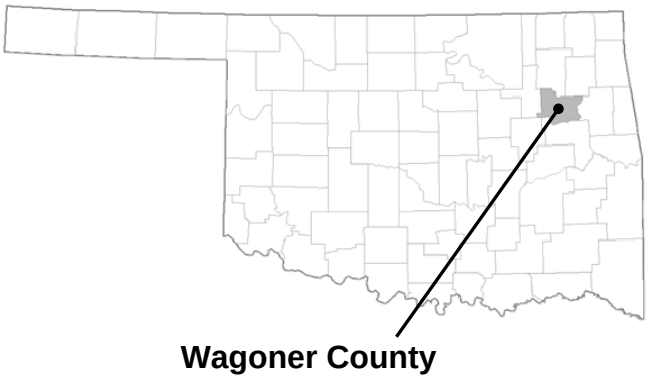
FLOOD INSURANCE STUDY

WAGONER COUNTY, OKLAHOMA
AND INCORPORATED AREAS



Community Name	Community Number
BIXBY, CITY OF	400207
BROKEN ARROW, CITY OF	400236
CATOOSA, CITY OF	400185
COWETA, CITY OF	400216
FAIR OAKS, TOWN OF	400509
OKAY, TOWN OF	400217
PORTER, TOWN OF	400434
RED BIRD, TOWN OF	400321
TULLAHASSEE, CITY OF*	400218
TULSA, CITY OF	405381
WAGONER, CITY OF	400219
WAGONER COUNTY (UNINCORPORATED AREAS)	400215

*Non-Floodprone Community

EFFECTIVE DATE
April 17, 2012

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
40145CV000A

NOTICE TO
FLOOD INSURANCE STUDY USERS

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

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

Old Zone	New Zone
A1 through A30	AE
V1 through V30	VE
B	X
C	X

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

Initial Countywide FIS Effective Date: April 17, 2012

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Flood Insurance Rate Map (published separately)

FLOOD INSURANCE STUDY

WAGONER COUNTY, OKLAHOMA AND INCORPORATED AREAS

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 Wagoner County, including the Cities of Broken Arrow, Bixby, Catoosa, Coweta, Tullahassee, Tulsa and Wagoner; the Towns of Fair Oaks, Porter, Okay, and Red Bird and the unincorporated areas of Wagoner County (referred to collectively herein as Wagoner 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 and to assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

Please note that the Cities of Bixby and Broken Arrow are geographically located in Tulsa and Wagoner Counties. The Wagoner County part of Bixby and Broken Arrow is included in this FIS report. The Tulsa County part of Bixby and Broken Arrow is included in the Tulsa County FIS report. The portion of Bixby shown in Wagoner County does not contain any Special Flood Hazard Areas (SFHAs). See separately published FIS report and Flood Insurance Rate Map (FIRM) for Tulsa County for flood hazard information outside of Wagoner County.

Please note that the Cities of Catoosa and Fair Oaks are geographically located in Rogers and Wagoner Counties. The Wagoner County part of Catoosa and Fair Oaks is included in this FIS report. The Rogers County part of Catoosa and Fair Oaks is included in the Rogers County FIS report.

Please note that the City of Tulsa geographically located in Osage, Rogers, Tulsa and Wagoner Counties. The portions in Wagoner County are included in this FIS report.

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 Revision 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, Wagoner County in a countywide format. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS report, is shown below.

The hydrologic and hydraulic analyses for the December 2, 1988 Wagoner County study

were prepared by the U.S. Army Corps of Engineers (USACE), Tulsa District, for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-84-E-1506, Project Order No. 1, Amendment No. 7 and 7A. This work was completed in May of 1986.

The hydrologic and hydraulic analyses for the September 18, 1986 City of Coweta study were prepared by the Tulsa District of the U.S. Army Corps of Engineers for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-E-1153, Project Order No. 1, Amendment No. 13. This work was completed in January of 1985.

The authority and acknowledgements for the Cities of Broken Arrow, Catoosa, Tullahassee, and Wagoner, and the Towns of Bixby, Porter, Okay, and Red Bird were not included because there were no previously printed FIS reports for these areas. Prior to this countywide FIS, the areas of study were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction at the time of publication.

For this countywide FIS, the hydrologic and hydraulic analyses for this study were performed by the Watershed Concepts, for FEMA, under Contract No. EMT-2002-CO-0048, Task Order J038. This study was completed in December 2007. Floodplain boundaries were delineated based on 10 and 30 meter Digital Elevation Models (DEMs) from the United States Geological Survey (USGS).

Base map information shown on this Flood Insurance Rate Map (FIRM) was derived from multiple sources. Base map information for Wagoner County and all incorporated communities within Wagoner County was provided in digital format by the State of Oklahoma, University of Oklahoma Center for Spatial Analysis. Additional base map data was also provided by the Oklahoma Department of Transportation and the Indian Nation Council of Government (INCOG). This information was compiled to create the FIRM panels. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features for clarity and readability.

The coordinate system used for the production of FIRM is Oklahoma State Plane (FIPS 3501), referenced to the North American Datum of 1983 and the GRS80. Differences in the datum and spheroid used in the production of the FIRMs for adjacent counties may result in slight positional differences in map features at the county boundaries. These differences do not affect the accuracy of information shown on the FIRM.

1.3 Coordination

An initial Consultation Coordination Officer's (CCO) meeting was held on April 9, 2007, and attended by representatives from FEMA, the community, and the study contractor.

The results of the study were reviewed at the final CCO meeting held on December 10, 2008, and attended by representatives of FEMA; the Cities of Broken Arrow, Catoosa, Coweta, Tullahassee, and Tulsa; Wagoner County; the Oklahoma Water Resources Board (OWRB); and the study contractor. All problems raised at that meeting have been addressed in this study.

2.0 AREA STUDIED

2.1 Scope of Study

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

In this county-wide study, the Arkansas River was studied by detailed methods; yet, floodplain boundaries of streams that have been previously studied by detailed methods were redelineated based on more detailed and up-to-date topographic mapping for this FIS report. Enhanced approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study for each stream were proposed to, and agreed upon, by FEMA and Wagoner County.

The September 18, 1986 Flood Insurance Study only studied the incorporated areas of City of Coweta, Oklahoma. The December 2, 1988 FIS only studied the unincorporated areas of Wagoner County. The following communities are located within Wagoner County but were not included in the December 2, 1988: the Cities of Broken Arrow, Coweta, Tullahassee, and Wagoner; and the Towns of Fair Oaks, Okay, Porter, and Red Bird.

Limits of new and revised detail studies streams included in this countywide FIS are shown in Table 1, "Scope of Study".

Table 1. Scope of Study

Flooding Source	Limits of Revised or Detail Study
Adams Creek	From the confluence with Verdigris River to the Tulsa/Wagoner County boundary
Arkansas River	From approximately 1.3 miles downstream of the Tulsa/Wagoner County boundary to the Tulsa/Wagoner County boundary
Broken Arrow Creek	From the Tulsa/Wagoner County boundary to approximately 1.0 mile upstream of East 101st Street
Broken Arrow Creek Tributary	From the confluence with Broken Arrow Creek to approximately 1.8 miles upstream of 209th East Ave
Covington Creek	The confluence with Adams Creek to approximately 220 feet upstream of East 101st Street
Covington Creek Tributary	From the confluence with Covington Creek to approximately 325 feet upstream of Forest Ridge Boulevard
Coweta Creek	From its confluence with the Arkansas River to approximately 1.0 mile upstream of East 121st Street
Coweta Creek Tributary A	From the confluence with Tributary A to approximately 915 feet upstream of South 289th East Avenue
Coweta Creek Tributary B	From the confluence with Coweta Creek to approximately 0.3 mile upstream of East 119th Street
East Coal Creek	From the confluence with Verdigris River to approximately 0.3 mile upstream of North Piece Avenue
Lone Star Creek	From the confluence with Adams Creek to the Tulsa/Wagoner County boundary
Middle Branch	From the confluence with Coweta Creek to the confluence with Middle Branch Tributary

Table 1. Scope of Study (continued)

Flooding Source	Limits of Revised or Detail Study
Middle Branch Tributary	From the confluence with Middle Branch to approximately 845 feet upstream of the confluence with Middle Branch
Midway Creek	From the confluence with Adam Creek to approximately 0.8 mile upstream of South 257th East Avenue
Neosho River	From the Muskogee/Wagoner County boundary to approximately 1.3 miles upstream of the Muskogee/Wagoner County boundary
Salt Creek	From the confluence with Verdigris River approximately 0.6 mile upstream of South 257th East Avenue
Salt Creek Tributary 1	From its confluence with Salt Creek to approximately 0.5 mile upstream of the confluence with Salt Creek
Salt Creek Tributary 2	From its confluence with Salt Creek to approximately 0.4 mile upstream of its confluence with Salt Creek
School Creek	From the confluence with Adams Creek to approximately 0.6 mile upstream of East Houston Street
Springtown Creek	From the confluence with Adams Creek to approximately 0.3 mile upstream of the confluence with Adams Creek
Spunky Creek	From the Rogers/Wagoner County boundary to the Tulsa/Wagoner County boundary
Spunky Creek Tributary A	From the Rogers/Wagoner County boundary to the Tulsa/Wagoner County boundary
South Branch	From the confluence with Middle Branch to approximately 300 feet upstream of North Fairland Avenue
Timber Creek	From the confluence with Adams Creek to approximately to approximately 0.7 mile upstream of South 257th East Avenue
Tributary A	From the confluence with Coweta Creek to the confluence with Coweta Creek Tributary A
Verdigris River	From the Muskogee/Wagoner County boundary to the Rogers/Wagoner County boundary
Verdigris River Divergence	From the confluence with Verdigris River to approximately 4.7 miles upstream of Verdigris River
West Coal Creek	From the confluence with Verdigris River to approximately 1.0 mile upstream of East 91st Street

This countywide FIS also incorporates the determination of letters issued by FEMA resulting in Letters of Map Change as shown in Table 2, "Letters of Map Change".

Table 2. Letters of Map Change

Community	Flooding Source(s) and Project Identifier	Date Issued	TYPE
CITY OF BROKEN ARROW	Unnamed tributary to Spunky Creek – 00-06-412P	June 5, 2000	LOMR
	Covington Creek Tributary – 00-06-156P	October 5, 2000	LOMR
	Broken Arrow Creek – 04-06-1611P	October 13, 2005	LOMR
	Covington Creek – The Highlands Subdivision – 06-06-BH69P	August 16, 2007	LOMR
WAGONER COUNTY (UNINCORPORATED)	Adams Creek -- County Gentleman Estates – 02-06-1643P	April 4, 2003	LOMR
CITY OF COWETA	Middle Branch of Coweta Creek – Carriage Crossing Addition – 99-06-1770P	March 10, 2000	LOMR

2.2 Community Description

Wagoner County is in northeastern Oklahoma. The county is bordered by the following areas: Rogers County to the north and northwest, Mayes County to the northeast, Cherokee County to the east, Muskogee County to the south, Okmulgee County to the southeast and Tulsa County to the west. It occupies approximately 605 square miles.

According to the United States (U.S.) Census Bureau's Population Estimates Program, there are approximately 66,313 inhabitants that make up Wagoner County's population in 2006. Wagoner County is served by Interstate 44 and US Highways 412 and 69. Approximately 7,669 residents live in the county seat of Wagoner County, the City of Wagoner. Additionally, 7,139 residents live in the City of Coweta, which is located in southwestern Oklahoma. Approximately 1,500 residents live in the Wagoner County portion of the City of Broken Arrow (Reference 1).

Wagoner County's economy relies heavily upon agriculture and light industry (located mainly along the Verdigris River Navigation Channel). Most pressure for new development is located in the upper Adams Creek basin near the City of Broken Arrow, and also along Spunky Creek and Broken Arrow Creek Tributary located in western Wagoner County. Intensive industrial development is probable along the Verdigris River because of the navigation system. Most undeveloped land is either pasture or in use for crop production.

The average annual precipitation for the region is approximately 38 to 39 inches, and the average annual temperature is approximately 61 degrees Fahrenheit (^{o}F).

Soils vary from deep, moderately drained, silty clay loams in the floodplains to shallow, stony soils in the uplands. Topography in the area is characterized by broad, flat expanses

of land in the floodplains to gently rolling hills in the uplands.

2.3 Principal Flood Problems

The major flooding problems in Wagoner County are the result of bridge structures (box culverts) on many of the smaller streams that create additional upstream flood depths. Some of the channel reach lengths along the smaller streams are choked with brush and small trees that help impede floodwaters. The most notable floods occurred along the Verdigris River in November 1941, May 1943, and May 1961. Peak discharges for those floods were 224,000 cubic feet per second (cfs), 118,000 cfs, and 105,000 cfs, respectively. These floods also have a recurrence interval of 60, 10, and 5 to 10 years, respectively. Significant flooding has occurred in the Adams Creek Basin and tributaries in 1976, 1986, 1999, 2006, and 2008.

A gaging station is located on the downstream side of State Route 20 over the Verdigris River, at river mile 76.0, and has a period of record from October 1953 to the present. Another gaging station was in operation at the downstream side of Old State Route 33 over the Verdigris River, at river mile 48.8, and had a record of operation from March 1940 to September 1970.

Little specific information is available concerning early Coweta-area floods. It is known that Coweta Creek flooded in the 1940s, and the soil bears evidence of earlier flooding along the creek (Reference 2).

A major flood occurred along Coweta Creek on June 19, 1980, after a violent early morning thunderstorm that followed a week of heavy rain. The flood caused $1.9 million (1980 dollars) in damage to approximately 45 homes and businesses, as well as several bridges, roads, and utilities. Damage along the creek stretched through Coweta to an area 2 miles north of the city (Reference 2).

2.4 Flood Protection Methods

The Verdigris River channel has been enlarged and straightened along much of the study reach as part of the McClellan-Ferr Arkansas River Navigation System. The project provides a navigation route from the Mississippi River, through the state of Arkansas, then upstream to its termination at the Port of Catoosa, located approximately 15 miles east of Tulsa, Oklahoma.

Covington Creek was slightly enlarged and straightened from the 71st Street South Bridge upstream approximately 0.53 mile when residential development was constructed in that area. The degree of 1-percent-annual flood reduction as a result of that effort is minimal.

Numerous small farm ponds are located throughout the county but do not provide a significant amount of flood reduction because of the relatively small drainage area they control.

Non-structural measures of flood reduction are also being used to aid in the prevention of future flood damages. These measures are in the form of land use regulations, adopted from the Code of Federal Regulations, which control building within the areas that have a high risk of flooding. Wagoner County entered the emergency phase of the NFIP in July 1981, and development is regulated by a floodplain management ordinance.

Several existing and proposed flood control structures are located in the Verdigris River

basin upstream of the study area. Existing reservoirs include Fall River, Toronto, Elk City, and Big Hill Lakes in Kansas, and Oologah, Copan, Hulah, Birch, and Skiatook Lakes in northern Oklahoma. These lakes are used not only for flood control but also for navigation, water supply, water quality, and recreation. The lakes are operated as a total system.

The Chouteau Lock and Dam and the Newt Graham Lock and Dam were constructed as part of the McClellan-Kerr Navigation System and are used solely for purposes of maintaining proper navigation depths along the channel. Fort Gibson Reservoir was constructed during the period 1946 to 1950 and is used for flood control, recreation, and hydropower.

There are no levees in Wagoner County; however, several miles of spoil berms are located along much of the navigation channel of Verdigris River. In much of the study reach, the berms confine the effective flow area to inside the channel itself. Because of the numerous breaks and low points in the spoil berms, flooding will occur in the overbank portions of the floodplain.

3.0 ENGINEERING METHODS

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

3.1 Hydrologic Analyses

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

Pre-Countywide Analysis

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

Flood flow frequency data for the Verdigris River were previously developed in the Verdigris River basin Hydropower Feasibility Study and were used in the FIS for the unincorporated areas of Rogers County (Reference 3 and 4). A statistical analysis of peak flows at the Inola and Claremore gages was conducted as part of that study. Historical flood flows were available at the Inola gage for the period of October 1939 through September 1962. Flows at both gages were slightly regulated since 1949 by Toronto and Fall River Lakes in Kansas and since 1950 by Hulah Reservoir in Oklahoma. Of the 7,911 square miles of drainage area above the Claremore gage, approximately 2,047 square miles

were somewhat regulated during the period of study. Methods outlined in Bulletin 17B were used in developing the natural frequency curves at the gages (Reference 5). Hypothetical flows for conditions regulated by Toronto and Fall River Lakes, and Hulsh, Oologah, Copan, Elk City, Big Hill, Birch, and Skiatook Reservoirs were developed using the Southwestern Division Hydrologic Runoff Computer Model (Reference 6). Those flows were used to derive a modified discharge-frequency curve at the gages. Hydrologic data previously developed for the FIS for the unincorporated areas of Tulsa County was also used in correlating the discharge-frequency information at the Inola and Claremore gages (Reference 7).

Hydrologic data for the Neosho River was taken from the FIS for the Town of Fort Gibson (Reference 8).

The hydrologic analysis and discharge determination for the Arkansas River was performed by the Tulsa District USACE. Please see the Tulsa District USACE Summary of Studies Report on the Peak Discharge Frequency Determination, Tulsa-Haskell Reach Arkansas River, Oklahoma for more detailed information (Reference 9).

Flood flow frequency data for the remaining streams studied by detailed methods were based on a synthetic unit hydrograph approach and a regional frequency rainfall analysis. The watersheds were appropriately subdivided and synthetic unit hydrographs were determined for each sub-area, using Snyder's Method. Snyder's unit graph coefficients and rainfall data were based on regional studies performed for the Flood Insurance Studies for the unincorporated areas of Rogers County and the City of Tulsa (Reference 3 and 10). The estimated rainfall excesses were then applied to the unit graphs to obtain runoff. Runoff values from the individual sub-areas were then routed downstream by the storage-discharge method and combined to determine peak flow values at key points along the streams. This was accomplished through the use of the USACE HEC-1 flood hydrograph computer program (Reference 11).

In the September 18, 1986 City of Coweta study, the watershed was divided into sub-areas, and synthetic unit and flood hydrographs were developed at selected locations. Technical Paper No. 40 was used in developing the 10-, 2-, 1-, and 0.2 percent-annual-chance frequency storms (Reference 12). The 0.2-percent-annual-chance storm was based on extrapolated data. Peak discharge-frequency values were computed for selected locations.

The routing of flood hydrographs through each sub-basin was accomplished using a modified Puls reservoir routing. The USACE HEC-2 step-backwater computer model provided the elevation-discharge-storage relationships (Reference 13).

Countywide Analyses

Discharges for the 1-percent-annual chance recurrence interval for all new approximate study streams in Wagoner County were determined using the General Rural area USGS regression equations for Oklahoma as described in USGS National Flood-Frequency Program – Methods for Estimating Flood Magnitude and Frequency in Rural and Urban Areas in Oklahoma Report (Reference 14).

Peak discharge-drainage area relationships for streams studied by detailed methods are shown in Table 3, "Summary of Discharges".

Table 3. Summary of Discharges

Flooding Source	Location	Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Adams Creek	At upstream side of 321st East Avenue	45.5	4,750[1]	11,990[1]	16,340[1]	29,230[1]
	At 341st East Avenue	15.4	4,490	9,810	12,330	19,140
	At confluence of Lone Star Creek	1.3	960	1,830	2,290	3,530
Arkansas River	Approximately 2.4 miles downstream of Old Highway 104	*	90,000	155,000	205,000	490,000
Verdigris River	At the confluence with Arkansas River	8,303	48,500	83,500	104,000	210,000
	At State Route 33	7,911	48,500	83,500	104,000	210,000
Verdigris River Divergence	At Dam No. 17	*	48,500	83,500	104,000	210,000
East Coal Creek	At upstream side of U.S. Route 69	16.5	4,780	9,650	12,260	19,460
	At State Route 51	3.6	1,110	2,270	2,870	4,480
West Coal Creek	At Lone Star Road	14.8	3,350	7,040	9,020	14,520
	At 91st Street South	1.7	1,200	2,280	2,850	4,390
Springtown Creek	At confluence with Adams Creek	0.6	460	870	1,090	1,670
Midway Creek	At confluence with Adams Creek	4.6	2,020	4,170	5,270	8,210
Timber Creek	At confluence with Adams Creek	2.5	970	1,960	2,460	3,830
Covington Creek	At 81st Street South	3.7	2,130	3,170	4,020	6,380
Covington Creek Tributary	At confluence with Covington Creek	1.0	600	1,150	1,440	2,230
School Creek	At confluence with Adams Creek	2.8	1,250	2,640	3,340	5,270
	At 81st Street South	1.1	810	1,580	1,970	3,050

Table 3. Summary of Discharges (continued)						
Flooding Source Location		Drainage Area *(square miles)*	Discharges *(cfs)*			
			10% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Coweta Creek	At the confluence with the Arkansas River	12.87	4,180	9,300	11,910	18,871
	At the confluence with Middle Branch	9.14	3,520	7,540	9,630	15,210
	At the confluence of Tributary A	6.09	3,010	6,090	7,760	12,020
	At the confluence of Tributary B	2.80	1,670	3,400	4,280	6,650
Middle Branch	At the confluence with Coweta Creek	0.90	540	1,070	1,350	2,120
South Branch	At the confluence with Middle Branch	0.99	740	1,570	1,980	3,100
Tributary A	At the confluence with Coweta Creek	1.59	770	1,520	1,910	2,940

* Data not available

[1] Flows at the lower end of Adams Creek are reduced due to extreme amount of floodplain valley storage as a result of the extremely flat terrain in the downstream reach

3.2 Hydraulic Analyses

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

Pre-Countywide Analyses

The 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.

Cross sections for the backwater analyses of the streams studied by detailed methods in the City of Coweta, Oklahoma (Coweta Creek, Middle Branch, South Branch and Tributary A) were obtained from topographic maps compiled from aerial photographs (Reference 15). Cross sections were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of these structures.

Cross sections for the Verdigris River Divergence Channel were field surveyed. Cross sections for all other streams studied by detailed methods in Wagoner County unincorporated areas were taken from aerial photogrammetric maps at a scale of 1:2,400 and 1:7,200 and with a contour interval of 2 feet (Reference 16). Bridge structures were field measured and checked against bridge plans when available.

The hydraulic analysis for the Neosho River was taken from the Flood Insurance Study for the Town of Fort Gibson (Reference 8).

Channel roughness coefficients (Manning's "n") used in the hydraulic computations for the streams studied by detailed methods were chosen by engineering judgment and based on field observations of the streams and floodplain areas.

The channel "n" and overbank "n" values for streams studied by detailed methods are listed in Table 4, "Summary of Roughness Coefficients".

Table 4. Summary of Roughness Coefficients

Stream	Channel "n"	Overbank "n"
Adams Creek	0.050 – 0.100	0.070 – 0.110
Arkansas River	0.015 – 0.035	0.050 – 0.150
Broken Arrow Creek	0.045 – 0.070	0.045 – 0.080
Broken Arrow Creek Tributary	0.060	0.070 – 0.080
Covington Creek	0.050 – 0.090	0.060 – 0.110
Covington Creek Tributary	0.050 – 0.080	0.060 – 0.100
Coweta Creek	0.065 – 0.075	0.080 – 0.200
Coweta Creek Tributary A	0.065 – 0.075	0.080 – 0.200
Coweta Creek Tributary B	0.065 – 0.075	0.080 – 0.200
East Coal Creek	0.025 – 0.060	0.030 – 0.090
Lone Star Creek	0.060 – 0.090	0.070 – 0.110
Middle Branch	0.065 – 0.075	0.015 – 0.120
Middle Branch Tributary	0.065 – 0.075	0.080 – 0.200
Midway Creek	0.090	0.110
Neosho River	0.035 – 0.040	0.050 – 0.075
Salt Creek	0.060 -0.090	0.080 – 0.110
Salt Creek Tributary 1	0.050	0.060
Salt Creek Tributary 2	0.050	0.060
School Creek	0.060 – 0.090	0.080 – 0.110
Springtown Creek	0.090	0.100 – 0.110
Spunky Creek	0.040 – 0.060	0.090 – 0.110
Spunky Creek Tributary A	*	*
South Branch	0.065	0.080 – 0.120
Timber	0.090	0.110
Verdigris River	0.035	0.090 – 0.150
Verdigris River Divergence	0.035	0.090 – 0.150
West Coal Creek	0.050	0.060

Water-surface elevations of floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (Reference 13). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. Starting water-surface elevations for the streams studied by detailed methods were determined by the slope/area method.

Starting water-surface elevations for the natural backwater runs on the Verdigris River, the

Verdigris River Divergence Channel, East Coal Creek, West Coal Creek, Adams Creek, and Salt Creek were based on the normal navigation pool elevations for the Verdigris River at the point of confluence. Stating elevations for Springtown Creek, Midway Creek, Timber Creek, Covington Creek, Covington Creek Tributary, School Creek, Lone Star Creek, and Salt Creek Tributaries 1 and 2 were based on coincident flooding elevations of the mainstem at the point of confluence. The starting water-surface elevations for Spunky Creek and Spunky Creek Tributary were taken from the FIS for the unincorporated areas of Rogers County (Reference 4). Two methods were used to compute starting elevations for Broken Arrow Creek and Broken Arrow Creek Tributary: the first method used the backwater effects of the Arkansas River and the second was the slope/area method; the higher of the two elevations was used for each stream. The starting elevations for the Arkansas River were taken from the FIS for the unincorporated areas of Muskogee County (Reference 17). The starting elevations for the Neosho River were taken from corresponding profiles of peak discharges on the Arkansas River. The starting elevations for Coweta Creek, Coweta Creek Tributaries A and B, and Middle Branch Tributary were determined by the slope/area method.

Countywide Study

Cross-section geometries were obtained from digital terrain data provided by the State of Oklahoma.

Water-surface profiles for the streams studied by approximate methods were computed through the use of the USACE HEC-RAS version 3.1.2 water-surface profiles computer program (Reference 18). The model was run for the 1-percent-annual-chance storm for the approximate studies. Starting water surface elevations were calculated using the slope/area method, except for stream reaches that tied-in directly with a redelineated study where a known water surface was used. Default roughness coefficients (Manning's "n") were used with values of 0.050 for the channel and 0.150 for the overbanks.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD88). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS reports and FIRMs are now prepared using NAVD as the referenced vertical datum.

Flood elevations shown in this FIS report and on the FIRM are referenced to the NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. Some of the data used in this revision were taken from the prior effective FIS reports and FIRMs and adjusted to NAVD88. The datum conversion factor from NGVD29 to NAVD88 in Wagoner County is 0.376 feet.

For additional information regarding conversion between the NGVD29 and NAVD88, 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

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

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent-annual-chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent-annual-chance flood is employed to indicate additional areas of flood risk in the community. For 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. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1”=500’ and 1”=1,000’.

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 0.2-percent-annual-chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards (Zone X). 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.

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 presented in this study were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. The results of the floodway computations are tabulated for selected cross section and are shown in Table 5, Floodway Data. The computed floodway and 1-percent-annual-chance floodplain boundaries are shown on the FIRM (Exhibit 2). 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 were made without regard to flood elevations in the receiving water body. Therefore, "without floodway" elevations presented in Table 5 for certain downstream cross sections may be lower than the regulatory flood elevations in that area, which must take into account the 1-percent-annual-chance flood due to backwater from other sources.

No floodways were computed for streams studied by enhanced approximate and approximate methods. Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than a 1.0-foot increase in the base flood elevations at any point within the community.

The area between the floodway and the 1-percent-annual-chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent-annual-chance flood by more than 1.0 foot at any point. Typical relationship between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1.

