FLOOD INSURANCE STUDY

VERNON PARISH, LOUISIANA
AND INCORPORATED AREAS

Community Name	Community Number
ANACOCO, VILLAGE OF	220046
DERIDDER, CITY OF	220027
HORNBECK, TOWN OF	220332
LEESVILLE, CITY OF	220229
NEW LLANO, TOWN OF	220340
ROSEPINE, TOWN OF	220346
SIMPSON, VILLAGE OF	220311
VERNON PARISH (UNINCORPORATED AREAS)	220228

REVISED
PRELIMINARY MAY 23, 2016

Federal Emergency Management Agency
FLOOD INSURANCE STUDY NUMBER
22115CV000B

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.

This FIS report was revised on <TBD>. Users should refer to Section 10.0 Revisions Descriptions, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this report should be aware that the information presented in the Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Parishwide FIS Effective Date: March 3, 2011

Revised Parishwide FIS Date: [TBD]

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FLOOD INSURANCE STUDY
VERNON PARISH AND INCORPORATED AREAS, LOUISIANA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study (FIS) revises and updates information on the existence and severity of flood hazards in the geographic area of Vernon Parish, Louisiana, including the Cities of Leesville and DeRidder; the Towns of Hornbeck, New Llano and Rosepine; the Villages of Anacoco and Simpson; and the unincorporated areas of Vernon Parish (hereinafter referred to collectively as Vernon Parish), 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 Vernon Parish 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.

Please note that the City of DeRidder is in both Beauregard (Reference 1) and Vernon Parishes. See the separately published FIS reports and Flood Insurance Rate Maps (FIRMs) for the countywide map dates and flood hazard information outside of Vernon Parish.

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 Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the previous study for the City of Leesville were performed by the U.S. Department of the Interior and the U.S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA) under Interagency Agreement No. EMW-91-E-3535, Project Order No. 4. This study was completed in March 1993 (Reference 2). There was not a corresponding study prepared for the unincorporated areas of Vernon Parish.

The hydrologic and hydraulic analyses for Sabine River, which were taken from the Newton County, TX FIS, were performed by Turner Collie & Braden Inc., for FEMA, under Contract No. EMW-93-C-4126 (Reference 3). The flood discharges used in this study were taken from hydrologic studies performed by Brown & Root Inc., for the Sabine River Authority (SRA) (Reference 4).

For this parishwide FIS, floodplain boundaries were redelineated based on more detailed topography. The work for this study was performed by the FTN/Taylor Joint Venture, for FEMA, under Contract No. EMT-2002-CO-0050. This work was completed in April 2009.

1.3 Coordination

The purpose of an initial Consultation Coordination Officer's (CCO) meeting is to discuss the scope of the FIS. A final CCO meeting is held to review the results of the study, answer any questions, and receive comments on the study. Following is a summary of CCO meetings for previous FIS as well as the current FIS.

1.3.1 Coordination for Previous FIS

For the City of Leesville, the results of the study were reviewed at the final CCO meeting held on May 17, 1994, and attended by representatives of the City of Leesville and FEMA. All problems raised at that meeting have been addressed.

1.3.2 Coordination for Current FIS

The initial CCO meeting was held on June 19, 2007, and attended by representatives of FEMA, the Towns of Hornbeck and Rosepine, the City of Leesville, and the study contractor.

Coordination with parish officials and Federal and State agencies produced information pertaining to floodplain regulations, community maps, flood history, and other hydrologic data.

The results of the study were reviewed at the final CCO meeting held on June 26, 2009, and attended by representatives of FEMA, the study contractor, and the community. All problems raised at the meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Vernon Parish, Louisiana including the communities listed in Section 1.1.

The areas studied by detailed methods were selected with priority given to all known flood hazards and areas of projected development. The streams and study limits are shown in Table 1, Scope of Study. Each study included the enhancement of a previous hydraulic model with more up to date topographic information for the channel overbanks.

Table 1: Scope of Study

Stream Name	Study Limits
Castor Bayou	From a point approximately 4,000 feet upstream of Highway 467 to a point approximately 1,000 feet upstream of its confluence with Stream No.1.
Sabine River	From a point approximately 7,727 feet downstream of the confluence of Rocky Creek to the northern parish boundary.
Stream No. 1	From its confluence with Bayou Castor to a point about 1,300 feet upstream of Bellview Boulevard.
Stream No. 2	From its confluence with Stream No. 1 to a point about 1,200 feet upstream of North 1st Street.
Sale Creek (formerly Stream No. 3)	From a point approximately 1,300 feet above Highway 1212 to a point approximately 4,200 feet up stream of its confluence with an unnamed tributary.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to Vernon Parish and agreed upon by FEMA and the parish at the initial CCO meeting.

2.2 Community Description

Vernon Parish is located in western Louisiana that is bordered on the northwest by Sabine Parish, on the north by Natchitoches Parish, on the east by Rapides Parish, on the southeast by Allen Parish, on the south by Beauregard Parish and on the west by Newton County, Texas. The parish has a total area of 1,342 square miles (3,474 km²), of which, 1,328 square miles (3,441 km²) is land and 13 square miles (34 km²) is water. The climate of the area is humid and subtropical with an average annual temperature of approximately 65 degrees Fahrenheit (°F). The average annual precipitation is 63.1 inches (Reference 5).

The 2010 population of the parish, including the incorporated areas of Anacoco, DeRidder, Hornbeck, Leesville, New Llano, Rosepine, and Simpson was 35,654 (Reference 6). The City of Leesville is the parish seat.

2.3 Principal Flood Problems

Principal flood problems in the City of Leesville were identified along Bayou Castor, Sabine River, Stream No. 1, Stream No. 2, and Sale Creek (formerly Stream No. 3). All of these streams except for the Sabine River, flow through mostly rural sections of the City of Leesville and are subject to future development.

Low-lying areas adjacent to the Sabine River are subject to periodic flooding. Official records of past floods show that damaging floods occurred during 1884, 1913, 1945, 1953, 1989, 1991, 1999 and 2016. The discharges and recurrence intervals of some recent major floods at the study area stream gage is presented in Table 2 (References 4 and 7).

Table 2: Recent Major Flooding of the Sabine River

Date of Record		USGS Gage 08026000 State Highway 63 (Burkeville)
May 1989	Discharge (cfs)	116,000
	Recurrence Interval (Years)	180
July 1989	Discharge (cfs)	103,000
	Recurrence Interval (Years)	97
April 1991	Discharge (cfs)	79,800
	Recurrence Interval (Years)	37
March 2016	Discharge (cfs)	220,000
	Recurrence Interval (Years)	TBD

2.4 Flood Protection Measures

There are no known flood protection measures other than local stream channel improvements.

The Toledo Bend Reservoir is primarily a water-supply and electricity generating reservoir. The SRA study (Reference 4) determined that this reservoir provides some

degree of regulation on lower flows, buts does not specifically impact major floods (1-percent annual chance and larger).

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

3.1 Hydrologic Analyses

Peak discharge-drainage area relationships for detailed studied streams and select approximate studied streams are shown in Table 3, Summary of Discharges.

3.1.1 Redelineated Detailed Study Streams

City of Leesville: Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied by detailed methods affecting the community. Because no stream flow information was available for any of the streams studied by detailed methods, the following theoretical equation presented by Lee (Reference 8) was used to estimate the 1-percent-annual-chance discharges:

$$Q_{100} = 3.85A^{0.79} (P-35)^{1.13} (S)^{0.84}$$

Where:

Q_{100} = 100-year discharge;
A = contributing drainage area;
P = precipitation index;
S = channel slope at 10% and 85% of the total stream distance;

The basins were mostly rural, and no adjustments for urbanization were needed.

Unincorporated Areas: A detailed study of Sabine River was completed with the September 21, 1998 Newton County, Texas FIS. The portion of that study where the Sabine River coincides with the boundary between Newton County, Texas and Vernon Parish, Louisiana is included in this parishwide study (Reference 3).

A log-Pearson Type III statistical analysis of peak-discharge records at three USGS gaging stations on the lower Sabine River below the Toledo Bend Dam was performed. The locations and length of flow records for the gaging stations are: Gage No. 08026000 at State Highway 63 -- 35 years; Gage No. 08028500 at U.S. Highway 190 – 67 years; and Gage No. 08030500 at State Highway 12 – 79 years.

The data record was extended by the regression-analysis technique. In order to reflect the effect of reservoir regulation on downstream river flows, systematic record

unregulated discharges prior to 1967 were converted to "regulated" flows prior to performing the statistical analysis. The log-Pearson Type III statistical analysis of the records from the State Highway 63 and U.S. Highway 190 gage records was adopted for use in the hydraulic studies.

Although peak discharges for the upstream detailed-study reach adjacent to the Toledo Bend Dam were, in general, based on the analysis of the State Highway 63 gage, discharges for the reach upstream of the Power Plant Discharge Channel were adjusted to reflect SRA operating policies. Records maintained by the SRA indicate that when total peak flow released from the Toledo Bend Dam exceeds approximately 50,000 cfs, the maximum release rate from the hydropower station is maintained at 18,000 cfs, and the remaining peak flow is released from the spillwater tainter gates. Therefore, 18,000 cfs were subtracted from each peak-flood discharge for this upstream reach.

3.1.2 March 3, 2011 Parishwide Study

No new hydrologic analysis was performed for the parishwide study.

Table 3: Summary of Discharges

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BAYOU ANACOCO						
At the confluence with Sabine River	440	24,318	47,129	56,413	72,887	120,614
At the confluence of Dry Branch	430	23,996	47,129	56,413	72,887	120,614
At the confluence of Bayou Anacoco Trib 1	420	23,890	47,129	56,413	72,887	120,614
At the confluence of Bayou Anacoco Trib 2	420	23,890	47,129	56,413	72,887	120,614
At the confluence of Bayou Anacoco Trib 3	410	23,890	47,129	56,413	72,887	120,614
At the confluence of Bayou Anacoco Trib 4	410	23,890	47,129	56,413	72,887	120,614
At the confluence of Brockston Gully	410	23,890	47,129	56,413	72,887	120,614
At the confluence of Boggy Branch (V)	400	23,755	47,129	56,413	72,887	120,614
At the confluence of Cypress Creek (V)	380	23,137	47,129	55,694	72,887	120,614
At the confluence of Clear Creek	370	23,097	47,129	55,809	72,887	120,614
At the confluence of Bayou Anacoco Trib 5	370	23,097	47,129	56,286	72,887	120,614

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BAYOU ANACOCO (continued)						
At the confluence of Bayou Anacoco Trib 6	370	23,020	47,129	56,413	72,887	121,170
At state highway 737	350	22,822	46,045	55,190	71,384	118,011
At the confluence of Bayou Anacoco Trib 7	350	22,822	46,004	55,162	71,132	117,840
At the confluence of Nichols Creek (V)	340	22,646	44,978	54,016	69,699	114,750
At the confluence of Bayou Anacoco Trib 8	340	22,646	44,978	54,016	69,519	114,750
At the confluence of Bayou Anacoco Trib 9	340	22,624	44,812	53,832	69,258	114,244
At the confluence of Bayou Anacoco Trib 10	340	22,395	44,093	52,995	68,123	112,182
At the confluence of Bayou Castor	230	16,133	25,347	31,169	38,677	59,287
At approximately 300 ft upstream of Jim Cryer Ln	220	16,098	25,045	30,833	38,281	58,391
At the confluence of Bayou Anacoco Trib 11	220	16,098	24,969	30,745	38,220	58,180
At the confluence of Spring Branch	220	16,098	24,908	30,693	37,993	57,940
At the confluence of Camp Branch	220	16,025	24,678	30,428	37,635	57,297
At the confluence of Wolf Creek	210	15,054	22,739	28,082	34,604	52,252
At Anacoco Dam	200	14,914	21,936	27,190	33,353	49,876
At the confluence of Little Sand Creek	180	14,029	19,785	24,652	72,887	44,110
At the confluence of Jurdon Creek	170	13,817	19,483	24,274	72,887	43,424
At the confluence of Prairie Creek	120	10,163	14,281	17,748	72,887	31,536
At the confluence of Bayou Anacoco Trib 12	110	9,080	12,732	15,801	72,887	27,957
BAYOU CASTOR						
At the confluence with Bayou Anacoco	110	8,936	12,477	15,448	18,710	27,223
At the confluence of Bayou Zourie	80	7,050	9,817	12,132	14,668	21,273
At Approximately 2700 feet downstream of Parish Rd 5	77	6,792	9,453	11,677	14,113	20,451

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BAYOU CASTOR (continued)						
At the confluence of Big Branch near New Llano	70	6,488	9,027	11,148	13,471	19,518
At the confluence of Bayou Castor Trib 2	58	5,728	7,957	9,816	11,851	17,141
At the confluence of New Llano Creek	51	5,654	7,861	9,701	11,764	16,970
At Approximately 1,200 feet downstream of US Hwy 171	51	5,676	7,891	9,740	11,764	17,042
At the confluence of Bayou Castor Trib 5	49	5,573	7,748	9,562	11,548	16,728
At the confluence of Sale Creek	44	5,104	7,087	8,739	10,546	15,254
At approximately 220 feet upstream of state road 467	41	4,986	6,924	8,537	10,303	14,903
At the confluence of Bayou Castor Trib 7	40	4,952	6,875	8,477	10,230	14,798
At the confluence of Bayou Castor Trib 8	39	4,843	6,723	8,289	10,002	14,466
At approximately 800 feet upstream of state road 468	37	4,823	6,697	8,258	9,965	14,419
At the confluence of Liberty Creek	26	3,648	5,049	6,211	7,479	10,777
At the confluence of Little Prairie Creek	20	2,900	4,001	4,910	5,902	8,471
At the confluence of Cooper Creek	12	2,274	3,131	3,838	4,608	6,602
At the confluence of Beason Creek	8.9	1,811	2,487	3,042	3,646	5,208
At the confluence of Beason Creek Trib	7.8	1,645	2,256	2,758	3,302	4,710
At the confluence of Beason Creek Trib 9	5.8	1,390	1,904	2,325	2,781	3,961
At the confluence of Beason Creek Trib 10	3	986	1,347	1,641	1,959	2,783
BAYOU TORO						
At the confluence with Sabine River	210	14,984	22,092	28,543	36,529	61,152
At the confluence of Hunter Branch	200	14,984	22,092	28,543	36,529	61,152

