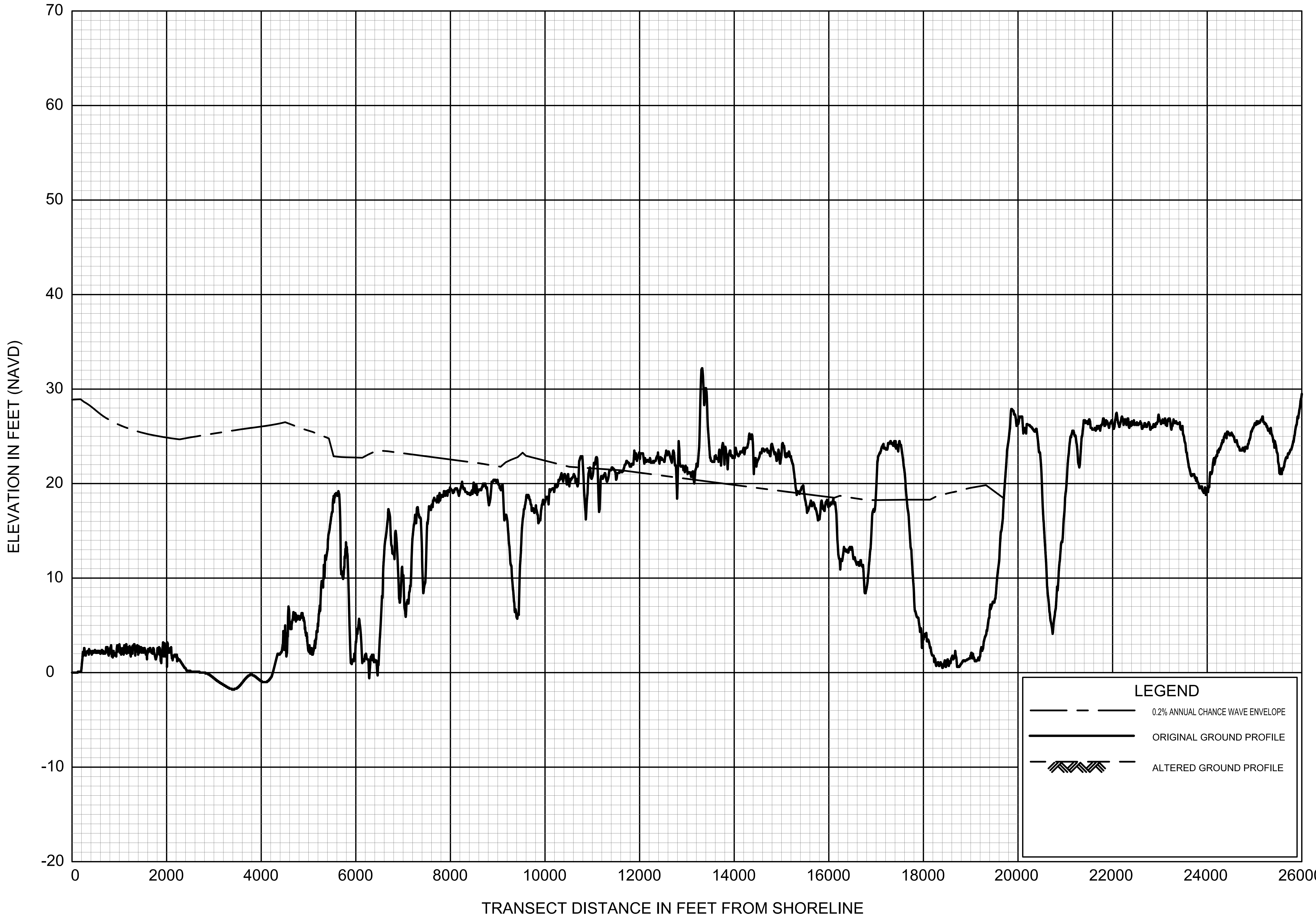
TRANSECT 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

11P



0.2% ANNUAL CHANCE WAVE ENVELOPE

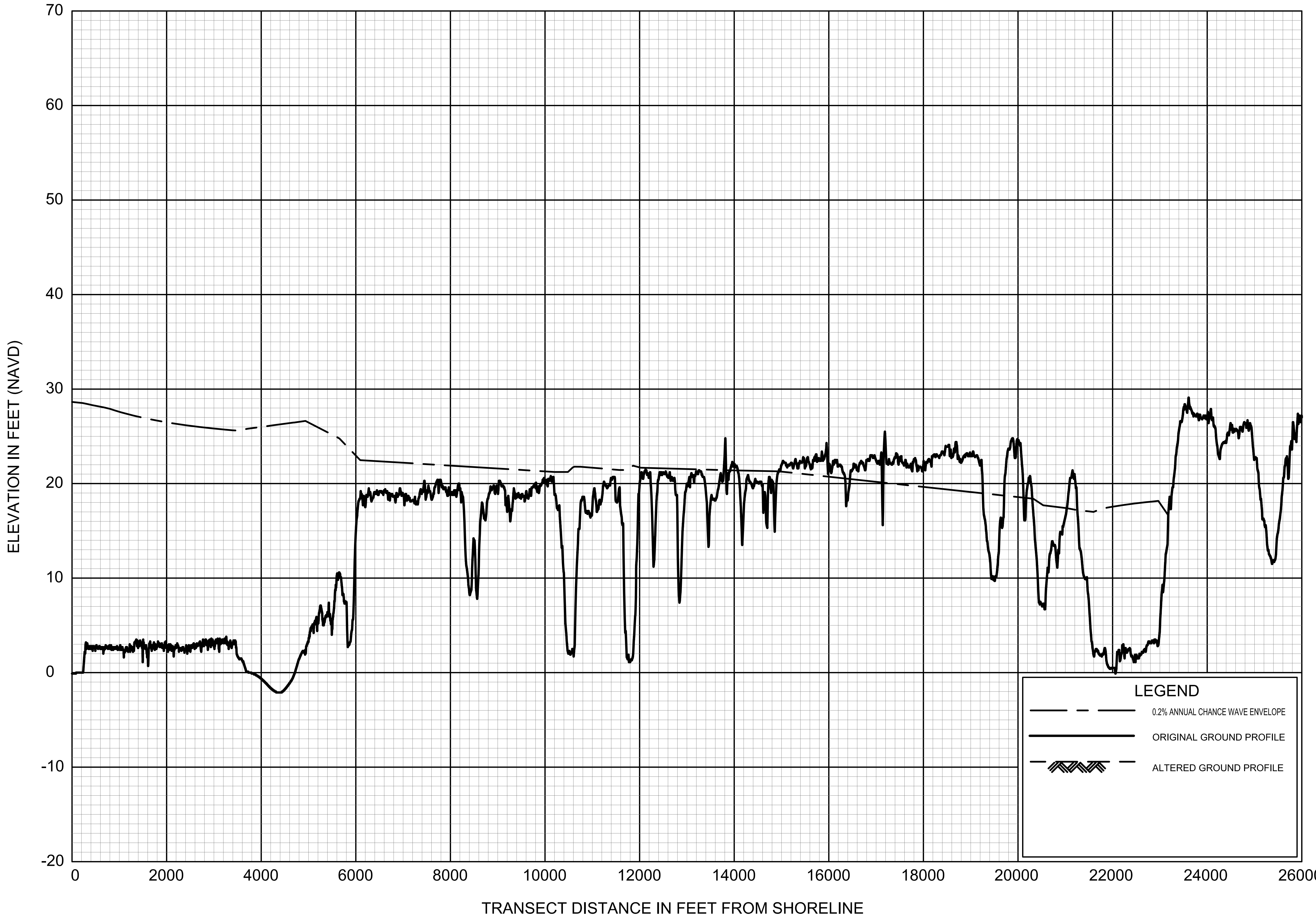
TRANSECT 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

12P



0.2% ANNUAL CHANCE WAVE ENVELOPE

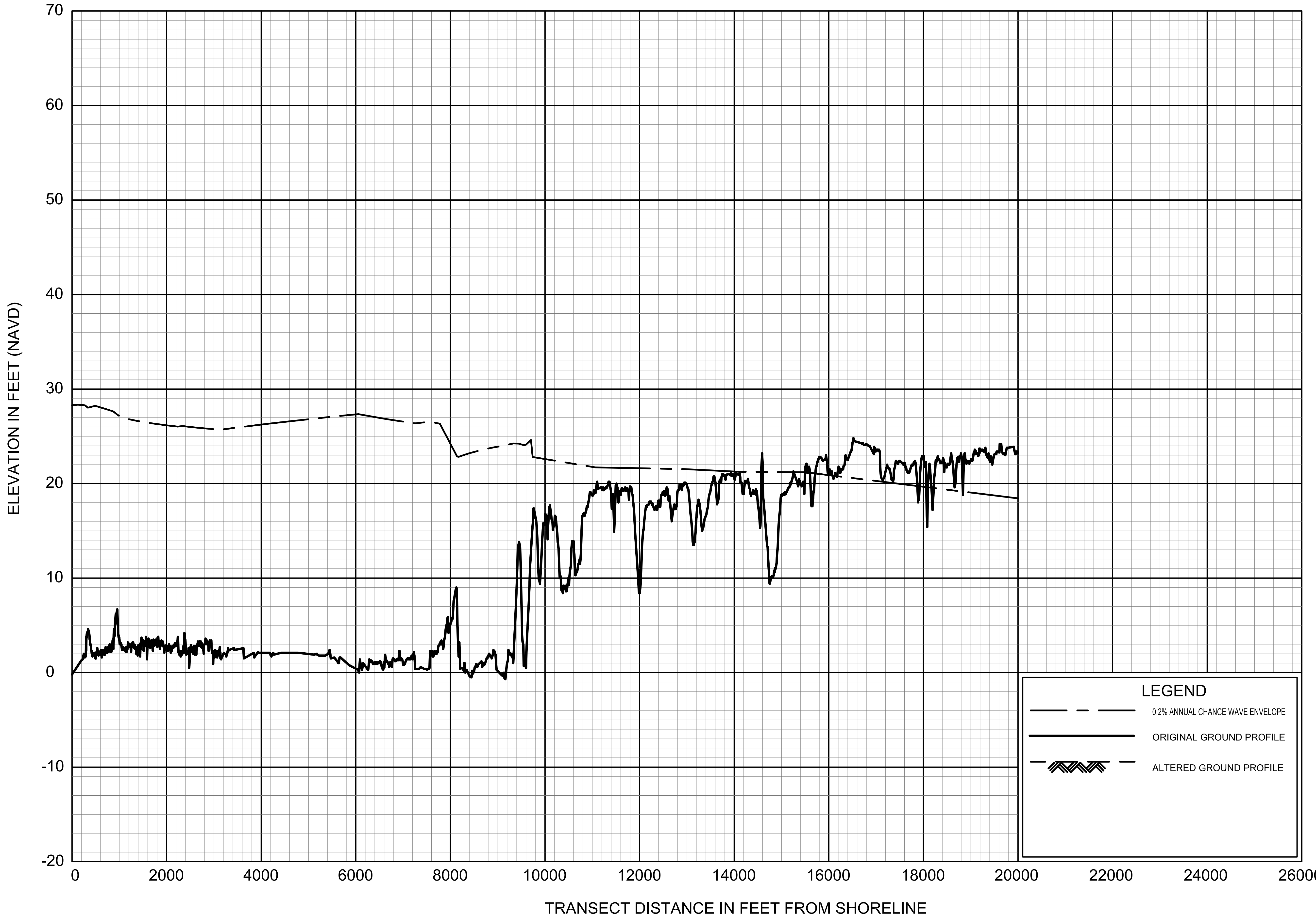
TRANSECT 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

13P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

14P

0.2% ANNUAL CHANCE WAVE ENVELOPE

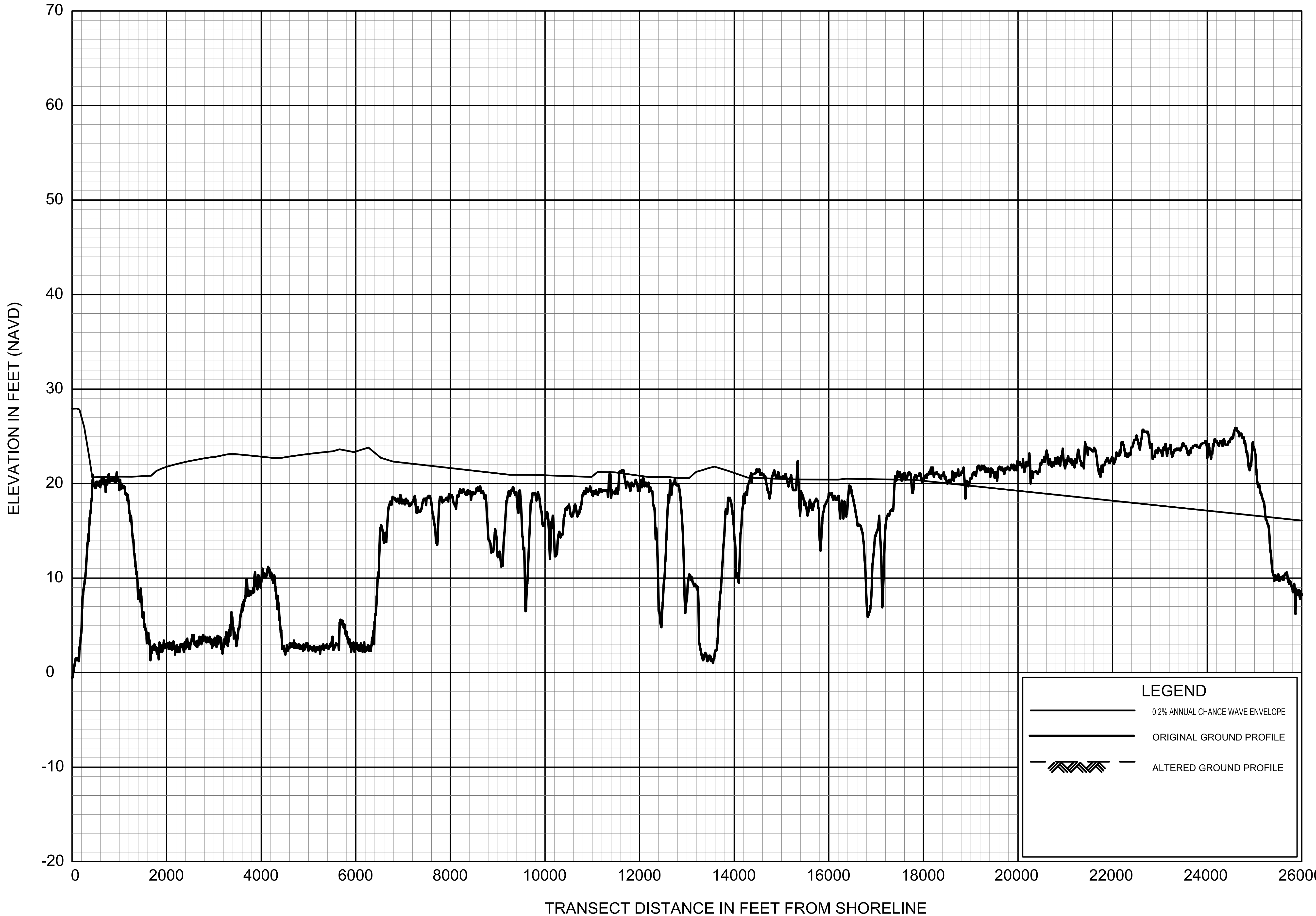
TRANSECT 14

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

15P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

16P

0.2% ANNUAL CHANCE WAVE ENVELOPE

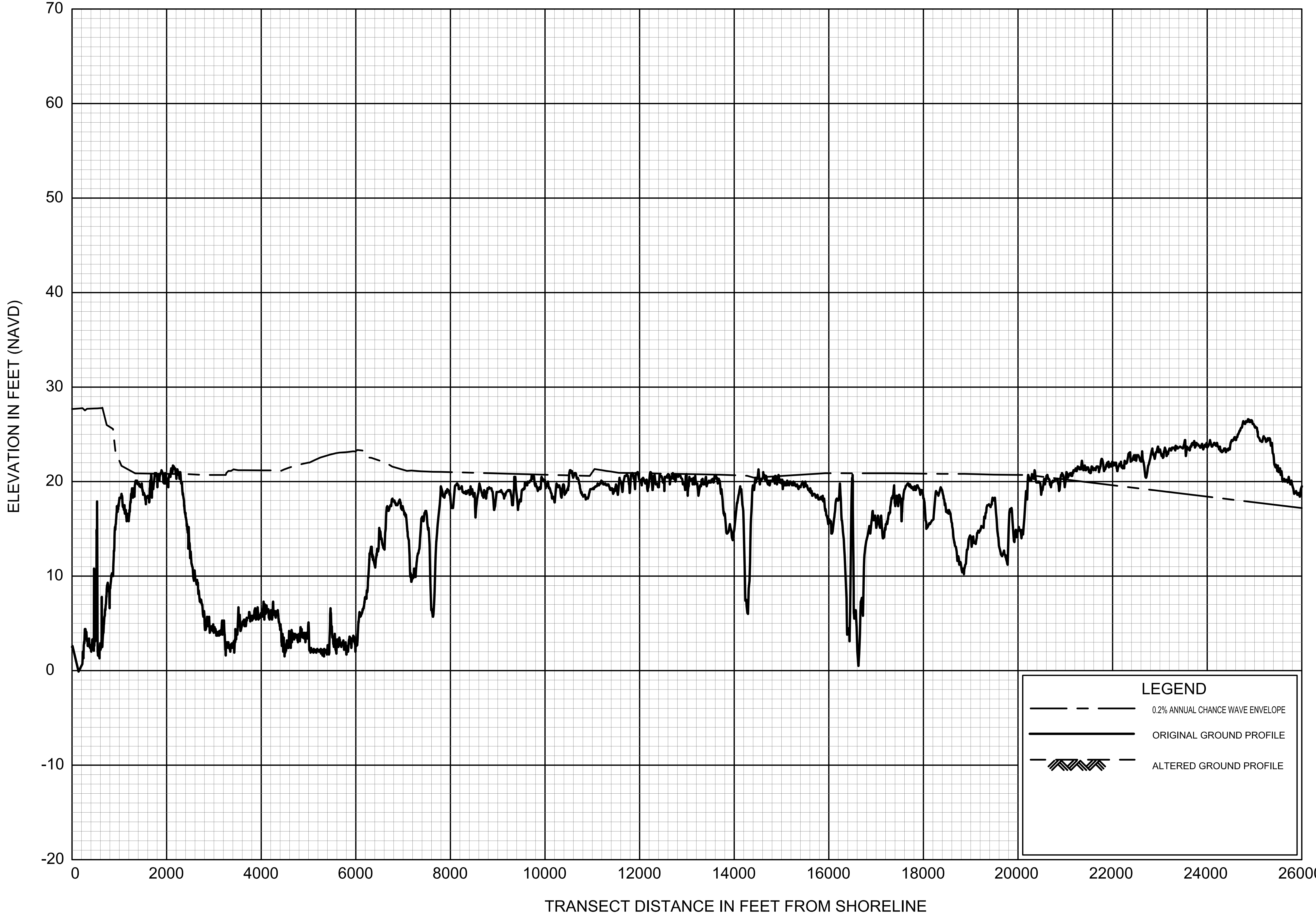
TRANSECT 15

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

17P



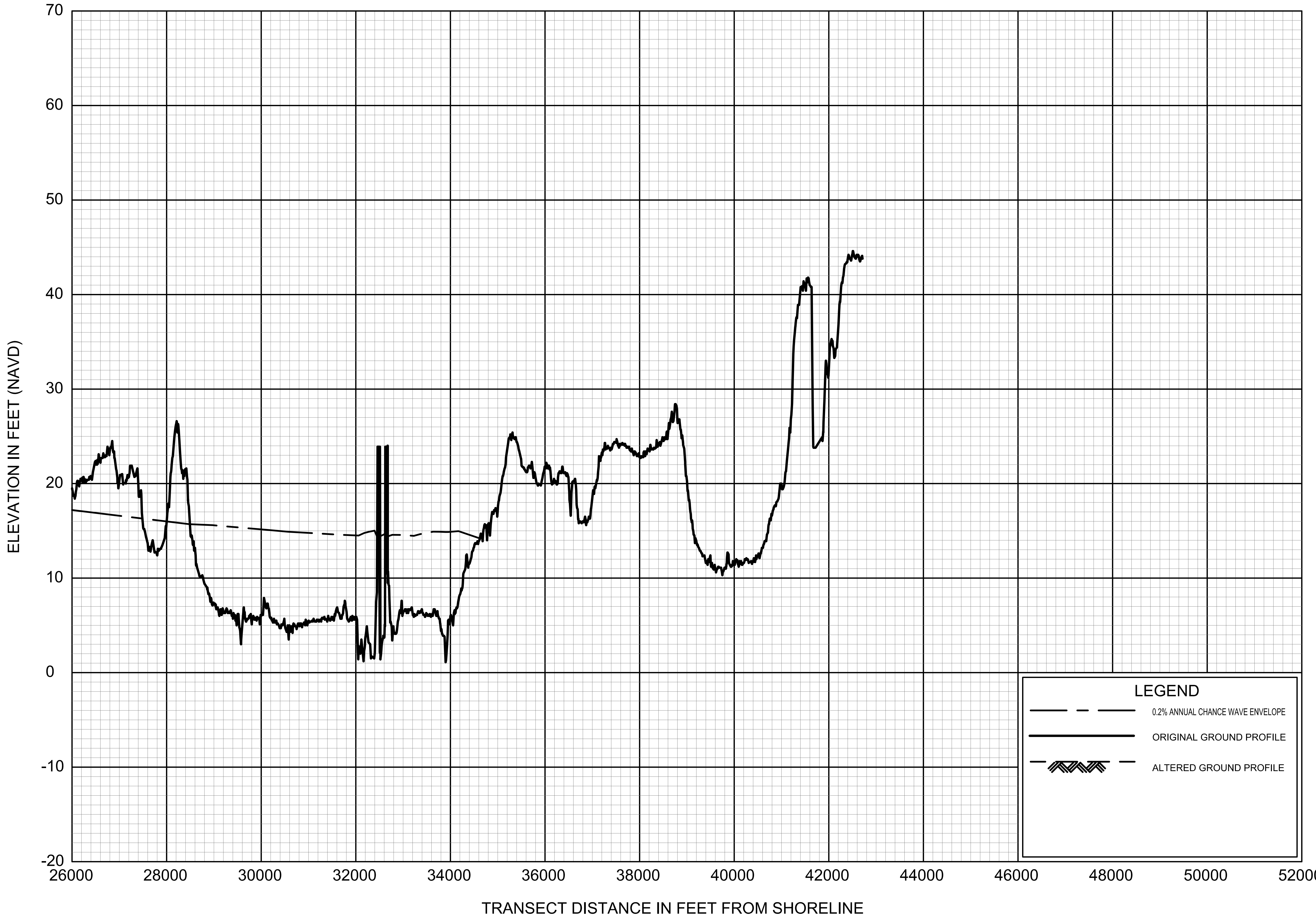
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

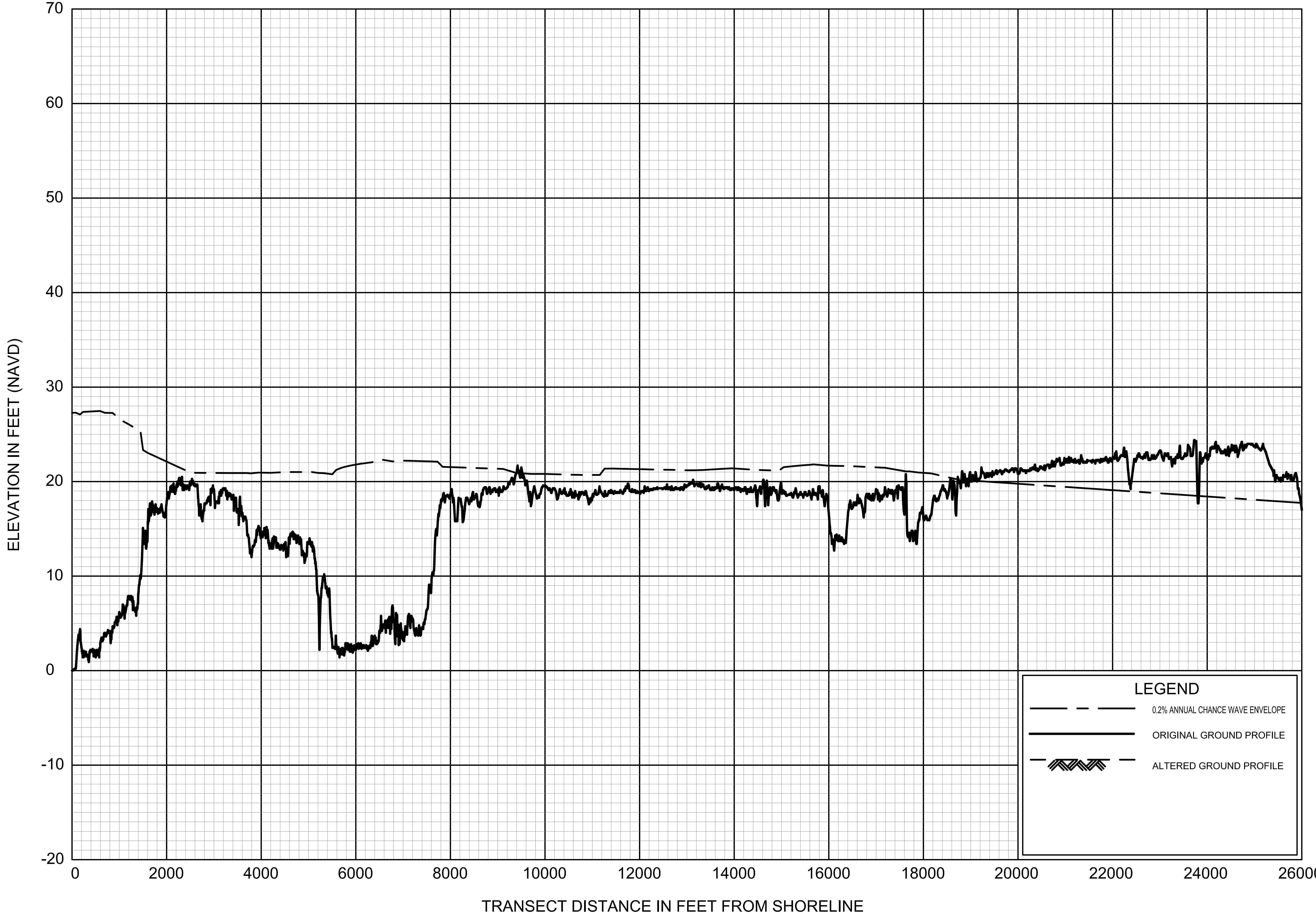
TRANSECT 16

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

19P



0.2% ANNUAL CHANCE WAVE ENVELOPE

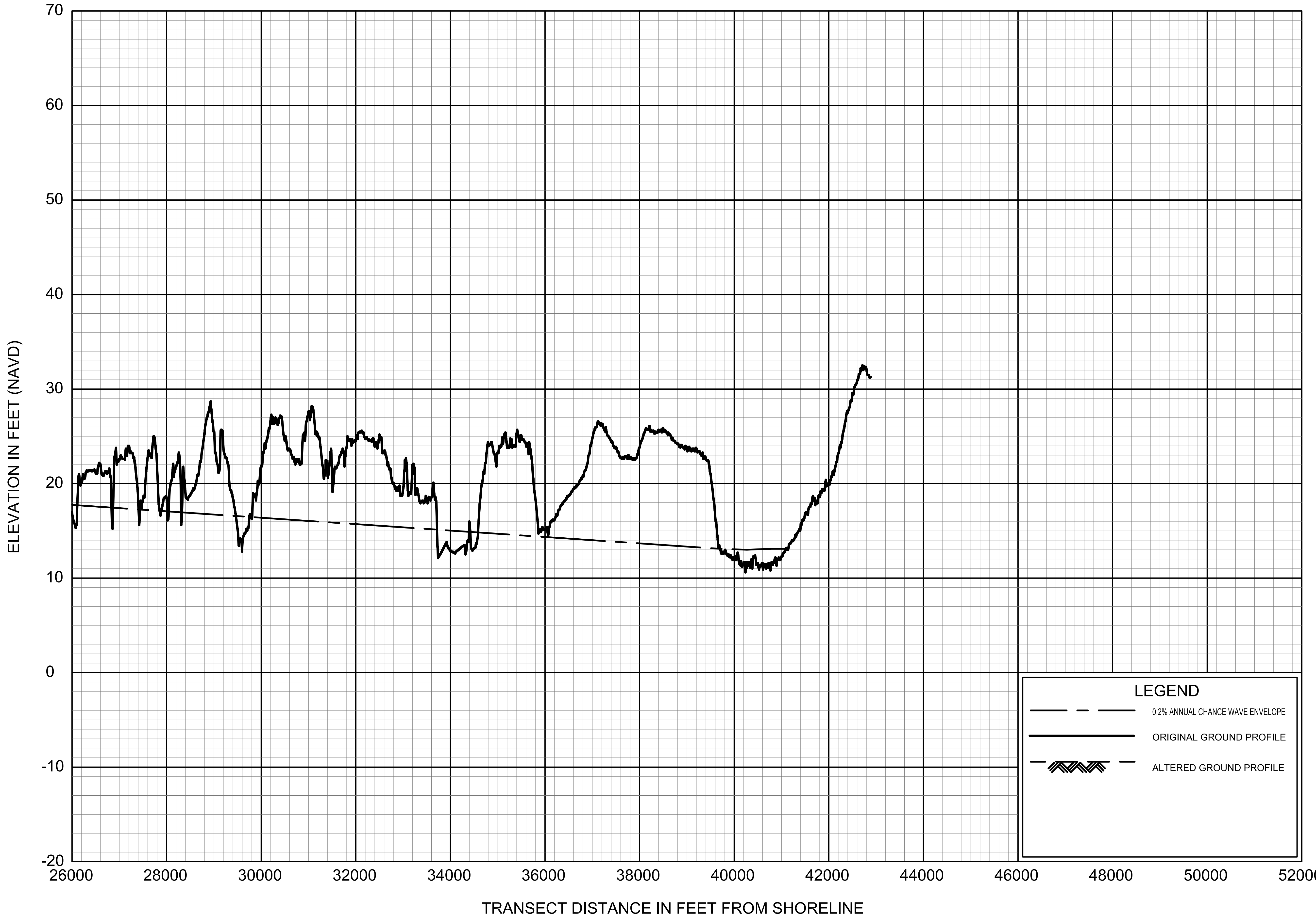
TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

20P



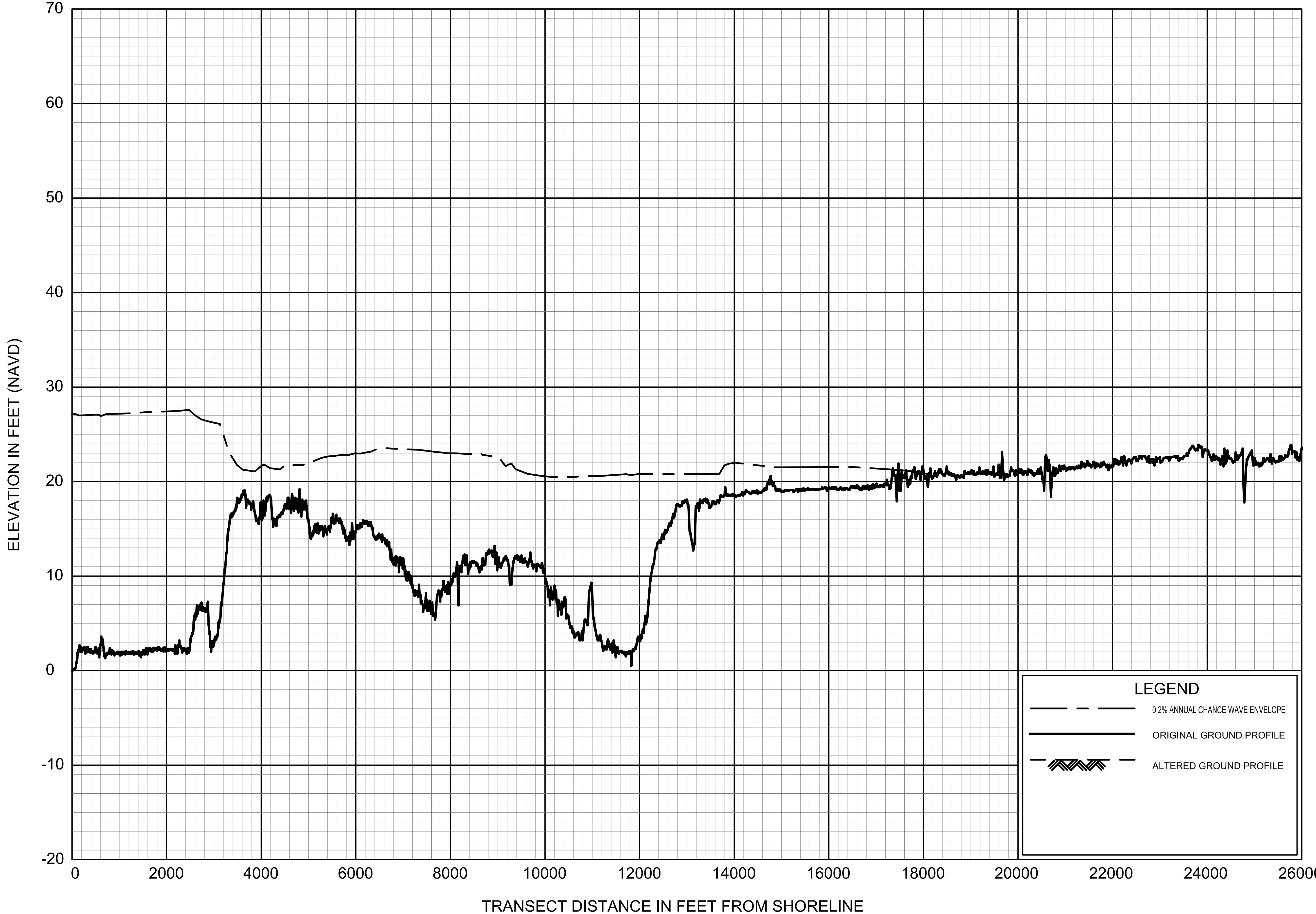
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 17

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



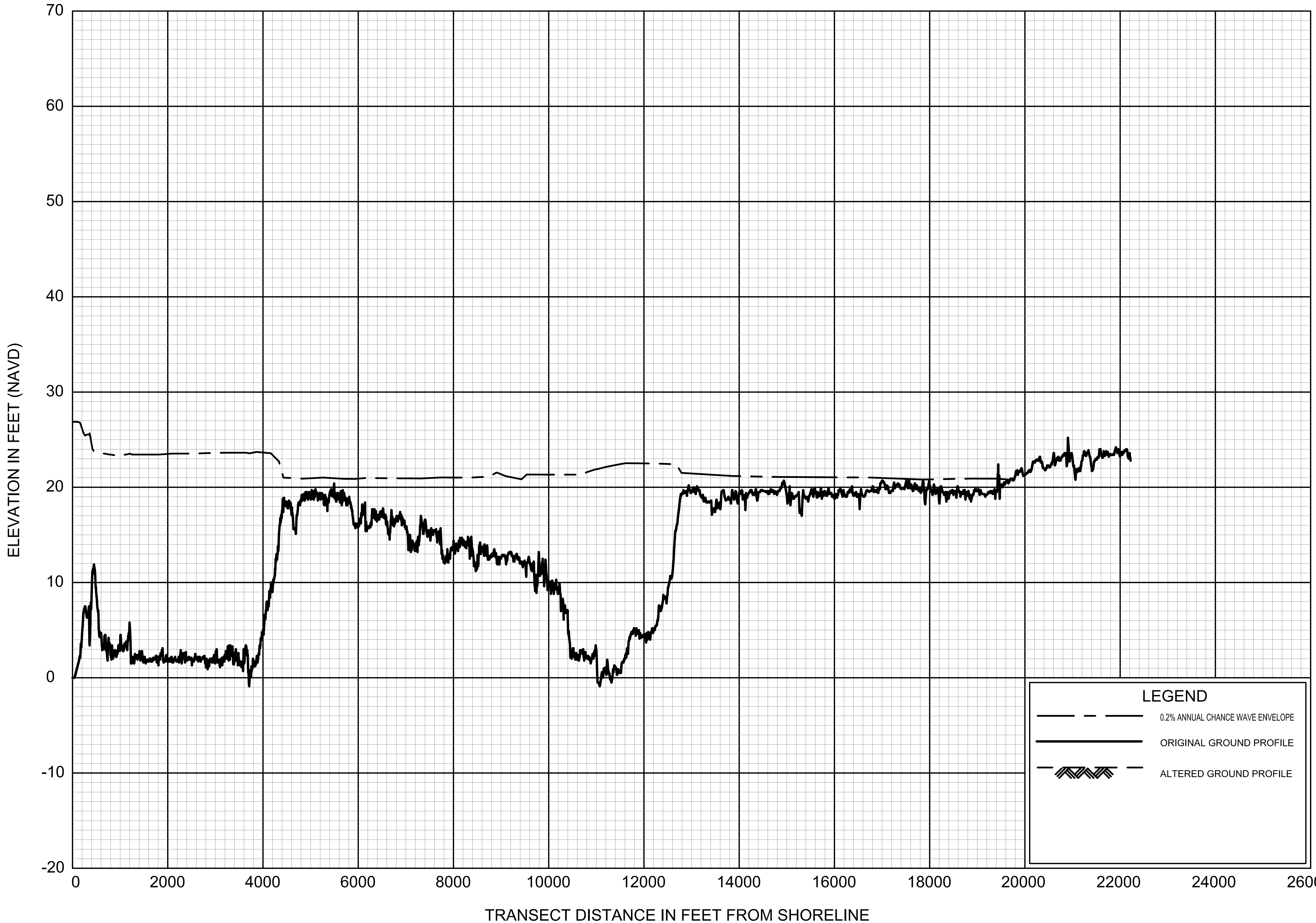
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 18