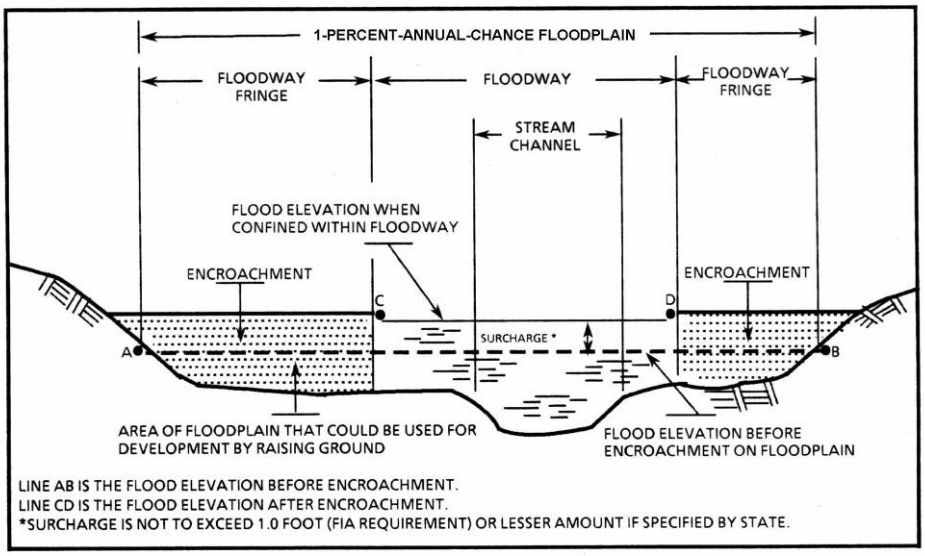

Figure 1. Floodway Schematic

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Adams Creek								
A	31,203	1,975	8,951	1.8	550.4	550.4	551.4	1.0
B	34,146	1,755	8,380	2.1	552.7	552.7	553.6	0.9
C	37,166	1,217	6,380	2.8	556.7	556.7	557.7	1.0
D	43,312	1,013	9,269	1.9	561.1	561.1	562.0	0.9
E	44,712	1,720	12,287	1.5	561.9	561.9	562.9	1.0
F	52,585	1,303	9,665	2.0	564.7	564.7	565.7	1.0
G	58,860	1,387	9,564	2.0	571.2	571.2	572.2	1.0
H	63,001	1,635	19,578	1.1	577.6	577.6	578.6	1.0
I	67,334	705	4,977	3.8	578.8	578.8	579.7	0.9
J	71,423	365	4,703	4.2	583.0	583.0	584.0	1.0
K	72,745	490	5,656	3.7	584.6	584.6	585.6	1.0
L	74,085	740	7,592	2.6	584.9	584.9	585.9	1.0
M	76,181	670	9,413	2.1	585.8	585.8	586.8	1.0
N	80,217	870	6,608	3.0	588.1	588.1	589.1	1.0
O	82,437	654	7,163	2.9	591.1	591.1	592.0	0.9
P	84,757	690	9,240	2.3	593.1	593.1	594.1	1.0
Q	85,973	710	6,189	3.3	594.1	594.1	595.0	0.9
R	87,476	758	6,517	3.1	597.7	597.7	598.7	1.0

[1] Feet above confluence with Verdigris River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Adams Creek (cont.)								
S	92,744	1,049	9,208	1.3	604.6	604.6	604.7	0.1
T	94,344	428	3,262	2.9	605.3	605.3	605.7	0.4
U	102,800	690	3,979	2.1	615.8	615.8	616.8	1.0
V	105,554	446	2,486	3.1	618.7	618.7	619.7	1.0
W	106,654	312	2,725	2.8	621.6	621.6	622.5	0.9
X	107,100	650	5,992	1.3	626.5	626.5	627.4	0.9
Y	109,418	630	3,034	2.5	627.6	627.6	628.4	0.8
Z	109,752	701	4,952	1.6	630.3	630.3	630.8	0.5
AA	110,701	727	3,899	2.0	630.7	630.7	631.3	0.6
AB	111,902	336	2,357	3.3	631.6	631.6	632.0	0.4
AC	114,254	279	1,821	3.7	636.0	636.0	637.0	1.0
AD	117,052	389	2,706	2.5	642.6	642.6	643.6	1.0
AE	123,215	136	1,076	5.4	657.0	657.0	657.9	0.9
AF	124,431	228	1,556	3.4	662.9	662.9	663.7	0.8

[1] Feet above confluence with Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

ADAMS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Arkansas River								
A	120,451	4,287	55,132	5.3	551.3	551.3	551.3	0.0
B	122,685	4,296	54,689	5.2	551.6	551.6	551.6	0.0
C	125,173	4,255	51,261	5.1	551.9	551.9	551.9	0.0
D	127,595	4,732	59,439	4.9	552.2	552.2	552.2	0.0
E	129,701	3,258	43,471	5.6	552.4	552.4	552.4	0.0
F	131,257	2,259	30,853	6.6	552.5	552.5	552.5	0.0
G	133,217	1,720	26,839	7.6	552.8	552.8	552.8	0.0
H	133,717	1,720	27,196	7.5	553.3	553.3	553.3	0.0
I	136,071	2,003	32,180	6.4	553.9	553.9	553.9	0.0
J	142,556	4,542	53,021	4.2	555.8	555.8	555.8	0.0
K	146,814	1,537	19,019	11.2	557.2	557.2	557.2	0.0
L	154,406	3,810	42,213	5.9	561.8	561.8	561.8	0.0
M	160,265	5,150	51,121	4.8	563.0	563.0	563.0	0.0
N	167,817	3,057	40,060	5.5	564.4	564.4	564.4	0.0
O	172,659	1,884	24,725	8.3	566.2	566.2	566.2	0.0
P	175,617	1,523	26,185	7.8	569.8	569.8	569.8	0.0
Q	180,524	2,216	40,607	5.1	572.6	572.6	572.6	0.0
R	186,168	2,335	41,937	4.9	574.3	574.3	574.3	0.0

[1] Feet above river mile 457.7.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Arkansas River (cont.)								
S	190,850	2,506	42,487	4.8	575.0	575.0	575.0	0.0
T	194,998	2,209	38,029	5.4	575.4	575.4	575.4	0.0
U	198,722	2,332	22,079	11.6	575.5	575.5	575.5	0.0
V	203,898	1,565	22,839	9.0	578.7	578.7	578.7	0.0

[1] Feet above river mile 457.7.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Broken Arrow Creek								
A	23,530	230	1,804	8.3	618.4	618.4	619.3	0.9
B	25,140	257	2,043	6.4	621.1	621.1	622.0	0.9
C	26,670	820	5,147	3.2	623.0	623.0	623.8	0.8
D	32,500	130	630	7.3	628.8	628.8	629.5	0.7
E	33,720	270	1,240	3.7	633.0	633.0	634.0	1.0
F	34,750	180	880	5.2	636.8	636.8	637.7	0.9
G	35,080	470	1,610	2.8	637.6	637.6	638.6	1.0
H	35,300	220	1,110	4.1	637.9	637.9	638.8	0.9
I	35,600	110	800	5.8	638.7	638.7	639.6	0.9
J	35,720	100	720	6.4	639.2	639.2	340.1	0.9
K	37,000	360	1,510	3.1	643.6	643.6	644.4	0.8
L	37,500	210	1,050	4.5	644.8	644.8	645.5	0.7
M	37,900	300	1,690	2.8	645.8	645.8	646.6	0.8
N	38,260	120	790	5.9	646.3	646.3	647.1	0.8
O	39,200	280	1,620	2.9	648.2	648.2	649.2	1.0
P	39,770	180	1,000	4.7	649.4	649.4	650.3	0.9
Q	40,200	140	810	5.8	650.4	650.4	651.3	0.9
R	40,356	170	1,300	3.6	651.3	651.3	652.3	1.0

[1] Feet above confluence with Arkansas River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

BROKEN ARROW CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Broken Arrow Creek (cont.)								
S	41,000	70	480	4.6	652.2	652.2	653.2	1.0
T	41,700	50	310	7.0	657.2	657.2	657.2	0.0
U	43,070	50	520	4.2	663.7	663.7	664.2	0.5
V	44,000	360	2,400	1.5	664.3	664.3	664.9	0.6
W	45,000	260	1,660	2.2	664.6	664.6	665.3	0.7
X	46,040	260	1,350	2.3	664.9	664.9	665.6	0.7
Y	46,640	330	980	3.2	665.4	665.4	666.2	0.8
Z	47,100	160	830	3.7	666.6	666.6	667.6	1.0
AA	47,240	140	530	5.8	666.8	666.8	667.7	0.9

[1] Feet above confluence with Arkansas River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Broken Arrow Creek (cont.)								
S	41,000	70	480	4.6	652.2	652.2	653.2	1.0
T	41,700	50	310	7.0	657.2	657.2	657.2	0.0
U	43,070	50	520	4.2	663.7	663.7	664.2	0.5
V	44,000	360	2,400	1.5	664.3	664.3	664.9	0.6
W	45,000	260	1,660	2.2	664.6	664.6	665.3	0.7
X	46,040	260	1,350	2.3	664.9	664.9	665.6	0.7
Y	46,640	330	980	3.2	665.4	665.4	666.2	0.8
Z	47,100	160	830	3.7	666.6	666.6	667.6	1.0
AA	47,240	140	530	5.8	666.8	666.8	667.7	0.9

[1] Feet above confluence with Arkansas River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Broken Arrow Creek Tributary								
A	0	279	2,264	2.3	626.4	626.4	627.4	1.0
B	2,110	311	2,271	2.3	628.0	628.0	629.0	1.0
C	3,050	110	744	7.1	629.0	629.0	669.9	0.9
D	4,176	202	1,201	4.4	635.0	635.0	636.0	1.0
E	4,680	91	785	6.7	635.7	635.7	636.7	1.0
F	5,078	210	980	8.3	637.1	637.1	638.0	0.9
G	6,146	246	1,826	2.9	639.6	639.6	640.6	1.0
H	6,896	171	1,189	4.4	641.0	641.0	642.0	1.0
I	7,267	251	2,169	2.4	641.6	641.6	642.6	1.0
J	7,581	95	751	6.9	641.6	641.6	642.5	0.9
K	8,061	251	1,912	2.7	643.4	643.4	644.4	1.0
L	10,591	149	1,181	4.4	647.9	647.9	648.7	0.8
M	12,282	156	1,516	3.0	650.6	650.6	651.6	1.0
N	14,448	159	1,162	4.0	653.7	653.7	654.7	1.0
O	16,330	96	622	7.4	660.5	660.5	661.3	0.8
P	16,746	267	1,299	3.5	663.3	663.3	664.2	0.9

[1] Feet above confluence with Broken Arrow Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

BROKEN ARROW CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Covington Creek								
A	8,716	540	2,726	2.2	609.9	609.9	610.4	0.5
B	10,312	115	604	10.1	610.9	610.9	611.4	0.5
C	13,163	237	2,492	1.6	621.0	621.0	621.6	0.6
D	15,662	197	688	5.9	622.9	622.9	623.9	1.0
E	16,123	118	1,633	2.5	628.4	628.4	629.3	0.9
F	17,640	272	2,029	2.1	630.1	630.1	630.2	0.1
G	24,768	321	1,080	4.2	655.2	655.2	655.6	0.4
H	25,212	361	2,768	1.6	658.2	658.2	659.2	1.0
I	25,899	217	1,604	2.8	658.6	658.6	659.6	1.0
J	28,013	233	2,060	1.0	668.8	668.8	669.7	0.9
K	28,263	122	784	2.6	669.6	669.6	670.6	1.0
L	30,921	41	173	11.7	675.0	675.0	675.4	0.4
M	32,930	130	702	2.9	687.9	687.9	688.9	1.0
N	33,424	109	655	3.1	692.7	692.7	693.4	0.7

[1] Feet above confluence with Adams Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

COVINGTON CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Covington Creek Tributary								
A	1,627	92	356	4.0	621.3	621.3	622.2	0.9
B	4,047	33	102	8.9	636.0	636.0	636.0	0.0
C	4,198	64	260	3.5	637.0	637.0	638.0	1.0

[1] Feet above confluence with Covington Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

COVINGTON CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Coweta Creek								
A	1	304	3,216	3.7	571.4	570.5[2]	571.5	1.0
B	1,170	191	2,325	5.1	571.7	571.7	572.7	1.0
C	2,280	222	2,719	4.4	573.6	573.6	574.5	0.9
D	3,650	251	2,717	4.4	575.2	575.2	576.1	0.9
E	4,640	152	1,852	6.4	576.8	576.8	577.7	0.9
F	5,400	87	1,316	8.4	578.9	578.9	579.7	0.8
G	6,730	259	2,498	4.4	583.1	583.1	584.0	0.9
H	7,870	286	2,860	3.9	584.6	584.6	585.6	1.0
I	9,500	233	2,092	5.3	587.3	587.3	588.3	1.0
J	9,900	266	1,990	5.5	588.6	588.6	589.6	1.0
K	11,800	525	3,435	3.1	593.1	593.1	594.0	0.9
L	11,900	153	1,295	8.1	593.6	593.6	594.4	0.8
M	13,560	250	2,404	4.4	599.0	599.0	600.0	1.0
N	15,530	291	1,661	5.9	601.0	601.0	601.9	0.9
O	16,370	178	1,660	5.8	604.8	604.8	605.8	1.0
P	18,060	605	4,130	2.9	607.5	607.5	608.5	1.0
Q	18,470	418	2,495	3.9	608.1	608.1	609.0	0.9
R	19,750	371	2,629	3.7	610.7	610.7	611.7	1.0

[1] Feet above confluence with Arkansas River.
[2] Elevation computed without consideration of backwater effects from Arkansas River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

FLOODWAY DATA

COWETA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Coweta Creek (cont.)								
S	20,650	329	2,527	3.8	612.4	612.4	613.4	1.0
T	22,080	370	2,358	4.1	615.1	615.1	616.0	0.9
U	22,670	269	2,109	4.6	616.8	616.8	617.7	0.9
V	23,120	346	2,532	3.8	618.5	618.5	619.4	0.9
W	23,310	579	3,918	2.3	620.0	620.0	620.9	0.9
X	23,670	580	3,718	2.4	620.4	620.4	621.4	1.0
Y	25,100	356	1,946	4.7	623.2	623.2	624.1	0.9
Z	27,940	622	3,048	3.0	629.8	629.8	630.8	1.0
AA	29,180	634	3,391	2.3	632.3	632.3	633.3	1.0
AB	30,325	399	1,833	4.2	634.6	634.6	635.4	0.8
AC	31,465	504	2,950	2.6	637.2	637.2	638.1	0.9
AD	32,570	155	906	8.6	640.0	640.0	640.9	0.9
AE	33,790	258	2,278	2.9	647.8	647.8	648.8	1.0
AF	35,740	422	2,598	2.5	650.9	650.9	651.8	0.9
AG	36,415	486	3,098	2.1	651.6	651.6	652.5	0.9
AH	36,935	404	2,753	2.4	652.2	652.2	653.1	0.9
AI	38,340	123	703	6.1	654.7	654.7	655.5	0.8
AJ	39,910	251	1,272	3.4	660.2	660.2	661.2	1.0

[1] Feet above confluence with Arkansas River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

COWETA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Coweta Creek (cont.)								
AK	41,265	177	1,076	2.6	663.0	663.0	664.0	1.0
AL	42,900	221	1,069	2.7	666.8	666.8	667.8	1.0
AM	43,530	222	976	2.9	668.4	668.4	669.4	1.0

[1] Feet above confluence with Arkansas River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Coweta Creek Tributary A								
A	830	503	2,985	0.6	634.5	634.5	635.5	1.0
B	1,390	195	1,050	1.8	634.6	634.6	635.6	1.0
C	2,820	223	771	2.5	638.7	638.7	639.7	1.0
D	2,910	254	1,300	1.5	638.8	638.8	639.8	1.0
E	3,610	200	537	3.6	639.8	639.8	640.6	0.8
F	3,850	140	438	4.4	641.2	641.2	642.2	1.0

[1] Feet above confluence with Coweta Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

COWETA CREEK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Coweta Creek Tributary B								
A	820	140	692	1.2	658.4	658.4	659.4	1.0
B	1,250	11	376	2.1	659.0	659.0	659.9	0.9
C	1,810	80	292	2.8	660.8	660.8	661.8	1.0
D	2,400	41	173	4.8	663.8	663.8	664.7	0.9
E	2,850	160	437	1.9	666.0	666.0	667.0	1.0
F	3,290	121	265	3.1	667.7	667.7	668.6	0.9

[1] Feet above confluence with Coweta Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

COWETA CREEK TRIBUTARY B

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
East Coal Creek								
A	11,938	1,619	21,084	0.6	526.0	524.3[2]	525.3[2]	1.0
B	12,863	1,028	10,015	1.2	526.0	524.3[2]	525.3[2]	1.0
C	15,036	1,134	11,069	1.1	526.0	524.5[2]	525.5[2]	1.0
D	16,447	853	8,331	1.1	526.0	524.6[2]	525.6[2]	1.0
E	16,556	721	7,197	1.3	526.0	524.7[2]	525.7[2]	1.0
F	18,114	780	6,462	1.4	526.0	524.9[2]	525.9[2]	1.0
G	19,431	318	2,343	3.4	526.0	525.2[2]	526.2[2]	1.0
H	22,477	146	940	8.4	531.0	531.0	531.9	0.9
I	24,546	565	3,740	2.1	534.9	534.9	535.9	1.0
J	24,639	691	6,997	1.1	539.9	539.9	539.9	0.0
K	25,454	743	6,214	1.2	539.9	539.9	539.9	0.0
L	26,831	515	4,367	1.7	540.1	540.1	540.3	0.2
M	29,083	538	4,952	1.5	540.6	540.6	541.1	0.5
N	30,226	458	3,339	2.2	540.9	540.9	541.5	0.6
O	32,330	386	2,301	2.9	543.3	543.3	544.2	0.9
P	32,516	502	2,997	2.2	543.7	543.7	544.6	0.9
Q	33,739	611	3,624	1.7	545.1	545.1	546.1	1.0
R	35,303	224	1,564	3.6	547.4	547.4	548.4	1.0

[1] Feet above confluence with Verdigris River.
[2] Elevation computed without consideration of backwater effects from Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

FLOODWAY DATA

EAST COAL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
East Coal Creek (cont.)								
S	37,025	464	2,968	1.9	550.2	550.2	551.2	1.0
T	37,087	589	3,506	1.1	550.5	550.5	551.5	1.0
U	38,224	361	2,019	1.9	551.3	551.3	552.2	0.9
V	39,226	313	1,612	2.4	552.8	552.8	553.7	0.9
W	40,404	226	1,322	2.9	555.3	555.3	556.1	0.8
X	40,497	615	5,558	0.7	560.6	560.6	561.3	0.7
Y	41,494	238	1,956	1.5	560.7	560.7	561.5	0.8
Z	44,620	186	1,117	2.1	562.5	562.5	563.5	1.0
AA	49,201	176	825	1.8	570.1	570.1	570.3	0.2
AB	51,260	56	343	3.2	572.3	572.3	573.2	0.9
AC	52,935	174	806	1.4	574.5	574.5	575.4	0.9
AD	53,053	236	991	1.1	574.7	574.7	575.6	0.9
AE	53,979	170	610	1.8	575.4	575.4	576.2	0.8
AF	54,593	124	390	2.2	576.4	576.4	577.3	0.9

[1] Feet above confluence with Verdigris River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Lone Star Creek								
A	626	82	726	3.2	644.1	644.1	645.1	1.0
B	1,925	74	496	4.6	648.6	648.6	649.6	1.0
C	3,967	81	537	3.4	665.0	665.0	665.6	0.6
D	4,403	104	572	3.1	669.7	669.7	670.7	1.0
E	4,692	39	159	11.3	672.1	672.1	672.8	0.7

[1] Feet above confluence with Adams Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

LONE STAR CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Middle Branch								
A	830	85	540	2.5	609.9	608.3[2]	609.3[2]	1.0
B	1,590	47	290	4.7	611.3	611.3	612.2	0.9
C	2,820	59	276	4.9	613.1	613.1	613.5	0.4
D	3,198	120	506	2.7	615.6	615.6	615.6	0.0
E	3,593	164	392	2.9	619.2	619.2	619.2	0.0
F	4,133	35	215	5.3	622.3	622.3	624.1	0.8
G	4,843	110	471	1.7	623.9	623.9	624.9	1.0
H	5,283	49	230	3.4	629.8	629.8	630.3	0.5
I	5,733	73	339	2.3	632.5	632.5	633.4	0.9
J	5,993	162	451	1.7	634.3	634.3	635.2	0.9
K	6,243	61	145	5.4	635.2	635.2	635.9	0.7
L	6,508	28	87	5.6	638.5	638.5	639.2	0.7
M	8,150	50	105	4.7	645.8	645.8	645.8	0.0
N	8,550	25	117	4.2	649.1	649.1	650.1	1.0
O	9,000	75	268	1.8	652.6	652.6	653.4	0.8

[1] Feet above confluence with Coweta Creek.
[2] Elevation computed without consideration of backwater effects from Coweta Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

MIDDLE BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Middle Branch Tributary								
A	8,150	50	105	4.7	645.8	645.8	645.8	0.0
B	8,550	25	117	4.2	649.1	649.1	650.1	1.0
C	9,000	75	268	1.8	652.6	652.6	653.4	0.8

[1] Feet above confluence with Coweta Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

MIDDLE BRANCH TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Midway Creek								
A	1,465	818	7,768	0.7	578.3	578.3	579.3	1.0
B	3,570	233	1,910	2.8	578.6	578.6	579.6	1.0
C	3,988	113	1,066	4.0	579.7	579.7	580.7	1.0
D	4,720	169	1,540	2.8	581.4	581.4	582.4	1.0
E	6,144	113	997	4.3	585.1	585.1	586.1	1.0
F	7,144	297	2,655	1.2	586.2	586.2	587.2	1.0
G	7,601	185	1,807	1.8	588.5	588.5	589.5	1.0
H	9,602	112	480	6.7	591.5	591.5	592.4	0.9

[1] Feet above confluence with Adams Creek.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Salt Creek								
A	20,405	436	4,921	3.3	563.0	563.0	564.0	1.0
B	21,626	130	1,451	10.5	563.8	563.8	564.5	0.7
C	30,432	168	913	9.1	580.1	580.1	580.8	0.7
D	34,607	164	1,178	4.5	600.8	600.8	601.8	1.0
E	35,284	343	2,795	1.9	607.5	607.5	608.5	1.0
F	36,179	379	2,817	1.8	607.8	607.8	608.8	1.0
G	38,025	110	547	2.5	614.7	614.7	615.7	1.0

[1] Feet above confluence with Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SALT CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Salt Creek Tributary 1								
A	1,139	48	310	9.0	579.4	579.4	580.1	0.7
B	1,579	132	755	3.7	581.9	581.9	582.9	1.0
C	2,134	43	188	11.9	584.2	584.2	584.8	0.6
D	2,756	64	375	4.5	590.5	590.5	591.4	0.9

[1] Feet above confluence with Salt Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SALT CREEK TRIBUTARY 1

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Salt Creek Tributary 2								
A	912	140	766	4.8	608.2	608.2	609.1	0.9
B	1,632	67	459	8.1	611.1	611.1	611.9	0.8
C	2,111	86	647	5.7	613.6	613.6	614.6	1.0

[1] Feet above confluence with Salt Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SALT CREEK TRIBUTARY 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
School Creek								
A	5,308	550	1,857	1.8	611.8	611.8	612.8	1.0
B	5,570	89	366	9.1	613.0	613.0	613.6	0.6
C	6,630	309	1,420	2.4	618.7	618.7	619.7	1.0
D	7,220	142	742	4.5	620.2	620.2	621.1	0.9
E	8,520	75	476	7.0	622.8	622.8	623.6	0.8
F	9,096	199	1,288	2.6	626.6	626.6	627.1	0.5
G	11,525	66	378	5.2	630.9	630.9	631.3	0.4
H	11,751	165	802	2.5	632.1	632.1	633.0	0.9
I	11,938	50	268	7.4	632.4	632.4	633.3	0.9
J	14,273	391	1,111	1.8	641.3	641.3	642.2	0.9
K	14,717	180	884	2.2	645.5	645.5	646.4	0.9
L	16,040	101	569	3.5	649.5	649.5	650.2	0.7
M	17,197	139	774	1.8	653.5	653.5	654.5	1.0
N	18,541	50	192	7.3	657.5	657.5	658.1	0.6

[1] Feet above confluence with Adams Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SCHOOL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
South Branch								
A	630	60	362	5.5	611.1	611.1	612.0	0.9
B	1,070	176	673	2.9	613.8	613.8	614.8	1.0
C	1,450	259	1,411	1.4	617.2	617.2	618.2	1.0
D	1,820	72	450	4.4	618.1	618.1	618.7	0.6
E	2,220	81	532	3.7	620.4	620.4	621.2	0.8
F	2,400	38	299	6.6	622.3	622.3	622.9	0.6
G	2,829	48	322	6.2	625.5	625.5	626.4	0.9
H	3,019	101	507	3.9	627.6	627.6	628.6	1.0
I	3,140	107	889	1.7	628.6	628.6	629.6	1.0
J	3,624	67	441	3.5	629.1	629.1	630.1	1.0
K	3,840	137	681	1.6	630.1	630.1	631.1	1.0
L	4,053	89	374	2.9	630.3	630.3	631.3	1.0
M	4,320	61	259	4.2	631.7	631.7	632.5	0.8

[1] Feet above confluence with Middle Branch Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Springtown Creek								
A	1,200	58	224	4.9	568.7	568.7	569.7	1.0
B	1,832	100	441	2.5	572.7	572.7	573.6	0.9
C	2,232	98	469	2.3	573.9	573.9	574.8	0.9
D	3,081	24	156	6.3	581.2	581.2	582.2	1.0

[1] Feet above confluence with Adams Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SPRINGTOWN CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Spunky Creek								
A	7,823	636	10,522	1.5	599.4	599.4	600.4	1.0
B	11,440	449	7,459	2.1	603.3	603.3	603.8	0.5
C	13,365	224	3,142	5.3	603.8	603.8	604.4	0.6
D	13,933	282	3,254	5.1	604.5	604.5	605.4	0.9
E	16,848	220	1,246	13.3	611.9	611.9	611.9	0.0
F	18,559	368	2,953	4.8	623.3	623.3	623.6	0.3
G	21,387	561	4,321	3.3	630.2	630.2	630.6	0.4
H	23,387	90	593	13.8	635.8	635.8	636.4	0.6
I	25,643	508	3,510	1.9	647.4	647.4	648.1	0.7
J	27,411	346	2,252	3.0	650.0	650.0	650.7	0.7
K	30,469	502	2,997	2.2	656.2	656.2	657.0	0.8
L	31,822	609	5,046	1.3	665.2	665.2	666.2	1.0
M	33,430	508	3,828	1.8	666.0	666.0	667.0	1.0

[1] Feet above confluence with Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SPUNKY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Spunky Creek Tributary A								
A	4,835	274	1,711	1.3	617.4	617.4	618.1	0.7
B	5,335	100	594	3.9	617.5	617.5	618.2	0.7
C	5,825	60	271	8.4	620.6	620.6	621.5	0.9
D	6,530	62	401	4.6	623.4	623.4	624.3	0.9
E	7,115	92	444	4.1	624.7	624.7	625.6	0.9
F	7,585	80	232	7.9	627.2	627.2	627.4	0.2
G	8,205	77	374	4.9	630.7	630.7	631.7	1.0

[1] Feet above confluence with Spunky Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

SPUNKY CREEK TRIBUTARY A

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Timber Creek								
A	1,725	258	1,398	1.8	600.2	600.2	601.2	1.0
B	3,580	84	390	6.3	605.3	605.3	605.8	0.5
C	5,278	161	1,044	2.4	612.9	612.9	613.9	1.0
D	6,226	51	425	5.8	615.5	615.5	616.5	1.0
E	10,442	48	283	7.0	635.5	635.5	636.5	1.0
F	12,381	60	475	4.2	652.4	652.4	653.3	0.9
G	13,885	43	195	5.7	662.9	652.4	653.0	0.6

[1] Feet above confluence with Adams Creek.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

TIMBER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Verdigris River								
A	9,955	539	10,952	6.5	516.2	505.5[2]	505.9[2]	0.4
B	12,882	450	13,110	7.9	516.2	507.4[2]	508.1[2]	0.7
C	16,339	572	14,390	7.2	516.2	509.1[2]	509.7[2]	0.6
D	16,970	594	16,803	6.2	516.2	509.8[2]	510.4[2]	0.6
E	20,264	557	16,002	6.5	516.2	510.7[2]	511.2[2]	0.5
F	23,659	552	18,331	5.7	516.2	511.6[2]	512.1[2]	0.5
G	26,590	453	13,997	7.4	516.2	512.3[2]	512.7[2]	0.4
H	28,800	510	13,591	7.7	516.2	513.2[2]	513.6[2]	0.4
I	32,516	580	15,241	6.8	516.2	515.1[2]	515.4[2]	0.3
J	38,156	400	18,159	5.7	517.6	517.6	517.9	0.3
K	46,045	2,800	33,115	3.1	526.2	526.2	526.2	0.0
L	49,958	539	14,252	7.3	526.7	526.7	526.9	0.2
M	52,993	5,100	83,301	1.2	527.9	527.9	528.1	0.2
N	55,112	4,800	81,752	1.3	528.0	528.0	528.2	0.2
O	59,025	5,400	90,748	1.1	528.2	528.2	528.5	0.3
P	65, 029	5,100	61,046	1.7	528.4	528.4	528.7	0.3
Q	69,627	4,493	57,854	1.8	528.8	528.8	529.1	0.3
R	74,430	4,586	68,568	1.5	529.2	529.2	529.6	0.4

[1] Feet above confluence with Arkansas River.
[2] Elevation computed without consideration of backwater effects from Arkansas River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

FLOODWAY DATA

VERDIGRIS RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Verdigris River (cont.)								
S	79,157	2,000	22,412	4.6	529.4	529.4	529.9	0.5
T	84,752	460	15,103	6.9	531.7	531.7	532.1	0.4
U	88,860	675	26,310	4.0	532.8	532.8	533.1	0.3
V	91,330	549	18,805	5.5	532.9	532.9	533.2	0.3
W	92,268	598	16,804	6.2	533.4	533.4	533.7	0.3
X	97,554	386	12,044	8.6	534.9	534.9	535.2	0.3
Y	101,416	450	12,080	8.6	536.4	536.4	536.7	0.4
Z	104,926	450	12,817	8.1	538.3	538.3	538.8	0.5
AA	110,878	400	13,116	7.9	540.6	540.6	541.1	0.5
AB	115,257	550	17,431	6.0	542.3	542.3	542.9	0.6
AC	118,797	1,400	38,352	2.7	543.1	543.1	543.7	0.6
AD	123,566	7,000	107,719	1.0	543.3	543.3	544.0	0.7
AE	127,135	10,000	124,430	0.8	543.4	543.4	544.2	0.8
AF	131,611	12,000	114,446	0.9	543.5	543.5	544.3	0.8
AG	135,530	810	24,921	4.2	543.6	543.6	544.5	0.9
AH	139,571	1,123	34,961	3.0	544.0	544.0	544.9	0.9
AI	143,753	578	17,192	6.0	543.9	543.9	544.0	0.1
AJ	148,298	534	14,229	7.3	545.1	545.1	545.1	0.0

[1] Feet above confluence with Arkansas River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Verdigris River (cont.)								
AK	154,718	852	28,868	3.6	547.2	547.2	547.2	0.0
AL	160,512	490	17,625	5.9	547.6	547.6	547.6	0.0
AM	163,885	429	13,955	7.5	548.2	548.2	548.2	0.0
AN	182,266	689	27,675	3.8	556.8	556.8	556.8	0.0
AO	186,756	868	24,730	4.2	557.1	557.1	557.2	0.1
AP	189,824	412	13,458	7.7	557.3	557.3	557.3	0.0
AQ	192,254	616	16,371	6.4	557.9	557.9	558.4	0.5
AR	192,754	803	21,040	4.9	558.1	558.1	558.9	0.8

[1] Feet above confluence with Arkansas River.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
Verdigris River Divergence Channel								
A	1,300	440	13,372	7.8	516.2	513.2[2]	514.1[2]	0.9
B	9,900	740	17,384	6.8	516.2	515.1[2]	515.8[2]	0.7
C	18,725	2,520	29,148	8.3	517.6	517.6	518.5	0.9

[1] Feet above confluence with Verdigris River.
[2] Elevation computed without consideration of backwater effects from Arkansas River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

FLOODWAY DATA

VERDIGRIS RIVER DIVERGENCE CHANNEL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
West Coal Creek								
A	32,550	451	1,540	5.9	544.8	544.8	545.8	1.0
B	34,575	1,227	4,413	2.0	549.0	549.0	549.2	0.2
C	37,505	432	2,022	4.5	551.5	551.5	552.4	0.9
D	43,133	602	2,709	3.6	558.6	558.6	559.5	0.9
E	46,295	566	2,901	3.6	563.6	563.6	564.6	1.0
F	49,420	808	3,667	2.9	567.4	567.4	568.3	0.9
G	52,224	351	1,787	4.5	571.0	571.0	572.0	1.0
H	55,840	549	2,584	3.1	577.3	577.3	578.3	1.0
I	57,986	208	1,314	4.9	580.7	580.7	581.6	0.9
J	62,243	94	698	9.2	591.6	591.6	592.2	0.6
K	64,492	133	1,369	4.7	598.0	598.0	599.0	1.0
L	66,560	136	892	6.3	603.0	603.0	603.7	0.7
M	68,845	127	1,086	4.3	608.0	608.0	609.0	1.0
N	71,380	113	544	8.7	614.4	614.4	615.2	0.8
O	76,474	143	998	3.8	635.4	635.4	636.3	0.9
P	81,003	93	647	5.9	651.2	651.2	651.8	0.6
Q	82,559	45	438	8.6	656.8	656.8	657.7	0.9
R	84,139	49	415	6.9	664.9	664.9	665.9	1.0

[1] Feet above confluence with Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

WEST COAL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY (FEET NAVD 88)	WITHOUT FLOODWAY (FEET NAVD 88)	WITH FLOODWAY (FEET NAVD 88)	INCREASE (FEET)
West Coal Creek (cont.)								
S	87,754	58	262	10.9	683.7	683.7	684.1	0.4
T	89,686	134	634	2.7	692.1	692.1	693.1	1.0
U	90,886	174	263	6.5	695.2	695.2	695.7	0.5

[1] Feet above confluence with Verdigris River.

