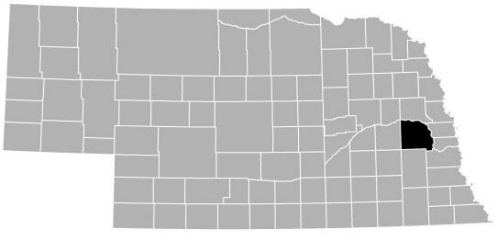
# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

**VOLUME 1 OF 1**



# SAUNDERS COUNTY, NEBRASKA

**AND INCORPORATED AREAS**

| COMMUNITY NAME | NUMBER | COMMUNITY NAME | NUMBER |
|---|---|---|---|
| **CITY OF ASHLAND** | **310196** | **VILLAGE OF MEMPHIS** | **310201** |
| **VILLAGE OF CEDAR BLUFFS** | **310356** | **VILLAGE OF MORSE BLUFF** | **310285** |
| **VILLAGE OF CERESCO** | **310197** | **VILLAGE OF PRAGUE** | **310202** |
| **VILLAGE OF COLON** | **310290** | **SAUNDERS COUNTY UNINCORPORATED AREAS** | **310195** |
| **CITY OF FREMONT** | **310069** | **VILLAGE OF VALPARAISO** | **310203** |
| **VILLAGE OF ITHACA** | **310198** | **CITY OF WAHOO** | **310204** |
| **VILLAGE OF LESHARA** | **310199** | **VILLAGE OF WESTON** | **310205** |
| **VILLAGE OF MALMO** | **310200** | **CITY OF YUTAN** | **310406** |
| **VILLAGE OF MEAD** | **310301** | | |

## Preliminary:

**12/19/2014**

FLOOD INSURANCE STUDY NUMBER
**31155CV000B**

Version Number 2.3.2.2

FEMA

DRAFT

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| Cottonwood Creek near Prague | 07-08 | P |
| Dry Run Creek | 09-10 | P |
| Johnson Creek | 11 | P |
| Platte River (With Levee) | 12-22 | P |
| Platte River (Without Levee) | 23-33 | P |
| Salt Creek | 34-35 | P |
| Sand Creek | 36-38 | P |
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| Tributary to Cottonwood Creek | 40 | P |
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| Wahoo Creek near Ashland | 43 | P |
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**Published Separately**

Flood Insurance Rate Map (FIRM)

**FLOOD INSURANCE STUDY REPORT**
**SAUNDERS COUNTY, NEBRASKA**

# SECTION 1.0 – INTRODUCTION

## 1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after

the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as “Post-FIRM” buildings.

## 1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

The Nebraska State NFIP Coordinator works for the Nebraska Department of Natural Resources and can be reached at (402) 471-2363.

## 1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Saunders County, Nebraska.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

Jurisdictions that have no identified SFHAs as of the effective date of this study are indicated in the table. Changed conditions in these communities (such as urbanization or annexation) or the availability of new scientific or technical data about flood hazards could make it necessary to determine SFHAs in these jurisdictions in the future.

**Table 1: Listing of NFIP Jurisdictions**

| Community | CID | HUC-8 Sub-Basin(s) | Located on FIRM Panel(s) | If Not Included, Location of Flood Hazard Data |
|---|---|---|---|---|
| City of Ashland | 310196 | 10200203 | 31155C0535D | |
| | | | 31155C0545D | |
| | | | 31155C0555D | |
| | | | 31155C0565D | |
| Village of Cedar Bluffs | 310356 | 10200203 | 31155C0075D | |
| | | | 31155C0090D | |
| Village of Ceresco | 310197 | 10200203 | 31155C0500D | Part of the ETJ is included in Lancaster County FIS Report, 2013 |
| | | | 31155C0525D | |

**Table 1: Listing of NFIP Jurisdictions (Continued)**

| Community | CID | HUC-8 Sub-Basin(s) | Located on FIRM Panel(s) | If Not Included, Location of Flood Hazard Data |
|---|---|---|---|---|
| | | | | |
| Village of Colon | 310290 | 10200203 | 31155C0200D | |
| | | | 31155C0225E | |
| City of Fremont | 310069 | 10200202 | * | Dodge County FIS Report, 2008 |
| Village of Ithaca | 310198 | 10200203 | 31155C0375E | |
| Village of Leshara | 310199 | 10200202 | 31155C0235D | |
| | | | 31155C0250D | |
| Village of Malmo | 310200 | 10200203 | 31155C0200D | |
| Village of Mead | 310301 | 10200203 | 31155C0375E | |
| | | | 31155C0400D | |
| Village of Memphis | 310201 | 10200203 | 31155C0535D | |
| | | | 31155C0550D | |
| Village of Morse Bluff | 310285 | 10200202, 10200203 | 31155C0045D | |
| Village of Prague | 310202 | 10200203 | 31155C0155D | |
| | | | 31155C0160D | |
| | | | 31155C0165D | |
| | | | 31155C0170D | |
| Saunders County, Unincorporated Areas | 310195 | 10200201, 10200202, 10200203 | 31155C0025D | |
| | | | 31155C0045D | |
| | | | 31155C0050D | |
| | | | 31155C0075D | |
| | | | 31155C0090D | |
| | | | 31155C0100D | |
| | | | 31155C0125D | |
| | | | 31155C0150D | |
| | | | 31155C0155D | |
| | | | 31155C0160D | |
| | | | 31155C0165D | |
| | | | 31155C0170D | |
| | | | 31155C0200D | |
| | | | 31155C0225E | |
| | | | 31155C0235D | |
| | | | 31155C0250D | |
| | | | 31155C0275D | |
| | | | 31155C0300D | |
| | | | 31155C0325D | |
| | | | 31155C0335E | |
| | | | 31155C0350E | |
| | | | 31155C0355E | |
| | | | 31155C0375E | |
| | | | 31155C0400D | |
| | | | 31155C0425D | |
| | | | 31155C0450D | |
| | | | 31155C0475D | |
| | | | 31155C0500D | |

**Table 1: Listing of NFIP Jurisdictions (Continued)**

| Community | CID | HUC-8 Sub-Basin(s) | Located on FIRM Panel(s) | If Not Included, Location of Flood Hazard Data |
|---|---|---|---|---|
| Saunders County, Unincorporated Areas (Continued) | | | 31155C0525D | |
| | | | 31155C0535D | |
| | | | 31155C0545D | |
| | | | 31155C0550D | |
| | | | 31155C0555D | |
| | | | 31155C0565D | |
| | | | 31155C0575D | |
| Village of Valparaiso | 310203 | 10200203 | 31155C0475D | |
| City of Wahoo | 310204 | 10200203 | 31155C0225E | |
| | | | 31155C0335E | |
| | | | 31155C0350E | |
| | | | 31155C0355E | |
| | | | 31155C0375E | |
| Village of Weston | 310205 | 10200203 | 31155C0325D | |
| | | | 31155C0350E | |
| City of Yutan | 310406 | 10200202, 10200203 | 31155C0250D | |
| | | | 31155C0275D | |
| | | | 31155C0400D | |
| | | | 31155C0425D | |

* Area Not Included

## 1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- 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 a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

  It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data

for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

  The initial Countywide FIS Report for Saunders County became effective on July 19, 1982. Refer to Table 28 for information about subsequent revisions to the FIRMs.

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

| Old Zone | New Zone |
|---|---|
| A1 through A30 | AE |
| B | X (shaded) |
| C | X (unshaded) |

- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available. Refer to Section 2.5.4 for additional information about the LiMWA.

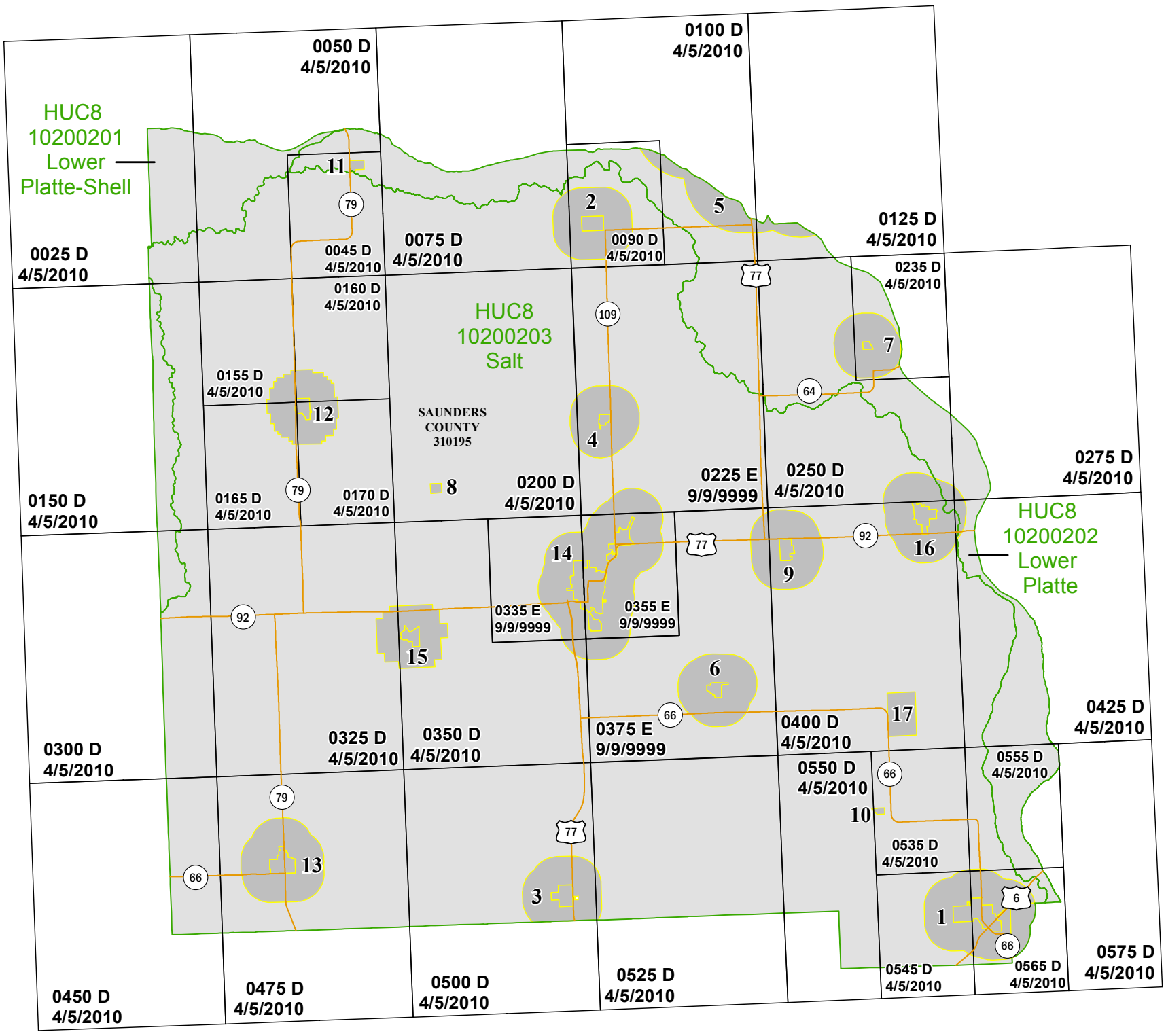
  The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at http://www.fema.gov or contact your appropriate FEMA Regional Office for more information about this program.

- Previous FIS Reports and FIRMs may have included levees that were accredited as reducing the risk associated with the 1% annual chance flood based on the information available and the mapping standards of the NFIP at that time. For FEMA to continue to accredit the identified levees, the levees must meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled "Mapping of Areas Protected by Levee Systems."

  Since the status of levees is subject to change at any time, the user should contact the appropriate agency for the latest information regarding levees presented in Table 9 of this FIS Report. For levees owned or operated by the U.S. Army Corps of Engineers (USACE), information may be obtained from the USACE national levee database. For all other levees, the user is encouraged to contact the appropriate local community.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read

panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at http://www.fema.gov.




| KEY TO POLITICAL AREA LABELING | | | | | |
|---|---|---|---|---|---|
| KEY ID | POLITICAL AREA NAME | CID | KEY ID | POLITICAL AREA NAME | CID |
| 1 | CITY OF ASHLAND | 310196 | 9 | VILLAGE OF MEAD | 310301 |
| 2 | VILLAGE OF CEDAR BLUFFS | 310356 | 10 | VILLAGE OF MEMPHIS | 310201 |
| 3 | VILLAGE OF CERESCO | 310197 | 11 | VILLAGE OF MORSE BLUFF | 310285 |
| 4 | VILLAGE OF COLON | 310290 | 12 | VILLAGE OF PRAGUE | 310202 |
| 5 | CITY OF FREMONT ETJ | 310069 | 13 | VILLAGE OF VALPARAISO | 310203 |
| 6 | VILLAGE OF ITHACA | 310198 | 14 | CITY OF WAHOO | 310204 |
| 7 | VILLAGE OF LESHARA | 310199 | 15 | VILLAGE OF WESTON | 310205 |
| 8 | VILLAGE OF MALMO | 310200 | 16 | CITY OF YUTAN | 310406 |
| | | | 17 | US MILITARY RESERVATION | |

**ATTENTION:** The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before 9/9/9999."

N

1 inch = 24,000 feet 1:288,000

0 6,000 12,000 24,000 36,000 48,000 Feet

Map Projection:
Nebraska State Plane Feet Zone 2600;
North American Datum 1983

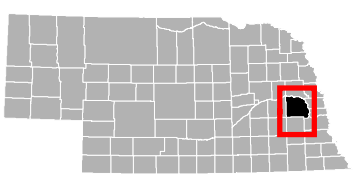
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

**HTTP://MSC.FEMA.GOV**

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
** PANEL NOT PRINTED - AREA NOT INCLUDED

COUNTY LOCATOR



# NATIONAL FLOOD INSURANCE PROGRAM

## FLOOD INSURANCE RATE MAP INDEX

**SAUNDERS COUNTY, USA** and Incorporated Areas

**PANELS PRINTED:**

0025, 0045, 0050, 0075, 0090, 0100, 0125, 0150, 0155, 0160, 0165, 0170, 0200, 0225, 0235, 0250, 0275, 0300, 0325, 0335, 0350, 0355, 0375, 0400, 0425, 0450, 0475, 0500, 0525, 0535, 0545, 0550, 0555, 0565, 0575

FEMA

PRELIMINARY

MAP NUMBER
31155CIND0B

MAP REVISED

**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 Map Service Center website at http://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 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 Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 29 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 Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

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

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

**Figure 2. FIRM Notes to Users**

PROJECTION INFORMATION: The projection used in the preparation of the map was Nebraska State Plane Coordinate System of 1983, FIPS 2600. 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 http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

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

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 32 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided by Nebraska Department of Natural Resources (NDNR). The aerial photography was photogrammetrically compiled at a scale of 1:12,000 from aerial photography dated 1999 or later. For information about base maps, refer to Section 6.2 “Base Map” 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.

**Figure 2. FIRM Notes to Users**

## NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Saunders County, Nebraska, USA, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 29 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.

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.

**Figure 3: Map Legend for FIRM**

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

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

**Figure 3: Map Legend for FIRM**

| | |
|---|---|
| | **Non-encroachment zone (see Section 2.4 of this FIS Report for more information)** |
| **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 |
| **GENERAL STRUCTURES** | |
| *Aqueduct*<br>*Channel*<br>*Culvert*<br>*Storm Sewer* | Channel, Culvert, Aqueduct, or Storm Sewer |
| *Dam*<br>*Jetty*<br>*Weir* | Dam, Jetty, Weir |

**Figure 3: Map Legend for FIRM**

| | |
|---|---|
| | Levee, Dike, or Floodwall accredited or provisionally accredited to reduce the flood risk from the 1% annual chance flood. |
| | Levee, Dike or Floodwall not accredited to reduce the flood risk from the 1% annual chance flood. |
| *Bridge* | Bridge |
| **COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA):** *CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.* | |
| **CBRS AREA 09/30/2009** | Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway. |
| **OTHERWISE PROTECTED AREA 09/30/2009** | Otherwise Protected Area |
| **REFERENCE MARKERS** | |
| 22.0 | River mile Markers |
| **CROSS SECTION & TRANSECT INFORMATION** | |
| B 20.2 | Lettered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 5280 21.1 | Numbered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 17.5 | Unlettered Cross Section with Regulatory Water Surface Elevation (BFE) |
| 8 | Coastal Transect |
| | Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation. |
| | Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping. |
| 513 | Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available) |
| **ZONE AE (EL 16)** | Static Base Flood Elevation value (shown under zone label) |

**Figure 3: Map Legend for FIRM**

| | |
|---|---|
| **ZONE AO (DEPTH 2)** | Zone designation with Depth |
| **ZONE AO (DEPTH 2) (VEL 15 FPS)** | Zone designation with Depth and Velocity |
| **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) |

# SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

## 2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and the Nebraska Department of Natural Resources (NDNR) as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 24), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 3 and Table 4 indicate the flood zone designations for each flooding source and each community within Saunders County, Nebraska, USA, respectively.

Table 3, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 14. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

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. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

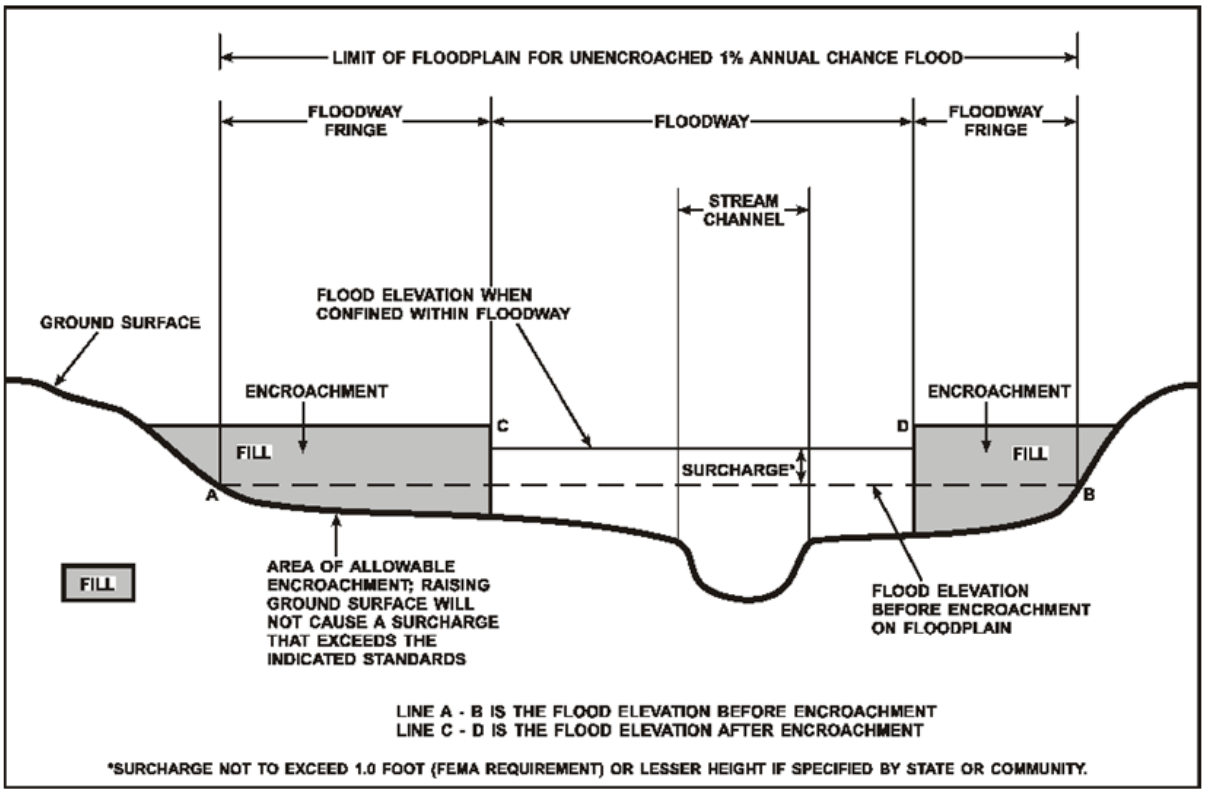
## 2.2 Floodways

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 balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance 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 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

**Figure 4: Floodway Schematic**



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 25, “Floodway Data.”

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and l% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

**Table 2: Flooding Sources Included in this FIS Report**

| Flooding Source | Community | Downstream Limit | Upstream Limit | HUC-8 Sub-Basin(s) | Length (mi) (streams or coastlines) | Area ($mi^2$) (estuaries or ponding) | Floodway (Y/N) | Zone shown on FIRM | Date of Analysis |
|---|---|---|---|---|---|---|---|---|---|
| Clear Creek near Ashland | City of Ashland | Confluence with Wahoo Creek | At County Road A | 10200203 | 0.87 | 59.00 | Y | AE | 10/1/1980 |
| Clear Creek near Ashland | City of Ashland | 28,849 Feet above confluence with Wahoo Creek | 40,700 Feet above confluence with Wahoo Creek | 10200203 | 2.44 | 59.00 | Y | AE | 10/1/1980 |
| Clear Creek near Yutan | City of Yutan | 15,500 Feet above confluence with Platte River | At Avenue D; 30,000 Feet above confluence with Platte River | 10200202, 10200203 | 2.75 | 21.20 | Y | AE | 2/1/1981 |
| Cottonwood Creek near Wahoo | City of Wahoo | Confluence with Wahoo Creek | County Road L | 10200203 | 2.93 | 54.67 | Y | AE | 8/14/2014 |
| Cottonwood Creek near Prague | City of Prague | 79,518 Feet above confluence with Wahoo Creek | 93,925 Feet above confluence with Wahoo Creek | 10200203 | 2.72 | | Y | AE | 4/1/2006 |
| Dry Run Creek | City of Wahoo | Confluence with Cottonwood Creek | County Road N | 10200203 | 3.97 | 6.41 | Y | AE | 8/14/2014 |
| Johnson Creek | City of Ashland | Confluence with Clear Creek near Ashland | County Road G; 3,700 Feet about the confluence of Clear Creek near Ashland | 10200203 | 0.70 | 21.20 | Y | AE | 5/1/1981 |
| Platte River | Saunders County | County Boundary | County Boundary | 10200201, 10200202, 10200203 | 53.41 | 82,900.00 | Y | AE | 7/1/2003 |
| Salt Creek | City of Ashland | County Boundary; 7,700 Feet above confluence with Platte River | County Road G; 37,320 Feet Feet above confluence with Platte River | 10200203 | 5.61 | 1,640.00 | Y | AE | 10/1/1980 |
| Sand Creek | City of Wahoo | Confluence with Wahoo Creek | County Road M/Lake Wanahoo | 10200203 | 6.21 | 94.43 | Y | AE | 8/14/2014 |

**Table 2: Flooding Sources Included in this FIS Report (Continued)**

| Flooding Source | Community | Downstream Limit | Upstream Limit | HUC-8 Sub-Basin(s) | Length (mi) (streams or coastlines) | Area (mi2) (estuaries or ponding) | Floodway (Y/N) | Zone shown on FIRM | Date of Analysis |
|---|---|---|---|---|---|---|---|---|---|
| Silver Creek | City of Ashland | Confluence with Clear Creek Near Ashland | 5,700 feet above the confluence with Clear Creek Near Ashland | 10200203 | 1.07 | 8.00 | Y | AE | 10/1/1980 |
| Tributary to Cottonwood Creek | City of Ashland | 2,660 Feet above confluence with Cottonwood Creek | County Road 28; 10,800 Feet above confluence with Cottonwood Creek | 10200203 | 1.54 | 10.10 | Y | AE | 5/1/1981 |
| Upper Clear Creek | City of Yutan | Confluence with Clear Creek near Yutan | County Road O; 12,545 Feet above confluence with Clear Creek near Yutan | 10200203 | 2.40 | 15.60 | Y | AE | 2/1/1981 |
| Wahoo Creek at Wahoo | City of Wahoo | County Road 15 | County Road 19 | 10200203 | 9.40 | 163.26 | Y | AE | 8/14/2014 |
| Wahoo Creek at Ashland | City of Ashland | Confluence with Salt Creek | County Road A; 21,250 feet above the confluence with Salt Creek | 10200203 | 4.02 | 511.00 | Y | AE | 10/1/1980 |

## 2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

## 2.4 Non-Encroachment Zones

Some States and communities use non-encroachment zones to manage floodplain development. While not a FEMA designated floodway, the non-encroachment zone represents that area around the stream that should be reserved to convey the 1% annual chance flood event.

Non-encroachment determinations may be delineated where it is not possible to delineate floodways because specific channel profiles with bridge and culvert geometry were not developed. Any non-encroachment determinations for this Flood Risk Project have been tabulated for selected cross sections and are shown in Table 26, “Flood Hazard and Non-Encroachment Data for Selected Streams.”

## 2.5 Coastal Flood Hazard Areas

### 2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

**Figure 5: Wave Runup Transect Schematic**

**[Not Applicable to this Flood Risk Project]**

### 2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

### 2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

**Figure 6: Coastal Transect Schematic**
**[Not Applicable to this Flood Risk Project]**

### 2.5.4 Limit of Moderate Wave Action

## SECTION 3.0 – INSURANCE APPLICATIONS

### 3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, "Map Legend for FIRM." Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 4 lists the flood insurance zones in the unincorporated and incorporated areas of Saunders County.

**Table 3: Flood Zone Designations by Community**

| Community | Flood Zone(s) |
|---|---|
| Saunders County, Unincorporated Areas | AE, A, X, AO |
| City of Ashland | AE, A, X |
| Village of Cedar Bluffs | A, X |
| Village of Ceresco | A, X |
| Village of Colon | A, X |
| City of Fremont | AREA NOT INCLUDED |
| Village of Ithaca | A, X |
| Village of Leshara | AE, A, X |
| Village of Malmo | A, X |
| Village of Mead | A, X |
| Village of Memphis | A, X |
| Village of Morse Bluff | AE, X |
| Village of Prague | AE, A, X |
| Village of Valparaiso | A, X |
| City of Wahoo | AE, A, X |
| Village of Weston | A, X |
| City of Yutan | AE, A, X |

### 3.2 Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 was established by Congress to create areas along the Atlantic and Gulf coasts and the Great Lakes, where restrictions for Federal financial assistance including flood insurance are prohibited. In 1990, Congress passed the Coastal Barrier Improvement Act (CBIA), which increased the extent of areas established by the CBRA and

added “Otherwise Protected Areas” (OPA) to the system. These areas are collectively referred to as the John. H Chafee Coastal Barrier Resources System (CBRS). The CBRS boundaries that have been identified in the project area are in Table 5, “Coastal Barrier Resource System Information.”

**Table 4: Coastal Barrier Resources System Information**

**[Not Applicable to this Flood Risk Project]**

## SECTION 4.0 – AREA STUDIED

### 4.1 Basin Description

Table 6 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

**Table 5: Basin Characteristics**

| HUC-8 Sub-Basin Name | HUC-8 Sub-Basin Number | Primary Flooding Source | Description of Affected Area | Drainage Area (square miles) |
|---|---|---|---|---|
| Lower Platte-Shell | 10200201 | Platte River | Begins east of Petersburg, Nebraska and follows Shell Creek to the Platte River confluence near Schuyler, emptying into the Lower Platte watershed near North Bend. This watershed covers the northwest corner and half of the western boundary of Saunders County. | 21 |
| Lower Platte | 10200202 | Platte River | Begins at the Lower Platte-Shell confluence and ends in the Missouri and Platte River confluence. This watershed covers the north and east boundaries of Saunders County. | 81 |
| Salt | 10200203 | Salt Creek | Largest watershed within Saunders County, encompassing almost the entire county. | 657 |

### 4.2 Principal Flood Problems

Table 7 contains a description of the principal flood problems that have been noted for Saunders County by flooding source.

**Table 6: Principal Flood Problems**

| Flooding Source | Description of Flood Problems |
|---|---|
| All sources | Both the 1960 and 1978 floods caused extensive property damage and economic loss in Saunders County. Crops, livestock, residences, farm buildings and property, roads, highways, railroads, and bridges were all affected by these floods. |
| Cottonwood Creek | On Cottonwood Creek and the Tributary to Cottonwood Creek, the two largest floods in recent history occurred in 1959 and 1963. Both floods caused extensive property damage in the Prague area. No discharge measurements are available for these floods. Both floods resulted from intense, localized thunderstorms centered over the Cottonwood Creek watershed. According to local newspaper reports, the 1959 flood resulted from a storm which produced greater than 12 inches of rainfall over most of the watershed. A storm of this magnitude could result in a flood having a recurrence interval greater than 0.2-percent-annual-chance. |
| Platte River | The Platte River has historically been a source of flooding problems in Saunders County. In recent history, major floods have occurred in the years 1944, 1947, 1948, 1949, 1950, 1960, 1962, 1966, 1967, 1971, 1978, and 1993. Most of these floods have resulted from rapid snowmelt runoff and ice jams. Flooding has also resulted, however, from widespread, heavy precipitation over large portions of the Platte River basin. The flood of record for the Platte River in Saunders County is the flood of March 1960. This flood resulted from rapid melting of an extensive snow cover, light to moderate precipitation, and ice jams. The peak discharge recorded for this flood at the USGS gaging station (No. 06796000) on the Platte River at North Bend, Nebraska, was 112,000 cfs. The recurrence interval for a flood of this magnitude is approximately 1.2-percent-annual chance. Another major flood occurred on the Platte River in March 1978. This flood was also the result of rapid snowmelt and ice jams. The peak discharge recorded at North Bend was 80,000 cfs, which would have a recurrence interval of approximately 4-percent-annual-chance. The maximum stage recorded at North Bend for the 1978 flood was 5.5 feet higher than that of the 1960 flood, and is the highest stage ever recorded. The major factor that aggravates flooding from the Platte River in Saunders County is ice jams. In the Platte River basin, ice jams most often occur when weather conditions cause breakup of ice cover in the upstream portions of the river prior to the downstream portions. This results in flood waters being forced out of the clogged main channel and into the surrounding floodplain areas. Ice jams may cause river stages for a given flood to be five to ten feet higher than would be experienced for open water conditions. Ice jams may occur anywhere along the river and may occur at several locations during the same flood. Flooding from the Platte River may also be aggravated by levees and by roads and railroads that act as levees. Floodwaters overtopping levees are prevented from returning to the main channel, thus, prolonging the effects of the flooding in the areas behind the levees. |
| Salt Creek | Salt Creek and Wahoo Creek have long histories of flooding in Saunders County. Major floods have occurred in 1908, 1947, 1948, 1949, 1951, 1958, 1960, 1963, 1964, 1965, 1967 and 1973. The largest flood of record at the Salt Creek at Ashland, Nebraska gage (No. 06805000) is the flood of June 25, 1963. The recorded peak discharge for this flood was 87,000 cfs. The recurrence interval for a flood of this magnitude is approximately 1.3 percent-annual-chance. |

**Table 6: Principal Flood Problems (Continued)**

| Flooding Source | Description of Flood Problems |
|---|---|
| Tributary to Cottonwood Creek | On Cottonwood Creek and the Tributary to Cottonwood Creek, the two largest floods in recent history occurred in 1959 and 1963. Both floods caused extensive property damage in the Prague area. No discharge measurements are available for these floods. Both floods resulted from intense, localized thunderstorms centered over the Cottonwood Creek watershed. According to local newspaper reports, the 1959 flood resulted from a storm which produced greater than 12 inches of rainfall over most of the watershed. A storm of this magnitude could result in a flood having a recurrence interval greater than 0.2-percent-annual-chance. |
| Wahoo Creek | Salt Creek and Wahoo Creek have long histories of flooding in Saunders County. Major floods have occurred in 1908, 1947, 1948, 1949, 1951, 1958, 1960, 1963, 1964, 1965, 1967 and 1973. The largest flood of record at the Salt Creek at Ashland, Nebraska gage (No. 06805000) is the flood of June 25, 1963. The recorded peak discharge for this flood was 87,000 cfs. The recurrence interval for a flood of this magnitude is approximately 1.3-percent-annual-chance. |

Table 8 contains information about historic flood elevations in the communities within Saunders County.

**Table 7: Historic Flooding Elevations**

| Flooding Source | Location | Historic Peak (Feet NGVD29) | Event Date | Approximate Recurrence Interval (years) | Source of Data |
|---|---|---|---|---|---|
| Wahoo Creek | USGS Gaging Station at Ithaca, NE | 1133.7 | 08/02/1959 | * | USGS gage |

## 4.3 Non-Levee Flood Protection Measures

Table 9 contains information about non-levee flood protection measures within Saunders County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

**Table 8: Non-Levee Flood Protection Measures**

| Flooding Source | Structure Name | Type of Measure | Location | Description of Measure |
|---|---|---|---|---|
| Clear Creek | * | Dam | Near Ashland in the Johnson Creek Watershed. | Controls discharges from 17.6 square miles of the watershed. |
| Cottonwood Creek | Cottonwood Creek 7-A, 8-D, 21-A, 22-A, 23-A, 32-A, 41-A, 42-A | Dam | Along tributaries to Cottonwood Creek upstream of Wahoo. | 8 dams constructed as part of a watershed improvement project. The dams attenuate flows for approximately 17.5 square miles of the Cottonwood Creek Watershed upstream of Wahoo. |
| Tributary to Cottonwood Creek | Cottonwood Creek 6-B, 6-C, 6-D, and 6-E | Dam | Watershed of the Tributary to Cottonwood Creek | Four dams control discharges from 6.2 square miles of watershed and provide an estimated 25% reduction in the 1-percent-annual-chance flood discharge on Cottonwood Creek. |
| Salt Creek | * | Dam | In the upper reaches of the Salt Creek basin. | 10 flood control dams were constructed by USACE. |
| Salt Creek and Wahoo Creek | * | Dam | The Salt Creek and Wahoo Creek basins. | A number of dams were constructed by the Soil Conservation Service. |
| Sand Creek | Sand Creek Site 13, Site 15, Site 16, and Site 24; Duck Creek Site 2, Site 3, and Site 6; Lake Wanahoo | Dam | Small dams in the upper reaches of the Sand Creek and Duck Creek basins upstream of Wahoo. Lake Wanahoo is placed along Sand Creek near Wahoo. | 8 dams constructed as part of a watershed improvement project. The dams attenuate flows for approximately 97.9 square miles of the Sand Creek Watershed upstream of Lake Wanahoo. |

## 4.4 Levees

For purposes of the NFIP, FEMA only recognizes levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with comprehensive floodplain management criteria. The Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10) describes the information needed for FEMA to determine if a levee system reduces the risk from the 1% annual chance flood. This information must be supplied to FEMA by the community or other party when a flood risk study or restudy is conducted, when FIRMs are revised, or upon FEMA request. FEMA reviews the information for the purpose of establishing the appropriate FIRM flood zone.

Levee systems that are determined to reduce the risk from the 1% annual chance flood are accredited by FEMA. FEMA can also grant provisional accreditation to a levee system that was previously accredited on an effective FIRM and for which FEMA is awaiting data and/or documentation to demonstrate compliance with Section 65.10. These levee systems are referred to as Provisionally Accredited Levees, or PALs. Provisional accreditation provides communities and levee owners with a specified timeframe to obtain the necessary data to confirm the levee's certification status. Accredited levee systems and PALs are shown on the FIRM using the symbology shown in Figure 3 and in Table 10. If the required information for a PAL is not submitted within the required timeframe, or if information indicates that a levee system not longer meets Section 65.10, FEMA will de-accredit the levee system and issue an effective FIRM showing the levee-impacted area as a SFHA.

FEMA coordinates its programs with USACE, who may inspect, maintain, and repair levee systems. The USACE has authority under Public Law 84-99 to supplement local efforts to repair flood control projects that are damaged by floods. Like FEMA, the USACE provides a program to allow public sponsors or operators to address levee system maintenance deficiencies. Failure to do so within the required timeframe results in the levee system being placed in an inactive status in the USACE Rehabilitation and Inspection Program. Levee systems in an inactive status are ineligible for rehabilitation assistance under Public Law 84-99.

FEMA coordinated with the USACE, the local communities, and other organizations to compile a list of levees that exist within Saunders County. Table 10, "Levees," lists all accredited levees, PALs, and de-accredited levees shown on the FIRM for this FIS Report. Other categories of levees may also be included in the table. The Levee ID shown in this table may not match numbers based on other identification systems that were listed in previous FIS Reports. Levees identified as PALs in the table are labeled on the FIRM to indicate their provisional status.