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BAYOU TORO (continued)						
At the confluence of Bayou Toro Trib 1	200	14,984	22,092	28,543	36,529	61,152
At the confluence of Macelva Creek	200	14,984	22,092	28,543	36,529	61,152
At the confluence of Bayou Toro Trib 2	200	14,984	22,092	28,543	36,529	61,152
At Toro Rd	190	14,984	22,092	28,543	36,529	61,152
At the confluence of Horsepen Creek	190	14,984	22,092	28,543	36,529	61,152
At the confluence of Zacks Branch	190	14,887	22,049	28,543	36,529	61,152
BAYOU ZOURIE						
At the confluence with Bayou Castor	29	3,769	5,208	6,401	7,705	11,088
At the confluence of Elmwood Creek	27	3,640	5,028	6,179	7,436	10,698
At the confluence of Bayou Zourie Trib 1	24	3,239	4,467	5,483	6,592	9,464
At the confluence of Coopers Creek	20	2,805	3,860	4,732	5,683	8,139
At Approximately 200 feet downstream of Parish road 5	17	2,542	3,495	4,281	5,138	7,352
At the confluence of Zourie Creek	12	2,092	2,871	3,512	4,209	6,012
At the confluence of Bayou Zourie Trib 2	7.4	1,553	2,124	2,592	3,101	4,413
At the confluence of Bayou Zourie Trib 3	5.5	1,339	1,829	2,230	2,666	3,790
At the confluence of Bayou Zourie Trib 4	4.4	1,150	1,569	1,911	2,281	3,238
At the confluence of Bayou Zourie Trib 5	3.1	978	1,332	1,621	1,934	2,743
At the confluence of Bayou Zourie Trib 6	2.5	880	1,198	1,457	1,737	2,461
At the confluence of Dry Lake Creek	2.2	801	1,089	1,324	1,617	2,233
At the confluence of Bayou Zourie Trib 7	1.7	817	1,114	1,355	1,617	2,297

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
BRUSHY CREEK						
At the confluence with West Bayou Anacoco	7.6	1,835	2,534	3,109	3,734	5,358
At approximately 1000 feet downstream of Parish Rd 2025	4.3	1,426	1,967	2,411	2,892	4,147
At Parish Rd 2025	3.7	1,285	1,771	2,168	2,599	3,722
At approximately 350 feet upstream of Parish Rd 2025	2.6	984	1,351	1,650	1,974	2,816
At the confluence of Brushy Creek Trib 3	2	873	1,198	1,463	1,749	2,494
960 meters upstream of State Route 392	1.7	822	1,127	1,376	1,645	2,346
1.4 kilometers upstream of State Route 392	1.1	558	761	926	1,103	1,562
BRUSHY CREEK TRIB 1						
At the confluence with Brushy Creek	0.6	376	510	619	735	1,036
BRUSHY CREEK TRIB 2						
At the confluence with Brushy Creek	1.1	677	927	1,130	1,350	1,923
430 meters downstream of State Route 392	0.79	558	762	928	1,107	1,575
BRUSHY CREEK TRIB 3						
At approximately 350 feet downstream of US Hwy 171	0.36	308	419	507	602	849
EAST ANACOCO CREEK						
At the confluence with Bayou Anacoco	47	4,957	6,899	8,516	10,283	14,872
At the confluence of Dogwood Dr	46	4,910	6,834	8,436	10,187	14,735
At the confluence of Franklin Branch	41	4,673	6,503	8,025	9,688	14,011
At the confluence of East Anacoco Branch Trib	37	4,366	6,070	7,488	9,092	13,057
At the confluence of Boone Creek	35	4,388	6,105	7,533	9,092	13,149

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
EAST ANACOCO CREEK (continued)						
At the confluence of Polly Branch	34	4,314	6,001	7,404	8,936	12,922
At the confluence of Big Branch (near Anacoco)	31	4,147	5,768	7,116	8,588	12,421
LIBERTY CREEK						
At the confluence with Bayou Castor	11	1,907	2,614	3,194	3,826	5,452
At the confluence of Pond Branch	8.8	1,752	2,401	2,934	3,513	5,009
NEW LLANO CREEK						
At the confluence with Bayou Castor	1.2	636	865	1,051	1,252	1,773
At approximately 2000 feet upstream of State Rd 1211	0.32	273	368	444	526	738
PRAIRIE CREEK						
At the confluence with Bayou Anacoco	56	5,777	8,046	9,940	12,012	17,407
At the confluence of Wyatt Creek	46	5,120	7,122	8,790	10,614	15,361
At the confluence of Big Branch near Leesville	30	4,266	5,931	7,316	8,828	12,774
At the confluence of Dry Fork	22	3,463	4,804	5,918	7,132	10,296
At the confluence of Prairie Creek Trib 1	19	3,161	4,382	5,394	6,497	9,371
At the confluence of Prairie Creek Trib 2	16	2,898	4,014	4,938	5,945	8,570
At approximately 1300 feet upstream of State Rte 111	13	2,528	3,496	4,296	5,166	7,432
At the confluence of Twin Branch	8.9	2,060	2,844	3,490	4,193	6,023

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
SABINE RIVER						
At State Highway 63	7,482	57,000	*	90,000	105,000	144,000
At Toledo Bend Dam[1]	7,178	39,000	*	72,000	87,000	126,000
STREAM NO. 1						
Upstream of the confluence with Stream No. 2	0.62	*	*	*	800	*
STREAM NO. 2						
Upstream of the confluence with Stream No. 1	0.3	*	*	*	450	*
SALE CREEK						
At the confluence with Bayou Castor	4.9	1,342	1,837	2,244	2,684	3,826
At US Hwy 171	4.3	1,198	1,638	1,998	2,389	3,398
At the confluence of Sale Creek Trib 1	2.5	799	1,087	1,322	1,575	2,227
At State Rte 8	1.2	573	778	945	1,124	1,588
At W Mechanic St	0.86	455	616	745	886	1,247
At approximately 200 feet down stream of Anacoco Street	0.29	214	287	346	408	569
WEST ANACOCO CREEK						
At the confluence with Bayou Anacoco	55	5,632	7,857	9,715	11,745	17,030
At the confluence of West Anacoco Creek Trib 1	49	5,323	7,424	9,177	11,092	16,079
At Approximately 550 feet downstream of Trigger Trap Dr.	48	5,361	7,480	9,248	11,180	16,217
At the confluence of West Anacoco Creek Trib 3	46	5,198	7,249	8,960	10,829	15,697
At the confluence of Little Sandy Branch	41	4,869	6,788	8,387	10,133	14,684
At the confluence of Elder Branch	34	4,406	6,138	7,579	9,152	13,251

* Data Not Available

[1] Adjusted for Discharges from hydropower tailrace

Table 3: Summary of Discharges (continued)

FLOODING SOURCE	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
WEST ANACOCO CREEK (continued)						
At the confluence of Brushy Creek	25	3,569	4,960	6,114	7,372	10,646
At the confluence of Everette Branch	23	3,358	4,664	5,747	6,926	9,994
At approximately 1500 feet upstream of US Hwy 171	22	3,296	4,577	5,640	6,797	9,808
At the confluence of Log Branch	20	3,180	4,416	5,440	6,556	9,459
At the confluence of Big Branch	17	2,864	3,973	4,891	5,890	8,487
At State Rte 392	13	2,397	3,318	4,079	4,906	7,053
At the confluence of Swenley Branch	12	2,273	3,146	3,865	4,648	6,679
At Roy Lee Snell Rd	8.6	1,814	2,503	3,070	3,685	5,279
At the confluence of Coon Branch (V)	7.1	1,581	2,178	2,668	3,200	4,574

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevation of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in Table 4, the Floodway Data Table in the FIS report. Flood elevations shown on the FIRM are primarily intended for the 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.

3.2.1 Redelineated Detailed Study Streams

Water-surface elevations for Bayou Castor, Stream No. 1, Stream No. 2, and Stream No. 3 in the City of Leesville were determined using the USGS WSPRO (Water Surface profile) step-backwater computer program (Reference 9). Cross sections used in the backwater analysis were obtained by field surveys conducted between July and August 1992, and extended on either side to encompass the 1-percent-annual-chance floodplain by scaling from 7.5 minute topographic maps, where necessary. In addition, cross sections were synthesized for computational purposes using the surveyed cross sections and topographic maps of the area. Bridge, culvert, and roadway geometry were also obtained to assess their effects on the 100-year flood profiles. Roughness

coefficients (Manning's "n") used in the hydraulic computations were chosen by engineering judgment based on field observations of the channels and overbanks at the time the surveys were made. Manning's "n" ranged from 0.040 in the channel to 0.125 in the overbanks. 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 Flood Insurance Rate Map. The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

A detailed study of Sabine River was completed with the September 21, 1998 Newton County, Texas FIS. The portion of this study where the Sabine River is the boundary between Newton County and Vernon Parish is included in this parishwide FIS.

Water-surface elevations of 10-, 20-, 1-, and 0.2-percent annual chance floods were computed using the HEC-2 computer program developed by the U.S. Army Corps of Engineers (USACE), Hydrologic Engineering Center (Reference 10).

Channel and valley cross sections of the streams were obtained by field surveys and available data from the Texas Department of Transportation; the USACE; the Atchison, Topeka, and Santa Fe Railroad; and the Kansas City Southern Railroad (References 11, 12 and 13). Locations of the surveyed cross sections used in the hydraulic analyses are shown on Exhibit 1, Flood Profiles, and on the FIRM.

Coefficients of roughness (Manning’s n) were assigned to elements of the valley on the basis of field inspection, aerial photos, and the calibration to the rating from the USGS curves of the three stream gages in the study area from a previous study (Reference 4). Channel coefficients of roughness ranged from 0.025 to 0.035. Overbank coefficients of roughness ranged from 0.050 to 0.140. Starting water-surface elevations for each detailed stream reach were obtained from the hydraulic analyses in the SRA study.

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 2).

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

3.2.2 March 3, 2011 Parishwide Study

No new hydraulic analysis was performed for the parishwide study.

3.3 Vertical Datum

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

All flood elevations shown in this FIS report and on the FIRM are referenced to NAVD (unless noted). The datum conversion factor from NGVD to NAVD in Vernon Parish is variable depending on location. For the Sabine River the calculated average conversion was -0.27 feet, while the remainder of Vernon Parish required a datum shift of -0.26 feet.

For information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Service
NOAA, N/CG12
Silver Spring Metro Center 3, #9202
1315 East-West Highway
Silver Spring, Maryland
20910 (301) 713-3242

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

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

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 the Floodway Data Table. Users should reference the data presented in the FIS report as well as additional information that may be available at the local map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For each stream studied by detailed methods, the 1-percent-annual-chance and 0.2-percent-annual-chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic data at a scale of 1:3,000 or better with a contour interval of 2 feet (Reference 14). Floodplains were derived for the current study using LIDAR topography.

The 1- and 0.2-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent-annual-chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE); and the 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent-annual-chance floodplain boundaries are close together, only the 1-percent-annual-

chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

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

4.2 Floodways

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

The floodways presented in this FIS report and on the FIRM 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. In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary had been shown.

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

The only floodways that were computed for Vernon Parish are for the Sabine River. These values were taken from the September 21, 1998, Newton County, Texas FIS and are shown in Table 4.

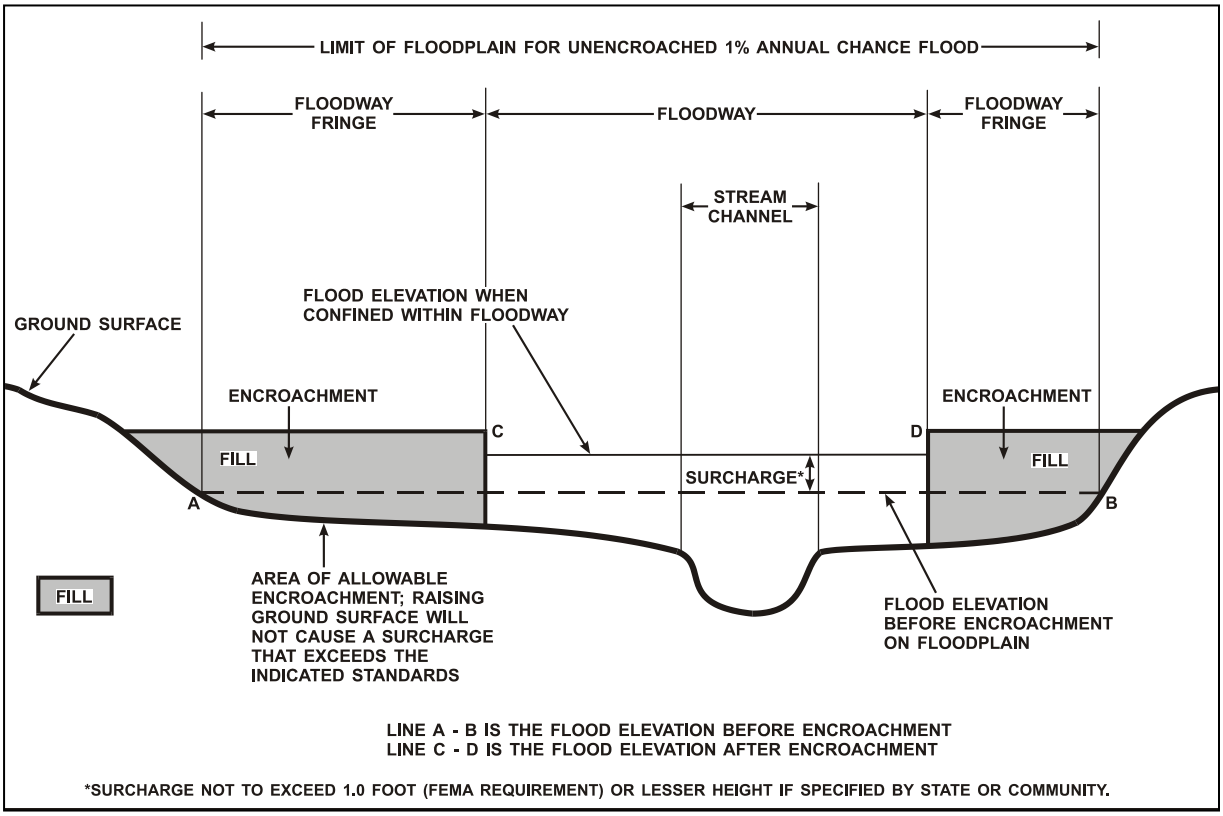

Figure 1: Floodway Schematic

FLOODING SOURCE		FLOODWAY			1-PERCENT-ANNUAL-CHANCE-FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION[1]	DISTANCE[2]	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SABINE RIVER								
A	593,608	15,200	112,839	1.0	85.5	85.5	86.4	0.9
B	617,288	8,300	83,741	1.3	88.5	88.5	89.5	1.0
C	641,668	7,986	42,303	2.6	91.7	91.7	92.6	0.9
D	670,108	7,487	67,682	1.6	96.4	96.4	97.3	0.9
E	699,238	8,785	91,745	1.2	99.9	99.9	100.9	1.0
F	718,208	8,625	82,251	1.3	104.9	104.9	105.6	0.7
G	736,606	2,300	26,746	3.9	106.9	106.9	107.5	0.6
H	768,126	7,286	68,868	1.5	111.1	111.1	111.9	0.8
I	783,886	7,885	69,479	1.3	112.9	112.9	113.7	0.8
J	804,286	3,192	24,486	3.6	115.2	115.2	116.2	1.0

[1] VERNON PARISH CROSS SECTIONS CORRESPOND TO NEWTON COUNTY, TX FIS CROSS SECTIONS “S” THROUGH “AB”
[2] FEET ABOVE MOUTH
[3] WIDTH EXTENDS BEYOND PARISH BOUNDARY

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

FLOODWAY DATA

SABINE RIVER

5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone X

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

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, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

The parish-wide FIRM presents flooding information for the entire geographic area of Vernon Parish. Previously, separate Flood Hazard Boundary Maps and/or Flood Insurance Rate Maps were prepared for each flood-prone incorporated community and the unincorporated areas of the Parish. Historical data relating to the maps prepared for each community are presented in Table 5, Community Map History.