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

FLOODWAY DATA

WEST COAL CREEK

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

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. In most instances, 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 1-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 rate zones as described in Section 5.0 and, in the 1-percent-annual-chance floodplains that were studied by detailed methods, shows selected whole-foot BFEs or average depths. Insurance agents use 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 Wagoner County, Oklahoma. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the County identified as flood-prone. Additional data relating to the maps prepared for each community, up to and including this countywide FIS, are presented in Table 6, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Bixby, City of	June 28, 1974	July 19, 1977	September 28, 1979	
Broken Arrow, City of	October 18, 1977	February 26, 1980	August 17, 1981	September 5, 1984
Catoosa, City of	September 6, 1974	February 27, 1976 January 14, 1977	August 1, 1980	
Coweta, City of	June 4, 1976	None	September 18, 1986	
Fair Oaks, Town of	April 17, 2012	None	April 17, 2012	
Okay, Town of	August 16, 1974	February 6, 1976	September 28, 1982	
Porter, Town of	April 17, 2012	None	April 17, 2012	
Red Bird, Town of	June 27, 1975	None	October 9, 1979	
Tullahassee, City of[1]	None	None	None	
Tulsa, City of	August 17, 1971		August 17, 1971	June 15, 1988 May 28, 1975 July 30, 1976 August 14, 1979 October 15, 1982 February 5, 1986 November 3, 1989

[1] Non-floodprone community.

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Wagoner, City of	June 28, 1974	January 23, 1976 January 3, 1978	October 19, 1982	
Wagoner County Unincorporated Areas	April 27, 1982	None	December 2, 1988	

TABLE 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

The detailed analyses of Spunky Creek and Spunky Creek Tributary A presented in this study are more detailed than the approximate analyses in the City of Tulsa study. The 1-percent-annual-chance water surface elevations for Spunky Creek Tributary A in the Tulsa County study is approximately 1.0 foot higher than the elevation in this study. The difference is attributable to assumed starting water surface elevation conditions and the bridge routing at the Wagoner-Tulsa County line and is considered within an acceptable tolerance. The Adams Creek analysis is more detailed in this study than in the Tulsa County study. In March 1980, the USACE, Tulsa District, prepared analyses of Adams Creek, Spunky Creek, and Broken Arrow Creek as part of a Tulsa Metropolitan Area study. The East Coal Creek detailed analysis in this study is more detailed than the approximate analysis in the City of Wagoner study. The Verdigris River analysis is more detailed in this study are in exact agreement with the results of the remaining studies.

The FIS for Rogers County is currently being prepared. The 1-percent-annual-chance water surface elevation of the Verdigris River at the Rogers-Wagoner County line, in the Rogers County study, is approximately 0.6 foot lower than the 1-percent-annual-chance elevation in this study. The Verdigris River analysis is more detailed in this study than in the Rogers County study.

In May 1971, the USACE published a Special Flood Hazard Information report for the McClellan-Kerr Navigation System along the Verdigris and Arkansas Rivers from the head of navigation at the Port of Catoosa, Oklahoma, downstream to the confluence with the Arkansas River near Muskogee, Oklahoma (Reference 19). The 1-percent-annual-chance water surface profile developed in that report averages approximately 4.0 feet higher than the 1-percent-annual-chance flood profile developed for this study. The 1971 report does not reflect flood flows regulated by Big Hill, Copan, Birch, and Skiatook Reservoirs and does not consider the total system operation of the reservoirs during flooding situations. Also, an additional 13 years of flow record are included in the flood flow frequency analysis of this study.

Flooding information for a portion of Adams Creek and its tributaries was developed for a Flood Plain Information report, which was completed in December 1976 (Reference 20). The 1-percent-annual-chance water surface profiles in the 1976 report coincide to within 1.5 feet of the 1-percent-annual-chance profiles of this study. Minor differences can be attributed to more detailed topographic information used in this study.

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Wagoner County has been compiled into this FIS. Therefore, this FIS supersedes all previously printed FIS reports, FIRMs, and\or FBFMs for all the incorporated and unincorporated jurisdictions with Wagoner County, 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 FEMA Region VI, Federal Insurance and Mitigation Division, 800 North Loop 288, Denton, TX 76209.

9.0 BIBLIOGRAPHY AND REFERENCES

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FLOODING CONTROLLED BY VERDIGRIS RIVER

1% ANNUAL CHANCE BACKWATER EFFECTS FROM VERDIGRIS RIVER

CONFLUENCE WITH VERDIGRIS RIVER

COUNTY RD

305TH EAST AVE

ELEVATION IN FEET (NAVD)

590
580
570
560
550
540
530
520
510

0
4,000
8,000
12,000
16,000
20,000
24,000
28,000
32,000
36,000
40,000
44,000
48,000
52,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH VERDIGRIS RIVER

A
B
C
D
E

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

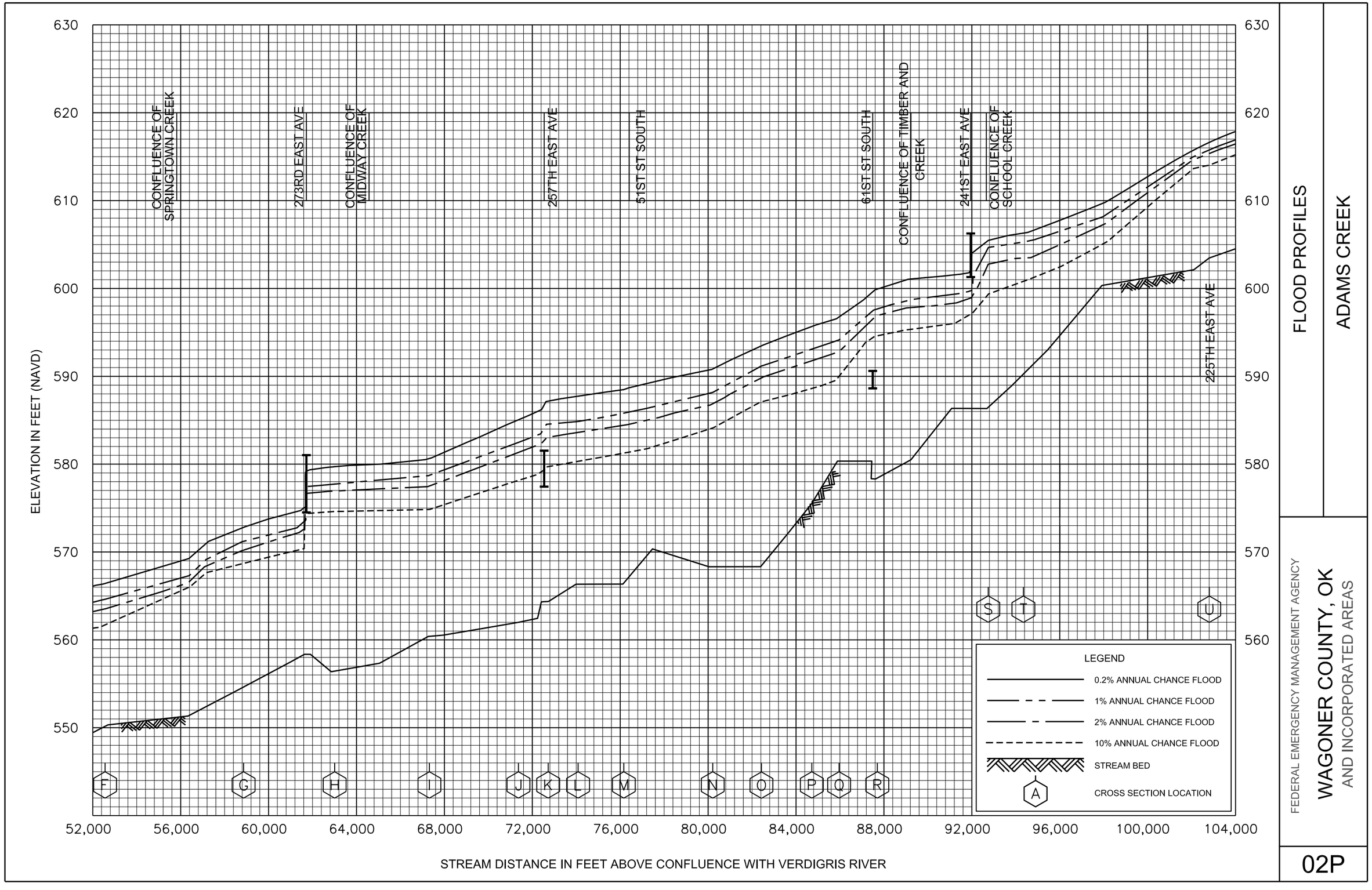
FLOOD PROFILES

ADAMS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

01P



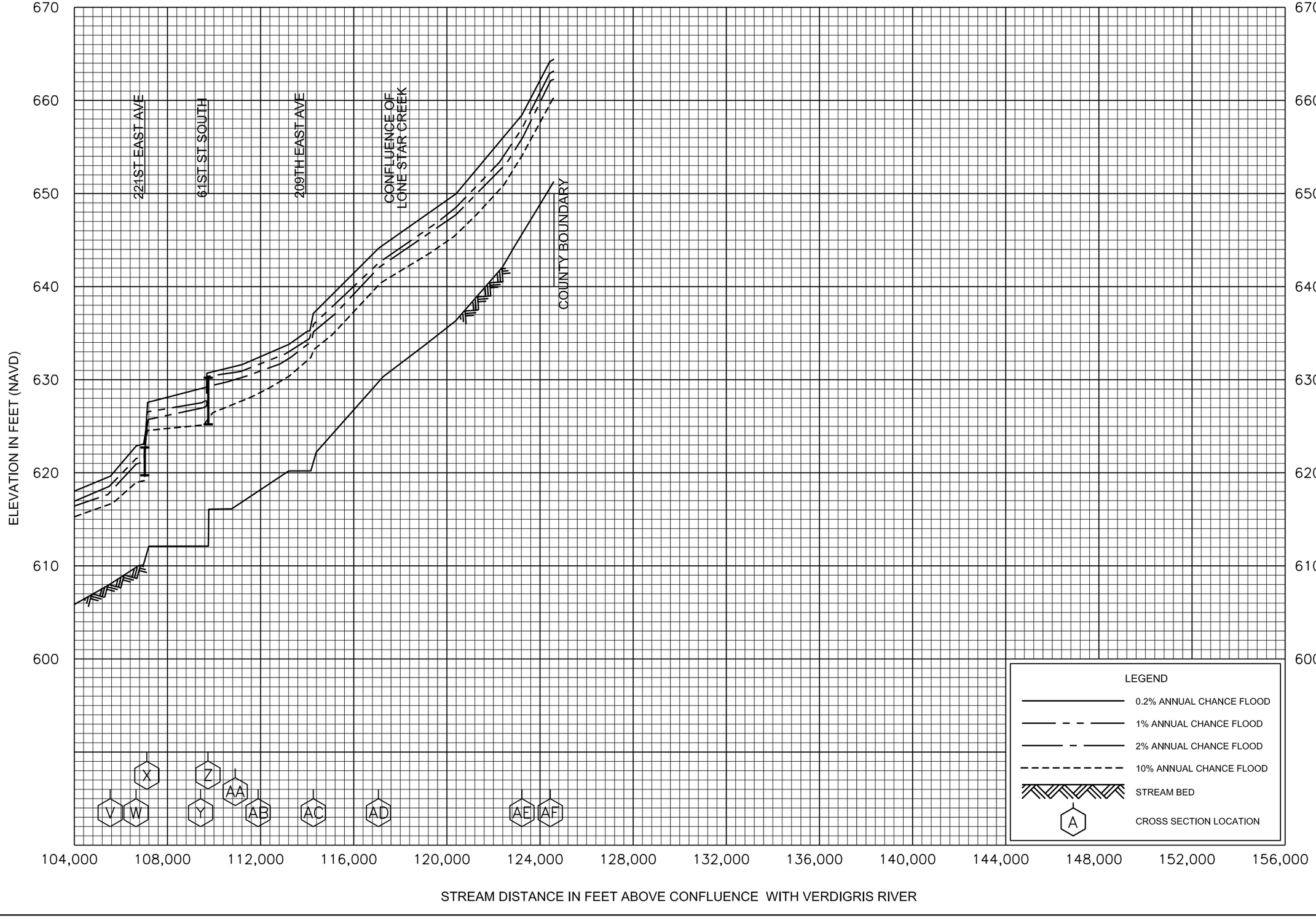
FLOOD PROFILES

ADAMS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

02P



FLOOD PROFILES

ADAMS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

03P

ELEVATION IN FEET (NAVD)

570
560
550
540
530
520
510
500
490
480

LIMIT OF DETAILED STUDY

US HIGHWAY 69

OLD US HWY ROUTE 69

A
B
C
D

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

20,000 21,000 22,000 23,000 24,000 25,000 26,000 27,000 28,000 29,000 30,000 31,000 32,000 33,000

STREAM DISTANCE IN FEET ABOVE RAILROAD

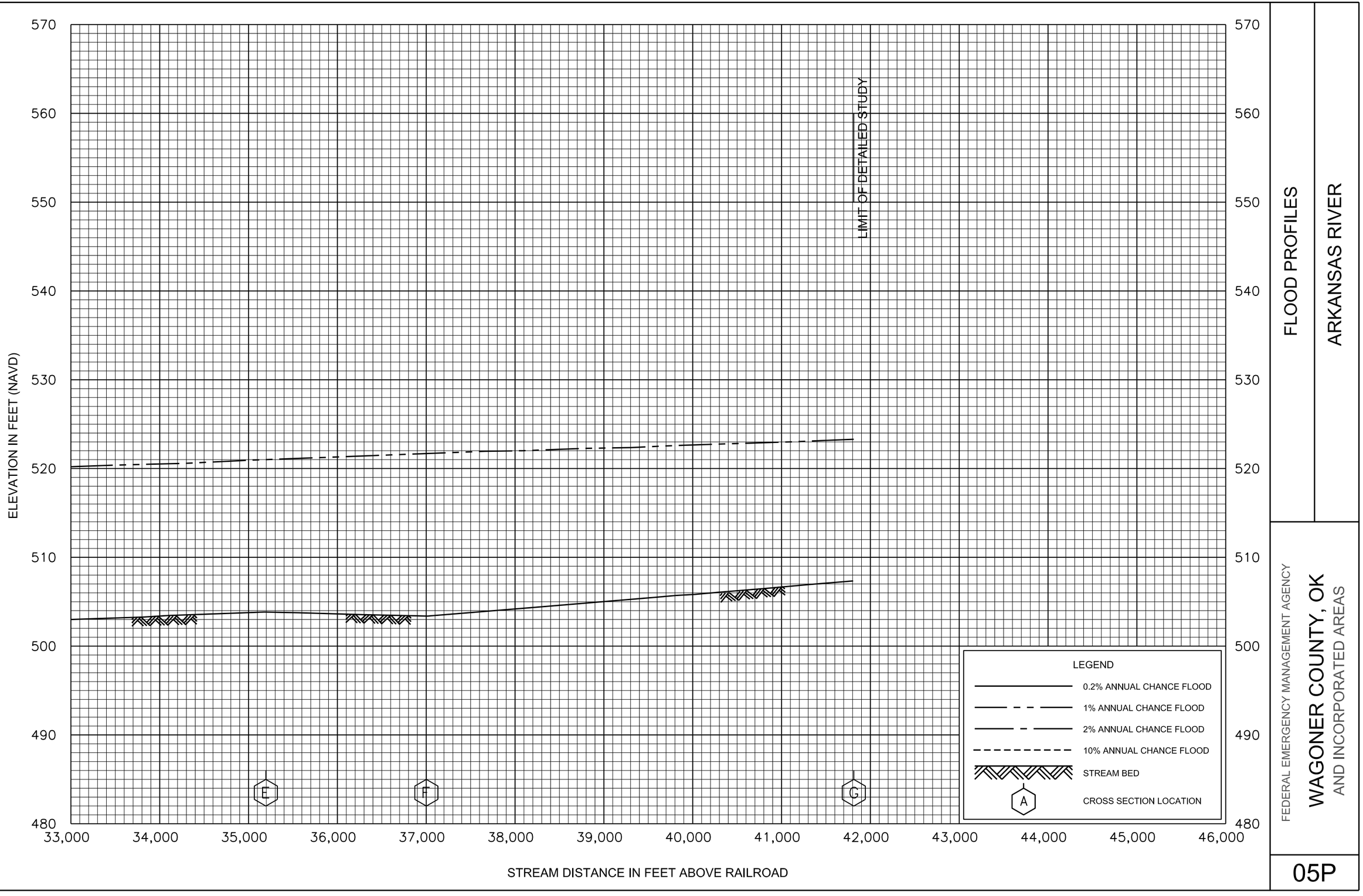
FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

04P



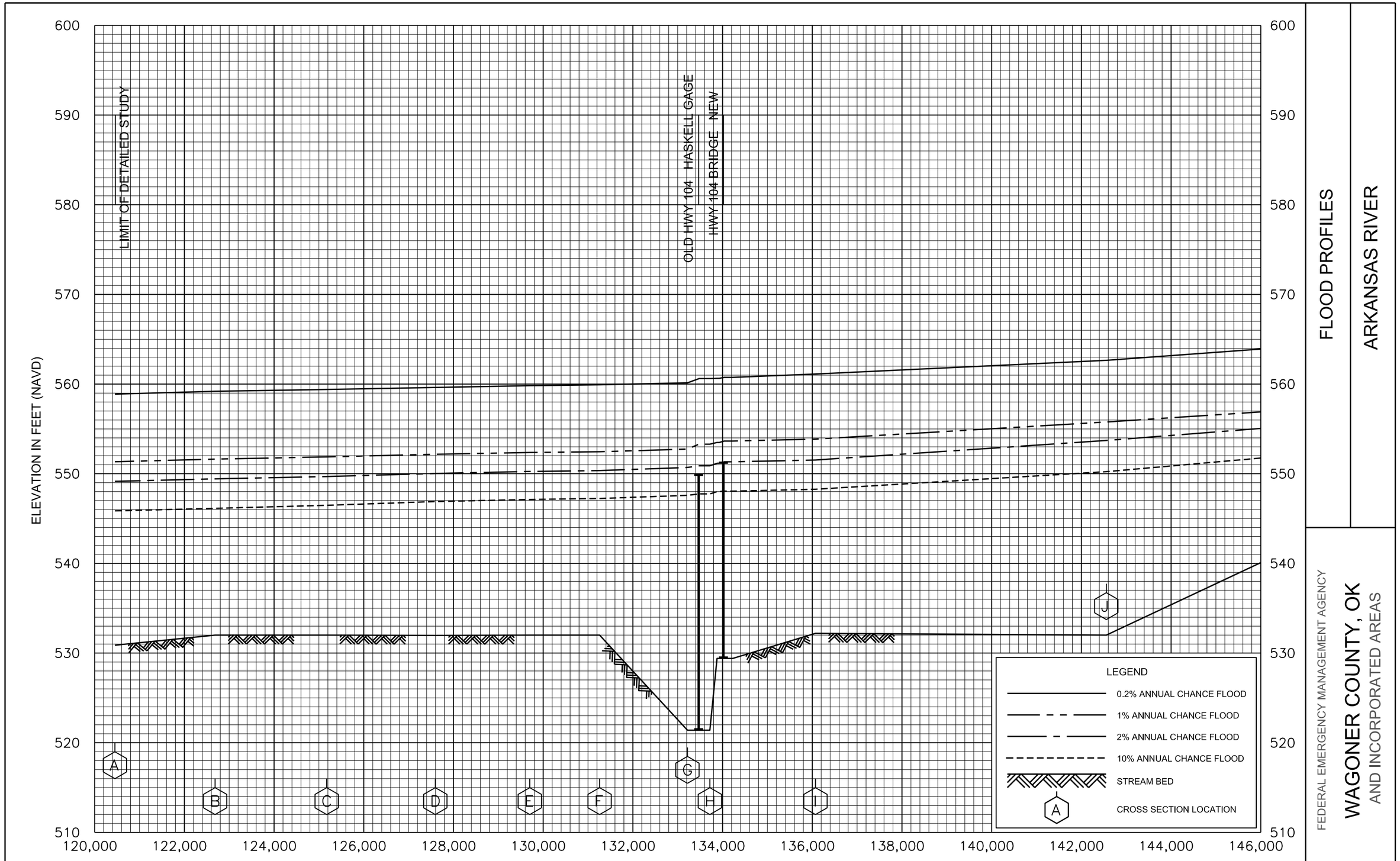
FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

05P



FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

06P

610
600
590
580
570
560
550
540
530
520

ELEVATION IN FEET (NAVD)

146,000 148,000 150,000 152,000 154,000 156,000 158,000 160,000 162,000 164,000 166,000 168,000 170,000 172,000

STREAM DISTANCE IN FEET ABOVE RIVER MILE 457.7

K L M N

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

07P

ELEVATION IN FEET (NAVD)

620
610
600
590
580
570
560
550
540
530

STATE HWY 72

O P Q R S T

LEGEND

0.2% ANNUAL CHANCE FLOOD
1% ANNUAL CHANCE FLOOD
2% ANNUAL CHANCE FLOOD
10% ANNUAL CHANCE FLOOD
STREAM BED
A CROSS SECTION LOCATION

172,000 174,000 176,000 178,000 180,000 182,000 184,000 186,000 188,000 190,000 192,000 194,000 196,000 198,000

STREAM DISTANCE IN FEET ABOVE RIVER MILE 457.7

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

08P

WAGONER COUNTY
TULSA COUNTY

ELEVATION IN FEET (NAVD)

630
620
610
600
590
580
570
560
550
540

198,000 200,000 202,000 204,000 206,000 208,000 210,000 212,000 214,000 216,000 218,000 220,000 222,000 224,000

STREAM DISTANCE IN FEET ABOVE RIVER MILE 457.7

U
V

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

ARKANSAS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

09P

FLOOD PROFILES

BROKEN ARROW CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

ELEVATION IN FEET (NAVD)

680
670
660
650
640
630
620
610
600
590

22,000
24,000
26,000
28,000
30,000
32,000
34,000
36,000
38,000
40,000
42,000
44,000
46,000
48,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH ARKANSAS RIVER

COUNTY BOUNDARY

193RD EAST AVENUE

CREEK PARKWAY

CONFLUENCE OF BROKEN ARROW CREEK TRIBUTARY

101ST ST SOUTH

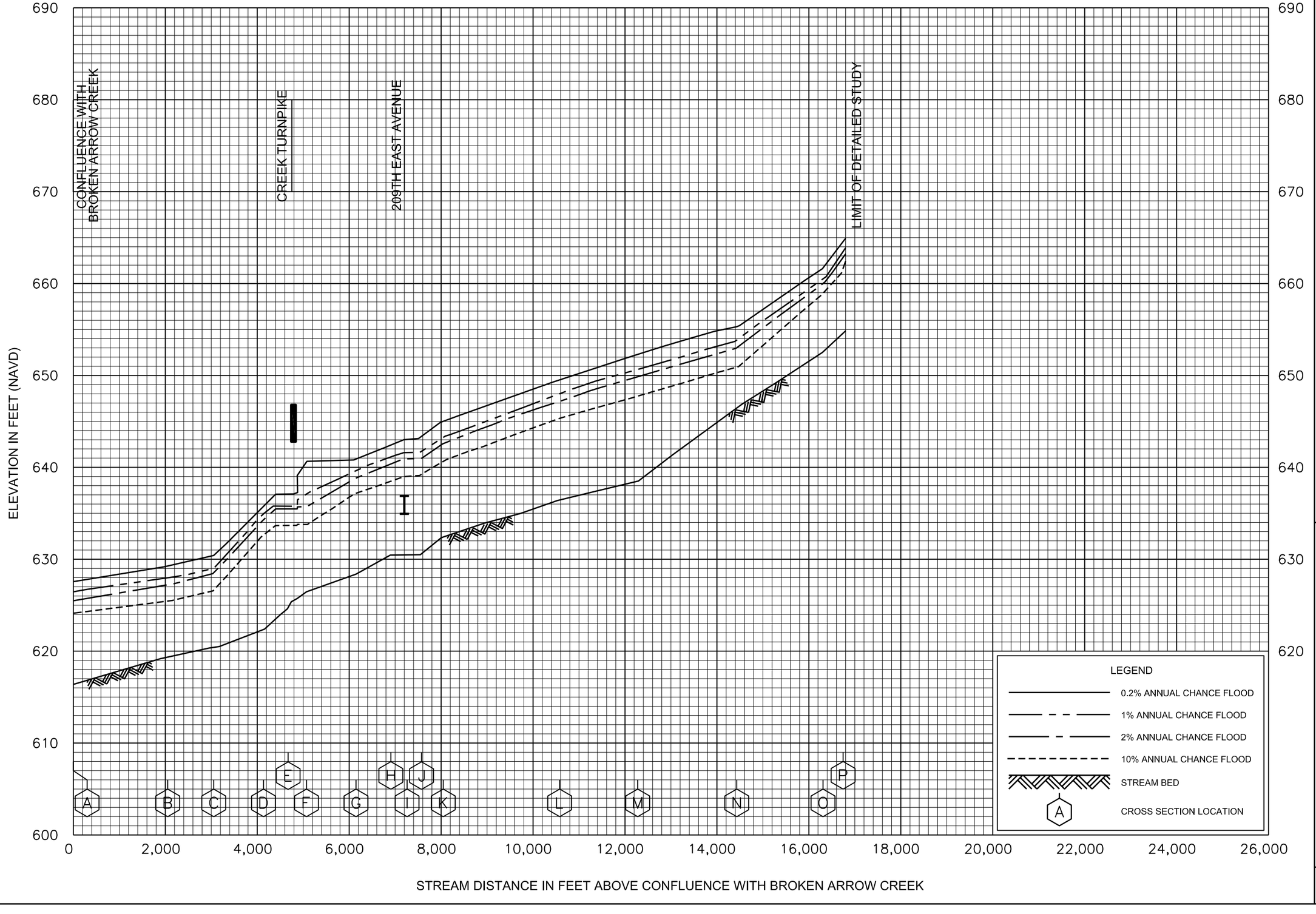
LIMIT OF DETAILED STUDY

193RD EAST AVE

A B C D E F G H I J K L M N O P Q R S T U V W X Y AA Z

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A CROSS SECTION LOCATION



FLOOD PROFILES

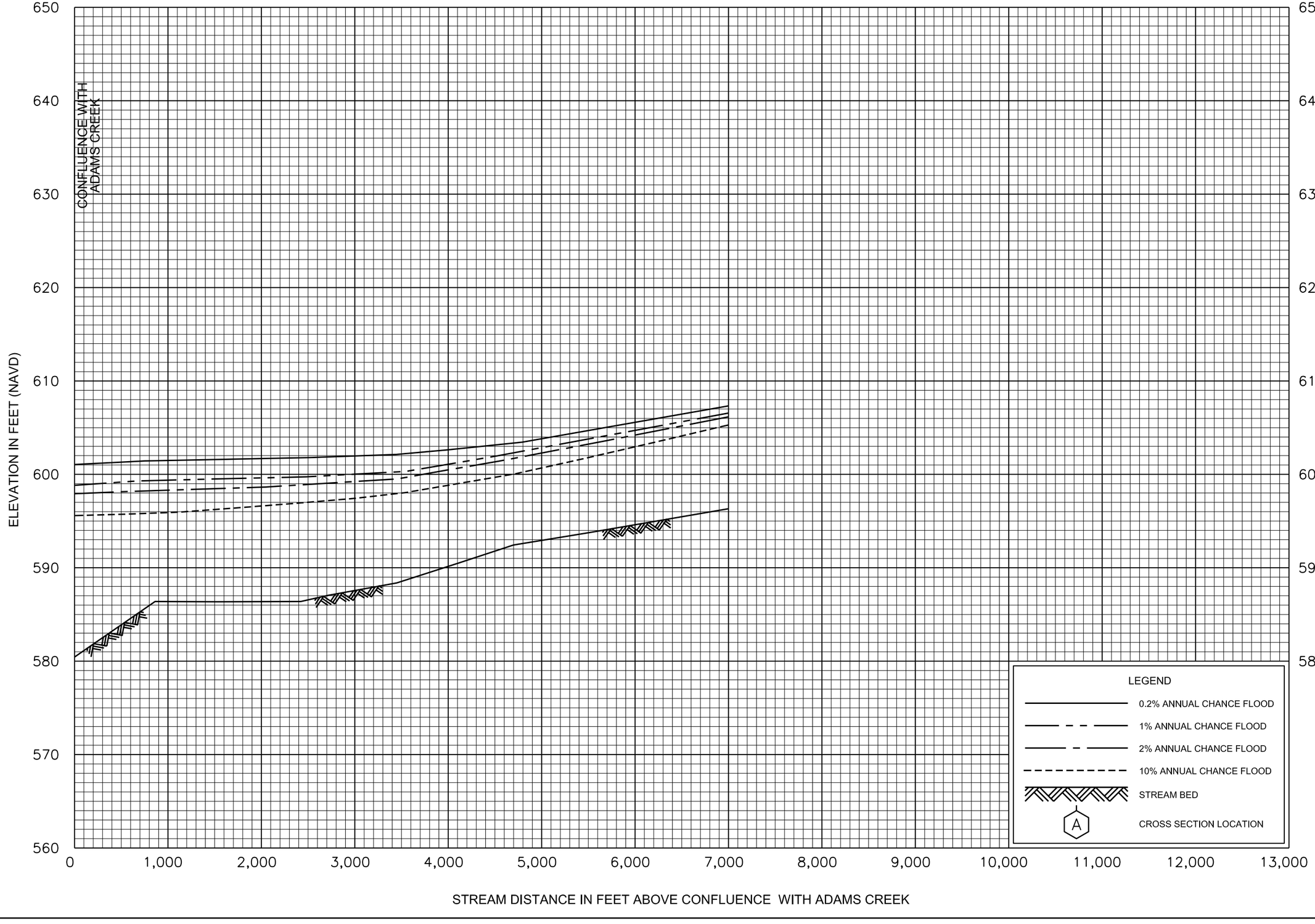
BROKEN ARROW CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