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



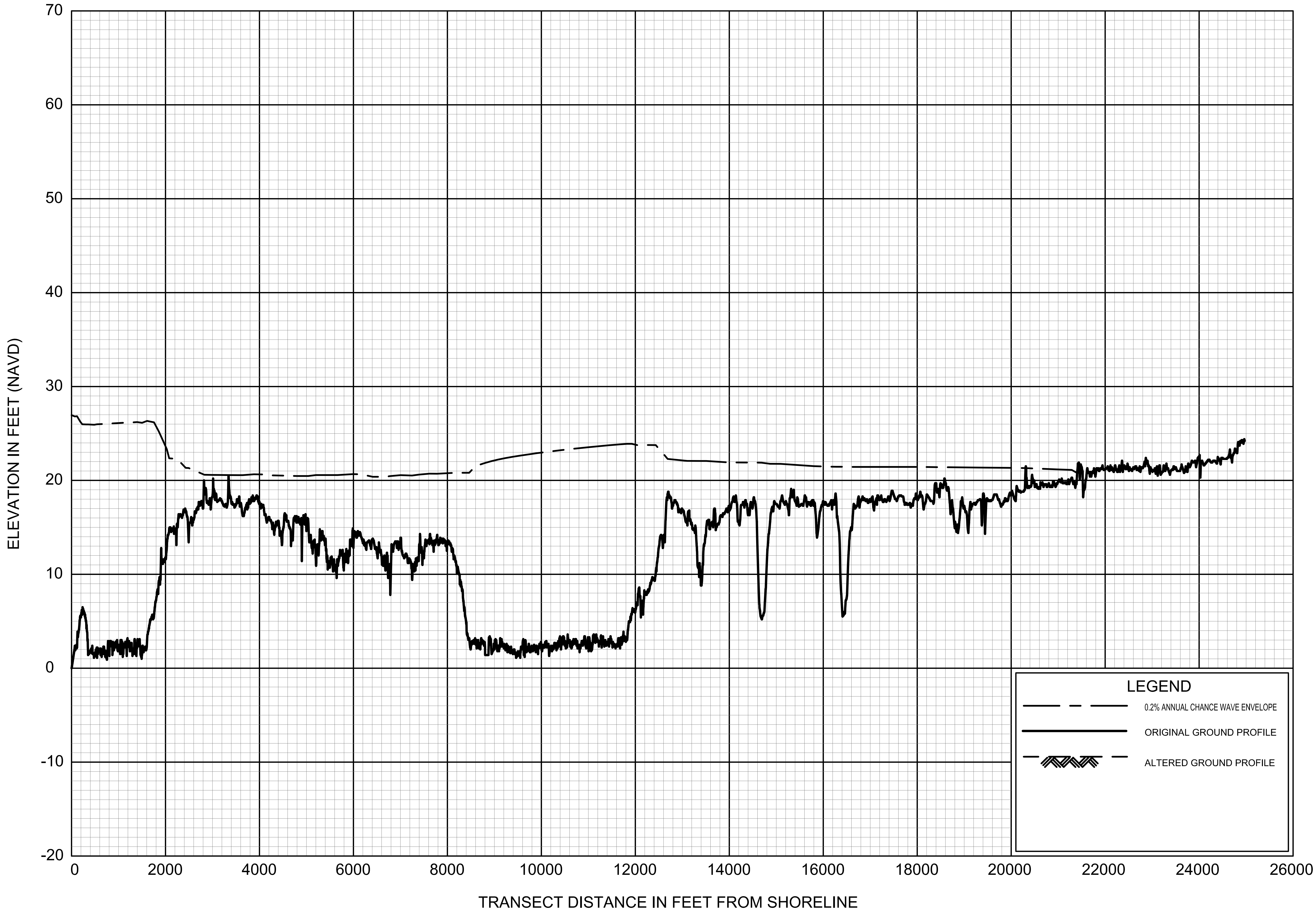
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 19

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

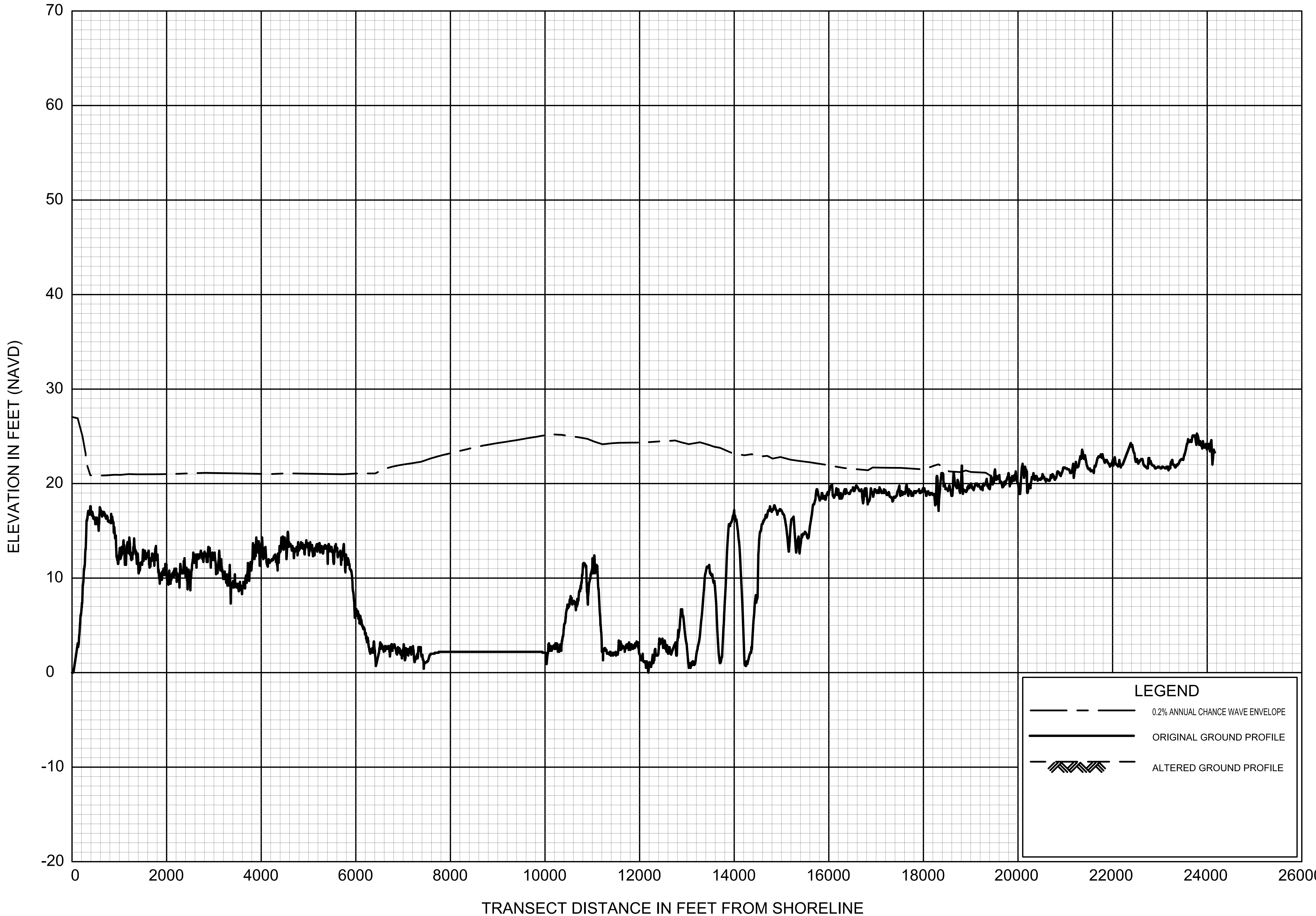
TRANSECT 20

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

24P



0.2% ANNUAL CHANCE WAVE ENVELOPE

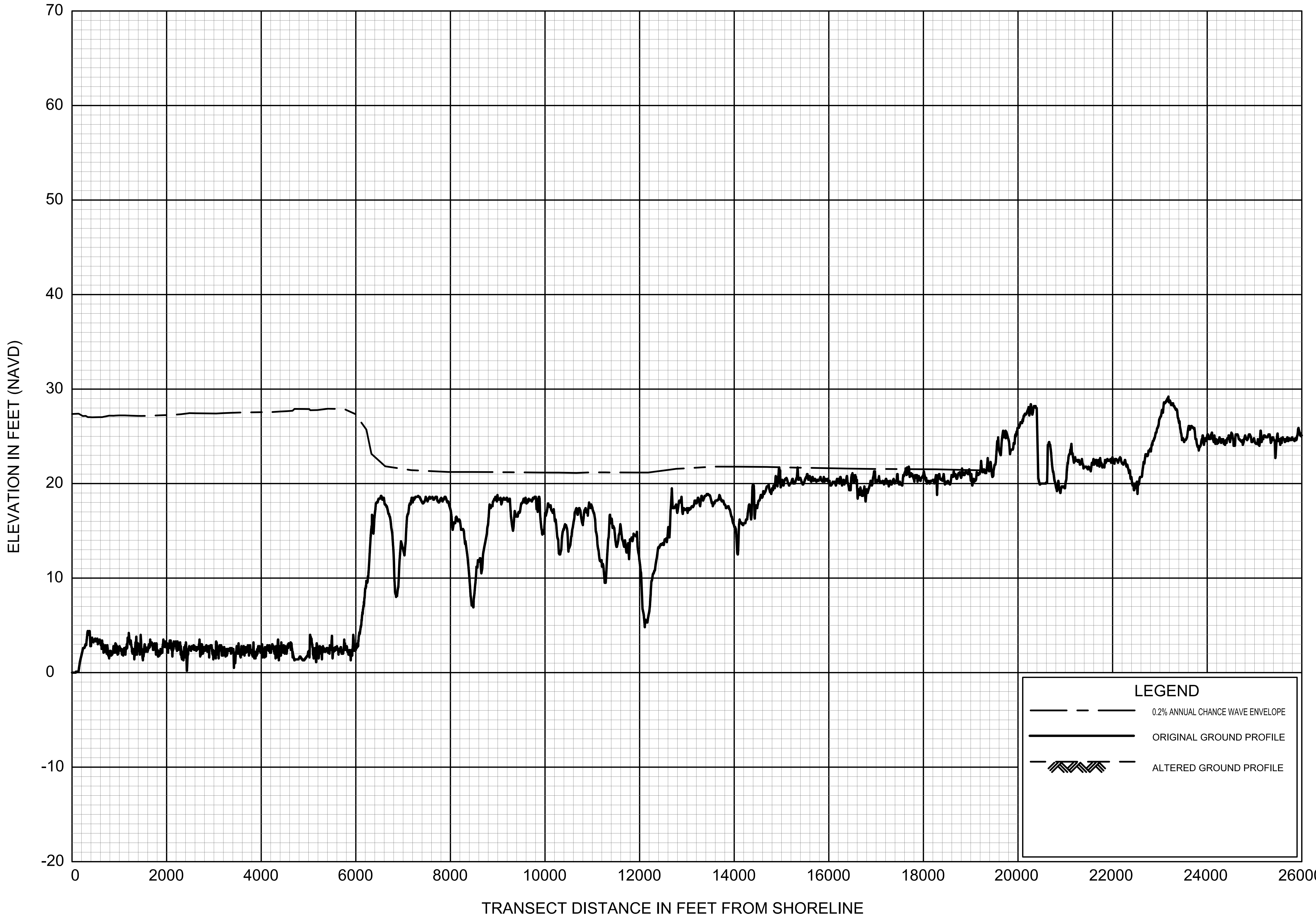
TRANSECT 21

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

25P



0.2% ANNUAL CHANCE WAVE ENVELOPE

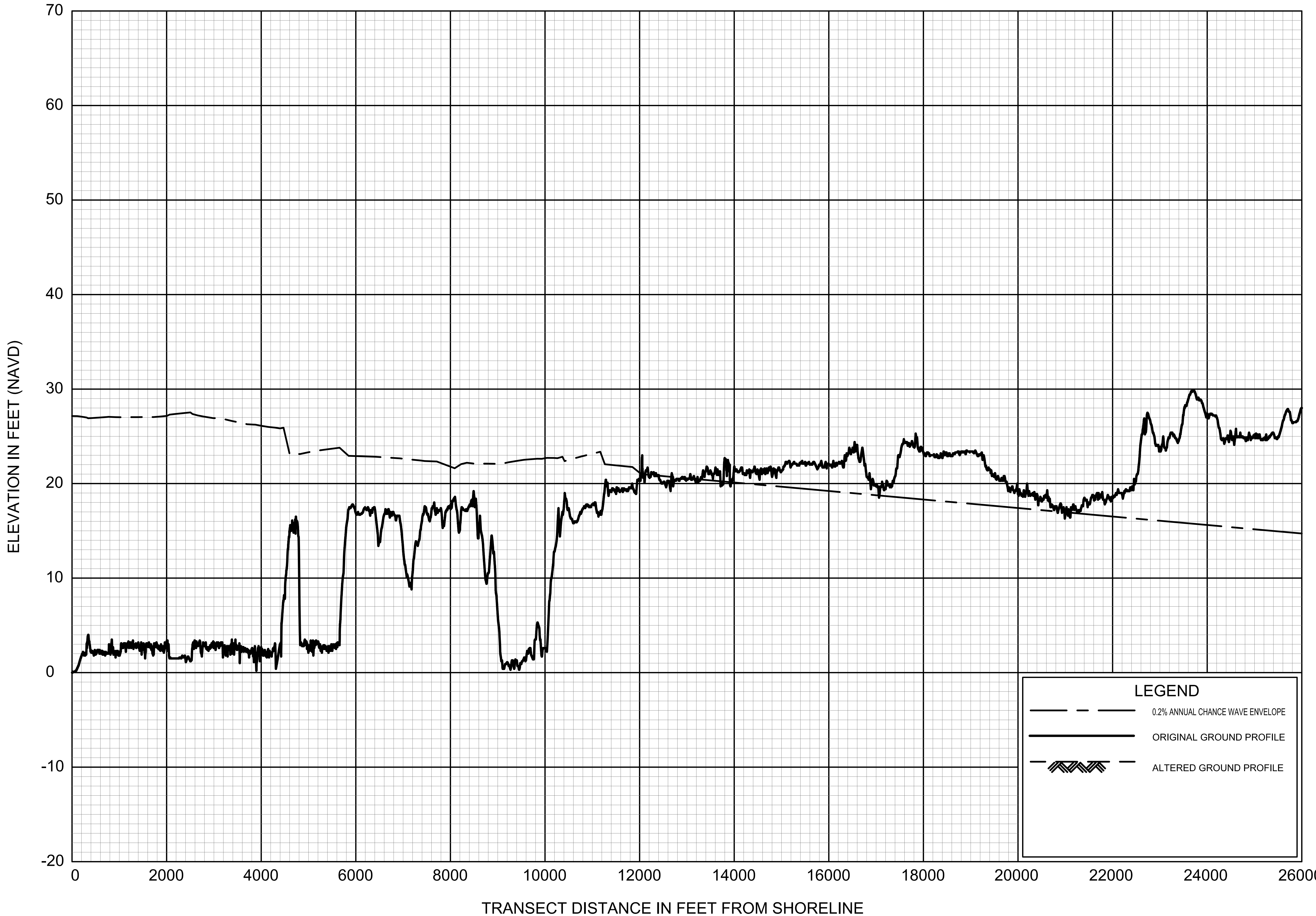
TRANSECT 22

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

26P



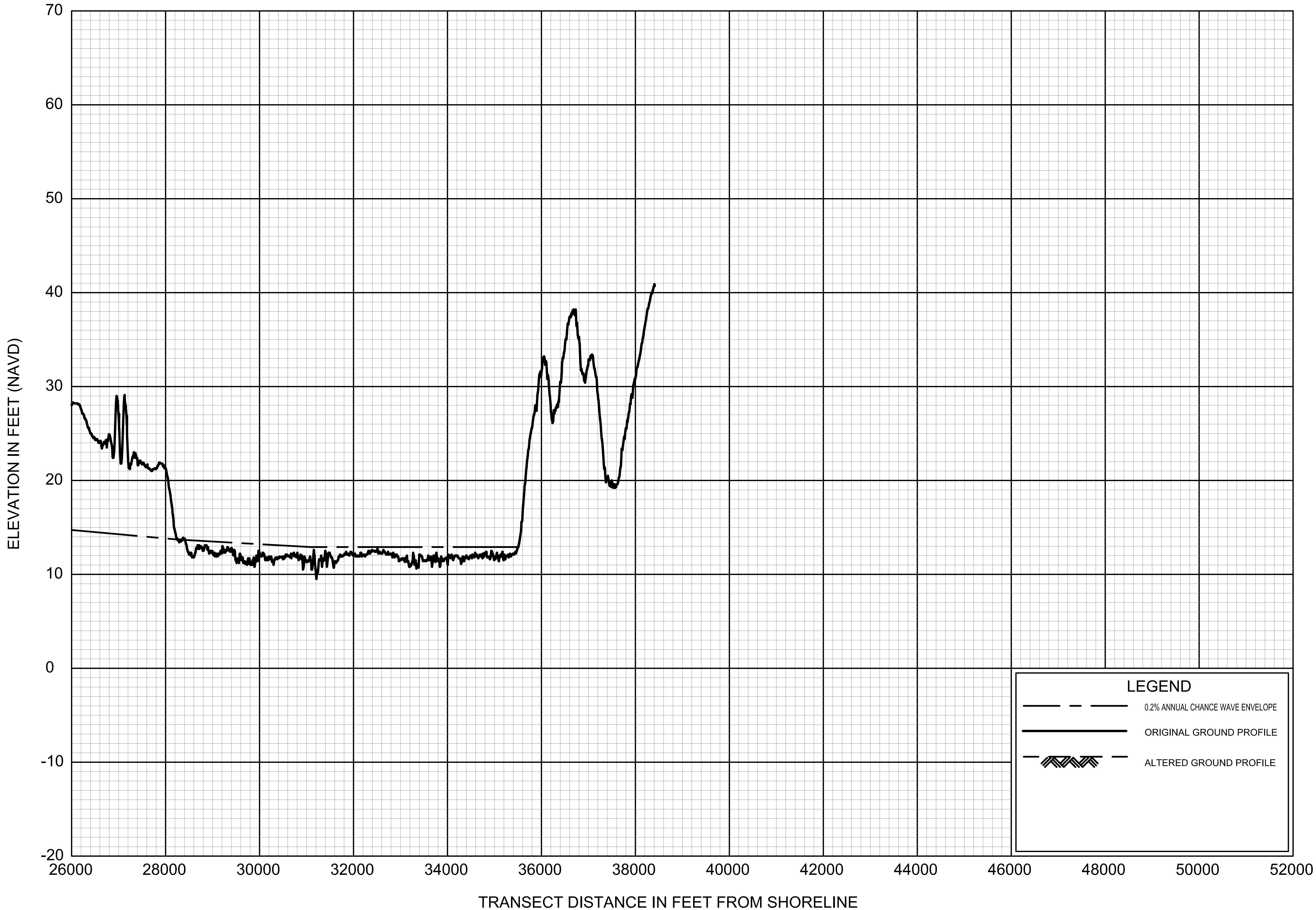
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



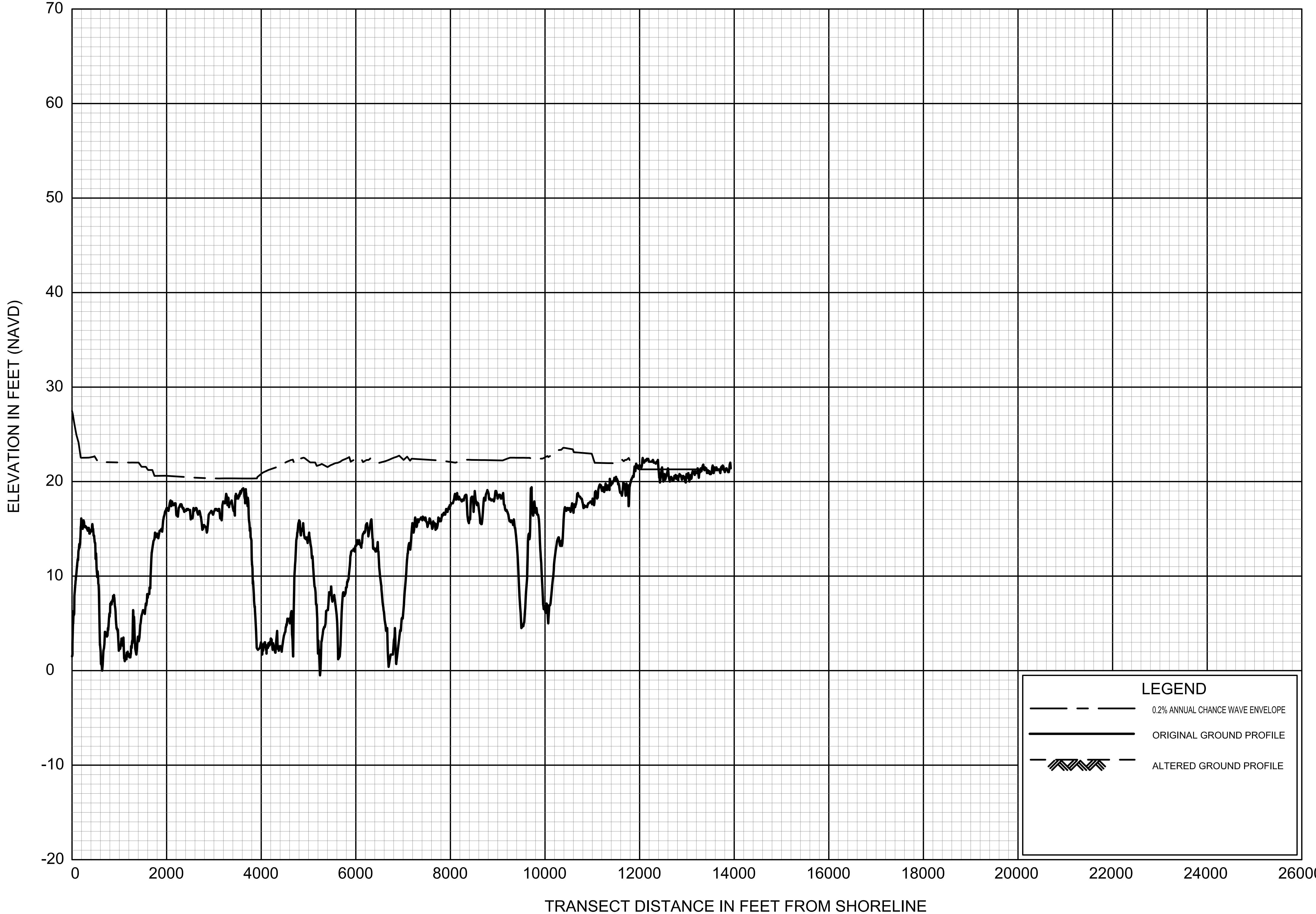
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 23

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

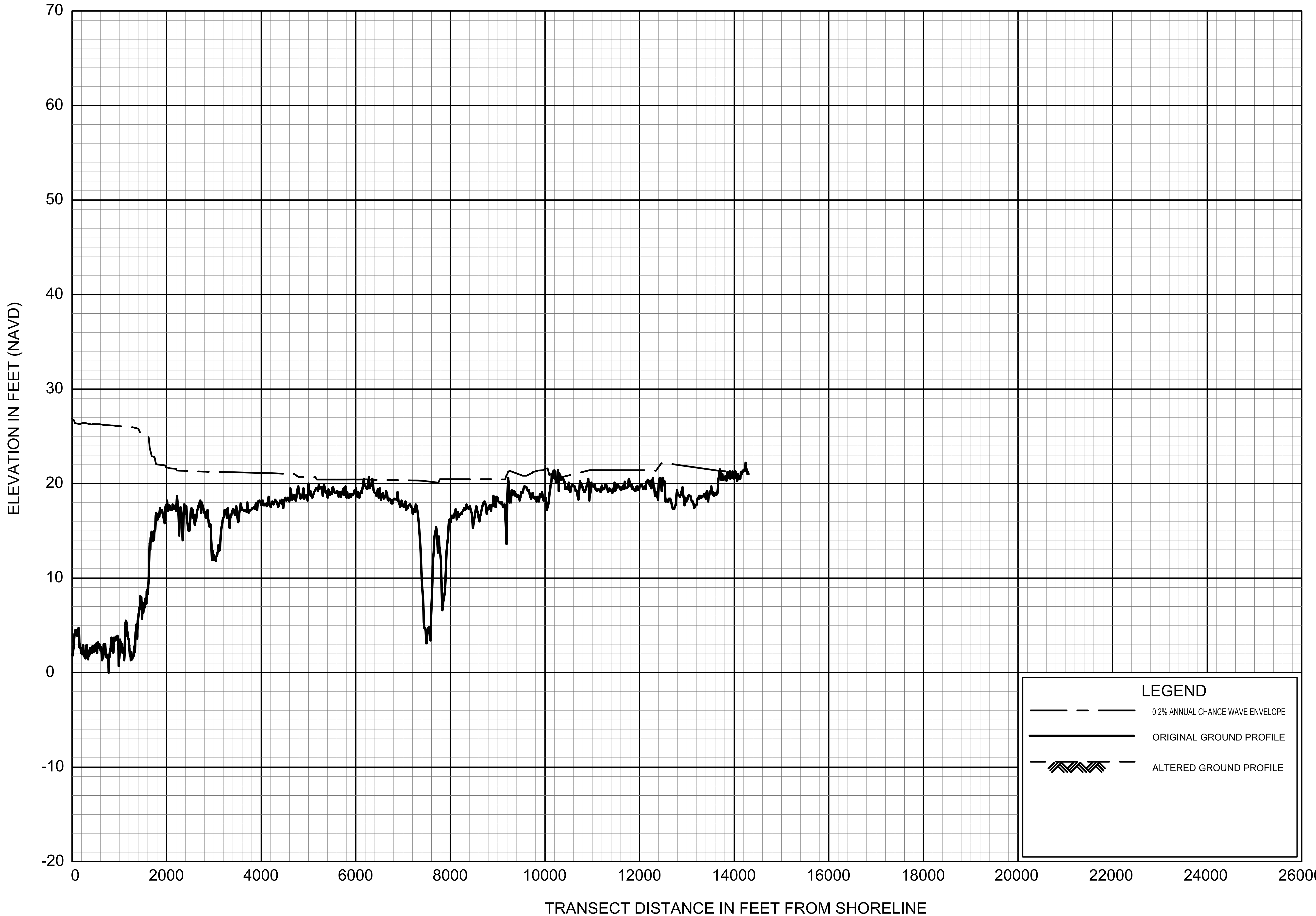
TRANSECT 24

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

29P



0.2% ANNUAL CHANCE WAVE ENVELOPE

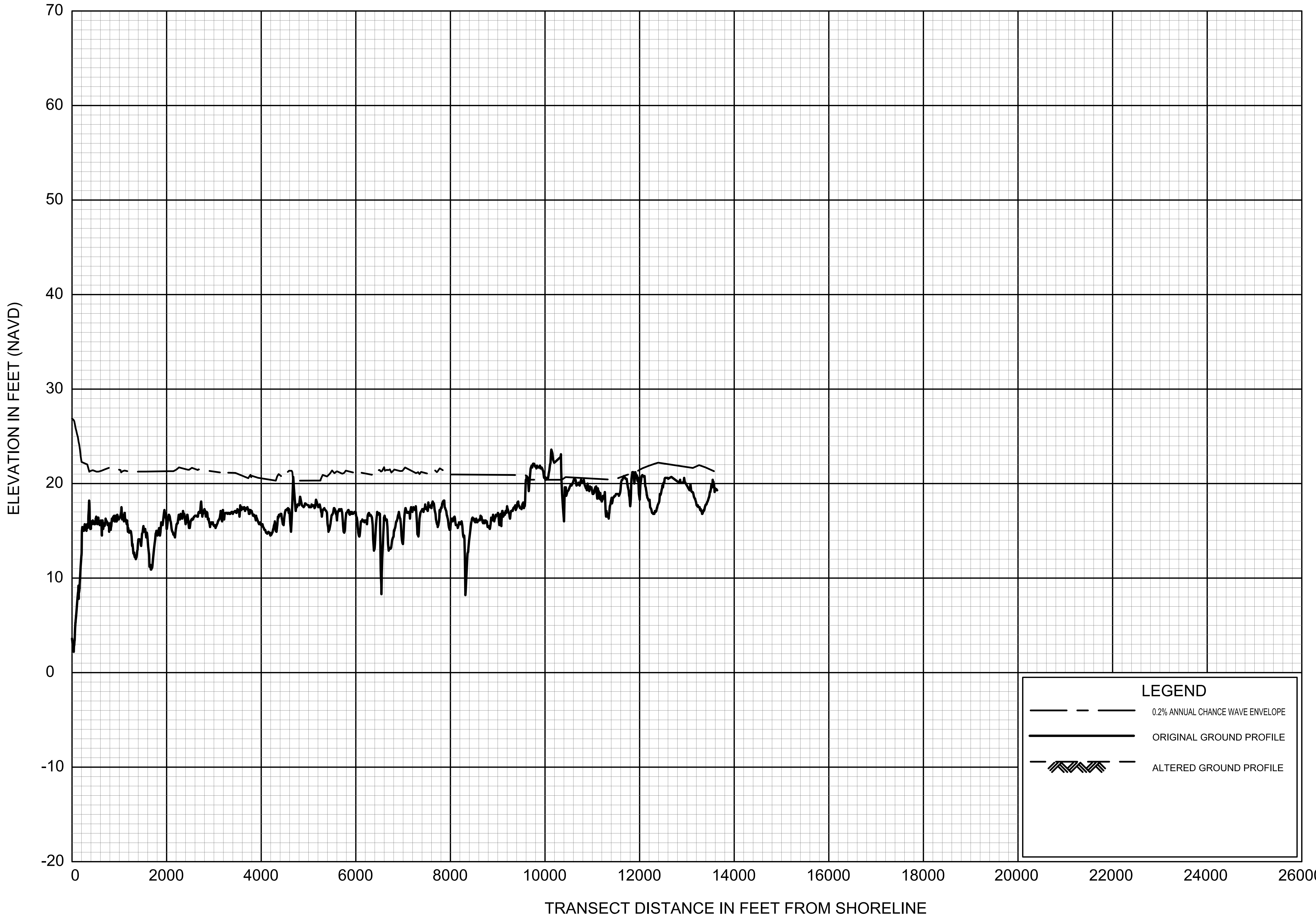
TRANSECT 25

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

30P



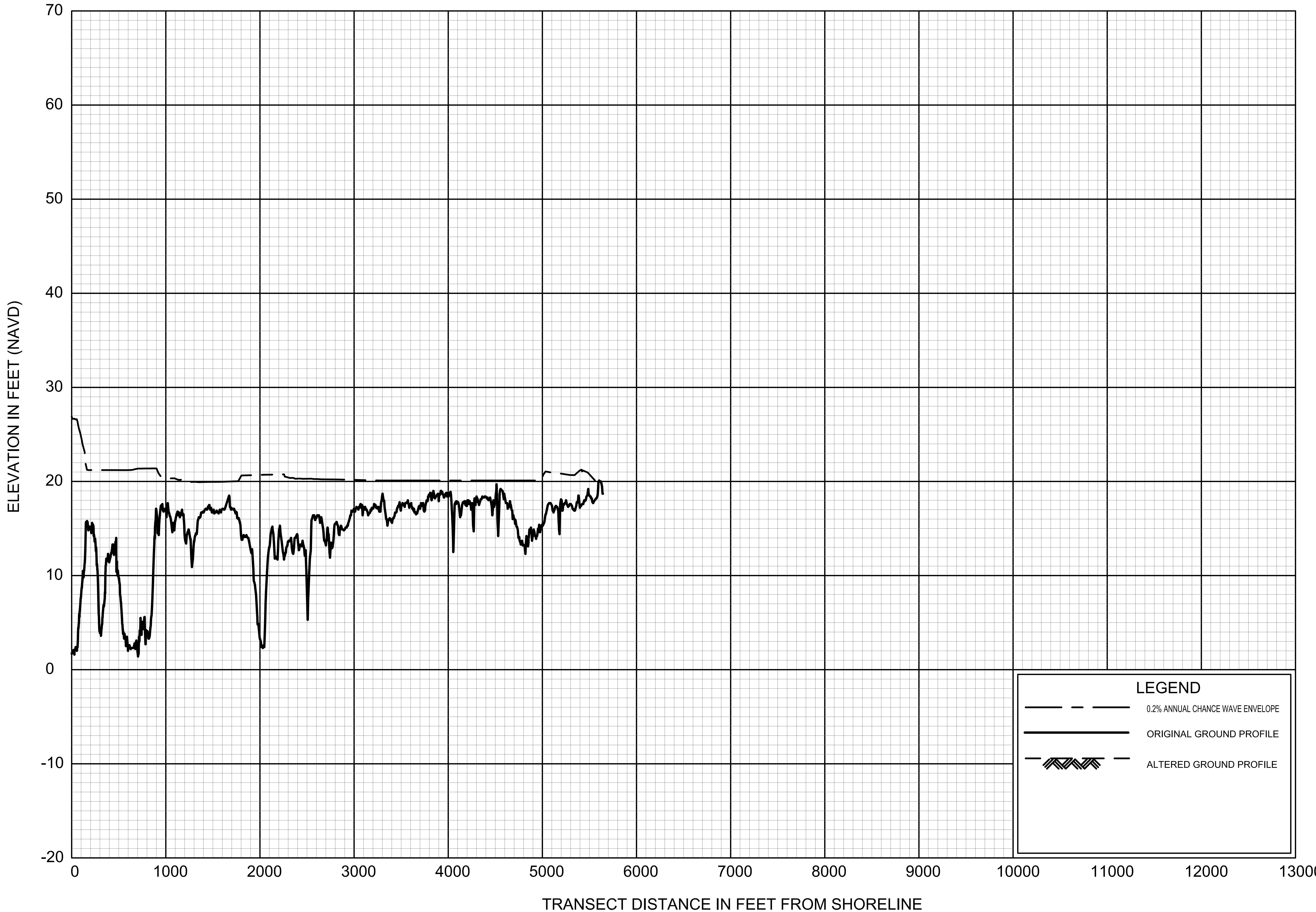
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 26

