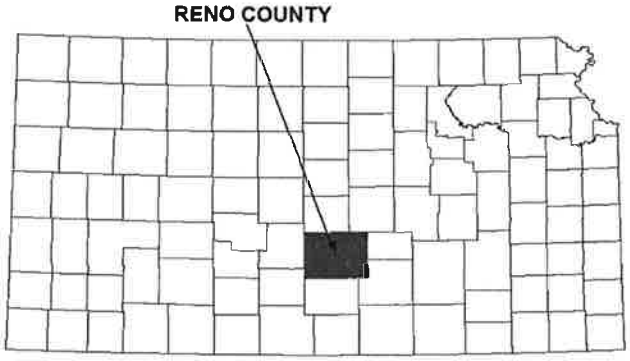
# FLOOD INSURANCE STUDY

# RENO COUNTY, KANSAS
## AND INCORPORATED AREAS

| COMMUNITY NAME | COMMUNITY NUMBER |
|---|---|
| *ABBYVILLE, CITY OF | 200416 |
| ARLINGTON, CITY OF | 200464 |
| BUHLER, CITY OF | 200472 |
| HAVEN, CITY OF | 200503 |
| *THE HIGHLANDS, CITY OF | 200707 |
| HUTCHINSON, CITY OF | 200283 |
| *LANGDON, CITY OF | 200364 |
| NICKERSON, CITY OF | 200284 |
| *PARTRIDGE, CITY OF | 200446 |
| *PLEVNA, CITY OF | 200423 |
| PRETTY PRAIRIE, CITY OF | 200549 |
| RENO COUNTY | 200567 |
| Unincorporated Areas | |
| SOUTH HUTCHINSON, CITY OF | 200530 |
| SYLVIA, CITY OF | 200515 |
| TURON, CITY OF | 200865 |
| WILLOWBROOK, CITY OF | 200285 |

*No Special Flood Hazard Areas Identified




**REVISED: JANUARY 29, 2021**

Federal Emergency Management Agency

**FLOOD INSURANCE STUDY NUMBER**

**20155CV000B**

## NOTICE TO
## FLOOD INSURANCE STUDY USERS

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

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

This FIS report was revised on January 29, 2021. Users should refer to Section 10.0, Revisions Description, for further information. Section 10.0 is intended to present the most up-to-date information for specific portions of this FIS report. Therefore, users of this FIS report should be aware that the information presented in Section 10.0 supersedes information in Sections 1.0 through 9.0 of this FIS report.

Initial Countywide FIS Date: September 28, 1990

Revised Countywide FIS Dates: February 4, 1998
July 19, 2000
January 6, 2010
January 29, 2021

## TABLE OF CONTENTS

## FIGURES

Page



## TABLES



## APPENDIX A

## FIGURES



## TABLES



## EXHIBITS

Exhibit 1 - Flood Profiles

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

# FLOOD INSURANCE STUDY
# RENO COUNTY, KANSAS 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 Reno County, Kansas, including the Cities of Abbyville, Arlington, Buhler, Haven, The Highlands, Hutchinson, Langdon, Nickerson, Partridge, Plevna, Pretty Prairie, South Hutchinson, Sylvia, Turon, and Willowbrook and the unincorporated areas of Reno County (referred to collectively herein as Reno 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 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.

This FIS revises and supersedes previous FIS reports countywide. This information will be used by the communities to update existing floodplain regulations as part of the regular phase of the NFIP. The information will also be used by local and regional planners to further promote sound land use and floodplain development.

The Digital Flood Insurance Rate Map (DFIRM) and FIS report for this countywide study have been produced in digital format. Flood hazard information was converted to meet the Federal Emergency Management Agency (FEMA) DFIRM database specifications and Geographic Information System (GIS) format requirements. The flood hazard information was created and is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community.

Please note that the Cities of Abbeville, The Highlands, Langdon, Partridge, and Plevna have no special flood hazard areas identified.

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 Acknowledgements

#### 1.2.1 Previous Countywide Studies

The hydrologic and hydraulic analyses for the July 19, 2000 *Reno County, Kansas and Incorporated Areas (Revised Countywide) FIS* study were performed by the U.S. Army Corps of Engineers (USACE), Tulsa District (the Study Contractor) for FEMA, under Inter-Agency Agreement No. EMW-83-E- 1153, Project Order No. 1. This study was completed in October 1985.

The hydrologic and hydraulic analyses for the January 6, 2010 *Reno County, Kansas and Incorporated Areas (Revised Countywide) FIS* were performed by AMEC Earth &

Environmental for FEMA, under Contract No. EMK-2005-CA-5010. This study was completed in October 1, 2007 (Reference 1).

### 1.3 Coordination

#### 1.3.1 Previous Countywide Studies

For the July 19, 2000 *Reno County, Kansas and Incorporated Areas (Revised Countywide) FIS*, the initial Consultation Coordination Officer (CCO) meeting was held on August 11, 1982, and attended by representatives of Reno County, the Kansas State Board of Agriculture, the Study Contractor, and FEMA. On May 9, 1988, the results of this Flood Insurance Study were reviewed, and on December 6, 1989, a coordination meeting was held to further discuss community concerns about flooding along Plum Creek. This meeting was attended by representatives of the Study Contractor, FEMA, the City of Hutchinson, and Reno County.

For the January 6, 2010 *Reno County, Kansas and Incorporated Areas, (Revised Countywide) FIS* a CCO meeting was held on August 11, 2005. The meeting was attended by representatives of Reno County, the Kansas Department of Agriculture Division of Water Resources, FEMA, and the Cities of Nickerson, Haven, Hutchinson, and Buhler.

The results of the study were reviewed at the final CCO meeting held on December 10, 2008, and attended by representatives of the Cities of Hutchinson, Pretty Prairie, South Hutchinson, Reno County, FEMA, and the Kansas Department of Agriculture. All problems raised at that meeting have been addressed in this study (Reference 1).

## 2.0 AREA STUDIED

### 2.1 Scope of Study

#### 2.1.1 Previous Countywide Study

The January 6, 2010 *Reno County, Kansas and Incorporated Areas (Revised Countywide) FIS* covered the geographic area of Reno County, Kansas including the incorporated communities listed in Section 1.1.

Flooding caused by overflow of the Arkansas River, the Little Arkansas River, Little Arkansas River Tributary A, Little Arkansas River Tributary B, North Fork Ninnescah River, Plum Creek, Gar Creek, Cow Creek, Cow Creek Tributary C, Sand Creek, Salt Creek, Salt Creek Tributary A, Salt Creek Tributary B, Kisiwa Creek, Kisiwa Creek Tributary, Smoots Creek, Smoots Creek Tributary, Silver Creek Tributary, and Bull Creek were studied in detail.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. In general, those areas previously defined using approximate methods and defined streams with one-square mile or greater contributing drainage areas were included in the approximate analysis. The scope and methods of study were proposed to, and agreed upon, by FEMA and Reno County (Reference 1).

## 2.2 Community Description

Reno County is in south-central Kansas. It is bordered by Stafford and Pratt Counties on the west, Rice and McPherson Counties on the north, Harvey and Sedgwick Counties on the east, and Kingman County on the south. Reno County is served by State Highways 61, 96, 14, and 11 and by U.S. Highway 50. The Burlington Northern railroad; the Missouri, Kansas Texas Railroad; the St. Louis Southwestern Railway; the Union Pacific railroad; and the Atchison, Topeka and Santa Fe Railway pass through Reno County. According to the Kansas Secretary of State by Division of the Budget, the 2017 estimated population of Reno County was reported to be 62,510 (Reference 4). The economy of Reno County is based primarily on agriculture and agriculture-related industries.

The topography of the county is characterized by flat, broad areas in lower river bottoms and gently rolling hills in the uplands. Soils vary from deep, nearly level, loamy soils to somewhat sandy, wind-modified soils. Most of the undeveloped land is used either for pasture or for producing grain crops. Development in the county occurs mainly in and around the City of Hutchinson (Reference 1).

Average monthly temperatures in the Reno County area range from 31 degrees Fahrenheit (°F) in January to 83°F in July. The average annual temperature is approximately 57°F. Average annual rainfall is approximately 30 inches (Reference 5).

## 2.3 Principal Flood Problems

Reno County, Kansas has a history of significant flooding on the Arkansas River, Cow Creek, North Fork Ninnescah River and the Salt Creek. Severe storms in July of 1993, May of 2007, October of 2018 and in May of 2019 caused considerable flooding and extensive damage within the county. Additional storms in September of 1973 and October of 1979 left Reno County with severe flooding and extensive damage (Reference 1 & 6).

## 2.4 Flood Protection Measures

The Arkansas River and Cow Creek local flood protection project near Hutchinson consists of a levee diversion canal located about one mile west of the corporate limits. At this point the canal intercepts Cow Creek northwest of the city carrying floodwaters from Cow Creek south to the Arkansas River. From there, the combined flow of the creek and the river is confined between levees on both sides of the river and carried past the city. The design flow for the Cow Creek diversion canal is 30,000 cfs, and the design flow for the Arkansas River levees is 58,500 cfs. As part of the project, over 26 miles of levees, including a ring levee in the vicinity of Island Park Subdivision, northwest of Hutchinson, were constructed (Reference 1).

Levees exist in this study area that provides the community with some degree of protection against flooding. The criteria used to evaluate protection against the 1-percent-annual-chance event are 1) adequate design, including freeboard 2) structural stability and 3) proper operation and maintenance. Levees that do not protect against the 1-percent-annual-chance flood are not considered in the hydraulic analysis of the 1-percent-annual-chance floodplain.

## 3.0 ENGINEERING METHODS

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

### 3.1 Hydrologic Analyses

#### 3.1.1 Previous Countywide Study

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

Rainfall-runoff models were developed for all detailed studied streams (except the Arkansas River and Cow Creek) using the Hydrologic Engineering Center (HEC) HEC-1 computer program. Snyder's unit hydrograph coefficients, rainfall loss rates, and routing criteria were developed as input for the HEC-1 models. The unit hydrograph coefficients were selected using the USACE mean curve that relates stream slope, length, subarea shape, percent of urbanization, and hydrograph peaking time. The mean curve was previously developed using data collected from various gaged watersheds in the Tulsa District of the USACE.

Loss rates for Salt Creek and the North Fork Ninnescah River were obtained by calibrating the HEC-1 models to match the 1-percent-annual-chance frequency discharges at the gages located on the two streams. Loss rates for the Little Arkansas River and its tributaries were obtained from the HEC-1 model developed for the local flood protection project for the City of Halstead, Kansas. Loss rates for Kisiwa Creek and its tributary were also taken from the report for Halstead. Loss rates for Cow Creek, Bull Creek, and the Cow Creek tributaries were obtained from the "Cow Creek, Kansas, Channel Improvement, Design Memorandum No. 1." Loss rates for Silver Creek Tributary and Smoots Creek and its tributary were assumed to be the same as those for the North Fork Ninnescah River because of the proximity of those streams to the river watershed Sand Creek and Gar Creek loss rates were assumed to be the same as those for Salt Creek because of the proximity of those streams to the Salt Creek basin, which has an area of high soil permeability along the Arkansas River noted in "Kansas Streamflow Characteristics."

Flood-flow frequency data for the Arkansas River and Cow Creek were obtained from the USACE Hutchinson, Kansas, Flood Insurance Study. Those discharges were based on

a statistical analysis of the peak flows at the Cow Creek gage located near the City of Lyons, Kansas, and the Arkansas River gage located near Hutchinson.

Flood-flow frequency data for Salt Creek; Cow Creek Tributaries A, B, and C; Plum Creek; Little Arkansas River Tributaries A and B; Smoots Creek; Smoots Creek Tributary; Gar Creek; Silver Creek Tributary; and Sand Creek were obtained using HEC-1 computer models and discharge-frequency information developed for the Salt Creek gage at Partridge as a guide curve. Rainfall amounts and distribution patterns were derived from Technical Paper No. 40.

Flood-flow frequency data for the Little Arkansas River at Buhler were developed using the discharge-frequency data developed for the local flood protection project for Halstead. The discharge-frequency data for the Buhler area were adjusted using the discharge-frequency data for the local flood protection study as a guide curve. Rainfall amounts and patterns were developed from Technical Paper No. 40.

Flood-flow frequency data for the North Fork Ninnescah River at Arlington were obtained by plotting the discharge-frequency data developed from the HEC-1 computer model and using the discharge-frequency data for the stream gage above Cheney Reservoir as a guide curve.

Peak discharge-drainage area relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods of each flooding source studied in detail in the community are shown in Table 1, Summary of Discharges.

Discharges for Zone A studies were developed using Regression Equations contained in the USGS report of Peak Stream flows for Unregulated Rural Streams in Kansas. Drainage areas along streams were determined using a flow accumulation grid developed from the USGS 10-meter digital elevation models and corrected National Hydrologic Data (NHD) stream coverage. Flow points along stream centerlines were calculated using the regression equations in conjunction with accumulated area for every 10 percent increase in flow along a particular stream (Reference 1).

TABLE 1 – SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-Percent Annual-Chance | 2-Percent Annual-Chance | 1-Percent Annual-Chance | 0.2-Percent Annual-Chance |
|---|---|---|---|---|---|
| ARKANSAS RIVER | | | | | |
| At Hutchinson | N/A[1] | N/A[1] | N/A[1] | N/A[1] | N/A[1] |
| BULL CREEK | | | | | |
| At Mouth | 88.0 | 5,000 | 8,000 | 9,300 | 12,500 |
| COW CREEK | | | | | |
| At Mouth | N/A[1] | N/A[1] | N/A[1] | N/A[1] | N/A[1] |
| COW CREEK TRIBUTARY A | | | | | |
| At Mouth | 10.0 | 3,000 | 4,750 | 5,500 | 7,500 |
| COW CREEK TRIBUTARY B | | | | | |
| At Mouth | 2.8 | 840 | 1,360 | 1,580 | 2,130 |
| COW CREEK TRIBUTARY C | | | | | |
| At Mouth | 2.7 | 860 | 1,380 | 1,600 | 2,150 |
| GAR CREEK | | | | | |
| At Mouth | 20.1 | 1,950 | 3,050 | 3,600 | 4,750 |
| GVI DITCH WEST | | | | | |
| At Mouth | 4.5 | 569 | 864 | 1,035 | 1,585 |
| LITTLE ARKANSAS RIVER | | | | | |
| At Rayl Road | 288.0 | 14,100 | 21,200 | 24,000 | 29,500 |
| LITTLE ARKANSAS RIVER TRIBUTARY A | | | | | |
| At Mouth | 6.2 | 820 | 1,330 | 1,600 | 2,150 |
| LITTLE ARKANSAS RIVER TRIBUTARY B | | | | | |
| At Mouth | 2.0 | 1,900 | 3,100 | 3,670 | 4,900 |
| NORTH FORK NINNESCAH RIVER | | | | | |
| At Mouth | 504.0 | 13,000 | 38,000 | 54,700 | 110,000 |

TABLE 1 – SUMMARY OF DISCHARGES

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-Percent Annual-Chance | 2-Percent Annual-Chance | 1-Percent Annual-Chance | 0.2-Percent Annual-Chance |
|---|---|---|---|---|---|
| PLUM CREEK | | | | | |
| At Mouth | 6.5 | 1,900 | 3,000 | 3,400 | 4,600 |
| Approximately 400 feet of East 56th Avenue | 0.8 | 88 | 156 | 181 | 283 |
| At confluence with GVI Ditch West | 3.2 | 245 | 394 | 443 | 653 |
| About 0.3 mile downstream of West 43rd Street | 3.4 | 1,900 | 3,000 | 3,400 | 4,600 |
| SALT CREEK | | | | | |
| At Mouth | 139.0 | 1,040 | 2,270 | 2,930 | 4,720 |
| About 0.6 mile upstream of Mohawk Road | N/A | 3,480 | 5,540 | 6,460 | 8,640 |
| SALT CREEK TRIBUTARY A At Mouth | 1.9 | 590 | 940 | 1,100 | 1,480 |
| SALT CREEK TRIBUTARY B | | | | | |
| At Mouth | 4.2 | 1,500 | 2,400 | 2,800 | 3,800 |
| SAND CREEK | | | | | |
| At Mouth | 46.1 | 5,400 | 8,700 | 10,200 | 13,800 |
| SILVER CREEK TRIBUTARY | | | | | |
| At Mouth | 8.1 | 1,720 | 2,750 | 3,200 | 4,300 |
| SMOOTS CREEK | | | | | |
| At Mouth | 4.8 | 2,200 | 3,500 | 4,100 | 5,500 |
| SMOOTS CREEK TRIBUTARY | | | | | |
| At Mouth | 0.9 | 840 | 1,330 | 1,540 | 2,100 |
| UNNAMED TRIBUTARY TO SAND CREK | | | | | |
| At Scott Boulevard | 6.1 | 681 | 1,286 | 1,628 | 2,385 |

[1]See revised flows in Section 10.0 Revision Description

## 3.2 Hydraulic Analyses

### 3.2.1 Previous Countywide Study

Analyses of the hydraulic characteristics of flooding from the sources studied in detail in the January 6, 2006 *Reno County, Kansas and Incorporated Areas (Revised Countywide)* FIS were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data Table in the FIS report. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in the FIS report in conjunction with the data shown on the FIRM.

Cross sections for the backwater analysis were defined at selected intervals along the study streams to model conveyance at valley sections, and at sections just upstream and downstream of bridges and culverts to compute the backwater effects of such structures. All bridges and culverts were field surveyed to obtain accurate descriptions of their condition and hydraulic openings.

Detail-studied streams that were not re-studied as part of the 2010 update may include a "profile base line" on the maps. The "profile base line" provides a link to the flood profiles included in the FIS report. The detail-studied stream centerline may have been digitized or redelineated as part of this revision. The "profile base lines" for these streams were based on the best available data at the time of their study and are depicted as they were on the previous FIRMs. In some cases where improved topographical data was used to redelineate floodplain boundaries, the "profile base line" may deviate significantly from the channel centerline or may be outside the SFHA.

Starting water-surface elevations were based on normal depth methods. Water-surface elevations for detailed studied streams were computed using the HEC-2 step-backwater computer program. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and the FIRM.

The January 6, 2006 *Reno County, Kansas and Incorporated Areas (Revised Countywide)* FIS study was originally revised on July 19, 2000 to show modifications to flood hazards along the Arkansas River, from downstream of U.S. Highway 50 to just downstream of the Union Pacific Railroad, and Unnamed Tributary to Sand Creek, from just upstream of U.S. Highway 50 to just upstream of Main Street in the Cities of South Hutchinson and Hutchinson and the unincorporated areas of Reno County.

The hydrologic and hydraulic analyses incorporated in the July 19, 2000 restudy of a portion of the Arkansas River and Unnamed Tributary to Sand Creek were presented in the "Special Flood Hazard Report" for South Hutchinson, Kansas, prepared by the USACE, Tulsa District, dated March 1996. Data for the cross sections for the Arkansas River backwater model are based on field surveys conducted in 1995. The study limits for the 2000 restudy on the Arkansas River extend from downstream of U.S. Highway 50 to just downstream of the Union Pacific Railroad, and for Unnamed Tributary to Sand Creek, from just upstream of U.S. Highway 50 to just upstream of Main Street in the Cities of South Hutchinson and Hutchinson and the unincorporated areas of Reno County.

Cross sections for the Unnamed Tributary to Sand Creek backwater model are based on 2-foot-contour-interval aerial photogrammetric maps dated February 1995. Unnamed Tributary to Sand Creek ponds behind the South Hutchinson Levee along the Arkansas River and the U.S. Highway 50 embankment. The USACE HEC-IFH program was used for the analysis of the 1-percent-annual-chance flood elevation of the ponded area. The starting water-surface elevation for Unnamed Tributary to Sand Creek was based on the ponded elevation. For the 10-, 2-, and 0.2-percent-annual-chance floods, the profiles were calculated starting just downstream of Scott Boulevard with the starting elevations based on the slope-area method.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 0.2- and 1-percent-annual-chance flood elevations are close together, due to limitations of the profile scale, only the 1-percent-annual-chance profile has been shown.

Areas of the community protected by levees are subject to potential risk due to possible failure or overtopping of the levee. These areas were delineated by applying the 1-percent-annual-chance elevation determined from the "levee in place" analysis.

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

Countywide hydraulic modeling for the approximate study streams was performed using HEC-RAS, version 3.1.2, from the USACE HEC. Wood's program, Automated Floodplain Generator (AFG) was used to assist in the development of the geometries and resulting floodplains throughout the county. AFG employs methodologies of HEC-GeoRAS, a GIS interface developed by HEC for the preparation of hydraulic models. In an GIS environment, the engineer places stream centerline and cross-section cut lines. The bank lines and flow path lines are automatically placed, buffering the stream based on user-specified spacing. The AFG extracts the vertical elevation from the background topography and creates the input geometry file for the HEC-RAS model. Next, Cross-section locations are then evaluated in reference to the floodplain boundary and are manually adjusted as necessary. The bank stations, Manning's n values, and ineffective flow areas are prescribed in the HEC-RAS model. Subsequently, the water surface elevation is extracted from the HEC-RAS model output and a water surface Triangulated Irregular Network (TIN) is created. The floodplain boundary is delineated based on the difference between the water surface TIN and ground surface TIN (Reference 1).

## 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 (NGVD). 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.

To accurately convert flood elevations for Reno County from the current NGVD29 datum to the newer NAVD88 datum, the following procedure was implemented. The vertical datum shift was calculated for each corner of the USGS 7.5-minute topographic quadrangle maps located inside or within 2.5 miles of the County boundary using the National Geodetic Survey conversion program, VertCon 2.1. A resulting average conversion factor

of 0.52 ft was applied to all components of the FIS that display flood elevations.

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. It is important to note that adjacent communities may be referenced to NGVD29. For information regarding conversion between the NGVD and NAVD, visit the National Geodetic Survey website at http://www.ngs.noaa.gov.

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

## 4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS 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 the 1- and 0.2-percent-annual-chance floodplains; and a 1-percent-annual-chance floodway. This information is presented on the FIRM and in many components of the FIS report, including Flood Profiles and Floodway Data 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 a 4-foot DEM (Reference 3).

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

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

### 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 base flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies

The floodways presented in this FIS report and on the FIRM were computed for certain stream segments on the basis of equal-conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations have been tabulated for selected cross sections (Table 3, Floodway Data). In cases where the floodway and 1-percent-annual-chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown.

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

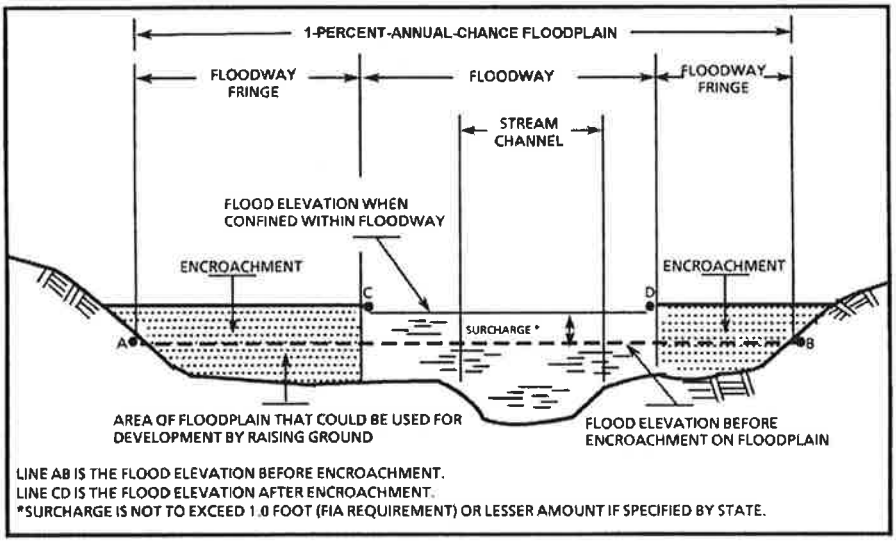



Figure 1. Floodway Schematic

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD 88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH[3] (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY[2] | WITHOUT FLOODWAY[4] | WITH FLOODWAY[4] | INCREASE |
| A | 20,904 | 3,829 | 24,141 | 2.6 | 1486.0 / 1489.0 /1487.4 | 1489.0 | 1489.2 | 0.2 |
| B | 30,591 | 2,825 | 11,794 | 3.0 | 1495.9 / 1498.2 | 1495.9 | 1496.6 | 0.7 |
| C | 42,379 | 3,000 | 12,309 | 2.9 | 1507.6 / 1509.0 /1507.5 | 1506.7 | 1507.6 | 0.9 |
| D | 56,480 | 968 | 7,354 | 4.8 | 1523.5 | 1523.2 | 1523.3 | 0.1 |
| E | 61,463 | 1,023 | 5,961 | 5.9 | 1527.1 | 1527.0 | 1527.1 | 0.1 |
| F | 64,340 | 926 | 6,884 | 5.1 | 1530.3 | 1530.3 | 1530.3 | 0.0 |
| G | 66,384 | 975 | 7,261 | 4.8 | 1532.1 | 1532.1 | 1532.1 | 0.0 |
| H | 69,619 | 950 | 7,035 | 5.0 | 1534.7 | 1534.7 | 1534.7 | 0.0 |
| I | 76,769 | 2,324 | 6,829 | 5.1 | 1540.9 | 1540.9 | 1540.9 | 0.0 |
| J | 82,571 | 2,453 | 25,299 | 1.4 | 1549.3 | 1549.3 | 1549.5 | 0.2 |
| K | 93,859 | 5,035 | 15,080 | 2.3 | 1558.7 | 1558.7 | 1559.0 | 0.3 |
| L | 104,561 | 5,065 | 15,316 | 2.3 | 1568.2 | 1568.2 | 1569.0 | 0.8 |
| M | 118,599 | 4,828 | 16,057 | 2.2 | 1581.2 | 1581.2 | 1582.0 | 0.8 |
| N | 134,448 | 3,784 | 15,646 | 2.2 | 1596.7 | 1596.7 | 1597.3 | 0.6 |
| O | 140,961 | 4,028 | 10,664 | 3.3 | 1602.5 | 1602.5 | 1602.8 | 0.3 |
| P | 153,270 | 1,398 / 3,743[5] | 16,136 | 2.2 | 1614.0 | 1614.0 | 1614.3 | 0.3 |
| Q | 155,655 | 632 / 4,661[5] | 18,579 | 1.9 | 1616.0 | 1616.0 | 1616.3 | 0.3 |
| R | 158,280 | 332 / 5,114[5] | 18,254 | 1.9 | 1618.2 | 1618.2 | 1618.2 | 0.0 |
| S | 180,218 | 1,459 / 5,112[5] | 19,038 | 1.8 | 1640.0 | 1640.0 | 1640.2 | 0.2 |
| T | 183,163 | 539 / 6,038[5] | 17,321 | 2.0 | 1641.7 | 1641.7 | 1641.9 | 0.2 |
| U | 185,650 | 0 / 6,135[5] | 13,711 | 2.6 | 1644.2 | 1644.2 | 1644.2 | 0.0 |

[1]Feet above South Haven Road
[2]Regulatory elevations notated as Left Overbank/Riverward/Right Overbank (Note: There is no Right Overbank elevation for Cross Section B because it is not applicable.)
[3]Total width measured between left encroachment and right encroachment including small areas above the flood elevation and levee considerations
[4]Elevations computed in consideration of certified levees.
[5]Width within county boundary / Total Width

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**ARKANSAS RIVER**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET)[3] | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY[2] | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 2,873 | 416 | 4,496 | 7.5 | 1,543.8 | 1,543.8 | 1,543.8 | 0.0 |
| B | 5,108 | 419 | 4,970 | 6.8 | 1,546.7 | 1,546.7 | 1,547.0 | 0.3 |
| C | 8,890 | 419 | 5,412 | 6.2 | 1,549.6 | 1,549.6 | 1,550.2 | 0.6 |
| D | 11,439 | 1,774 | 19,177 | 1.8 | 1,551.7 | 1,551.7 | 1,552.0 | 0.3 |
| E | 16,695 | 3,947 | 26,465 | 1.3 | 1,552.5 | 1,552.5 | 1,552.7 | 0.2 |
| F | 21,352 | 5,260 | 26,248 | 1.3 | 1,552.9 | 1,552.9 | 1,553.1 | 0.2 |
| G | 28,761 | 6,486 | 21,057 | 1.6 | 1,557.4 | 1,557.4 | 1,557.5 | 0.1 |
| H | 35,112 | 4,608 | 20.114 | 1.7 | 1,561.5 | 1,561.5 | 1,561.7 | 0.2 |
| I | 39,815 | 5,606 | 25,996 | 1.3 | 1,563.3 | 1,563.3 | 1,563.7 | 0.4 |
| J | 43,437 | 7,888 | 21,601 | 1.6 | 1,564.8 | 1,564.8 | 1,565.2 | 0.4 |
| K | 50,046 | 7,980 | 27,743 | 1.3 | 1,567.0 | 1,567.0 | 1,567.1 | 0.1 |
| L | 63,146 | 7,067 | 27,168 | 1.3 | 1,572.2 | 1,572.2 | 1,572.6 | 0.4 |
| M | 69,896 | 6,061 | 31,466 | 1.1 | 1,576.8 | 1,576.8 | 1,577.7 | 0.9 |
| N | 78,411 | 4,788 | 20,954 | 1.6 | 1,580.8 | 1,580.8 | 1,581.6 | 0.8 |

[1]Feet above South Haven Road
[2]Regulatory elevations notated as Riverward with consideration of levees
[3]Total width measured between left encroachment and right encroachment including small areas above the flood elevation and levee considerations

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COW CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 2,382 | 336 | 1063 | 1.7 | 1,508.9[2] | 1,505.7 | 1,506.5 | 0.8 |
| B | 4,615 | 632 | 1624 | 1.2 | 1,509.6[2] | 1,508.1 | 1,508.4 | 0.3 |
| C | 10,157 | 1739 | 2521 | 0.8 | 1,509.7[2] | 1,509.7 | 1,510.4 | 0.7 |
| D | 14,705 | 565 | 1329 | 1.4 | 1,511.6 | 1,511.6 | 1,512.4 | 0.8 |
| E | 17,223 | 224 | 931 | 2.1 | 1,513.9 | 1,513.9 | 1,514.7 | 0.8 |
| F | 18,584 | 489 | 2473 | 0.8 | 1,514.6 | 1,514.6 | 1,515.3 | 0.7 |
| G | 21,202 | 575 | 1191 | 1.7 | 1,515.8 | 1,515.8 | 1,516.5 | 0.7 |
| H | 23,630 | 336 | 813 | 2.6 | 1,517.3 | 1,517.3 | 1,518.0 | 0.7 |
| I | 25,079 | 534 | 1570 | 1.3 | 1,519.2 | 1,519.2 | 1,519.7 | 0.5 |
| J | 26,622 | 673 | 1712 | 1.0 | 1,519.5 | 1,519.5 | 1,520.3 | 0.8 |
| K | 28,110 | 475 | 953 | 1.8 | 1,520.5 | 1,520.5 | 1,521.2 | 0.7 |
| L | 28,839 | 167 | 634 | 2.7 | 1,521.4 | 1,521.4 | 1,522.1 | 0.7 |
| M | 29,943 | 806 | 1895 | 0.9 | 1,522.2 | 1,522.2 | 1,523.2 | 1.0 |
| N | 30,637 | 823 | 1811 | 1.0 | 1,522.5 | 1,522.5 | 1,523.4 | 0.9 |
| O | 31,167 | 184 | 507 | 3.4 | 1,523.7 | 1,523.7 | 1,524.0 | 0.3 |
| P | 31,959 | 267 | 680 | 2.5 | 1,524.4 | 1,524.4 | 1,525.2 | 0.8 |
| Q | 33,360 | 267 | 680 | 2.5 | 1,525.3 | 1,525.3 | 1,526.1 | 0.8 |

[1] Feet above confluence with GVI Drainage Ditch
[2] Elevations computed with consideration of overflow effects from Arkansas River (Left Overbank)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COW CREEK (OLD CHANNEL)**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 50 | 5,326[2] | 30,995 | 0.7 | 1,576.2 | 1,574.1[3] | 1,574.1 | 0.0 |
| B | 1,850 | 7,487[2] | 15,155 | 1.5 | 1,576.3 | 1,574.1[3] | 1,574.1 | 0.0 |
| C | 2,220 | 650 | 1,041 | 1.5 | 1,576.4 | 1,575.2[3] | 1,576.2 | 1.0 |
| D | 3,215 | 607 | 370 | 4.3 | 1,585.7 | 1,585.7 | 1,585.7 | 0.0 |
| E | 4,665 | 900 | 599 | 2.7 | 1,603.0 | 1,603.0 | 1,603.6 | 0.6 |

[1] Feet above West 82nd Avenue
[2] Combined Floodway width of Cow Creek and Cow Creek Tributary C
[3] Elevation without consideration of backwater effects from Cow Creek

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**COW CREEK TRIBUTARY C**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 8,200 | 1,180 | 3,156 | 1.1 | 1,451.3 | 1,451.3 | 1,452.3 | 1.0 |
| B | 8,750 | 1,000 | 2,992 | 1.2 | 1,451.8 | 1,451.8 | 1,452.7 | 0.9 |
| C | 9,344 | 1,000 | 1,719 | 2.1 | 1,452.0 | 1,452.0 | 1,452.8 | 0.8 |
| D | 9,650 | 1,000 | 2,609 | 1.4 | 1,452.4 | 1,452.4 | 1,453.1 | 0.7 |
| E | 10,350 | 1,000 | 2,239 | 1.6 | 1,452.8 | 1,452.8 | 1,453.3 | 0.5 |
| F | 10,700 | 1,300 | 2,720 | 1.3 | 1,453.0 | 1,453.0 | 1,453.5 | 0.5 |
| G | 13,000 | 1,900 | 2,130 | 1.7 | 1,453.7 | 1,453.7 | 1,454.5 | 0.8 |
| H | 16,100 | 2,000 | 2,505 | 1.4 | 1,455.8 | 1,455.8 | 1,456.7 | 0.9 |
| I | 17,700 | 1,700 | 2,124 | 1.7 | 1,458.0 | 1,458.0 | 1,458.5 | 0.5 |
| J | 18,850 | 500 | 952 | 3.8 | 1,460.8 | 1,460.8 | 1,461.0 | 0.2 |
| K | 21,200 | 1,000 | 2,312 | 1.6 | 1,463.2 | 1,463.2 | 1,463.8 | 0.6 |
| L | 21,806 | 1,200 | 3,935 | 0.9 | 1,465.2 | 1,465.2 | 1,466.2 | 1.0 |
| M | 22,620 | 1,000 | 3,671 | 1.0 | 1,465.3 | 1,465.3 | 1,466.3 | 1.0 |
| N | 24,370 | 500 | 1,319 | 2.7 | 1,466.6 | 1,466.6 | 1,467.4 | 0.8 |
| O | 25,570 | 400 | 805 | 4.5 | 1,469.5 | 1,469.5 | 1,469.7 | 0.2 |
| P | 26,650 | 500 | 1,404 | 2.6 | 1,472.0 | 1,472.0 | 1,472.8 | 0.8 |
| Q | 26,912 | 600 | 1,676 | 2.1 | 1,472.3 | 1,472.3 | 1,473.1 | 0.8 |
| R | 27,869 | 121 | 911 | 4.0 | 1,474.0 | 1,474.0 | 1,474.9 | 0.9 |
| S | 28,810 | 800 | 2,112 | 1.7 | 1,474.5 | 1,474.5 | 1,475.3 | 0.8 |

[1] Feet above Worthington Road

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**GAR CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| T | 29,280 | 1,000 | 1,037 | 3.5 | 1,474.9 | 1,474.9 | 1,475.2 | 0.3 |
| U | 30,200 | 500 | 1,166 | 3.1 | 1,477.1 | 1,477.1 | 1,477.5 | 0.4 |
| V | 30,828 | 378 | 712 | 5.1 | 1,477.6 | 1,477.6 | 1,478.2 | 0.6 |
| W | 30,933 | 400 | 979 | 3.7 | 1,477.6 | 1,477.6 | 1,478.4 | 0.8 |
| X | 31,725 | 200 | 705 | 5.1 | 1,479.1 | 1,479.1 | 1,479.7 | 0.6 |
| Y | 32,150 | 200 | 668 | 5.4 | 1,479.6 | 1,479.6 | 1,480.4 | 0.8 |
| Z | 33,000 | 400 | 1,306 | 2.8 | 1,480.9 | 1,480.9 | 1,481.6 | 0.7 |
| AA | 33,753 | 300 | 1327 | 2.7 | 1,481.7 | 1,481.7 | 1,482.3 | 0.6 |
| AB | 34,200 | 300 | 1312 | 2.7 | 1,483.0 | 1,483.0 | 1,483.8 | 0.8 |
| AC | 34,800 | 400 | 1469 | 2.5 | 1,483.4 | 1,483.4 | 1,484.3 | 0.9 |
| AD | 35,850 | 400 | 1776 | 2.0 | 1,484.0 | 1,484.0 | 1,484.9 | 0.9 |
| AE | 36,670 | 300 | 1401 | 2.6 | 1,484.6 | 1,484.6 | 1,485.5 | 0.9 |
| AF | 38,600 | 260 | 1278 | 2.8 | 1,486.2 | 1,486.2 | 1,487.1 | 0.9 |
| AG | 40,000 | 150 | 674 | 5.3 | 1,487.4 | 1,487.4 | 1,488.3 | 0.9 |