11P



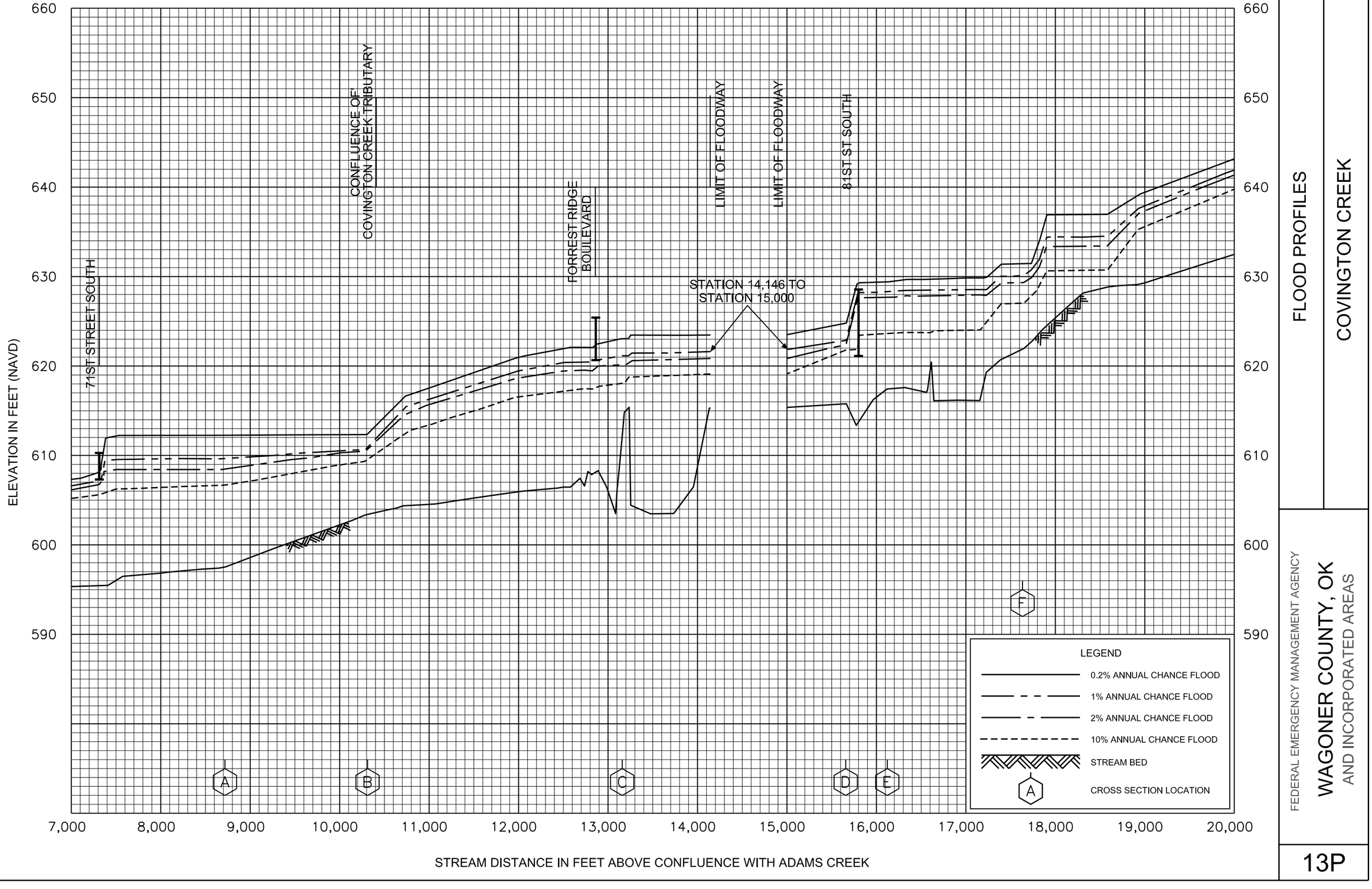
FLOOD PROFILES

COVINGTON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

12P



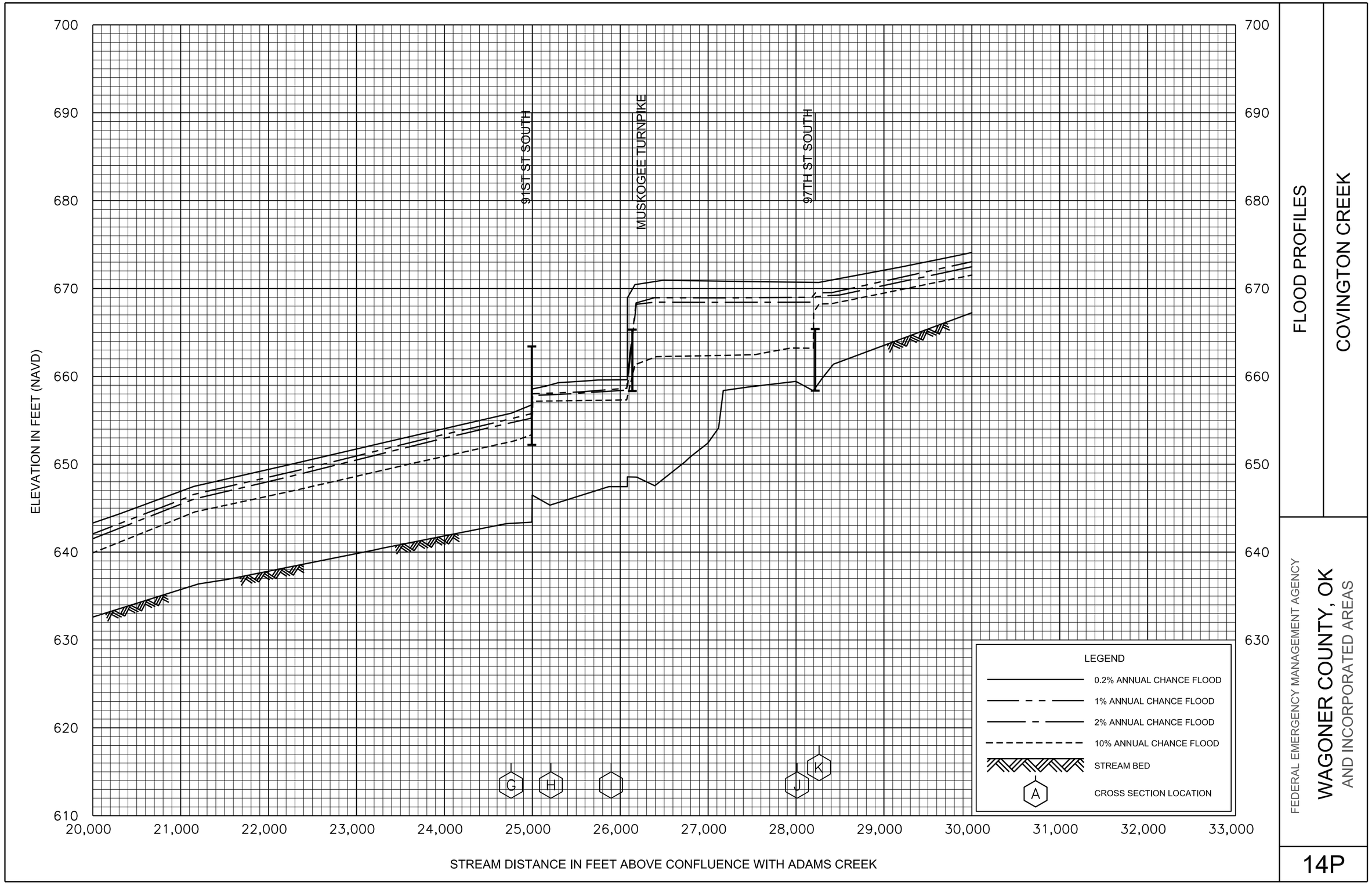
FLOOD PROFILES

COVINGTON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

13P



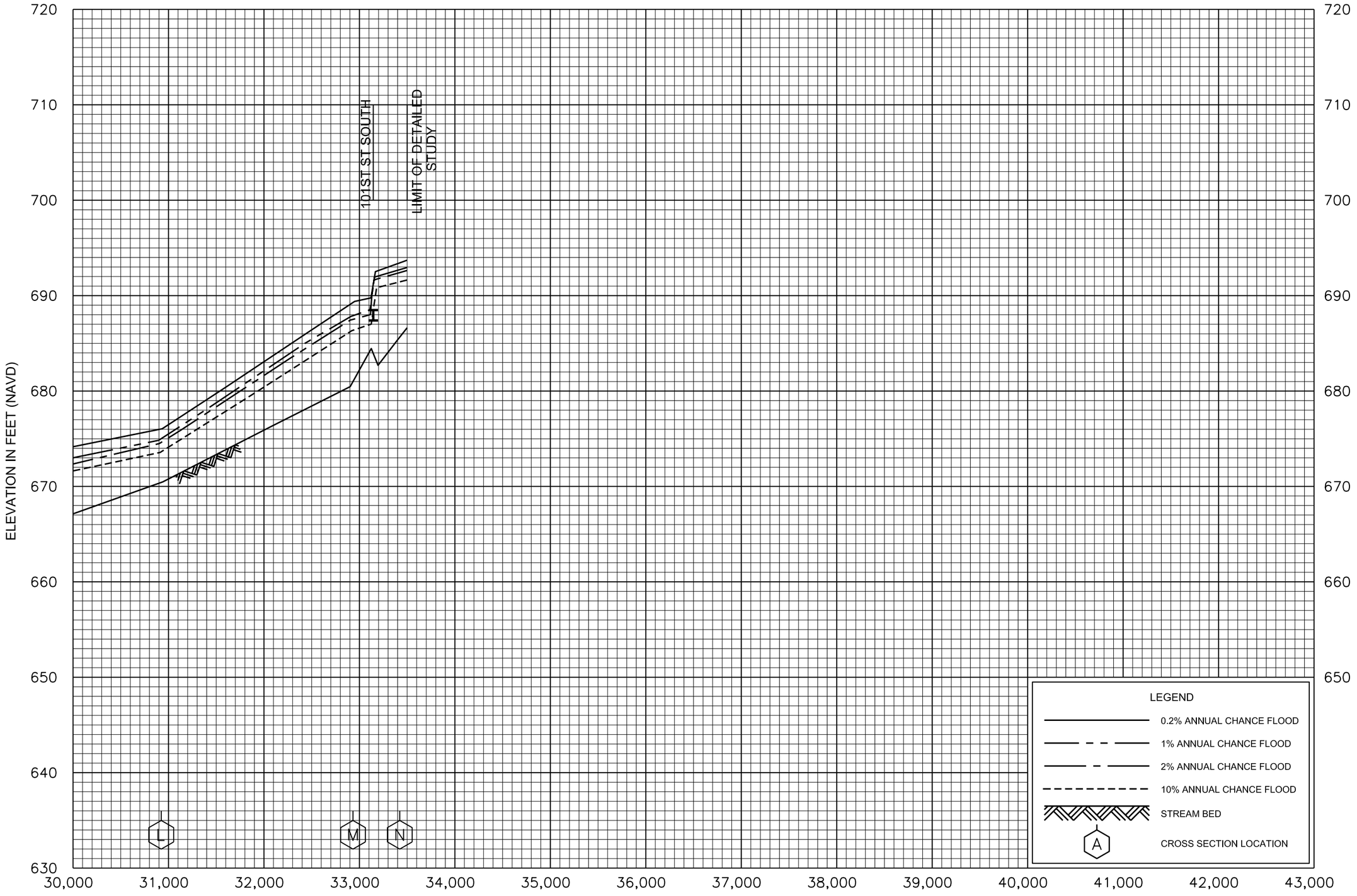
FLOOD PROFILES

COVINGTON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

14P



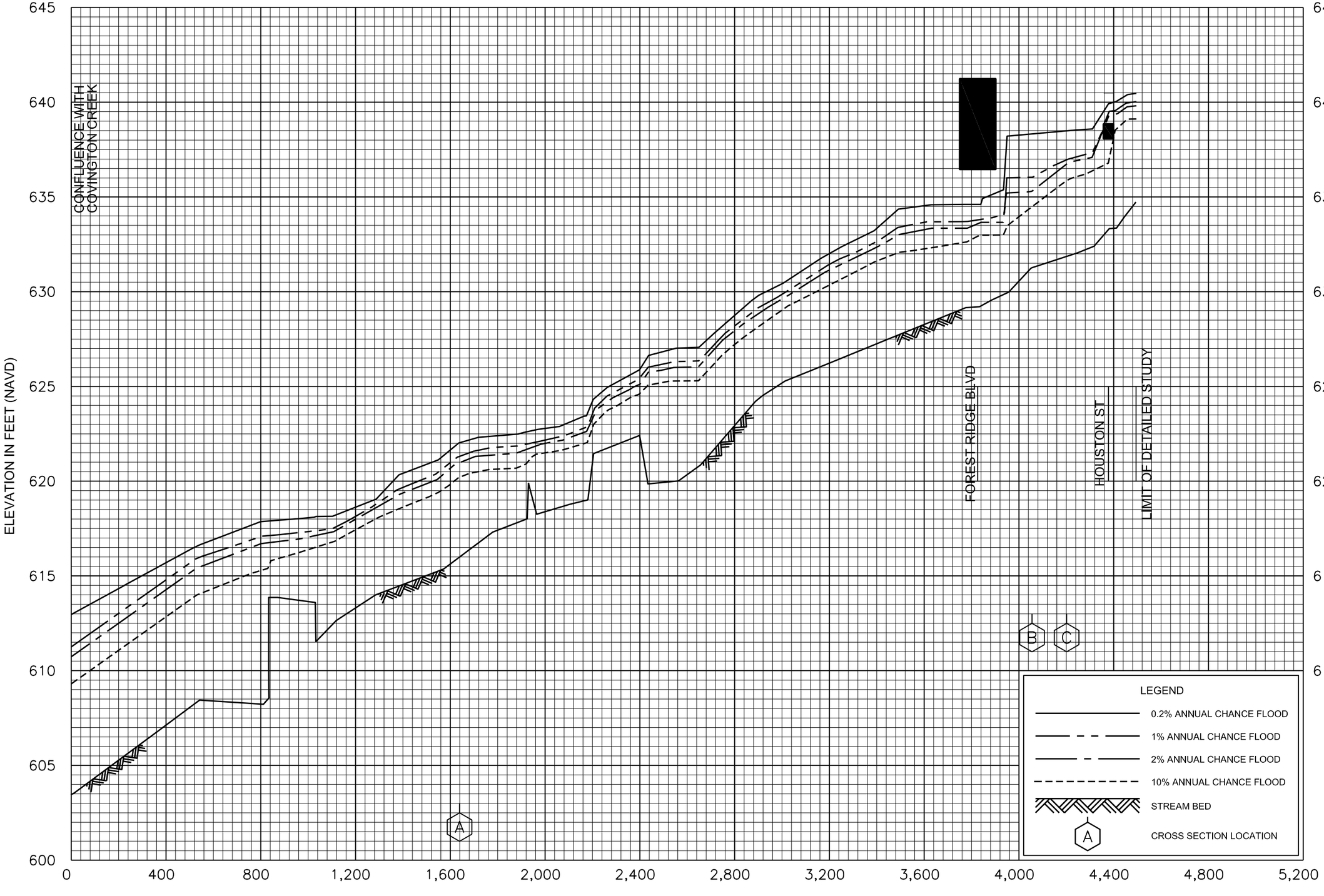
FLOOD PROFILES

COVINGTON CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

15P



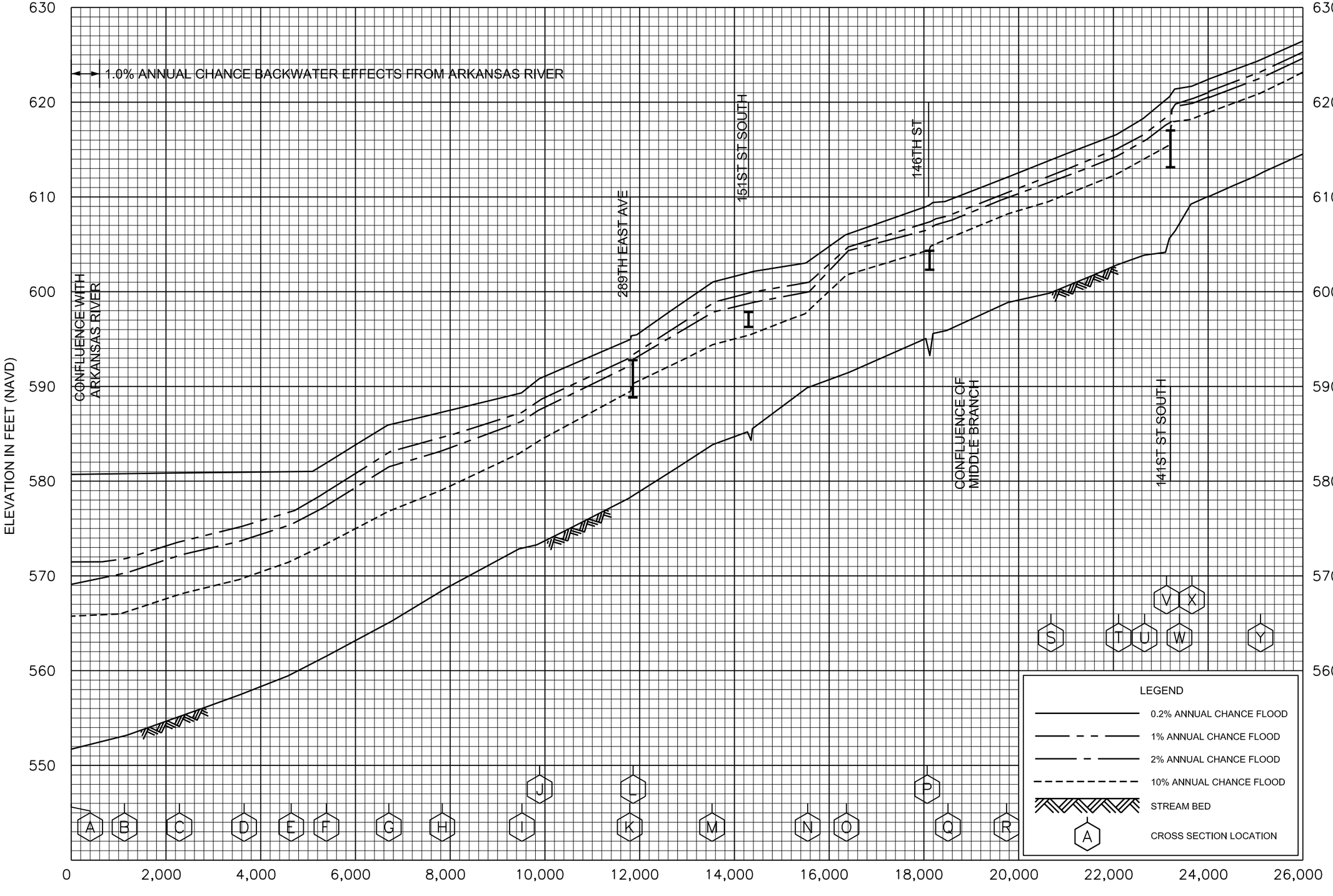
FLOOD PROFILES

COVINGTON CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

16P



FLOOD PROFILES

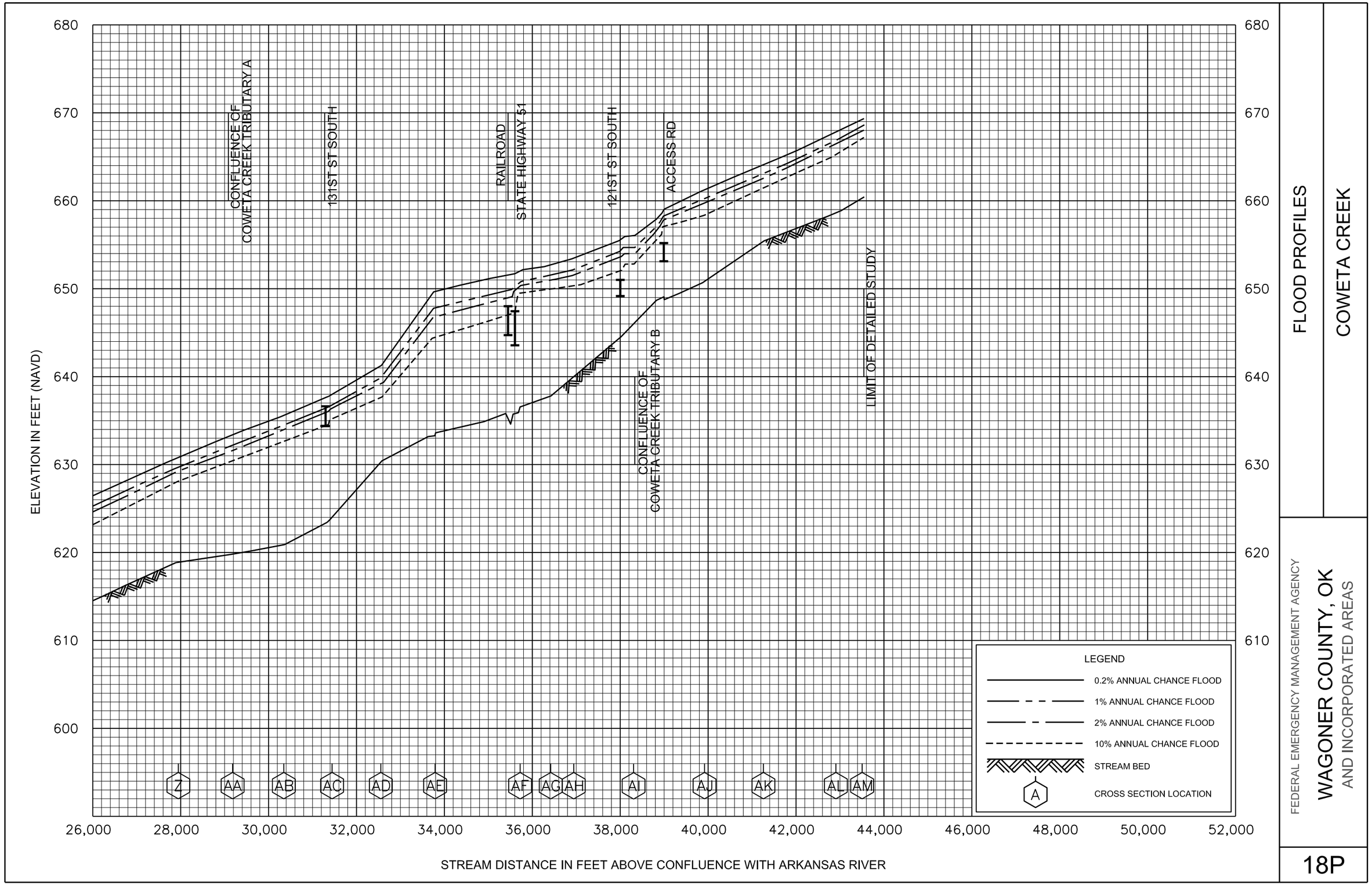
COWETA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