Please note that the information presented in Table 10 is subject to change at any time. For that reason, the latest information regarding any USACE structure presented in the table should be obtained by contacting USACE and accessing the USACE national levee database. For levees owned and/or operated by someone other than the USACE, contact the local community shown in Table 32.

**Table 9: Levees**

| Community | Flooding Source | Levee Location | Levee Owner | USACE Levee | Levee ID | Covered Under PL84-99 Program? | FIRM Panel(s) | Levee Status |
|---|---|---|---|---|---|---|---|---|
| Saunders County, Unincorporated Areas | PLATTE RIVER | From approximately 1 mile east of State Highway 79 to approximately 2 miles west of State Highway 79 | Morse Bluff Drainage District | * | 31155C_13 | * | 31155C0045D, 31155C0050D | * |
| Saunders County, Unincorporated Areas | PLATTE RIVER | approximately 1.5 miles north of State Highway 92 to the Village of Leshara | Platte Valley Drainage District | * | 31155C_15 | * | 31155C0235D, 31155C0250D, 31155C0275D | * |
| Saunders County, Unincorporated Areas | CLEAR CREEK | National Guard camp near Ashland to approximately 2 miles south of State Highway 92 | Clear Creek Drainage District | * | 31155C_16 | * | 31155C0425D, 31155C0555D | * |
| Saunders County, Unincorporated Areas | PLATTE RIVER | A levee owned by Woodcliff connects with the Leshara levee and extends to the Burlington Northern & Santa Fe Railway bridge southeast of Fremont. | Woodcliff | * | 31155C_9 and 31155C_6 | * | 31155C0125D, 31155C0235D, 31155C0250D | * |
| Saunders County, Unincorporated Areas and Village of Leshara | PLATTE RIVER | From Leshara to Woodcliff | Leshara Drainage District | * | 31155C_7 and 31155C_8 | * | 31155C0125D, 31155C0235D, 31155C0250D | * |
| Village of Leshara | OTOE CREEK | Along the straightened channels | Unknown | * | 31155C_14 | * | 31155C0235D | * |
| Village of Leshara | OTOE CREEK | Along the straightened channels | Unknown | * | 31155C_17 | * | 31155C0235D | * |

## SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 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-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 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.

The engineering analyses described here incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 28, “Incorporated Letters of Map Change”, which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, “FIRM Revisions.”

### 5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 14. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 11. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 12. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 18.) Stream gage information is provided in Table 13.

**Table 10: Summary of Discharges**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance Existing | 1% Annual Chance Future | 0.2% Annual Chance |
| CLEAR CREEK NEAR ASHLAND | At confluence with Wahoo Creek | 59.00 | 4,180 | * | 7,010 | 8,610 | * | 12,400 |
| CLEAR CREEK NEAR ASHLAND | Just upstream of confluence of Silver Creek | 50.70 | 3,770 | * | 6,260 | 7,600 | * | 10,800 |
| CLEAR CREEK NEAR ASHLAND | Just upstream of County Road E | 42.70 | 3,520 | * | 5,860 | 7,110 | * | 10,110 |
| CLEAR CREEK NEAR ASHLAND | Approximately 3,000 feet upstream of County Road E | 32.30 | 2,190 | * | 3,680 | 4,480 | * | 6,390 |
| CLEAR CREEK NEAR ASHLAND | Just upstream of confluence of Johnson Creek | 10.40 | 1,570 | * | 2,650 | 3,230 | * | 4,610 |
| CLEAR CREEK NEAR YUTAN | Approximately 1,850 feet downstream of confluence of Upper Clear Creek | 21.20 | 7,470 | * | 9,910 | 11,480 | * | 14,540 |
| CLEAR CREEK NEAR YUTAN | Just upstream of confluence of Upper Clear Creek | 5.40 | 3,350 | * | 4,530 | 5,280 | * | 6,820 |
| CLEAR CREEK NEAR YUTAN | Approximately 1,900 feet upstream of Union Pacific Railroad | 3.40 | 2,730 | * | 3,750 | 4,380 | * | 5,650 |
| CLEAR CREEK NEAR YUTAN | Approximately 2,950 feet upstream of Union Pacific Railroad | 2.70 | 2,290 | * | 3,150 | 3,680 | * | 4,740 |
| COTTONWOOD CREEK NEAR PRAGUE | Approximately 50 feet upstream of County Road R | * | 2,800 | * | 5,000 | 6,100 | * | 9,900 |

**Table 10: Summary of Discharges (Continued)**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance Existing | 1% Annual Chance Future | 0.2% Annual Chance |
| COTTONWOOD CREEK NEAR PRAGUE | Approximately 3,775 feet upstream of State Highway 79 | * | 740 | * | 1,120 | 1,300 | * | 1,730 |
| COTTONWOOD CREEK NEAR WAHOO | At confluence with Wahoo Creek | 54.67 | 3,134 | 4,424 | 5,565 | 6,947 | * | 12,230 |
| COTTONWOOD CREEK NEAR WAHOO | At U.S. Highway 77 | 48.22 | 2,626 | 3,858 | 4,952 | 6,246 | * | 10,783 |
| COTTONWOOD CREEK NEAR WAHOO | At Wahoo ETJ Limits | 46.51 | 2,537 | 3,726 | 4,781 | 6,030 | * | 10,417 |
| DRY RUN CREEK | At confluence with Cottonwood Creek | 6.41 | 1,071 | 1,456 | 1,785 | 2,141 | * | 3,084 |
| JOHNSON CREEK | At confluence with Clear Creek near Ashland | 21.20 | 890 | * | 1,490 | 1,810 | * | 2,570 |
| PLATTE RIVER | At North Bend Gage (No. 06796000) | 82,900.00 | 62,000 | * | 106,000 | 132,000 | * | 220,000 |
| SALT CREEK | Approximately 3,200 feet downstream of U.S. Highway 6 | 1,640.00 | 37,500 | * | 74,000 | 98,000 | * | 180,000 |
| SALT CREEK | Just upstream of confluence of Wahoo Creek | 1,129.00 | 33,100 | * | 63,000 | 78,400 | * | 106,000 |
| SAND CREEK | At Lake Wanahoo Outlet | 86.94 | 6,930 | 7,866 | 8,673 | 9,178 | * | 15,469 |
| SILVER CREEK | At confluence with Clear Creek near Ashland | 8.00 | 1,980 | * | 3,000 | 3,450 | * | 4,650 |

**Table 10: Summary of Discharges (Continued)**

| Flooding Source | Location | Drainage Area (Square Miles) | Peak Discharge (cfs) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance Existing | 1% Annual Chance Future | 0.2% Annual Chance |
| TRIBUTARY TO COTTONWOOD CREEK | At confluence with Cottonwood Creek | 10.10 | 1,880 | * | 2,750 | 3,070 | * | 4,150 |
| TRIBUTARY TO COTTONWOOD CREEK | Approximately 6,335 feet upstream of confluence with Cottonwood Creek | 9.40 | 1,680 | * | 2,480 | 2,820 | * | 3,710 |
| TRIBUTARY TO COTTONWOOD CREEK | Approximately 2,100 feet downstream of County Road 28 | 9.10 | 1,640 | * | 2,390 | 2,720 | * | 3,580 |
| TRIBUTARY TO COTTONWOOD CREEK | Just downstream of County Road 28 | 5.50 | 1,500 | * | 2,190 | 2,480 | * | 3,270 |
| UPPER CLEAR CREEK | At confluence with Clear Creek | 15.60 | 3,040 | * | 4,160 | 4,830 | * | 6,100 |
| WAHOO CREEK NEAR ASHLAND | At confluence with Salt Creek | 511.00 | 11,600 | * | 33,000 | 49,000 | * | 104,000 |
| WAHOO CREEK NEAR ASHLAND | Approximately 1,250 feet upstream of Burlington Northern & Santa Fe Railway | 415.00 | 12,400 | * | 35,400 | 53,000 | * | 108,000 |
| WAHOO CREEK NEAR WAHOO | At Wahoo ETJ Limits | 156.16 | 12,177 | 17,557 | 22,365 | 27,855 | * | 44,088 |
| WAHOO CREEK NEAR WAHOO | At South Chestnut Street | 152.98 | 13,065 | 18,955 | 24,238 | 30,259 | * | 48,318 |
| WAHOO CREEK NEAR WAHOO | At U.S. Highway 77 | 96.56 | 10,073 | 14,561 | 18,580 | 23,094 | * | 35,673 |

*Not calculated for this Flood Risk Project

**Figure 7: Frequency Discharge-Drainage Area Curves**

**[Not Applicable to this Flood Risk Project]**

**Table 11: Summary of Non-Coastal Stillwater Elevations**

| Flooding Source | Location | Elevations (feet NAVD88) | | | | |
|---|---|---|---|---|---|---|
| | | 10% Annual Chance | 4% Annual Chance | 2% Annual Chance | 1% Annual Chance | 0.2% Annual Chance |
| Lake Wanahoo | Wahoo | 1213.4 | 1215.2 | 1216.7 | 1218.4 | 1221.7 |

**Table 12: Stream Gage Information used to Determine Discharges**

| Flooding Source | Gage Identifier | Agency that Maintains Gage | Site Name | Drainage Area (Square Miles) | Period of Record | |
|---|---|---|---|---|---|---|
| | | | | | From | To |
| Platte River | 6805500 | USGS | Platte River at Louisville | 85,370.00 | 1954 | 1994 |
| Platte River | 6801000 | USGS | Platte River near Ashland | 83,600.00 | 1929 | 1960 |
| Platte River | 6801000 | USGS | Platte River near Ashland | 83,600.00 | 1989 | 1994 |
| Platte River | 6796000 | USGS | Platte River at North Bend | 70,400.00 | 1950 | 1994 |
| Platte River | 6774000 | USGS | Platte River at Duncan | 59,300.00 | 1942 | 1994 |
| Platte River | 6770500 | USGS | Platte River at Grand Island | 57,650.00 | 1942 | 1994 |
| Salt Creek | 6803555 | USGS | Salt Creek at Ashland, Nebraska | 1,050.00 | 1947 | 1967 |
| Salt Creek | 6805000 | USGS | Salt Creek at Greenwood, Nebraska | 1,640.00 | 1952 | 1980 |
| Wahoo Creek | 6804000 | USGS | Wahoo Creek at Ithaca, Nebr. | 273.00 | 2/28/1950 | 5/20/2011 |

## 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate

properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 25, “Floodway Data.”

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 14. Roughness coefficients are provided in Table 15. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

**Table 13: Summary of Hydrologic and Hydraulic Analyses**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Clear Creek Near Yutan | 15,500 Feet above confluence with Platte River | At Avenue D; 30,000 Feet above confluence with Platte River | SCS TR-20 | HEC-2 | 2/1/1981 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40, the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Clear Creek Near Ashland | Confluence with Wahoo Creek | 40,700 Feet above confluence with Wahoo Creek | SCS TR-20 | HEC-2 | 10/1/1980 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40, the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Cottonwood Creek near Wahoo | Confluence with Wahoo Creek | County Road L | HEC-HMS 3.5 | HEC-RAS 4.1.0 | 8/14/2014 | AE w/ Floodway | |
| Cottonwood Creek near Prague | 79,518 Feet above confluence with Wahoo Creek | 93,925 Feet above confluence with Wahoo Creek | Cordes and Hotchkiss Regression Equations | HEC-RAS 3.1.2 | 4/1/2006 | AE w/ Floodway | |
| Dry Run Creek | Confluence with Cottonwood Creek | County Road N | HEC-HMS 3.5 | HEC-RAS 4.1.0 | 8/14/2014 | AE w/ Floodway | |

**Table 13 Summary of Hydrologic and Hydraulic Analyses (Continued)**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Johnson Creek | Confluence with Clear Creek near Ashland | County Road G; 3,700 Feet about the confluence of Clear Creek near Ashland | SCS TR-20 | HEC-2 | 5/1/1981 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40 (Reference 14), the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Platte River (without Levee) | Hwy 6 | 150350 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PLRV1 - assumes levees on the left and right bank failed. PLRV1 was also used for the floodway modeling. |
| Platte River (without Levee) | 150350 | 158450 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PLRV3 - assumes levees on the left and right bank failed. |
| Platte River (without Levee) | 158450 | 161550 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | Backwater areas are the transition areas between no levees and areas with levees that are assumed to fail. PLRV3 - assumes levees on the left and right bank failed. |
| Platte River (without Levee) | 161550 | 208475 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PLRV3 - assumes levees on the left and right bank failed. |
| Platte River (without Levee) | 208475 | HWY 92 (217200) | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PRMID1 - there are no levees in this reach, PRMID1 is the base flood and floodway model. |
| Platte River (without Levee) | HWY 92 | 228225 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRMID3 – assumes left levees hold and right levees fail |

**Table 13: Summary of Hydrologic and Hydraulic Analyses (Continued)**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Platte River (without Levee) | 229600 | 231750 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | Backwater areas are the transition areas between no levees and areas with levees that are assumed to fail. PRMID2 – assumes right levee failure and spill over the Union Pacific Railroad embankment to the Elkhorn River on the left overbank. |
| Platte River (without Levee) | 228225 | 260100 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PRMID3 – assumes left levees hold and right levees fail |
| Platte River (without Levee) | 261900 | 263700 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRMID3 – assumes left levees hold and right levees fail |
| Platte River (without Levee) | 263700 | 265575 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | Backwater areas are the transition areas between no levees and areas with levees that are assumed to fail. |
| Platte River (without Levee) | 267250 | 284200 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PRMID3 – assumes left levees hold and right levees fail |
| Platte River (without Levee) | 228625 | 296685 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRMID3 – assumes left levees hold and right levees fail |
| Platte River (without Levee) | 296685 | 337900 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRMID3 – assumes left levees hold and right levees fail |

**Table 13: Summary of Hydrologic and Hydraulic Analyses (Continued)**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Platte River (without Levee) | 337900 | HWY79 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRNBUNC – no levees along the right overbank – unconfined flow |
| Platte River (without Levee) | HWY79 | 385650 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | Backwater areas are the transition areas between no levees and areas with levees that are assumed to fail. PRNBUNC – no levees along the right overbank – unconfined flow |
| Platte River (without Levee) | 385650 | 392000 | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | PRNBUNC – no levees along the right overbank – unconfined flow |
| Platte River (without Levee) | 392000 | County line | Bulletin 17B Analysis using HEC-FFA | HEC-2 | 7/1/2003 | AE w/ Floodway | "CP" stands for the combined probability method for determining ice-affected flood depths. PRNBUNC – no levees along the right overbank – unconfined flow |
| Salt Creek | County Boundary; 7,700 Feet above confluence with Platte River | County Road G; 37,320 Feet Feet above confluence with Platte River | Peak discharge-frequency relationships | HEC-2 | 10/1/1980 | AE w/ Floodway | Peak discharge-frequency relationships for Salt Creek were developed from recorded peak discharges at the USGS gaging stations at Ashland, Nebraska (No. 06805000) and at Greenwood, Nebraska (No. 06803555). |
| Sand Creek | Confluence with Wahoo Creek | County Road M/ Lake Wanahoo | HEC-HMS 3.5 | HEC-RAS 4.1.0 | 8/14/2014 | AE w/ Floodway | The impact of the Lake Wanahoo Dam is included. |

**Table 13: Summary of Hydrologic and Hydraulic Analyses (Continued)**

| Flooding Source | Study Limits Downstream Limit | Study Limits Upstream Limit | Hydrologic Model or Method Used | Hydraulic Model or Method Used | Date Analyses Completed | Flood Zone on FIRM | Special Considerations |
|---|---|---|---|---|---|---|---|
| Silver Creek | Confluence with Clear Creek Near Ashland | 5,700 feet above the confluence with Clear Creek Near Ashland | SCS TR-20 | HEC-2 | 10/1/1980 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40 (Reference 14), the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Tributary to Cottonwood Creek | 2,660 Feet above confluence with Cottonwood Creek | County Road 28; 10,800 Feet above confluence with Cottonwood Creek | SCS TR-20 | HEC-2 | 5/1/1981 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40 (Reference 14), the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Upper Clear Creek | Confluence with Clear Creek near Yutan | County Road O; 12,545 Feet above confluence with Clear Creek near Yutan | SCS TR-20 | HEC-2 | 2/1/1981 | AE w/ Floodway | SCS: The hydrologic model utilized the SCS dimensionless unit hydrograph, U.S. Weather Bureau rainfall-frequency data from TP40 (Reference 14), the SCS rainfall-runoff relationship, the SCS 24-hour, Type II, rainfall distribution, and the Convex method of channel routing. |
| Wahoo Creek Near Wahoo | County Road 19 | County Road 15 | HEC-HMS 3.5 | HEC-RAS 4.1.0 | 8/14/2014 | AE w/ Floodway | |
| Wahoo Creek Near Ashland | Confluence with Salt Creek | County Road A; 21,250 feet above the confluence with Salt Creek | Peak discharge-frequency relationships | HEC-2 | 10/1/1980 | AE w/ Floodway | |

**Table 14: Roughness Coefficients**

| Flooding Source | Channel “n” | Overbank “n” |
|---|---|---|
| Clear Creek near Ashland | 0.035-0.050 | 0.040-0.110 |
| Clear Creek near Yutan | 0.035-0.055 | 0.035-0.060 |
| Cottonwood Creek near Prague | 0.040-0.045 | 0.035-0.150 |
| Cottonwood Creek near Wahoo | 0.035 | 0.035-0.080 |
| Dry Run Creek | 0.034 | 0.034-0.090 |
| Johnson Creek | 0.035-0.040 | 0.040-0.110 |
| Platte River | 0.025-0.030 | 0.050-0.095 |
| Salt Creek | 0.030-0.035 | 0.040-0.100 |
| Sand Creek | 0.035 | 0.035-0.080 |
| Silver Creek | 0.04 | 0.040-0.110 |
| Tributary to Cottonwood Creek | 0.035-0.045 | 0.055-0.085 |
| Upper Clear Creek | 0.040-0.065 | 0.040-0.100 |
| Wahoo Creek near Ashland | 0.035-0.047 | 0.040-0.110 |
| Wahoo Creek near Wahoo | 0.035 | 0.035-0.080 |

## 5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

**Table 15: Summary of Coastal Analyses**

**[Not Applicable to this Flood Risk Project]**

### 5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

**Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas**

**This figure is not applicable to this Flood Risk Project.**

**Table 16: Tide Gage Analysis Specifics**

**[Not Applicable to this Flood Risk Project]**

### 5.3.2 Waves

This section is not applicable to this Flood Risk Project.

### 5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

### 5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

**Table 17: Coastal Transect Parameters**
**[Not Applicable to this Flood Risk Project]**

**Figure 9: Transect Location Map**
**[Not Applicable to this Flood Risk Project]**

## 5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

**Table 18: Summary of Alluvial Fan Analyses**
**[Not Applicable to this Flood Risk Project]**

**Table 19: Results of Alluvial Fan Analyses**
**[Not Applicable to this Flood Risk Project]**

# SECTION 6.0 – MAPPING METHODS

## 6.1 Vertical and Horizontal Control

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 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

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

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

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact information services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Saunders County are provided in Table 21.

**Table 20: Countywide Vertical Datum Conversion**

| Quadrangle Name | Quadrangle Corner | Latitude | Longitude | Conversion from NGVD29 to NAVD88 (feet) |
|---|---|---|---|---|
| Bruno | NE | 41.373 | -96.872 | 0.551 |
| Prague | NE | 41.373 | -96.749 | 0.518 |
| Malmo | NE | 41.373 | -96.624 | 0.502 |
| Colon | NE | 41.373 | -96.498 | 0.489 |
| Loma | NE | 41.248 | -96.872 | 0.551 |
| Touhy | NE | 41.248 | -96.749 | 0.531 |
| Wahoo West | NE | 41.248 | -96.624 | 0.495 |
| Wahoo East | NE | 41.248 | -96.498 | 0.476 |
| Mead | NE | 41.248 | -96.373 | 0.440 |
| Valparaiso SW | NE | 41.123 | -96.872 | 0.561 |
| Valparaiso | NE | 41.123 | -96.749 | 0.528 |
| Ceresco | NE | 41.123 | -96.624 | 0.459 |
| Wahoo SE | NE | 41.123 | -96.498 | 0.397 |
| Ashland West | NE | 41.123 | -96.373 | 0.367 |
| Greenwood | NE | 40.997 | -96.373 | 0.338 |
| Average Conversion from NGVD29 to NAVD88 = 0.48 feet | | | | |

**Table 21: Stream-Based Vertical Datum Conversion**

**[Not Applicable to this Flood Risk Project]**

## 6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Mapping Partners*, Appendix L.

Base map information shown on the FIRM was derived from the sources described in Table 23.

**Table 22: Base Map Sources**

| Data Type | Data Provider | Data Date | Data Scale | Data Description |
|---|---|---|---|---|
| 2012 Digital Orthophoto NAIP Imagery | USDA FSA | 2012 | 1 meter GSD | Color Orthoimagery provided for the City of Wahoo |
| Digital Orthophoto Quarter Quadrangles | NDNR | 1999 | 1:12,000 | Digital Orthophoto Quadrangles were used in all areas besides the City of Wahoo |
| Political boundaries | JEO | 2013 | 1:5,000 | City of Wahoo boundaries |
| Political boundaries | NDOR Map Library | 2000 | * | All areas other than the City of Wahoo |
| Transportation Features | Nebraska Public Service Commission | 2013 | 1:10,000 | Roads and Railroads from the 911 data |
| Surface Water Features | NDNR | 2013 | 1:12,000 | Streams from detailed studies in the City of Wahoo |
| Public Land Survey System (PLSS) | NDNR | 1995 | 1:24,000 | PLSS data were digitized from USGS quadrangles |
| Benchmarks | NGS | 2006 | 1:24,000 | Benchmarks downloaded from NGS website |

## 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 24.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% 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.

The floodway widths 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. Table 3 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 25, “Floodway Data.”

**Table 23: Summary of Topographic Elevation Data used in Mapping**

| Community | Flooding Source | Source for Topographic Elevation Data | | | |
|---|---|---|---|---|---|
| | | Description | Scale | Contour Interval | Citation |
| Saunders County | All within HUCs 10200201, 10200202, 10200203 | Tagged Vector Contours from USGS 7.5 Minute Quads | 1:12,000 | 5-10 ft | NDNR, 2000 |
| City of Wahoo | Wahoo Creek, Sand Creek, Cottonwood Creek, and Dry Run Creek. | LiDAR | * | 2 ft | NRCS, 2010 |

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations.

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 28,849 | 3,712 | 7,544 | 0.9 | 1,077.7 | 1,077.7 | 1,077.9 | 0.2 |
| B | 30,666 | 3,600 | 10,990 | 0.6 | 1,077.9 | 1,077.9 | 1,078.3 | 0.4 |
| C | 31,526 | 2,891 | 7,593 | 0.9 | 1,078.1 | 1,078.1 | 1,078.5 | 0.4 |
| D | 32,901 | 2,300 | 6,347 | 0.7 | 1,078.4 | 1,078.4 | 1,078.9 | 0.5 |
| E | 34,214 | 2,600 | 8,569 | 0.5 | 1,078.9 | 1,078.9 | 1,079.3 | 0.4 |
| F | 35,830 | 2,505[2] | 7,768 | 0.6 | 1,079.1 | 1,079.1 | 1,079.5 | 0.4 |
| G | 38,150 | 3,454[2] | 9,718 | 0.5 | 1,079.3 | 1,079.3 | 1,079.7 | 0.4 |
| H | 39,650 | 3,174[2] | 5,197 | 0.9 | 1,079.4 | 1,079.4 | 1,079.9 | 0.5 |

[1]Feet above confluence with Wahoo Creek

[2]Combined floodway width of Clear Creek near Ashland and Johnson Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: CLEAR CREEK NEAR ASHLAND**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 15,920 | 602 | 3,578 | 3.2 | 1,142.1 | 1,142.1 | 1,143.0 | 0.9 |
| B | 16,170 | 483 | 3,340 | 3.4 | 1,142.3 | 1,142.3 | 1,143.2 | 0.9 |
| C | 17,320 | 546 | 3,751 | 3.1 | 1,143.2 | 1,143.2 | 1,144.0 | 0.8 |
| D | 18,640 | 623[2] | 2,887 | 4.0 | 1,144.2 | 1,144.2 | 1,145.0 | 0.8 |
| E | 19,440 | 311 | 949 | 5.6 | 1,145.7 | 1,145.7 | 1,146.4 | 0.7 |
| F | 19,620 | 41 | 430 | 12.3 | 1,147.5 | 1,147.5 | 1,148.4 | 0.9 |
| G | 19,812 | 185 | 1,536 | 3.4 | 1,152.5 | 1,152.5 | 1,152.5 | 0.0 |
| H | 20,312 | 372 | 2,446 | 2.2 | 1,152.9 | 1,152.9 | 1,153.0 | 0.1 |
| I | 21,412 | 321 | 1,673 | 3.2 | 1,153.5 | 1,153.5 | 1,153.7 | 0.2 |
| J | 22,382 | 395 | 1,630 | 3.2 | 1,154.9 | 1,154.9 | 1,155.4 | 0.5 |
| K | 23,412 | 55 | 488 | 10.8 | 1,157.4 | 1,157.4 | 1,158.2 | 0.8 |
| L | 23,440 | 46 | 480 | 11.0 | 1,158.8 | 1,158.8 | 1,159.2 | 0.4 |
| M | 24,140 | 265 | 1,291 | 4.1 | 1,162.7 | 1,162.7 | 1,163.0 | 0.3 |
| N | 24,564 | 128 | 1,278 | 4.1 | 1,164.1 | 1,164.1 | 1,164.5 | 0.4 |
| O | 25,464 | 428 | 1,522 | 3.5 | 1,165.3 | 1,165.3 | 1,165.7 | 0.4 |
| P | 26,484 | 268 | 970 | 5.4 | 1,167.2 | 1,167.2 | 1,168.2 | 1.0 |
| Q | 27,514 | 318 | 951 | 4.6 | 1,170.7 | 1,170.7 | 1,171.3 | 0.6 |
| R | 29,014 | 150 | 419 | 8.8 | 1,176.9 | 1,176.9 | 1,176.9 | 0.0 |
| S | 29,884 | 404 | 1,523 | 2.4 | 1,180.5 | 1,180.5 | 1,180.9 | 0.4 |

[1]Feet above confluence with Platte River

[2]Combined floodway width of Clear Creek near Yutan and Upper Clear Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: CLEAR CREEK NEAR YUTAN**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| F | 79,518 | 117 | 1,581 | 3.9 | 1,310.5 | 1,310.5 | 1,311.4 | 0.9 |
| G | 79,608 | 94 | 1,307 | 4.7 | 1,312.4 | 1,312.4 | 1,313.1 | 0.7 |
| H | 79,681 | 117 | 1,577 | 3.9 | 1,312.6 | 1,312.6 | 1,313.2 | 0.6 |
| I | 80,230 | 106 | 1,173 | 5.3 | 1,312.9 | 1,312.9 | 1,313.5 | 0.6 |
| J | 81,381 | 78 | 1,039 | 6.0 | 1,314.2 | 1,314.2 | 1,314.9 | 0.7 |
| K | 82,881 | 61 | 783 | 7.9 | 1,316.5 | 1,316.5 | 1,317.2 | 0.7 |
| L | 84,141 | 98 | 1,194 | 5.2 | 1,319.3 | 1,319.3 | 1,319.7 | 0.4 |
| M | 85,227 | 116 | 1,390 | 4.5 | 1,320.4 | 1,320.4 | 1,320.7 | 0.3 |
| N | 86,070 | 70 | 818 | 7.6 | 1,321.2 | 1,321.2 | 1,321.6 | 0.4 |
| O | 86,430 | 55 | 701 | 8.9 | 1,322.0 | 1,322.0 | 1,322.3 | 0.3 |
| P | 87,660 | 72 | 936 | 6.6 | 1,325.0 | 1,325.0 | 1,325.4 | 0.4 |
| Q | 87,709 | 72 | 941 | 6.6 | 1,325.4 | 1,325.4 | 1,325.8 | 0.4 |
| R | 87,749 | 72 | 946 | 6.6 | 1,325.4 | 1,325.4 | 1,325.8 | 0.4 |
| S | 88,390 | 44 | 575 | 2.5 | 1,326.8 | 1,326.8 | 1,327.1 | 0.3 |
| T | 88,977 | 32 | 343 | 4.2 | 1,326.9 | 1,326.9 | 1,327.2 | 0.3 |
| U | 89,433 | 34 | 316 | 4.6 | 1,327.3 | 1,327.3 | 1,327.7 | 0.4 |
| V | 89,525 | 34 | 447 | 3.2 | 1,331.4 | 1,331.4 | 1,331.5 | 0.1 |
| W | 89,562 | 34 | 447 | 3.2 | 1,331.4 | 1,331.4 | 1,331.5 | 0.1 |
| X | 90,621 | 29 | 295 | 4.9 | 1,332.0 | 1,332.0 | 1,332.2 | 0.2 |
| Y | 91,361 | 42 | 374 | 3.9 | 1,332.7 | 1,332.7 | 1,333.0 | 0.3 |
| Z | 92,168 | 61 | 435 | 3.3 | 1,333.5 | 1,333.5 | 1,333.7 | 0.2 |

[1]Feet above confluence with Wahoo Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: COTTONWOOD CREEK NEAR PRAGUE**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| AA | 92,246 | 58 | 414 | 3.5 | 1,334.8 | 1,334.8 | 1,335.0 | 0.2 |
| AB | 92,306 | 58 | 417 | 3.5 | 1,334.8 | 1,334.8 | 1,335.1 | 0.3 |
| AC | 93,028 | 35 | 183 | 7.9 | 1,335.9 | 1,335.9 | 1,336.0 | 0.1 |
| AD | 93,925 | 32 | 198 | 7.3 | 1,341.3 | 1,341.3 | 1,341.4 | 0.1 |

[1]Feet above confluence with Wahoo Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: COTTONWOOD CREEK NEAR PRAGUE**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 3,670 | 6,542 | 5,355 | 1.3 | 1,071.3 | 1,071.3 | 1,072.0 | 0.7 |
| B | 8,870 | 4,405 | 27,484 | 2.2 | 1,071.4 | 1,071.4 | 1,072.1 | 0.7 |
| C | 8,895 | 4,406 | 27,562 | 2.2 | 1,071.4 | 1,071.4 | 1,072.1 | 0.7 |
| D | 12,295 | 3,814 | 22,217 | 2.3 | 1,071.6 | 1,071.6 | 1,072.2 | 0.6 |
| E | 17,495 | 2,913 | 16,225 | 3.1 | 1,073.5 | 1,073.5 | 1,074.1 | 0.6 |

[1]Feet above the confluence of Wahoo Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: COTTONWOOD CREEK NEAR WAHOO**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 3,230 | 259 | 358 | 6.0 | 1,185.7 | 1,185.7 | 1,186.2 | 0.5 |
| B | 3,990 | 120 | 452 | 4.7 | 1,189.3 | 1,189.3 | 1,189.5 | 0.2 |
| C | 4,443 | 240 | 817 | 2.6 | 1,190.9 | 1,190.9 | 1,191.0 | 0.1 |
| D | 5,344 | 266 | 603 | 3.5 | 1,192.4 | 1,192.4 | 1,192.7 | 0.3 |
| E | 5,979 | 248 | 453 | 4.7 | 1,194.0 | 1,194.0 | 1,194.1 | 0.1 |
| F | 6,443 | 271 | 563 | 3.8 | 1,195.7 | 1,195.7 | 1,195.9 | 0.2 |
| G | 6,679 | 260 | 415 | 5.2 | 1,196.7 | 1,196.7 | 1,197.3 | 0.6 |
| H | 6,948 | 235 | 607 | 3.8 | 1,197.7 | 1,197.7 | 1,198.6 | 0.9 |
| I | 7,431 | 315 | 861 | 5.2 | 1,199.7 | 1,199.7 | 1,199.7 | 0.0 |
| J | 7,502 | 331 | 1,448 | 3.4 | 1,202.4 | 1,202.4 | 1,202.5 | 0.1 |
| K | 8,449 | 77/236[2] | 705 | 3.0 | 1,203.1 | 1,203.3 | 0.2 | 1203.1 |
| L | 9,231 | 47/206[2] | 443 | 4.8 | 1,204.2 | 1,204.5 | 0.3 | 1204.2 |
| M | 9,732 | 41/324[2] | 513 | 4.2 | 1,205.9 | 1,206.0 | 0.1 | 1205.9 |
| N | 10,755 | 23/288[2] | 877 | 2.7 | 1,207.7 | 1,208.6 | 0.9 | 1207.7 |
| O | 11,139 | 780 | 1,870 | 1.9 | 1,212.1 | 1,212.1 | 1,212.1 | 0.0 |
| P | 11,475 | 350 | 477 | 4.5 | 1,214.0 | 1,214.0 | 1,214.0 | 0.0 |
| Q | 12,361 | 295 | 392 | 5.5 | 1,217.0 | 1,217.0 | 1,217.2 | 0.2 |
| R | 12,903 | 274 | 620 | 3.5 | 1,218.6 | 1,218.6 | 1,219.0 | 0.4 |
| S | 13,395 | 247 | 664 | 3.2 | 1,219.1 | 1,219.1 | 1,219.6 | 0.5 |
| T | 14,023 | 251 | 421 | 5.1 | 1,221.6 | 1,221.6 | 1,221.8 | 0.2 |

[1]Feet above the confluence with Cottonwood Creek

[2] Left along main channel/right downstream of culvert

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: DRY RUN CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| U | 14,903 | 221 | 512 | 4.8 | 1,224.8 | 1,224.8 | 1,224.9 | 0.1 |
| V | 15,097 | 260 | 1,177 | 1.8 | 1,227.5 | 1,227.5 | 1,228.0 | 0.5 |
| W | 15,794 | 258 | 524 | 4.1 | 1,228.2 | 1,228.2 | 1,228.6 | 0.4 |
| X | 16,165 | 204 | 391 | 5.5 | 1,230.1 | 1,230.1 | 1,230.2 | 0.1 |
| Y | 16,981 | 234 | 552 | 3.9 | 1,233.7 | 1,233.7 | 1,234.4 | 0.7 |
| Z | 17,859 | 158 | 444 | 4.8 | 1,236.8 | 1,236.8 | 1,237.0 | 0.2 |
| AA | 18,987 | 170 | 440 | 4.9 | 1,240.2 | 1,240.2 | 1,240.6 | 0.4 |
| AB | 19,584 | 181 | 360 | 5.9 | 1,243.1 | 1,243.1 | 1,243.2 | 0.1 |
| AC | 20,572 | 139 | 425 | 5.0 | 1,246.2 | 1,246.2 | 1,246.4 | 0.2 |
| AD | 20,982 | 189 | 526 | 4.1 | 1,247.2 | 1,247.2 | 1,247.7 | 0.5 |

[1]Feet above the confluence with Cottonwood Creek

[2] Left along main channel/right downstream of culvert

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: DRY RUN CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH[2] (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 1,050 | 2,505 | 7,768 | 0.6 | 1,079.1 | 1,079.1 | 1,079.5 | 0.4 |
| B | 2,700 | 3,454 | 9,718 | 0.5 | 1,079.3 | 1,079.3 | 1,079.7 | 0.4 |
| C | 3,700 | 3,174 | 5,197 | 0.9 | 1,079.4 | 1,079.4 | 1,079.9 | 0.5 |