[1] Feet above Worthington Road

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**GAR CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 1,916 | 90 | 406 | 2.6 | 1,541.8 | 1,537.7[2] | 1,537.9 | 0.2 |

[1] Feet above Confluence with Plum Creek

[2] Elevation without consideration of the overflow effects from Cow Creek (Left Overbank)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**GVI DITCH WEST**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET)[3] | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY[4] | WITHOUT FLOODWAY[2] | WITH FLOODWAY | INCREASE |
| A | 42,260.1 | 3,599 | 7,130 | 0.9 | 1503.7 / 1508.3 / 1506.4 | 1,501.7 | 1,502.7 | 1.0 |
| B | 44,208.4 | 1,601 | 4,298 | 1.2 | 1505.0 / 1509.7 / 1507.2 | 1,504.9 | 1,505.7 | 0.8 |
| C | 45,123.9 | 2,204 | 5,976 | 0.9 | 1508.8 / 1511.2 / 1507.7 | 1,507.4 | 1,508.3 | 0.9 |
| D | 45,894.9 | 2,540 | 1,487 | 3.6 | 1509.6 / 1512.4 / 1509.1 | 1,508.4 | 1,509.1 | 0.7 |
| E | 47,709.2 | 2,637 | 6,376 | 0.8 | 1512.1 / 1512.6 / 1513.2 | 1,512.1 | 1,512.6 | 0.5 |
| F | 48,868.4 | 2,652 | 5,787 | 0.9 | 1512.7 / 1513.6 / 1513.6 | 1,512.7 | 1,513.0 | 0.3 |

[1] Feet above South Haven Road
[2] Elevation computed without consideration of backwater effects from Arkansas River
[3] Total width measured between left encroachment and right encroachment including small areas above the flood elevation and levee considerations
[4] Regulatory elevations notated as Left Overbank/Riverward/Right Overbank
Note: 1. Reference to left and right are based on looking in the downstream direction

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**GVI DRAINAGE DITCH**

| FLOODING SOURCE | | FLOODWAY | | | BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH[4] (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY[2] | WITHOUT FLOODWAY[3] | WITH FLOODWAY[3] | INCREASE |
| A | 932 | 168 | 615 | 1.9 | 1,533.0[2] | 1,528.4[2] | 1,528.5[2] | 0.1 |
| B | 2,628 | 249 | 977 | 1.2 | 1,533.0[2] | 1,529.3[2] | 1,529.4[2] | 0.1 |
| C | 3,246 | 179 | 699 | 1.7 | 1,533.0[2] | 1,529.5[2] | 1,529.5[2] | 0.0 |
| D | 3,480 | 149 | 592 | 2.0 | 1,533.0[2] | 1,529.6[2] | 1,529.6[2] | 0.0 |
| E | 3,882 | 145 | 573 | 2.0 | 1,533.0[2] | 1,529.8[2] | 1,529.8[2] | 0.0 |
| F | 4,088 | 138 | 544 | 2.1 | 1,533.0[2] | 1,529.9[2] | 1,530.0[2] | 0.1 |
| G | 4,525 | 137 | 570 | 2.0 | 1,533.0[2] | 1,530.2[2] | 1,530.2[2] | 0.0 |
| H | 5,352 | 162 | 636 | 1.8 | 1,533.0[2] | 1,530.8[2] | 1,530.9[2] | 0.1 |
| I | 5,760 | 155 | 688 | 1.7 | 1,533.0[2] | 1,531.0[2] | 1,531.2[2] | 0.2 |
| J | 6,391 | 147 | 607 | 1.9 | 1,533.0[2] | 1,531.3[2] | 1,531.4[2] | 0.1 |
| K | 7,710 | 157 | 458 | 2.5 | 1,533.3 | 1,533.3 | 1,533.3 | 0.0 |
| L | 8,436 | 190 | 704 | 1.7 | 1,534.0 | 1,534.0 | 1,534.0 | 0.0 |
| M | 9,258 | 168 | 565 | 0.9 | 1,534.2 | 1,534.2 | 1,534.2 | 0.0 |
| N | 10,620 | 165 | 515 | 1.0 | 1,534.4 | 1,534.4 | 1,534.4 | 0.0 |
| O | 11,857 | 124 | 341 | 1.5 | 1,534.8 | 1,534.8 | 1,534.8 | 0.0 |
| P | 12,536 | 143 | 395 | 1.3 | 1,535.1 | 1,535.1 | 1,535.1 | 0.0 |
| Q | 13,824 | 175 | 395 | 0.7 | 1,535.5 | 1,535.5 | 1,535.5 | 0.0 |
| R | 14,677 | 120 | 218 | 1.2 | 1,535.9 | 1,535.9 | 1,535.9 | 0.0 |
| S | 15,765 | 99 | 192 | 1.4 | 1,536.8 | 1,536.8 | 1,536.8 | 0.0 |

[1]Feet above confluence with the Arkansas River
[2]Elevation computed with consideration of Arkansas River backwater effects.
[3]Elevation computed with consideration of levees
[4]Total width measured between left encroachment and right encroachment not including small areas above the flood elevation

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**HARSHA CANAL**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 0 | 3,828 | 12,658 | 1.9 | 1,451.4 | 1,451.4 | 1,452.4 | 1.0 |
| B | 1,601 | 3,170 | 12,208 | 2.0 | 1,452.5 | 1,452.5 | 1,453.5 | 1.0 |
| C | 3,461 | 3,380 | 13,070 | 1.8 | 1,453.2 | 1,453.2 | 1,454.1 | 0.9 |
| D | 4,193 | 2,950 | 10,412 | 2.3 | 1,453.6 | 1,453.6 | 1,454.5 | 0.9 |
| E | 7,293 | 3,610 | 14,275 | 1.7 | 1,456.0 | 1,456.0 | 1,456.5 | 0.5 |
| F | 10,314 | 5,550[2] | 12,621 | 1.9 | 1,456.8 | 1,456.8 | 1,457.5 | 0.7 |
| G | 13,345 | 4,480 | 16,027 | 1.5 | 1,457.5 | 1,457.5 | 1,458.4 | 0.9 |
| H | 19,805 | 3,871[2] | 14,374 | 1.7 | 1,459.8 | 1,459.8 | 1,460.7 | 0.9 |
| I | 21,637 | 1,490[2] | 9,205 | 2.6 | 1,461.8 | 1,461.8 | 1,462.6 | 0.8 |
| J | 24,437 | 3,410 | 15,047 | 1.6 | 1,463.1 | 1,463.1 | 1,463.7 | 0.6 |
| K | 27,337 | 4,090[2] | 13,548 | 1.8 | 1,464.5 | 1,464.5 | 1,464.9 | 0.4 |
| L | 30,037 | 3,908 | 9,868 | 2.4 | 1,466.5 | 1,466.5 | 1,466.6 | 0.1 |
| M | 32,069 | 2,720 | 12,825 | 1.9 | 1,467.7 | 1,467.7 | 1,468.1 | 0.4 |
| N | 34,069 | 1,775 | 8,436 | 2.8 | 1,468.6 | 1,468.6 | 1,469.4 | 0.8 |
| O | 36,269 | 2,490 | 11,511 | 2.1 | 1,470.1 | 1,470.1 | 1,471.0 | 0.9 |
| P | 37,669 | 1,368 | 4,904 | 4.9 | 1,471.6 | 1,471.6 | 1,472.3 | 0.7 |

[1] Feet above Rayl Road
[2] Values include small Zone X Areas

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**LITTLE ARKANSAS RIVER**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| Q | 38,901 | 2,850 | 13,403 | 1.8 | 1,472.9 | 1,472.9 | 1,473.8 | 0.9 |
| R | 42,701 | 3,706 | 12,109 | 2.0 | 1,474.6 | 1,474.6 | 1,475.3 | 0.7 |
| S | 45,501 | 3,409 | 10,658 | 2.2 | 1,476.7 | 1,476.7 | 1,476.9 | 0.2 |
| T | 46,432 | 3,500 | 13,831 | 1.7 | 1,477.1 | 1,477.1 | 1,477.3 | 0.2 |
| U | 48,764 | 2,735 | 13,289 | 1.8 | 1,477.3 | 1,477.3 | 1,477.5 | 0.2 |
| V | 51,694 | 2,640 | 11,886 | 2.0 | 1,477.6 | 1,477.6 | 1,477.9 | 0.3 |
| W | 54,326 | 3,080[2] | 12,549 | 1.9 | 1,478.4 | 1,478.4 | 1,478.9 | 0.5 |
| X | 55,927 | 2,500 | 3,374 | 7.1 | 1,479.3 | 1,479.3 | 1,480.1 | 0.8 |
| Y | 56,693 | 2,255 | 3,584 | 6.7 | 1,479.4 | 1,479.4 | 1,480.2 | 0.8 |
| Z | 57,993 | 3,818 | 9,316 | 1.2 | 1,481.3 | 1,481.3 | 1,482.1 | 0.8 |
| AA | 58,953 | 2,940 | 15,498 | 1.5 | 1,481.5 | 1,481.5 | 1,482.3 | 0.8 |
| AB | 59,784 | 3,031 | 11,108 | 2.2 | 1,481.6 | 1,481.6 | 1,482.4 | 0.8 |
| AC | 61,385 | 3,450[2] | 13,480 | 1.8 | 1,482.0 | 1,482.0 | 1,482.8 | 0.8 |
| AD | 63,985 | 2,550[2] | 7,738 | 3.1 | 1,483.4 | 1,483.4 | 1,484.3 | 0.9 |

[1] Feet above Rayl Road

[2] Values include small Zone X Areas

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**LITTLE ARKANSAS RIVER**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 1,500 | 775 | 861 | 1.9 | 1,477.8 | 1,477.8 | 1,478.8 | 1.0 |
| B | 3,210 | 470 | 459 | 3.5 | 1,485.0 | 1,485.0 | 1,485.0 | 0.0 |
| C | 4,260 | 200 | 330 | 4.8 | 1,490.4 | 1,490.4 | 1,490.7 | 0.3 |
| D | 5,060 | 380 | 467 | 3.4 | 1,494.2 | 1,494.2 | 1,495.2 | 1.0 |
| E | 5,560 | 450 | 657 | 2.4 | 1,496.1 | 1,496.1 | 1,497.0 | 0.9 |
| F | 6,330 | 550 | 540 | 3.0 | 1,498.5 | 1,498.5 | 1,498.9 | 0.4 |
| G | 6,680 | 250 | 297 | 5.4 | 1,500.1 | 1,500.1 | 1,500.7 | 0.6 |
| H | 7,110 | 125 | 298 | 5.4 | 1,503.2 | 1,503.2 | 1,504.2 | 1.0 |
| I | 7,800 | 150 | 263 | 5.1 | 1,508.2 | 1,508.2 | 1,508.6 | 0.4 |
| J | 8,290 | 382 | 398 | 4.0 | 1,511.6 | 1,511.6 | 1,512.6 | 1.0 |
| K | 8,530 | 390 | 398 | 4.0 | 1,512.9 | 1,512.9 | 1,513.9 | 1.0 |
| L | 9,070 | 500 | 643 | 2.5 | 1,516.7 | 1,516.7 | 1,517.7 | 1.0 |
| M | 9,450 | 400 | 611 | 2.6 | 1,517.4 | 1,517.4 | 1,518.3 | 0.9 |
| N | 10,270 | 400 | 381 | 4.2 | 1,525.4 | 1,525.4 | 1,526.0 | 0.6 |
| O | 11,450 | 83 | 259 | 6.2 | 1,536.8 | 1,536.8 | 1,537.8 | 1.0 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**LITTLE ARKANSAS RIVER TRIBUTARY A**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 1,800 | 1,100 | 1,640 | 2.2 | 1,467.8 | 1,467.8 | 1,468.8 | 1.0 |
| B | 2,352 | 738 | 715 | 5.1 | 1,470.2 | 1,470.2 | 1,470.4 | 0.2 |
| C | 3,332 | 475 | 881 | 4.3 | 1,475.4 | 1,475.4 | 1,476.4 | 1.0 |
| D | 3,972 | 598 | 1,259 | 2.9 | 1,478.1 | 1,478.1 | 1,479.0 | 0.9 |
| E | 5,442 | 300 | 888 | 4.1 | 1,490.5 | 1,490.5 | 1,491.1 | 0.6 |
| F | 6,912 | 210 | 753 | 4.9 | 1,503.4 | 1,503.4 | 1,504.3 | 0.9 |
| G | 7,953 | 380 | 1,340 | 2.7 | 1,509.7 | 1,509.7 | 1,510.5 | 0.8 |
| H | 9,083 | 250 | 659 | 5.6 | 1,514.4 | 1,514.4 | 1,514.4 | 0.0 |
| I | 9,973 | 168 | 640 | 5.7 | 1,519.8 | 1,519.8 | 1,520.8 | 1.0 |

[1] Feet above Wilson Road

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**LITTLE ARKANSAS RIVER TRIBUTARY B**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 0 | 1,600 | 9,663 | 5.7 | 1,549.3 | 1,549.3 | 1,550.3 | 1.0 |
| B | 700 | 1,600 | 11,329 | 4.8 | 1,551.4 | 1,551.4 | 1,552.0 | 0.6 |
| C | 1,320 | 1,600 | 10,591 | 5.2 | 1,552.5 | 1,552.5 | 1,553.2 | 0.7 |
| D | 1,502 | 2,100 | 13,036 | 4.2 | 1,553.2 | 1,553.2 | 1,554.1 | 0.9 |
| E | 2,312 | 1,500 | 11,988 | 4.6 | 1,554.7 | 1,554.7 | 1,555.2 | 0.5 |
| F | 5,012 | 1,500 | 11,676 | 4.7 | 1,558.3 | 1,558.3 | 1,559.1 | 0.8 |
| G | 6,612 | 1,300 | 11,578 | 1.7 | 1,561.6 | 1,561.6 | 1,562.4 | 0.8 |
| H | 8,212 | 1,360 | 11,900 | 4.6 | 1,563.9 | 1,563.9 | 1,564.8 | 0.9 |
| I | 11,112 | 1,110 | 10,981 | 5.0 | 1,567.4 | 1,567.4 | 1,568.3 | 0.9 |
| J | 12,940 | 1,020 | 10,351 | 5.3 | 1,569.5 | 1,569.5 | 1,570.4 | 0.9 |
| K | 14,490 | 800 | 7,379 | 7.4 | 1,573.3 | 1,573.3 | 1,573.5 | 0.2 |
| L | 14,810 | 1,085 | 17,566 | 3.1 | 1,582.3 | 1,582.3 | 1,583.0 | 0.7 |
| M | 14,890 | 1,200 | 26,211 | 2.1 | 1,586.1 | 1,586.1 | 1,586.2 | 0.1 |
| N | 15,400 | 1,200 | 25,196 | 2.2 | 1,586.2 | 1,586.2 | 1,586.3 | 0.1 |
| O | 16,700 | 1,200 | 24,472 | 2.2 | 1,586.3 | 1,586.3 | 1,586.5 | 0.2 |
| P | 17,570 | 1,200 | 19,322 | 2.8 | 1,586.4 | 1,586.4 | 1,586.5 | 0.1 |
| Q | 17,730 | 1,600 | 27,824 | 2.0 | 1,586.6 | 1,586.6 | 1,587.5 | 0.9 |
| R | 20,050 | 2,800 | 45,980 | 1.2 | 1,586.9 | 1,586.9 | 1,587.9 | 1.0 |
| S | 22,500 | 2,800 | 39,944 | 1.4 | 1,587.2 | 1,587.2 | 1,588.2 | 1.0 |

[1] Feet above limit of detailed study (limit of detailed study is 1,430 feet downstream of Castleton Road)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**NORTH FORK NINNESCAH RIVER**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| T | 23,300 | 2,800 | 37,330 | 1.5 | 1,587.3 | 1,587.3 | 1,588.2 | 0.9 |
| U | 24,200 | 3,240 | 32,764 | 1.7 | 1,587.6 | 1,587.6 | 1,588.5 | 0.9 |

[1] Feet above limit of detailed study (limit of detailed study is 1,430 feet downstream of Castleton Road)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**NORTH FORK NINNESCAH RIVER**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 200 | 380 | 1,063 | 3.2 | 1,535.9 | 1,534.6[2] | 1,534.8 | 0.2 |
| B | 500 | 164 | 136 | 4.6 | 1,536.0 | 1,534.6[2] | 1,534.9 | 0.2 |
| C | 1,200 | 160 | 803 | 4.2 | 1,536.5 | 1,534.8[2] | 1,535.5 | 0.8 |
| D | 2,500 | 136 | 773 | 4.4 | 1,537.8 | 1,535.3[2] | 1,536.2 | 1.0 |
| E | 2,800 | 100 | 742 | 4.6 | 1,538.1 | 1,536.6[2] | 1,536.4 | 1.0 |
| F | 2,980 | 414 | 1,525 | 2.2 | 1,539.3 | 1,536.7[2] | 1,538.3 | 0.9 |
| G | 3,500 | 105 | 837 | 4.1 | 1,539.7 | 1,536.8[2] | 1,538.4 | 0.9 |
| H | 3,900 | 230 | 921 | 3.7 | 1,540.0 | 1,536.8[2] | 1,538.6 | 0.9 |
| I | 4,500 | 762 | 2,140 | 1.6 | 1,540.3 | 1,537.0[2] | 1,540.0 | 0.8 |
| J | 5,000 | 716 | 2,644 | 1.3 | 1,540.3 | 1,537.0[2] | 1,540.2 | 0.8 |
| K | 6,000 | 669 | 2,613 | 1.3 | 1,540.8 | 1,537.3[2] | 1,540.5 | 0.9 |
| L | 7,000 | 682 | 2,462 | 1.4 | 1,540.8 | 1,537.9[2] | 1,540.6 | 0.8 |
| M | 7,400 | 662 | 1,529 | 2.2 | 1,540.9 | 1,538.0[2] | 1,540.8 | 0.9 |
| N | 8,200 | 335 | 1,040 | 3.3 | 1,541.3 | 1,538.5[2] | 1,541.5 | 0.9 |
| O | 8,830 | 290 | 708 | 4.8 | 1,542.0 | 1,539.3[2] | 1,542.4 | 0.9 |
| P | 9,340 | 429 | 1,550 | 2.2 | 1,542.4 | 1,542.0[2] | 1,545.4 | 0.8 |
| Q | 9,800 | 656 | 3,237 | 1.1 | 1,544.4 | 1,544.4 | 1,546.6 | 0.6 |
| R | 10,600 | 662 | 2,772 | 1.2 | 1,544.4 | 1,544.4 | 1,546.7 | 0.6 |
| S | 11,200 | 545 | 1,972 | 1.7 | 1,545.2 | 1,544.5[2] | 1,547.0 | 0.7 |

[1] Feet above 30th Avenue
[2] Elevation without consideration of overflow effects from Cow Creek (Left Overbank)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**PLUM CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| T | 11,450 | 954 | 3,449 | 1.0 | 1,545.7 | 1,544.5[2] | 1,548.7 | 0.3 |
| U | 12,200 | 780 | 3,410 | 1.0 | 1,546.9 | 1,546.2[2] | 1,548.8 | 0.4 |
| V | 13,000 | 535 | 2,462 | 1.4 | 1,547.8 | 1,546.2[2] | 1,548.9 | 0.4 |
| W | 13,900 | 225 | 405 | 8.4 | 1,548.7 | 1,548.7 | 1,550.5 | 0.9 |
| X | 14,600 | 153 | 441 | 7.7 | 1,555.3 | 1,555.3 | 1,558.5 | 0.5 |
| Y | 15,770 | 287 | 884 | 3.8 | 1,562.8 | 1,562.8 | 1,567.1 | 0.9 |
| Z | 16,240 | 170 | 430 | 7.9 | 1,569.9 | 1,569.9 | 1,571.9 | 0.0 |
| AA | 16,560 | 160 | 460 | 7.4 | 1,572.3 | 1,572.3 | 1,577.1 | 0.7 |
| AB | 18,160 | 213 | 506 | 6.7 | 1,595.1 | 1,595.1 | 1,596.7 | 0.9 |
| AC | 18,960 | 85 | 381 | 8.9 | 1,600.9 | 1,600.9 | 1,605.3 | 0.8 |
| AD | 19,760 | 118 | 512 | 6.6 | 1,609.9 | 1,609.9 | 1,614.8 | 0.9 |
| AE | 20,560 | 71 | 291 | 11.7 | 1,615.5 | 1,615.5 | 1,620.8 | 0.4 |
| AF | 21,360 | 160 | 906 | 3.8 | 1,625.6 | 1,625.6 | 1,629.2 | 0.6 |
| AG | 22,160 | 130 | 726 | 4.7 | 1,631.8 | 1,631.8 | 1,635.5 | 0.9 |
| AH | 22,960 | 250 | 1,151 | 3.0 | 1,640.5 | 1,640.5 | 1,643.1 | 0.9 |
| AI | 23,760 | 320 | 1,009 | 3.4 | 1,643.0 | 1,643.0 | 1,646.8 | 0.8 |

[1] Feet above 30th Avenue
[2] Elevation without consideration of overflow effects from Cow Creek (Left Overbank)

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**PLUM CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 19,000 | 541[3] | 669 | 4.4 | 1,549.3 | 1,546.1[2] | 1,546.1 | 0.0 |
| B | 21,050 | 800[3] | 1,694 | 1.7 | 1,549.4 | 1,549.1[2] | 1,549.5 | 0.4 |
| C | 23,250 | 800[3] | 1,989 | 1.5 | 1,550.0 | 1,550.0[2] | 1,550.8 | 0.8 |
| D | 24,821 | 800[3] | 2,750 | 1.1 | 1,553.5 | 1,550.9[2] | 1,551.5 | 0.6 |
| E | 28,350 | 1,500 | 2,681 | 2.4 | 1,555.2 | 1,555.2 | 1,556.2 | 1.0 |
| F | 29,000 | 1,400 | 4,018 | 1.6 | 1,556.8 | 1,556.8 | 1,557.5 | 0.7 |
| G | 29,670 | 1,400 | 2,944 | 1.7 | 1,557.3 | 1,557.3 | 1,557.9 | 0.6 |
| H | 31,200 | 1,400 | 3,778 | 1.2 | 1,558.1 | 1,558.1 | 1,558.8 | 0.7 |
| I | 33,300 | 3,337 | 7,265 | 0.7 | 1,558.7 | 1,558.7 | 1,559.4 | 0.7 |
| J | 34,100 | 3,095 | 4,931 | 1.0 | 1,558.9 | 1,558.9 | 1,559.7 | 0.8 |
| K | 35,220 | 1,500 | 2,115 | 2.3 | 1,560.0 | 1,560.0 | 1,560.7 | 0.7 |
| L | 37,150 | 2,500 | 4,406 | 1.1 | 1,561.0 | 1,561.0 | 1,561.6 | 0.6 |
| M | 38,950 | 4,000[3] | 2,762 | 1.8 | 1,561.4 | 1,561.4 | 1,562.2 | 0.8 |
| N | 40,200 | 2,500[3] | 3,378 | 1.5 | 1,562.2 | 1,562.2 | 1,562.9 | 0.7 |
| O | 42,000 | 1,500[3] | 2,879 | 1.7 | 1,565.0 | 1,565.0 | 1,565.5 | 0.5 |
| P | 44,400 | 1,500 | 2,780 | 1.8 | 1,567.2 | 1,567.2 | 1,568.2 | 1.0 |
| Q | 45,800 | 757 | 2,662 | 1.8 | 1,568.3 | 1,568.3 | 1,569.2 | 0.9 |
| R | 46,550 | 1,000 | 4,184 | 1.2 | 1,569.5 | 1,569.5 | 1,570.2 | 0.7 |
| S | 47,300 | 1,100 | 2,100 | 2.3 | 1,569.5 | 1,569.5 | 1,570.4 | 0.9 |
| T | 48,300 | 1,500 | 1,069 | 4.6 | 1,571.5 | 1,571.5 | 1,571.6 | 0.1 |

[1] Feet above mouth
[2] Elevation without consideration of overflow effects from Arkansas River
[3] Floodway width within Arkansas River floodway

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SALT CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| T | 48,300 | 1,500 | 1,069 | 4.6 | 1,571.5 | 1,571.5 | 1,571.6 | 0.1 |
| U | 49,250 | 2,000 | 4,193 | 1.2 | 1,573.2 | 1,573.2 | 1,574.1 | 0.9 |
| V | 49,900 | 2,000 | 6,167 | 0.8 | 1,573.2 | 1,573.2 | 1,574.2 | 1.0 |
| W | 51,500 | 2,940 | 10,171 | 0.5 | 1,573.5 | 1,573.5 | 1,574.5 | 1.0 |
| X | 52,270 | 1,900 | 5,100 | 1.1 | 1,573.6 | 1,573.6 | 1,574.6 | 1.0 |
| Y | 53,900 | 1,000 | 3,250 | 1.7 | 1,574.5 | 1,574.5 | 1,575.4 | 0.9 |
| Z | 54,700 | 590 | 2,703 | 2.0 | 1,574.9 | 1,574.9 | 1,575.7 | 0.8 |
| AA | 56,400 | 400 | 2,016 | 2.7 | 1,576.5 | 1,576.5 | 1,577.1 | 0.6 |
| AB | 58,000 | 500 | 2,689 | 2.0 | 1,577.1 | 1,577.1 | 1,578.0 | 0.9 |
| AC | 60,300 | 600 | 2,404 | 2.2 | 1,577.7 | 1,577.7 | 1,578.7 | 1.0 |
| AD | 63,200 | 600 | 2,666 | 2.0 | 1,579.2 | 1,579.2 | 1,580.1 | 0.9 |
| AE | 64,300 | 600 | 3,255 | 1.6 | 1,580.3 | 1,580.3 | 1,581.2 | 0.9 |
| AF | 66,300 | 1,000 | 3,273 | 1.6 | 1,581.0 | 1,581.0 | 1,581.8 | 0.8 |
| AG | 68,600 | 1,100 | 3,323 | 1.6 | 1,581.4 | 1,581.4 | 1,582.3 | 0.9 |
| AH | 69,700 | 1,000 | 3,532 | 1.5 | 1,581.7 | 1,581.7 | 1,582.6 | 0.9 |
| AI | 71,100 | 400 | 2,500 | 2.4 | 1,582.4 | 1,582.4 | 1,583.1 | 0.7 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SALT CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 400 | 60 | 270 | 4.1 | 1,573.2 | 1,573.2 | 1,574.2 | 1.0 |
| B | 1,840 | 100 | 399 | 2.8 | 1,578.2 | 1,578.2 | 1,578.8 | 0.6 |
| C | 3,640 | 100 | 349 | 3.2 | 1,581.6 | 1,581.6 | 1,582.5 | 0.9 |
| D | 5,110 | 100 | 385 | 2.9 | 1,583.9 | 1,583.9 | 1,584.8 | 0.9 |
| E | 5,495 | 100 | 393 | 2.8 | 1,587.3 | 1,587.3 | 1,587.9 | 0.6 |
| F | 6,210 | 100 | 430 | 2.6 | 1,588.3 | 1,588.3 | 1,589.1 | 0.8 |
| G | 7,210 | 100 | 448 | 2.5 | 1,590.0 | 1,590.0 | 1,590.7 | 0.7 |
| H | 7,810 | 100 | 467 | 2.4 | 1,590.7 | 1,590.7 | 1,591.6 | 0.9 |
| I | 8,510 | 100 | 423 | 2.6 | 1,591.6 | 1,591.6 | 1,592.6 | 1.0 |
| J | 8,771 | 100 | 415 | 2.7 | 1,591.7 | 1,591.7 | 1,592.7 | 1.0 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SALT CREEK TRUBUTARY A**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 500 | 200 | 938 | 3.0 | 1,581.6 | 1,581.6 | 1,582.6 | 1.0 |
| B | 1,700 | 200 | 791 | 3.5 | 1,584.4 | 1,584.4 | 1,585.2 | 0.8 |
| C | 3,100 | 200 | 924 | 3.0 | 1,586.7 | 1,586.7 | 1,587.3 | 0.6 |
| D | 4,500 | 200 | 665 | 4.2 | 1,588.2 | 1,588.2 | 1,588.8 | 0.6 |
| E | 5,000 | 200 | 1,063 | 2.6 | 1,590.8 | 1,590.8 | 1,591.6 | 0.8 |
| F | 5,800 | 200 | 885 | 3.2 | 1,591.6 | 1,591.6 | 1,592.4 | 0.8 |
| G | 6,500 | 350 | 1,290 | 2.2 | 1,593.1 | 1,593.1 | 1,593.9 | 0.8 |
| H | 8,400 | 900 | 3,092 | 0.9 | 1,593.6 | 1,593.6 | 1,594.5 | 0.9 |
| I | 10,000 | 700 | 1,184 | 2.4 | 1,596.6 | 1,596.6 | 1,597.1 | 0.5 |
| J | 11,200 | 500 | 1,301 | 2.2 | 1,599.3 | 1,599.3 | 1,600.2 | 0.9 |
| K | 11,500 | 400 | 1,270 | 2.2 | 1,599.8 | 1,599.8 | 1,600.7 | 0.9 |
| L | 11,800 | 400 | 1,290 | 2.2 | 1,600.3 | 1,600.3 | 1,600.9 | 0.6 |
| M | 12,500 | 400 | 1,725 | 1.6 | 1,602.2 | 1,602.2 | 1,603.1 | 0.9 |
| N | 12,800 | 500 | 1,333 | 2.1 | 1,602.3 | 1,602.3 | 1,603.3 | 1.0 |
| O | 13,450 | 297 | 712 | 3.9 | 1,604.2 | 1,604.2 | 1,604.3 | 0.1 |
| P | 14,650 | 200 | 880 | 3.2 | 1,606.9 | 1,606.9 | 1,607.4 | 0.5 |
| Q | 15,300 | 200 | 662 | 4.2 | 1,607.9 | 1,607.9 | 1,608.6 | 0.7 |
| R | 15,950 | 300 | 1,000 | 2.8 | 1,610.0 | 1,610.0 | 1,610.4 | 0.4 |
| S | 16,700 | 300 | 1,100 | 2.5 | 1,611.0 | 1,611.0 | 1,611.4 | 0.4 |
| T | 17,800 | 300 | 888 | 3.2 | 1,612.8 | 1,612.8 | 1,613.4 | 0.6 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SALT CREEK TRUBUTARY B**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 3,250 | 934 | 3,379 | 3.1 | 1,513.0 | 1,513.0 | 1,514.0 | 1.0 |
| B | 3,315 | 887 | 2,895 | 3.7 | 1,515.3 | 1,515.3 | 1,515.7 | 0.4 |
| C | 3,395 | 1,124 | 4,344 | 2.4 | 1,515.6 | 1,515.6 | 1,516.2 | 0.6 |
| D | 6,365 | 888 | 4,586 | 0.3 | 1,517.1 | 1,517.1 | 1,518.1 | 1.0 |
| E | 8,465 | 482 | 2,828 | 3.7 | 1,519.1 | 1,519.1 | 1,520.1 | 1.0 |
| F | 11,315 | 529 | 3,154 | 3.4 | 1,522.6 | 1,522.6 | 1,523.2 | 0.6 |
| G | 12,115 | 586 | 3,188 | 3.3 | 1,523.3 | 1,523.3 | 1,524.1 | 0.8 |
| H | 13,025 | 724 | 4,823 | 2.2 | 1,525.2 | 1,525.2 | 1,526.0 | 0.8 |
| I | 15,195 | 633 | 3,491 | 3.0 | 1,526.5 | 1,526.5 | 1,527.3 | 0.8 |
| J | 16,875 | 452 | 2,971 | 3.6 | 1,528.2 | 1,528.2 | 1,529.0 | 0.8 |
| K | 17,725 | 700 | 4,169 | 2.5 | 1,529.0 | 1,529.0 | 1,529.8 | 0.8 |
| L | 18,095 | 800 | 5,241 | 2.0 | 1,529.3 | 1,529.3 | 1,530.0 | 0.7 |
| M | 18,235 | 590 | 3,782 | 2.8 | 1,530.7 | 1,530.7 | 1,531.4 | 0.7 |
| N | 18,425 | 595 | 2,692 | 3.9 | 1,530.9 | 1,530.9 | 1,531.6 | 0.7 |
| O | 19,645 | 300 | 2,008 | 5.3 | 1,532.5 | 1,532.5 | 1,533.2 | 0.7 |
| P | 20,125 | 440 | 2,946 | 3.6 | 1,533.9 | 1,533.9 | 1,534.5 | 0.6 |
| Q | 20,675 | 1,307 | 13,300 | 0.8 | 1,540.7 | 1,540.7 | 1,541.5 | 0.8 |
| R | 20,795 | 1,977 | 17,241 | 0.6 | 1,540.7 | 1,540.7 | 1,541.5 | 0.8 |
| S | 21,125 | 1,315 | 10,555 | 1.0 | 1,540.7 | 1,540.7 | 1,541.5 | 0.8 |
| T | 22,865 | 1,266 | 8,763 | 1.2 | 1,540.8 | 1,540.8 | 1,541.6 | 0.8 |
| U | 25,505 | 1,014 | 5,832 | 1.8 | 1,541.6 | 1,541.6 | 1,542.5 | 0.9 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SAND CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| U | 25,505 | 1,014 | 5,832 | 1.8 | 1,541.6 | 1,541.6 | 1,542.5 | 0.9 |
| V | 26,445 | 1,558 | 5,197 | 2.1 | 1,542.0 | 1,542.0 | 1,542.9 | 0.9 |
| W | 26,715 | 1,536 | 6,032 | 1.8 | 1,543.0 | 1,543.0 | 1,543.8 | 0.8 |
| X | 26,848 | 734 | 3,067 | 3.5 | 1,543.2 | 1,543.2 | 1,544.0 | 0.8 |
| Y | 27,885 | 570 | 3,035 | 3.5 | 1,544.7 | 1,544.7 | 1,545.6 | 0.9 |
| Z | 29,195 | 1,455 | 5,660 | 1.9 | 1,546.8 | 1,546.8 | 1,547.8 | 1.0 |
| AA | 29,342 | 1,369 | 5,212 | 2.0 | 1,547.5 | 1,547.5 | 1,548.5 | 1.0 |
| AB | 29,995 | 1,826[2] | 7,434 | 1.4 | 1,547.9 | 1,547.9 | 1,548.9 | 1.0 |
| AC | 31,565 | 800 | 3,669 | 2.9 | 1,549.2 | 1,549.2 | 1,550.0 | 0.8 |
| AD | 32,625 | 874 | 4,611 | 2.3 | 1,549.9 | 1,549.9 | 1,550.8 | 0.9 |

[1] Feet above mouth
[2] Values include small Zone X areas

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SAND CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 5,200 | 190 | 807 | 4.0 | 1,729.2 | 1,729.2 | 1,730.2 | 1.0 |
| B | 5,940 | 250 | 926 | 3.5 | 1,731.3 | 1,731.3 | 1,732.3 | 1.0 |
| C | 6,560 | 200 | 541 | 5.9 | 1,734.9 | 1,734.9 | 1,735.0 | 0.1 |
| D | 6,961 | 250 | 932 | 3.4 | 1,736.9 | 1,736.9 | 1,737.8 | 0.9 |
| E | 7,099 | 250 | 1,995 | 1.6 | 1,740.9 | 1,740.9 | 1,741.7 | 0.8 |
| F | 7,780 | 300 | 1,327 | 2.4 | 1,740.9 | 1,740.9 | 1,741.8 | 0.9 |
| G | 8,810 | 350 | 1,349 | 2.4 | 1,742.0 | 1,742.0 | 1,742.9 | 0.9 |
| H | 9,330 | 300 | 1,101 | 2.9 | 1,743.6 | 1,743.6 | 1,744.4 | 0.8 |
| I | 10,260 | 300 | 1,283 | 2.5 | 1,746.6 | 1,746.6 | 1,747.4 | 0.8 |
| J | 10,830 | 350 | 1,552 | 2.1 | 1,748.1 | 1,748.1 | 1,749.0 | 0.9 |
| K | 11,341 | 550 | 1,462 | 2.2 | 1,749.9 | 1,749.9 | 1,750.8 | 0.9 |
| L | 11,546 | 600 | 1,978 | 1.6 | 1,750.4 | 1,750.4 | 1,751.4 | 1.0 |
| M | 11,629 | 500 | 1,882 | 1.7 | 1,752.7 | 1,752.7 | 1,753.4 | 0.7 |
| N | 11,840 | 300 | 660 | 4.8 | 1,752.7 | 1,752.7 | 1,753.4 | 0.7 |
| O | 12,020 | 200 | 470 | 6.8 | 1,753.1 | 1,753.1 | 1,754.4 | 1.3 |

[1] Feet above Sylvia Road

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SILVER CREEK TRIBUTARY**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 1 | 400 | 1,155 | 3.6 | 1,549.9 | 1,549.9 | 1,550.9 | 1.0 |
| B | 235 | 500 | 2,481 | 1.7 | 1,550.4 | 1,550.4 | 1,551.4 | 1.0 |
| C | 800 | 600 | 2,067 | 2.0 | 1,550.6 | 1,550.6 | 1,551.5 | 0.9 |
| D | 1,825 | 400 | 1,536 | 2.1 | 1,553.2 | 1,553.2 | 1,553.4 | 0.2 |
| E | 2,450 | 300 | 1,166 | 2.8 | 1,553.9 | 1,553.9 | 1,554.4 | 0.5 |
| F | 3,150 | 200 | 763 | 4.3 | 1,555.0 | 1,555.0 | 1,555.9 | 0.9 |
| G | 4,585 | 200 | 780 | 4.2 | 1,558.8 | 1,558.8 | 1,559.8 | 1.0 |
| H | 5,696 | 200 | 694 | 4.8 | 1,561.8 | 1,561.8 | 1,562.3 | 0.5 |
| I | 5,896 | 200 | 769 | 4.3 | 1,562.2 | 1,562.2 | 1,562.9 | 0.7 |
| J | 6,280 | 200 | 858 | 3.8 | 1,563.1 | 1,563.1 | 1,564.1 | 1.0 |
| K | 6,780 | 300 | 821 | 4.0 | 1,564.0 | 1,564.0 | 1,564.8 | 0.8 |
| L | 7,408 | 300 | 828 | 4.0 | 1,565.8 | 1,565.8 | 1,566.5 | 0.7 |
| M | 7,915 | 300 | 829 | 4.0 | 1,566.6 | 1,566.6 | 1,567.6 | 1.0 |
| N | 8,400 | 250 | 542 | 6.1 | 1,568.8 | 1,568.8 | 1,568.8 | 0.0 |
| O | 9,434 | 250 | 756 | 4.4 | 1,572.2 | 1,572.2 | 1,573.0 | 0.8 |
| P | 10,300 | 200 | 591 | 5.6 | 1,575.0 | 1,575.0 | 1,575.5 | 0.5 |
| Q | 11,375 | 200 | 567 | 5.8 | 1,579.7 | 1,579.7 | 1,579.8 | 0.1 |
| R | 12,000 | 200 | 509 | 6.5 | 1,582.1 | 1,582.1 | 1,582.6 | 0.5 |

[1] Feet above boundary road

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SMOOTS CREEK**

| FLOODING SOURCE | | FLOODWAY | | | 1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (FEET) | SECTION AREA (SQUARE FEET) | MEAN VELOCITY (FEET PER SECOND) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 800 | 135 | 448 | 3.4 | 1,553.5 | 1,553.5 | 1,554.5 | 1.0 |
| B | 1,200 | 130 | 380 | 4.1 | 1,554.7 | 1,554.7 | 1,555.7 | 1.0 |
| C | 1,600 | 100 | 319 | 4.8 | 1,555.9 | 1,555.9 | 1,556.8 | 0.9 |
| D | 2,280 | 100 | 308 | 5.0 | 1,557.8 | 1,557.8 | 1,558.5 | 0.7 |
| E | 3,260 | 100 | 326 | 4.7 | 1,560.1 | 1,560.1 | 1,560.7 | 0.6 |
| F | 3,750 | 100 | 327 | 4.7 | 1,561.0 | 1,561.0 | 1,561.8 | 0.8 |
| G | 4,000 | 100 | 377 | 4.1 | 1,561.7 | 1,561.7 | 1,562.5 | 0.8 |
| H | 4,150 | 100 | 314 | 4.9 | 1,561.9 | 1,561.9 | 1,562.8 | 0.9 |
| I | 4,463 | 250 | 729 | 2.1 | 1,565.0 | 1,565.0 | 1,565.7 | 0.7 |
| J | 4,830 | 250 | 743 | 2.1 | 1,565.2 | 1,565.2 | 1,566.0 | 0.8 |
| K | 4,955 | 250 | 516 | 3.0 | 1,565.3 | 1,565.3 | 1,566.0 | 0.7 |
| L | 5,180 | 250 | 516 | 3.0 | 1,565.6 | 1,565.6 | 1,566.4 | 0.8 |
| M | 5,352 | 200 | 362 | 4.2 | 1,566.0 | 1,566.0 | 1,566.8 | 0.8 |
| N | 5,510 | 200 | 441 | 3.5 | 1,566.5 | 1,566.5 | 1,567.3 | 0.8 |

[1] Feet above mouth

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KANSAS AND INCORPORATED AREAS**

**FLOODWAY DATA**

**SMOOTS CREEK TRIBUTARY**

## 5.0 INSURANCE APPLICATIONS

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

Zone A

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

Zone AE

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

Zone AH

Zone AH is the flood insurance risk zone that corresponds to the areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

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

## 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 Reno County. Previously, FIRMs were prepared for each incorporated community and the unincorporated areas of the county identified as having special flood hazard areas. This

countywide FIRM also includes flood-hazard information that was presented separately on Flood Boundary and Floodway Maps (FBFMs), where applicable. Historical data relating to the maps prepared for each community are presented in Table 3, Community Map History.