17P



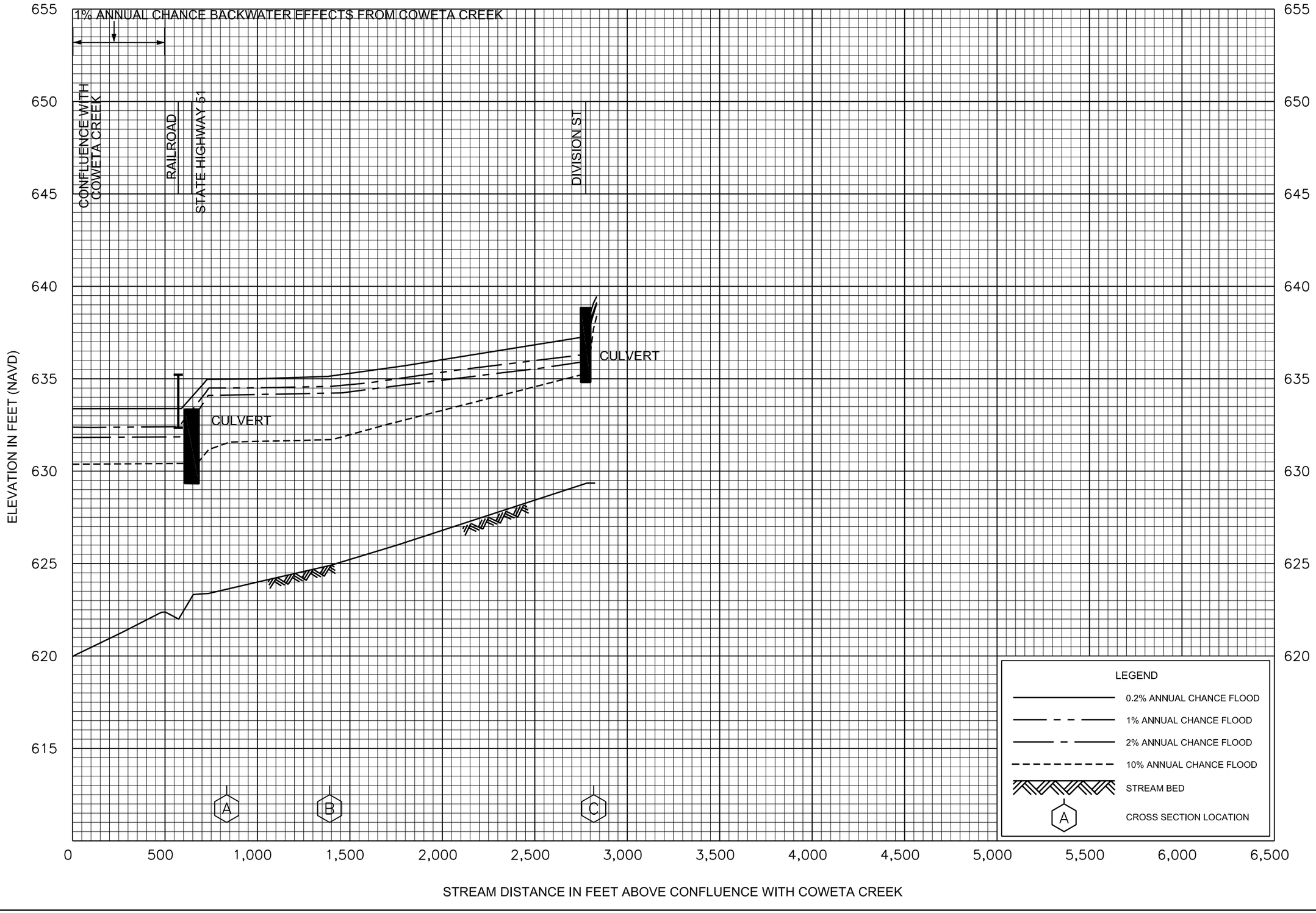
FLOOD PROFILES

COWETA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

18P



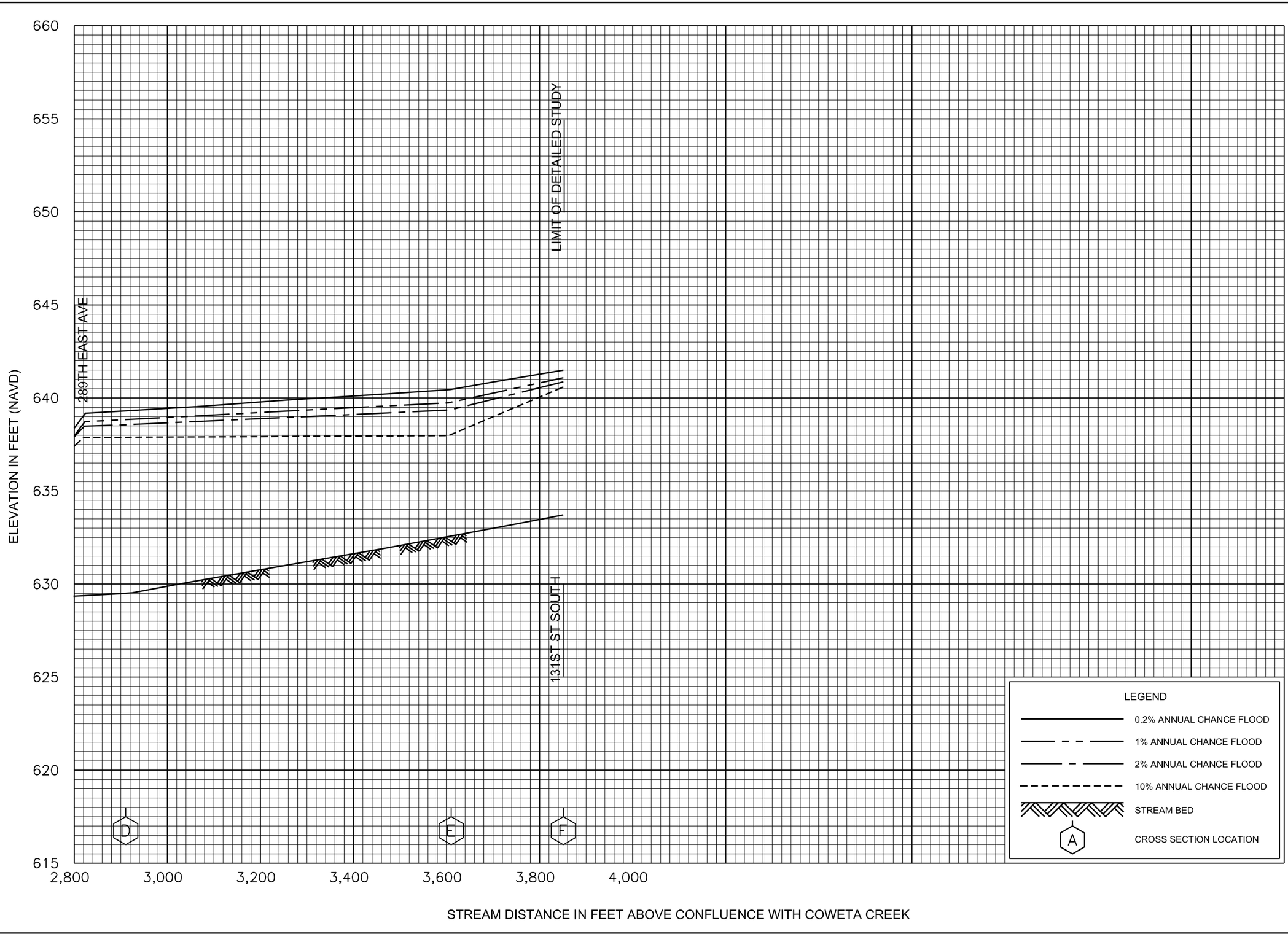
FLOOD PROFILES

COWETA CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

19P

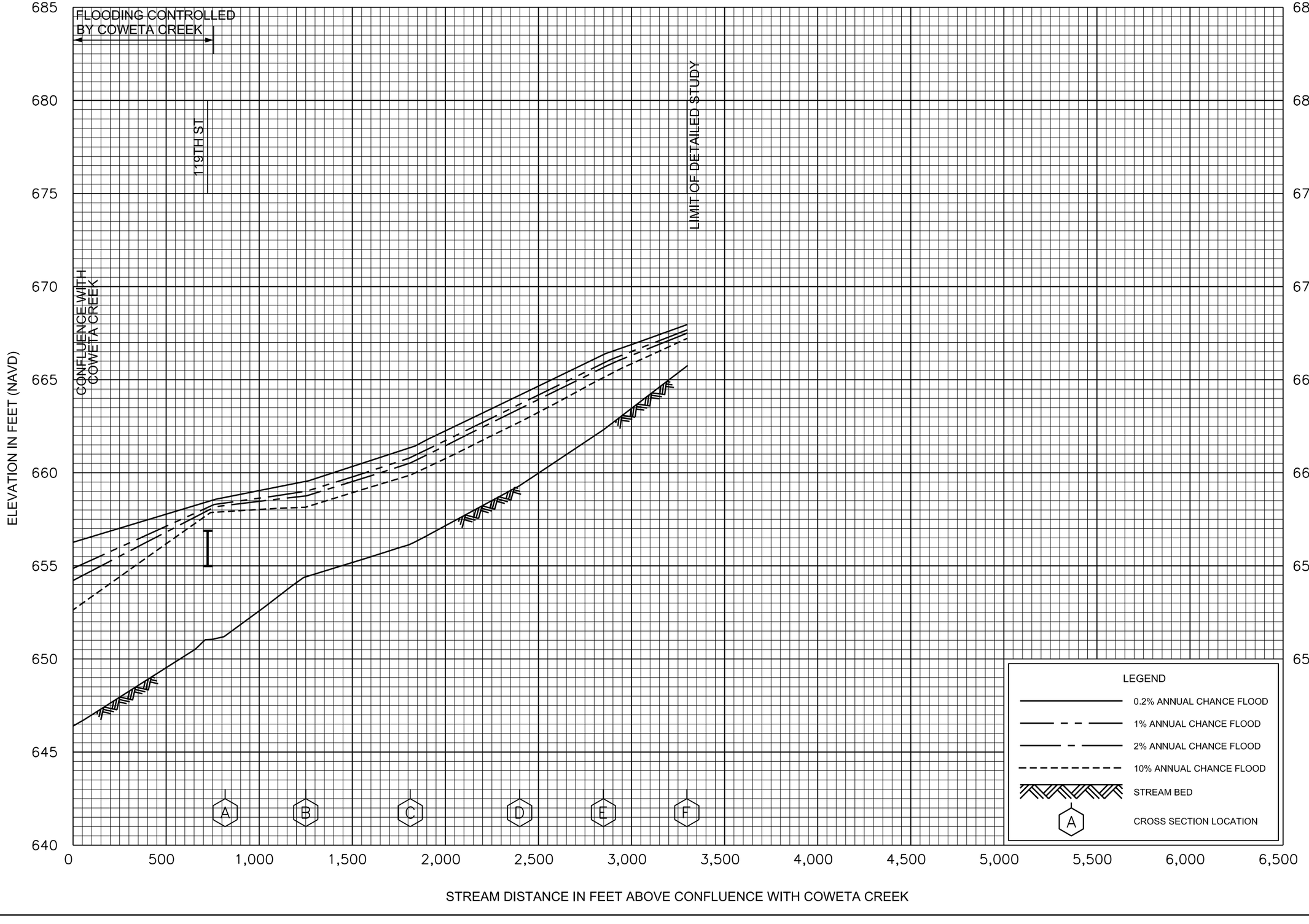


FLOOD PROFILES

COWETA CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS



FLOOD PROFILES

COWETA CREEK TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

21P

1% ANNUAL CHANCE BACKWATER EFFECTS FROM VERDIGRIS RIVER

CONFLUENCE WITH VERDIGRIS RIVER

U.S. HIGHWAY 69

760 RD

750 RD

15TH ST SOUTH

ELEVATION IN FEET (NAVD)

560
550
540
530
520
510
500
490
480
470

0
2,500
5,000
7,500
10,000
12,500
15,000
17,500
20,000
22,500
25,000
27,500
30,000
32,500

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH VERDIGRIS RIVER

A B C D E F G H I J K L M N O

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

FLOOD PROFILES

EAST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

22P

ACCESS RD
STATE HIGHWAY 51
TIMBERLANE DR
PIERCE AVE
LIMIT OF DETAILED STUDY
RAILROAD

ELEVATION IN FEET (NAVD)

610
600
590
580
570
560
550
540
530
520

32,500 35,000 37,500 40,000 42,500 45,000 47,500 50,000 52,500 55,000 57,500 60,000 62,500 65,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH VERDIGRIS RIVER

P Q R S T U V W X Y Z AA AB AC AD AE AF

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

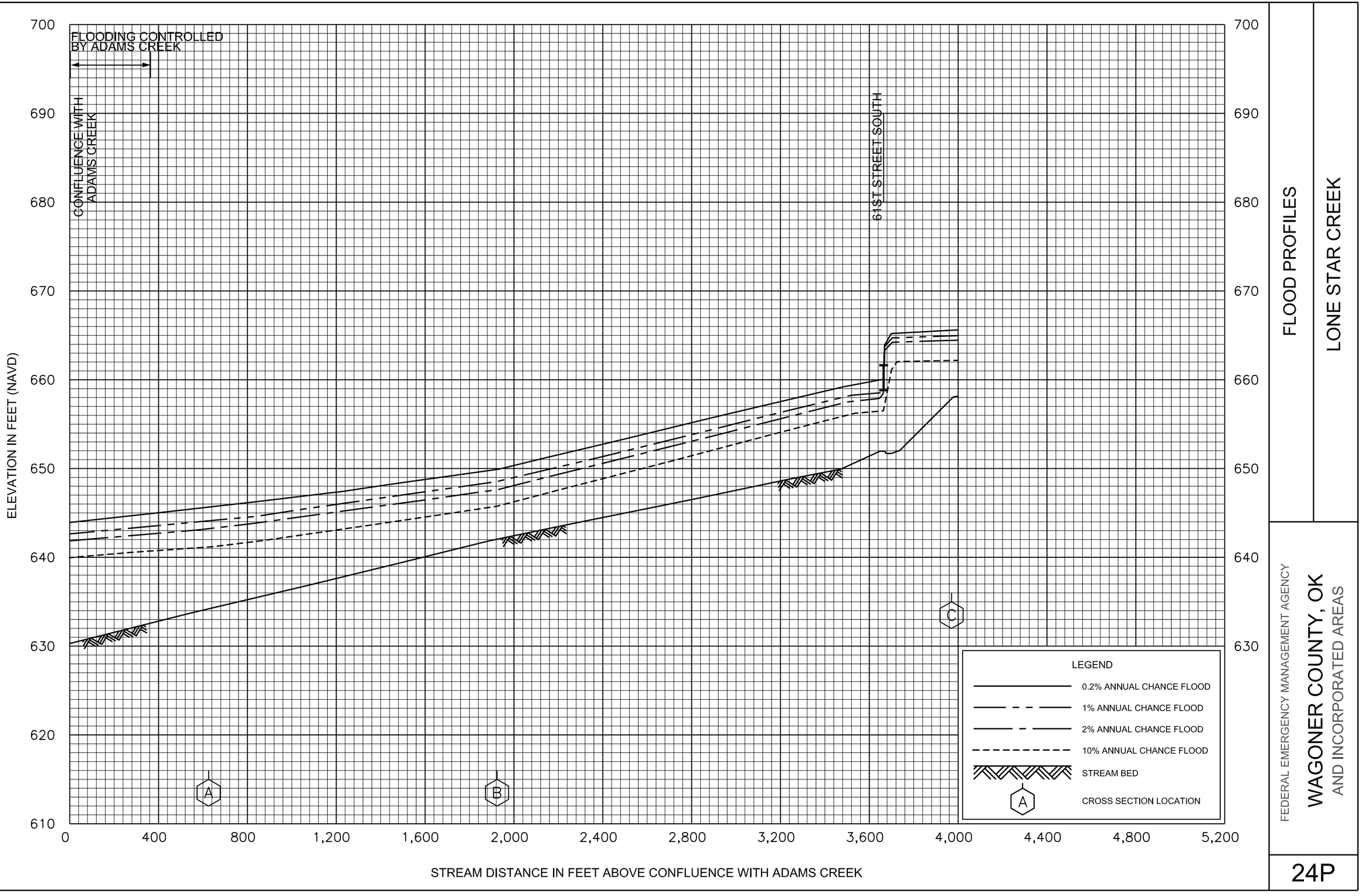
FLOOD PROFILES

EAST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

23P



FLOOD PROFILES

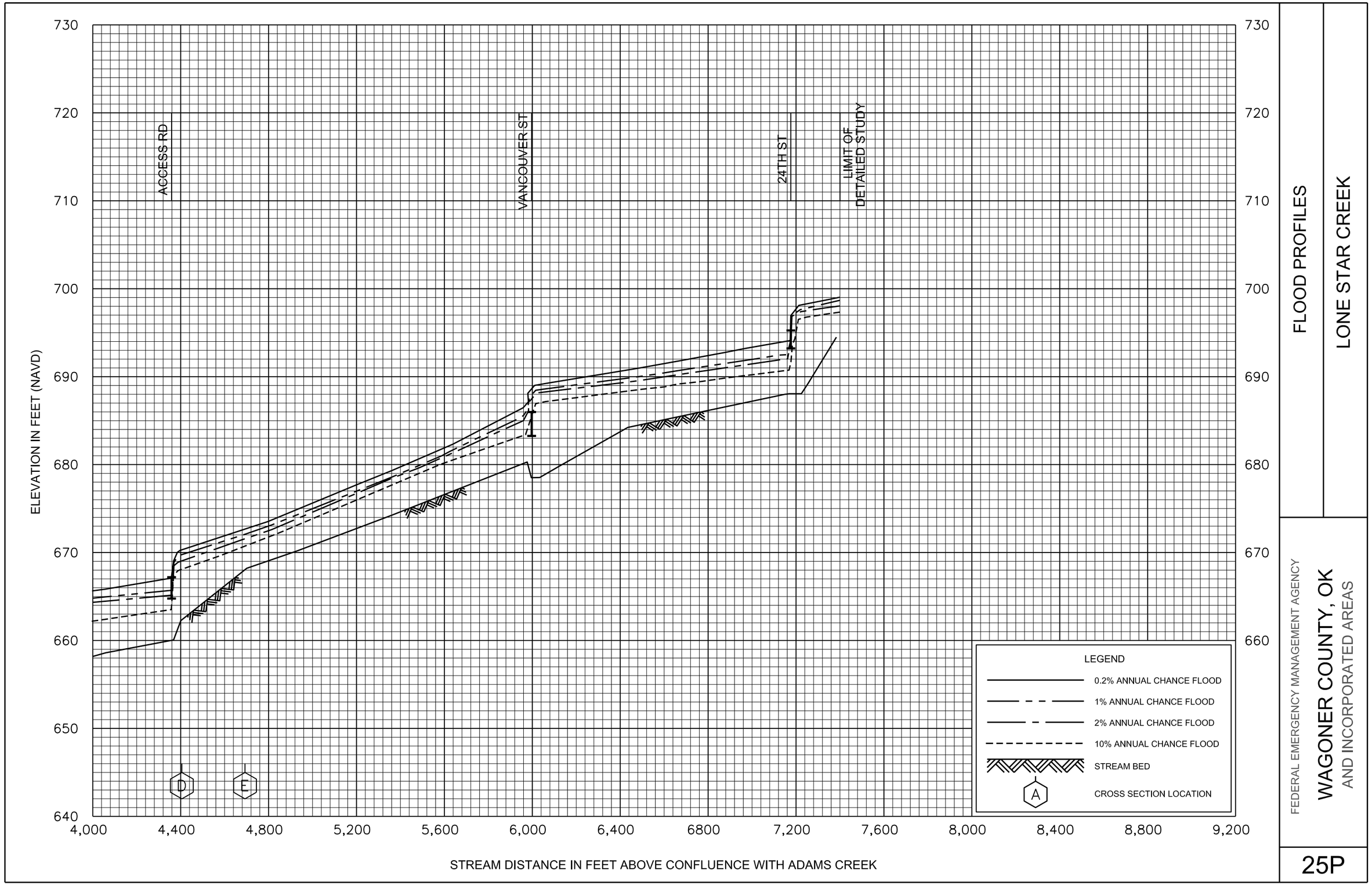
LONE STAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

24P



FLOOD PROFILES

LONE STAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

25P

FLOODING CONTROLLED BY COWETA CREEK

CONFLUENCE WITH COWETA CREEK

CONFLUENCE OF SOUTH BRANCH

OAK ST

141ST ST

RAILROAD

STATE HIGHWAY 51

ENTRANCE TO WALMART

ENTRANCE TO WALMART

ENTRANCE TO WALMART

THE 0.2% AND 2% ANNUAL CHANCE FLOOD PROFILE IS TOO CLOSE TO THE 1% ANNUAL CHANCE ELEVATION TO BE SHOWN SEPARATELY

LIMIT OF DETAILED STUDY

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

ELEVATION IN FEET (NAVD)

670
660
650
640
630
620
610
600
590

A B C D E F G H I J K L M N O

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 11,000 12,000 13,000

STREAM DISTANCE IN FEET ABOVE CONFLUENCE WITH COWETA CREEK

FLOOD PROFILES

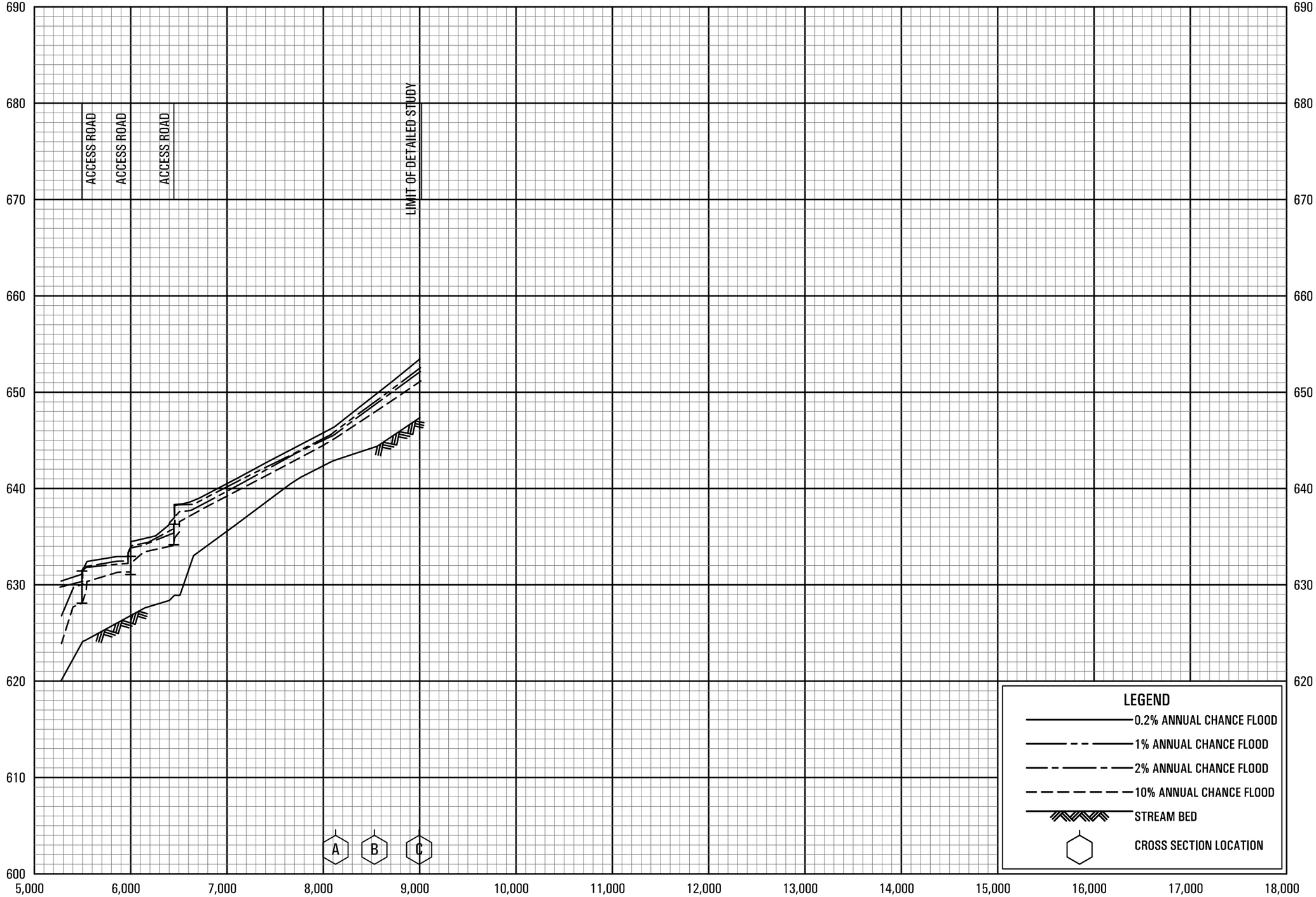
MIDDLE BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

26P



FLOOD PROFILES

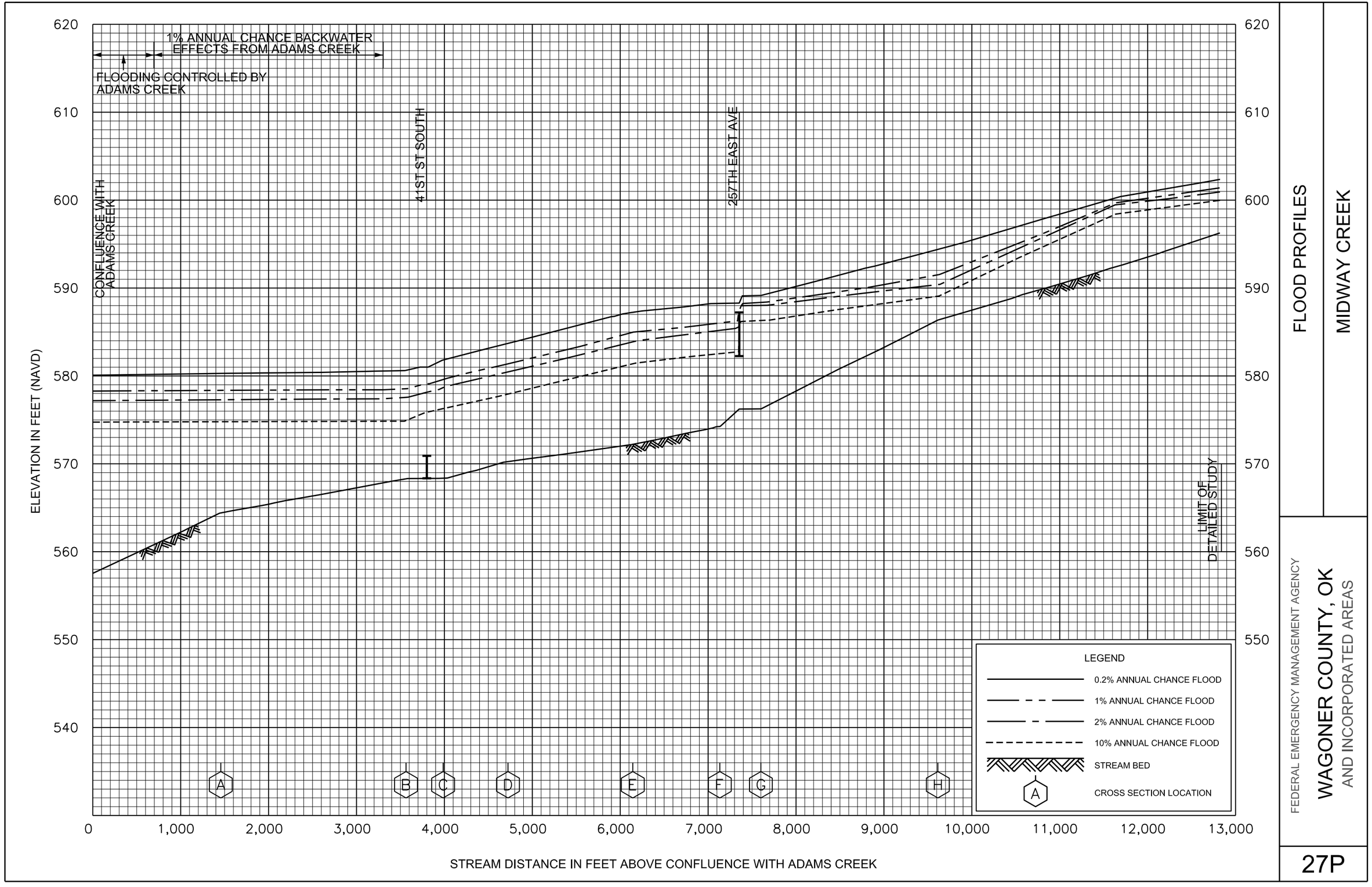
MIDDLE BRANCH TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

26P (a)