[1]Feet above confluence with Clear Creek near Ashland

[2]Combined floodway width of Johnson Creek and Clear Creek near Ashland

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: JOHNSON CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**)[2] | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY[4,5] | WITHOUT FLOODWAY[3] | WITH FLOODWAY[3] | INCREASE |
| A | 142,900 | 9,100/2,181 | 60,079 | 3.1 | 1,062.8[3]/1,062.8 | 1,062.8 | 1,063.3 | 0.5 |
| B | 148,300 | 14,100/3,424 | 74,005 | 2.5 | 1,067.5[3]/1,067.5 | 1,067.5 | 1,068.3 | 0.8 |
| C | 152,350 | 13,700/1,646 | 91,680 | 2.0 | 1,069.6/1,069.6 | 1,068.9 | 1,069.6 | 0.7 |
| D | 158,450 | 12,550/489 | 63,720 | 2.9 | 1,074.3/1,074.3 | 1,071.5 | 1,072.5 | 1.0 |
| E | 161,550 | 12,064/846 | 62,293 | 3.0 | 1,078.1/1,074.4 | 1,074.4 | 1,075.4 | 1.0 |
| F | 167,300 | 10,400/3,535 | 56,687 | 3.3 | 1,081.5/1,078.2 | 1,078.2 | 1,079.0 | 0.8 |
| G | 170,350 | 11,300/5,313 | 53,407 | 3.5 | 1,085.4/1,080.7 | 1,080.7 | 1,081.7 | 1.0 |
| H | 173,700 | 10,890/5,206 | 49,506 | 3.8 | 1,087.2/1,083.2 | 1,083.2 | 1,084.2 | 1.0 |
| I | 179,325 | 10,800/5,835 | 56,963 | 3.3 | 1,091.2/1,087.8 | 1,087.8 | 1,088.7 | 0.9 |
| J | 182,400 | 9,300/5,385 | 53,761 | 3.5 | 1,093.9/1,090.1 | 1,090.4 | 1,091.4 | 1.0 |
| K | 186,600 | 5,237/954 | 30,219 | 6.2 | 1,096.4/1,093.5 | 1,094.1 | 1,094.7 | 0.6 |
| L | 190,000 | 5,807/1,106 | 34,714 | 5.4 | 1,098.2/1,096.0 | 1,097.0 | 1,097.5 | 0.5 |
| M | 193,450 | 9,061/1,536 | 41,086 | 4.6 | 1,100.8/1,098.7 | 1,100.0 | 1,100.3 | 0.3 |
| N | 198,700 | 4,007/1,658 | 24,511 | 5.4 | 1,107.6/1,103.4 | 1,106.3 | 1,106.7 | 0.4 |
| O | 201,450 | 3,689/448 | 27,713 | 4.8 | 1,108.8/1,106.1 | 1,108.3 | 1,108.9 | 0.6 |
| P | 204,925 | 5,048/513 | 33,050 | 4.0 | 1,112.2/1,109.7 | 1,111.5 | 1,112.2 | 0.7 |
| Q | 208,475 | 5,617/913 | 41,795 | 3.2 | 1,114.7/1,112.0 | 1,113.8 | 1,114.7 | 0.9 |
| R | 211,825 | 5,150/1,458 | 25,233 | 5.2 | 1,116.8/1,116.8 | 1,115.8 | 1,116.8 | 1.0 |
| S | 214,225 | 3,200/771 | 28,617 | 4.6 | 1,120.2/1,120.2 | 1,120.2 | 1,120.3 | 0.1 |
| T | 217,200 | 2,600/418 | 14,583 | 9.1 | 1,122.3/1,122.3 | 1,122.3 | 1,122.4 | 0.1 |

[1]Feet above confluence with Missouri River

[2]Total width/width within county

[3]Elevation computed without consideration of ice jam effects

[4]With levee and ice jam effects/without levee or ice jam effects

[5]Where with and without levee elevations are equivalent, both include ice jam effects

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: PLATTE RIVER (WITH LEVEE)**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**)[2] | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY[4,5] | WITHOUT FLOODWAY[3] | WITH FLOODWAY[3] | INCREASE |
| U | 218,300 | 3,433/761 | 30,996 | 4.3 | 1,126.0/1,126.0 | 1,125.1 | 1,125.6 | 0.5 |
| V | 222,725 | 4,389/2,452 | 26,645 | 5.0 | 1,128.8/1,128.8 | 1,127.0 | 1,127.2 | 0.2 |
| W | 226,200 | 3,121/2,401 | 22,157 | 6.0 | 1,131.3/1,131.3 | 1,129.7 | 1,130.1 | 0.4 |
| X | 229,600 | 3,027/1,929 | 19,647 | 6.7 | 1,136.0/1,133.2 | 1,133.4 | 1,133.6 | 0.2 |
| Y | 233,475 | 3,846/919 | 28,918 | 4.6 | 1,138.9/1,134.5 | 1,137.2 | 1,137.3 | 0.1 |
| Z | 237,100 | 3,274/485 | 21,675 | 6.1 | 1,141.4/1,136.4 | 1,139.2 | 1,139.2 | 0.0 |
| AA | 241,500 | 2,610/980 | 18,353 | 7.2 | 1,146.1/1,139.6 | 1,143.4 | 1,143.4 | 0.0 |
| AB | 244,325 | 2,784/976 | 18,559 | 7.1 | 1,148.8/1,141.8 | 1,146.4 | 1,146.4 | 0.0 |
| AC | 245,575 | 2,681/740 | 24,417 | 5.4 | 1,150.7/1,147.3 | 1,148.5 | 1,148.5 | 0.0 |
| AD | 248,500 | 3,197/854 | 28,175 | 4.7 | 1,153.2/1,148.6 | 1,150.8 | 1,150.8 | 0.0 |
| AE | 251,875 | 3,100/686 | 23,329 | 5.7 | 1,155.5/1,151.3 | 1,152.8 | 1,152.8 | 0.0 |
| AF | 256,675 | 2,982/826 | 27,021 | 4.9 | 1,159.3/1,157.1 | 1,158.3 | 1,158.3 | 0.0 |
| AG | 260,100 | 3,511/2,534 | 28,156 | 4.7 | 1,164.2/1,160.9 | 1,161.3 | 1,161.3 | 0.0 |
| AH | 263,700 | 3,993/3,219 | 25,603 | 5.2 | 1,166.5/1,165.6 | 1,163.3 | 1,164.2 | 0.9 |
| AI | 267,250 | 2,993/2,441 | 25,844 | 5.1 | 1,170.1/1,166.3 | 1,167.8 | 1,168.1 | 0.3 |
| AJ | 270,850 | 3,362/2,778 | 25,765 | 5.1 | 1,173.3/1,169.0 | 1,170.9 | 1,171.0 | 0.1 |
| AK | 274,700 | 4,067/2,590 | 31,746 | 4.2 | 1,177.0/1,172.8 | 1,174.5 | 1,174.5 | 0.0 |
| AL | 278,675 | 3,654/602 | 23,393 | 5.6 | 1,179.5/1,175.7 | 1,177.1 | 1,177.1 | 0.0 |
| AM | 282,300 | 3,944/1,150 | 30,727 | 4.3 | 1,182.3/1,179.2 | 1,180.6 | 1,180.6 | 0.0 |
| AN | 286,250 | 4,185/1,916 | 26,169 | 5.0 | 1,185.7/1,185.7 | 1,183.8 | 1,184.0 | 0.2 |

[1]Feet above confluence with Missouri River

[2]Total width/width within county

[3]Elevation computed without consideration of ice jam effects

[4]With levee and ice jam effects/without levee or ice jam effects

[5]Where with and without levee elevations are equivalent, both include ice jam effects

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: PLATTE RIVER (WITH LEVEE)**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**)[2] | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY[4,5] | WITHOUT FLOODWAY[3] | WITH FLOODWAY[3] | INCREASE |
| AO | 288,425 | 3,340/1,720 | 21,517 | 6.1 | 1,189.4/1,189.4 | 1,186.6 | 1,186.6 | 0.0 |
| AP | 290,350 | 2,291/0 | 20,062 | 6.6 | 1,191.9/1,191.9 | 1,188.7 | 1,188.7 | 0.0 |
| AQ | 292,100 | 2,558/0 | 21,012 | 6.3 | 1,192.9/1,192.9 | 1,190.5 | 1,190.5 | 0.0 |
| AR | 325,200 | 2,484/24 | 13,847 | 9.5 | 1,221.5/1,221.5 | 1,218.6 | 1,218.8 | 0.2 |
| AS | 328,550 | 2,551/71 | 15,514 | 8.5 | 1,225.0/1,225.0 | 1,222.6 | 1,222.8 | 0.2 |
| AT | 330,950 | 2,557/30 | 20,492 | 6.4 | 1,227.3/1,227.3 | 1,225.6 | 1,226.2 | 0.6 |
| AU | 334,500 | 3,009/149 | 24,187 | 5.5 | 1,229.8/1,229.8 | 1,228.2 | 1,229.0 | 0.8 |
| AV | 337,900 | 4,134/975 | 27,403 | 4.8 | 1,232.7/1,232.7 | 1,231.1 | 1,231.6 | 0.5 |
| AW | 341,200 | 2,928/0 | 22,249 | 5.9 | 1,234.2/1,234.2 | 1,233.4 | 1,233.8 | 0.4 |
| AX | 344,900 | 3,500/0 | 16,299 | 8.1 | 1,238.3/1,238.3 | 1,237.3 | 1,237.6 | 0.3 |
| AY | 348,400 | 3,440/892 | 22,391 | 5.9 | 1,241.8/1,241.8 | 1,240.9 | 1,241.7 | 0.8 |
| AZ | 351,000 | 3,264/1,119 | 20,316 | 6.5 | 1,244.3/1,244.3 | 1,243.0 | 1,243.7 | 0.7 |
| BA | 354,000 | 3,326/948 | 18,229 | 7.2 | 1,246.8/1,246.8 | 1,245.5 | 1,246.4 | 0.9 |
| BB | 356,250 | 3,644/380 | 26,086 | 5.1 | 1,249.6/1,249.6 | 1,248.9 | 1,249.9 | 1.0 |
| BC | 359,450 | 3,700/0 | 26,765 | 4.9 | 1,254.0/1,254.0 | 1,252.3 | 1,252.6 | 0.3 |
| BD | 361,200 | 3,663/0 | 22,914 | 5.8 | 1,255.5/1,255.5 | 1,253.8 | 1,254.1 | 0.3 |
| BE | 363,050 | 2,792/0 | 21,392 | 6.2 | 1,257.5/1,257.5 | 1,255.9 | 1,256.1 | 0.2 |
| BF | 367,300 | 1,331/0 | 15,510 | 8.5 | 1,260.5/1,260.5 | 1,258.6 | 1,259.3 | 0.7 |
| BG | 370,650 | 1,619/0 | 16,704 | 7.9 | 1,263.2/1,263.2 | 1,261.2 | 1,262.1 | 0.9 |
| BH | 373,650 | 2,397/0 | 19,944 | 6.6 | 1,266.6/1,266.6 | 1,263.9 | 1,264.5 | 0.6 |

[1]Feet above confluence with Missouri River

[2]Total width/width within county

[3]Elevation computed without consideration of ice jam effects

[4]With levee and ice jam effects/without levee or ice jam effects

[5]Where with and without levee elevations are equivalent, both include ice jam effects

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: PLATTE RIVER (WITH LEVEE)**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**)[2] | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY[4,5] | WITHOUT FLOODWAY[3] | WITH FLOODWAY[3] | INCREASE |
| BI | 375,900 | 2,414/0 | 16,589 | 8.0 | 1,269.4/1,269.4 | 1,265.6 | 1,266.2 | 0.6 |
| BJ | 378,500 | 3,490/0 | 21,276 | 6.2 | 1,272.1/1,272.1 | 1,268.5 | 1,268.9 | 0.4 |
| BK | 383,750 | 1,479/63 | 19,644 | 6.7 | 1,279.0/1,276.6 | 1,276.3 | 1,276.4 | 0.1 |
| BL | 385,650 | 1,669/197 | 12,229 | 10.8 | 1,280.7/1,276.6 | 1,276.5 | 1,276.6 | 0.1 |
| BM | 389,000 | 3,366/1,213 | 32,194 | 4.1 | 1,285.6/1,279.7 | 1,281.3 | 1,281.3 | 0.0 |
| BN | 392,000 | 4,180/770 | 22,938 | 5.8 | 1,287.8/1,281.2 | 1,282.4 | 1,282.4 | 0.0 |
| BO | 394,050 | 4,701/292 | 29,626 | 4.5 | 1,288.0/1,288.0 | 1,284.6 | 1,284.6 | 0.0 |
| BP | 396,100 | 4,842/105 | 28,357 | 4.7 | 1,289.1/1,289.1 | 1,285.7 | 1,285.9 | 0.2 |
| BQ | 398,700 | 4,573/434 | 22,788 | 5.8 | 1,290.5/1,290.5 | 1,287.6 | 1,287.8 | 0.2 |
| BR | 400,650 | 4,281/647 | 23,564 | 5.6 | 1,292.1/1,292.1 | 1,289.7 | 1,289.9 | 0.2 |
| BS | 403,000 | 3,772/284 | 20,969 | 6.3 | 1,293.8/1,293.8 | 1,291.9 | 1,292.1 | 0.2 |
| BT | 404,500 | 4,750/125 | 24,029 | 5.5 | 1,295.0/1,295.0 | 1,293.4 | 1,293.6 | 0.2 |
| BU | 406,500 | 4,400/375 | 25,606 | 5.2 | 1,297.2/1,297.2 | 1,295.9 | 1,296.1 | 0.2 |
| BV | 408,300 | 4,200/417 | 27,134 | 4.9 | 1,297.7/1,297.7 | 1,297.4 | 1,298.0 | 0.6 |
| BW | 410,700 | 3,950/245 | 26,265 | 5.0 | 1,300.1/1,300.1 | 1,299.0 | 1,299.6 | 0.6 |
| BX | 413,000 | 4,012/648 | 24,194 | 5.5 | 1,302.3/1,302.3 | 1,300.8 | 1,301.2 | 0.4 |
| BY | 415,700 | 4,058/1,246 | 22,750 | 5.8 | 1,304.7/1,304.7 | 1,303.0 | 1,303.3 | 0.3 |
| BZ | 418,350 | 4,045/1,334 | 23,307 | 5.7 | 1,306.7/1,306.7 | 1,305.2 | 1,305.7 | 0.5 |
| CA | 420,850 | 5,000/1,783 | 26,541 | 5.0 | 1,308.7/1,308.7 | 1,307.5 | 1,308.1 | 0.6 |

[1]Feet above confluence with Missouri River

[2]Total width/width within county

[3]Elevation computed without consideration of ice jam effects

[4]With levee and ice jam effects/without levee or ice jam effects

[5]Where with and without levee elevations are equivalent, both include ice jam effects

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: PLATTE RIVER (WITH LEVEE)**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 14,100 | 5,216[2] | 35,034 | 6.4 | 1,067.8 | 1,067.8 | 1,068.7 | 0.9 |
| B | 17,600 | 6,666 | 45,778 | 5.3 | 1,068.5 | 1,068.5 | 1,069.5 | 1.0 |
| C | 17,740 | 6,666 | 61,154 | 3.2 | 1,071.1 | 1,071.1 | 1,071.8 | 0.7 |
| D | 20,140 | 2,057 | 15,776 | 9.8 | 1,071.2 | 1,071.2 | 1,071.6 | 0.4 |
| E | 21,190 | 1,030 | 9,686 | 8.1 | 1,071.8 | 1,071.8 | 1,072.6 | 0.8 |
| F | 22,190 | 1,156 | 13,044 | 6.0 | 1,074.5 | 1,074.5 | 1,075.1 | 0.6 |
| G | 22,740 | 752 | 9,781 | 8.0 | 1,075.2 | 1,075.2 | 1,075.7 | 0.5 |
| H | 24,490 | 610 | 8,748 | 9.0 | 1,078.1 | 1,078.1 | 1,078.3 | 0.2 |
| I | 25,491 | 685 | 10,050 | 7.8 | 1,079.4 | 1,079.4 | 1,079.7 | 0.3 |
| J | 26,891 | 922 | 16,130 | 4.9 | 1,083.4 | 1,083.4 | 1,084.2 | 0.8 |
| K | 29,490 | 2,101 | 36,370 | 2.2 | 1,084.8 | 1,084.8 | 1,085.8 | 1.0 |
| L | 31,390 | 4,361 | 71,927 | 1.1 | 1,085.0 | 1,085.0 | 1,086.0 | 1.0 |
| M | 34,690 | 5,125 | 78,669 | 1.0 | 1,085.1 | 1,085.1 | 1,086.1 | 1.0 |
| N | 37,320 | 5,066 | 70,310 | 1.1 | 1,085.2 | 1,085.2 | 1,086.2 | 1.0 |

[1]Feet above confluence with Platte River

[2]Width includes Platte River Floodway

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SALT CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 19,123 | 1,961 | 3,060 | 3.0 | 1,174.5 | 1,174.5 | 1,174.7 | 0.2 |
| B | 19,584 | 1,991 | 3,665 | 2.5 | 1,175.4 | 1,175.4 | 1,175.6 | 0.2 |
| C | 20,418 | 1,941 | 2,183 | 4.2 | 1,176.4 | 1,176.4 | 1,176.4 | 0.0 |
| D | 21,891 | 1,346 | 2,657 | 3.5 | 1,178.5 | 1,178.5 | 1,179.0 | 0.5 |
| E | 23,354 | 1,304 | 5,450 | 1.7 | 1,180.2 | 1,180.2 | 1,181.0 | 0.8 |
| F | 23,821 | 1,073 | 2,163 | 4.2 | 1,180.4 | 1,180.4 | 1,181.1 | 0.7 |
| G | 25,406 | 896 | 2,812 | 3.3 | 1,182.9 | 1,182.9 | 1,183.6 | 0.7 |
| H | 26,279 | 1,032 | 3,817 | 7.0 | 1,184.4 | 1,184.4 | 1,184.6 | 0.2 |
| I | 27,284 | 880 | 5,024 | 1.8 | 1,186.6 | 1,186.6 | 1,187.5 | 0.9 |
| J | 28,389 | 903 | 4,563 | 2.0 | 1,187.1 | 1,187.1 | 1,187.8 | 0.7 |
| K | 29,361 | 867 | 3,073 | 3.0 | 1,187.5 | 1,187.5 | 1,188.2 | 0.7 |
| L | 31,286 | 742 | 2,589 | 3.5 | 1,188.9 | 1,188.9 | 1,189.6 | 0.7 |
| M | 32,276 | 689 | 3,663 | 2.5 | 1,189.4 | 1,189.4 | 1,190.3 | 0.9 |
| N | 32,794 | 587 | 2,506 | 3.7 | 1,189.3 | 1,189.3 | 1,190.3 | 1.0 |

[1]Feet above the confluence with Wahoo Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: SAND CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| B | 2,660 | 73 | 536 | 5.7 | 1,327.1 | 1,327.1 | 1,327.1 | 0.0 |
| C | 4,510 | 113 | 729 | 4.2 | 1,331.2 | 1,331.2 | 1,331.2 | 0.0 |
| D | 6,240 | 57 | 406 | 6.9 | 1,335.5 | 1,335.5 | 1,335.5 | 0.0 |
| E | 7,290 | 87 | 713 | 4.0 | 1,339.1 | 1,339.1 | 1,339.1 | 0.0 |
| F | 8,760 | 51 | 373 | 7.3 | 1,340.8 | 1,340.8 | 1,340.8 | 0.0 |
| G | 10,800 | 47 | 359 | 6.9 | 1,350.5 | 1,350.5 | 1,350.5 | 0.0 |

[1]Feet above confluence with Cottonwood Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: TRIBUTARY TO COTTONWOOD CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 850 | 623[2] | 2,887 | 4.0 | 1,144.2 | 1,144.2 | 1,145.0 | 0.8 |
| B | 1,770 | 64 | 702 | 6.9 | 1,146.5 | 1,146.5 | 1,146.5 | 0.0 |
| C | 3,470 | 397 | 1,307 | 3.7 | 1,151.1 | 1,151.1 | 1,152.1 | 1.0 |
| D | 4,270 | 148 | 775 | 6.2 | 1,153.7 | 1,153.7 | 1,154.6 | 0.9 |
| E | 4,870 | 166 | 1,109 | 4.4 | 1,156.2 | 1,156.2 | 1,156.9 | 0.7 |
| F | 5,515 | 218 | 1,086 | 4.1 | 1,157.4 | 1,157.4 | 1,158.2 | 0.8 |
| G | 6,215 | 112 | 897 | 4.9 | 1,158.3 | 1,158.3 | 1,159.1 | 0.8 |
| H | 7,945 | 350 | 1,596 | 2.8 | 1,161.7 | 1,161.7 | 1,162.4 | 0.7 |
| I | 8,295 | 177 | 574 | 7.7 | 1,161.9 | 1,161.9 | 1,162.5 | 0.6 |
| J | 8,745 | 202 | 1,024 | 4.3 | 1,164.2 | 1,164.2 | 1,164.9 | 0.7 |
| K | 9,695 | 333 | 1,516 | 2.6 | 1,165.7 | 1,165.7 | 1,166.7 | 1.0 |
| L | 10,820 | 220 | 948 | 4.2 | 1,167.6 | 1,167.6 | 1,168.4 | 0.8 |
| M | 11,745 | 295 | 1,205 | 3.3 | 1,170.1 | 1,170.1 | 1,171.0 | 0.9 |
| N | 12,545 | 69 | 730 | 5.4 | 1,172.0 | 1,172.0 | 1,172.8 | 0.8 |

[1]Feet above confluence with Clear Creek near Yutan

[2]Combined floodway width of Upper Clear Creek and Clear Creek near Yutan

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: UPPER CLEAR CREEK**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| A | 3,670 | 6,542 | 5,355 | 1.3 | 1,071.3 | 1,071.3 | 1,072.0 | 0.7 |
| B | 8,870 | 4,405 | 27,484 | 2.2 | 1,071.4 | 1,071.4 | 1,072.1 | 0.7 |
| C | 8,895 | 4,406 | 27,562 | 2.2 | 1,071.4 | 1,071.4 | 1,072.1 | 0.7 |
| D | 12,295 | 3,814 | 22,217 | 2.3 | 1,071.6 | 1,071.6 | 1,072.2 | 0.6 |
| E | 17,495 | 2,913 | 16,225 | 3.1 | 1,073.5 | 1,073.5 | 1,074.1 | 0.6 |

[1]Feet above the confluence of Salt Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: WAHOO CREEK NEAR ASHLAND**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| F | 139,216 | 4,125 | 13,405 | 3.0 | 1,151.8 | 1,151.8 | 1,152.8 | 1.0 |
| G | 139,562 | 3,654 | 10,739 | 3.8 | 1,152.2 | 1,152.2 | 1,153.2 | 1.0 |
| H | 139,613 | 3,951 | 12,145 | 3.4 | 1,152.5 | 1,152.5 | 1,153.5 | 1.0 |
| I | 143,851 | 2,772 | 10,306 | 3.7 | 1,155.1 | 1,155.1 | 1,155.9 | 0.8 |
| J | 146,956 | 3,871[2] | 6,906 | 4.4 | 1,159.3 | 1,159.9 | 1,159.3 | 0.6 |
| K | 150,745 | 4,908[2] | 8,278 | 3.7 | 1,164.6 | 1,165.4 | 1,164.6 | 0.8 |
| L | 153,817 | 5,529[2] | 12,097 | 2.5 | 1,167.7 | 1,168.1 | 1,167.7 | 0.4 |
| M | 155,961 | 6,015[2] | 8,769 | 3.5 | 1,168.5 | 1,168.9 | 1,168.5 | 0.4 |
| N | 156,062 | 6,131[2] | 14,186 | 2.2 | 1,169.0 | 1,169.3 | 1,169.0 | 0.3 |
| O | 158,829 | 4,140[2] | 6,746 | 4.5 | 1,170.3 | 1,170.4 | 1,170.2 | 0.2 |
| P | 159,766 | 3,825[2] | 7,695 | 3.9 | 1,171.4 | 1,171.7 | 1,171.4 | 0.3 |
| Q | 162,099 | 3,745[2] | 8,673 | 3.5 | 1,173.1 | 1,173.5 | 1,173.1 | 0.4 |
| R | 162,374 | 2,519 | 8,461 | 3.6 | 1,173.3 | 1,173.3 | 1,173.7 | 0.4 |
| S | 162,778 | 2,051 | 7,734 | 3.9 | 1,173.5 | 1,173.5 | 1,173.9 | 0.4 |
| T | 166,159 | 1,731 | 8,208 | 3.7 | 1,177.9 | 1,177.9 | 1,178.7 | 0.8 |
| U | 166,545 | 1,673 | 7,702 | 3.9 | 1,178.9 | 1,178.9 | 1,179.0 | 0.1 |
| V | 168,111 | 1,487 | 5,699 | 5.3 | 1,179.0 | 1,179.0 | 1,179.7 | 0.7 |
| W | 168,204 | 1,490 | 6,943 | 5.7 | 1,180.7 | 1,180.7 | 1,181.0 | 0.3 |
| X | 169,162 | 1,380 | 5,825 | 5.2 | 1,181.7 | 1,181.7 | 1,182.3 | 0.6 |
| Y | 170,335 | 1,476 | 7,384 | 4.1 | 1,183.2 | 1,183.2 | 1,183.6 | 0.4 |
| Z | 171,928 | 1,503 | 8,594 | 3.5 | 1,184.3 | 1,184.3 | 1,185.0 | 0.7 |

[1]Feet above the confluence with Salt Creek

[2]Combined floodway width of Wahoo Creek and Sand Creek

[3]Combined floodway width of Wahoo Creek and Cottonwood Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: WAHOO CREEK NEAR WAHOO**

| LOCATION | | FLOODWAY | | | 1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88) | | | |
|---|---|---|---|---|---|---|---|---|
| CROSS SECTION | DISTANCE[1] | WIDTH (**FEET**) | SECTION AREA (**SQ. FEET**) | MEAN VELOCITY (**FEET/ SEC**) | REGULATORY | WITHOUT FLOODWAY | WITH FLOODWAY | INCREASE |
| AA | 176,468 | 1,887[3] | 8,361 | 2.8 | 1,185.7 | 1,186.3 | 1,185.7 | 0.6 |
| AB | 177,572 | 2,248[3] | 9,212 | 2.5 | 1,186.2 | 1,186.2 | 1,186.7 | 0.5 |
| AC | 179,178 | 3,536[3] | 13,022 | 2.7 | 1,187.9 | 1,188.4 | 1,187.9 | 0.5 |
| AD | 179,254 | 3,627[3] | 12,872 | 4.1 | 1,187.9 | 1,188.3 | 1,187.9 | 0.4 |
| AE | 180,215 | 2,305 | 7,773 | 3.0 | 1,189.1 | 1,189.1 | 1,189.7 | 0.6 |
| AF | 180,500 | 2,193 | 6,876 | 3.4 | 1,189.5 | 1,189.5 | 1,190.1 | 0.6 |
| AG | 188,832 | 2,128 | 4,922 | 4.7 | 1,196.5 | 1,196.5 | 1,197.5 | 1.0 |

[1]Feet above the confluence with Salt Creek

[2]Combined floodway width of Wahoo Creek and Sand Creek

[3]Combined floodway width of Wahoo Creek and Cottonwood Creek

TABLE 34

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**SAUNDERS COUNTY, NE**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: WAHOO CREEK NEAR WAHOO**

**Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams**

**[Not Applicable for this Flood Risk Project]**

## 6.4 Coastal Flood Hazard Mapping

This section and table are not applicable to this Flood Risk Project.

**Table 26: Summary of Coastal Transect Mapping Considerations**

**[Not Applicable to this Flood Risk Project]**

## 6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 32, "Map Repositories").

### 6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, visit http://www.fema.gov and download the form "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill". Visit the "Flood Map-Related Fees" section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

### 6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting http://www.fema.gov for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

### 6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit http://www.fema.gov and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Saunders County FIRM are listed in Table 27. Please note that this table only includes LOMCs that have been issued on the FIRM panels updated by this map revision. For all other areas within this county, users should be aware that revisions to the FIS Report made by prior LOMRs may not be reflected herein and users will need to continue to use the previously issued LOMRs to obtain the most current data.

**Table 27: Incorporated Letters of Map Change**

| Case Number | Effective Date | Flooding Source | FIRM Panel(s) |
|---|---|---|---|
| 12-07-3332P | 2/14/2014 | Sand Creek | 31155C0225E<br>31155C0355E |

### 6.5.4 Physical Map Revisions

PMRs are an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit http://www.fema.gov and visit the "Flood Map Revision Processes" section.

### 6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

### 6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Saunders County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.

- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.

- *Initial FHBM Effective Date* is the effective date of the first Flood Hazard Boundary Map (FHBM). This date may be the same date as the Initial NFIP Map Date.

- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.

- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community. This is the first effective date that is shown on the FIRM panel.

- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated

accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as Physical Map Revisions (PMR) of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Saunders County FIRMs in countywide format was 12/1/1978.

**Table 28: Community Map History**

| Community Name | Initial Identification Date (First NFIP Map Published) | Initial FHBM Effective Date | FHBM Revision Date(s) | Initial FIRM Effective Date | FIRM Revision Date(s) |
|---|---|---|---|---|---|
| Ashland, City of | 11/3/1982 | 5/17/1974 | 9/19/1975 | 11/3/1982 | 4/5/2010 |
| Cedar Bluffs, Village of | 4/5/2010 | 4/2/1976 | None | 4/5/2010 | None |
| Ceresco, Village of | 7/3/1986 | 11/8/1974 | None | 7/3/1986 | 4/16/2013 |
| Colon, Village of | 4/5/2010 | None | None | 4/5/2010 | None |
| Ithaca, Village of | 5/1/1987 | 10/18/1974 | 11/7/1975 | 5/1/1987 | 4/5/2010<br>9/9/9999 |
| Leshara, Village of | 4/5/2010 | None | None | 4/5/2010 | None |
| Malmo, Village of | 4/5/2010 | 12/27/1974 | None | 4/5/2010 | None |
| Mead, Village of | 4/5/2010 | 9/5/1975 | None | 4/5/2010 | 9/9/9999 |
| Memphis, Village of | 4/5/2010 | None | None | 4/5/2010 | None |
| Morse Bluff, Village of | 4/5/2010 | None | None | 4/5/2010 | None |
| Prague, Village of | 1/19/1983 | 12/26/1975 | None | 1/19/1983 | 4/5/2010 |
| Saunders County Unincorporated Areas | 12/1/1978 | 1/19/1983 | 1/19/1983 | 12/1/1978 | 4/5/2010<br>9/9/9999 |
| Valparaiso, Village of | 6/3/1986 | 11/8/1974 | 3/19/1976 | 6/3/1986 | 4/5/2010 |
| Wahoo, City of | 12/1/1977 | 10/12/1973 | 6/18/1976 | 12/1/1977 | 1/3/1986<br>4/5/2010<br>9/9/9999 |
| Weston, Village of | 7/3/1985 | 10/18/1974 | None | 7/3/1985 | 4/5/2010<br>9/9/9999 |
| Yutan, Village of | 4/4/1983 | 8/13/1976 | None | 4/4/1983 | 11/20/1991<br>4/5/2010 |

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

Table 30 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

**Table 29: Summary of Contracted Studies Included in this FIS Report**

| Flooding Source | FIS Report Dated | Contractor | Number | Work Completed Date | Affected Communities |
|---|---|---|---|---|---|
| Clear Creek | 11/20/1991 | State of Nebraska Natural Resources Commission | * | * | City of Yutan |
| Clear Creek | 4/4/1983 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | February, 1981 | City of Yutan |
| Clear Creek | 7/19/1982 | Hoskins-Western-Sonderegger, Inc | EW-C-0064 | May, 1981 | Saunders County Uninc. |
| Clear Creek | 5/3/1982 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | October, 1980 | Ciy of Ashland |
| Cottonwood Creek | 9/9/9999 | NDNR | EMK-2012-CA-1205 | August, 2014 | City of Wahoo |
| Cottonwood Creek | 4/5/2010 | NDNR | * | April, 2006 | Village of Prague |
| Dry Run Creek | 9/9/9999 | NDNR | EMK-2012-CA-1205 | August, 2014 | City of Wahoo |
| Johnson Creek | 7/19/1982 | Hoskins-Western-Sonderegger, Inc | EW-C-0064 | May, 1981 | Saunders County Uninc. |
| Platte River | 4/5/2010 | USACE | EMW-97-IA-0140 | July, 2003 | Saunders County Uninc. |
| Salt Creek | 5/3/1982 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | October, 1980 | Ciy of Ashland |
| Sand Creek | 9/9/9999 | NDNR | EMK-2012-CA-1205 | August, 2014 | City of Wahoo |
| Silver Creek | 5/3/1982 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | October, 1980 | Ciy of Ashland |
| Tributary to Cottonwood Creek | 7/19/1982 | Hoskins-Western-Sonderegger, Inc | EW-C-0064 | May, 1981 | Saunders County Uninc. |
| Upper Clear Creek | 11/20/1991 | State of Nebraska Natural Resources Commission | * | * | City of Yutan |
| Upper Clear Creek | 4/4/1983 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | February 1981 | City of Yutan |
| Wahoo Creek | 9/9/9999 | NDNR | EMK-2012-CA-1205 | August, 2014 | City of Wahoo |
| Wahoo Creek | 5/3/1982 | Hoskins-Western-Sonderegger, Inc | EMW-C-0064 | October, 1980 | Ciy of Ashland |

## 7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and any previous Flood Risk Projects are shown in Table 31. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

**Table 30: Community Meetings**

| Community | FIS Report Dated | Date of Meeting | Meeting Type | Attended By |
|---|---|---|---|---|
| Saunders County and Unincorporated Areas | 9/9/9999 | 2/7/2013 | Initial CCO | City of Wahoo, Saunders County, NDNR, FEMA, JEO, Lower Platte North Natural Resources District. |
| | | 9/29/2014 | Flood Risk Review Meeting | |
| | | 9/9/9999 | Final CCO | |
| Saunders County and Unincorporated Areas | 4/5/2010 | 6/22/2005 | Initial CCO | NDNR, Village of Prague |
| | | 11/18/2008 | Final CCO | FEMA, NDNR, Saunders County, Village of Ithaca, City of Wahoo, City of Ashland, City of Yutan, Village of Valparaiso, Village of Ceresco, and the Village of Malmo. |
| Village of Yutan | 4/4/1983 | 6/6/1979 | Scoping | City of Yutan, FEMA, the Nebraska Natural Resources Commission, and the contractor |
| | | 10/20/1981 | Final CCO | City of Yutan, FEMA, the Nebraska Natural Resources Commission, and the contractor |
| Saunders County, Unincorporated Areas | 7/19/1982 | 6/6/1979 | Scoping | Saunders County representatives, the FIA, the Nebraska Natural Resources Commission, and the study contractor. |
| | | Unknown | Final CCO | Saunders County, FEMA, and the study contractor. |
| City of Ashland | 5/3/1982 | 6/6/1979 | Scoping | City of Ashland, FEMA, the Nebraska Natural Resources Commission, and the contractor |
| | | 2/14/1980 | Scoping | U.S. Army Corps of Engineers and the study contractor |
| | | 9/10/1981 | Final CCO | City of Ashland, FEMA, and the contractor |
| City of Wahoo | 12/1/1977 | 2/1/1975 | Scoping | L. Robert Kimball, Consulting Engineers, the Department of Housing and Urban Development, and the City of Wahoo. |
| | | 6/1/1975 | Initial CCO | U.S. Soil Conservation Service, U.S. Geological Survey, representatives of Price, Johnson, & Erickson, and the City of Wahoo city engineers and officials. |
| | | 2/1/1976 | Intermediate CCO | Department of Housing and Urban Development, Nebraska Natural Resources Commission, city officials, and local residents. |
| | | 9/30/1976 | Final CCO | Unknown |

## SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see http://www.fema.gov.

Table 32 is a list of the locations where FIRMs for Saunders County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

**Table 31: Map Repositories**

| Community | Address | City | State | Zip Code |
|---|---|---|---|---|
| Ashland | 2304 Silver Street | Ashland | NE | 68003 |
| Cedar Bluffs | 208 West Main | Cedar Bluffs | NE | 69015 |
| Ceresco | 217 South 2nd Street | Ceresco | NE | 68014 |
| Colon | 102 Spruce Street | Colon | NE | 68018 |
| Ithaca | 510 Main St | Ithaca | NE | 68033 |
| Leshara | 210 Summit Street | Leshara | NE | 68064 |
| Malmo | 122 Center Avenue | Malmo | NE | 68040 |
| Mead | 312 S. Vine | Mead | NE | 68041 |
| Memphis | 203 Natchez | Memphis | NE | 68042 |
| Morse Bluff | 440 2nd Street | Morse Bluff | NE | 68648 |
| Prague | 401 West Center Avenue | Prague | NE | 68050 |
| Valparaiso | 312 Pine Street | Valparaiso | NE | 68065 |
| Wahoo | 605 North Broadway | Wahoo | NE | 68066 |
| Saunders County, Unincorporated Areas | 433 N Chestnut | Wahoo | NE | 68066 |
| Weston | 340 North Elm | Weston | NE | 68070 |
| Yutan | 112 Vine | Yutan | NE | 68073 |

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 33.

Table 33 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the state NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of state and local GIS data in their state.