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISIONS DATE | FIRM EFFECTIVE DATE | FIRM REVISIONS DATE |
|---|---|---|---|---|
| [1, 2]Abbyville, City of | N/A | N/A | N/A | None |
| [2]Arlington, City of | September 26, 1975 | N/A | N/A | None |
| [2]Buhler, City of | N/A | N/A | N/A | None |
| [2]Haven, City of | N/A | N/A | N/A | None |
| Hutchinson, City of | June 28, 1974 | December 5, 1975 | September 5, 1978 | January 19, 1982 |
| [1, 2]Langdon, City of | N/A | N/A | N/A | None |
| Nickerson, City of | March 8, 1974 | N/A | January 3, 1979 | None |
| [1, 2]Partridge, City of | December 17, 1976 | N/A | N/A | None |
| [1, 2]Plevna, City of | N/A | N/A | N/A | None |
| [1, 2]Pretty Prairie, City of | August 13, 1976 | N/A | N/A | None |

[1] No Special Flood Hazards Identified
[2] This community did not have a FIRM prior to the first countywide FIRM for Reno County.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

| COMMUNITY NAME | INITIAL IDENTIFICATION | FLOOD HAZARD BOUNDARY MAP REVISIONS DATE | FIRM EFFECTIVE DATE | FIRM REVISIONS DATE |
|---|---|---|---|---|
| [2]Reno County Unincorporated Areas | August 16, 1977 | N/A | N/A | None |
| [2]South Hutchinson, City of | July 25, 1975 | N/A | N/A | None |
| [2]Sylvia, City of | N/A | N/A | N/A | None |
| [1, 2]The Highlands, City of | N/A | N/A | N/A | None |
| [2]Turon, City of | N/A | N/A | N/A | None |
| Willowbrook, City of | December 13, 1974 | N/A | August 1, 1986 | None |

[1] No Special Flood Hazards Identified
[2] This community did not have a FIRM prior to the first countywide FIRM for Reno County.

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS AND INCORPORATED AREAS**

**COMMUNITY MAP HISTORY**

## 7.0 OTHER STUDIES

The USACE prepared a report titled Cow Creek, Kansas, Channel Improvement Design Memorandum No. 1. The 1-percent-annual-chance flood-flow for Cow Creek at Hutchinson, as developed for that study, was 22,600 cfs and the 50-year flood-flow at Hutchinson was 15,800 cfs (Reference 1).

The USACE also prepared an FIS for the City of Hutchinson, Kansas. The FIS reflects slight modification of the Arkansas River flows to account for the additional drainage area flowing into the Arkansas River at the confluence of Cow Creek. The FIS's published for McPherson, Harvey, and Sedgwick Counties and the FIRM printed for Rice County are in agreement with this study (Reference 1).

A report published for the Arkansas River and Bull Creek local flood protection project for the City of Nickerson is in agreement with this study.

The January 6, 2010 *Reno County, Kansas and Incorporated Areas, (Revised Countywide)* FIS supersedes the previously printed Flood Hazard Boundary Maps for the Cities of Arlington, Partridge, Pretty Prairie, and South Hutchinson, and Reno County, Kansas; the previously published FIS for the City of Nickerson, Kansas; and the previously printed FIRMs for the Cities of Hutchinson and Willowbrook, Kansas (References 1).

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

## 8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting Federal Regional Center, 11224 Holmes Road, Kansas City, Missouri 64131-3626

## 9.0 BIBLIOGRAPHY AND REFERENCES


1. Federal Emergency Management Agency, Flood Insurance Study, Reno County Kansas and Incorporated Areas, Washington, DC., January 6, 2010.

2. Kansas Data Access & Support Center, Data Catalog, Farm Service Agency (FSA) National Agricultural Imagery Program (NAIP), 2003-2019.

3. Photo Science Geospatial Solutions, Airborne Light Detection and Ranging (LiDAR), City of Hutchinson, Reno County Kansas 4-foot DEM, Reno County, Kansas, 2010.

4. U.S Census Bureau, U.S Census Bureau, State & County Quick Facts, http://quickfacts.census.gov.qfd/ accessed January 2011.

5. U.S Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Climatological Data for Kansas, Asheville, North Carolina, 1984.

6. Kansas Division of Emergency Management, Kansas Hazard Mitigation Team, Kansas

Hazard Mitigation Plan, Topeka, Kansas, November 2007.

7. U.S. Army Corps of Engineers, Hydrologic Modeling System (HEC-HMS), Version 3.4.

8. Kansas Department of Transportation, Rainfall Intensity Tables for Counties in Kansas, June 1997.

9. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-RAS River Analysis System, Davis, California, November 2002.

10. Federal Emergency Management Agency, FEMA Guidelines & Specifications Appendix H, Guidance for Mapping of Areas Protected by Levee Systems, April 2003.

11. Federal Emergency Management Agency, Procedure Memorandum No. 52, Guidelines for Mapping Landward of Levee Systems, April 24, 2009.

## 10.0 REVISIONS DESCRIPTIONS

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data which can be found in Appendix A.

### 10.1 First Revision (Revised January 29, 2021)

This study was revised January 29, 2021 to update a portion of Reno County's FIS. These updates were made to incorporate new detailed studies for the purpose of remapping the area protected by levees in Reno County, Hutchinson, South Hutchinson and Willowbrook. For more information, please see the Area Studied section below.

#### a. Authority and Acknowledgments

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

For this countywide FIS, hydrologic and hydraulic analyses were performed and submitted in accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated September 1, 1999, between the Kansas Department of Agriculture (KDA) and FEMA. Contract 1605 dated October 8, 2009, as described in "Agency Task Order No. 2" between KDA and AMEC Earth & Environmental (currently Wood Environment and Infrastructure Solutions, Inc.), outlines the detailed scope of work.

Planimetric base map information shown on all affected FIRM panels was derived from the Farm Service Agency (FSA) National Agricultural Imagery Program (NAIP), 2003-2019. Users of this FIRM should be aware that minor adjustments may have been made to specific base map features (Reference 2). Elevation data was derived from (Light Detection and Ranging) LiDAR technology produced by Photo Science Geospatial Solutions and provided by Wood for the revised study. A 4-foot Digital Elevation Model (DEM) was created from the LiDAR and used for terrain modeling and topographic production in this study (Reference 3).

The coordinate system used for the production of this FIRM is the North American Datum of 1983 (NAD 83), Universal Transverse Mercator (UTM) projection, NAD 83 Zone 14N. Corner coordinates shown on the FIRM are in latitude and longitude referenced to the Universal Transverse Mercator (UTM) projection, NAD 83 Zone 14N.

**b. Coordination**

The results of the study were reviewed at the final CCO meeting held on March 27, 2019 and attended by representatives of FEMA, local community and KDA. All problems raised at that meeting have been addressed in this study.

**c. Area Studied**

This FIS report covers a portion of the geographic area of Reno County, Kansas, including the incorporated communities of Hutchinson, South Hutchinson and Willowbrook, Nickerson, and The Highlands listed in Section 1.1.

For this study, Wood restudied the following flooding sources and incorporated new detailed studies:

i. Arkansas River; from approximately 21,000 feet upstream of South Haven Road to the limit of detailed study approximately 1,400 feet upstream of West 82nd Avenue.

ii. Cow Creek; from approximately 21,000 feet upstream of South Haven Road to the limit of detailed study approximately 11,400 feet upstream of West 95th Avenue.

iii. Cow Creek Old Channel; from the confluence with GVI Drainage Ditch, to the limit of detailed study at South Main Street.

iv. GVI Drainage Ditch; approximately 35,100 feet upstream of South Haven Road to the limit of detailed study approximately 3,925 feet upstream of East Illinois Avenue.

v. Harsha Canal; from the confluence with the Arkansas River to the limit of detailed study approximately 2,170 feet upstream of North Hendricks Street.

For this study no new approximate analyses were performed. Approximate analyses from the January 6, 2010 *Reno County, Kansas and Incorporated Areas, (Revised Countywide) FIS* were incorporated to produce Zone A floodplains. In addition, those detailed studies listed in Section 2.1 of this FIS report that are not specifically listed above as being restudied, were digitally moved forward from the previous FIS without any changes.

**d. Hydrologic Analysis**

For this countywide FIS new hydrologic analyses were completed to establish peak discharge-frequency relationships for the Arkansas River, Cow Creek (with the diversion), Harsha Canal, Cow Creek Old Channel, and the GVI Drainage Ditch. No new hydrologic analysis was performed on all remaining previously approximate and detailed study areas.

Detailed hydrologic analysis was performed for the Harsha Canal, Cow Creek Old Channel, and the GVI Drainage Ditch using the USACE rainfall-runoff model HEC-HMS (Version 3.4) (Reference 7). Wood generated runoff hydrographs for the 10-, 2-, 1-, and 0.2-percent-annual-chance 24 hour SCS Type II rainfall events.

Basin boundaries were developed using GIS processes, the aerial photography, the City of Hutchinson stormwater network, and LiDAR topography. Rainfall depths were derived from the "Rainfall Intensity Tables for Counties in Kansas," published by the Kansas Department of Transportation (Reference 8). The 0.2-percent-annual-chance rainfall depth was extrapolated using procedures outlined in TP-40. Runoff was computed using the NRCS Runoff Curve Number methodology. The computed runoff was transformed into a hydrograph using the Clark Unit Hydrograph method. The developed hydrographs were then routed using the Muskingum-Cunge eight-point routing and Lag methodologies. The eight-point cross section geometry was developed by using GIS processes and 2010 LiDAR topography. Storage areas and diversions were also utilized where appropriate adhering to proper engineering methods in HEC-HMS. In some instances the storage areas were calibrated to the hydraulic models in order to balance flow and water surface elevations for the 1-percent-annual-chance event.

New detailed hydrology for Cow Creek and the Arkansas River was provided by the USACE, as part of the levee certification project that was completed simultaneously to these new studies. Wood reviewed and incorporated the new detailed hydrology for Cow Creek and the Arkansas River into this countywide update. The Arkansas River hydrology was performed using the HEC-SSP statistical analysis program developed by the USACE with a Bulletin 17B (log-Pearson Type III) methodology using peak flow records from USGS gages 07143330 and 07142800. Detailed hydrologic analysis was performed for Cow Creek using Bulletin 17B analysis of peak discharges at a USGS gage located on Cow Creek at Lyons, Kansas. The computed frequency discharges were modified by applying a multiplier of 1.6 to the calculated values at Lyons, accounting for local runoff from the Hutchinson subarea (as determined from a HEC-HMS hydrologic model analysis calibrated to the May 2007 storm). The frequency discharges from the USACE were applied at USGS Gage 07143310 near the upstream limit of the Cow Creek study area. Wood developed an Unsteady HEC-RAS model in order to attenuate the flows through the study area caused by the wide floodplain of Cow Creek. The attenuated flood frequency peak discharges were then applied during the hydraulic phase of this countywide update to develop peak water surface elevations for the selected frequency events.

Finally, levee ponding areas were developed by the City of Hutchinson's consultants for the ponding areas on the dry sides of the levee. These were completed as part of the levee certification project or subsequent to the levee certification project as required by 44 CFR 65.10. Ponding area hydraulics was completed in either the USACE's HEC-HMS program or the EPA's EPA SWMM program using PCSWMM GUI interface. SCS rainfall-runoff hydrology methodology was used for these analyses.

Peak discharge-drainage area relationships for the 10-, 2-, 1-, and 0.2-percent-annual-chance floods of each flooding source studied in detail in the community are shown in Table 4, Summary of Discharges including those revised as part of this update.

TABLE 4 – SUMMARY OF DISCHARGES (Revised January 29, 2021)

| FLOODING SOURCE AND LOCATION | DRAINAGE AREA (sq. miles) | PEAK DISCHARGES (cfs) 10-Percent Annual-Chance | 2-Percent Annual-Chance | 1-Percent Annual-Chance | 0.2-Percent Annual-Chance |
|---|---|---|---|---|---|
| ARKANSAS RIVER | | | | | |
| At Hutchinson | 37,870 | 15,270 | 28,270 | 35,080 | 54,240 |
| COW CREEK | | | | | |
| At West 82nd Avenue | 855.0 | 12,400 | 26,400 | 34,200 | 57,100 |
| Approx. 2400 feet upstream of Pennington Road | N/A | 12,400 | 26,400 | 33,914 | 57,100 |
| Approx. 2600 feet downstream of Pennington Road | N/A | 12,400 | 26,400 | 33,580 | 57,100 |
| COW CREEK (OLD CHANNEL) | | | | | |
| At S Main Street | 1.0 | 750 | 1,095 | 1,225 | 2,380 |
| Just upstream of K-61 | 4.8[1] | 1,620 | 1,951 | 2,074 | 2,380 |
| Approx. 1800 feet upstream of S Halstead Street | 7.7[1] | 1,251 | 1,691 | 1,840[1] | 2,225 |
| GVI DRAINAGE DITCH | | | | | |
| Approx. 1100 feet downstream of E Blanchard Avenue | 24.1 | 3,175 | 4,838 | 5,298 | 6,540 |
| Approx. 1200 feet downstream of E Illinois Avenue | 31.9 | 3,489 | 5,251 | 5,749 | 7,095 |
| HARSHA CANAL | | | | | |
| Approx. 800 feet downstream of Hendricks Street | 0.4 | 153 | 234 | 265 | 336 |
| Approx. 1000 feet downstream of Hendricks Street | 0.6 | 302 | 462 | 522 | 663 |
| Approx. 450 feet downstream of W 11th Avenue | 5.4 | 652 | 1,021 | 1,159 | 1,477 |
| At W 5th Avenue | 6.7 | 677 | 1,024 | 1,159 | 1,477 |
| At confluence with Arkansas River | 6.9 | 688 | 1,024 | 1,159 | 1,477 |

[1]Drainage Area and/or discharge is affected by inter-basin diversions or floodplain attenuation.

**e. Hydraulic Analysis**

For this study update Wood performed new detailed hydraulic analyses for portions of the Arkansas River, Cow Creek, Cow Creek Old Channel, Harsha Canal and portions of the GVI Drainage Ditch. Water surface elevations were computed for select frequency events using the USACE step-backwater program HEC-RAS (version 4.0) (Reference 9). In addition, a 1D/2D HEC-RAS unsteady-state model (version 5.0.5) was developed for portions of Cow Creek Old Channel from South Main Street to the Railroad structure just downstream of South Maple Street. No new hydraulic analyses were performed on any other study areas within the county.

Cross section geometry was developed using GIS processes to extract station and elevation data from 2010 LiDAR. In addition, structure and channel geometry was derived from field surveys. Manning's "n" values were determined from aerial photography and field investigations. The starting water surface elevations were based on normal depth methods. For Cow Creek Old Channel, the 1D/2D unsteady-state HEC-RAS model was validated against information provided by the City of Hutchinson including flood photos taken at Avenue B from the May 23, 2007 event.

There are several levee systems that were certified by the City of Hutchinson's engineering consultant in parallel to this restudy project. These levees protect a portion of Reno County, the City of Hutchinson, the City of South Hutchinson and the City of Willowbrook. Upon completion of the certification project, FEMA fully accredited these levees for the purpose of this mapping update. For the purpose of this study, the USACE levee systems currently in the USACE's PL 84-99 levee program were recognized as accredited for the detailed analysis of the Arkansas River, Cow Creek, Cow Creek Old Channel, Harsha Canal, and the GVI Drainage Ditch. Note that an upper portion of the Harsha Canal levee system and the Yoder Drainage District's levees along the Arkansas River downstream of the USACE designed and constructed levee systems continue to be shown on the mapping as de-accredited as they were in the previous FIS.

For the detailed analysis of Cow Creek, attenuated flows of the May 2007 storm were computed during the hydrologic phase and were used to compute a peak water surface elevation at USGS Gage 07143310. These computed water surface elevations were calibrated to the accompanying measured gage flood elevation for the May 2007 event at USGS gage 07143310. The computed calibrated elevation was within 0.01-foot of the gage flood elevation (See Table 5). Also, various observed flood remarks were provided by the City of Hutchinson to further verify computed water surface elevations downstream throughout the study area.

**Table 5: May 2007 Calibration Comparison**

| Source | Water Surface Elevation (FT NAVD88) |
|---|---|
| Wood HEC-RAS | 1575.39 |
| USGS 07143310 Peak Gage Height | 1575.38 |

Levee ponding areas were developed by the City of Hutchinson's consultants for the ponding areas on the dry sides of the levee. These were completed as part of the levee certification project or subsequent to the levee certification project as required by 44 CFR 65.10. Ponding area hydraulics was completed in either the USACE's HEC-HMS program or the EPA's EPA SWMM program using a PCSWMM GUI interface. Static elevations, or in a few cases sloped water surface elevations, were computed using either the HEC-HMS or EPA SWMM software.

## Appendix A

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

**Figure 2: FIRM Notes to Users**

# NOTES TO USERS

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

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

For community and countywide map dates, refer to Section 10.0 in this FIS Report.

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

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

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

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

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

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

PROJECTION INFORMATION: The projection used in the preparation of the map was UTM Zone 14. The horizontal datum was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

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

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Appendix A of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by USDA Farm Service Agency, National Agriculture Imagery Program (NAIP), at a scale of 1:12,000 dated 2019. For information about base maps, refer to Section 1.2 in this FIS Report.

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

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

## NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Reno County, Kansas, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Section 10.0 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

## SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Reno County, Kansas, effective January 29, 2021.

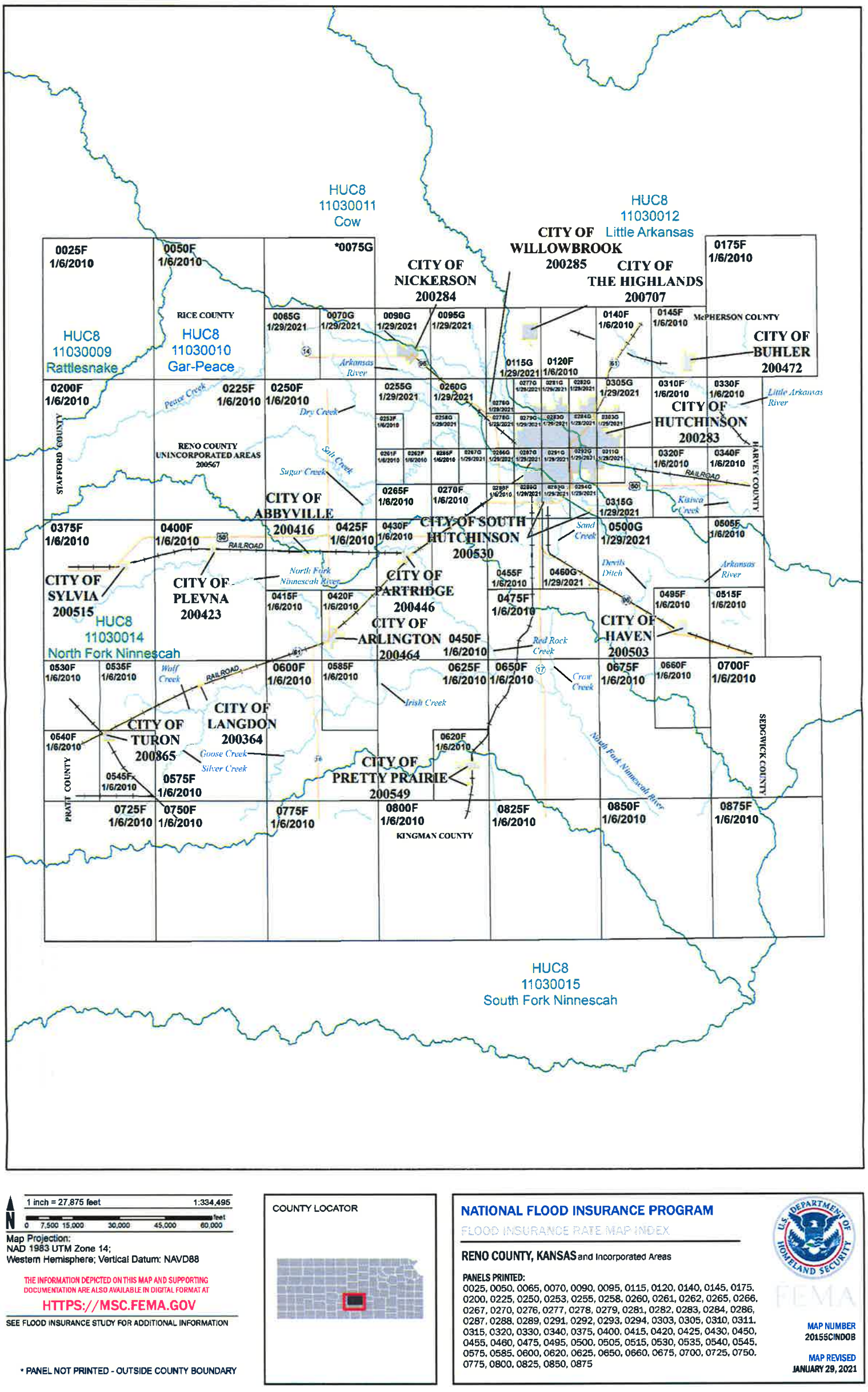
ACCREDITED LEVEE: Check with your local community to obtain more information, such as the estimated level of protection provided (which may exceed the 1-percent-annual-chance level) and Emergency Action Plan, on the levee system(s) shown as providing protection for areas on this panel. To mitigate flood risk in residual risk areas, property owners and residents

are encouraged to consider flood insurance and floodproofing or other protective measures. For more information on flood insurance, interested parties should visit www.fema.gov/national-flood-insurance-program.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

The FIRM Index in Figure 3 shows the overall FIRM panel layout within Reno County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, flooding sources, watershed boundaries, and United States Geological Survey (USGS) Hydrologic Unit Code – 8 (HUC-8) codes.

**Figure 3: FIRM Panel Index**




1 inch = 27,875 feet 1:334,495

0 7,500 15,000 30,000 45,000 60,000 feet

Map Projection:
NAD 1983 UTM Zone 14;
Western Hemisphere; Vertical Datum: NAVD88

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTPS://MSC.FEMA.GOV

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - OUTSIDE COUNTY BOUNDARY

COUNTY LOCATOR



**NATIONAL FLOOD INSURANCE PROGRAM**

FLOOD INSURANCE RATE MAP INDEX

**RENO COUNTY, KANSAS** and Incorporated Areas

**PANELS PRINTED:**
0025, 0050, 0065, 0070, 0090, 0095, 0115, 0120, 0140, 0145, 0175, 0200, 0225, 0250, 0253, 0255, 0258, 0260, 0261, 0262, 0265, 0266, 0267, 0270, 0276, 0277, 0278, 0279, 0281, 0282, 0283, 0284, 0286, 0287, 0288, 0289, 0291, 0292, 0293, 0294, 0303, 0305, 0310, 0311, 0315, 0320, 0330, 0340, 0375, 0400, 0415, 0420, 0425, 0430, 0450, 0455, 0460, 0475, 0495, 0500, 0505, 0515, 0530, 0535, 0540, 0545, 0575, 0585, 0600, 0620, 0625, 0650, 0660, 0675, 0700, 0725, 0750, 0775, 0800, 0825, 0850, 0875

MAP NUMBER
20155CIND0B

MAP REVISED
JANUARY 29, 2021

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 4 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Reno County.

**Figure 4: Map Legend for FIRM**

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

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

**Figure 4: Map Legend for FIRM (Continued)**

| | |
|---|---|
| | Non-encroachment zone (see Section 2.4 of this FIS Report for more information) |
| FLOOD INSURANCE IS NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER APRIL 8, 1987, IN THE DESIGNATED COLORADO RIVER FLOODWAY | The Colorado River Floodway was established by Congress in the Colorado River Floodway Protection Act of 1986, Public Law 99-450 (100 Statute 1129). The Act imposes certain restrictions within the Floodway. |
| **OTHER AREAS OF FLOOD HAZARD** | |
| | Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile. |
| | Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone. |
| | Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information. |
| **OTHER AREAS** | |
| | Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible. |
| NO SCREEN | Unshaded Zone X: Areas of minimal flood hazard. |
| **FLOOD HAZARD AND OTHER BOUNDARY LINES** | |
| (ortho) (vector) | Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping) |
| | Limit of Study |
| | Jurisdiction Boundary |
| | Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet |

**Figure 4: Map Legend for FIRM (Continued)**

| | |
|---|---|
| **GENERAL STRUCTURES** | |
| *Aqueduct*<br>*Channel*<br>*Culvert*<br>*Storm Sewer* | Channel, Culvert, Aqueduct, or Storm Sewer |
| *Dam*<br>*Jetty*<br>*Weir* | Dam, Jetty, Weir |
| | Levee, Dike, or Floodwall |
| *Bridge* | Bridge |
| **REFERENCE MARKERS** | |
| 22.0 | River mile Markers |
| **CROSS SECTION & TRANSECT INFORMATION** | |
| B 20.2 | Lettered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 5280 21.1 | Numbered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 17.5 | Unlettered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 8 | Coastal Transect |
| | Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation. |
| | Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping. |
| 513 | Base Flood Elevation Line |
| **ZONE AE (EL 16)** | Static Base Flood Elevation value (shown under zone label) |
| **ZONE AO (DEPTH 2)** | Zone designation with Depth |
| **ZONE AO (DEPTH 2) (VEL 15 FPS)** | Zone designation with Depth and Velocity |

**Figure 4: Map Legend for FIRM (Continued)**

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

**Table 6: Listing of NFIP Jurisdictions**

| Community | CID | HUC-8 Sub-Basin(s) | Located on FIRM Panel(s) | If Not Included, Location of Flood Hazard Data |
|---|---|---|---|---|
| Abbyville, City of[1] | 200416 | 11030010, 11030014 | 20155C0425F | |
| Arlington, City of | 200464 | 11030014 | 20155C0415F, 20155C0420F | |
| Buhler, City of | 200472 | 11030012 | 20155C0145F | |
| Haven, City of | 200503 | 11030010 | 20155C0495F | |
| The Highlands, City of[1] | 200707 | 11030012 | 20155C0115G | |
| Hutchinson, City of | 200283 | 11030010, 11030011, 11030012, 11030015 | 20155C0277G, 20155C0279G, 20155C0281G, 20155C0282G, 20155C0283G, 20155C0284G, 20155C0287G, 20155C0291G, 20155C0292G, 20155C0293G, 20155C0294G, 20155C0303G, 20155C0305G, 20155C0311G | |
| Langdon, City of[1] | 200364 | 11030014 | 20155C0575F | |
| Nickerson, City of | 200284 | 11030010, 11030011 | 20155C0090G | |
| Partridge, City of[1] | 200446 | 11030014 | 20155C0430F | |
| Plevna, City of[1] | 200423 | 11030014 | 20155C0400F | |
| Pretty Prairie, City of | 200549 | 11030015 | 20155C0620F | |

**Table 6: Listing of NFIP Jurisdictions (Continued)**

| | | | | |
|---|---|---|---|---|
| Reno County Unincorporated Areas | 200567 | 11030009, 11030010, 11030011, 11030012, 11030014, 11030015 | 20155C0025F, 20155C0050F, 20155C0065G, 20155C0070G 20155C0075G[2], 20155C0090G, 20155C0095G, 20155C0115G, 20155C0120F, 20155C0140F, 20155C0145F, 20155C0175F, 20155C0200F, 20155C0225F, 20155C0250F, 20155C0253F, 20155C0255G, 20155C0258G, 20155C0260G, 20155C0261F, 20155C0262F, 20155C0265F, 20155C0266F, 20155C0267G, 20155C0270F, 20155C0276G, 20155C0277G, 20155C0278G, 20155C0279G, 20155C0281G, 20155C0282G, 20155C0283G, 20155C0284G, 20155C0286G, 20155C0287G, 20155C0288F, 20155C0289G, 20155C0291G, 20155C0292G, 20155C0293G, 20155C0294G, 20155C0303G, 20155C0305G, 20155C0310F, 20155C0311G, 20155C0315G, 20155C0320F, 20155C0330F, 20155C0340F, 20155C0375F, 20155C0400F, 20155C0415F, 20155C0420F, | |

| | | | | |
|---|---|---|---|---|
| Reno County (continued) | 200567 | 11030009, 11030010, 11030011, 11030012, 11030014, 11030015 | 20155C0425F, 20155C0430F, 20155C0450F, 20155C0455F, 20155C0460G, 20155C0475F, 20155C0495F, 20155C0500G, 20155C0505F, 20155C0515F, 20155C0530F, 20155C0535F, 20155C0540F, 20155C0545F, 20155C0575F, 20155C0585F, 20155C0600F, 20155C0620F, 20155C0625F, 20155C0650F, 20155C0660F, 20155C0675F, 20155C0700F, 20155C0725F, 20155C0750F, 20155C0775F, 20155C0800F, 20155C0825F, 20155C0850F, 20155C0875F | |
| South Hutchinson, City of | 200530 | 11030014 | 20155C0287G, 20155C0289G, 20155C0291G, 20155C0293G, | |
| Sylvia, City of | 200515 | 11030014 | 20155C0375F | |
| Turon, City of | 200865 | 11030014 | 20155C0535F, 20155C0545F | |
| Willowbrook, City of | 200285 | 11030011 | 20155C0276G | |

[1] No Special Flood Hazards Identified
[2] Panel Not Printed

**Table 7: Map Repositories**

| Community | Address | City | State | Zip Code |
|---|---|---|---|---|
| Abbyville, City of[1] | City Hall<br>100 North Abby Street | Abbyville | KS | 67510 |
| Arlington, City of | City Hall<br>900 West Main Street | Arlington | KS | 67514 |
| Buhler, City of | City Building<br>219 North Main Street | Buhler | KS | 67522 |
| Haven, City of | City Office<br>120 South Kansas Avenue | Haven | KS | 67543 |
| The Highlands, City of | Reno County<br>Public Works Department<br>600 Scott Blvd. | South Hutchinson | KS | 67505 |
| Hutchinson, City of | City Hall<br>125 East Avenue B | Hutchinson | KS | 67501 |
| Langdon, City of[1] | Reno County<br>Public Works Department<br>600 Scott Blvd. | South Hutchinson | KS | 67505 |
| Nickerson, City of | City Hall<br>15 North Nickerson Street | Nickerson | KS | 67561 |
| Partridge, City of[1] | Reno County<br>Public Works Department<br>600 Scott Blvd. | South Hutchinson | KS | 67505 |
| Plevna, City of[1] | City Hall<br>301 South Main Street | Plevna | KS | 67568 |
| Pretty Prairie, City of | City Hall<br>119 West Main Street | Pretty Prairie | KS | 67570 |
| Reno County | Reno County<br>Public Works Department<br>600 Scott Blvd. | South Hutchinson | KS | 67505 |
| South Hutchinson, City of | City Hall<br>2 South Main Street | South Hutchinson | KS | 67505 |
| Sylvia, City of | City Hall<br>120 South Main Street | Sylvia | KS | 67581 |
| Turon, City of | City Hall<br>501 East Price Street | Turon | KS | 67583 |
| Willowbrook, City of | Reno County<br>Public Works Department<br>600 Scott Blvd. | South Hutchinson | KS | 67505 |