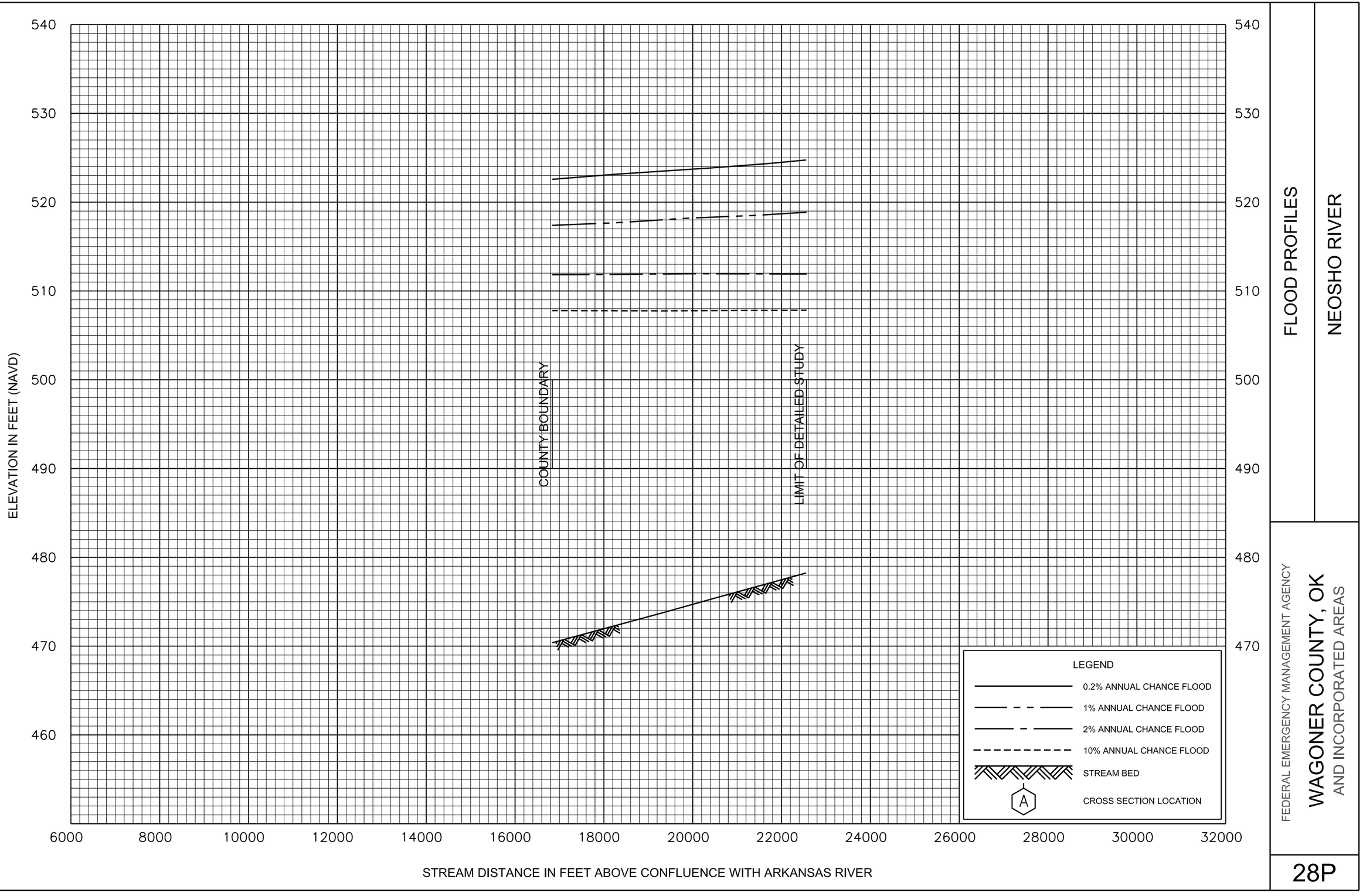
FLOOD PROFILES

MIDWAY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

27P



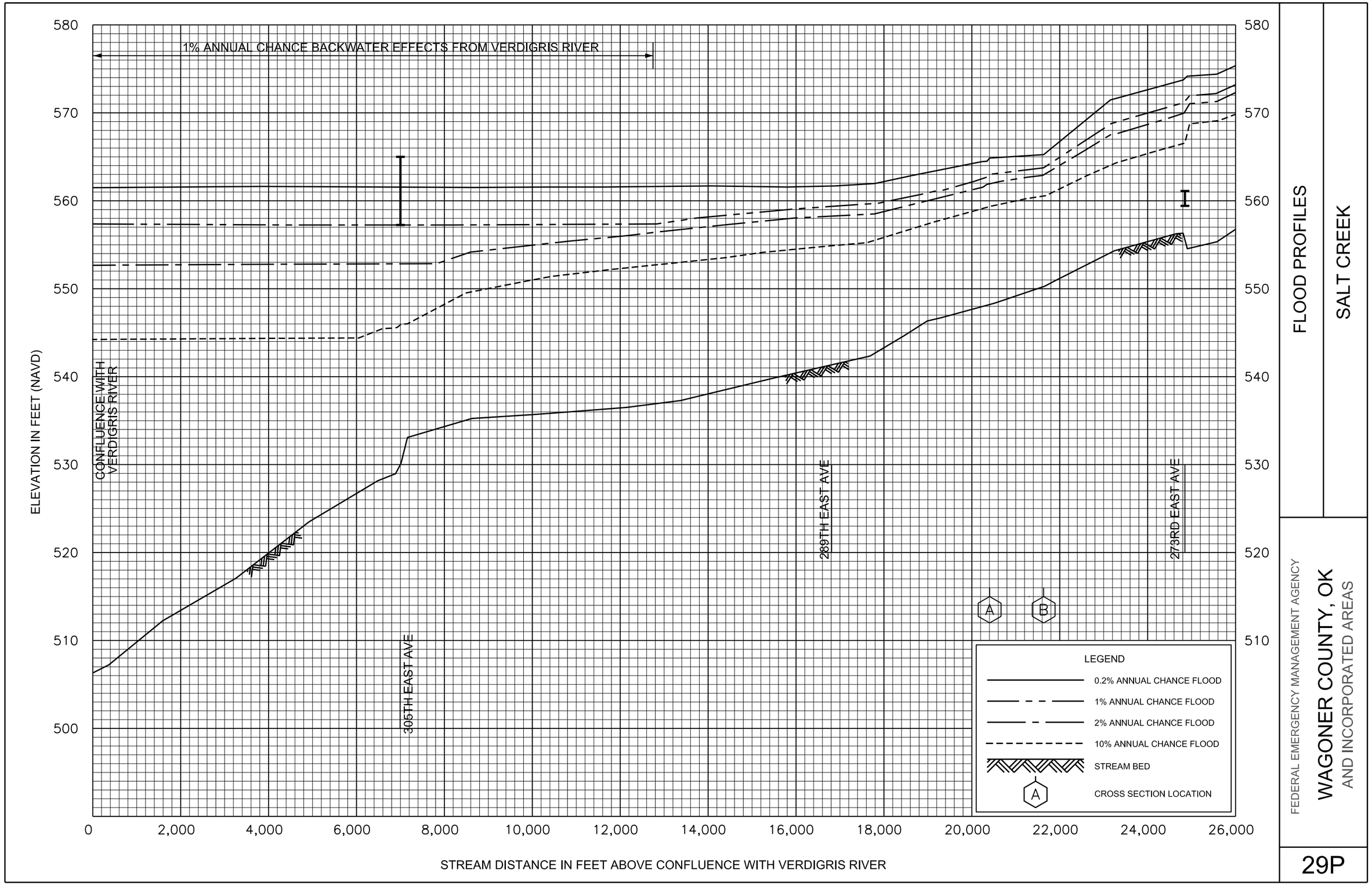
FLOOD PROFILES

NEOSHO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

28P



FLOOD PROFILES

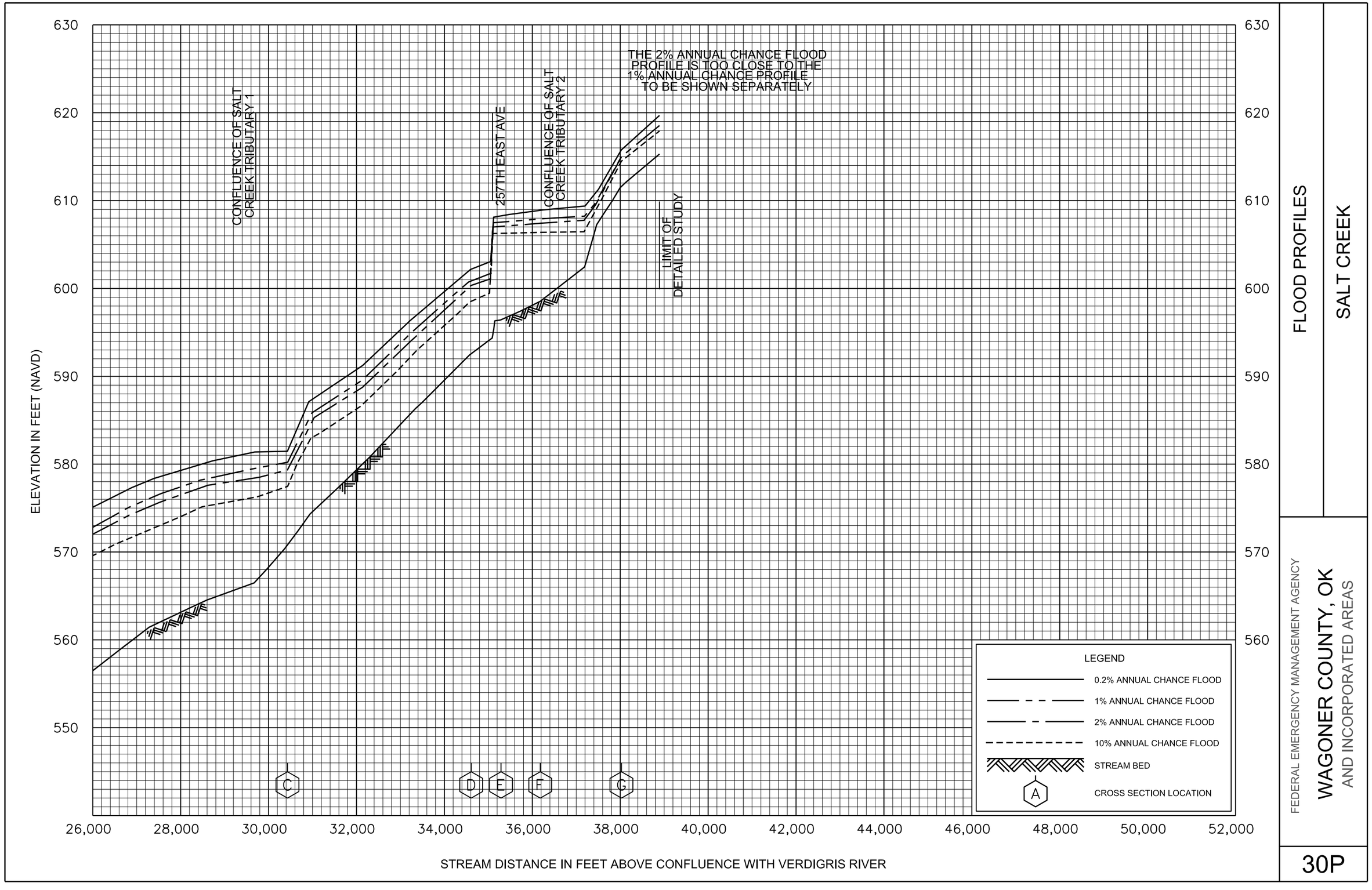
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

29P



FLOOD PROFILES

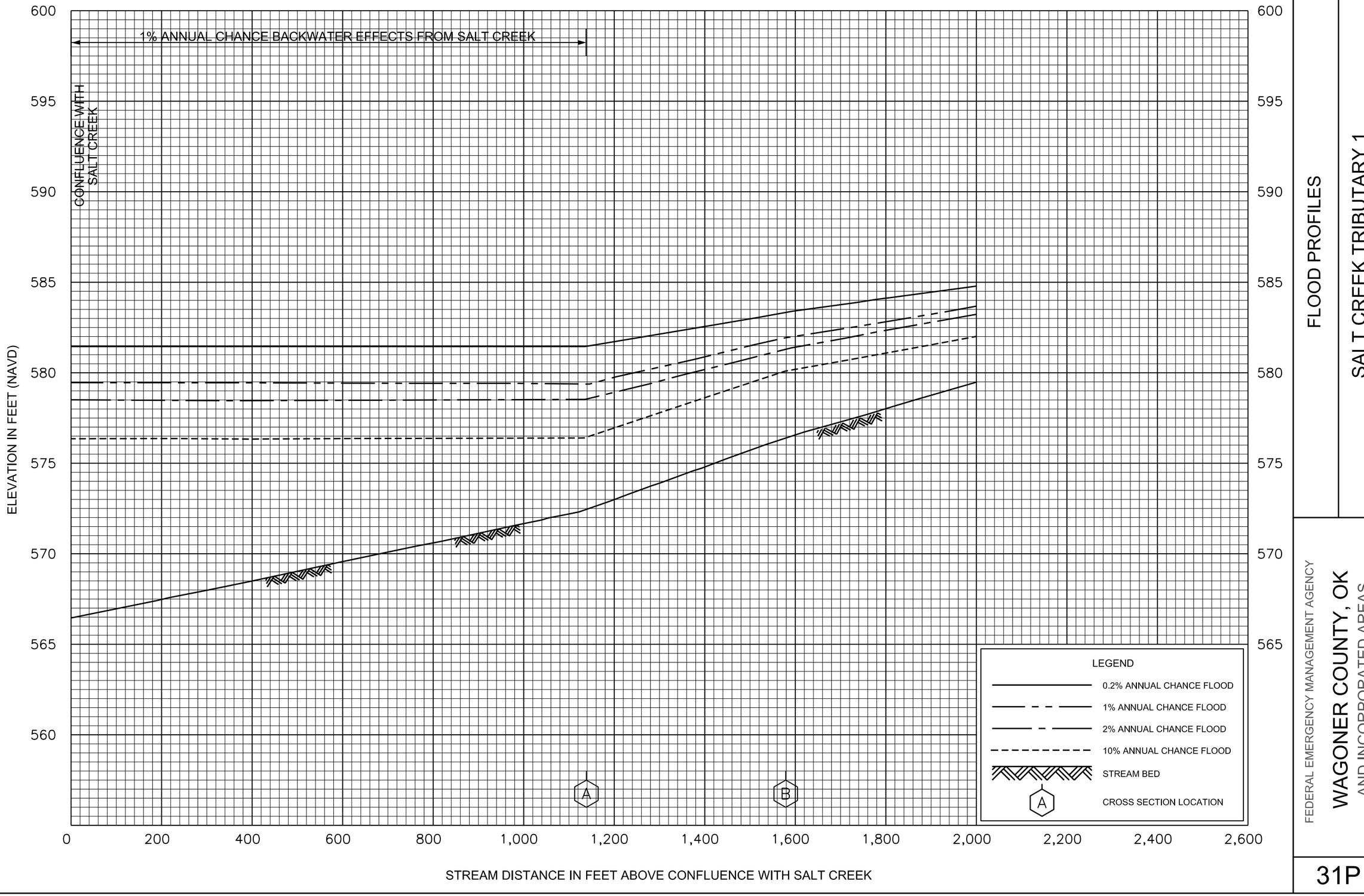
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

30P

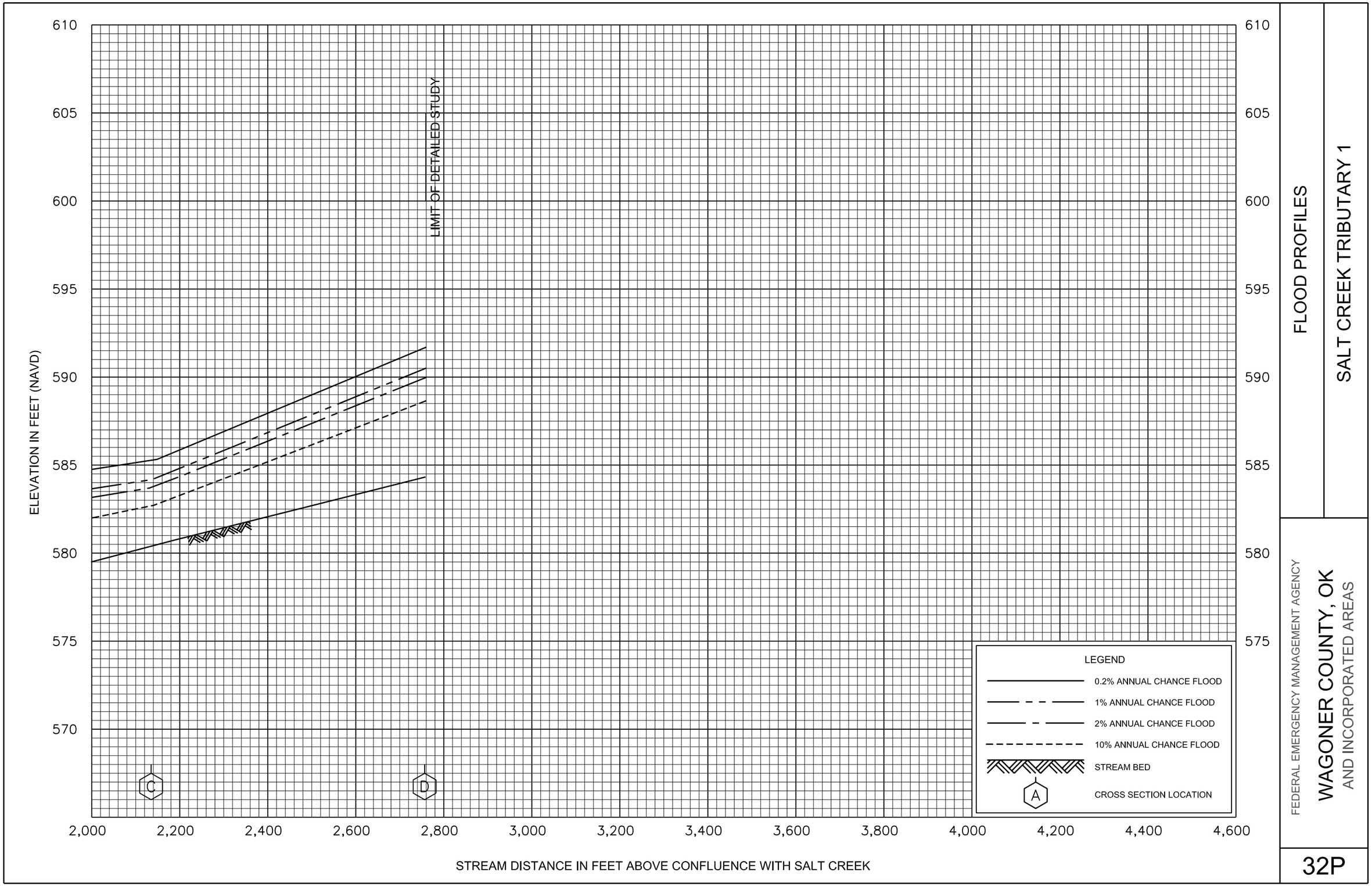


FLOOD PROFILES

SALT CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS



FLOOD PROFILES

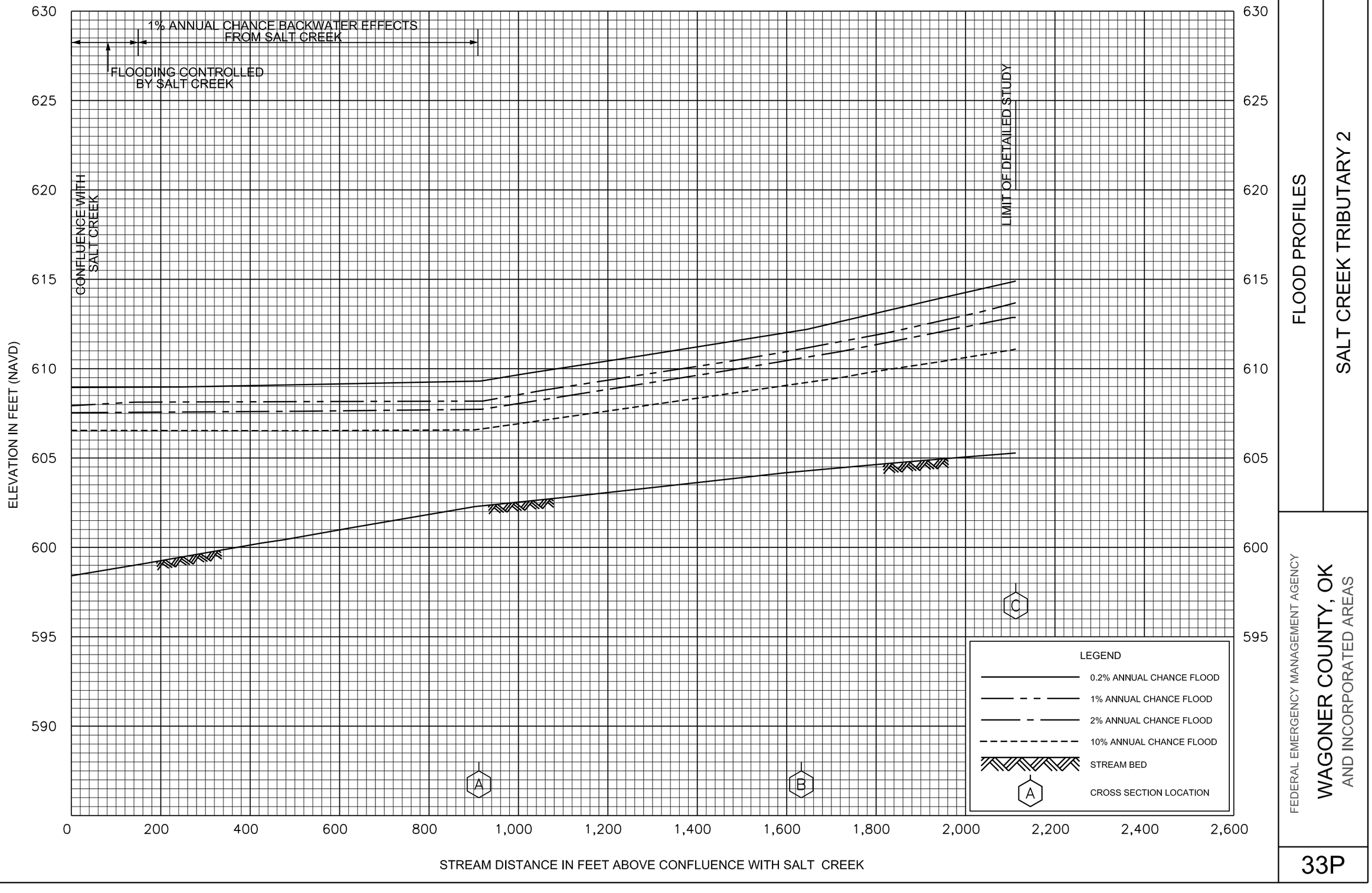
SALT CREEK TRIBUTARY 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