**Table 32: Additional Information**

| FEMA and the NFIP | |
|---|---|
| FEMA and FEMA Engineering Library website | http://www.fema.gov |
| NFIP website | http://www.fema.gov/business/nfip |
| NFHL Dataset | http://msc.fema.gov |
| FEMA Region 7 | 9221 Ward Parkway, Suite 300<br>Kansas City, MO. 64114-3372<br>Telephone: 816-283-7061 |
| **Other Federal Agencies** | |
| USGS website | http://www.usgs.gov |
| Hydraulic Engineering Center website | http://www.hec.usace.army.mil |
| **State Agencies and Organizations** | |
| State NFIP Coordinator | John P. Callen, PE, CFM<br>Department of Natural Resources<br>State NFIP Coordination<br>301 Centennial Mall South<br>Lincoln, NE 68509<br>Telephone: 402-471-3957<br>Email: john.callen@nebraska.gov |
| State Hazard Mitigation Officer | Mary Baker<br>State Hazard Mitigation Officer<br>2433 N.W. 24th Street<br>Lincoln, Nebraska 68524-1801<br>Telephone: 402-471-7185<br>Email: mary.baker@nebraska.gov |

## SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

Table 34 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

**Table 33: Bibliography and References**

| Citation in this FIS | Publisher/Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/Date of Issuance | Link |
|---|---|---|---|---|---|---|
| NDNR, 2014 | Nebraska Department of Natural Resources | *Flood Hazard Areas* | Nebraska Department of Natural Resources | Lincoln, NE | Jun-14 | |
| NDOR, 2013 | Nebraska Department of Roads | *As-Built Bridges* | Nebraska Department of Roads | Lincoln, NE | Oct-13 | |
| JEO, 2013 | JEO | *City of Wahoo City Limits* | JEO | Wahoo, NE | Oct-13 | |
| NPSC, 2013 | Nebraska Public Service Commission | *911 Transportation Data* | Nebraska Public Service Commission | Lincoln, NE | Sep-13 | http://psc.gisworkshop.com/Repo/login.jsp |
| MRLC, 2013 | PE&RS | *PE&RS Vol. 77(9):858-864. Completion of the 2006 National Land Cover Database for the Conterminous United States* | Multi-Resolution Land Characteristics Consortium (MRLC) - Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J. | US | Apr-13 | http://www.mrlc.gov/nlcd2006.php |
| NRCS, 2013 | Natural Resources Conservation Service | *Web Soil Survey* | Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture | | Apr-13 | http://websoilsurvey.nrcs.usda.gov |
| HPRCC, 2013 | High Plains Regional Climate Center | *Historical Precipitation* | High Plains Regional Climate Center (HPRCC) | Lincoln, NE | Apr-13 | http://www.hprcc.unl.edu/ |
| NCDC, 2013 | NOAA's National Climatic Data Center | *Climate Data Online* | NOAA's National Climatic Data Center (NCDC) | | Apr-13 | http://www.ncdc.noaa.gov/cdo-web/ |
| NOAA, 2013 | National Oceanic and Atmospheric Administration's National Weather Service | *NOAA Atlas 14: Precipitation-Frequency Atlas of the United States, Volume 8 Version 2.0* | National Oceanic and Atmospheric Administration's National Weather Service | Silver Spring, Maryland | Apr-13 | http://www.nws.noaa.gov/oh/hdsc/currentpf.htm |
| NOAA, 2013 | NOAA's National Weather Service | *Hydrometerological Design Studies Center Precipitation Frequency Data Server* | NOAA's National Weather Service | Silver Spring, Maryland | Apr-13 | http://hdsc.nws.noaa.gov/hdsc/pfds/ |
| USGS, 2013 | U.S. Geological Survey | *Streamflow Data* | U.S. Geological Survey | Lincoln, NE | Mar-13 | http://ne.water.usgs.gov/ |

**Table 33: Bibliography and References (Continued)**

| Citation in this FIS | Publisher/Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/Date of Issuance | Link |
|---|---|---|---|---|---|---|
| USACE, 2013 | U.S. Army Corps of Engineers | *HEC-GeoHMS Geospatial Hydrologic Modeling Extension Version 10.1 User's Manual, CPD-77* | U.S. Army Corps of Engineers Hydrologic Engineering Center | Davis, CA | Feb-13 | http://www.hec.usace.army.mil/software/hec-geohms/ |
| FSA, 2012 | USDA FSA | *2012 Digital Orthophoto NAIP Imagery* | USDA FSA | Salt Lake City, UT | Jul-12 | http://datagateway.nrcs.usda.gov/ |
| USGS, 2011 | U.S. Geological Survey et al | *National Hydrography Dataset* | U.S. Geological Survey | Reston, VA | Sep-11 | http://nhd.usgs.gov/ |
| USACE-2, 2010 | U.S. Army Corps of Engineers | *HEC-SSP Statistical Software Package Version 2.0 User's Manual, CPD-86* | U.S. Army Corps of Engineers Hydrologic Engineering Center | Davis, CA | Oct-10 | http://www.hec.usace.army.mil/software/hec-ssp/documentation/HEC-SSP_20_Users_Manual.pdf |
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**Table 33: Bibliography and References (Continued)**

| Citation in this FIS | Publisher/Issuer | *Publication Title,* "Article," Volume, Number, etc. | Author/Editor | Place of Publication | Publication Date/Date of Issuance | Link |
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|---|---|---|---|---|---|---|
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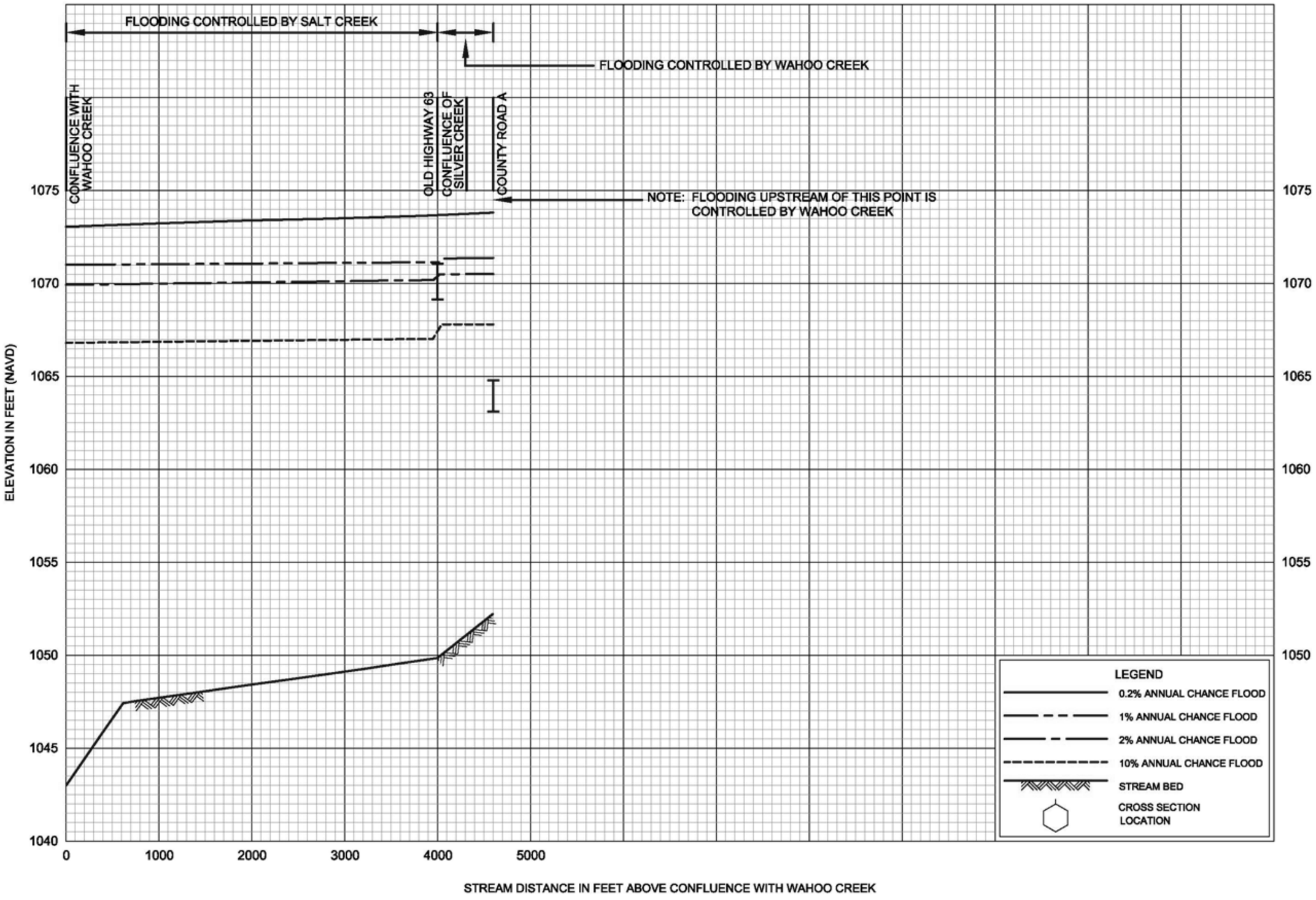



FLOOD PROFILES

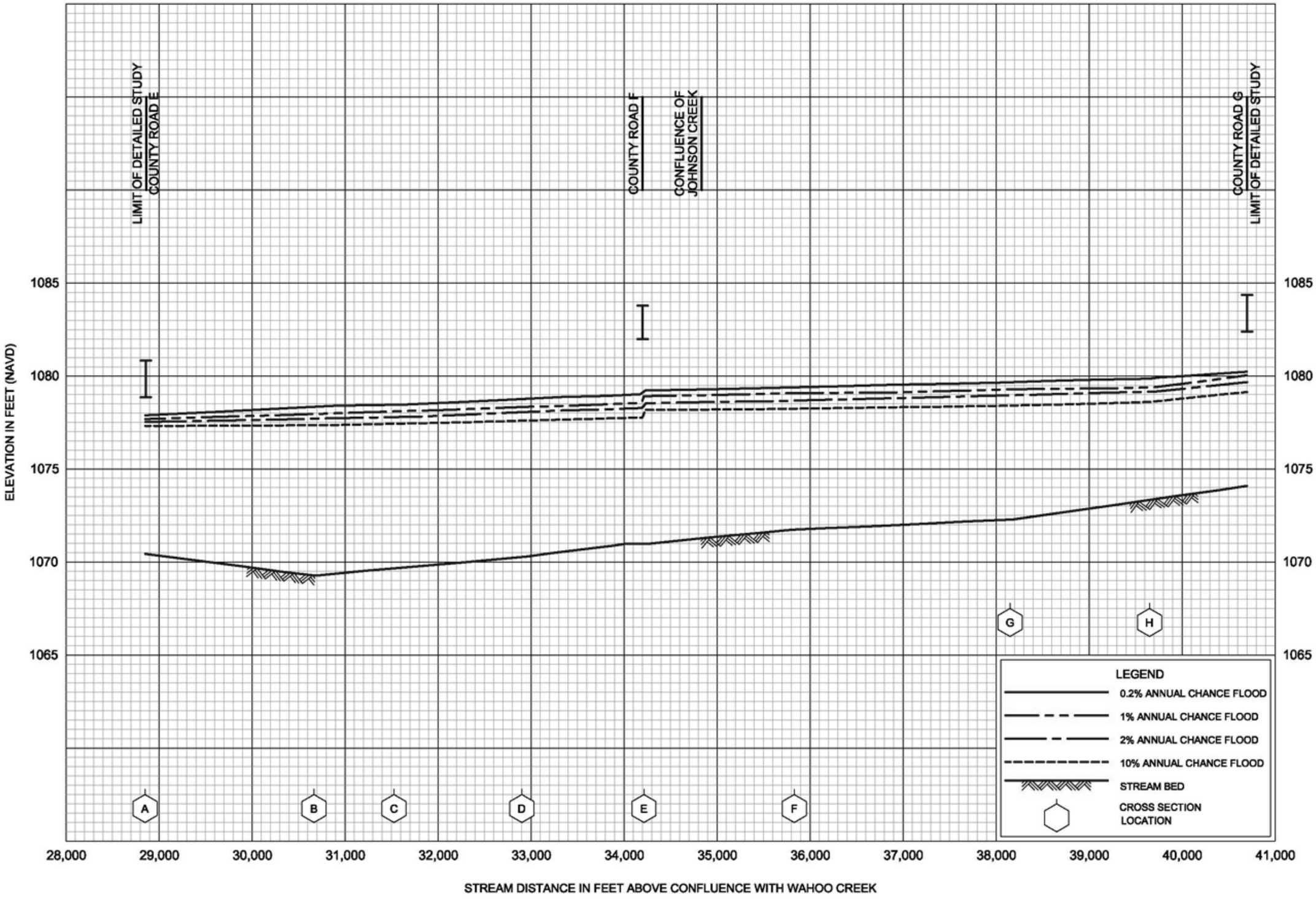
CLEAR CREEK NEAR ASHLAND

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

01P




FLOOD PROFILES

CLEAR CREEK NEAR ASHLAND

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

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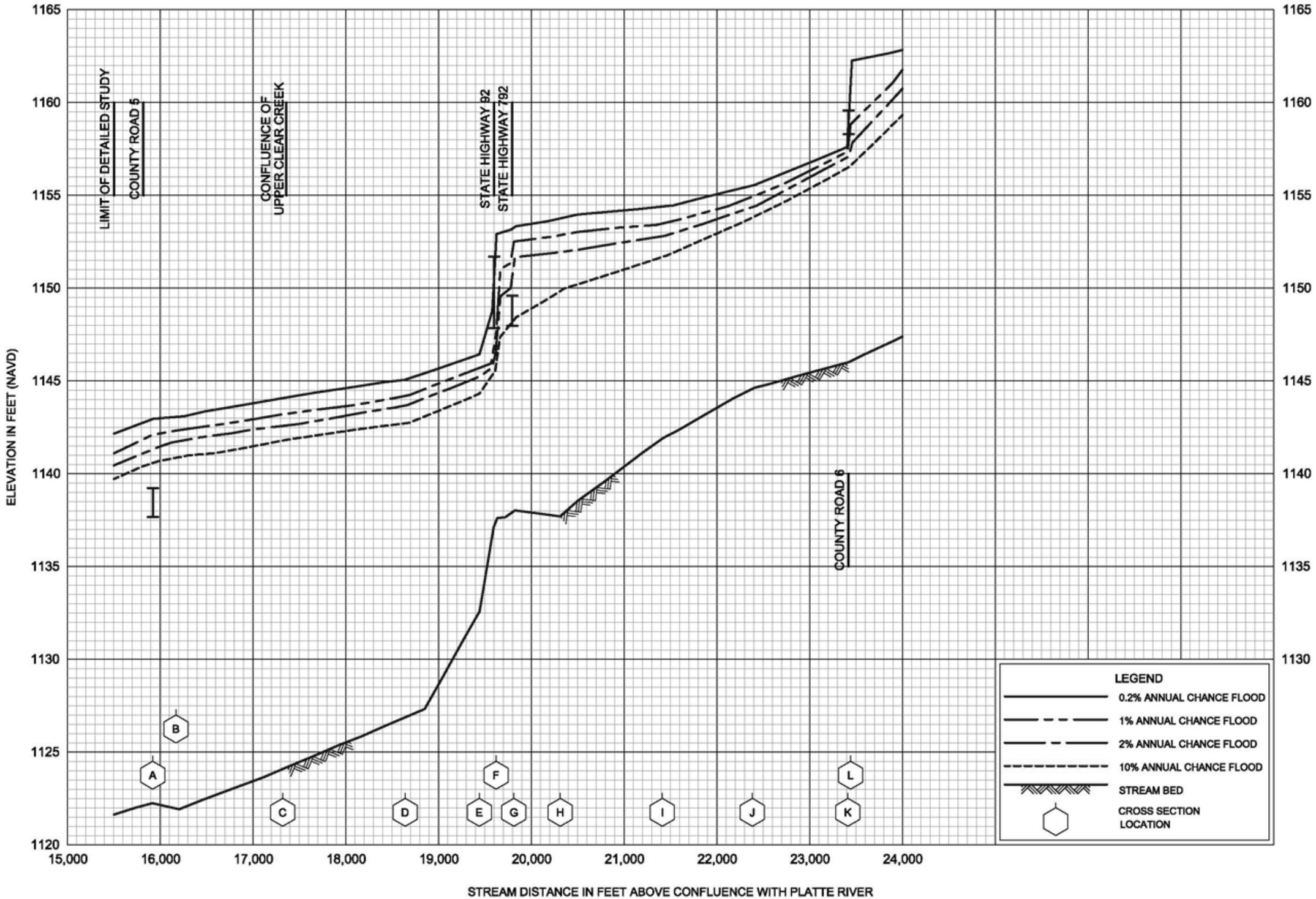



FLOOD PROFILES

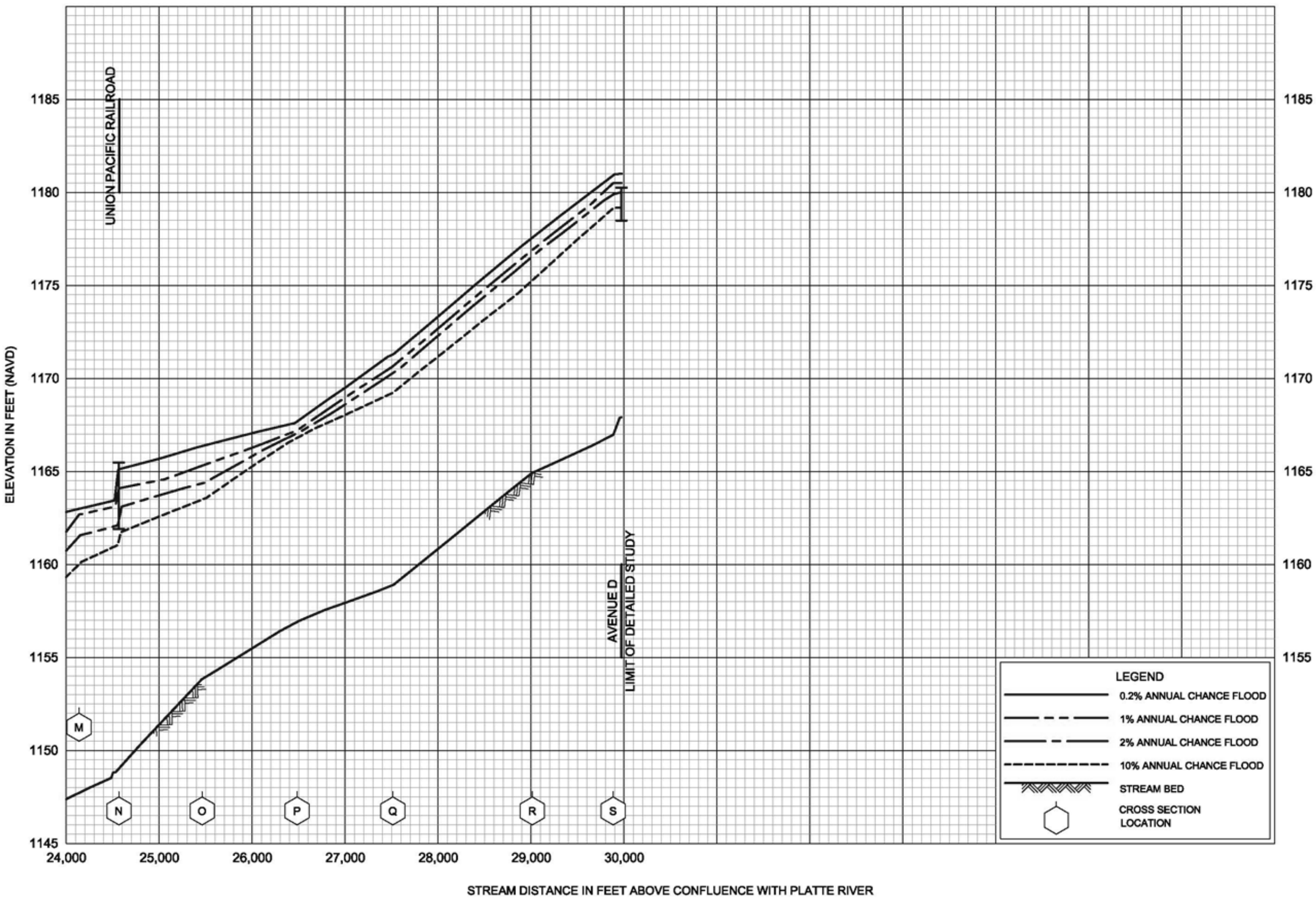
CLEAR CREEK NEAR YUTAN

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

03P




FLOOD PROFILES

CLEAR CREEK NEAR YUTAN

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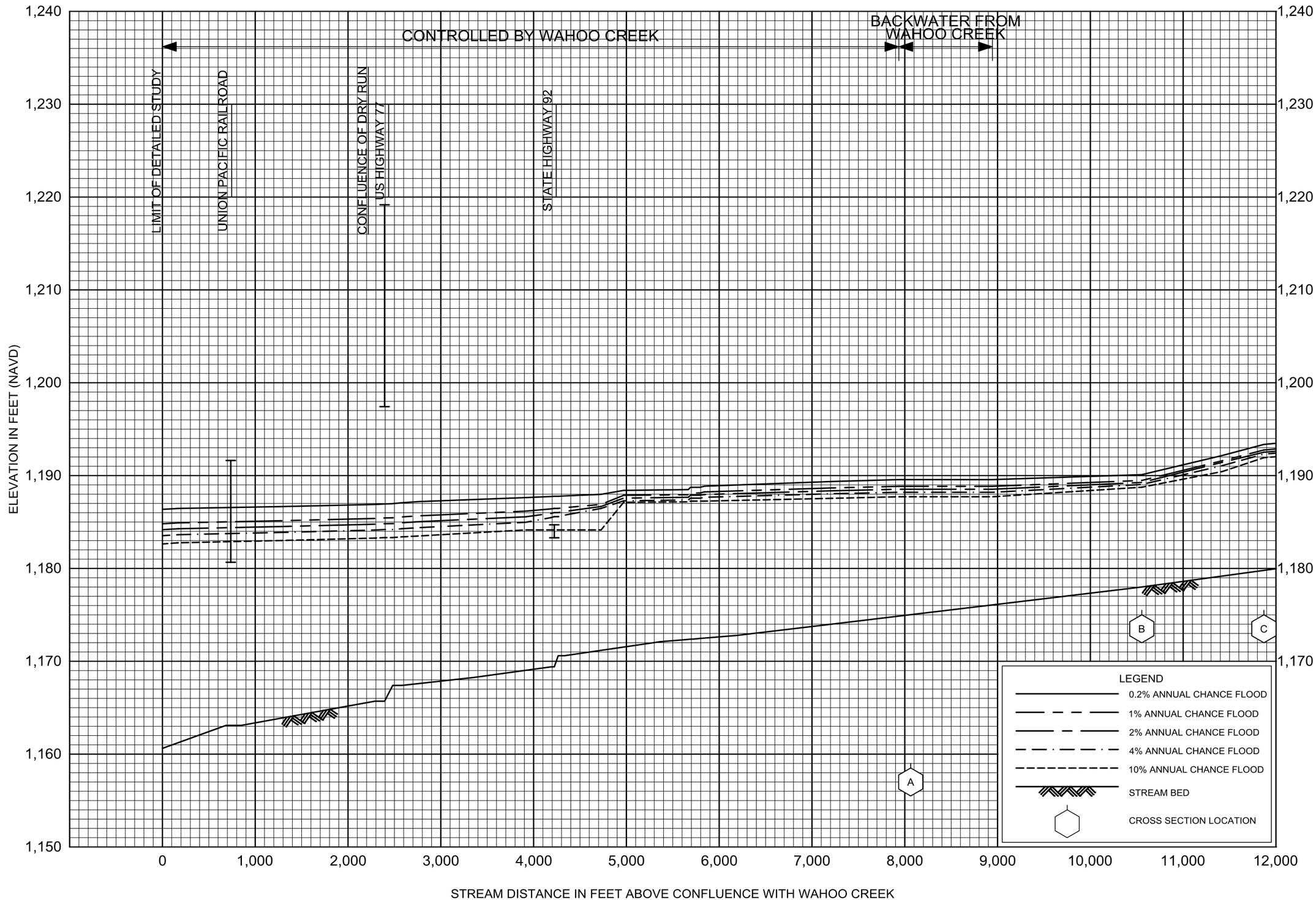


FLOOD PROFILES

COTTONWOOD CREEK NEAR WAHOO

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

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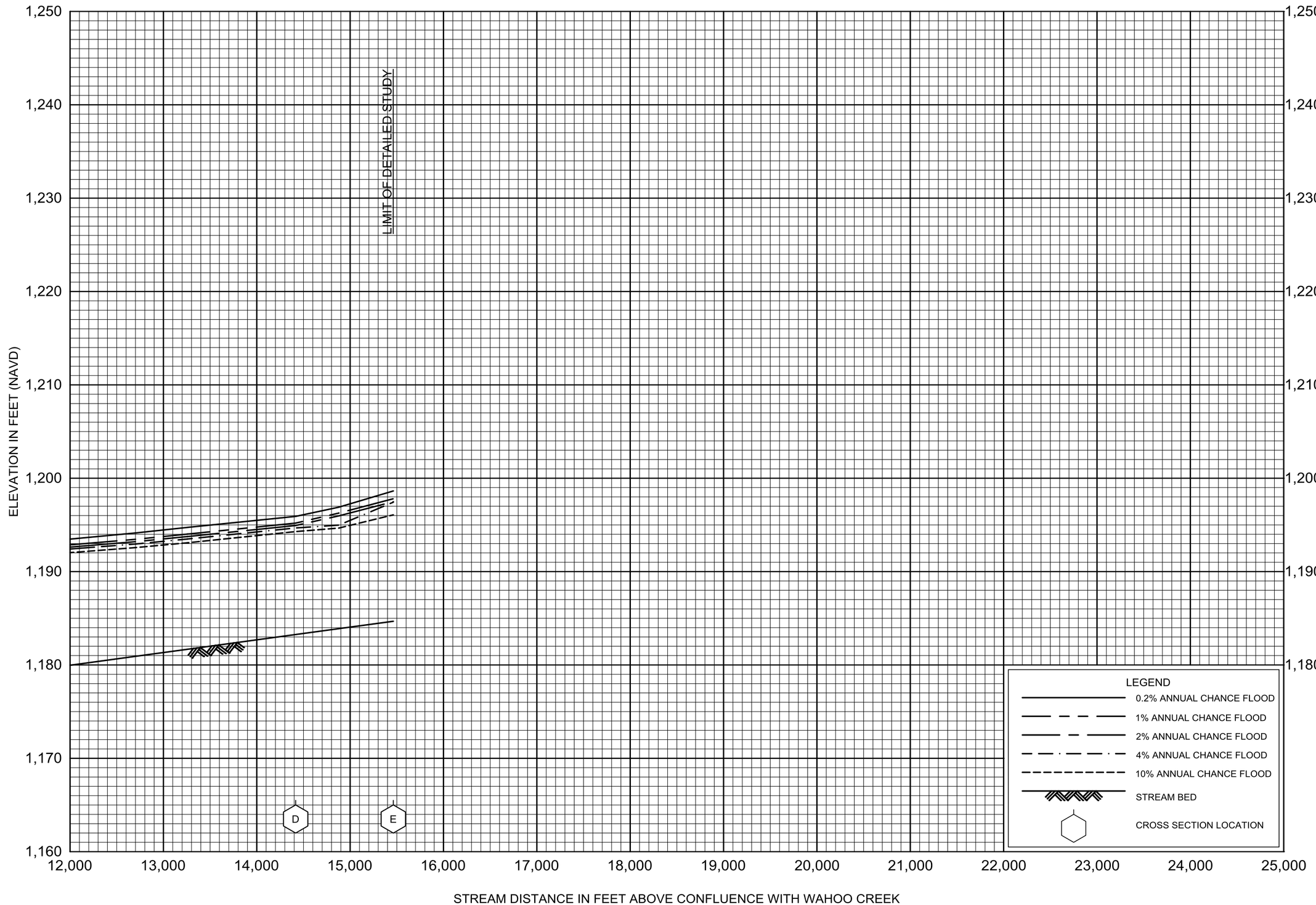


FLOOD PROFILES

COTTONWOOD CREEK NEAR WAHOO

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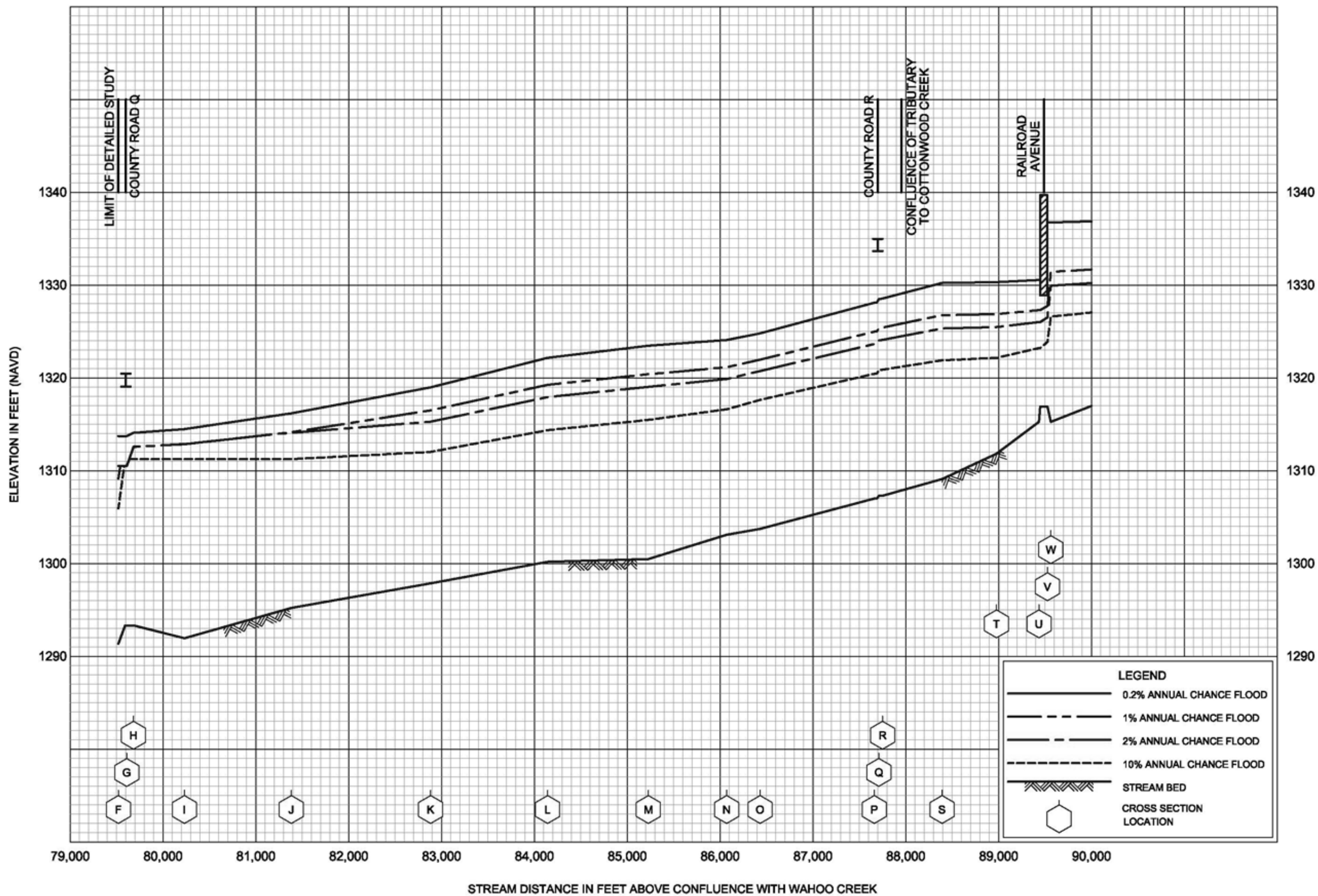
SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

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COTTONWOOD NEAR PRAGUE

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SAUNDERS COUNTY, NE

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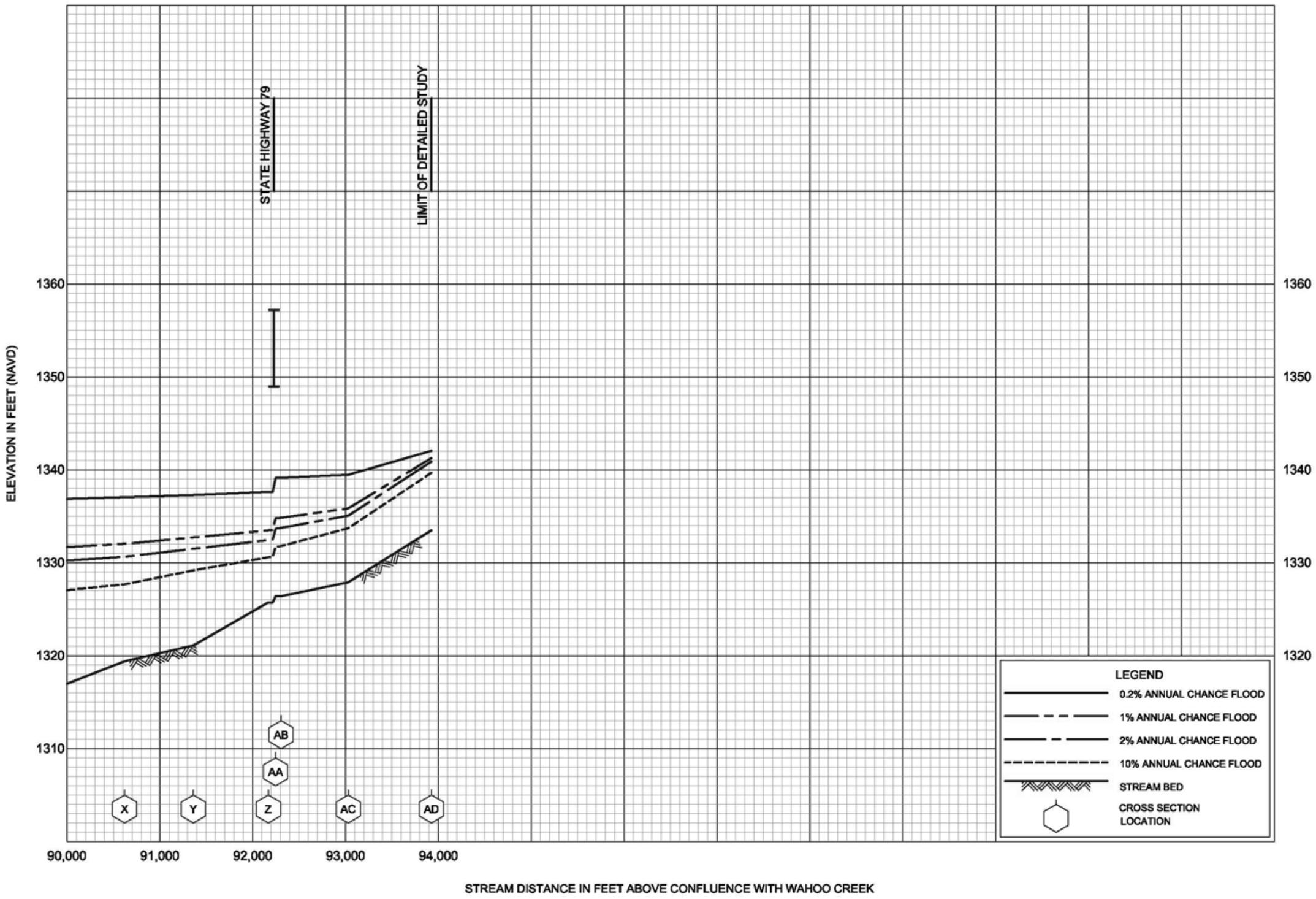


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COTTONWOOD NEAR PRAGUE

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SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