[1] No Special Flood Hazard Areas Identified

# FLOOD PROFILES

# ARKANSAS RIVER (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**

**01P**

FLOOD PROFILES

ARKANSAS RIVER (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

02P

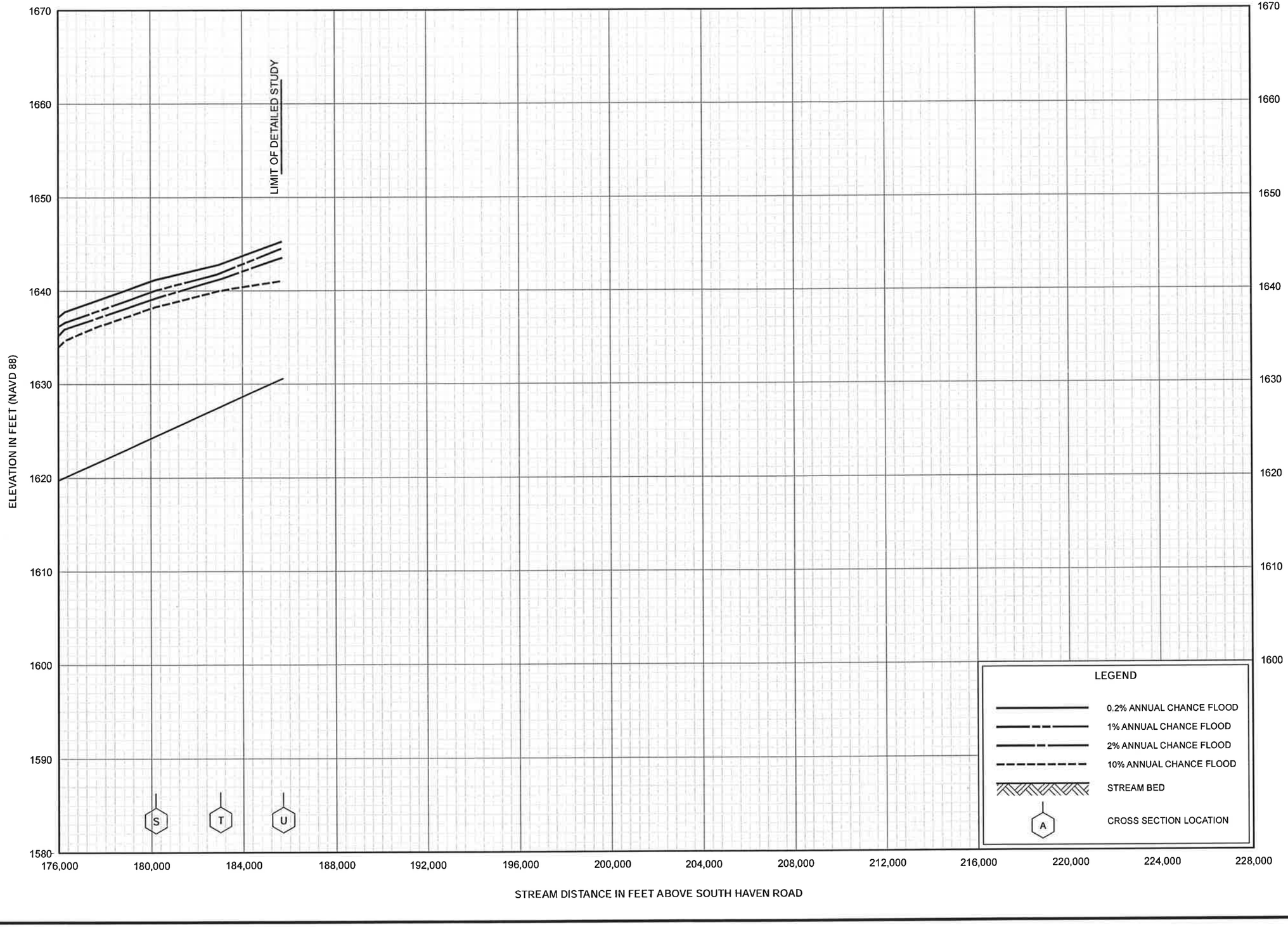
FLOOD PROFILES

ARKANSAS RIVER (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

03P




FLOOD PROFILES

ARKANSAS RIVER (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

04P

# FLOOD PROFILES

## ARKANSAS RIVER (WITHOUT RIGHT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

05P

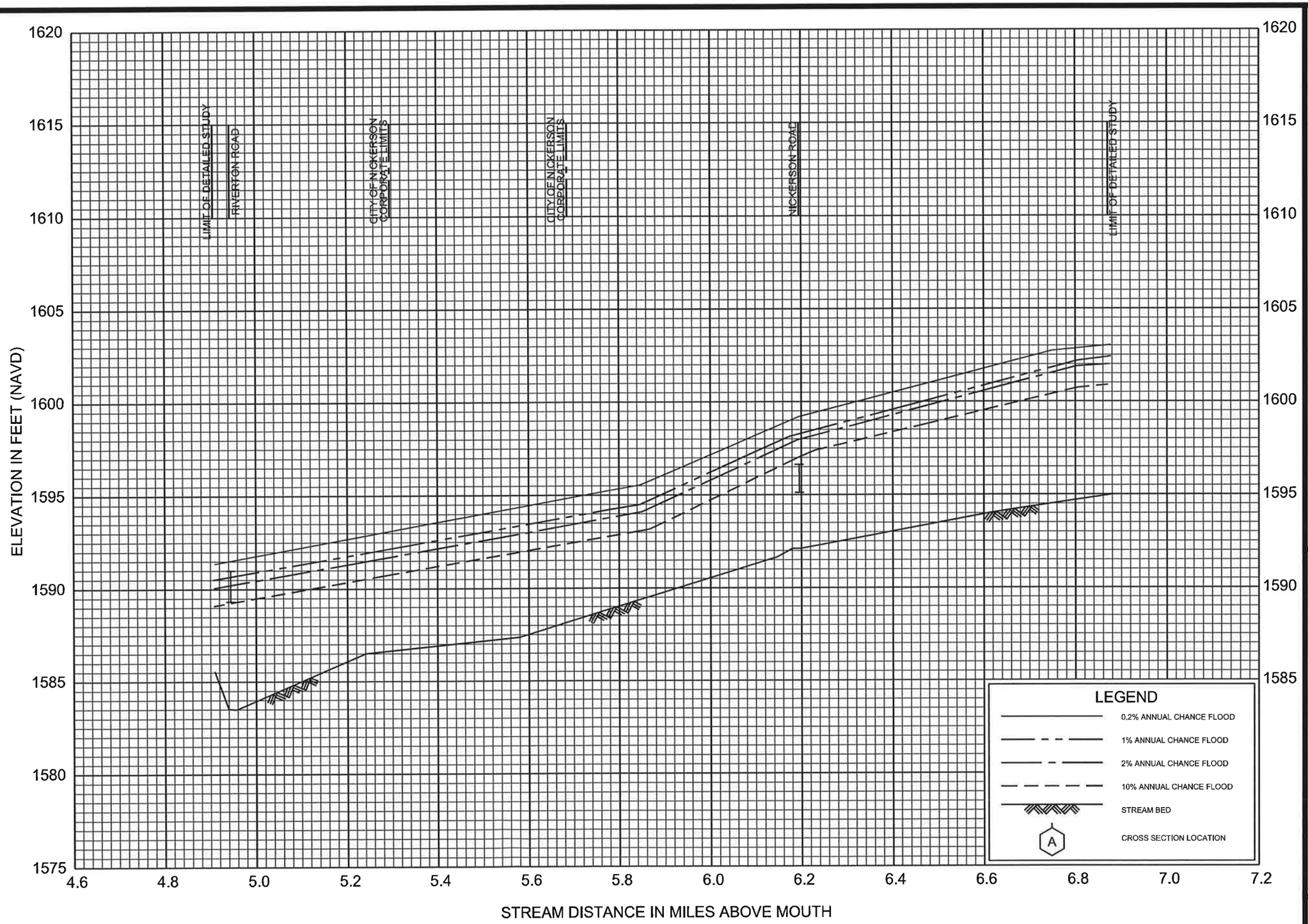
# FLOOD PROFILES

## ARKANSAS RIVER (WITHOUT LEFT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

06P




# FLOOD PROFILES

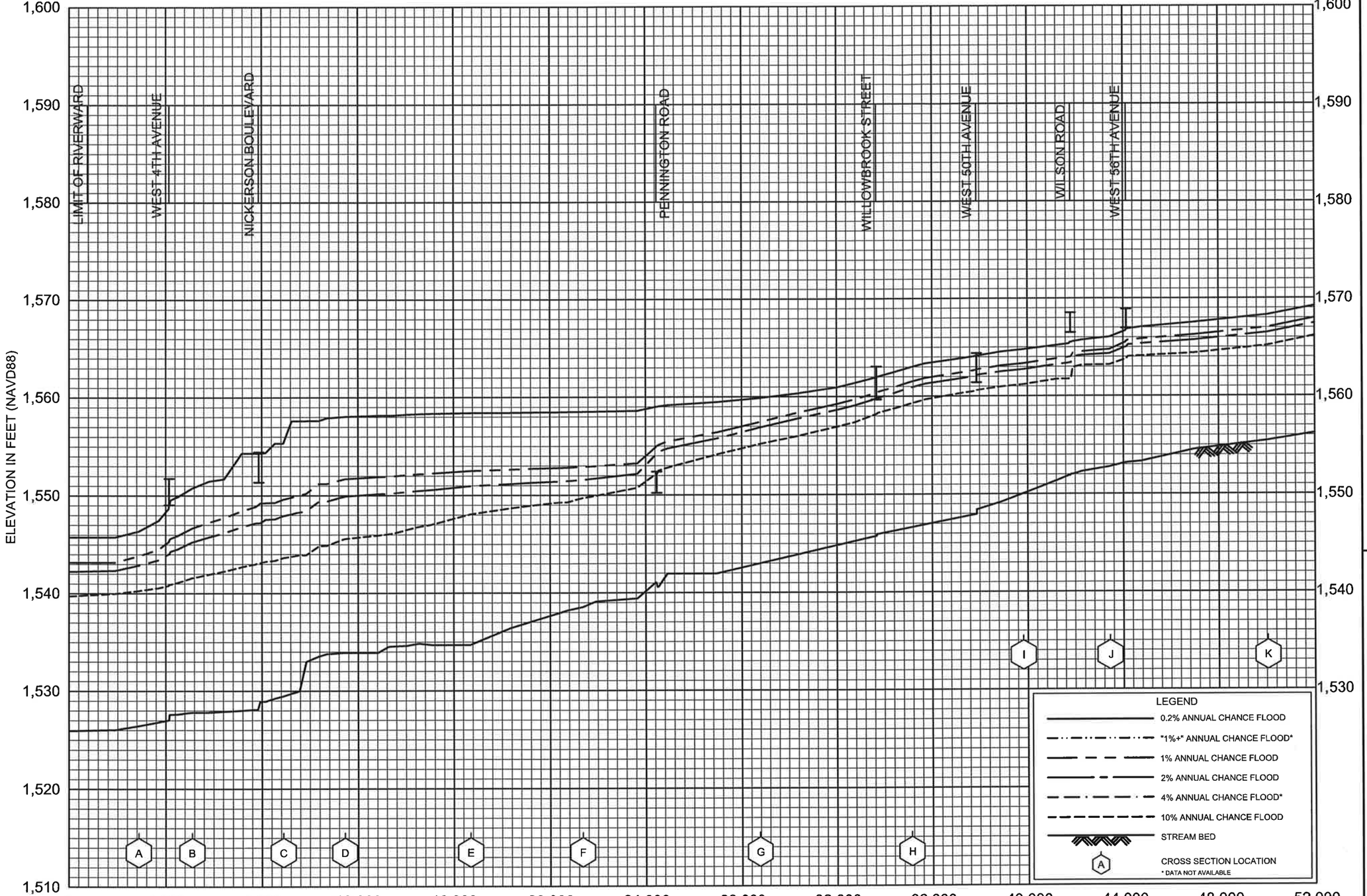
## BULL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

07P




FLOOD PROFILES

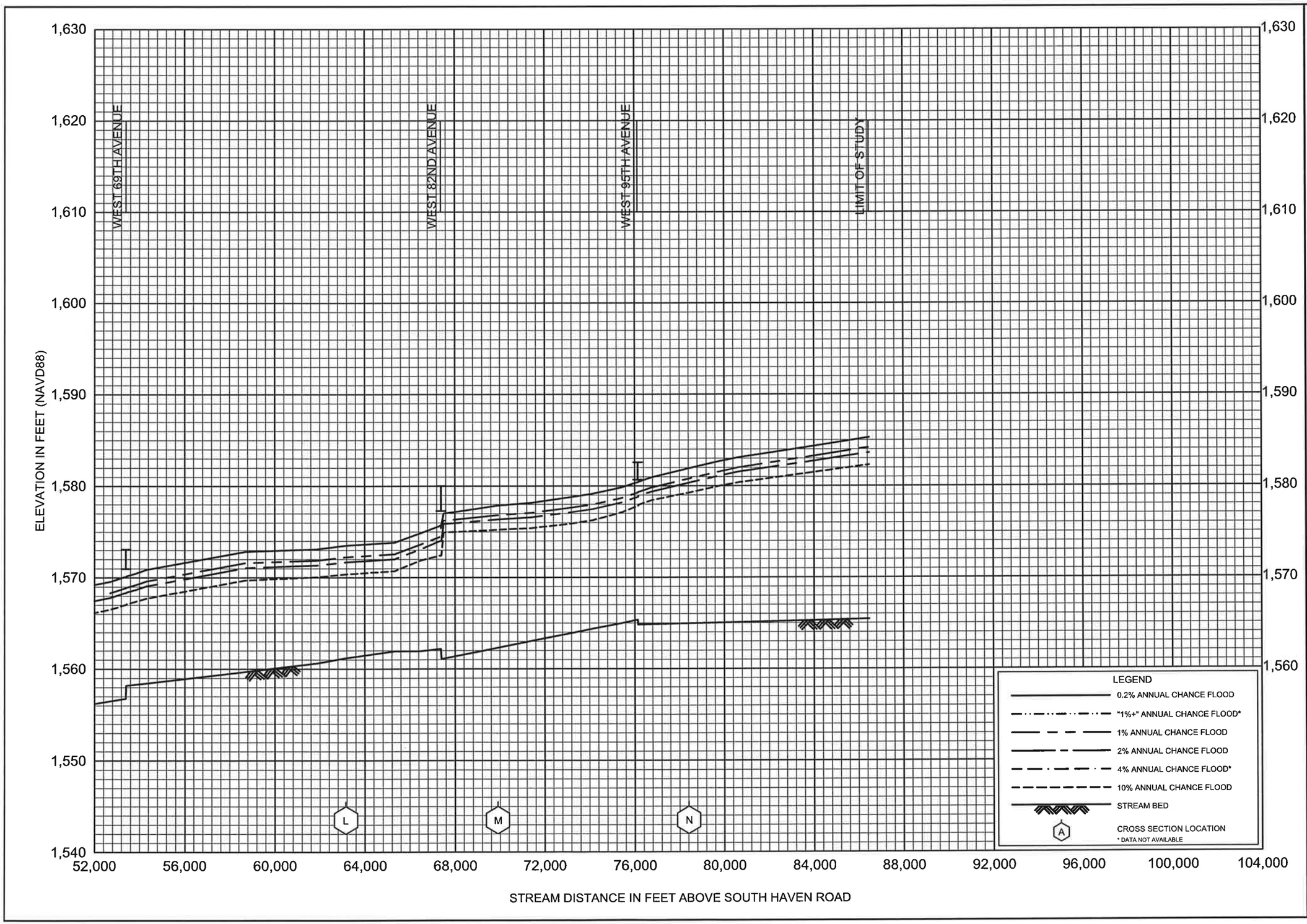
COW CREEK (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND INCORPORATED AREAS

08P




FLOOD PROFILES

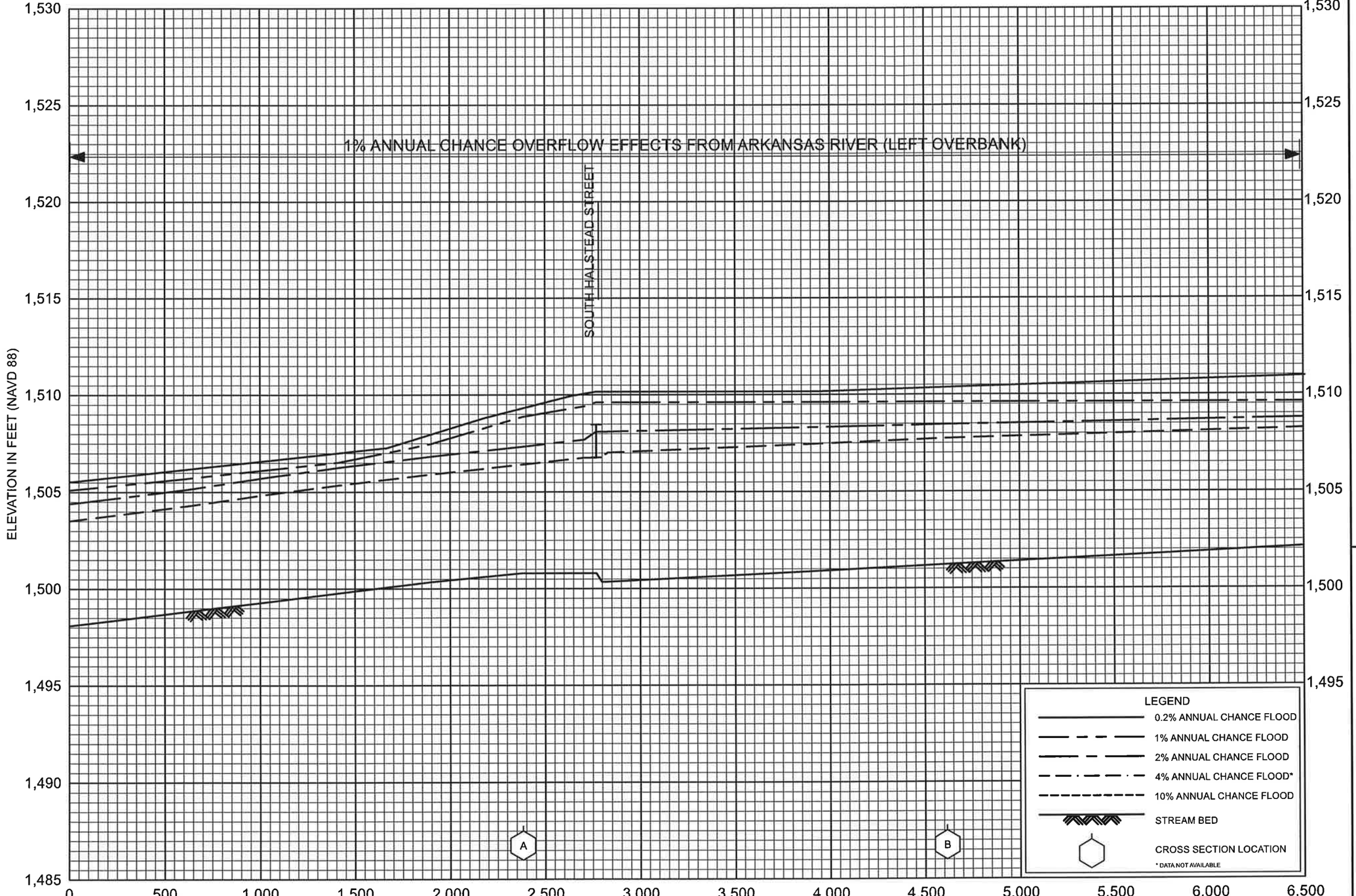
COW CREEK (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND INCORPORATED AREAS

09P




FLOOD PROFILES

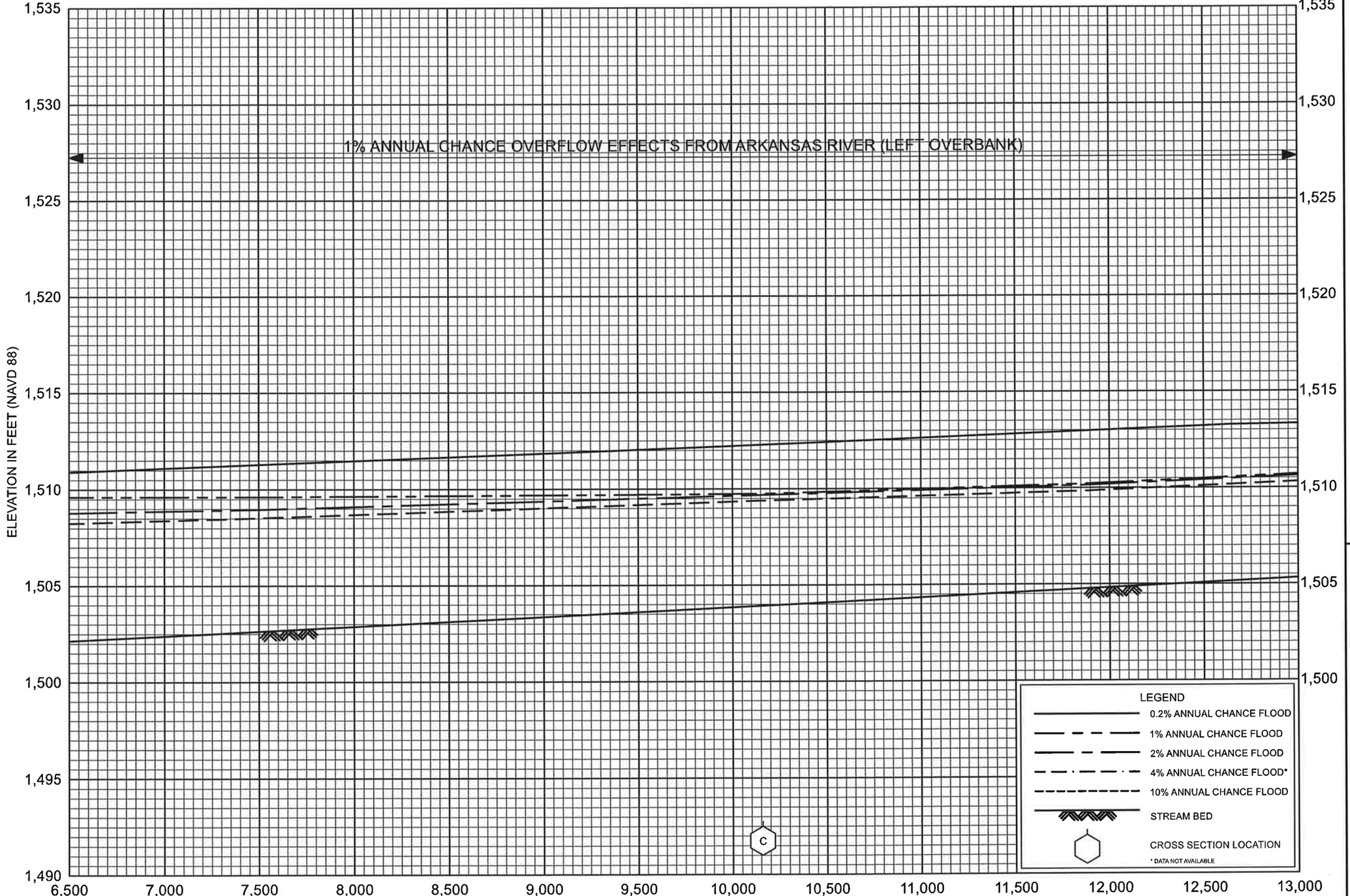
COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES

10P




FLOOD PROFILES

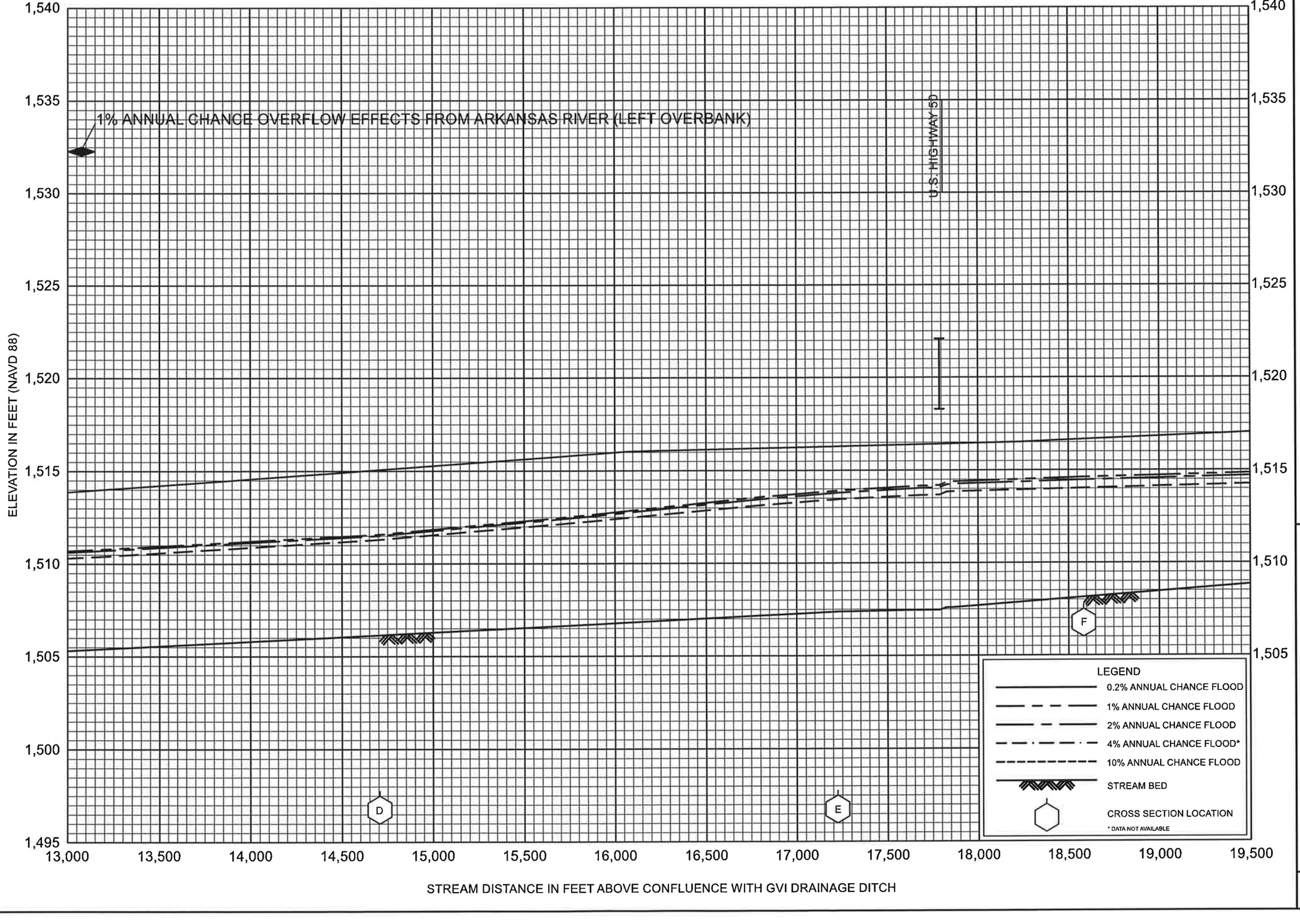
COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES

11P




FLOOD PROFILES

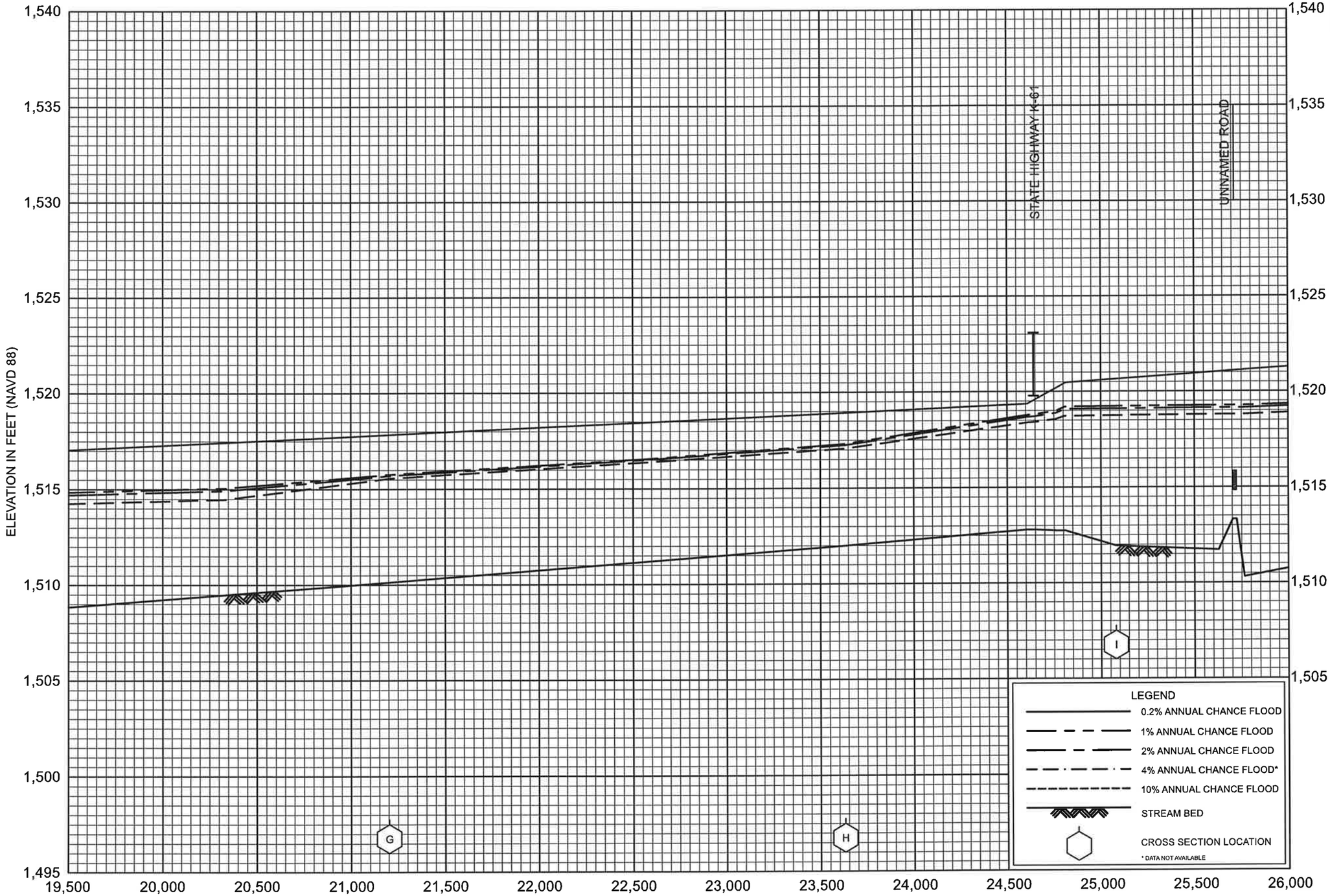
COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES

12P




FLOOD PROFILES

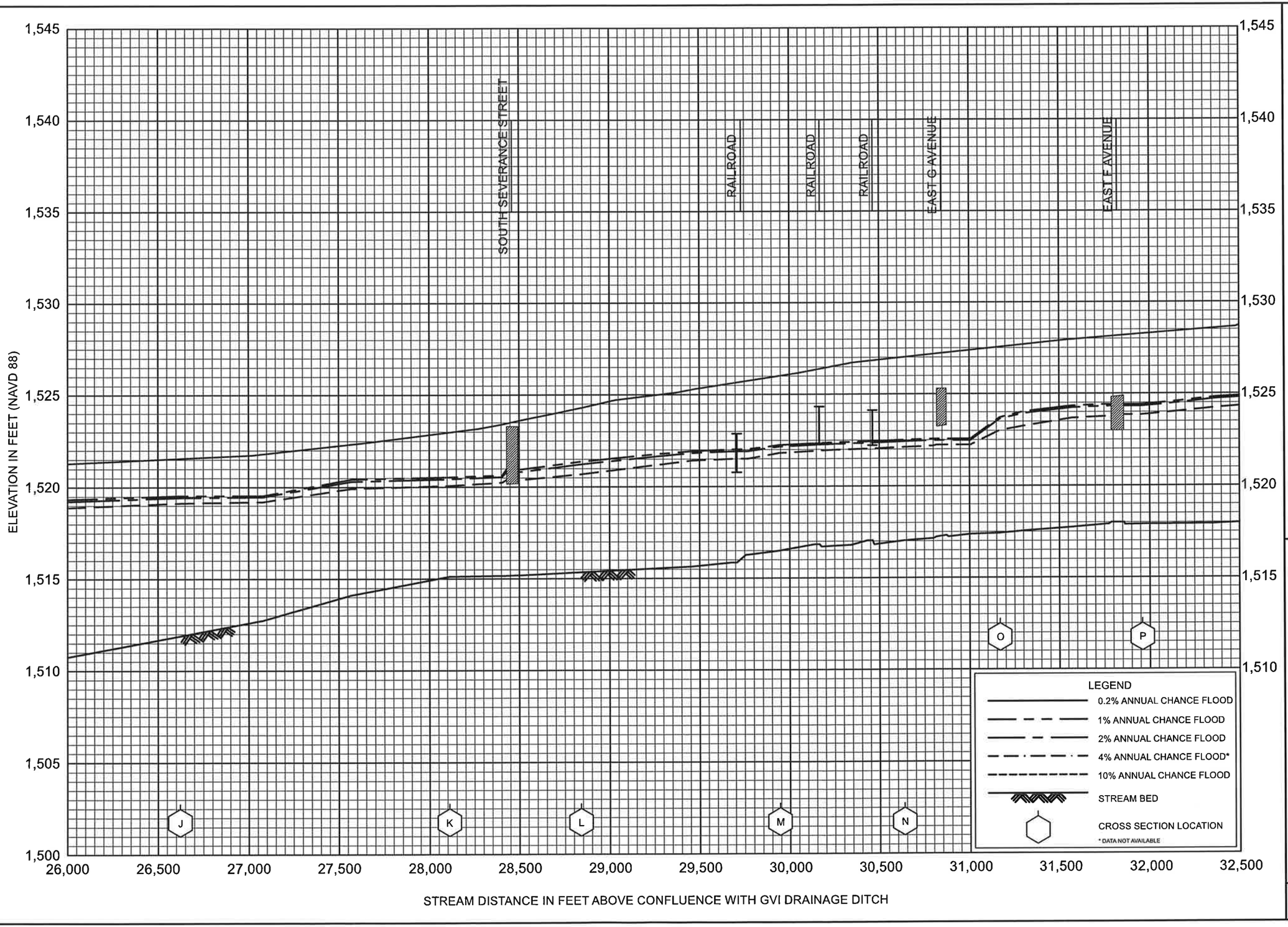
COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES

13P



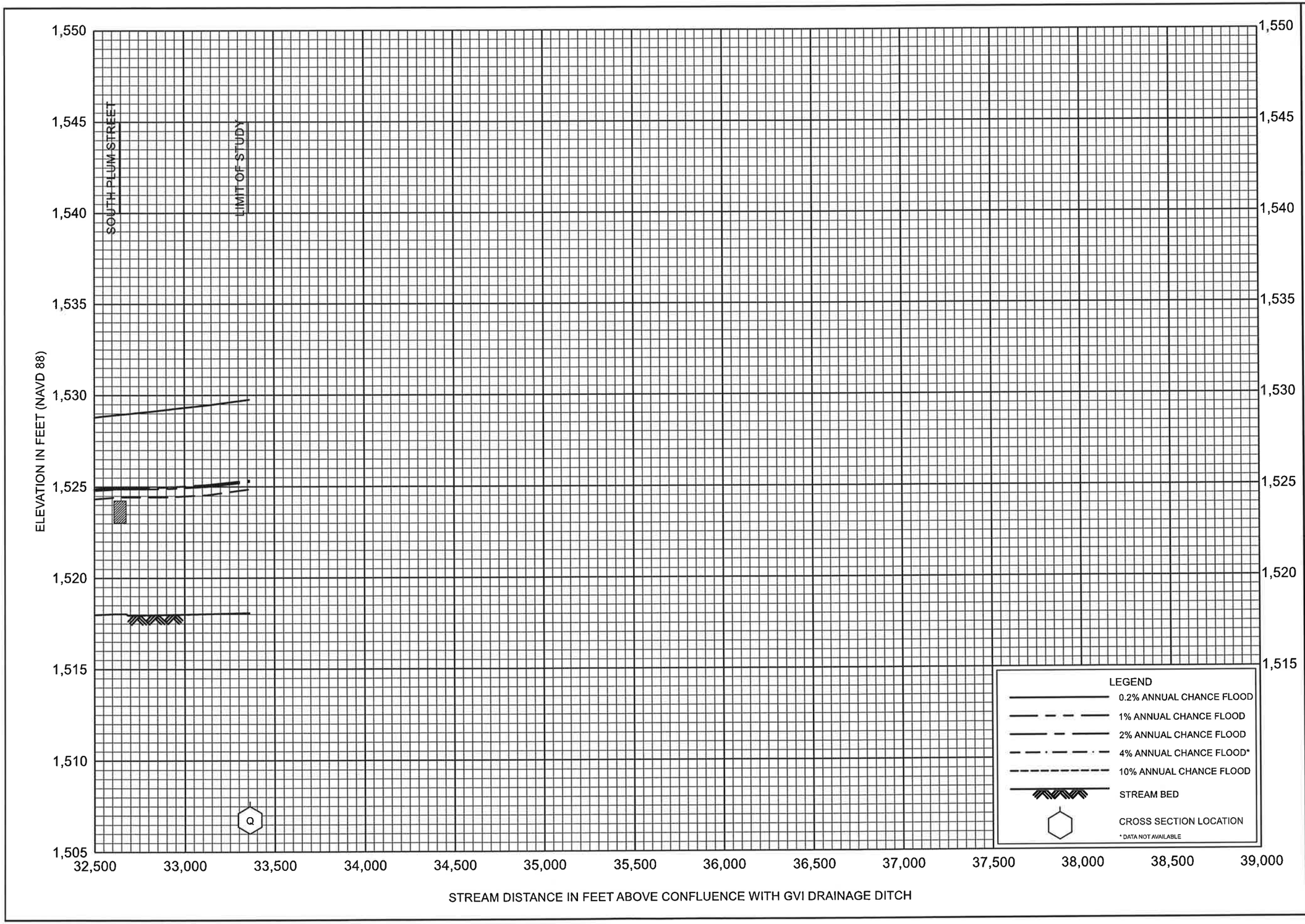

FLOOD PROFILES

COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES




FLOOD PROFILES

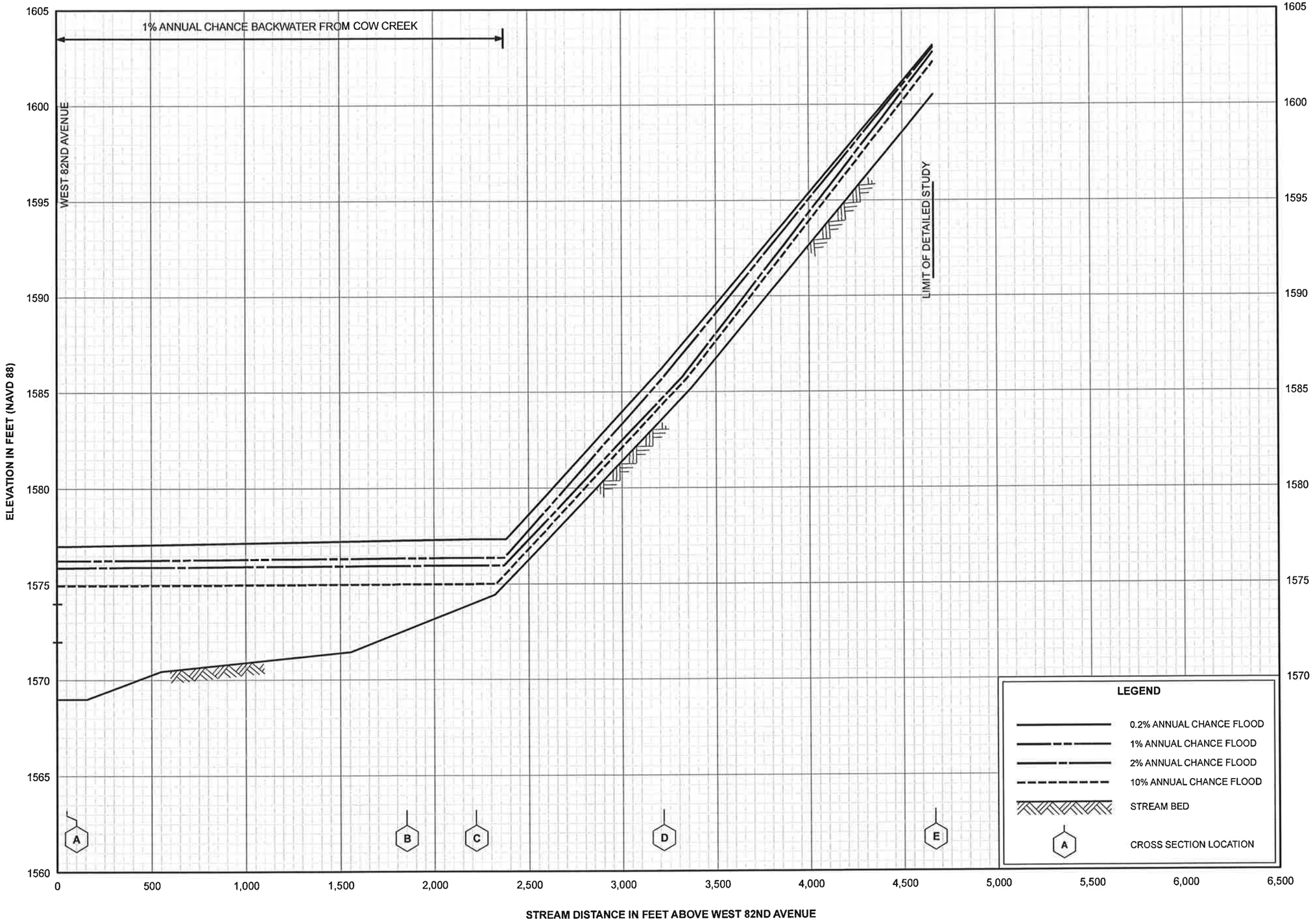
COW CREEK OLD CHANNEL

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

AND SURROUNDING COMMUNITIES

15P




FLOOD PROFILES

COW CREEK TRIBUTARY C

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

16P

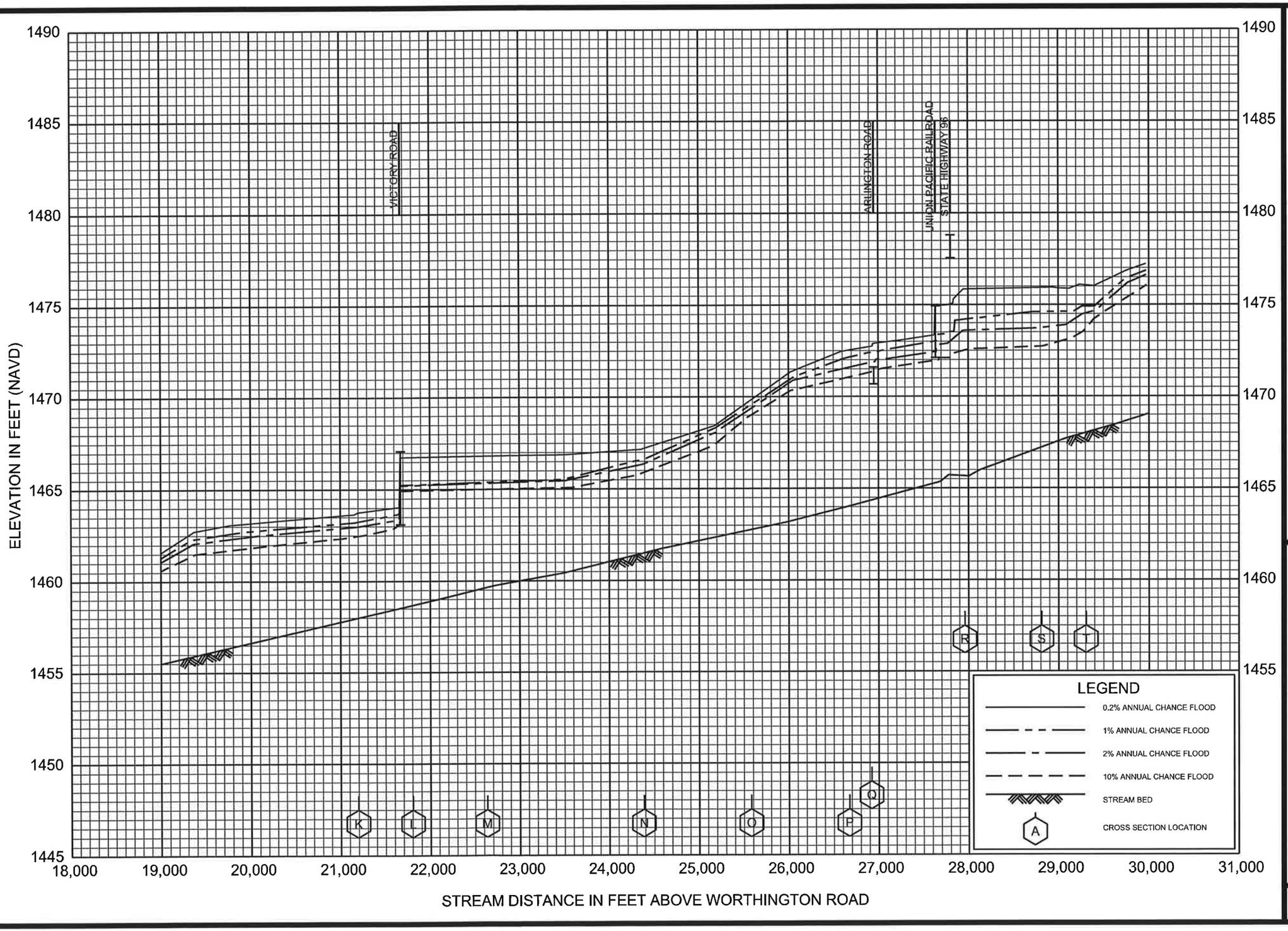
# FLOOD PROFILES

## GAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

17P




# FLOOD PROFILES

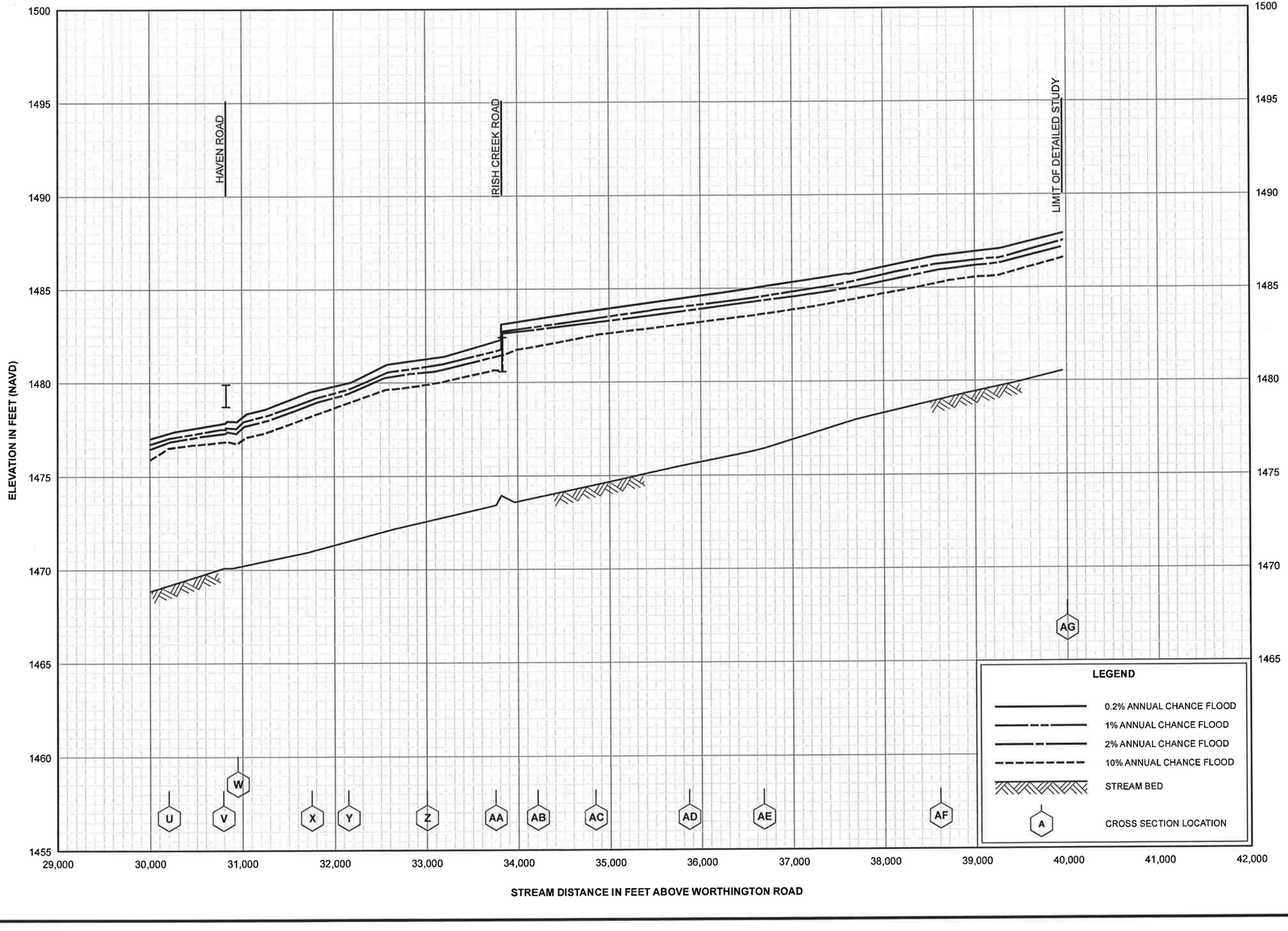
GAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

18P

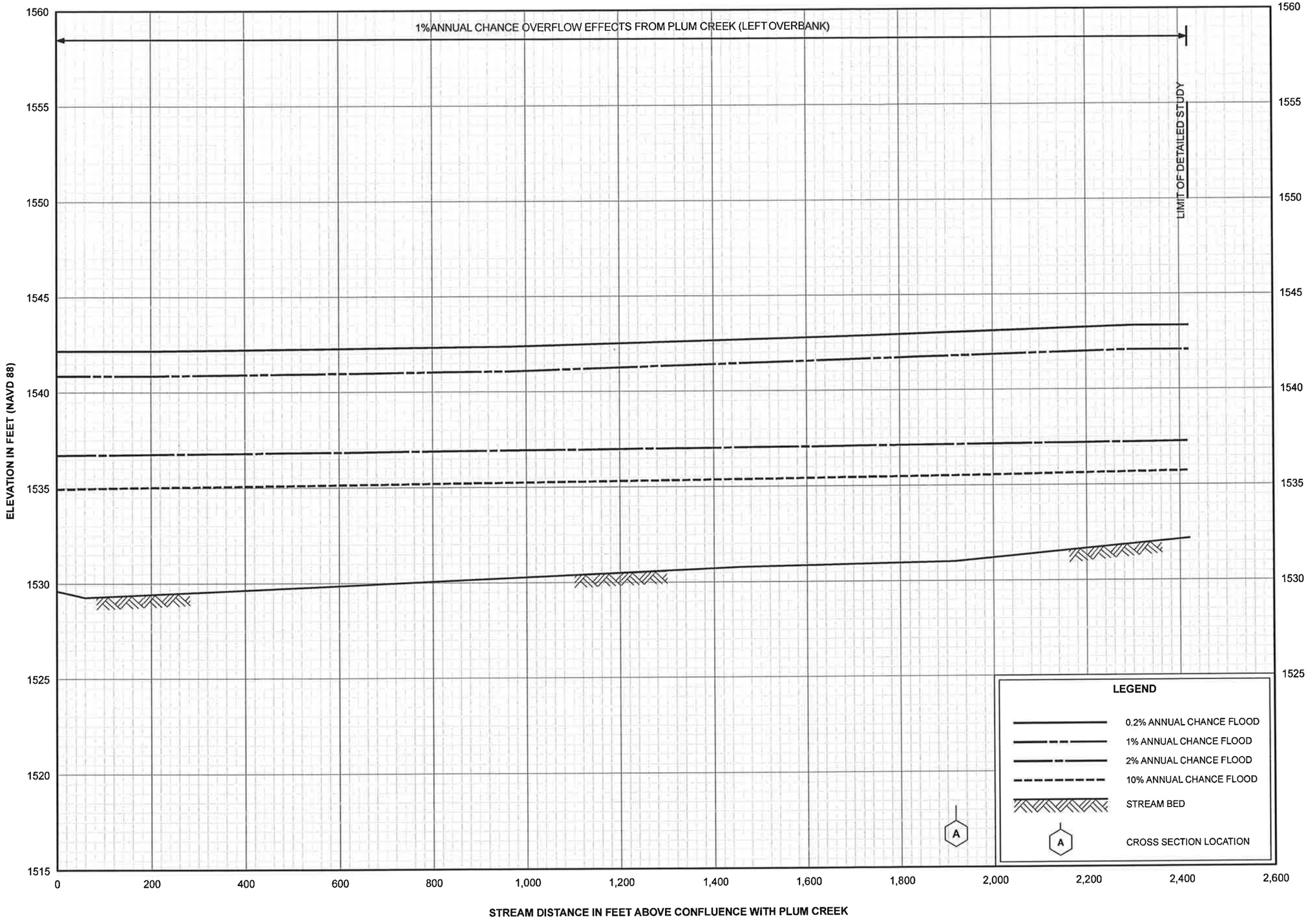



**FLOOD PROFILES**

**GAR CREEK**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

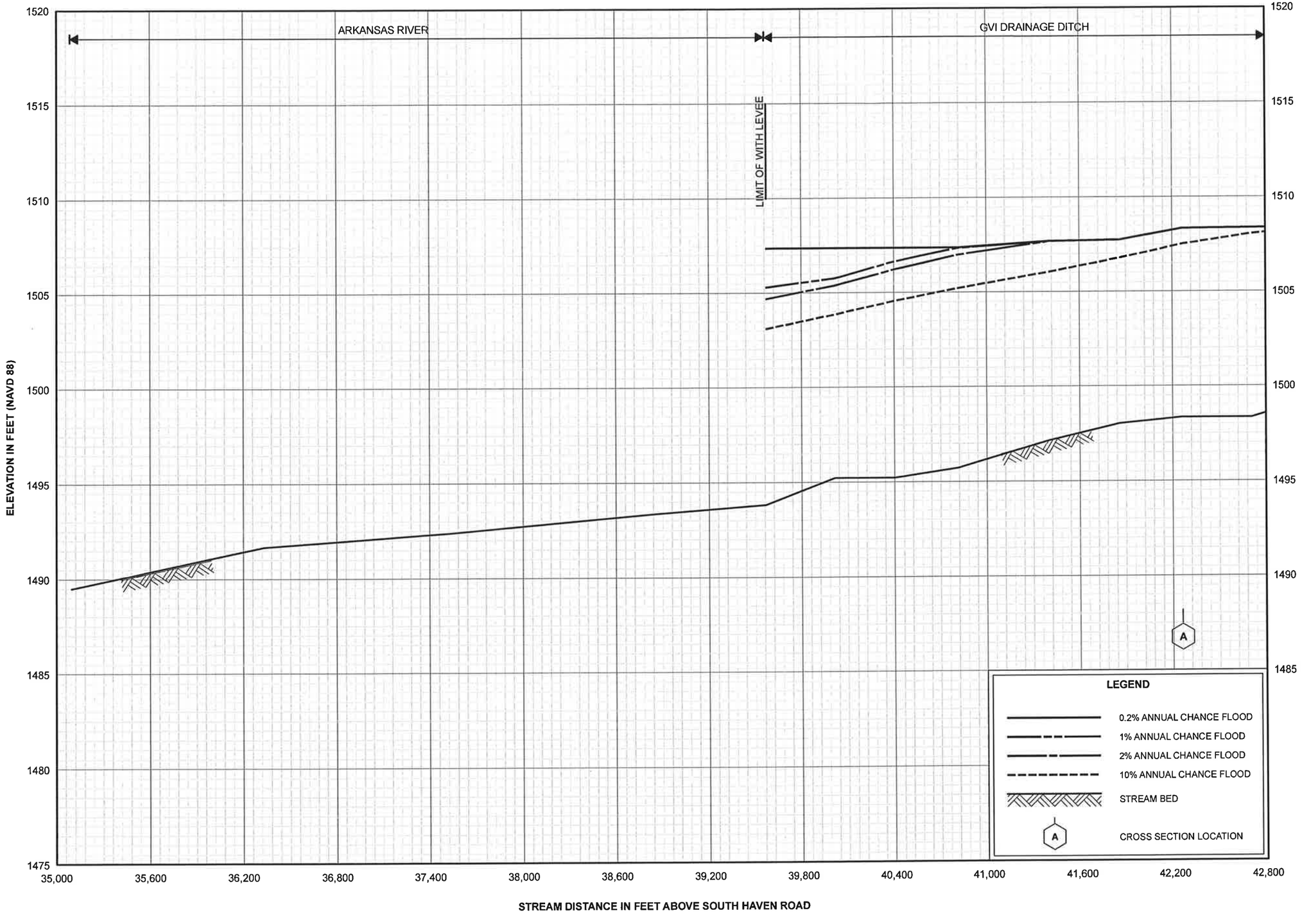



FLOOD PROFILES

GVI DRAINAGE DITCH WEST

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

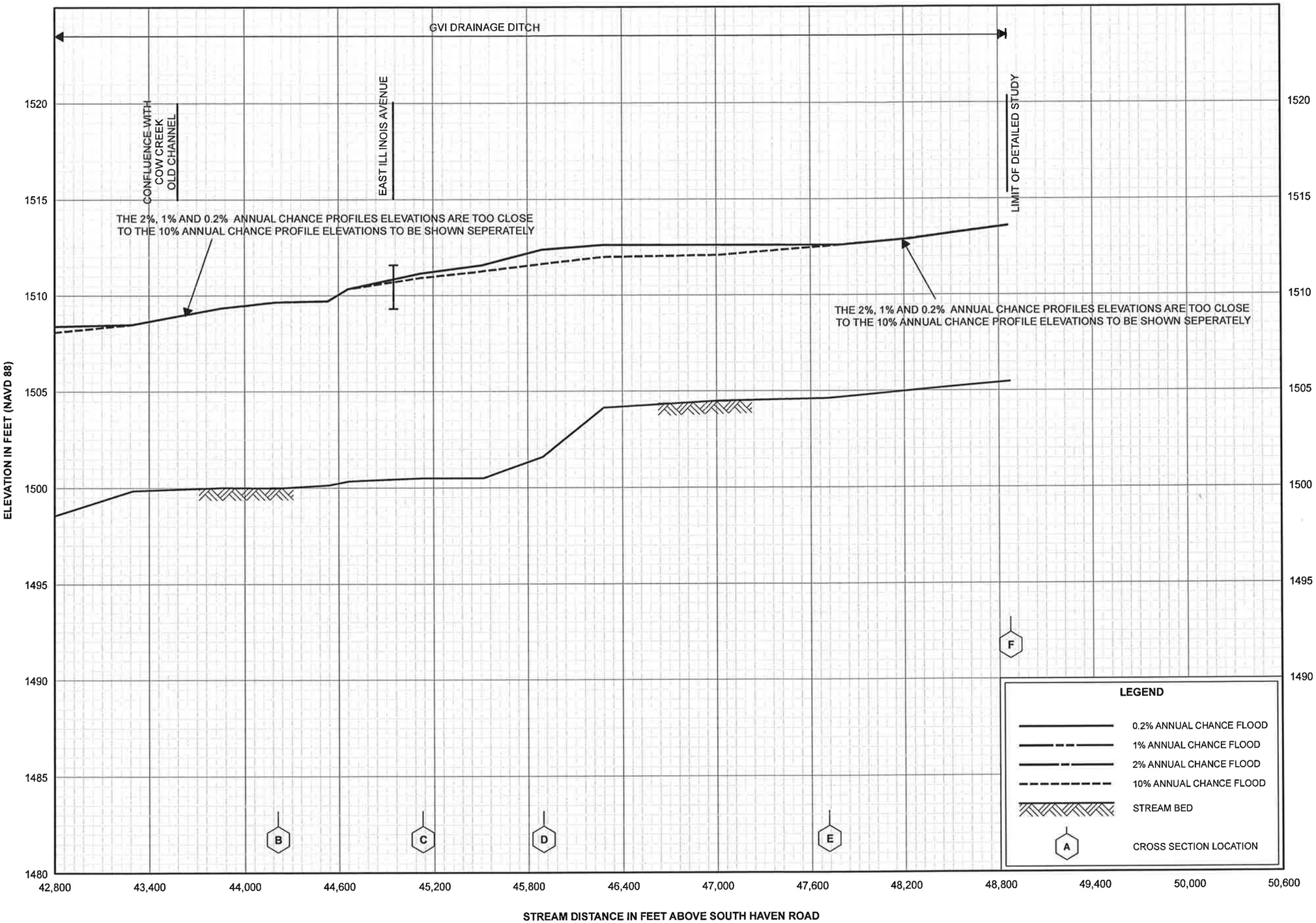



FLOOD PROFILES

GVI DRAINAGE DITCH (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

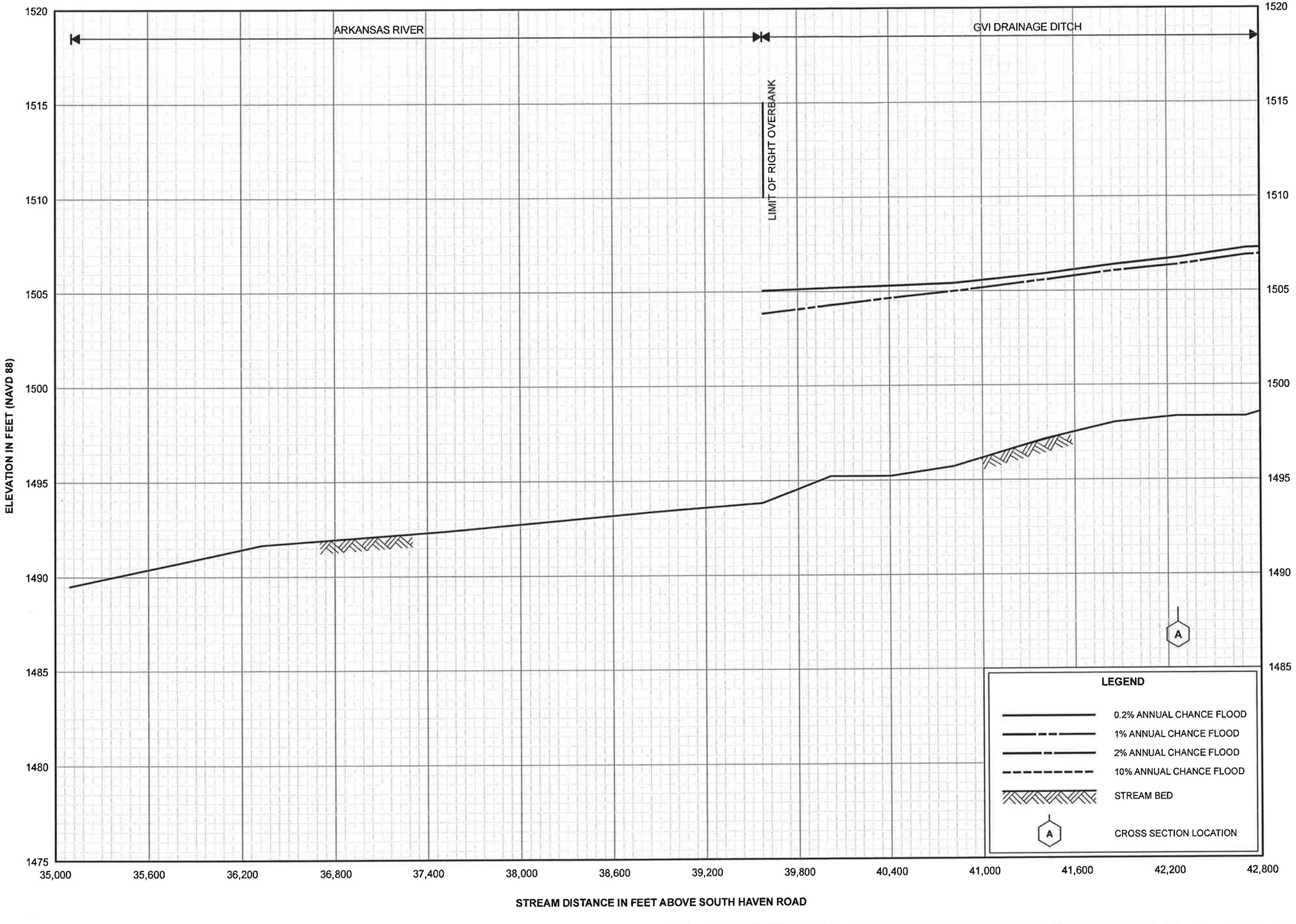



**FLOOD PROFILES**

**GVI DRAINAGE DITCH (WITH LEVEES)**

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**




FLOOD PROFILES

GVI DRAINAGE DITCH (WITHOUT RIGHT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY
AND INCORPORATED AREAS

GVI DRAINAGE DITCH

CONFLUENCE WITH COW CREEK OLD CHANNEL

EAST ILLINOIS AVENUE

THE 0.2 % AND 1% PROFILE ELEVATIONS ARE TOO CLOSE TO BE SHOWN SEPERATELY

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NAVD 88)

1525
1520
1515
1510
1505
1500
1495
1490
1485
1480

42,800 43,400 44,000 44,600 45,200 45,800 46,400 47,000 47,600 48,200 48,800 49,400 50,000 50,600

STREAM DISTANCE IN FEET ABOVE SOUTH HAVEN ROAD

B C D E F

**LEGEND**

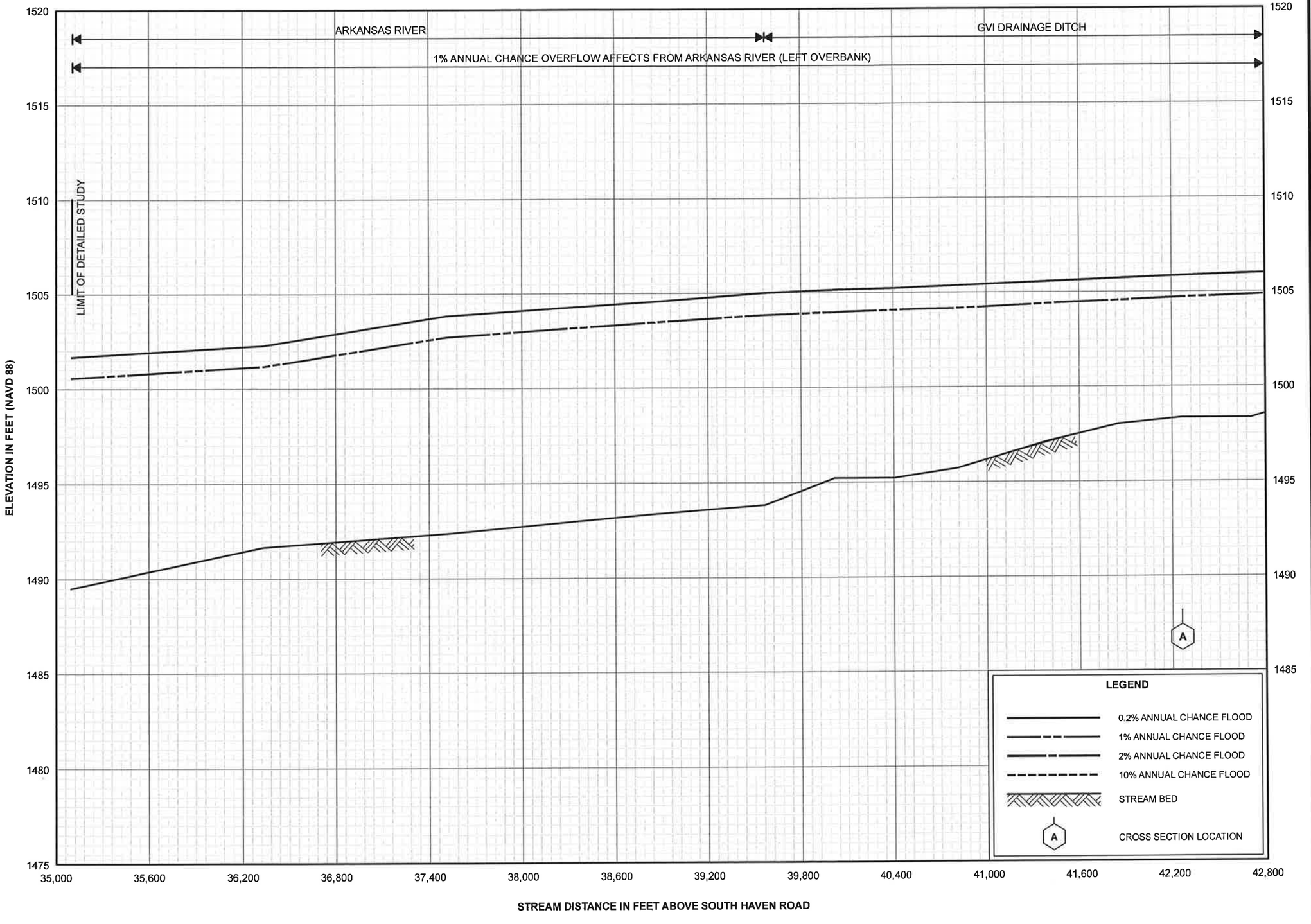
- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- STREAM BED
- A — CROSS SECTION LOCATION