32P



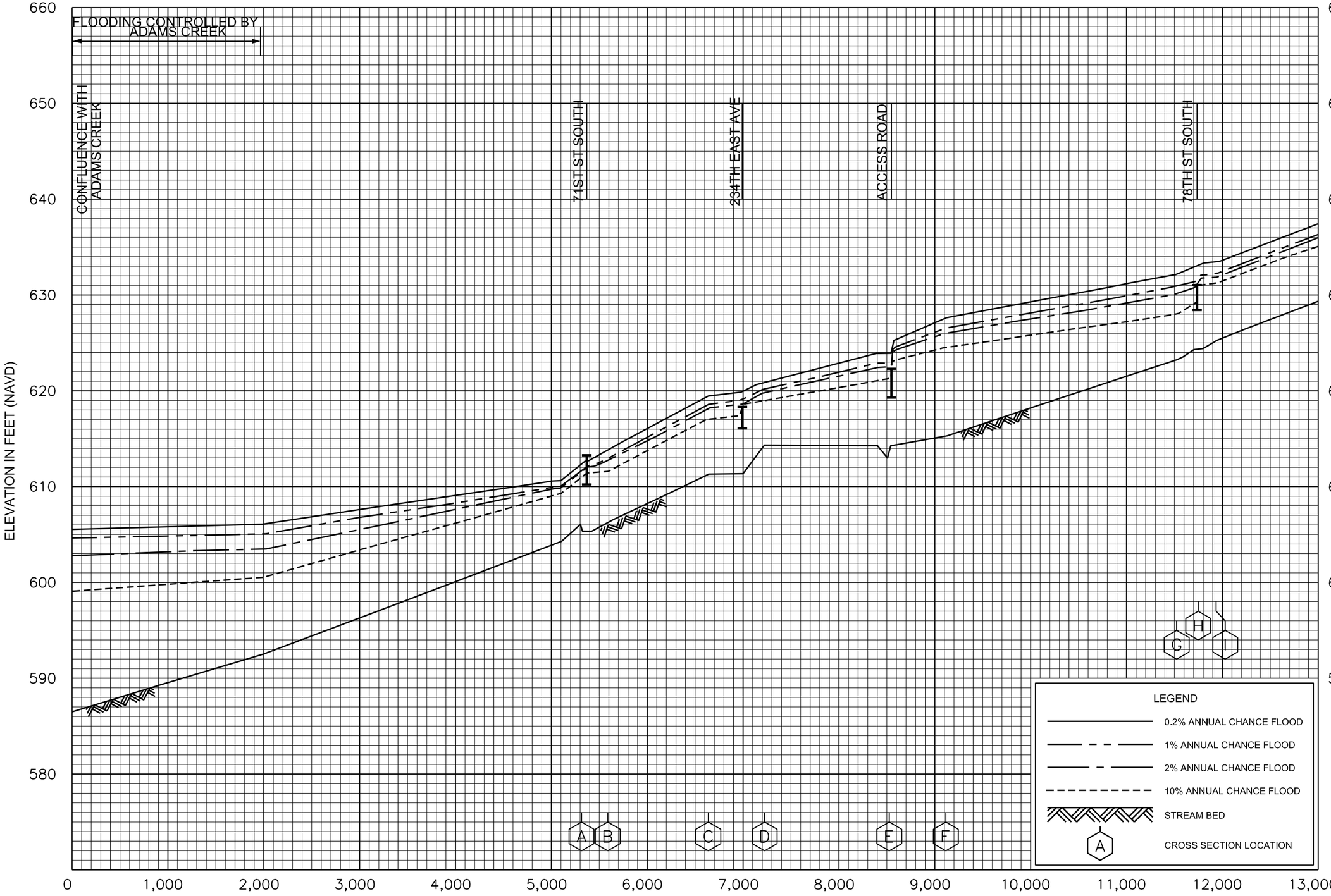
FLOOD PROFILES

SALT CREEK TRIBUTARY 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

33P



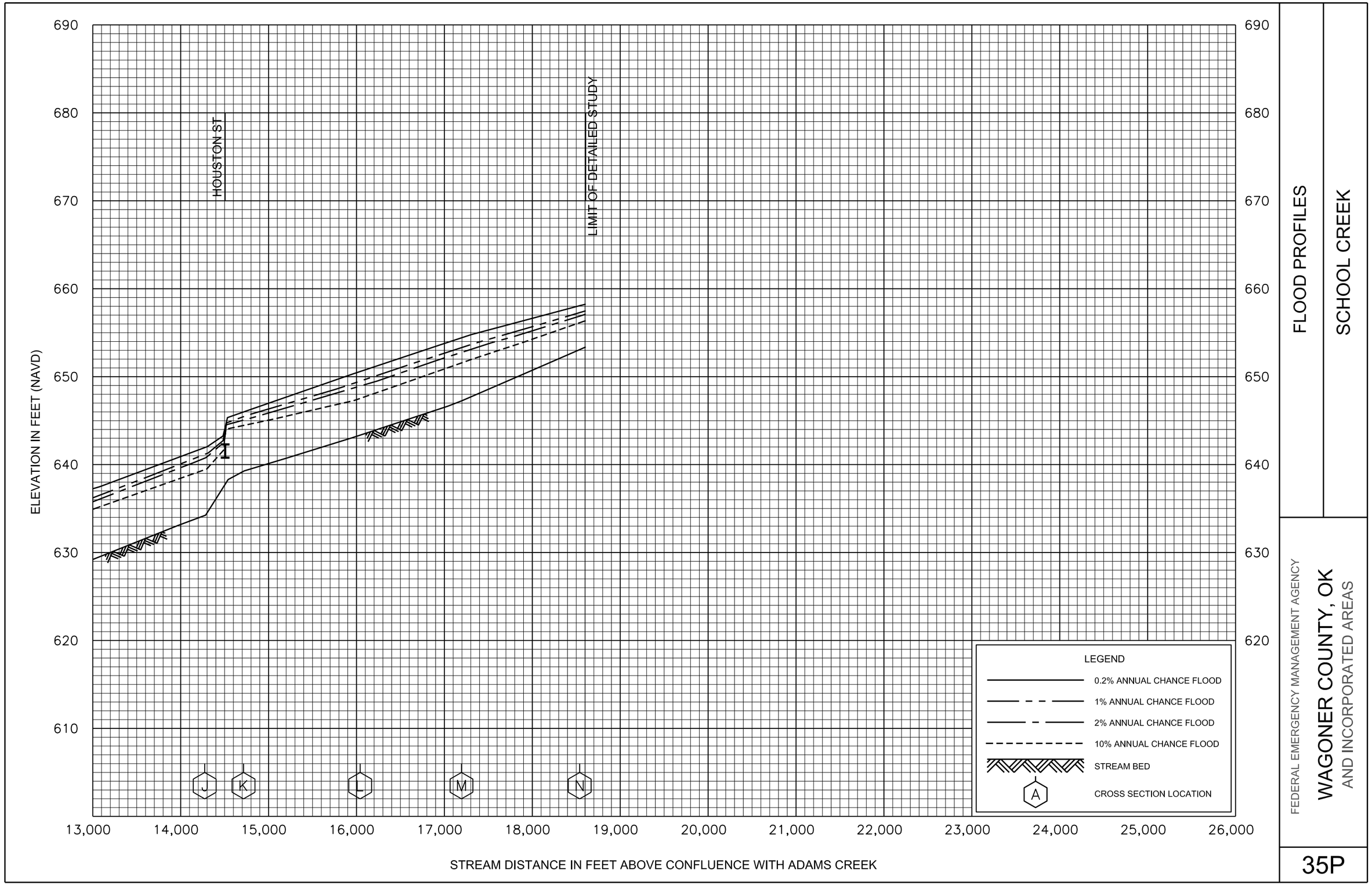
FLOOD PROFILES

SCHOOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS



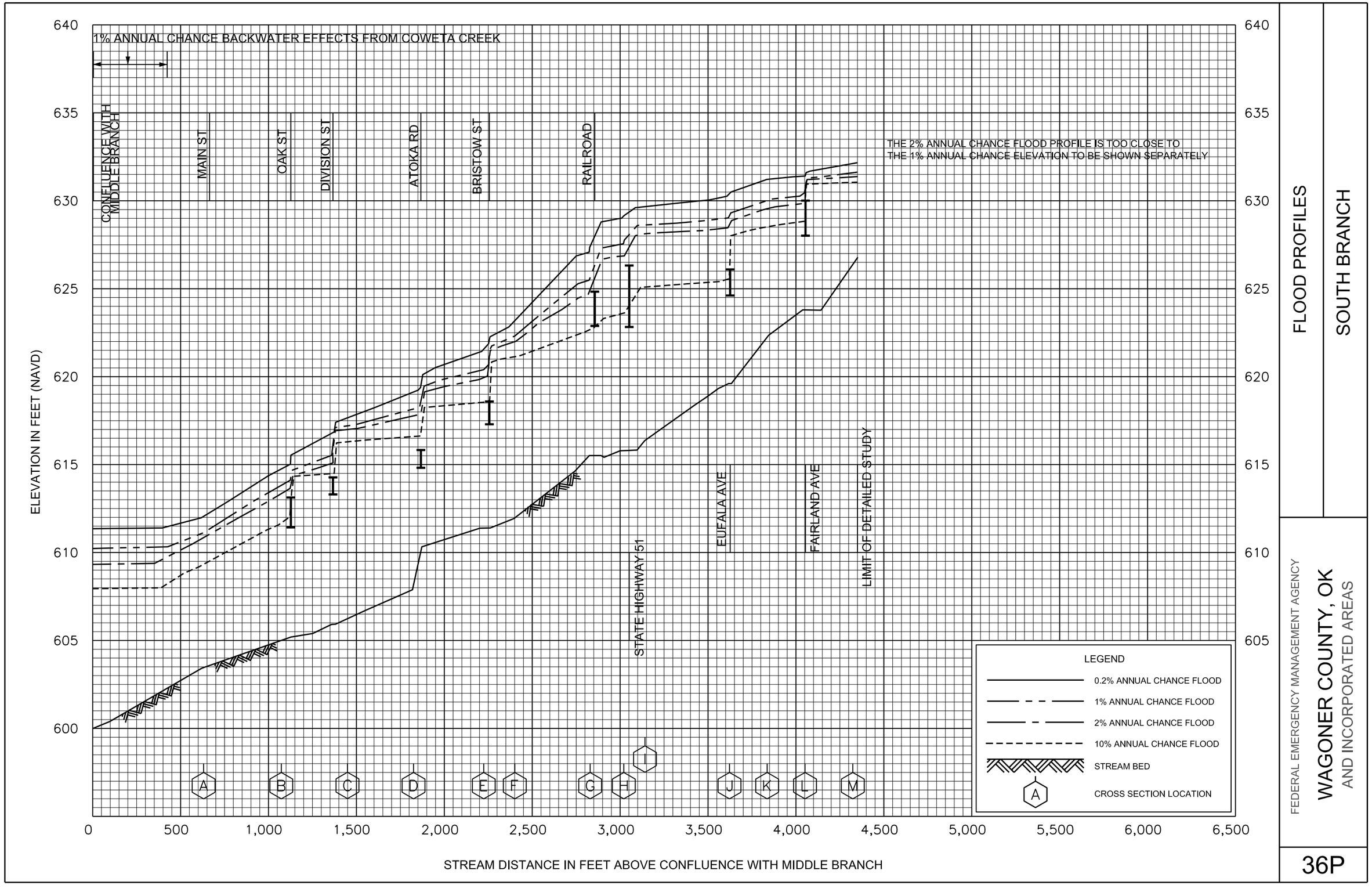
FLOOD PROFILES

SCHOOL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

35P



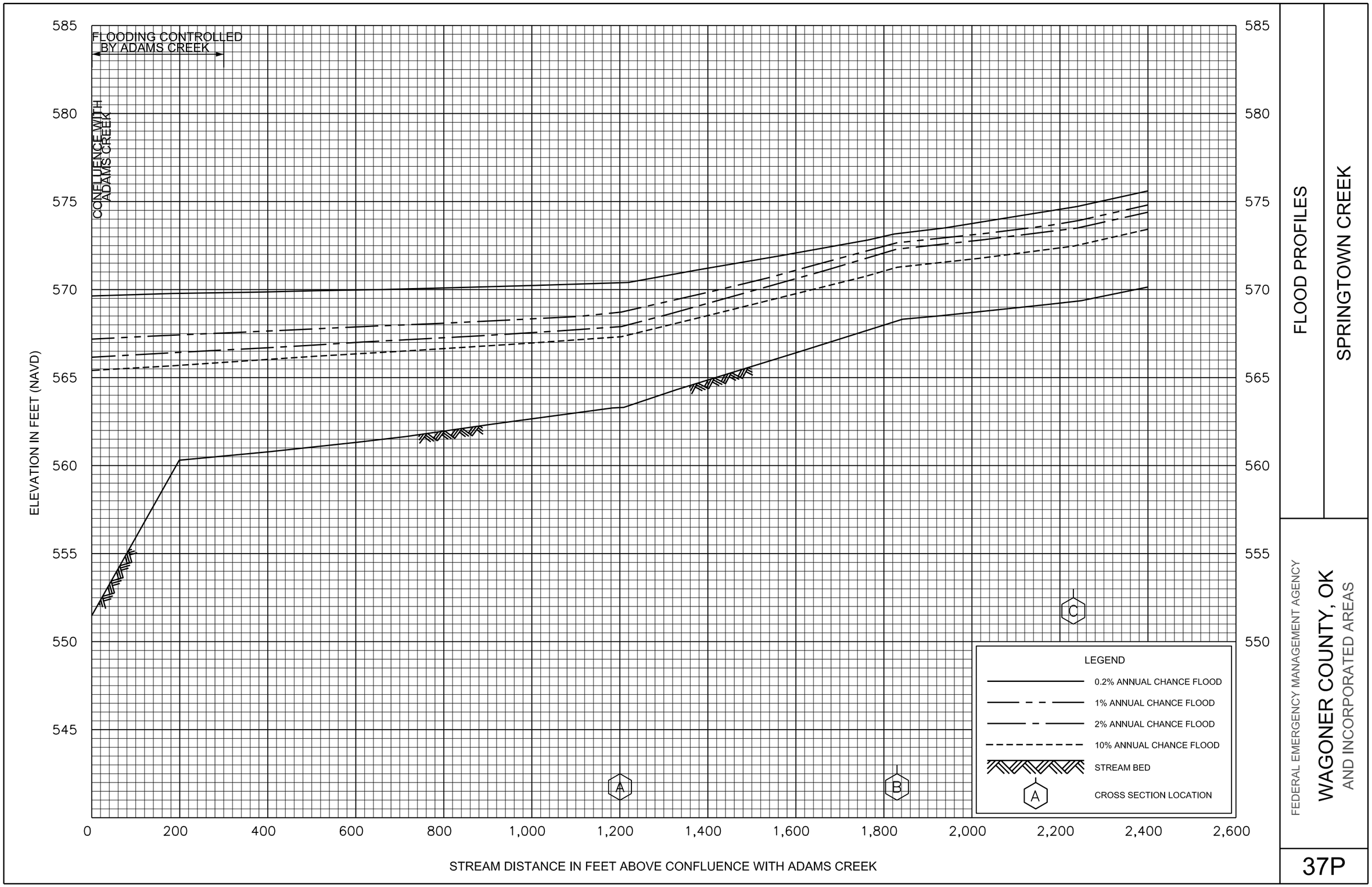
FLOOD PROFILES

SOUTH BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS



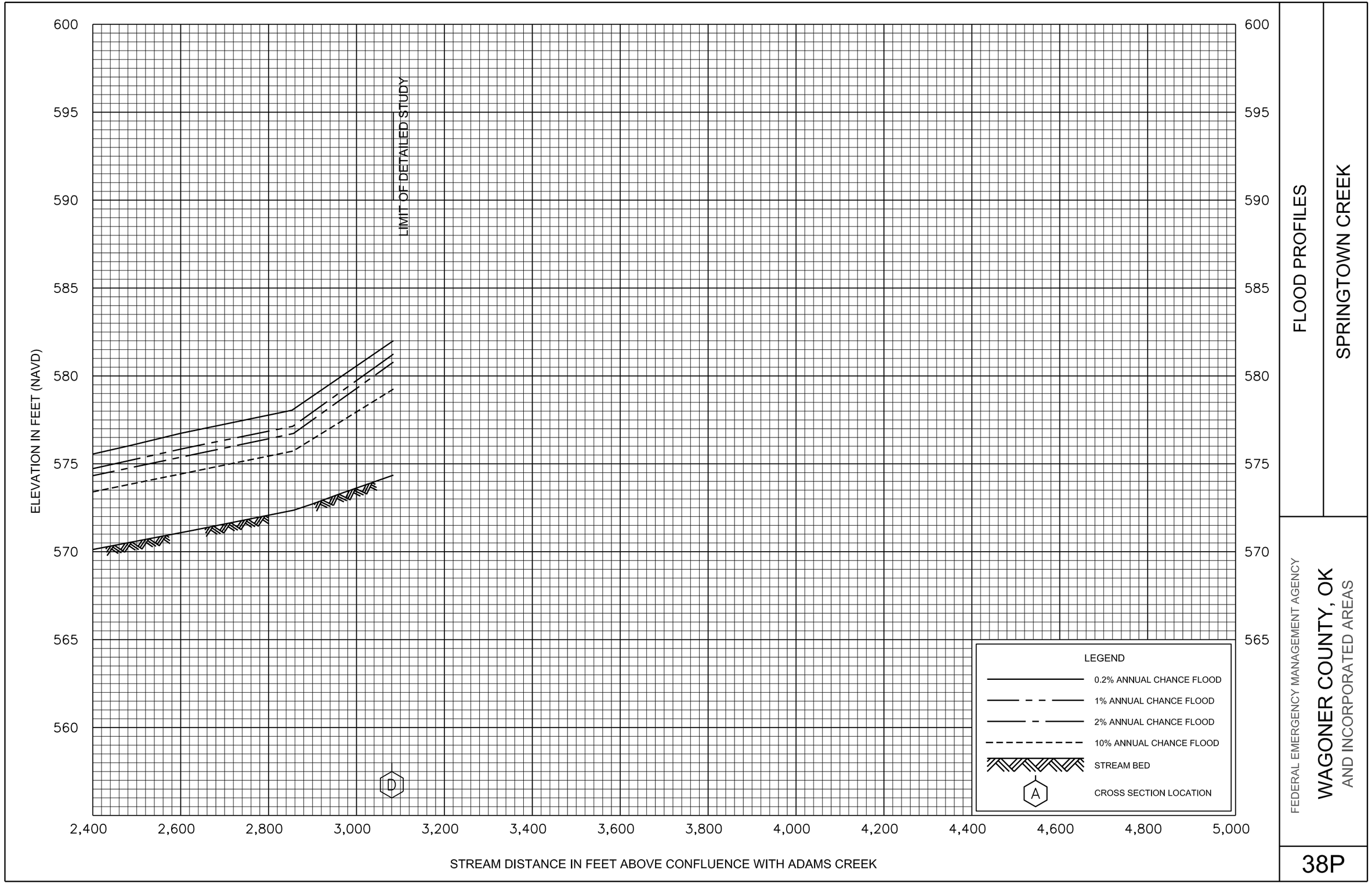
FLOOD PROFILES

SPRINGTOWN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

37P



FLOOD PROFILES

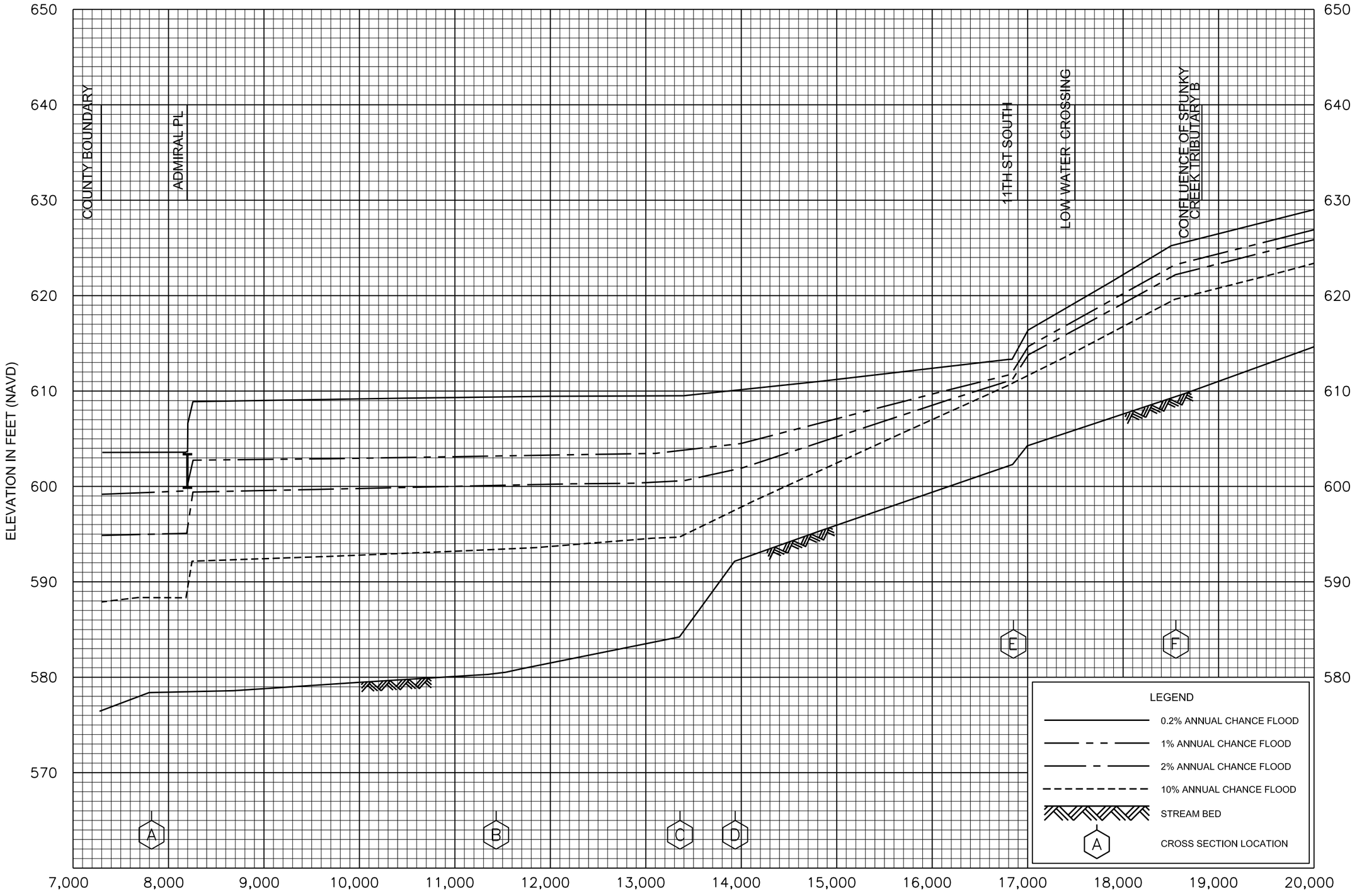
SPRINGTOWN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

38P



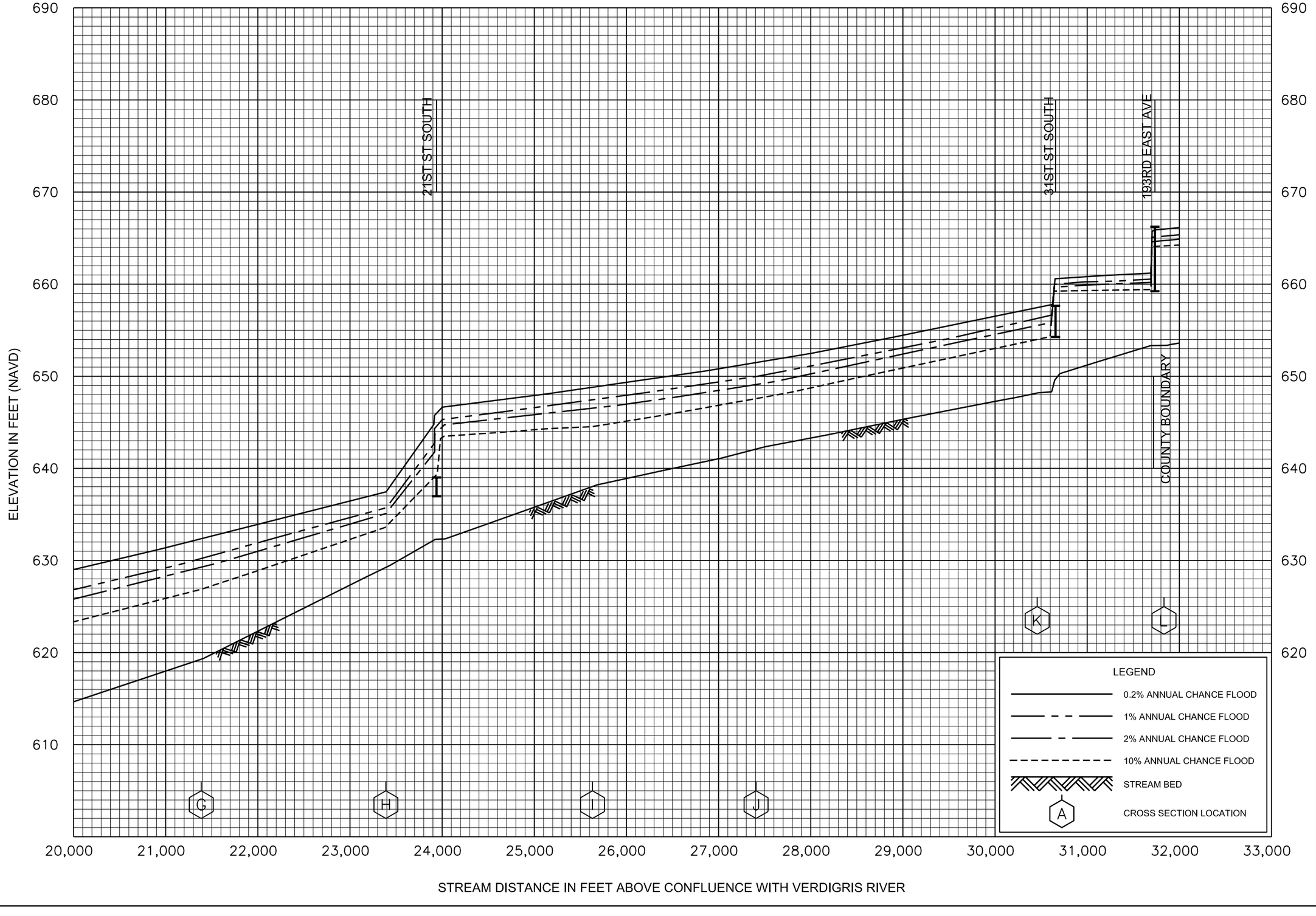
FLOOD PROFILES

SPUNKY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

39P



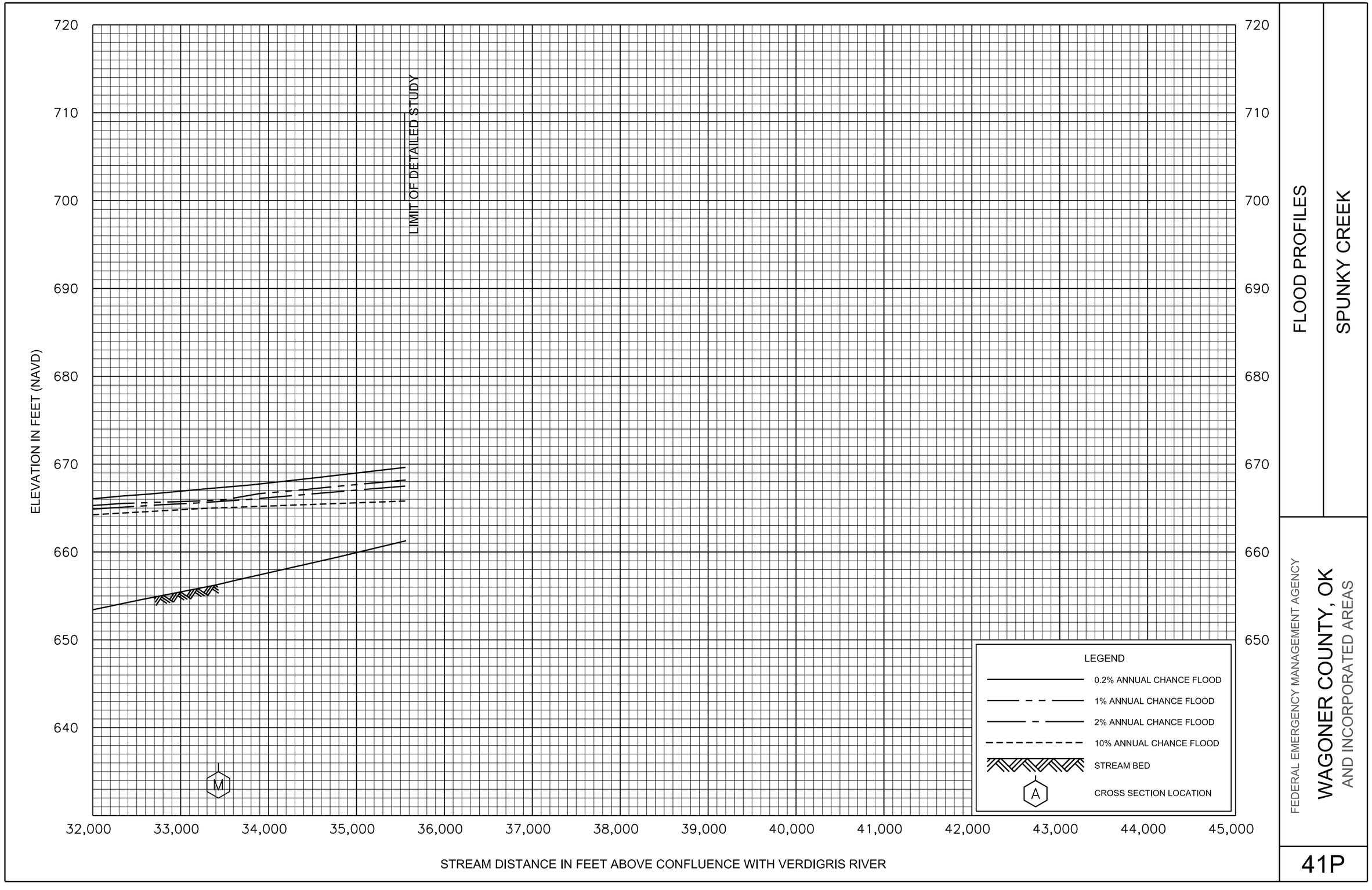
FLOOD PROFILES

SPUNKY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

40P



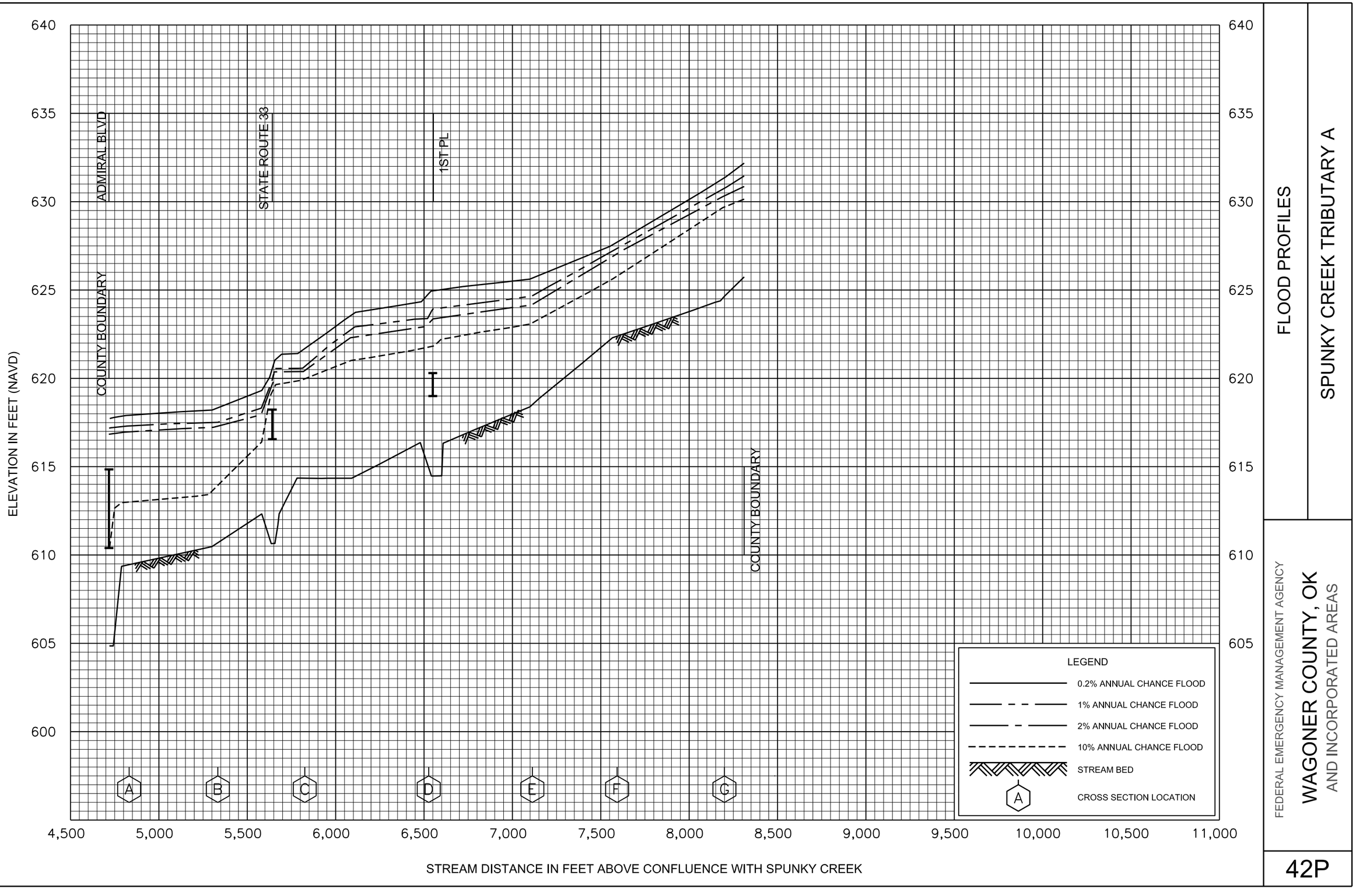
FLOOD PROFILES

SPUNKY CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

41P



FLOOD PROFILES

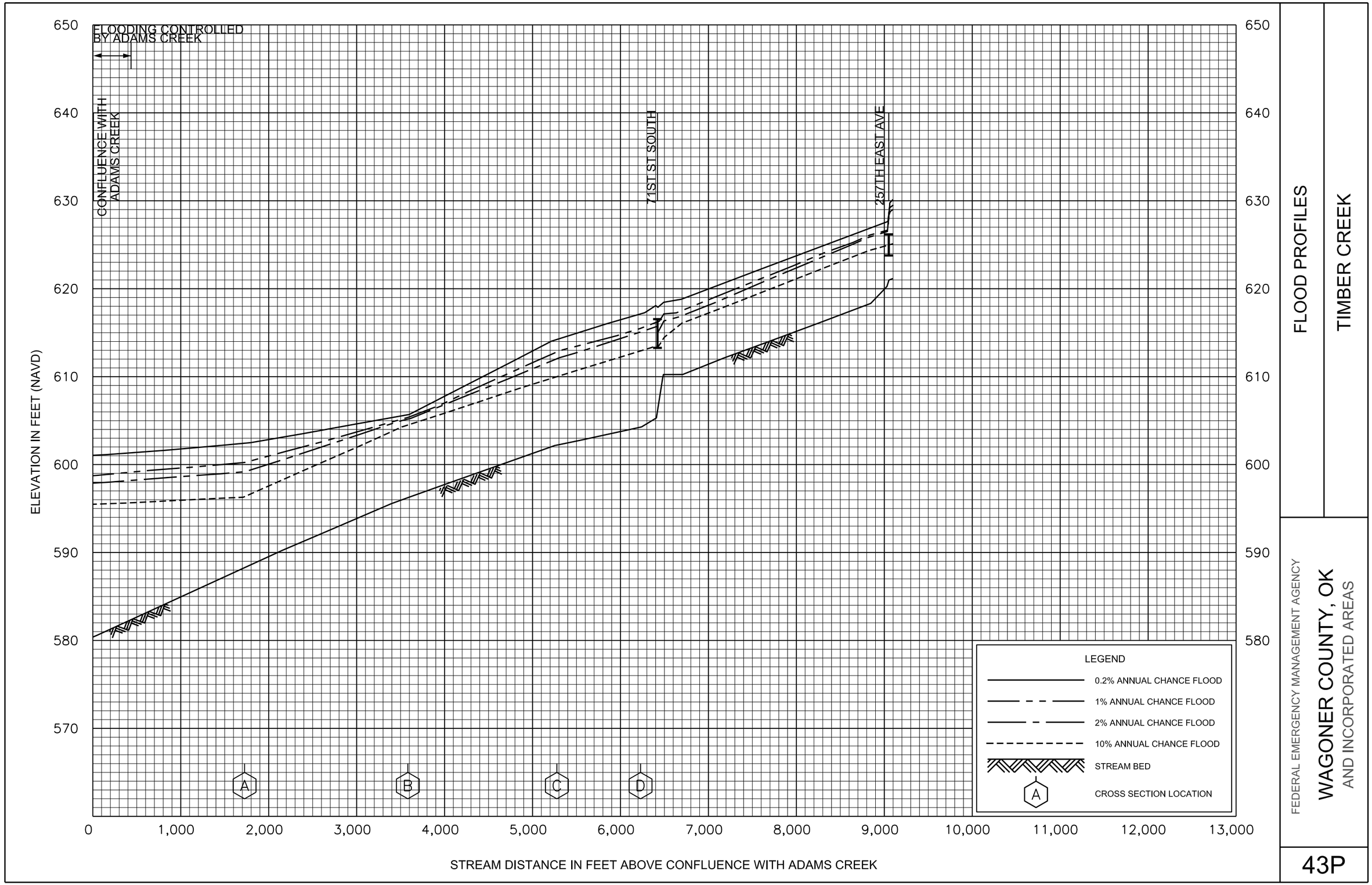
SPUNKY CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

42P



FLOOD PROFILES

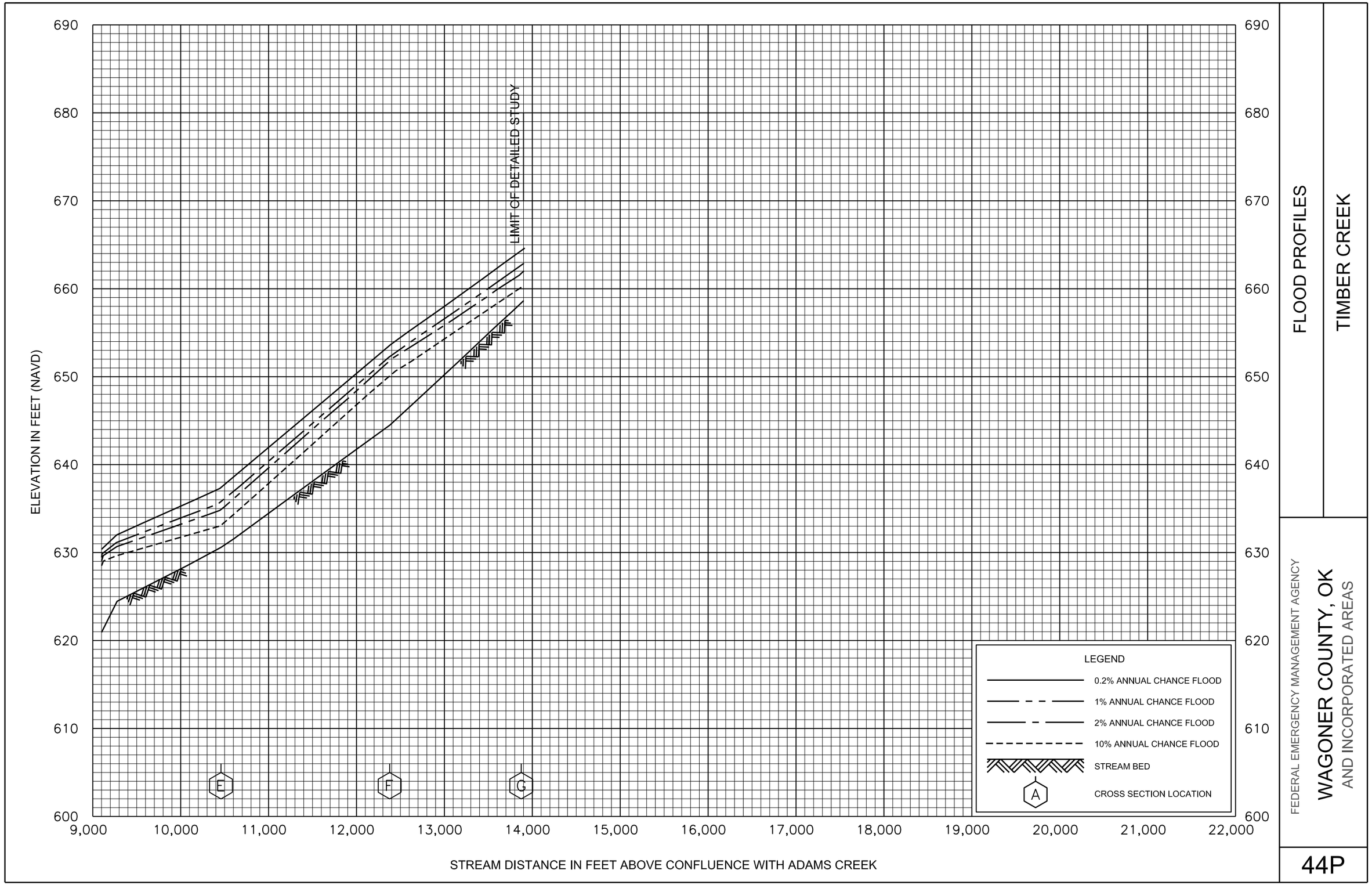
TIMBER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