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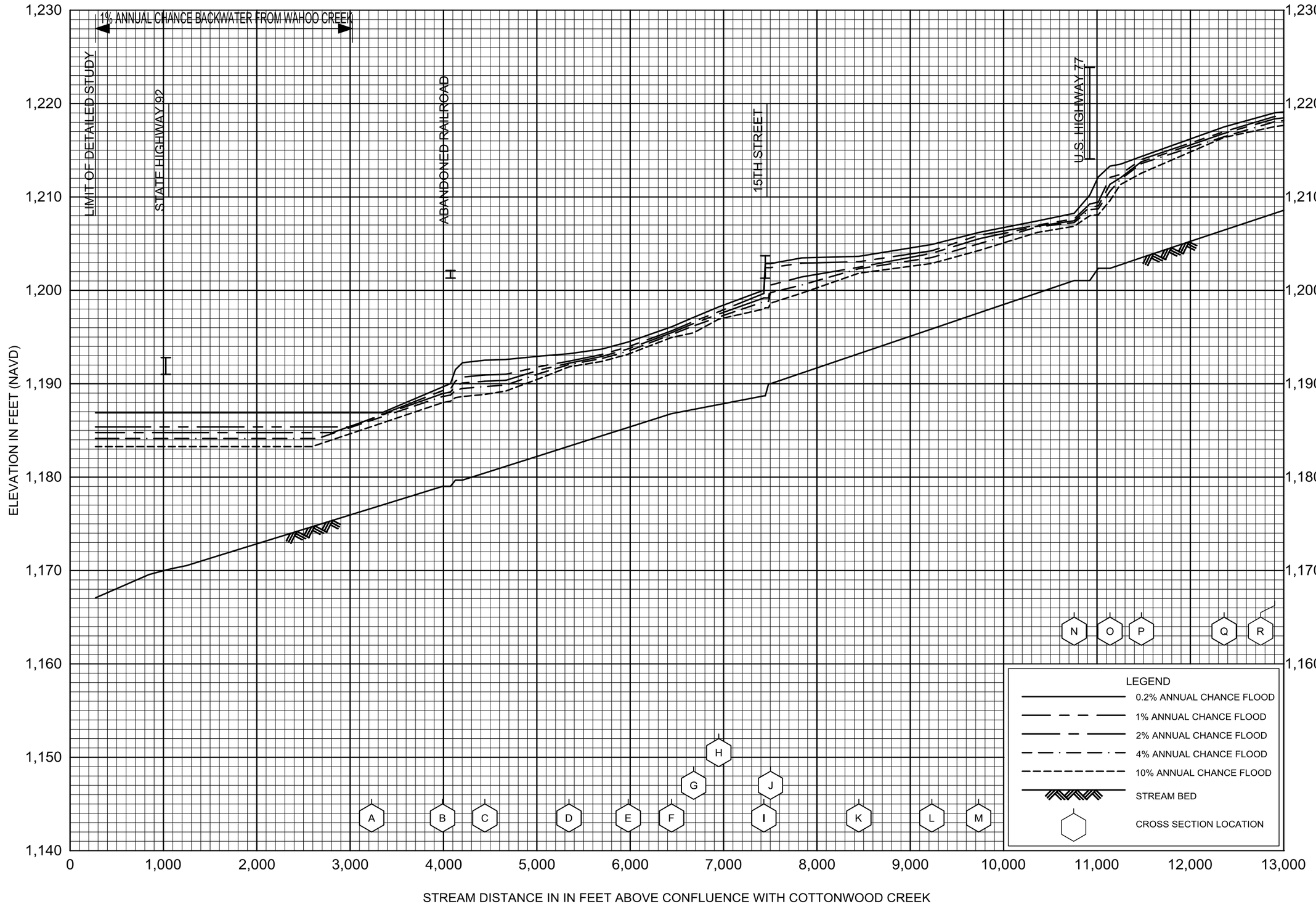


FLOOD PROFILES

DRY RUN CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

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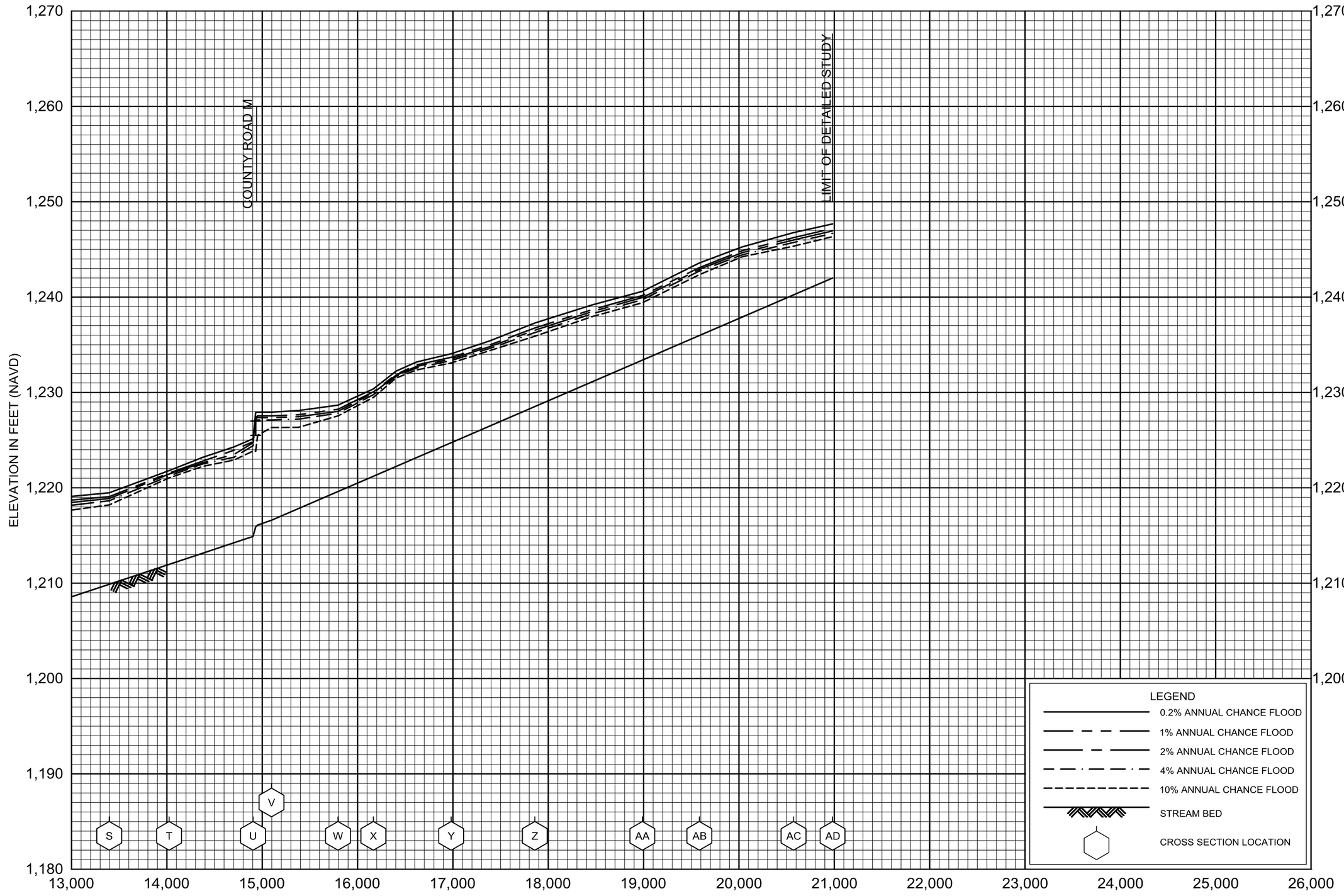


FLOOD PROFILES

DRY RUN CREEK

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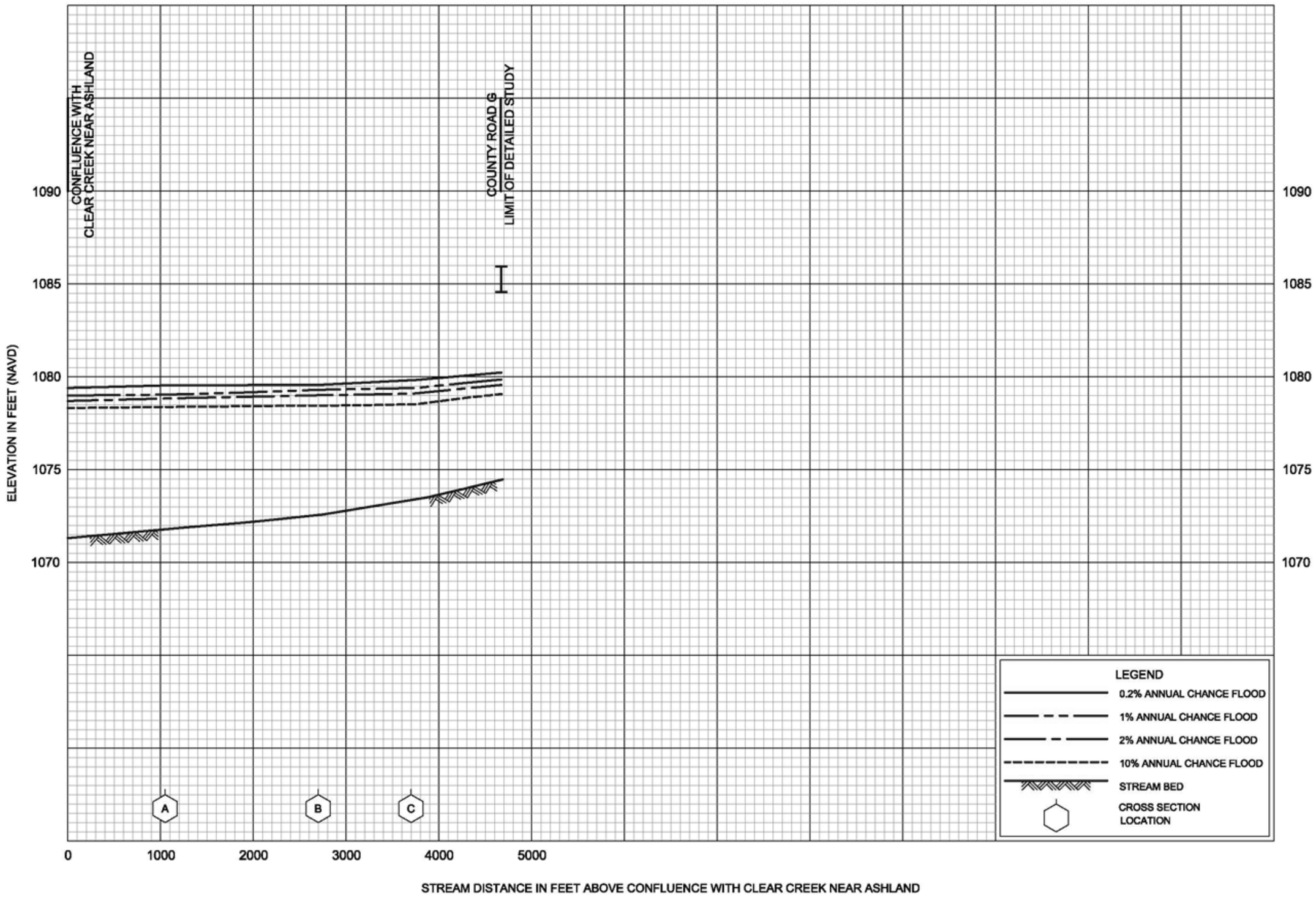


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JOHNSON CREEK

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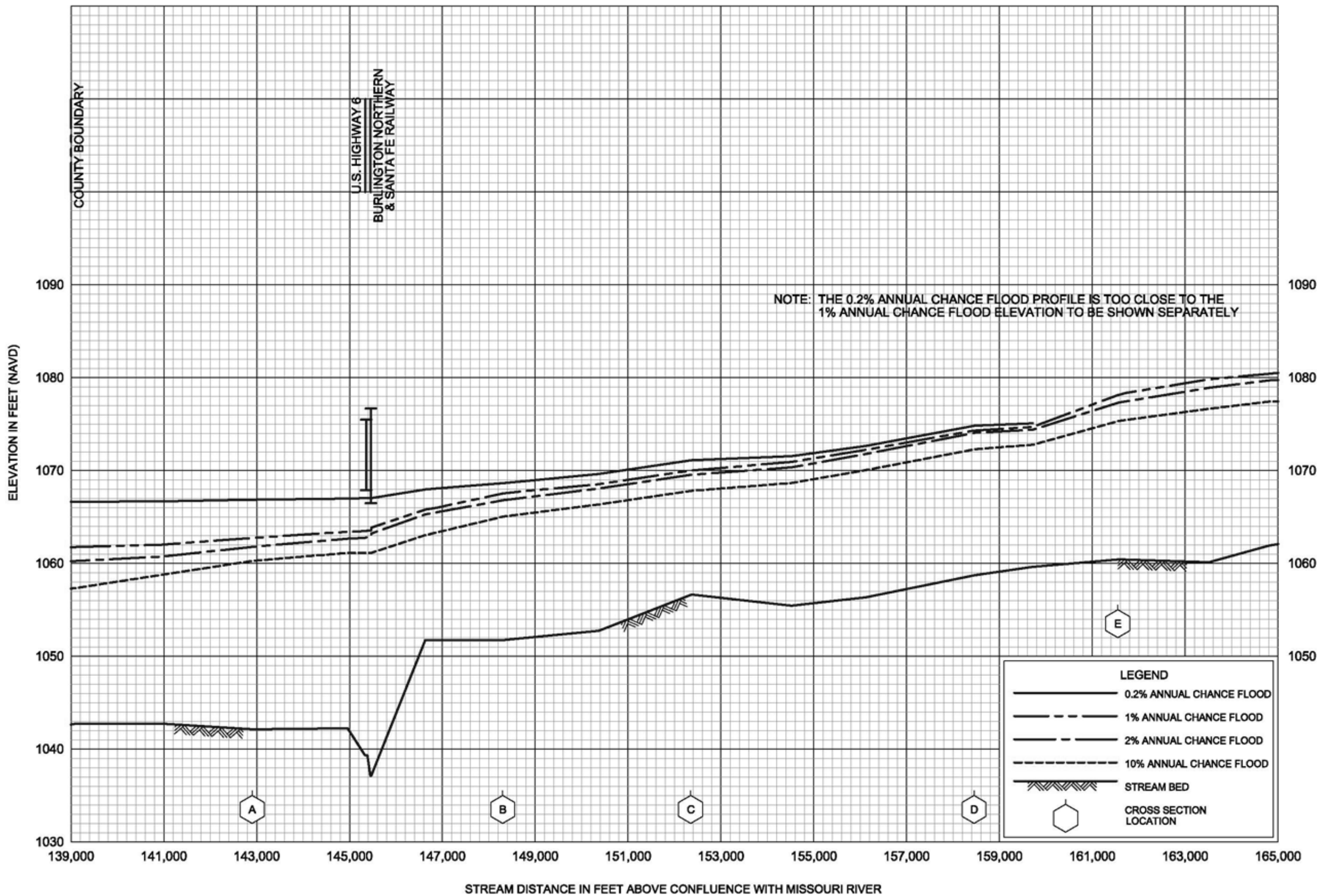


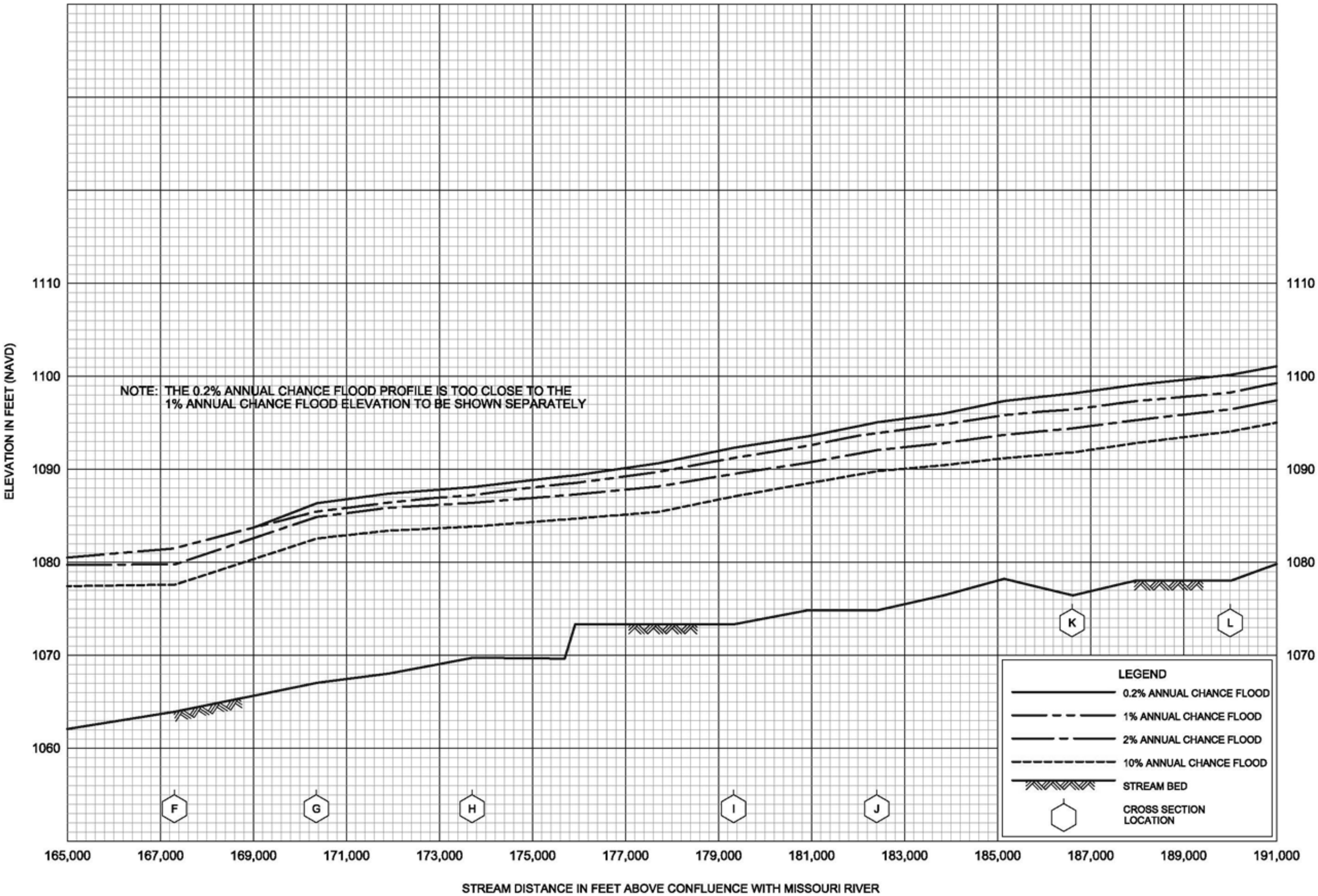

FLOOD PROFILES

PLATTE RIVER (WITH LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS

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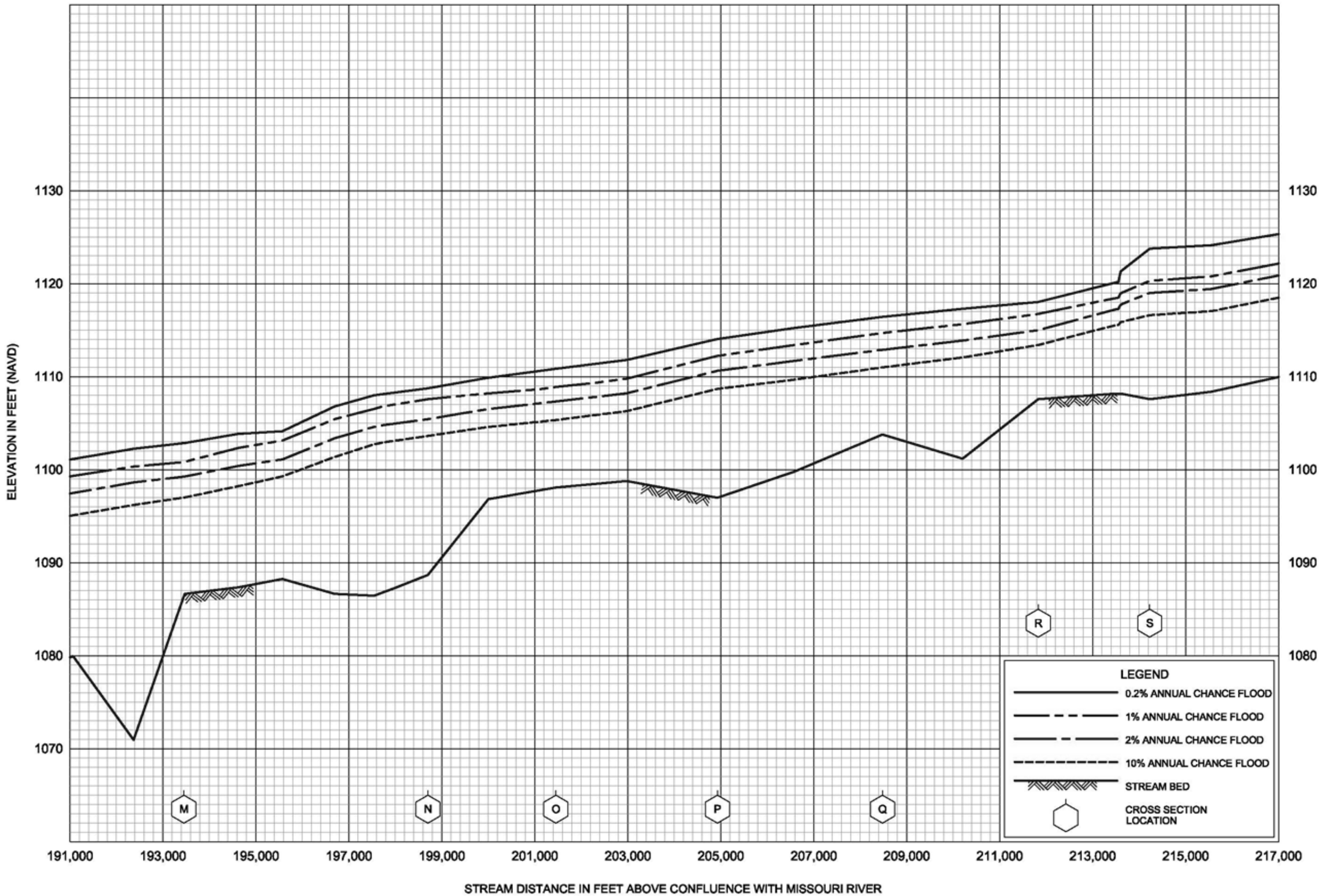


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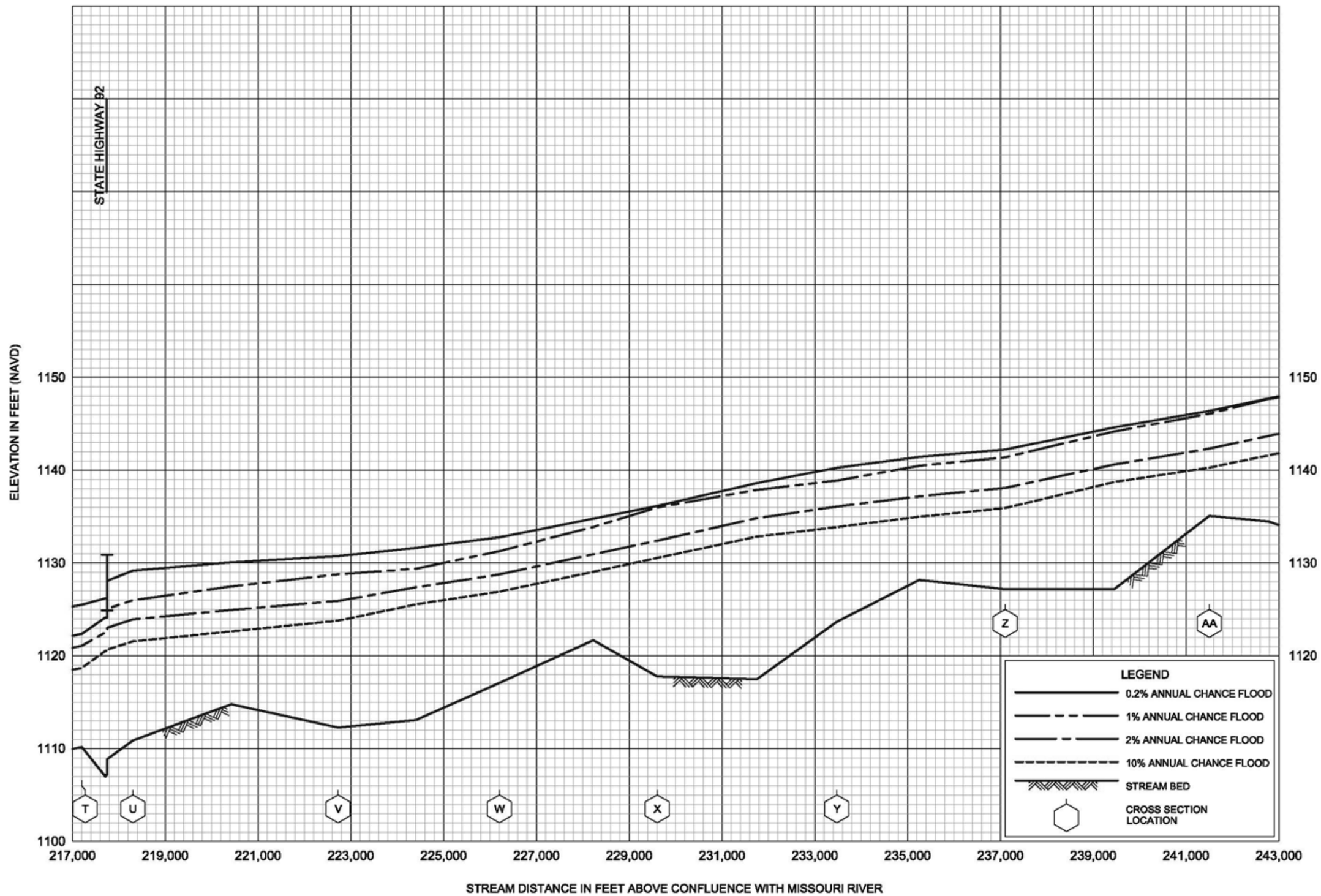


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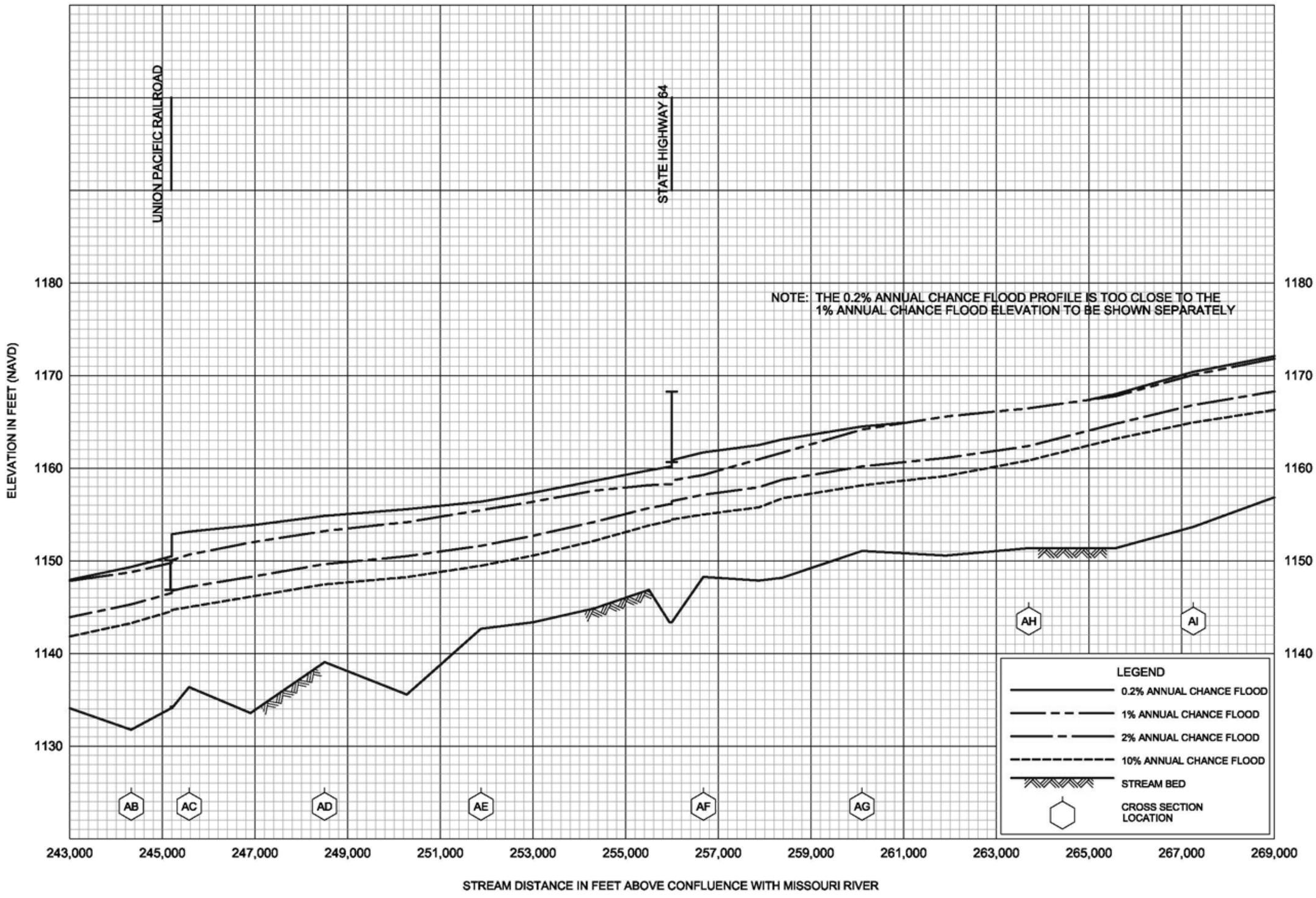


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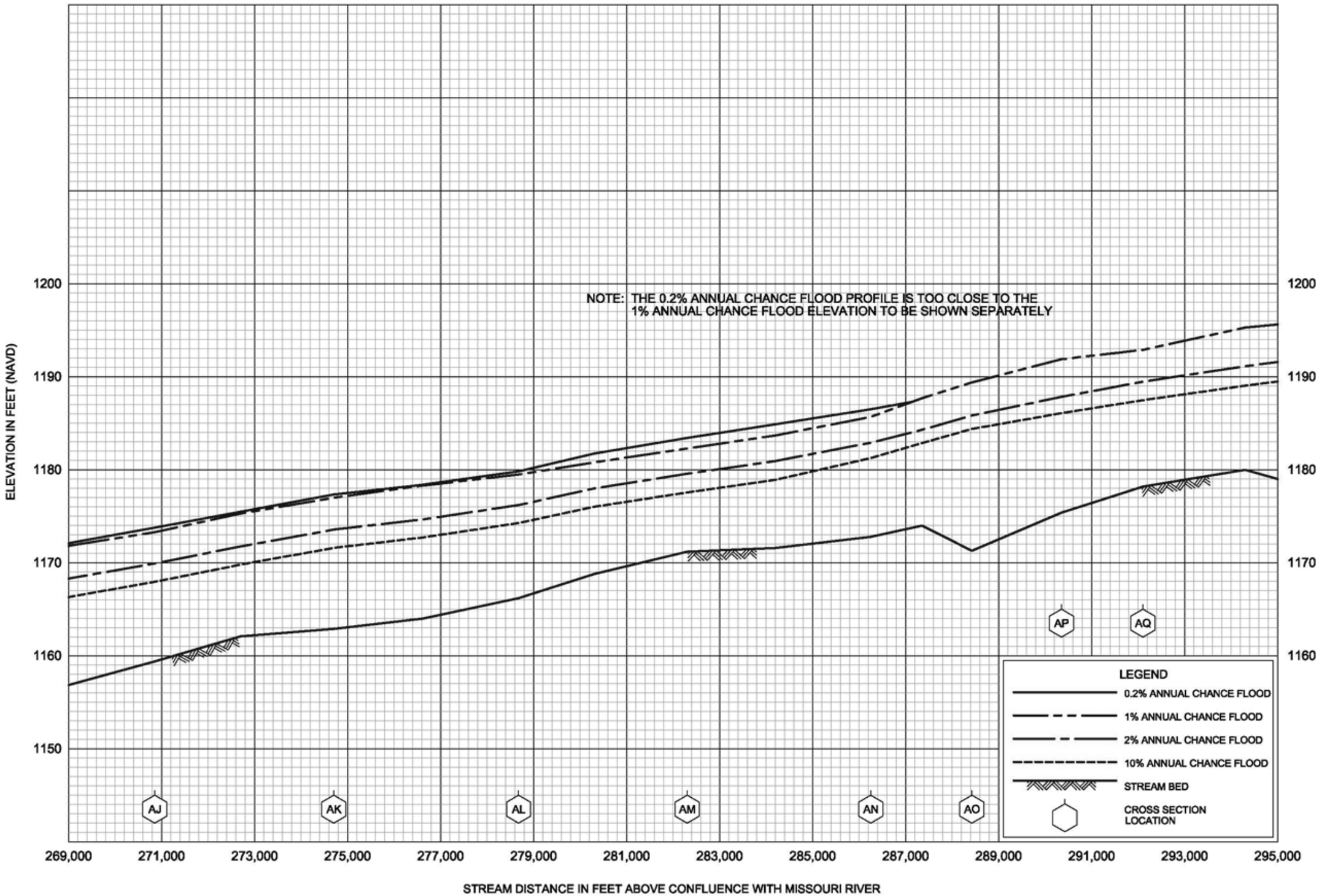


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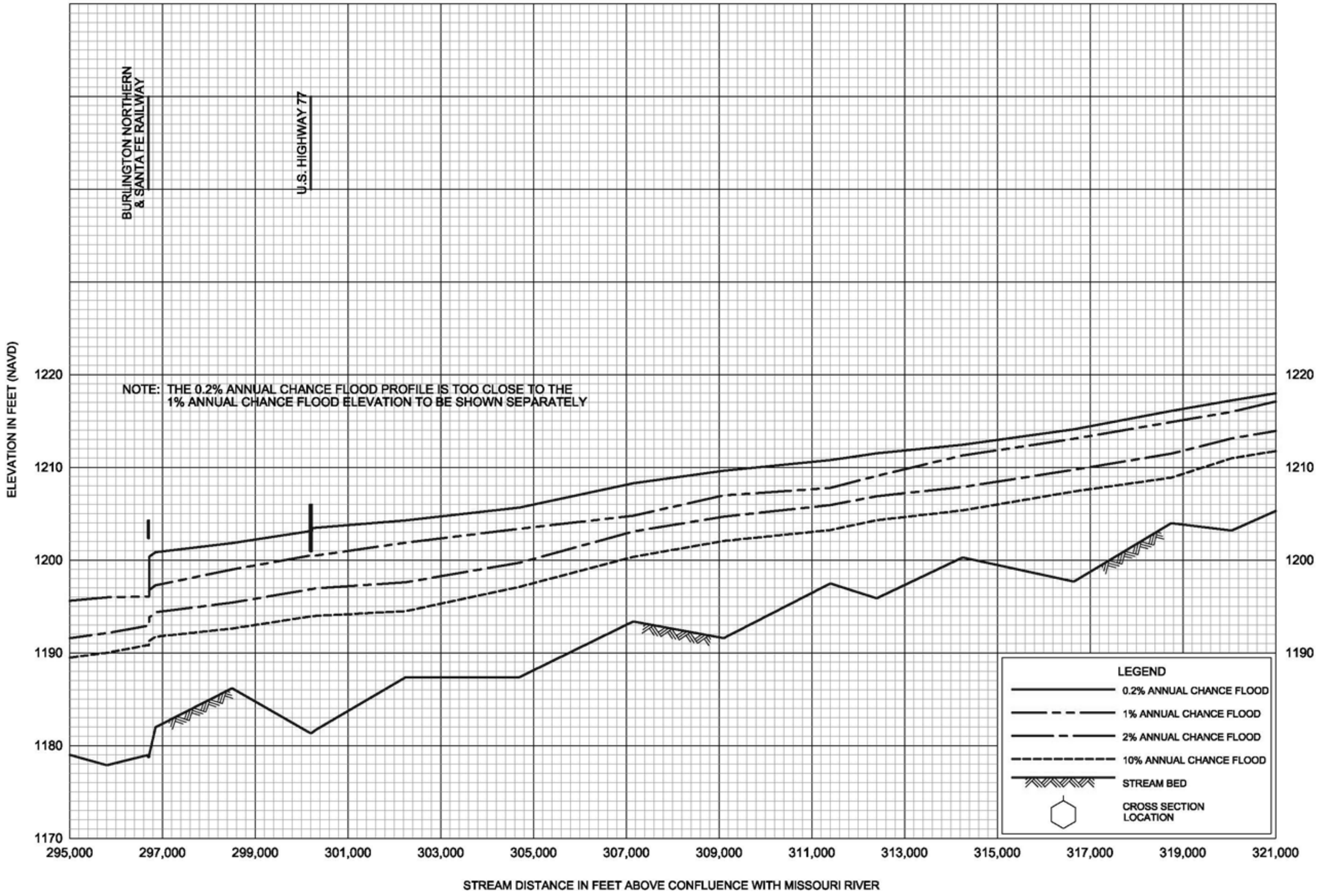