# FLOOD PROFILES

## GVI DRAINAGE DITCH (WITHOUT RIGHT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY**
**AND INCORPORATED AREAS**

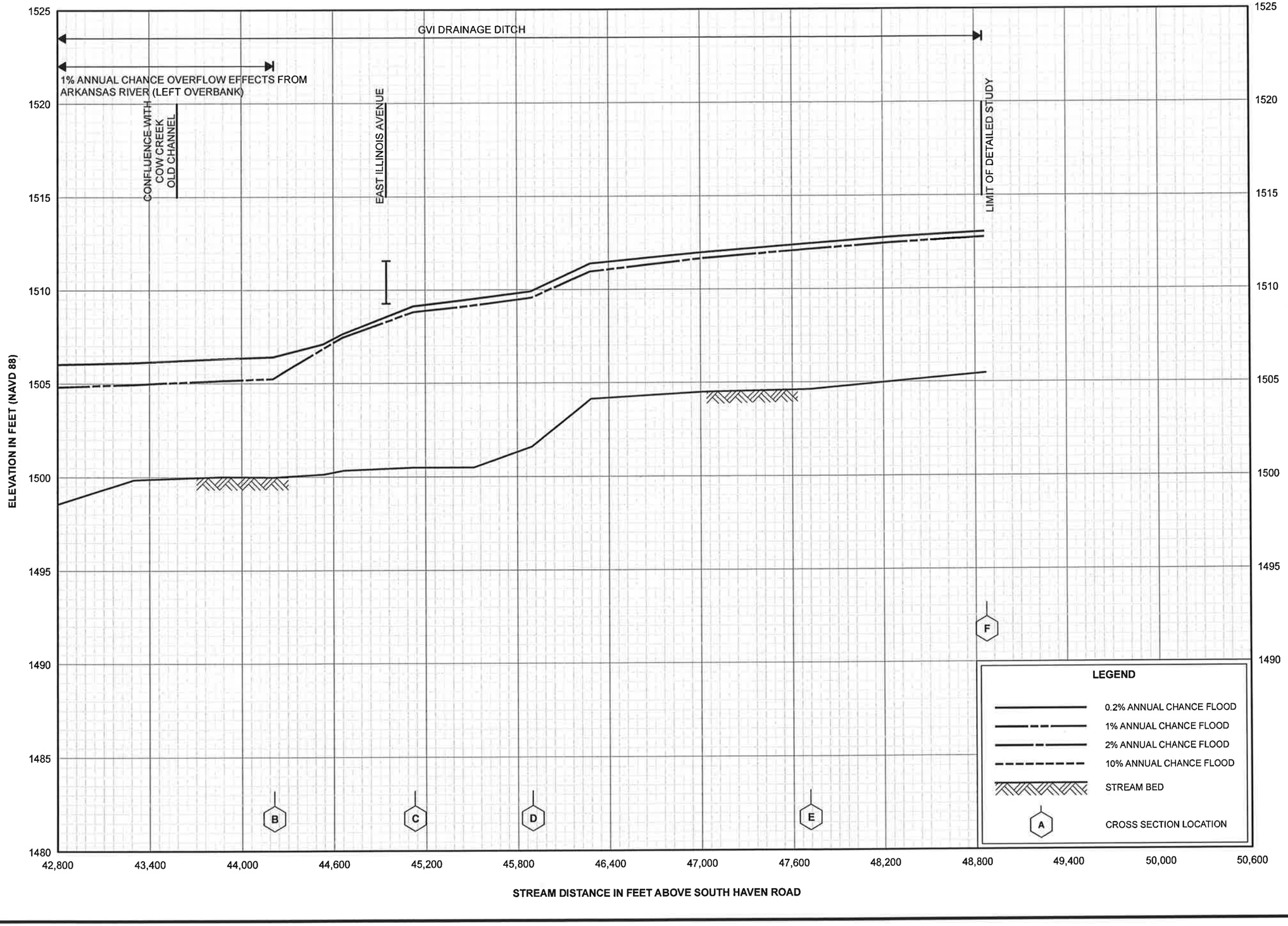



# FLOOD PROFILES

## GVI DRAINAGE DITCH (WITHOUT LEFT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY**
**AND INCORPORATED AREAS**

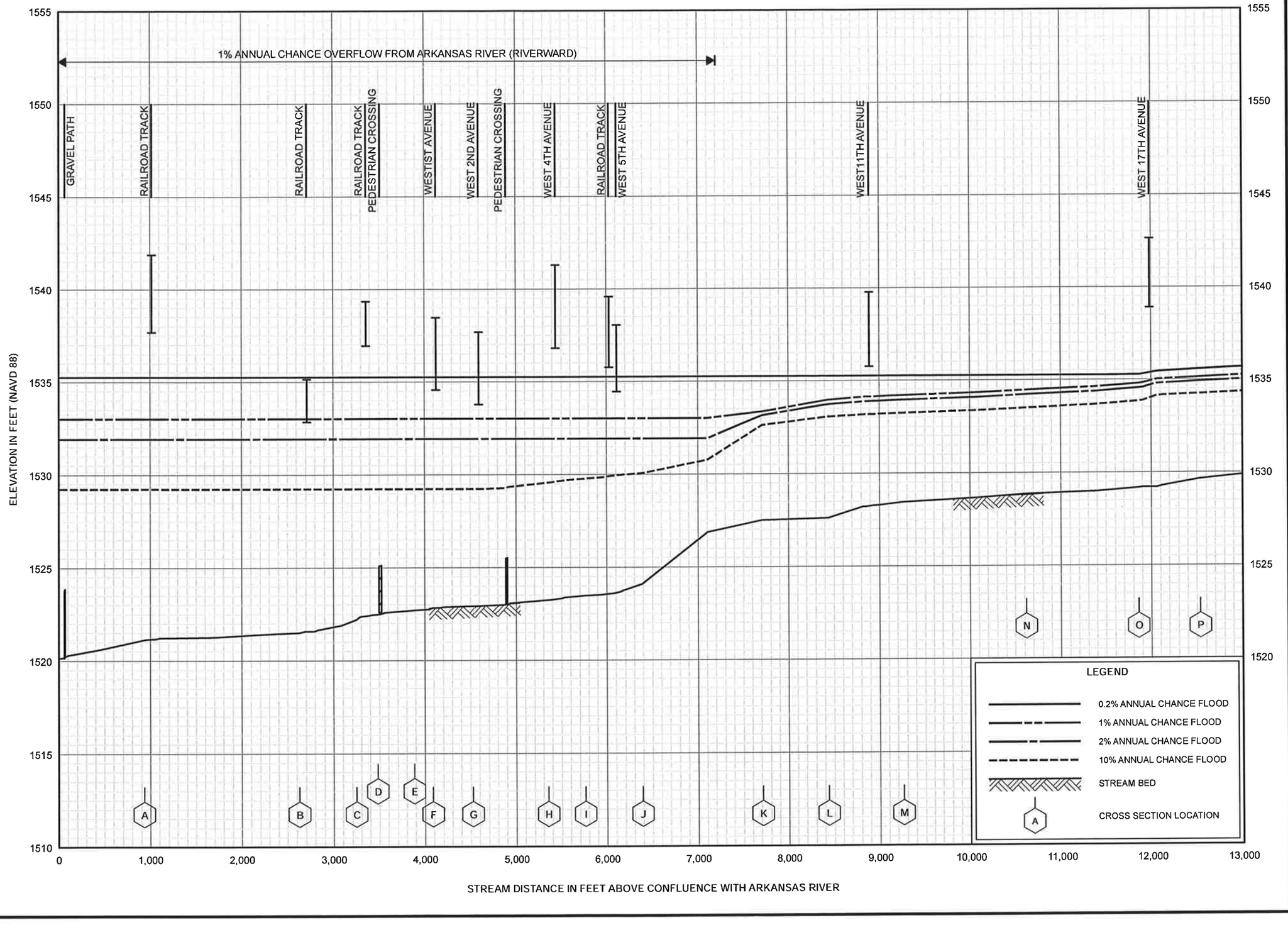



FLOOD PROFILES

GVI DRAINAGE DITCH (WITHOUT LEFT LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY
AND INCORPORATED AREAS




FLOOD PROFILES

HARSHA CANAL (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

27P

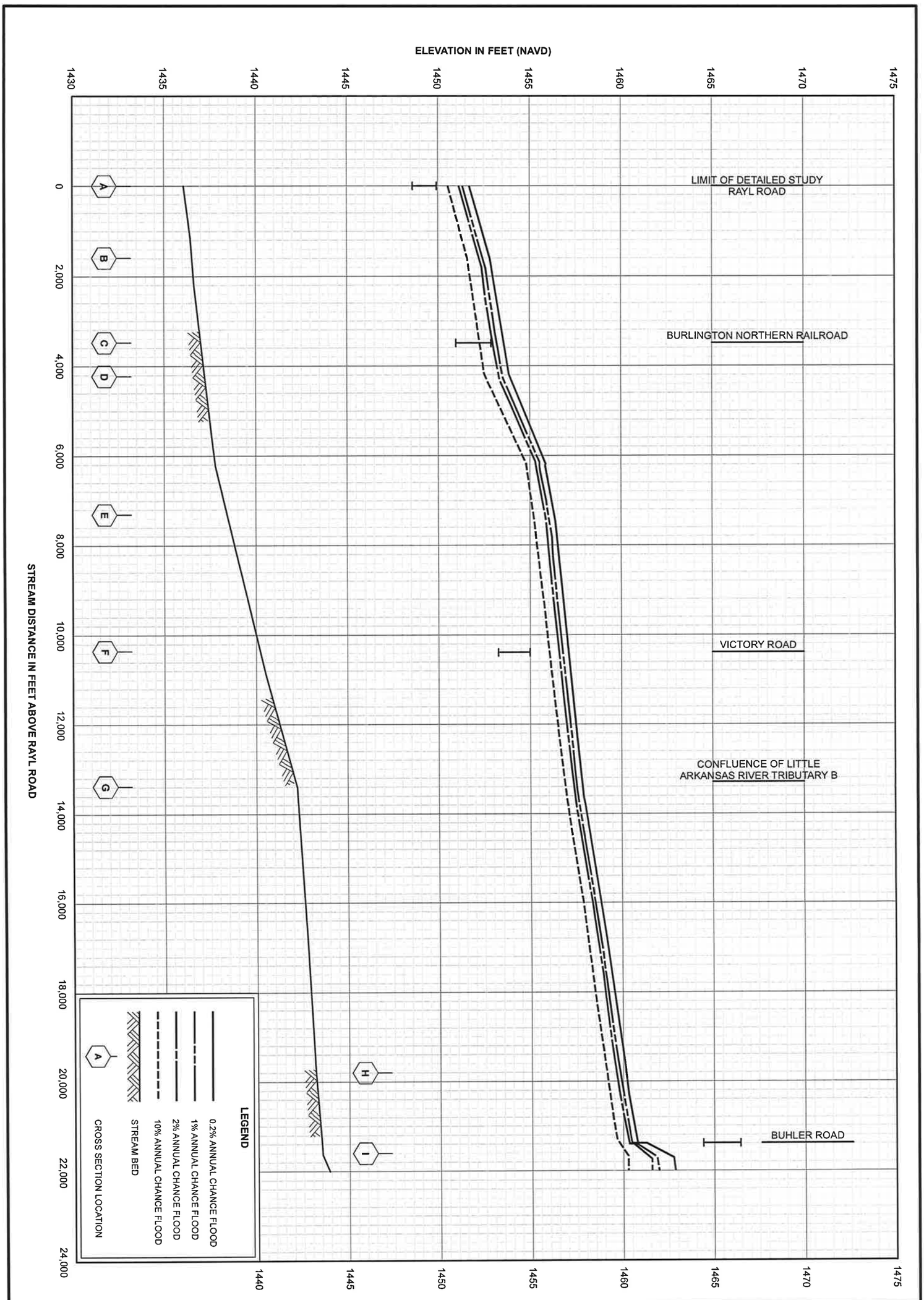
FLOOD PROFILES

HARSHA CANAL (WITH LEVEES)

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

28P



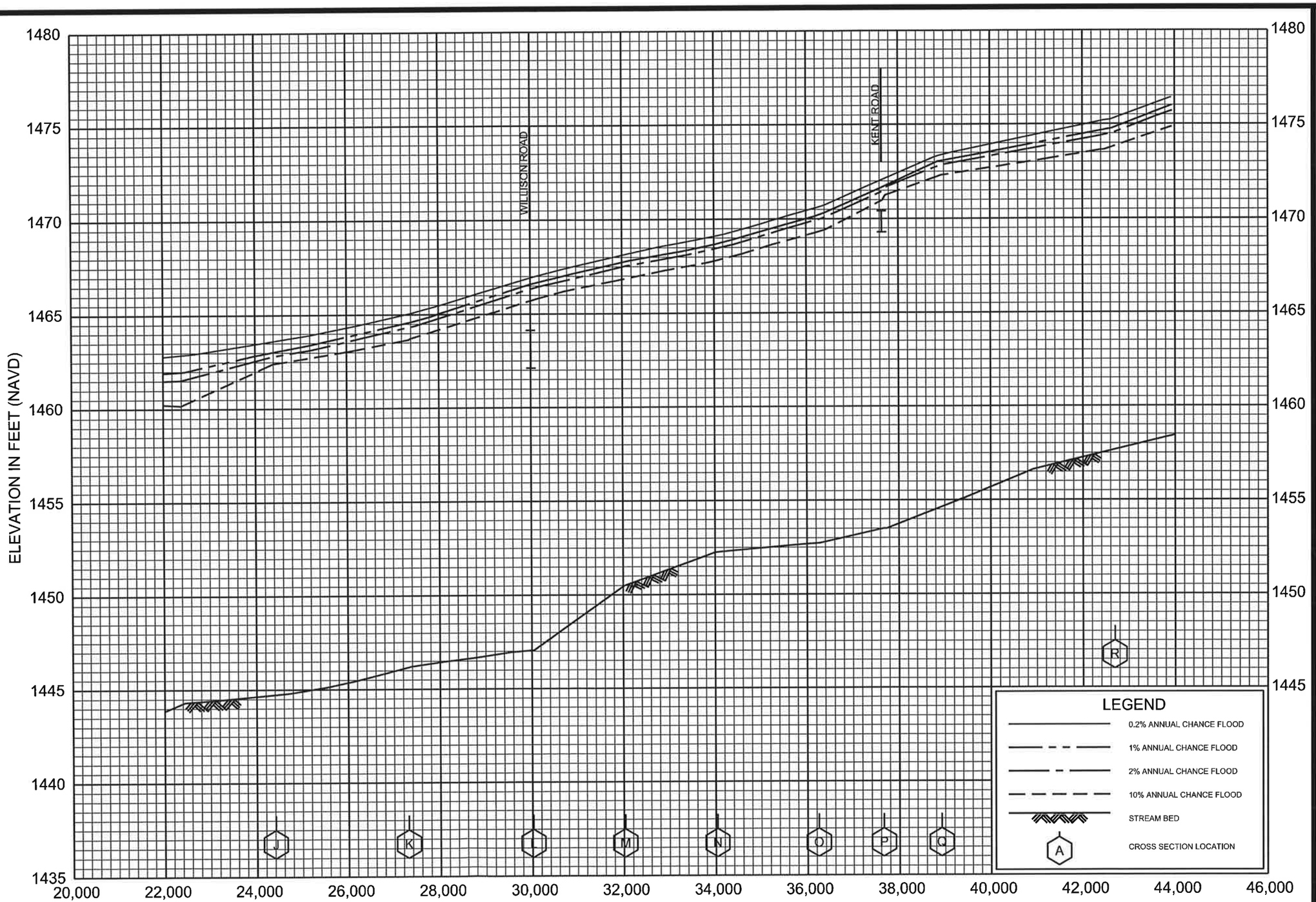

29P

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

**FLOOD PROFILES**

**LITTLE ARKANSAS RIVER**




# FLOOD PROFILES

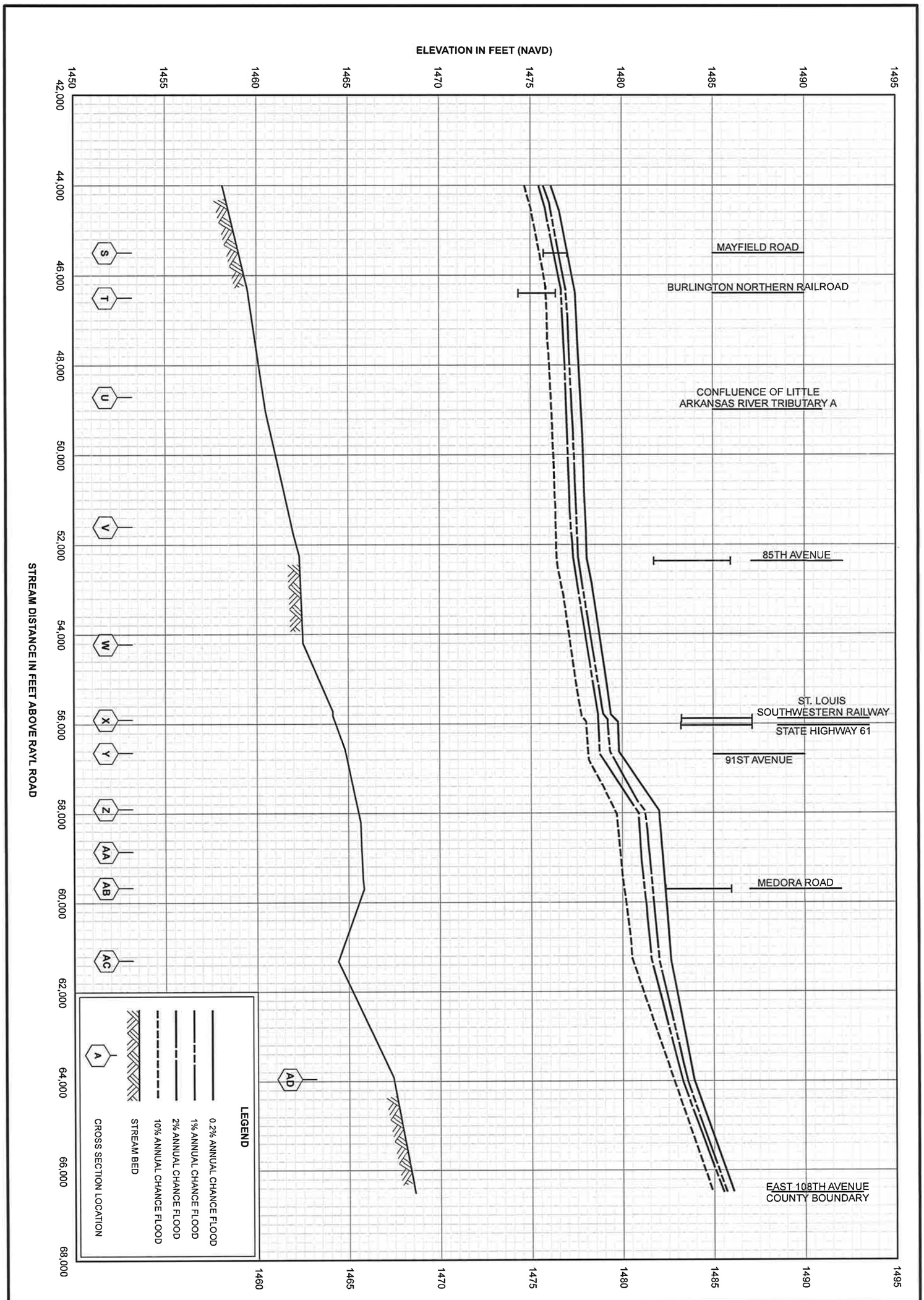
## LITTLE ARKANSAS RIVER

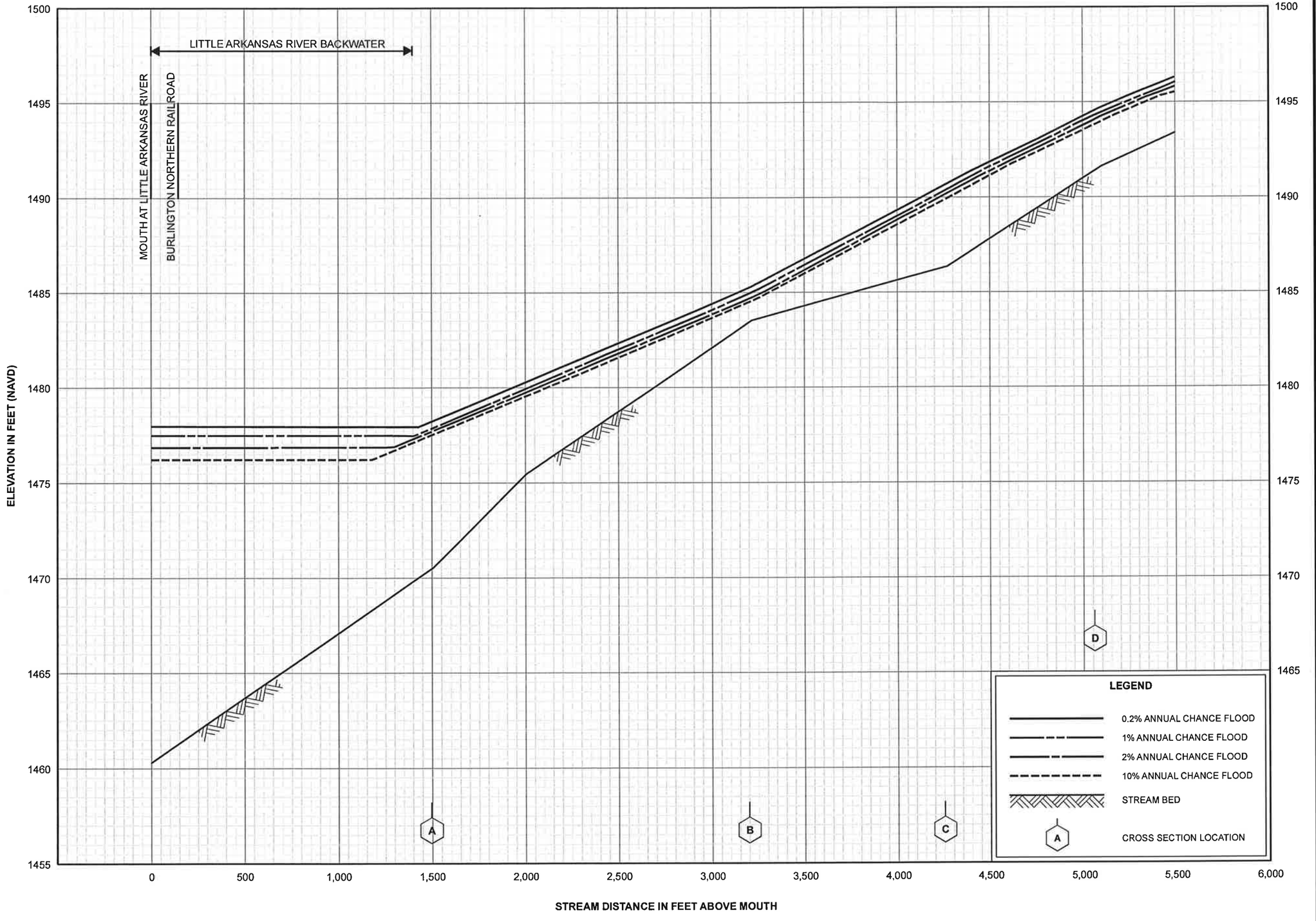
FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

30P


ELEVATION IN FEET (NAVD)
1450
1455
1460
1465
1470
1475
1480
1485
1490
1495
STREAM DISTANCE IN FEET ABOVE RAYL ROAD
42,000
44,000
46,000
48,000
50,000
52,000
54,000
56,000
58,000
60,000
62,000
64,000
66,000
68,000
S
T
U
V
W
X
Y
Z
AA
AB
AC
AD
MAYFIELD ROAD
BURLINGTON NORTHERN RAILROAD
CONFLUENCE OF LITTLE ARKANSAS RIVER TRIBUTARY A
85TH AVENUE
ST. LOUIS SOUTHWESTERN RAILWAY
STATE HIGHWAY 61
91ST AVENUE
MEDORA ROAD
EAST 108TH AVENUE
COUNTY BOUNDARY
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

LITTLE ARKANSAS RIVER TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
(AND INCORPORATED AREAS)