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



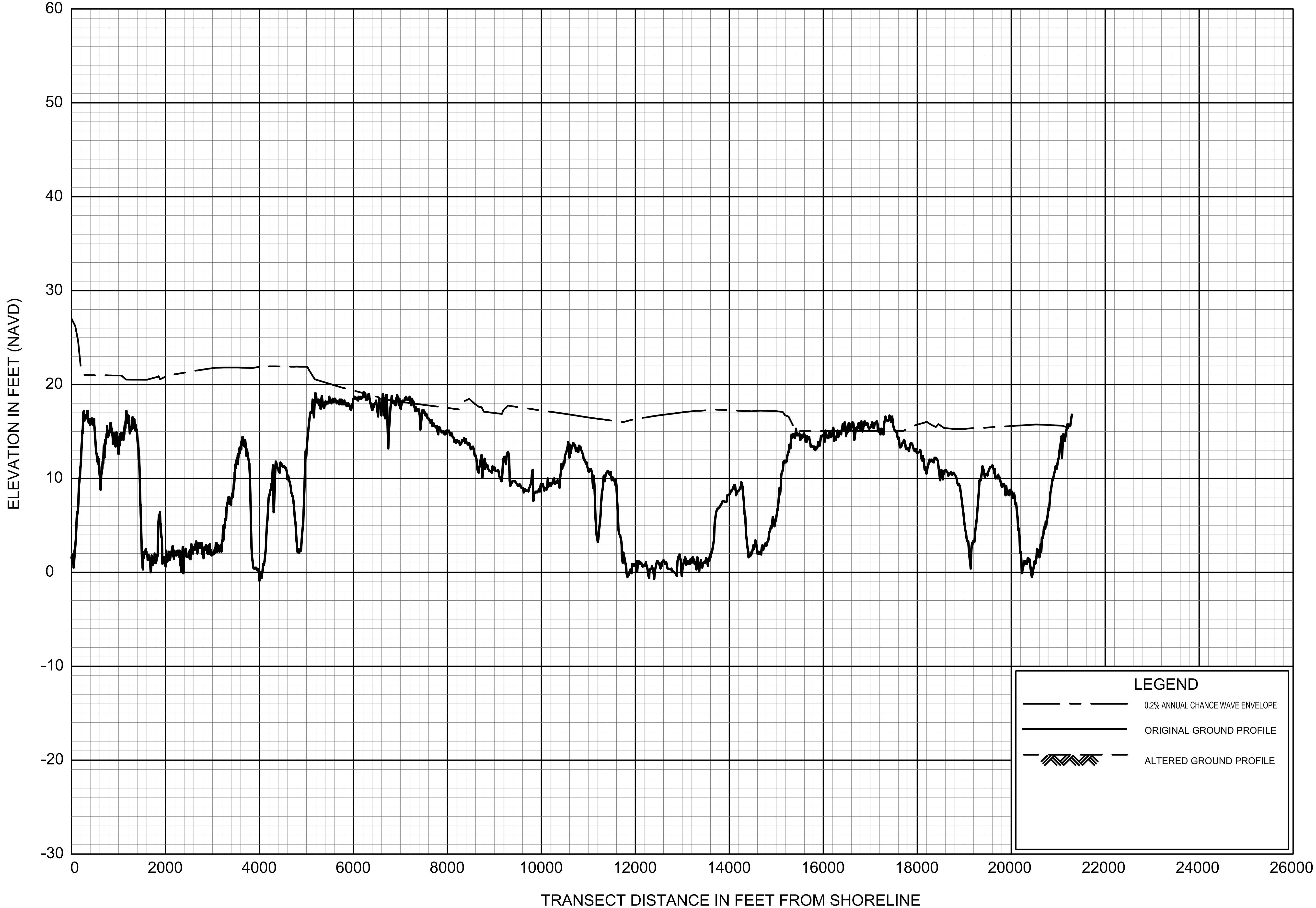
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 27

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 28

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

33P

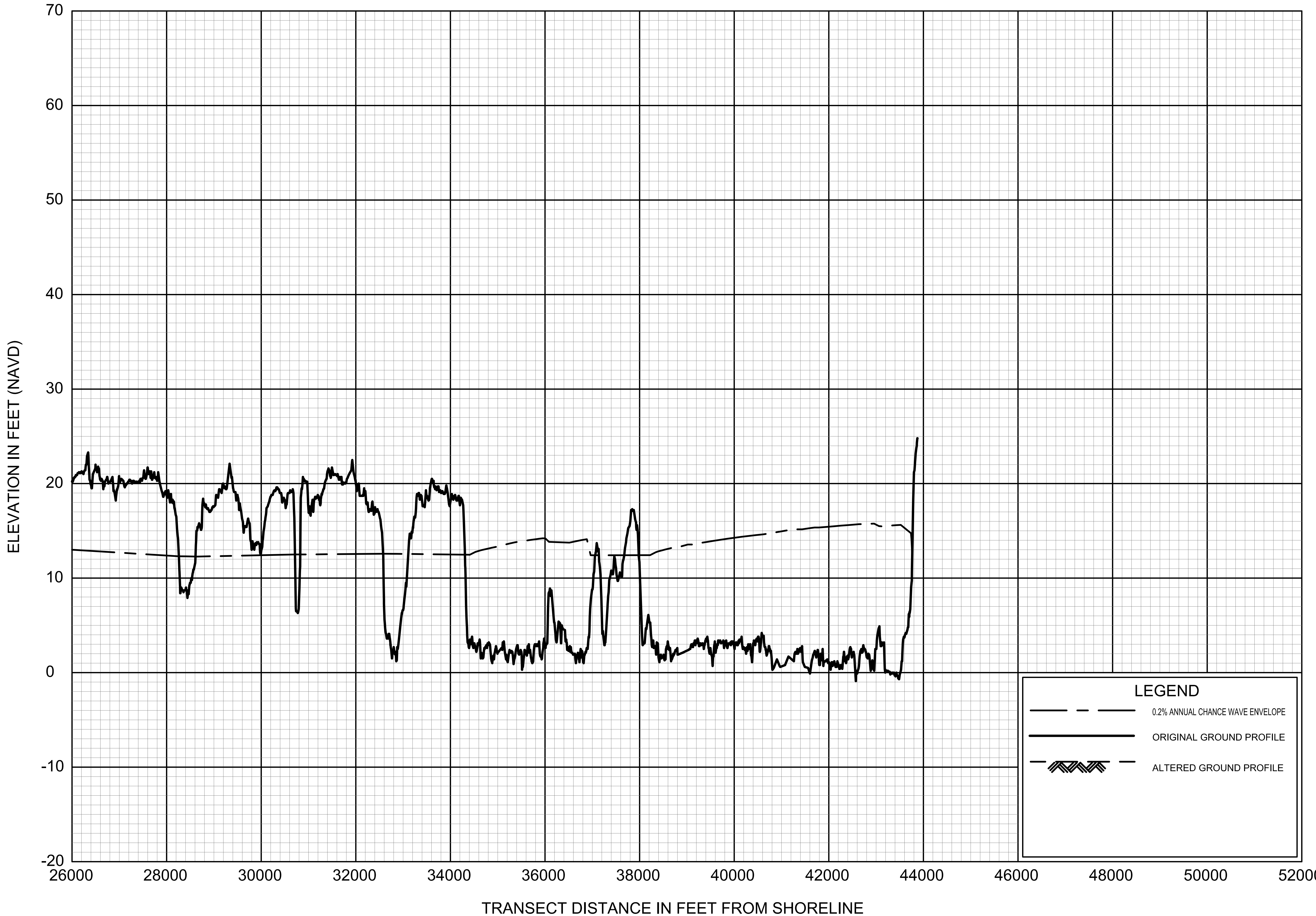
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 29

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



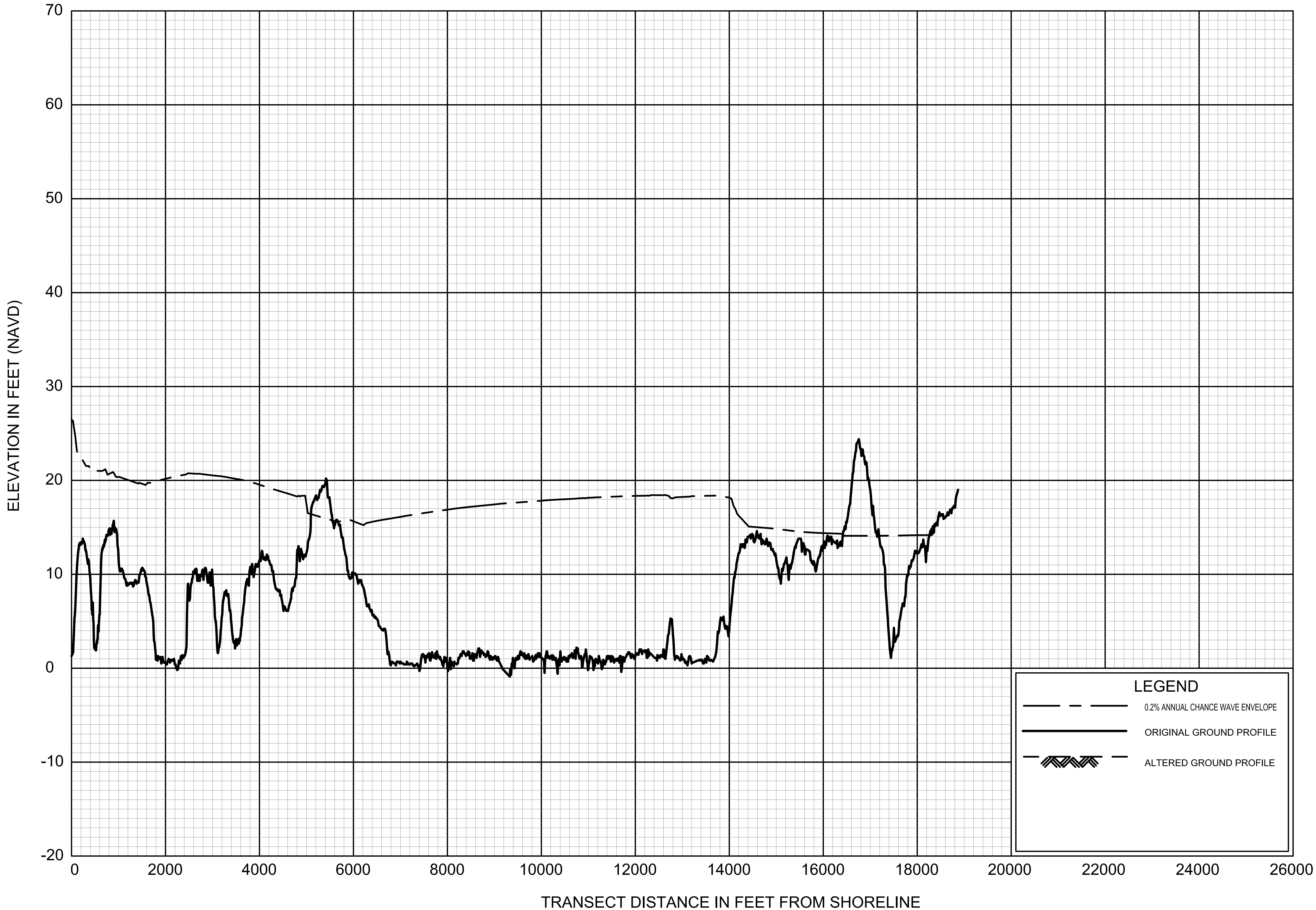
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 29

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



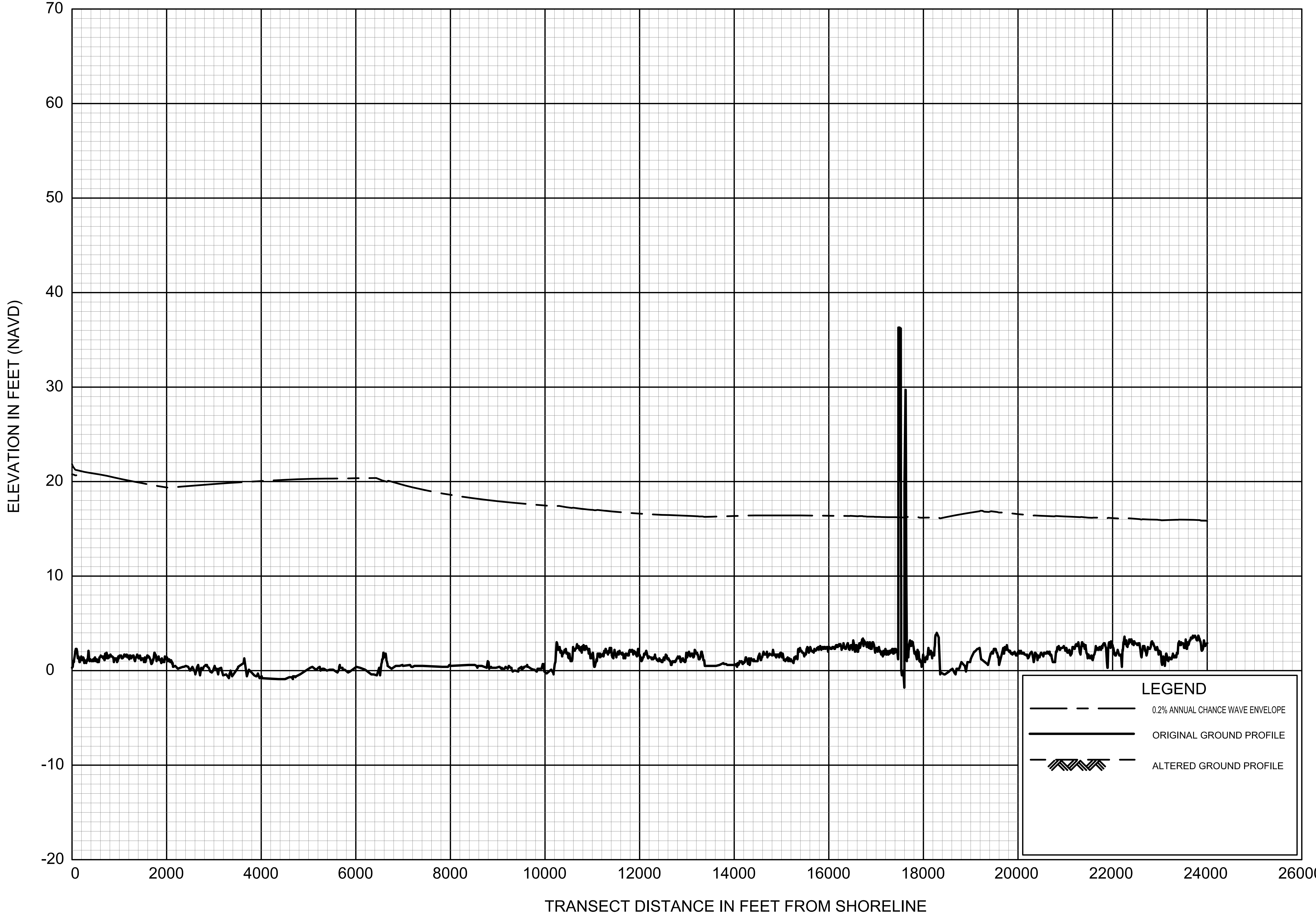
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 30

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

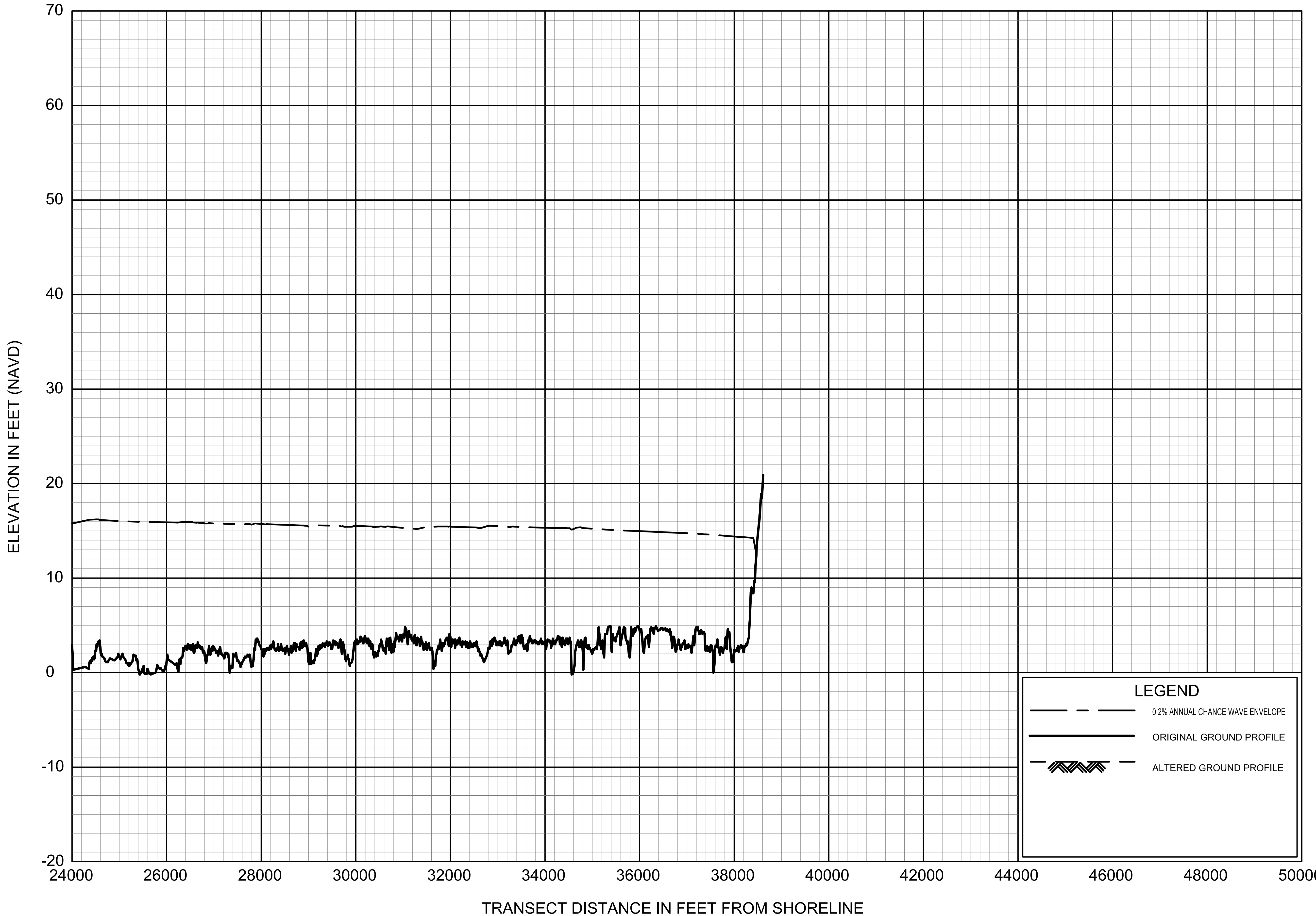
TRANSECT 31

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

37P



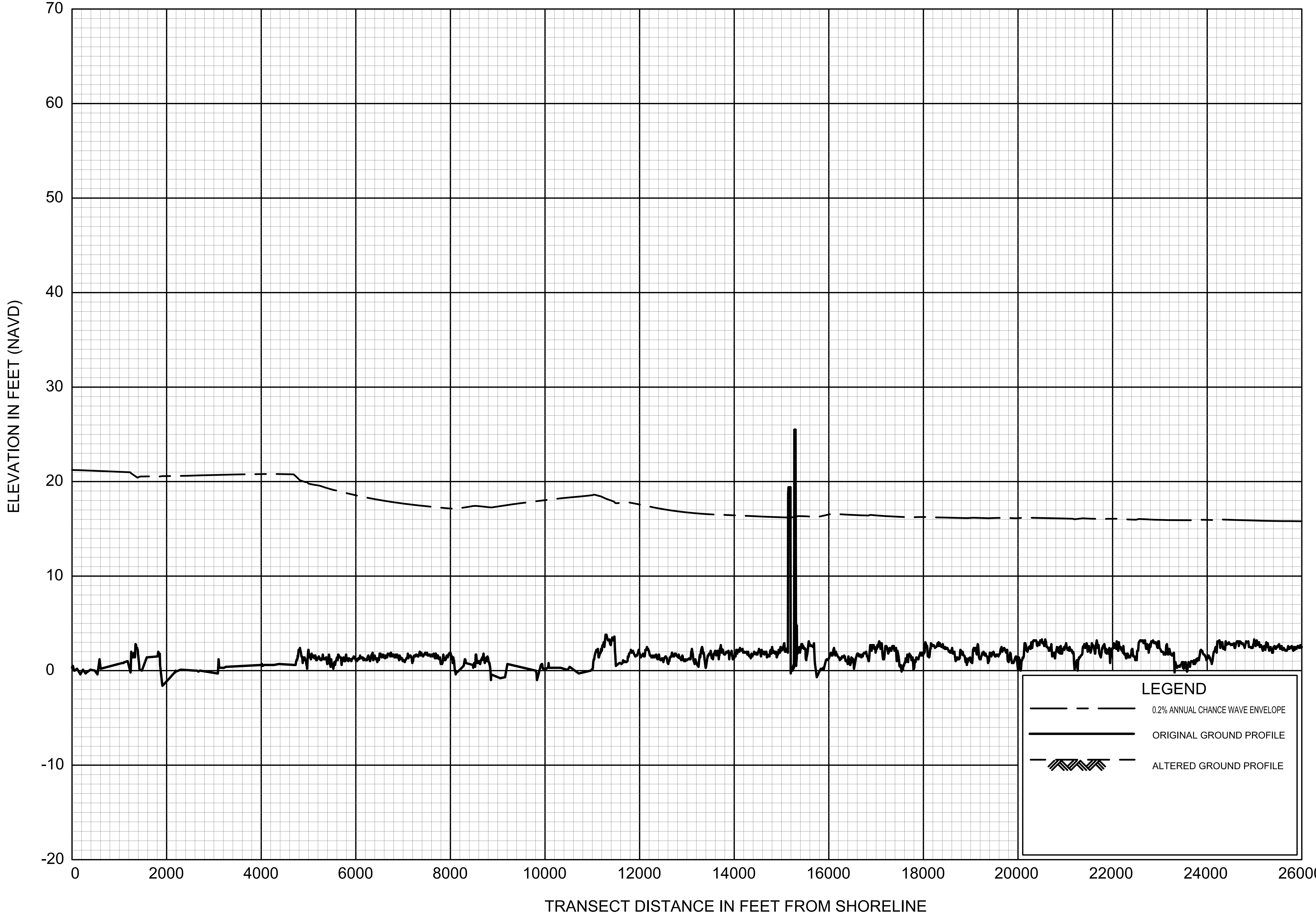
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 31

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

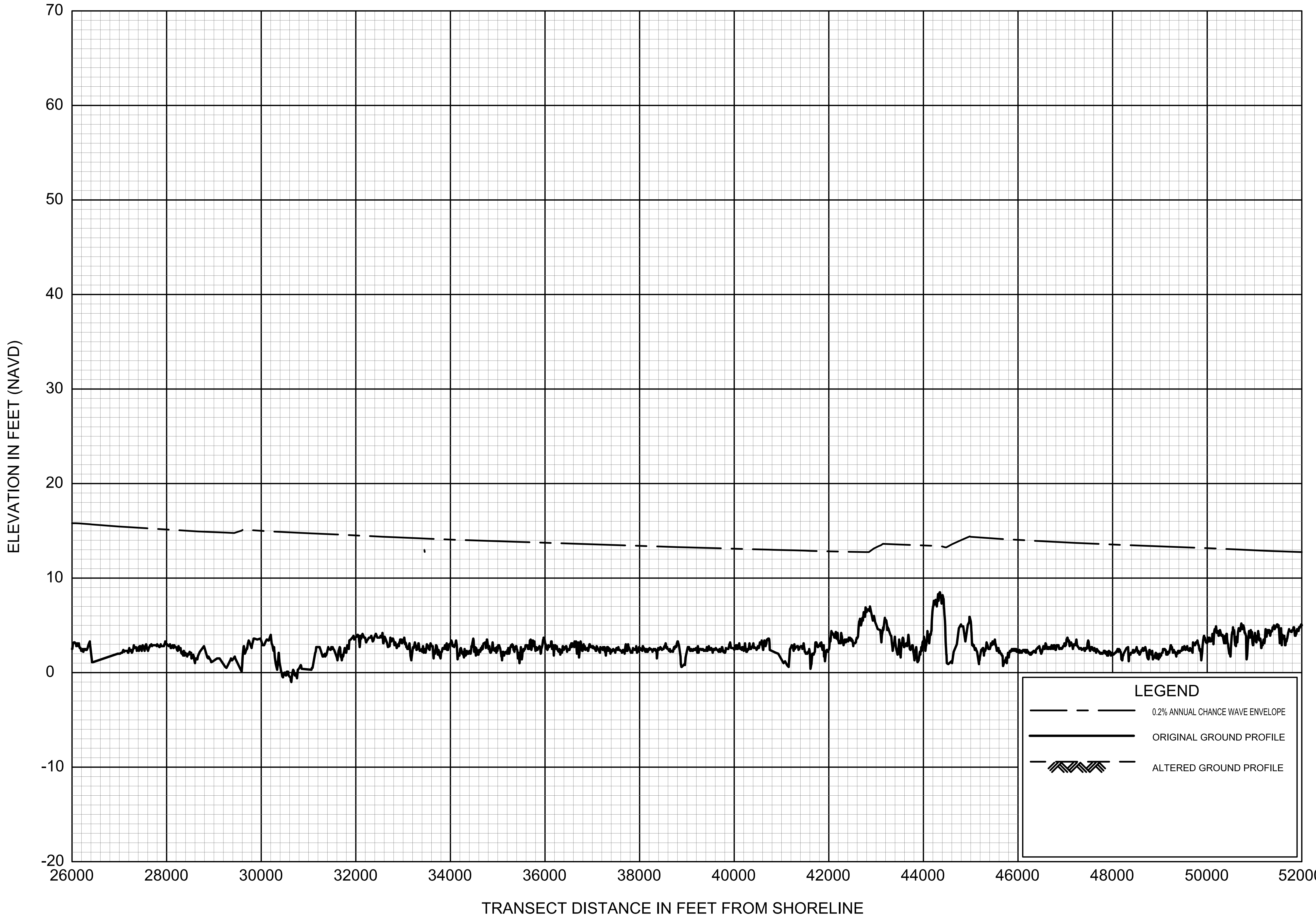
TRANSECT 32

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

39P



0.2% ANNUAL CHANCE WAVE ENVELOPE

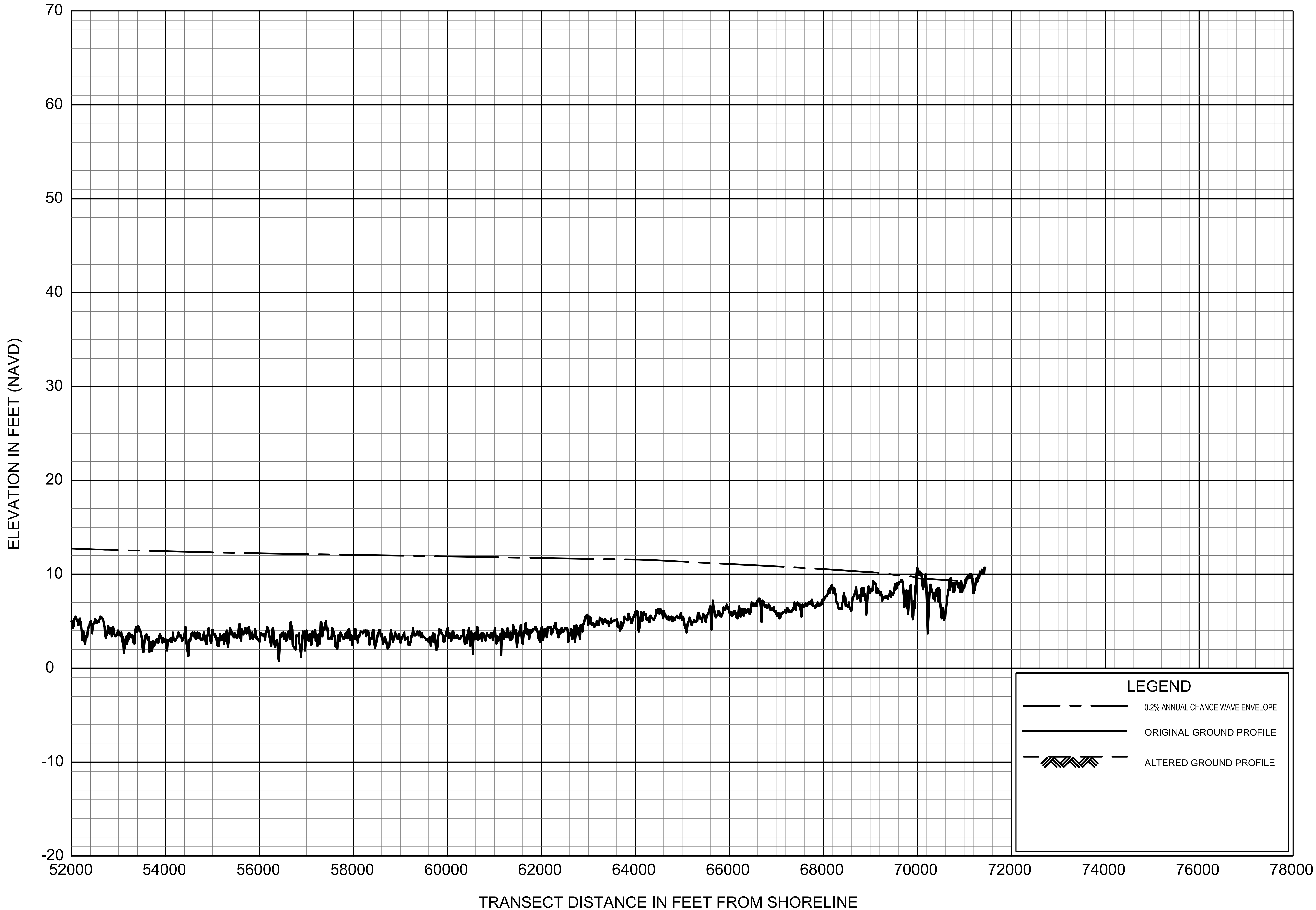
TRANSECT 32

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

40P



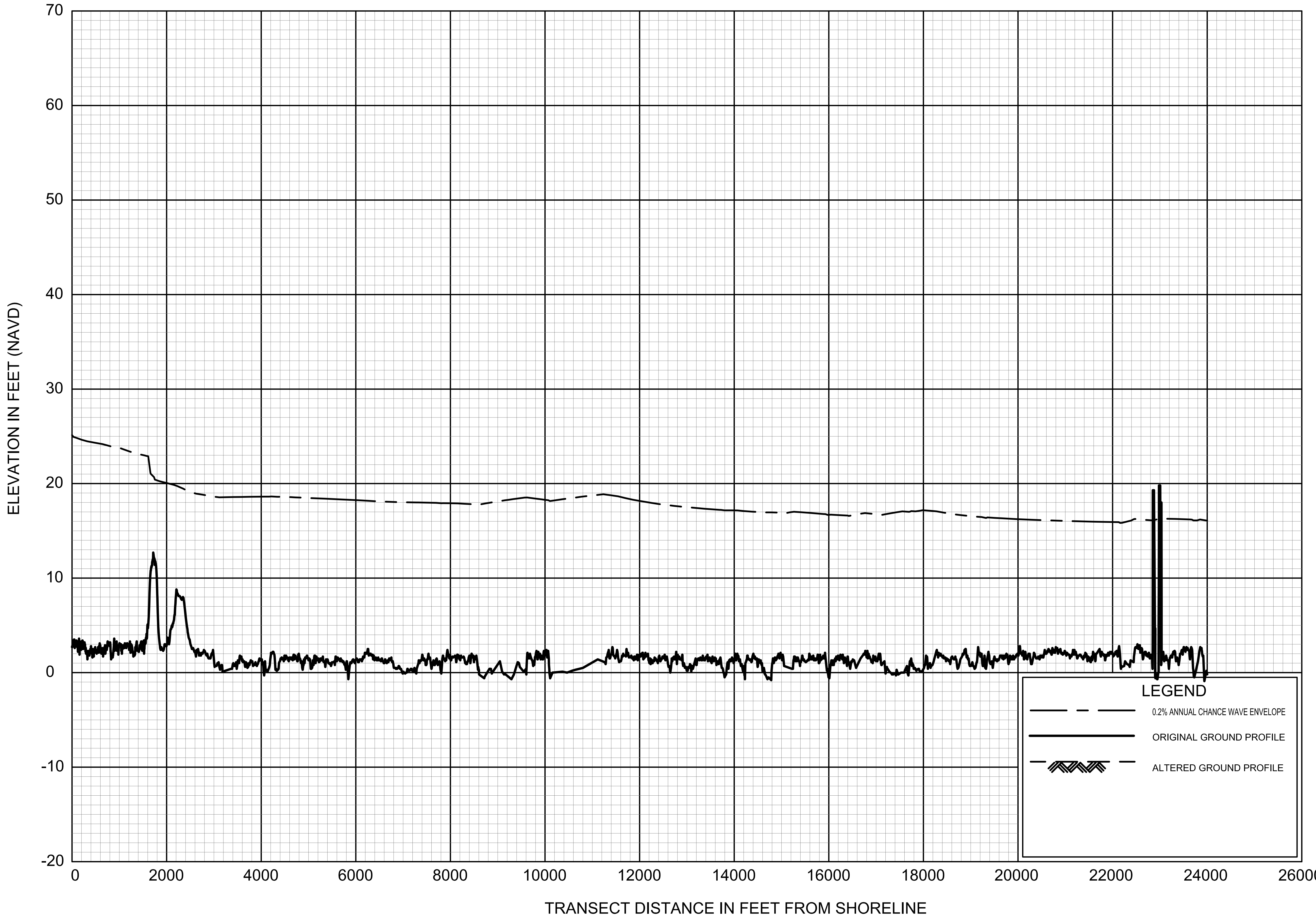
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 32

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

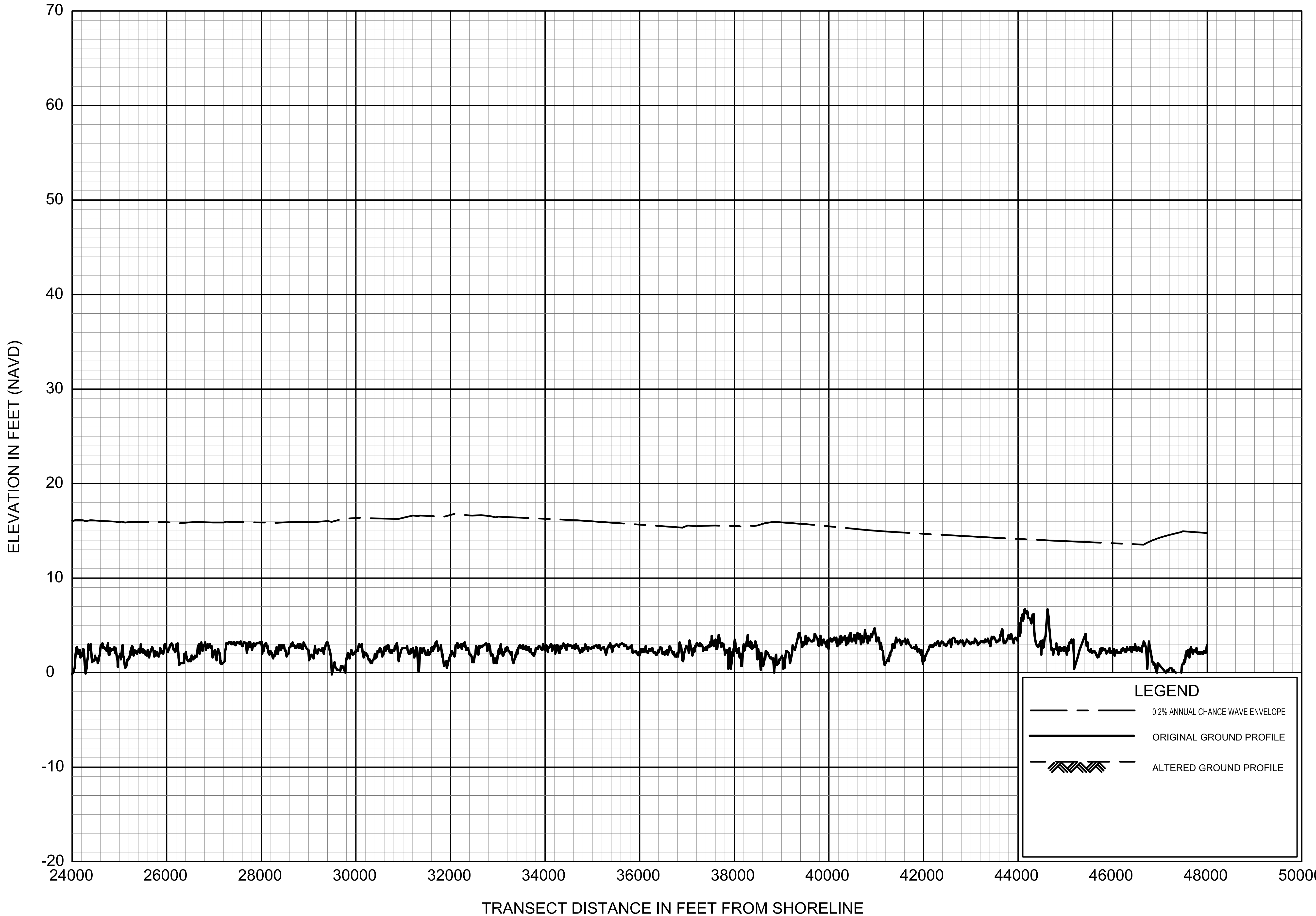
TRANSECT 33

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

42P



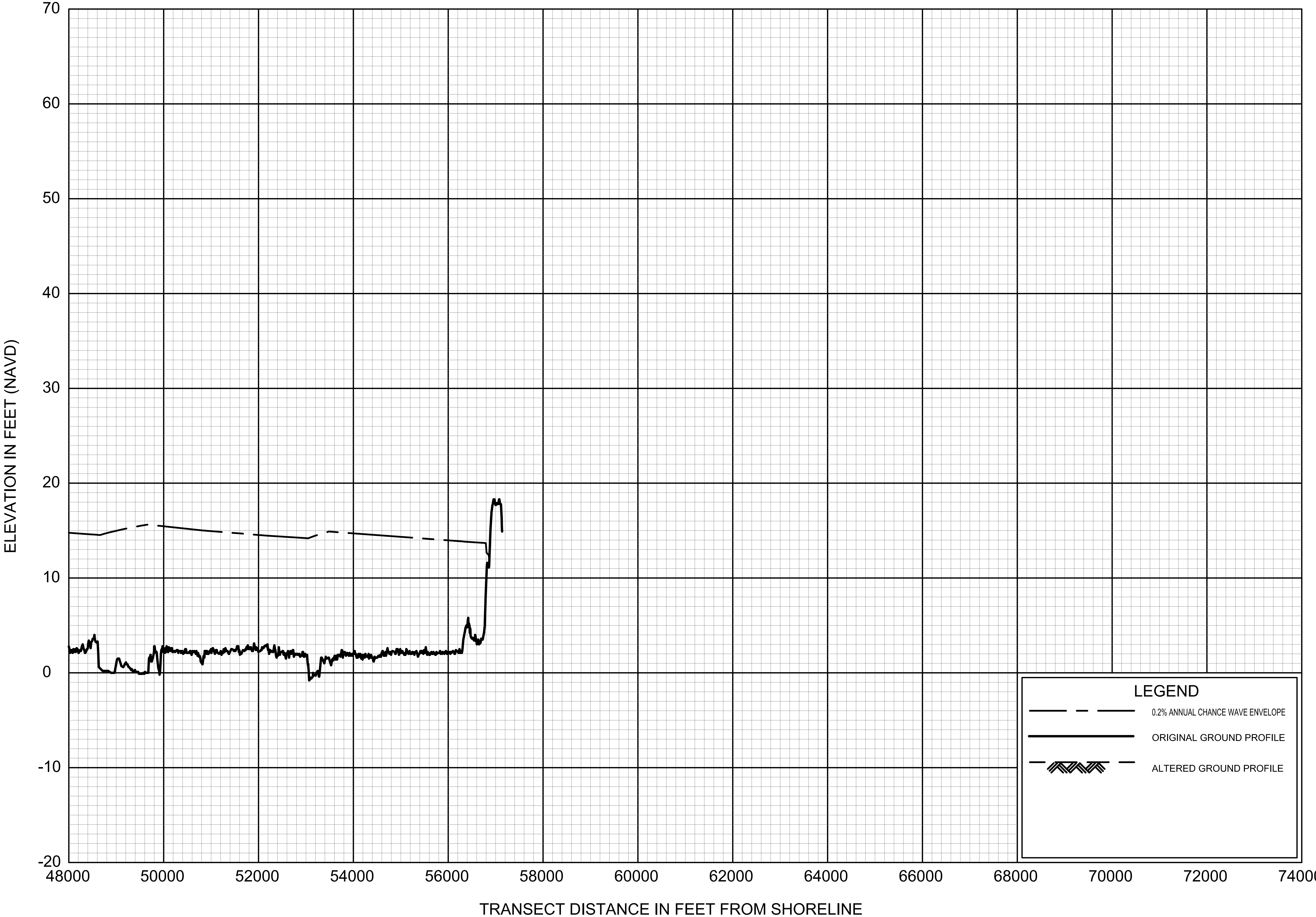
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 33