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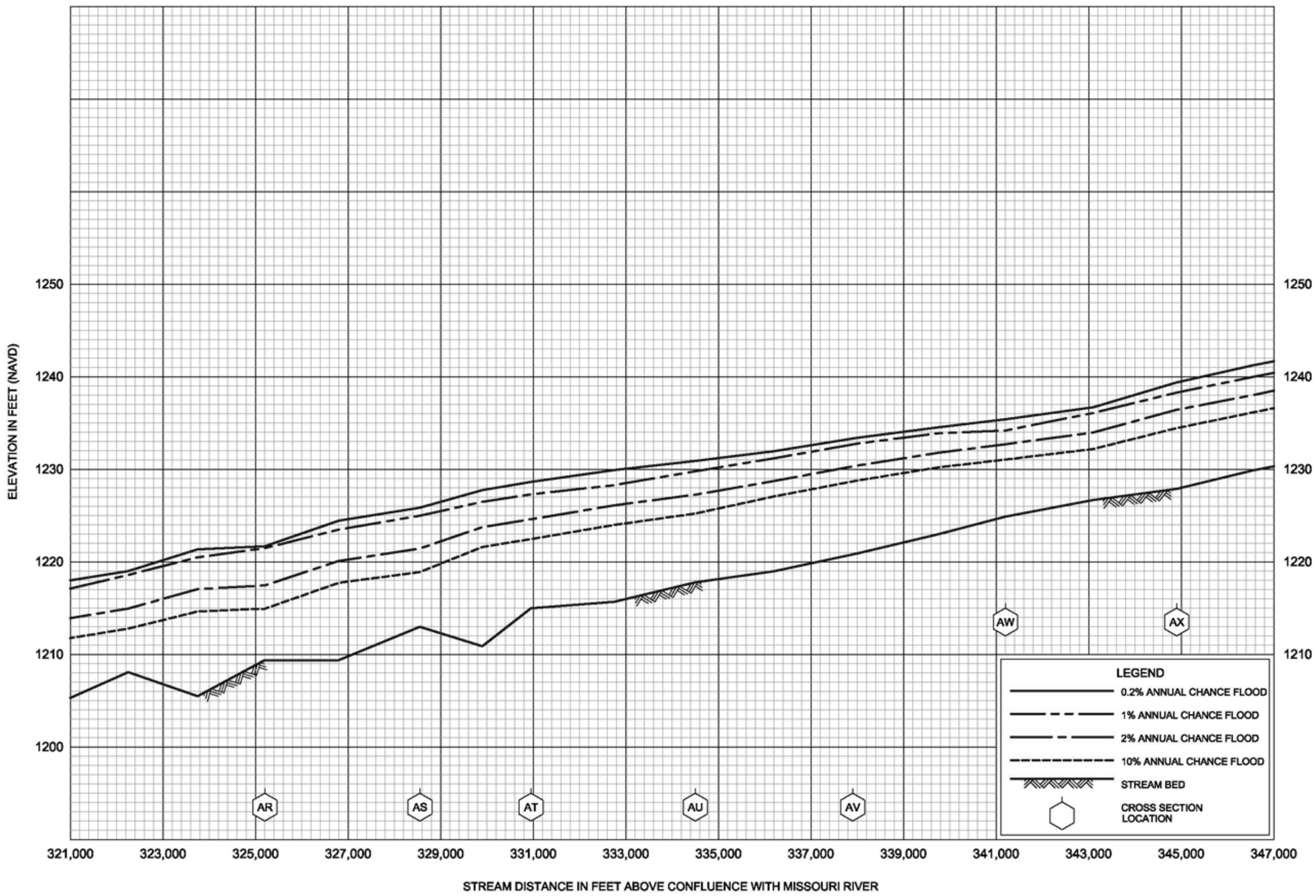


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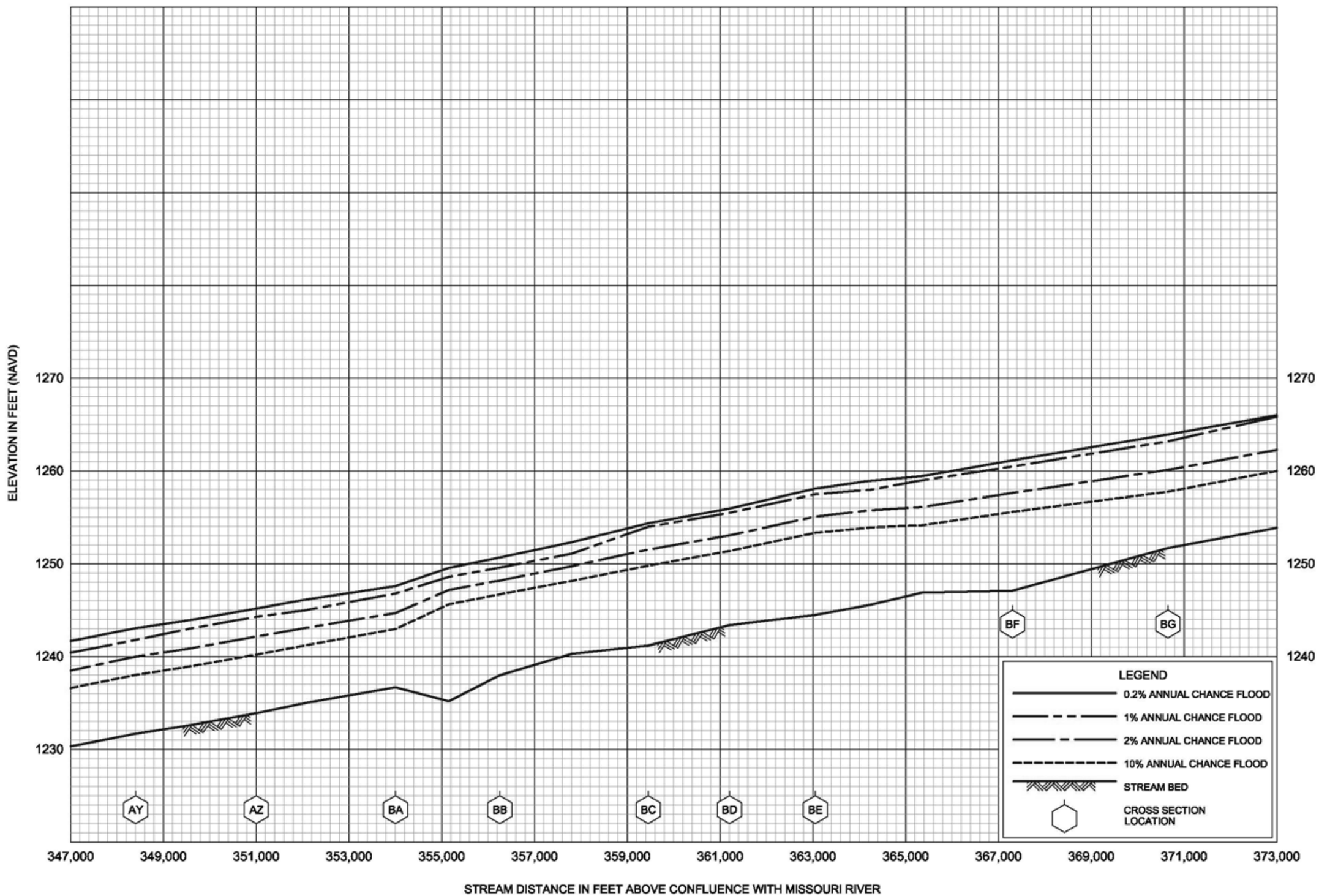


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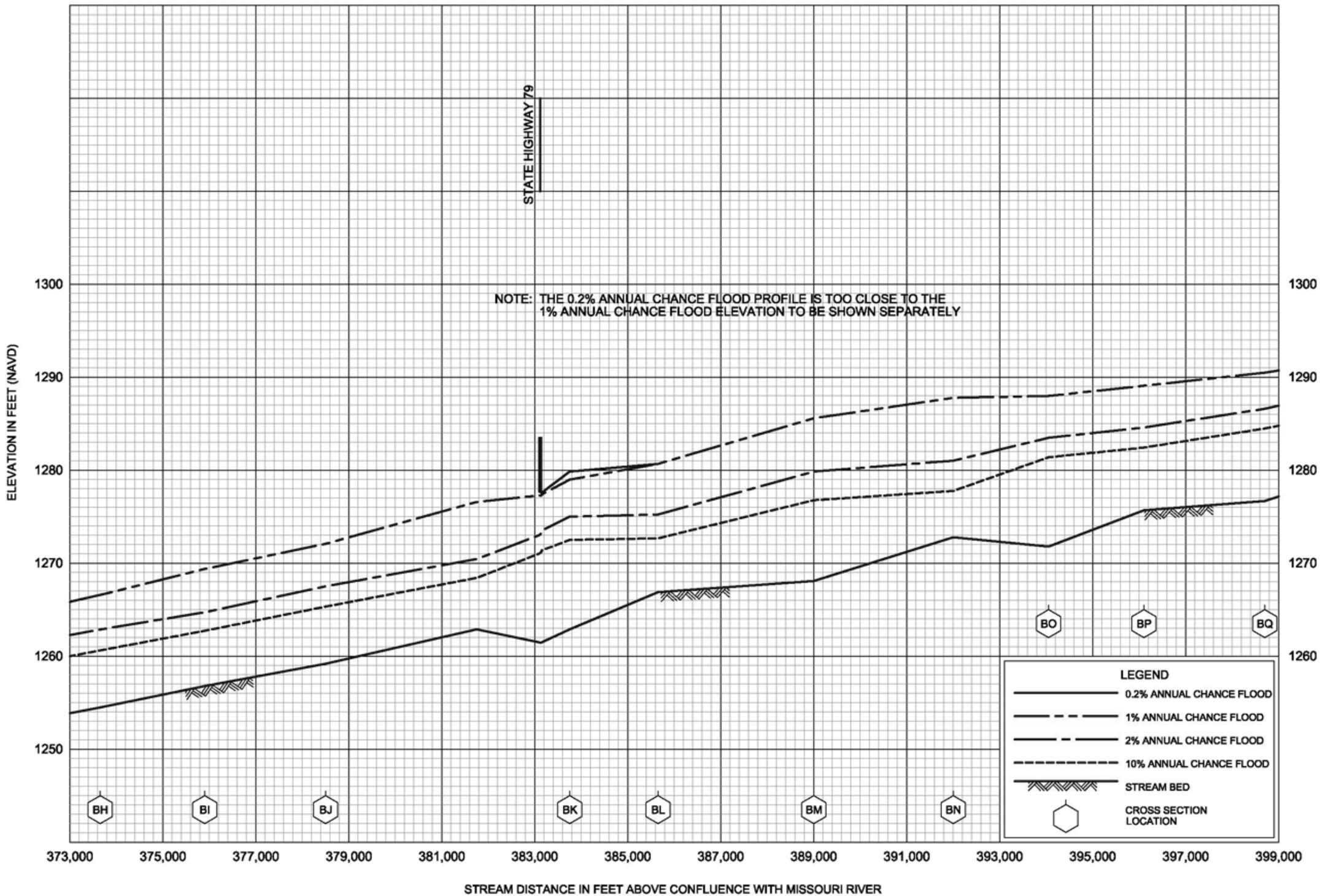


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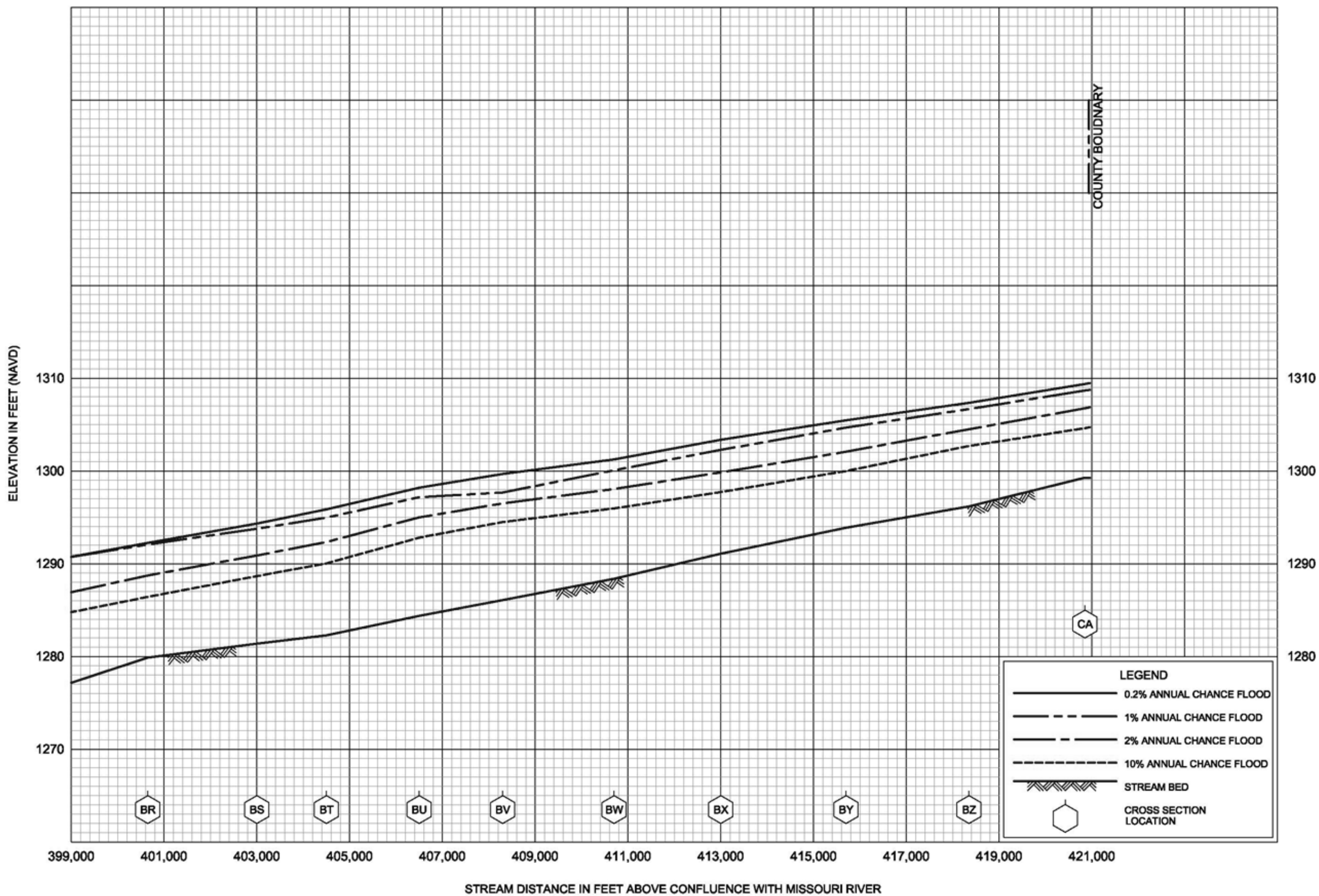


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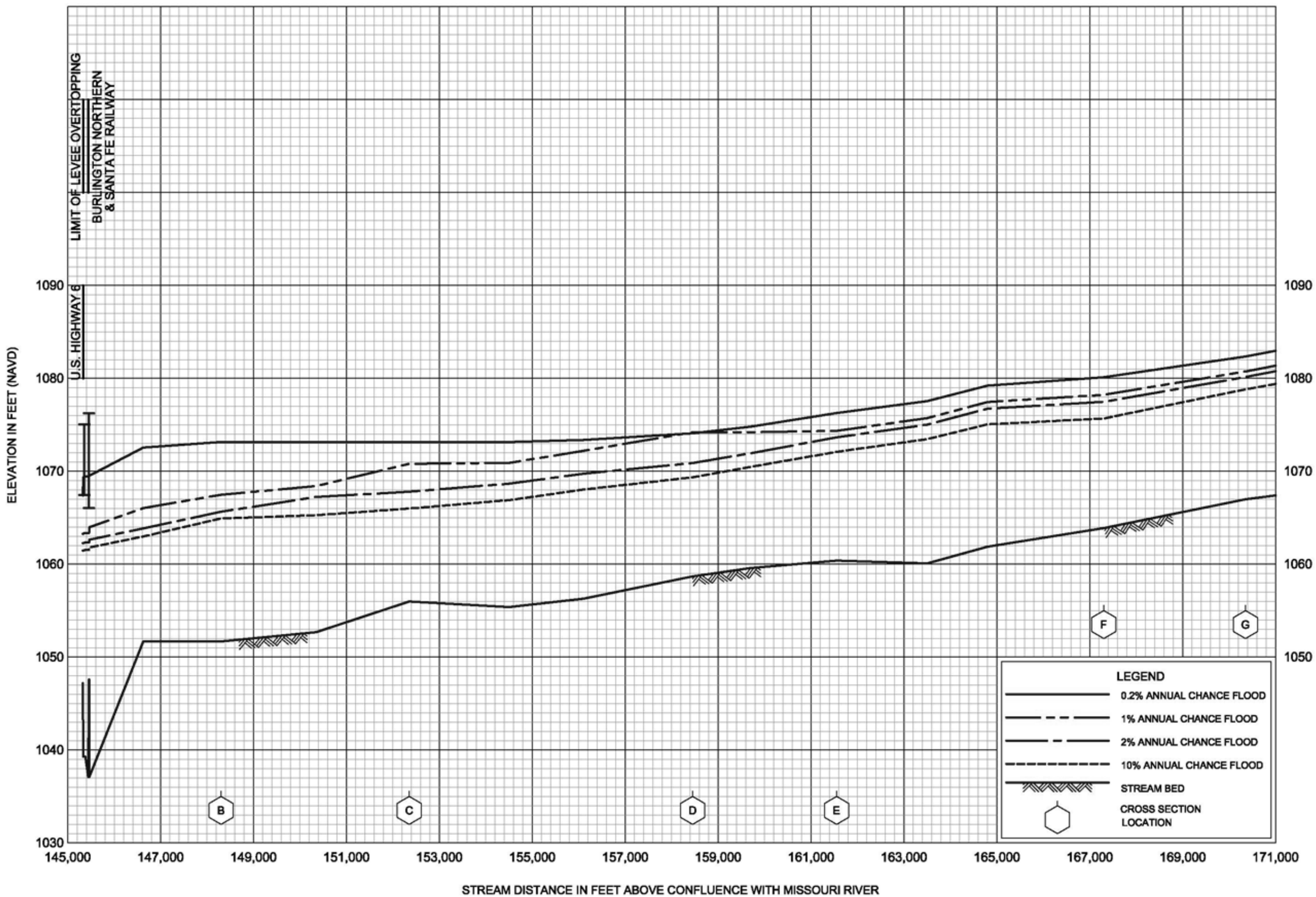


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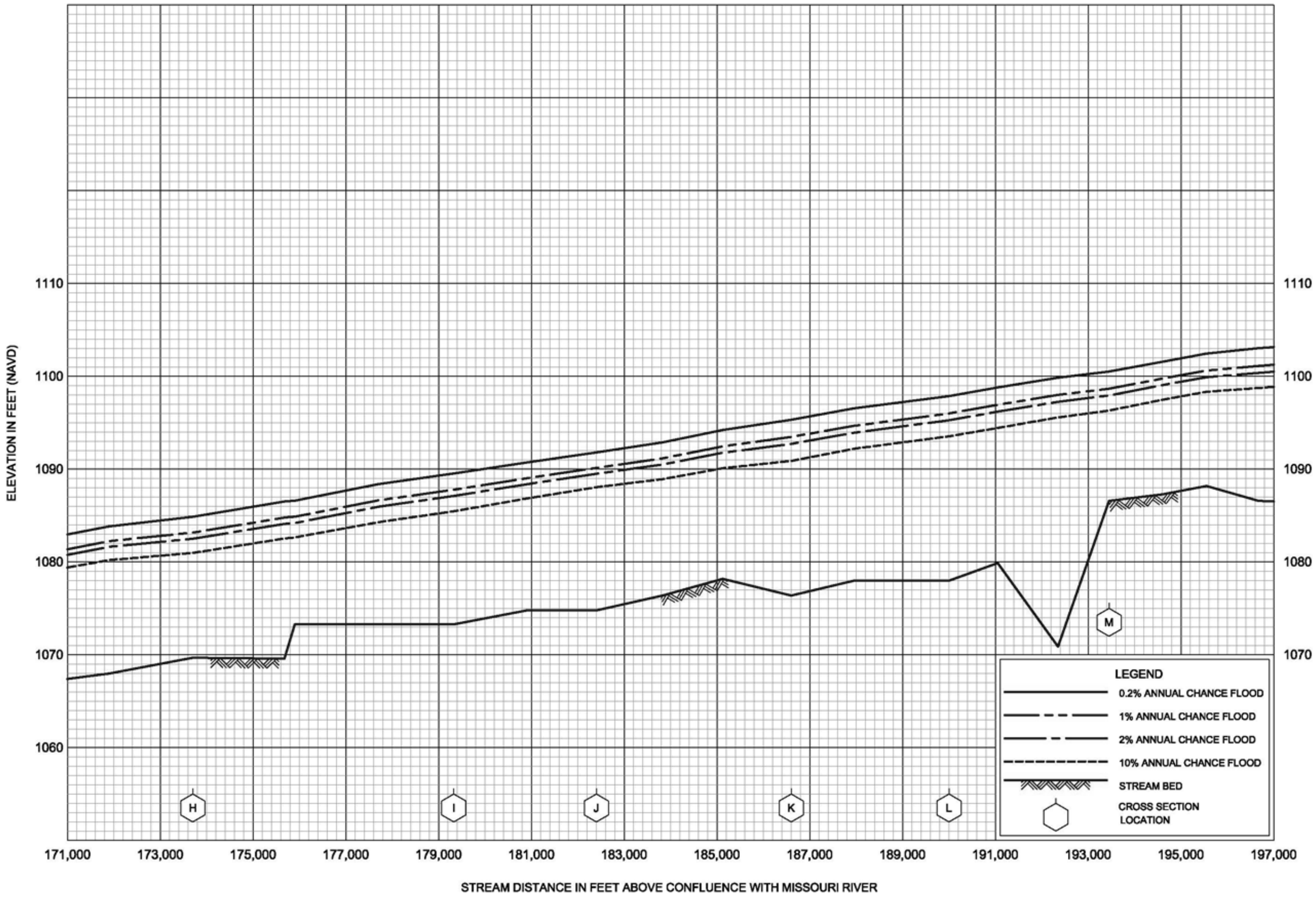


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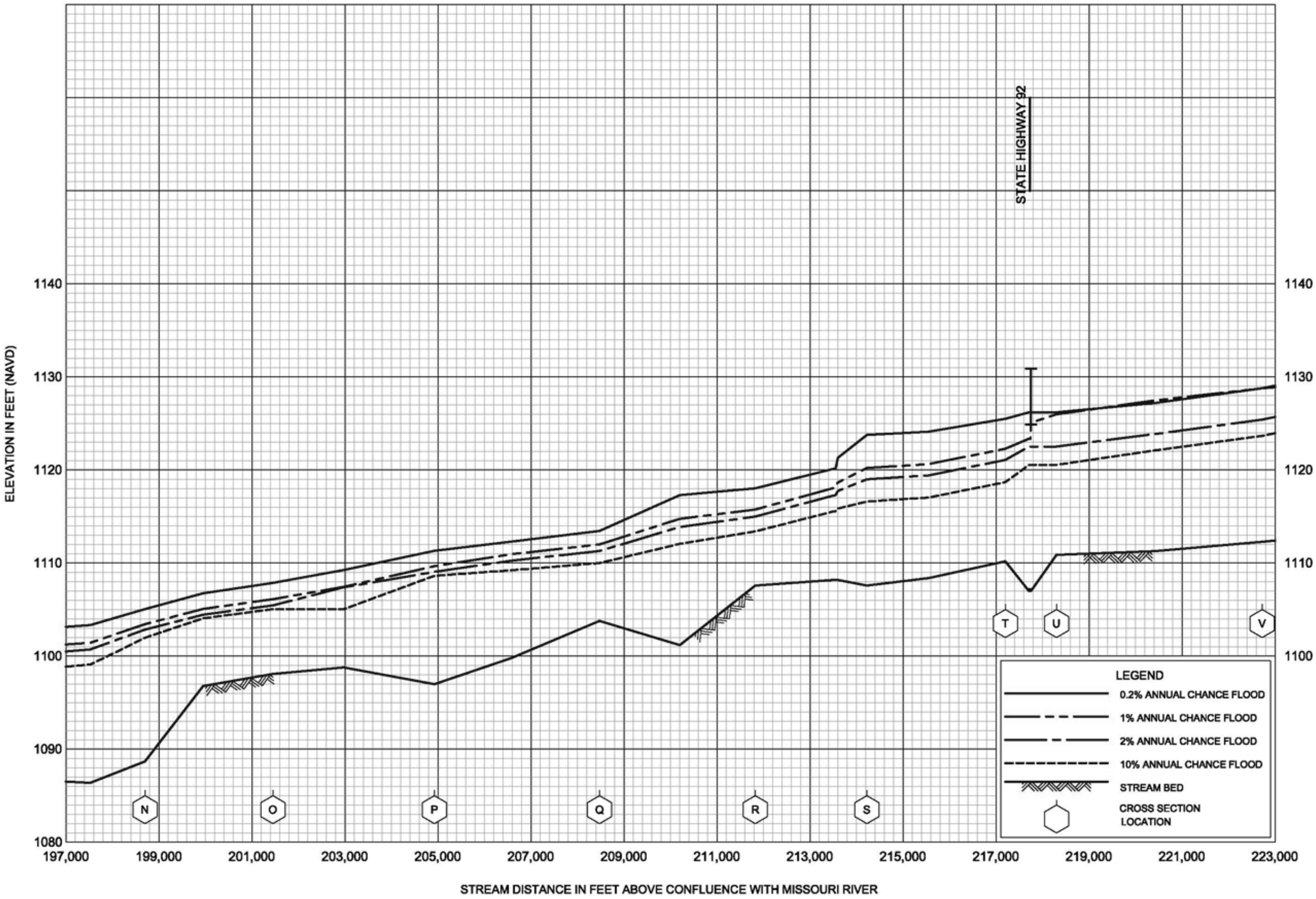
SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