COMMUNITY NAME	INITIAL NFIP MAP DATE	FLOOD HAZARD BOUNDARY MAP REVISION DATE(S)	INITIAL FIRM DATE	FLOOD INSURANCE RATE MAP REVISION DATE(S)
Anacoco, Village of[2]	None	None	None	
DeRidder, City of[1]	February 1, 1974	July 16, 1976 March 27, 1979	October 19, 1982	October 16, 1992
Hornbeck, Town of	August 15, 1975	None	June 1, 2005	
Leesville, City of	November 23, 1973	November 14, 1975	January 17, 1986	June 2, 1995
New Llano, Town of	April 9, 1976	None	July 18, 1985	
Rosepine, Town of	August 15, 1975	March 28, 1978	October 19, 1982	
Simpson, Village of[2]	None	None	None	
Vernon Parish (Unincorporated Areas)	July 26, 1977	None	March 1, 1987	

[1] Dates for this community were taken from the Beauregard FIS

[2] This community did not have a FIRM prior to the initial parishwide FIRM for Vernon Parish

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

The preparation of an updated FIS is ongoing for Sabine, Natchitoches, Rapides, Allen, and Beauregard Parishes, Louisiana. The Vernon Parish study is in agreement with these studies.

This FIS report supersedes or is compatible with all previous studies on streams studied in this report and should be considered authoritative for 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:

FEMA Region VI
Flood Insurance and Mitigation Division
800 North Loop 288
Denton, TX 76209

9.0 REFERENCES AND BIBLIOGRAPHY

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10.0 REVISIONS DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original FIS report and FIRM were printed. Future revisions may be made that do not result in the republishing of the FIS report. All users are advised to contact the Community Map Repository to obtain the most up-to-date flood hazard data.

10.1 First Revision (Revised <insert effective date>)

a. Acknowledgements

For the [TBD], FIS revision, Brushy Creek and its tributaries in the Town of Hornbeck were studied by limited detailed methods. In addition flooding sources throughout the Lower Sabine Watershed (HUC-8 12010002) were studied by approximate methods, including Bayou Anacoco, Bayou Castor, and Bayou Toro. In addition floodplains for the Sabine River were redelineated based on LiDAR (Reference 15) and brought into agreement with floodplains for the Sabine River in Newton County, Texas and Beauregard and Sabine Parishes, Louisiana. This work was performed by Risk Assessment, Mapping, and Planning Partners (RAMPP), for FEMA under Contract No. HSFHQ-09-D-0369, Homeland Security Task Order No. HSFE06-11-J-0001. This study was completed in November 2015.

This FIS revision is part of the larger Lower Sabine Watershed HUC-8 (12010002) study covering flooding sources in Calcasieu, Cameron, Sabine, and Vernon Parishes, Louisiana; and Jasper, Newton, and Orange Counties, Texas. Additional materials related to the entire Lower Sabine Watershed study may be obtained by accessing the appropriate Technical Support Data

Notebook (TSDN). Interested individuals may contact FEMA to access these data.

For the [TBD], FIS revision, base map information shown on the FIRM was provided in digital format by FEMA, dated 2010; from the US Census Bureau dated 2015; and from US Department of Agriculture orthoimagery dated 2015.

b. Coordination

The initial CCO meeting (study kick-off meeting) was held on April 23, 2013, and attended by representatives from Vernon Parish, the Town of Hornbeck, Natural Resource Conservation Service, the Louisiana NFIP coordinator, the SRA, FEMA, and the study contractor RAMPP. Additionally a Flood Risk Review meeting was held on June 15, 2015, and attended by representatives from Vernon Parish, Sabine River Authority, the Louisiana State National Flood Insurance Program Coordinator, FEMA and the study contractor RAMPP.

The results of the [TBD], FIS revision, were reviewed at the final CCO meeting held [TBD], and attended by representatives of FEMA, the Study Contractor and Vernon Parish.

c. Scope

Scope of the study within Vernon Parish is shown in Table 6.

Table 6: Summary of Hydrologic and Hydraulic Methods

Stream Name	Study Limits	Hydrologic Method	Hydraulic Method	Flood Zone
Brushy Creek	From 1,000 ft .downstream of Brushy Creek Rd to Parish Boundary	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone AE, Zone A
Brushy Creek Trib 1	From confluence with Brushy Creek to approximately 1,760 ft. upstream of Port Arthur Rd.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone AE,
Brushy Creek Trib 2	From confluence with Brushy Creek to approximately 3,160 ft. upstream of confluence.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone AE,
Brushy Creek Trib 3	From confluence with Brushy Creek to approximately 4,025 ft. upstream of confluence.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone AE,
Bayou Anacoco	From confluence with Sabine River to confluence with East and West Anacoco Creeks.	PeakFQ Version 5.2	HEC-RAS version 4.1.0	Zone A
Bayou Castor	From confluence with Bayou Anacoco to Limit of Study.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A

Table 6: Summary of Hydrologic and Hydraulic Methods (continued)

Bayou Toro	From confluence with Sabine River to Limit of Study.	PeakFQ Version 5.2	HEC-RAS version 4.1.0	Zone A
Bayou Zourie	From confluence with Bayou Castor to Limit of Study.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
East Anacoco Creek	From confluence with Bayou Anacoco to Limit of Study	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
Liberty Creek	From confluence with Bayou Castor to Bed & Breakfast Ln.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
New Llano Creek	From confluence with Bayou Castor to approximately 2,000 ft. upstream of Stanton Rd.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
Prairie Creek	From confluence with Bayou Anacoco to confluence with East and West Forks Prairie Creek.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
Sale Creek	From confluence with Bayou Castor to approximately 1,00 ft. upstream of State Highway 1212; and again From State Route 8 to Industrial Park Rd.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
West Anacoco Creek	From confluence with Bayou Anacoco to Limit of Study.	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A
Other Watershed Wide Approximate Analysis Streams in Vernon Parish	Varies	USGS Regression Equations for Louisiana	HEC-RAS version 4.1.0	Zone A

d. Hydrology and Hydraulics

For streams newly studied, the 10-, 4-, 2-, 1-, and 0.2 percent chance discharges were calculated and have been added to Table 3. Only selected approximate streams (representing major drainage basins) are included in Table 3. Discharges for other streams studied by approximate methods can be found in the Hydrology TSDN for the Lower Sabine Watershed Study (Reference 16).

USGS Regression equations for Louisiana were used to calculate the hydrology of the flood sources in the watershed. The Louisiana regression equations were obtained from The National Flood-Frequency Program Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Louisiana, 2001 (Reference 17). The Louisiana regression equations were applied to the applicable portions of the watersheds spanning the state boundary, and then the final peak flows were computed using the area-to-flow weighting technique as described in "The National Streamflow Statistics Program: A Computer Program for Estimating Streamflow Statistics for Ungaged Sites" (Reference 18).

Regression Equations for Louisiana utilize precipitation data rasters to determine the average annual rainfall in a drainage area. The precipitation raster dataset for Louisiana was created from the mean annual precipitation map from The National Flood-Frequency Program Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Louisiana (Reference 17). The basin mean annual precipitation was determined by clipping the precipitation raster to the

sub-basin extents and determining the raster mean value using ArcGIS tools. The precipitation raster dataset was obtained from Oregon State University's Parameter-Elevation Regressions on Independent Slopes Model (PRISM) website, http://www.prism.oregonstate.edu/. The mean annual precipitation data is for the climatological period from 1981 to 2010. The precipitation units of original raster data are in millimeters, so the units were converted to inches. The mean annual precipitation was assigned at the center of the watersheds. ArcMap tools were used to determine the center location of each drainage area and a point was placed at the center of the basin. The mean annual precipitation was determined at the center location of the drainage area.

Per the FEMA G&S, the preferred hydrologic methodology is gage analysis. Stream data is considered as a viable resource if it meets the following criteria:

- Stream gages must have 10 years or more of historic record for general statistical analysis and at least 25 years of record for skew analysis.
- Stream gages should not have flood flows appreciably altered by reservoir regulation.
- Ungaged cumulative drainage areas must fall within 50 % to 150% of drainage area for a gaged location on the same stream.

The PeakFQ (PKFQWIN) Program, Version 5.2, was used to perform a flood-frequency analysis on annual peak flow records according to Bulletin 17B guidelines and compute the 1-percent-annual chance storm event discharge for each gage station used in the hydrologic analysis. Weighting estimates and adjustment factors were used to transfer the Bulletin 17B estimates to the discharge locations. Weighted estimates improve peak discharge estimates by combining regression results with the gage records, so regression was determined at gage sites.

The USGS has thirteen gages in the Lower Sabine Watershed. Of the thirteen, four are located along the Sabine River. Another, located on the Cypress Creek, was located far upstream of the discharge locations for this study and did not meet the 50% - 150% drainage area criterion. Only gages in Vernon County are noted below.

Bayou Anacoco: There are four USGS Gages located on the Bayou Anacoco and Anacoco Lake. Due to the age and short records of three of the gage locations, only Gage 08028000 near Rosepine was acceptable for use. The bulletin 17B estimates for all frequencies were used to determine weighted discharge estimates for the streams segments in the reach that fell within the 50% - 150% drainage area range.

Bayou Toro: USGS Gage 08020550 is located on the Bayou Toro near Toro, Louisiana in Sabine Parish. It has a drainage area of 365 square miles and a peak streamflow record from 1951 to 2012. The bulletin 17B estimates for all frequencies were used to determine weighted discharge estimates for the streams segments in the reach that fell within the 50% - 150% drainage area range.

Hydraulics for all approximate analyses within the watershed were studied and refined by automated approximate methods. For WSELs determined using approximate methods, HEC-RAS version 4.1.0 and the HEC-GeoRAS ArcGIS extension version 10.1 were used to assist in the hydraulic computations. Cross sections were cut from the topographic data using GeoRAS within an Esri ArcMap version 10.1 GIS platform. Large rivers were modeled first in order to determine backwater extents in tributaries.

Hydraulic cross sections were placed approximately 500 feet apart. Additional cross sections were placed to account for significant profile inflection points (profile breaks). Cross sections at profile breaks are critical for accuracy in the development of flood elevations. Cross sections were extended to contain all flood frequencies.

Structures such as dams, culverts and bridges were not included in the model. Cross Sections were placed atop road crossings and roads were modeled as though they were completely obstructed.

Manning's n values for both the channel and overbanks were entered into the hydraulic model to represent the values that were estimated from the available aerial photography as shown in Table 4. Based on the vegetation and terrain observed in the aerial photography and from data collected in the field reconnaissance, a Manning's n value of 0.045 was selected as the default for main channels, which represents clean, winding, natural streams with some pools, shoals, weeds, and stones. For the floodplains, a Manning's n of 0.1 was used, which represents heavy strands of timber, with a few down trees, little undergrowth, and flood stages below branches. Areas that had cleared forests or were developed used different Manning's n values. A range of 0.03 to 0.045 was used for channel n values and a range of 0.045 to 0.1 was used for overbanks areas.

Table 7: Summary of Roughness Coefficients

	Manning's "n" Values	
Stream Name	**Channel**	**Overbanks**
Watershed-wide Approximate Streams	0.03 - 0.045	0.045 – 0.1
Brushy Creek	0.03 - 0.045	0.045 – 0.1
Brushy Creek Trib 1	0.03 - 0.045	0.045 – 0.1
Brushy Creek Trib 2	0.03 - 0.045	0.045 – 0.1
Brushy Creek Trib 3	0.03 - 0.045	0.045 – 0.1

Methodology for the Limited Detailed Study along Brushy Creek and its tributaries was similar to that done for the approximate streams. However the models were updated based on survey data taken for each bridge and culvert. The dam located along Brushy Creek Trib 3 was modeled as a spillway.

Expansion and contraction loss coefficients were applied to all crossing structures within the HEC-RAS model to account for the additional energy losses. Expansion and contraction loss coefficients were applied between cross sections to account for losses to the changing width of the channel.

Floodplain boundaries for approximate studies, limited detailed studies and redelineation were interpolated using LiDAR data that were provided by the communities in Louisiana and Texas. The floodway for the Sabine River redelineation was taken from the effective FIRMs.

e. Other Studies

As noted previously, this revision is part of a larger Lower Sabine Watershed HUC-8 (12010002) study covering flooding sources in Calcasieu, Cameron, Sabine, and Vernon Parishes, Louisiana; and Jasper, Newton, and Orange Counties, Texas. As such floodplain boundaries within the Watershed were adjusted to match across county and parish boundaries.

g. Additional Considerations

This revision to the Vernon Parishwide FIS incorporates new analysis and mapping information for the FIRM panels shown in Table 8. This section presents important considerations for using the information contained in this FIS Report and in the FIRM panels updated by this

revision. These considerations include changes in format and content. Figures 3 and 4 present information that applies to using the updated FIRM panels with the FIS Report.