32P

# FLOOD PROFILES

# LITTLE ARKANSAS RIVER TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

# FLOOD PROFILES

# LITTLE ARKANSAS RIVER TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

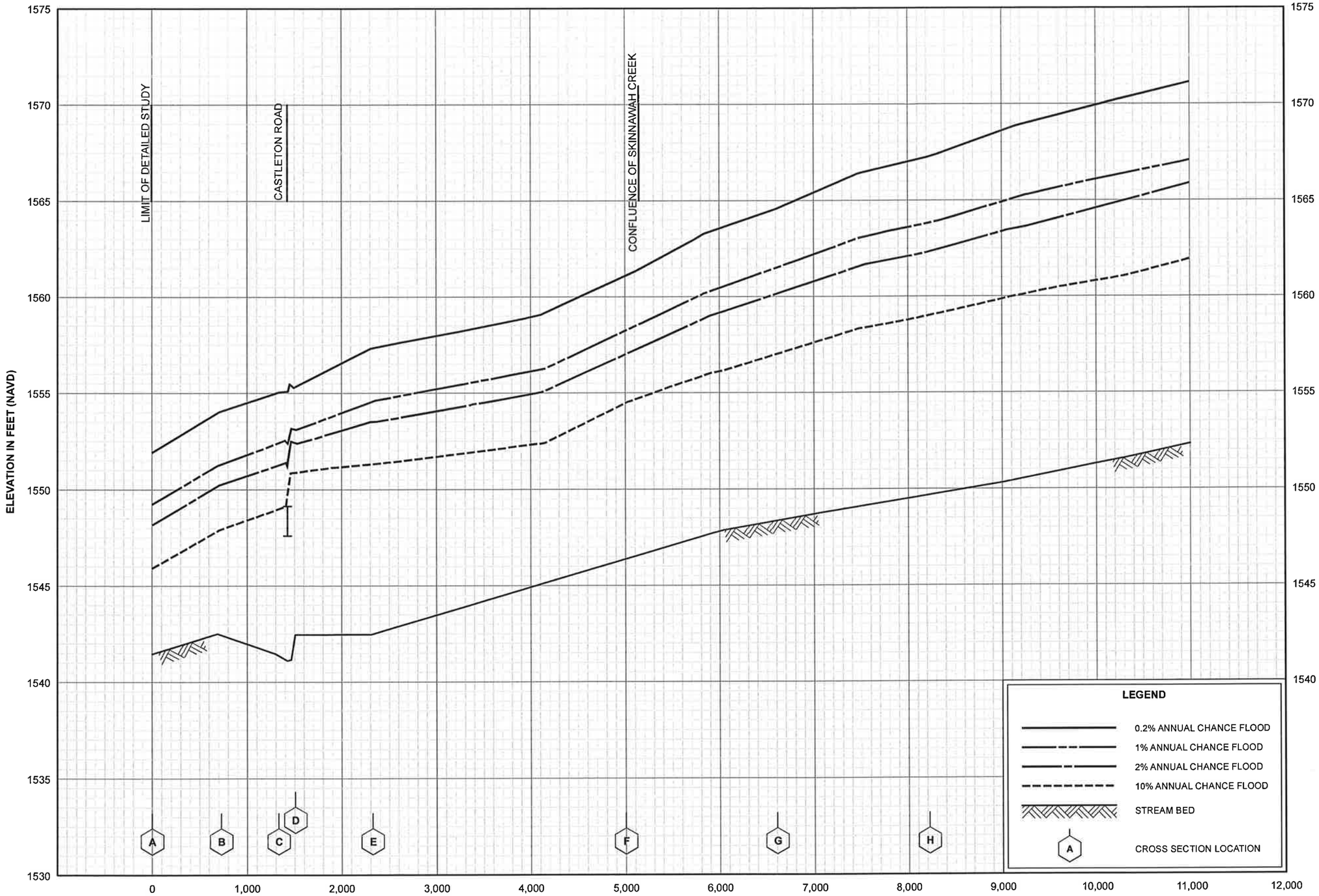
# FLOOD PROFILES

# LITTLE ARKANSAS RIVER TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

35P



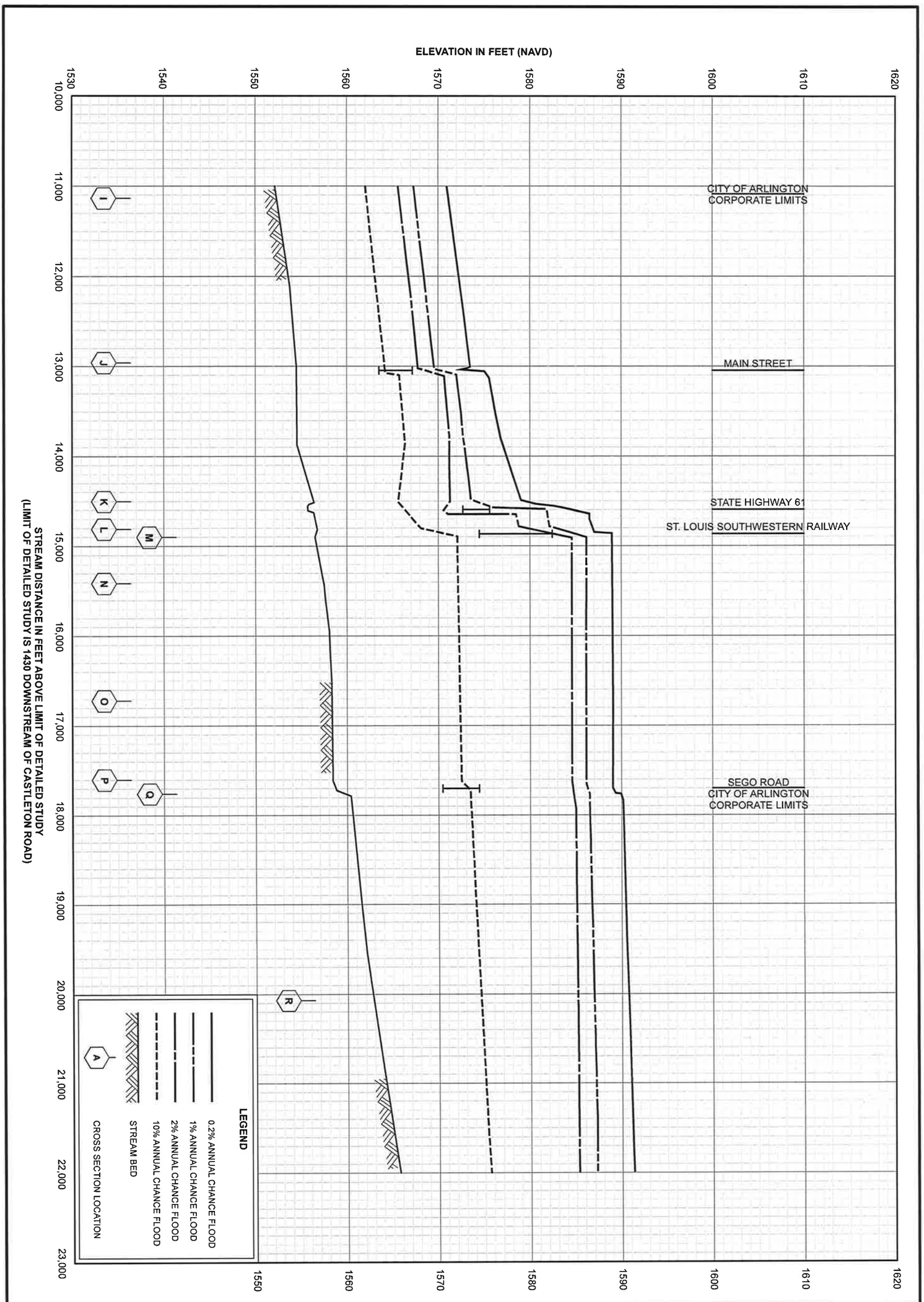

# FLOOD PROFILES

# NORTH FORK NINNESCAH RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

36P



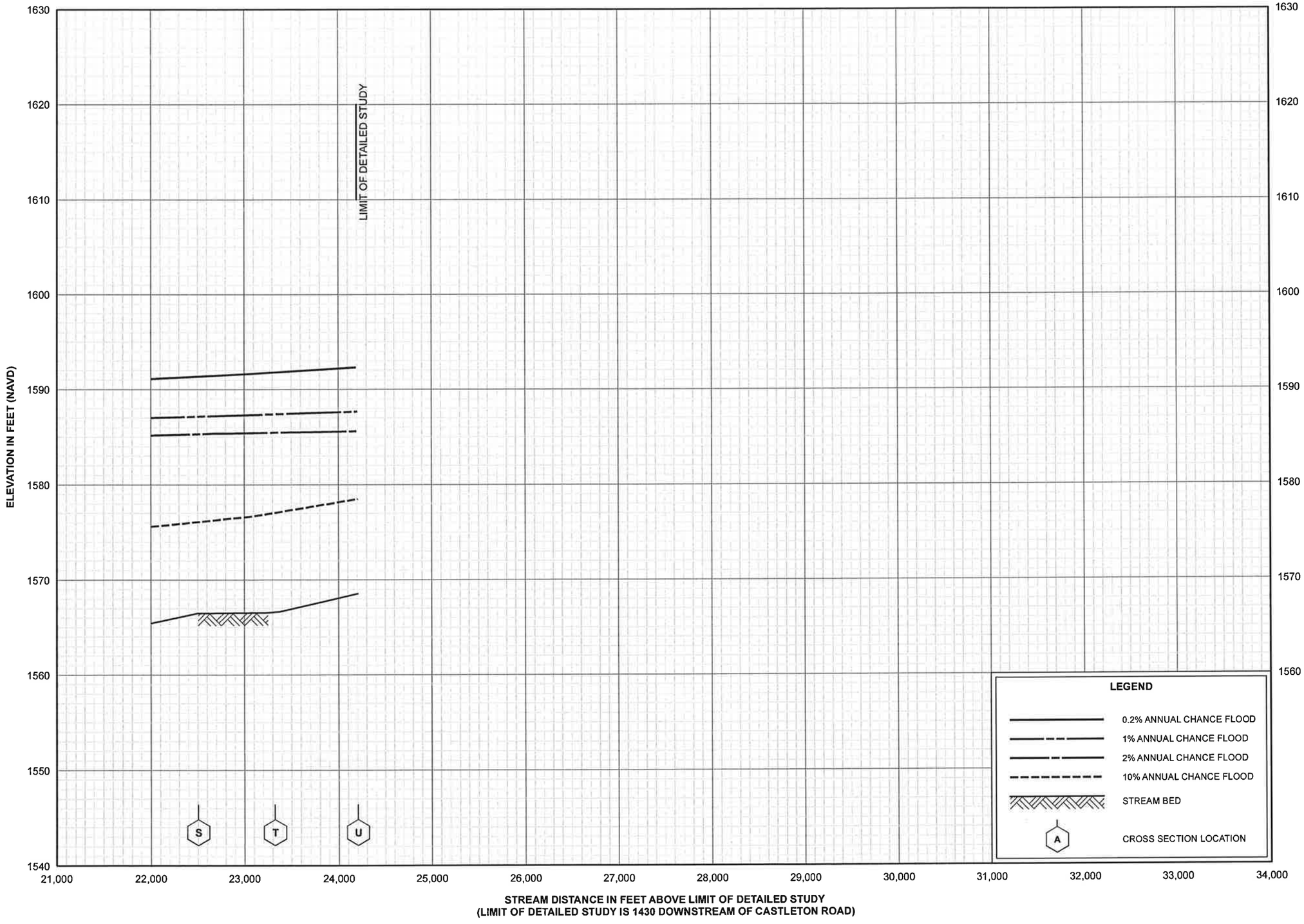

37P

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

**FLOOD PROFILES**

**NORTH FORK NINNESCAH RIVER**

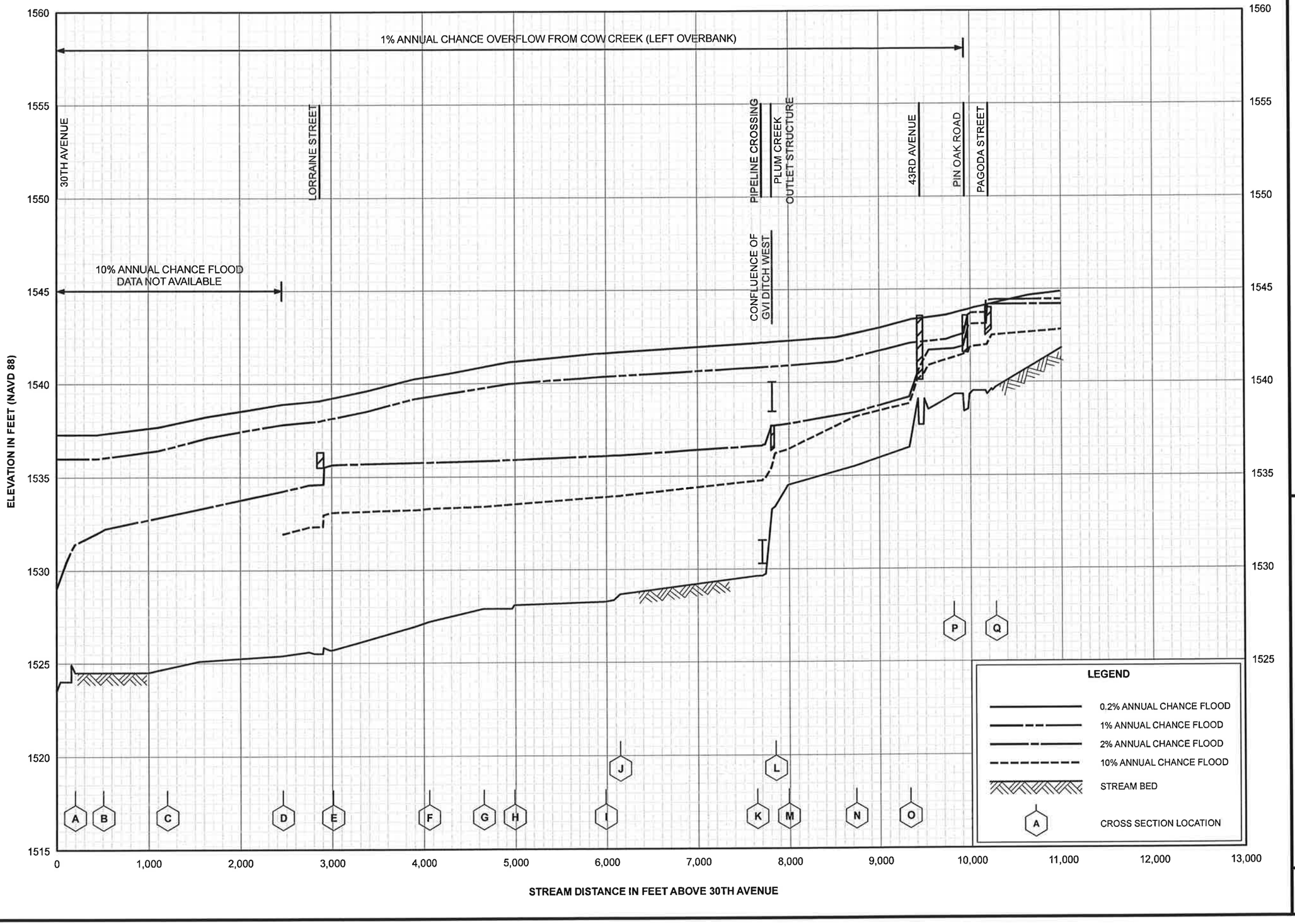



# FLOOD PROFILES

# NORTH FORK NINNESCAH RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

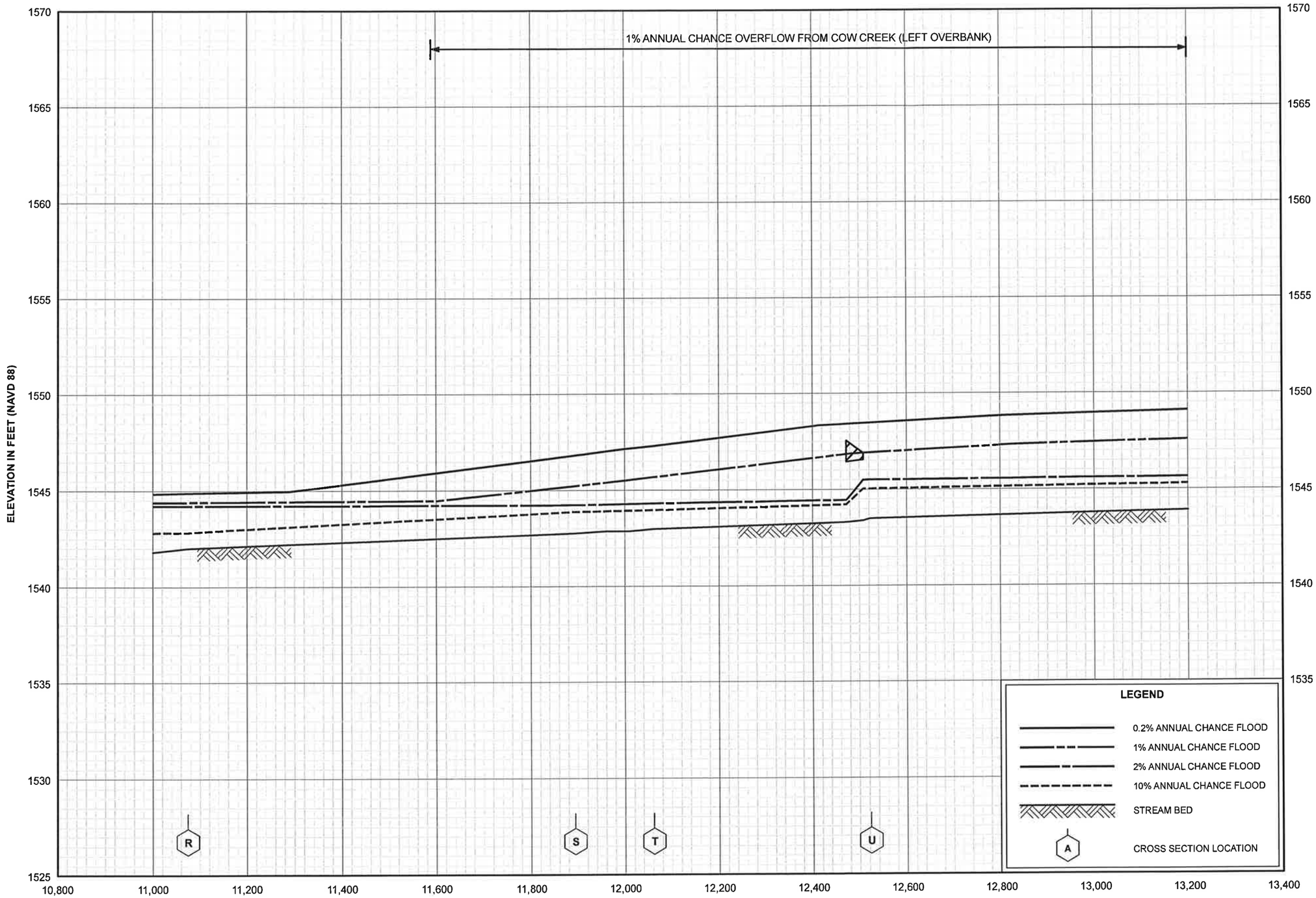



FLOOD PROFILES

PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS



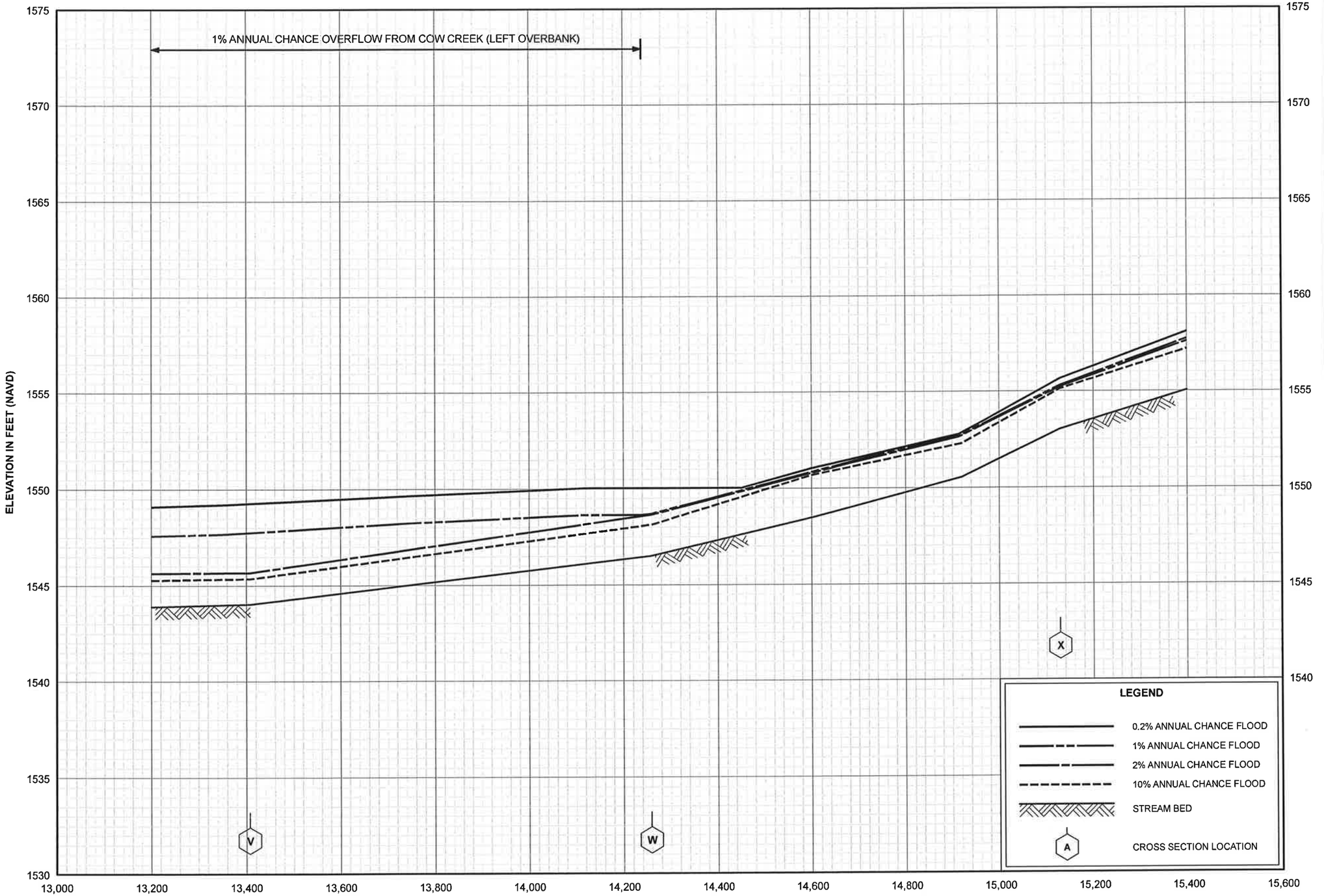

FLOOD PROFILES

PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**

40P



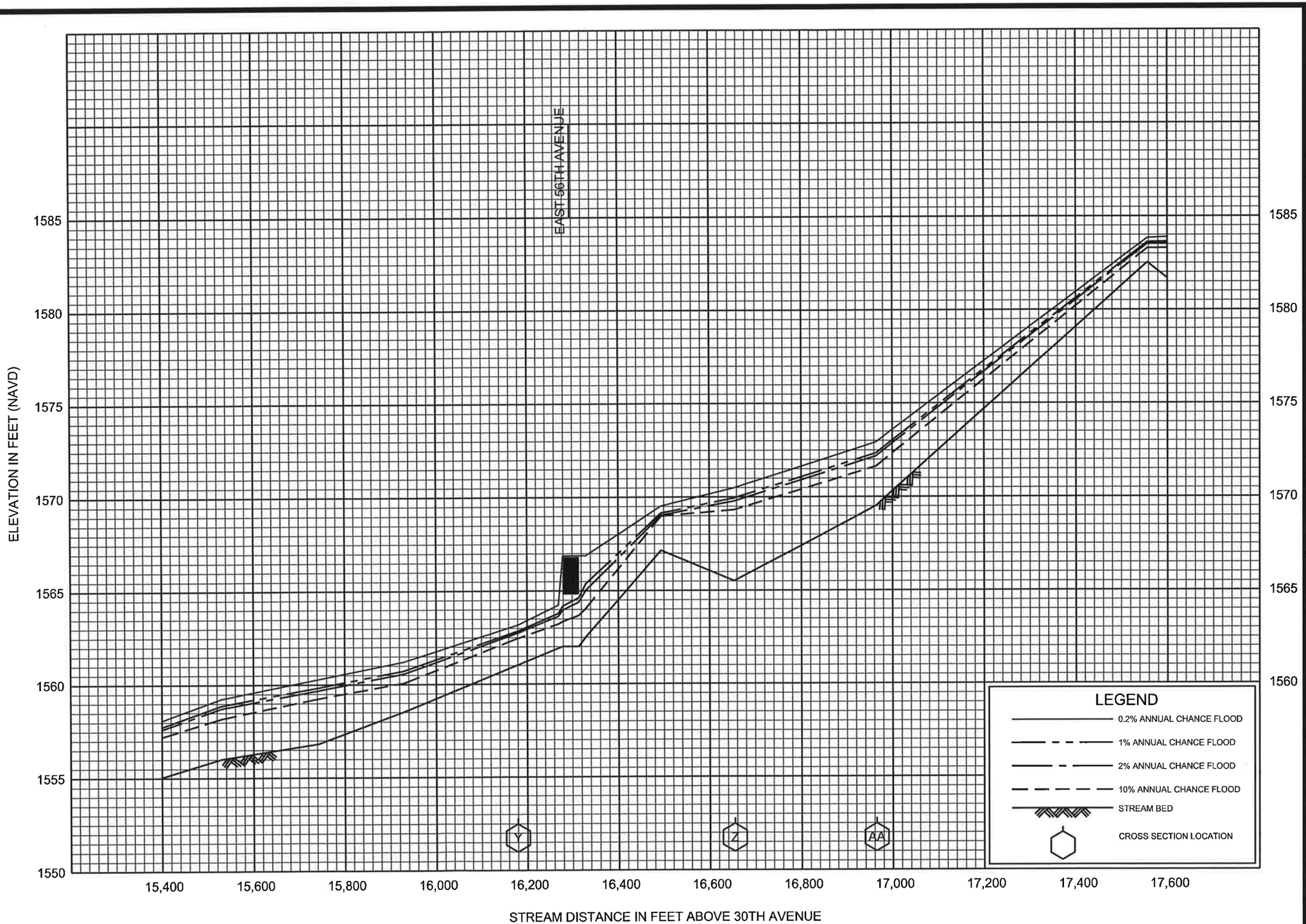

FLOOD PROFILES

PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

41P




FLOOD PROFILES

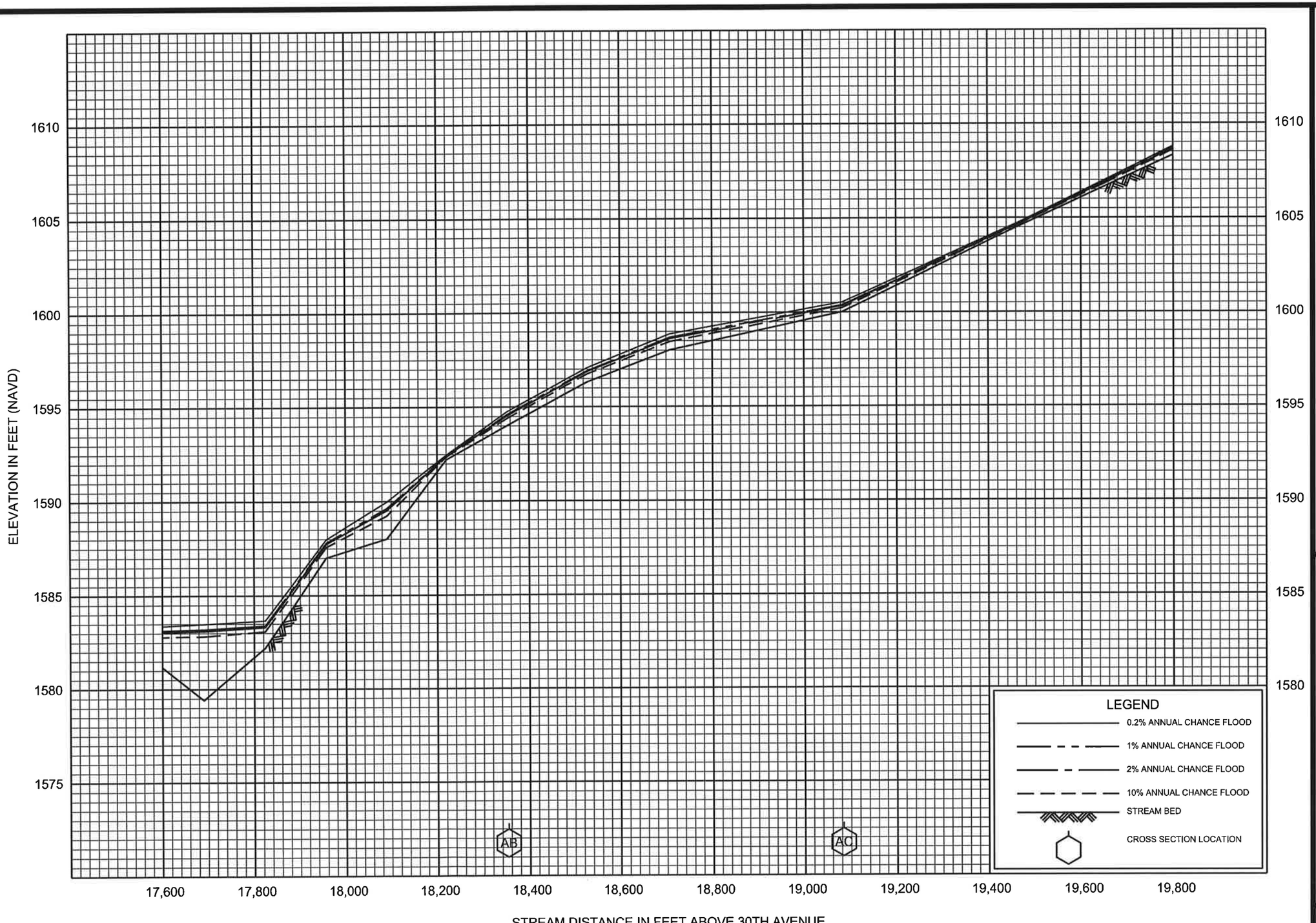
PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

42P




FLOOD PROFILES

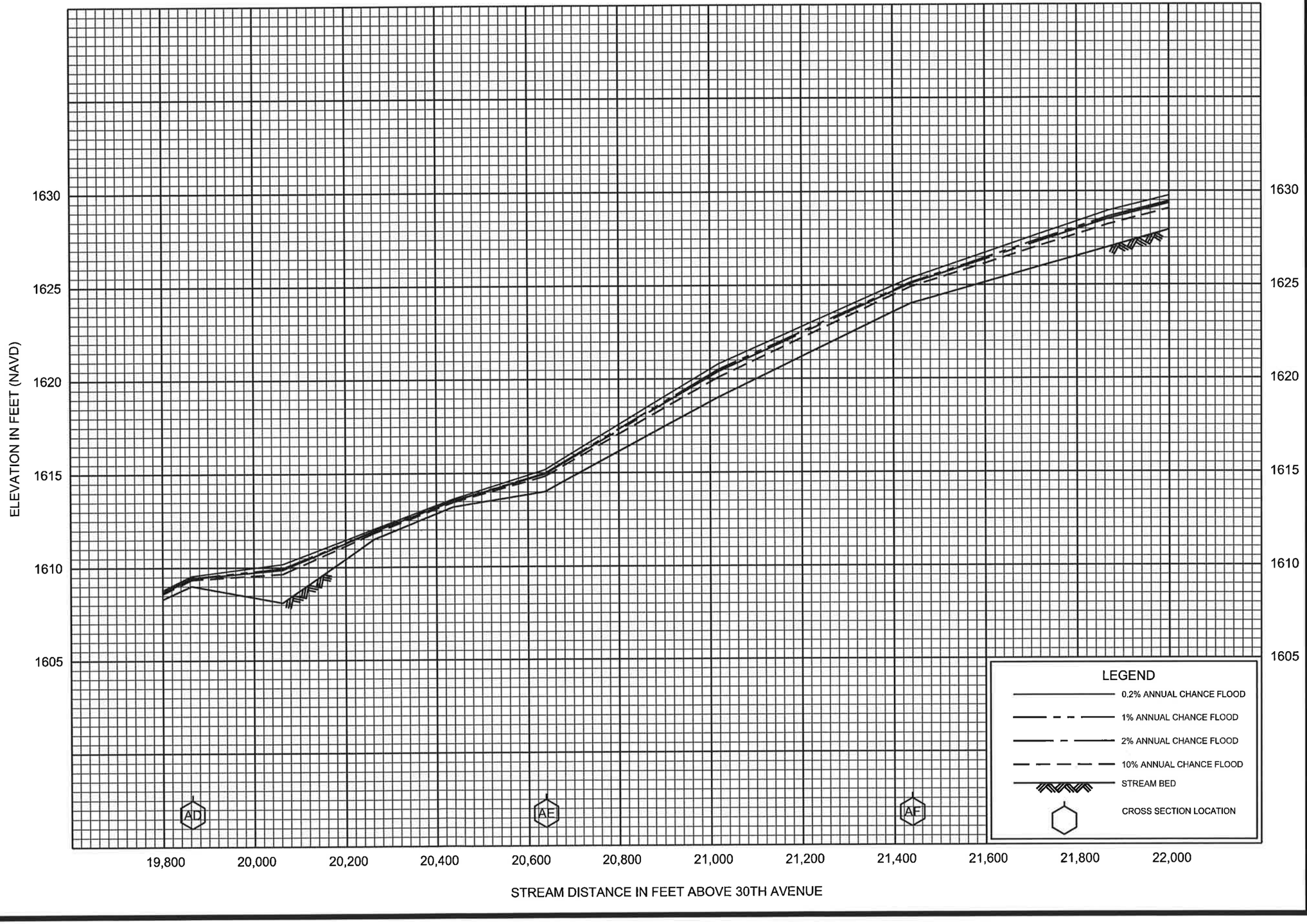
PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

43P




FLOOD PROFILES

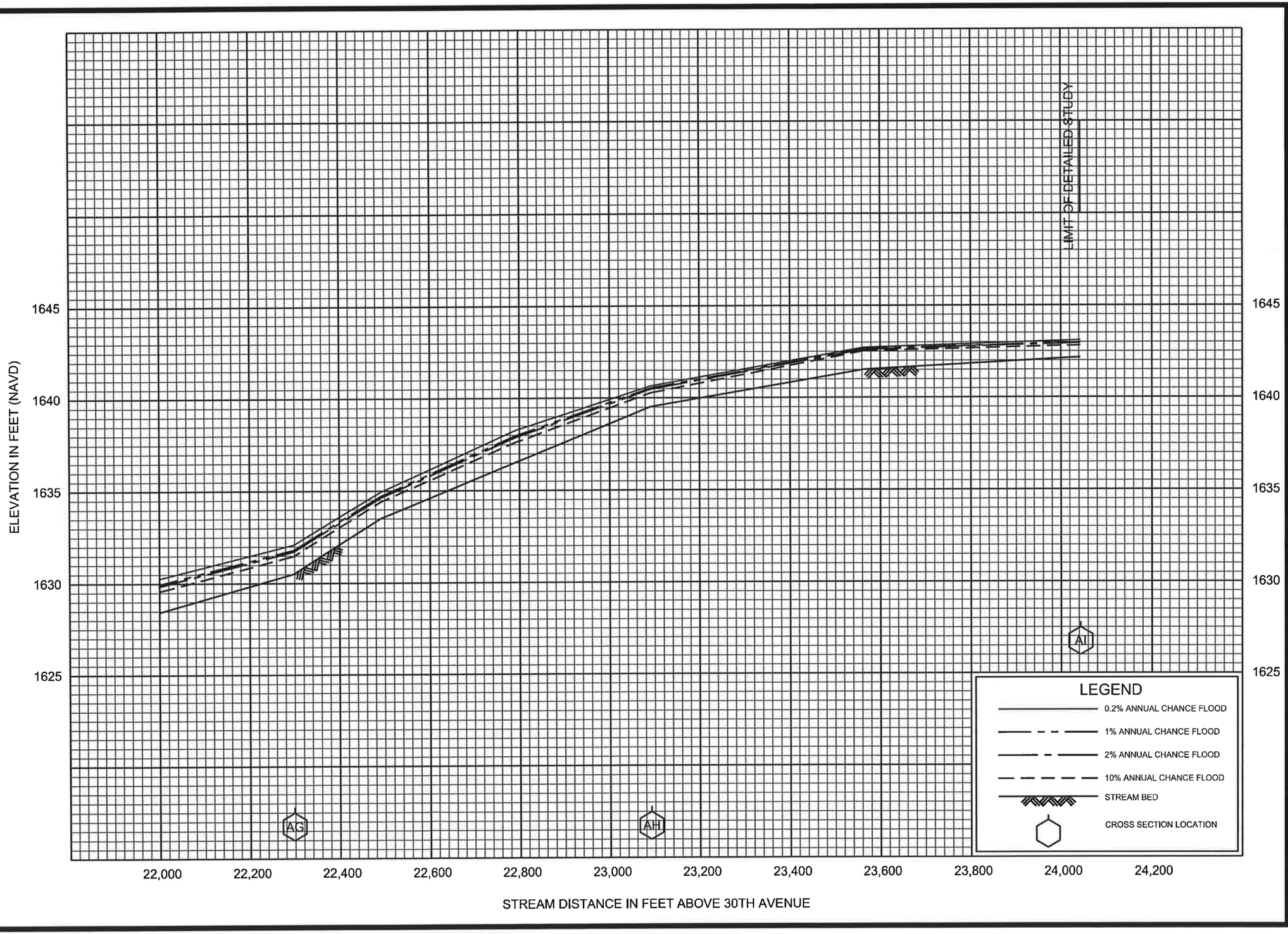
PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

44P




FLOOD PROFILES

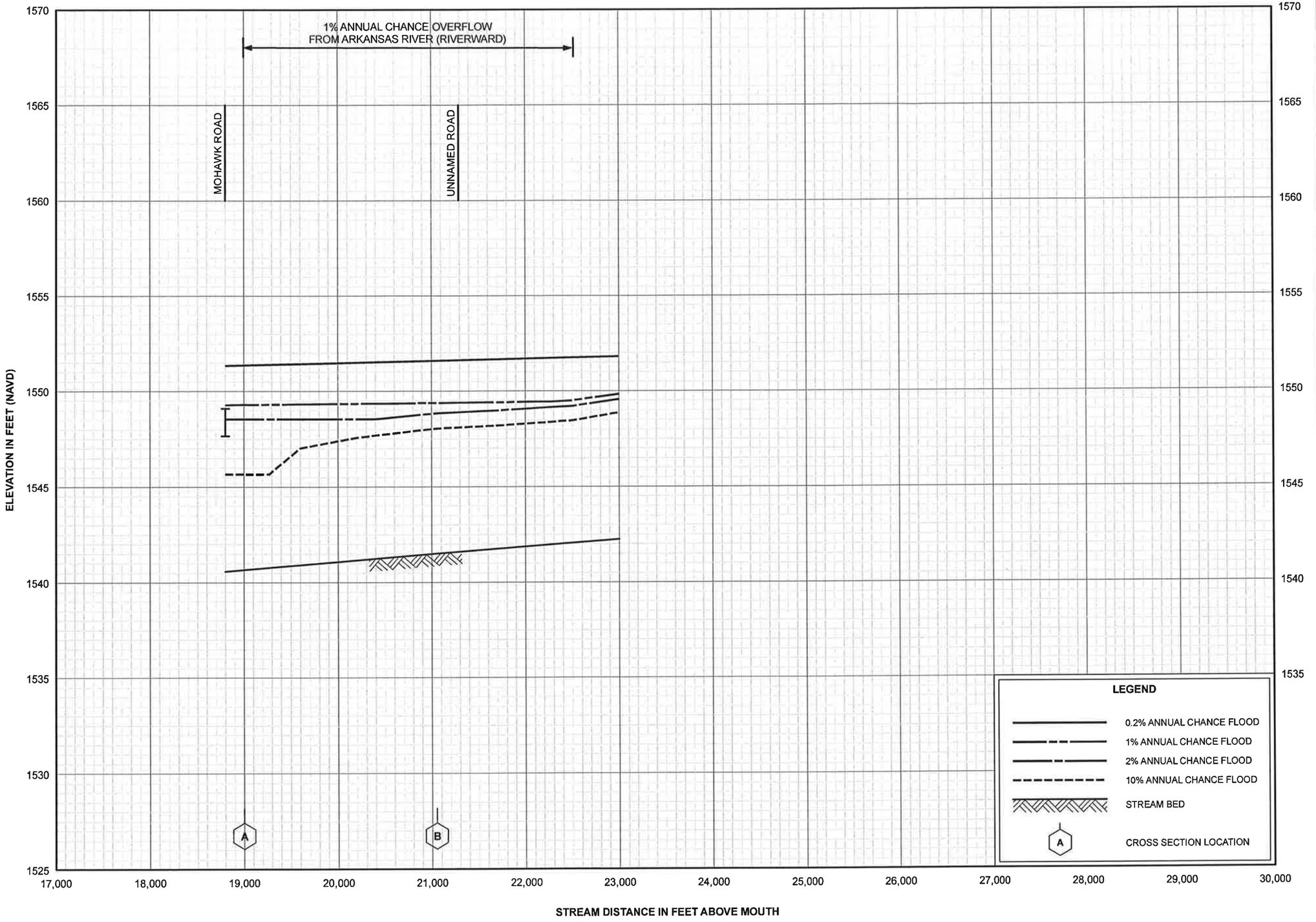
PLUM CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