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

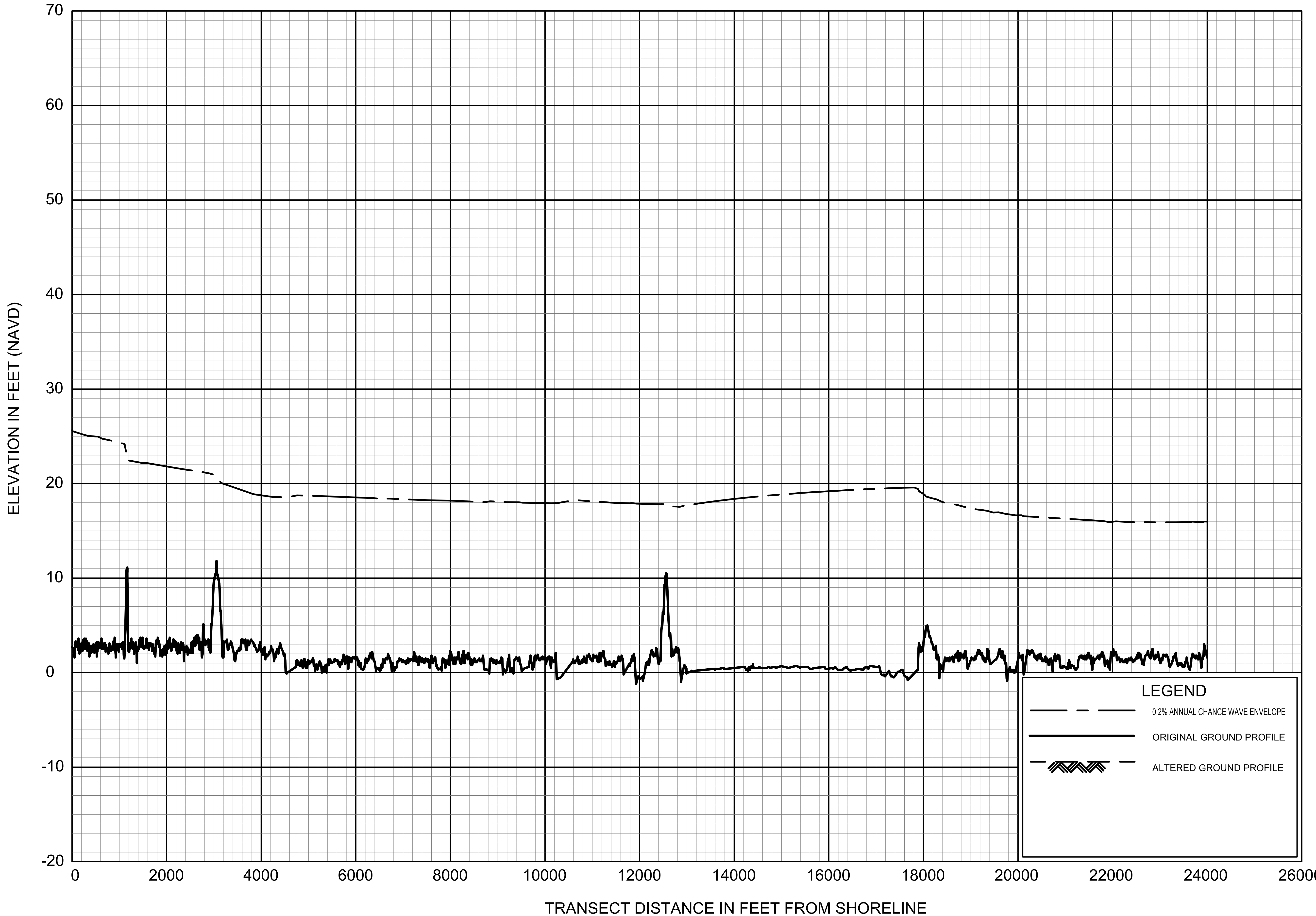
TRANSECT 33

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

44P



0.2% ANNUAL CHANCE WAVE ENVELOPE

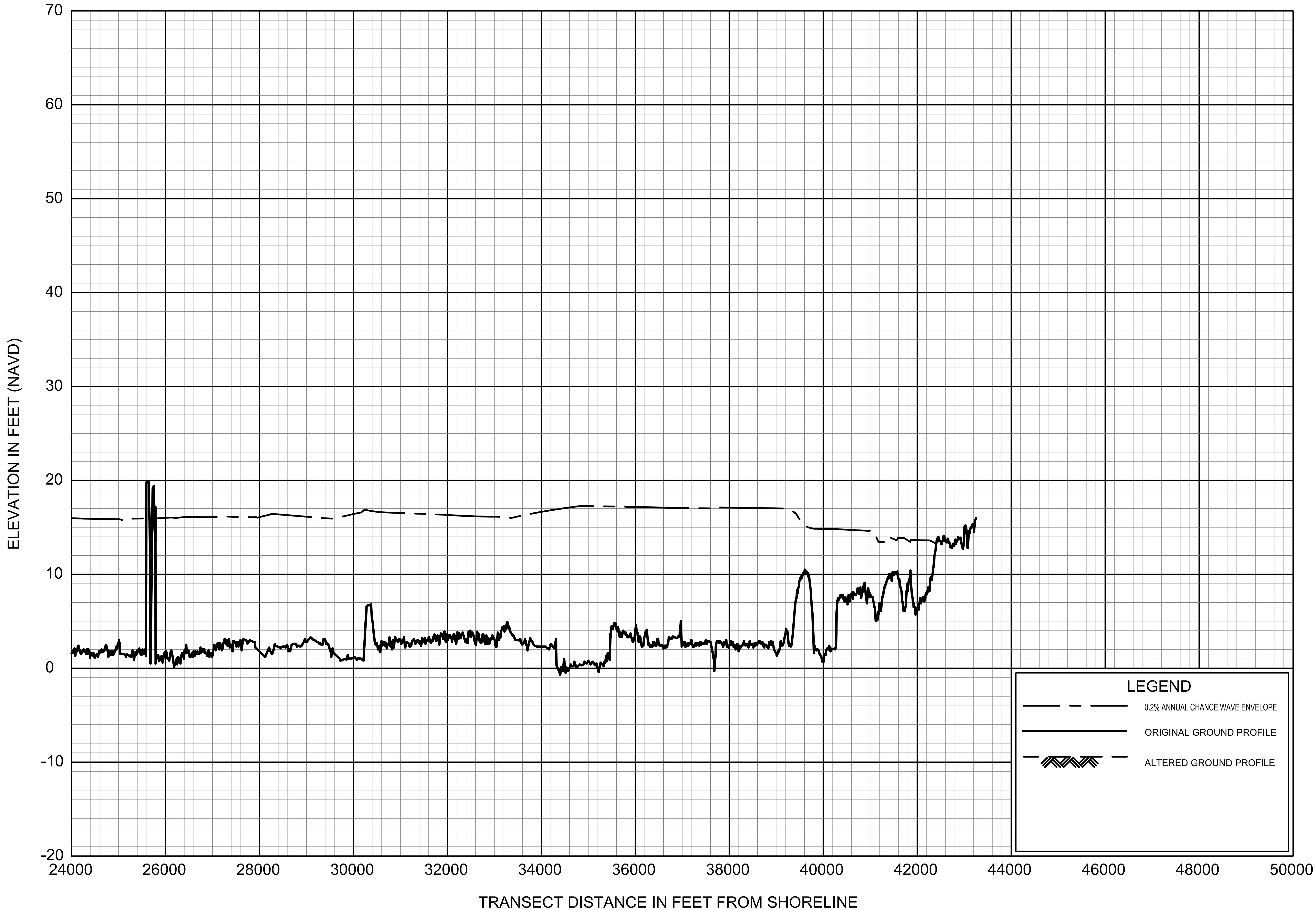
TRANSECT 34

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

45P



0.2% ANNUAL CHANCE WAVE ENVELOPE

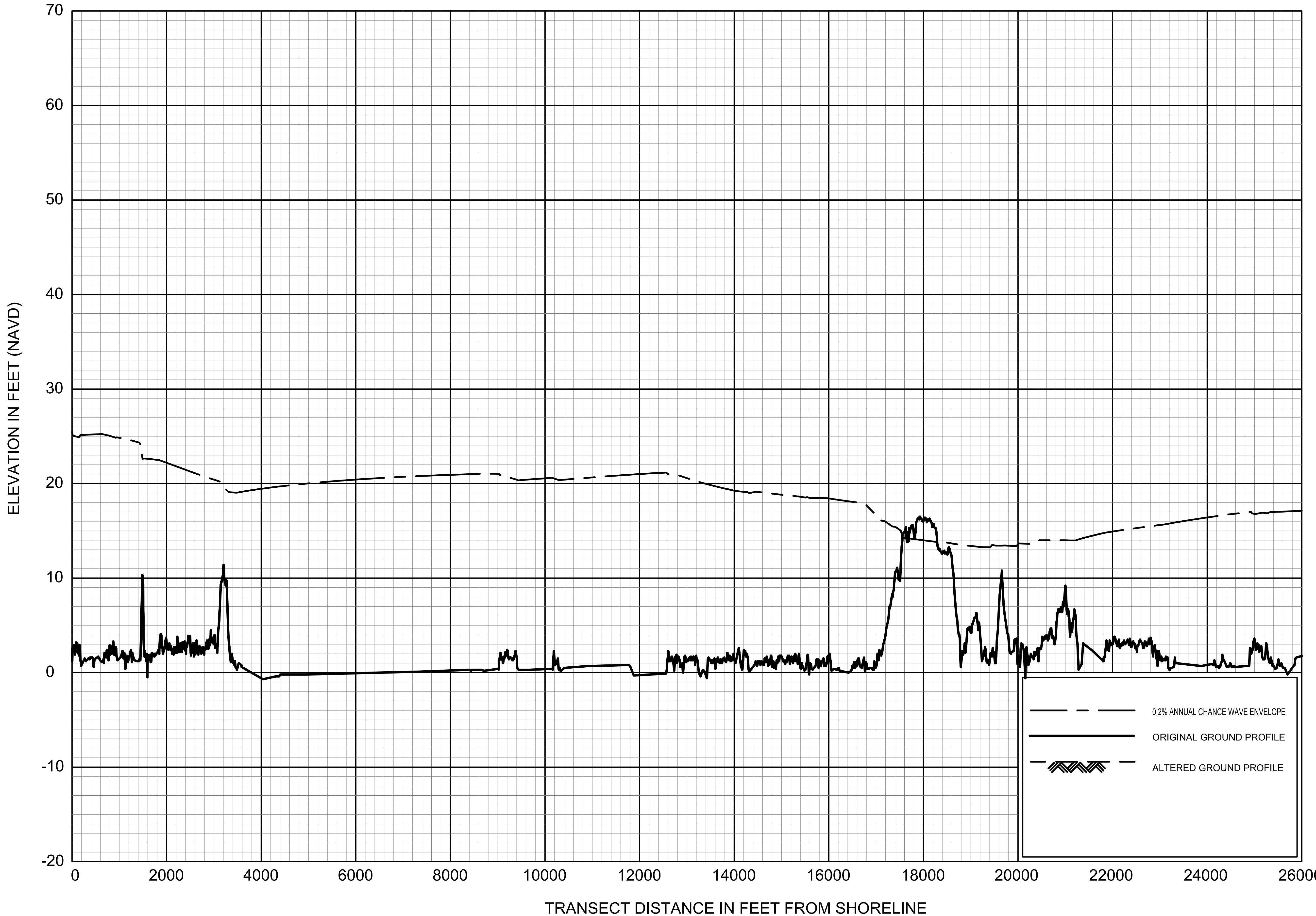
TRANSECT 34

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

46P



0.2% ANNUAL CHANCE WAVE ENVELOPE

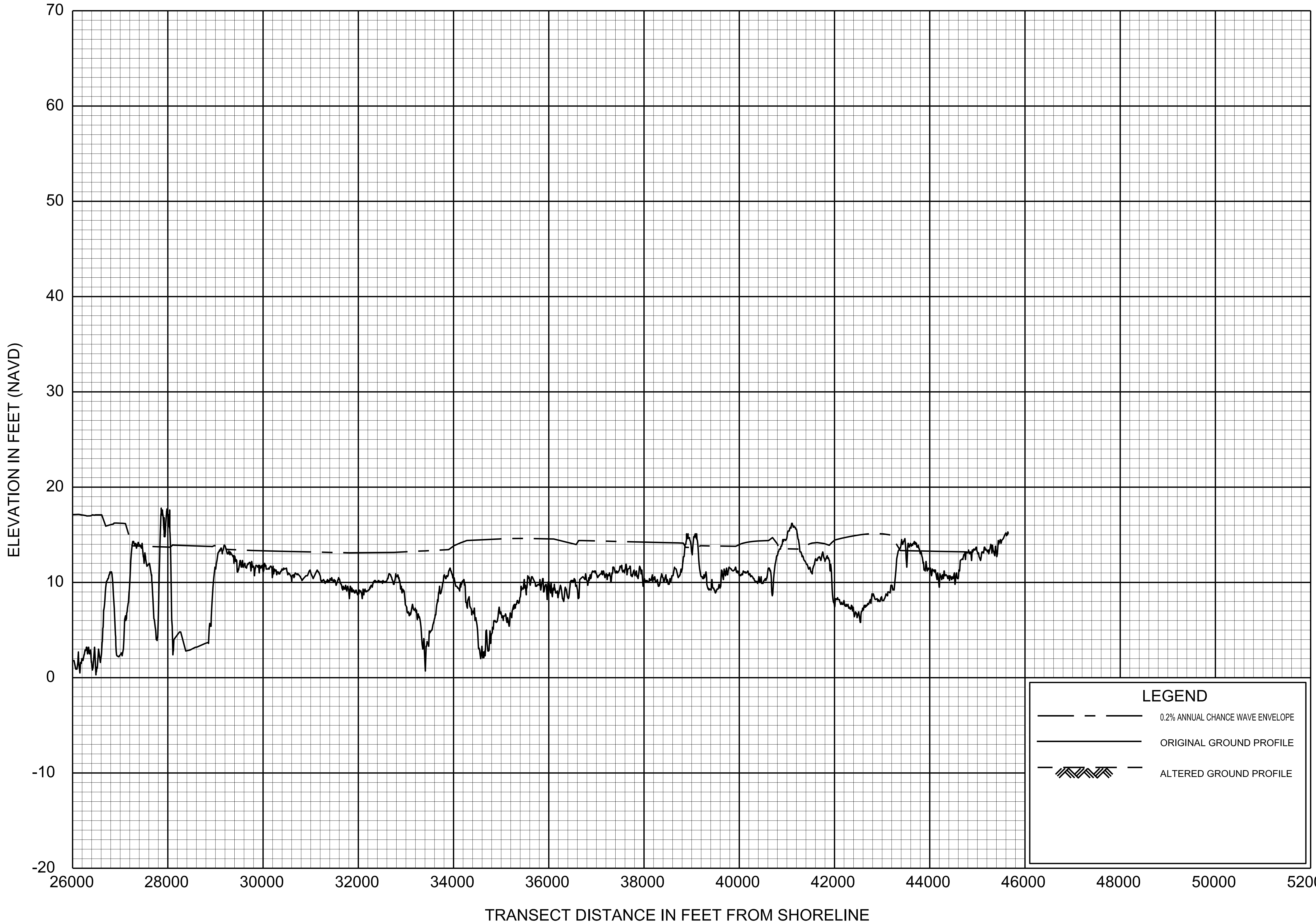
TRANSECT 35

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

47P



0.2% ANNUAL CHANCE WAVE ENVELOPE

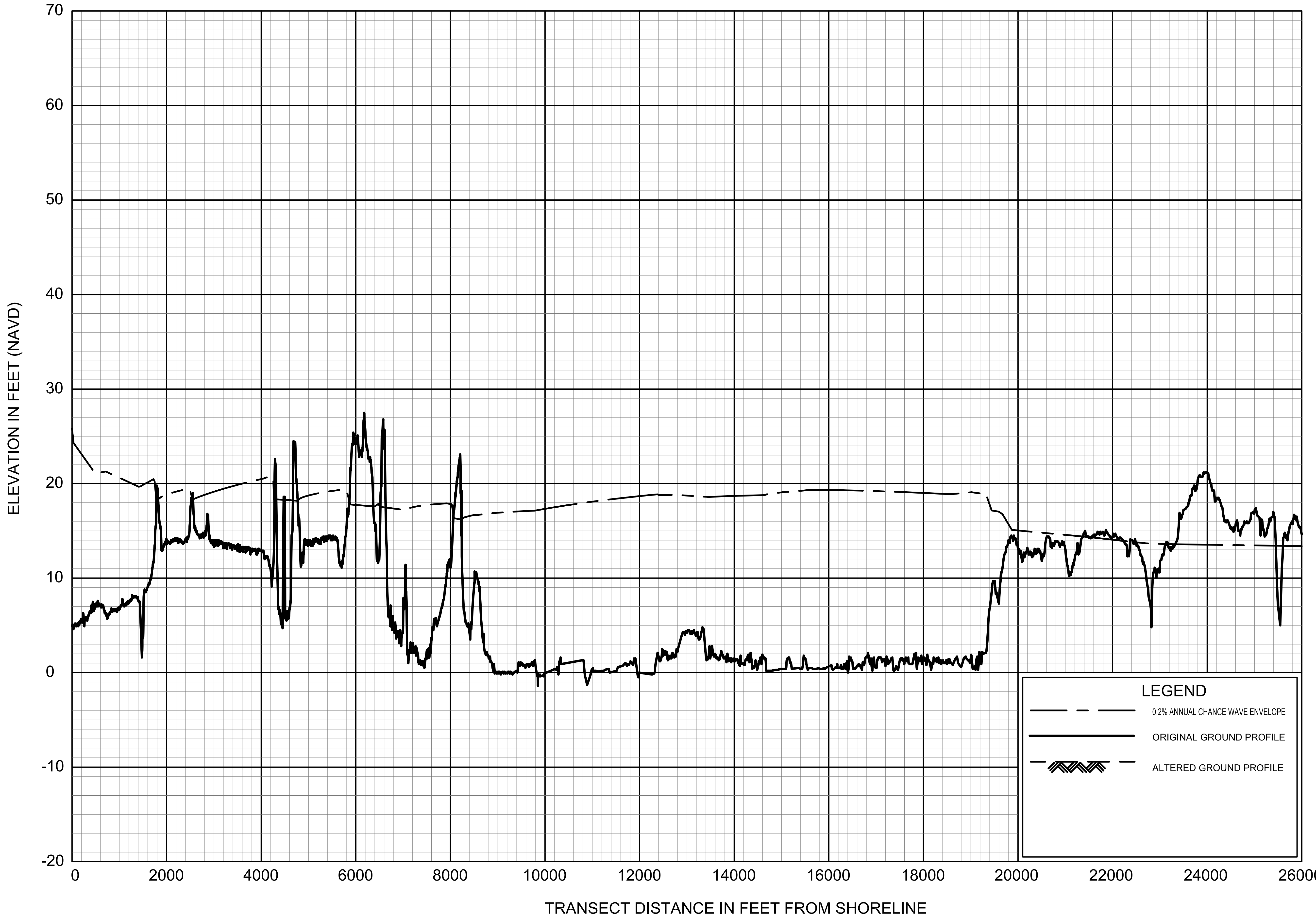
TRANSECT 35

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

48P



0.2% ANNUAL CHANCE WAVE ENVELOPE

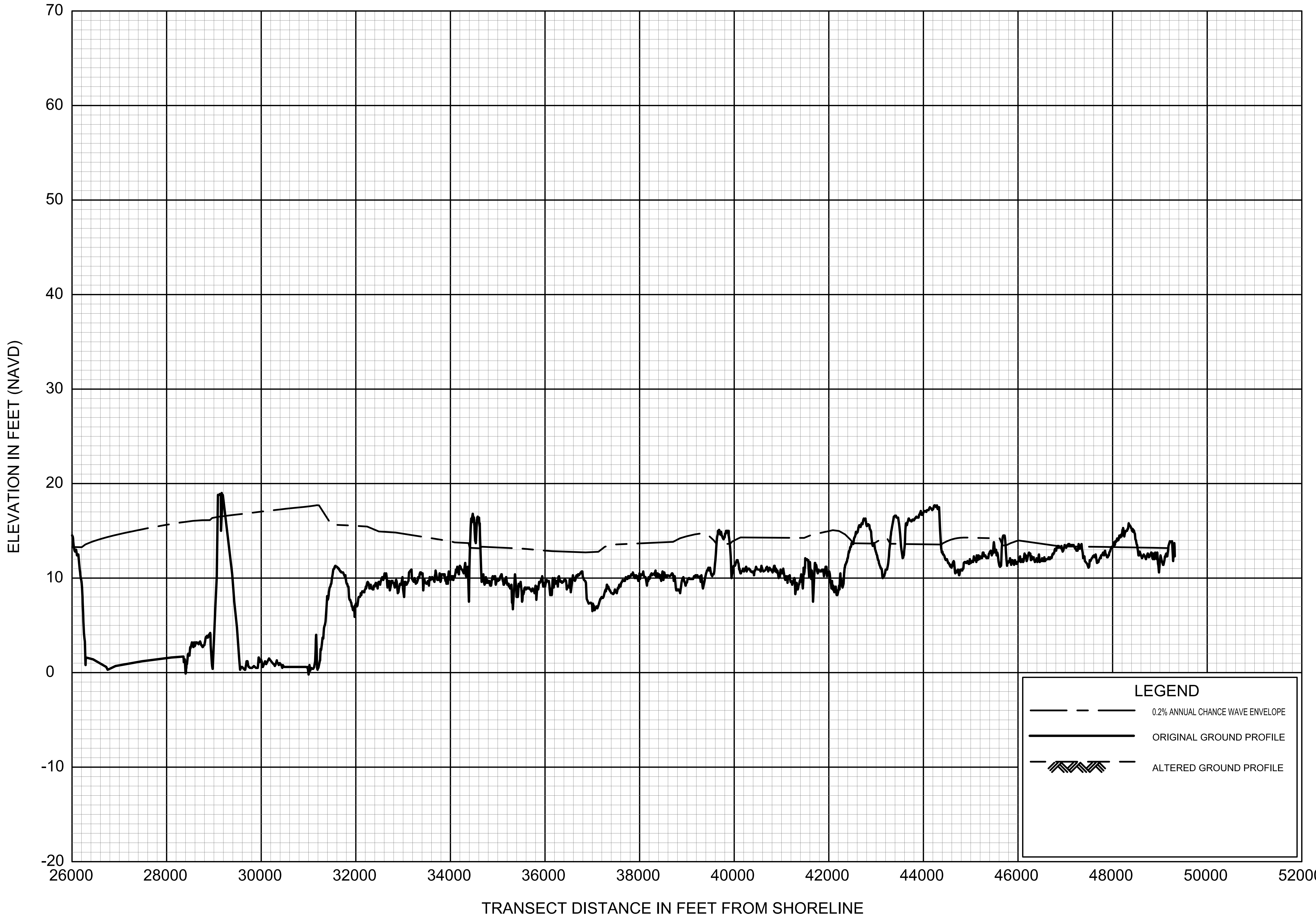
TRANSECT 36

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

49P



0.2% ANNUAL CHANCE WAVE ENVELOPE

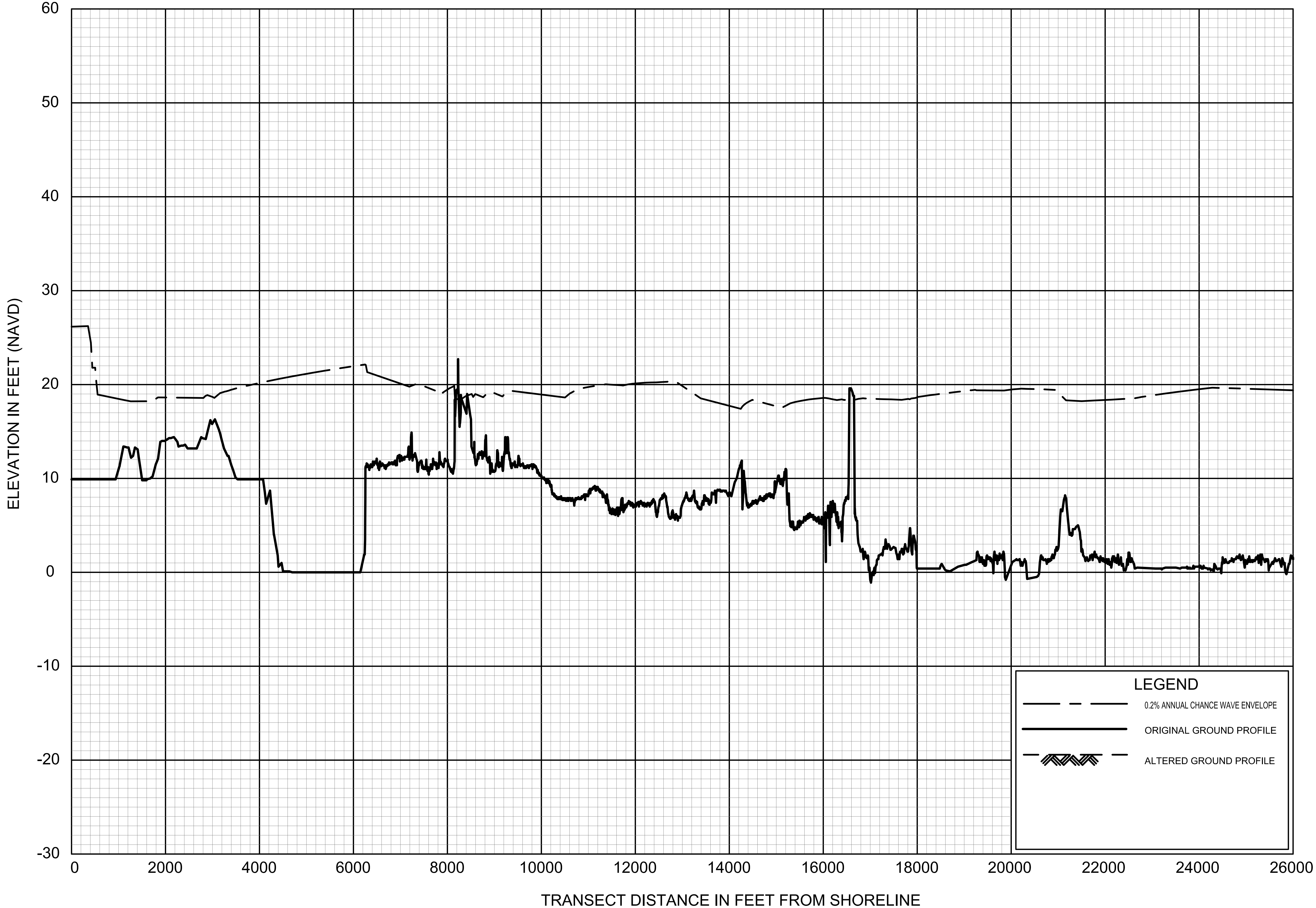
TRANSECT 36

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

50P



0.2% ANNUAL CHANCE WAVE ENVELOPE

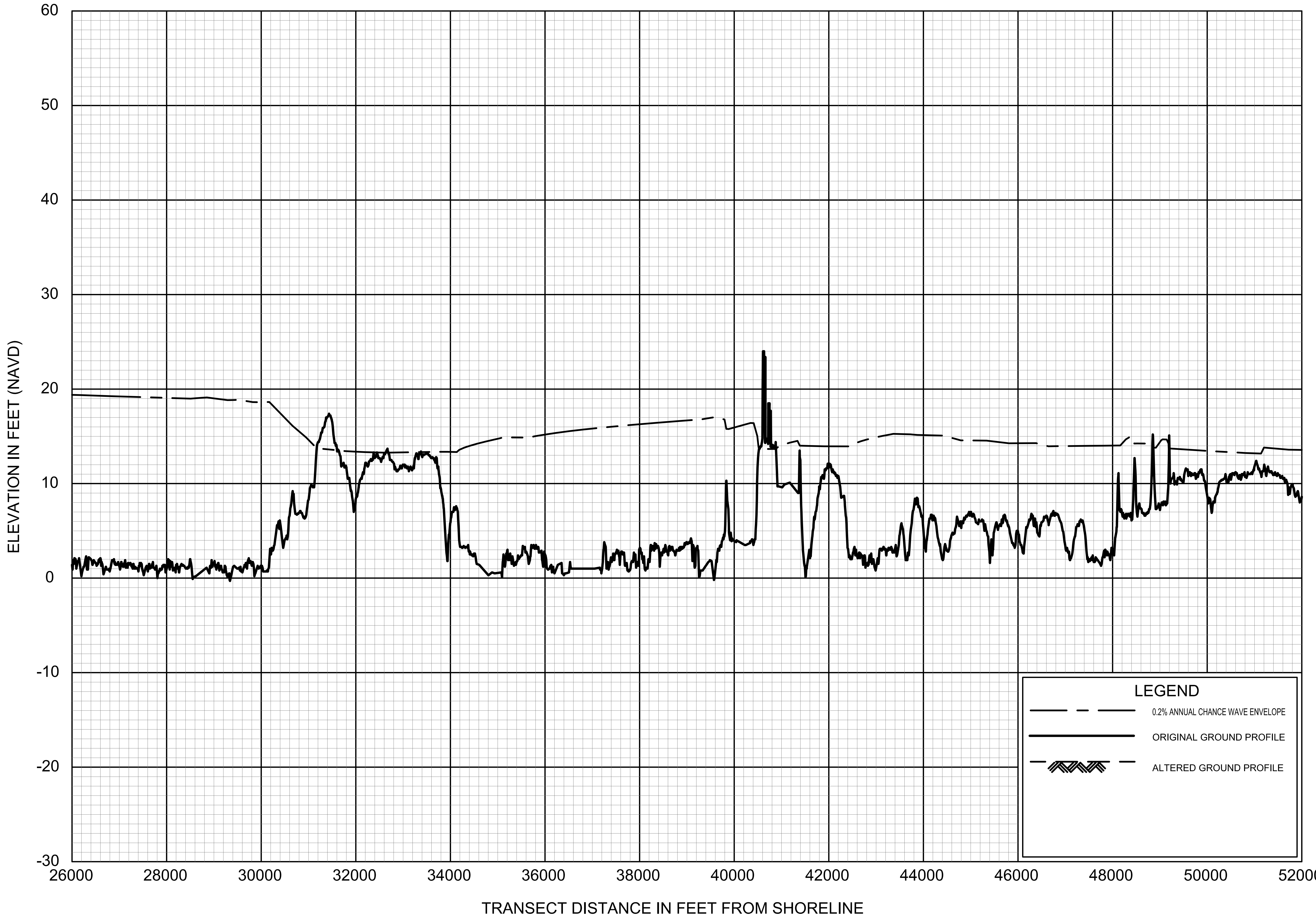
TRANSECT 37

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

51P



0.2% ANNUAL CHANCE WAVE ENVELOPE

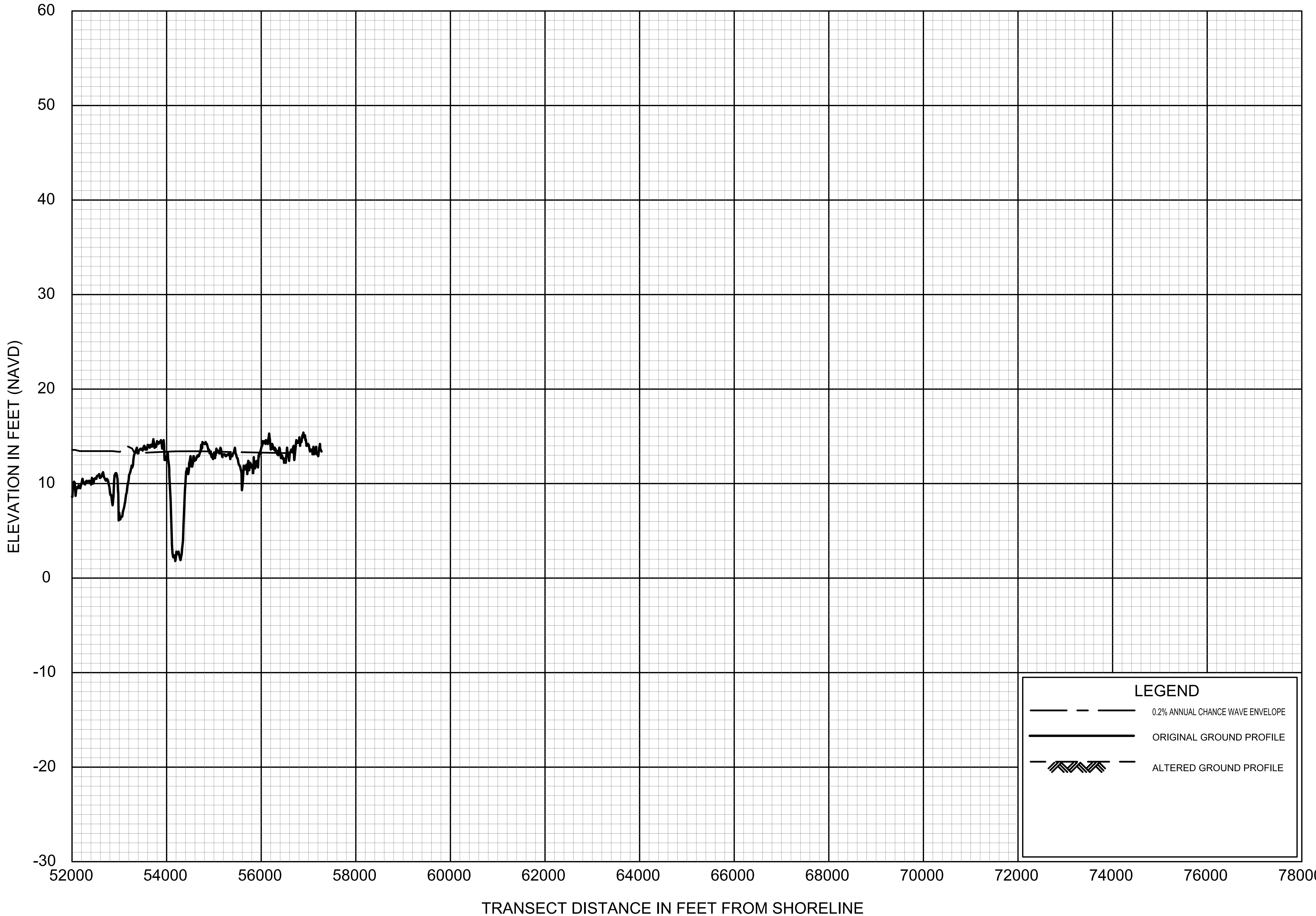
TRANSECT 37

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

52P