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

Table 8: Panels Updated by this Revision (TBD)

22115C0025E	22115C0035E	22115C0050E	22115C0075E
22115C0100E	22115C0200E	22115C0225E	22115C0245E
22115C0250E	22115C0275E	22115C0375E	22115C0400E
22115C0425E	22115C0450E	22115C0550E	22115C0575E
22115C0600E	22115C0725E	22115C0750E	

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

Figure 2: FIRM Notes to Users (continued)

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Louisiana North Zone (FIPS 1701). The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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

Local vertical monuments may have been used to create the map.

BASE MAP INFORMATION: Base map information shown on this FIRM was provided in digital format by FEMA, dated 2010; from the US Census Bureau dated 2015; and from US Department of Agriculture Orthoimagery dated 2015.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Note to Users section was created specifically for Vernon Parish, Louisiana, effective <insert effective date of revision>.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Vernon Parish.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*

	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone, either at cross section locations or as static whole-foot elevations that apply throughout the zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.
	Regulatory Floodway determined in Zone AE.

Figure 3: Map Legend for FIRM (continued)

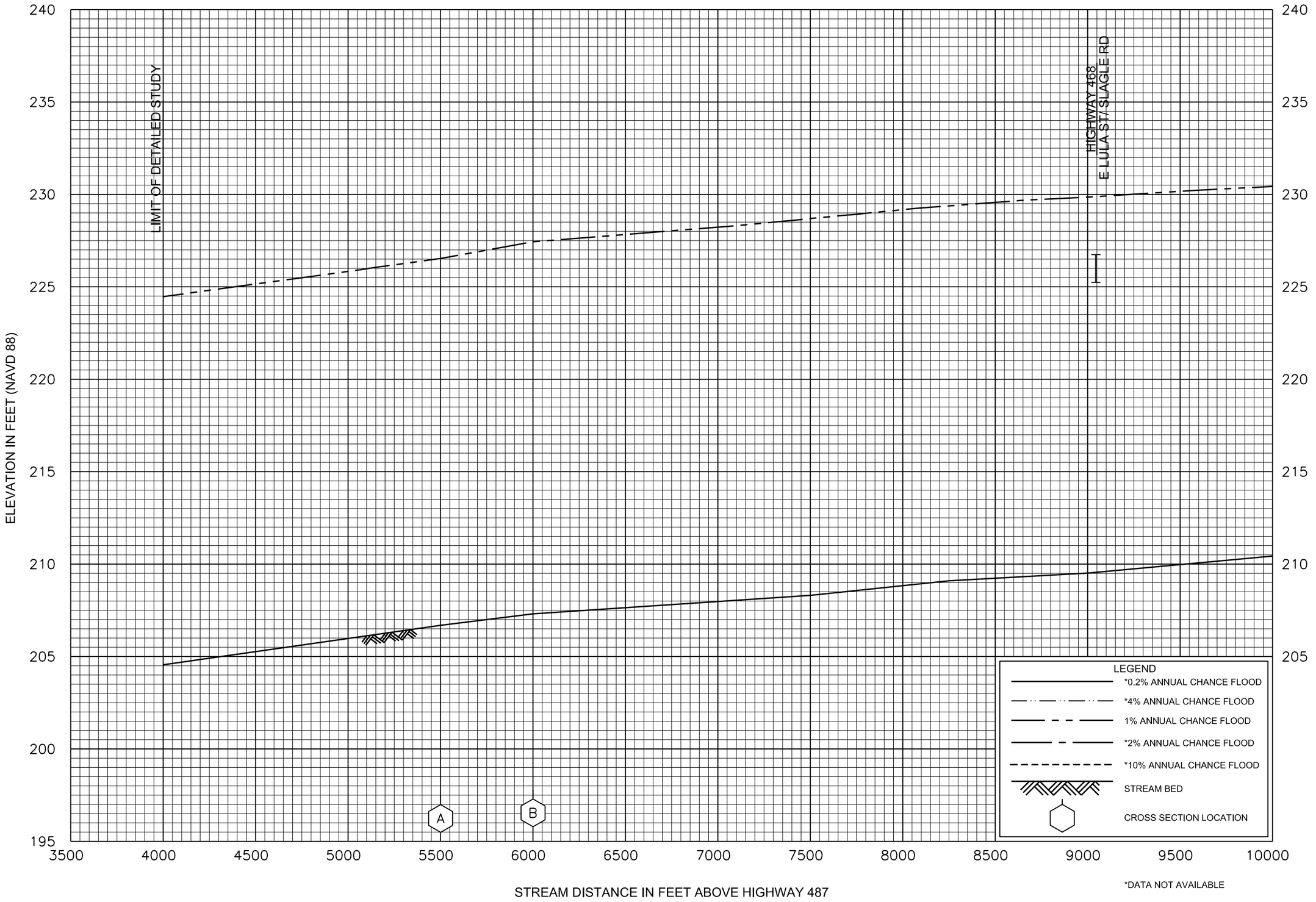
OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible
NO SCREEN	Unshaded Zone X: Areas determined to be outside the 0.2% annual chance flood hazard
FLOOD HAZARD AND OTHER BOUNDARY LINES	
(ortho) **(vector)**	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
Aqueduct *Channel* *Culvert* *Storm Sewer*	Channel, Culvert, Aqueduct, or Storm Sewer
Dam *Jetty* *Weir*	Dam, Jetty, Weir
	Levee, Dike or Floodwall
Bridge	Bridge

Figure 3: Map Legend for FIRM (continued)

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.*	
CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
B 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
5280 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
8	Coastal Transect
	Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.
	Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.
513	Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available)
ZONE AE (EL 16)	Static Base Flood Elevation value (shown under zone label)
ZONE AO (DEPTH 2)	Zone designation with Depth
ZONE AO (DEPTH 2) (VEL 15 FPS)	Zone designation with Depth and Velocity

Figure 3: Map Legend for FIRM (continued)

BASE MAP FEATURES	
Missouri Creek	**River, Stream or Other Hydrographic Feature**
234	Interstate Highway
234	U.S. Highway
234	State Highway
234	County Highway
MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
RAILROAD	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
+	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
$^{42}76^{000m}$E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16’ 52.5”	Corner Coordinates (Latitude, Longitude)



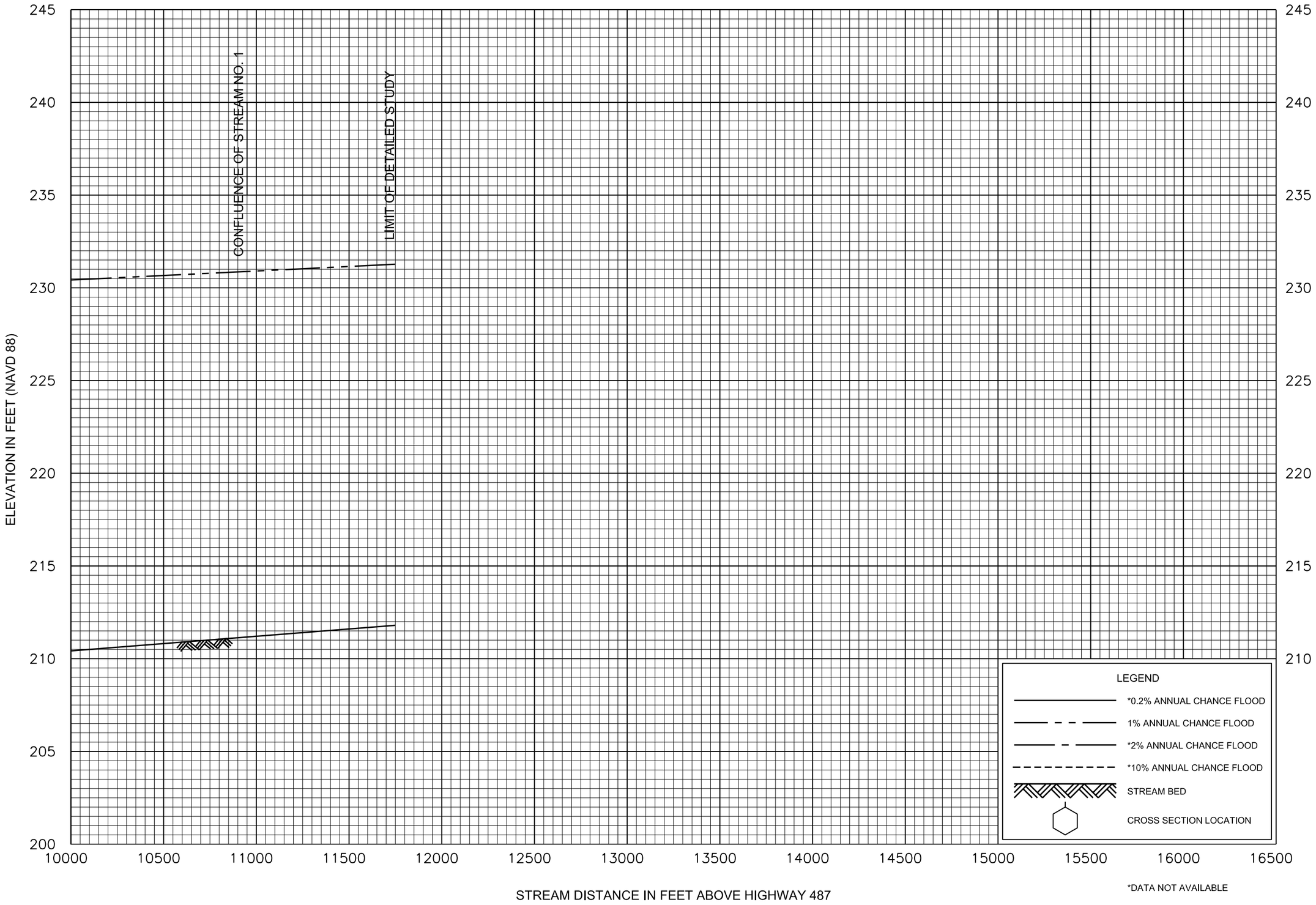
*DATA NOT AVAILABLE

FLOOD PROFILES

BAYOU CASTOR

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS



FLOOD PROFILES

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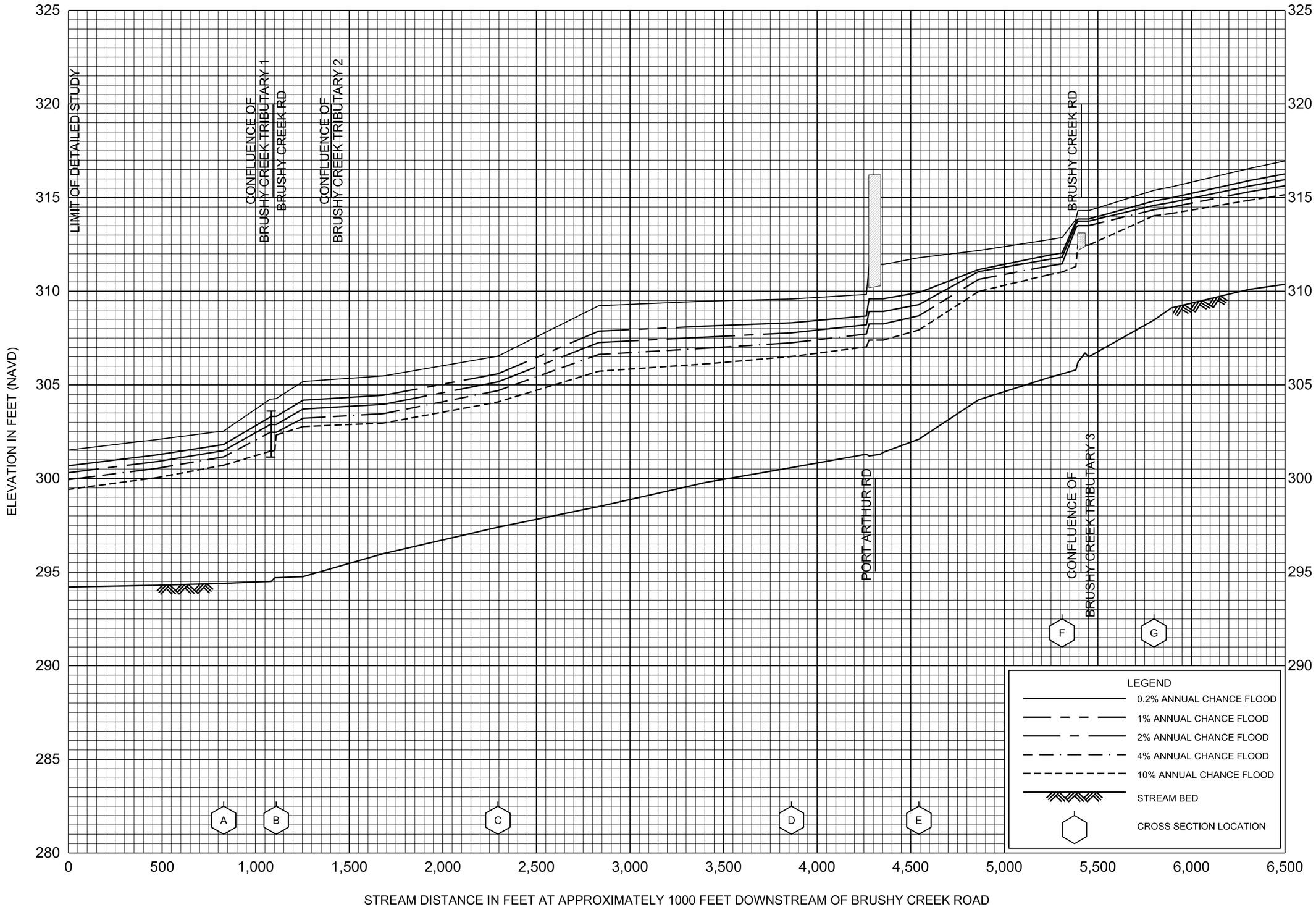
FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