45P



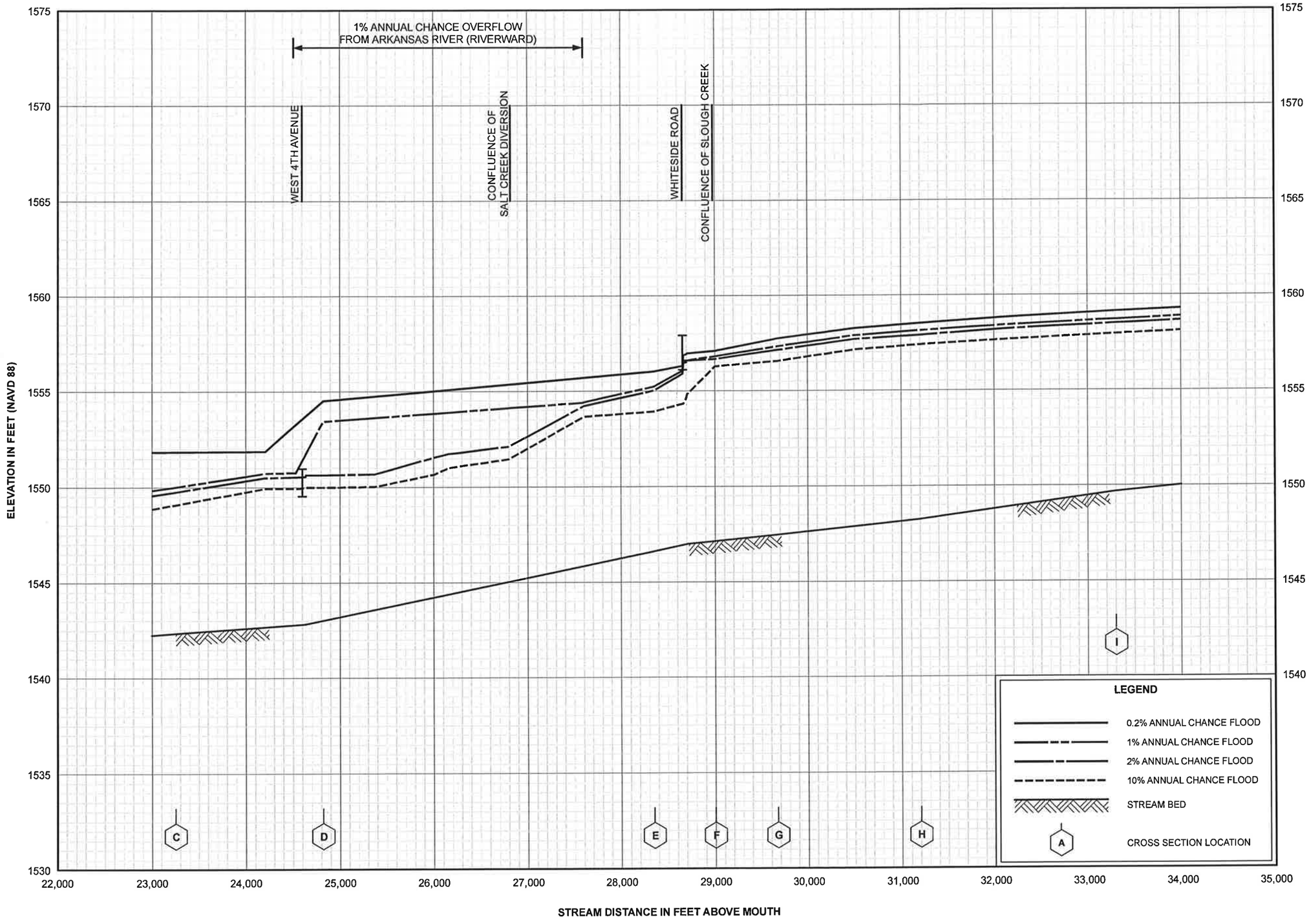

FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

46P

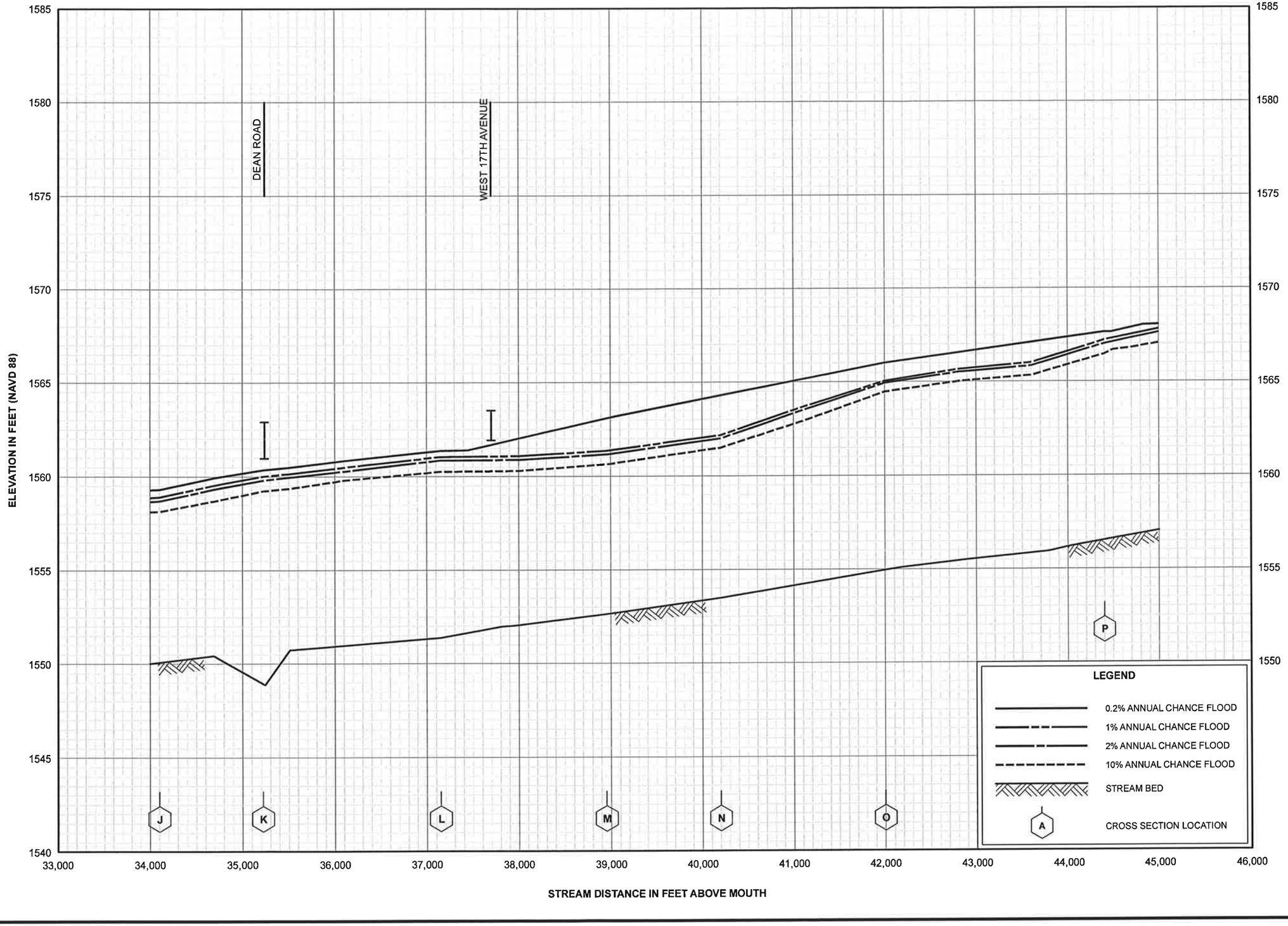



FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**

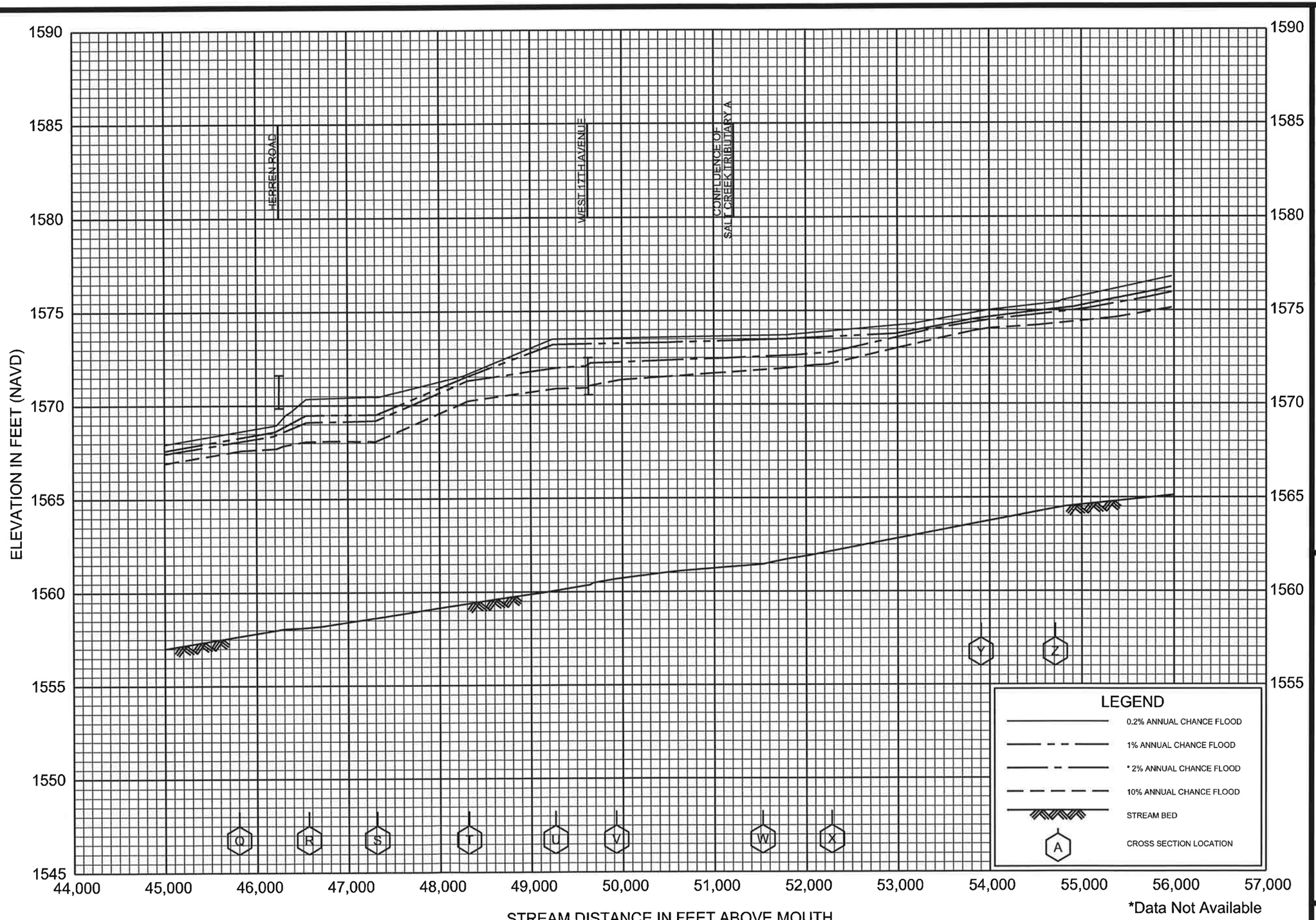



FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS



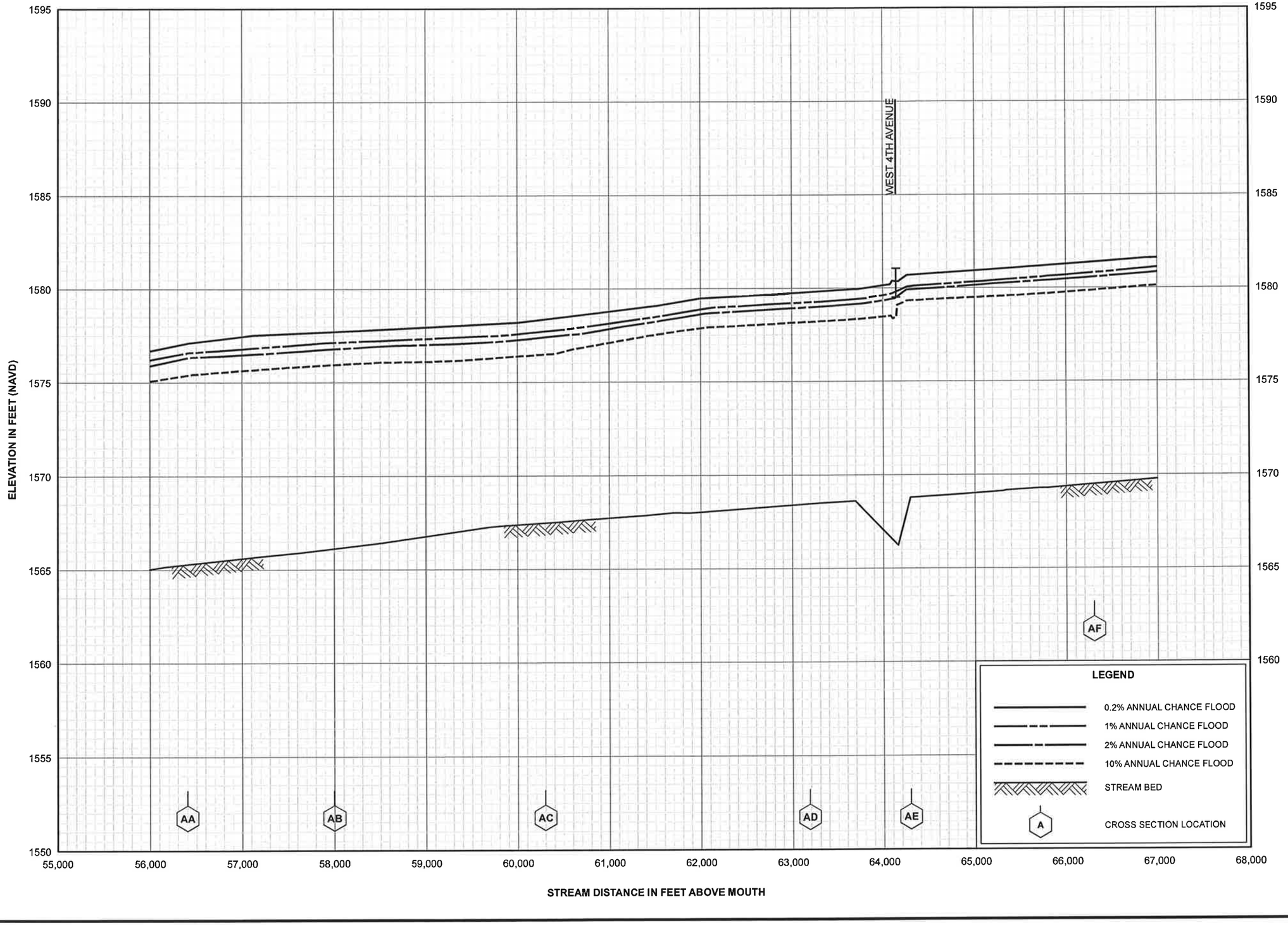

# FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

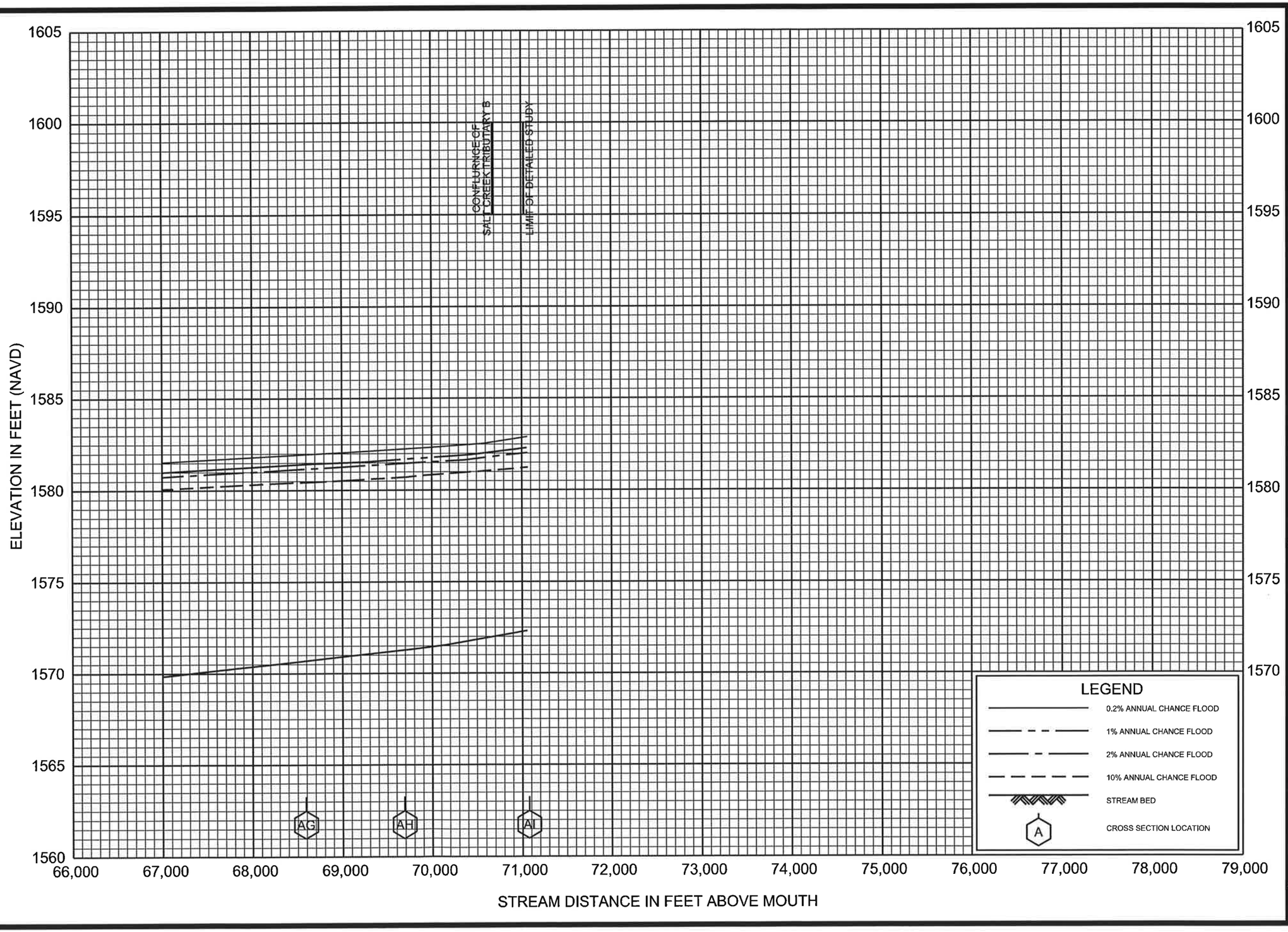



FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
(AND INCORPORATED AREAS)




FLOOD PROFILES

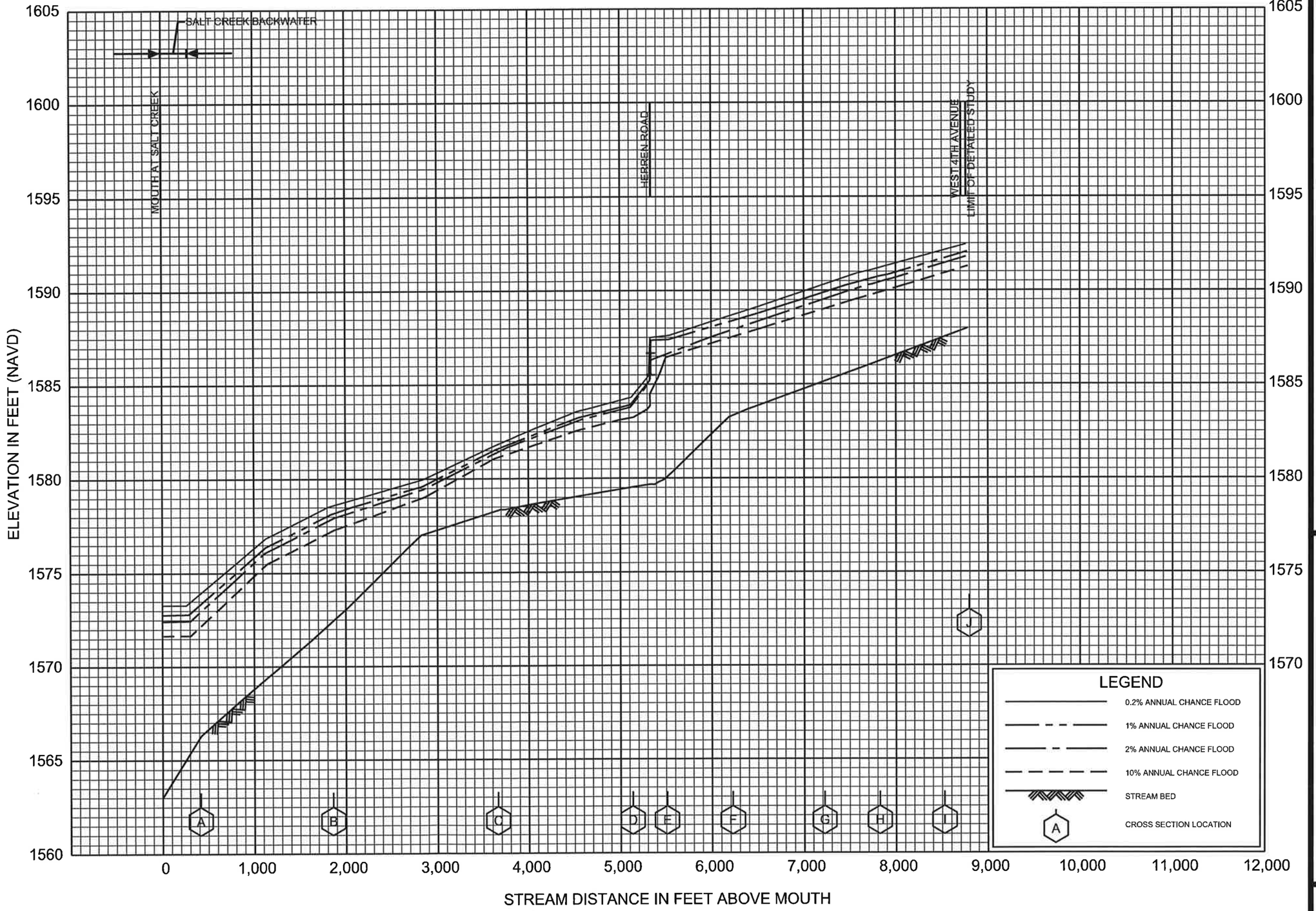
SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

51P




# FLOOD PROFILES

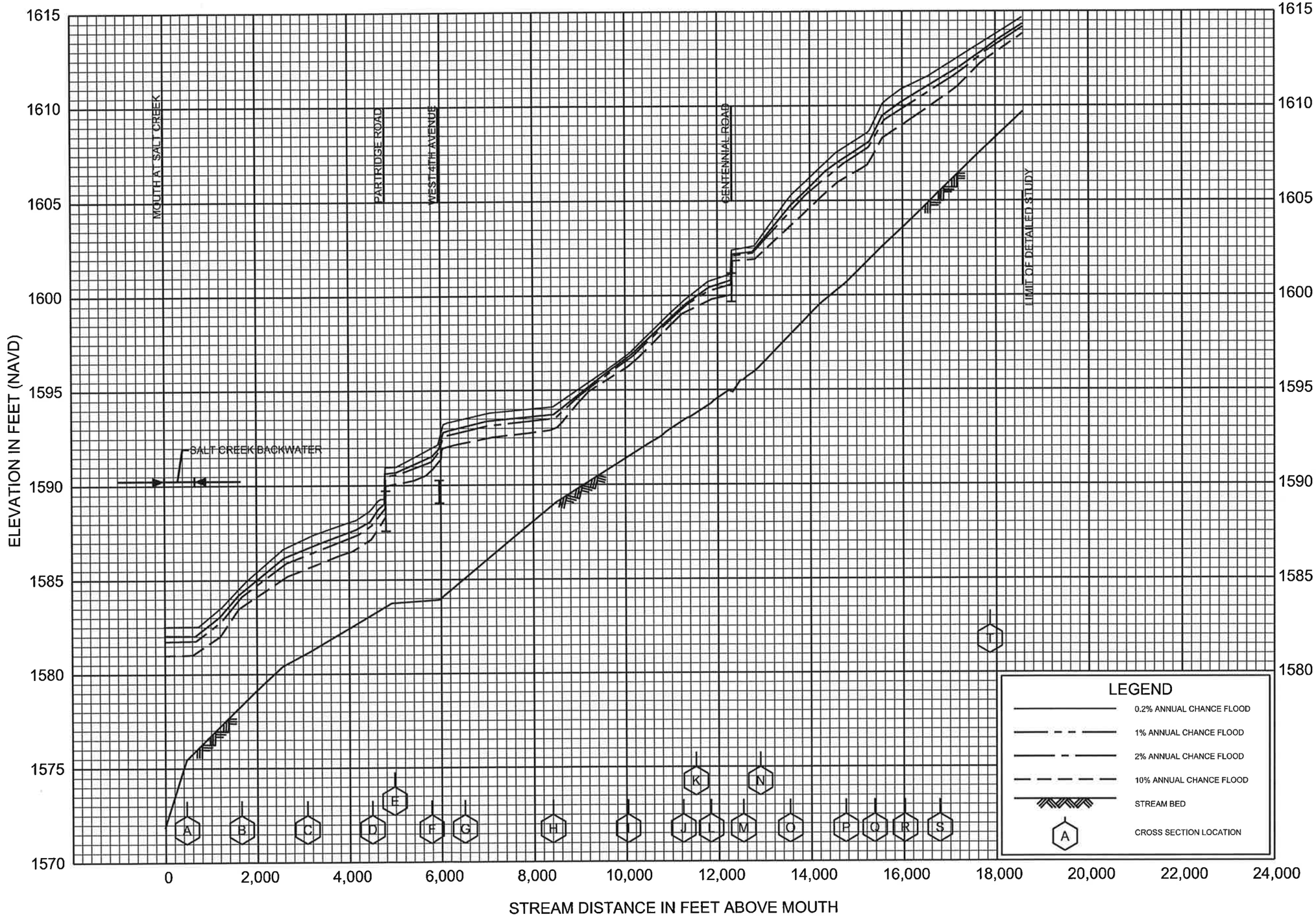
## SALT CREEK TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

52P



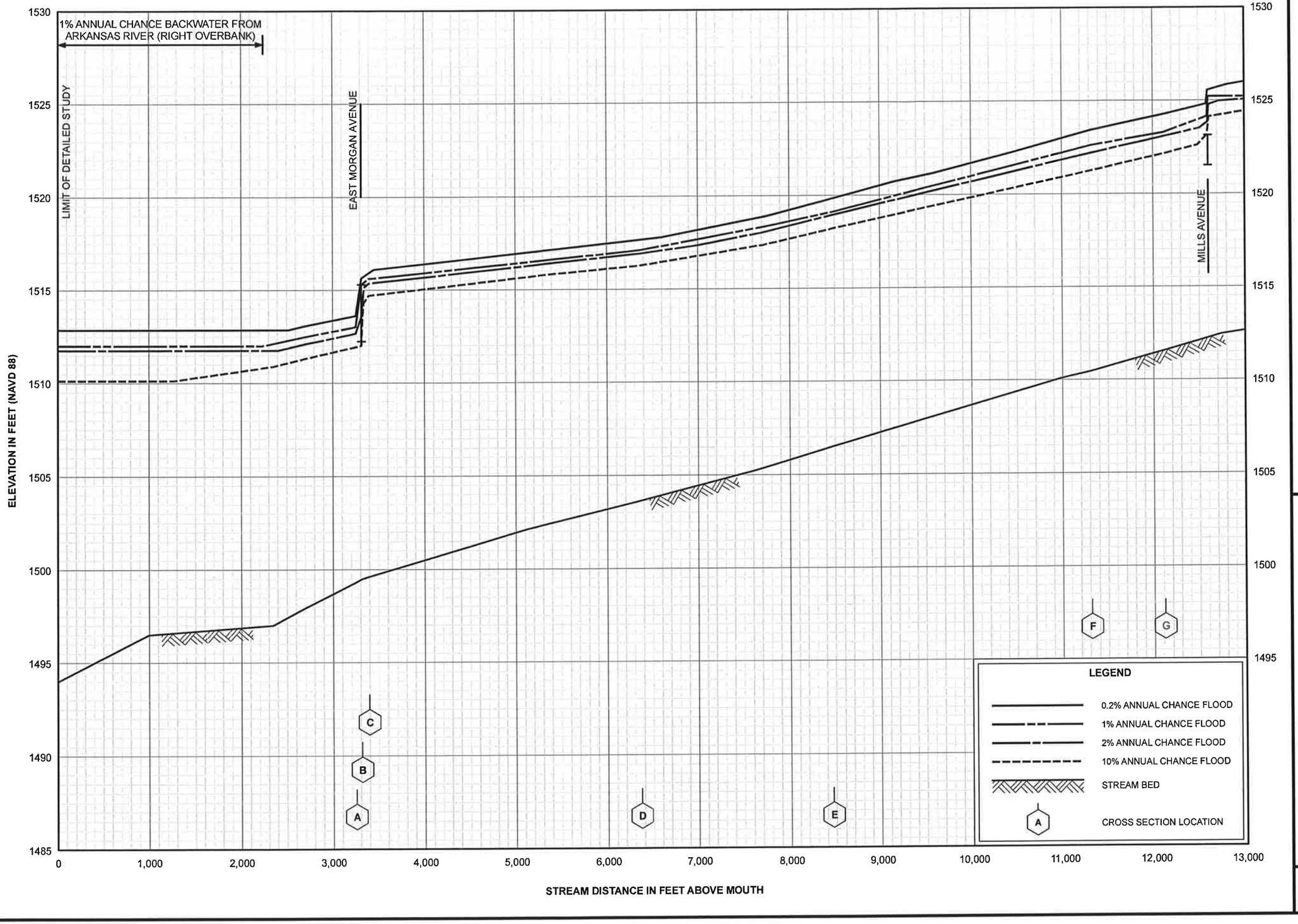

# FLOOD PROFILES

## SALT CREEK TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS

(AND INCORPORATED AREAS)

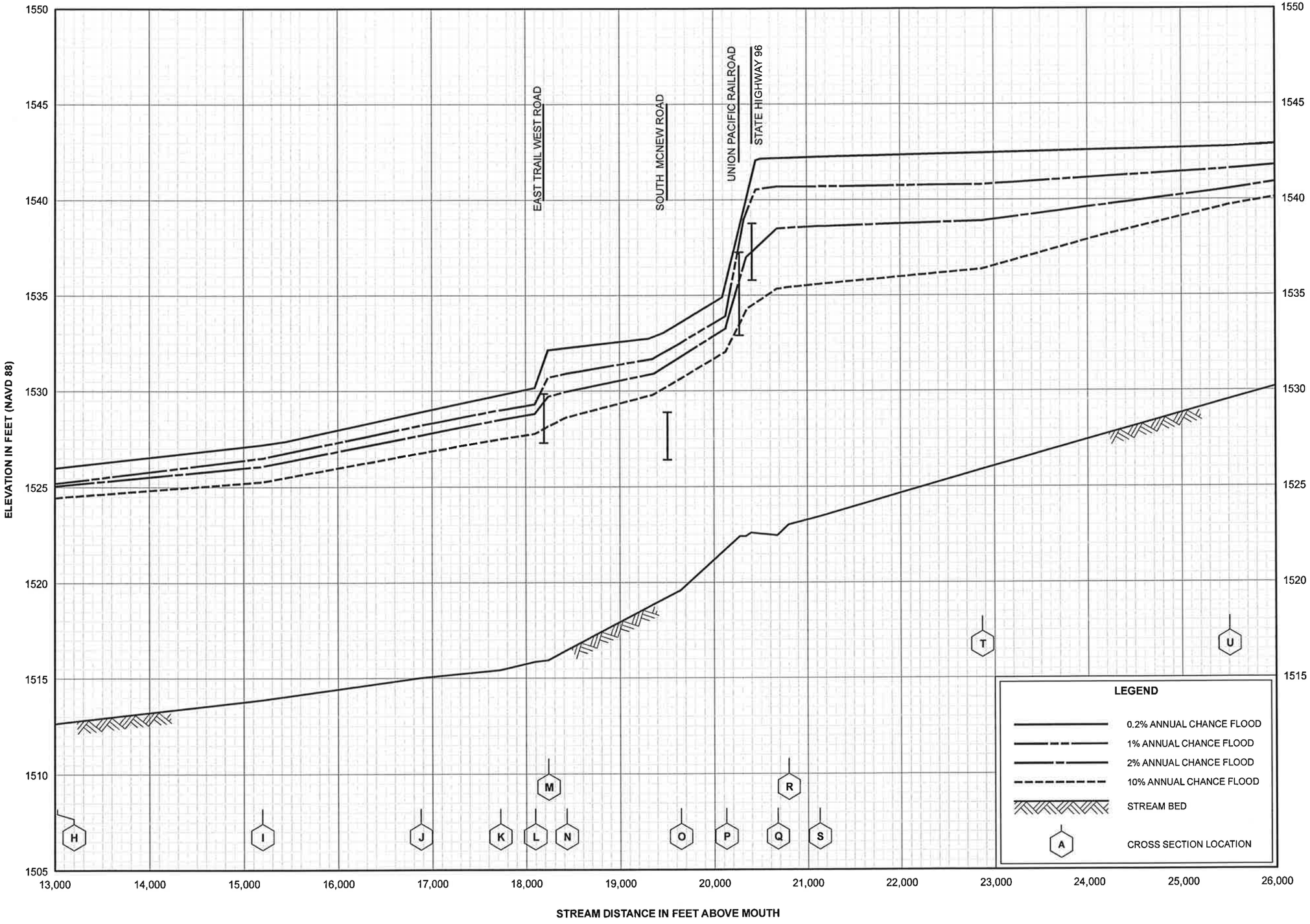



FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**



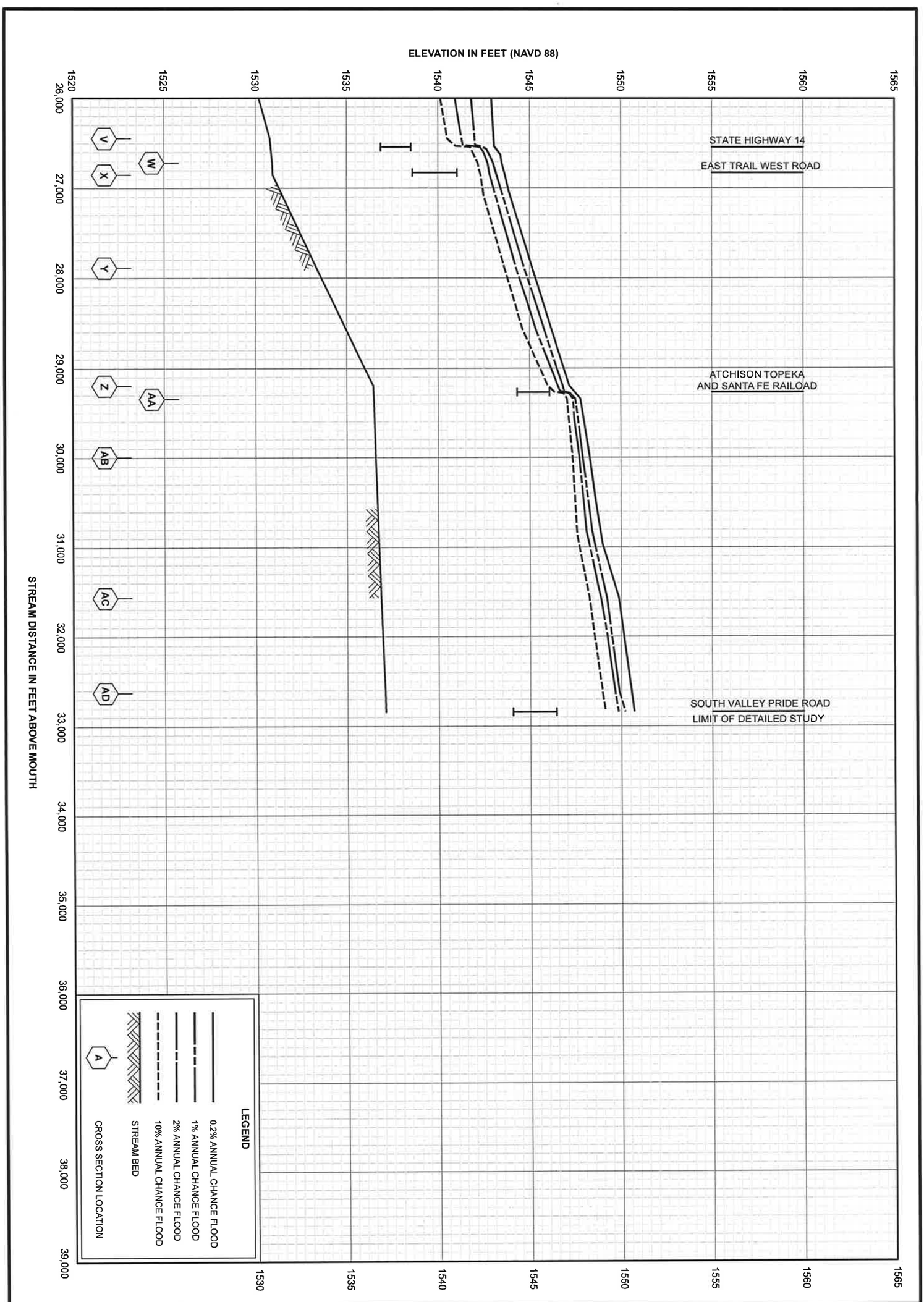

FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

55P



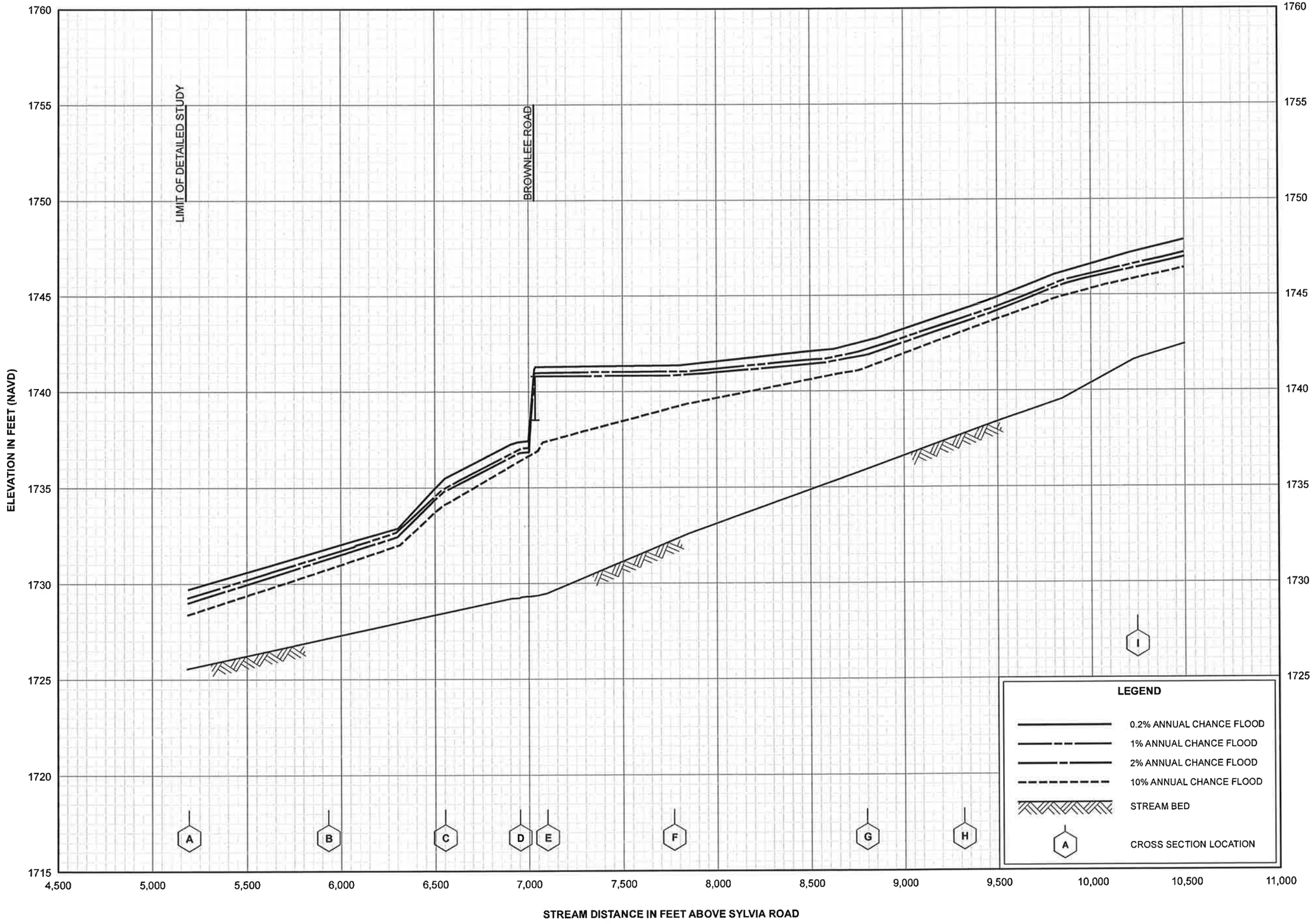



FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**

**FLOOD PROFILES**

**SAND CREEK**



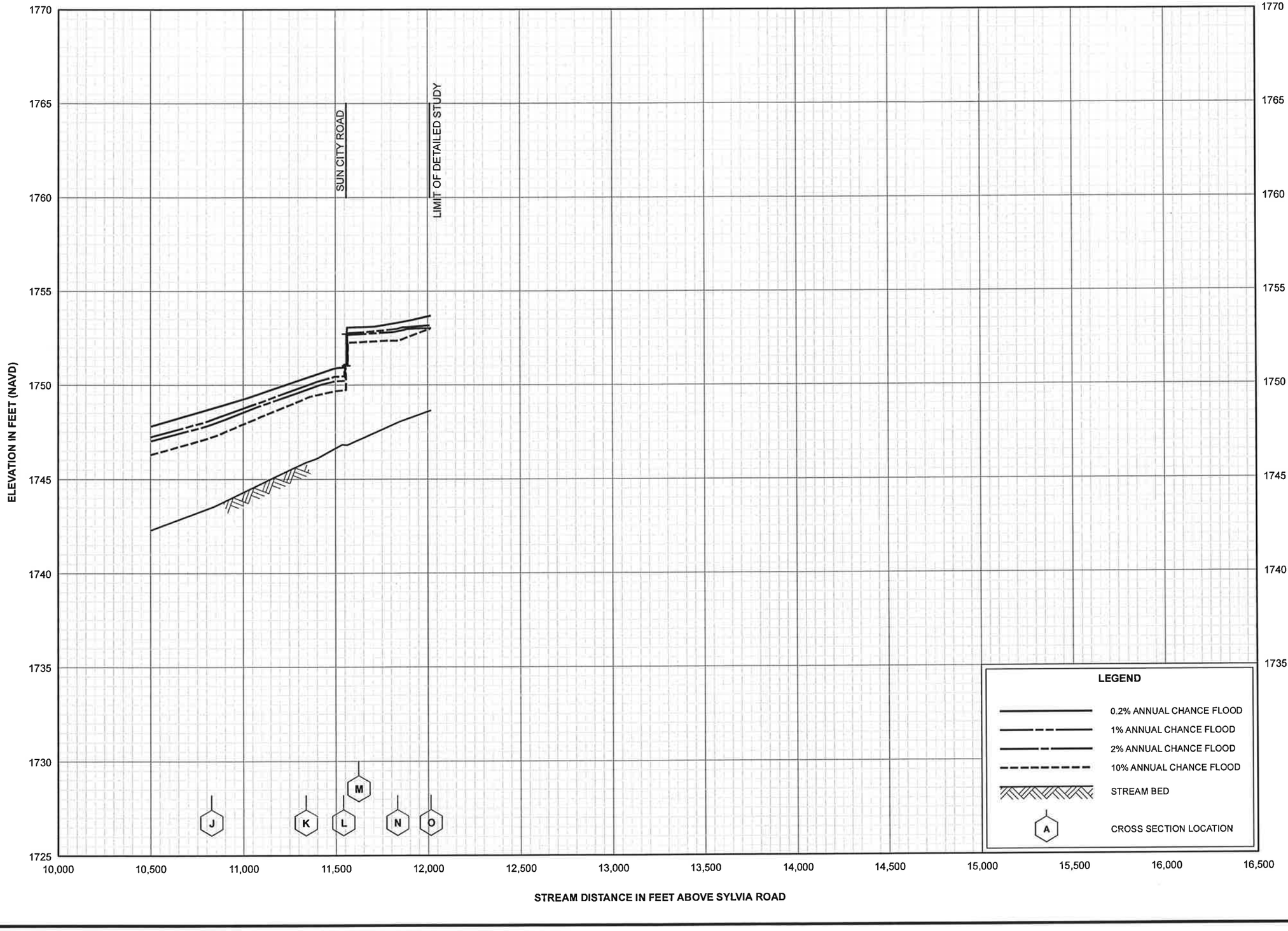

FLOOD PROFILES

SILVER CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
(AND INCORPORATED AREAS)

57P




# FLOOD PROFILES

## SILVER CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

# FLOOD PROFILES

# SMOOTS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

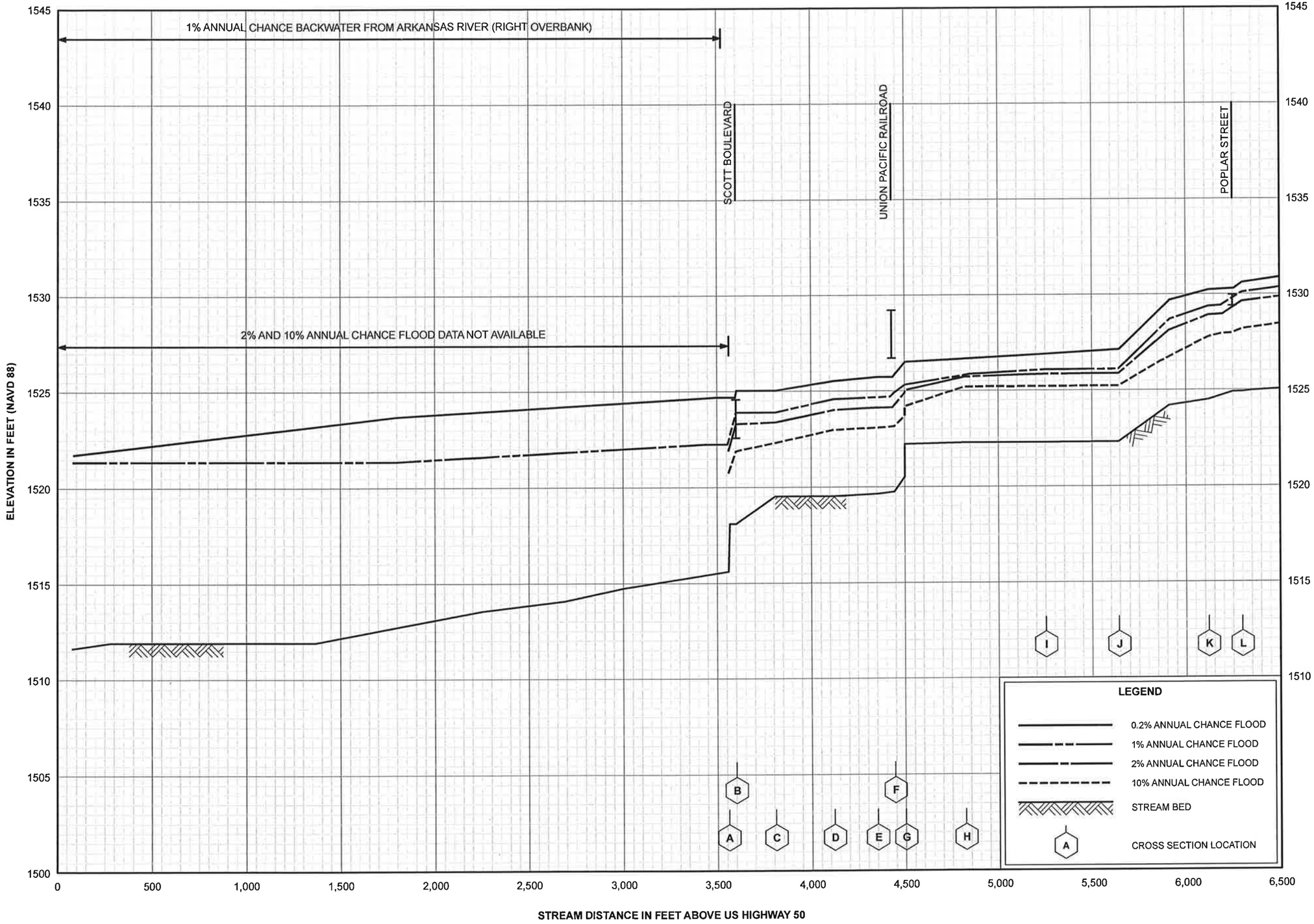
# FLOOD PROFILES

# SMOOTS CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**(AND INCORPORATED AREAS)**

60P




FLOOD PROFILES

UNNAMED TRIBUTARY TO SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

RENO COUNTY, KS
AND INCORPORATED AREAS

61P

# FLOOD PROFILES

## UNNAMED TRIBUTARY TO SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

**RENO COUNTY, KS**
**AND INCORPORATED AREAS**

62P