0.2% ANNUAL CHANCE WAVE ENVELOPE

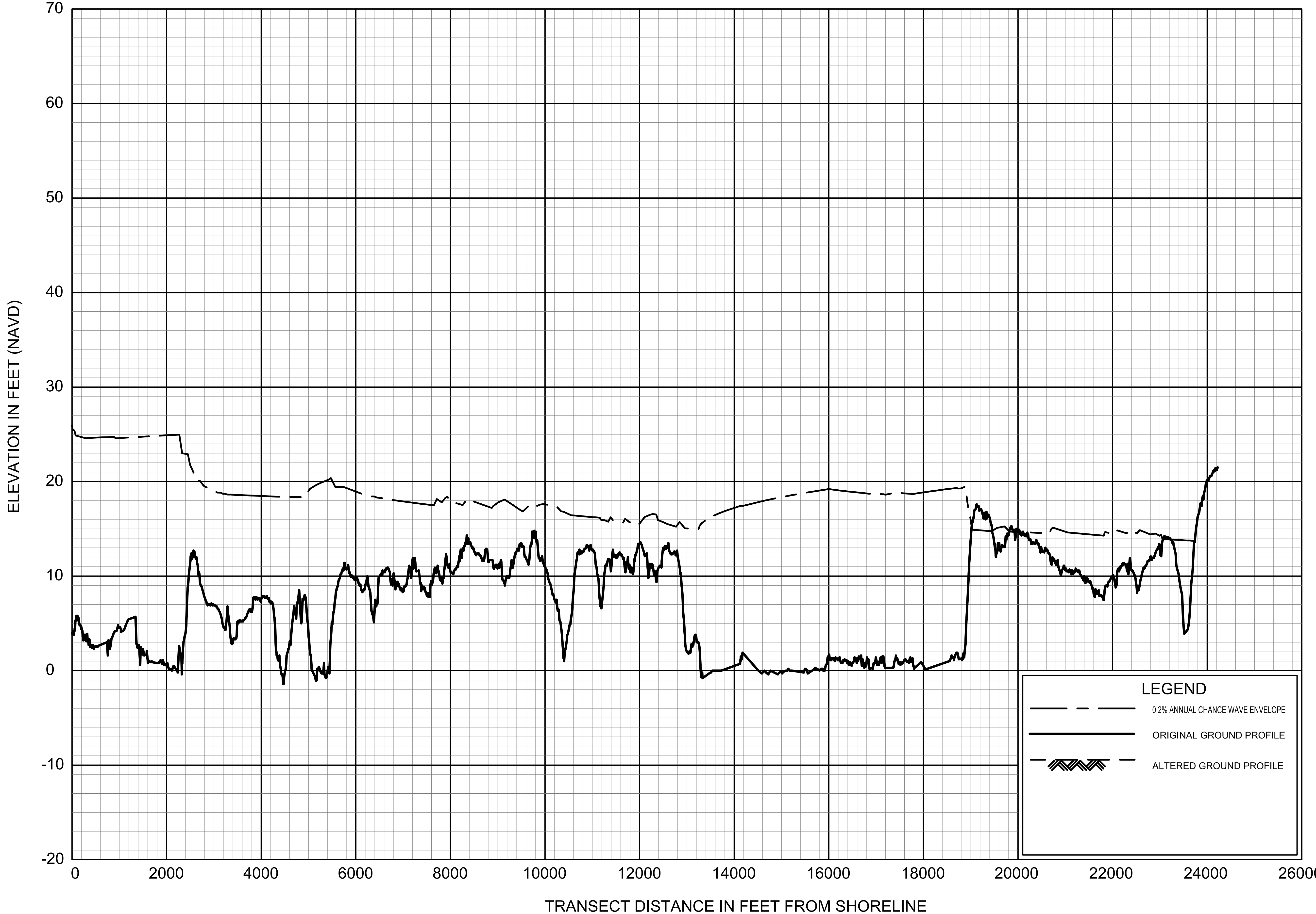
TRANSECT 37

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

53P



0.2% ANNUAL CHANCE WAVE ENVELOPE

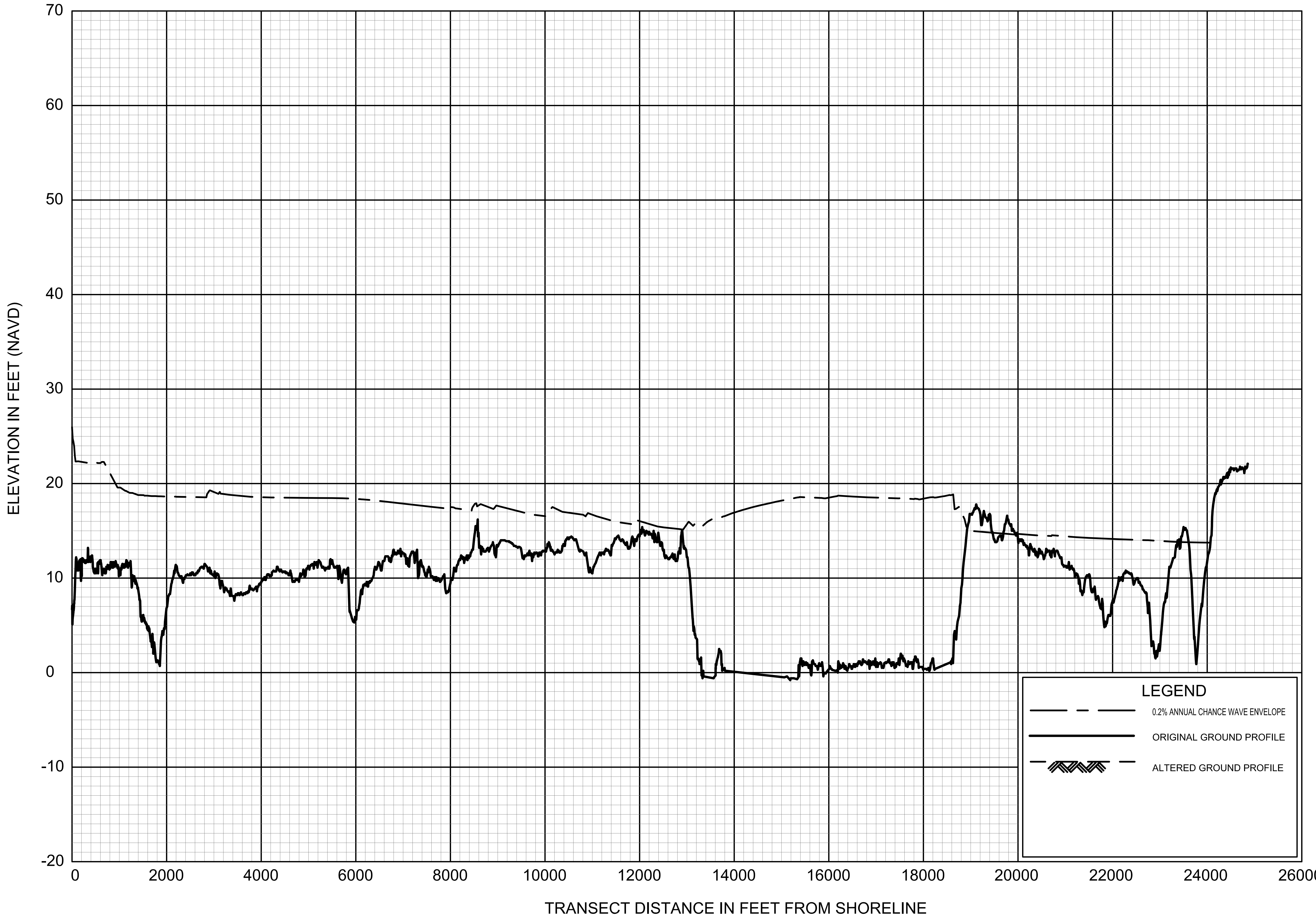
TRANSECT 38

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

54P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 39

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

0.2% ANNUAL CHANCE WAVE ENVELOPE

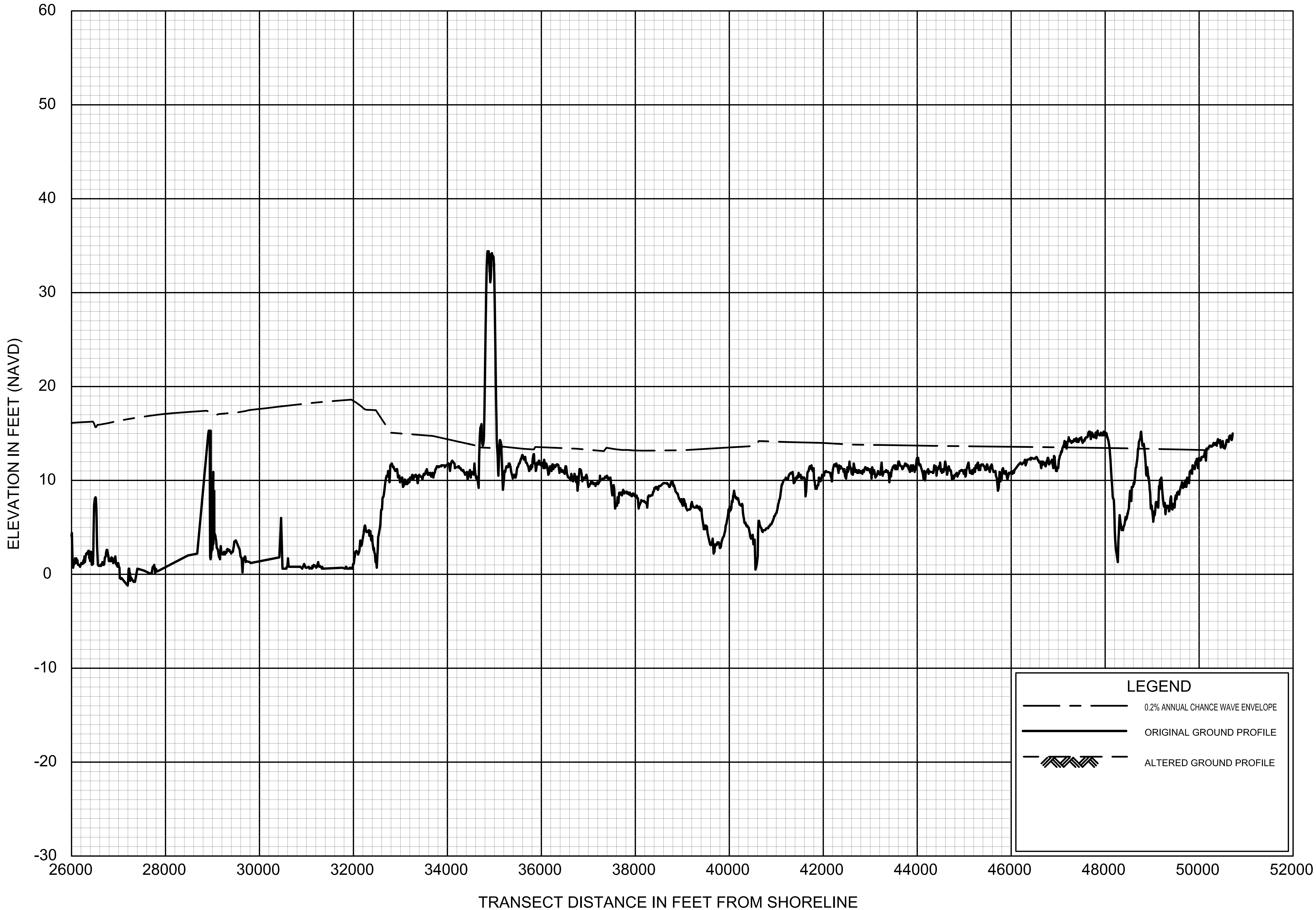
TRANSECT 40

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

56P



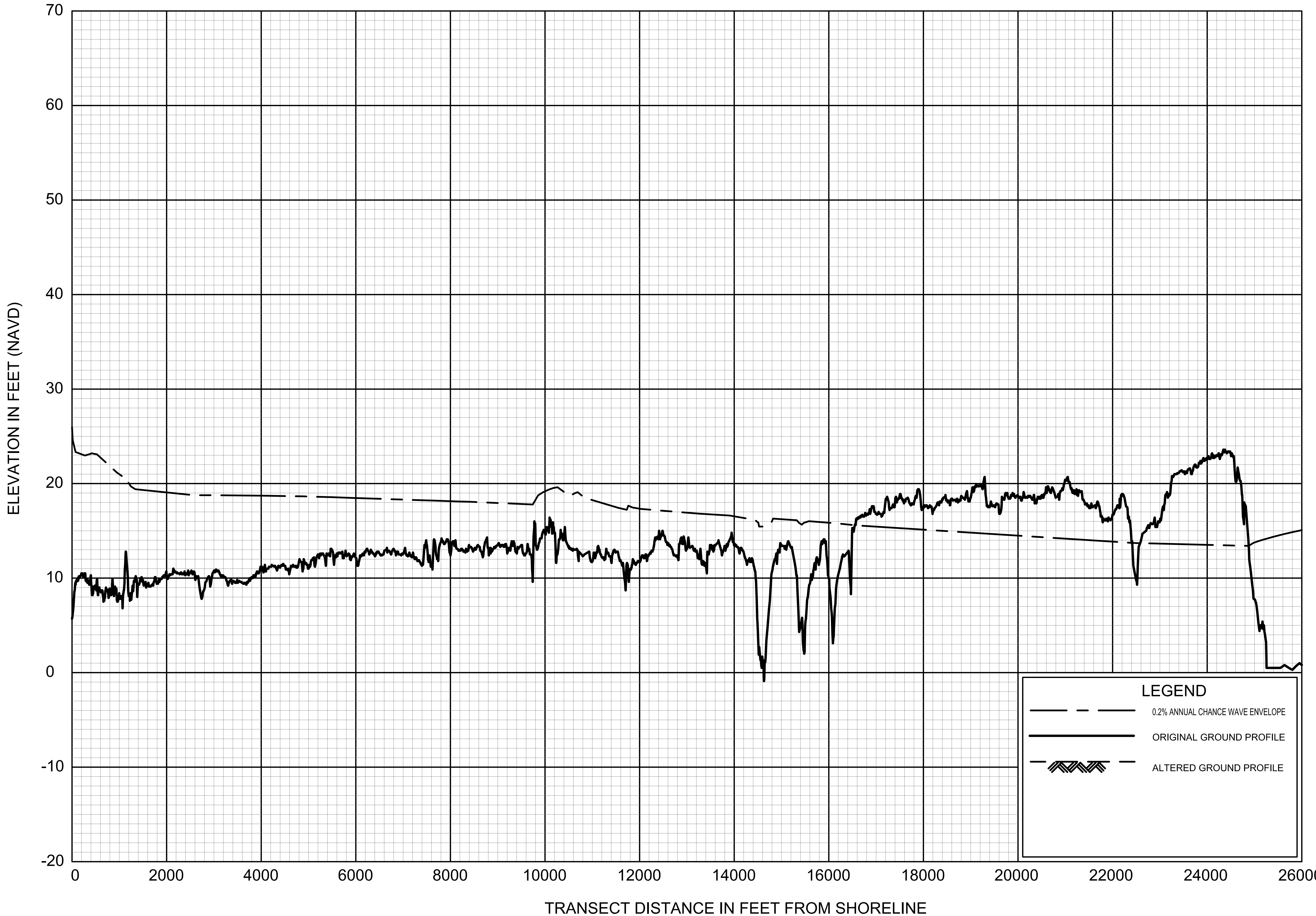
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 40

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



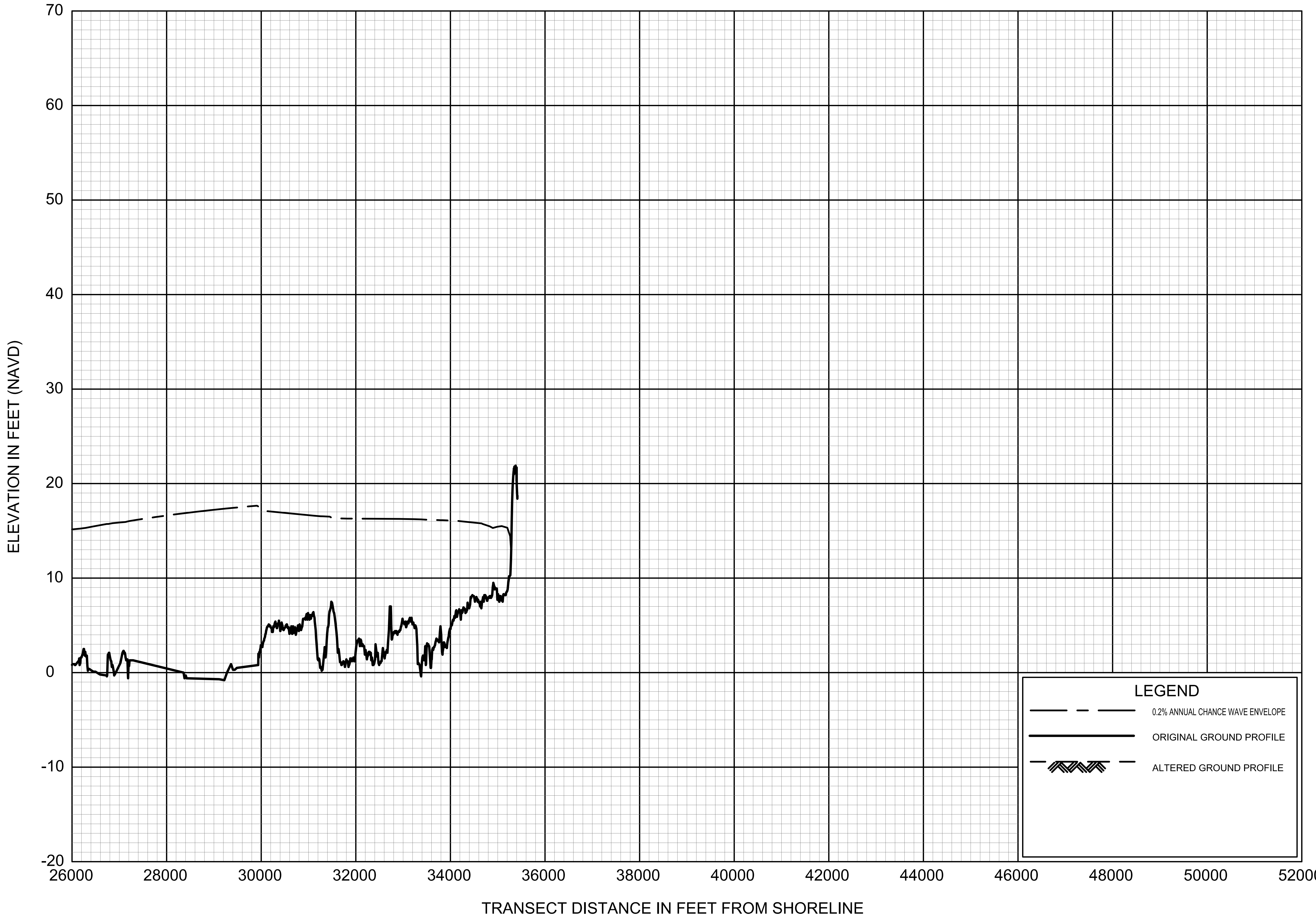
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 41

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



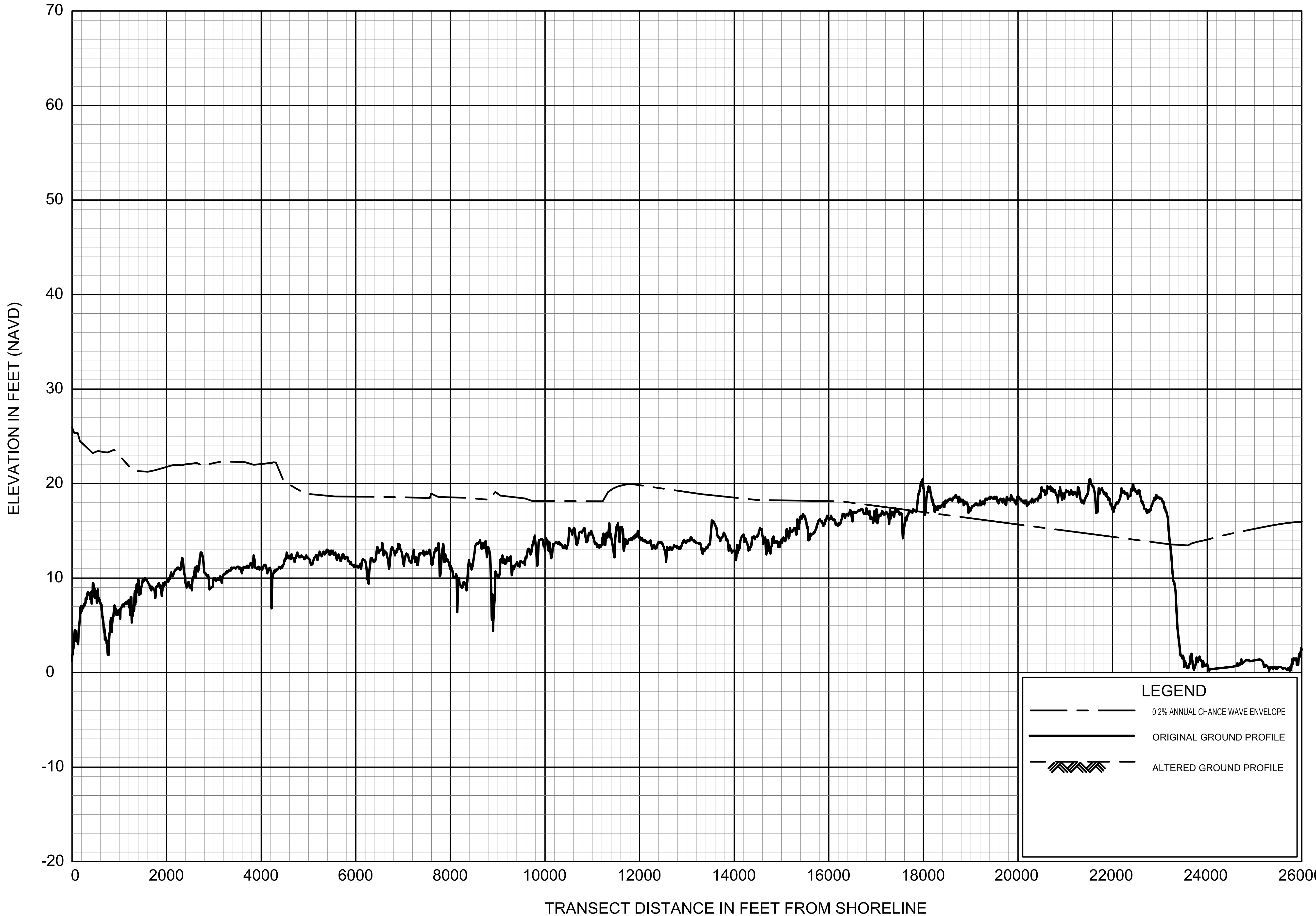
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 41

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

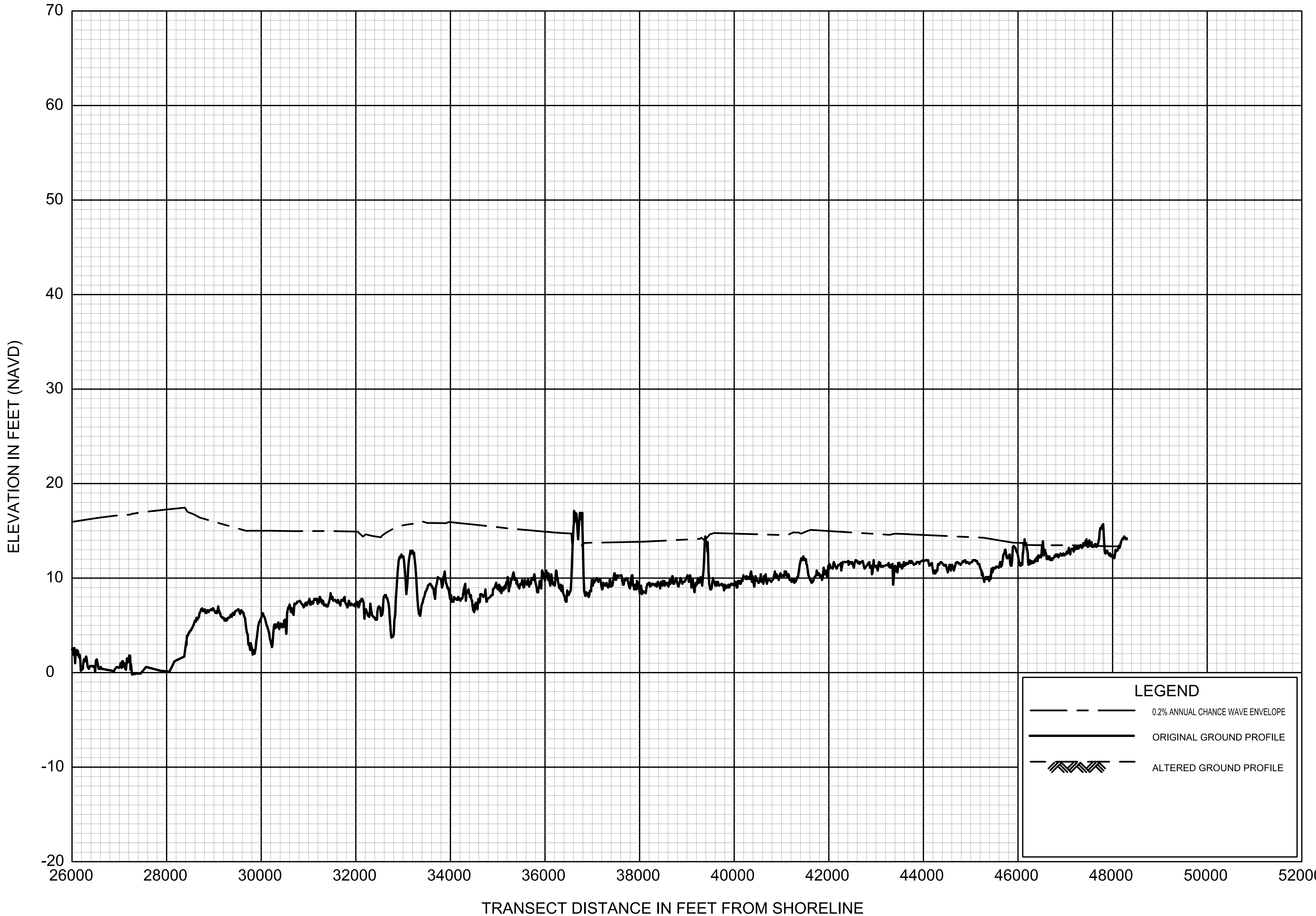
TRANSECT 42

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

60P



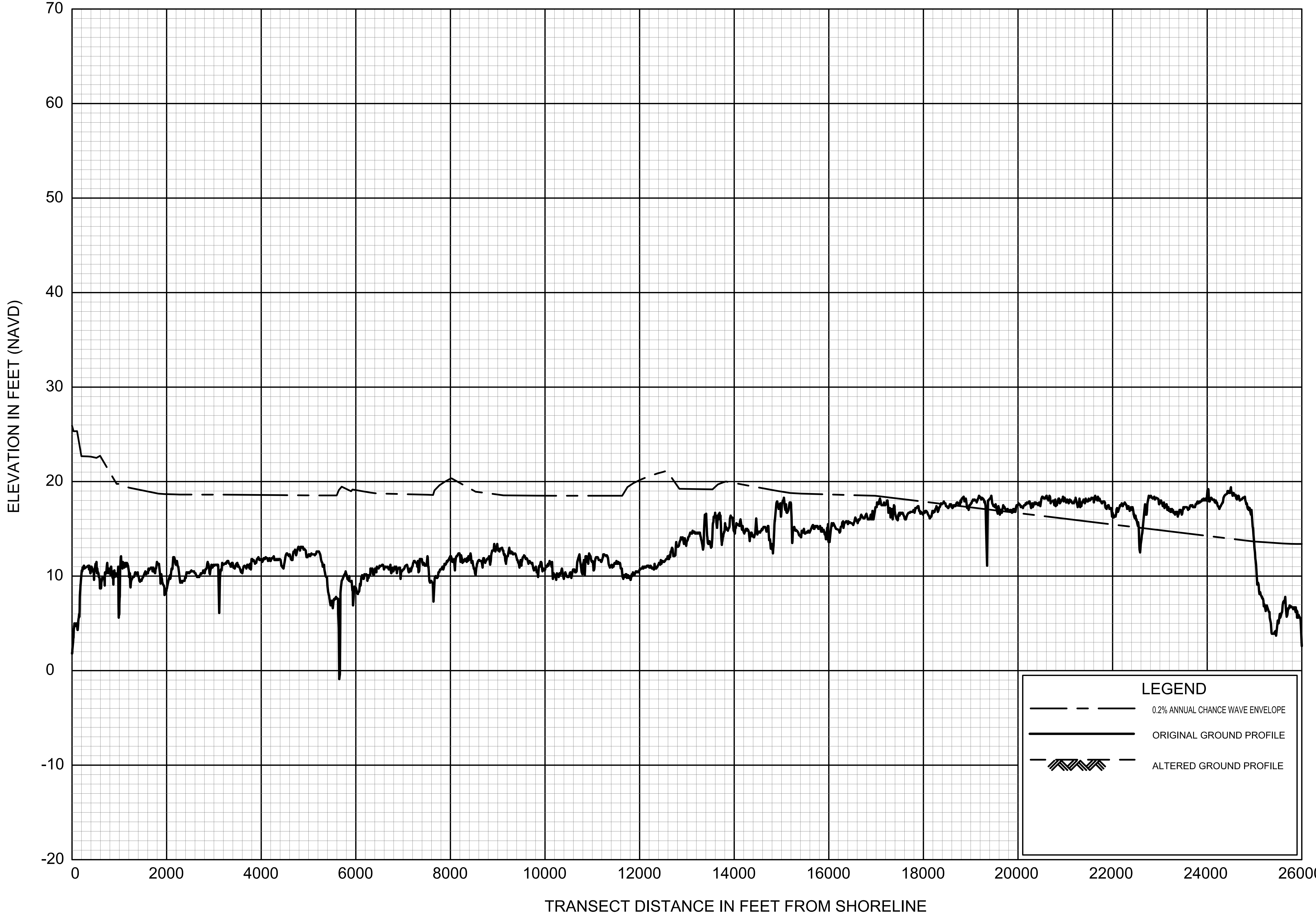
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 42

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



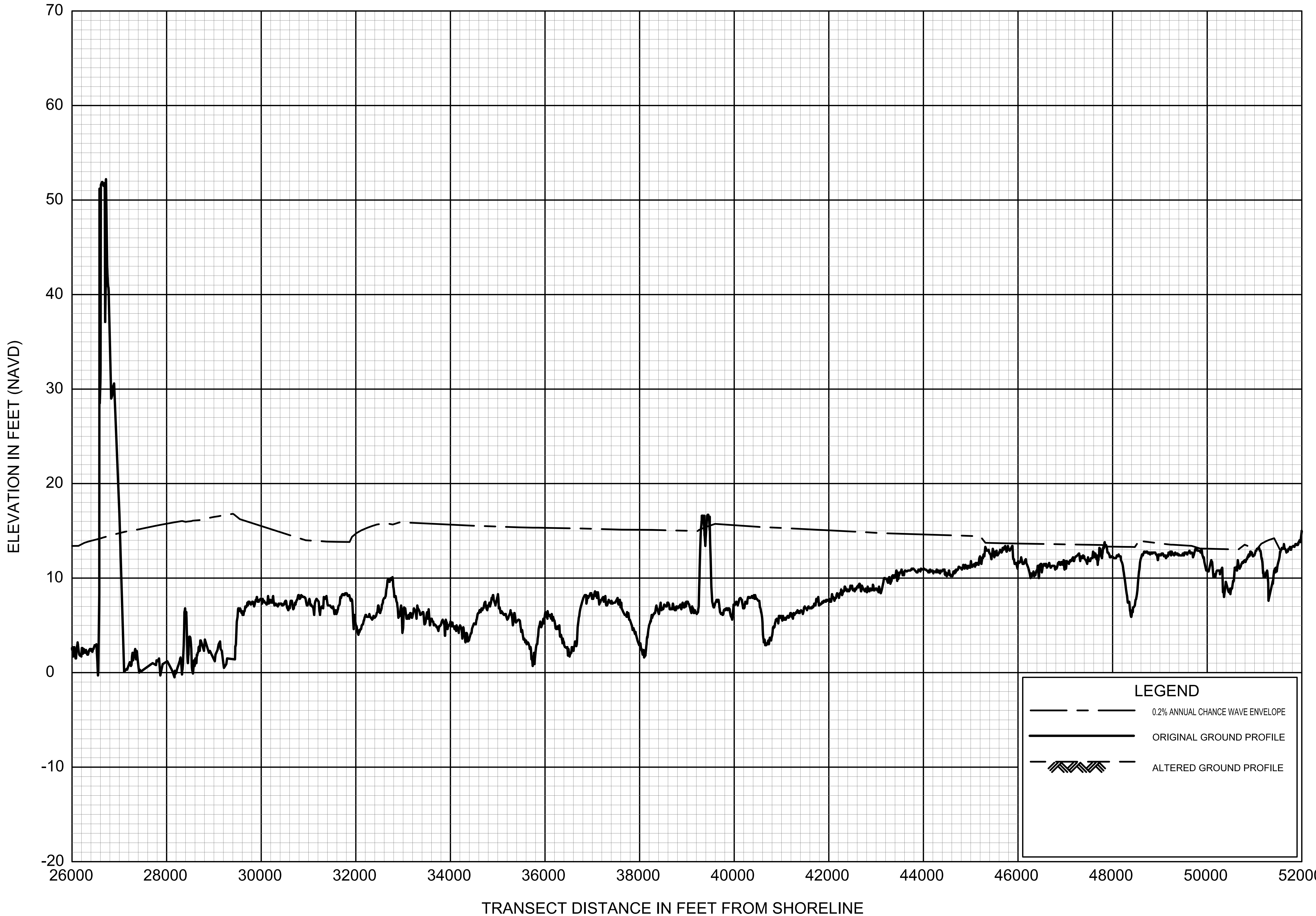
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 43