02P



FLOOD PROFILES

BRUSHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCOPORATED AREAS

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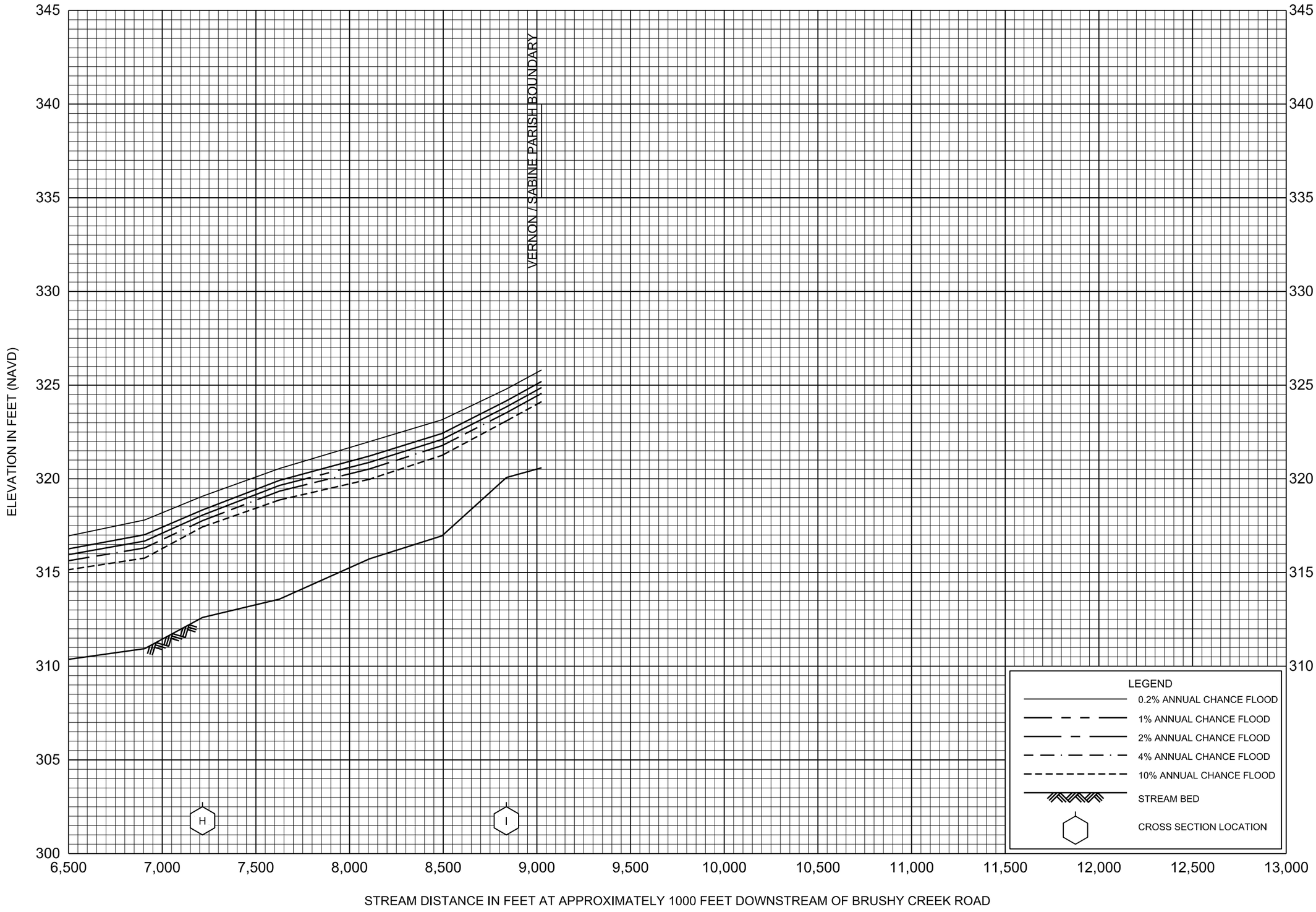


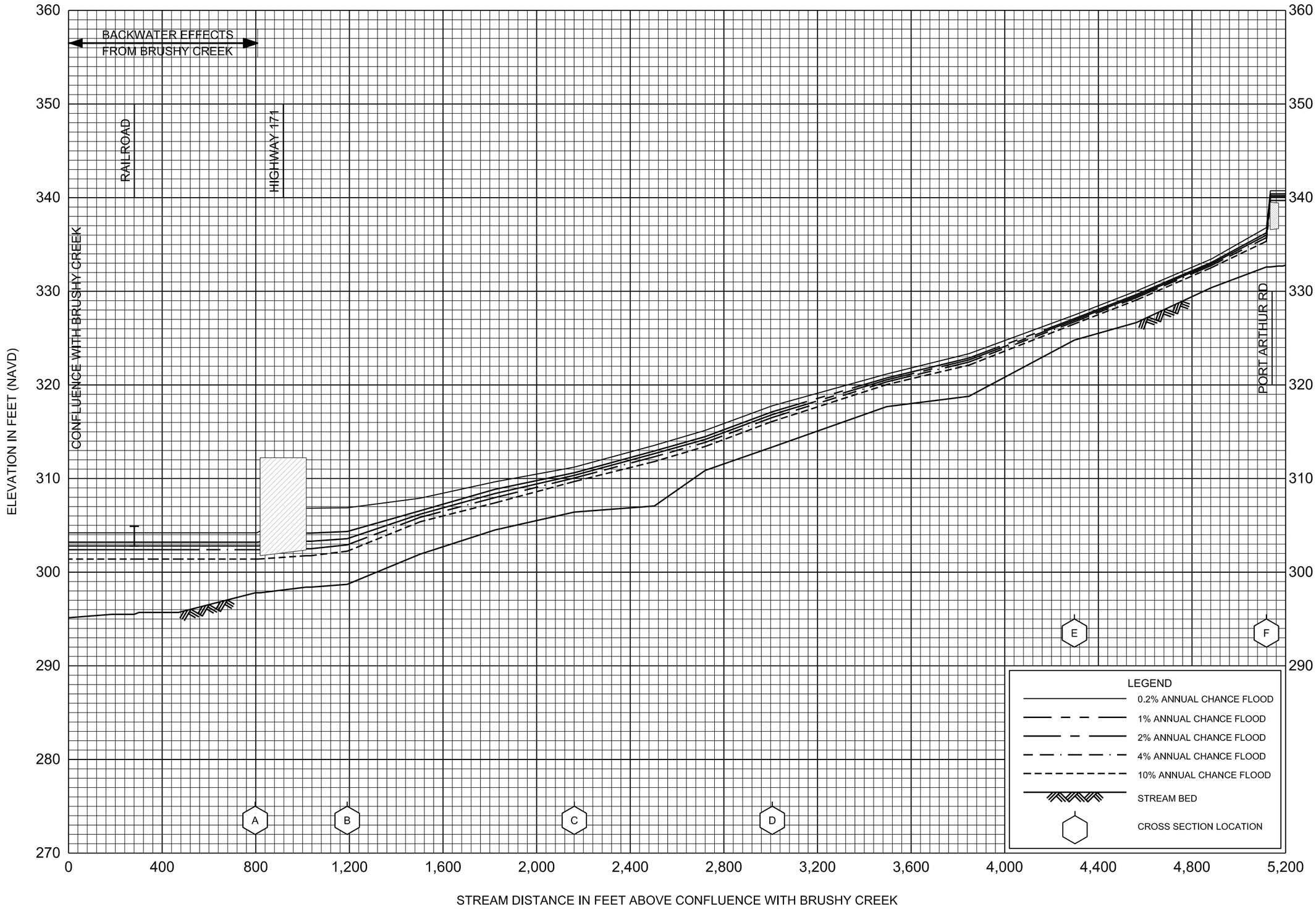
FLOOD PROFILES

BRUSHY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCOPORATED AREAS



FLOOD PROFILES

BRUSHY CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCORPORATED AREAS

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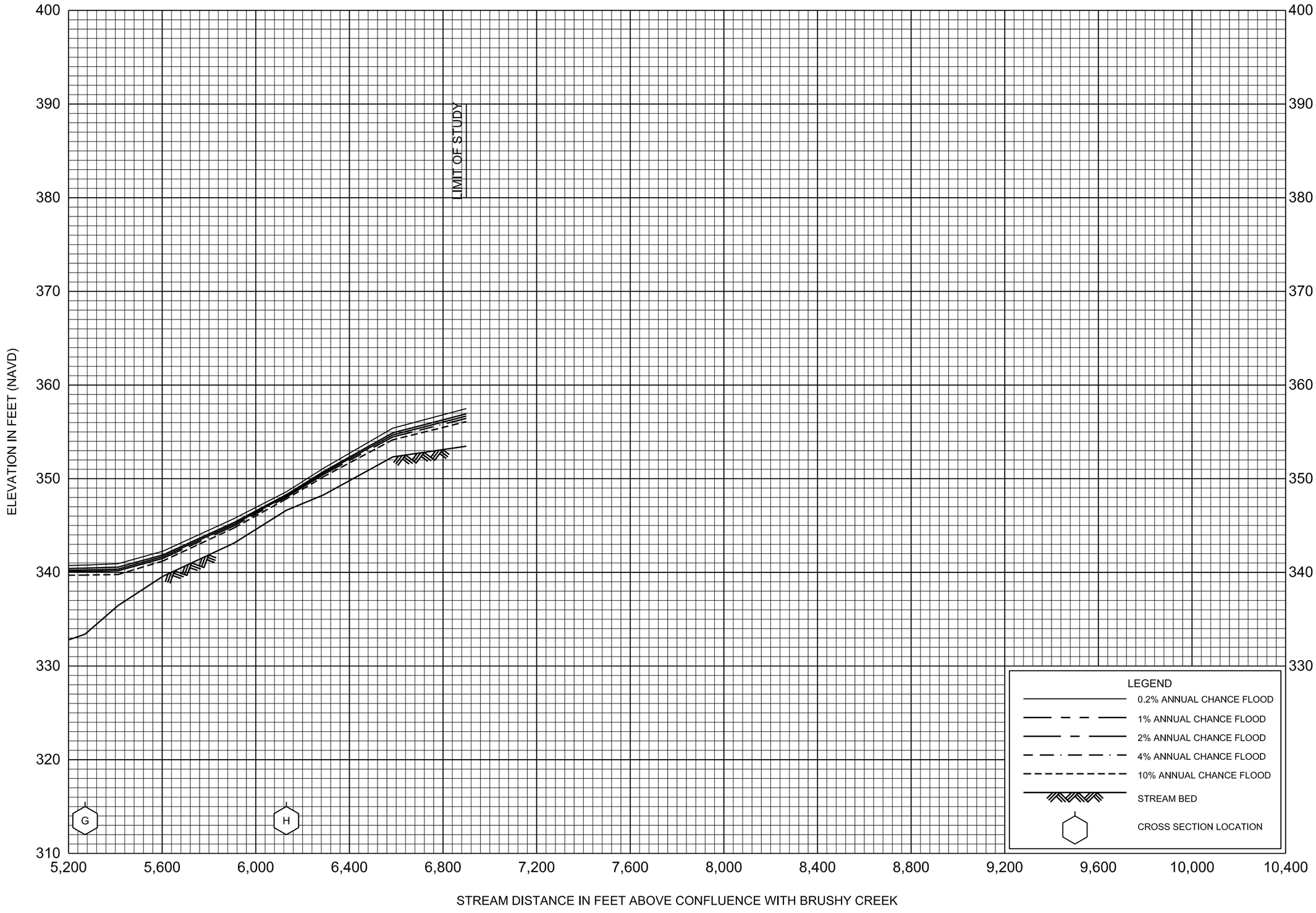

FLOOD PROFILES

BRUSHY CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCORPORATED AREAS

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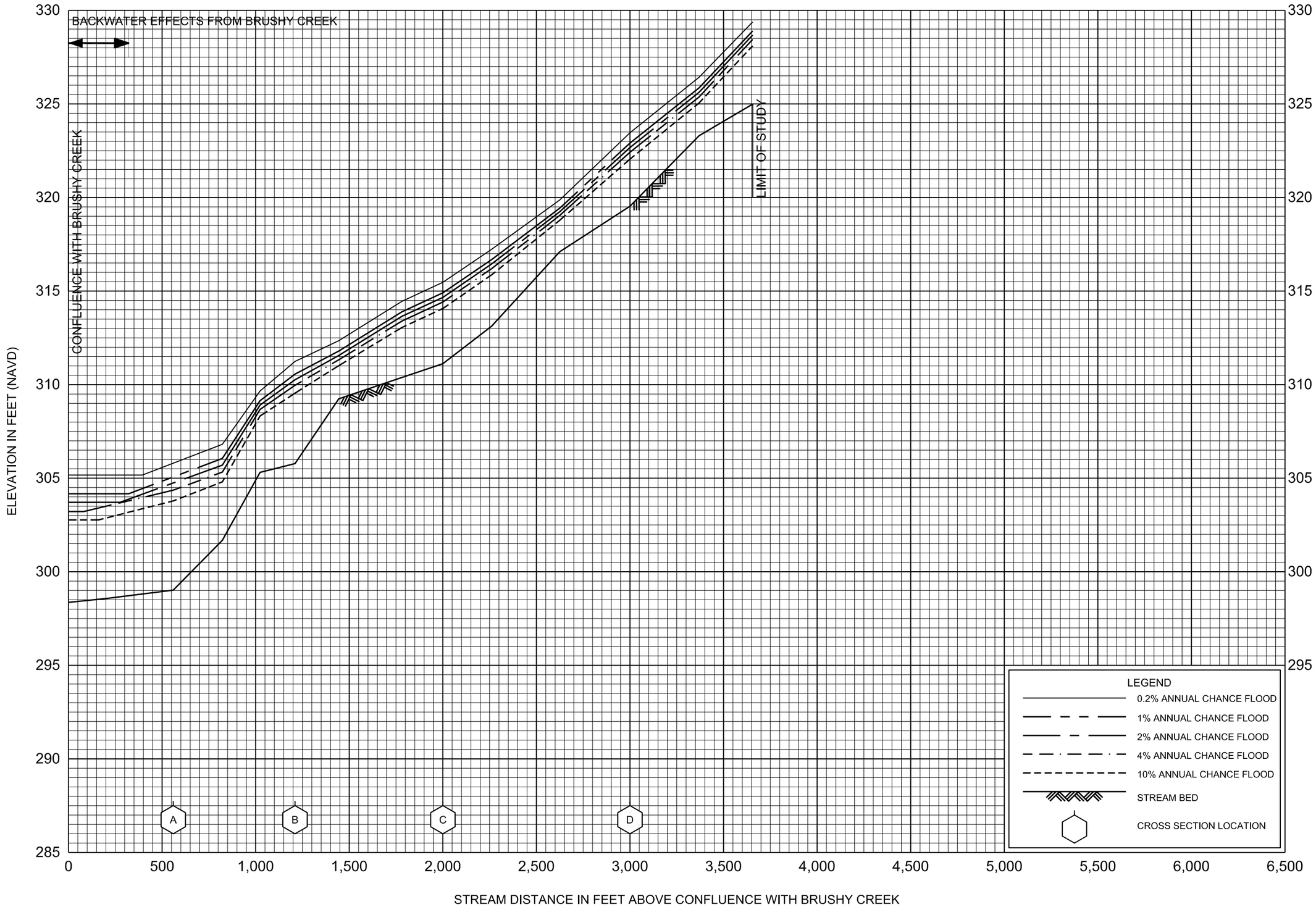