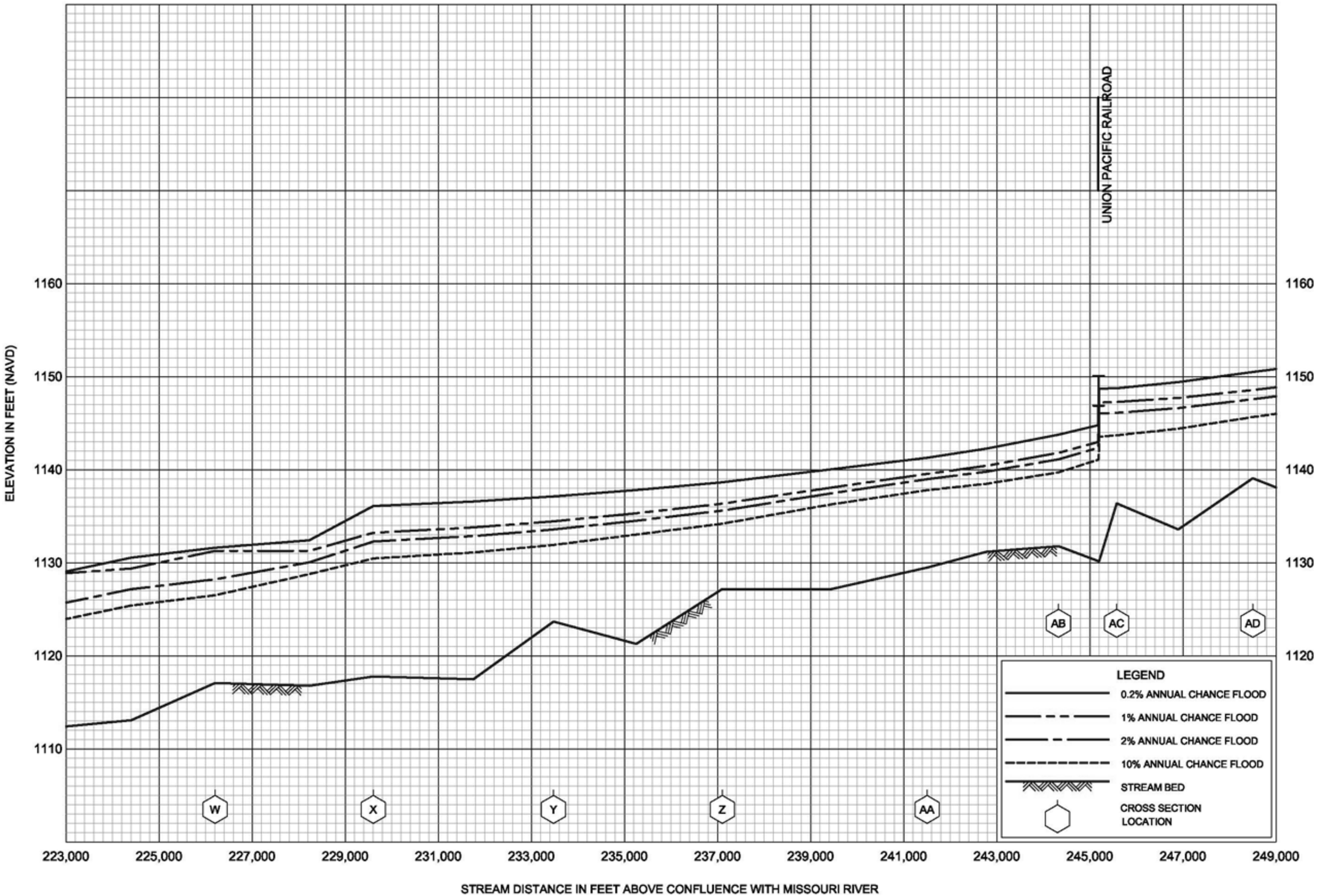

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



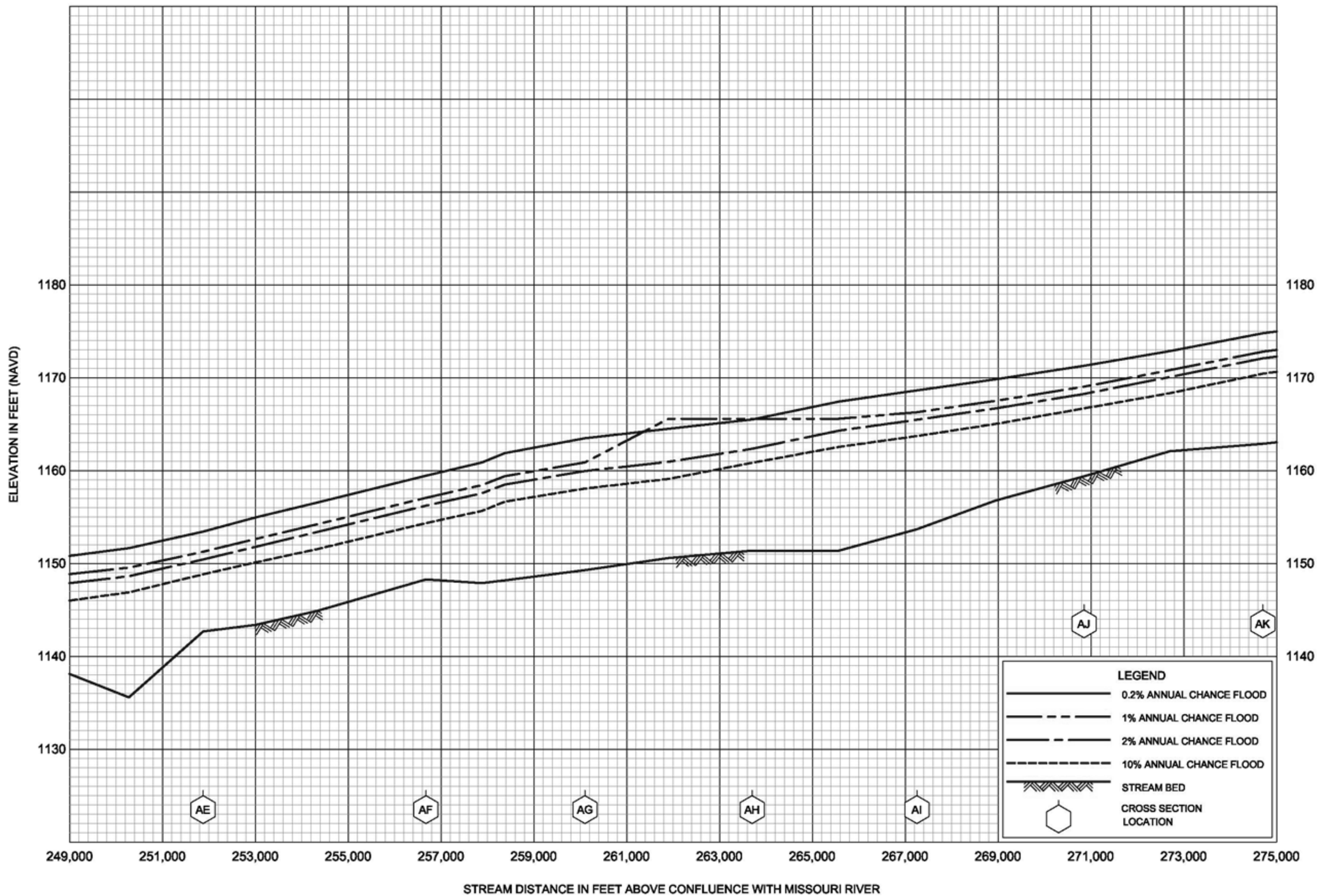

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



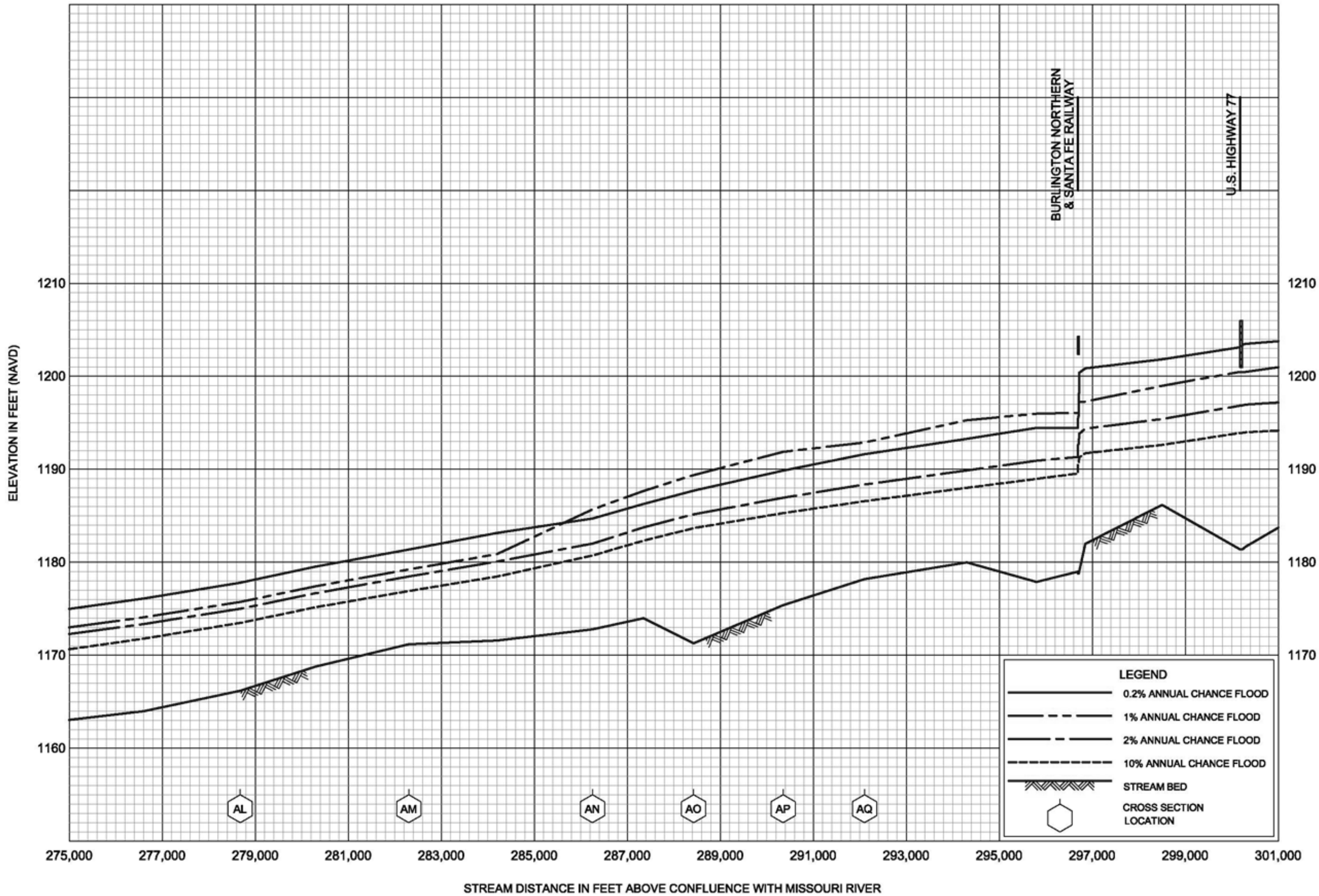

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



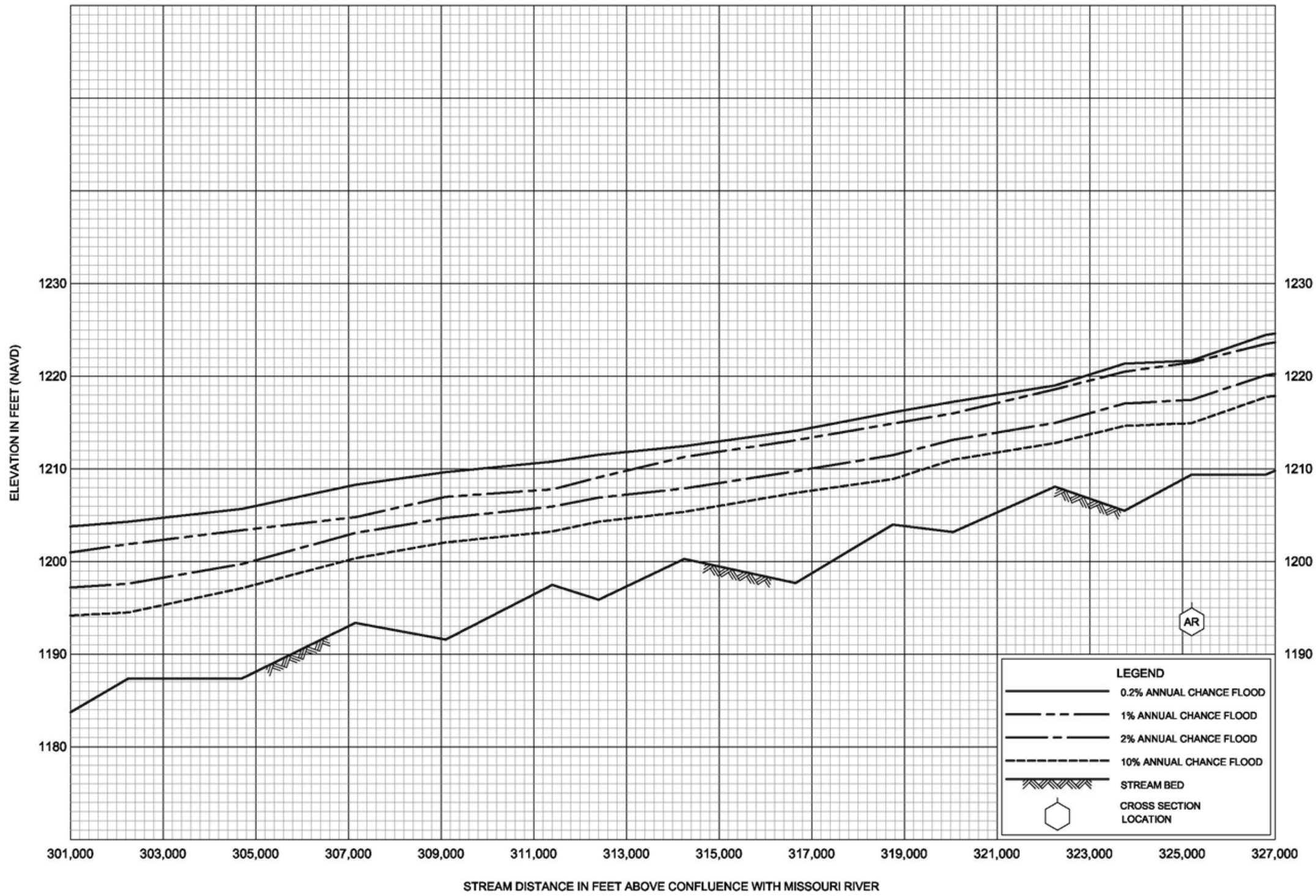

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



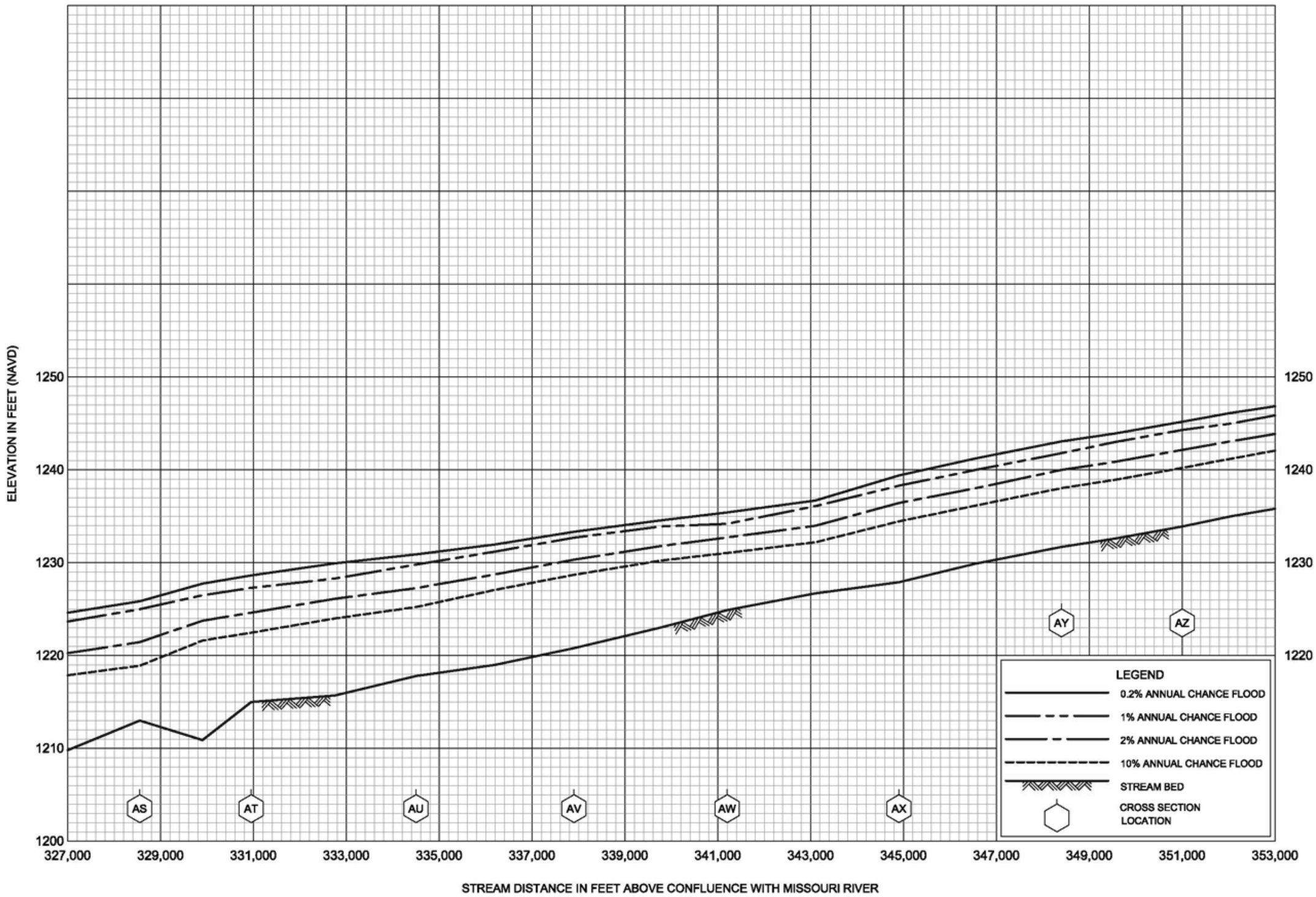

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



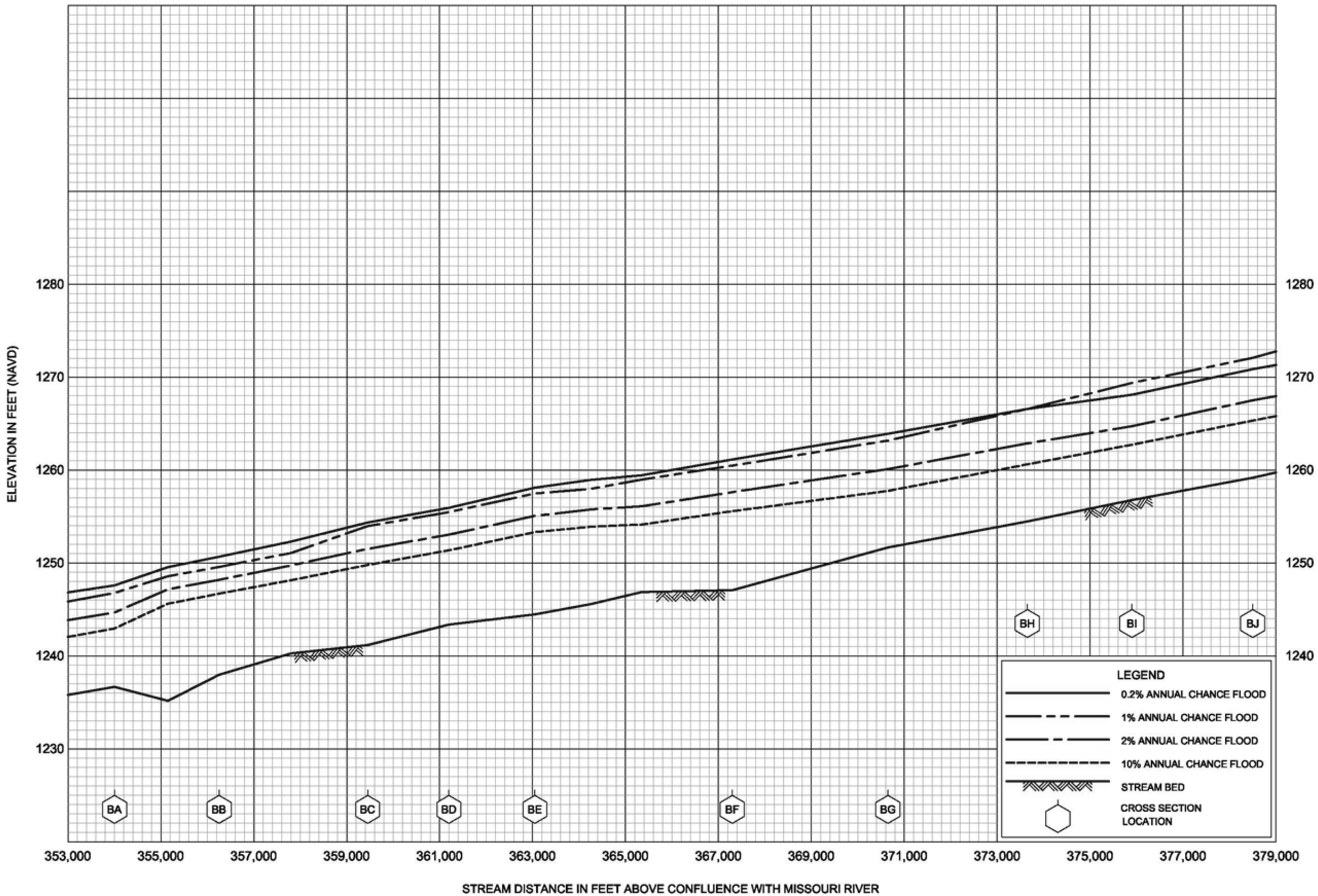

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



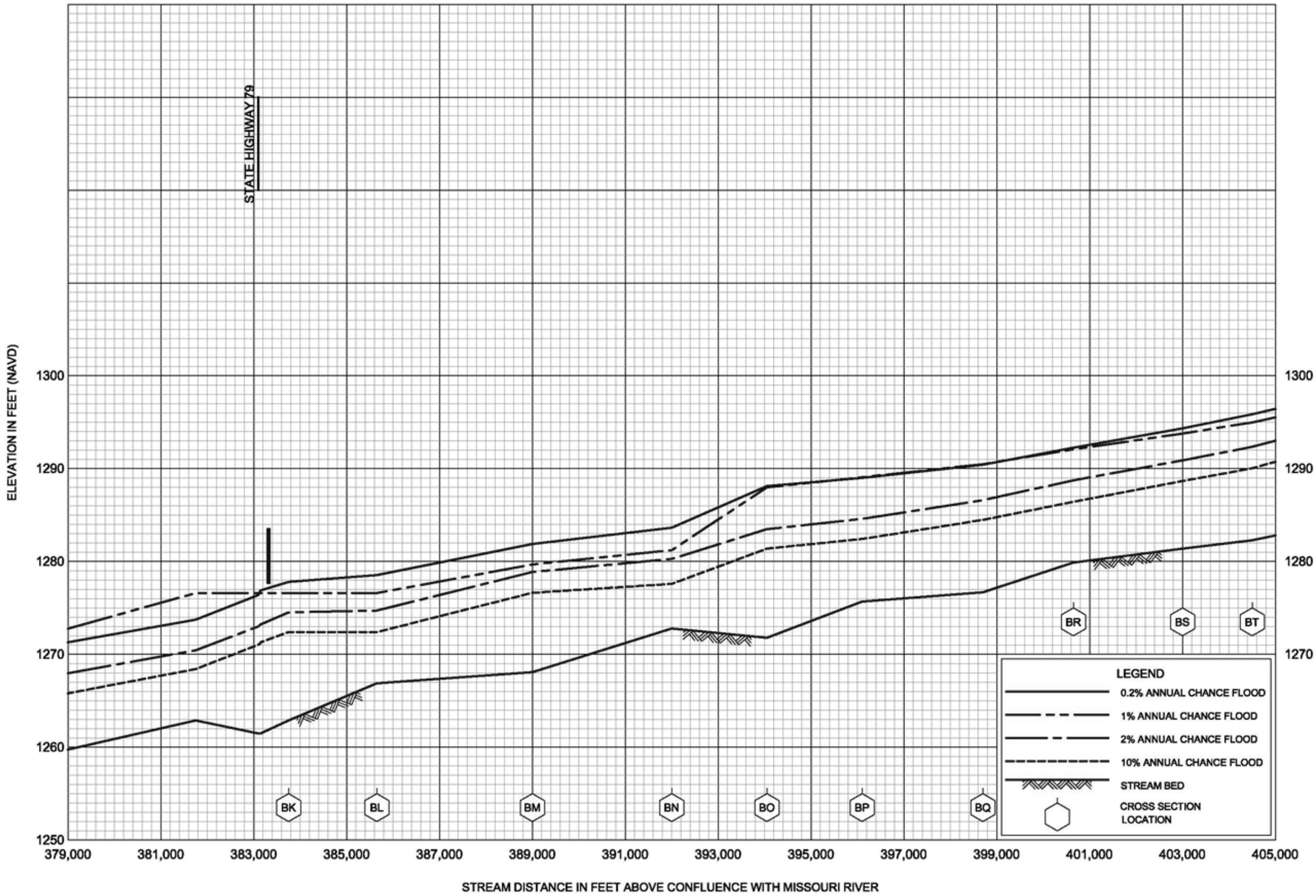

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



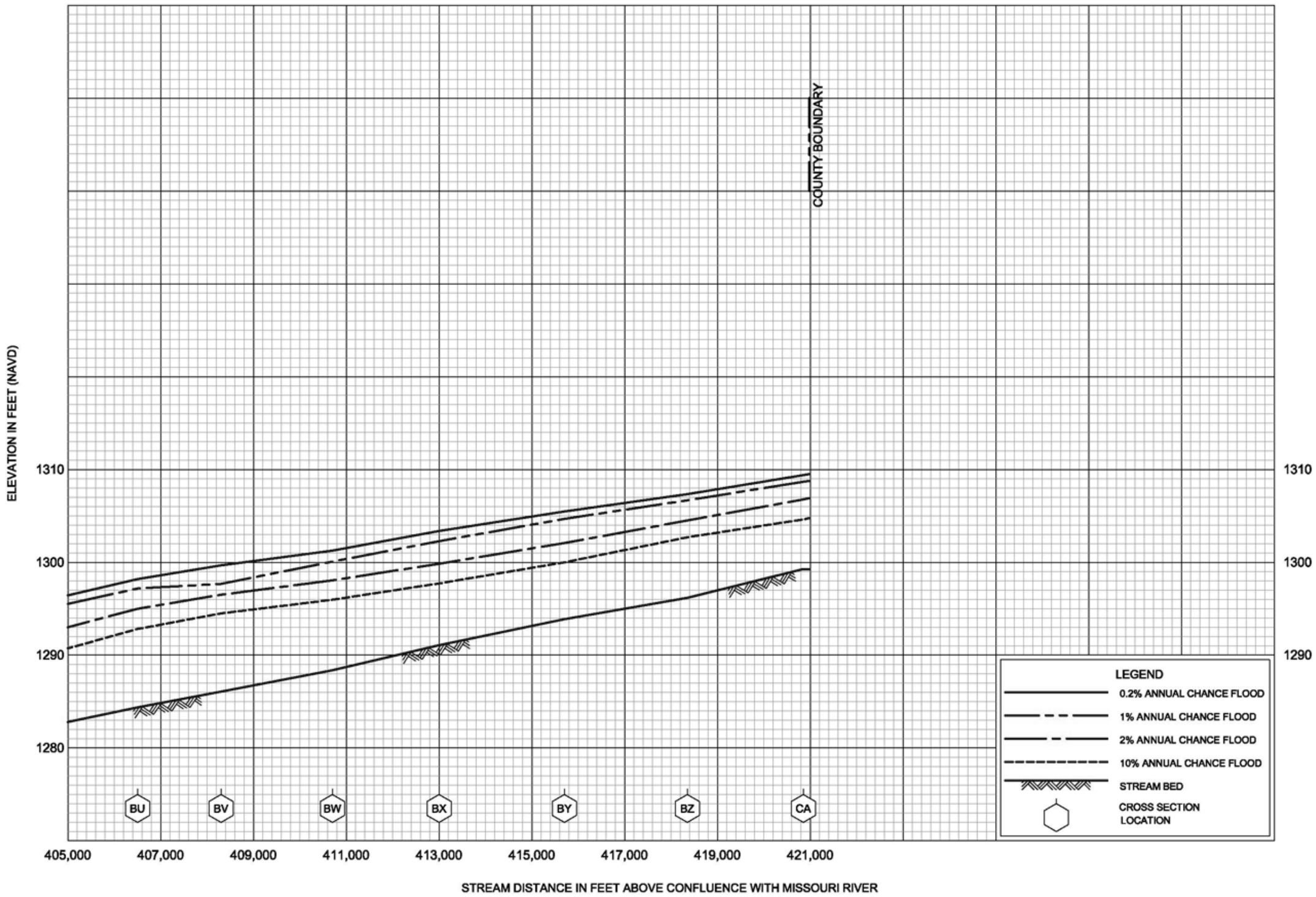

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



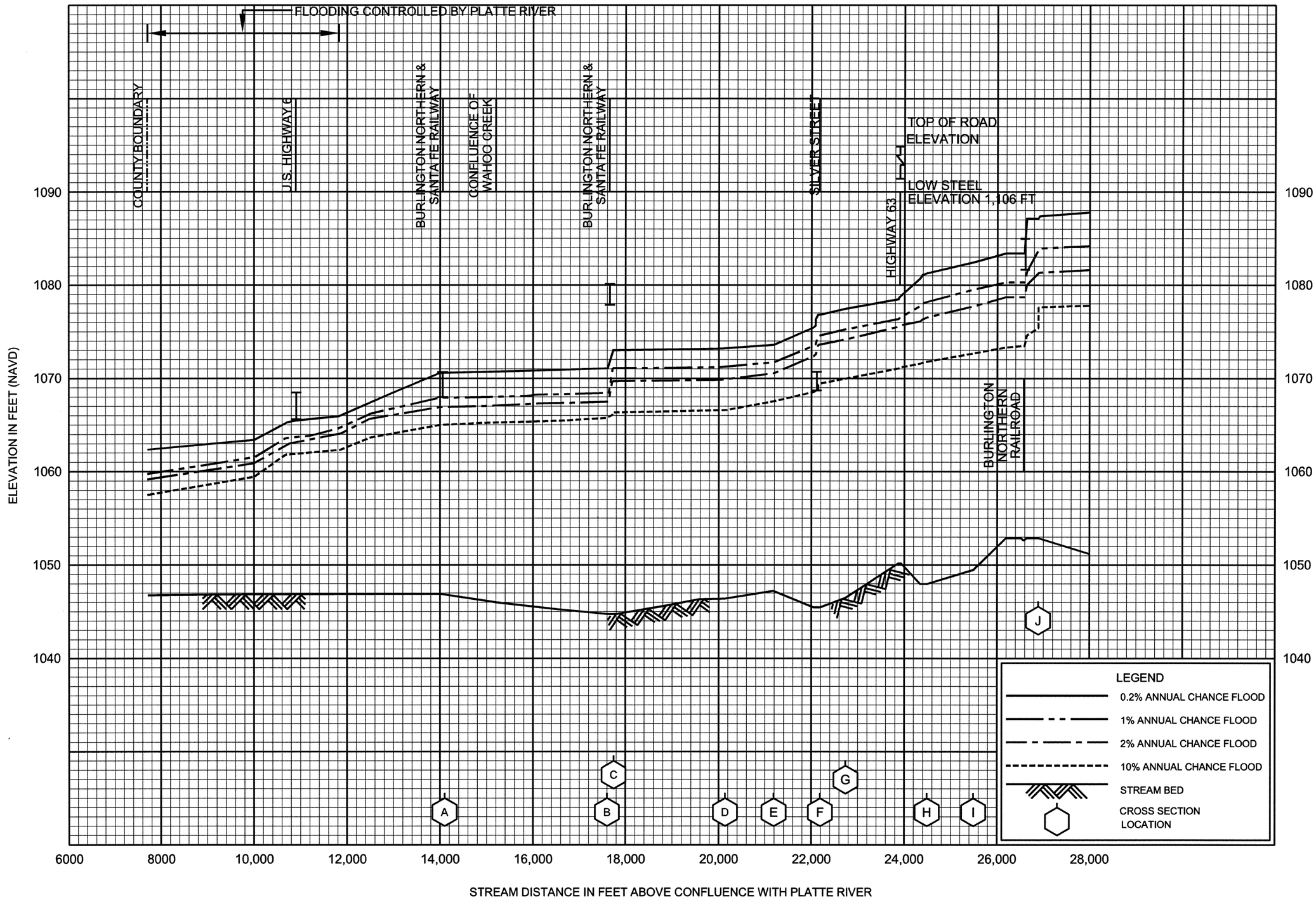

FLOOD PROFILES

PLATTE RIVER (WITHOUT LEVEE)