43P



FLOOD PROFILES

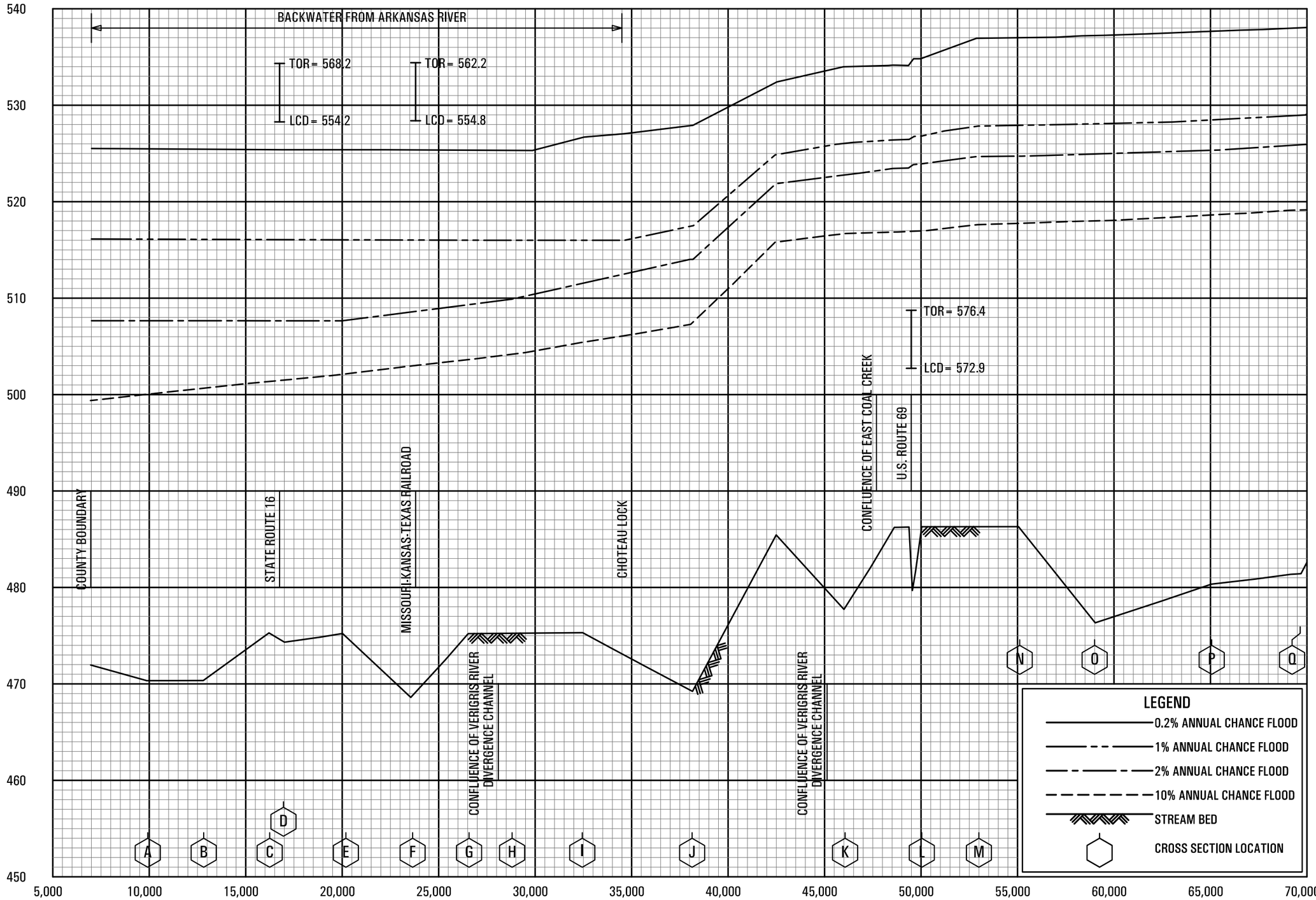
TIMBER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

44P



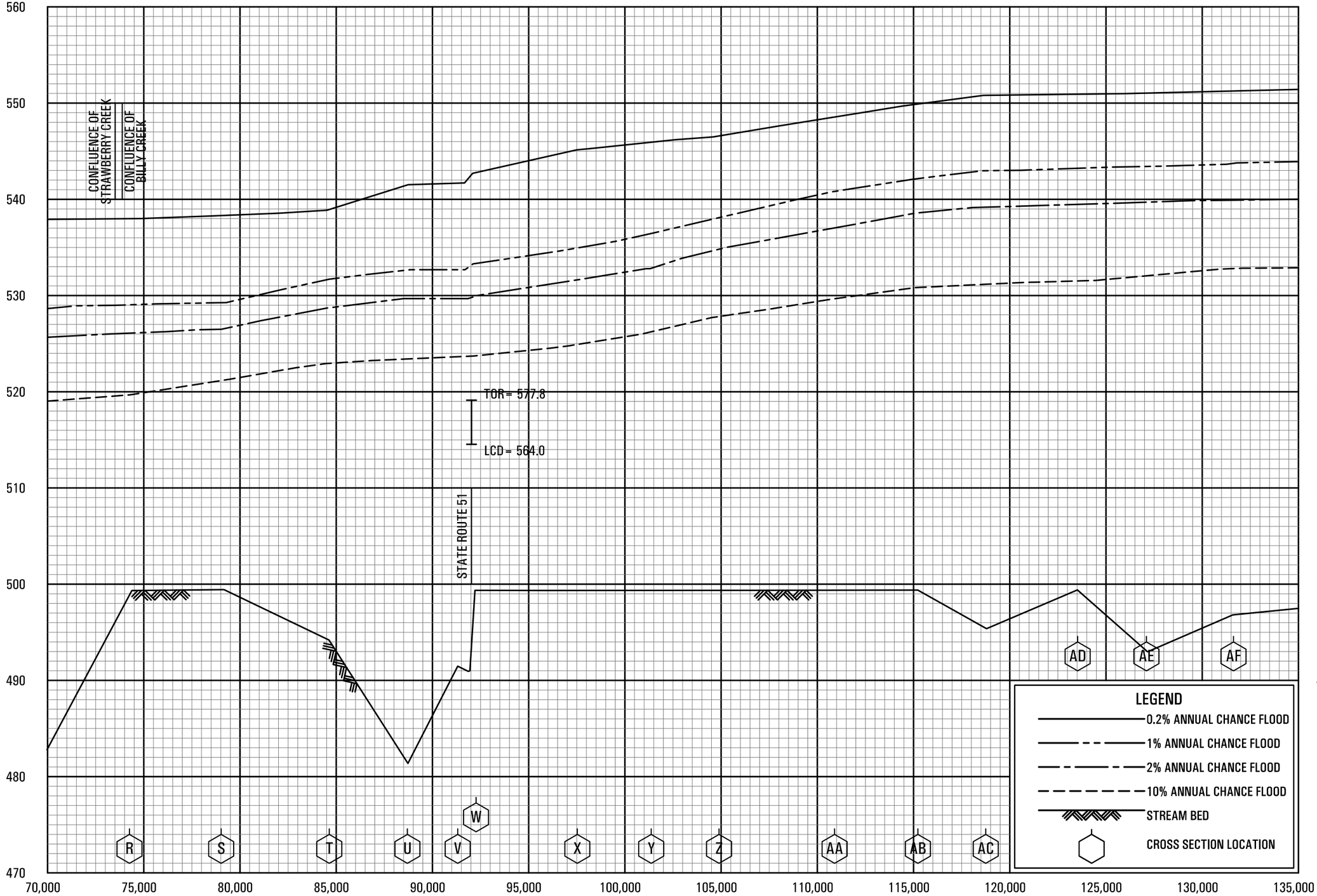
FLOOD PROFILES

VENDIGRIS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

45P



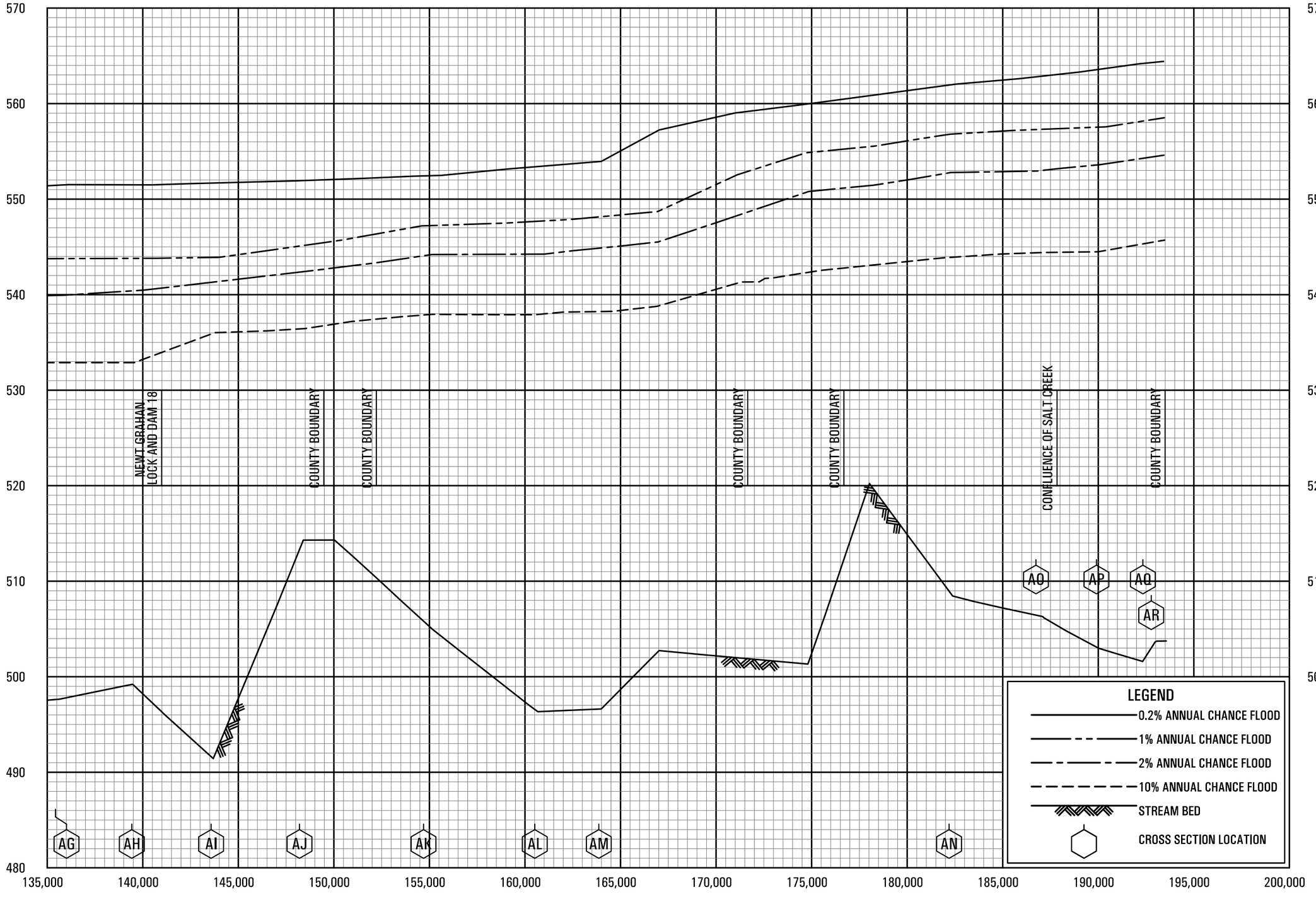
FLOOD PROFILES

VENDIGRIS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS



FLOOD PROFILES

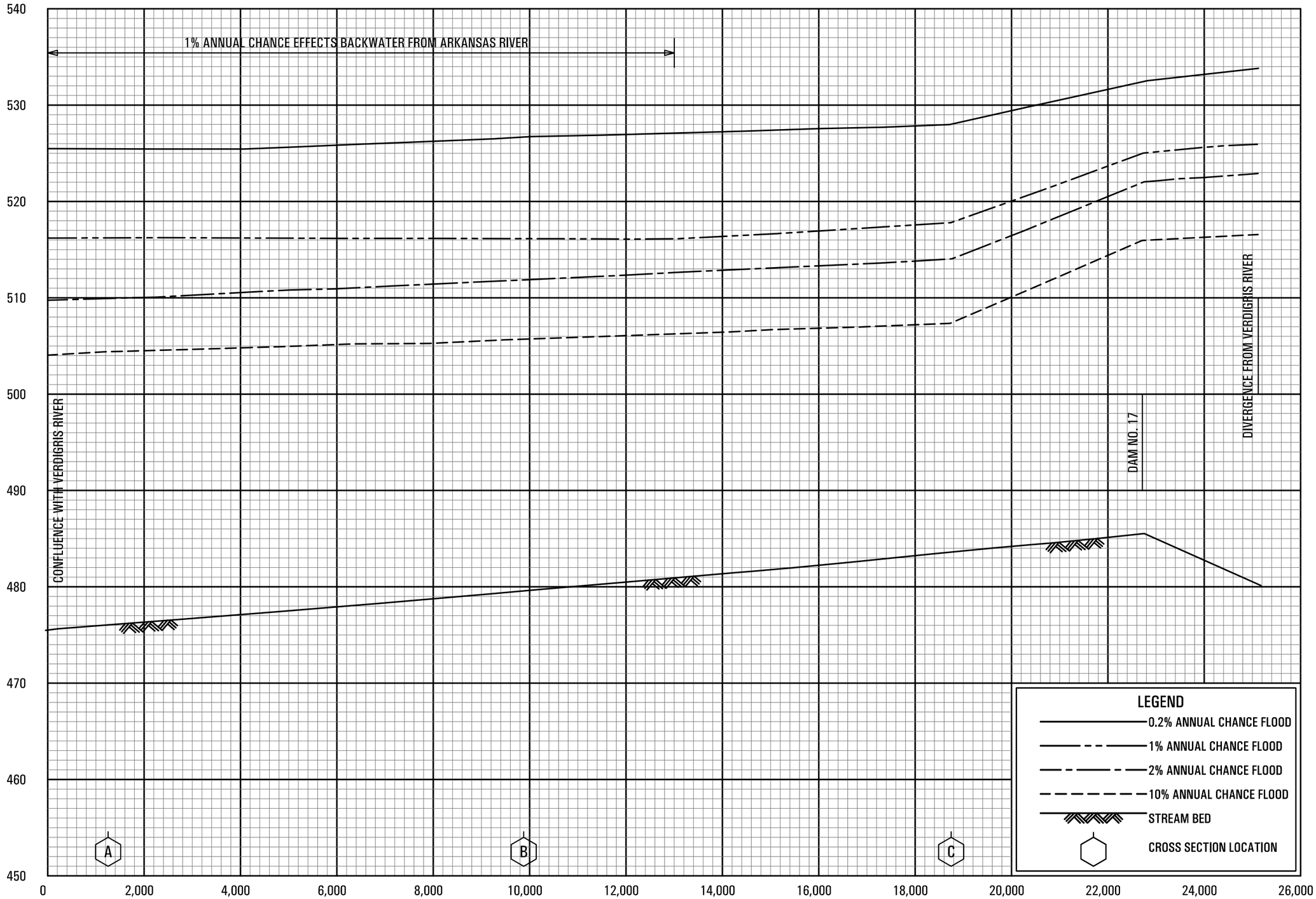
VENDIGRIS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

47P



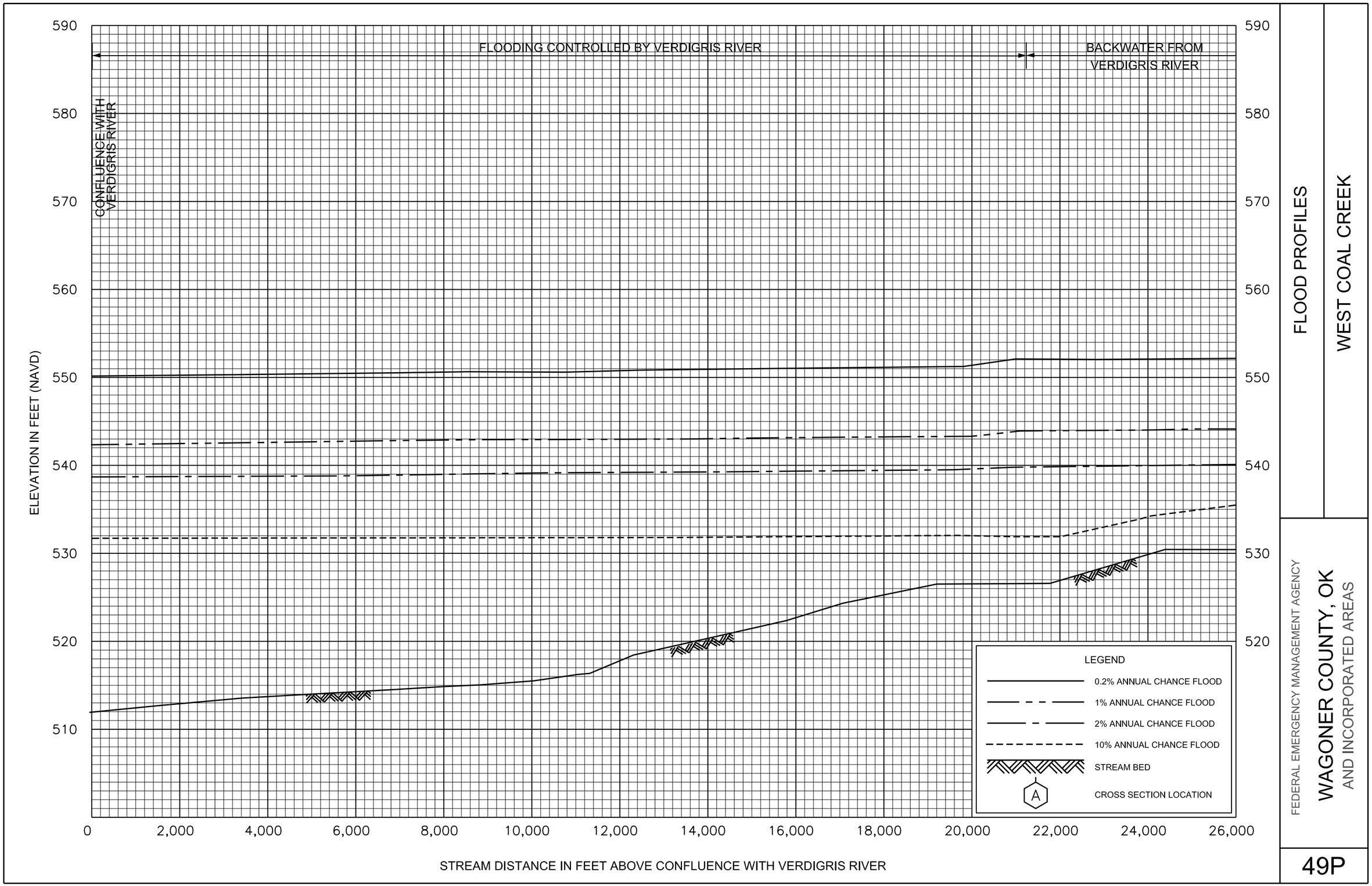
FLOOD PROFILES

VENDIGRIS RIVER DIVE CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS

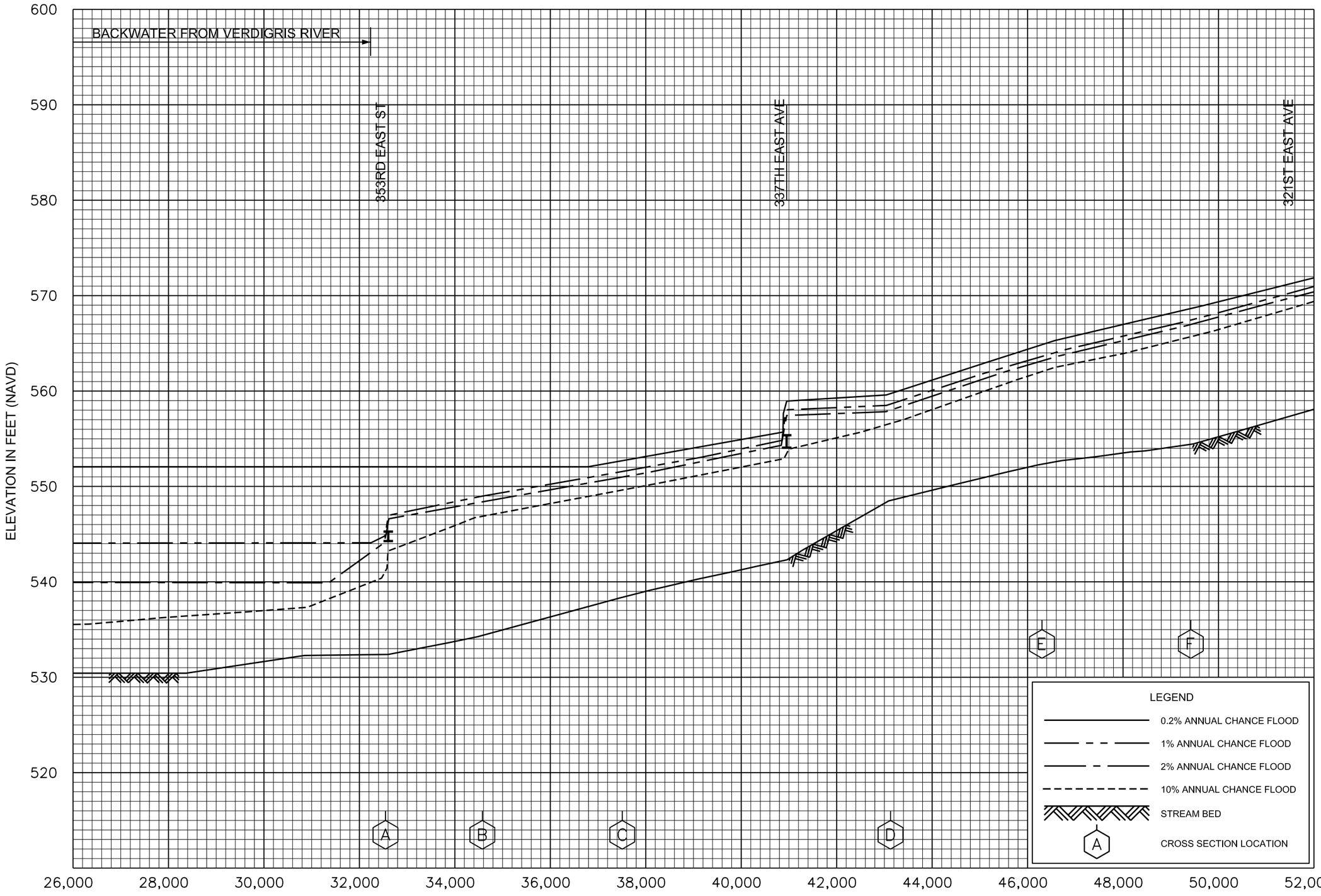


FLOOD PROFILES

WEST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS



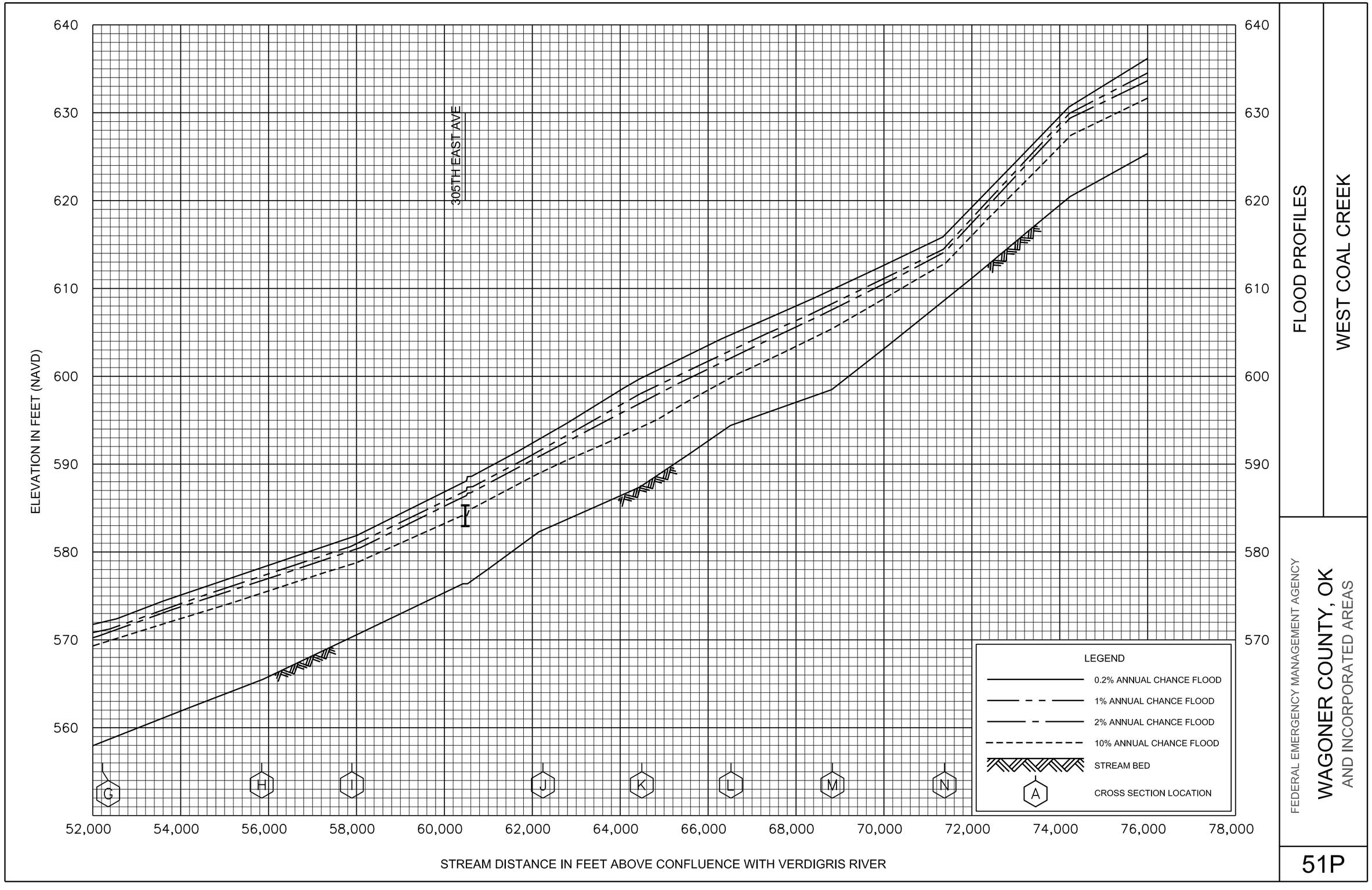
FLOOD PROFILES

WEST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS

50P



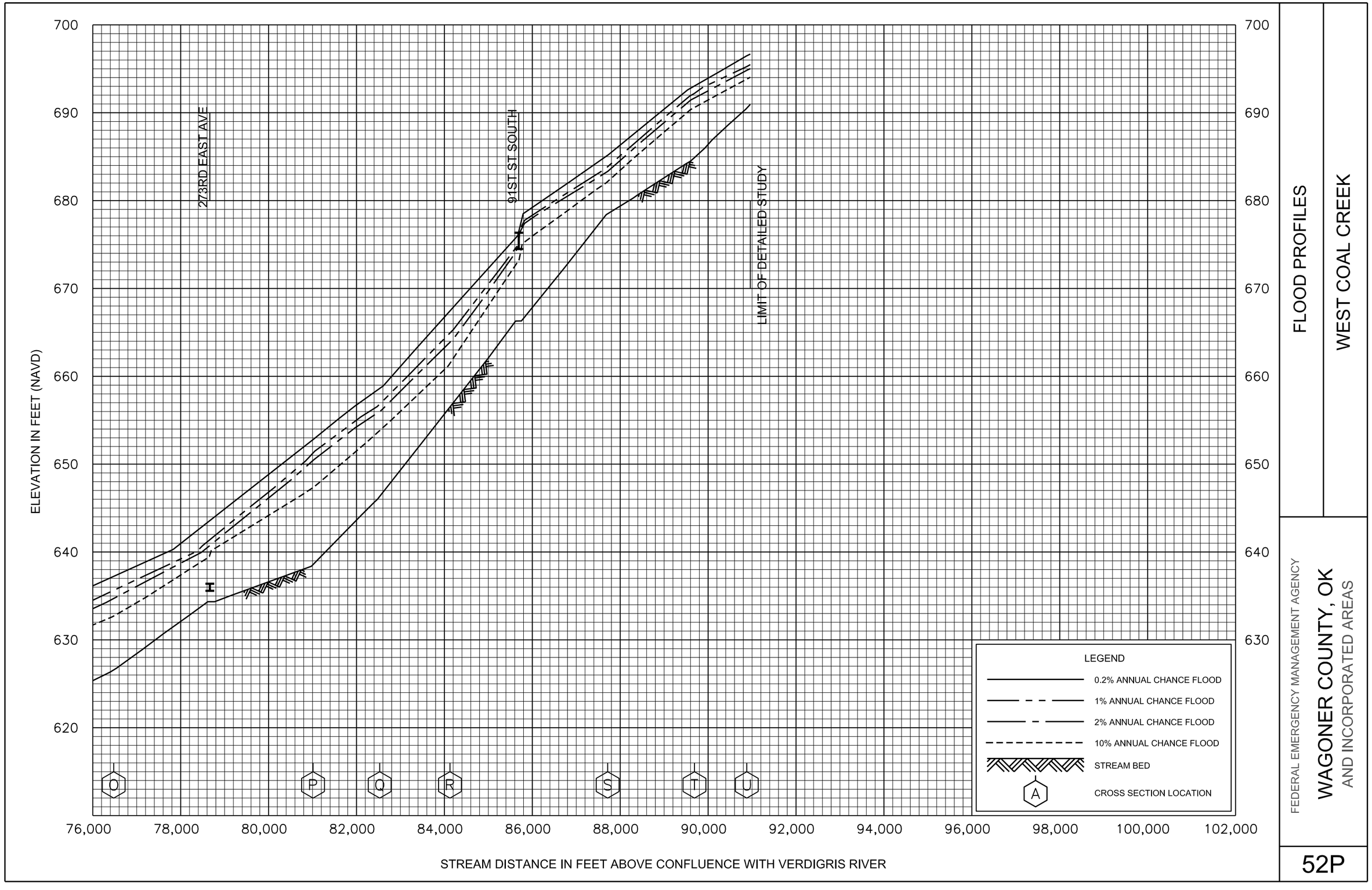
FLOOD PROFILES

WEST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK

AND INCORPORATED AREAS



FLOOD PROFILES

WEST COAL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

WAGONER COUNTY, OK
AND INCORPORATED AREAS