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



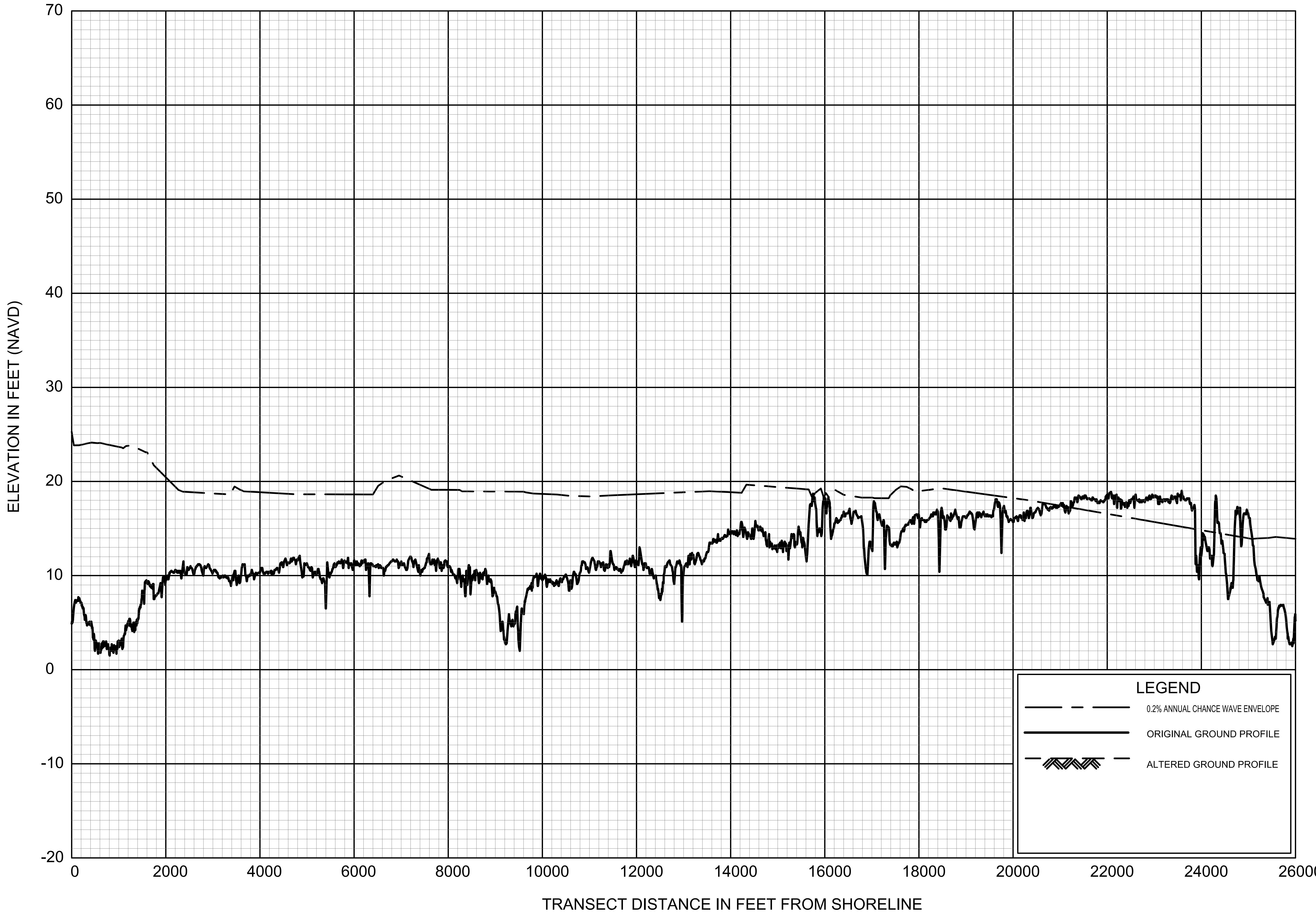
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 43

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

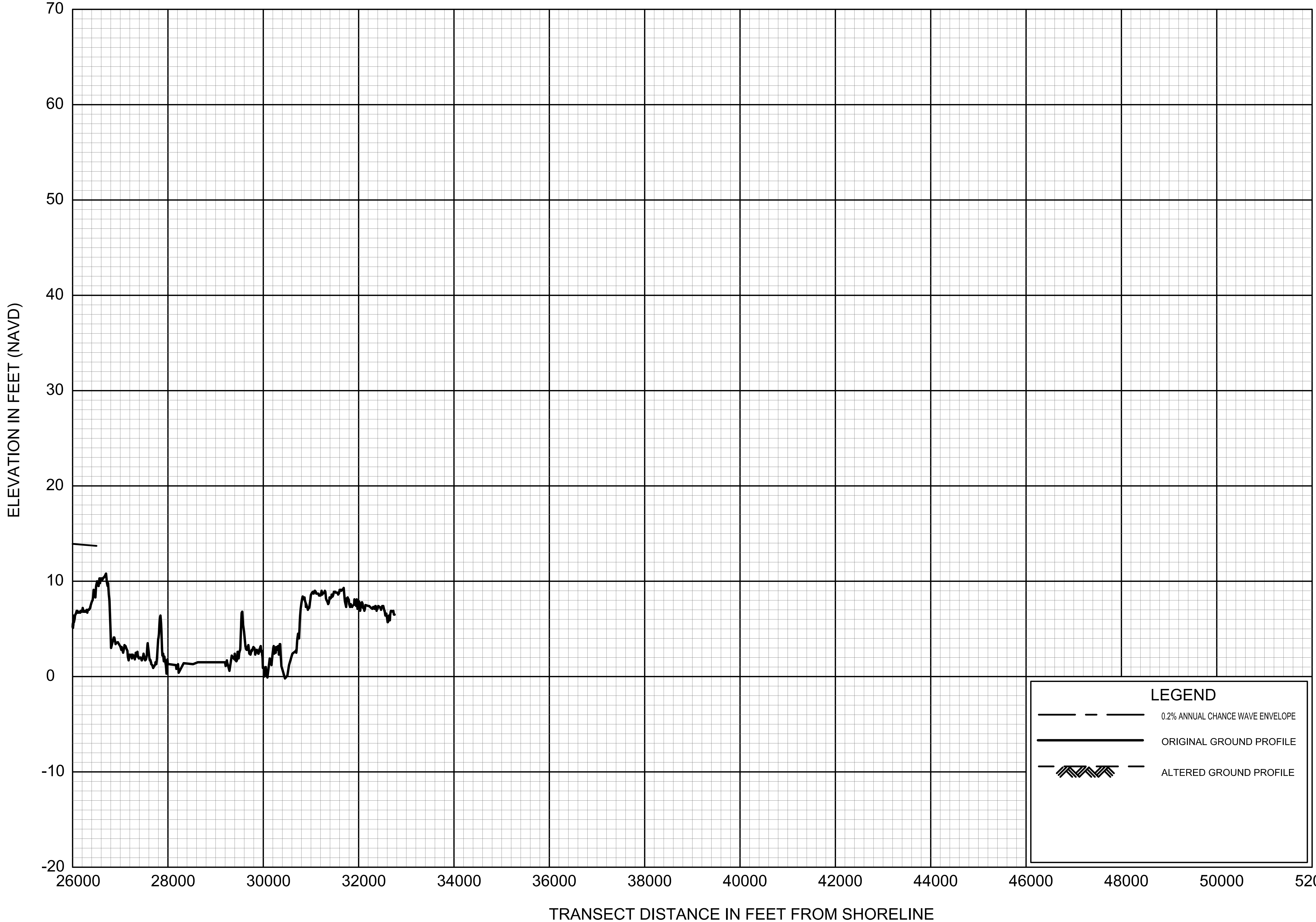
TRANSECT 44

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

64P



0.2% ANNUAL CHANCE WAVE ENVELOPE

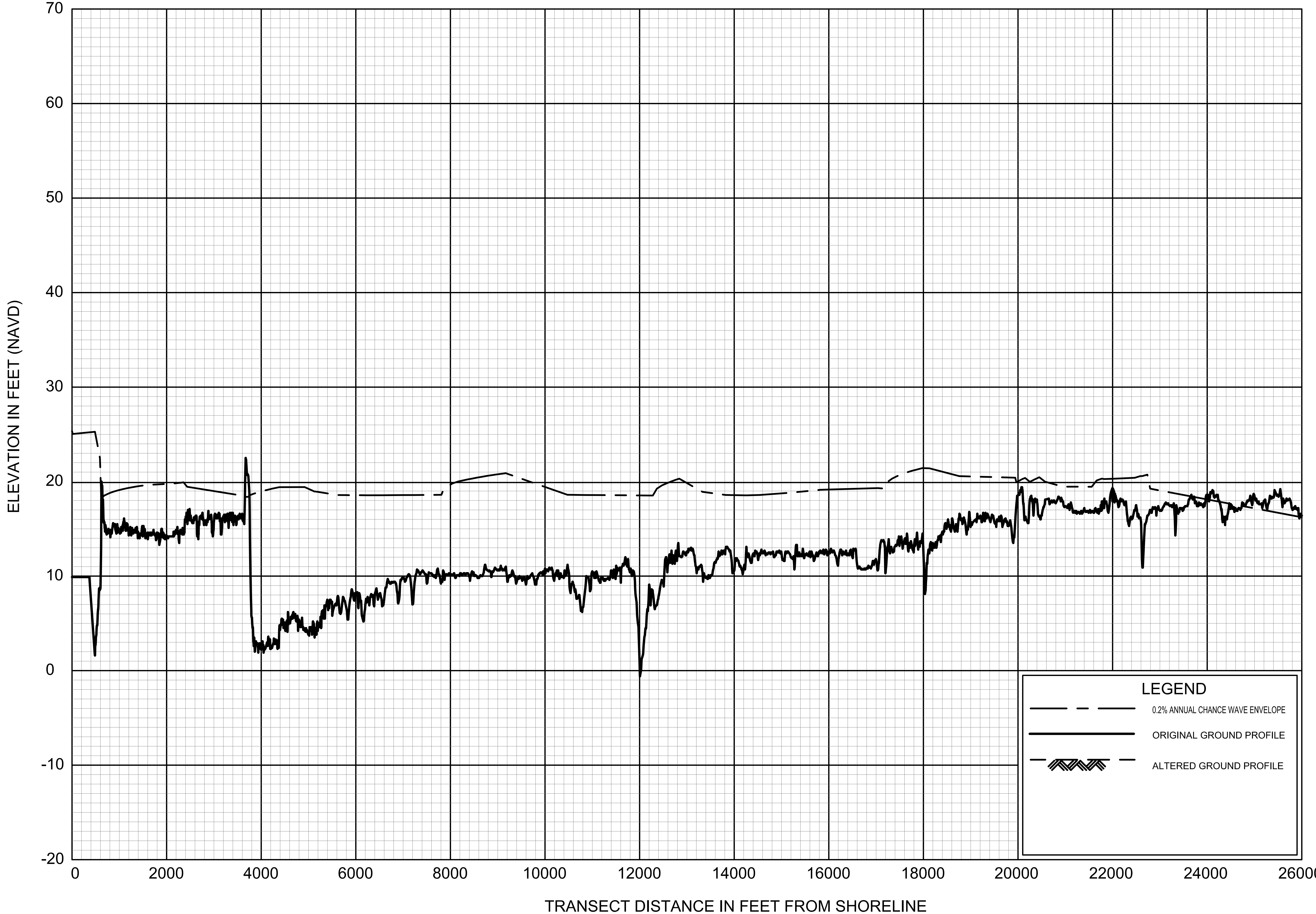
TRANSECT 44

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

65P



0.2% ANNUAL CHANCE WAVE ENVELOPE

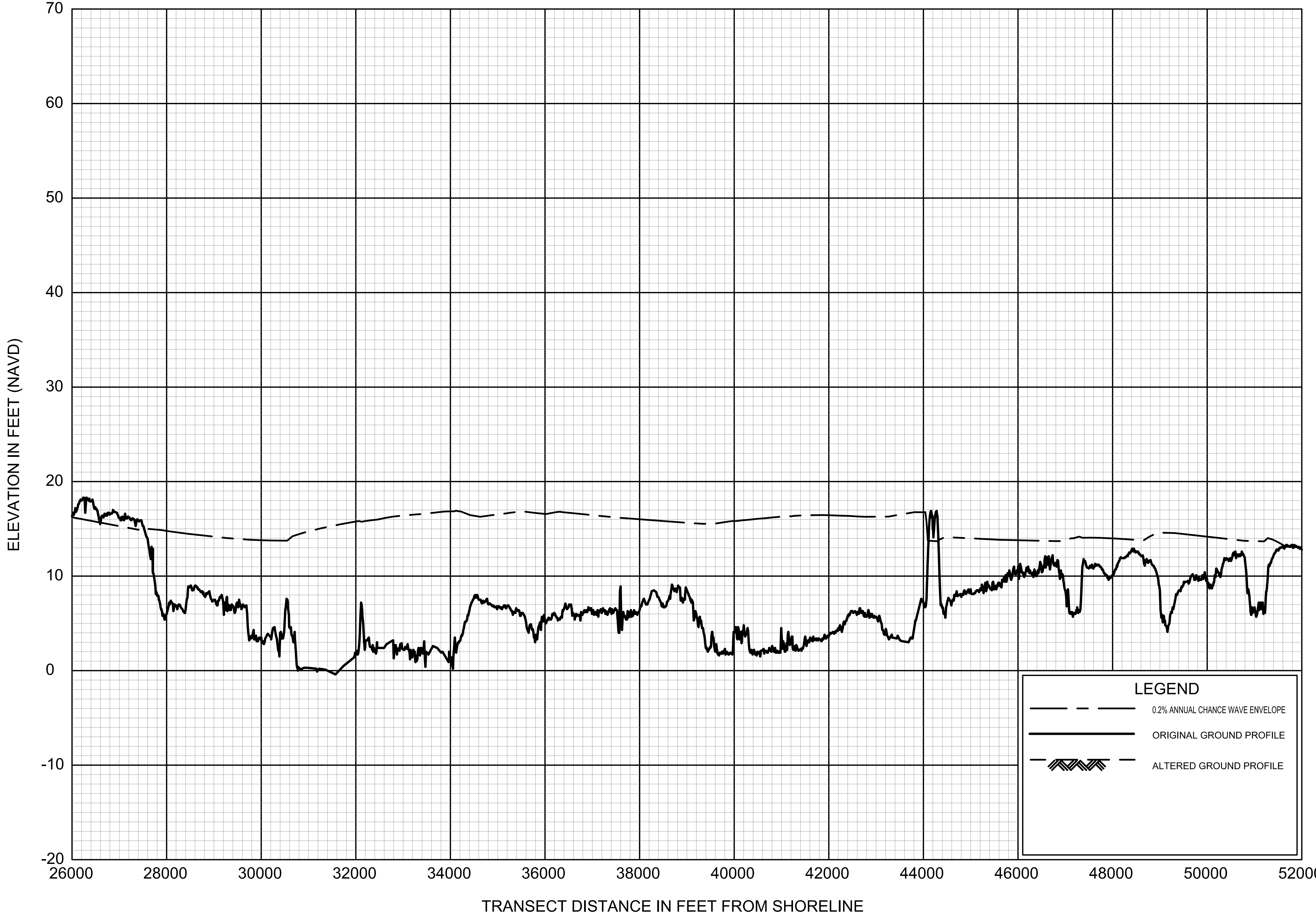
TRANSECT 45

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

66P



0.2% ANNUAL CHANCE WAVE ENVELOPE

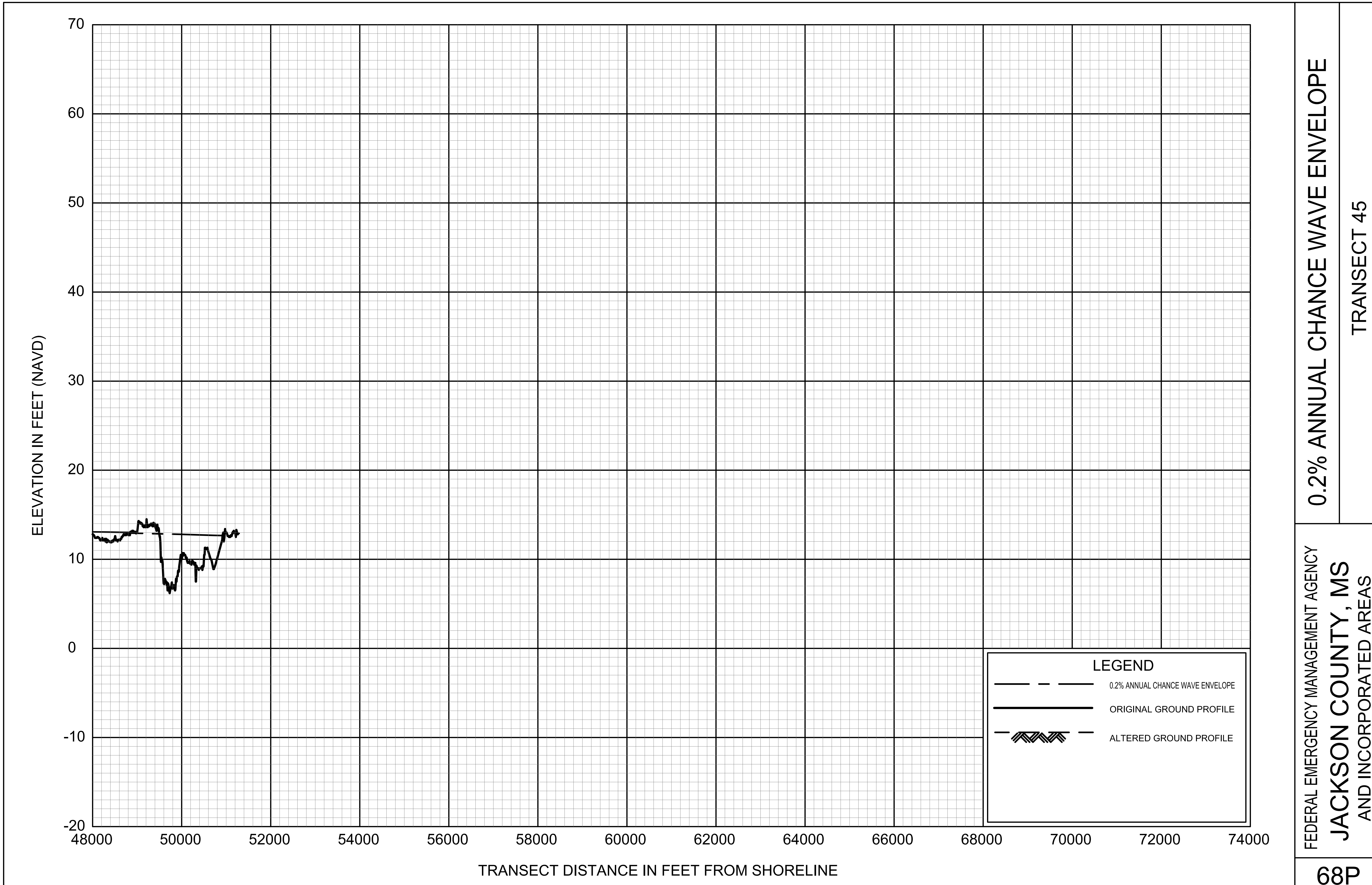
TRANSECT 45

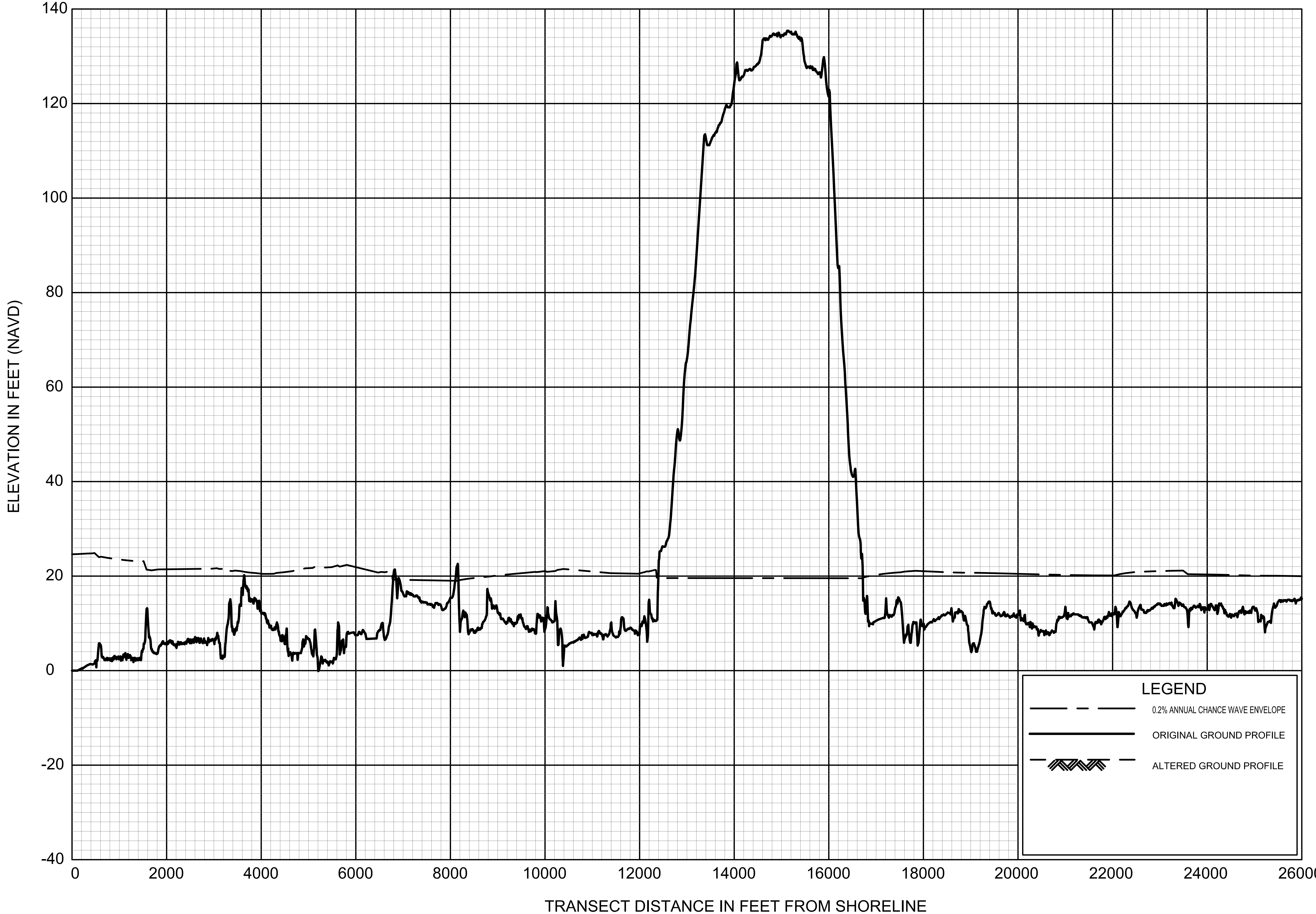
FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

67P


70
60
50
40
30
20
10
0
-10
-20
ELEVATION IN FEET (NAVD)
48000
50000
52000
54000
56000
58000
60000
62000
64000
66000
68000
70000
72000
74000
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 45
FEDERAL EMERGENCY MANAGEMENT AGENCY
JACKSON COUNTY, MS
AND INCORPORATED AREAS
68P



0.2% ANNUAL CHANCE WAVE ENVELOPE

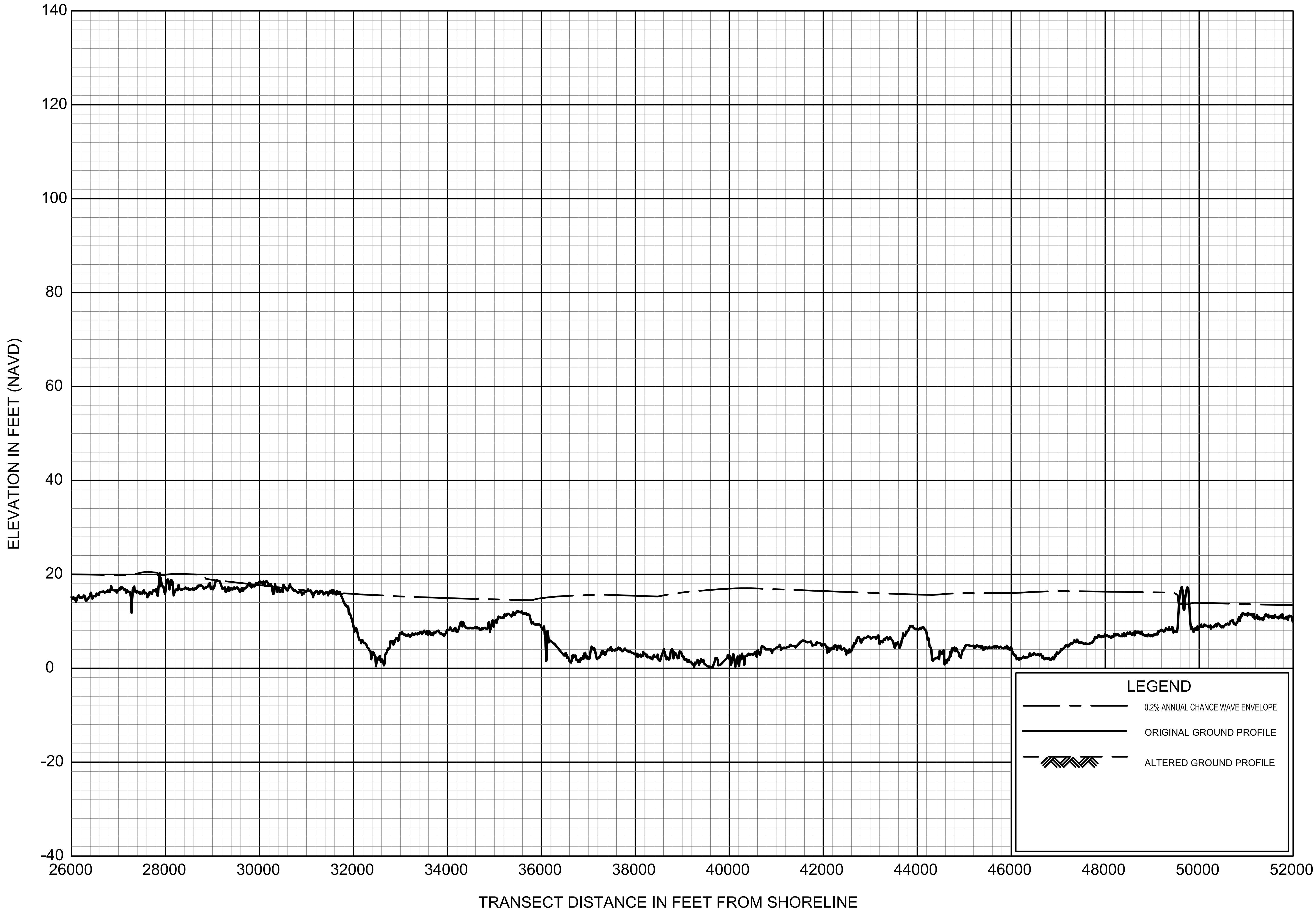
TRANSECT 46

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

69P



0.2% ANNUAL CHANCE WAVE ENVELOPE

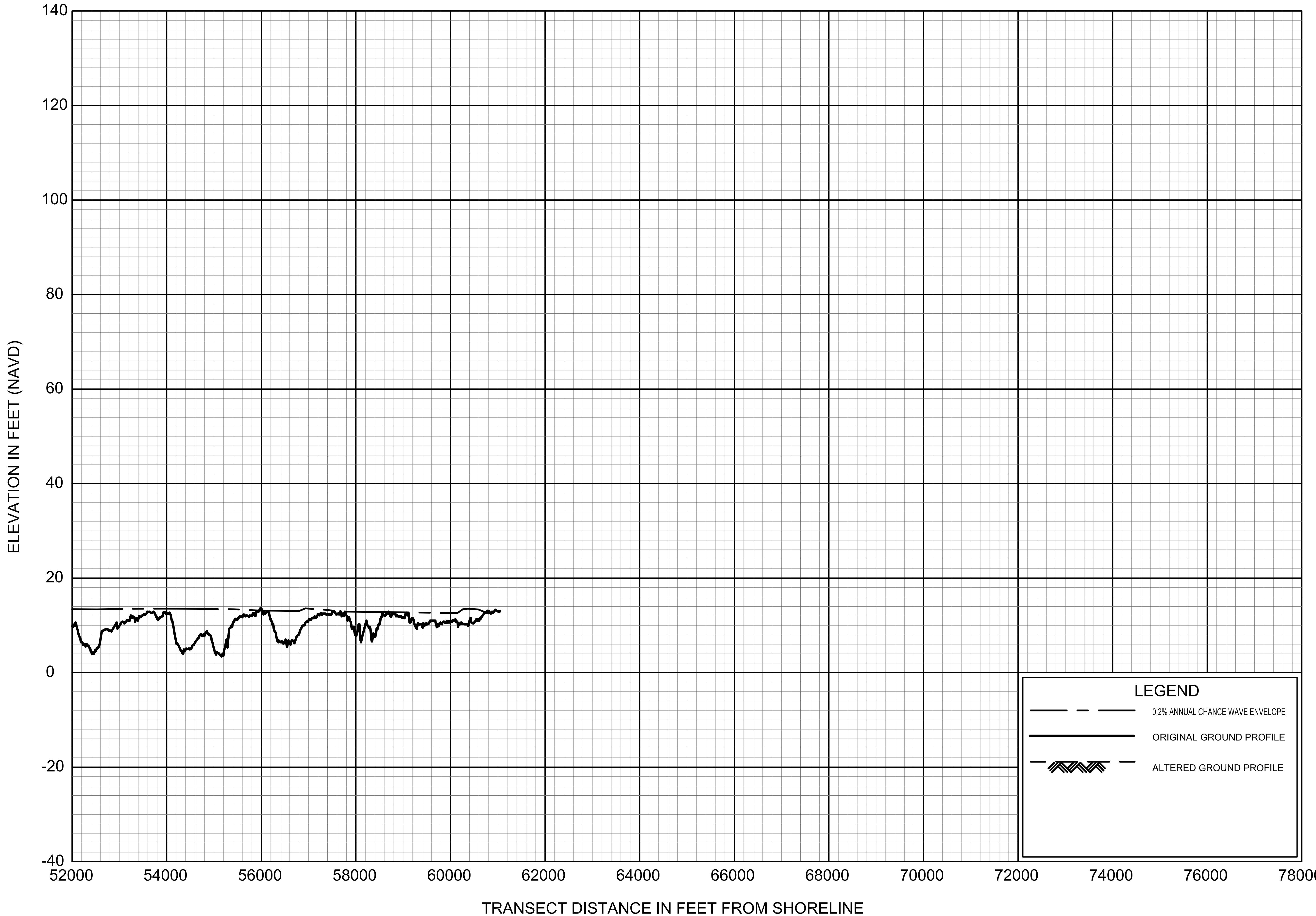
TRANSECT 46

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

70P



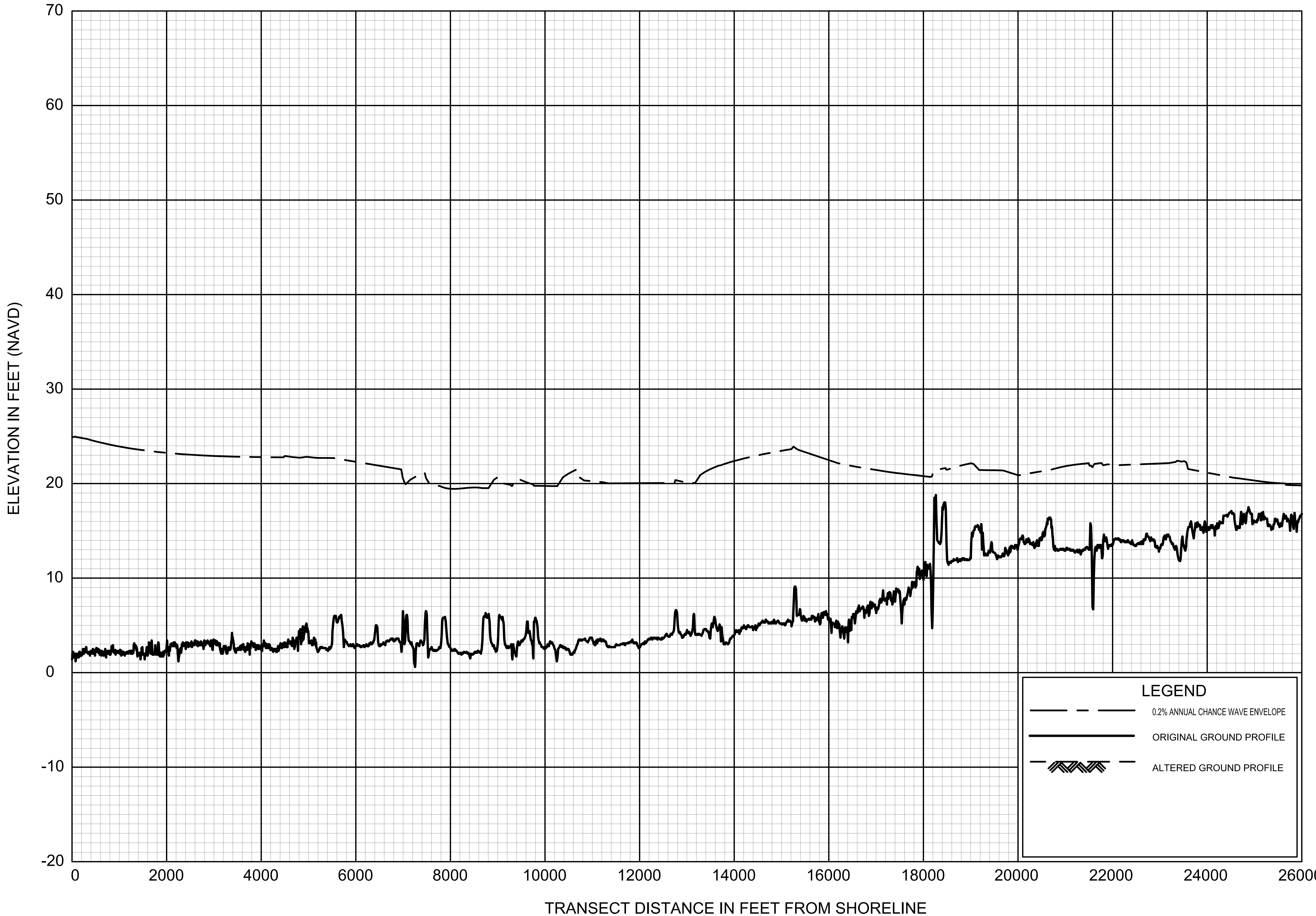
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 46

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



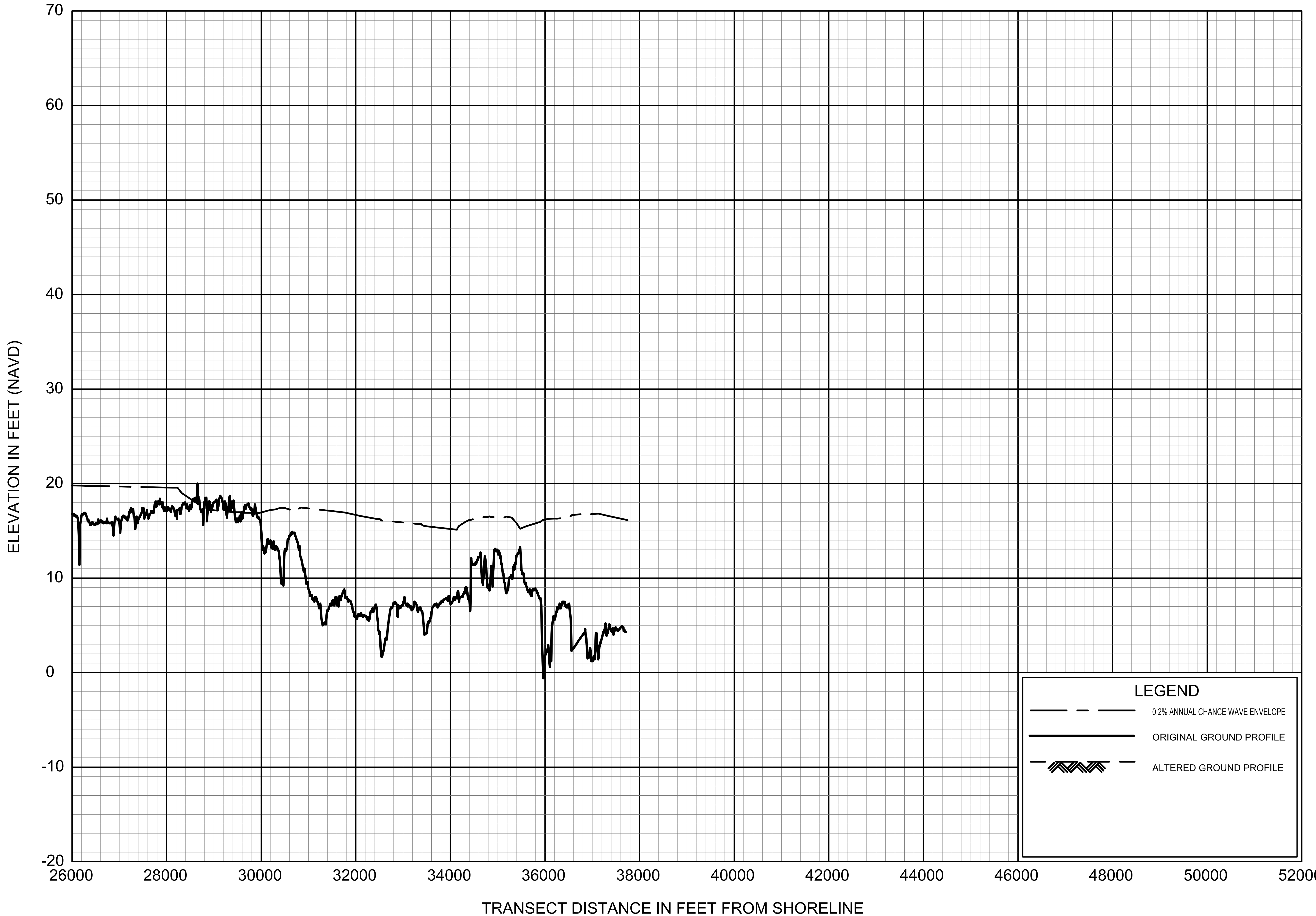
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 47