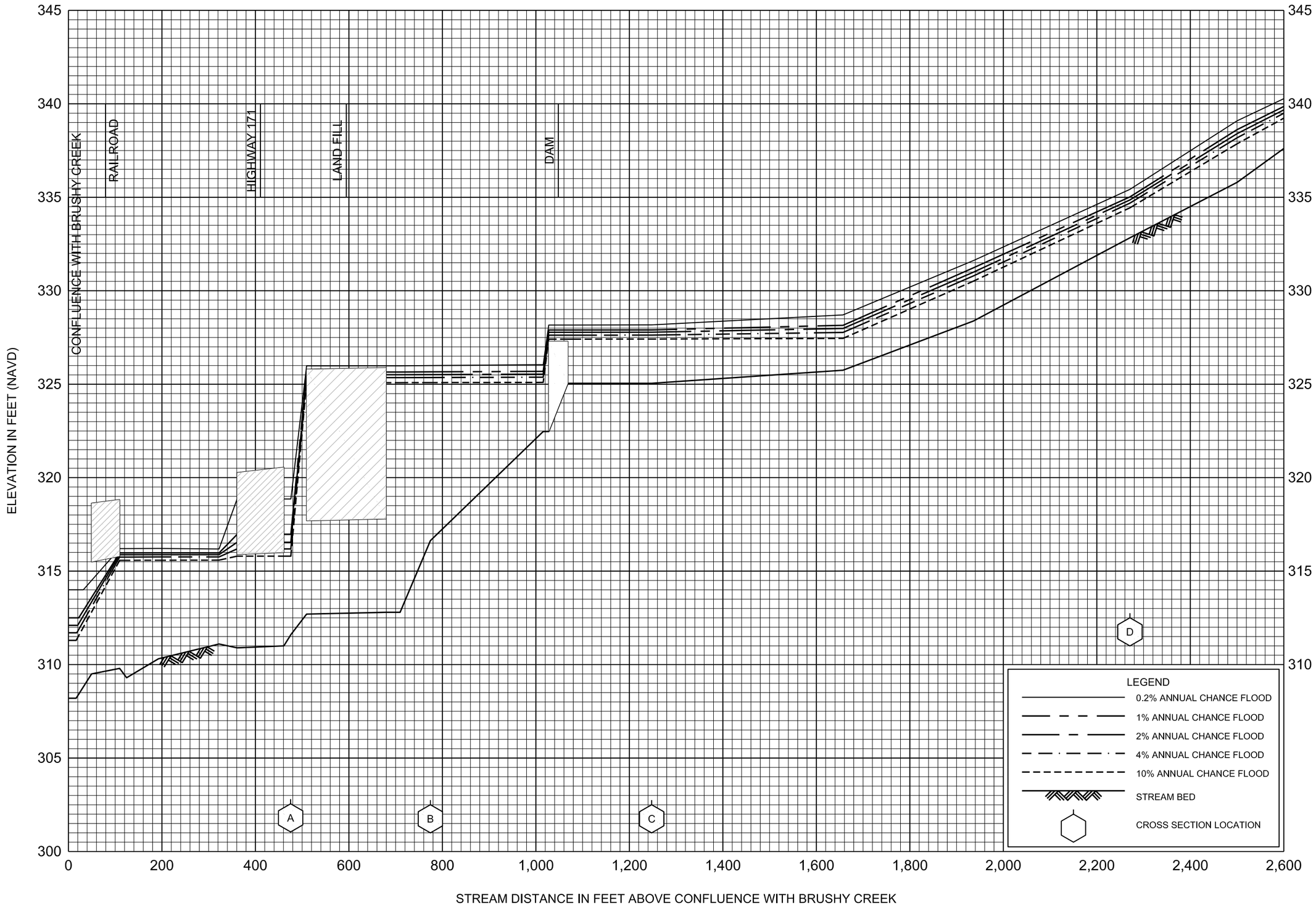
FLOOD PROFILES

BRUSHY CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCORPORATED AREAS



FLOOD PROFILES

BRUSHY CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCORPORATED ARES

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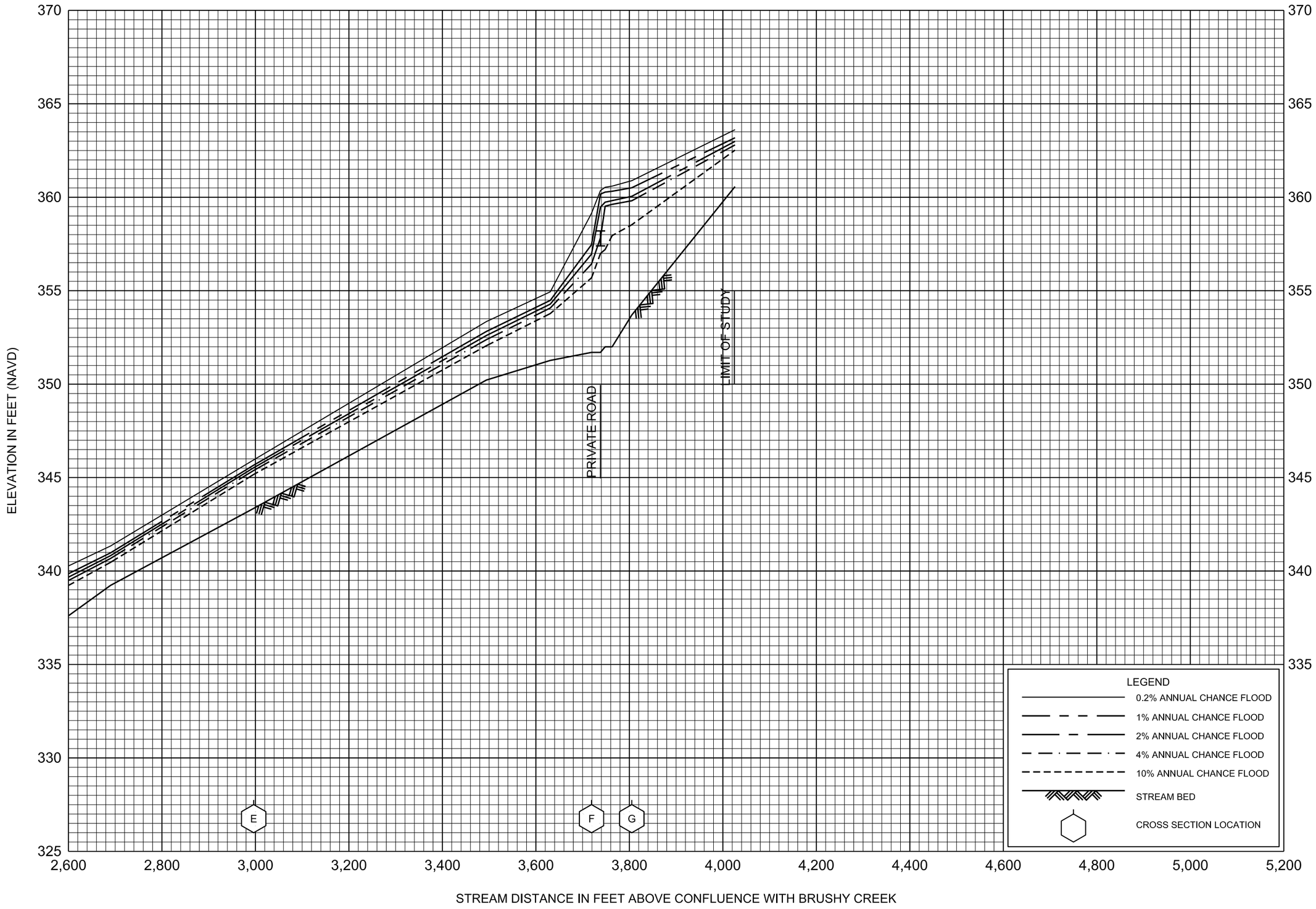