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



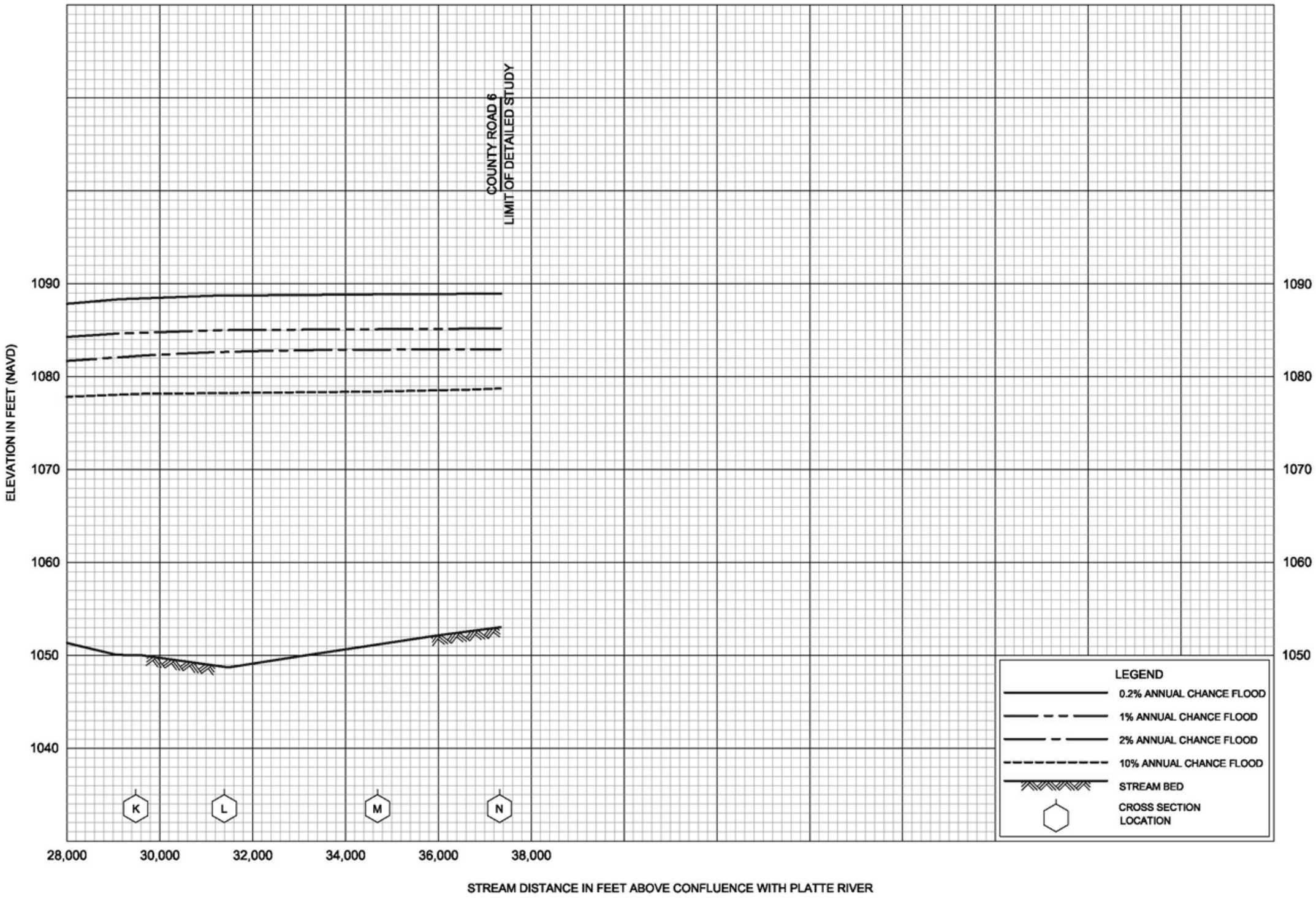

FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



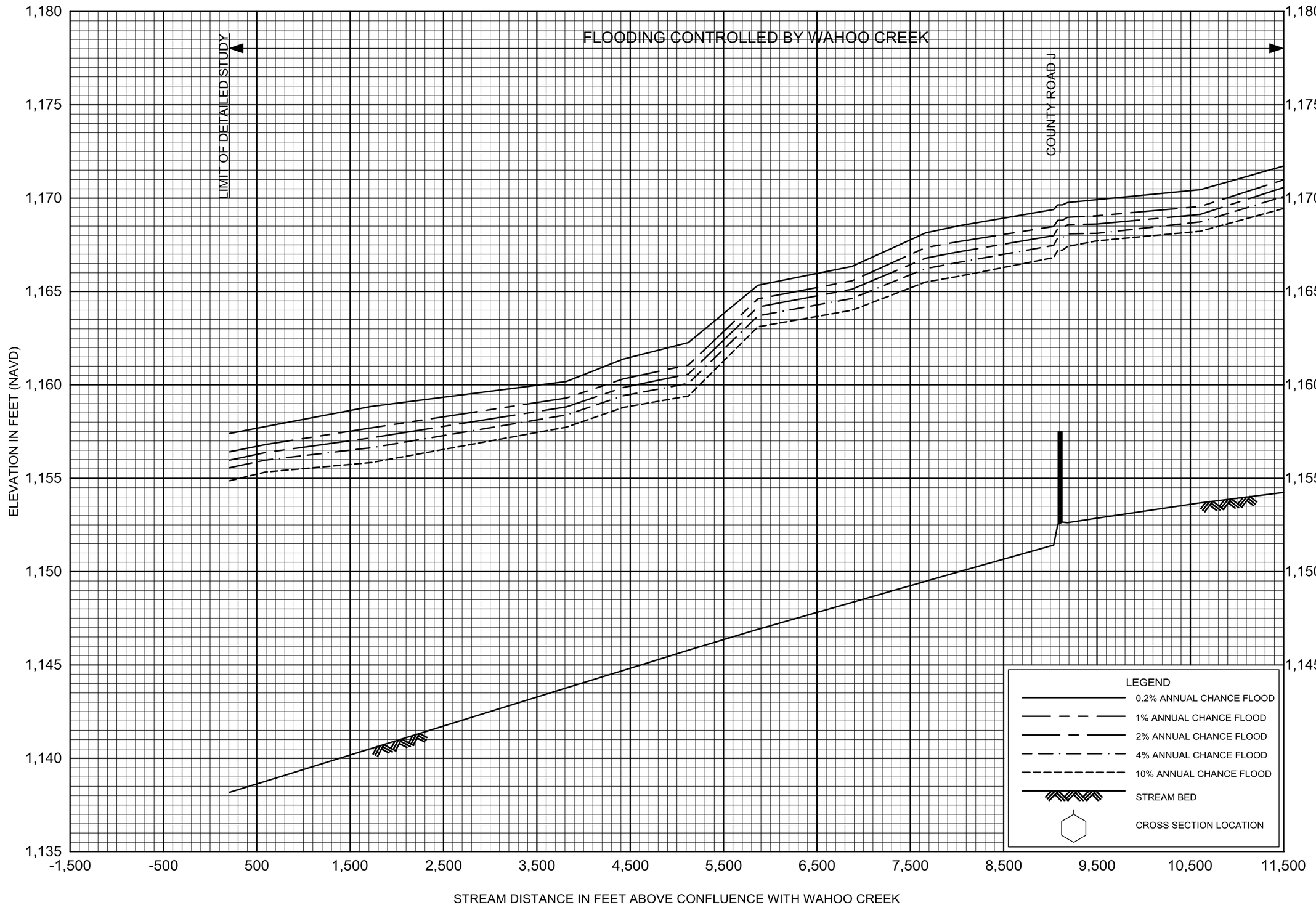

FLOOD PROFILES

SALT CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



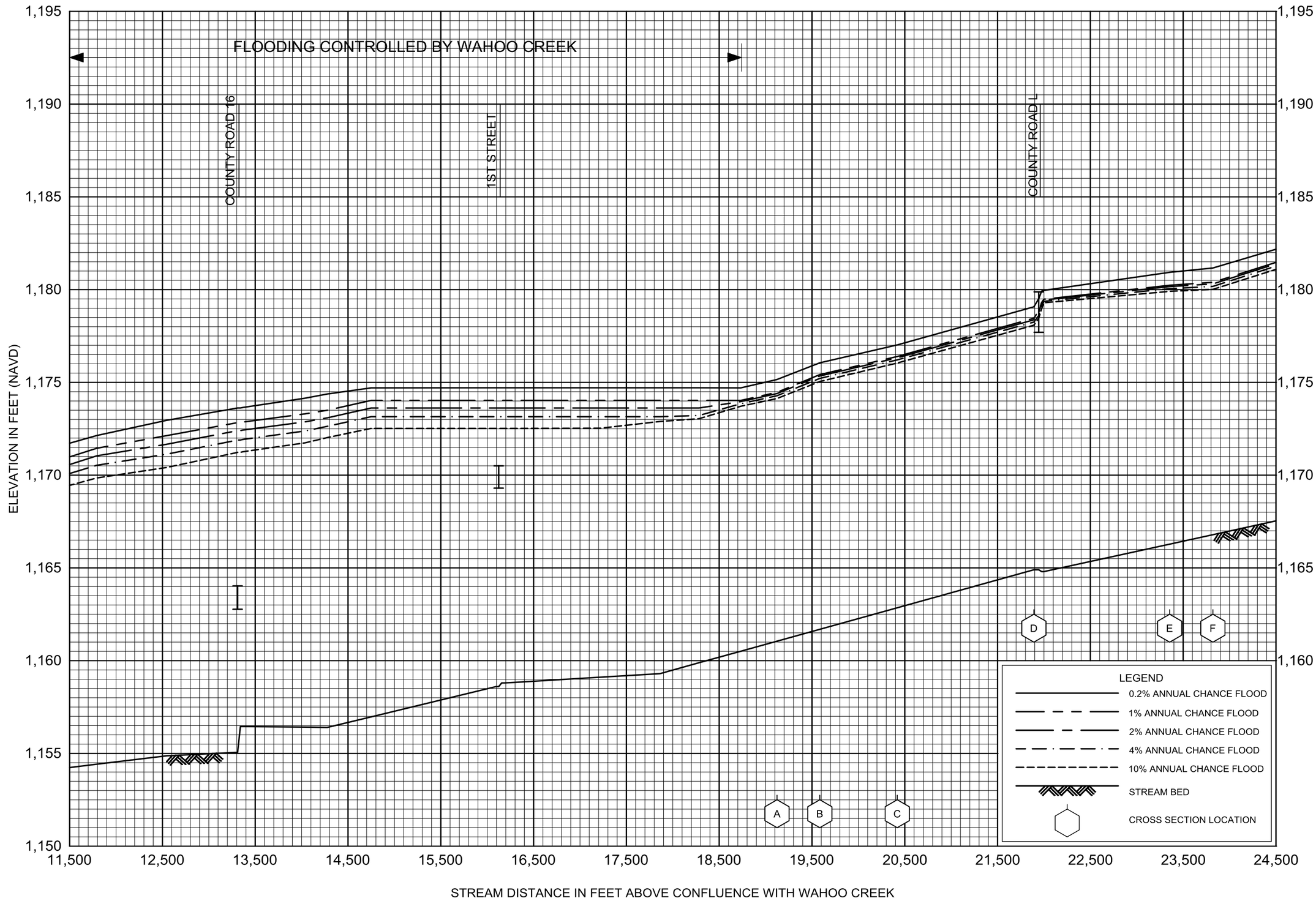

FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



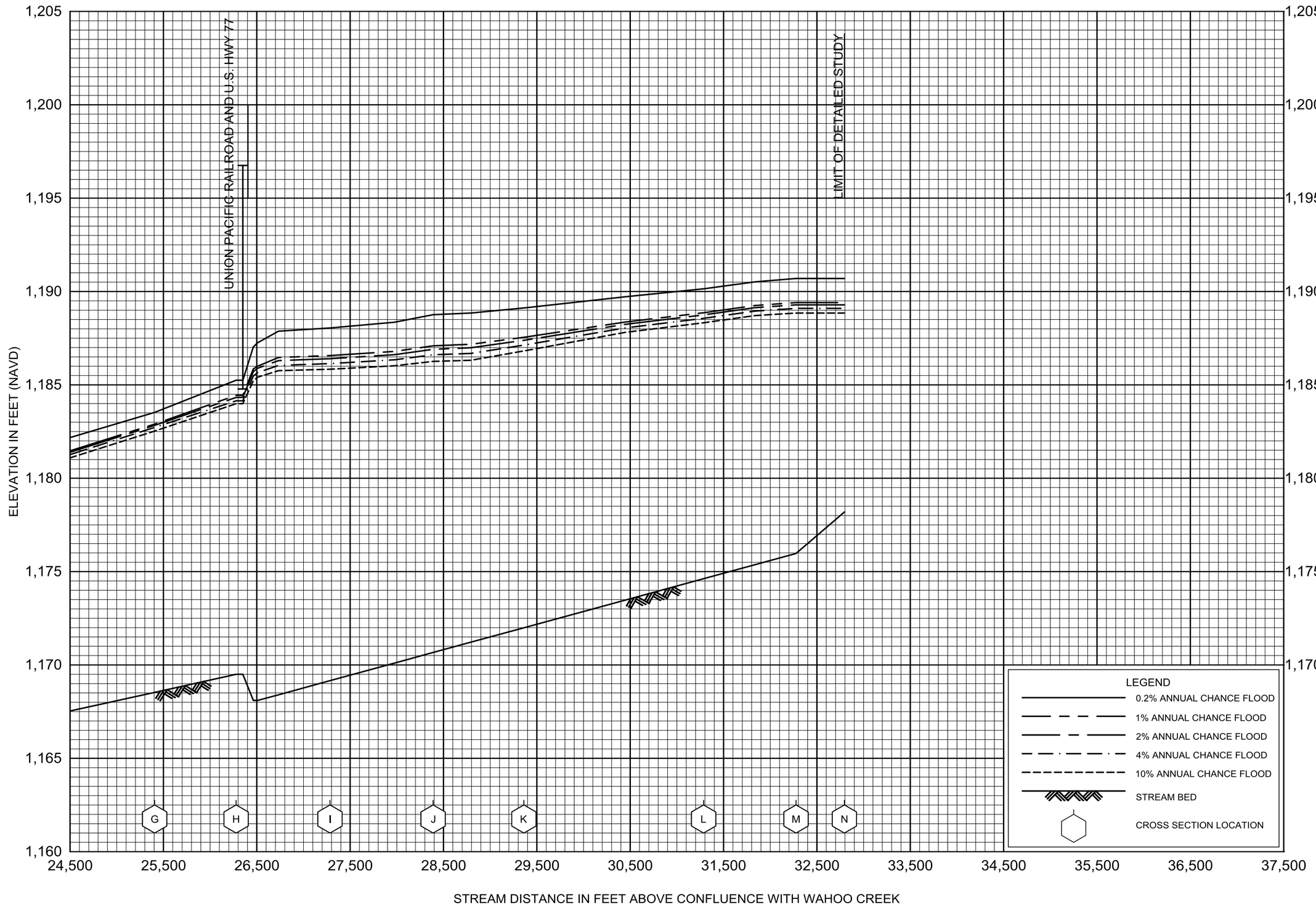

FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



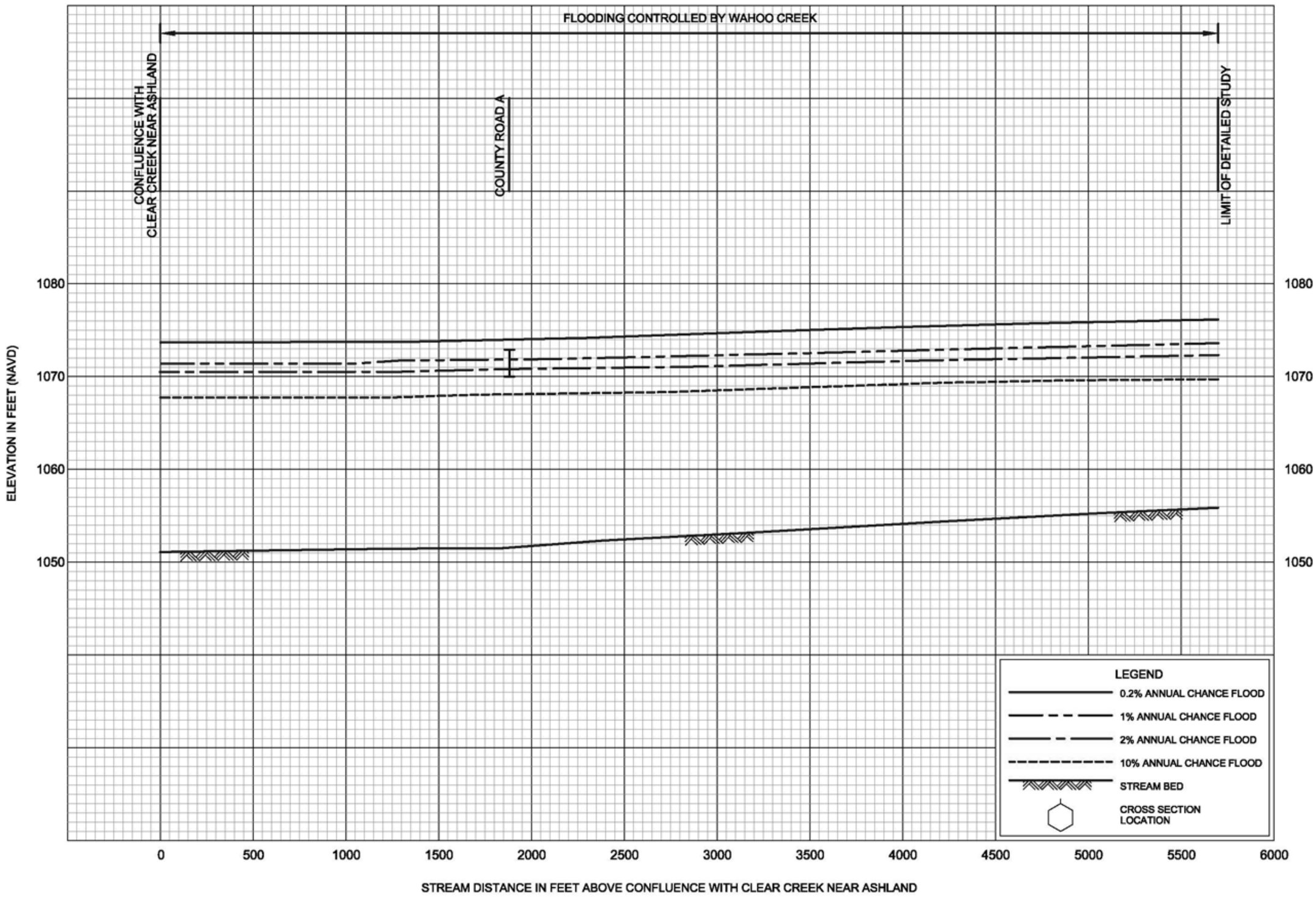

FLOOD PROFILES

SAND CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



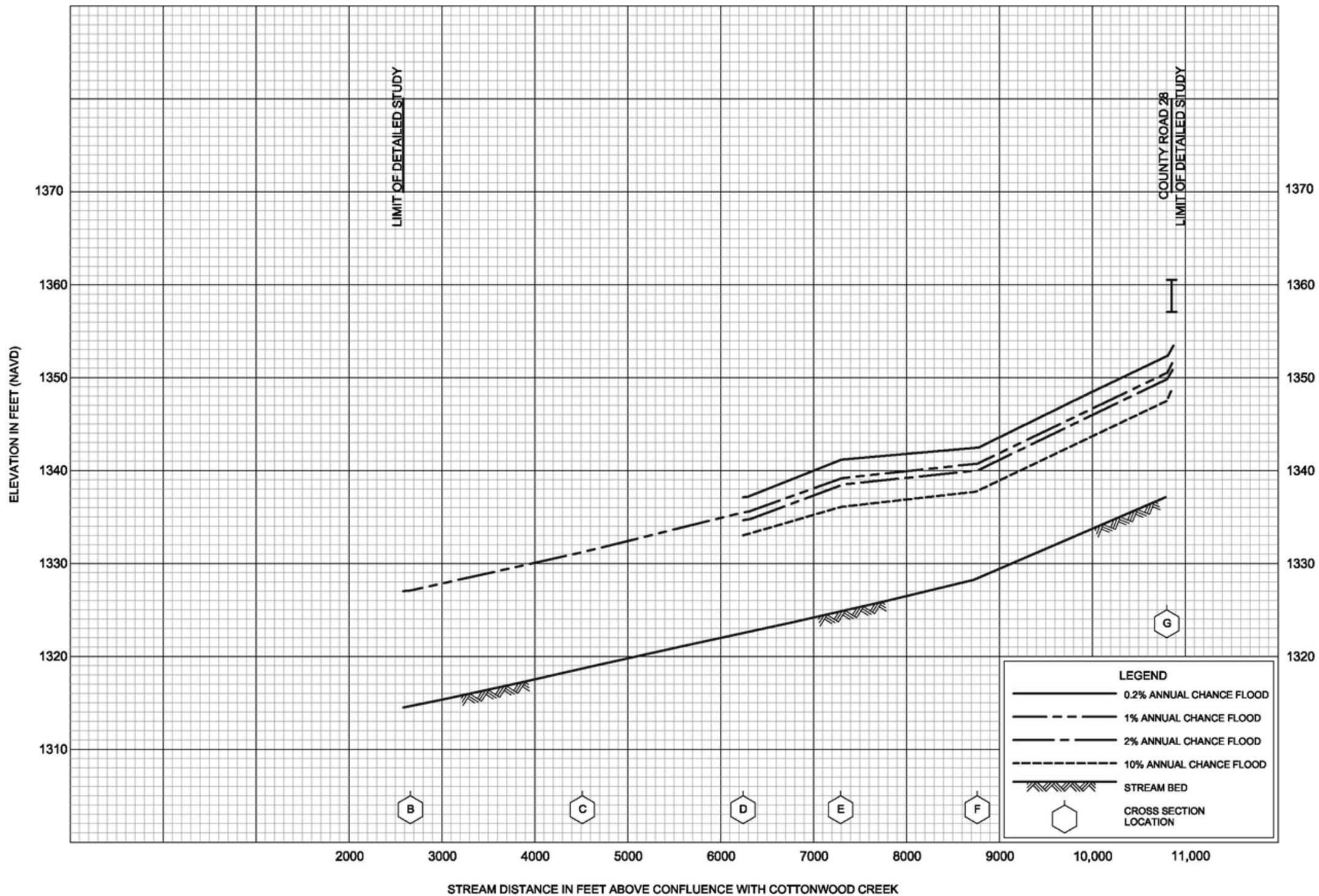

FLOOD PROFILES

SILVER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



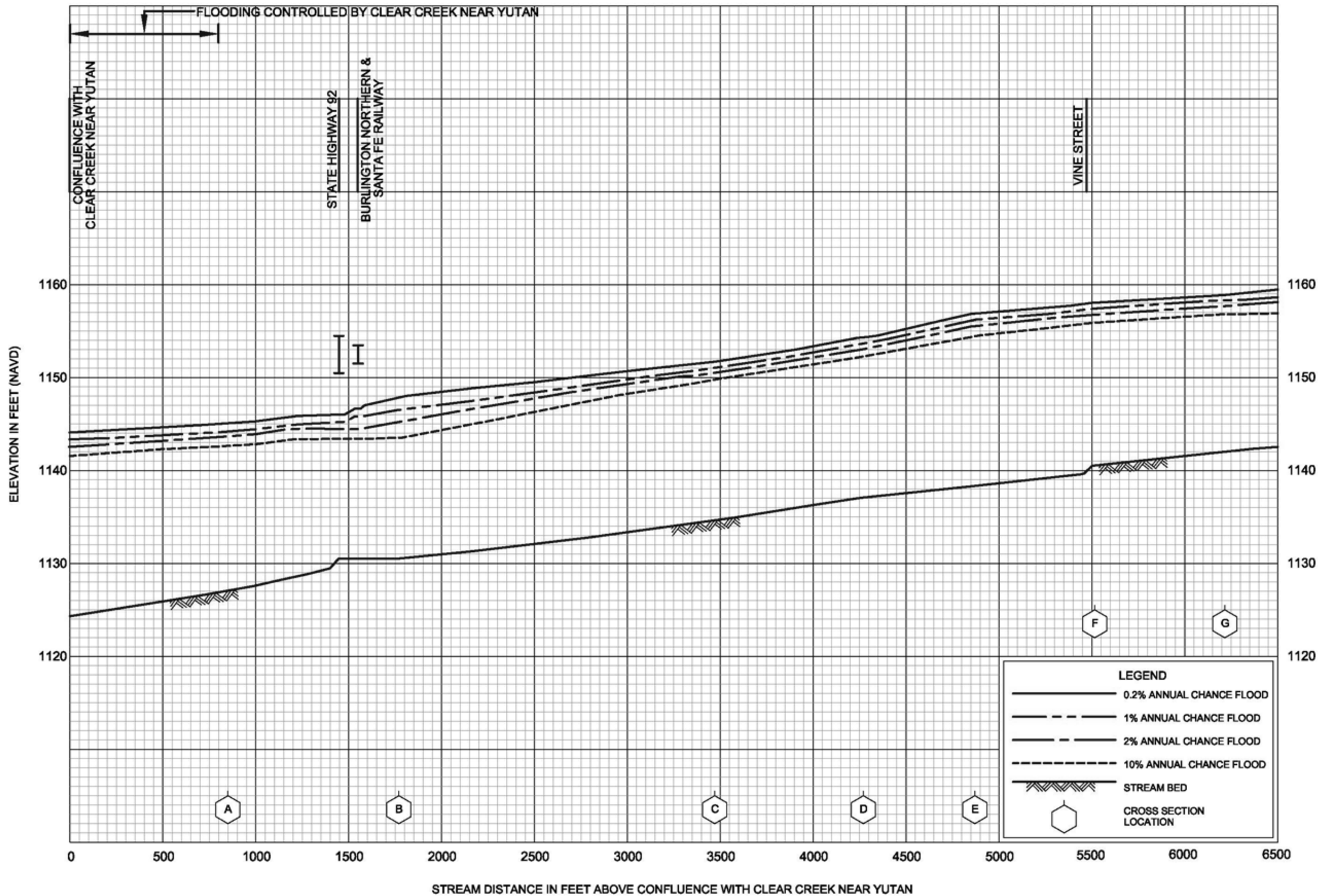

FLOOD PROFILES

TRIBUTARY TO COTTONWOOD CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



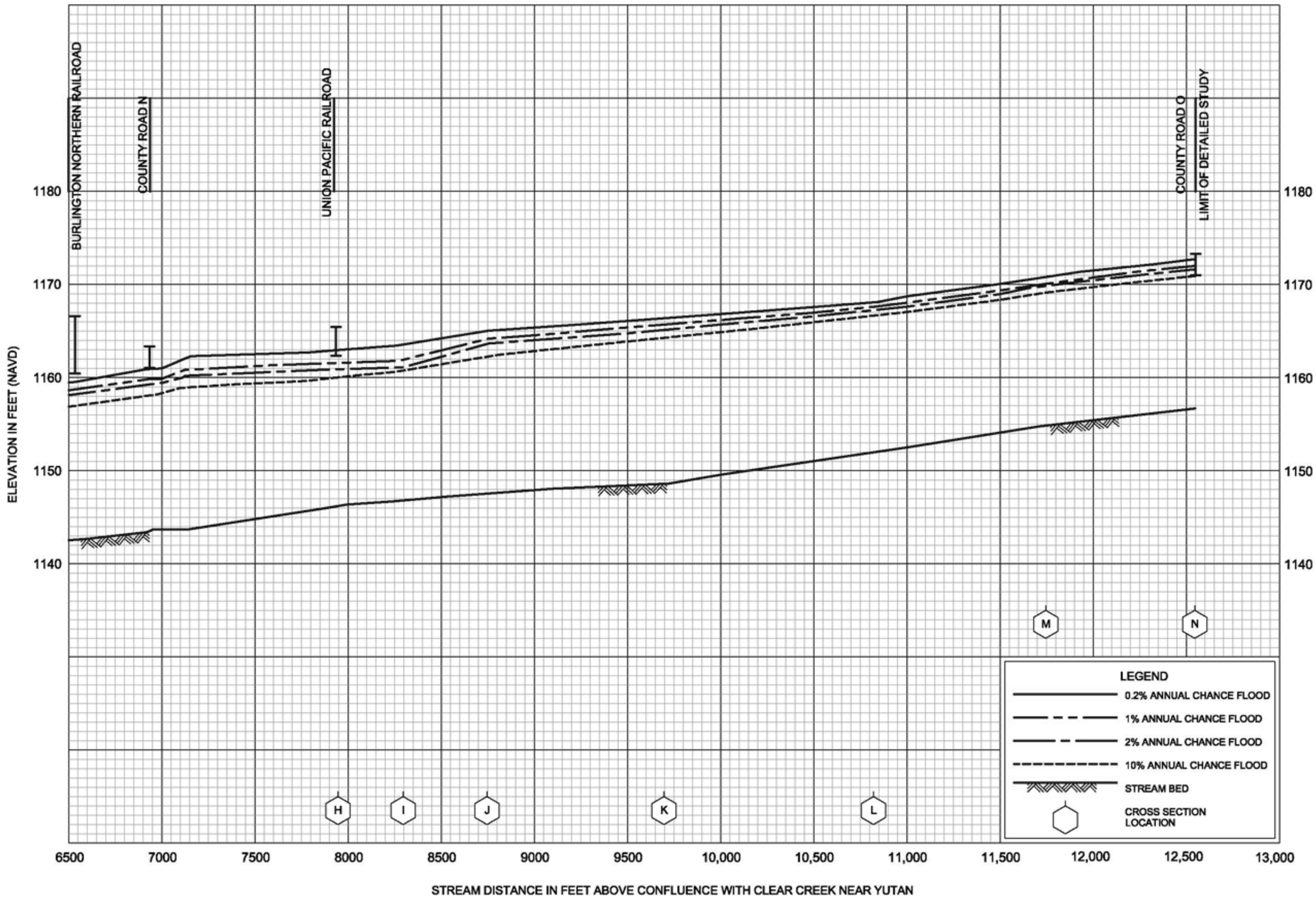

FLOOD PROFILES

UPPER CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



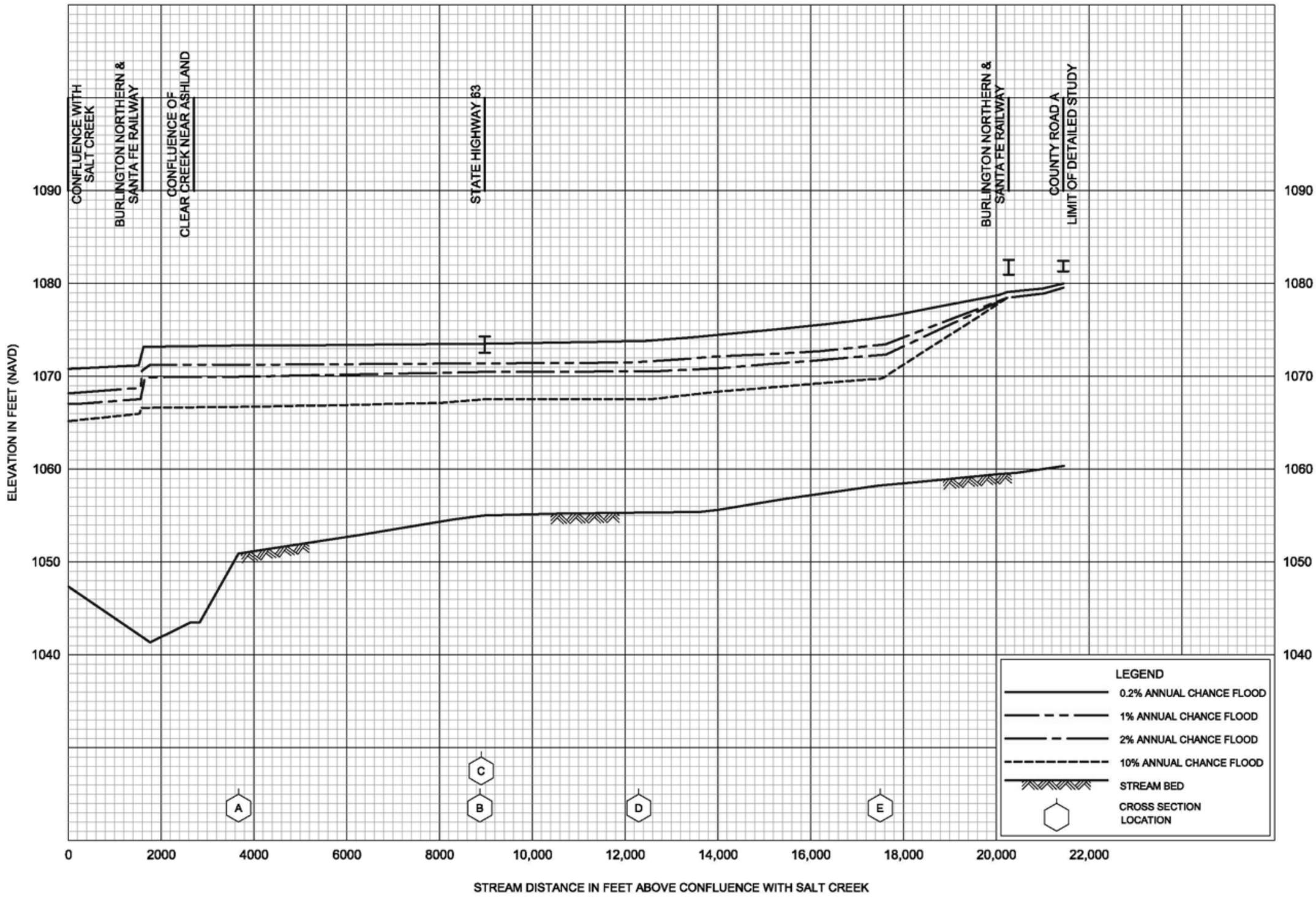

FLOOD PROFILES

UPPER CLEAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



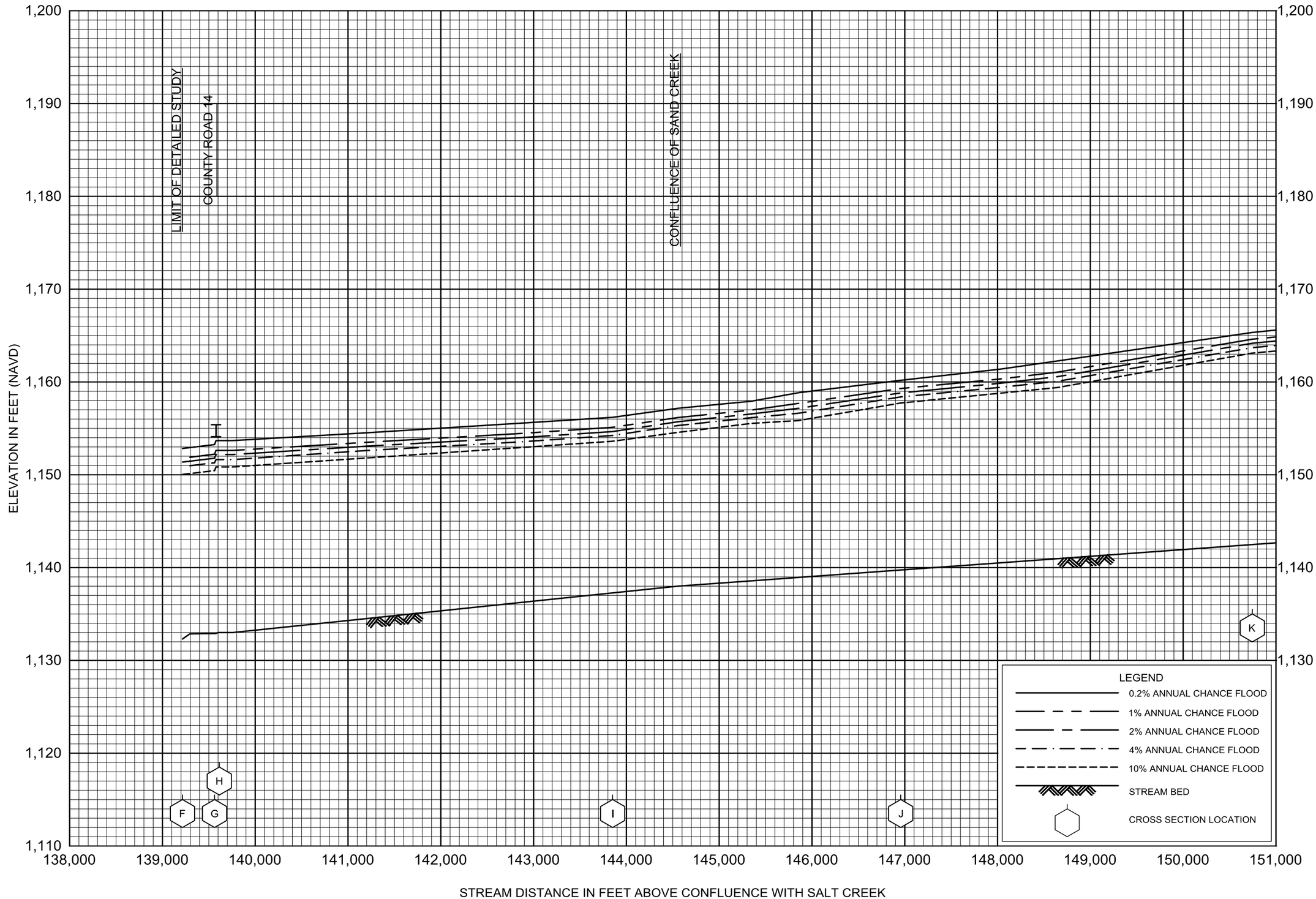

FLOOD PROFILES

WAHOO CREEK NEAR ASHLAND

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



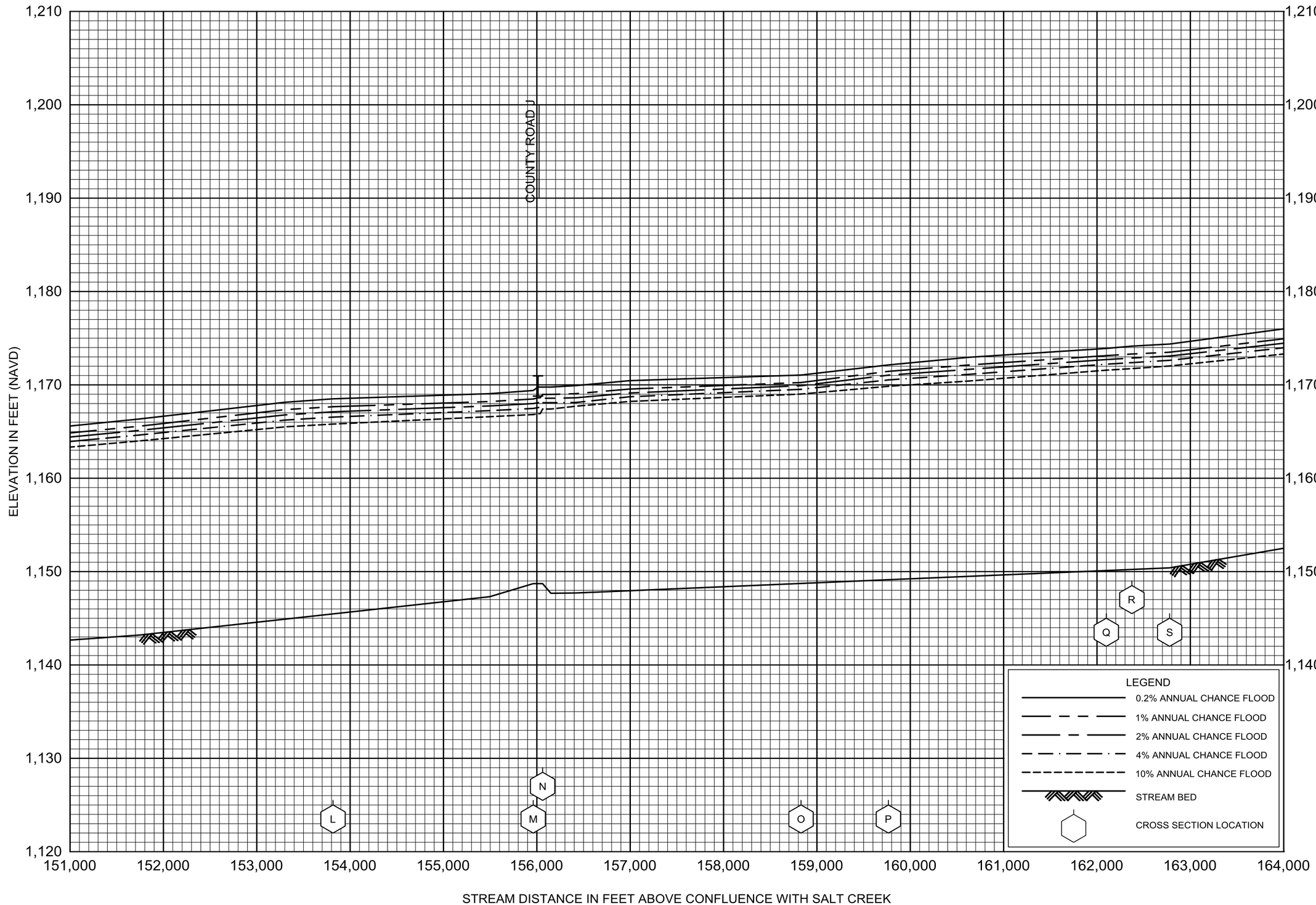

FLOOD PROFILES

WAHOO CREEK NEAR WAHOO

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS



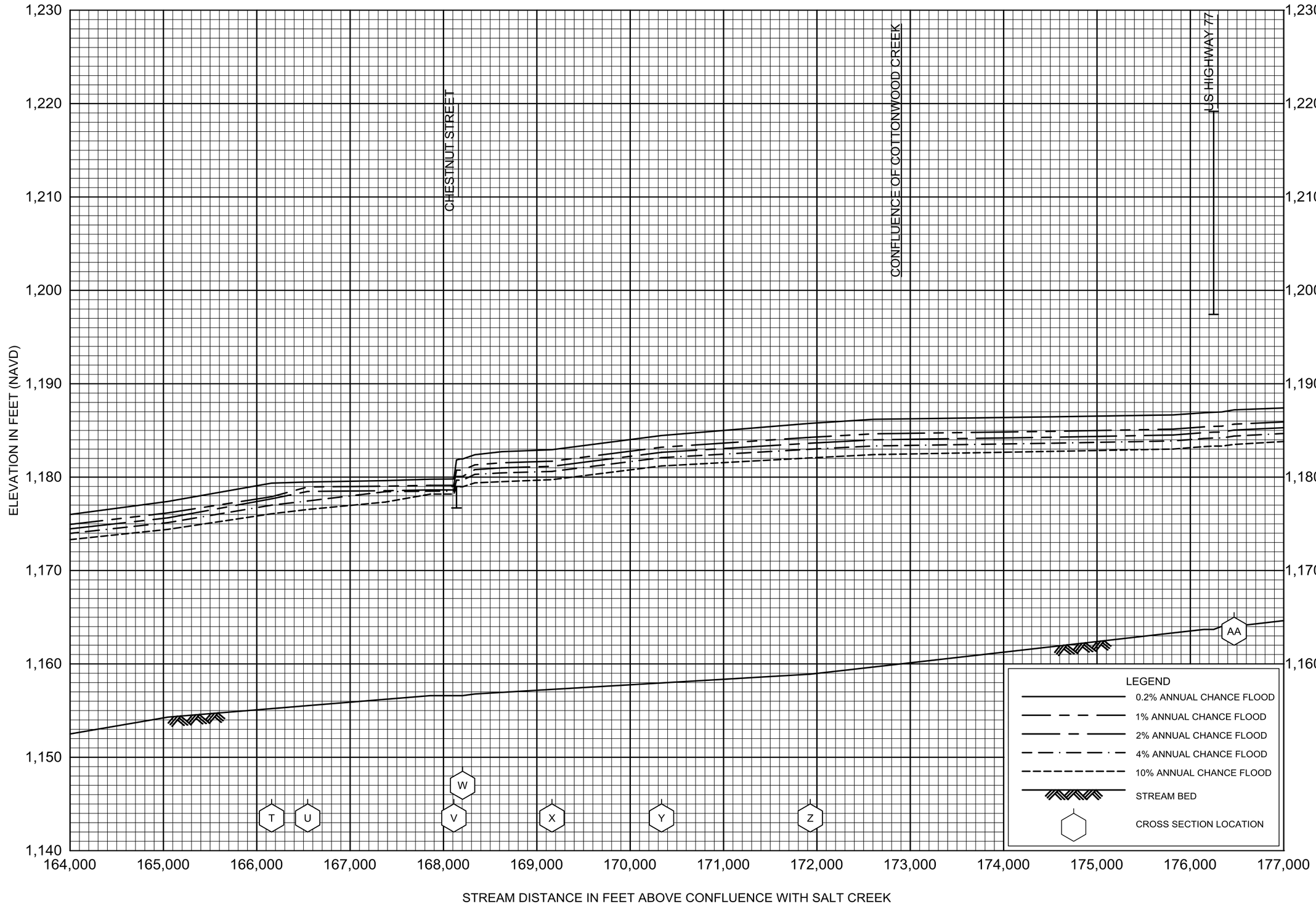

FLOOD PROFILES

WAHOO CREEK NEAR WAHOO

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS




FLOOD PROFILES

WAHOO CREEK NEAR WAHOO

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

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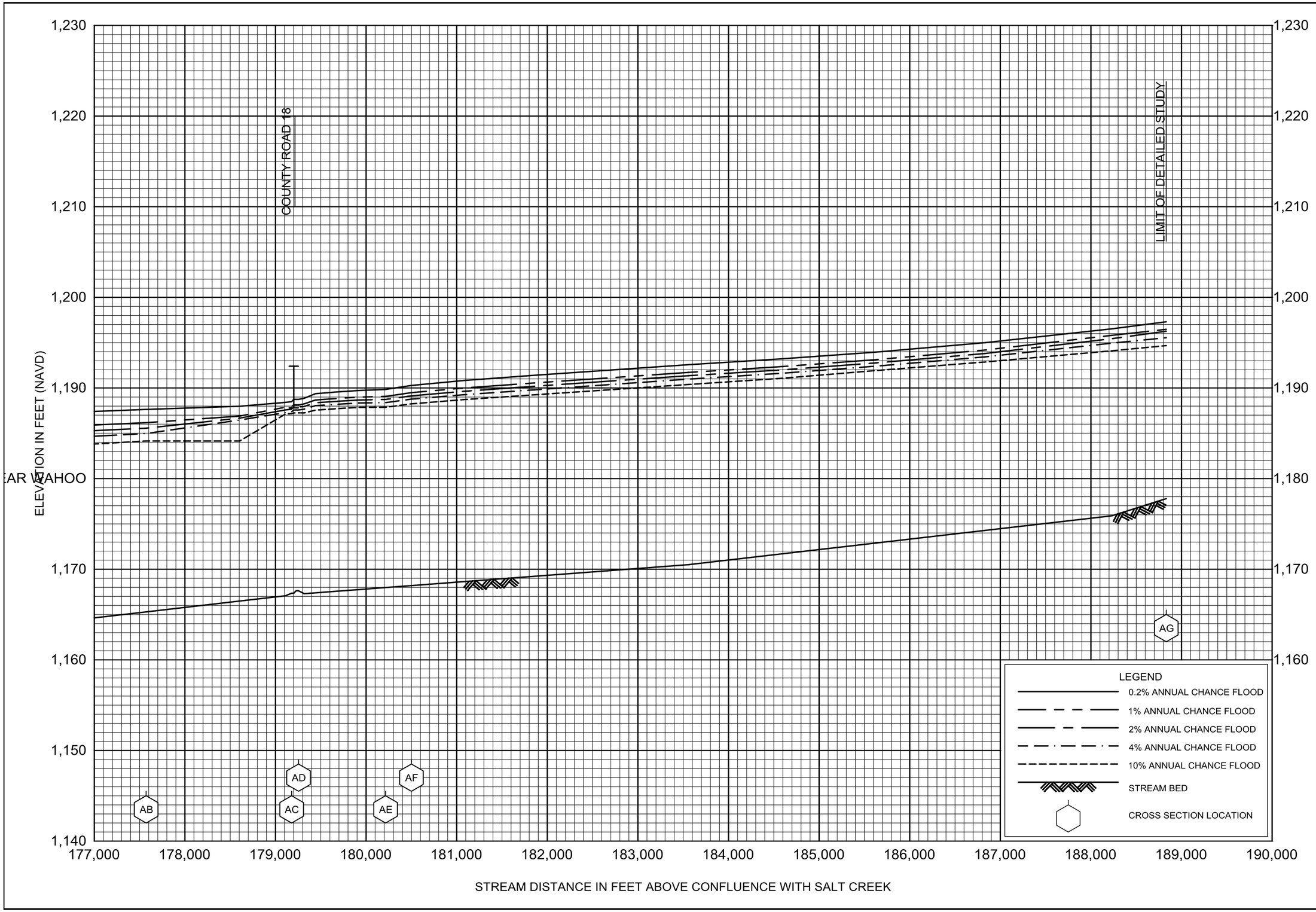


FLOOD PROFILES

WAHOO CREEK NEAR WAHOO

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAUNDERS COUNTY, NE

AND INCORPORATED AREAS