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



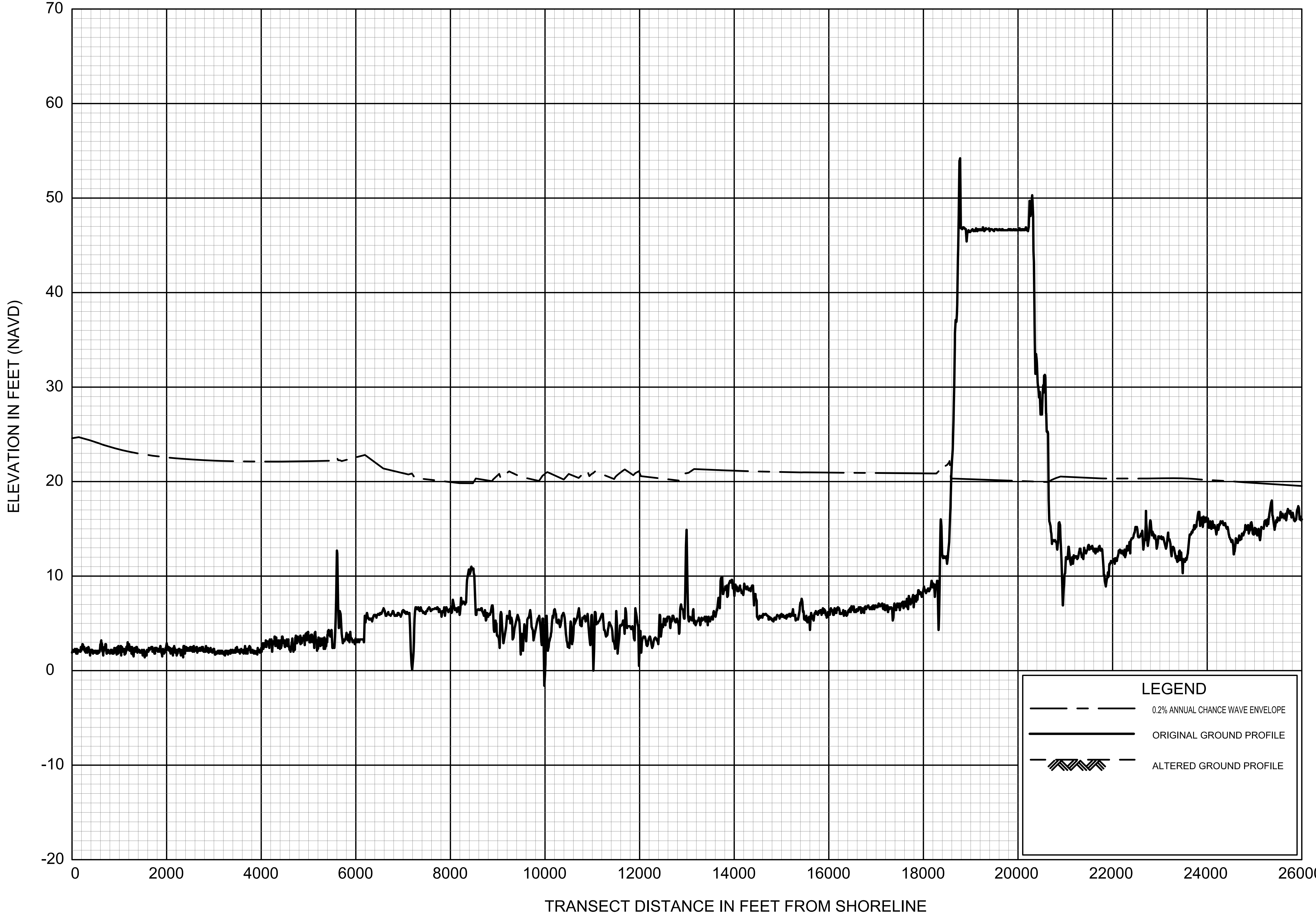
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 47

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

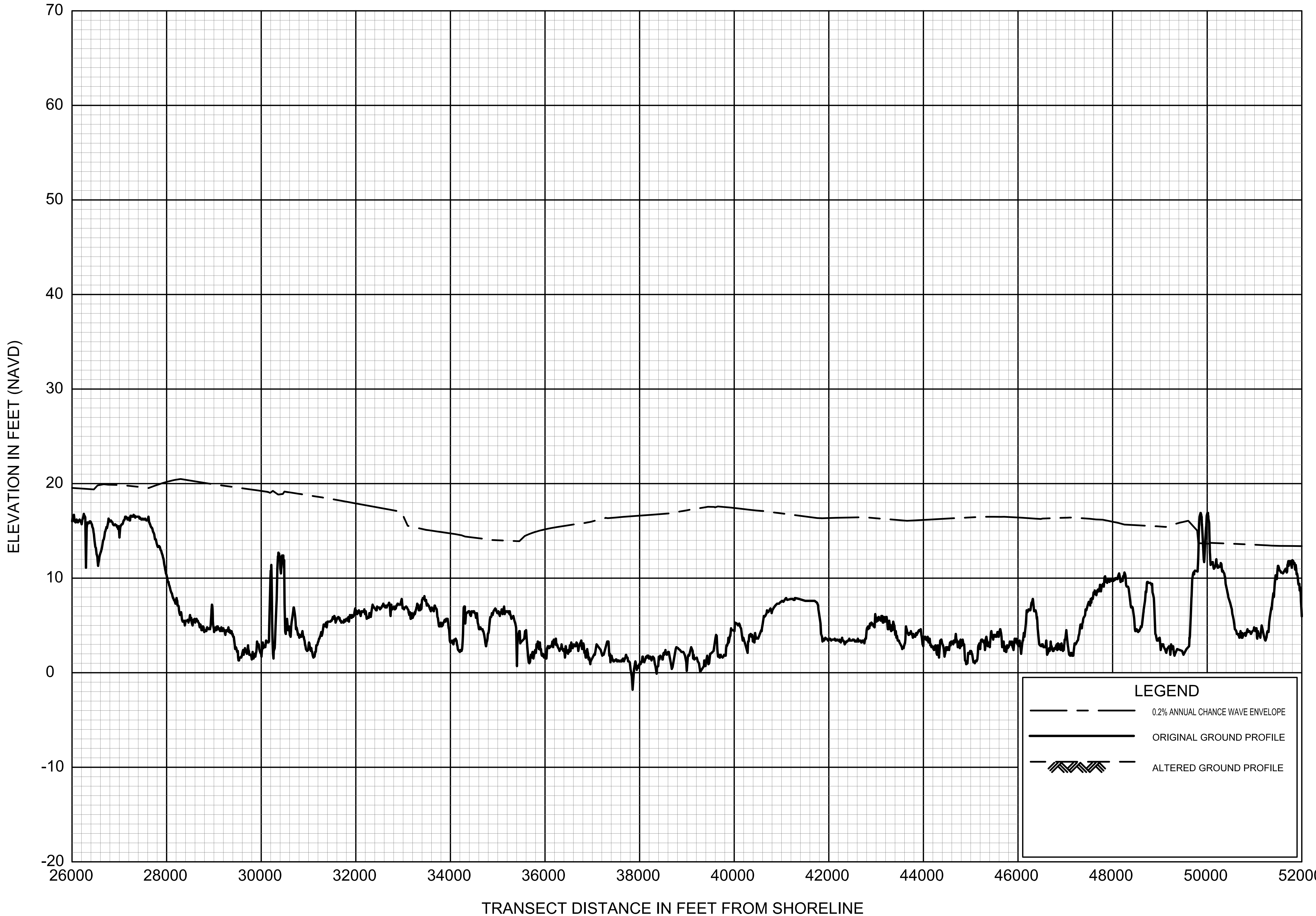
TRANSECT 48

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

74P



0.2% ANNUAL CHANCE WAVE ENVELOPE

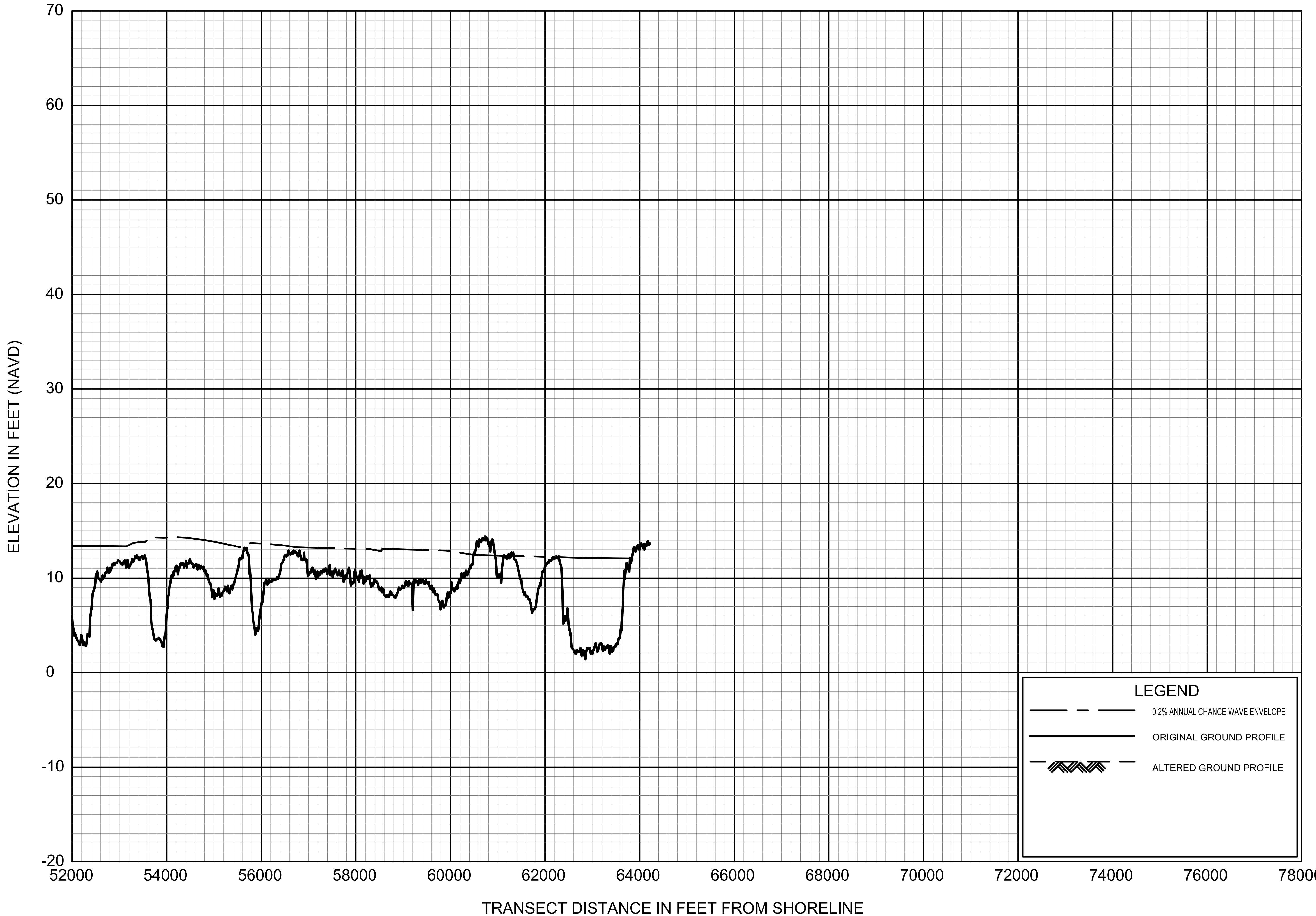
TRANSECT 48

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

75P



0.2% ANNUAL CHANCE WAVE ENVELOPE

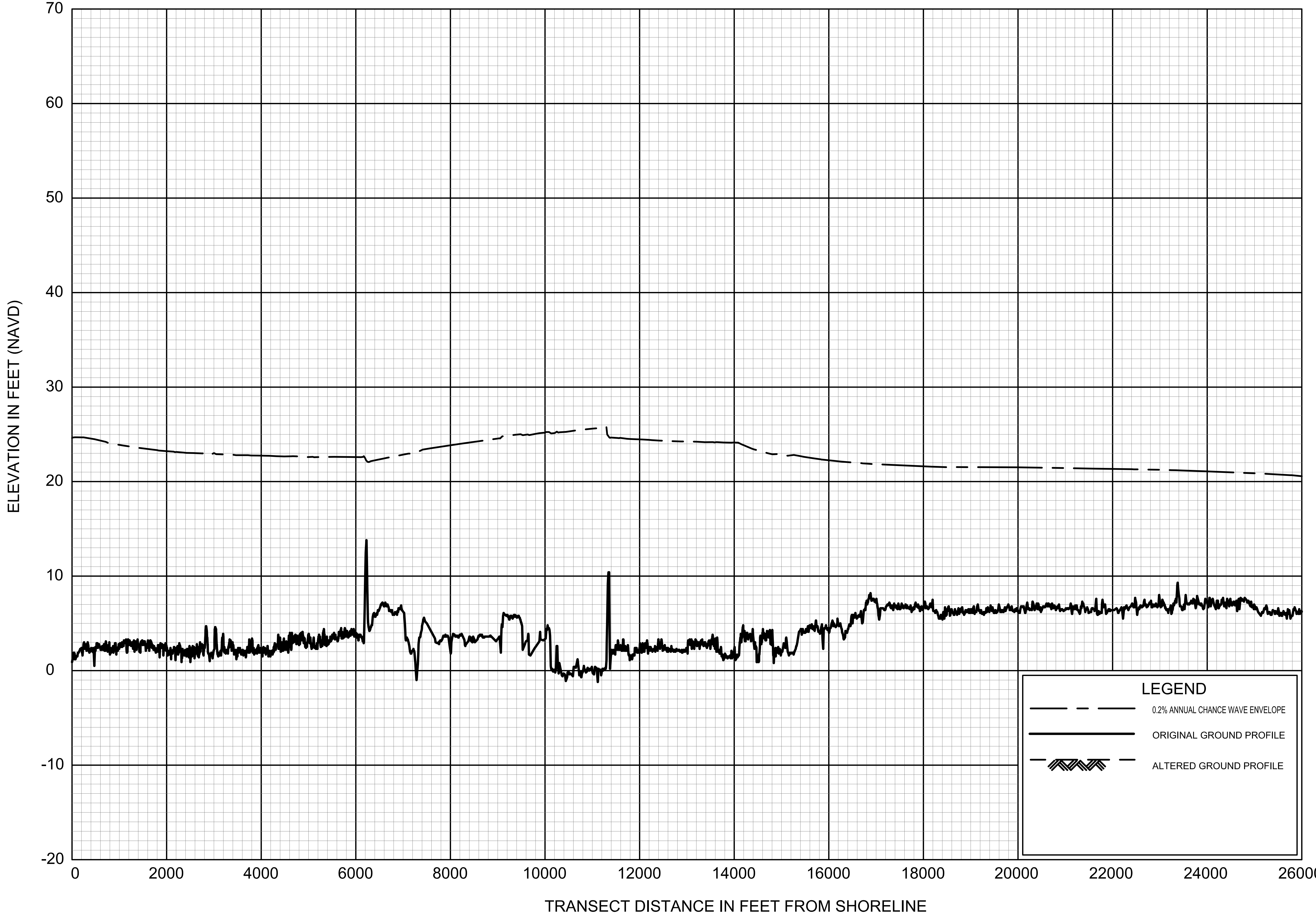
TRANSECT 48

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

76P



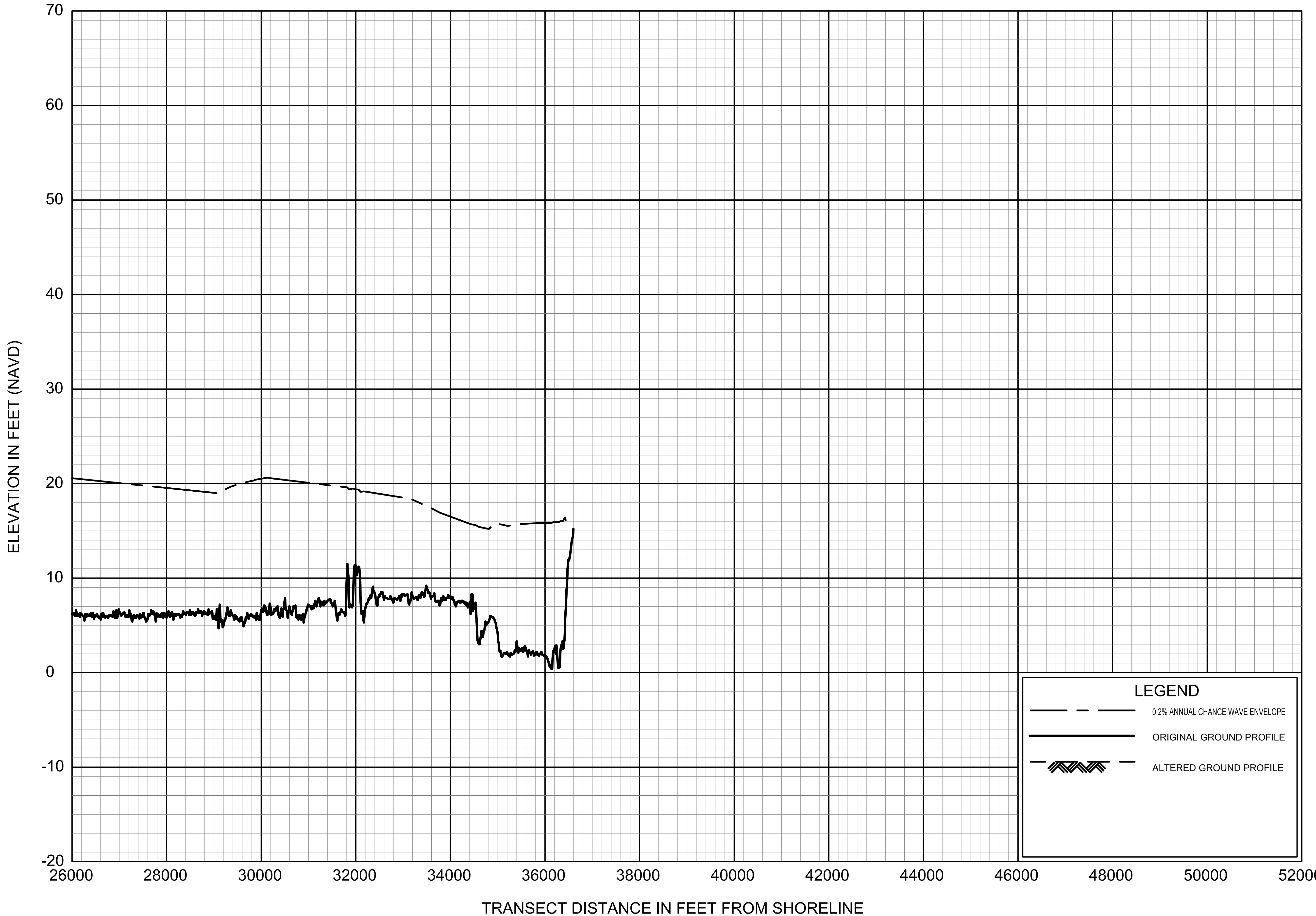
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 49

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

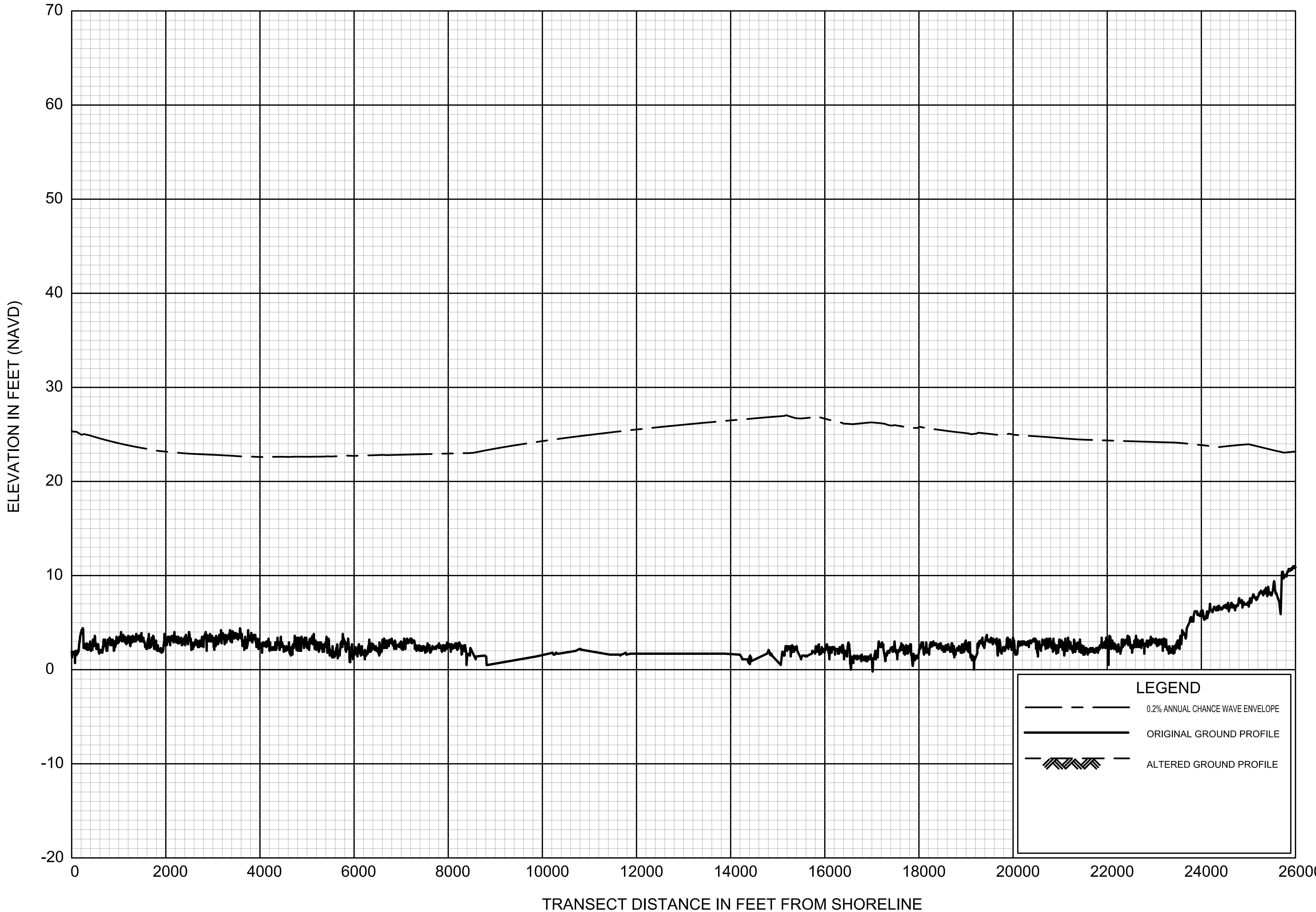
TRANSECT 49

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

78P



0.2% ANNUAL CHANCE WAVE ENVELOPE

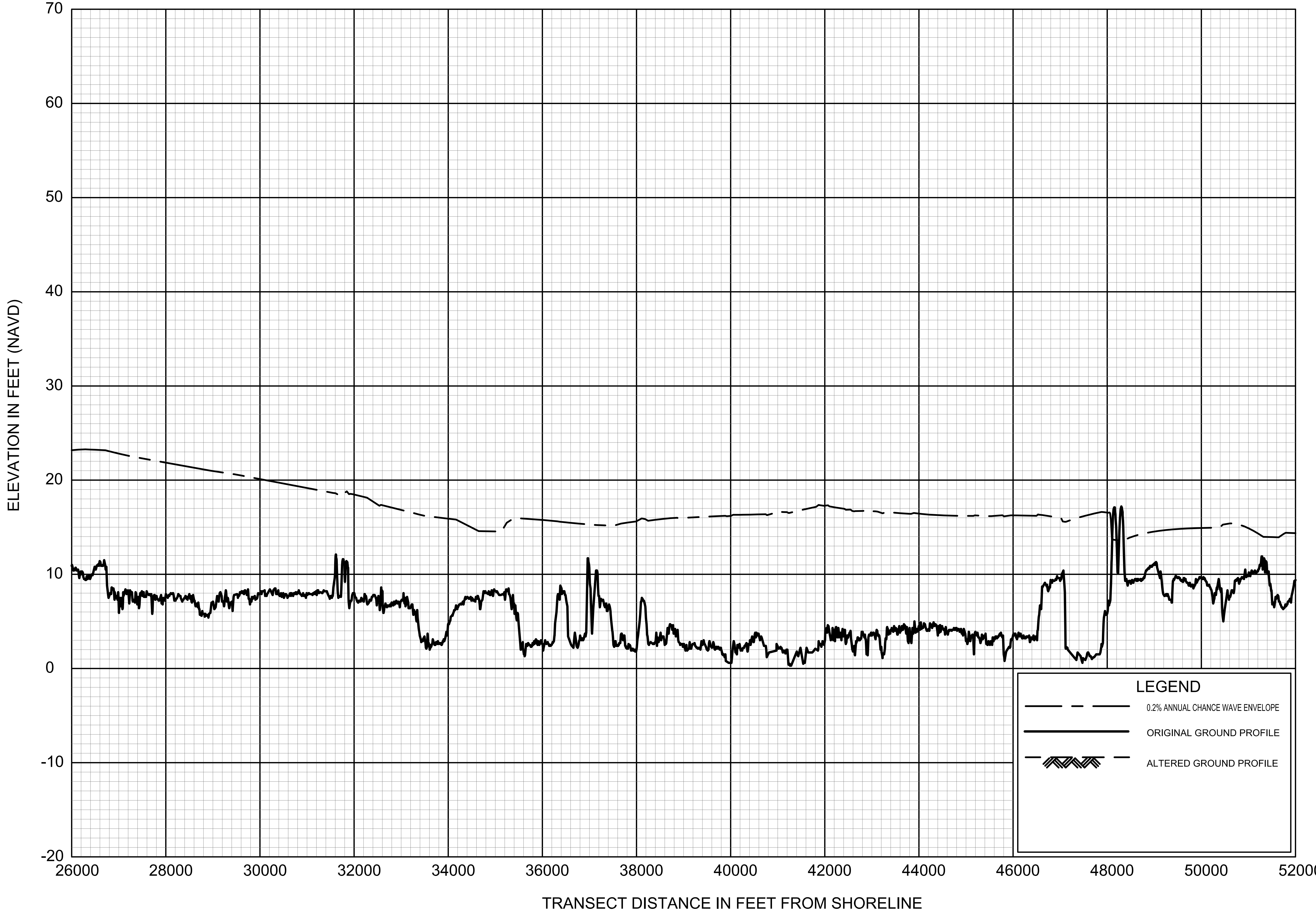
TRANSECT 50

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

79P



0.2% ANNUAL CHANCE WAVE ENVELOPE

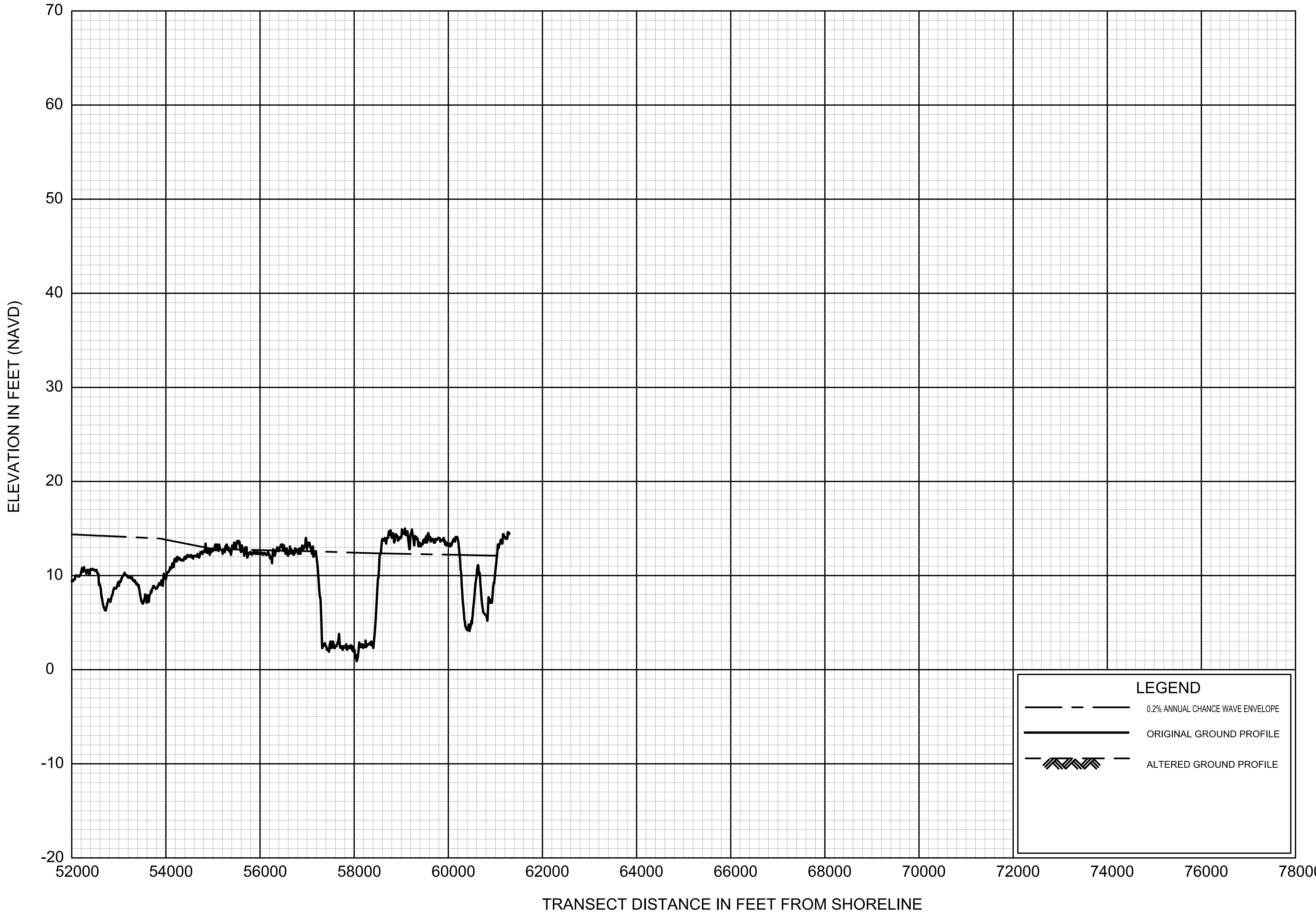
TRANSECT 50

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

80P



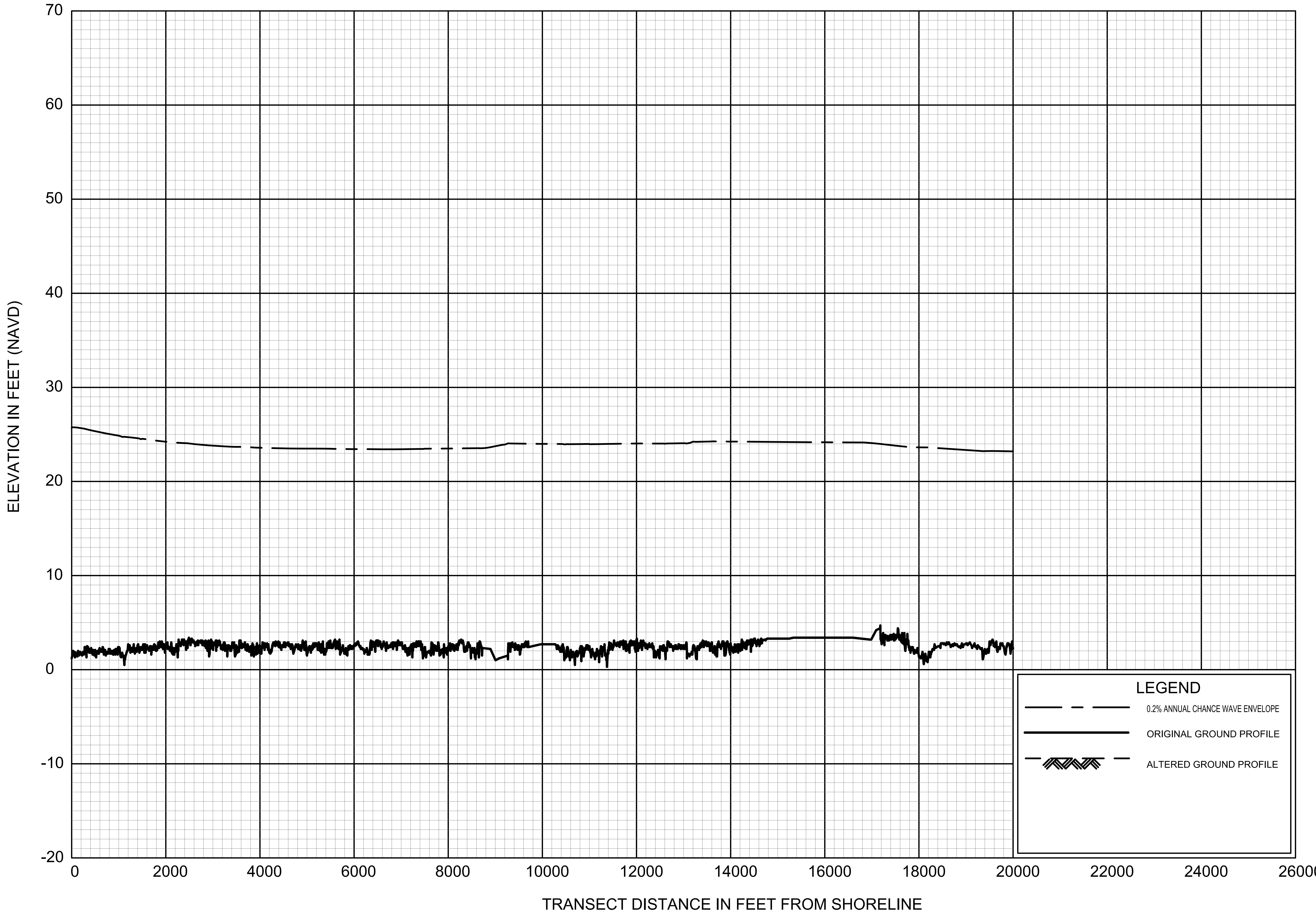
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 50