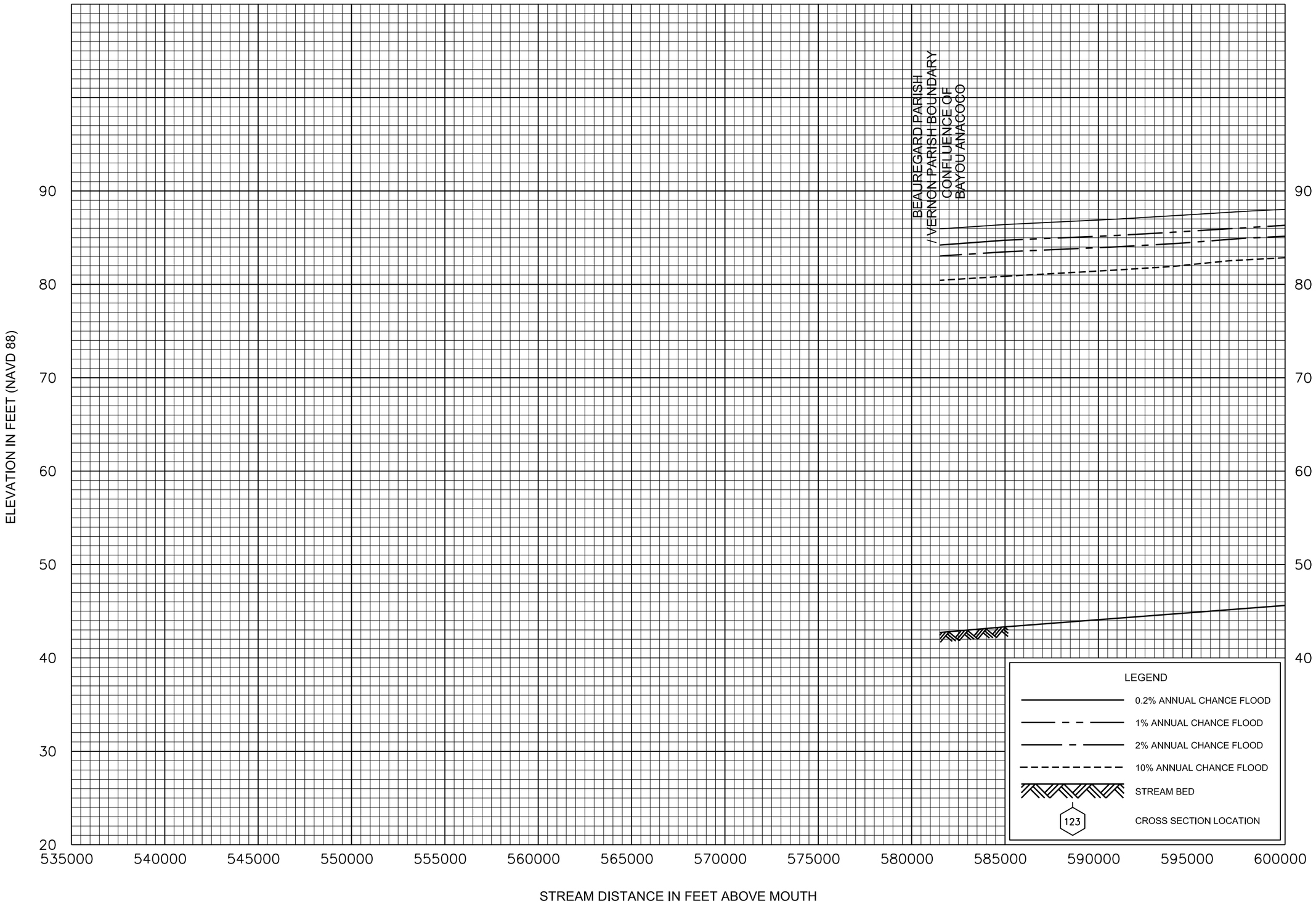
FLOOD PROFILES

BRUSHY CREEK TRIBUTARY 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA

AND INCORPORATED ARES



FLOOD PROFILES

SABINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

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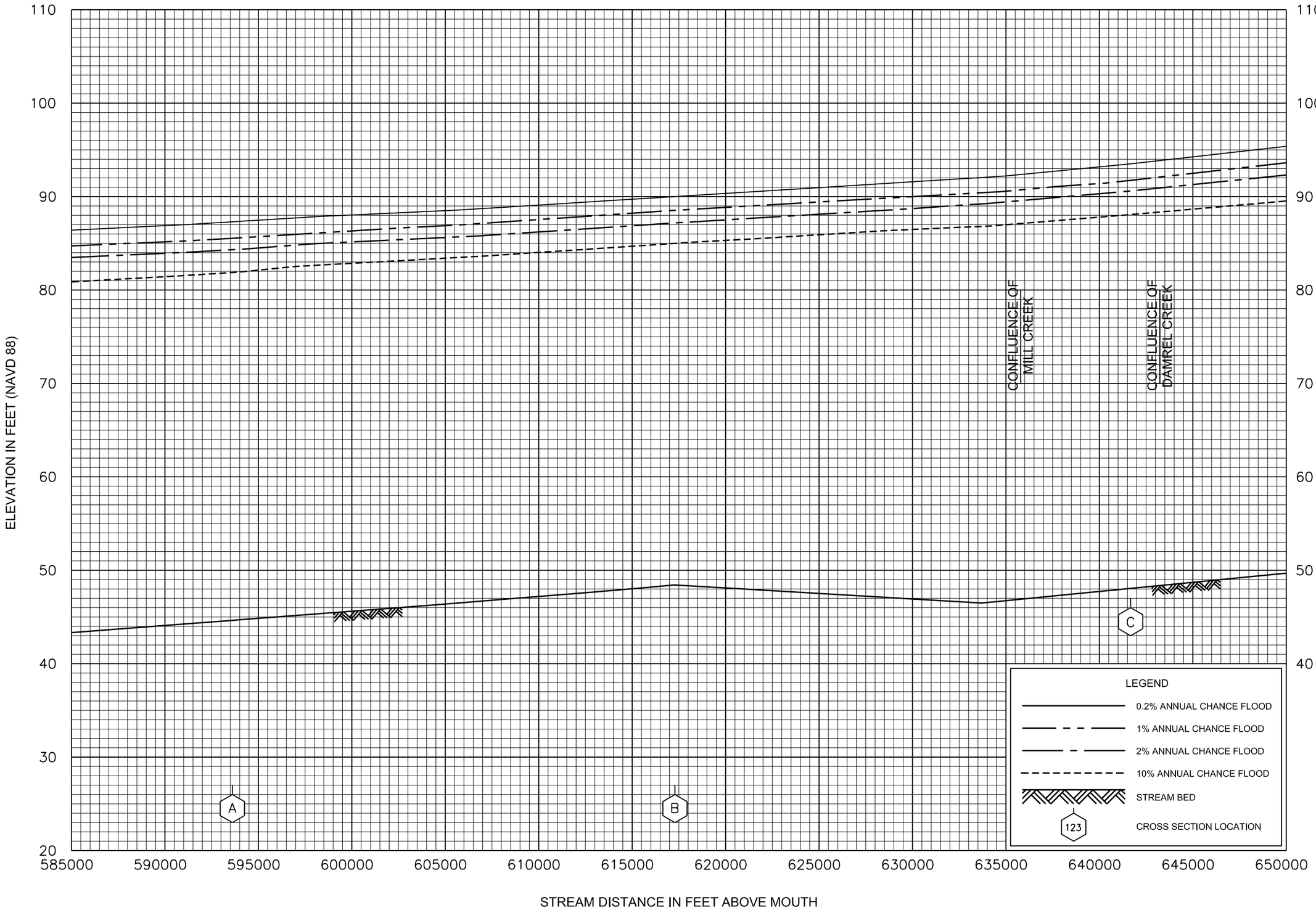
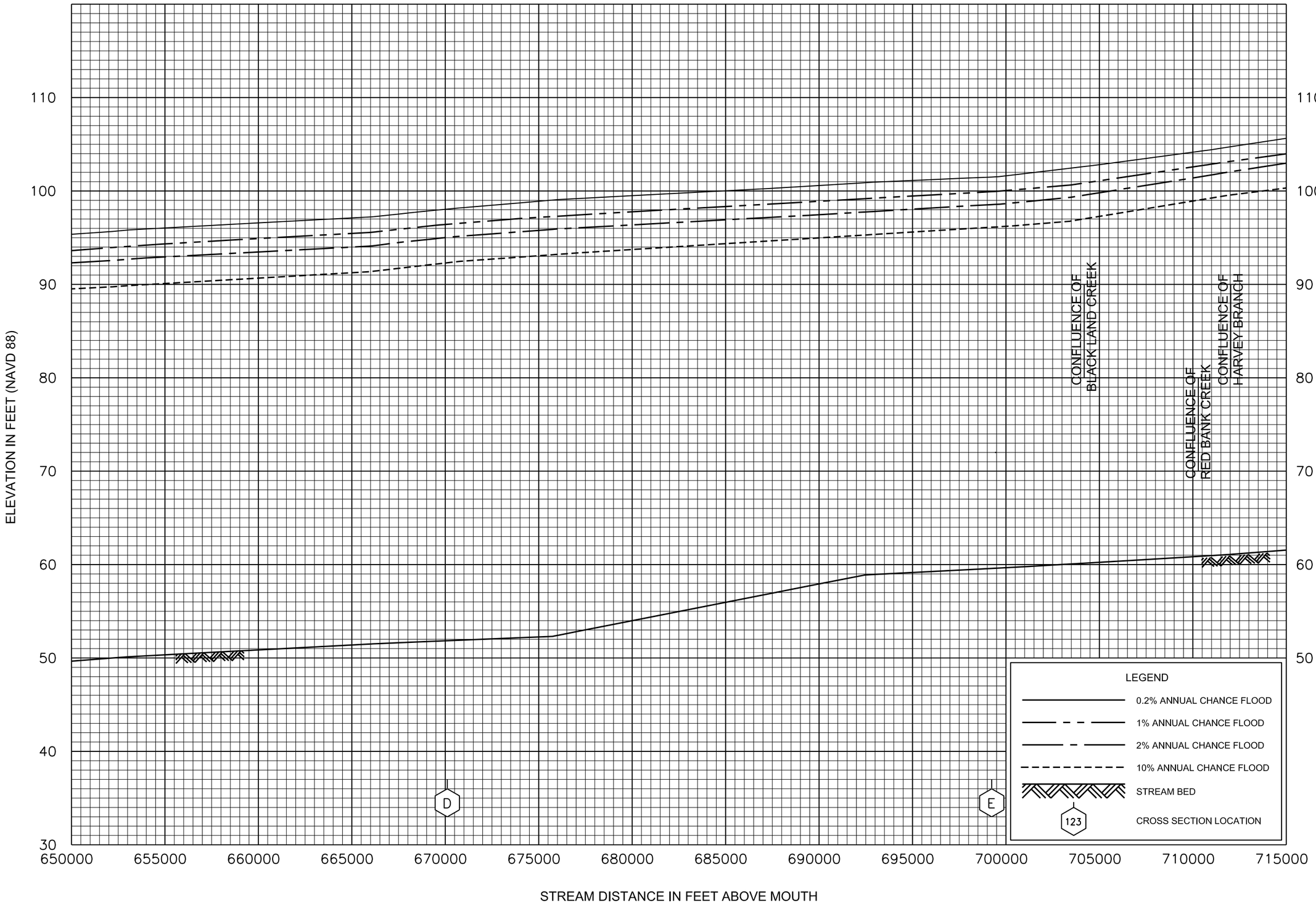


FLOOD PROFILES

SABINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

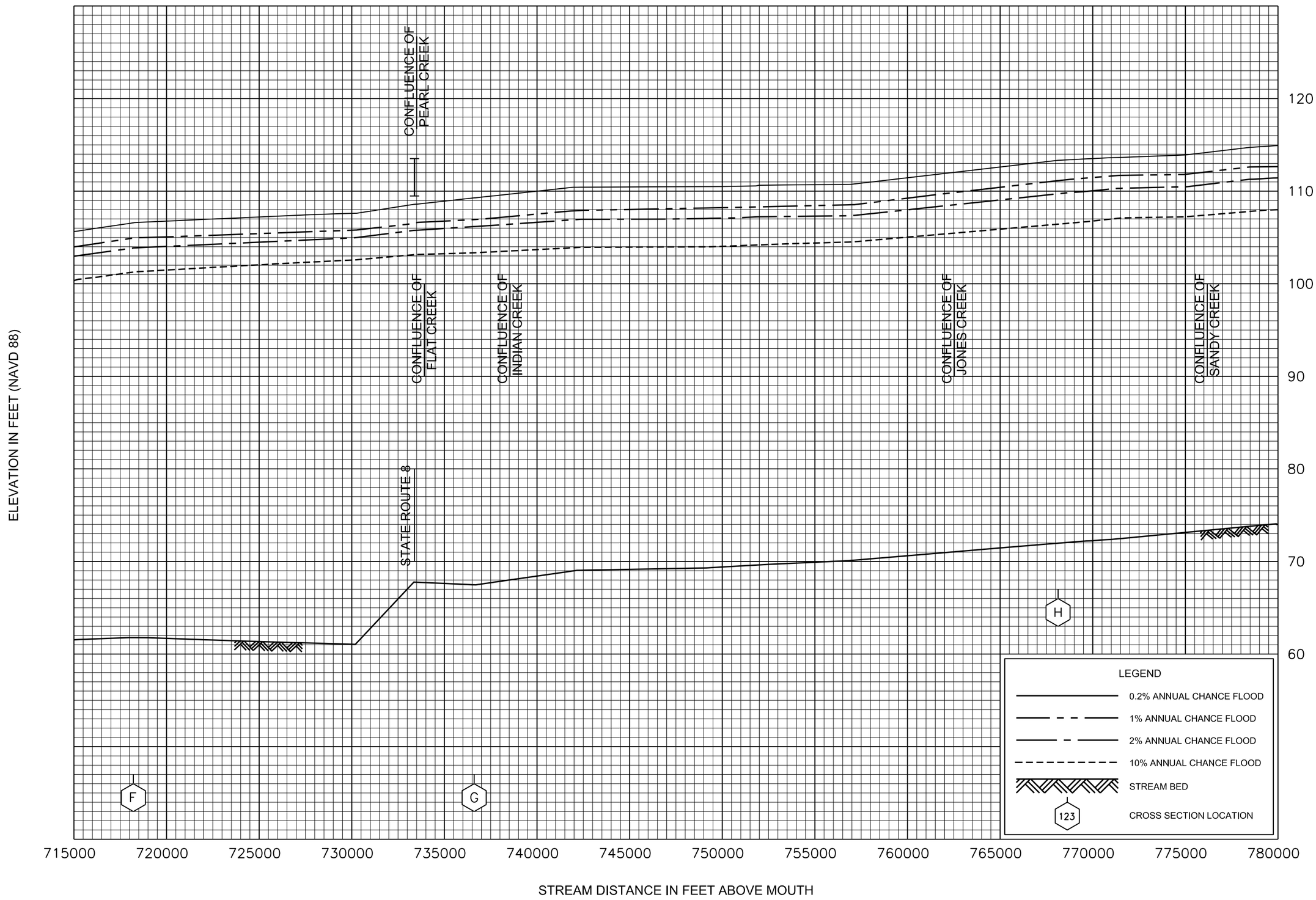


FLOOD PROFILES

SABINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

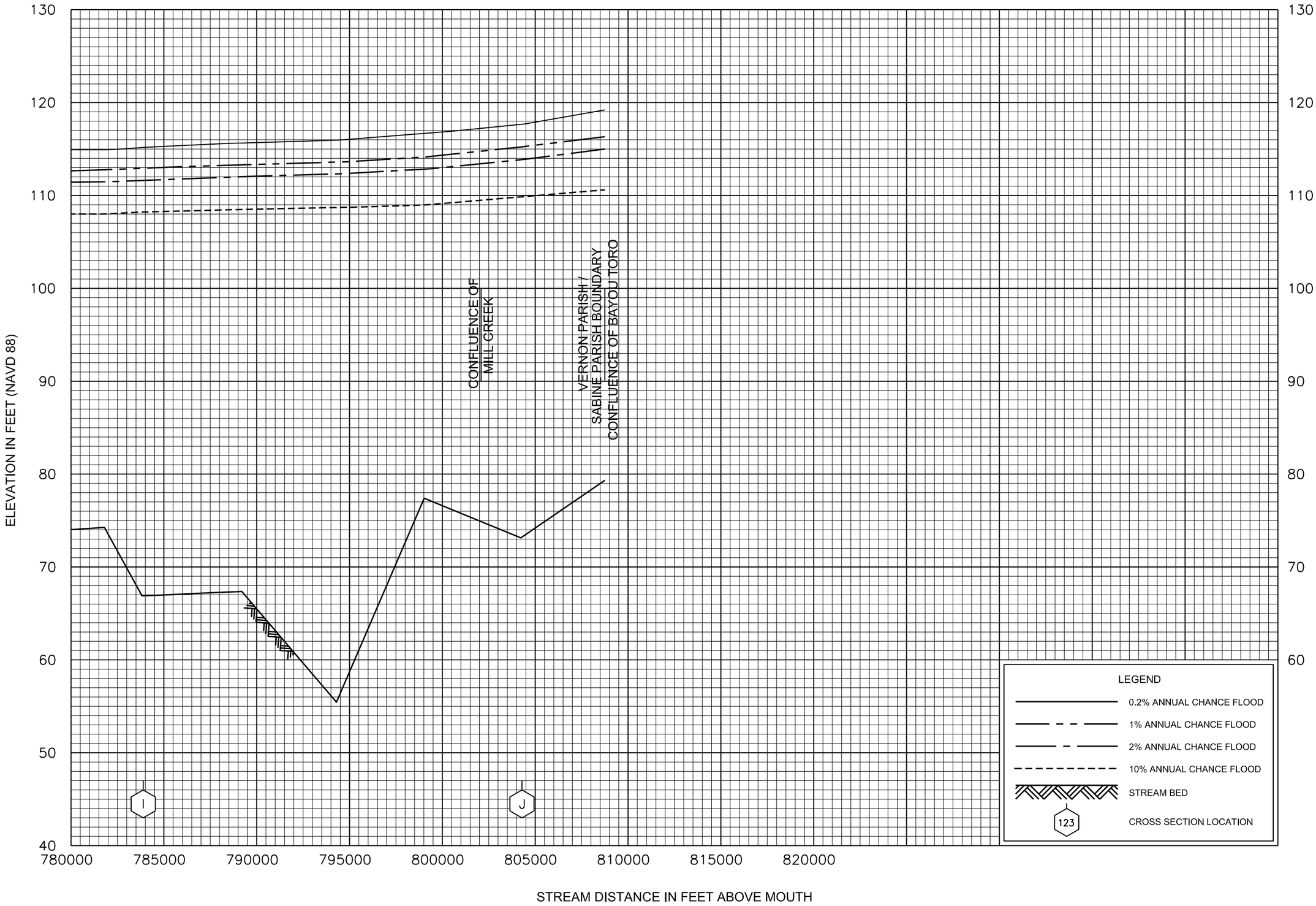


FLOOD PROFILES

SABINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

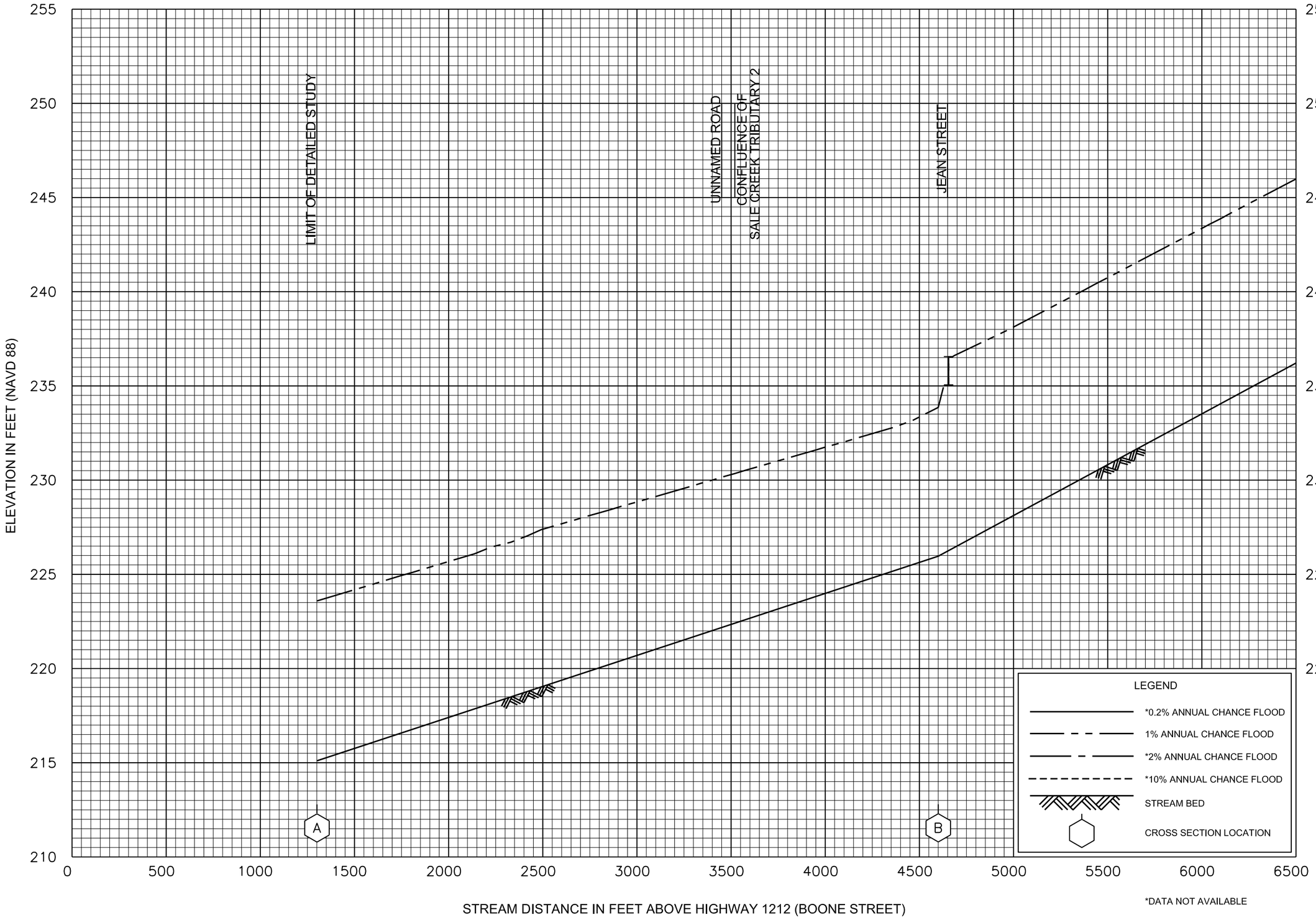


FLOOD PROFILES

SABINE RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

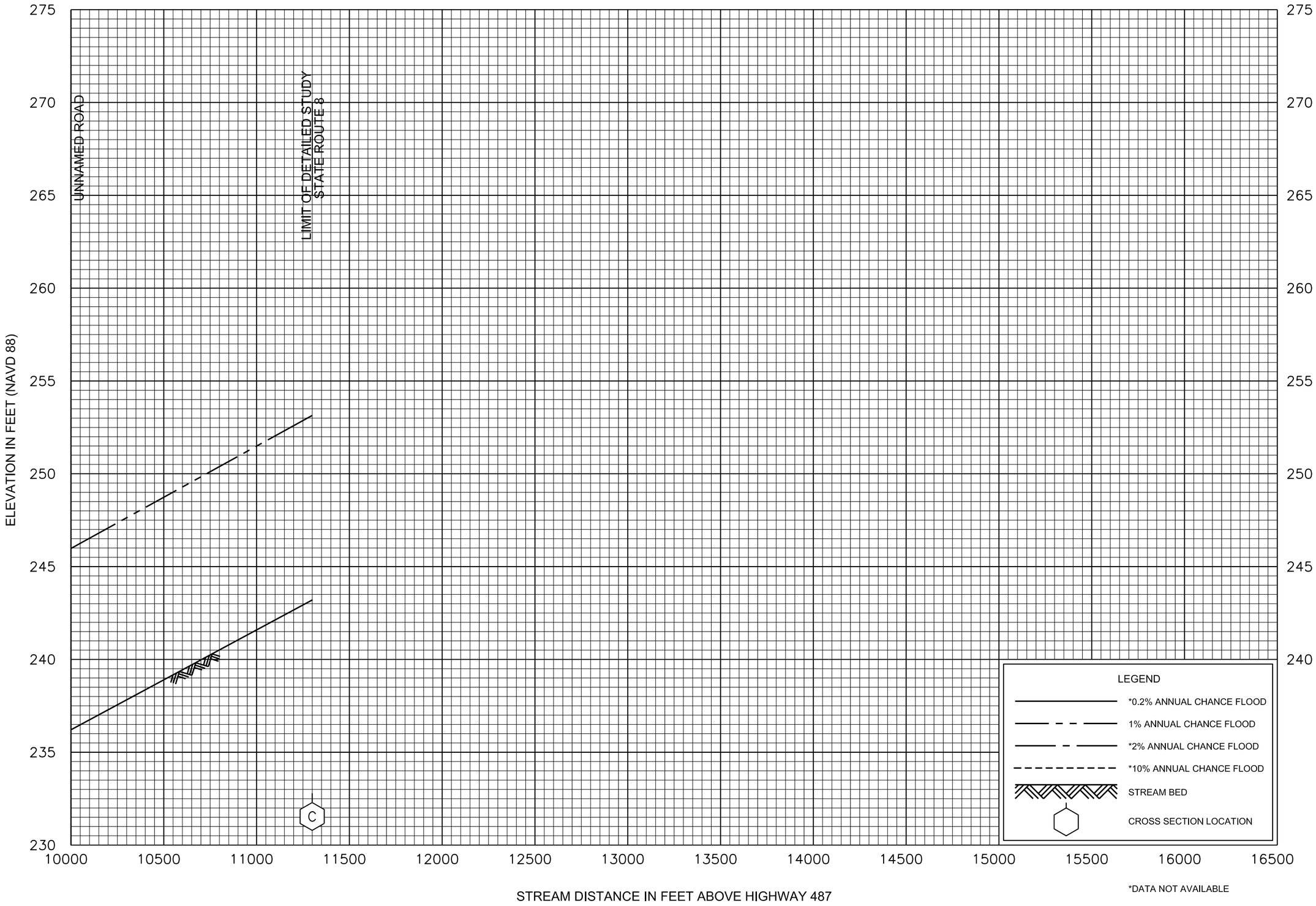


FLOOD PROFILES

SALE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

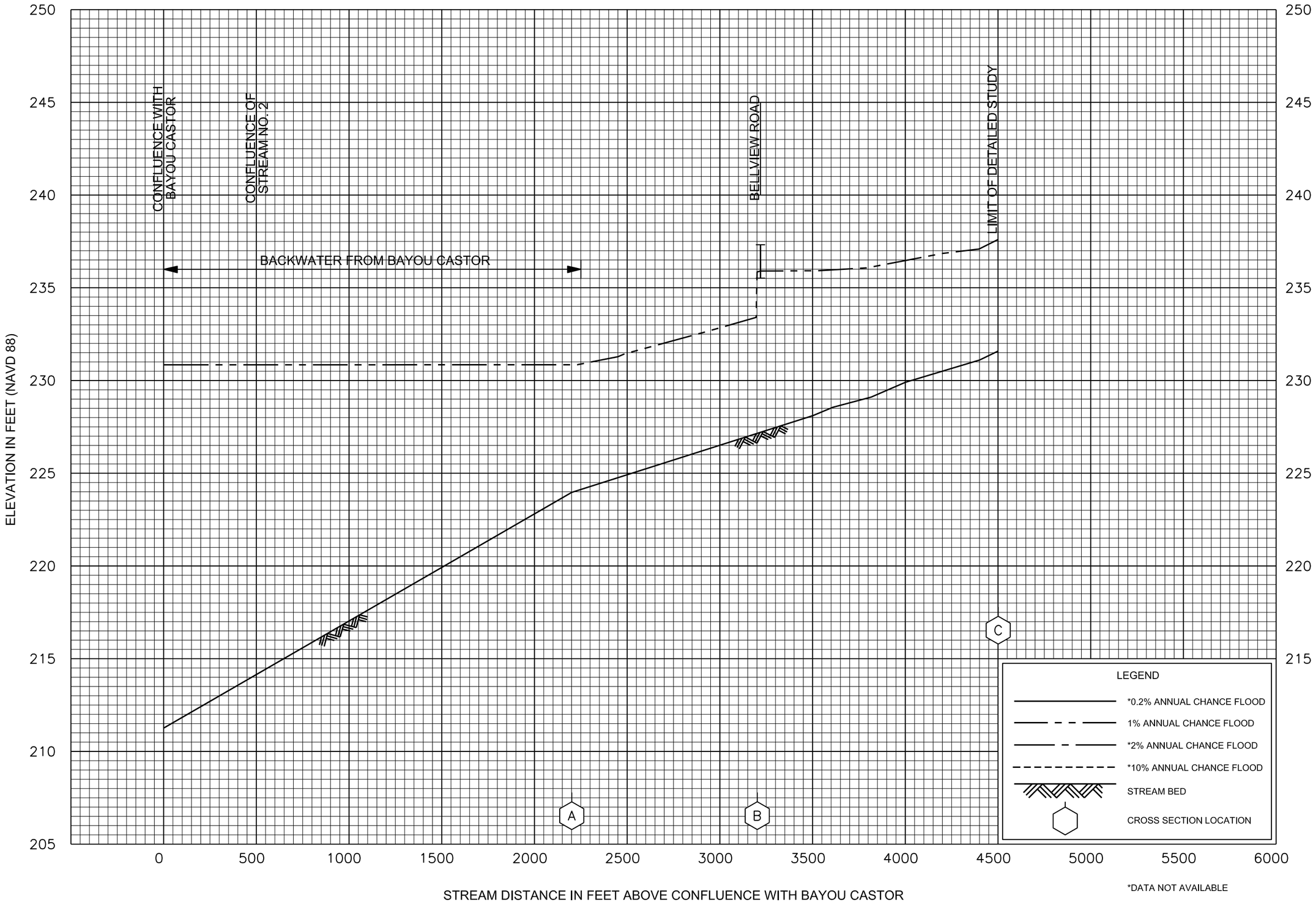


FLOOD PROFILES

SALE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS

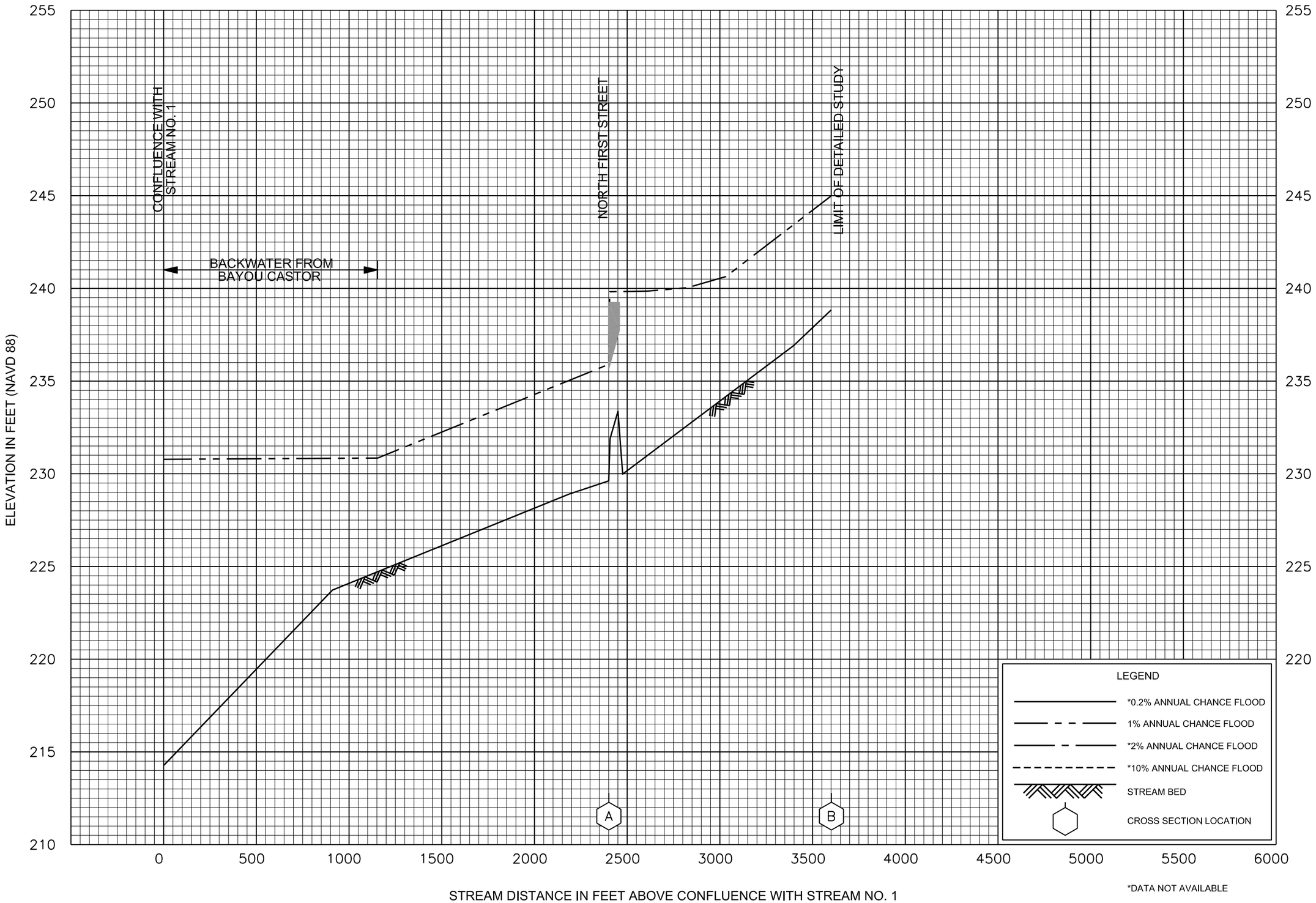


FLOOD PROFILES

STREAM NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS



FLOOD PROFILES

STREAM NO. 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VERNON PARISH, LA
AND INCORPORATED AREAS