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

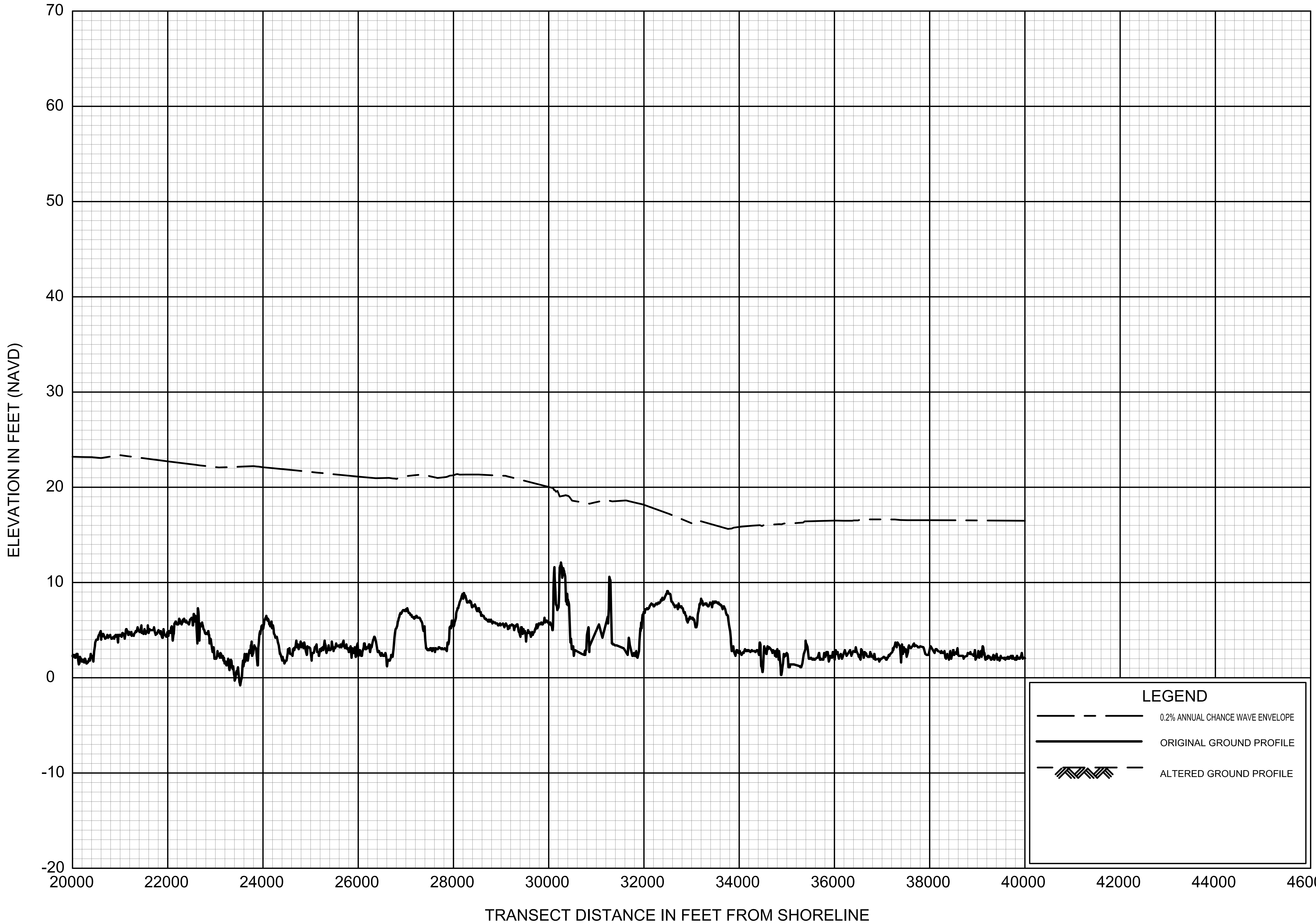
TRANSECT 51

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

82P



0.2% ANNUAL CHANCE WAVE ENVELOPE

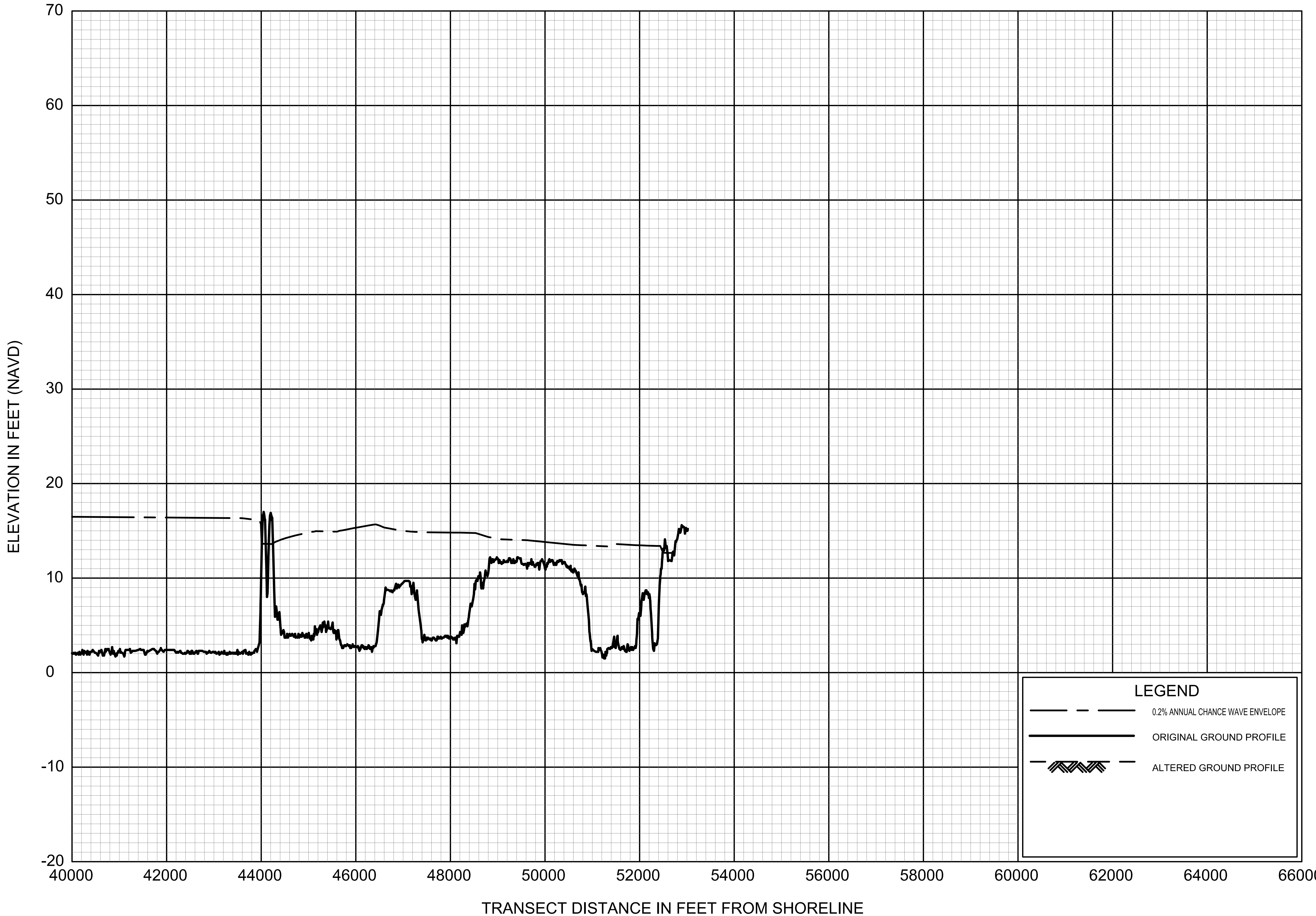
TRANSECT 51

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

83P



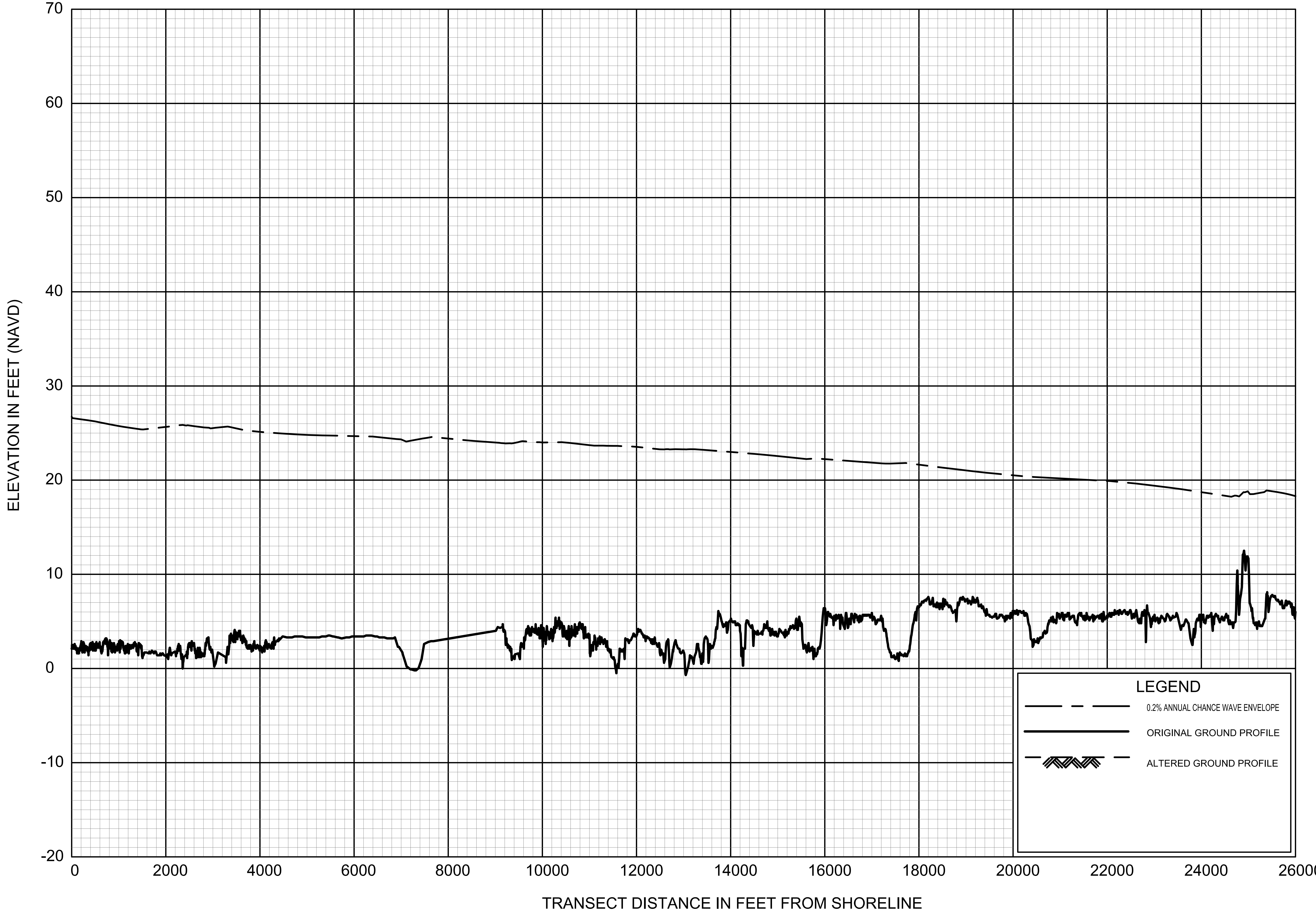
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 51

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 52

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

85P

0.2% ANNUAL CHANCE WAVE ENVELOPE

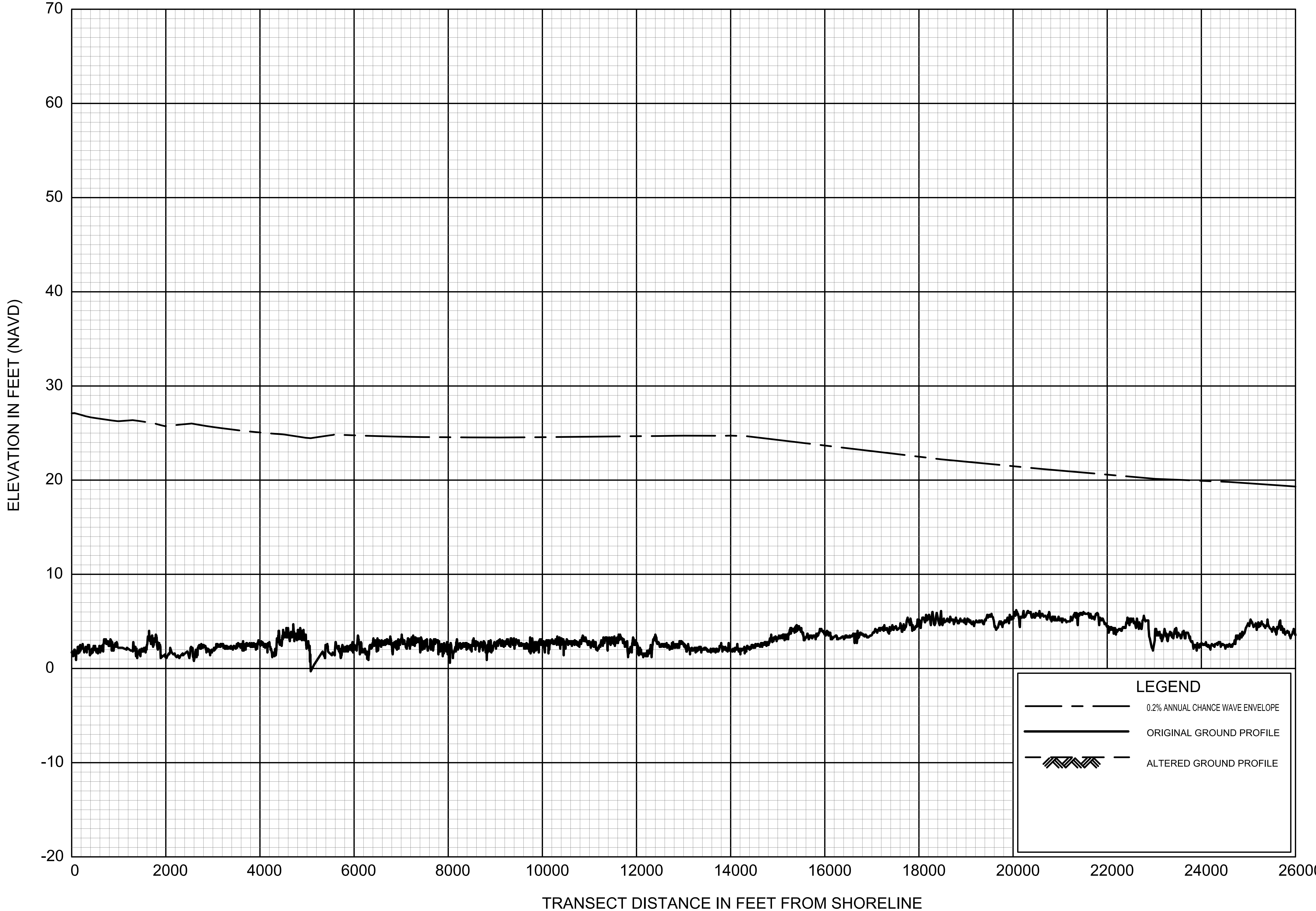
TRANSECT 52

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

86P



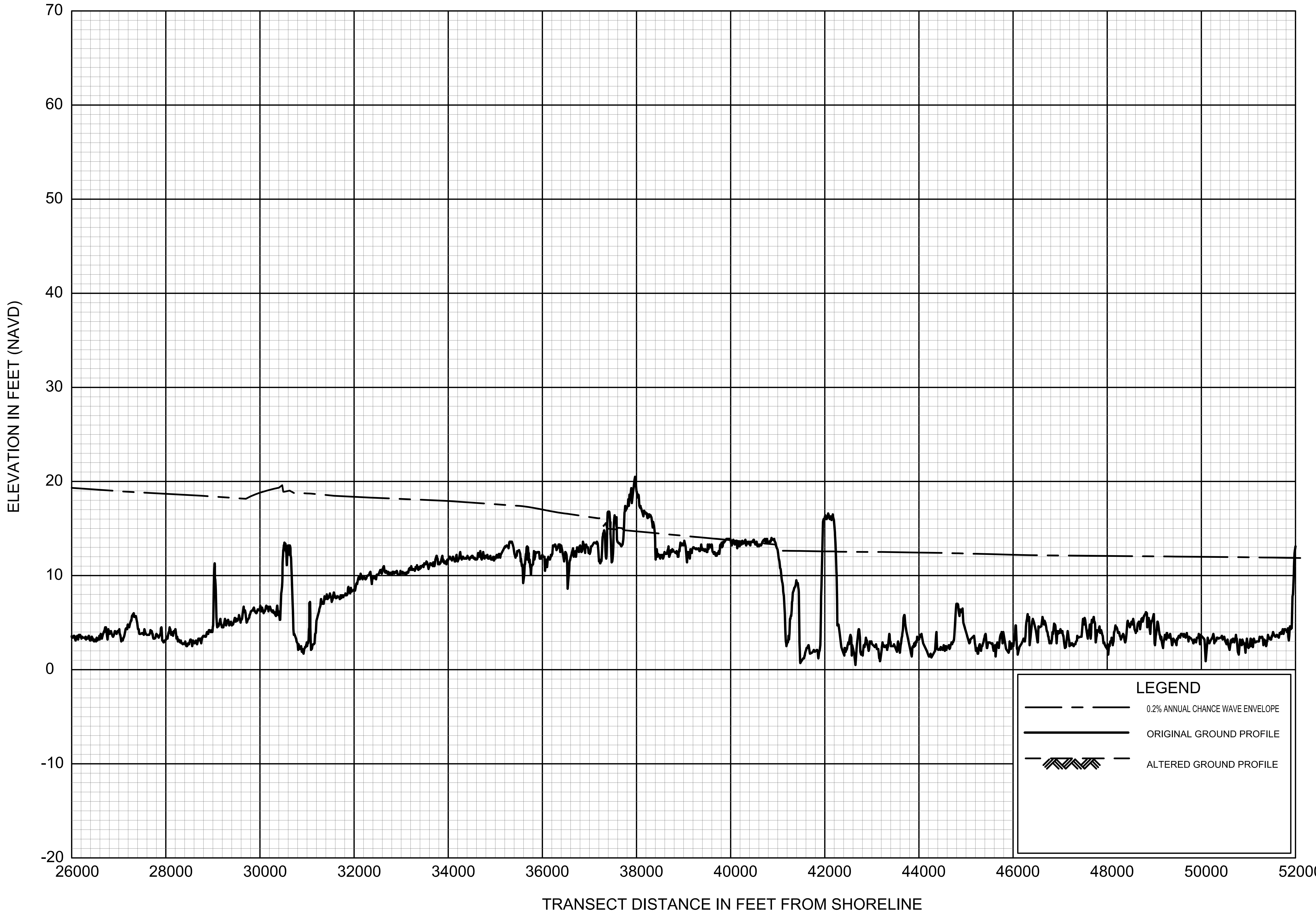
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 53

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



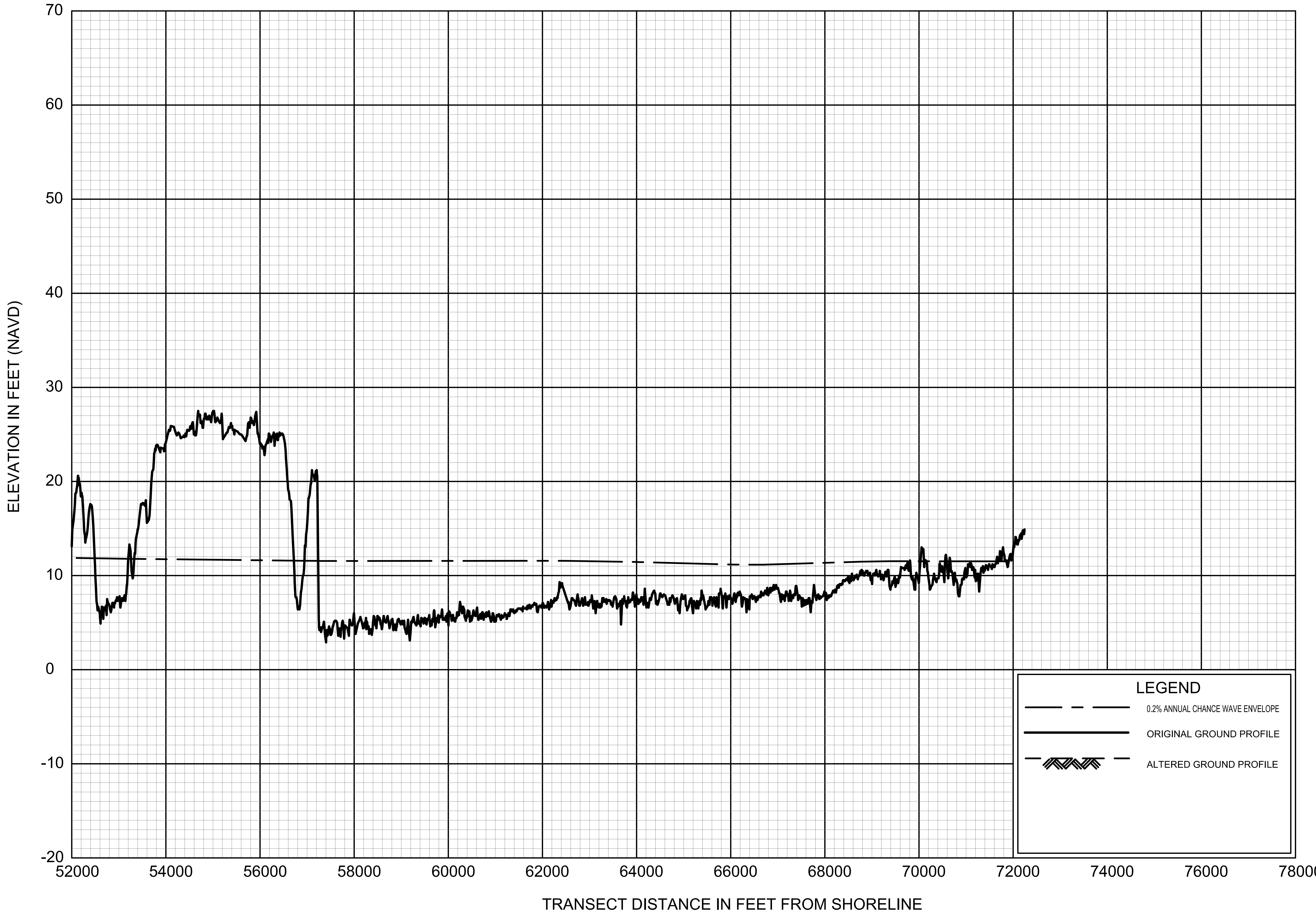
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 53

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

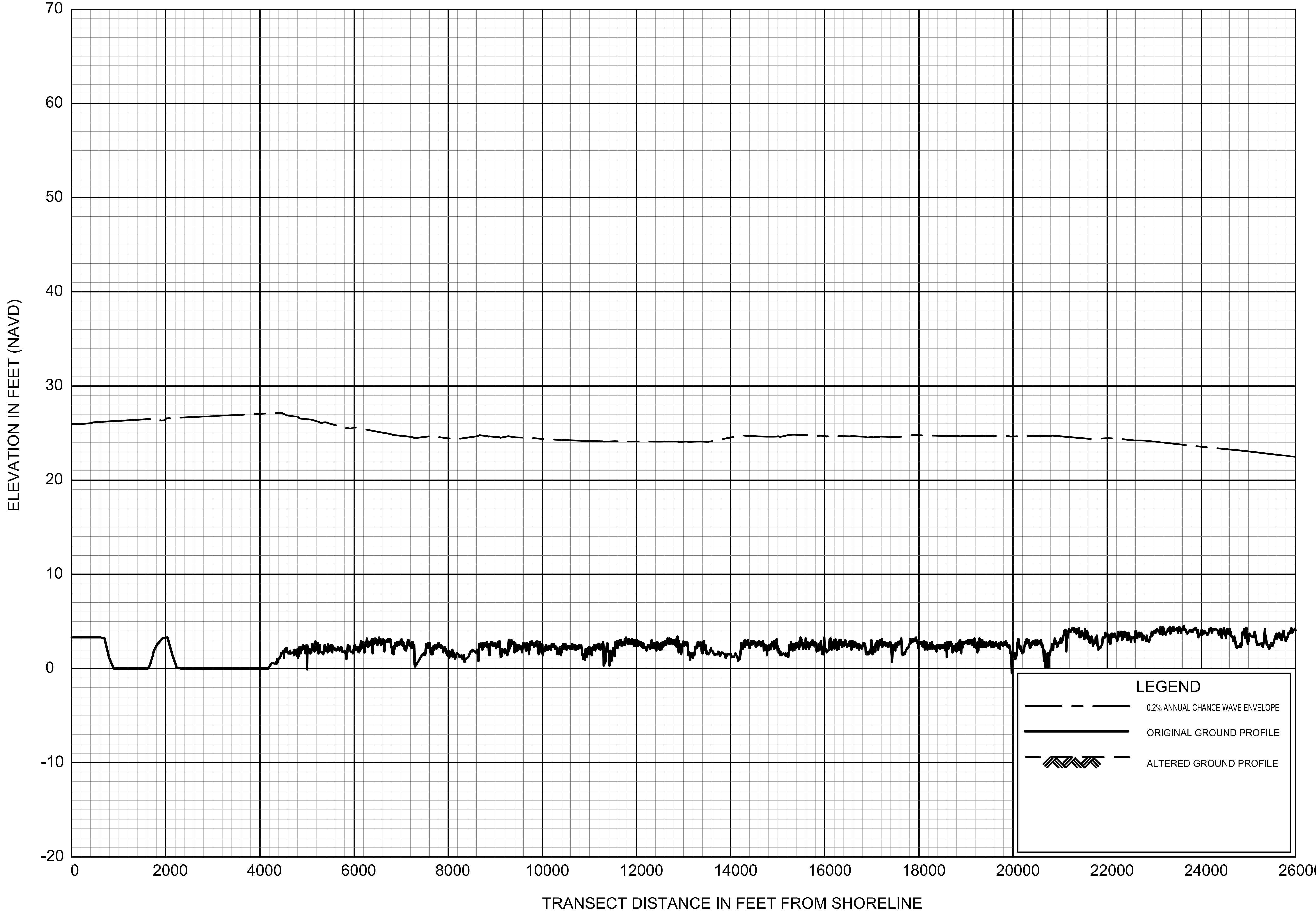
TRANSECT 53

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

89P



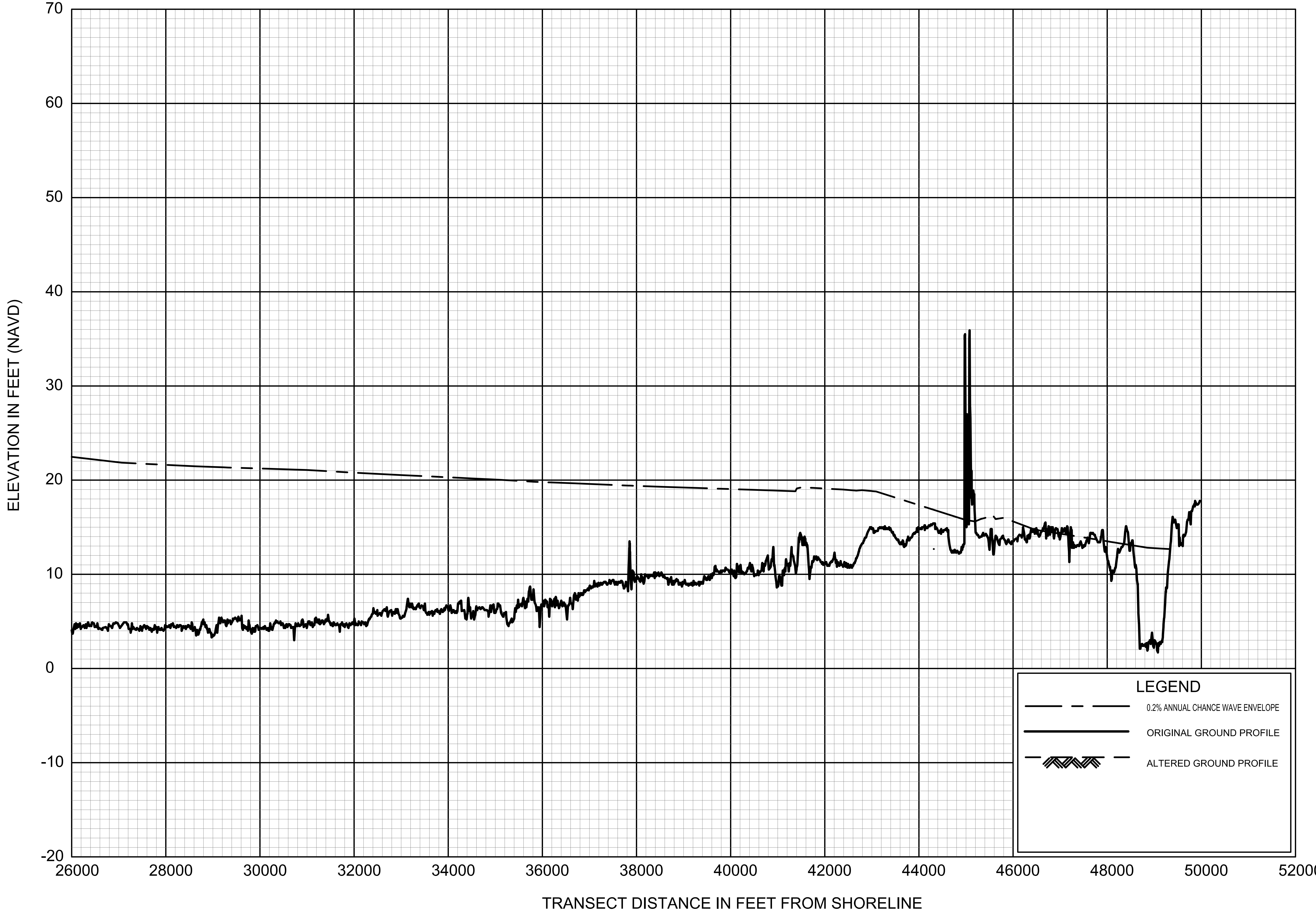
0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 54

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS



0.2% ANNUAL CHANCE WAVE ENVELOPE

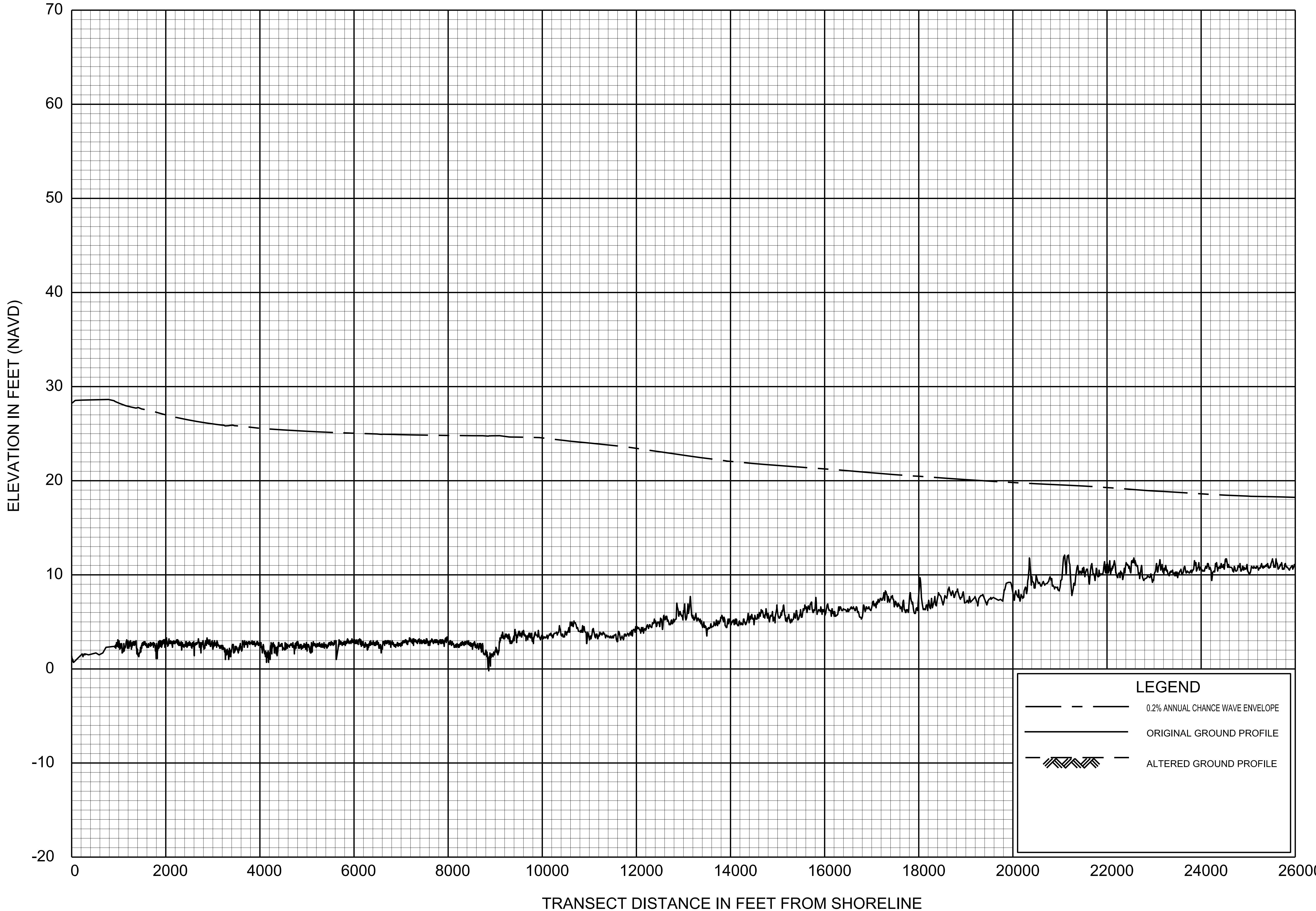
TRANSECT 54

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

91P



0.2% ANNUAL CHANCE WAVE ENVELOPE

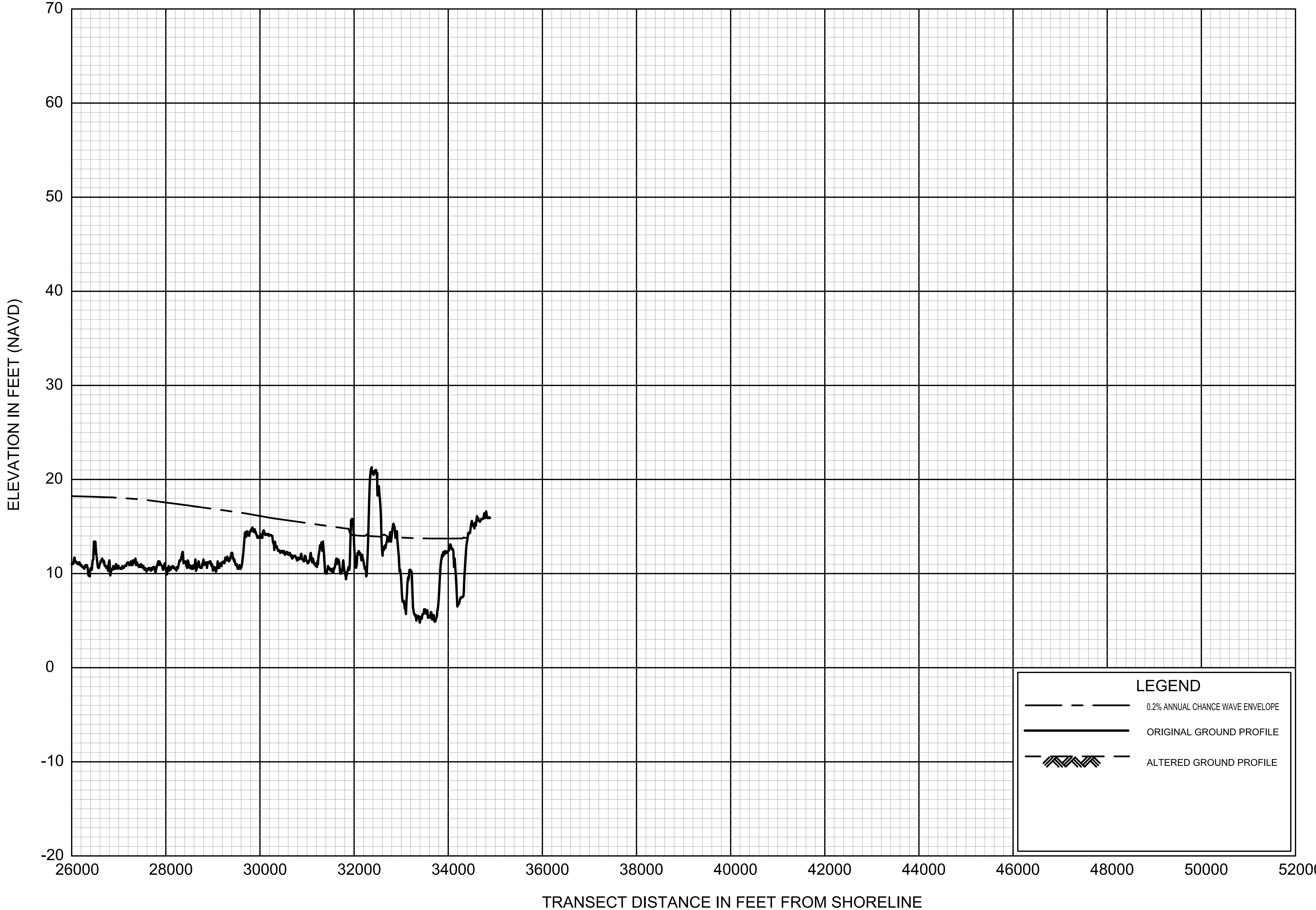
TRANSECT 55

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

92P



0.2% ANNUAL CHANCE WAVE ENVELOPE

TRANSECT 55

FEDERAL EMERGENCY MANAGEMENT AGENCY

JACKSON COUNTY, MS

AND INCORPORATED AREAS

93P